



POL-BAT-5.0-W Battery User Manual

Contents

1 Notes	4
1.1 Basic overview	4
1.2 Symbol description	4
1.3 Personnel requirements	5
2 Safety	7
2.1 General safety	7
2.2 Safety Precautions	8
2.2.1 Environment requirements	8
2.2.2 Operation precautions	8
2.3 Emergency responses	9
2.4 Warning message	11
3 Storage and Transportation	12
3.1 Storage requirements	12
3.2 Replenishing electricity during inventory period	12
3.3 Transportation requirements	13
4 Product Introduction	15
4.1 Product description	15
4.2 Appearance description	16
4.2.1 Battery overall view	16
4.2.2 Battery dimensions and interface view	16
4.2.3 LED display description	19
4.3 Label description	21
4.3.1 Nameplate	21
4.3.2 Serial number	21
5 Installation	23
5.1 Installation environment	23
5.2 Basic installation requirements	24
5.3 Check	26
5.3.1 Pre-installation check	26

5.3.2 Check the packing list	26
5.4 Installation required tools	27
5.5 Installation	28
5.5.1 Definition of battery communication port	28
5.5.2 Battery installation	29
5.5.3 Electrical connection	31
5.5.4 Communication protocol selection	36
6 Power on and off the battery system	40
6.1 Power On	40
6.2 Power Off	41
7 Maintenance Guide	41
7.1 Upgrade Firmware	41
7.2 Troubleshooting	42
7.2.1 Preparation	42
7.2.2 Failure Information and troubleshooting suggestions	43
7.3 Battery Replacement	45
7.4 Adding new batteries	45
7.5 Battery recycling	45
8 Technical Parameter	46
9 Appendix I	48








1 Notes



1.1 Basic overview

This document describes the installation, electrical connection, operation, commission, specifications, maintenance, troubleshooting and disposal of waste of POL-BAT-5.0-W battery system. Before installing and operating POL-BAT-5.0-W, ensure that you are familiar with product features, functions, and safety precautions provided in this document.






1.2 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	<p>WARNING indicates a hazardous situation which, if not avoided, may result in serious injury.</p>
 CAUTION	<p>Operate caution.</p>

Markings on this product

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


1.3 Personnel requirements

 CAUTION	<p>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.</p>
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- 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.
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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 disassemble 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°C 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	<p>Manufacturers take foreseeable risk scenarios into consideration and are designed to reduce hazards and dangers. However, if the following situation occurs, do as below:</p>
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Emergency	Description and measures
Leakage	<p>Avoid contact with leaked liquids or gases. Should you come into direct contact with the battery electrolyte, do as follows:</p> <p>1) Inhalation: Evacuate the contaminated area and seek medical help.</p>

	<p>2) Eye contact: Flush your eyes with flowing water for 15 minutes and seek medical help.</p> <p>3) Skin contact: Wash the affected area with soap and water and seek immediate medical attention.</p>
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 the batteries to avoid electric shock. Contact Polar ESS or your distributor 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

Symbol	Description
 WARNING	Safety information contained in this section must be always observed when working on or with batteries. For safety, installers are responsible 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°C to 50°C ;
 - 3) If you store the Battery over a long period of six months, the storage temperature is between -20°C to 40°C , 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

Symbol	Description
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 WARNING	<p>Stock batteries suggest to be replenished and maintained every six months.</p>
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- 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

Symbol	Description
 WARNING	<p>Please refer to the following requirements for battery transport, otherwise the battery will out of warranty</p>

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

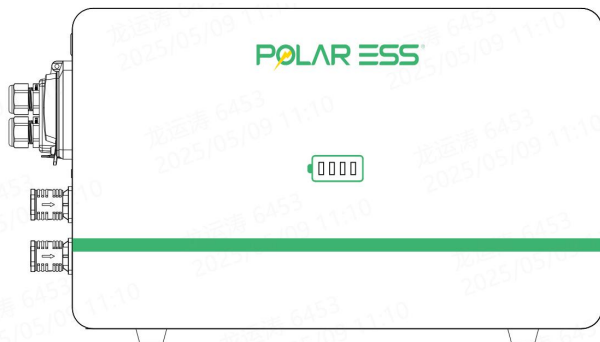
4.1 Product description

POL-BAT-5.2-W 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.

