Battery energy storage system

Product installation and user manual

1)LPBES-864-100-PA, 2) LPBES-768-100-PA,3) LPBES-672-100-PA, 4) LPBES-576-100-PA,
5) LPBES-480-100-PA, 6) LPBES-384-100-PA,7) LPBES-288-100-PA, 8) LPBES-192-100-PA.

OLIPOWER ENERGY &AUTOMATION TECHNOLOGY

Document version: V1.5

CONTENTS

Statement:

This product is a battery energy storage system. The product names mentioned below are all described as "Battery Energy Storage System (BESS)".

This document will be adjusted as appropriate for product upgrades or other reasons. Unless otherwise agreed, this document is used only as a guideline, and all declaration, information and recommendations stated in this document do not constitute any express or implied.

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1 Introduction

Thank you for choosing our battery energy storage system, we will provide you with quality products and reliable after-sales service.

To protect the safety of personnel and products, please read carefully the details of the product, structure, operating standards, maintenance and troubleshooting provided in this manual.

Special statement:

The company has the final interpretation of this manual.

2 Information of the Manual

2.1 About the Manual

This manual is for the use of battery energy storage systems. The use of equipment or installation procedure must strictly follow the manual.

2.2 Application Scope

This manual is only applicable to the battery energy storage system of our company.

2.3 Special Instruction

Product specifications can be changed without notice to the customer.

2.4 Use of Logo

The meaning of the logo:

Warning:

Warning indicates minor equipment damage or personal injury if not avoided.

Note:

Note indicates that damage to product performance can occur if not avoided.

Information:

The information provides the most appropriate installation and operating skills for the product.

3. Security

3.1 Warnings and Notifications

Note:

Installation environment requirements: The battery energy storage system must be installed in a position that meets the IP20 protection level. If the installation environment does not meet the IP20 protection requirements, the installation or use of the product may fail, and the product may not guarantee any related accidents or damage.

For Australian market, the battery energy storage system can only be installed indoors or in containers mounted into battery cabinet. Distances of any standoff from a wall, floor, ceiling/roof is 0.5m at least; Distance from any heat source (e.g. hot water systems, gas heaters or the like) is 0.5m at least; Distance/clearances from any equipment/wall/structure to the sides, bottom, top is 0.5m at least; Clearance distances from any vents to any wall, other equipment, structure is 0.5m at least.

3.2 Safety Guidelines

Warning:

When installing and using the battery, it must avoid short circuit between anode and cathode of the battery. All electrical connections on the battery energy storage system must be performed by qualified professionals. When the operation is as expected, the battery system will be used as a safe and reliable power source. In the event of improper operating conditions, damage, misuse and/or abuse, the battery case may present potential safety hazards such as overheating or electrolyte fumes, and the user must comply with the safety precautions and warnings described in this section. If any of the following precautions are not fully understood or any problems, please

contact customer service for assistance. The safety section may not include all regulations for your area, and the use of the battery system must be subject to review applicable local laws and regulations as well as industry standards for the product.

Installation personnel should not wear metal objects such as watches during installation operation to avoid short circuits and personal injury.

Warning:

Due to the size and weight limitation of the battery pack, please use the original packaging in the secondary transportation, or use other alternative packaging that meets the transportation standards to ensure the safety of the battery case during transportation, so as to avoid product damage and personal injury.

3.3 Recycling and Disposal

The battery energy storage system must not be disposed of with domestic waste. The user has the responsibility and obligation to send it to the designated organization for recycling and disposal.

4. Product Overview

4.1 Product Introduction

The battery energy storage system is a high voltage lithium-ion phosphate battery energy storage system. The system is installed in a cabinet format, and the modular design makes installation quite convenient. The energy storage system includes 1 battery rack, 9 battery modules, 1 control module, provide 86.4kWh energy and reliable control. Do not use the equipment beyond the functions and performance described in the product manual. Alternative use of the product, random variations, and use of components not sold or recommended by the company without consent will void the product warranty.

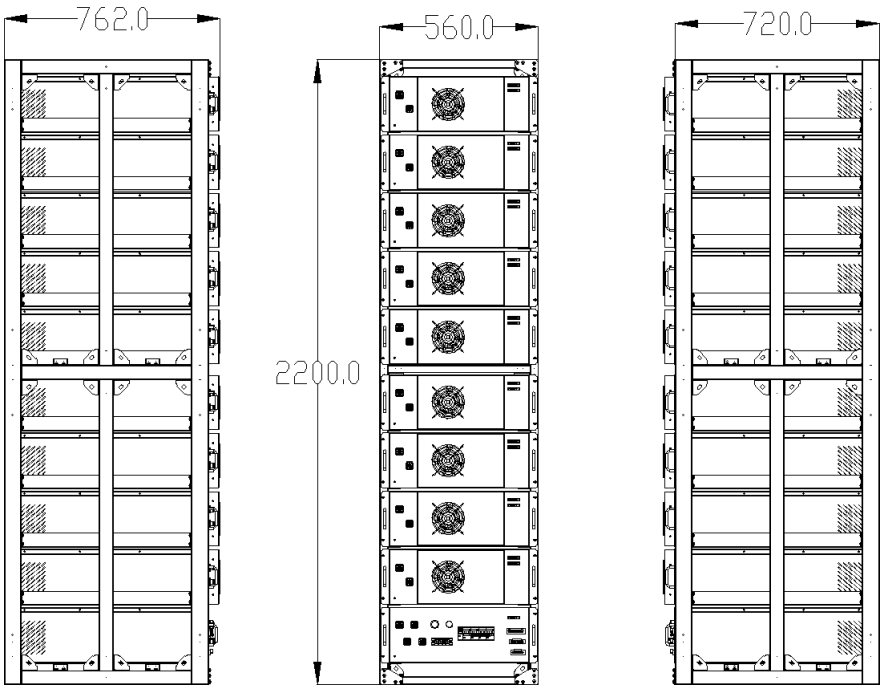
4.2 Product specifications

Technical Specifications	**LPBES-864-100-PA**	**LPBES-768-100-PA**	**LPBES-672-100-PA**	**LPBES-576-100-PA**
Nominal Voltage	864V	768V	672V	576V
Range of Voltage	756~972V	672~864V	588~756V	504~648V
Total Energy	86.4KWh	76.8KWh	67.2KWh	57.6KWh
Cell Type	LFP (LiFePO4)	LFP (LiFePO4)	LFP (LiFePO4)	LFP (LiFePO4)
Rated Charge/discharge power (kW)	43.2	38.4	33.6	28.8
Maximum continuous Charge/discharge power (kW)	86.4	76.8	67.2	57.6
Peak Charge/discharge power (kW)	95(5s)	84.4(5s)	73.9(5s)	63.3(5s)
Standard Charge/Discharge Current	50A (0.5C) / 50A (0.5C)	50A (0.5C) / 50A (0.5C)	50A (0.5C) / 50A (0.5C)	50A (0.5C) / 50A (0.5C)
Max. Charge/Discharge Current	100A (1C) / 100A (1C)	100A (1C) / 100A (1C)	100A (1C) / 100A (1C)	100A (1C) / 100A (1C)
Module series	9 pack	8 pack	7 pack	6 pack
installation	19-inch rack type	19-inch rack type	19-inch rack type	19-inch rack type
Dimension (W*D*H)	560mm x720mmx 2200mm	560mm x720mmx 2000mm	560mm x720mmx 1800mm	560mm x720mmx 1600mm

Weight	995±5Kg	869±5Kg	764±5Kg	659±5Kg
Communication	RS485 / CAN	RS485 / CAN	RS485 / CAN	RS485 / CAN
working temperature	0~55℃	0~55℃	0~55℃	0~55℃
Discharge depth (DOD)	80%	80%	80%	80%
IP Rating	20	20	20	20
Cycle Life	≥4000	≥4000	≥4000	≥4000
Warranty	5 Years Warranty	5 Years Warranty	5 Years Warranty	5 Years Warranty

Technical Specifications	**LPBES-480-100-PA**	**LPBES-384-100-PA**	**LPBES-288-100-PA**	**LPBES-192-100-PA**
Nominal Voltage	480V	384V	288V	192V
Range of Voltage	420~540V	336~432V	252~324V	168~216V
Total Energy	48KWh	38.4KWh	28.8KWh	19.2KWh
Cell Type	LFP (LiFePO4)	LFP (LiFePO4)	LFP (LiFePO4)	LFP (LiFePO4)
Rated Charge/discharge power (kW)	24	19.2	14.4	9.6
Maximum continuous Charge/discharge power (kW)	48	38.4	28.8	19.2
Peak Charge/discharge power (kW)	52.8(5s)	42.2(5s)	31.6(5s)	21.1(5s)
Standard Charge/Discharge Current	50A (0.5C) / 50A (0.5C)	50A (0.5C) / 50A (0.5C)	50A (0.5C) / 50A (0.5C)	50A (0.5C) / 50A (0.5C)
Max. Charge/Discharge Current	100A (1C) / 100A (1C)	100A (1C) / 100A (1C)	100A (1C) / 100A (1C)	100A (1C) / 100A (1C)
Module series	5 pack	4 pack	3 pack	2 pack
Installation	19-inch rack type	19-inch rack type	19-inch rack type	19-inch rack type
Dimension(W*D*H)	560mm x720mmx 1400mm	560mm x720mmx 1200mm	560mm x720mmx 1000mm	560mm x720mmx 800mm
Weight	549±5Kg	444±5Kg	339±5Kg	234±5Kg
Communication	RS485 / CAN	RS485 / CAN	RS485 / CAN	RS485 / CAN
working temperature	0~55℃	0~55℃	0~55℃	0~55℃
Discharge depth (DOD)	80%	80%	80%	80%
IP Rating	20	20	20	20
Cycle Life	≥4000	≥4000	≥4000	≥4000
Warranty	5 Years Warranty	5 Years Warranty	5 Years Warranty	5 Years Warranty

4.3 Product appearance structure



Picture 1-1 Dimension

4.4 Battery cell and system parameters

Serial number	Items	Technical Parameters
1	Charge cut-off cell voltage	3.65V
2	Discharge cut-off cell voltage	2.80V
3	Standard Continuous charging current	0.5C
4	Maximum charging current	1C
5	Standard Continuous discharge current	0.5C
6	Maximum discharge current	1C
7	Single battery voltage sampling resolution	1mV
8	Single battery voltage sampling frequency	100ms
9	Temperature detection resolution	±2℃
10	Current detection accuracy	0.1%
11	SOC accuracy	≤5%
12	Temperature sampling points	72
13	Temperature sensor	Temperature acquisition 8 modules per module
14	Storage environment humidity	0~95% without condensation
15	Working environment humidity	0~95% without condensation

16	EOL (End of life)	80% at 10 years
17	System communication interface	Rs485/CAN
18	System communication protocol	CAN2.0、Standard Modbus RTU
19	Machine display	Integrated display panel
20	System efficiency	〉95%
21	In and out line mode	Down-in and down-out
22	Cooling method	Natural cooling
23	Battery self-discharge	＜3%
24	Noise	<70dB

4.5 Liability Limitation

Any product damage or property loss caused by the following conditions OLiPower does not assume any direct or indirect liability.

