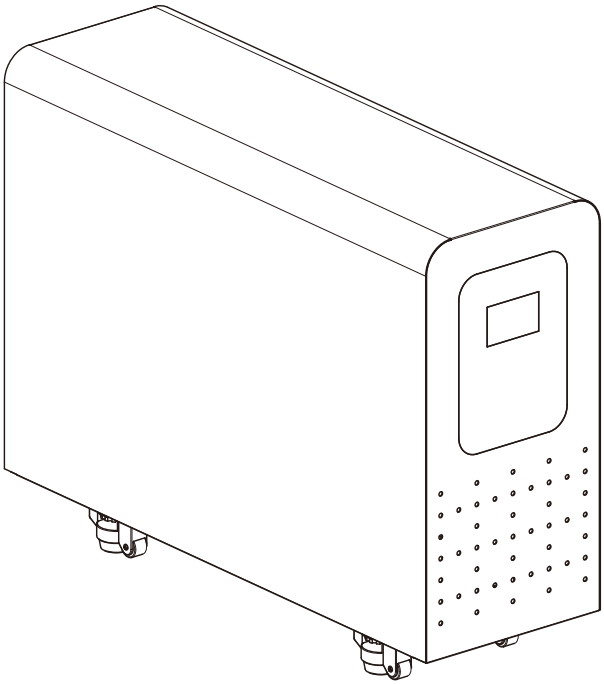
User Manual



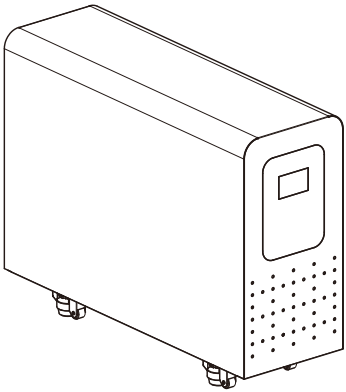
LF51314-11 51. 2V 314AH

LiFePO4 BATTERY

Thank you for choosing our product.
Before using the product, please read the following precautions carefully to avoid damage or errors.

1. INTRODUCTION

1.1. Before Using The Battery



Thank you for choosing our energy storage system.

- This manual provides information regarding safety precautions to prevent possible accidents and how to use the product. Please read this manual carefully before use for safety and keep this manual handy for reference. Work on the lithium battery should be carried out by qualified personnel only.
- Please note the warning sign on the battery, do not tear up or destroy the warning labels.
- Please charge the battery to full before putting in service, using an appropriate charger.

1.2. Safety Precautions

Our products are designed with full consideration of safety. However, all electrical appliances can be dangerous if used inappropriately; it can cause a fire or electric shock that leads to severe injury or death. For your protection, please read these safety precautions thoroughly.

Definitions of Symbols:
Below are symbols used in this manual and the unit.
Please read through the following definitions before reading the manual.

	**Warning**	If you ignore these instructions, it can lead to a fire or electric shock causing serious injury or death.
	**Caution**	If you ignore these instructions, it can lead to electric shock or other accidents causing injury or harm to nearby products.

Warning

If you do not follow the instructions below, it can lead to a fire or electric shock causing serious injury or death.

Do	Do not
✓ Use designated cable. A non-designated cable use can cause electric shock. Be sure to use the cable designated in this manual.	✗ Do not damage cables. If you damage a cable, it can cause a fire or electric shock. 1. Do not work over or damage a cable. 2. Do not place heavy objects on a cable or pull the cable. 3. Do not place a heater near the cable, which may result in the cable overheating. 4. Do not tuck down a cable when installing in a rack. 5. When you unplug a communication cable, be sure to hold the plug and pull it.
✓ Connect a power cable and communication cable properly. 1. If you connect a power cable improperly, contact resistance will increase and it may damage the parts or cause a fire. 2. Insert the connector of the communication cable all the way in. If it is connected improperly, the system may be deactivated.	✗ Do not install in a closed area. If the module/controller is installed in a closed area with no air-conditioning, heat may build up inside the set and cause a fire.
✓ Wear insulating gloves and protection glasses during installation and connection of the set to prevent electric shock or other injuries.	✗ Do not place the set in direct sunlight or near a heater. Doing so can cause deformation, a breakdown, Pay extra attention when you place the set near windows.
✓ Install in a stable place. Do not install upside down or sideways. The set may drop and cause injury.	