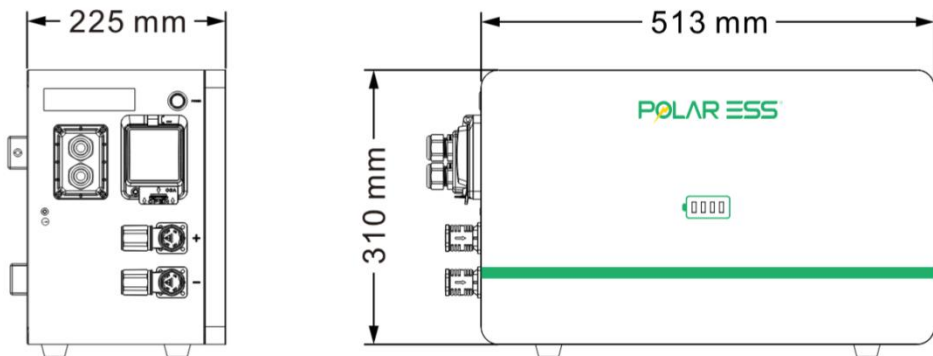
4.2 Appearance description

4.2.1 Battery overall view

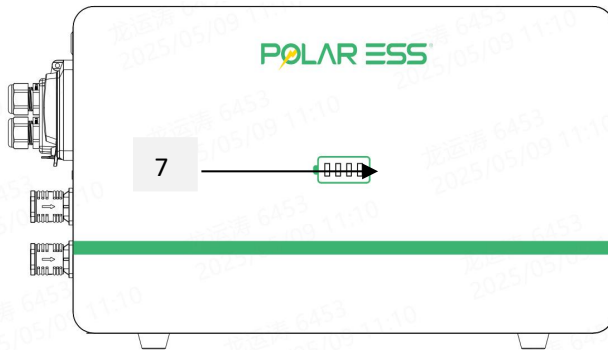
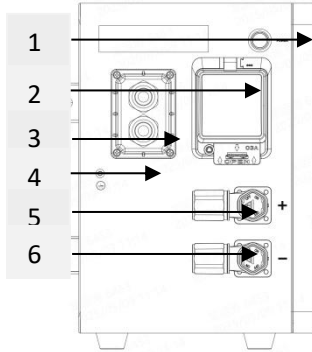


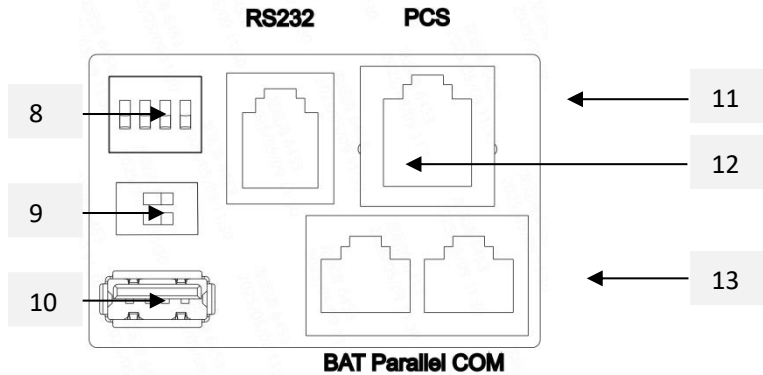
4.2.2 Battery dimensions and interface view

1) Battery Dimensions



2) Interface View

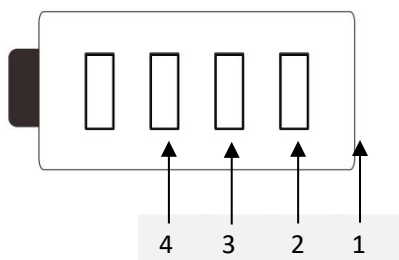




Location	Port	Function
1	Power button	Turning on and off the battery
2	DC breaker	Protecting batteries and maintenance personnel
3	Waterproof cover	Communication waterproof cover
4	Ground screw	Tighten the ground wire
5	Positive terminal	Battery positive
6	Negative terminal	Battery negative
7	LED	Display SOC and operating status
8	DIP switch	Select address when batteries are connected in parallel
9	USB switch	USB switch, used during upgrade
10	USB	Upgrade battery FW
11	PCS	Communication with inverter

12	RS232	Debug Port
13	BAT Parallel COM	Battery parallel communication

4.2.3 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	






- 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.

POLAR ESS [®] Li-ion Battery	
Model	POL-BAT-5.0-W
Nominal Voltage	51.2 Vd.c.
Battery Capacity	100 Ah
Battery Energy	5120 Wh
Battery Voltage Range	44.8-57.6 Vd.c.
Max. Charging and Discharging Current	100 A
Ingress Protection	IP65
Protective Class	Class I
Operating Temperature Range	Charging: 0 to 55°C Discharging: -10 to 55°C
     Hazardous Waste	
Serial Number:	

4.3.2 Serial number

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


SN: PBJ 25 5 0001

↓ ↓ ↓ ↓
 1 2 3 4

Number	Paraphrase
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1	Identification code
2	Year
3	Month
4	Serial number

