HOMEGRID

POWERED BY LITHION

Stack'd Series

Reference Manual

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1. Safety Precautions

It is very important to read the user manual carefully before installing or using battery. Failure to do so or to follow any of the instructions or warnings in this document can result in electrical shock, serious injury, or death. Installing the battery incorrectly can permanently damage battery or rendering it inoperable.

For more information about this product, please visit the official website: http://www.homegridenergy.com

Work on a Li-ion Battery should be carried out by qualified personnel only.

1.1. General warnings

While working on the Li-ion Battery wear protective eyeglasses and clothing.

Any internal lithium ion cell material such as electrolyte or powder on the skin or in the eyes must be flushed with plenty of clean water immediately. Then seek medical assistance. Any material spilled on clothing should be rinsed out with water

Explosion and fire hazard. Terminals of the Li-ion Battery are always alive; therefore, do not place items or tools on the Li-ion Battery. Avoid short circuits, over discharges and high charge currents. Use insulated tools. Do not wear any metallic items such as watches, bracelets, etc. In case of fire; you must use a type D, foam or CO2 fire extinguisher.

Do not open or dismantle the battery. Electrolyte is very corrosive. In normal working conditions you will not have any contact with the electrolyte. If the battery casing is damaged do not touch the exposed electrolyte or powder because it is corrosive.

Li-ion batteries are heavy. If involved in an traffic accident they can become a projectile! Ensure adequate and secure mounting and always use suitable handling equipment for transportation.

Handle with care because this lithium ion battery is sensitive to mechanical forces

Do not expose bare cables outs, all the battery terminals must be disconnected

Do not place in an area used by at a children or pets.

Do not use cleaning solvents to clean battery.

Do not expose battery to flammable or harsh chemicals or vapors.


Do not paint any part of battery; include any internal or external components.


Do not drop, deform, impact, or cut with a sharp object.


Do not power wash the battery or get wet. Direct sunlight must be avoided at


Do not use a damaged battery.


Please contact the supplier within 24 hours if there is something abnormal.


Do not place any foreign objects into any part of battery.


The warranty will be void for direct or indirect damage due to items above.

1.2. Charge and discharge warnings


If the battery is stored for long time, it is required to charge them every six months, and the SOC should be no less than 90%.


Battery needs to be recharged within 12 hours, after fully discharged.


Do not connect battery with PV solar wiring directly.


Use only with BMS approved by the supplier.


If charged after the Lithium Battery was discharged below the "Discharge cut-off voltage", or when the Lithium Battery is damaged or overcharged, the Lithium Battery can release a harmful mixture of gasses such as phosphate.


The temperature range for battery charging is0°C to 55°C. Charging the battery at temperatures outside this range may cause severe damage to the battery or reduce battery life expectancy.


The temperature range for battery discharging is -20°C to 55°C. Discharging the battery at temperatures outside this range may cause severe damage to the battery or reduce battery life expectancy.

1.3. Transportation warnings

The battery must be transported in its original or equivalent package and in an upright position. If the battery is in its package, use soft slings to avoid damage.

Do not stand below a battery when it is hoisted.

Never lift the battery at the terminals or the BMS communication cables, only lift the battery at the handles.

NOTE：

●*Batteries are tested according to UN Handbook of Tests and Criteria, part III, sub section 38.3 (ST/SG/AC.10/11/Rev.5).*

●*For transport the batteries belong to the category UN3480, Class 9, Packaging Group II and have to be transported according to this regulation. This means that for land and sea transport (ADR, RID & IMDG) they have to be packed according to packaging instruction P903 and for air transport (IATA) according to packaging instruction P965. The original packaging complies with these instructions.*

1.4. Disposal of lithium batteries

Batteries marked with the recycling symbol must be processed via a recognized recycling agency. By agreement, they may be returned to the manufacturer.

Batteries must not be mixed with domestic or industrial waste.

Do not throw a battery into fire.

1.5. Before Connecting

◆After unpacking, please check product and packing list first, if product is damaged or lack of parts, please contact your distributor.

◆Before installation, be sure to turn off the grid power and make sure the battery is in off mode.

◆Wiring must be correct, do not reverse the positive and negative cables, also ensure no short circuits with the external device.

◆DO NOT connect the battery and AC power directly.

◆The embedded BMS in the battery is designed for 48V DC, DO NOT connect battery in series.

◆ Battery system must be well grounded, and the resistance must be less than 1oumu;

◆Make sure the grounding connection set correctly before operation.

◆Please ensure the inverter and other equipment are compatible.

◆ Keep the battery away from water and fire.

1.6. During Use

◆If the battery system needs to be moved or repaired, the power must be turned off on the controller and each battery module is switched off.

◆DO NOT connect this battery with any different type or manufacturer of battery.

◆DO NOT connect the batteries with faulty or incompatible inverter.

◆DO NOT disassemble the battery.