- Product modified, design changed, or parts replaced without OLiPower authorization.
- Changes, or attempted repairs and erasing of series number or seals by non OLiPower technician.
- System design and installation are not in compliance with standards and regulations.
- Failure to comply with the local safety regulations.
- Transport damage (including painting scratch caused by movement inside packaging during shipping). A claim should be made directly to the shipping or insurance company as soon as the container/packaging is unloaded and such damage is identified.
- Failure to follow any/all of the user manual, the installation guide and the maintenance regulations.
- Improper use or misuse of the device.
- The maintenance procedures relating to the product have not been followed to an acceptable standard
- Force majeure (violent or stormy weather, lightning, overvoltage, fire etc.).

Damages caused by any external factors.

5. System installation

5.1 Installation Precautions

a) Check the open circuit voltage of the battery packs before installation.

b) The battery packs should be installed away from the heat source and avoid sparks. The safety distance should be greater than 0.5m.

c) Battery packs of different models and manufacturers are not allowed to be used in parallel.

d) Before using the battery packs, check to make sure that the anode and cathode of the battery packs are properly installed.

e) The floor of the installed battery cabinet should be flat.

f) Battery Modular is installed into the cabinet supplied.

Note:

For Australian market, the battery energy storage system can only be installed indoors or in container fulfilled the condition IP20 battery modulars installation environment.

5.2 Packing Information

On receiving the Battery energy storage system, please make sure the components and quantity are consistent with the packing list as below and not missing or broken.

5.2.1 Packing list

Number	Part name	Quantity	Description
1	Battery Rack	1	H2200*W700*D560mm
2	Battery Module	9*	OPBES-96-100-L-YJ
3	Control Module	1	OPCON-1000-100
4	Power Cable	10	For Battery Pack in series
5	Communication Cable and 24V power cable	9	CAN communication and power for or from battery module and control module
7	Ground Cable	10	Used for grounding the battery module and control module

8	Cabinet Screws		For fixing the cabinets together
9	Module fixing screws	1bag	For fixing the battery module and control module on the install panel
10	Ground screws	1bag	For fixing the ground cables

Note:*

Battery Module QUANTITY is dependent on the modular type as following, and system installation is shown LPBES-864-100-PA as sample.

1) LPBES-864-100-PA	9
2) LPBES-768-100-PA	8
3) LPBES-672-100-PA	7
4) LPBES-576-100-PA	6
5) LPBES-480-100-PA	5
6) LPBES-384-100-PA	4
7) LPBES-288-100-PA	3
8) LPBES-192-100-PA	2

5.2.2 Tools required for installation

 Phillips screwdriver M3 ~ M10	 Slotted screwdriver M3 ~ M6	 Socket wrench
 Wire nipper	 Adjustable wrench	 Lift cart

5.2.3 Required personal protective equipment

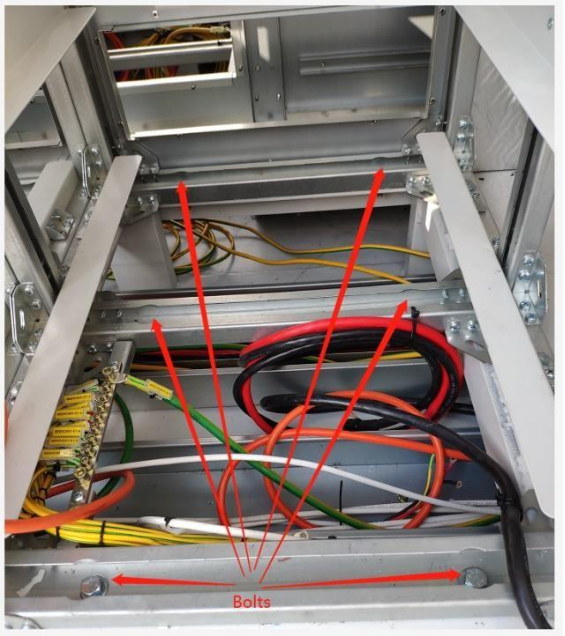
 Insulating shoe	 Insulating gloves

5.3 Installation

5.3.1 Safe Battery Handling Procedures

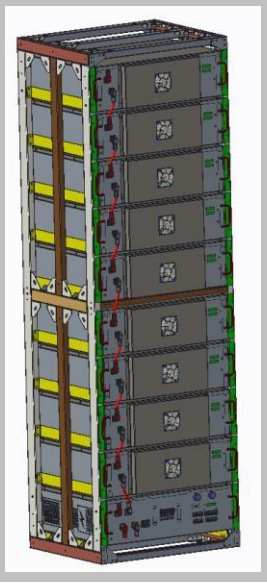
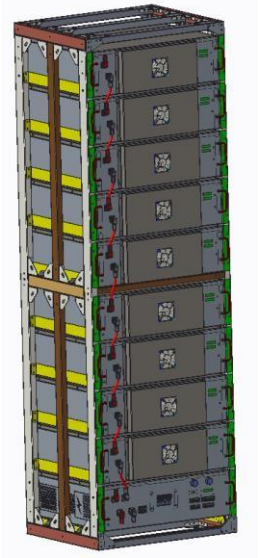
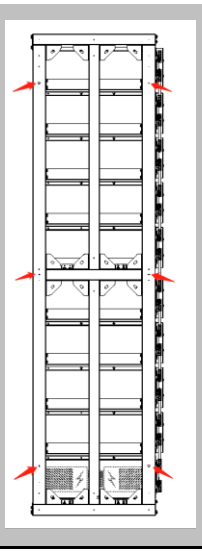
- Personal Protective Equipment (PPE): Always wear insulated gloves, safety goggles, and flame-resistant clothing when handling batteries.
- Lifting: Use mechanical lifting equipment (e.g., forklifts, lift carts) for battery modules exceeding 20 kg. Avoid manual lifting to prevent injury.
- Short-Circuit Prevention: Cover battery terminals with insulating caps during transport/installation. Never place metal tools or objects near exposed terminals.
- Fire Safety: Keep a Class D fire extinguisher (for lithium fires) nearby. Do not use water or standard extinguishers.
- Storage: Store batteries in a dry, ventilated area, away from direct sunlight and heat sources.

5.3.2 Cabinet Installation

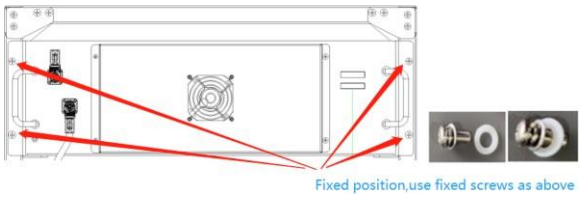


The positions of bolts are shown in the picture, which are anchored into ground. The

specific steps are as follows:

Step	Diagram	Description
1		Select the appropriate site and place, ⚠ information: The battery cabinets are heavy and chooses a site with sufficient load, such as the area where the building or container load beam is located.
2		Install the cabinets (as shown on the left), and install 6 cabinet screws between the two cabinets.
3		The installation location is located between the upper, lower and rear beams between the two cabinets (as shown on the left).

5.3.3 Battery pack installation

Step	Diagram	Description
1		The installation position of the battery modules and control modules is shown on the left. Each battery module has a tag as like "B001-01", this mean install in the B001 cabinet, 01. The battery modules have to install as shown on the left accordingly.
2		Use the lift truck to raise the battery to its mounting height and push the battery into the battery cabinet. Caution： Due to the heavy weight of the battery module, attention is paid to the dropping of heavy objects during the installation process, resulting in personal injury and equipment damage.
3		Equipment such as battery modules and control module are fixed using screws as show on the left.

5.3.4 Electrical connection

A. Power cables connection of the system as shown below:

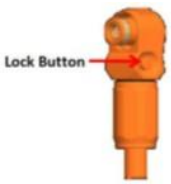
NOTE: There are two types of power cables. Short ones, without yellow tags, are used for interconnecting batteries.

Power cable without yellow tags

The cables with tags on the terminals, are longer, which are for specific connection between battery controller modulars and invertors.

Power cable with yellow tags

Power terminals connection method



NOTE: Keep pressing this lock button during pulling out the power plug

A. Plug the terminals with same color, you must hear a slight “click” sound when you finish the

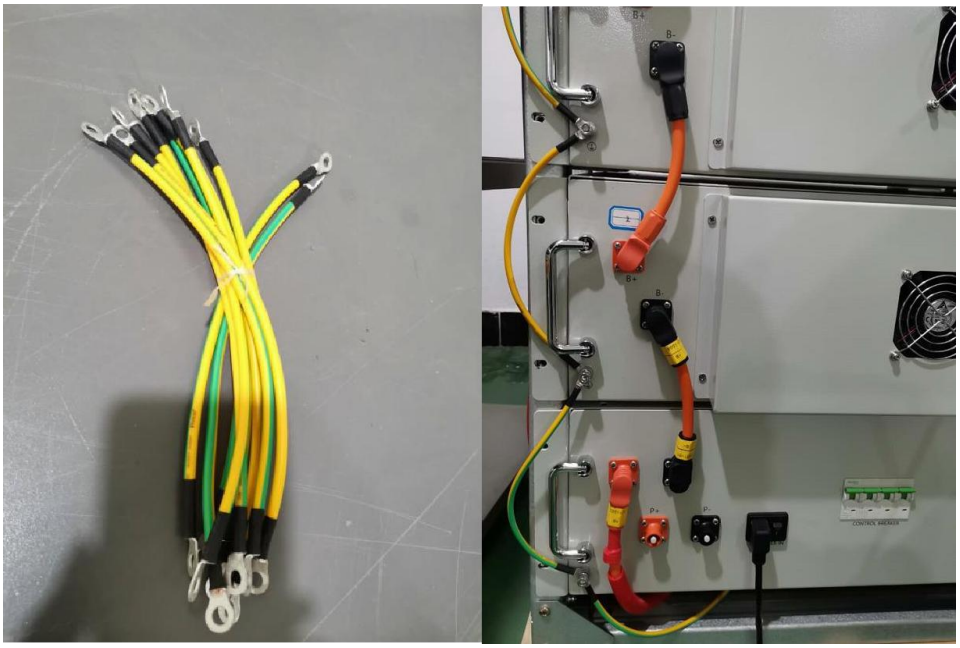
terminal connection, if not, the terminals might not be completely connected.