5 Installation

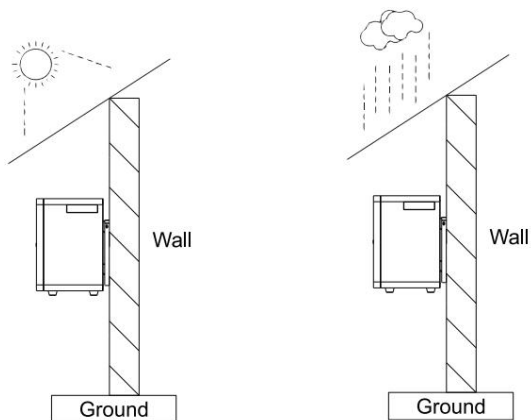
Symbol	Description
 WARNING	<ul style="list-style-type: none"> ● Ensure to read the guidance before installation in order to understand product information and safety cautions. ● Operators should be well trained technicians and fully understand the whole photovoltaic system, grid network, working principle and national and regional standards. ● Installers must use insulated tools and wear PPE. ● Device damage caused by failure to comply with storage, transportation, installation and user requirements specified in Guidance are not covered by the Warranty. ● Please ensure batteries in parallel connection are from the same 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

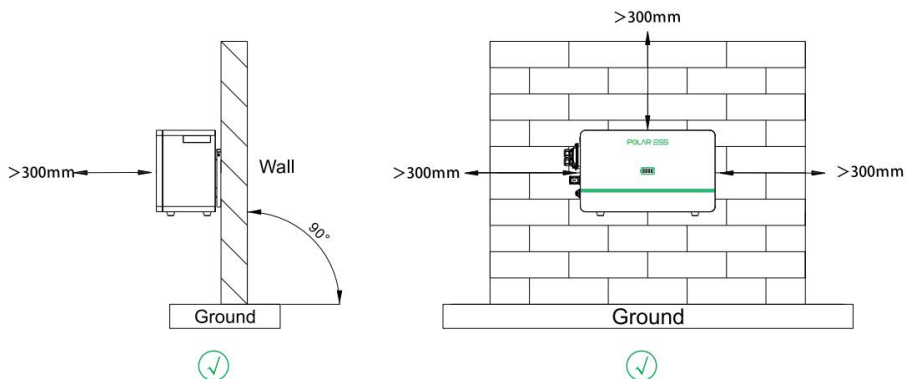
The ambient temperature for the installation of the battery system should be above -10°C , below 55°C , and the humidity should be between 5% and 95% .

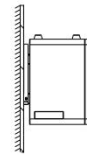
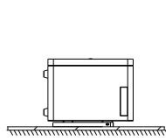
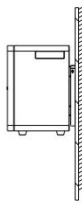
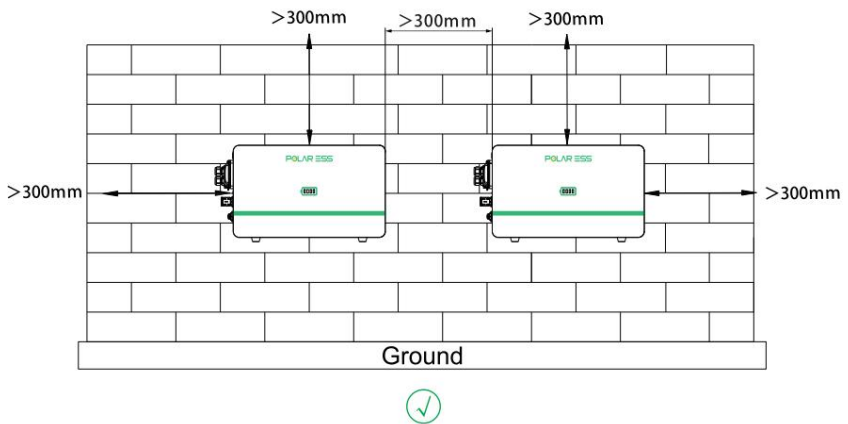
 Max. 55°C	 Min. -10°C	 RH. +5% ~ +95%
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For outdoor installation, a rain cover should be installed above the battery. It should be installed in a place that avoids direct sunlight and maintains ventilation.



5.2 Basic installation requirements





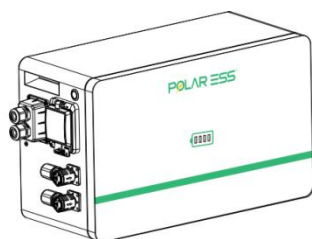
Note: Ensure that the load-bearing capacity of the wall exceeds 300kg. The wall thickness should not be less than 120mm.

