ALPS Cube Pro LV Battery

ALPS Cube BA5.2

User Manual

Contents

1. Notes

1.1. Basic overview

This document describes the installation, electrical connection, operation, commission, specifications, maintenance, troubleshooting and disposal of waste of GIV-BAT-XX.X-HV Battery System.

Before installing and operating GIV-BAT-XX.X-HV, ensure that you are familiar with product features, functions, and safety precautions provided in this document. GIV-BAT-XX.X-HV includes products: GIV-BAT-10.2-HV, GIV-BAT-13.6-HV, GIV-BAT-17.0-HV, GIV-BAT-20.4-HV.

1.1. Symbol description

The following types of safety instructions and general information appear in this document as described below:

Symbols	Description
	Explosive gas.
	May leak corrosive electrolyte.
	Caution！Unassisted lifting can cause injury.
	Keep the battery away from children.
	Keep away from open flame or ignition sources.
	Ensure that positive and negative terminals are correctly.
	Observe the manual.
 WARNING	WARNING indicates a hazardous situation which, if not avoided, may result in serious injury.
 CAUTION	Operate caution.

Markings on this product

Symbols	Description
	The battery complies with the requirements of the applicable CE guidelines.
	Do not dispose of household waste but in accordance with the local regulations.
	Lithium-ion battery can be recycled.
	Electric shock hazard.
	Notes of hazardous waste.

1.2. Personnel requirements

 **CAUTION**	**This manual is intended for professionals who have received training and demonstrated skills and knowledge in the construction and operation of the equipment. Qualified personnel are trained to deal with the dangers and hazards involved in installing electrical equipment.**

- Qualified to install.
- Knowing how to deal with the hazards and risks associated with the installation and use of electrical equipment.
- Authorized personnel trained in the installation and commissioning of electrical equipment and plant machinery.
- Understand all applicable standards and guidelines.
- Understand and follow this manual and all safety instructions.

2. Safety

 **WARNING**	**Observe all the safety precautions provided in this section when performing operations on the batteries. To prevent personal injury and device damage, installation and operation personal must be familiar with this manual and precautions required.**

2.1. General safety

The Battery has been designed and tested in strict rules with international safety certification requirements.

Polar ESS shall not be liable for any consequence caused by the violation of the following:

- Damage occurred during transportation.
- Incorrect transportation, storage, installation and use, or customer fails to convey the correct information about transportation, storage, installation and use.
- Non-professional installation.
- Failure to obey the rules of this operation instructions and safety precautions in this document.
- Unauthorized modification or deletion of battery firmware.
- Battery tamper label is damaged or product with any part missing (except the authorized dissemble parts).
- Operation in extreme environments which are outside of operating parameters.
- Repair, disassemble, or change Batteries without authorization and cause failure.
- Damage to shell labels or modifies date of production.
- Battery fails to be charged for more than six months.
- Damages due to force majeure (such as lightning, earthquakes, fire, and storms).
- Warranty expiration.

2.2. Safety Precautions

2.2.1. Environment requirements

- Do not expose the battery to temperature above 50℃ or heat sources.
- Do not install or use the battery in a wet environment with moisture, corrosive gases, or liquids, such as in the bathroom.
- Do not expose the battery to direct sunlight for extended periods of time.

- Place the battery in a safe place and ensure that it is not accessible to children and animals.
- Battery power terminals shall not come in contact with conductive objects such as wires.
- Do not dispose of the battery in fire, which may cause an explosion.
- For indoor installation, do not install it in the bedroom, the living room and the kitchen, etc.
- When installing outdoors, please avoid installing in a place directly exposed to the sun and make sure to have a rain shelter.
- The battery system must be protected from liquids.

2.2.2. Operation precautions

- Do not touch the battery with wet hands.
- Do not disassemble the battery without permission.
- Dispose of the batteries according to local safety regulations.
- Store and recharge batteries in accordance with this manual.
- Ensure that the ground cable is securely connected.
- Remove all metal objects such as watches and rings that could cause a short circuit before installation, replacement, and maintenance.
- The Battery must be repaired, replaced, or maintained by qualified and well-trained personnel.
- When storing or handling batteries, do not stack batteries without package.
- Handle the battery with caution to avoid leakage. The leaked electrolyte is toxic and harmful to the skin and eyes.
- Packaged batteries should not be stacked more than specified number stipulated on the packing case.
- Do not use damaged, faulty or deformed batteries, which may lead to safety hazards, such as leakage of corrosion materials, electric shock and fire.

2.3. Emergency responses

 **WARNING**	**Manufacturers take foreseeable risk scenarios into consideration and are designed to reduce hazards and dangers. However, if the following situation occurs, do as below:**

Emergency	Description and measures
Leakage	Avoid contact with leaked liquids or gases. Should you come into direct contact with the battery electrolyte, do as follows: 1) Inhalation：Evacuate the contaminated area and seek medical help. 2) Eye contact: Flush your eyes with flowing water for 15 minutes and seek medical help. 3) Skin contact：Wash the affected area with soap and water and seek immediate medical attention.
Fire	Under normal circumstances, the battery won't ignite spontaneously.If a fire occurs, do not try to extinguish the fire but evacuate people immediately.
Wet Batteries	If the battery is soaked or submerged in water, do not touch thebatteries to avoid electric shock. Contact Polar ESS or yourdistributor immediately for technical assistance.
Damaged Batteries	Damaged batteries are dangerous and must be handled with extra attention. Do not use damaged batteries, which may cause safety hazards. Contact Polar ESS or a distributor to dispose of them.

2.4. Warning message

- Do not disassemble or alter the battery to avoid heat, explosion or fire.
- Do not use the battery beyond specified conditions. It might cause heat generation, damage, or deterioration of its performance.
- Do not throw, drop, hit, drive a nail in, stamp on the battery. It may cause heat generation, explosion, or fire.
- In case of electrolyte leakage, keep leaked electrolyte away from contact with eyes or skin. Immediately clean with water and seek help from a doctor.
- Do not put the battery into a fire. Do not use it or leave it on a place near fire, heaters, or high temperature sources. It may cause over temperature, explosion or fire.
- Do not submerge the battery in water or wet the product. It may cause heat generation, explosion, or fire.
- Do not reversely connect the battery positive (+) and negative (-) terminal.
- Do not short circuit by letting the battery terminals (+and -) contact a wire or any metal.
- The unit is heavy enough to cause severe injury.
- Keep out of reach of children or animals.

3. Storage and Transportation

3.1. Storage requirements

 **WARNING**	**Safety information contained in this section must be always observed when working on orwith batteries. For safety, installers are responsibility to familiarize themselves with this manual and all warnings before installation.**

- Place the battery follow the identification on the packing case during storage.
- Do not put the Battery upside down or sidelong.
- The defective Battery needs to be separated from other Batteries.

The storage environment requirements are as follows:

1) Install the Battery in a dry and clean place with proper ventilation.
2) The storage temperature for a short week is between -20℃ to 50℃ ;
3) If you store the Battery over a long period of six months, the storage temperature is between -20℃ to 40℃,relative humidity: 5%~95% RH.
4) Place the Battery away from corrosive and organic substances (including gas exposure).
5) Free from direct exposure to sunlight and rain.
6) At least two meters away from heat sources (such as a radiator).
7) Free from exposure to intensive infrared radiation.

