



5.12  
kWh



# User Manual

Volt Bank  
VB5100

**1C**  
Continuous Power

**10**  
Year Warranty

**16**  
Units Stackable

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### 1.1 Application Scope

This manual introduces the information about Volt Bank Vertical Stacked battery products, including product specifications, operation specifications, product maintenance and other related information. The Vertical Stacked battery products have been widely used in small and medium-size energy storage fields.

### 1.2 Applicable People

This manual is used for professional and technical staff who installs, operates and maintains the batteries, as well as for the end-user who may need to view the relevant technical parameters.

### 1.3 User Manual

Please read the user manual carefully before use to ensure that the person using the product is fully understood. After reading, please keep it in a safe place for future reference.

### 1.4 Disclaimers

It may cause serious injury to yourself or others, or result in damage to the product or property, if fail to operate this product properly. Once using, you will be deemed to have understood, acknowledged and accepted all the terms and contents in this document. Users undertake to be responsible for their own actions and all the consequences arising therefrom. The Company shall not be liable for all damages caused by the user's failure in accordance with the provisions of this document and the user manual.

The content of this manual will be constantly updated and revised, and update, revision or termination without prior notice. So please obtain the latest product manual.

#### Revision History

No	Version	Revised by	Content	Revision Date
1	Rev1.0		First release	2022.4.19
2	Rev2.0		Update	2022.7.4
3	Rev2.1		Update	2022.8.9
4	Rev3.0		Update	2023.4.2
5				
6				

# Safety Precautions

## Warning

- Please do not put the battery into water or fire, in case of explosion or any other situation that might endanger your life.
- Please connect wires properly while install, do not reverse connect.
- Please check the positive and negative connection with meter before powering on the battery, to avoid short circuit.
- Please avoid damaging the battery, especially stab, hit, trample or strike.
- Please turn off the battery and cut off all power completely when you remove the device or reconnect power cables ,otherwise it could cause the danger of electric shock.
- In case of fire, please use a dry powder fire extinguisher to extinguish the fire. Liquid fire extinguishers may explode.
- For your safety, please do not disassemble any parts at will under any circumstances.  
Maintenance must be carried out by authorized technicians or our company's technical support personnel. Equipment failure caused by unauthorized operation is not covered by the warranty.



## Caution

- Our products have been strictly inspected before shipment. Please contact us if you find any abnormal phenomena such as unable to turn on.
- Please ground the product correctly before use to ensure your safety.
- In order for the product to be used correctly, please ensure that the relevant equipment is compatible and matched, and the parameters are set correctly.
- **Please do not mix batteries from different manufacturers, different types and models, as well as old and new.**
- The environment and storage method may affect the life of the product, please follow the user manual to ensure the normal operation of the device.
- For long-term storage, the battery should be recharged once every 6 months, to make SOC get to 50%.
- Please recharge the battery in 24 hours after it is fully discharged or over-discharge
- protection is activated.
- Formula of theoretical standby time:  $T=C/I$  (T is standby time(h), C is battery capacity(Ah), I is total current on the battery(A)).

# Preface

## Manual declaration

The VB5100 (LFP) battery energy storage system is designed to supply energy to users through parallel combination, and it is not suitable for use in series.

This user manual provides information on the fundamental structure, parameters, basic procedures, and methods for the installation, operation, and maintenance of the equipment.

# 1 Introduction

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## 1.1 Brief Introduction

Volt Bank is a vertical stack Lithium iron phosphate battery module system that is designed for energy storage power supply system application. This battery module integrated with intelligent BMS inside, has big advantages on safety, cycle life, energy density, temperature range and environmental protection. This product specification describes the type, size, structure, electrochemistry performance, service life, and BMS characteristics. This specification only applies to the battery module supplied by Solar Energy Distributors LLC.

## 1.2 Product Properties













VB5100 battery system is a standard 5.12kwh battery unit, customers can choose a certain number of VB5100 according to your needs, parallel them to create a larger capacity battery pack. This product is especially suitable for energy storage applications with high operating temperatures, limited installation space, long power backup time and long service life.

- Packed with high performance LFP single cell, long life, safety and wide temperature range
- High energy density, small size, light weight, no pollution
- Packing with single cell container, fire retardant wire and laser welding, stable and safe
- Built-in BMS, with battery voltage, current, temperature and health management
- LCD Screen display the battery voltage, current, temp.,SOC detail information
- Set different communication protocols through LCD touch screen
- Support communicate with solar inverter by CAN or RS485
- Support 16nos in parallel and communicate by RS485/CAN
- Integrated with fire extinguishing module inside, Prevention of fire
- More than 15 years design life
- Stable performance, maintenance-free

### 1.3 Product identity definition

In order to ensure the user's personal safety when using this product, this manual provides relevant identification information and uses appropriate symbols to alert the user, who should carefully read the following list of symbols used in this manual.

Table 2-1 Label description

	Potentially low risk: may result in mild or moderate impairment if not avoided
	High Risk: May result in serious injury or death if not avoided
	The battery terminals must be disconnected before commencing on the battery
	The battery could explode and/or be severely damaged if dropped or crushed
	The battery may explode if exposed to open flames or other extreme sources of heat
	Grounding: The system must be firmly grounded for operator safety
	This side should be up
	Handle with care to avoid damage
	Keep dry
	Keep the battery away from kids
	Do not short circuit
	Do not reverse connection the positive and negative

## 2 Product Specification

### 2.1 Size and Weight

Table 2-1 VB5100 Size of the device

Product	Nominal Voltage	Nominal Capacity	Max.Dimension	
VB5100	DC51.2V	100Ah	27"W * 7"D * 18"H	≈110lbs (50kg)

Table 2-2 VB5100 performance parameter

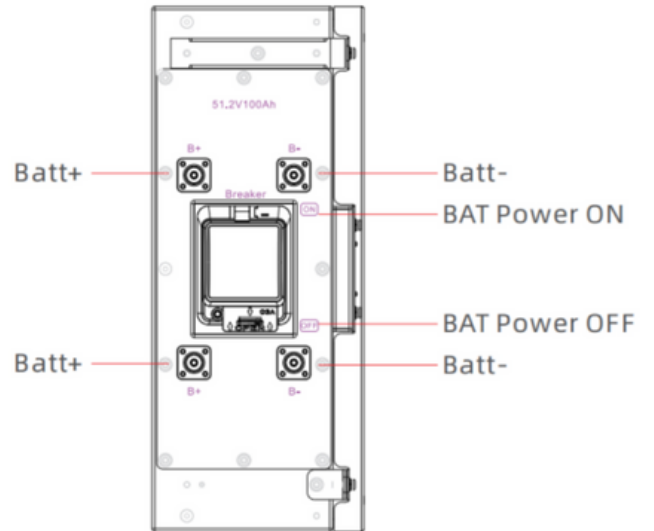
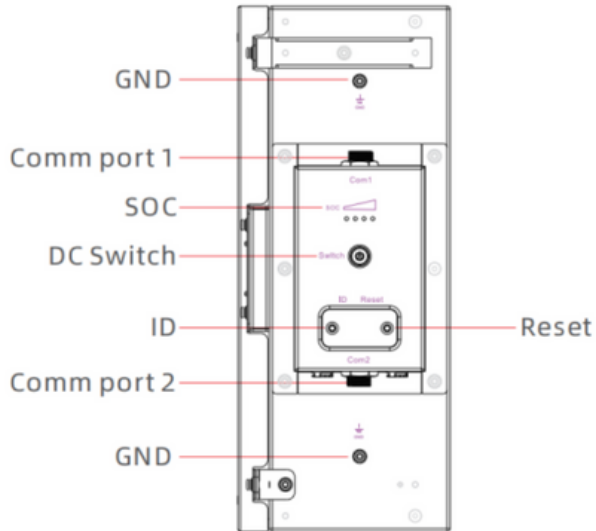
### 2.2 Performance Parameter