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



POL-BAT-5.0-W



Wall bracket*1



Power Cable*2



Communication Cable*1



Waterproof Cover*1



Cable Gland*2



Connector*2



Countersunk screw*6

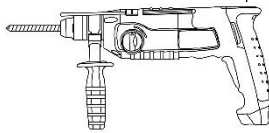
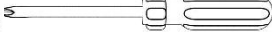


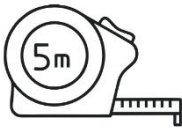



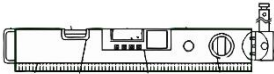



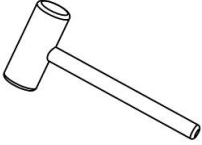

Safety Screw*2



Expansion Screw*4

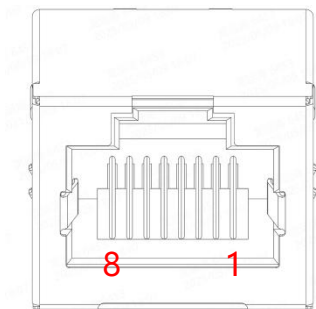
5.4 Installation required tools

		
Impact drill	Screw Driver	Spanner
		
Pencil	Tape Measure	Multimeter

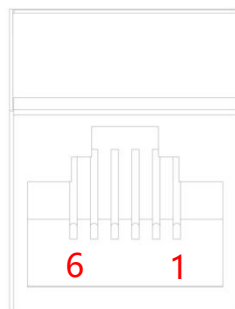
		
Spirit level	Insulated Glove	Safety Goggle
		
Safety Shoes	Hammer	T25 Plum blossom Allen key

5.5 Installation

5.5.1 Definition of battery communication port



PCS Port

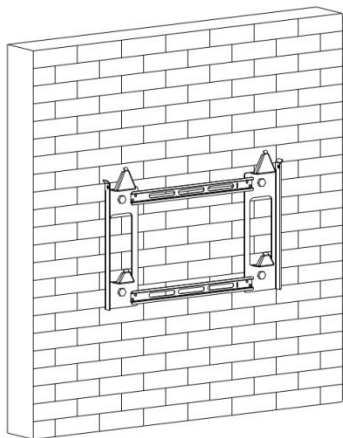


RS232 Port

Port	PIN number	Definition	Port	PIN number	Definition
PCS	1	/	RS232	1	/
	2	/		2	/
	3	GND_S		3	TX
	4	CAN_H		4	RX
	5	CAN_L		5	GND
	6	/		6	/
	7	RS485_A			
	8	RS485_B			

5.5.2 Battery installation

A. Installation bracket



1 Keep the bracket level



2 Mark the mounting hole positions on the wall installing the bracket



3 Drill 4- Φ 14mm holes, the depth is not less than 55mm.

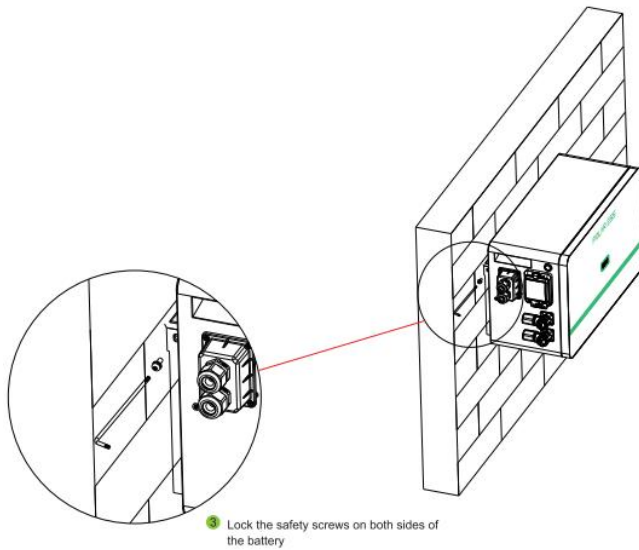
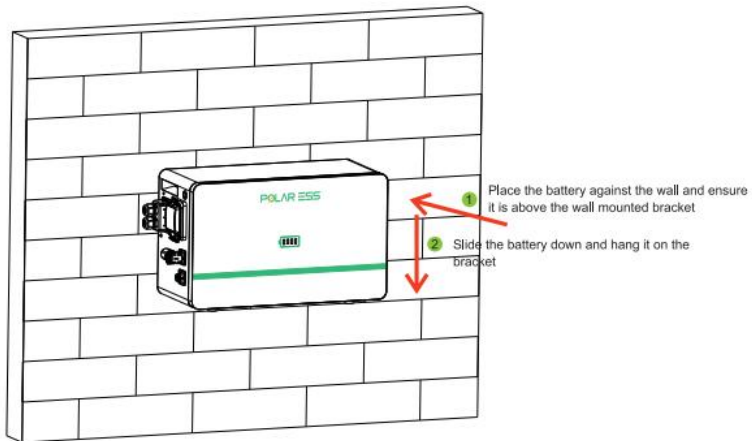


4 Hammer the expansion bolts




5 Fix the expansion bolts with wrench

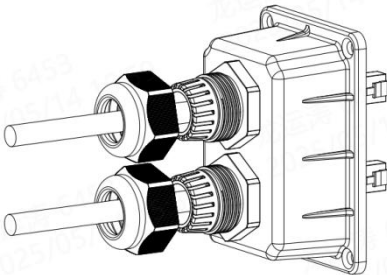
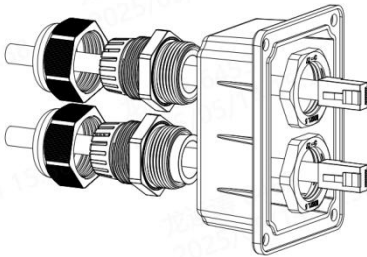
B. Hang the battery