3.2. Replenishing electricity during inventory period

 **WARNING**	**Stock batteries suggest being replenished and maintained every six months.**

1) Identify the Battery that needs recharging, Remove the batteries to be recharged from the packing case.
2) Connect the battery to the inverter.
3) Charge the battery to SOC=100%.
4) Discharge the battery to SOC=30%.
5) Place the batteries back in the original carton and seal the carton.

3.3. Transportation requirements

 **WARNING**	**Please refer to the following requirements for battery transport, otherwise the battery will out of warranty.**

The Battery has been certified in UN38.3 (Section 38.3 of the seventh Revised Edition of the Recommendations on the Transport of Dangerous Goods: Manual of Tests and Criteria) and SN/T 0370.2-2021 (Part 2: Performance test of the rules for the Inspection of packaging for exporting dangerous goods). Battery is classified as category 9 dangerous goods.

- The Battery shall not be transported with other inflammable, explosive or toxic substances.
- Ensure the original package and label complete are away from damage.
- Prohibit direct exposure to sunlight, rain, condensing water caused by temperature difference and mechanical damages.
- There will be a drop in capacity during transportation and storage.
- Transportation temperature is between-20°C to 50°C, relative humidity: 5%～95%RH.

4. Product Introduction

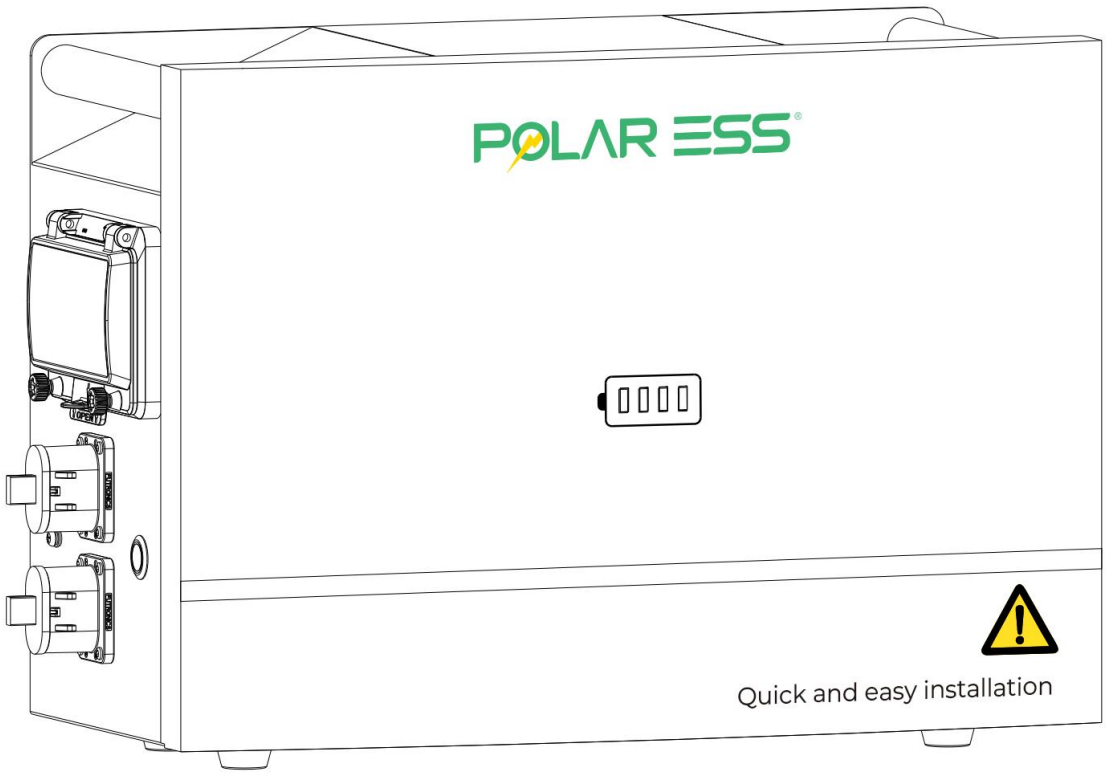
4.1. Product description

GIV-BAT-5.12-G3 Battery is an energy storage unit composed of electrochemical cells, switch button, battery management unit, power and signal terminals, and mechanical parts. It features better charge and discharge performance, more precise status monitor, longer cycle life, and less self-discharge loss than other batteries. Up to 5 Batteries connected in parallel increase the capacity and power of battery system; the whole battery system communicates to Power Conversion System (Inverter) via CAN/RS485.

- Monitoring: voltage, current and temperature detection of both single cells and
- module.
- Protection and Alarm: protection and alarm when overvoltage, under voltage, over current, over-temperature or under temperature occurs. See Appendix I for the details.
- Report: report all alarm and status data to Inverter.
- Parallel connection: support two to five Batteries in parallel connection.
- Passive balance function.