Item Parameter value	Specification
Rated Voltage(V)	51.2V
Rated Capacity(Ah)	100Ah
Rated Energy(kWh)	5.12 kWh
Recommend Charge/Discharge Current (A)	30 A
Max. continuous Charge/Discharge Current (A)	100 A
Charging current	5.12
Discharging current	100A
Charge range	32° ~ 113°F (0° ~ 45°C )
Discharge range	-4° ~ 122°F (-20° ~ 50°C )
Storage range	-4° ~ 122°F (-20° ~ 50°C )
Charge Voltage (Vdc) 56.5	44.8 ~ 56.0 +/- 0.8V

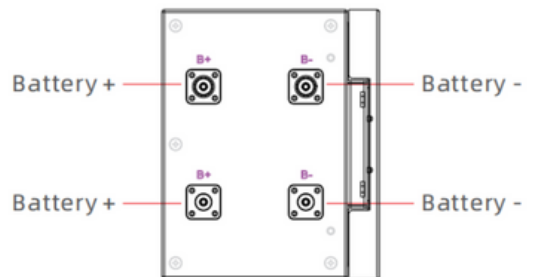
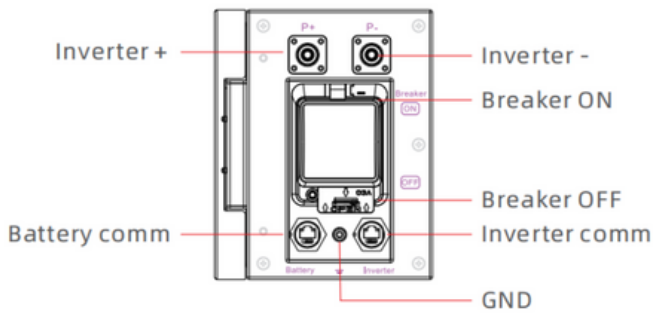


## 2.3 Volt Bank Panel Diagram

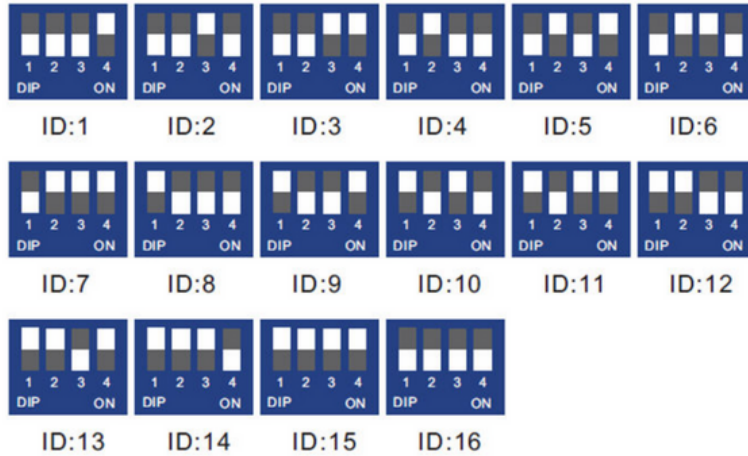
### Battery module



### Combiner box



### 2.3.1 DIP switch definition and description



**Notes:**

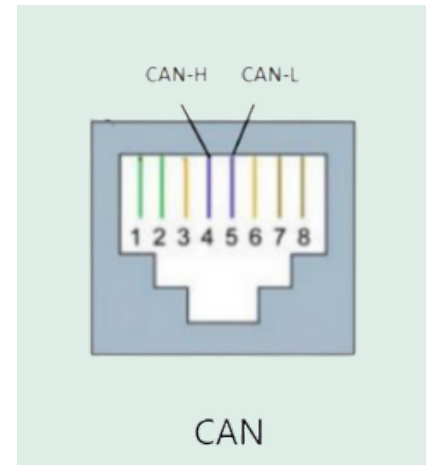
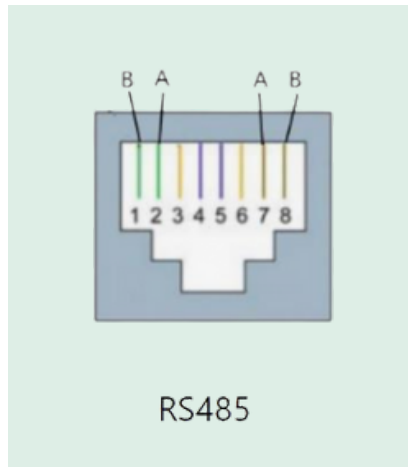
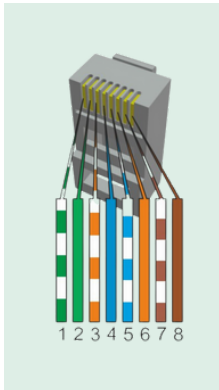
ID code bits corresponds to binary digits, down represents "ON", up represents "OFF", the right side of the code bit is the low bit, the left side is the high bit, the code range is 0~15, in the communication mode can support up to 16 modules in parallel.

Status	Normal/Alarm/Protection	RUN	ALM	SOC Indicate LED	Notes	
		●	●	SOC1~SOC4 ●		
Shutdown / Sleep		OFF	OFF	OFF		
Stand by	Normal	ON	OFF	Based on battery indicator (Each LED indicators 25%SOC)		
	Alarm	ON	Flash		According to the state before standby	
Charge	Normal	Short flash	OFF			
	Alarm	Short flash	Short flash			
	End-off Voltage	OFF	ON			
	Over-Temp Protection	OFF	Short flash			
	Over-current transfer limit -current	Short flash	Short flash/OFF		Over-current flash, limit-current OFF	
Discharge	Normal	Long Flash	OFF		Based on SOC indicator	
	Alarm	Long Flash	Long Flash			
	End-off Voltage	OFF	OFF			Go to sleep
	OverTemp/Over-current Protection	OFF	ON			
BMS Fault		OFF	Flash	All OFF		

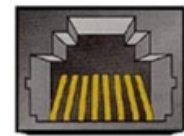
**Notes:**

Shutdown: All LED lights are off; Power on: RUN light is always on; System failure: ALM light is always on; each SOC light represents 25% capacity; Long flash: flash once every 2.4 seconds; Short flash: flash once every 1.2 seconds.