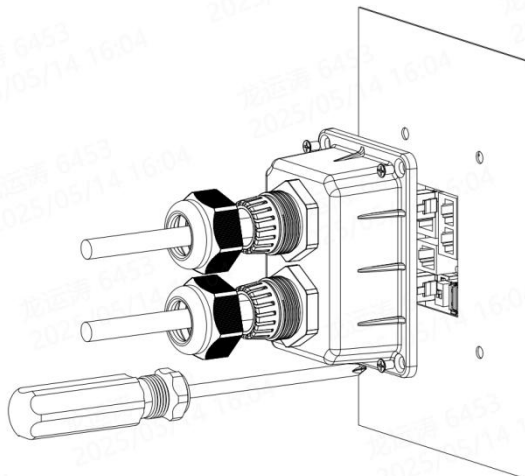
5.5.3 Electrical connection

Symbol	Description
 <p>WARNING</p>	<ul style="list-style-type: none"> ● 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. ● Please refer to the inverter manual for communication wiring methods and PIN definitions on the inverter side.

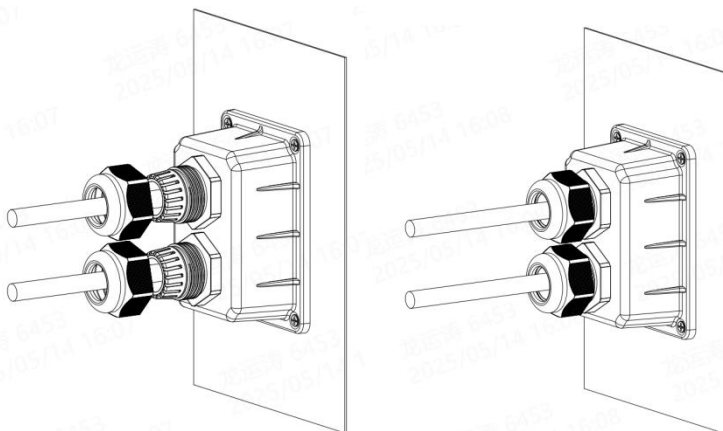
5.5.3.1 Communication cable



- ① Install the cable gland on the waterproof box.
- ② Thread the communication cable through the cable gland.



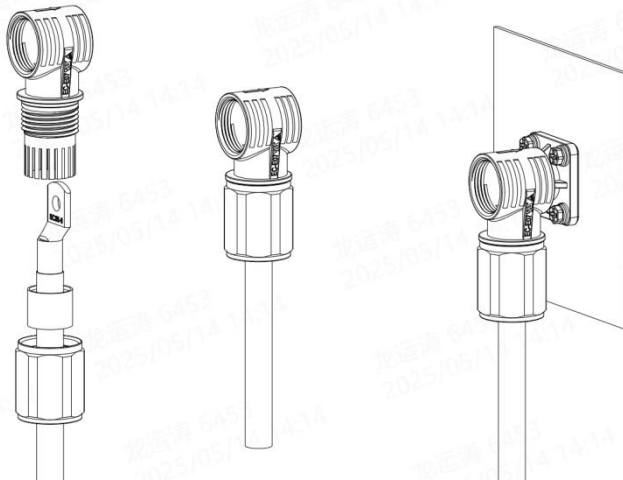
- ③ Insert the communication cable into the corresponding communication port.
- ④ Then tighten the 4 screws of the waterproof cover.



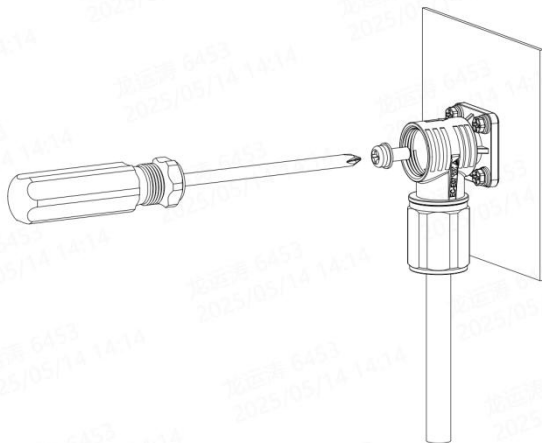
- ⑤ Finally, tighten the waterproof cover of the cable gland

- ⑥ If you only connected one communication cable, Please insert the rubber plug into the other cable gland