Do	Do not
✓ Install other equipment or accessories properly. If you inadequately install other equipment or accessories sold separately, they may fall and cause injury. When you install any of the following accessories, install it properly based on this manual.	✗ Do not install the set where excessive oil smoke, steam, moisture or dust is contained in the air.
✓ Power off at a malfunction In case any malfunction happens, please turn off the POWER ON/OFF switch in order to shut down, and remove the power connector from the POWER CONNECTOR terminal of the module.	✗ Do not allow water and/or foreign objects inside the module . Should this occur, however, turn off the "POWER ON/OFF" switch on the controller to shut down, and remove the power connector from the POWER CONNECTOR terminal of the module.
✓ Follow related laws or ordinances for disposal. When you dispose of this product, do not dispose as general or household waste.	
✓ Disposal with specified method Contact technical vendor when you discard. Do not disassemble, destroy, or disposal in the fire.	

Caution

If you ignore any of the following instructions, it can cause injury or damage to nearby products.

Danger

If liquid is leaking from the module, observe the following measures.

Do	Do not
Precautions for Use ■ In the case of a failure, or any of the abnormalities shown below, turn off the set and contact customer services. 1. Abnormal sound, smell or smoke. 2. Water or particles inside the product. 3. The product is dropped, or the cabinet is damaged. ■ Charge and discharge the product according to the control signals of the controller. Do not hammer a nail or punch a hole in the product. ■ Replace the module with a new one if discharge time at room temperature is noticeably short, even from fully charged.	■ Disassemble. ■ Modify the product (Modification may destroy the protection function inside, or cause abnormal charge/ discharge, heat generation, gas eruption, or fire). ■ Touch the rear output terminal except for installation. ■ Throw the product into fire or heat, or otherwise expose the set to heat or naked flame. ■ Submerge the product in liquid or allow it to become wet. ■ Apply strong shock, crush, or drop. ■ Place any foreign objects inside. ■ Connect any devices that exceed the operating voltage and current range. ■ Do not unplug the power connector from the POWER CONNECTOR terminal while power is turned on.

2. SPECIfiCATION AND FUNCTIONS

2.1. Basic functions

* SOC self-learning
* Customized APP
* Buzzer alarm
* Low power consumption design
* Anti-ignition function
* 10 temperature sampling
* LED status indication
* Data storage function
* Multiple units can be used in parallel
* Customized communication protocol
* Adaptive communication in parallel
* High-precision current sampling
* PWM pre-charging technology
* Intelligent balance management technology
* APP online upgrade function
* One-key start, one-key switch shipping mode
* Isolated communication: two independent RS485, two independent CAN
* Bluetooth, 4G modules are reserved for external connections
* Screen: Reserved for button screen and touch screen
* Parallel automatic address assignment function, automatic identification of host function
* APP can support CAN, RS485, wireless (4G, WIFI, BCE) monitoring and online upgrade
* Short circuit protection, over-charge, over-discharge, under-voltage, over-current, over-temperature, low temperature, differential pressure alarm and protection

2.2. Nominal technical parameters

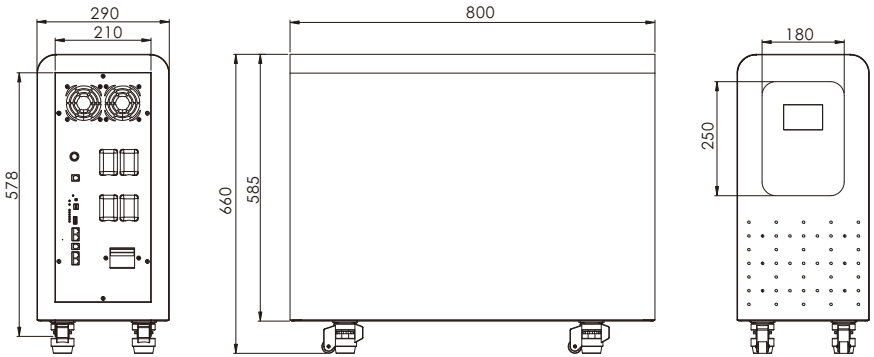
S/N	Project		Parameter	Remark
1	Nominal Voltage		51.2V	
2	Nominal Capacity		314AH	
3	Maximum charge/discharge current	Standard charge/discharge	150A/150A	
		Pulse Charge/Discharge 30S	300A/300A	
4	The SOC window is recommended		5~100%	N.A.
5	Charging operating temperature		-10℃~65℃	
6	Discharge operating temperature		-35℃~65℃	
7	Storage temperature	3 months	0℃~35℃	N.A.
		1 months	-20℃~45℃	
8	Store humidity		<95%	
9	Monthly self-discharge rate		<3%/month	(25±2)°C, 30%~50% SOC storage
10	Recommended charging current		⩽150A	
11	Maximum charging voltage		58.4V	
12	Floating charging voltage		58.4V	
13	Cycle life		⩾8000	