### 2.3.2 Communication port and cable pinout definition



### Communication interface definition



87654321

RS485 interface		CAN- interface	
Pin No.	Definition	Pin No.	Definition
Pin-1,Pin-8	RS485 B-(T/R-)	PIN-4	CAN_H
Pin-2, Pin-7	RS485 A+(T/R+)	PIN-5	CAN_L
Others	NC	Others	NC

Tip: Please pay attention of the communication port definition of inverter, in order to make battery and inverter communicate normally.

## Note:

The buzzer sound alarm setting can be manually turned off on the monitor software, and the factory default is on.

## 2.4 Battery Management System(BMS)

### 2.4.1 Voltage Protection

#### Low Voltage Protection :

When battery Min.cell voltage or total voltage is lower than the rated protection value, the over-discharge protection will be activated, and the buzzer on BMS will make an alarm sound. Then battery system will cut off output. When there is charge current and the voltage increase to rated value, the protection is off.

#### Over Voltage Protection in Charging:

Battery will start protection and stop charging when total voltage or Max. cell voltage reaches the rated protection value during charge. When total voltage and Max. cell decrease to rated value, the protection is off.

### 2.4.2 Current Protection

#### Charge Limit Current function :

When  $102A \leq \text{charge current} < 105A$ , BMS will limit the charge current to 10A automatically.

BMS retest every 10min, and discharge/full charge/no-charge 2.5min /restart SW can release immediately .

If this function is not activated when  $\text{charge current} \geq 102A$ , BMS will start the over-charge current protection and cut off charge after 15s.

#### Over-charge Current Protection :

When it is " $105A \leq \text{charge current} < 110A$ ", the BMS will start the over-charge current protection and cut off charge after 15s,when it is " $\text{charge current} \geq 110A$ ",BMS will start protection and cut off charge after 500ms.

After protection, restore in 1min delay or you can restart SW.

#### Over-discharge Current Protection :

When it is " $105A \leq \text{charge current} < 120A$ ", the BMS will start the over-discharge current protection and cut off discharge after 15s,when it is " $\text{discharge current} \geq 120A$ ",BMS will start protection and cut off discharge after 500ms.

After protection, restore in 3min delay or immediately when there is charge current. Or restart SW button.

### 2.4.3 Temperature Protection

#### Low/High temperature protection during charge

When cell's temperature is beyond range of  $32^{\circ} \sim 113^{\circ}F$  ( $0^{\circ} \sim 45^{\circ}C$ ) during charge, temperature protection is activated, BMS will stop charging.

The protection is off when temperature goes back to rated work range.

**Low/High temperature protection during discharge**

When cell's temperature is beyond range of -4° ~ 122°F (-20° ~ 50°C ) during discharge, temperature protection is activated, BMS will stop discharging.

The protection is off when temperature goes back to rated work range.

**2.4.4 Other Protection**

**Short Circuit Protection:**

Each time when short circuit appears,BMS will recover after 1 min automatically ,after 4 times it will be locked,then you need to check the connection,and restart SW to release.Charge the battery also can release the locked state.

**Reverse Connect Protection:**

Yes , generally it can protect BMS in reverse connection,but you should avoid reverse connection to prevent irreversible damage to the BMS in extreme cases.



**Caution**

The discharge current that load needs should be lower than the battery's Max.discharge current.

# 3 Installation and Configuration

## 3.1 Preparation for installation

### 3.1.1 Safety Requirement

This system can only be installed by personnel who have been trained in the power supply system and have sufficient knowledge of the power system.

During the installation, daily maintenance, overhaul and other operations of Volt Bank products, the following conventions should be observed in order to prevent the accidental operation, proximity or occurrence of accidents by unrelated personnel: the front and rear switches of the products should be clearly marked to prevent accidents caused by wrong switches; warning signs or safety warning belts should be set near the operation area to prevent the proximity of unrelated personnel.

When installing the battery system, installer must wear the protective items below:

Tools	Protective suit 	Safety glasses 	ESD wrist strap 
Installation Tools	Electric screwdriver 	Cross screwdriver 	Wrench 
	Slotted screwdriver 	Wire stripper 	

### 3.1.2 Environmental requirements

Discharge temperature: -4°F ~ 131°F (-20°C ~ 55°C)

Charge temperature: 32°F ~ 131°F (0°C ~ 55°C)

Storage temperature: 14°F ~ 95°F (-10°C ~ 35°C)

Relative humidity: 5% ~ 85%RH

And the following conditions are met:

- Installation location should be away from the sea to avoid brine and high humidity environment.
- The ground for product arrangement shall be flat and level.
- No flammable explosive materials near the installation site.
- The optimal ambient temperature is 59° ~ 86°F (15° ~ 30°C)
- Keep away from dust and messy zones

### 3.1.3 Technical preparation

#### **Electrical interface check**

- Confirm the battery interface on the inverter is good and no short circuit.
- Confirm the battery capacity is enough to supply power to the load when the inverter is running at full power.



#### **The security check**

- No flammable, explosive and other dangerous materials are placed beside the battery.
- Warning labels, back panels and front doors of cabinet contain important and safety protection information and are strictly forbidden to be torn and damaged.

### 3.1.4 Unpacking inspection

- After the equipment arrives at the installation site, it should be loaded and unloaded according to the regulations to prevent the sun and rain.
- Before unpacking, the total number of packages should be indicated on the invoice attached to each package, and the box should be checked to see if it is in good condition.
- During the unpacking process, handle with care to protect the surface coating of the item.
- When opening the package, the installer should read the technical documents, checklist, and ensure that the items are complete and intact according to the configuration sheet and packing list. If there is any damage to the inner package, it should be checked and recorded in detail.

Pack list: battery + BMS Combiner Unit

Item	Specification	Quantity	Figure
securing brackets		2	
Parallel cable-positive	Red 12" L	1	
Parallel cable-negative	Black 12" L	1	
Comm cable batteries	Blue 12" L	1	
Comm cable Inverter	Blue 6' L	1	
Inverter cable-positive	Red 6' L	2	
Inverter cable-Negative	Red 6' L	2	
BMS Combiner Unit	27 1/4"W *10 1/4" H *6 3/4"D	1	
51.2V/100Ah with base	27 1/4"W * 15 5/8"H * 6 3/4"D 2" H Base	1	

### 3.1.5 Engineering coordination

The following items should be noted before construction:

- Power line specification. The power line specification shall meet the requirements of maximum discharge current for product.
- Mounting space and bearing capacity. Make sure that the battery has enough room to install, and that the brackets have enough load capacity.
- Wiring. Make sure the power line and ground wire are reasonable. Not easy to short-circuit, water and corrosion.

