Manual on High Voltage Li-ion Battery

Product model:LFH51100/LFH51200



Copyright ©Chengdu Greenfaith New Energy Technology Co., Ltd. All rights reserved.

www.lvfuenergy.com

Battery Model：LFH51100

System Model：

System Model	Battery Quantity	Voltage	Energy
153.6V-15.4kWh	3	153.6V	15.36kWh
204.8V-20.5kWh	4	204.8V	20.48kWh
256V-25.6kWh	5	256V	25.6kWh
307.2V-30.7kWh	6	307.2V	30.72kWh
358.4V-35.8kWh	7	358.4V	35.84kWh
409.6V-41kWh	8	409.6V	40.96kWh
460.8V-46.1kWh	9	460.8V	46.08kWh
512V-51.2kWh	10	512V	51.2kWh
563.2V-56.3kWh	11	563.2V	56.32kWh
614.4V-61.4kWh	12	614.4V	61.44kWh
665.6V-66.6kWh	13	665.6V	66.56kWh

Battery Model：LFH51200

System Model：

System Model	Battery Quantity	Voltage	Energy
153.6V-30.7kWh	3	153.6V	30.7kWh
204.8V-41kWh	4	204.8V	41kWh
256V-51.2kWh	5	256V	51.2kWh
307.2V-61.5kWh	6	307.2V	61.5kWh
358.4V-71.7kWh	7	358.4V	71.7kWh
409.6V-81.9kWh	8	409.6V	81.9kWh
460.8V-92.2kWh	9	460.8V	92.2kWh
512V-102.4kWh	10	512V	102.4kWh
563.2V-112.6kWh	11	563.2V	112.6kWh
614.4V-122.9kWh	12	614.4V	122.9kWh
665.6V-133.1kWh	13	665.6V	133.1kWh

File version: V1.0

Revision record

Number	Version	Revision content	Revision date
1	V1.0	first edition	2024/11/02

Contents

1. Safety instructions ..... - 1 -

2. Introduction to Basic Functions of High Voltage Rack-mounted Battery ..... - 4 -

3. Structure and Function Description of Rack Battery Products ..... - 9 -

4. Instructions for LFH51100/LFH51200 series Rack-Mounted High Voltage Battery System ..... - 12 -

5. Screen operation instructions ..... - 20 -

6. Storage instructions ..... - 28 -

7. Declaration ..... - 29 -

1. Safety instructions

⚠ Danger: If there is no standardized operation, it may lead to accidents such as fire, serious personal injury, and even death. ⚠ Attention: If there is no standardized operation, it may cause moderate or minor personal injury, as well as system failure or damage. When installing, using, and repairing this system, please read this manual carefully and be sure to follow the safety precautions required in this chapter! Any injury or loss caused by illegal operations is not related to our company!	
Usefulness	⚠ Danger
	◆ This series of battery packs must be used together with the compatible inverter, otherwise it may cause system damage. ◆ This series of battery packs is used for energy storage and cannot be used for other purposes, as it may cause system malfunctions or fires.
Arrival inspection	⚠ Attention
	◆ If system components are found to be damaged, they cannot be installed. Please communicate and confirm with the manufacturer in a timely manner, otherwise it may affect the project application. ◆ If it is found that the packing list does not

	match the physical name, communicate and confirm with the manufacturer in a timely manner, otherwise it may affect the project application.
Install	 Attention
	◆ when handling and installing, please handle with care, otherwise it may cause system damage. ◆ This system should be kept away from flammable and explosive materials and heat sources.
Assembly wiring	 Danger
	◆ Installation must be guided by qualified electrical engineering personnel who are familiar with the system, otherwise there is a risk of electric shock or damage to the system. ◆ Before wiring, it is necessary to ensure that the power supply is disconnected, otherwise there is a risk of electric shock or fire.
	 Attention
	◆ Confirm if the communication wiring is correct, otherwise it may cause abnormal operation ◆ Confirm whether the positive and negative pole connections of the power supply are correct, otherwise it may cause system damage.
Running	 Danger

	◆ Only after proper connection can the power be turned on. It is strictly prohibited to plug and unplug the wiring harness when the power is on, otherwise there is a risk of electric shock. ◆ Non system familiar professionals are not allowed to change the parameters of the upper computer settings page without authorization, otherwise it may cause system malfunctions or even accidents.
	 Attention
	◆ Before running, please confirm whether this system is within the allowable range of use, otherwise it may cause damage to the system. ◆ Before operation, please confirm that the positive and negative wiring screws are tightened, otherwise it may cause system damage
Maintenance Inspection	 Danger
	◆ If you want to disassemble the casing, please make sure to turn off the power, otherwise there is a risk of electric shock. ◆ Please designate qualified electrical engineering personnel for maintenance, inspection, or replacement of components, otherwise accidents may occur.
Others	 Danger

	◆ Do not squeeze, puncture, drop, vibrate, heat or short-circuit, and keep away from corrosive substances. ◆ Do not disassemble the battery by yourself. Incorrect disassembly can cause short circuits and other problems such as fire, gas, and even explosion; ◆ Do not place the battery in a fire. Otherwise, it may cause very dangerous situations such as fire and explosion.
	⚠ Attention
	◆ If deformation, swelling, leakage or other issues are found, please do not use. ◆ Do not place the battery in substances such as water or liquids.