Test environmental conditions
Temperature: (25±2)°C
Relative humidity: 15%~90%

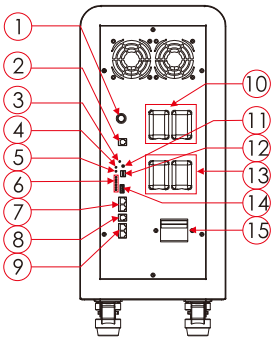
2.3. Dimensions

Unit: mm

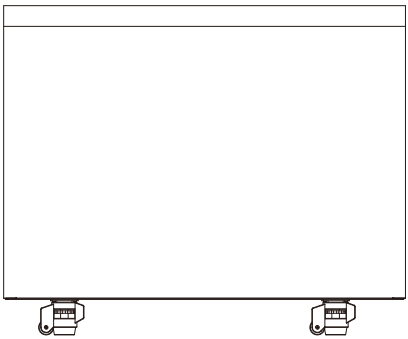
51.2V 314AH



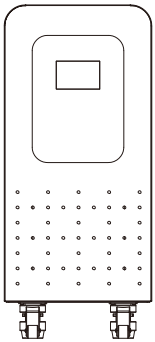
2.4. Panel indication



Side view



Front view



Side view

Item	Model
1	BMS switch
2	Screen upgrade port
3	On/off LED indicator
4	"RUN" indicator
5	ALM indicator
6	Power indicator light
7	RS485 port and CAN port
8	RS232 interface
9	RS485 Parallel communication port*2
10	Port Negative *2
11	Reset button
12	Dial code
13	Port Positive *2
14	dry contact
15	Air switch

2.5. LED indication instructions

2.5.1. LED operating status indication

State	Normal/Alarm/ Protection	RUN	ALM	Battery level indicator LED						Illustrate
		●	●	●	●	●	●	●	●	
Shutdown	Dormancy	no	no	no	no	no	no	no	no	Completely extinguished
Standby	Normal	Flash 1	no	According to the indication of the power level						Standby state
	Alarm	Flash 1	no							Module low voltage
Charge	Normal	Continuous	no	According to the battery level indication (battery level indication up to LED flashing 2)						The maximum battery LED flashes (flashes 2) and the ALM does not flash when the overcharge alarm is alarmed
	Alarm	Continuous	no							
	Overcharge protection	Continuous	no	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	If there is no mains power, it will be turned into standby
	Temperature, overcurrent, fail-safe	no	Continuous	no	no	no	no	no	no	Stop charging
Discharge	Normal	Flash 3	no	According to the indication of the power level						
	Alarm	Flash 3	no							
	Undervoltage protection	no	no	no	no	no	no	no	no	Stop discharging
	Temperature, overcurrent, short circuit, reverse polarity, fail-safe	no	Continuous	no	no	no	no	no	no	Stop discharging
Lapse		no	Continuous	no	no	no	no	no	no	Stop charging and discharging

2.5.2. Capacity indication

State		Charge					
Capacity indicator		L6	L5	L4	L3	L2	L1
		●	●	●	●	●	●
Electricity	0~17%	no	no	no	no	no	Flash 2
	18~33%	no	no	no	no	Flash 2	Continuous
	34~50%	no	no	no	Flash 2	Continuous	Continuous
	51~66%	no	no	Flash 2	Continuous	Continuous	Continuous
	67~83%	no	Flash 2	Continuous	Continuous	Continuous	Continuous
	84~100%	Flash 2	Continuous	Continuous	Continuous	Continuous	Continuous
Running indicator ●		Continuous					