B. When you done with the terminal plug step, you must pull the terminals to make sure is solid connected, if it is completely connected, you can't pull you except you press the "lock button" as shown below:

NOTE: It must keep pressing this lock button while pulling out the power plug

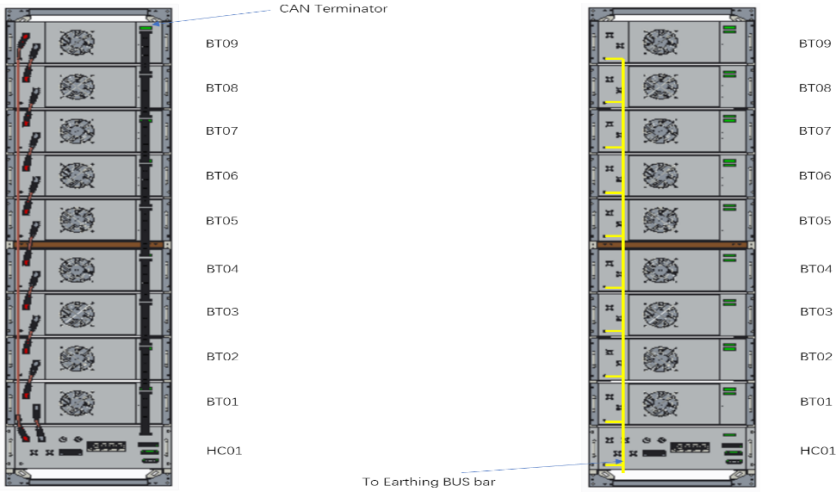
Warning: It is very important to make sure the power cable is plugged completely and stable.

B. Grounding wire connection



- Use copper grounding cables with a minimum cross-sectional area of 6 mm²
- Each module has a Grounding tag to show where to grounding, connected the grounding wire like the picture shown above.

C. Can terminal Communication Cable Connection



NOTE: There are two types of the CAN terminal Communication cables. Short ones, without yellow tags, are used for interconnecting batteries.

Can terminal Communication cable without yellow tags

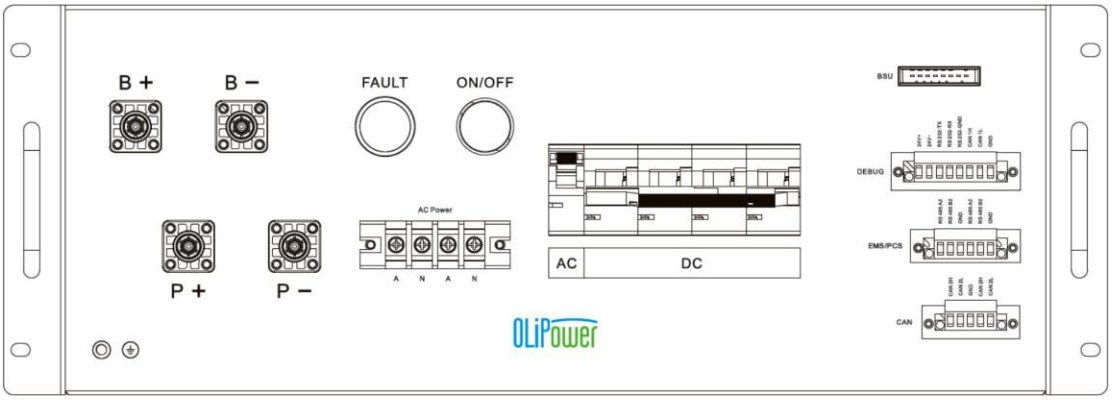
The cables with tags on the terminals are longer, which are for specific connection between battery controller modulars and invertors.

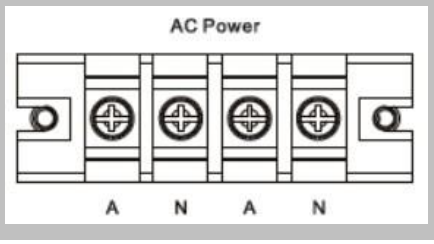
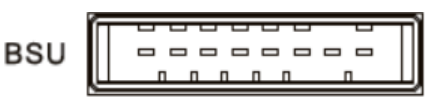
Can terminal Communication cable with yellow tags

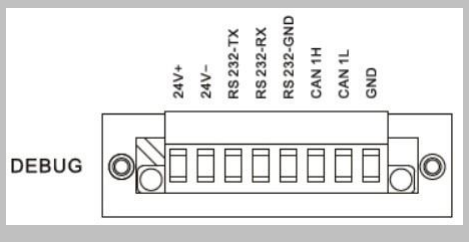
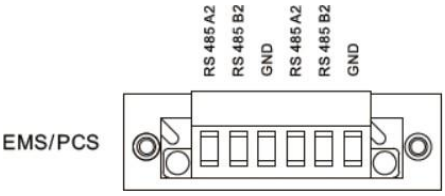
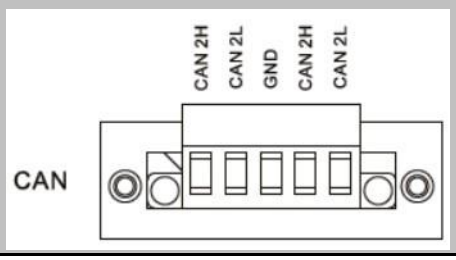
D. Wire connection

Procedure	Wire connection Table
System communication cable connection	C001-01 BMS ⟷ B001-01 COM2 B001-01 COM1 ⟷ B00-02 COM2 B001-02 COM1 ⟷ B00-03 COM2 B001-03 COM1 ⟷ B00-04 COM2 B001-04 COM1 ⟷ B00-05 COM2 B001-05 COM1 ⟷ B00-06 COM2 B001-06 COM1 ⟷ B00-07 COM2 B001-07 COM1 ⟷ B00-08 COM2 B001-08 COM1 ⟷ B00-09 COM2 B001-09 COM1 ⟷ Terminating resistor
System power cables connection	C001-01-B- ⟷ B001-01- B- B001-01-B+ ⟷ B001-02-B- B001-02-B+ ⟷ B001-03-B- B001-03-B+ ⟷ B001-04-B- B001-04-B+ ⟷ B001-05-B- B001-05-B+ ⟷ B001-06-B- B001-06-B+ ⟷ B001-07-B- B001-07-B+ ⟷ B001-08-B- B001-08-B+ ⟷ B001-09-B- B001-09-B+ ⟷ C001-01-B+ C001-01-P+ ⟷ PCS + C001-01-P- ⟷ PCS -

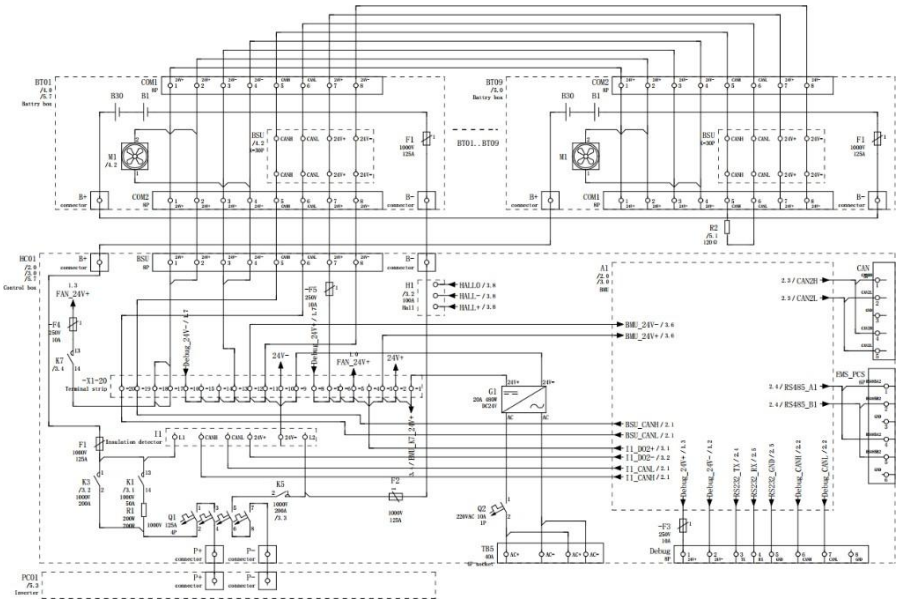
E. Control module front interface



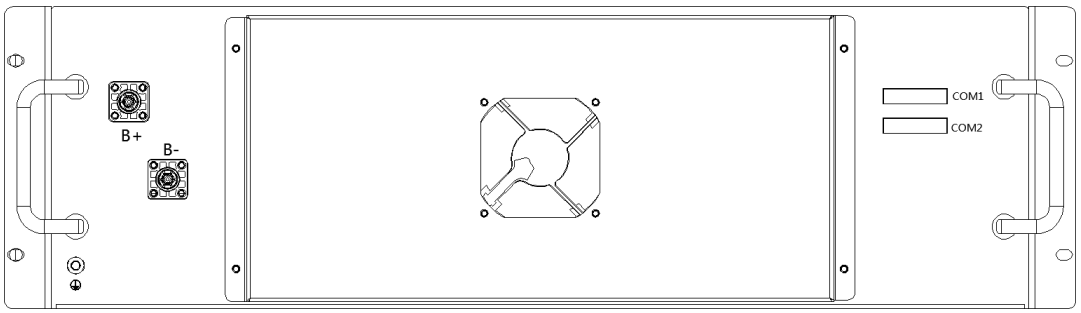
Item	Description
B+	The B+ terminal is connected to connect the power cable
B-	The B- terminal is connected to connect the power cable
ON/OFF	System start/stop button To show the system is running
FAULT	Warning indicator is on
DC BREAKER	DC input power switch, 1000V/125A, to control the positive and negative DC main circuit between battery system and inverter.
AC BREAKER	BMS control AC power switch
Debug	Debug port for the BMS
PCS	Communication port for PCS
EMS/HMI	Communication port for EMS or HMI
CAN	Communication port for CAN
BMS	BMS communication
P+	Load positive connector, connected to PCS battery side positive
P-	Load negative connector, connected to PCS battery side negative
⏚	Grounding
AC power input	220V-240V/50hz input 
BSU	Internal control connector 

