SHANDONG HUISON ELECTRONICS TECHNOLOGY CO.,LTD

USER MANUAL

Disclaimer

Shandong Huison Electronics Technology Co., Ltd reserves the right to modify the content here without prior notice.

To access the latest version of the manual, please visit our website at
www.huisonbattery.com.

1. Safety Instructions

Before installing the batteries, ensure you read and follow all safety instructions.

Lithium iron phosphate (LiFePO4) batteries are inherently safe chemicals; however, safety measures should always be considered before, during, and after installation, as well as during ongoing use and maintenance.

The following safety precautions are crucial for both installers and end-users to operate this product safely.

Improper installation may cause injury to the installer or others and damage the battery or connected equipment.

1.2 ⚠Precautions:

➢ All product work must be handled by qualified personnel to reduce the risk of electric shock.

➢ Install according to local and national electrical standards before connecting to the grid.

➢ Keep product warning stickers visible.

➢ Due to the weight of the battery, use proper tools and manual lifting techniques.

➢ Do not short the battery terminals.

➢ Exercise caution with metal tools near the battery or battery-powered devices; arcing or short-circuits could cause severe injury, death, or equipment damage.

➢ Ensure the battery is "off" and check for voltage presence using a voltmeter before installation or operation.

➢ Always wear personal protective equipment (PPE) when handling batteries.

➢ Handle the battery carefully to avoid damage: prevent drops, dragging, or other improper handling.

➢ Inspect the battery carefully before use; do not use damaged or deformed products.

➢ Ensure all cables, busbars, and plug connections are properly tightened and secured.

➢ Use the correct tools for installing and removing the battery.

➢ Do not place any objects on top of the battery.

1.3 ⚠ Warning:

- The charging voltage must not exceed 57.6V.

- Do not charge or discharge the battery when the ambient temperature exceeds 55°C (131°F).

- Do not charge the battery if the ambient temperature is below 0°C (32°F), and do not discharge the battery if the temperature drops below -20°C (-4°F).

- Do not install the battery in locations where it may come into contact with conductive materials, water, seawater, strong oxidizers, or strong acids.

- Do not install the battery in direct sunlight, on hot surfaces, or in high-temperature environments.

- Do not install the battery in confined spaces with inadequate ventilation, as this may cause the system to overheat.

- Keep the battery away from any heat sources or materials that can be ignited by heat (such as paper, cloth, plastic, etc.).

- If the battery emits unusual odors, heats up, or exhibits abnormal behavior during operation or charging, immediately disconnect the battery.

- Equip the area near the system with an ABC or BC class fire extinguisher.

- Do not disassemble the battery,contact Powastone team for proper operating instructions. Incorrect repairs or reassembly may pose a risk of electric shock or fire and void the warranty.

2. POWASTONE Products

2.1 Introduction

Powastone batteries providing a compact and scalable solution for seamlessly integrating renewable energy into your home or business. With its cutting-edge features and intelligent design, this advanced lithium battery system empowers individuals and organizations to utilize their energy in unprecedented ways.

With Powastone series battery systems, you will always stay powered!

This user manual is intended to familiarize you with the specifications, features, performance, and usage of these batteries. Please read and pay attention to all safety information before installing or operating the batteries. This document applies to all Powastone Series Stackable Batteries.

2.2 Product Description

The Powastone Stackable 51.2V, 100Ah, 5kWh, with the capability to expand from 5kWh to 80kWh, is ideal for low-voltage residential solar , off-grid power systems, and backup power applications.

All Powastone battery products are equipped with our specially developed Battery Management System (BMS), which continuously monitors and records battery voltage, as well as real-time data on module current, voltage, and temperature. The BMS features both active and passive balancing functions with advanced algorithms to enhance battery pack performance.

Designed for durability, Powastone battery has a lifespan of over 15 years, achieving 6000-8000 cycles at 0.5C and 80% Depth of Discharge (DOD). You can always monitor the battery's status and performance through the product's touchscreen interface, which displays real-time battery conditions.

2.3 Product features

Advanced Battery Management System (BMS)

Safe and efficient lithium iron phosphate battery

Modular design for quick and easy installation and expansion

Built-in fire protection module (Optional)

Multi-layer safety protection

Built-in active balancing module

Excellent insulation performance

Busbar design, high current operation supported

Touchscreen operation and debugging

Supports parallel connection of up to 30 batteries

Compatible with mainstream inverters

CANBUS and RS485 communication

2.4 Applications

- **Residential**
- **Commercial**
- **Restaurants**

- **Apartments**
- **Small Offices**
- **Backup Power**

2.5 Product and accessories

	51.2V100Ah 5KWh Battery pack
	Back cover
	T568B cable for parallel connecting.
	Busbar, positive, Orange
	Busbar, negative,Black
	Fuse

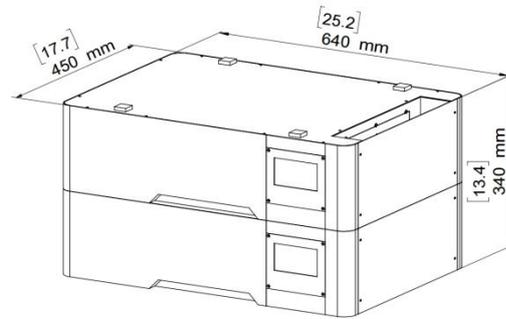## 3.POWASTONE Family

Powastone 5KWh-30KWh

3.1 Specification

Model	PS-10KWh	PS-15KWh	PS-20KWh	PS-25KWh	PS-30KWh
Voltage	51.2V				
Current	Max 100A				
Capacity	200Ah	300Ah	400Ah	500Ah	600Ah
Energy	10KWh	15KWh	20KWh	25KWh	30KWh
Voltage range	40V-57.6V				
Max charge current	100A				
Max discharge current	150A				
Peak current	1000A(3S)				
Working temperature	Charge 0~60℃ Discharge -20~60℃				
Storage temperature	-20~45°C				
Size mm	640*450*300	640*450*450	640*450*600	640*450*750	640*450*900
Weight kg	106	159	212	265	318
Communication	RS485/CANBUS				
IP Level	50 Indoor				
Certificate	UL9540,UL1973,IEC62619,CE/EMC,MSDS,UN38.3				

3.2 Mechanical dimension

5KWh Dimension
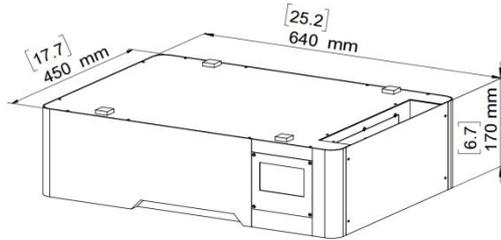
[17.7] 450 mm
[25.2] 640 mm
[6.7] 170 mm

