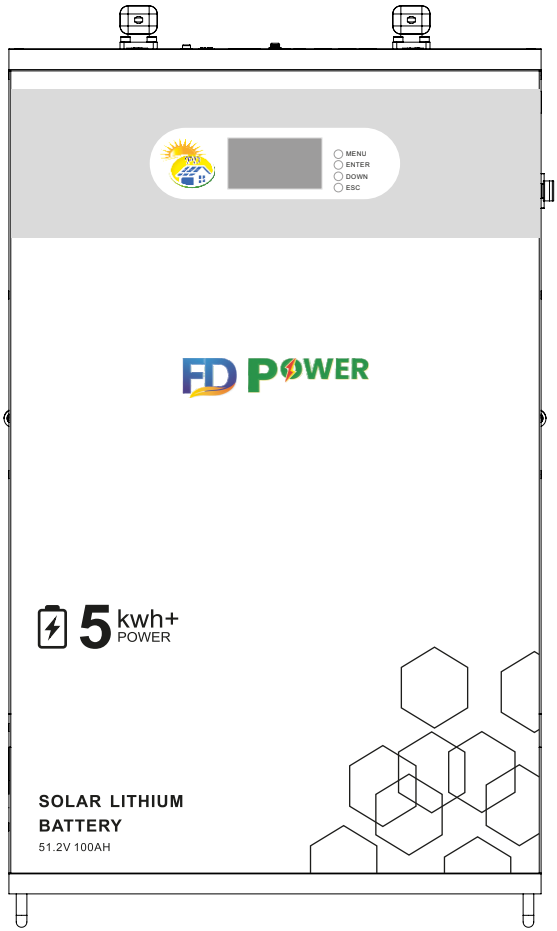
Power Wall E5B Energy Storage System

User Manual



Note: Please read and understand all the contents of this Manual carefully before installation and use of the product.
If you have any suggestions while using the device, please do not hesitate to give us feedback.

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Table of Contents

1. Instructions

Thank you for choosing the Power Wall E5B series household energy storage system designed and manufactured by our company. Please read the manual carefully before installing and using the product. If you have any suggestions during the use, please do not hesitate to give us feedback.

1.1 Range of Application

The product should be used in accordance with local standards, laws and regulations, as failure to do so may result in personal injury and property damage. The drawings in this manual are used to explain the concepts related to the product, including product information, installation instructions, electrical connection, system troubleshooting, safety information, general problems, and maintenance, etc. The internal parameters of this product were set before shipment. No internal parameters can be changed without authorization. Any unauthorized change of settings will void the warranty and the company will not be liable for any resulting damage. This manual and other related documents are an integral part of the product and should be retained for on-site installation personnel and associated technical personnel to consult.

1.2 Meaning of Abbreviations

AC	Alternating Current
DC	Direct Current
PV	Photovoltaic
BMS	Battery Management System
PCS	Power Conversion System
RJ45	Registered Jack 45
SOC	State Of Charge
C	Charge C-rate
RS485	RS485 Communication Interface
CAN	Controller Area Network

1.3 Symbol Stipulations

There may be following symbols herein, and their meanings are as follows.

Symbols	Description
	Indicate a hazard with a high level of risk which, if not avoided, will result in death or serious injuries.
	Indicate a hazard with a medium level of risk which, if not avoided, could result in death or serious injuries.
	Indicate a hazard with a low level of risk which, if not avoided, could result in minor or moderate injuries.
	Warning information about device or environment safety. If not avoided, equipment damage, data loss, performance degradation or other unanticipated results may be resulted in. The “NOTICE” does not involve any personal injuries.

2 Safety Precautions

2.1 Safety Symbols

This product contains the following symbols, please pay attention to identifying.

Symbols	Description
	Observe enclosed documentation
	Danger. Risk of electric shock!
	Danger of high voltages. Danger to life due to high voltages in the Energy storage system
	Hot surface
CE	CE certification
	Do not touch the product in 5mins after shutdown
RoHS	Comply with RoHS standard
	The Energy storage system should not be disposed together with the household waste.

2.2 General Safety

2.2.1 Important Notice

Before installing, operating, and servicing the equipment, please first read this manual and observe the symbols on the equipment and all safety precautions in this manual. The items marked “DANGER”, “CAUTION”, “ATTENTION” and “NOTICE” in this manual do not represent all safety precautions to be observed, but are only supplements to all safety precautions. The company is not liable for violations of the general safety regulations for operation or for violations of the safety standards for the design, manufacture and use of the device. The device must be used in an environment that meets the requirements of the design specifications. Failure to do so may result in failure of the device, and the resulting malfunction of the device or damage to components, personal injury accidents, and property damage are not covered by the quality assurance scope of the device. When installing, operating, and maintaining the unit, comply with local laws, codes, and regulations. The safety precautions in this manual are only supplements to local laws, rules and regulations. The company is not liable for the following circumstances.

- The device is not operated under the operating conditions described in this manual
- The installation and operating environment does not meet the requirements of the relevant international or national standards.
- The product is disassembled or modified, or the software code is modified without authorization.
- The operating instructions and safety warnings associated with the product and in the documents are not followed.
- Damage to the device is caused by abnormal natural environmental conditions (force majeure, such as earthquake, fire and storm).
- Transport damage is caused by the customer’s own transport
- Storage conditions do not meet the requirements of the product-related documents and cause damage.

2.2.2 General Requirements

Symbols	Description
	During installation, operation with the power supply switched on is strictly prohibited.
	It is strictly prohibited to install, use and operate equipment or cables outdoors (including, but not limited to, transporting equipment, operating equipment and cables, plugging and unplugging signal connectors connected to the outdoors, working at heights and installing outdoors) during severe weather, such as thunderstorms, rain, snow and gale force 6.
	In the event of a fire, evacuate the building or facility area and sound the fire alarm bell or dial 911. Under no circumstances should a burning building be re-entered.
	The assembly and mounting sequence of the device must not be changed under any circumstances without the consent of the manufacturer.

	Battery terminal components must not be compromised during shipment. And the battery terminal bolts must not be lifted or transported.
	It is strictly forbidden to alter, damage or cover the markings and nameplates affixed to the device.
	The composition and operating principle of the entire photovoltaic power generation system, as well as the relevant standards of the country/region where the project is located, must be fully known.
	After installing the equipment, remove empty packing materials, such as boxes, foam, plastic, and cable ties, from the equipment area.

2.2.3 Personnel Safety

Wear appropriate personal protective equipment when operating the equipment. If a fault is detected that may cause injury or damage to the equipment, stop operation immediately, notify the person in charge and take effective protective measures.

- Before using tools, learn the correct way to handle the tool to avoid injury and damage.
- When the device is in operation, the temperature of the housing is high, which can cause burns. Therefore, do not touch the housing.
- To ensure personal safety and normal use, reliable grounding should be performed.
- Do not open or damage the battery. The released electrolyte is harmful to skin and eyes, so avoid touching it.
- Do not place unimportant objects on the top of the device and do not insert them into any part of the device.
- Do not place flammable objects near the device.
- Never place the battery in a fire to avoid explosion and personal safety.
- The battery may present a risk of electric shock and high short-circuit currents. When using the battery, observe the following precautions

a) Metal objects such as watches, and rings shall be removed.
b) Tools with insulated handles shall be used.
c) Rubber gloves and shoes shall be worn.
d) The charging power supply shall be disconnected before connecting or disconnecting the battery terminals.
e) Check to see if the battery is accidentally grounded. If the battery is inadvertently grounded, remove the power supply from the ground.

- Do not clean the internal and external electrical components of the enclosure with water or detergents.

2.2.4 Personnel Requirements

- Personnel assigned to installation and maintenance must be rigorously trained to understand all safety precautions and master proper operating methods.
- Only qualified professionals or trained personnel may install, operate and maintain the equipment.
- Personnel operating the equipment, including operators, trained personnel and specialists, must have the special qualifications for operation required by their respective countries, e.g. for operation under high voltage, for work at great heights and for the operation of special equipment.
- Replacement of equipment or components (including software) must be carried out by specialists or authorized personnel.