◆ In case of fire, only use dry powder fire extinguisher, liquid fire extinguishers are prohibi

2. Introduction

The Stack'd Series lithium iron phosphate battery is an energy storage product developed and produced by HOMEGRID, it can be used to support reliable power for various types of equipment and systems. The Stack'd Series is especially suitable for applications of high power, limited installation space, and restricted load-bearing and long cycle life.
The Stack'd Series has a built-in BMS battery management system, which can manage and monitor cell's information including voltage, current and temperature. The BMS can also help extend the cycle life by balancing cells during charging and discharging.

Multiple battery stacks are allowed to be connected in parallel to expand capacity and power to meet almost any requirement.

2.1. Lithium iron phosphate Battery

The lithium iron phosphate battery (LiFePO4 or LFP) is the safest lithium battery. A single LFP cell has a nominal voltage of 3.2V. A 48V LFP battery consists of 15 cells connected in series.

LFP is the chemistry of choice for very demanding applications. Some of its features are:

◆Safety- LFP is the safest Li-Ion battery and does not propagate thermal run away.

◆High round trip efficiency.

◆High energy density - More capacity with less weight and volume.

◆High charge and discharge currents - Fast charge and discharges are possible.

◆Flexible charge voltages.

The lithium iron phosphate battery is therefore the chemistry of choice for a range of very demanding applications.

2.2. Stack'd Series Features

◆The whole module is non-toxic, pollution-free and environment-friendly;

◆Cathode material is made from LiFePO4 for safety, performance, and long cycle life;

◆Battery management system (BMS) has many protection functions including over-discharge, over-charge, over-current, and high/low temperature;

◆The system will automatically manage charge and discharge state and balance current and voltage of each cell;

◆Flexible configuration, multiple battery modules can be internal for expanding voltage and Capacity.

◆Adaptative self-cooling reduced system noise;

◆The module has low self-discharge, up to 6 months without charging, no memory effect, excellent performance of low discharge;

◆Working temperature range is from -20℃ to 55℃, (Charging 0℃~55℃; discharging -20℃~55℃) with excellent discharge performance and cycle life;

◆Small volume, plug-in embedded design module, easy to install and maintain;

2.3. Specifications

Figure2.3.1Overallsystemdiagram

No.	Items		Parameters						
1	Model		PF5-LFP***00-2A01						
2	Main Controller Module		HG-MC100-200M2						
3	Battery Module Type		HG-FS48100-15OSJ1						
4	Battery Module Chemistry		LiFePO4						
5	Battery Module QTY		2	3	4	5	6	7	8
6	Nominal Capacity(Ah)		200	300	400	500	600	700	800
7	Nominal Energy(kWh)***		9.60	14.4	19.2	24.0	28.8	33.6	38.4
8	Voltage	Nominal(V)	48.0						
		Recommend Charging(V)	53.25						
		Max.Charging(V)	55.5						
		Discharge Cut-off(V)	40.5						
9	Current	Max.Charging(A)	180	270	300	300	300	300	300
		Max.Discharging(A)	180	270	300	300	300	300	300
		Peak for 10s(A)	300	300	500	500	500	500	500
10	Weight (Approx.)		230lbs	325lbs	420lbs	515lbs	610lbs	705lbs	800lbs
11	Dimensions (H*W=29"*D=15.75")		24.2"	29.4	35.2"	41"	46.8"	52.6"	58.4"
12	Communication		RS485, CAN						
13	Cycle Life		6000 times@80%DOD						
14	Designed Calendar Life		≥10 years						
15	Safety Function		Over-charge, Over-discharge, Over-current, Low/High-temperature, Low-voltage, Short-circuit Protections						
16	Parallel Capability		Maximum 15Stacks (Recommended 6 Stacks)						

2.4. Equipment Interface Instruction

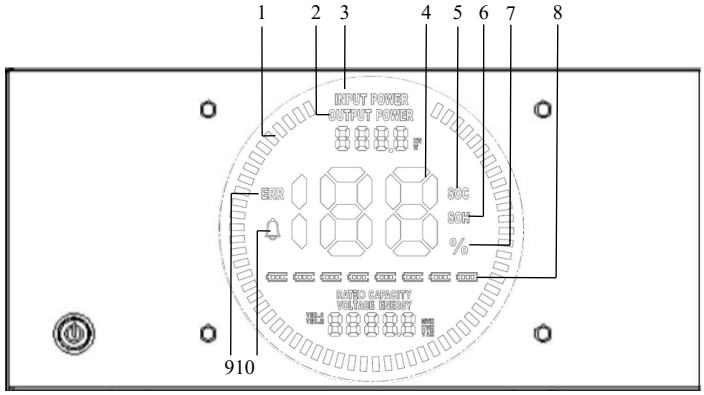


Figure2.4.1Controllermodulepositive

No.	Instructions	NO.	Instructions
1	Animated streamline	6	Battery state of health (SOH)
2	Discharge power	7	Numerical percentage
3	Charging power	8	Number of modules
4	Numerical information	9	Fault (error)
5	Battery state of charge (SOC)	10	Alarm (warning)