10kWh Dimension

[17.7] 450 mm
[25.2] 640 mm
[13.4] 340 mm

15KWh Dimension

[17.7] 450 mm
[25.2] 640 mm
[20.1] 510 mm

20kWh Dimension

[17.7] 450 mm
[25.2] 640 mm
[26.8] 680 mm

25KWh Dimension

[17.7] 450 mm
[25.2] 640 mm
[33.5] 850 mm

30kWh Dimension

[17.7] 450 mm
[25.2] 640 mm
[40.2] 1020 mm

35KWh Dimension

[17.7] 450 mm
[25.2] 640 mm
[46.9] 1190 mm

40KWh Dimension

[17.7] 450 mm
[25.2] 640 mm
[53.5] 1360 mm
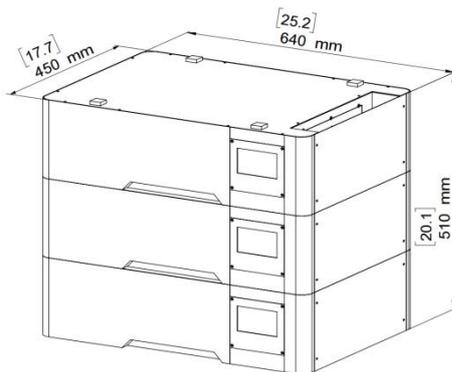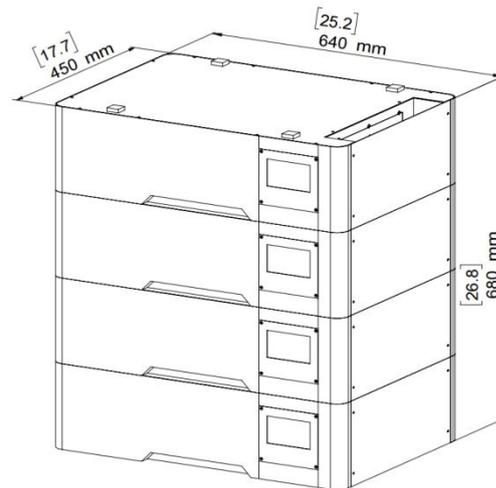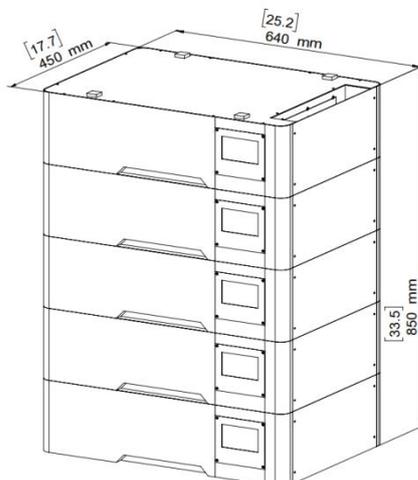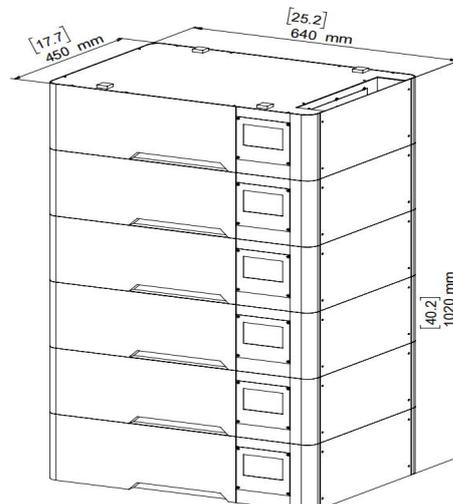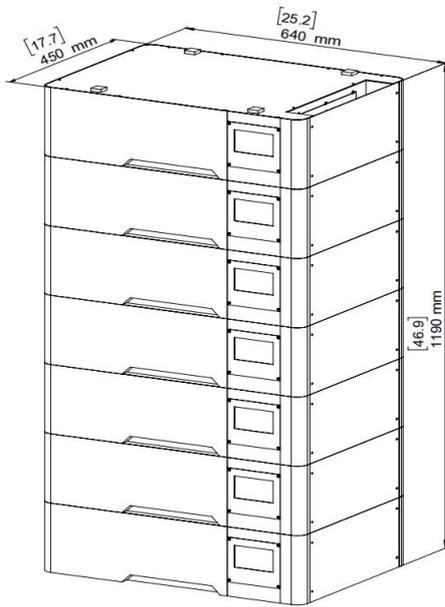
Top cover dimension

[17.7] 450 mm
[25.2] 640 mm
[1.6] 40 mm

Bottom base Dimension

[17.7] 450 mm
[25.2] 640 mm
[2.4] 60 mm
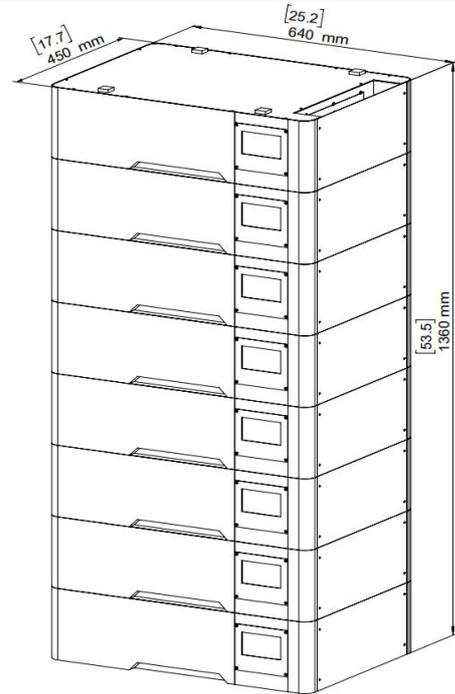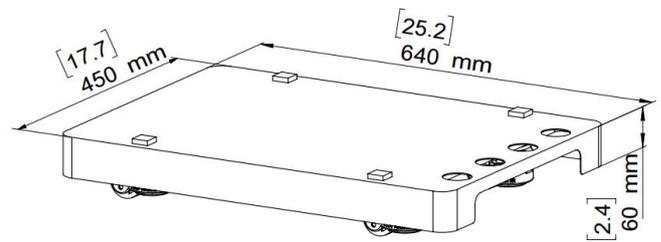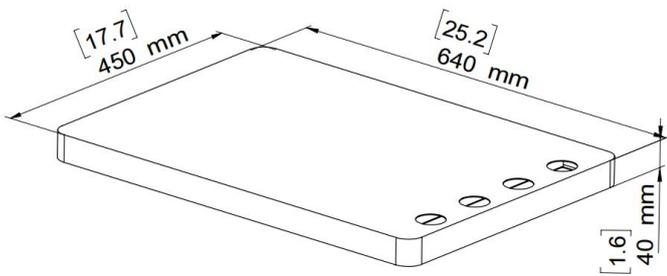
3.3 Definition of the BMS interface
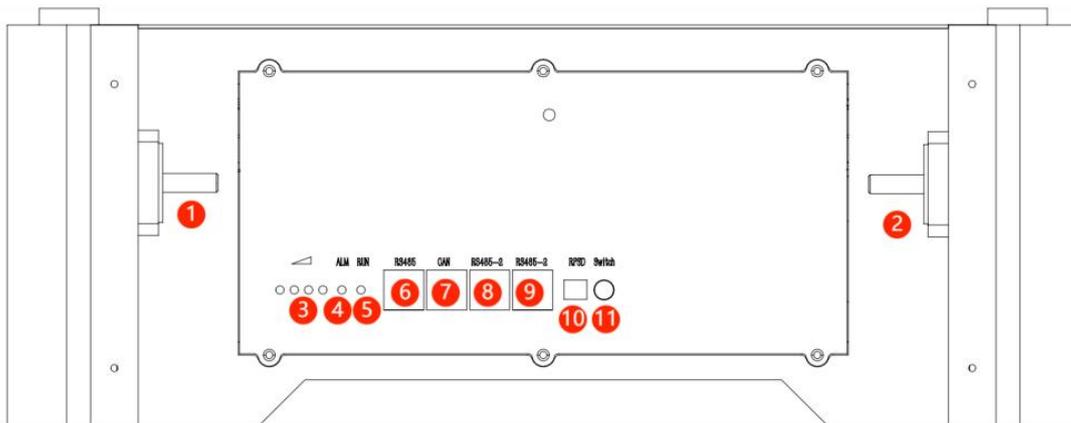
No.	Item	Description	Note
1	Negative terminal Batt-	Black	200A Current
2	Positive terminal Batt+	Orange	200A Current
3	SOC indicator	0-100% SOC	
4	Alarm	Errors	
5	Run	Working status	
6	RS485 comm port	PC software/Inverter communication	
7	CANBUS comm port	Inverter communication	
8	Parallel RS485 port	Battery parallel	Must be empty for master battery
9	Parallel RS485 port	Battery parallel	
10	RPSD	2 pins dry contact	Rapid shut down
11	ON/OFF switch	Turn on off the BMS	

3.4 Communication port definition of RS485 and CANBUS
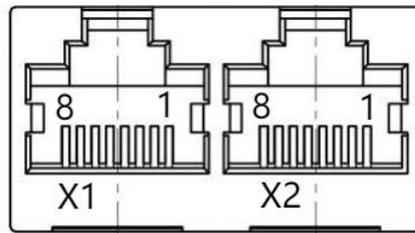
RS485 and CANBUS

RS485--PC software、485 update (X1)		CAN--Inverter CAN/RS485Comm (X2)	
Pin number	**Definition**	**Pin number**	**Definition**
PIN1	Empty	PIN1	Empty
PIN2	Empty	PIN2	Empty
PIN3	RS485A1	PIN3	Empty
PIN4	Empty	PIN4	CAN-BUSH
PIN5	RS485B1	PIN5	CAN-BUSL
PIN6	Empty	PIN6	Empty
PIN7	Empty	PIN7	RS485A1
PIN8	Empty	PIN8	RS485B1