State		Discharge					
Capacity indicator		L6	L5	L4	L3	L2	L1
		●	●	●	●	●	●
Electricity	0~17%	no	no	no	no	no	Continuous
	18~33%	no	no	no	no	Continuous	Continuous
	34~50%	no	no	no	Continuous	Continuous	Continuous
	51~66%	no	no	Continuous	Continuous	Continuous	Continuous
	67~83%	no	Continuous	Continuous	Continuous	Continuous	Continuous
	84~100%	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous
Running indicator ●		Flash 3					

2.5.3. LED Flash Status

Status	On	Off
Flash 1	0.25s	3.75s
Flash 2	0.5s	0.5s
Flash 3	0.5s	1.5s

3. CHARGING AND DISCHARGE

3.1. Charging

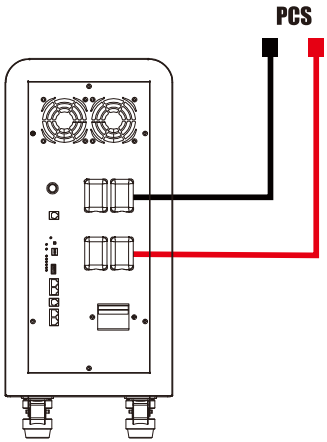
- Please use a special charger for LiFePo4 battery which matches the specific battery parameters.
- Please refer to the battery datasheet for more information about charging.
- Charge the battery under the environment temperature range from 0°C to 55°C. Try to keep the temperature close to 25°C for best performance/lifespan ratio. Note that due to internal protection, the battery will not charge under temperatures below -20°C.
- The charging process and time should be observed, otherwise, overcharge may occur and can lead to shortening of the battery lifespan and cause a safety hazard.

3.2. Discharge

■ Please refer to your battery datasheet for the maximum rate of discharge for your specific battery model.
■ LiFePo4 batteries can be discharged up to 100% of their capacity. However, to optimize the performance of your LiFePo4 battery, and to avoid the BMS disconnecting the battery, we recommend limiting the discharge to 20%.
■ Discharge the battery under the environment temperature range from -20°C to 55°C. Try to keep the temperature close to 25°C for best performance/lifespan ratio.