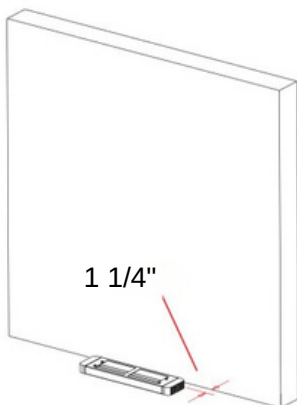
## 3.2 Equipment installation

The installation position of the battery cabinet has a direct impact on its safety, service life and performance. It should ensure that the wiring of the system is convenient, easy to maintain and operate, and should avoid placing the battery cabinet in a high temperature and high humidity environment.

1. Installation space and load bearing. Make sure that there are sufficient fixed components to install the battery, and to ensure the battery mounting bracket or the cabinet be strong enough to bear the weight.
2. Cable specifications. To ensure that the use of the connection of the power supply line can match the maximum current requirements of equipment operation.
3. Layout. Ensure the whole construction process of power equipment, batteries reasonable layout.
4. Wiring layout. Ensure the wiring reasonable, orderly; consider the moisture-proof, corrosion prevention.
5. The whole installation process should wear anti-static wristband.
6. The installation site should be at least two or more peoples to operate.

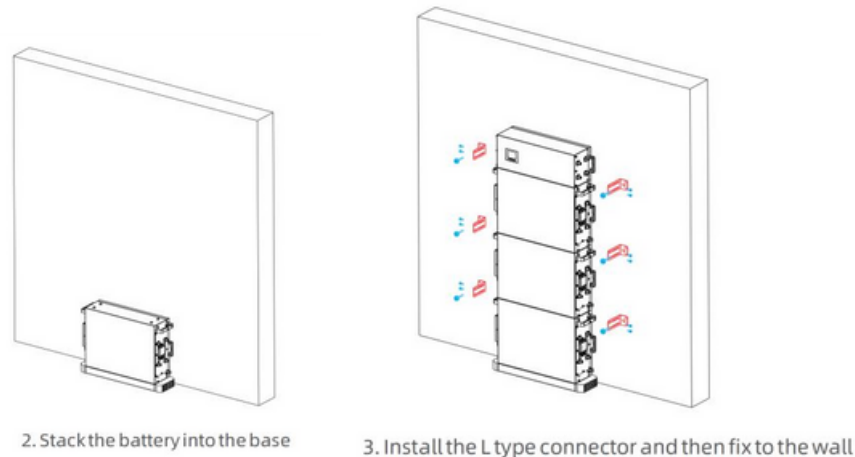
### 3.2.1 Bottom base installation

Put the Bottom base on the ground against the wall.



1. Install battery base





Install the battery on the wall and lock the battery using the security screws.

1. Single battery module is about 55kg. If without handling tools must have more than 2 men to handling with it. Handles on the two sides of the battery can be used to handle.

2. And the battery has feet for standing on the ground application, If you can't hang the wall, you can also use it on the ground, but need be careful of falling.

## 7.4.2 Terminals Connection

1. Connect to Inverter with power cable and communication cable.

2. More than one battery module to parallel, Set the ID following the ID arrangement table. Connect the power cable in parallel by power cables and connect communication cables in battery comm interface with communication cables .

Connect the first or last battery module RS485/CAN interface to the inverter.

3. Push the "ON/OFF" button to start the battery system.

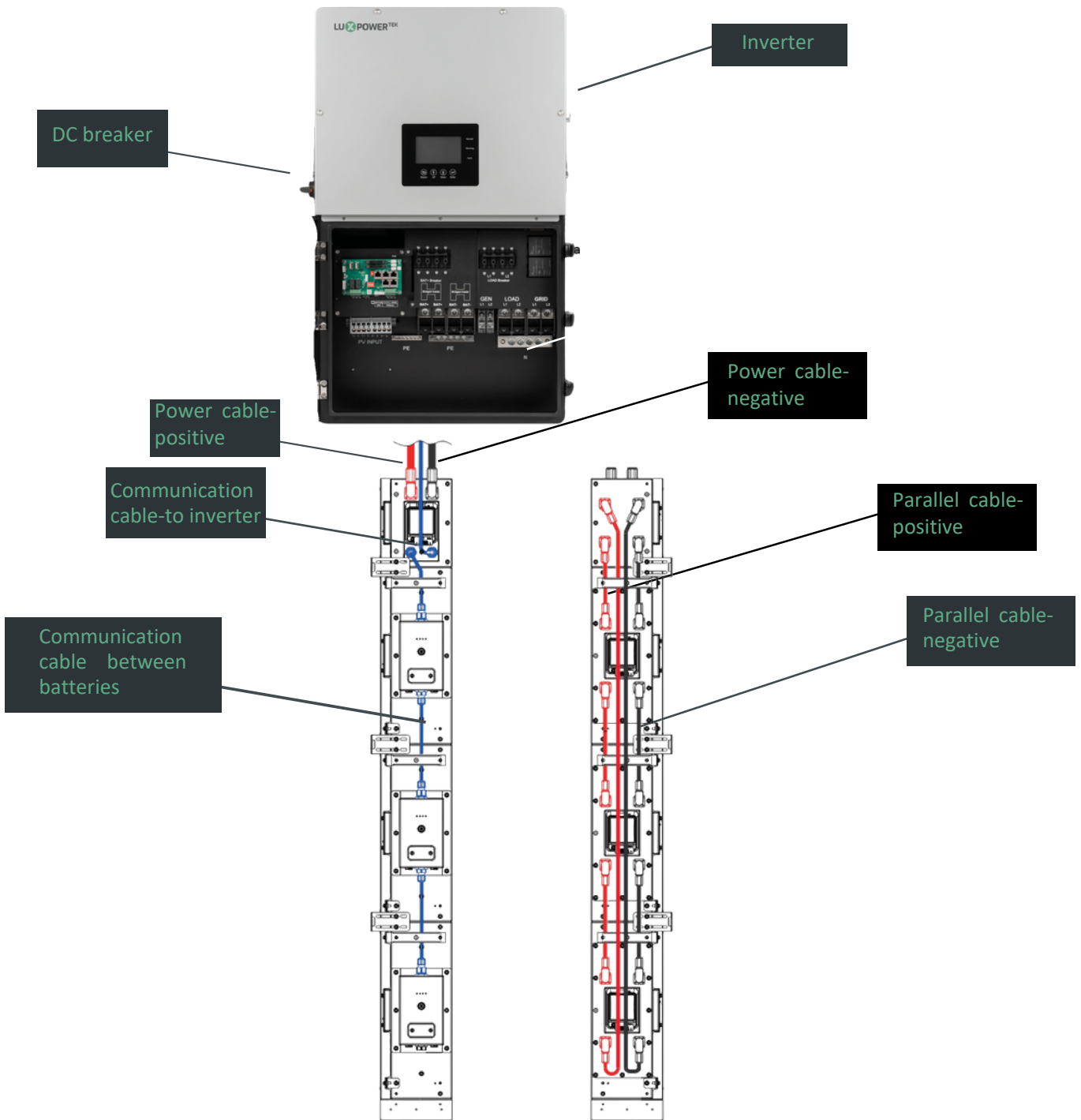
4. Check the battery data and ensure the battery is on normal operation.