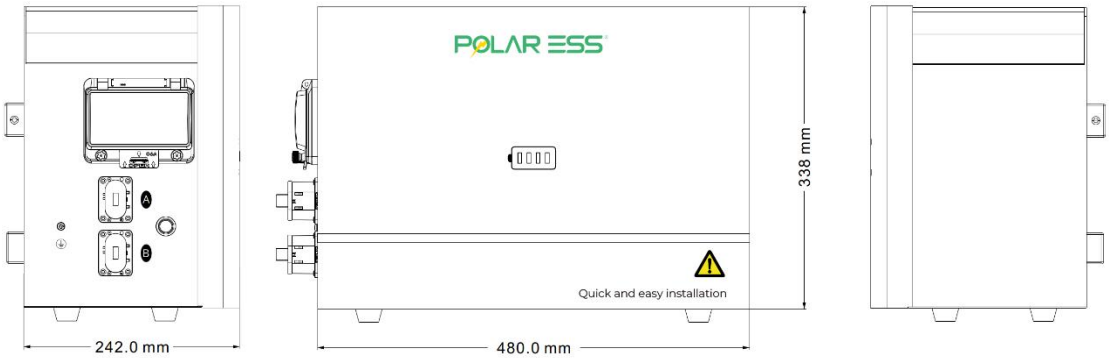
4.2. Appearance description

4.2.1. Battery overall view

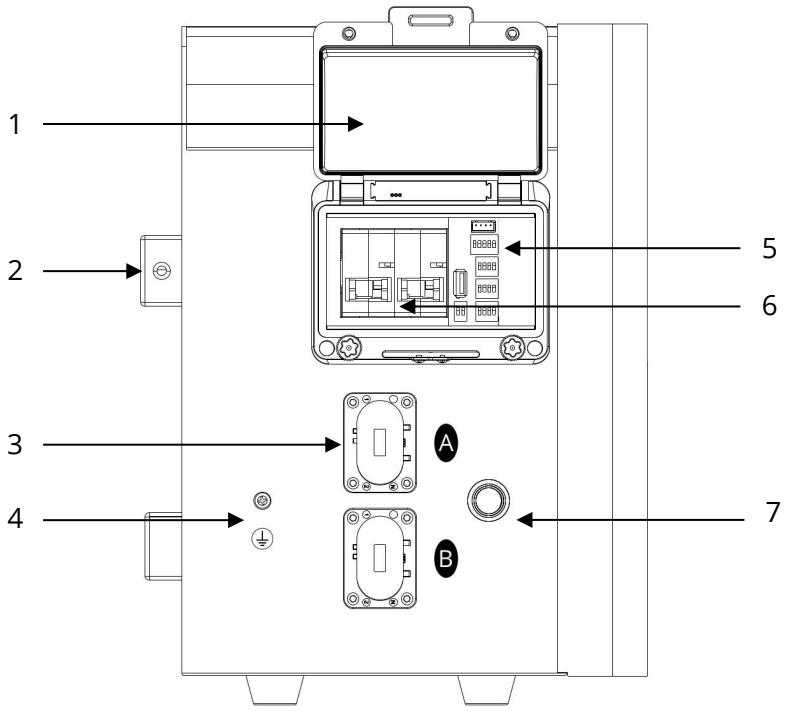


4.2.2. Battery dimensions and interface view

4.2.2.1. Battery Dimensions



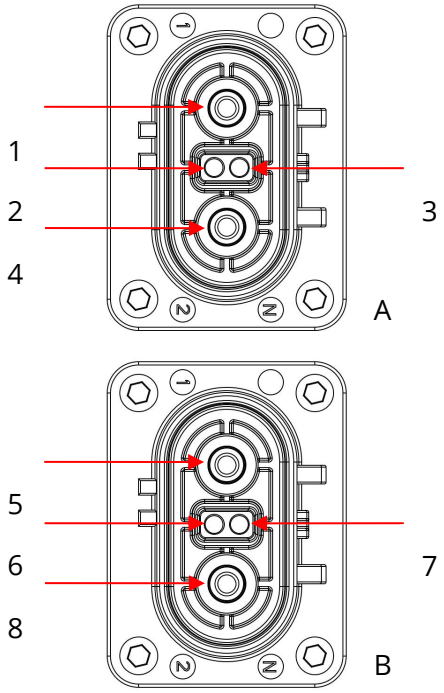
4.2.2.2. Interface View



Location	Port	Function
1	Waterproof cover	Protection breaker and DIP switch
2	Safety screw	Connect the battery to the wall bracket
3	Power terminal	Battery positive and negative electrodes and communication
4	Ground Screw	Tighten the ground wire
5	DIP switch	Choose communication method and battery address, See 5.5.2.3

6	DC breaker	Protecting batteries and maintenance personnel
7	Power button	Turning on and off the battery
8	LED	Display battery SOC

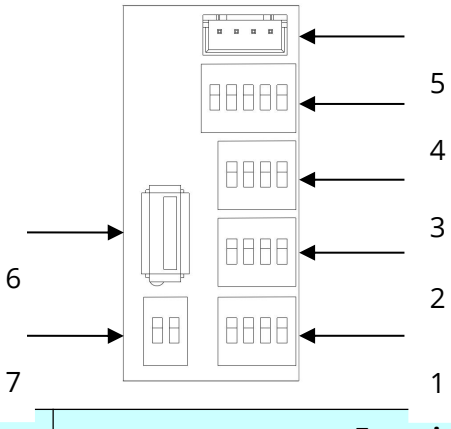
4.2.2.3. Power terminal



Location	Port	Function
1	Battery positive	The positive pole of port A， connected to an inverter or a parallel battery
2	Communication Port	Communication port A，RS 485B&CAN-L, connected to an inverter or parallel connected battery
3	Communication Port	Communication port A，RS 485A&CAN-H, connected to an inverter or parallel connected battery
4	Battery negative	The negative pole of port A， connected to an inverter or a parallel battery
5	Battery positive	The positive pole of port B，connected to an inverter or a parallel battery
6	Communication Port	Communication port B，RS 485B&CAN-L, connected to an inverter or parallel connected battery
7	Communication Port	Communication port B，RS 485A&CAN-H, connected to an inverter or parallel connected battery

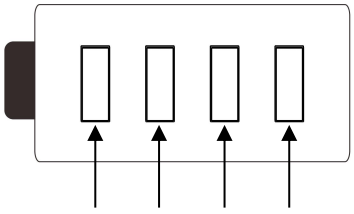
8	Battery negative	The negative pole of port B， connected to an inverter or a parallel battery

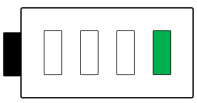
4.2.2.4. DIP Switch

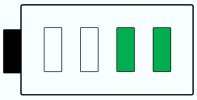
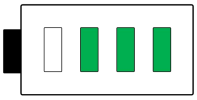
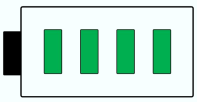
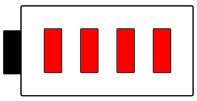
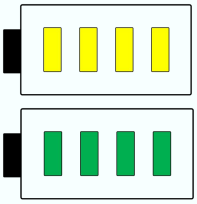


Location	Port	Function
1	SW4	Choose the communication method between the battery and inverter
2	SW3	Choose the parallel communication method between batteries
3	SW2	Set communication address for parallel batteries
4	SW1	Set communication address for parallel batteries
5	Upper computer communication port	Developers or maintenance personnel use it to connect the battery upper computer
6	USB	Upgrade Firmware, See 7.1
7	USB switch	Select USB communication

4.2.2.5. LED display description



No.	Name	Color	Description	Illustration
1	SOC LED1	Green	SOC 0%～25%	

2	SOC LED2	Green	SOC 26%～50%	
3	SOC LED3	Green	SOC 51%～75%	
4	SOC LED4	Green	SOC 76%～100%	
5	SOC LED	Red	Fault	
6	Update	Yellow-green twinkling	Update FW	
7	Power button	Blue	Normal operation	

- **Battery on**: Press and hold the Battery button for 1s; the buzzer will sound for two seconds, and the LED of battery switch will be green.
- **Battery off**: Press and hold the Battery button for 3s; the buzzer will sound for one second and the LED of battery switch will dim.
- **Charge**: The Battery SOC in which range, the corresponding SOC LED The indicator is green and off at intervals of 1s.
- **Parallel connection**: If the parallel is successful, the SOC LED green and off for 5S every 0.8s.
- **Low SOC**: When the SOC ranges from 0% to 5%, LED1 is displayed in green and off for 2s.
- **Upgrade**: The SOC LED Yellow-Green twinkling.

4.3. Label description

4.3.1. Nameplate

Provide unique identification of the battery (product type, device-specific characteristics, certificates and approvals). The Nameplate is located on the right side of the battery.

4.3.2. Serial number

Located on the right side of the battery, the current battery serial number information.

SN:XX XX XX X XXX
1 2 3 4 5

Number	Paraphrase
1	Model code
2	Year
3	Week
4	Identification code
5	Joumal number

4.3.4 Warning Label

The equipment is electrified, please pay attention to safety. The label is in the lower right corner of the front of the device.