4.DC Cable Connection

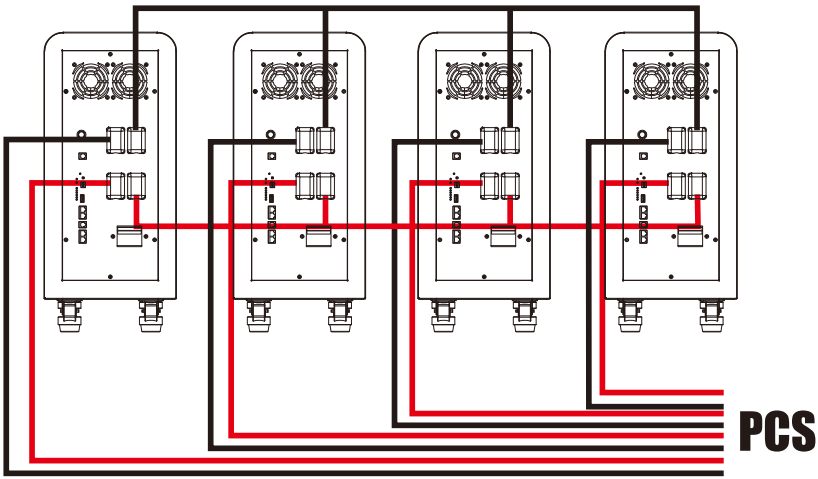
4.1. Single Unit



Single Unit Connection

4.2. Multi-Units in Parallel (4 sets as an example)

Max. Number Of Parallel: 6 Sets

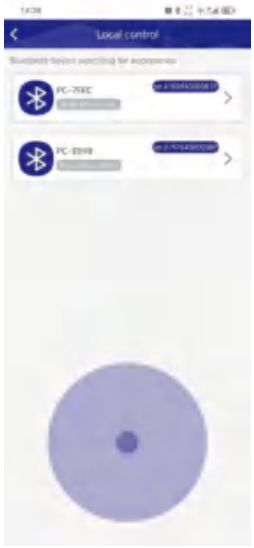


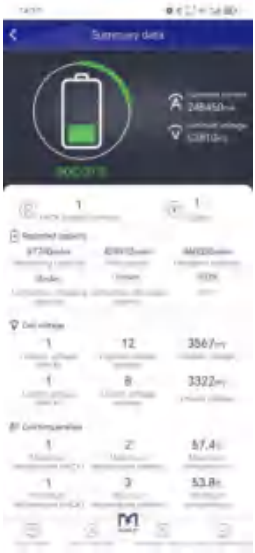
Multi-Units Connection

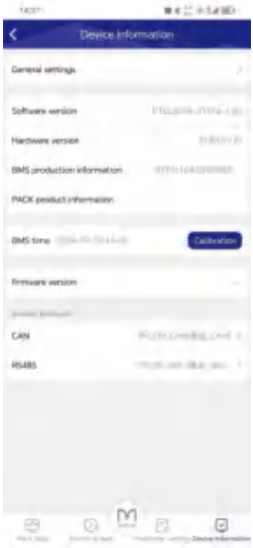
Master Pack and Slave Pack can be used as single unit as well as multi-units (in parallel) mode. The customer must inform supplier if multi-units mode is required.

5. Bluetooth Communication

APP interface content







Bluetooth Communication

The BMS can communicate with the Peicheng Bluetooth APP through Bluetooth, so as to monitor various information of the battery in the Bluetooth APP, including battery voltage, current, temperature, status, SOC, SOH and battery production information, etc., and the default baud rate is 9600bps.

6. RESET BUTTON DESCRIPTION

- When the BMS is in the sleep state, press the button (3~6S) and release it, the protection board is activated, and the LED indicator lights up sequentially for 0.5 seconds from "RUN".
- When the BMS is active, press the button (3~6S) and release it, the protection board is asleep, and the LED indicator lights up for 0.5 seconds from the lowest battery light.
- When the BMS is active, release it after pressing the button (6~10S), the protection board is reset, and all the LED lights are lit up at the same time for 1.5 seconds.

After the BMS is reset, the parameters and functions set by the host computer will still be retained. If it is necessary to restore the initial parameters, it can be achieved by "restore default values" of the host computer, but the relevant operating records and storage data will remain unchanged (such as battery power, number of cycles , protecting records, etc.).

7. SLEEP AND WAKE UP

7.1 Hibernate

When any of the following conditions is met, the system enters low-power mode:
1) The individual or overall over-discharge protection is not released within 30 seconds.
2) Press the button (3~6S) and release the button.
3) The lowest cell voltage is lower than the sleep voltage, and the duration reaches the sleep delay time (while satisfying no communication, no protection, no balancing, and no current).
4) Standby time exceeds 24 hours (no communication, no charging and discharging, no mains power).
5) Force shutdown through the host computer software.
Before entering sleep mode, make sure that the input terminal is not connected to external voltage, otherwise it will not be able to enter low-power mode.

7.2 Wake up

When the system is in low-power mode and any of the following conditions is met, the system will exit the low-power mode and enter the normal operating mode:
1) Connect to the charger, the charger output voltage must be greater than 48V.
2) Press the button (3~6S) and release the button.
3) With RS232 activation.

8. COMMUNICATION SPECIFICATION

8.1 RS232 communication

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

8.2 CAN communication

The default baud rate is 500K. This interface is used to communicate with the inverter. When the battery is the host, it can aggregate slave data and communicate with the inverter.

8.3 Parallel RS485 communication

You can view PACK information. The default baud rate is 9600bps. If you need to communicate with the monitoring device through RS485, the monitoring device serves as the host and polls data according to the address. The address setting range is 2~15.

8.4 Independent RS485 communication

The default baud rate is 9600bps. This interface is used to communicate with the inverter. When the battery is the host, it can aggregate slave data and communicate with the inverter.

8.5 Bluetooth communication

BMS can communicate with Peicheng Bluetooth APP through Bluetooth, thereby monitoring various battery information on the Bluetooth APP, including battery voltage, current, temperature, status, SOC, SOH and battery production information, etc. The default baud rate is 9600bps.

8.6WiFi communication

Press and hold the reset button for 10-13 seconds, and then release it after the running light is fully lit and turn on 1 light (except for ON/OFF lights), and wait for 8 seconds to see the new device in the APP to add devices.