3.5 Parallel communication
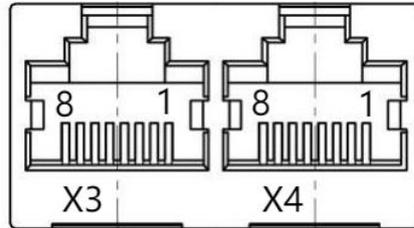
RS485B1 & RS485B2

RS485- parallel communication			
RJ45 (X3)	Definition	RJ45 (X4)	Definition
PIN1	Empty	PIN1	Empty
PIN2	DI	PIN2	DI
PIN3	A-PACK parallel	PIN3	A-PACK parallel
PIN4	GNDDI	PIN4	GNDDI
PIN5	B-PACK parallel	PIN5	B-PACK parallel
PIN6	IO1	PIN6	IO2
PIN7	Empty	PIN7	Empty
PIN8	DGND	PIN8	DGND

3.6 Definition of the LED indicator

State	Normal / Alarm / Protection	Power quantity indicates the LED				Alarm indicator	Run	Definition
		🟢	🟢	🟢	🟢	🔴	🟢	
Shut down	Sleep	Off	Off	Off	Off	Off	Off	All off
Charge	Normal	According to the SOC				Off	Flash	
	Alarm	According to the SOC				ON	Flash	Stop charging
	Overcharge protection	ON	ON	ON	ON	ON	Flash	Stop charging
	Temperature, overcurrent, and failure protection	According to the SOC				ON	Flash	Stop charging
Discharge	Normal					Off	Flash	
	Alarm					ON	Flash	Stop discharge
	Over-discharge protection	ON	ON	ON	ON	ON	Flash	Stop discharge
	Temperature, overcurrent, and failure protection	According to the SOC				ON	Flash	Stop discharge

3.7 Dry contact

Number	Function	Definition
1	2 -4 pins	Often closed, emergency stop

4. Battery Installation

Warning: Before installation, be sure to review all warnings and precautions in Section 1.

4.1 Installation Safety Guidelines

➢ Upon receiving the battery, inspect it for any signs of damage before use. If the battery is damaged, contact Powastone for repair or replacement. Avoid using a defective battery, as this may lead to malfunction, unnecessary losses, and even the risk of fire.

➢ Check to ensure that all cables, plugs, and components are in good condition.

➢ Ensure that your battery pack is in the "off" state before connecting/disconnecting any components.

➢ It is prohibited to short-circuit the external battery terminals. When connecting the battery, ensure that each wire harness, busbar, and plug is properly connected, and no materials should be present that could cause a short circuit.

➢ Use a screwdriver with rubber-coated handles.

➢ Do not connect batteries in series.

➢ Always install the battery horizontally.

4.2 Installation Requirements

The installation of the battery significantly affects safety, lifespan, and performance. It should be installed in a location that facilitates system wiring, maintenance, and operation while avoiding environments with high temperatures and high humidity. Ensure the battery has sufficient space and secure support. Use cables that match the maximum current demand of the equipment. Keep the wiring tidy, moisture-proof, and corrosion-resistant. During installation, wear an anti-static wrist strap, and have at least two people present.

4.3 Installing tools

Voltage meter	Clamp meter	Screwdriver kit	Hexagonal screwdriver kit
Wrench kit	Knife	Claw hammer	USB to RS485 adapter

4.4 Personal protective equipment
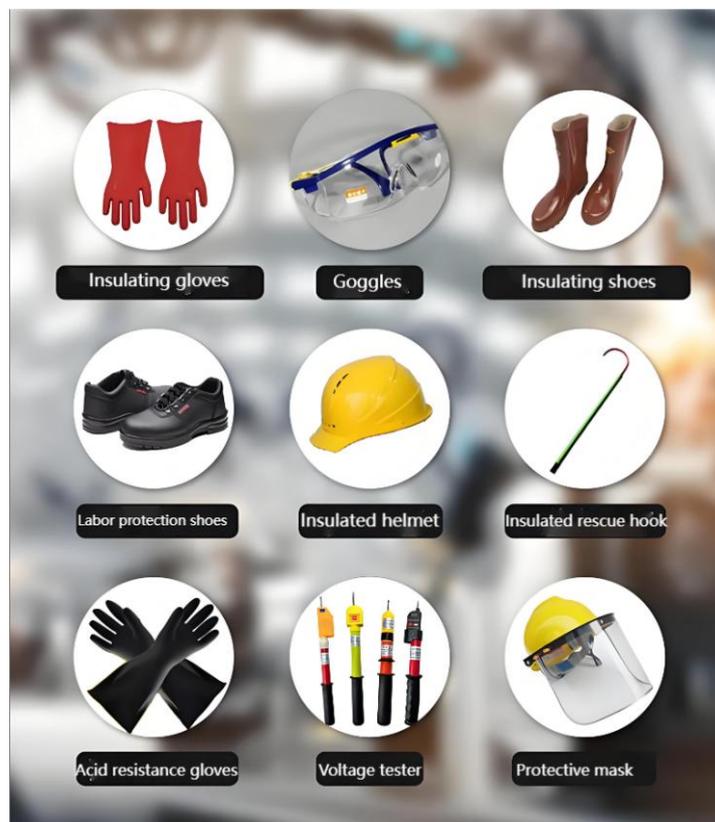
5. Powastone system installation

5.1 Installing batteries

① Install the bottom base on the ground about 50 millimeters (2 inches) away from the wall and lock the casters to prevent sliding.
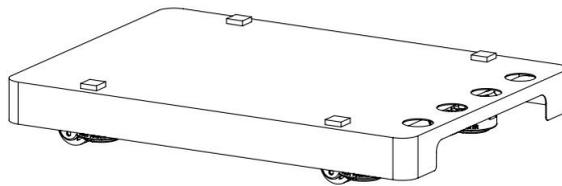
② Stack a battery module on top of the base, aligning the fixing holes to prevent the battery from sliding.
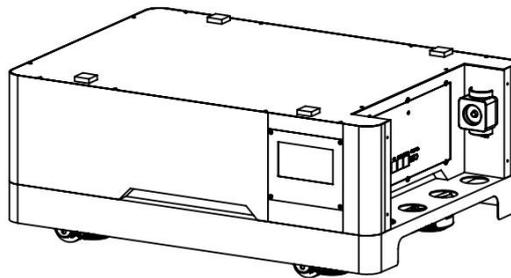
③ Then stack another battery module and align the fixing holes.
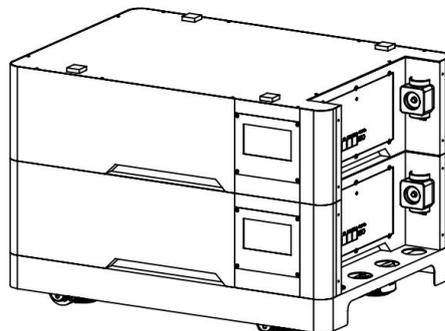
④ The rest of the batteries are stacked in sequence, and it is recommended to stack a maximum of 8 battery modules.

5.2 Busbars connection

If the battery system has a capacity of 10KWh(2 x batteries) or above, it must be connected using the supplied busbars.

① Connect the negative terminals of the master battery and the slave batteries using black insulated busbar;
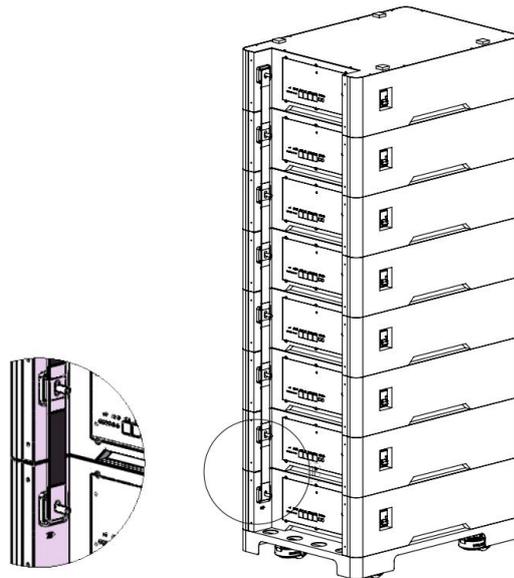
② Connect the positive terminals of the master battery and the slave batteries using orange insulated busbar;
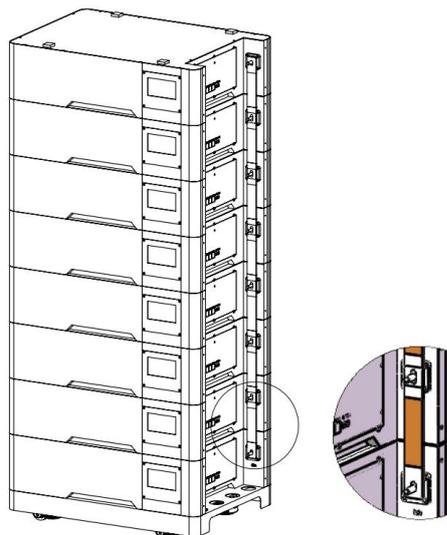
③ Use the M8 nuts provided and tighten them with a wrench with a torque of 17-20Nm, put on the plastic cover with the plastic nut.