5. Installation

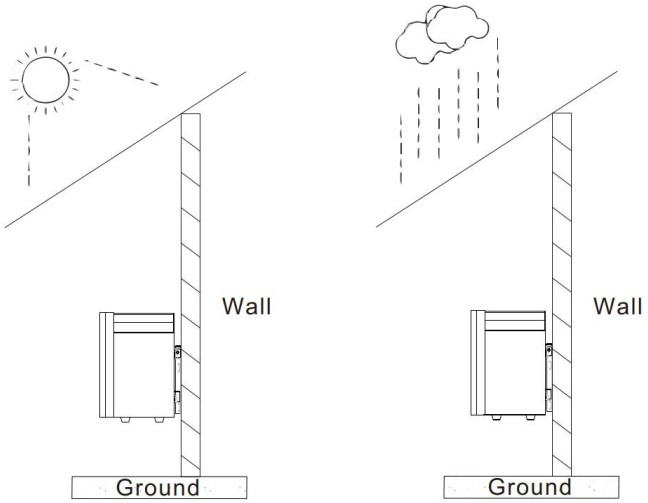
 **WARNING**	• **Ensure to read the guidance before installation in order to understand product information and safety cautions.** • **Operators should be well trained technicians and fully understand the whole photovoltaic system, grid network, working principle and national and regional standards.** • **Installers must use insulated tools and wear PPE.** • **Device damages caused by failure to comply with storage, transportation, installation and user requirements specified in Guidance are not covered by Warranty.** • **Please ensure batteries in parallel connection are from the same.**
 **CAUTION**	**model and same manufacturer. Do not mix an old battery with a new battery. Batteries undergone less than 300 cycles are defined as new batteries.**

5.1. Installation environment

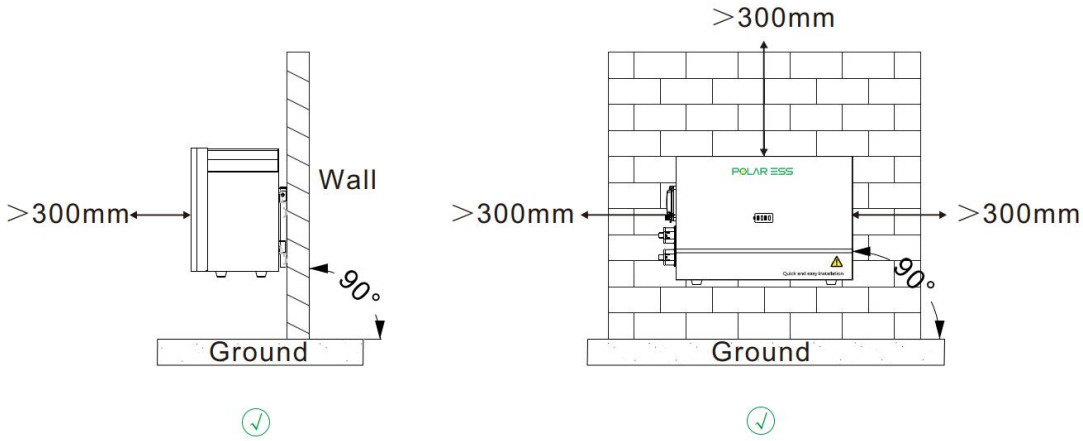
The ambient temperature for the installation of the battery system should be above -10℃ , below 50℃ , and the humidity should be between 5% and 95% .

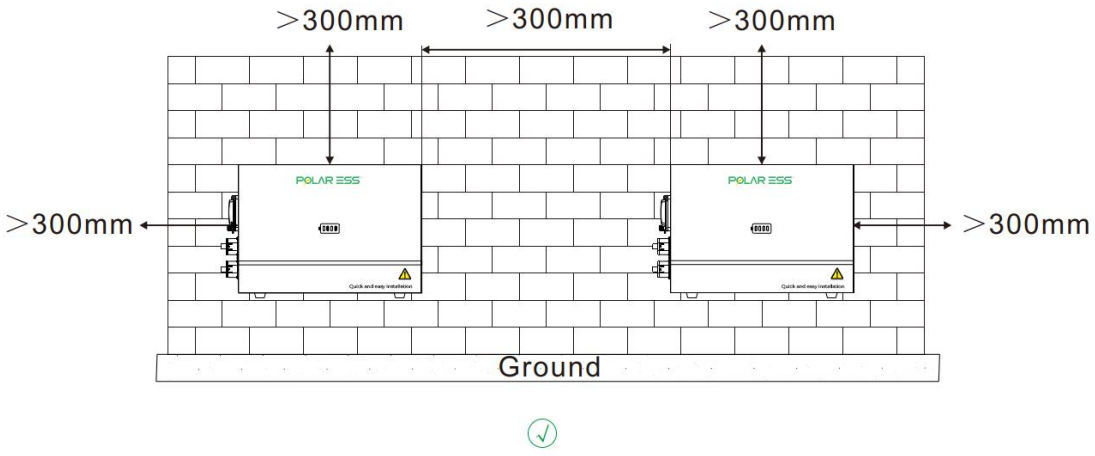
 Max. 50℃	 Min. -10℃	 RH. +5% ~ +95%

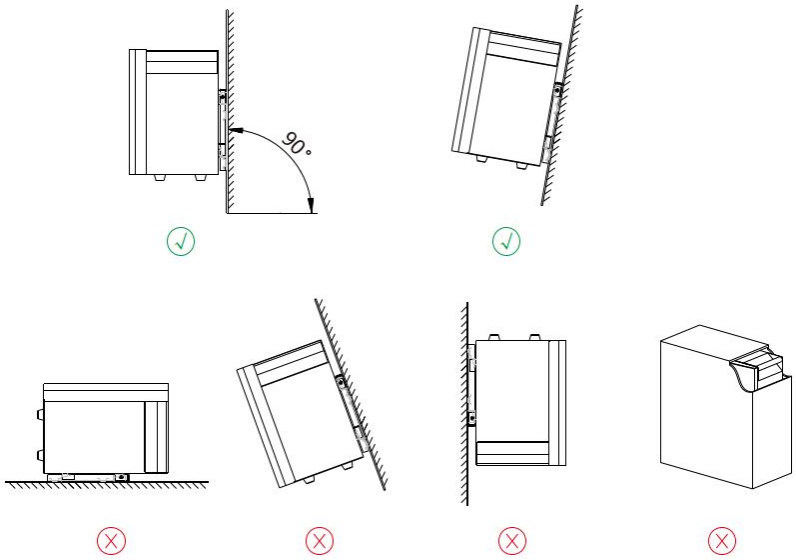
For outdoor installation, a rain cover should be installed above the battery. It should be installed in a place that avoids direct sunlight and maintains ventilation.