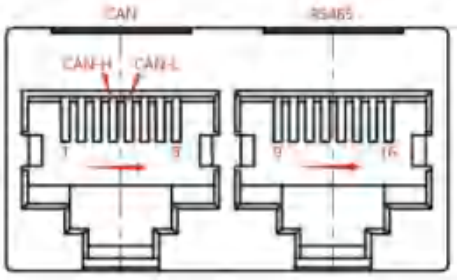
8.7 DIP switch setting

When PACKs are used in parallel, different PACKs can be distinguished by setting the address using the DIP switch on the BMS. It is necessary to avoid setting the same address. For the definition of the BMS DIP switch, please refer to the table below. In parallel mode, the default DIP address is 1. for the host.

Address	DIP switch position			
	#1	#2	#3	#4
1	ON	OFF	OFF	OFF
2	OFF	ON	OFF	OFF
3	ON	ON	OFF	OFF
4	OFF	OFF	ON	OFF
5	ON	OFF	ON	OFF
6	OFF	ON	ON	OFF
7	ON	ON	ON	OFF
8	OFF	OFF	OFF	ON
9	ON	OFF	OFF	ON
10	OFF	ON	OFF	ON
11	ON	ON	OFF	ON
12	OFF	OFF	ON	ON
13	ON	OFF	ON	ON
14	OFF	ON	ON	ON
15	ON	ON	ON	ON

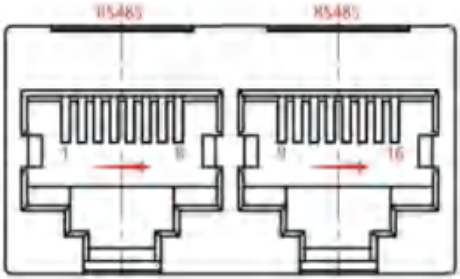
9. INTERFACE DEFINITION

9.1 Interface diagram

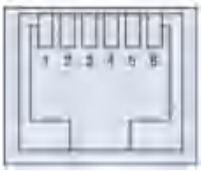


CAN and RS485 interface

Dry contact



Parallel communication port



RS232 communication interface

9.2 Definition of electrical interface

RS232--using 6P6C vertical RJ11 socket	
RJ11 pin	Definition
1、2、6	NC
3	TX (single board)
4	RX (single board)
5	GND

CAN--using 8P8C vertical RJ45 socket		RS485--using 8P8C vertical RJ45 socket	
Rj45 pin	Definition	Rj45 pin	Definition
1, 3, 6, 7, 8	NC	9, 16	RS485-B1
4	CAN-H	10, 15	RS485-A1
5	CAN-L	11,14	GND
2	GND	12, 13	NC

CAN and RS485 interface

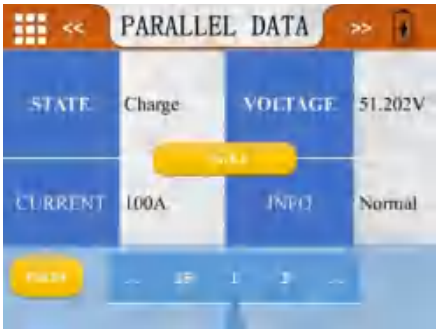
RS485--using 8P8C vertical RJ45 socket		RS485--using 8P8C vertical RJ45 socket	
Rj45 pin	Definition	Rj45 pin	Definition
1,8	RS485-B	9, 16	RS485-B
2, 7	RS485-A	10, 15	RS485-A
3, 6	GND	11, 14	GND
4, 5	NC	12, 13	NC