④ Install the back cover and put on the top cover.
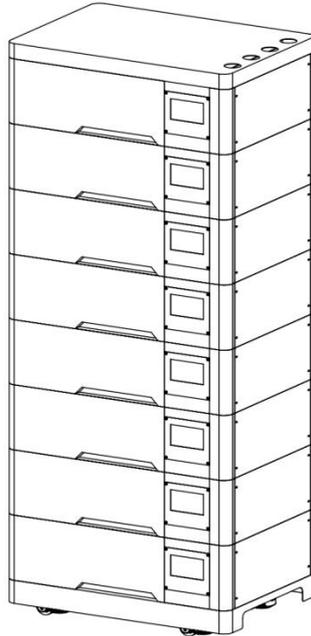
5.2.2 Parallel communication cable connection

The Ethernet cable provided must be used for two or more batteries are used in parallel, as other Ethernet cables may cause communication errors.

RS485A   CAN   RS485B1   RS485B2
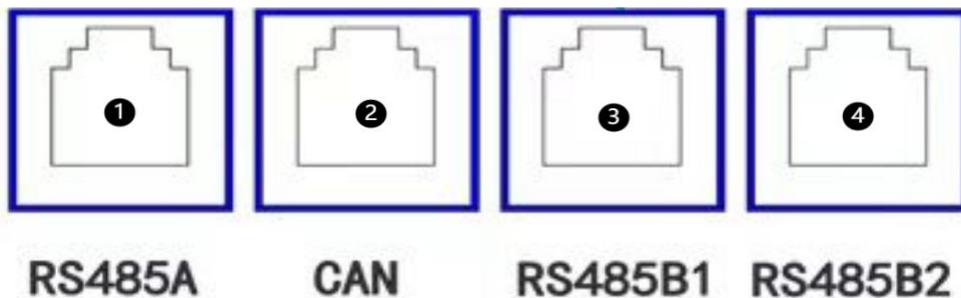
BMS Ethernet port sequence number

① Insert the RJ45 connector of the network cable into the fourth RS485 port of the master battery.

② Insert the RJ45 connector on the other end of the network cable into the third RS485 port of the second battery.

③ Repeat this process for the corresponding network cables. The fourth port of the last battery group will remain empty.
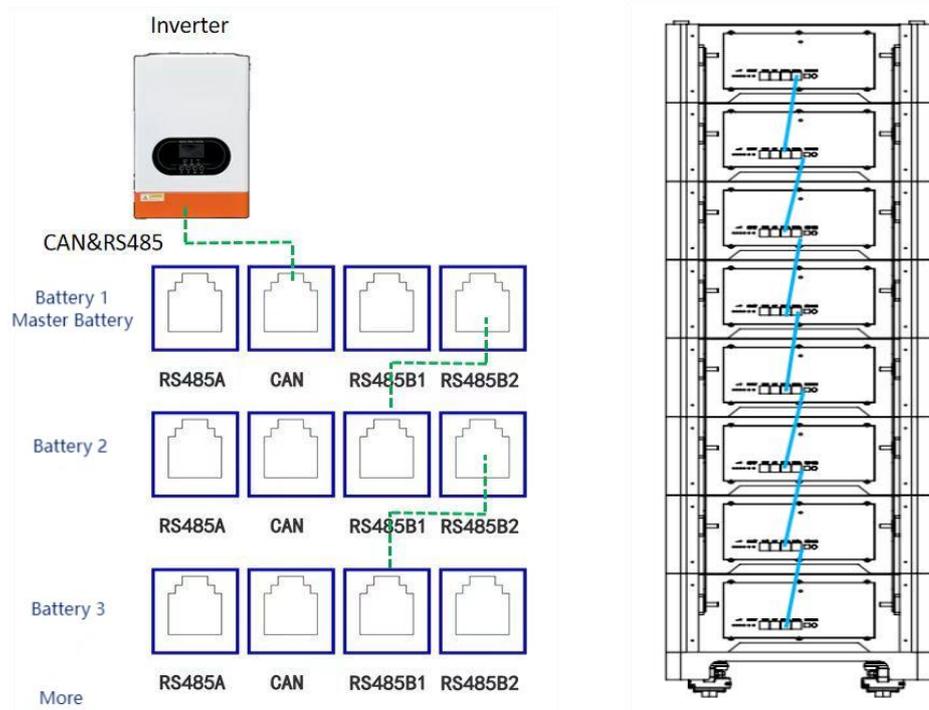
<mark>Warning: The master battery (connected to the inverter) is not allowed to use the 3rd RS485-B1 network port!</mark>

5.2.3 Connection Between Battery Clusters

When connecting more than 8 batteries in parallel, you need to use another set of bases and install the batteries properly. The maximum distance between two battery clusters should not exceed 1 meter.

Prepare one red and one black AWG#4 cable, with each end crimped using 25-8 lugs.

Prepare a 1-meter network cable.

① Connect the black cable from the negative terminal of the last battery in the main battery cluster to the negative terminal of the other battery cluster.

② Connect the red cable from the positive terminal of the last battery in the main battery cluster to the positive terminal of the other battery cluster.

③ Connect the No.4 network port of the last battery in the main battery cluster to the 3rd network port of the other battery cluster.
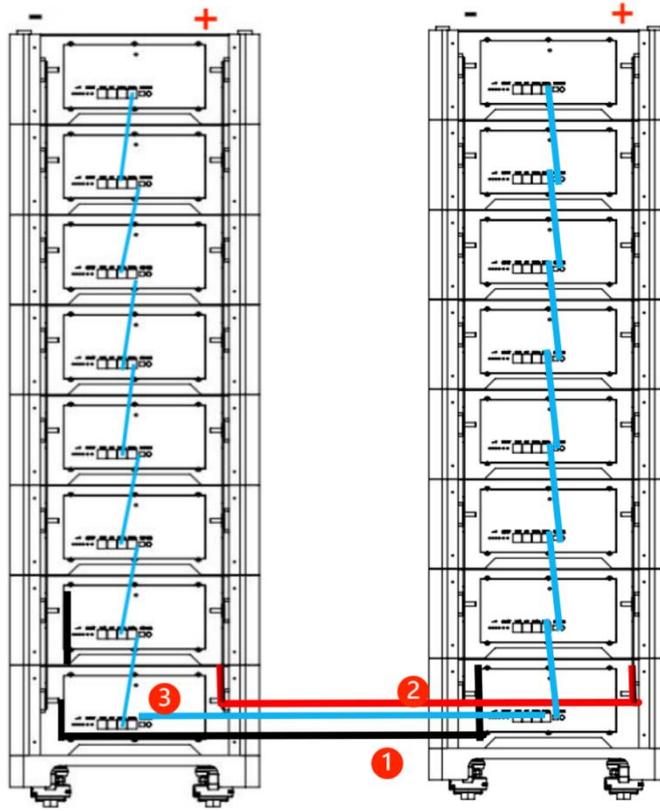
For parallel more than 30 batteries, contact us for advice.

6. System Debugging

6.1 Master and Slave Battery Address Setup

The master and slave battery settings can be configured via the built-in touch screen or a PC computer, without the need for DIP switch operations.

6.1.1 Auto DIP(Address) setting

To facilitate user installation and use, we have integrated an automatic address assignment feature in the latest version 6.1 of the BMS. You only need to set the address of the master battery touch screen to 1, and the other batteries will automatically assign their corresponding addresses.

Go to SETTING Page.