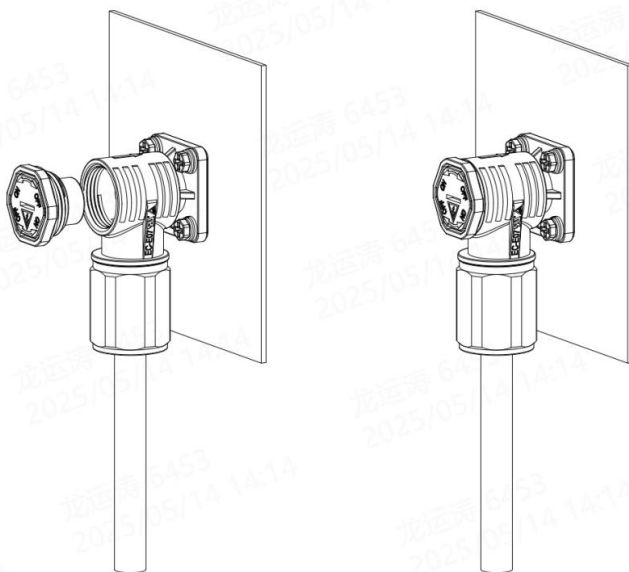
5.5.3.2 Power cable



- ① Thread the cable into the connector as shown in the diagram and pay attention to the direction of the cable terminals.
- ② Tighten the waterproof nut of the connector.
- ③ Place the connector on the socket according to the direction of the arrow.

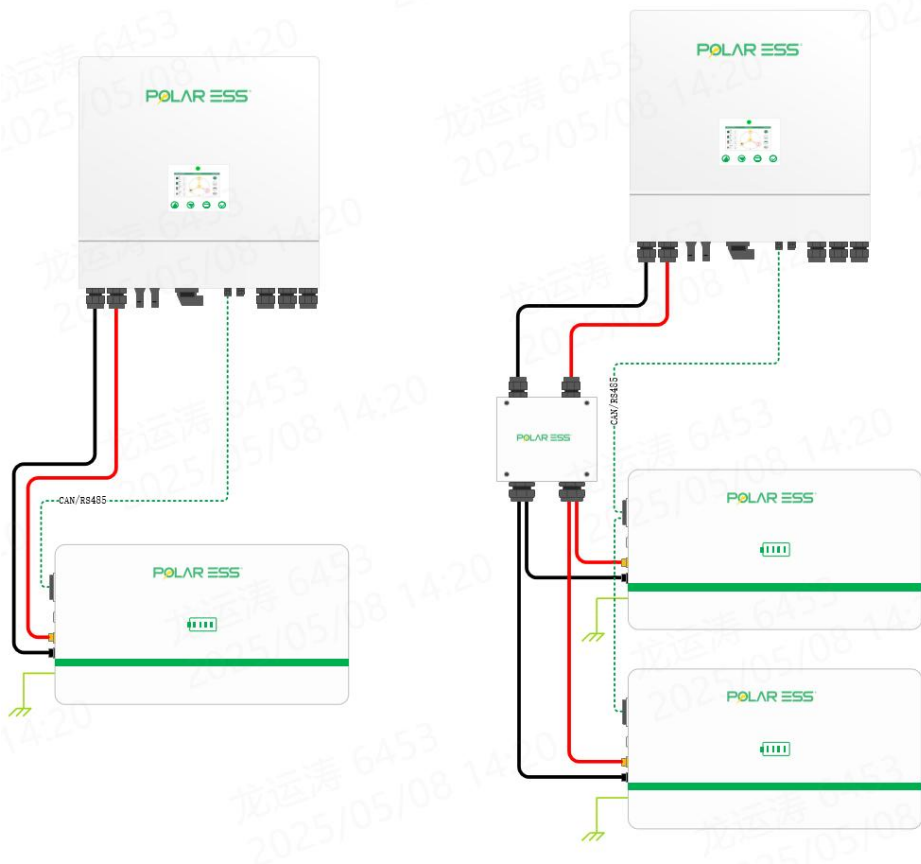


④ Tighten the M6 screw to a torque of $4 \sim 5 \text{ N} \cdot \text{m}$.



- ⑤ Tighten the waterproof cover of the connector.
- ⑥ If you want to remove the cable, you can do it in reverse.






5.5.3.3 System wiring diagram



When you need parallel batteries, please purchase a separate parallel box.

5.5.3.4 Setting for battery ID

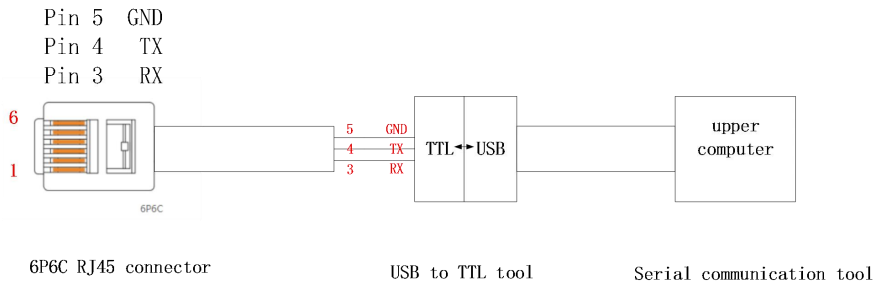
When the batteries are connected in parallel, you need to select the battery address according to the following diagram:

Battery	ID	Description
Master		0,0,0,0
Slave1		1,0,0,0
Slave2		0,1,0,0
Slave3		0,0,1,0
Slave4		0,0,0,1

5.5.4 Communication protocol selection

- The default communication protocol for batteries at the factory is Polar ESS.
- If you need to connect other inverters, please follow these steps:
 - A. Preparing communication tools
 - a) 6P6C RJ45 Connector
 - b) USB to TTL tool
 - c) Serial communication tool

Pin5: GND
Pin4: TX
Pin3: RX



- B. Insert the prepared communication tools into the battery RS232 port and the computer USB port respectively according to the schematic diagram.
- C. Open the installation package of the battery monitoring software and double-click the battery icon.



- D. Set communication parameters for the battery upper computer.
 - a) Select the corresponding USB serial port number.
 - b) Choose the communication Baud Rate: 38400.
 - c) Click "Open Serial Port".
 - d) Click "Start Monitoring".

System View

Real-time Monitoring | Historical Monitoring | System Settings | Switch Language

Battery Information

Total Voltage	mV	VBAT	mV
DoD SOC	%	Actual SOC	%
Display SOC	%	SOH	%
Full Charge Capacity	mAh	Remaining Capacity	mAh
Cycle Count			

Current Information

Current	mA	Mos Temperature	°C
Low Current Range	mA		
High Current Range	mA		

Temperature Information

Serial Port: COM44 | Baud Rate: 38400 | Pack: 1 | Number of Packs: 1 | Address: 0 | Interval (Seconds): 1

Control Status | Alarm Status

Protection Status | Fault Status

Basic Information

Number of Cells: | Number of Temperatures: | Select DOD: | BMS Update Flag: | Udb Type: |

Individual Information

Highest Voltage	mV	Highest Temperature	°C	Highest Internal Resistance	mΩ
Lowest Voltage	mV	Lowest Temperature	°C	Lowest Internal Resistance	mΩ
Average Voltage	mV	Average Temperature	°C		

System Status

Battery Mode: Status 1 | Heating Film Status: |

Switch Control

Maximum Charging Current: mA | Maximum Discharging Current: mA

Disable Discharge: [Open] [Close] | Disable Charging: [Open] [Close]

Disable Heating Film: [Open] [Close]

Version: | Barcode: | Communication Status: | Status: | System Time: 2025-04-24 19:08:57 | Progress:

E. The status display of the host computer shows: "Communication is normal". Progress indicates that data transmission and reception have been successful. Otherwise, please check whether the communication cables are connected correctly.

System View

Real-time Monitoring | Historical Monitoring | System Settings | Switch Language

Battery Information

Total Voltage	54045 mV	VBAT	53898 mV
DoD SOC	100 %	Actual SOC	100 %
Display SOC	100 %	SOH	100 %
Full Charge Capacity	100000 mAh	Remaining Capacity	100000 mAh
Cycle Count	8		

Current Information

Current	4760 mA	Mos Temperature	32.2 °C
Low Current Range	4769 mA		
High Current Range	4719 mA		

Temperature Information

Serial Port: COM42 | Baud Rate: 38400 | Pack: 1 | Number of Packs: 1 | Address: 0 | Interval (Seconds): 1

Control Status: 列柜MOS组合, 极柜MOS组合 | Alarm Status: |

Protection Status | Fault Status

Basic Information

Number of Cells: 18 | Number of Temperatures: 4 | Select DOD: 0.9 | BMS Update Flag: 0 | Udb Type: |

Individual Information

Highest Voltage	3379 mV	Highest Temperature	30.5 °C	Highest Internal Resistance	mΩ
Lowest Voltage	3376 mV	Lowest Temperature	29.9 °C	Lowest Internal Resistance	mΩ
Average Voltage	3377.9 mV	Average Temperature	30.2 °C		

System Status

Battery Mode: Status 1 | Heating Film Status: |

Switch Control

Maximum Charging Current: 100000 mA | Maximum Discharging Current: 100000 mA

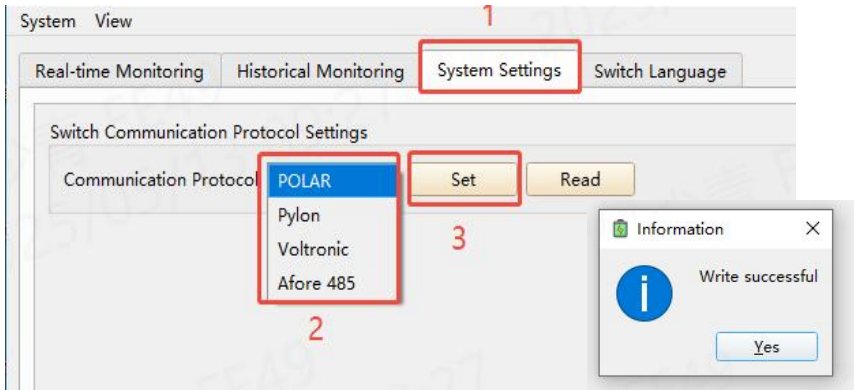
Disable Discharge: [Open] [Close] | Disable Charging: [Open] [Close]