DEBUG	Internal debug terminals 
EMS/PCS	EMS/PCS communication terminals 
CAN	Can outside terminals 

Internal wire diagram

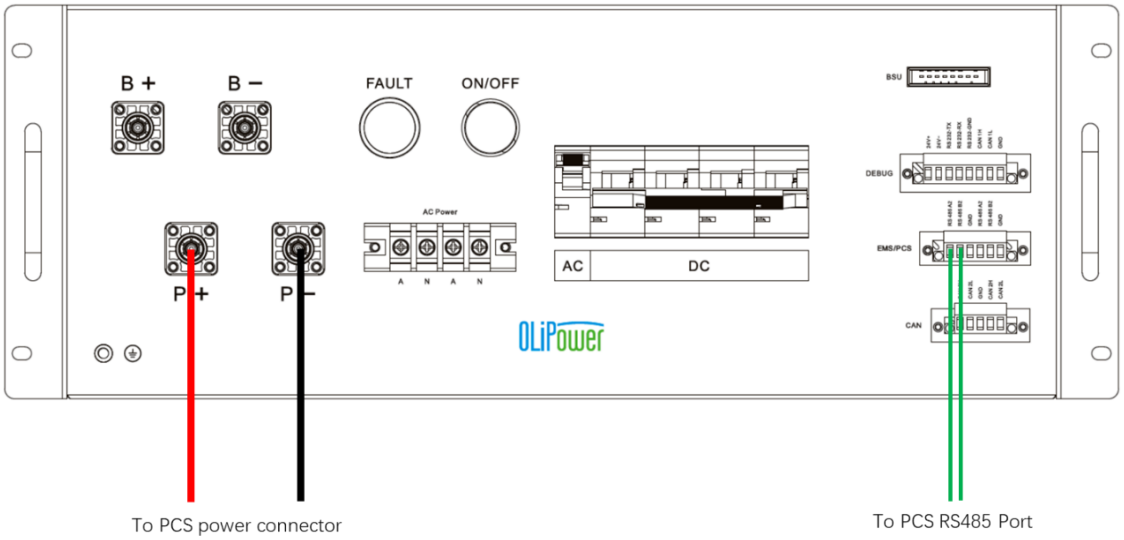


F. Battery module front interface

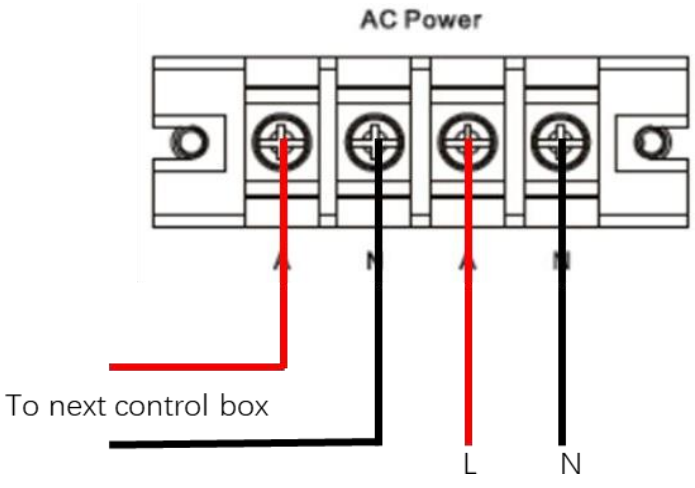


Item	Description
B+	Power terminal +
B-	Power terminal -
COM1	BSU power supply and communication port
COM2	BSU power supply and communication port
⏚	Grounding

G. Connection between Control module and PCS



H. AC input cables connection 220V-240V



6 Battery system operation

6.1 Power-on step

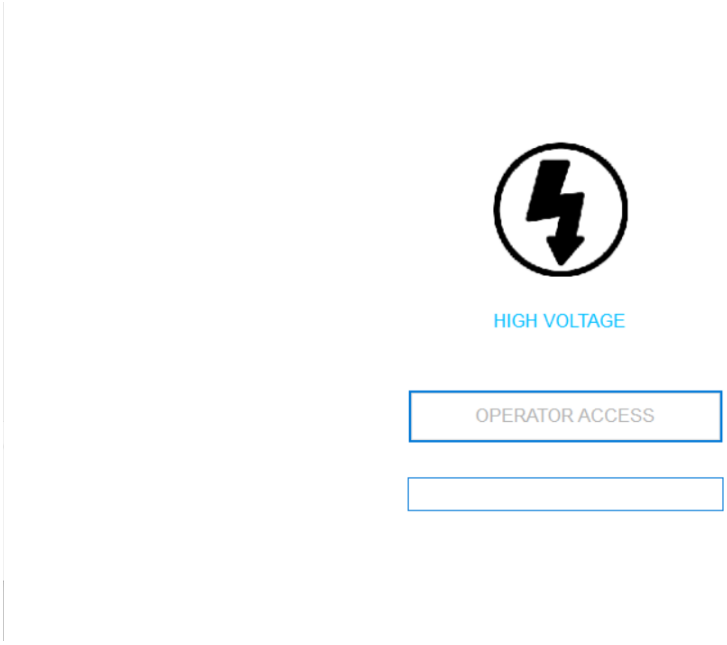
(1) Check the battery system grounding well.
(2) Make sure AC POWER connects well (220V-240V/50Hz).
(3) Turn on the AC BREAKER in front of the control module.
(4) Turn on DC BREAKER which controls both the positive and negative DC main circuit.
(5) Push “ON/OFF” button and hold 2 seconds until green light start flashing. The system runs into self-check process and warmup.
(6) Waiting for “ON/OFF” button green light solid light. FAULT red light off. Main DC power is switched on into working conditions.
(7) If the battery system is out of order, “ON/OFF” button green light isn’t light but Faulty red light on.

6.2 Power-off step

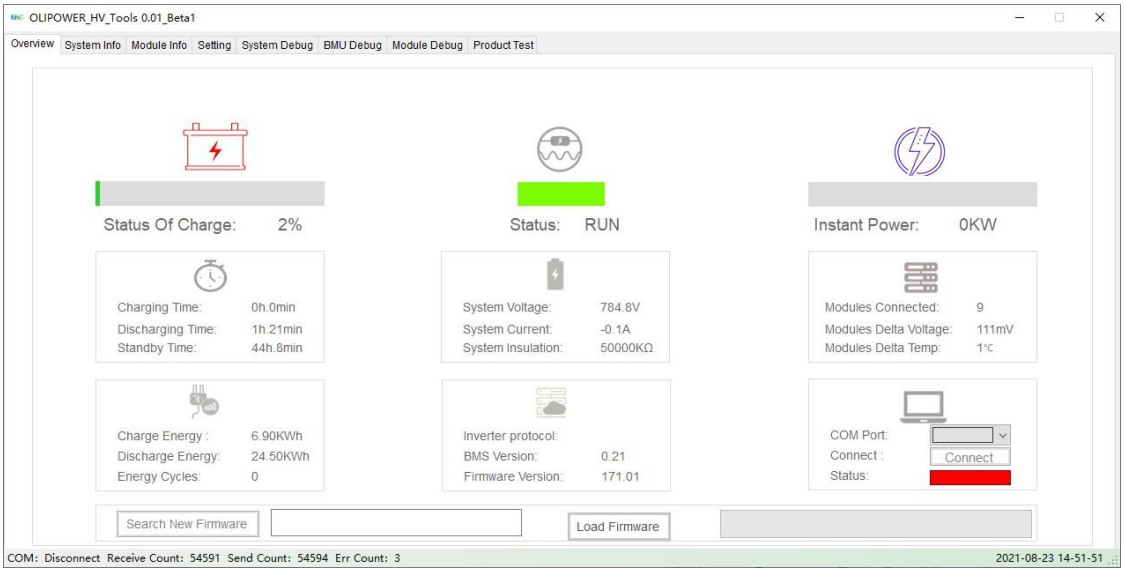
(1) Make sure no charge or discharge is processing.
(2) Switch off DC BREAKER.
(3) PUSH DOWN “ON/OFF” button and hold 5 seconds. Main DC circuit will be switched off.
(4) Switch off AC BREAKER.

7 Host computer monitoring software (RS232)

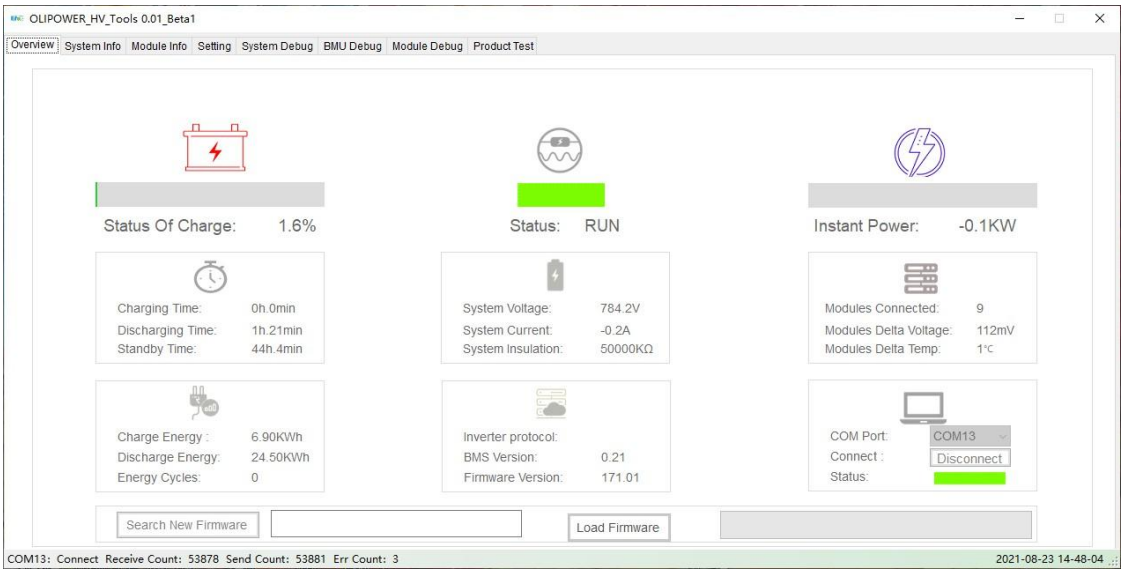
1. Operation system enquiry： WIN10 computer with RS232 adapter, with installation RS232 driver and set series port number.
2. Connect the cable to CAN port terminal on control module.