Type in 1 here, and all batteries address will be assigned automatically

6.1.2 Manually DIP(Address) Setting

If not Version 6.1BMS, need set the Master Battery and slave battery:

Go to SETTING Page.

PACK- 1   Inverter

Amensolar   GoodWe   Growatt

Aiswei   SMA   Sorotec

Select battery address(00-50) 1   Free ☑

Inverter charging voltage limiting 57.0V

🏠 ▶

Set the master battery, click <u>Free</u> first, and type in <u>1</u> here from the mini keyboard.

PACK- 1   Inverter

Amensolar   GoodWe   Growatt

Aiswei   SMA   Sorotec

Select battery address(00-50) 2   Free ☑

Inverter charging voltage limiting 57.0V

🏠 ▶

Set 2nd battery, type 2 here

PACK- 1   Inverter

Amensolar   GoodWe   Growatt

Aiswei   SMA   Sorotec

Select battery address(00-50) 3   Free ☑

Inverter charging voltage limiting 57.0V

🏠 ▶

Set 3rd battery, type <u>3</u> here,and so on.

Max support 30 batteries in parallel, for more than 30 batteries, contact us for advice.

6.1.3 DIP(Address) Setting via PC software

Refer to the operational guidelines in Section 15 of this manual.

Note: The master battery must be set to 1, while slave batteries cannot be set to 1, and there must be no duplicate addresses between the master and slaves; otherwise, communication issues may occur.

- Master Battery: The battery connected to the inverter.

- Slave Battery: Other parallel batteries in the battery system, excluding the master battery.

7.Definition of the inverter RS45 pins

Rj45 Pin No. of different inverters				
Brand	Type	Version	Model	BMS to inverter PIN No.
Sol-Ark	CAN	V1.2	Sol-Ark-12K-P/15K	CAN 4 5 to 4 5
Megarevo	CAN	V1.01	R6KL1	CAN 4 5 to 4 5
GOODWE	CAN	V1.7		CAN 4 5 to 4 5
MUST	CAN	V1.04.04	PH18-5048 PLUS	CAN 4 5 to 6 5
Growatt	CAN	V1.08	SPF 5000ES	CAN 4 5 to 4 5
Schneider	CAN		Conext XW Pro6848	CAN 4 5 to 4 5
Sorotec	CAN		REVO HES 6kW	CAN 4 5 to 4 5
Aiswei	CAN	V1.0		CAN 4 5 to 4 5
Deye	CAN	V1.0	SUN-10K-SG04LP3-EU	CAN 4 5 to 4 5
GSSTES	CAN	V1.2		CAN 4 5 to 4 5
Victrion	CAN		MultiPlus-II	CAN 4 5 to 7 8

			48|3000|35-50 120V	
Voltronic	RS485	20231202		RS485 3 5 to 5 4
SMK	RS485			RS485 3 5 to 2 1
WAET	RS485	20231202	SL1108	RS485 3 5 to 7 8
SRNE	RS485	V1.3	HF4850S80-H/SPI-10K-U/HSI 5500P	RS485 3 5 to 7 8
Growatt	CAN&RS485	V1.08/V2.01	SPH 3000TL BL-UP	CAN 4 5 to 4 5

8.Screen Navigation and Protocol Selection

After connecting the Powastone battery to the inverter, if you want the battery to communicate with the inverter, you need to configure the battery address and protocol through the screen on the master battery.

If communication is not required, the battery can be directly connected to the inverter.

The Powastone battery has multiple built-in inverter protocols with different brands. When using different inverters, you need to access the battery's touch screen settings page and select the corresponding protocol.

8.1 Master Battery Touch Display

After the battery is parallel connected, the total information of the battery system, including total capacity, total voltage, and information of individual batteries, can be read through the touch screen of the master battery display.

Total

Total voltage: 56.0 V
Total current: 2.0 A
Rated capacity: 10.0 Ah
Current capacity: 10.0 Ah
Average temp: 100.0 ℃

10%

PACK-1	PACK-2	PACK-3	PACK-4
PACK-5	PACK-6	PACK-7	PACK-8
PACK-9	PACK-10	PACK-11	PACK-12
PACK-13	PACK-14	PACK-15	PACK-16
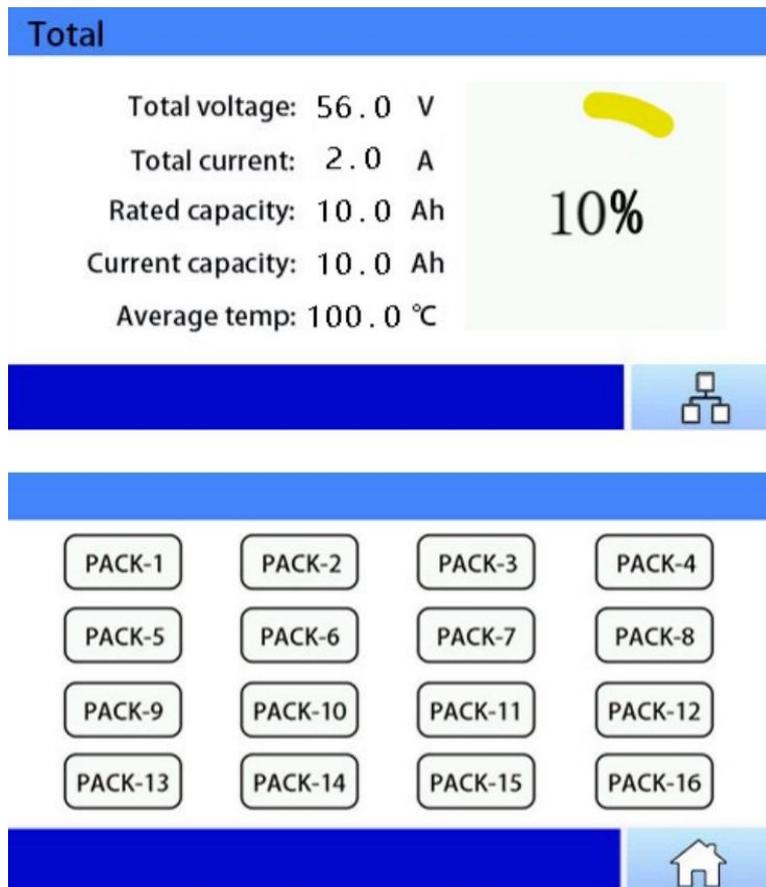
8.2 Slave Battery Touch Display

Also show the real-time cell voltages, 7-temperatures, alarm,fault, and setting

① Basic information

PACK- 1

Voltage: 56.0 V
Current: 1.0 A
Capacity: 10.0 Ah
Status: Charge
Balancing: ON

10%
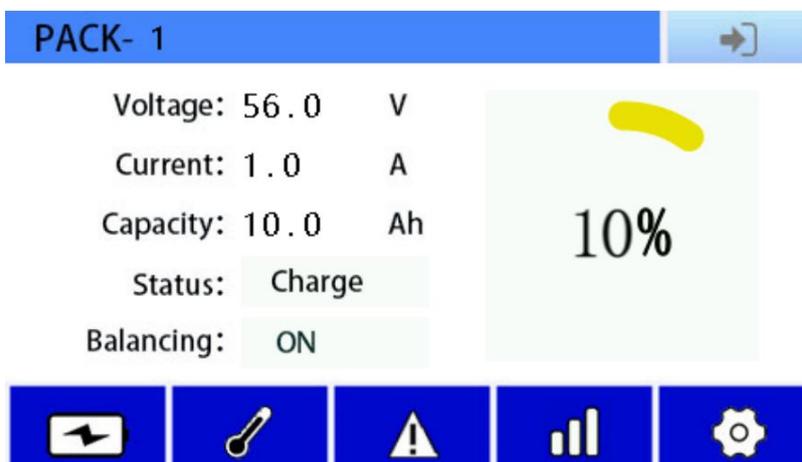
② 12 strings of cell voltages

PACK- 1	Cell voltage		
01: 3281 mv		09: 3290 mv
02: 3281 mv		10: 3289 mv
03: 3288 mv		11: 3288 mv
04: 3289 mv		12: 3287 mv
05: 3290 mv		13: 3286 mv
06: 3291 mv		14: 3285 mv
07: 3292 mv		15: 3286 mv
08: 3291 mv		16: 3287 mv