2.3 Electrical Safety

2.3.1 General Requirements

Before making electrical connections, make sure that the device is not damaged, otherwise it may result in electric shock or fire.

Never install or remove power cables when the power is on. The moment the power cable touches the conductor, electric arcs or sparks may occur, which may cause a fire or personal injury.

- All electrical connections must comply with the electrical standards of the country/region where the project is located.
- User-made cables must comply with local laws and regulations.
- Special insulation tools should be used for high-voltage work.
- Before connecting the power cord, make sure that the marking on the power cord is correct.
- Do not work on the unit until five minutes after the power is completely turned off.
- The insulating layer of the cable may be aged or damaged if the cable is used in an environment with high temperatures. Therefore, the distance between the cable and the heat source must be at least 30mm.
- Cables of the same type should be bundled together. Cables of different types should be spaced at least 30 mm apart and should not be coiled or crossed together.

2.3.2 Grounding Requirements

- When installing the equipment to be grounded, install the protective ground wire first; when removing the equipment, remove the protective ground wire last.
- It is forbidden to destroy the protective ground wire.
- It is forbidden to operate the device without the protective ground wire installed.
- The device must be permanently connected to the protective ground wire. Before operating the device, check the electrical connection of the device to ensure that the device is reliably grounded.

2.4 Installation Environment Requirements

- This product is for indoor use only and must not be used outdoors.
- The installation position should be far away from water sources such as faucets, sewage pipes, and sprinklers to avoid the ingress of water.
- The unit should be installed on a firm and level surface.
- Do not place flammable or explosive objects near the unit.
- When the unit is in operation, do not block the ventilation openings or heat dissipation system to prevent fires caused by high temperatures.

The operation and life of the energy storage device depend on the operating temperature. The energy storage device should be installed at a temperature equal to or better than the ambient temperature

Max+60℃

Min-10℃

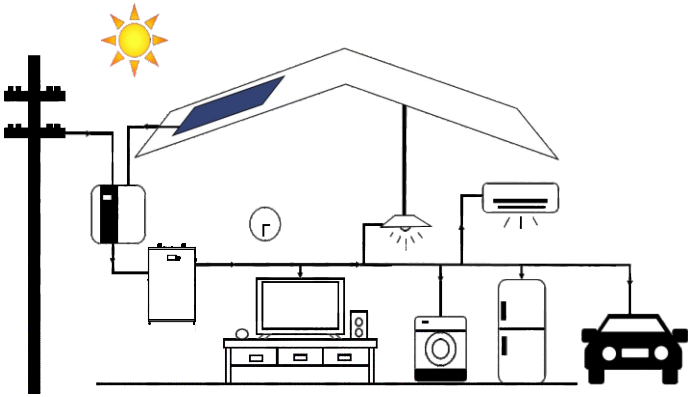
RH.+5%~+95%

3 Product Introduction

3.1 Brief Introduction to Product

- Power Wall E5B is a new generation of home energy storage system with two output specifications of 220V and 110v, which can meet the diverse needs of global users. The Power Wall E5B energy storage system is modular and consists of power modules and battery expansion modules, so it can be easily combined to create a system to fit your requirements.
- Lithium iron phosphate batteries with high performance and long service life are used in the energy storage module. At the same time, the modular design is adopted. Each energy storage module is internally integrated with the intelligent BMS system, which can be easily expanded and combined into a battery pack of maximum 80 kWh (16 batteries).

The typical topological scheme for the application of the system looks like this:



3.2 Description of Energy Storage Capacity

The Power Wall E5B series storage unit has a single battery voltage of 51.2V and a capacity of 100Ah.

3.2.1 Energy Storage Battery Module Communication description

RS232

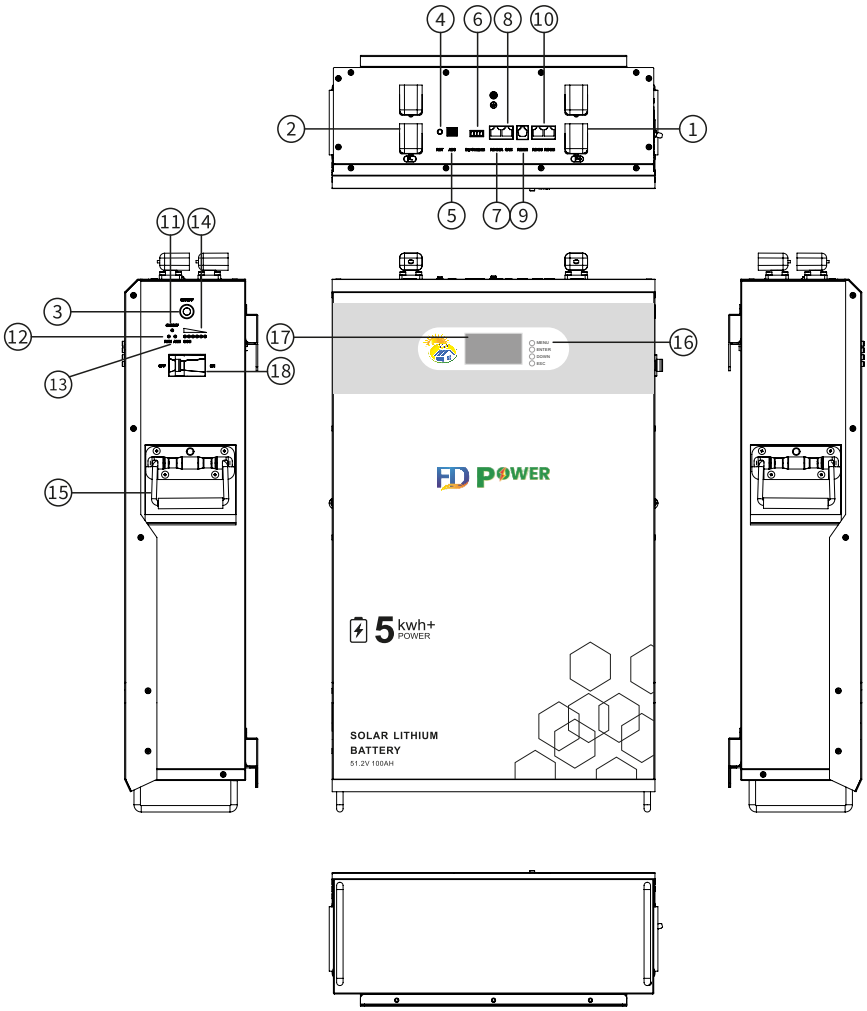
The communication BMS can communicate with the upper computer through RS232 interface, so that various information of the battery can be monitored through the upper computer, including battery voltage, current, temperature, status and battery production information. The default baud rate is 9600bps.

CAN communication

CAN communication, the default communication rate is 250K.

RS485 communication

With dual RS485 interface, you can view the pack information. The default baud rate is 9600bps. If it is necessary to communicate with the monitoring equipment through RS485, the monitoring equipment, as the host, polls the data according to the address.