**Caution:** If you have any question about the installation, please stop and contact technical support immediately.

If the battery does not start or control panel ALM lights, please disconnect the power line inspection and re-install the start, if still cannot solve please contact technical support, avoid damage to equipment or cause accidents.

When multiple battery modules are used in parallel, connect the positive and negative terminals in parallel one by one, and then connect the top battery terminals and the bottom battery terminals to combiner box.



**Note:**

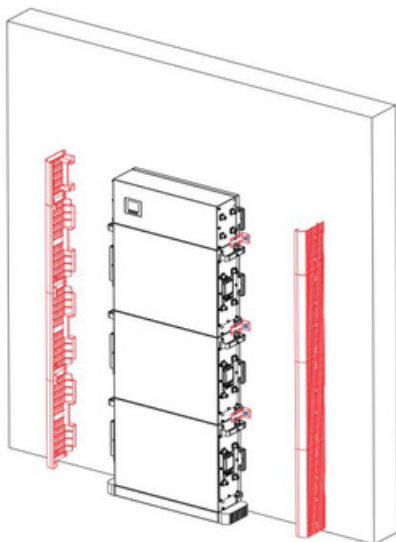
Each pair of power cable, its limited continuous current is 125A, if the inverter Max.

After installation or maintenance, the lithium battery system needs to be started up. Before starting up, please check the following precautions carefully to make sure there are no errors.

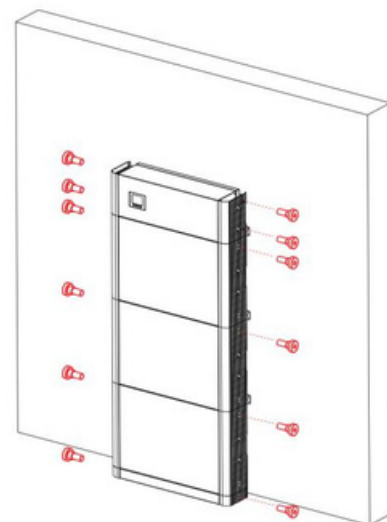
All electrical connections must be made in accordance with the electrical diagrams in the manual; the DC combiner box must be open; the cables are properly distributed, without mechanical damage, and connected and fastened correctly; the internal protection devices in the combiner box must be firmly installed; No excess parts or conductive material remains.

After completing the above steps, press the ON/OFF switch on the control panel to turn on the machine, then turn on the miniature circuit breaker and turn on the power of the whole system to complete the installation.

### Side cover installation



5. Install decoration bracket



6. Screw the decoration bracket tight

### 7.5.4 System Charge



When the battery system is transported or stored for a long time, the battery SOH may be low due to self-discharge of the cells and system consumption, and the lithium battery needs to be charged after normal start-up and before use.

### 3.2.2 Battery parameter settings on the inverter

Item Parameter value	Specification
Rated Voltage(V)	51.2V
Rated Capacity(Ah)	100Ah
Rated Energy(kWh)	5.12 kWh
Recommend Charge/Discharge Current (A)	30 A
Max. continuous Charge/Discharge Current (A)	100 A
Charging current	5.12
Discharging current	100A
Charge range	32° ~ 113°F (0° ~ 45°C )
Discharge range	-4° ~ 122°F (-20° ~ 50°C)
Storage range	-4° ~ 122°F (-20° ~ 50°C)
Charge Voltage (Vdc) 56.5	44.8 ~ 56.0 +/- 0.8V

## 4 Use, maintenance and troubleshooting

### 4.1 Battery system usage and operation instructions

After completing the electrical installation, follow these steps to start the battery system.!

1. Refer to the description of the DIP switch of 2.3.1 to prepare the battery module before starting up, then press down the SW button .
2. After the indicator self-test, the RUN indicator will light and the SOC indicator will be on according to actual SOC.
3. If you want to turn off the battery ,please stop the charge or discharge firstly,then turn off the SW button.

Figure4-1



#### Caution:

1. After waking up the battery, if the ALM light is flashing or on, please refer to the "4.2 Alarm description and processing ". If the failure cannot be eliminated, please contact the dealer timely.
2. Use a voltmeter to measure whether the voltage of the circuit breaker battery access terminal is higher than 44.8V, and check whether the voltage polarity is consistent with the inverter input polarity. If the circuit breaker battery input terminal has a voltage output and is greater than 44.8V, then the battery begun to work normally.
3. After confirming that the battery output voltage and polarity are correct, turn on the DC breaker.

## 4.2 LCD Screen and PC Software

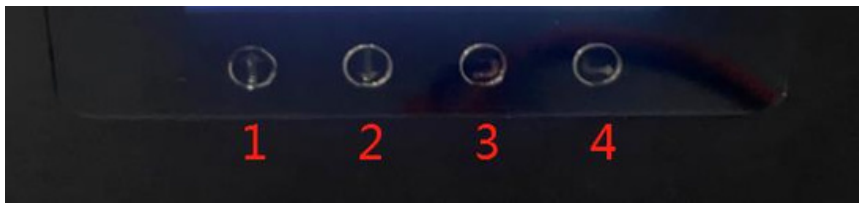
The PC software is only suitable for installation, maintenance.

### LCD Display Introduction

LCD display is embedded in each battery module, it's used to display some important information about the cells, such as voltage, current, temperature, SOC, capacity, running status etc.

### Button Description

There are 4 function buttons below the display with detailed descriptions as shown in the table below.



The corresponding function description for each button is shown in the table below.