③ 7 temperatures

PACK- 1 Internal temperature

BMS: 16.0 ℃ Pack: 16.7 ℃

Cell1: 16.2 ℃ Cell2: 17.0 ℃

Cell3: 16.4 ℃ Cell4: 17.3 ℃

Environment: 17.6 ℃

④ Historical record

PACK- 1 Alarm

latest 0 Total 0

0

0

0

⑤ Alarm
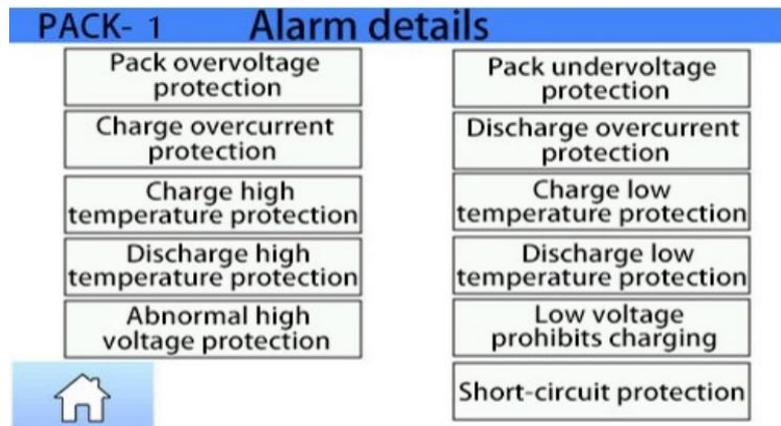
⑥ Protocol selecting

8.3 Inverter Protocol Settings

①Click the gear button, input the password, and enter the settings interface
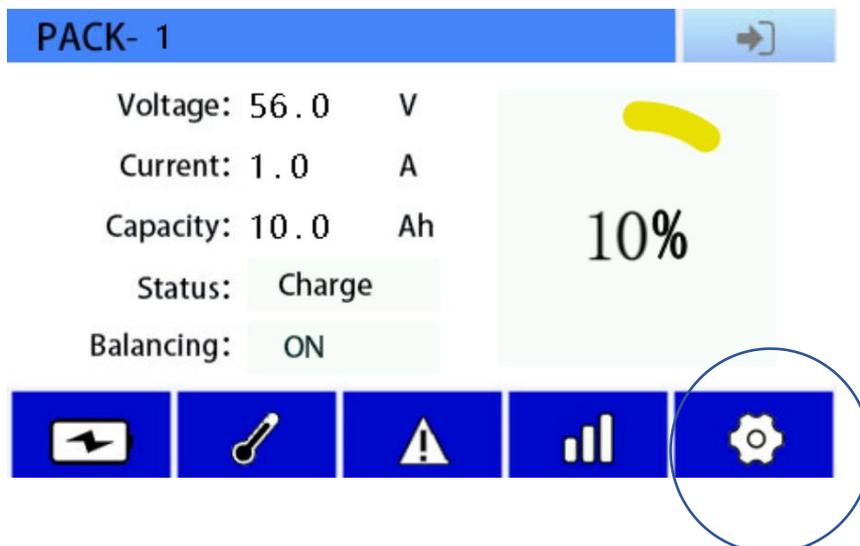
②Click to select the protocol of the inverter, once selected.

PACK- 1　　　　Inverter

Amensolar　　GoodWe　　Growatt

Aiswei　　SMA　　Sorotec

Select battery address(00-50)__1.__ Free ☐
Inverter charging voltage limiting 57.0V

Warning: Do not operate while the battery and inverter are connected and working!

List of currently supported inverters

PYLONTECH	LU X POWER EK	Voltronic Power
GOODWE	victron energy BLUE POWER	SMK SOLAR Energy · Anytime · Anywhere
Deye	SOFAR SOLAR	MEGAREVO
SUN SYNK	solis	SELECTRONIC
GROWATT	invt	SOROTEC®
Schneider Electric	MUST®	SNADI®
Sol-Ark LIMITLESS POWER	EAST®	And more
SMA	SRNE	

9. Turn ON/OFF the battery

Function	Steps
Power on	BMS is in the off state, press the on/off switch of master and slave batteries in sequence to activate the BMS. After the LED indicator lights flash in sequence, it enters the normal working state, the display screen lights up, and then open the circuit breaker .
Power off	BMS is in the power on state,press the on/off switch, the BMS is turned off and enters the shutdown state. At this time, all indicator lights and display screens are turned off. Close the

	circuit breaker

10. Battery Operation Guide

Warning: Before installation, be sure to check all parameters listed in Chapter 2.

10.1 Charging

✓ Before starting to charge, check the charging voltage to ensure it is within the appropriate voltage range.

✓ The battery cannot be charged at freezing temperatures. If an attempt is made to charge the battery below 0°C/32°F, the BMS (Battery Management System) will prevent charging until the battery temperature rises above 0°C/32°F.

✓ It is recommended to charge the battery regularly rather than waiting for it to be fully discharged. This is better for the battery's longevity compared to frequent fast charging, which shortens battery life.

✓ It is advisable to charge the battery when the SOC (State of Charge) is at 20%. Deep discharging will not damage the battery's lifespan, but the BMS requires a minimum operating voltage to function properly.

10.2 Discharging

➢ The battery can be fully discharged, and lithium iron phosphate (LiFePO4) batteries can safely be discharged to 0%. However, charging the battery at more than 20% SOC instead of 0% can extend its life to 8000 cycles or more.

➢ Do not discharge the battery if the temperature exceeds 55°C/131°F.

➢ Discharging the battery at sub-freezing temperatures may result in lower capacity. Capacity will increase once the temperature rises above 0°C/32°F.

➢ When the battery reaches its set minimum voltage, the BMS will engage protection and stop discharging automatically, with no manual intervention needed. After protection is triggered, charge the battery promptly to prevent damage from over-discharge.

Note: Failure to charge the battery after a full discharge for an extended period may cause irreversible damage, voiding the warranty.

11. Charge and discharge curve

51.2V100Ah Charge-Discharge Curve 0.2C,25^{0}C
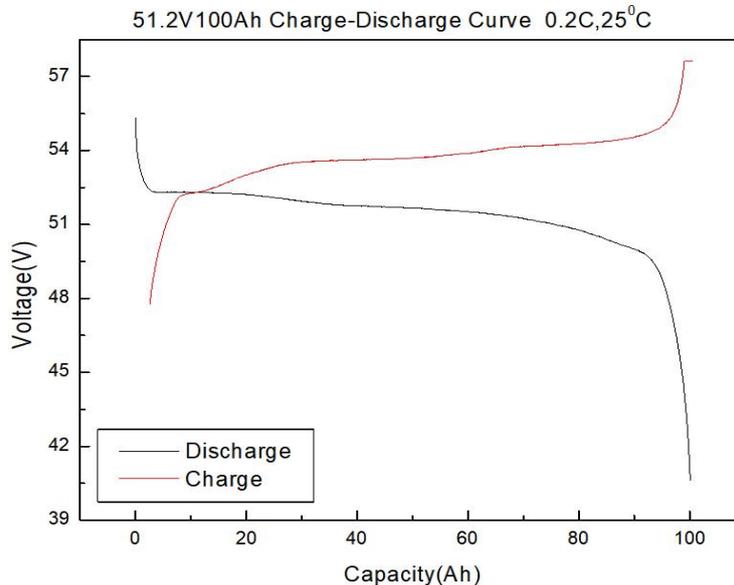
12. Storage

➢ Lithium iron phosphate (LiFePO4) batteries have an extremely low self-discharge rate in off mode and can be stored for a long time, as long as they retain some charge before storage.

➢ Before storing a lithium-ion battery, charge it to at least <u>80%</u>. Do not store a completely discharged battery. If the battery is fully charged, discharge it to <u>80%</u> before storage.

➢ If you need to store the battery for an extended period, make sure to disconnect all loads to reduce self-discharge.

➢ Batteries stored for more than six months must be recharged. Damage caused by over-discharge will void the warranty.

13.Extending Battery Life

Powastone batteries are designed to last 15 years. To ensure the battery operates normally, you must follow the instructions and battery parameters mentioned earlier. To extend the battery's lifespan, follow these recommendations:

➢ Avoid discharging the battery beyond 80% Depth of Discharge (DOD) unless absolutely necessary.

➢ Keep the battery temperature below 95°F (35°C) and above 59°F (15°C).

➢ Maintain the charging and discharging current below 0.5C.