①	Positive	⑩	RS485/RS485
②	Negative	⑪	(LED)ON/OFF
③	ON/OFF	⑫	(LED) RUN
④	RST	⑬	(LED) ALM
⑤	Address	⑭	(LED)CAPACITY
⑥	Dry Contacts	⑮	Handle
⑦	RS485	⑯	MENU ENTER ESC DOWN
⑧	CAN	⑰	LCD screen
⑨	RS232	⑱	Air-Breaker

3.2.2 Interface definition

RS232--adopts 6P6C vertical RJ11 socket.	
RJ11pin	Definition description
2	NC
3	TX (Veneer)
4	RX (Veneer)
5	GND

RS232 Interface

RS485--adopts 8P8C vertical RJ45 socket		CAN--adopts 8P8C vertical RJ45 socket	
RJ45pin	Definition description	RJ45pin	Definition description
1、8	RS485-B1	1、2、3、4、5	NC
2、7	RS485-A1	6	CANL
3、6	GND	7	CANH
4、5	NC	8	GND

RS485 and CAN Interface

RS485--adopts 8P8C vertical RJ45 socket		RS485--adopts 8P8C vertical RJ45 socket	
RJ45pin	Definition description	RJ45pin	Definition description
1、8	RS485-B	1、8	RS485-B
2、7	RS485-A	2、7	RS485-A
3、6	GND	3、6	GND
4、5	NC	4、5	NC

RS485 and RS485 Interface (Battery parallel communication)

3.3 Monitoring

3.3.1 The software runs on PC and its compatible computers and uses the Windows operating system. The system environment requires support for Microsoft . Net Framework version 2.0 or higher. Please make sure it is installed before use. Installation is performed as follows:

1. Download the Microsoft version of the Microsoft . Net framework

2. Double-click the downloaded program to install it (the installation steps of the different versions are different. Please follow the official instructions from Microsoft for installation)

3. The software does not need to be installed independently. If the environment meets the requirements, double-click on the Bmstools v1.22 icon to run it. After execution, the main interface of the software is displayed (see Figure 1-2)

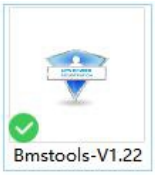


Figure 1-1

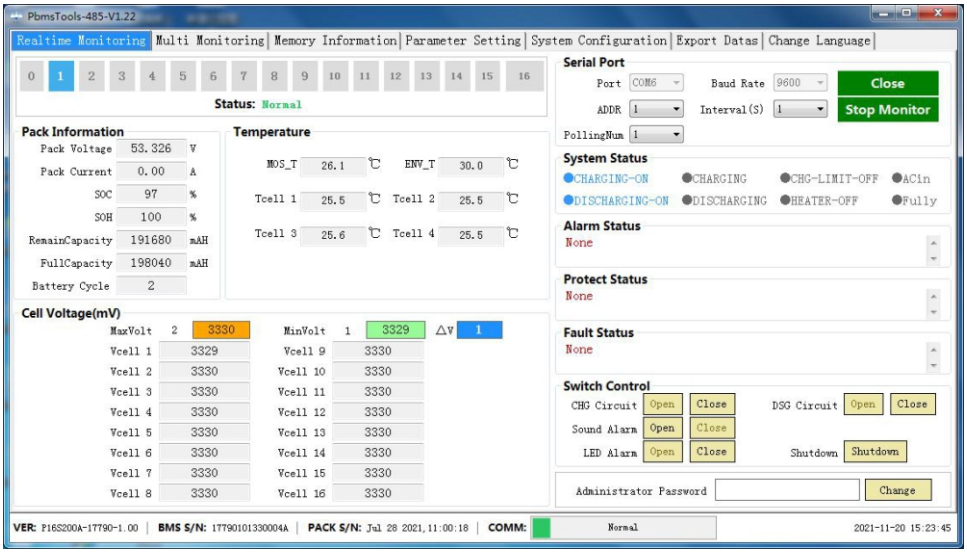


Figure 1-2（ Software main interface ）

4. After opening the main interface (see Figure 1-2), the software automatically searches for all available serial ports. When an effective serial port is found, it will automatically connect and communicate the serial port and read battery information, temperature information, device voltage, system status, alarm status, protection status, error status and other battery parameters in real time.

3.4 Interface introduction

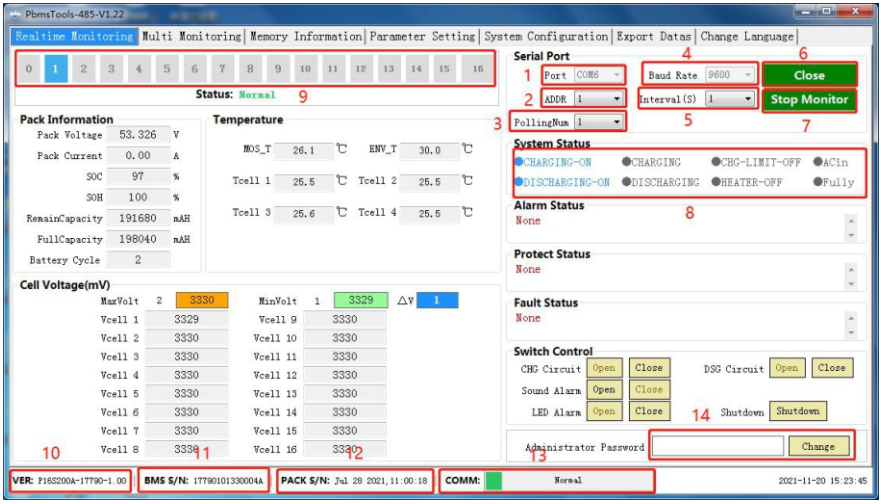


Figure1-3（ Software main inter face ）

Description of main controls (Figure 1-3)

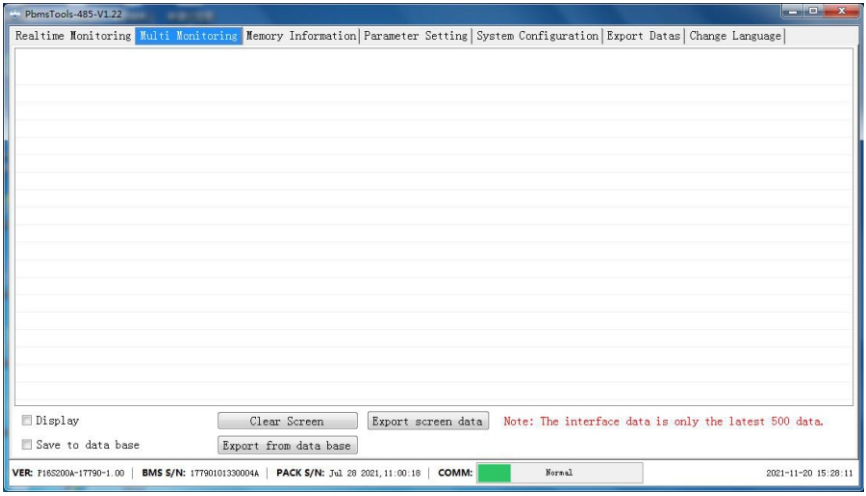
NO	Explain
1	Serial port: you can select the drop-down item to select the serial port to communicate. (Note: available when the serial port is not opened)
2	Address: read-only value, the currently read BMS address value
3	Read only value,the total number of batteries read by the host computer from the BMS board(when applied to multiple computers in parallel, battery data is obtained from the main battery)
4	Baud rate: you can select the drop-down item to select the baud rate of communication. (Note: available when the serial port is not opened)
5	Interval (seconds): optional. The interval between the upper computer reading data from the BMS board
6	Open serial port: alternate function buttons to open or close the serial port
7	Start monitoring: alternate function buttons to start or stop monitoring. The time frequency of reading data during monitoring is the time interval set in 5
8	System status: when a system status occurs, the text of the item is blue.Gray indicates no occur rence
9	Battery pack serial number: data key, which is the serial number of the battery pack. The battery pack being read and presented on the current interface is displayed in white words on a blue background

10	Version: software version number of BMS
11	Bar code of BMS board
12	Bar code of PACK board
13	Communication status: the communication status between the software and BMS board. It is valid when monitoring is started and communication is normal
14	Administrator password column: some setting functions can only be used after entering the administrator password, such as some functions in system settings. (Note: when the password is entered correctly, the input box will turn green, and you have obtained the permission of the administrator)

Open serial port and start monitoring

First set the baud rate and serial port on the upper computer, then connect the BMS board with the RS232/RS485 communication line, and then insert the USB interface of the communication line into the USB port of the computer. At this time, the upper computer will automatically search the serial port and start monitoring. If the automatic search fails, you need to manually select the newly connected serial port on the upper computer, then click button **Open** to open the serial port, and then click button **Start Monitor** to start monitoring.