Disable Heating Film: [Open] [Close]


Version: BM_4_9.8.2 | Barcode: PBL2540009 | Communication Status: Connect | **Status: Communication is normal** | System Time: 2025-04-23 10:09:24 | Progress: AuB2 TuB2

F. Select communication protocol:

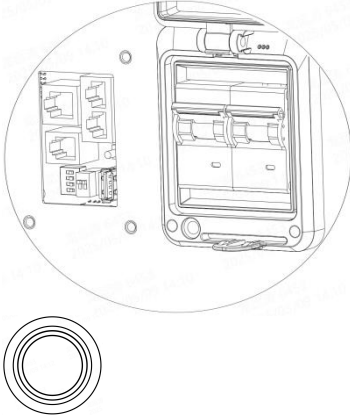
- a) Click on "System Settings"
- b) Select the protocol from the drop-down list
- c) Click on the "Set" button
- d) Click "YES", the protocol setting is successful!



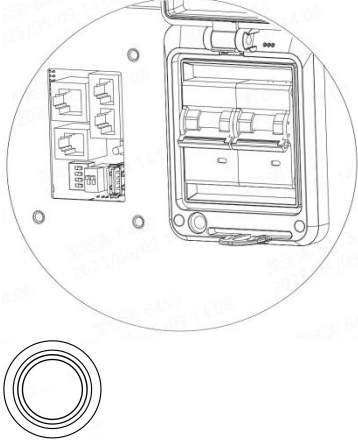
6 Power on and off the battery system

Symbol	Description
 <p data-bbox="151 584 268 608">WARNING</p>	<ul style="list-style-type: none"> ● 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.

6.1 Power On


	<ol style="list-style-type: none"> 1) Switch the breakers of all batteries to the "On" position. 2) Within 2 minutes, press the power button on all batteries (Press for 1 seconds on each battery, the buzzer will sound for 1 second) . Observe the LED indicator lights on the panel. 3) The battery LED indicator lights up to indicate that the battery has been turned on.
--	---

6.2 Power Off

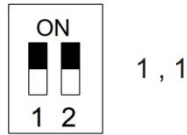
	<p>1) Press the power button for 3 seconds to turn off the battery. During the process, the buzzer will sound for 1 second and the LED light will turn off. When multiple batteries need to be shut down in parallel, this action needs to be repeated.</p> <p>2) Switch the breakers of all batteries to the "Off" position.</p>
---	---

7 Maintenance Guide

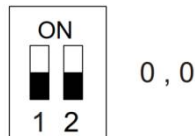
7.1 Upgrade Firmware

Symbol	Description
 WARNING	<p>The battery USB 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.</p>

- 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.



- 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 yellow 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.



7.2 Troubleshooting

7.2.1 Preparation

- 1) Prepare tools including safety gloves, a crosshead screwdriver and a socket wrench.
- 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 7.3.

7.2.2 Failure Information and troubleshooting suggestions

Error Indication	Error description	Possible 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. Users 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-circuit	External short circuit of battery.	There is safety risk and users 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 users 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 users 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.

7.3 Battery Replacement

- 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 $SOC \leq 25\%$ before incorporating the new battery.

7.4 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.

7.5 Battery recycling

Contact your qualified local recycling agency or distributor for recycling of discarded batteries. Do not discard them at will.

8 Technical Parameter

Technical Specifications	POL-BAT-5.0-W
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	100A
Peak Current	125A@3s
Max Charging and Discharging Power	5kW
Peak Power	6kW@3s
DOD(Depth of Discharge)	93%
Operating Temperature	Charge: 0°C ~ 55°C Discharge: -10°C ~ 55°C
Storage Conditions	Temperature: -20°C ~ +50°C/7 days -20°C ~ +40°C/6 months Humidity: 5%~95%RH
Dimension (W/H/D)	513*310*225(mm)
Weight	43±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/Wall installation

9 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
Protectio n	Cell charge overvoltage protection	☹				SOC LED light red
	battery charge over voltage protection	☹				SOC LED light red
	Overcharge and over discharge protection	☹				SOC LED light red
	Cell discharge undervoltag e protection	☹				SOC LED light red
	battery discharge undervoltag e protection	☹				SOC LED light red
	Discharge short circuit	☹				SOC LED light red
	Voltage sampling fault	☹				SOC LED light red
	Charge/ Discharge overcurrent protection	☹				SOC LED light red

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