5.2. Basic installation requirements







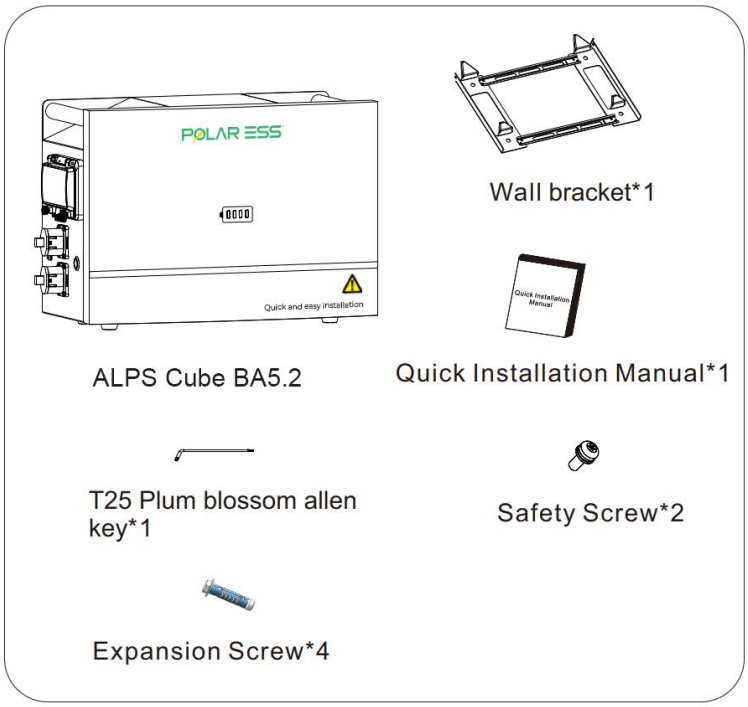
Note: Ensure that load capacity of the wall exceeds 300kg. The wall thickness of the hanging battery is not less than 120mm.

5.3. Check

5.3.1. Pre-installation check

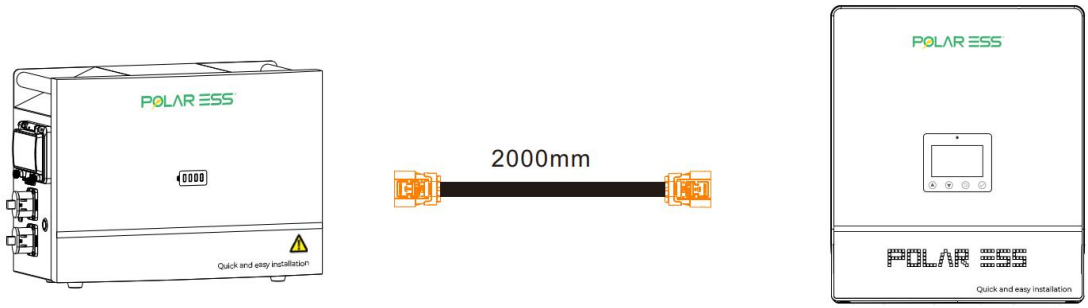
- Check the package before unpacking it. If any damage is found，do not unpack the package and contact your distributor.
- Check and confirm the battery is powered off before installation.
- Check that the deliverables are intact and complete according to the packing list. If any item is missing or damaged, contact your distributor.
- Please do not discard the battery package box. If you need to transport the battery, try to use the original package box for transportation.

5.3.2. Check the packing list



5.3.3. Installation accessories and compound mode

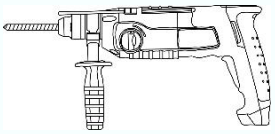
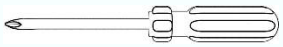
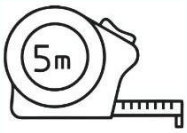
Note: The user manual, quick guide, and wall bracket are standard accessories packaged with the battery, while cables are optional, and you need to purchase them separately.

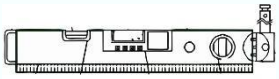
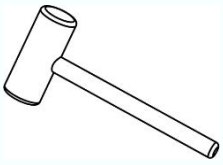


Installation Method	Compound Mode
Single battery	A + B + C
Multiple batteries	A * n + B * n + C

Remark: “N” stands for the number of batteries and cables. (n≤5); The maximum number of high-voltage batteries that can be paralleled is 5 units.