【 Multi Monitoring 】



Check【 ☑Display 】at the bottom left to display the monitored real-time data in the data area. Note: there is data only when the monitoring is started normally. If there is no data, please check whether the monitoring is normal. Click **Clear Screen** button to clear the real-time data on the interface.

Click **Export screen data** to save the existing data on the interface to the local.

Check【 ☑Save to data base 】to automatically save each real-time data.The saved path is in the folder named"data" under the program root directory by default,and is stored according to the battery pack serial number by date.

【 Memory Information 】

1. The interface

Click the main interface TAB [Memory Information] to enter the interface, as shown in Figure 3-1

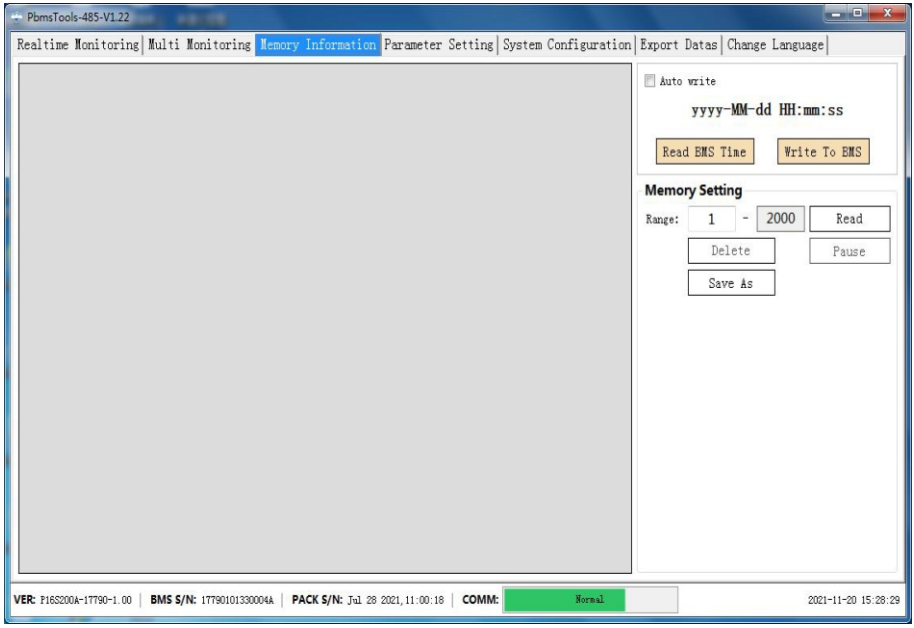


Figure 3-1

2. Read/write the BMS time

Click the upper right button to **Read BMS Time**

Click the upper right button to **Write To BMS**

3. Storage Settings

Read Record: Click **Read** the BMS. On the right.

Pause/Continue: Click **Pause** reading while reading records,and click again to continue reading.

Save records: Click **Save as** to save the records that have been read to the interface locally.

Delete Record: Click **Delete** to delete the stored record in the BMS.

【 Parameter Setting 】

1. The interface

Click the main interface TAB [Parameter Information] to enter the interface. When entering the interface, the default value of the interface is empty. As shown in figure 4-1

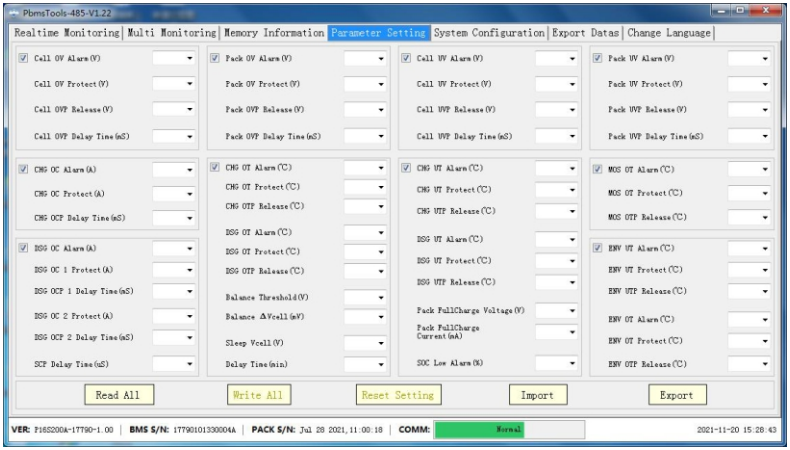


figure 4-1

2. Function

Read parameters: Click **Real All** button to read all parameters of the interface.

Write parameters: Click the **Write all** button to write parameters. This operation requires administrator privileges.

Restore default parameters: Click the **Resent Setting** button to restore all interface parameters to default parameters.

The default parameters come from the default parameters in the BMS. This operation requires administrator privileges.

Import parameters: click the **Import** button to read the data from the local file into this interface. Note: Data is only read to the interface, not written to the BMS, if you need to write, please perform write operation.

Export parameters: Click the **Export** button to save the data on the interface as an XML file.

【 System configuration 】

1. Interface

Click the main interface TAB [System Configuration] to enter the interface, as shown in Figure 5-1

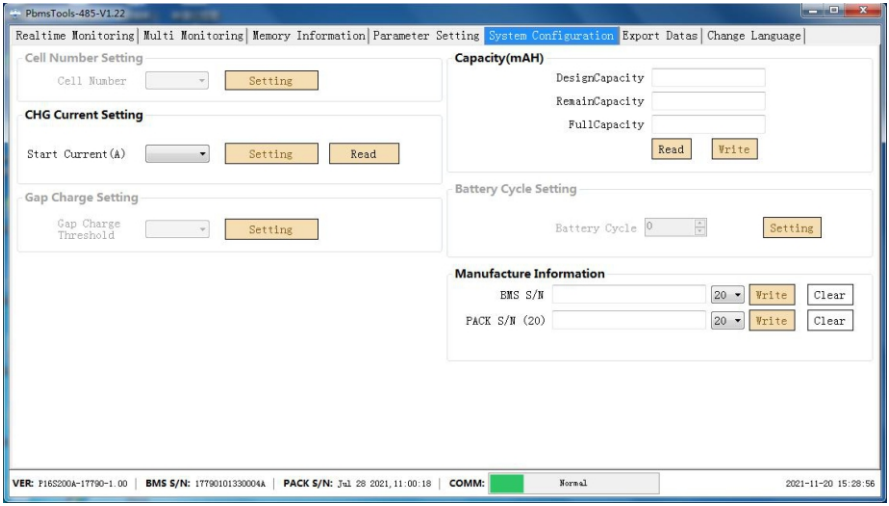
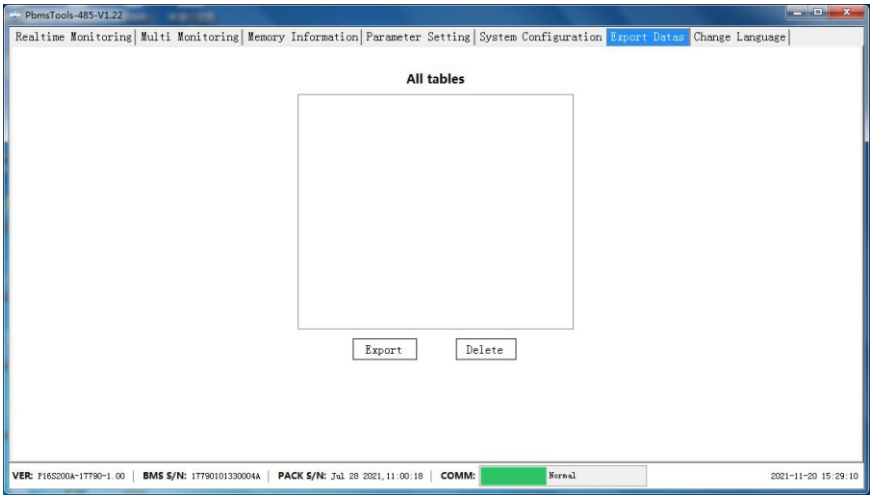


Figure 5-1

2. Function

Perform operations as prompted. Some functions require administrator rights.