2. Introduction to Basic Functions of High Voltage Rack-mounted Battery

This series products are rack mounted high voltage lithium battery systems that can be combined with an adaptive inverter to form a household energy storage system. AC mains electricity (or solar energy generated through photovoltaic panels) is converted into appropriate voltage range DC electricity through an inverter to charge the battery pack and store electrical energy for use when needed. When battery storage is needed, the electricity from the lithium battery pack is converted into alternating current (grid connected or off grid,

depending on user needs and inverter functions) through an inverter to supply power to the user's electrical equipment.

2.1. LFH51100 Series Battery and System

（1）The shapes of LFH51100 rack mounted battery are shown in figure 1：

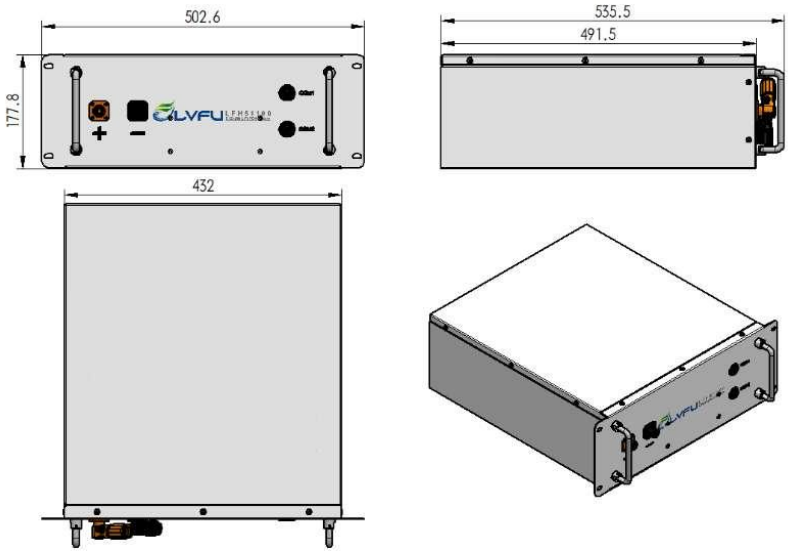


Figure 1. External view of LFH51100

（2）For example, the shapes of 409.6V-41kWh rack-mounted high voltage battery system are shown in figure 2：

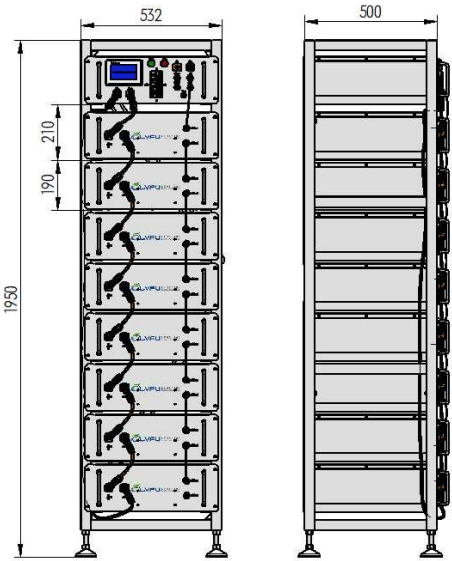


Figure 2. External view of 409.6V-41kWh

2.2. LFH51200 Series Battery and System

（1）The shapes of LFH51200 rack mounted battery are shown in figure 3：

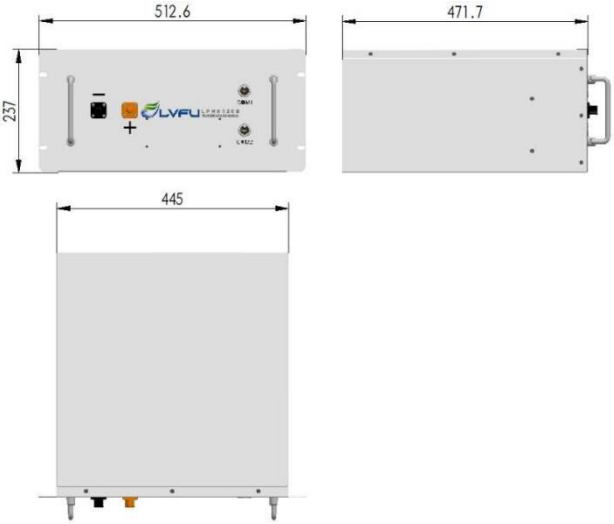


Figure3. External view of LFH51200

（2）For example, the shapes of 512V-102.4kWh rack-mounted high voltage battery system are shown in figure 4：



Figure 4. External view of 512V-102.4kWh

2.3. Application scenario

The application scenario is shown in figure 5:

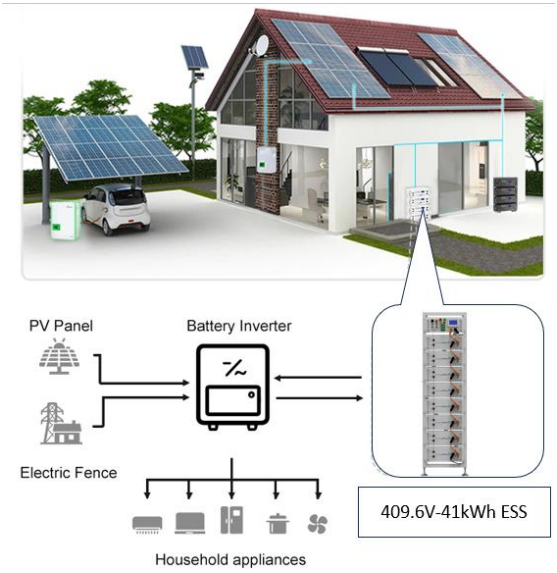


Figure5. Application scenario diagram

2.4. Technical parameter

（1）The technical parameters of the **battery** are shown in the table below

Table 1. Technical parameters of rack battery LFH51100 and LFH51100

Type		LFH51100	LFH51200
Product Specification		51.2V100Ah	51.2V200Ah
Battery parameters	Battery type	LFP(LiFePO4)	LFP(LiFePO4)
	Nominal voltage(V)	51.2	51.2
	Charging voltage range (V)	43.2-57.6	43.2-57.6
	Max charging current(A)	100	200
	Charging cut-off conditions	total voltage≥57.6V	total voltage≥57.6V
		Cell voltage≥3.60V	Cell voltage≥3.60V
	Max discharge current(A)	100	200
	Discharging cut-off conditions	total voltage≤43.2V	total voltage≤43.2V
		Cell voltage≤2.7V	Cell voltage≤2.7V
	Rated capacity*(Ah)	100	200
	Rated energy(kWh)	5.12	10.24
General characteristics	Dimensions(W*D*H)	512.6*491.5*178mm	502.6*471.5*237mm
	Battery pack weight (Kg)	50±2	83±2

（2）The technical parameters of the Rack-Mounted High Voltage

Battery **System** are shown in the table below

Table 2. Technical parameters of Rack-Mounted High Voltage Battery System

Product category	LFH51200 series	LFH51100 series
Battery Quantity	N（3≤N≤13）	N（3≤N≤13）
Product Model	51.2*N V-10.24*N kWh	51.2*N V-5.12*N kWh
Nominal Voltage (Vdc)	51.2*N	51.2*N
Operating Voltage (Vdc)	43.2*N-57.6*N	43.2*N-57.6*N
Nominal Capacity (Ah)	200	100
Nominal Energy (kWh)	10.24*N	5.12*N
Usable Energy 90% DOD (kWh)	9.2*N	4.6*N
Max. Charge/Discharge Current(A)	200	100
Charge Temperature	0~55℃	0~55℃
Discharge Temperature	-20~55℃	-20~55℃
Storage Temperature	-30℃~45℃（1 month）； -30℃~35℃（6 months）	-30℃~45℃（1 month）； -30℃~35℃（6 months）
Ingress Protection	IP20	IP20

3. Structure and Function Description of Rack Battery Products

3.1. Product Interface

（1）The interface and its definition of battery is as follows

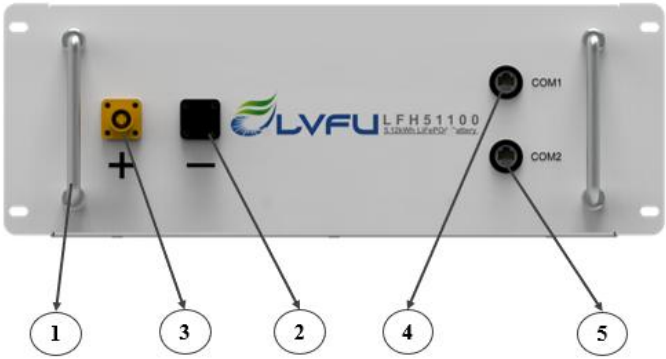


Fig. 6 Battery Interface and Components Diagram

Table3. Definition details of battery interface

No.	Components of Interface	Silk Screen and Identification	Functions
1	Handle	/	Battery transfer handle
2	Negative terminal	—	Negative battery output terminal
3	Positive terminal	+	Positive battery output terminal
4	RJ45 interface	COM1	Battery communication port 1
5	RJ45 interface	COM2	Battery communication port 2

（2）The interface and its definition of high voltage control box is as follows:

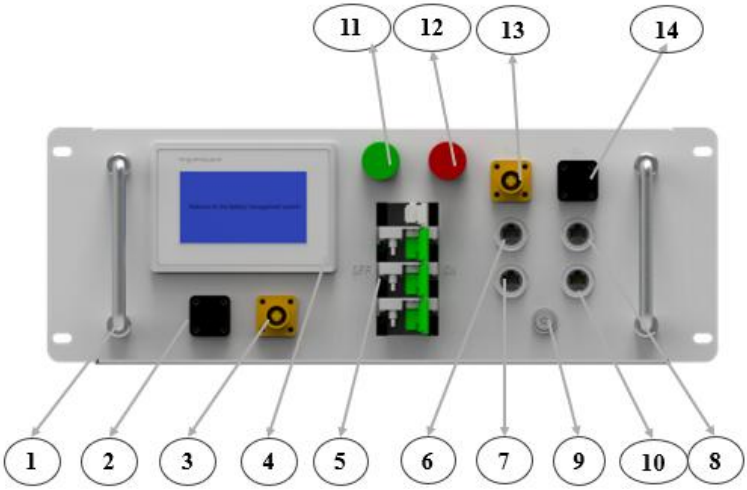


Fig.7 LFH51100 Series High Voltage Control Box Interface and Components Diagram

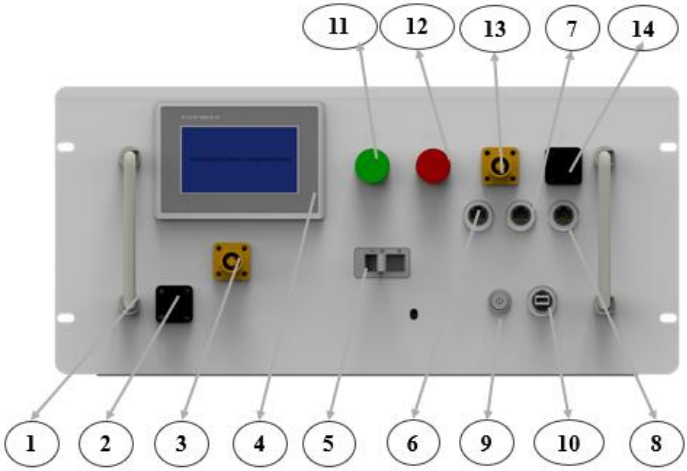


Fig.8 LFH51200 Series High Voltage Control Box Interface and Components Diagram

Table 4. Definition details of high voltage control box interface

No.	Components of Interface	Silk Screen and Identification	Functions
1	Handle	/	

2	Battery Negative terminal	B-	Negative battery access
3	Battery Positive terminal	B+	Positive battery access
4	Display screen	/	Display battery system information
5	Breaker switch	Switch	High-voltage box power supply and main circuit switch
6	RJ45 interface	COMA	Parallel cluster interface A
7	RJ45 interface	COMB	Parallel cluster interface B
8	RJ45 interface	PCS	Communication interface with PCS
9	Push-button switch	Start	Start button
10	RJ45 interface	COM	Communication interface with battery pack
11	Running light	RUN	Run the indicator light
12	Alarm light	Alarm	Fault indicator light
13	ESS positive terminal	P+	Positive output
14	ESS negative terminal	P-	Negative output

4. Instructions for LFH51100/LFH51200 series Rack-Mounted High Voltage Battery System

4.1. Unpacking and Inspection

After unpacking, check if the goods are complete according to the packing list in the document, and check the battery pack for appearance, the device for integrity and correctness, and the battery case for deformation and corrosion.

(1)The packing list of each model of **LFH51100** series is as follows：

Model	Battery Quantity	High Voltage Control Box Quantity	Wires			Rack
			Battery pack upper and lower series line	The upper and lower communication lines of the battery package	Other Wires	
153.6V-15.4kWh	3	1	2	3	(1)Battery pack cross-line series line × 1 unit (2)Battery pack to the high-voltage box positive wire × 1 unit (3)Battery pack to the high-voltage box negative line × 1 unit (4)P+ output line × 1 unit (5)P- output	1set
204.8V-20.5kWh	4		3	4		1set
256V-25.6kWh	5		4	5		1set
307.2V-30.7kWh	6		5	6		1set
358.4V-35.8kWh	7		6	7		1set
409.6V-41kWh	8		7	8		1set
460.8V-46.1kWh	9		8	9		1set
512V-51.2kWh	10		9	10		1set
563.2V-56.3kWh	11		10	11		1set
614.4V-61.4kWh	12		11	12		1set

665.6V-66.6kWh	13		12	13	line × 1 unit (6)PCS communication cable × 1 unit (7)Grounding wire × 1 unit (8)Battery pack cross-line communication line × 1 unit (9) terminal resistor RJ 45 plug×1	1set

Instruction × 1 (this product)

(2) The packing list of each model of **LFH51200J**series is as follows：

Model	Battery Quantity	High Voltage Control Box Quantity	Wires			Rack
			Battery pack upper and lower series line	The upper and lower communication lines of the battery package	Other Wires	
153.6V-30.7kWh	3	1	2	3	(1)Battery pack cross-line	1set
204.8V-41kWh	4		3	4		1set

256V-51.2kWh	5		4	5	series line × 1 unit (2)Battery pack to the high-voltage box positive wire × 1 unit (3)Battery pack to the high-voltage box negative line × 1 unit (4)P+ output line × 1 unit (5)P- output line × 1 unit (6)PCS communication cable × 1 unit (7)Grounding wire × 1 unit (8)Battery pack cross-line communication line × 1 unit	1set
307.2V-61.5kWh	6		4	5		1set
358.4V-71.7kWh	7		5	6		2sets
409.6V-81.9kWh	8		6	7		2sets
460.8V-92.2kWh	9		7	8		2sets
512V-102.4kWh	10		8	9		2sets
563.2V-112.6kWh	11		9	10		2sets
614.4V-122.9kWh	12		10	11		2sets
665.6V-133.1kWh	13		11	12		2sets

					(9) terminal resistor RJ 45 plug×1	

Instruction × 1 (this product)

4.2. Precautions before installation

(1) Before installing the battery module, it is necessary to carefully check whether the open circuit voltage of the battery is normal, and whether there is any damage to the shell, leakage, or other phenomena;

(2) During the installation process, insulated tools and gloves should be used. Metal containing conductors such as watch bracelets should be removed from the wrist to prevent electric shock or short circuits between the positive and negative poles;

(3) The installation location of the battery should be far away from heat sources or areas prone to metal sparks, with a safe distance of more than 0.5m;

(4) Cannot connect batteries of different models, performance, and manufacturers together for use;

(5) The connection wires for battery pack installation should be as short as possible to prevent excessive line losses.