	Button	Description
1	Up	Page up
2	Down	Page down
3	Back	Return
4	Enter	Confirm

### Screen Wake Up

Press any key to wake up the screen when power is on, and more information will be shown on the display. Main Page information



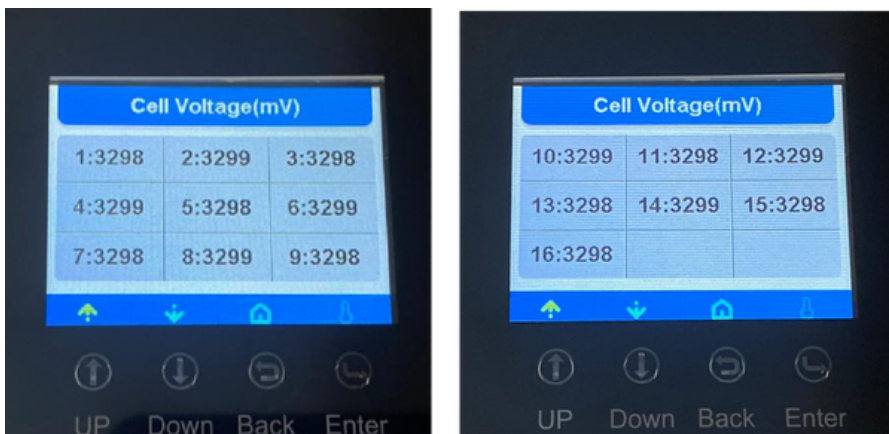
Main page information introduction

Battery module name	LFP-51.2V100Ah-V1.0		
Battery status	Standby	Battery module voltage	Vol: 52.77V
Battery module current	Cur: 0.00A	Battery SOC	SOC: 100%
System time	2023-04-11 00:00		

## Cell Information

Press the "Enter" button, check the cell information, there are 2 pages, "Up" and "Down" to change the page. Page 1 is for cell 01~ cell 9, page 2 is for cell 10~cell 16.

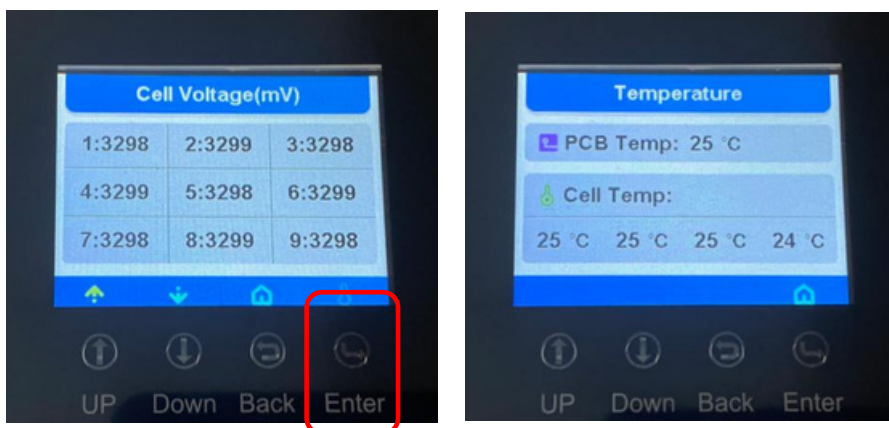
Cell information



## Temperature Information

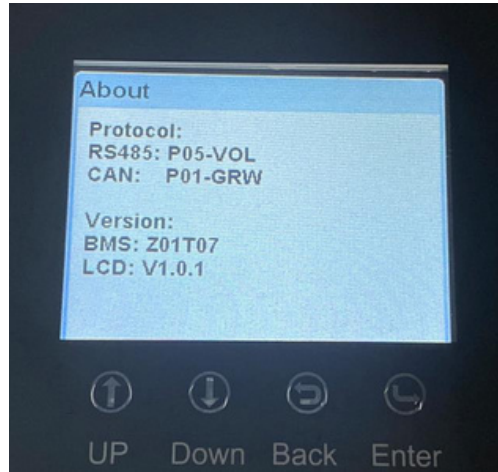
In the above interface, click the thermometer icon on the screen and press "Enter" below to view the information under the corresponding icon.

Temperature information



## Working Mode Selection

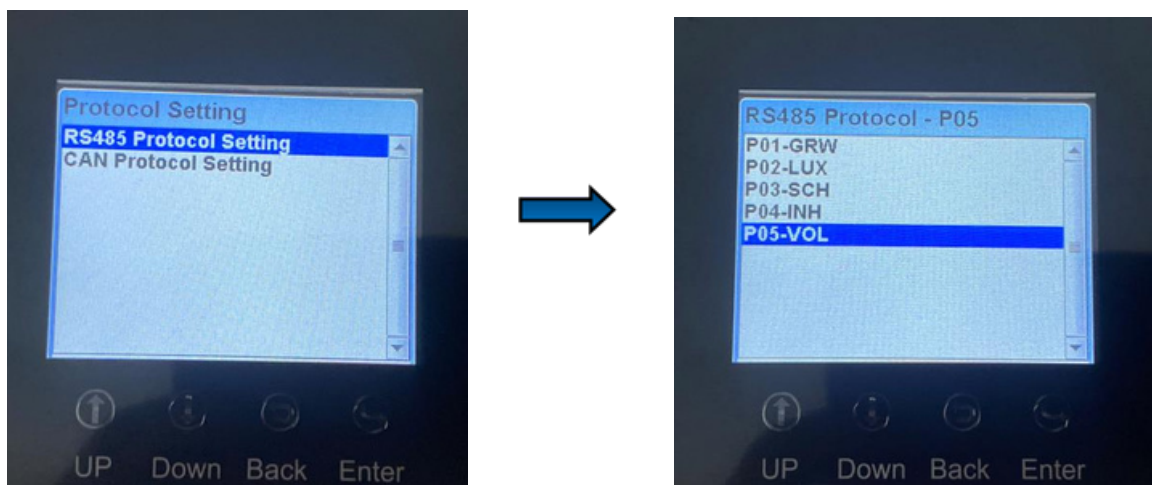
Press “Back” to check the working communication protocol version.



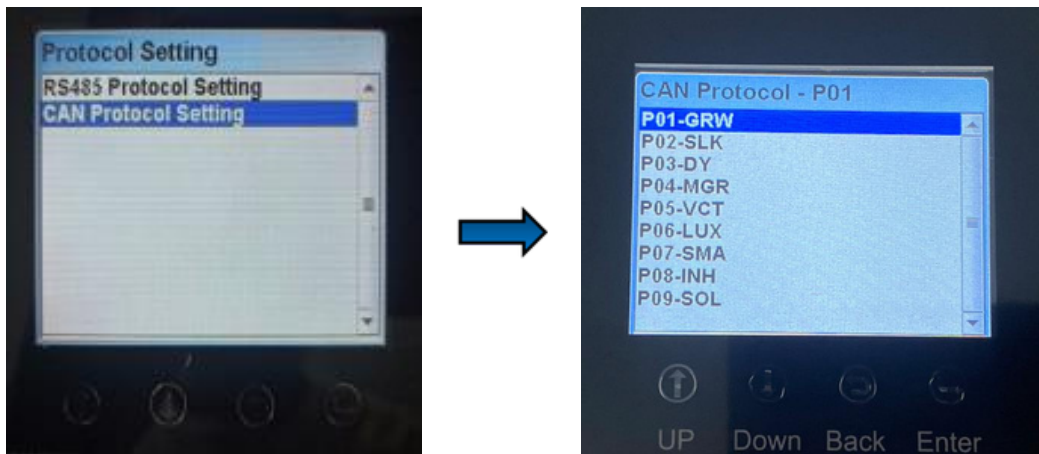
If need change the protocol to other, follow the below step.