【 Export Data 】



【 Change Language 】

1.Interface

Click the main interface TAB [Switch Language] to enter the interface, as shown in Figure 6-1

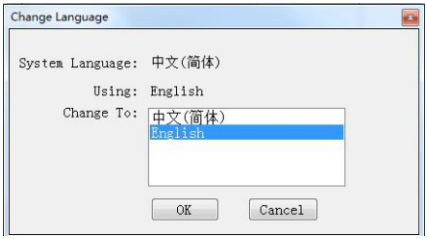


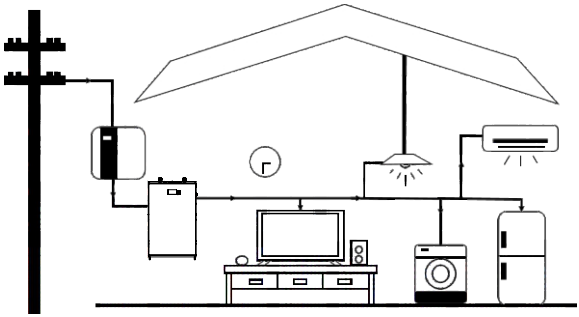
Figure 6-1

4 Application Scenarios and Settings

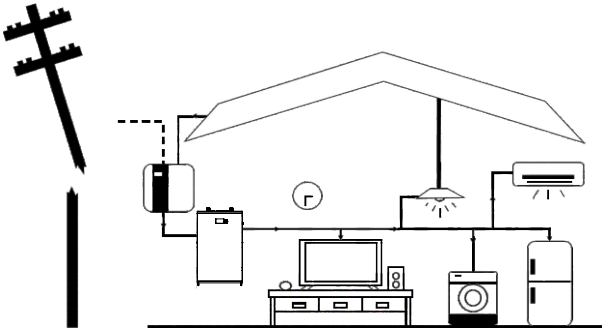
4.1 Application Scenarios

4.1.1 Application Scenarios with Only Mains Power but No Photovoltaic

When the grid is normal, it charges the battery and supplies power to the loads.

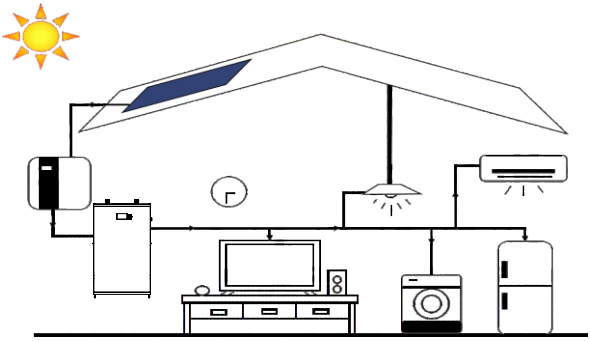


If the power grid is interrupted or stops working, the battery supplies power to the loads via the power module.

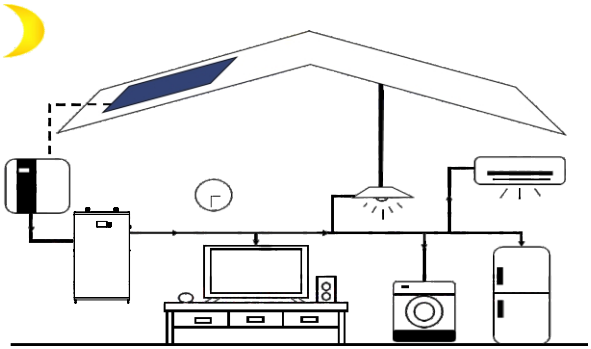


4.1.2 Application Scenarios with Only Photovoltaic but No Mains Power

During the day, the photovoltaic system supplies the consumers directly with electricity and charges the battery at the same time.

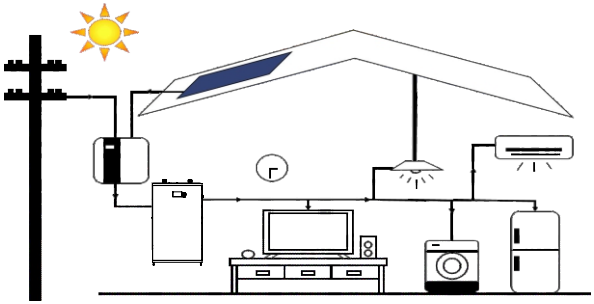


At night, the battery supplies the consumers with power via the power module.

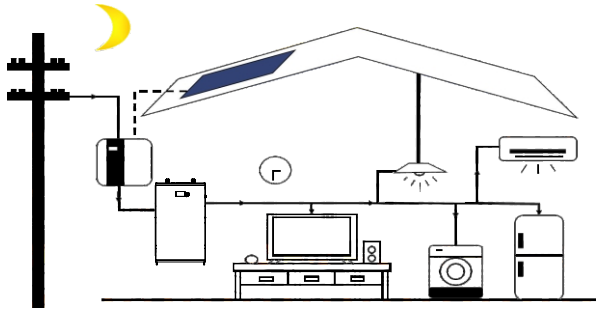


4.1.3 Complete Application Scenarios

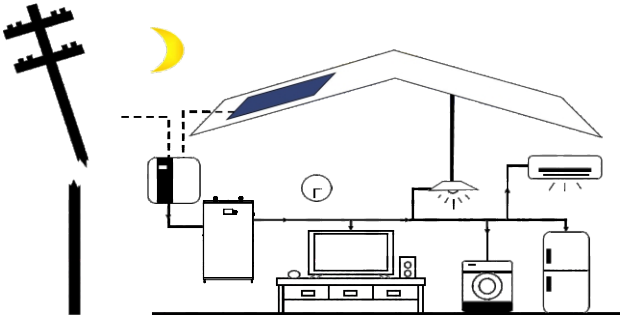
During the day, the power grid and the photovoltaic system simultaneously charge the battery and supply the loads with electricity.



At night, the grid supplies power to the loads and continues to charge the battery when the battery is not fully charged.



When the power grid is interrupted, the battery supplies power to the loads.



4.2 Load Working Mode

Load working mode	PCS setting	Description
PV priority mode	SOL	switching to the Mains when the PV fails or the battery is lower than the set value of parameter
Mains priority mode	UTI	Mains priority mode, switching to inverter only when the mains fails.
Inverter priority mode	SBU	switching to the mains only when the battery is under voltage or lower than the set value of parameter

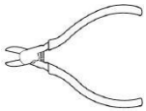
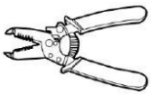
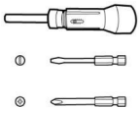
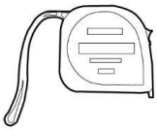
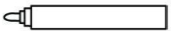
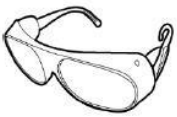
5 System Installation

5.1 Inspections before Installation

Inspection of outer package

Before opening the outer packaging of the energy storage device, check whether there is any visible damage to the outer packaging such as - holes, cracks, or other signs of possible internal damage, and check the type of energy storage device. If there are any anomalies on the package or the model of the energy storage device does not match, do not open it and contact us as soon as possible.