5.4. Installation required tools

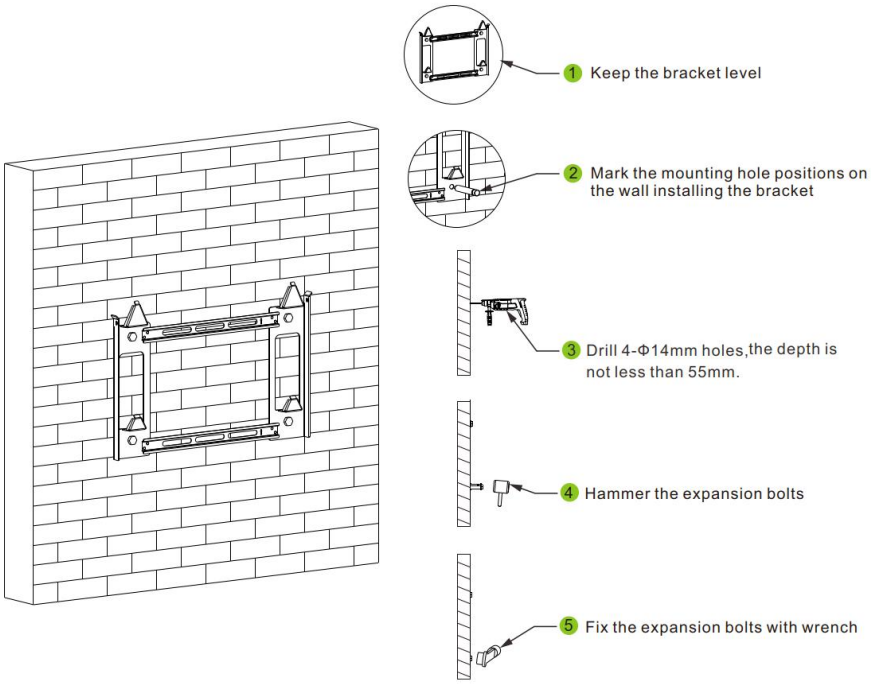
		
Impact drill	Phillips Screwdriver	Spanner
		
Pencil	Tape Measure	Multimeter

		
Spirit level	M3 Hex Key	Hammer
		
Safety Shoes	Insulated Glove	Safety Goggle

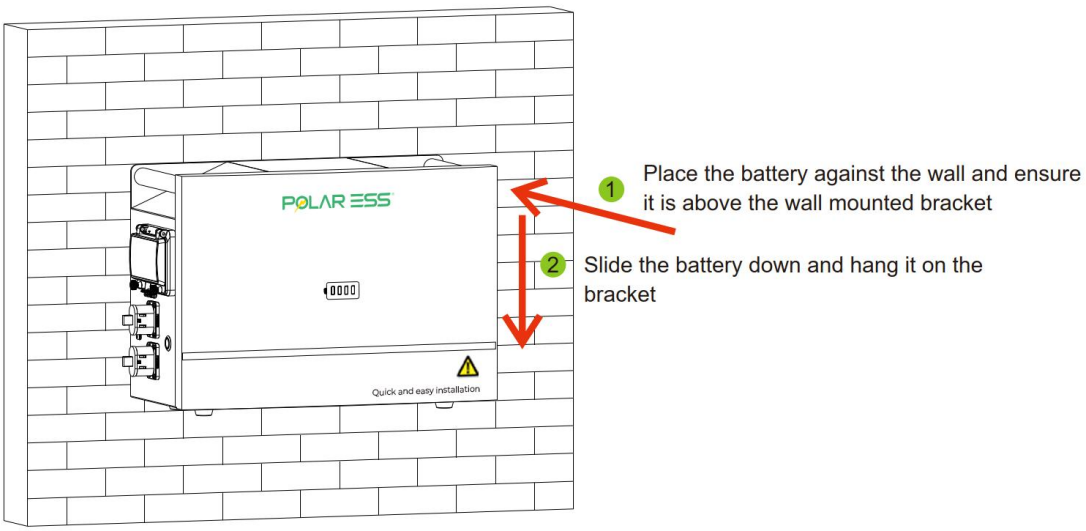
5.5.Wall Mount Installation

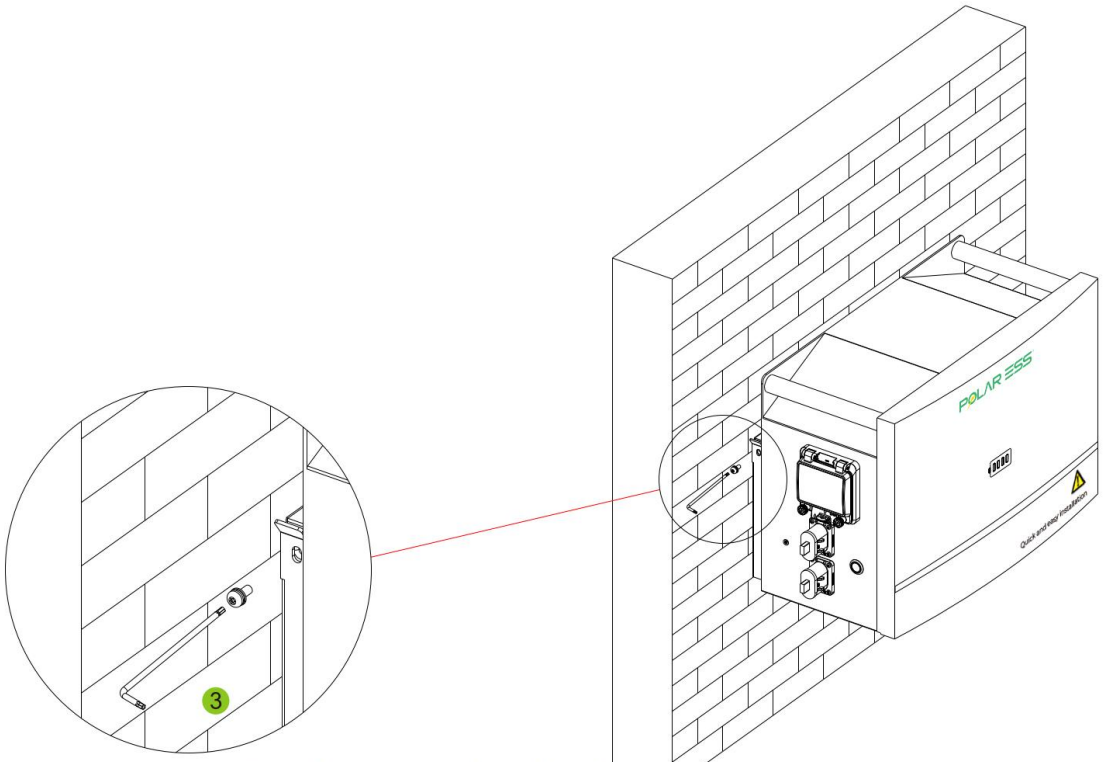
5.5.1. Battery installation

5.5.1.1. Installation bracket



5.5.1.2. Hang the battery





Lock the safety screws on both sides of the battery

6. Electrical connection

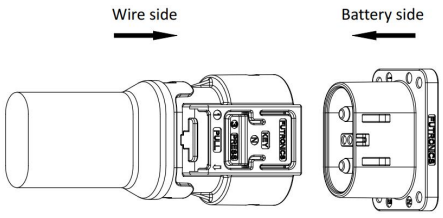
WARNING	• **Do not forget to wear ESD wrist strap, safety gloves and goggles.** • **Do not install the battery cable whilst switched on.** • **To ensure system safety, do not forget to install ground wire.** • **If you need to install a circuit breaker between the battery and inverter, we recommend using a molded case circuit breaker with a rated working voltage greater than 80V and a rated working current greater than 125A.**

6.1. Power terminal

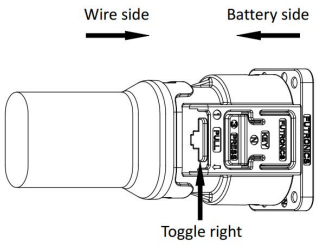
Confirm that the battery is in the switch OFF position and the machine is not turned on. Take out the dedicated connection cable, push out the anti-disassembly, and connect one end of the cable to the corresponding terminal position of the battery.

6.1.1. Connect the connecting wires

Step 1:



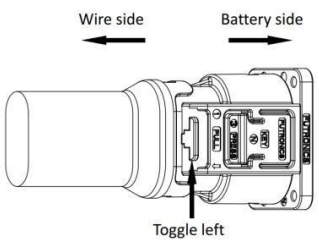
Step 2:



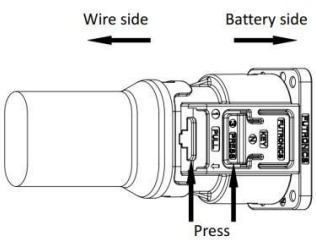
After installing the connector, you will hear a "click" sound, indicating that it has been installed in place. Please don't forget to push the anti-disassembly device in.

6.1.2. Remove the connecting wires

Step 1:



Step 2:



If you want to disassemble the connector, please first pull out the anti-disassembly device, then press the anti-disassembly device and the buckle at the same time, and then pull it out.

6.2. Ground wire connection

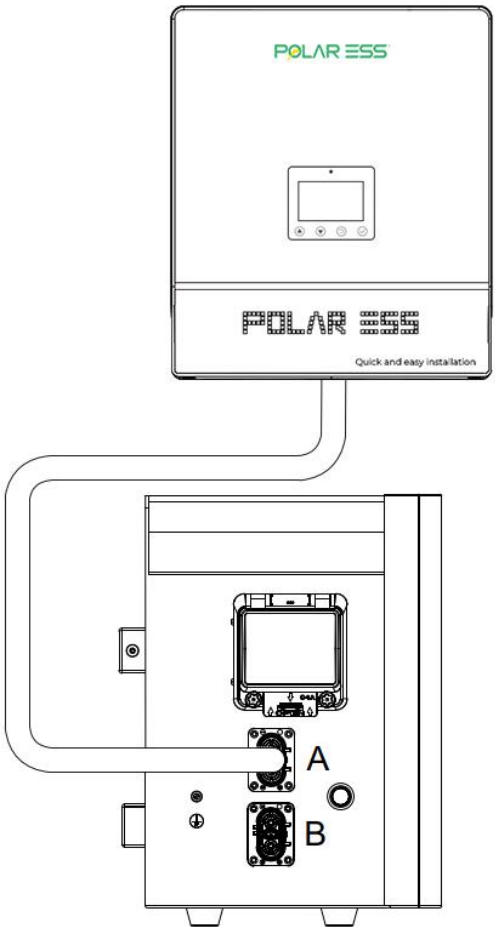
WARNING	**The diameter of the ground wire should not be less than 6AWG.**