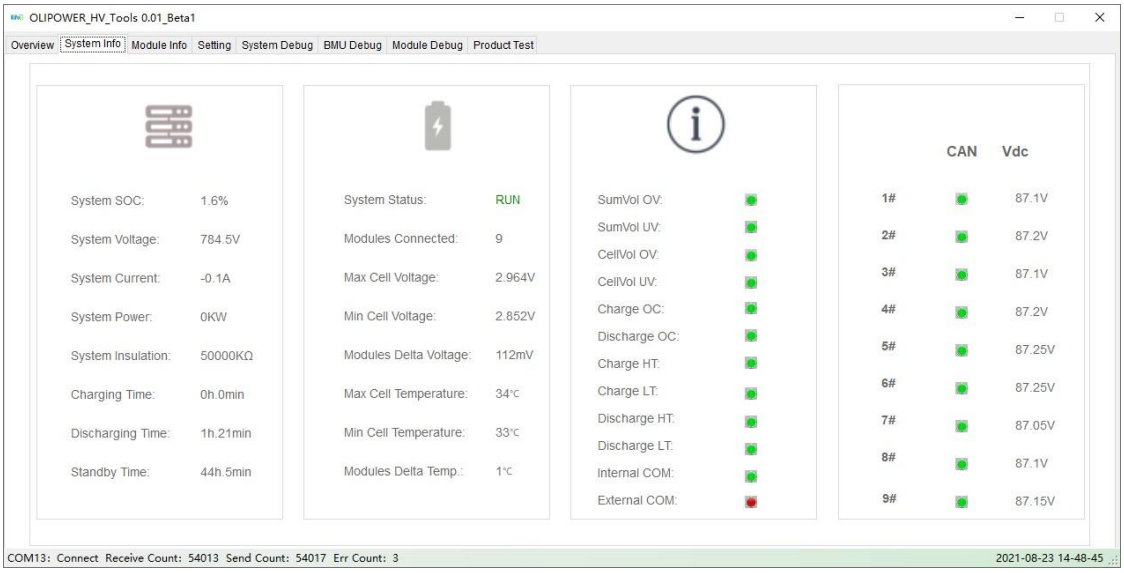


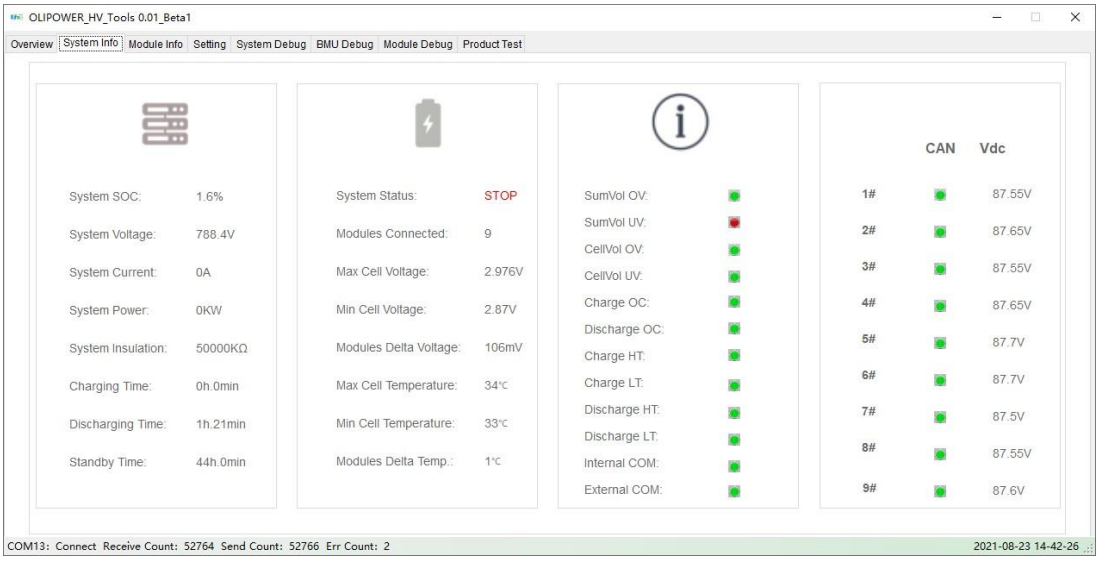
3. Run app and input user name： admin333， push enter button.
4. In ”Overview” window right down coner choose right COM port number, click “connect”.

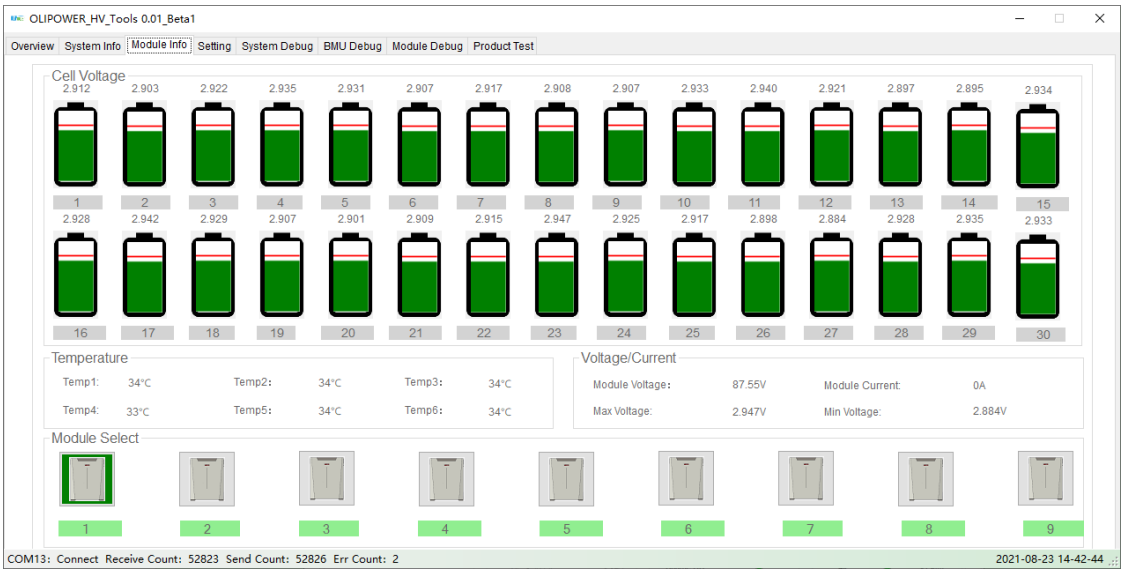


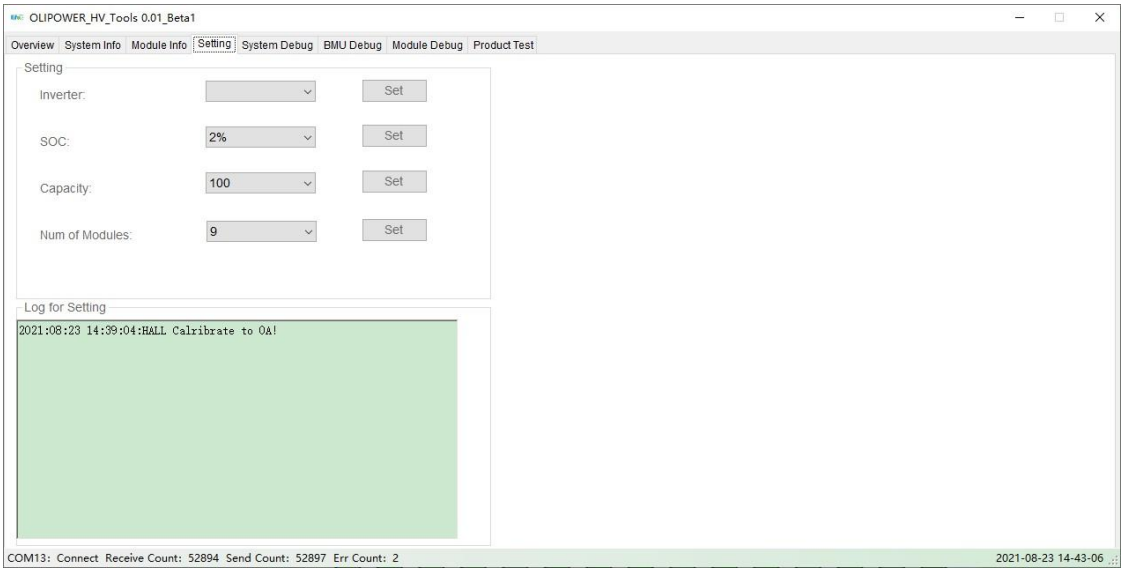
5. If connection is good, status is green, and faulty is shown in red color.
6. Then the battery system information is shown as following:

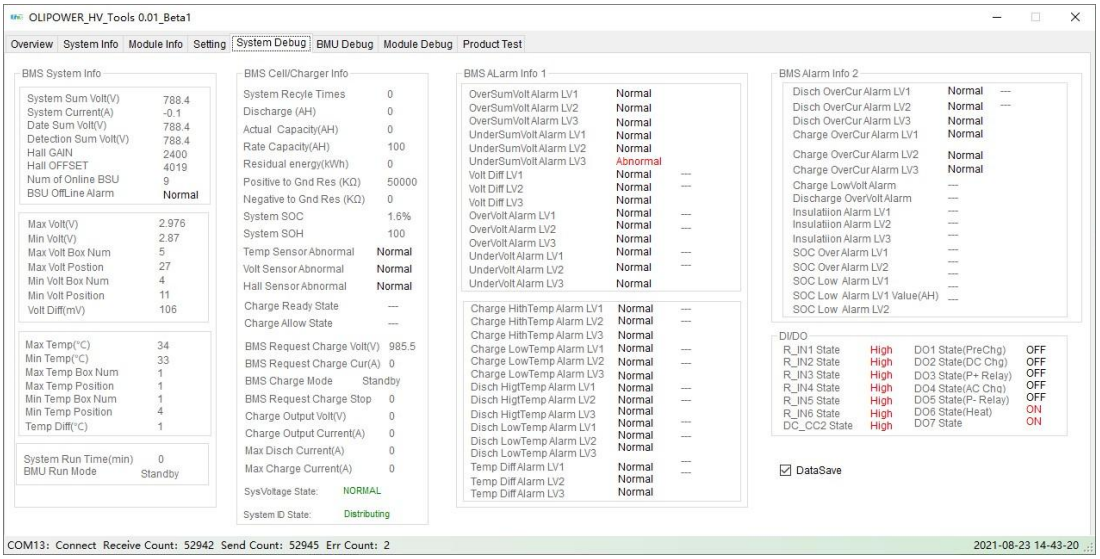

OLIPOWER_HV_Tools 0.01_Beta1
Overview
System Info
Module Info
Setting
System Debug
BMU Debug
Module Debug
Product Test
Status Of Charge: 1.6%
Status: RUN
Instant Power: -0.1KW
Charging Time: 0h.0min
Discharging Time: 1h.21min
Standby Time: 44h.4min
System Voltage: 784.2V
System Current: -0.2A
System Insulation: 50000KΩ
Modules Connected: 9
Modules Delta Voltage: 112mV
Modules Delta Temp: 1℃
Charge Energy : 6.90KWh
Discharge Energy: 24.50KWh
Energy Cycles: 0
Inverter protocol:
BMS Version: 0.21
Firmware Version: 171.01
COM Port: COM13
Connect : Disconnect
Status:
Search New Firmware
Load Firmware
COM13: Connect Receive Count: 53878 Send Count: 53881 Err Count: 3
2021-08-23 14-48-04

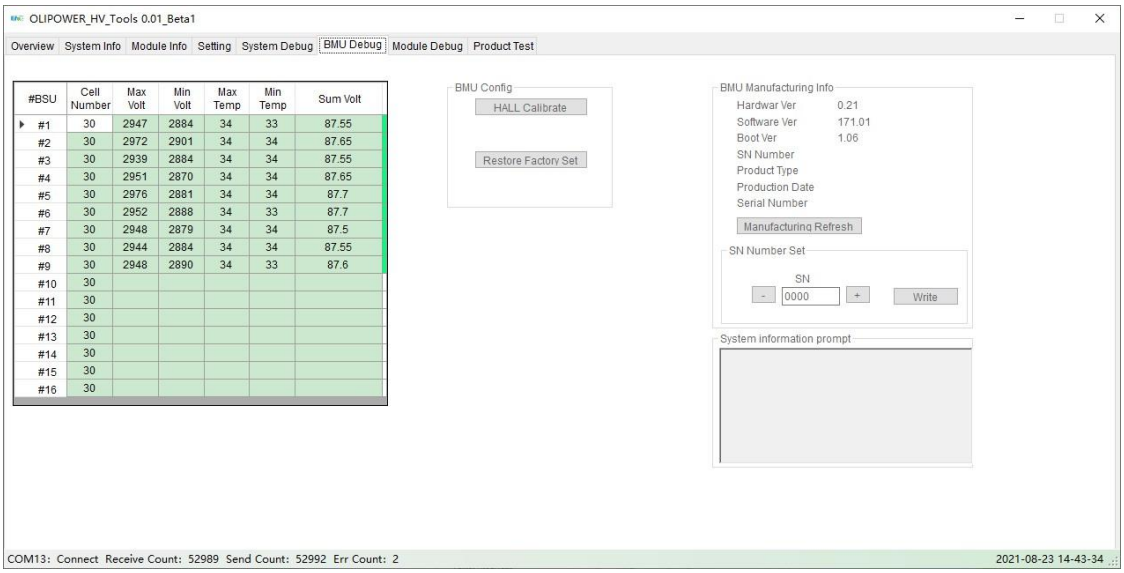

OLIPOWER_HV_Tools 0.01_Beta1
Overview
System Info
Module Info
Setting
System Debug
BMU Debug
Module Debug
Product Test
System SOC: 1.6%
System Voltage: 784.5V
System Current: -0.1A
System Power: 0KW
System Insulation: 50000KΩ
Charging Time: 0h.0min
Discharging Time: 1h.21min
Standby Time: 44h.5min
System Status: RUN
Modules Connected: 9
Max Cell Voltage: 2.964V
Min Cell Voltage: 2.852V
Modules Delta Voltage: 112mV
Max Cell Temperature: 34℃
Min Cell Temperature: 33℃
Modules Delta Temp.: 1℃
SumVol OV:
SumVol UV:
CellVol OV:
CellVol UV:
Charge OC:
Discharge OC:
Charge HT:
Charge LT:
Discharge HT:
Discharge LT:
Internal COM:
External COM:
CAN Vdc
1# 87.1V
2# 87.2V
3# 87.1V
4# 87.2V
5# 87.25V
6# 87.25V
7# 87.05V
8# 87.1V
9# 87.15V
COM13: Connect Receive Count: 54013 Send Count: 54017 Err Count: 3
2021-08-23 14-48-45

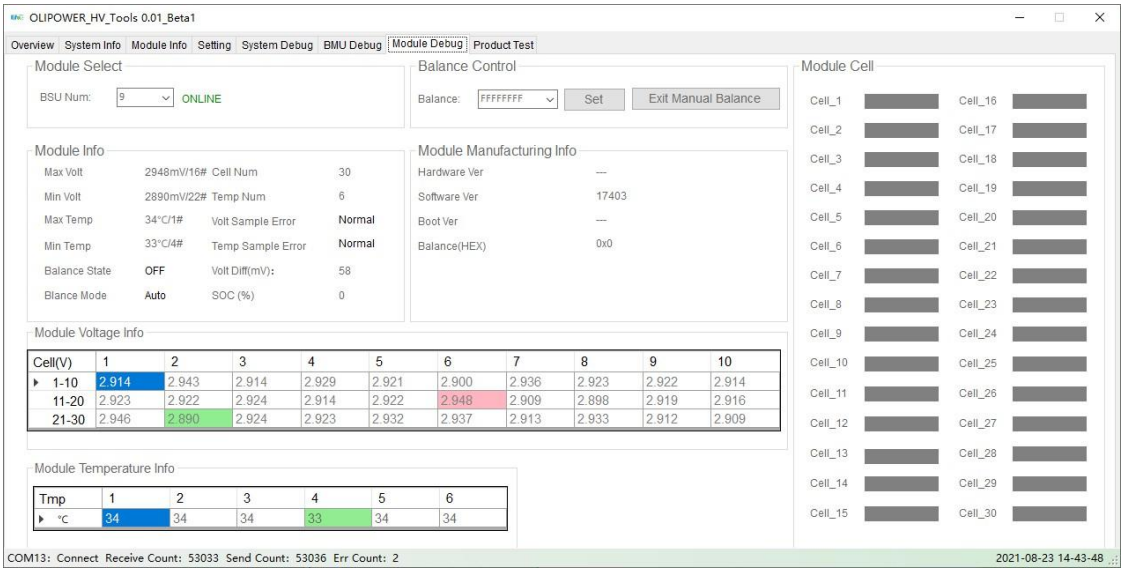

OLIPOWER_HV_Tools 0.01_Beta1
Overview
System Info
Module Info
Setting
System Debug
BMU Debug
Module Debug
Product Test
System SOC: 1.6%
System Voltage: 788.4V
System Current: 0A
System Power: 0KW
System Insulation: 50000KΩ
Charging Time: 0h.0min
Discharging Time: 1h.21min
Standby Time: 44h.0min
System Status: STOP
Modules Connected: 9
Max Cell Voltage: 2.976V
Min Cell Voltage: 2.87V
Modules Delta Voltage: 106mV
Max Cell Temperature: 34℃
Min Cell Temperature: 33℃
Modules Delta Temp.: 1℃
SumVol OV:
SumVol UV:
CellVol OV:
CellVol UV:
Charge OC:
Discharge OC:
Charge HT:
Charge LT:
Discharge HT:
Discharge LT:
Internal COM:
External COM:
CAN Vdc
1# 87.55V
2# 87.65V
3# 87.55V
4# 87.65V
5# 87.7V
6# 87.7V
7# 87.5V
8# 87.55V
9# 87.6V
COM13: Connect Receive Count: 52764 Send Count: 52766 Err Count: 2
2021-08-23 14-42-26

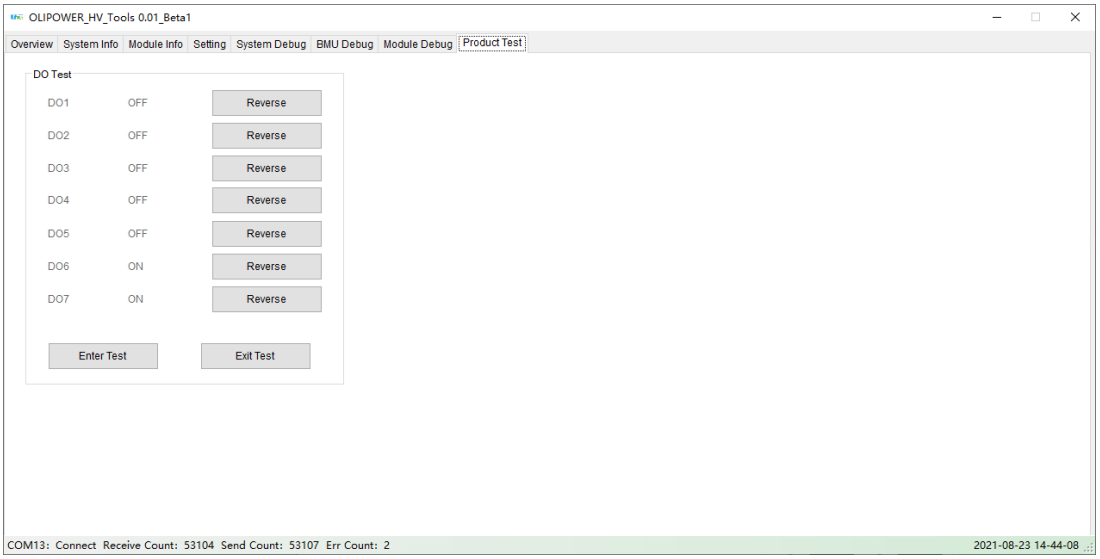

OLIPOWER_HV_Tools 0.01_Beta1
Overview
System Info
Module Info
Setting
System Debug
BMU Debug
Module Debug
Product Test
Cell Voltage
2.912 2.903 2.922 2.935 2.931 2.907 2.917 2.908 2.907 2.933 2.940 2.921 2.897 2.895 2.934
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
2.928 2.942 2.929 2.907 2.901 2.909 2.915 2.947 2.925 2.917 2.898 2.884 2.928 2.935 2.933
16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Temperature
Temp1: 34°C
Temp2: 34°C
Temp3: 34°C
Temp4: 33°C
Temp5: 34°C
Temp6: 34°C
Voltage/Current
Module Voltage: 87.55V
Module Current: 0A
Max Voltage: 2.947V
Min Voltage: 2.884V
Module Select
1 2 3 4 5 6 7 8 9
COM13: Connect Receive Count: 52823 Send Count: 52826 Err Count: 2
2021-08-23 14-42-44