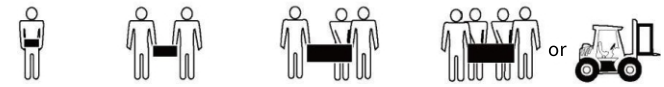
5.2 Preparation of Tools and Meters

Types	Tools Needed		
Installation tool			
			
Personal protective equipment			
			

5.3 Selection of Installation Location

5.3.1 Basic Requirements

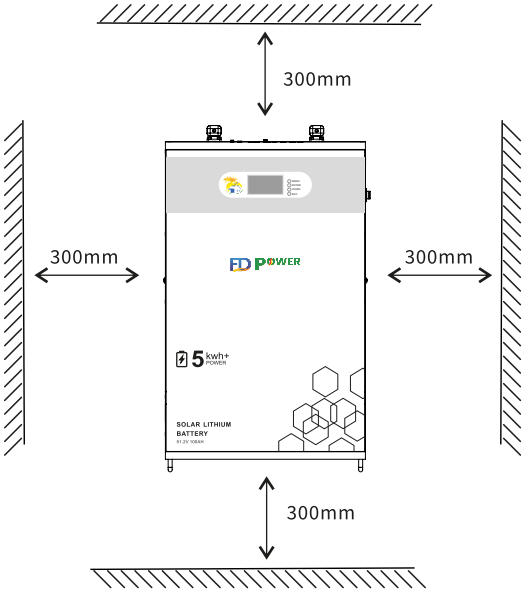
- When the energy storage device is in operation, the temperature of the cabinet and the radiator will be high. Therefore, do not install it in a place that is easy to touch.
- Do not install the energy storage device in areas where flammable or explosive materials are stored.
- If the energy storage unit is installed in areas with salt damage, it will become corroded and may cause a fire. Therefore, do not install it in areas where salt damage can occur. Salt-damaged areas are defined as areas that are not 500 m from the coast or affected by the sea breeze – Areas affected by sea breeze vary depending on meteorological conditions (e.g. typhoons, monsoons) or topographical conditions (levees, hills). Please remember this product is for indoor use only and must not be used outdoors.
- Do not install the unit in places that children can touch.
- The energy storage device cannot be installed forward, horizontally, inversely, backward or sideways.
- When drilling holes on walls or in the floor, wear protective goggles and gloves.
- During drilling, the unit should be shielded to prevent debris from falling into the unit. After drilling, debris should be removed in a timely manner.
- When handling heavy objects, be prepared to carry loads to prevent bruises or sprains.
- When handling the equipment by hand, wear protective gloves to prevent injury.



＜18kg　18kg～32kg　32kg～55kg　＞55kg

5.3.2 Installation Space Requirements

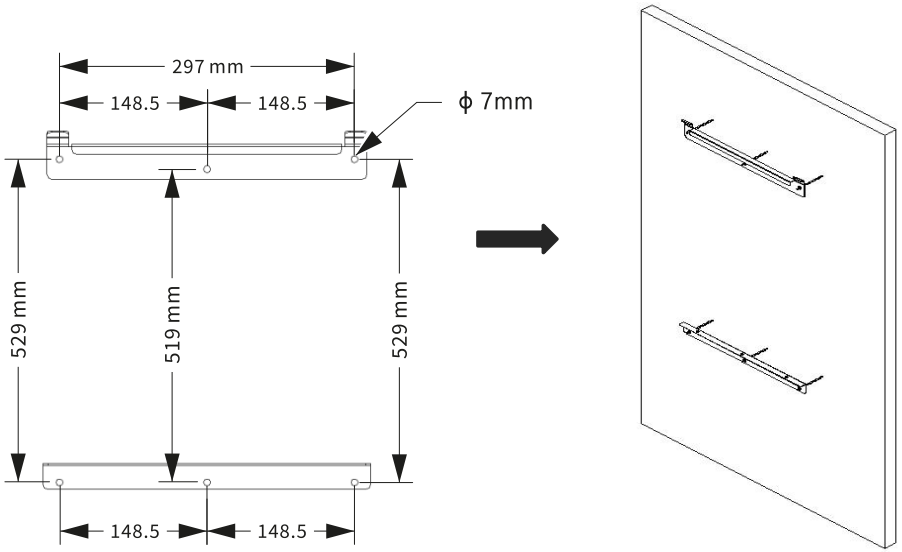
When installing the energy storage device, leave a certain space around it to ensure sufficient space for installation and heat dissipation.

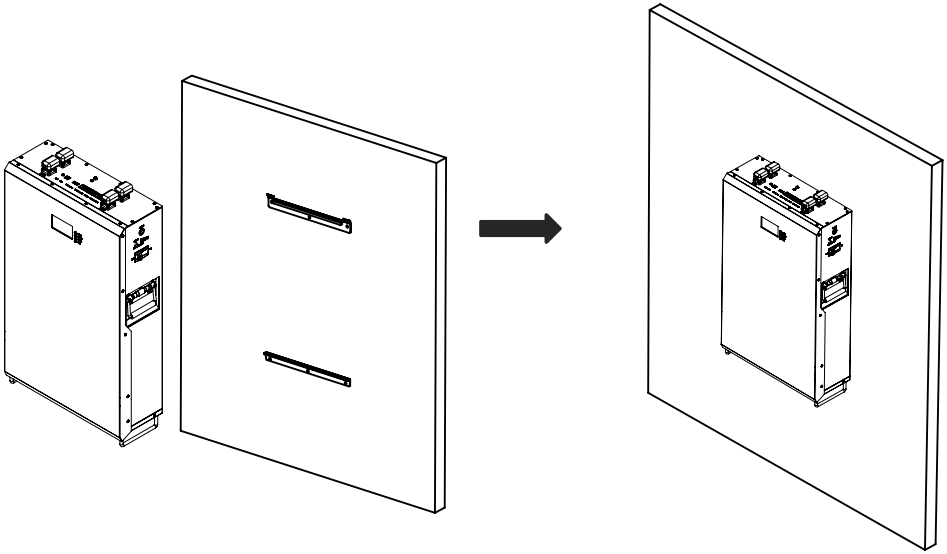


Position	Min size
Left	300mm
Right	300mm
Top	300mm
Bottom	300mm
Front	300mm

5.4 Device Installation

The battery should be placed on the wall.



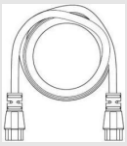


6 Electrical Connection

Before electrical connection, make sure that the switches of the energy storage device and the power module, as well as all switches connected to the energy storage device, are in the "OFF" state and the power module is in the OFF state. Otherwise, the high voltage of the device may cause an electric shock.

- Damage to the device caused by incorrect wiring is not covered by the warranty
- Work related to the electrical connections must be carried out by professional electricians.
- When making electrical connections, the operator must wear personal protective clothing (or spectacles)

6.1 List of product accessories

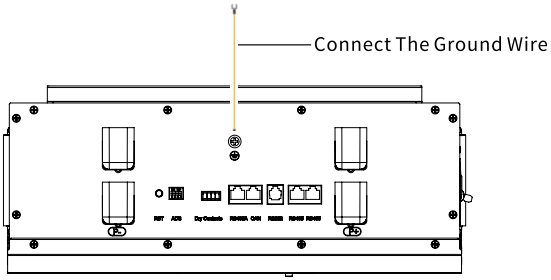
No.	Name	Description	Recommended specifications	Source
1	Certificate of approval	The Product Quality Act clearly stipulates that all products must be inspected and labeled as qualified before leaving the factory		Provided with the product together
2	User Manual	Instructions and precautions for use		Provided with the product together
3	Connecting line	Power cable between the storage battery modules		Provided with the product together
4	Stainless steel screw	Installation and fixation for connecting lines		Provided with the product together
5	Hooks	Supported on the wall		Provided with the product together
6	Signal line of energy storage	A 1.5m long signal line		Provided with the product together
7	Ground wire	Ground wire between the storage battery modules,length is 1.5m		Provided with the product together

7	Desiccant	Keep product dry		Provide with the product together
8	Expansion screws	Expansion screw fixation is to use the sharp slope to promote expansion to produce friction gripping force, to achieve the anchoring effect		Provide with the product together

6.2 Internal Electrical Connection of Energy Storage

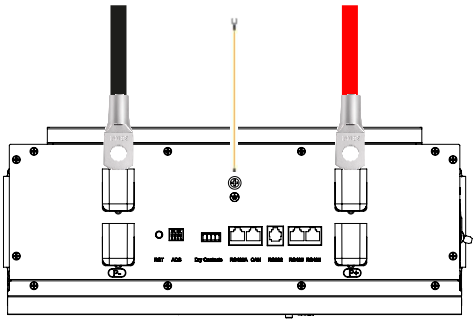
6.2.1 Connecting Ground Wire

Each energy storage battery module shall be connected with the grounding wire provided and with the product together.
When installing the equipment to be grounded, install the protective ground wire first; when removing the equipment, remove the protective ground wire last.