The schematic diagram of the grounding wire is as follows:

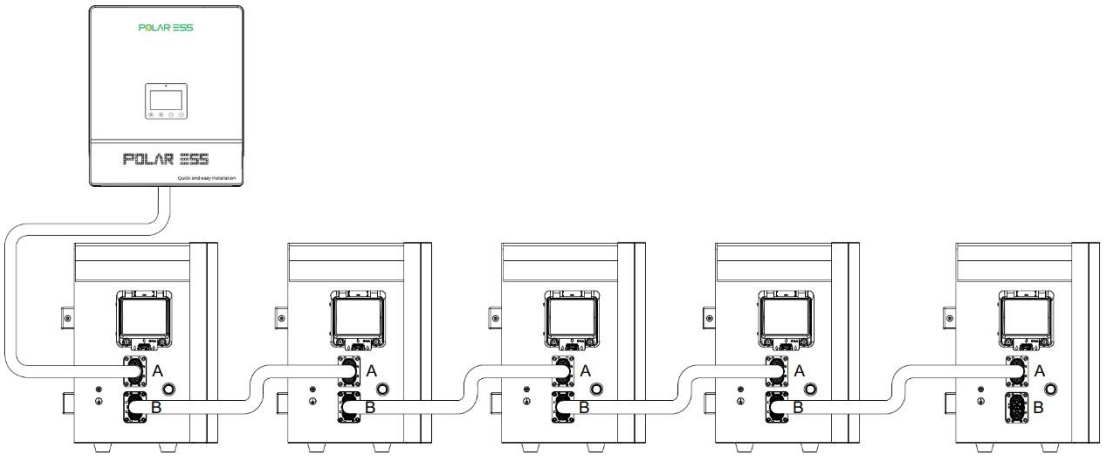
The battery is not equipped with a grounding wire, and a grounding wire needs to be made by oneself during installation.

6.3. System wiring diagram

6.3.1. Single battery wiring diagram



6.3.2. Multiple battery parallel wiring diagram



6.3.3. Setting for battery ID

When the inverter supports CAN communication, please select CAN communication mode for the main battery to communicate with the inverter and select CAN communication for parallel connection between batteries.

If the inverter does not support CAN communication, please select RS 485 communication method for the main battery to communicate with the inverter and select RS 485 communication for parallel connection between batteries.

6.3.3.1. Single battery

Battery SN	DIP Switch name	CAN ID Setting		RS485 ID Setting	
Master	SW4		1,1,1,1,1		0,0,0,0,0
	SW3		1,1,0,0		0,0,1,1
	SW2		0,0,0,0		0,0,1,1
	SW1		0,0,0,0		0,0,0,0

6.3.3.2. Multiple batteries in parallel

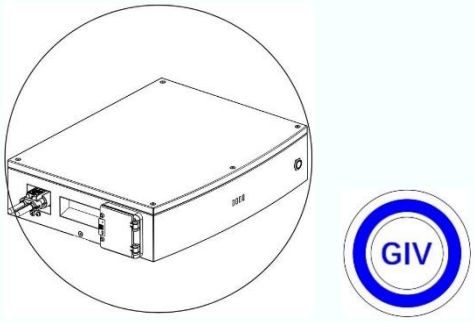
Battery SN	DIP Switch name	CAN ID Setting		RS485 ID Setting	
Master	SW4		1,1,1,1,1		0,0,0,0,0

(CAN& RS485)	SW3		1,1,0,0		0,0,1,1
	SW2		0,0,0,0		0,0,1,1
	SW1		0,0,0,0		0,0,0,0
Slave1	SW4		1,1,1,1,1		0,0,0,0,0
	SW3		1,1,0,0		0,0,1,1
	SW2		0,0,0,0		0,0,1,1
	SW1		1,0,0,0		1,0,0,0
Slave2	SW4		1,1,1,1,1		0,0,0,0,0
	SW3		1,1,0,0		0,0,1,1
	SW2		0,0,0,0		0,0,1,1
	SW1		0,1,0,0		0,1,0,0
Slave3	SW4		1,1,1,1,1		0,0,0,0,0
	SW3		1,1,0,0		0,0,1,1
	SW2		0,0,0,0		0,0,1,1
	SW1		0,0,1,0		0,0,1,0
Slave4	SW4		1,1,1,1,1		0,0,0,0,0
	SW3		1,1,0,0		0,0,1,1
	SW2		0,0,0,0		0,0,1,1
	SW1		0,0,0,1		0,0,0,1

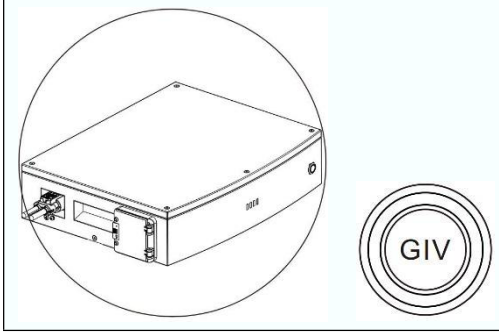
7. Power on/off the battery system

WARNING	• **If any abnormalities or red lights are found during the process of powering on the battery, please immediately turn off the battery power. After solving the problem, turn on the battery again.** • **Make sure the inverter is turned off before checking the battery.** • **After debugging, please check if the power port of the unconnected cable is covered with a protective cover.** • **If not, please cover it (The protective cover is already installed on the power terminal of the battery when it leaves the factory).** • **Please close the waterproof cover of the circuit breaker and tighten the waterproof cover screws.**

7.1. Power ON

	**1)** Switch the circuit breakers of all high- voltage boxes to the "on" position. **2)** Within 5 minutes, press the power button of any high-voltage box (press 1 to 3 seconds). Observe the LED indicator on the panel. **3)** The LED indicator lights up, indicating that the battery has been turned on.

7.2. Power OFF

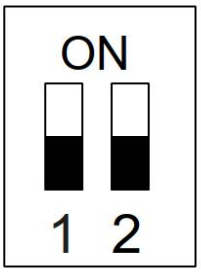
	**1)** Press the power button of any high voltage box (1 to 3 seconds) to turn off the battery system. During this process, all high-voltage box LED lights will be turned off. **2)** Switch all high-voltage box circuit breakers to the "off" position.