Parallel communication port

10. Description of the display function

10.1 Introduction

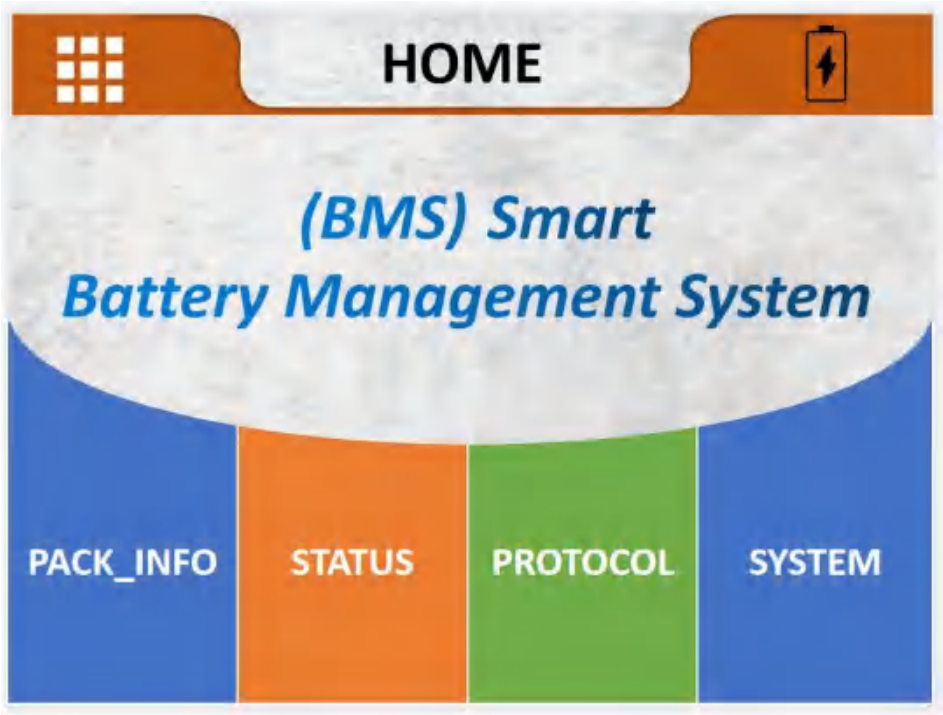
Ø **Main status page**



Icon description:

	Main menu icon, click to enter the main menu HOME interface
	Main State icon, click to enter the Main State interface
	Parallel data icon, click to enter the parallel data parral data interface

Ø **HOME page**



Menu structure:

- Menu
- min state page（Main Status Screen)
  - SOC(Total)
  - Current
  - Voltage
  - BMS INFO
  - Warranty
  - Parral data
    - SOC(each pack)
    - Current
    - Voltage
    - BMS INFO
- HOME（home page）
  - PACK Info（ pack Cell data）
    - Voltage
      - Cell01 voltage
      - Cell02 voltage

        .....
      - Cell16 voltage
    - Temperature
      - NT1
      - NT2
      - NT3
      - NT4
      - Mos_T
      - ENV_T

        .....
  - BMS Status
    - Warning
    - Protect
    - Fault
    - Record

- PROTOCOL (Protocol Selection)
  - CAN
    - GOODWE PROTOCOL
    - LV BMS Protocol(CAN) for Solar Inverter Family EN_V 1.5
    - PYLON PROTOCOL 2.0
    - Pylon CAN bus protocol V 2.0.420211122
    - SMA PROTOCOL
    - SMAF SS-Connecting Bat-TI-en-20W
    - GROWATT_PROTOCOL
    - Growatt BMS CAN-Bus-protocol-low-voltage
  - RS485
    - USER_485_VOLTRON
    - Voltronic Inverter and BMS 485 communication protocol 20200325(1)
    - PYLON
    - RS 485-protocol-pylon-low-voltag
    - Luxpowertek Battery Protocol RS 485_V 01
- SYSTEM
  - Language select（English、Chinese、Arabic）
  - PACK SN
  - BLUETOOTH SN

Note: The protocol list is read from the BMS motherboard, the following is the case, the built-in list of each BMS motherboard shall prevail, change the protocol, the first time you need to change Enter the permission password, the initial password is 123456, exit the agreement interface, the permission takes effect, modify the agreement again, and need to verify the permission again.

10.2 Hibernation/shutdown

In normal operation, the system will enter the hibernation/shutdown state after 3 minutes of keyless operation. In a shutdown/hibernation state In this case, tap any position on the color screen, and the display will be activated and enter the status interface before the screen is turned off.

11. Install and use

Please connect the display to the main control board through a dedicated cable!

Warranty Card

CUSTOMER Information

*Contact Name _____

*Phone Number _____ *Email _____

Company Name _____

*Address _____

*State _____ Zip Code _____

PRODUCT Information

*Module Type _____

*Serial Number _____

*Purchase Date _____

*Faulty Description _____

1) Can the battery boot? Yes or No ?
2) Can battery charged? Yes or No ?
3) Can battery discharged? Yes or No?
4) Red light on? Yes or No?
5) Running light on? Yes or No?

INSTALLER Information

*Installer Name _____

Staff Number _____

*Installing Date _____

Please fill the form carefully, and the items marked with "*" are necessary, Thank you!

*Customer Signature _____ *Provider Signature _____

*Date _____