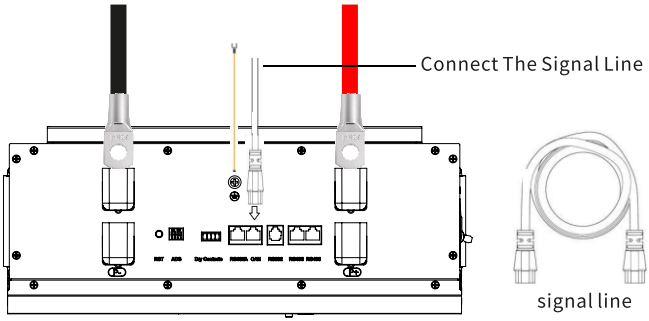
6.2.2 Connecting Power Cord

Before connecting the energy storage battery module, ensure that the energy storage battery is not working and the indicator lights on the battery are OFF. The power cord delivered with the product together should be used to connect the positive and negative terminals of other batteries or power modules. It shall be noticed that the red cable should be connected to the red terminal (positive battery terminal) and the black cable to the black terminal (negative battery terminal).



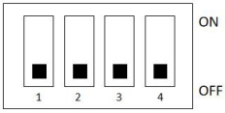
6.2.3 Connecting Signal Line

The signal line delivered with the product together shall be used to connect each energy storage battery module.



6.2.4 Energy Storage Battery Module Address Setting

If multiple energy storage battery modules are used in parallel, the address of the energy storage battery module needs to be set. The address is set to 1~4, and the address of each module cannot be repeated.



Address	Dial switch position				Explanation
	#1	#2	#3	#4	
1	ON	OFF	OFF	OFF	Set to Pack1(host)
2	OFF	ON	OFF	OFF	Set to Pack2
3	ON	ON	OFF	OFF	Set to Pack3
4	OFF	OFF	ON	OFF	Set to Pack4
5	ON	OFF	ON	OFF	Set to Pack5
6	OFF	ON	ON	OFF	Set to Pack6
7	ON	ON	ON	OFF	Set to Pack7
8	OFF	OFF	OFF	ON	Set to Pack8
9	ON	OFF	OFF	ON	Set to Pack9
10	OFF	ON	OFF	ON	Set to Pack10
11	ON	ON	OFF	ON	Set to Pack11
12	OFF	OFF	ON	ON	Set to Pack12
13	ON	OFF	ON	ON	Set to Pack13
14	OFF	ON	ON	ON	Set to Pack14
15	ON	ON	ON	ON	Set to Pack15
16	OFF	OFF	OFF	OFF	Set to Pack16

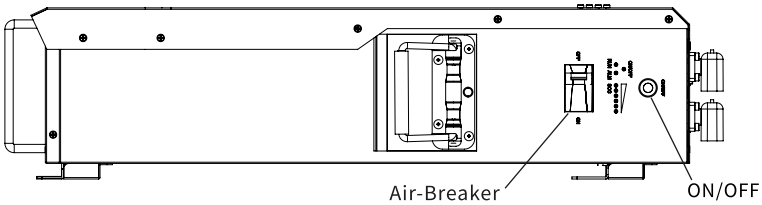
7 System Debugging

7.1 Inspections before Power-On

No.	Inspection items	Acceptance criteria	Validation
1	The energy storage is installed in place	The installation is correct, secure and reliable.	☐Yes ☐No
2	The installation environment meets requirements	The installation space is reasonable and the environment is clean and tidy without any construction remains.	☐Yes ☐No
3	The energy storage power cord is correctly connected	The positive and negative terminals are connected correctly without any missing.	☐Yes ☐No
4	The energy storage signal line is correctly connected	The signal line is connected reliably	☐Yes ☐No
5	The grounding is reliable	The grounding wire is correctly and reliably connected.	☐Yes ☐No
6	The switch of the energy storage battery module is off	All switches connected to the energy storage are in the "OFF" state.	☐Yes ☐No
7	All air switches of the power module are off	All air switches of the power module are in the "OFF" state.	☐Yes ☐No

7.2 Power-On of Energy Storage Battery Module

After pre-power-on check and confirmation, firstly turn on the metal button of the energy storage module, then turn on the air-breaker (This is a standard switch on process of one module). If there are several modules, please switch on the power switch one after the other according to the address sequence.



8 System Maintenance

8.1 System Power-Off

CAUTION

- After the system is turned off, the case still has residual voltage and heat, which may cause electric shocks or burns. Therefore, wear protective gloves before operating the energy storage device 5 minutes after the system is turned off. Maintenance work on the energy storage device should only be carried out after ensuring that all control lamps of the energy storage device have gone out
- When the energy storage system is operating, the system cannot be completely shut down by turning off only the power supply switch. No maintenance work can be performed on the energy storage system at this time. The switch of the energy storage system must be turned off before.

Power-off operation steps of the system:

Step 1 Turn off the switch between the power unit and AC output.
Step 2 Turn off the switch between the power unit and AC input.
Step 3 Turn off the switch between the power unit and the PV string.
Step 4 Turn off the switch between the power unit and the energy storage battery unit.
Step 5 Turn off switches on all energy storage units and hold down the key on energy storage for three seconds until all indicator lights turn off and the energy storage is powered off successfully.

8.2 Routine Maintenance

To ensure the long-term and good operation of the energy storage system, it is recommended to perform the routine maintenance as described in this section

Items	Methods	Maintenance interval
System cleanliness	● Check if the radiator is covered or dirt on a regular basis.	Once every six months to one year.
Running status of system	● Observe whether the energy storage appearance is damaged or deformed. ● Listen to whether the energy storage has any abnormal sound during running. ● When the energy storage is running, check whe ther the energy storage parameters are set correctly.	Once every six months.
Electrical connection	● Check if any cable connection is off or loose. ● Check if any cable is damaged, and especially if there are cuts on the sheath where the cable contacts with the metal surface. ● Check if the unused DC input terminals, energy storageterminals, COM ports, and waterproof covers are locked.	Half a year after first debugging and testing, and once every six months to one year thereafter.
Grounding reliability	● Check if the grounding cable is grounded reliably.	Half a year after first debugging and testing, and once every six months to one year thereafter.

8.3 Trouble shooting

8.3.1 Fault Code and Handling Methods

Fault code	Fault name	Whether it affects the output or not	Description
【01】	BatVoltLow	No	Battery under-voltage alarm
【02】	BatOverCurrSw	Yes	Battery discharge average current over-current software protection
【03】	BatOpen	Yes	Battery not-connected alarm
【04】	BatLowEod	Yes	Battery under-voltage stop discharge alarm
【05】	BatOverCurrHw	Yes	Battery over-current hardware protection
【06】	BatOverVolt	Yes	Charging over-voltage protection
【07】	BusOverVoltHw	Yes	Bus over-voltage hardware protection
【08】	BusOverVoltSw	Yes	Bus over-voltage software protection
【09】	PvVoltHigh	No	PV over-voltage protection
【10】	PvBuckOCSw	No	Buck over-current software protection
【11】	PvBuckOCHw	No	Buck over-current hardware protection
【12】	bLineLoss	No	Mains power down
【13】	OverloadBypass	Yes	Bypass overload protection
【14】	OverloadInverter	Yes	Inverter overload protection
【15】	AcOverCurrHw	Yes	Inverter over-current hardware protection
【17】	InvShort	Yes	Inverter short circuit protection
【19】	OverTemperMppt	No	Buck heat sink over temperature protection
【20】	OverTemperInv	Yes	Inverter heat sink over temperature protection
【21】	FanFail	Yes	Fan failure
【22】	EEPROM	Yes	Memory failure
【23】	ModelNumErr	Yes	Model setting error
【26】	RlyShort	Yes	Inverted AC Output Back-fills to Bypass AC Input
【29】	BusVoltLow	Yes	Internal battery boost circuit failure

8.3.2 Common Faults and Handling Methods

Faults	Handling measures
No display on the screen	Check if the battery air switch or the PV air switch has been closed; if the switch is in the "ON" state; press any button on the screen to exit the screen sleep mode.
Battery over-voltage protection	Measure if the battery voltage exceeds rated, and turn off the PV array air switch and Mains air switch.
Battery under-voltage protection	Charge the battery until it returns to the low voltage disconnection recovery voltage.