(6) Batteries should be kept away from direct sunlight and should not be placed in environments with a large amount of radioactivity, infrared radiation, organic solvent gases, and corrosive gases. They should be kept away from windows, air conditioning, exhaust fans, etc.

4.3. Installation steps:

4.3.1 Assemble rack

Fasten the frame with screws as described in the following figure.



Step1. Set up the two side brackets



Step2. Install the beam



Step3. Lock the screws of 8 small triangles (6 at the bottom of the shelf and 2 at the back of the top)

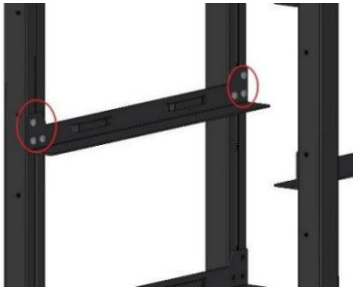


Step4. Lock the screws of eight large triangle plates





Step5. Fix all beams and mounting blocks in turn



Step6. Install four feet and adjust them to the level of the shelf



Step7. Install the battery shelf

Step8. Ensure that the shelves on the same floor are installed horizontally



Step9. Install the back stiffener

4.3.2 Install batteries and cable connections

（1）Install the batteries and high voltage box on the bracket, Take

409.6V-41kWh ESS as an example.



Fig. 9 Installation diagram of409.6V-41 kWh power system

（2）Connecting harness

Connect the power harness and the communication harness in the sequence shown in the figure. Note the following when connecting the communication harness:

① The COM interface of the high voltage control box must be connected to the COM1 of the first battery

② The COM1 of each battery is the input port, and the COM2 is the output port, which means that when connecting the adjacent battery, it is necessary to ensure that the COM2 of the previous battery is connected to the COM1 of the current battery, and the COM2 of the current battery must be connected to the COM1 of the next battery;

③ Plug an RJ45 plug into the COM2 port of the last battery pack. This plug contains a 120Ω terminal resistor

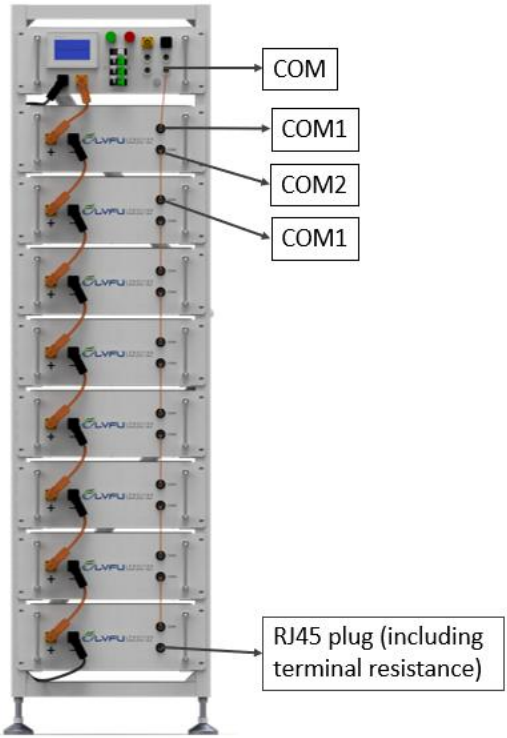


Fig. 10 409.6V-41kWh Cable connection complete

4.4. Switching on and running

Power on/start up:

After the cable is connected, first push the switch to ON, and then press the start button to make the high-pressure box work.

5. Screen operation instructions

5.1. Keys

The display interface of industrial control screen integrates display, control, alarm, log and other functions, and realizes a series of operations such as displaying data, processing data, prompting alarm information in real time, saving alarm log, and insulation control.

The display interface is mainly divided into 7 functional interface modules, namely the startup interface, the home page interface, the details data interface, the current alarm interface, the alarm log interface, the system information interface, and the system setting interface.

The details data interface has three sub-interfaces, which are the cell data sorting interface, the cell data display voltage interface, and the cell data display temperature interface.

There is a Chinese-English switch button in the system information interface, which can switch between the Chinese-English interface and the English interface.

5.2. Function Introduction

5.2.1. After the system is powered on, the startup page is displayed to initialize data. The boot interface is shown in Figure 9.



Fig 11. Boot screen

5.2.2. After the startup screen is initialized, you can enter the home screen, or click the Home button in the interface switch bar to return to the home page.

Real-time display content ： Current alarm status, system status,

voltage, current, Power, SOC, Accumulated charge capacity, accumulated discharge capacity, maximum voltage of a unit, minimum voltage of a unit, maximum temperature of a unit, and minimum temperature of a unit.

Switch button on the left side of the interface: You can click the corresponding switch button to jump to the corresponding functional interface.

Alarm bar: When an alarm is generated, an alarm icon is displayed in the alarm bar.

Login status: You can click to go to the login page.