8. Maintenance

8.1. Update firmware

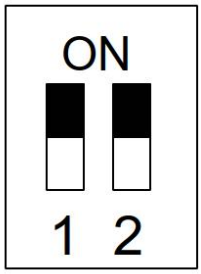
WARNING	**The USB of the battery can only be used for firmware upgrades. Please do not plug your phone or other electronic products into the USB of the battery for charging, otherwise the battery may be damaged.**

1) Prepare a USB 2.0 interface USB flash drive in FAT32 format, storage space not exceeding 8GB.
2) Copy the battery firmware provided by the manufacturer to the root directory of the USB drive and delete all other files in the USB drive.
3) Unscrew the fixing screws of the waterproof cover and open it, then set the dial switch according to the following diagram.



0 , 0

4) Insert the USB drive into the USB port of the battery, and the firmware will automatically update. After the SOC indicator light flashes alternately in red and green, the battery will automatically restart and the buzzer will sound once, indicating a successful upgrade.
5) After the upgrade is successful, unplug the USB flash drive, set the dial switch according to the following diagram, close the waterproof cover, and tighten the waterproof cover screws.



1 , 1

8.2. Running status

Perform a visual inspection after a power outage or without contact to confirm the following:

- Check whether the connecting wire is connected normally.
- Check whether the LED is abnormally red or yellow, please refer to Appendix I for specific abnormalities
- Check whether the surface of the fuselage is normal, no rust, no water ingress.
- Check whether the ground wire connection is normal, no disconnection, no loosening, and good connection with the ground wire copper bar.

8.3. Adding new batteries

Please ensure that:

- The newly added batteries come from the same model and manufacturer.
- Do not mix old batteries with new batteries.
- A battery with less than 300 cycles or within 1 year of leaving the factory is defined as a new battery.
- The installation time of newly added batteries and installed batteries is less than or equal to 1 year, and the newly added batteries must be within a shelf life of 6 months.

8.4. Battery Replacement

 **WARNING**	**Before performing any operations, please ensure that the connected inverter and battery have been powered off. Otherwise, there is a risk of electric shock, which may result in personal injury or death.**

- Wear safety gloves.
- Turn off battery power and circuit breaker.
- Disconnect the battery cable.
- Remove the safety screws from the wall bracket on the back of the battery.
- Lift the battery upwards and remove it.
- Put the battery into the packing box according to the repair procedure and transport the battery to the designated repair site.
- Install new battery based on procedure specified in Section 5.
- Please ensure that the new battery and the faulty battery being replaced are of the same model and manufacturer. When multiple batteries are connected in

parallel in the system, please discharge the original system battery to SOC ⩽ 25% before incorporating the new battery.

8.5. Battery recycling

	**Do not dispose of household waste but in accordance with the local regulations.**

Please contact local qualified recycling agencies or dealers to recycle used batteries. Do not dispose of them casually.

8.6. Troubleshooting

8.6.1. Preparation

1) Prepare tools including safety gloves, a crosshead screwdriver and M3 Hex Key.

2) Prepare the computer, battery upper computer, and communication tools for checking battery faults. You can also obtain battery failure information through the server and app.

3) Check if the battery cables are properly connected and if there is any tripping phenomenon in the circuit breaker.

4) Troubleshooting based on relevant information in 7.2.2 and Appendix I.

5) If the fault cannot be eliminated, please replace the battery according to the steps in 8.4.

8.6.2. Troubleshooting suggestions

Error Indication	Error description	Error cause	Suggested actions
SOC LED light red	Discharge undervoltage protection	Single cell voltage below the threshold for under-voltage protection	There is over discharge risk. User should stop discharging and arrange recharge
	Charge overvoltage protection	Single cell voltage exceeding threshold for protection threshold	There is no safety threat; User should stop charging. Idle battery and it will turn to normal status
	Discharge short-circuits	External short circuit of battery	There is safety risk and user should stop using battery User should contact installer to repair inverter and battery
	Pre charge short-circuit and timeout	External short circuit of battery	There is safety risk and user should stop using battery User should contact installer to repair inverter and battery
SOC LED light yellow	External Communication failure	Communication loss between inverter and battery	There is no safety threat. and user should stop

			using battery. Check if inverter and battery communication terminal is well connected. If inverter and battery cannot communicate when the communication wire is confirmed well connected, user should contact installer to repair battery
	Parallel connection failure protection	Communication failure between parallel connected battery	Check the communication line between batteries

9. Technical Parameter

Technical Specifications	ALPS CUBE BA5.2
Cell type	LFP
Battery Capacity	100Ah
Battery Energy	5120Wh
Nominal Voltage	51.2V
Battery Voltage Range	44.8-57.6V
Max charging and discharging current	60A
Peak Current	120A@1s
Max charging and discharging power	3000W
Peak Power	6000W@1s
Beast Mode (Discharge)1	100A/5000W
DOD	100%
Operating Temperature	Charge：0℃～50℃ Discharge：-10℃～50℃
Storage conditions	Temperature: -20℃ ~ +50℃/7 days -20℃ ~ +40℃/6 months Humidity：5%~95%RH
Dimension (W/H/D)	480*338*242(mm)
Weight	48±2kg
Cooling	Natural cooling
Communication Protocols	CAN/RS485
Humidity Range	5%~95%RH
Ingress Protection	IP65
Protective Class	I
Parallel quantity	2～5pcs
Installation	Floor/Will installation
Battery certification	IEC 62619/IEC 62040/CE/UKCA/UN38.3 /CEC-AU/SABS COC
Battery Designation	IFpP/50/175/122/[1P16S]M/-10+50/90

Notes：1. When using beast mode below 25℃, it is necessary to ensure SOC ≥ 50%, and above 25 ℃, it is necessary to ensure SOC ≥ 20%.

Appendix I

LED Indication states

LED lights definition						
Status	Items	SOC indication				Remark
		LED1	LED2	LED3	LED4	
Charge SOC	0%～25%	☼ t=1s				The Battery SOC in which range, the corresponding SOC LED The indicator is green and off at intervals of 1S;
	26%～50%	☼	☼ t=1s			
	51%～75%	☼	☼	☼ t=1s		
	76%～99%	☼	☼	☼	☼ t=1s	
	100%	☼	☼	☼	☼	
Discharge SOC	100%～76%	☼	☼	☼	☼	No special display status
	75%～51%	☼	☼	☼		
	50%～26%	☼	☼			
	25%～0%	☼				
Standby	100%～76%	☼	☼	☼	☼	When the SOC ranges from 0% to 5%, LED1 is displayed in green and off for 2s
	75%～51%	☼	☼	☼		
	50%～26%	☼	☼			
	25%～5%	☼				
	5%～0%	☼ t=2s				
Parallel connection	Parallel connection succeeds	☼ t=0.8s	☼ t=0.8s	☼ t=0.8s	☼ t=0.8s	If the parallel is successful, the SOC LED green and off for 5S every 0.8S
Protection	Cell charge overvoltage protection	☼				SOC LED light red
	battery charge overvoltage protection	☼				SOC LED light red
	Overcharge and over discharge protection	☼				SOC LED light red
	Cell discharge	☼				SOC LED light red

	undervoltage protection		
	battery discharge undervoltage protection	☋	SOC LED light red
	Discharge short-circuits	☋	SOC LED light red
	Voltage sampling fault	☋	SOC LED light red
	Charge/ Discharge overcurrent protection	☋	SOC LED light red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