Fan failure	Check if the fan is not turning or blocked by foreign object.
Heat sink over temperature protection	When the temperature of the device is lower than the recovery temperature, normal charge and discharge control is resumed.
Bypass overload protection, inverter overload protection	❶ Reduce the use of power equipment; ❷Restart the unit to resume load output.
Inverter short circuit protection	❶ Check the load connection carefully and clear the short-circuit fault points; ❷ Re-power up to resume load output.
PV over-voltage	Use a multi-meter to check if the PV input voltage exceeds the maximum allowable input voltage rated.
Battery missed alarm	Check if the battery is not connected or if the battery circuit breaker is not closed.

8.4 Battery Storage and Maintenance

8.4.1 Battery Storage Requirements

Do not place the battery in a fire. The battery may explode. Do not open or damage the battery. The electrolyte that flows from the battery is harmful to the skin and eyes. The electrolyte may also be toxic;

1. During storage, batteries must be properly placed according to the markings on the package.
Do not place them upside down or on their side.
2. When stacking the battery packs, the stacking instructions on the outer packaging must be followed .
3. The batteries must be handled with care and damage to the batteries must be strictly avoided.
4. Storage environment requirements:
- Ambient temperature: -10℃ to 60 ℃, recommended storage temperature: 20℃ to 30℃.
- Relative humidity: 5% RH -80% RH.
- Dry, well ventilated, and clean.
- Corrosive organic solvents, gases and other substances shall be kept away.
- Direct sunlight should be avoided.
- The distance to the heat source should not be less than two metres.
5. During storage, the battery must be disconnected from the external connection. If there is an indicator light on the battery panel, the indicator light must be turned off.
6. The storekeeper must make monthly statistics of the stored batteries and the battery panel, the indicator light shall be off.regularly inform the planning office about the battery inventory. If a battery has been stored for nearly 15 months (-10 ℃ to 25 ℃), 9 months (25 ℃ to 35 ℃) or 6 months (35 ℃ to 55 ℃), timely recharging shall be arranged.
7. The principle of "first in first out" should be observed when delivering the stored batteries.

8. After the battery has been manufactured and tested, it must be charged to at least 50% before storage SOC. If the instrument will not be used for an extended period of time, discharge the battery to 45% to 60% of the battery capacity and disconnect the battery output to prevent the battery from running down.
9. Do not touch the battery with wet hands.
10. Do not squeeze,drop,or stab the battery.
11. The battery should always be disposed of in accordance with local safety regulations.
12. The battery should be stored and recharged in accordance with these operating instructions.
13. The batteries should not be stacked without protective packaging, and the number of stacked, packaged batteries should not exceed the number indicated on the packaging.
14. All operators of the energy storage system must comply with the user manual,installation and maintenance manual and quality assurance requirements.Any damage to the device due to failure to comply with or incorrect reading of the User Manual,Installation and Maintenance and Quality Assurance Requirements will void the product warranty.

8.4.2 Requirements for Charging of Battery

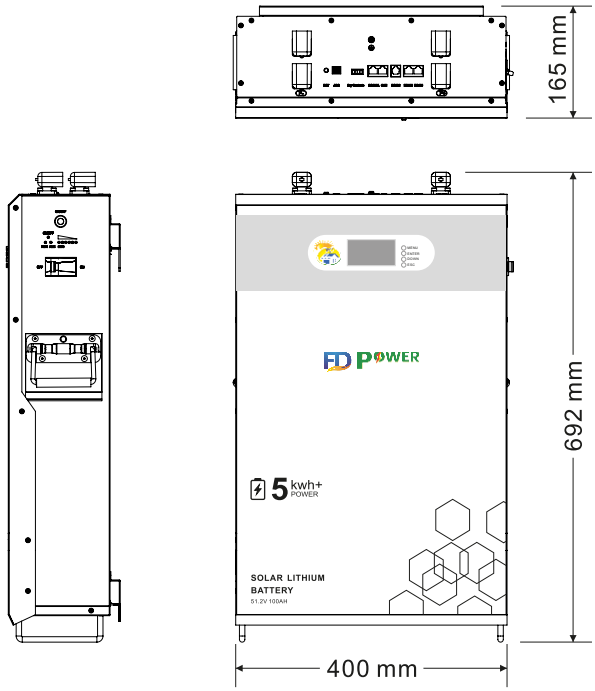
The batteries that are to be stored for a long period of time (unused, more than 3 months) must be kept in a dry and cool place. The storage voltage is 51V-53V. The batteries should be stored in a clean environment of 23±2℃ and humidity of 45%-75%. If the battery is not used for a long period of time, it should be charged every 3 months to ensure that the battery voltage is within the above range.
As with batteries and long-term storage, regular maintenance is required. Please charge the battery to 40% SOC at a current of 0.2C according to the requirements in the following table:

Ambient temperature for storage	Relative humidity for storage environment	Storage Time	SOC
<-10℃	/	Prohibited	/
-10~25℃	5%~70%	≤12 months	30%≤SOC≤60%
25~35℃		≤6 months	
35~45℃		≤3 months	
>45℃	/	Prohibited	/

8.5 Device Cleaning

It is recommended to clean and maintain the product from time to time. When cleaning, dust and stains on the product should be removed with a soft, dry cloth or a vacuum cleaner, especially when cleaning the heat dissipation and ventilation openings on both sides of the product. The product must not be cleaned with organic solvents, corrosive liquids, or other cleaning agents.

8.6 Battery Module Data



Technical Parameters	
Model	E5B
Battery Type	LiFePO4
Energy	5120Wh
Capacity	100Ah
Rated Voltage	51.2V
Working Voltage Range	43.2~58.4V
Max Charge Current	100A
Max Discharge Current	100A
DOD	80%
Max Parallel Quantity	16
Designed Life-span	6000cycles
Operating Temperature	Charge: 0~55°C Discharge: -10~55°C
Operation Humidity	5~95%
Nominal Operation Altitude	＜3000m
IP Rating	IP20
Installation Method	Wall-Mounted
Net Weight	46kg
Dimension (L*W*H)	692*400*165mm
Warranty	10 years

9. Warranty Card

Product Name	E5B
Manufacturer	
Date Purchased	
Serial Number	
Installer name	
Installer Address	
Installer Email Address	
Installer Tel Number	
Customer name	
Customer Address	
Customer Email Address	
Customer Tel Number	

1. Within one month from the date the product is purchased, if there is a performance failure, the product itself and the outer packaging must be intact. The product of the same model can be replaced, except for human-made damage.

2. The product is guaranteed for five years from the date of sale but please note the accessories are not covered by the warranty.

3. The warranty service is only valid under normal use set out in the instruction manual.

4. All damage, self-disassemble, modification or improper use is not covered under the warranty.

5. Please keep the warranty card safe (we recommend keeping the warranty card with the instruction manual). The warranty card will be needed in case of a problem. The company has the right to refuse the warranty if not provided.

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