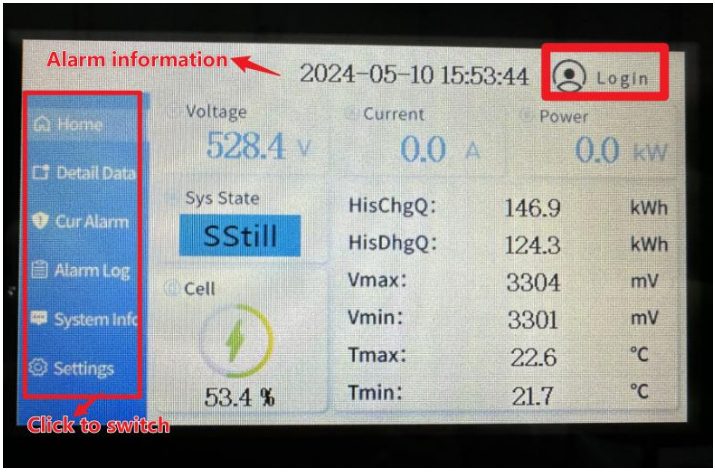


Fig12. Home page interface

5.2.3. Click the Detailed Data Interface switch button in the interface switch bar to jump to the detailed data interface.

Real-time display: cell voltage and cell temperature.

Switch button on the left side of the interface: You can click the corresponding switch button to jump to the corresponding functional interface.

Alarm bar: When an alarm is generated, an alarm icon is displayed

in the alarm bar.

Login status on the right: You can click to go to the login page.

Section number input field: After clicking, the section number input pop-up window will pop up and enter the corresponding section number. You can switch to the interface that displays the information of the corresponding section number.

Switch up and down button: Click to display the details of the corresponding next page.

Sub-interface switch button: You can jump to the corresponding sub-interface by clicking the corresponding sub-interface key. Figure 13,14,15 show the English subinterfaces.

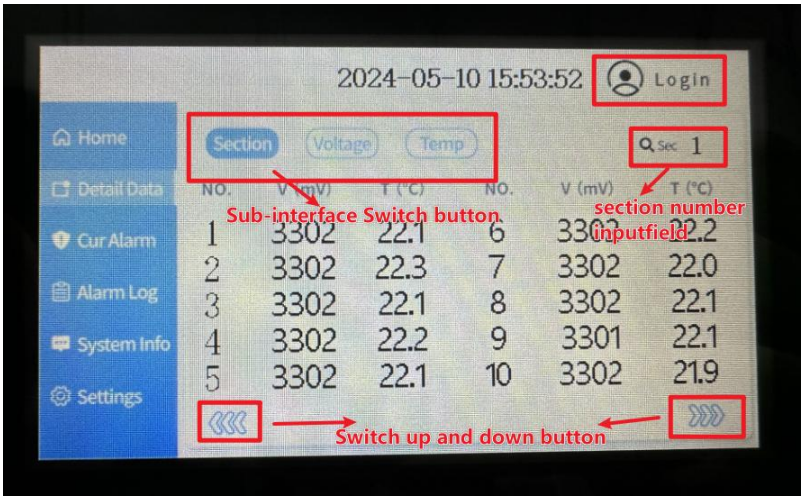


Fig.13 English sub-interfaces.

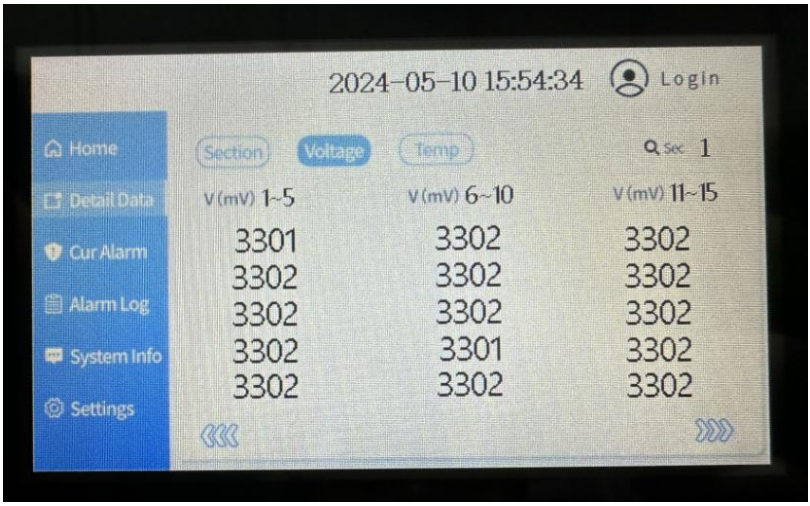


Fig.14 Voltage information

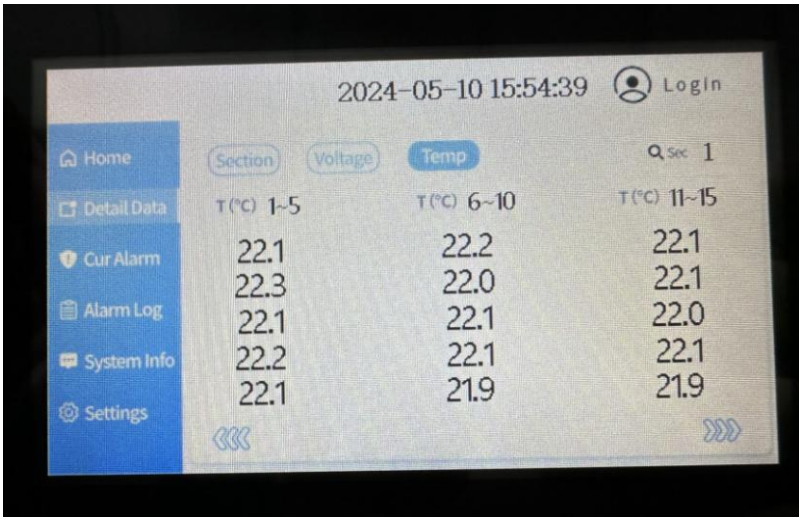


Fig.15 Temperature information

5.2.4. To switch to the current alarm screen, click the switch button in the switch bar.

Display description: Level indicates the level of the current alarm. Level 5 is the highest level. Location indicates the location of the

current alarm, for example, 16/90, module 16, and module 90. For example, if the voltage of a single cell is 1.0V low, the threshold is 1.5V. 1.0V indicates the voltage of the single cell and 1.5V indicates the alarm threshold.