1. Set the battery ID be No.16 (refer to 6.3) when battery is turn off;
2. Turn on the battery, and press “Enter” for 5 seconds to enter the protocol choosing screen;
3. Select the corresponding RS485 program or CAN program;
4. And click “Enter” to choose the protocol on list;
5. press the “Back” key to return to the main interface, restart the battery, and the battery will correspond to the program.

### Working mode selection—RS485



Working mode selection—CAN



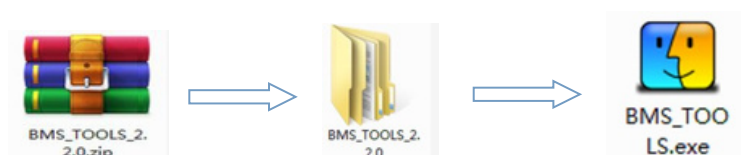
Notes: The protocol can only be changed at address No.16(dial all down). After the change is completed, restart the battery to take effect. The protocol list below:

RS485		CAN	
Protocol name	Inverter's brand name	Protocol name	Inverter's brand name
P01-GRW	Growatt	P01-GRW	Growatt
P02-LUX	Luxpower	P02-SLK	Sol-Ark
P03-SCH	Schneider	P03-DY	Deye
P04-INH	Inhenergy	P04-MGR	Megarevo
P05-VOL	Voltronic	P05-VCT	Victron
		P06-LUX	Luxpower
		P07-SMA	SMA
		P08-INH	Inhenergy
		P09-SOL	Solis

## 4.2 PC Software Installation

Contact the supplier to get the latest version of the software for free, and run the BMS\_tools.exe program directly after unpacking.

PC software installation steps

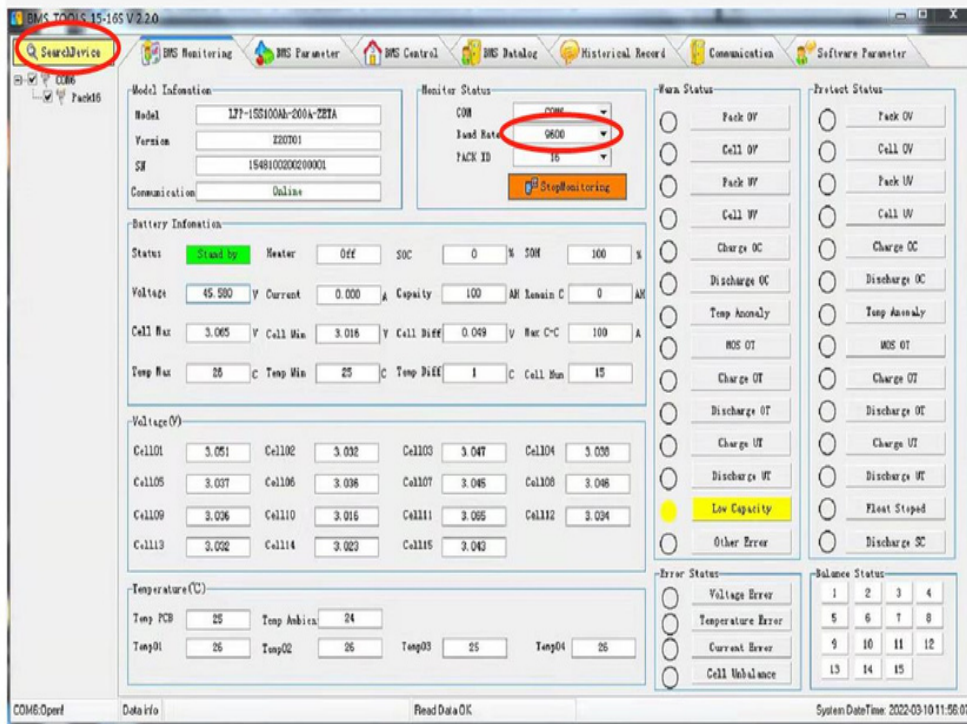




### 4.3 Communication Connection

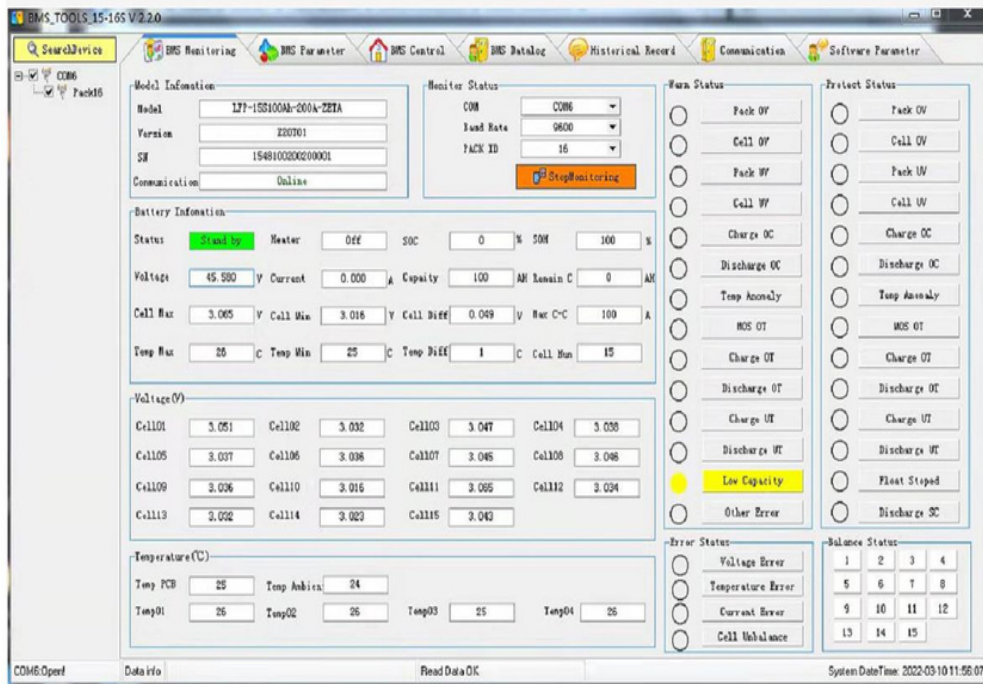
Connect the 485 to USB cable; set the baud rate to 9600; click "Find Device" in the upper left corner; the software will automatically identify the connected battery pack.