OLIPOWER_HV_Tools 0.01_Beta1
Overview
System Info
Module Info
Setting
System Debug
BMU Debug
Module Debug
Product Test
Setting
Inverter:
Set
SOC:
2%
Set
Capacity:
100
Set
Num of Modules:
9
Set
Log for Setting
2021:08:23 14:39:04:HALL Calribrate to 0A!
COM13: Connect Receive Count: 52894 Send Count: 52897 Err Count: 2
2021-08-23 14-43-06


OLIPOWER_HV_Tools 0.01_Beta1
Overview
System Info
Module Info
Setting
System Debug
BMU Debug
Module Debug
Product Test
BMS System Info
System Sum Volt(V) 788.4
System Current(A) -0.1
Date Sum Volt(V) 788.4
Detection Sum Volt(V) 788.4
Hall GAIN 2400
Hall OFFSET 4019
Num of Online BSU 9
BSU OffLine Alarm Normal
Max Volt(V) 2.976
Min Volt(V) 2.87
Max Volt Box Num 5
Max Volt Postion 27
Min Volt Box Num 4
Min Volt Position 11
Volt Diff(mV) 106
Max Temp(°C) 34
Min Temp(°C) 33
Max Temp Box Num 1
Max Temp Position 1
Min Temp Box Num 1
Min Temp Position 4
Temp Diff(°C) 1
System Run Time(min) 0
BMU Run Mode Standby
BMS Cell/Charger Info
System Recyle Times 0
Discharge (AH) 0
Actual Capacity(AH) 0
Rate Capacity(AH) 100
Residual energy(kWh) 0
Positive to Gnd Res (KΩ) 50000
Negative to Gnd Res (KΩ) 0
System SOC 1.6%
System SOH 100
Temp Sensor Abnormal Normal
Volt Sensor Abnormal Normal
Hall Sensor Abnormal Normal
Charge Ready State ---
Charge Allow State ---
BMS Request Charge Volt(V) 985.5
BMS Request Charge Cur(A) 0
BMS Charge Mode Standby
BMS Request Charge Stop 0
Charge Output Volt(V) 0
Charge Output Current(A) 0
Max Disch Current(A) 0
Max Charge Current(A) 0
SysVoltage State: NORMAL
System ID State: Distributing
BMS ALarm Info 1
OverSumVolt Alarm LV1 Normal
OverSumVolt Alarm LV2 Normal
OverSumVolt Alarm LV3 Normal
UnderSumVolt Alarm LV1 Normal
UnderSumVolt Alarm LV2 Normal
UnderSumVolt Alarm LV3 Abnormal
Volt Diff LV1 Normal
Volt Diff LV2 Normal
Volt Diff LV3 Normal
OverVolt Alarm LV1 Normal
OverVolt Alarm LV2 Normal
OverVolt Alarm LV3 Normal
UnderVolt Alarm LV1 Normal
UnderVolt Alarm LV2 Normal
UnderVolt Alarm LV3 Normal
Charge HithTemp Alarm LV1 Normal
Charge HithTemp Alarm LV2 Normal
Charge HithTemp Alarm LV3 Normal
Charge LowTemp Alarm LV1 Normal
Charge LowTemp Alarm LV2 Normal
Charge LowTemp Alarm LV3 Normal
Disch HigtTemp Alarm LV1 Normal
Disch HigtTemp Alarm LV2 Normal
Disch HigtTemp Alarm LV3 Normal
Disch LowTemp Alarm LV1 Normal
Disch LowTemp Alarm LV2 Normal
Disch LowTemp Alarm LV3 Normal
Temp Diff Alarm LV1 Normal
Temp Diff Alarm LV2 Normal
Temp Diff Alarm LV3 Normal
BMS Alarm Info 2
Disch OverCur Alarm LV1 Normal
Disch OverCur Alarm LV2 Normal
Disch OverCur Alarm LV3 Normal
Charge OverCur Alarm LV1 Normal
Charge OverCur Alarm LV2 Normal
Charge OverCur Alarm LV3 Normal
Charge LowVolt Alarm
Discharge OverVolt Alarm
Insulation Alarm LV1
Insulation Alarm LV2
Insulation Alarm LV3
SOC Over Alarm LV1
SOC Over Alarm LV2
SOC Low Alarm LV1
SOC Low Alarm LV1 Value(AH)
SOC Low Alarm LV2
DI/DO
R_IN1 State High
R_IN2 State High
R_IN3 State High
R_IN4 State High
R_IN5 State High
R_IN6 State High
DC_CC2 State High
DO1 State(PreChg) OFF
DO2 State(DC Chg) OFF
DO3 State(P+ Relay) OFF
DO4 State(AC Chg) OFF
DO5 State(P- Relay) OFF
DO6 State(Heat) ON
DO7 State ON
DataSave
COM13: Connect Receive Count: 52942 Send Count: 52945 Err Count: 2
2021-08-23 14-43-20


OLIPOWER_HV_Tools 0.01_Beta1
Overview
System Info
Module Info
Setting
System Debug
BMU Debug
Module Debug
Product Test
#BSU
Cell Number
Max Volt
Min Volt
Max Temp
Min Temp
Sum Volt
#1 30 2947 2884 34 33 87.55
#2 30 2972 2901 34 34 87.65
#3 30 2939 2884 34 34 87.55
#4 30 2951 2870 34 34 87.65
#5 30 2976 2881 34 34 87.7
#6 30 2952 2888 34 33 87.7
#7 30 2948 2879 34 34 87.5
#8 30 2944 2884 34 34 87.55
#9 30 2948 2890 34 33 87.6
#10 30
#11 30
#12 30
#13 30
#14 30
#15 30
#16 30
BMU Config
HALL Calibrate
Restore Factory Set
BMU Manufacturing Info
Hardwar Ver 0.21
Software Ver 171.01
Boot Ver 1.06
SN Number
Product Type
Production Date
Serial Number
Manufacturing Refresh
SN Number Set
SN
0000
Write
System information prompt
COM13: Connect Receive Count: 52989 Send Count: 52992 Err Count: 2
2021-08-23 14-43-34


OLIPOWER_HV_Tools 0.01_Beta1
Overview
System Info
Module Info
Setting
System Debug
BMU Debug
Module Debug
Product Test
Module Select
BSU Num: 9 ONLINE
Balance Control
Balance: FFFFFFFF Set Exit Manual Balance
Module Cell
Module Info
Max Volt 2948mV/16# Cell Num 30
Min Volt 2890mV/22# Temp Num 6
Max Temp 34°C/1# Volt Sample Error Normal
Min Temp 33°C/4# Temp Sample Error Normal
Balance State OFF Volt Diff(mV): 58
Blance Mode Auto SOC (%) 0
Module Manufacturing Info
Hardware Ver ---
Software Ver 17403
Boot Ver ---
Balance(HEX) 0x0
Module Voltage Info
Cell(V) 1 2 3 4 5 6 7 8 9 10
1-10 2.914 2.943 2.914 2.929 2.921 2.900 2.936 2.923 2.922 2.914
11-20 2.923 2.922 2.924 2.914 2.922 2.948 2.909 2.898 2.919 2.916
21-30 2.946 2.890 2.924 2.923 2.932 2.937 2.913 2.933 2.912 2.909
Module Temperature Info
Tmp 1 2 3 4 5 6
°C 34 34 34 33 34 34
Cell_1 Cell_2 Cell_3 Cell_4 Cell_5 Cell_6 Cell_7 Cell_8 Cell_9 Cell_10 Cell_11 Cell_12 Cell_13 Cell_14 Cell_15
Cell_16 Cell_17 Cell_18 Cell_19 Cell_20 Cell_21 Cell_22 Cell_23 Cell_24 Cell_25 Cell_26 Cell_27 Cell_28 Cell_29 Cell_30
COM13: Connect Receive Count: 53033 Send Count: 53036 Err Count: 2
2021-08-23 14-43-48


OLIPOWER_HV_Tools 0.01_Beta1
Overview
System Info
Module Info
Setting
System Debug
BMU Debug
Module Debug
Product Test
DO Test
DO1 OFF Reverse
DO2 OFF Reverse
DO3 OFF Reverse
DO4 OFF Reverse
DO5 OFF Reverse
DO6 ON Reverse
DO7 ON Reverse
Enter Test
Exit Test
COM13: Connect Receive Count: 53104 Send Count: 53107 Err Count: 2
2021-08-23 14-44-08

8 Battery system trouble shooting

Fault	Solution
The touch screen is not lit	1. Check and make sure the control switch is ON; 2. Check and make sure the touch screen power terminal is plugged in.
No data on the touch screen	1. Check and ensure that the HMI is connected to the communication line of the main control module correctly and reliably.
"BMU communication" on the touch screen displays red	1. Check and make sure the control switch is ON; 2. 2. Check if the communication line is wired correctly;
BSU communication is abnormal	1. Check if the communication connector from the control module to the battery module is plugged in.
The system can't work	1. Check if the system alarm has two or more battery with "single under-voltage alarm", "discharge high temperature alarm", "discharge low temperature alarm", "discharge overcurrent alarm", "BMU communication", "BSU communication status is abnormal.
The system has no output voltage	1. Check if the positive and negative contactors status

9 Maintenance

9.1 Battery Pack Swap

Battery packs need to be swapped by spare pack when system is running not well with predominance listed below.

(1) BSU can't collect data smoothly, BUS hardware faulty, BSU function faulty, BSU communication faulty.

(2) Temperature sensor faulty, temperature detection irregular.

(3) Cell faulty: voltage gaps can't be balanced in one series of cells.