Figure 16 show the current alarm page in Chinese and English.

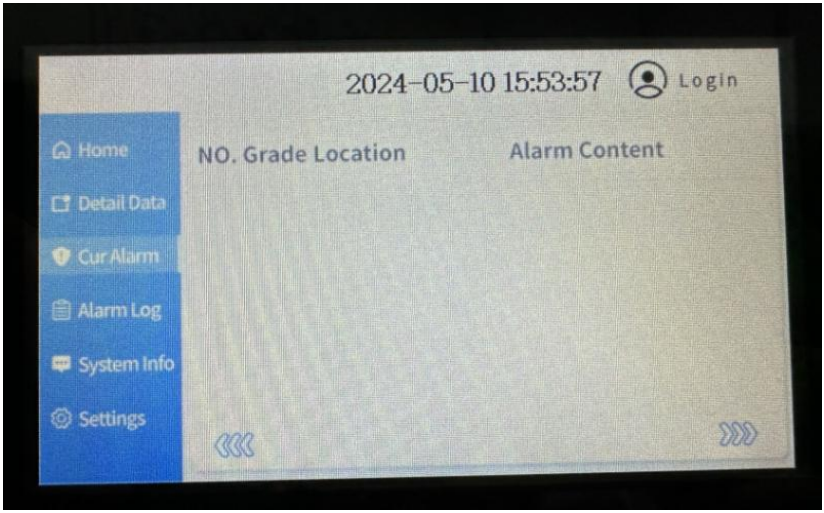


Fig.16 Current alarm interface

5.2.5. Click the Alarm Log screen switch button in the switch bar.

Real-time display: serial number, date, time, level, system status, location, disconnect, and log content.

Level Indicates the level of the current alarm. Level 5 is the highest level. Location Indicates the location of the current alarm, for example, 16/90, module 16, and module 90. For example, if the voltage of a single cell is 1.0V low, the threshold is 1.5V. 1.0V indicates the voltage of the single cell and 1.5V indicates the alarm threshold. Off Indicates whether the relay is off.

Figure 17 show the alarm log page.

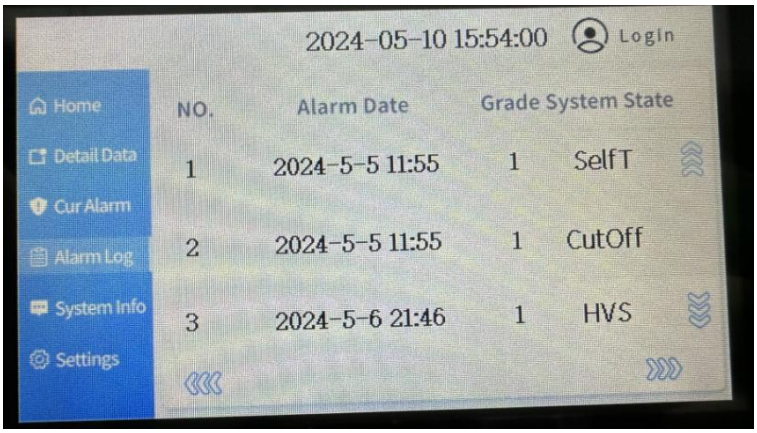


Fig.17 Alarm Log

5.2.6. Click the System Information Interface switch button in the interface switch bar to jump to the system information interface.

Real-time display: system version, BCU version, hardware version.

Touch Calibration bar: Touch screen calibration can be performed through the touch screen calibration button even calibration mode.

Chinese-English switch bar: You can switch the Chinese-English interface by using the Chinese-English switch button.

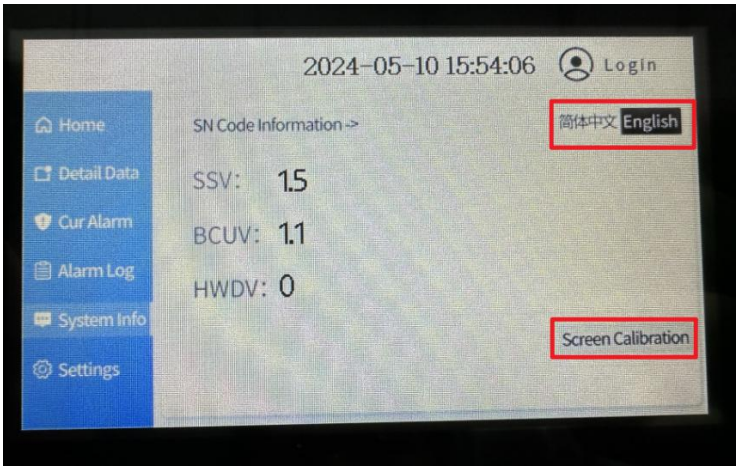


Fig.18 System information interface

5.2.7. Click the Setting Interface Switch button in the interface switch bar to go to the setting interface.

Real-time display: number of modules, number of unit voltage, number of unit temperature, rated voltage, rated capacity, PCS protocol, sensor type.