Communication connection setting



### Software Interface

The software interface:



Interface menu definition

Item	Definition
BMS Real-time monitoring	Real-time data and status monitoring of the BMS
BMS Parameter Setting	BMS parameter Setting management
BMS Control Management	Control state management of BMS (not open)
BMS Data Record (Optional)	BMS operation data logging
Monitoring History	Battery operation data record in this machine (exportable)
Real-time data reception	Record of sending and receiving of battery pack data (mainly for debugging)
Software system parameters	Software configuration, settings and language selection, etc.

## 5 Daily Maintenance

### Alarm Description and Handling

When the ALM light on the battery control panel is on, it means that the battery has given an alarm or has been protected, please check the cause of the failure through the computer and take appropriate measures or go directly to the site to troubleshoot. Common alarm conditions are shown in Table 9-1 below.

Table 9-1 Major alarms and protection

State	Type	Indicator	Disposal
Charge	Over current protection	ALM	Stop charge, check the settings and limitation
	Temperature protection	ALM	Stop charge, wait for the temp recovery
Discharge	Over current protection	ALM	Stop discharge, check if there is an over load
	Temperature protection	ALM	Stop discharge, wait for the temp recovery

### Common Faults (Phenomenon) and Solutions

Common faults and solutions are shown in table

Common faults(phenomenon) and solutions



NO.	Fault phenomenon	Analysis	Solution
1	Communication failure with inverter	Communication port connect error or battery ID setting error	Refer 7.4.2
2	No DC output	Not close breaker or low voltage	Close breaker or charge the battery
3	Power supply time is too short	Battery capacity lack or not full power	Maintenance or replacement
4	Battery can't be charged fully	Power system DC output voltage falls below the minimum charge voltage	Regulating DC output voltage of power supply to battery suitable charging voltage
5	ALM LED always lights	Power line connection short circuit	Disconnect the power cable and check all cables
6	The battery output voltage is unstable	Battery management system do not operate normally	Press the reset button to reset the system, then reboot the system
7	ALM LED flash 20 times and SOC1 LED on	Unbalance voltage with cell	Examine/balance the cell
8	ALM LED flash 20 times and SOC2 LED on	Unbalance temperature	Replace temperature sensor cable
9	ALM LED flash 20 times and SOC3/4 LED on	BMS damaged	Replace BMS
10	Different SOC value of batteries in parallel	Normal phenomenon	No operation


11	Low voltage protection and no LED on	BMS goes into low voltage protection, and goes to sleep mode.	<p>Follow the below steps to reboot the module.</p> <ol style="list-style-type: none"> <li>1. Charge the battery immediately and it will reboot itself.</li> <li>2. Switch off and switch on 14, when it switch on, charge it immediately.</li> <li>3. Press 7 to reboot and charge it immediately.</li> </ol> <p>If you follow step 2 or step 3 without charging immediately. BMS will protect and go to sleep mode in several minutes.</p> <p>If the battery sleeps for a long time and the voltage is too low to start the BMS, you have to open the cover of the pack and charge it up to 40V before you reboot it.</p>
12	Deep discharged and on LED on	No charging in a long time after deep discharged, the voltage is too low to start the BMS	

## Daily Maintenance

Routine maintenance items are shown in Table

Routine maintenance items

Item	Maintenance Method	Maintenance intervals
<p>Power Cables</p> 	<ol style="list-style-type: none"> <li>1. check whether there is mechanical damage to the power cable and whether the terminal insulation sleeve has fallen off; if there is such a phenomenon, please turn off the machine and carry out maintenance or replacement.</li> <li>2. check whether the power cable is loose; if there is any sign of looseness, please use a standard torque wrench to tighten it.</li> <li>3. check the system for loose screws or discoloration of the copper bus bar; if the screws are loose, please tighten them with a standard torque wrench; if the copper bus bar is discolored, please contact the manufacturer for after-sales replacement.</li> </ol>	Once every 6 month
<p>Communication Cables</p> 	<ol style="list-style-type: none"> <li>1. check whether the parallel communication cable terminal is loose, if it is loose, re-tighten it.</li> <li>2. check whether the color of the communication cable has obvious discoloration, if discoloration, please shut down the machine to replace the communication cable</li> </ol>	Once a year
Cabinet Cleanliness	Check the cleanliness of the front door, back door and battery module inside the cabinet, if there is obvious dusty, please clean up in time.	Once 6-12 month

<p>System running status</p> 	<p>1. check if all parameters are normal when the system is running (system voltage, current, temperature, etc.) 2. check whether the main core components of the system are normal, including system switches, contactors, etc. are normal 3. check whether the system air inlet and outlet, air ducts are normal, if there is blockage and congestion, need to clean up in time</p>	<p>Once every 6 month</p>
<p>Charge and discharge maintenance</p>	<p>Use light load and shallow charge/discharge to check whether the SOC, SOH status of the battery is normal (using the upper computer software to read); it is recommended that the depth of discharge and charge/discharge power should not exceed 20% of the rated value</p>	<p>Once every 6 month</p>

## Cautions and Warranty

### Cautions



Please read and comply with the following conditions of installation and use of the battery, incorrect installation using the battery may cause personal injury or damage to the product.

- (1) DO NOT throw the battery into water. Store batteries in cool and dry environment.
- (2) DO NOT put the battery into fire or heat the battery, so as to avoid explosion or other dangerous events.
- (3) When charge the battery, please choose specialized charging equipment, and follow the correct procedures, do not use unqualified chargers.
- (4) DO NOT reverse positive and negative terminals, do not connect the battery directly to AC power, avoid battery short circuit.
- (5) DO NOT using batteries from different manufacturers or different kinds, types together, and do not mix old batteries and new batteries.
- (6) DO NOT use the battery when it is hot, bulges, deforms or leaks.
- (7) DO NOT puncture the battery by nail or other sharp objects; Do not throw, stamp on, impact or hit the battery.
- (8) DO NOT open or try to repair the battery when it is defective. Warranty invalid if the battery repaired or disassembled.
- (9) Batteries are half charged before shipment, don't use the battery if it's hot, bulge, or smell abnormal and so on, and report to after-sale dept. immediately.
- (10) If you need storage the battery for a long time, please charge and discharge the battery every three months to ensure the best performance, and the best state of charge for storage is between 50%~60%.

- (11) Please use the battery in the temperature range which defined in the manual.
- (12) The state of charge of batteries is 50% before shipment, please charge the battery before using.

### **Description of Warranty**

During the valid warranty period of the product, any problems such as product damage or functional failure caused by non-human or intentional damage will enjoy our free repair and replacement services. Customers need to provide a valid purchase invoice or related product warranty information. If no valid proof can be provided, our company has the right to refuse to provide related services.

# VOLT BANK

## BATTERY

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