➢ If the connectors, harnesses, or busbars are oxidized, damaged, or dirty, clean or replace them promptly to prevent overheating risks.

14.Troubleshooting

If the battery malfunctions, you will see the operation indicator light turns red and stay solid. When you wake up the battery's touchscreen, the corresponding error will appear, and you can view the fault in the history log (refer to the error codes in the diagram).
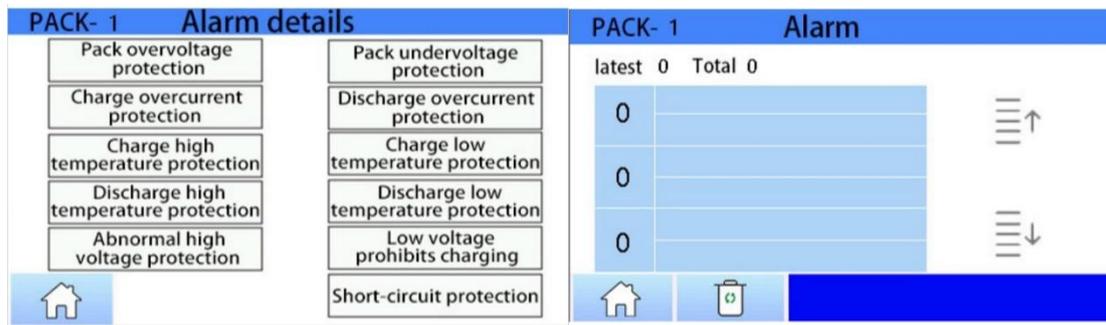
Screen alarm history English abbreviation comparison

Charging over-current protection	OCC
Charging low temperature protection	UTC
Charging high temperature protection	OTC
Discharge over-current protection	OCD
Discharge low temperature protection	UTD
Discharge high temperature protection	OTD
Single cell overvoltage protection	OV
Single cell undervoltage protection	UV
Short circuit protection	SC
Emergency stop alarm	RPSD Activated
Charge/discharge MOS fault	C-MOSfault/D-MOSfault

14.1 Troubleshooting List

No.	Troubles	Description	Solution
1	Communication failure	Communication port	Use the right PIN RJ45 connector
		Battery address	Reset the battery address
		Protocol error	Select the right protocol
2	No DC output	Battery off Low voltage	Turn on the battery Charge the battery
3	Short working time	Low capacity Not fully charged	Ask for warranty Charge the battery
4	Can not be fully charged	Charging voltage too low	Reset the charging voltage
6	Capacity is low	Voltage differences between the cells	Check the display of the cell voltages, use active balance
7	Can not charge or discharge	BMS/Cell/Sensors failure	Ask for warranty
8	Protection status	Over current	Charge or discharge current is too high, need reduce the load power
9		High/low temperature	Turn off the battery to lower/raise the battery temperature to the BMS recovery temperature value
10		Low voltage/over voltage	Charge/discharge the battery
11		Short circuit	Check and remove the short
12	Touch screen error	Show error code/ Frozen	Ask for warranty

15.Battery maintenance

Items	Maintenance	Interval
Power cables/ Busbar/ Connectors/ Screws	Check if the power cable is damaged, Discoloration, rusting, and oxidation of the busbar. Check if the terminal connections are loose; If there are signs of looseness, please use a standard torque wrench to tighten. Check if the screws are loose or if the busbar has discolored, rusted, or corroded; If the screw is loose, please tighten it with a standard torque wrench; If the busbar rusts, please contact after-sales for replacement.	Every 6 months
Ethernet cables	Check if the RJ45 connectors are loose. If they are loose, please re plug them tightly. Check if the color of the cable has changed significantly. If it has changed color, please turn off the system and replace the cable.	Every 12 months
Metalwork	Check if the metal casing is dirty, damaged, or rusted.	Every 6-12 months
Running status	Check if all parameters (voltage, current, temperature, etc.) are normal during system operation. Check if the critical components , including switches, display screens, circuit breakers, etc., are functioning properly.	Every 6 months
Charge/discharge	Check SOC and SOH of the battery, can be viewed from PC software	Every 6 months

16.PC software debugging

To view real-time detailed information of BMS and historical data, you can use battery monitoring software and follow the following steps.

You will need the following tools and software:

① Windows laptop or tablet with USB interface;

② USB to RS485 adapter and network port to RS485 connection terminal or RJ45；

A to A PIN3   B to B to PIN5
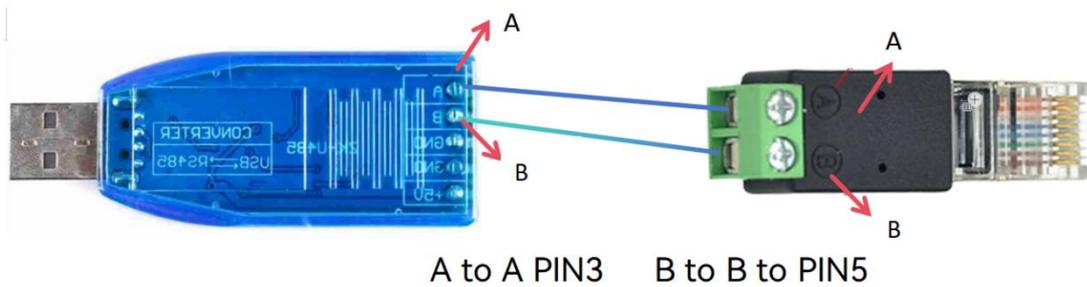
③ Connecting Diagram

RJ45						
	1	NC		RS485-B	1	
	2	NC		RS485-A	2	
	3	RS485-A		RXD	3	
	4	NC		TXD	4	
	5	RS485-B		GND	5	
	6	NC		NC		
	7	NC		NC		
	8	NC		NC		

④ Insert the adapter's USB port into the computer's USB port, and insert the RJ45 connector into the battery's RS485 network port.

⑤ Operating from the PC software (bt_bms).

Open the PC software	bt_bms
Click to set <u>Serial Port</u> (may different COM), and the corresponding MODBUS address and port rate 9600, click to <u>open serial port.</u>	

After completing the serial port configuration, click to Start collect, and the current real-time data can be displayed in the the main interface.

Screenshot (System Config tab):

Tabs: Real-time Collect | System Config | Data Log | Alarm Record | Calibration

System Config
- Batteries Number: 16
- Control of Precharge Function: off
- Control of C-MOS Recovery: off
- MOS Control of OCC&OCD: off
- MCU as Balance Controller: off
- Control of LOV: off
- MOS Control of UV: Close D-MOS
- Control of PF: on
- Control of Pin_CTL: Invalid
- Control of OC Release Time: off
- Load Control of UVR: off
- Relay Time of Load Release: 2000mS
- Relay Time of OV MOS Opening: 128uS

Address: 2 | Capacity: 100 Ah | SOC: 100 % (Write)
Protocol(Select on the left or input on the right): 01.Sol-Ark (CAN) (Write)

Voltage Protection
- Voltage of PF: 3900 mV
- Relay Time of PF: 8S
- Voltage of OV: 3750 mV
- Release Voltage of OV: 3550 mV
- Relay Time of OV: 1S
- Voltage of UV: 2500 mV
- Release Voltage of UV: 2700 mV
- Relay Time of UV: 1S
- Voltage of BAL: 3500 mV
- Voltage of PRE: 2400 mV
- Voltage of LOV: 2000 mV
- Detection Voltage of C&D: 500uV

Inverter-related(1 decimal place only)
- Chg Voltage Limit: 57.6 V
- Dsg Voltage Limit: 41.6 V
- Chg Current Limit: 100.0 A
- Dsg Current Limit: 100.0 A
(Write)

Current Protection
- Voltage of OCD1: 20mV
- Relay Time of OCD1: 4S
- Voltage of OCD2: 30mV
- Relay Time of OCD2: 2S
- Voltage of SC: 50mV
- Relay Time of SC: 320uS
- Voltage of OCC: 20mV
- Relay Time of OCC: 1S
- Relay Time of OC Recovery: 8S
- Current of OCC: 100 A
- Current of OCD: 100 A
- Relay Time of OCC: 8 S
- Relay Time of OCD: 8 S
- Recovery Time of OC: 30 S
- Release Temp of UTD: 100 A
- Relay Time of CHGLimit: 5 S
- Recovery Time of CHGLimit: 600 S