Balance detection (can be added) : You can click to control the balance switch, the balance control function requires permission to use.

Insulation control: The insulation switch can be controlled by clicking, and the insulation control function requires permission to use.

Parameter setting: In the case of login permission, you can click the corresponding parameter box and enter the value in the input pop-up window to set the system parameter, and the background color prompt is displayed.

Time synchronization button: Click to synchronize time with the master. Figure 19 show the Chinese and English interface of system Settings.

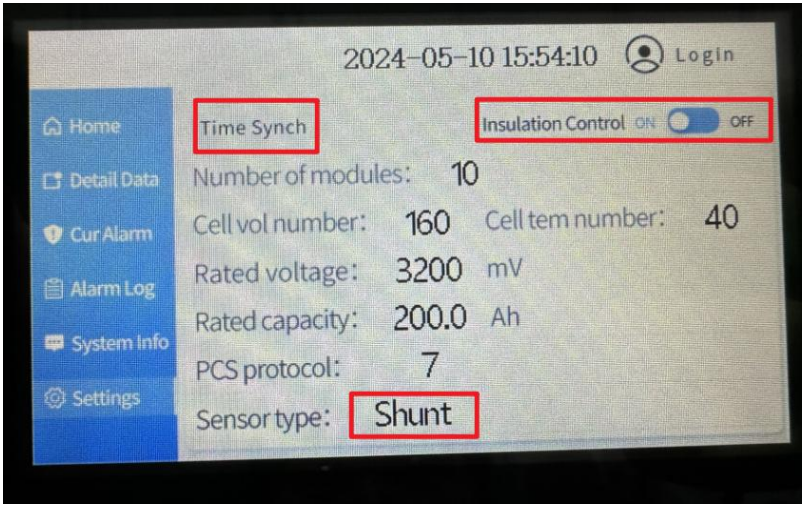


Fig.19 System setting interface

5.2.8. Tap the login button in the upper right corner to go to the login page.

Real-time display content: User input account, password box and login and logout login buttons.

Back key: You can return to the main page by clicking the Back button.

Account input box: You can click to enter the login account.

Password input box: You can click to enter the login password.

Login: Enter the account password and click login to verify the account password.

Log out: Click to log out.

Figure 20 show the interface for system login.

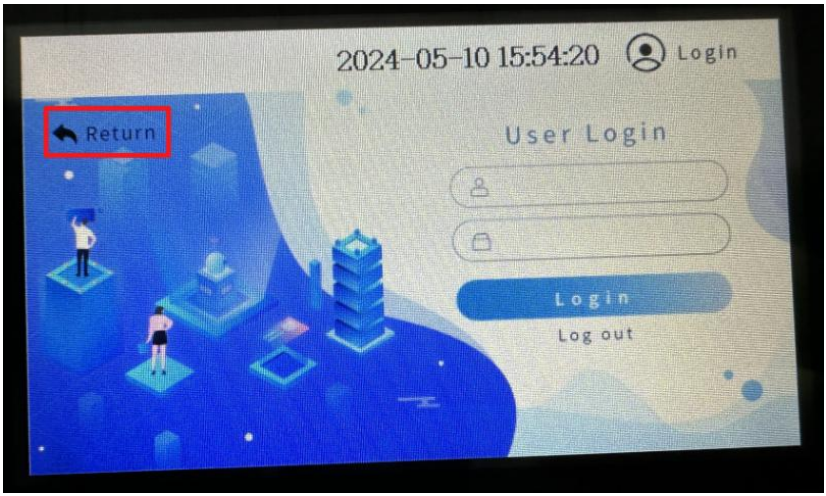


Fig.20 System login interface

6. Storage instructions

(1) When storing batteries, it is necessary to ensure that the SOC is ⩾ 50%;

(2) The battery storage location should be dry and away from the source of goods;

(3) If the battery needs to be stored for a long time, it should be recharged at least once every three months

7. Declaration

(1) Due to product version upgrades or other reasons, the content of this document will be updated from time to time. Unless otherwise agreed, this document is for instructional purposes only. All statements, information, and advice in this document do not constitute any express or implied warranties.

(2) Before installing the equipment, please read the user manual carefully to understand product information and safety precautions.

(3) All installation operations of the equipment must be performed by trained and qualified electrical technicians. Operators must wear personal protective equipment.

(4) Before installing the equipment, please check the delivery items according to the "Packing List" to ensure that all the items are complete and intact, without any obvious external damage. If anything is missing or damaged, please contact your dealer.

(5) Equipment damage caused by failure to operate according to the document is not covered by the equipment warranty.

(6) The cable colors mentioned in this document are for reference only, and the selection of cables should comply with local cable standards.



Chengdu Greenfaith New Energy Technology Co., Ltd.

Add:No. 619, Tomorrow Base, No. 555, Xinyu Road, High-tech Zone,Chengdu, Sichuan, P.R.China
Email:info@lvfubattery.com
Web:www.lvfuenergy.com