 NOTE:

Battery pack swap preparation:

(1) Make sure the spare battery pack's function is good and BSU's Mac number is as same as the pack before.

(2) Recharge the spare pack's voltage equal to the system voltage.

(3) Switch off the system before swap.

(4) Depart the cables of bad battery pack, take off it from cabinet.

(5) Install the new spare battery pack and connect cables.

(6) Detect the voltage at the control module, make sure the voltage as same as other module in the system.

(7) Switch on the system according to the operation procedure.

(8) Monitor the system through the host computer software.

9.2 Regular Maintenance

Items	Time
Cleaning case using soft cloth	Once 6 months
Cleaning ventilation holes using soft brush	Once a year

Discharge to SOH 50% when not to use in 3month	On demand
Fully charge discharge to SOH 25%	Once a year

9.3 Disposal

The battery energy storage system must not be disposed of with domestic waste to fulfill the regulations and legal enquiry. The user has the responsibility and obligation to send it to the designated organization for recycling and disposal.

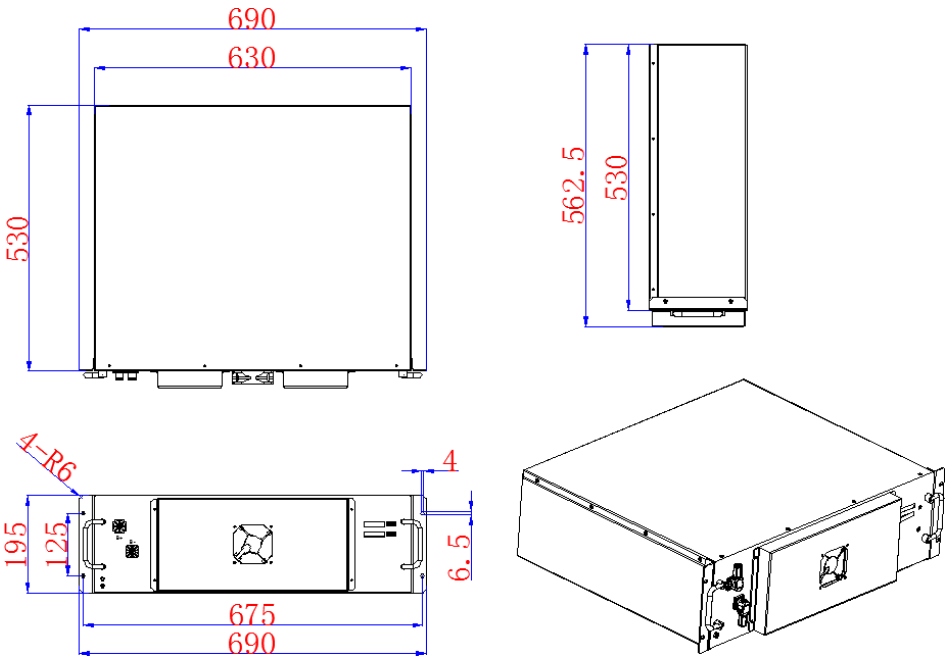
Appendix - Product Size Weight Table

1. Products Dimension and Weight

	Dimension(W*D*H)	Weight
LPBES-864-100-PA	560mm x720mmx 2200mm	995±5Kg
LPBES-768-100-PA	560mm x720mmx 2000mm	869±5Kg
LPBES-672-100-PA	560mm x720mmx 1800mm	764±5Kg
LPBES-576-100-PA	560mm x720mmx 1600mm	659±5Kg
LPBES-480-100-PA	560mm x720mmx 1400mm	549±5Kg
LPBES-384-100-PA	560mm x720mmx 1200mm	444±5Kg
LPBES-288-100-PA	560mm x720mmx 1000mm	339±5Kg
LPBES-192-100-PA	560mm x720mmx 800mm	234±5Kg
LPBES-864-100-PA	560mm x720mmx 2200mm	995±5Kg
LPBES-768-100-PA	560mm x720mmx 2000mm	869±5Kg
LPBES-672-100-PA	560mm x720mmx 1800mm	764±5Kg
LPBES-576-100-PA	560mm x720mmx 1600mm	659±5Kg
LPBES-480-100-PA	560mm x720mmx 1400mm	549±5Kg
LPBES-384-100-PA	560mm x720mmx 1200mm	444±5Kg
LPBES-288-100-PA	560mm x720mmx 1000mm	339±5Kg
LPBES-192-100-PA	560mm x720mmx 800mm	234±5Kg

2. One Battery Pack Dimension and Weight

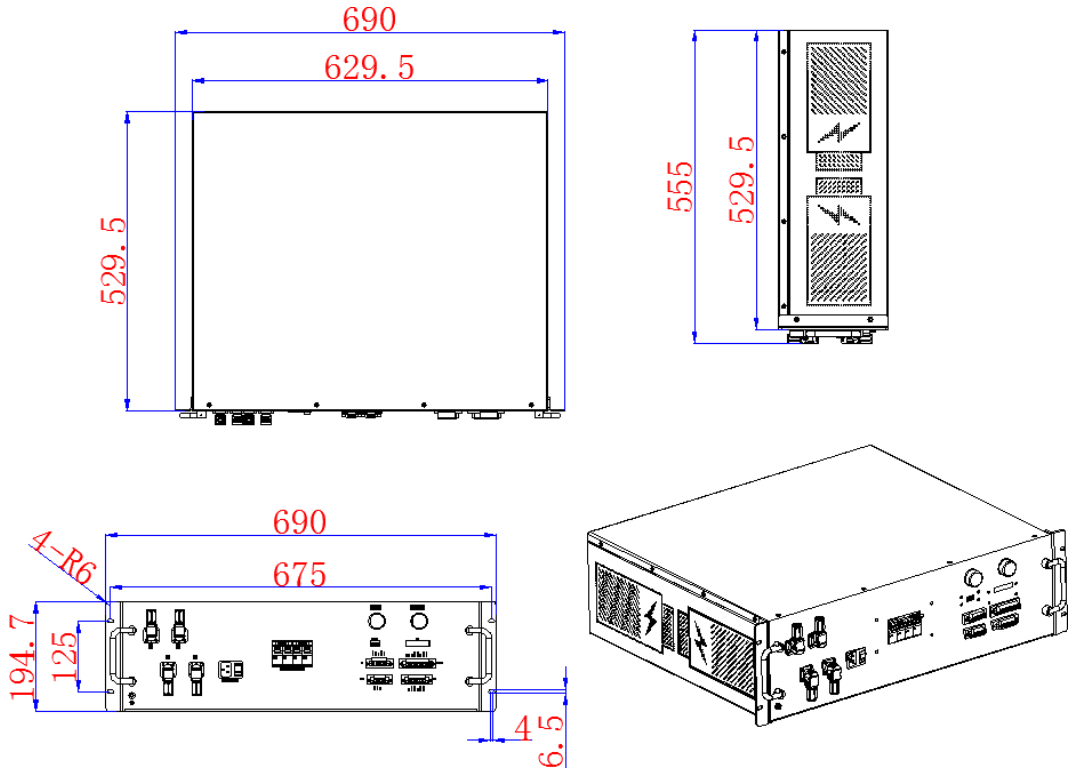
Number	Dimension	weight
BC01-U01	H195*W690*D562.5（mm）	96Kg



Battery Pack

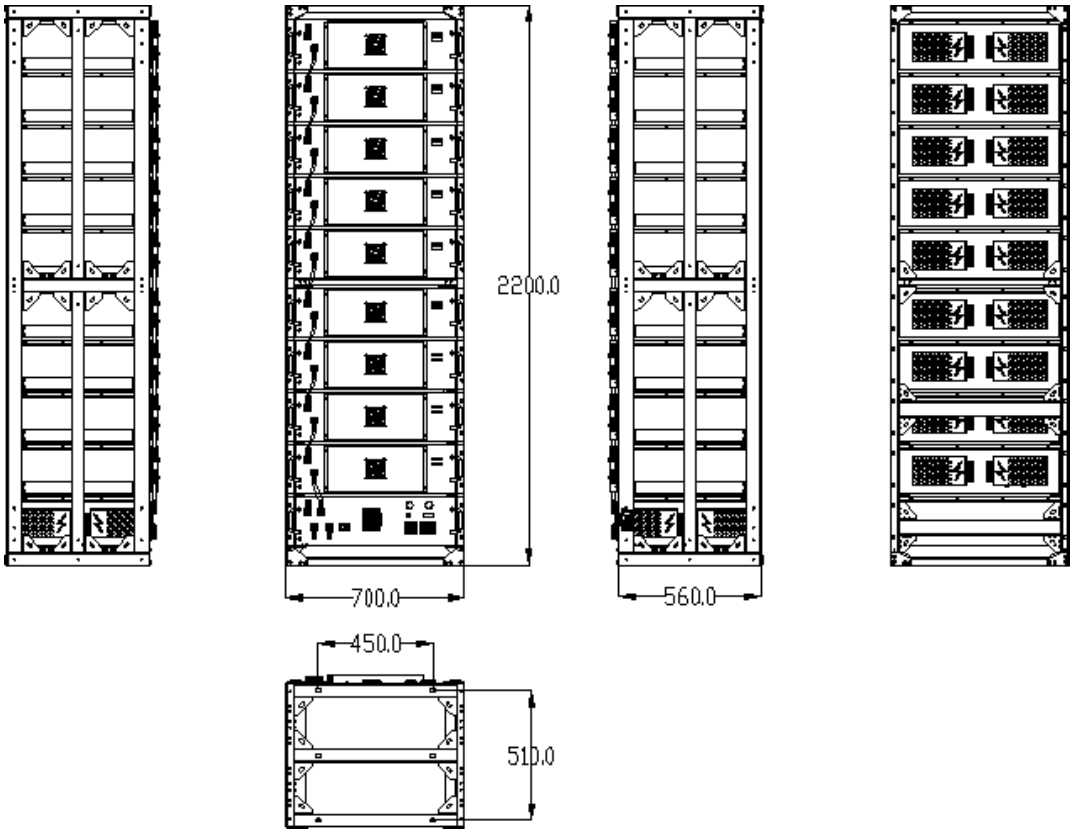
3. Control Module

Number	Dimension	weight
BC	H195*W690*D555（mm）	25Kg



4. Battery Cabinet

Number	Dimension	weight
BC01~03	W700*D560*H2200（mm）	995Kg



Battery Cabinet