Temperature Protection
MOS Temp:
- Temp of OTC: 100 ℃
- Release Temp of OTC: 70 ℃
- Temp of UTC: -20 ℃
- Release Temp of UTC: -10 ℃
- Temp of OTD: 100 ℃
- Release Temp of OTD: 70 ℃
- Temp of UTD: -20 ℃
- Release Temp of UTD: -10 ℃

Battery Temp:
- Temp of OTC: 65 ℃
- Release Temp of OTC: 55 ℃
- Temp of UTC: 2 ℃
- Release Temp of UTC: 5 ℃
- Temp of OTD: 65 ℃
- Release Temp of OTD: 55 ℃
- Temp of UTD: -5 ℃
- Release Temp of UTD: -2 ℃

After selecting system config page, click the read register button to start reading the original configuration of the device. After completing the reading, the configuration of the device can be modified. After confirming the modification, click the write register to complete the configuration modification (Click the default parameter button to reset the configuration to the default value)

Screenshot (System Config tab — same layout as above):

Tabs: Real-time Collect | System Config | Data Log | Alarm Record | Calibration

System Config
- Batteries Number: 16
- Control of Precharge Function: off
- Control of C-MOS Recovery: off
- MOS Control of OCC&OCD: off
- MCU as Balance Controller: off
- Control of LOV: off
- MOS Control of UV: Close D-MOS
- Control of PF: on
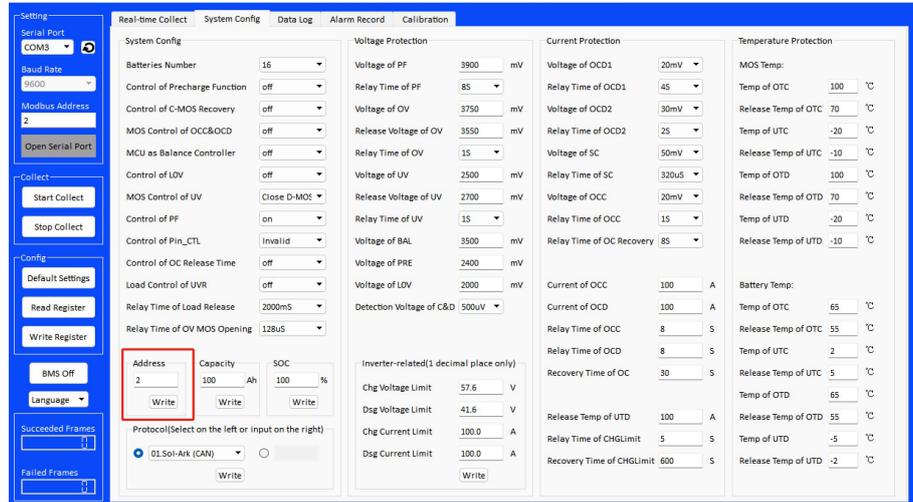- Control of Pin_CTL: Invalid
- Control of OC Release Time: off
- Load Control of UVR: off
- Relay Time of Load Release: 2000mS
- Relay Time of OV MOS Opening: 128uS

Address: 2 | Capacity: 100 Ah | SOC: 100 % (Write)
Protocol(Select on the left or input on the right): 01.Sol-Ark (CAN) (Write)

Voltage Protection
- Voltage of PF: 3900 mV
- Relay Time of PF: 8S
- Voltage of OV: 3750 mV
- Release Voltage of OV: 3550 mV
- Relay Time of OV: 1S
- Voltage of UV: 2500 mV
- Release Voltage of UV: 2700 mV
- Relay Time of UV: 1S
- Voltage of BAL: 3500 mV
- Voltage of PRE: 2400 mV
- Voltage of LOV: 2000 mV
- Detection Voltage of C&D: 500uV

Inverter-related(1 decimal place only)
- Chg Voltage Limit: 57.6 V
- Dsg Voltage Limit: 41.6 V
- Chg Current Limit: 100.0 A
- Dsg Current Limit: 100.0 A
(Write)

Current Protection
- Voltage of OCD1: 20mV
- Relay Time of OCD1: 4S
- Voltage of OCD2: 30mV
- Relay Time of OCD2: 2S
- Voltage of SC: 50mV
- Relay Time of SC: 320uS
- Voltage of OCC: 20mV
- Relay Time of OCC: 1S
- Relay Time of OC Recovery: 8S
- Current of OCC: 100 A
- Current of OCD: 100 A
- Relay Time of OCC: 8 S
- Relay Time of OCD: 8 S
- Recovery Time of OC: 30 S
- Release Temp of UTD: 100 A
- Relay Time of CHGLimit: 5 S
- Recovery Time of CHGLimit: 600 S

Temperature Protection
MOS Temp:
- Temp of OTC: 100 ℃
- Release Temp of OTC: 70 ℃
- Temp of UTC: -20 ℃
- Release Temp of UTC: -10 ℃
- Temp of OTD: 100 ℃
- Release Temp of OTD: 70 ℃
- Temp of UTD: -20 ℃
- Release Temp of UTD: -10 ℃

Battery Temp:
- Temp of OTC: 65 ℃
- Release Temp of OTC: 55 ℃
- Temp of UTC: 2 ℃
- Release Temp of UTC: 5 ℃
- Temp of OTD: 65 ℃
- Release Temp of OTD: 55 ℃
- Temp of UTD: -5 ℃
- Release Temp of UTD: -2 ℃

Set the battery address on the PC software

Click <u>read register</u>, enter the address address in the write address field, click <u>write</u>, and a popup will appear, indicating that the battery address has been successfully modified.

## Select the inverter protocol from PC software

Click <u>read register</u>, choose the protocol to use from the drop-down menu, or manually enter the serial number on the right and click write. The message 'Write successful' will pop up, indicating that the inverter protocol has been successfully modified.

Read BMS firmware and hardware

Click Read under the BMS Version on the bottom right.

You can see the hardware and software version of the current BMS.
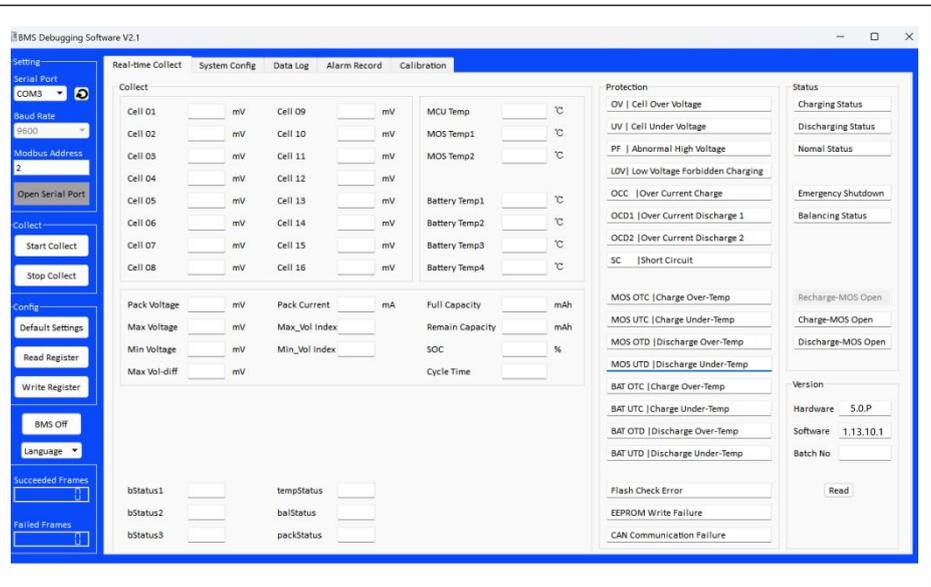
17.BMS firmware update

Firmware upgrade can be performed through the PC software or a dedicated upgrade tool.

18.Disposal of used batteries

Abandoned lithium iron phosphate batteries have potential hazards and should not be thrown directly into the trash can. Please search online for free recycling.

Many places can safely handle these batteries. Make sure to call first to confirm their business. If you cannot find a safe disposal solution, please contact our team instead of mishandling the battery.

19.Contact us

SHANDONG HUISON ELECTRONICS TECHNLOGY CO.,LTD

N0.10 West Keda Road, Yicheng District, Zaozhuang City,Shandong,China 277300

Tel:0086-0632-7526626

Eamail:sales@huisonbattery.com