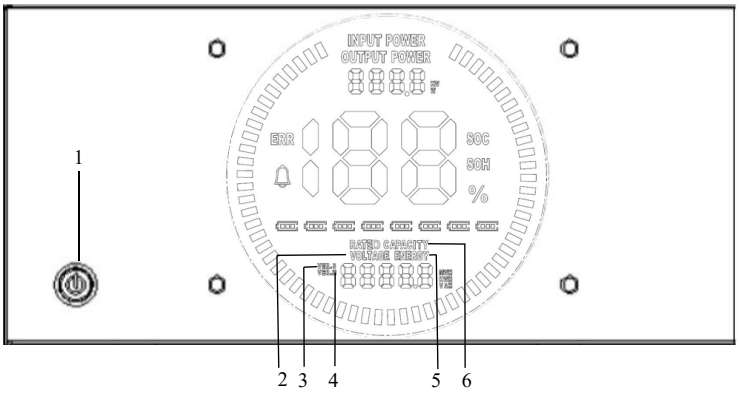


Figure2.4.2Controllermodulepositive

No.	Instructions	NO.	Instructions
1	Power switch	4	Hardware version
2	Current voltage level	5	Energy throughput
3	Software version	6	Capacity of a new battery

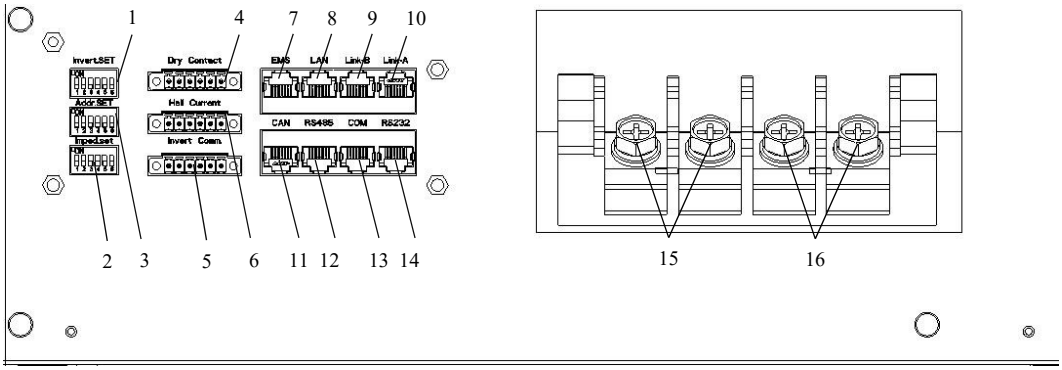


Figure2.4.3Interface definition of Controller module

No.	Instructions	No.	Instructions
1	Inverter protocol dialing switch	9	Parallel communication port B
2	Imped. SET (Reserved)	10	Parallel communication port A
3	Address Dial Switch	11	Inverter CAN communication port
4	Dry Contact (Reserved)	12	Inverter RS485communication port
5	Inverter CAN/ RS485communication port	13	CAN upgrade communication port
6	Hall Current (Reserved)	14	RS232 communication interface
7	Reserved	15	Charge discharge negative electrode
8	Reserved	16	Charge discharge positive electrode

Power switch

Power switch: turn on/off the input and output of the whole system.

Display screen

Display screen: the interface can observe the operation status information SOC, SOH, charging/discharging power, alarm fault indication, charging and discharging status, and system status of the whole system.

Status code

Status code: The code will only be displayed on fault, during if the system is normal the code will not be shown. The definition of alarm is shown in the table below：

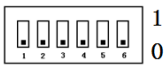
Numerical value	Alarm indication	Numerical value	Alarm indication
000	Normal	014	Charging circuit fault
002	Low voltage protection	015	Cell failure
003	Charging over current protection	016	NTC failure
004	Discharge over current protection	019	Communication interruption fault of external equipment
005	Short circuit protection	020	Internal equipment communication interruption fault
006	Charging high temperature	022	Relay over temperature protection
007	High discharge temperature	023	Copper bus over temperature protection
008	Low charging temperature	025	Lost communication between screen and device
009	Low discharge temperature	051	Total pressure overcharge protection
011	High ambient temperature	052	Total pressure over discharge protection
012	Excessive differential pressure	053	Low ambient temperature protection
013	Discharge circuit failure	054	MOS over temperature protection

NOTE:

●*When the system is charged, the display streamline gathers in the middle, and when it is discharged, the display streamline disperses to both sides*

Controller address dial switch

Dial switch: 6-digit dial switch, address "0" and "1", as shown in the figure. After setting, you need to restart the system and activate it.



When the system groups are in parallel, the communication between two levels is needed. Both master and slave packets need hardware address configuration, and the hardware address can be set through the dial switch on the board. The definition of switch is shown in the table below.

Address Coding	Dial Code Switch Position						Definition
	#1	#2	#3	#4	#5	#6	
1	ON	OFF	OFF	OFF	NG	NG	The host computer can monitor the operation of other systems by setting the main package
2	OFF	ON	OFF	OFF	NG	NG	Set to Pack2
3	ON	ON	OFF	OFF	NG	NG	Set to Pack3
4	OFF	OFF	ON	OFF	NG	NG	Set to Pack4
5	ON	OFF	ON	OFF	NG	NG	Set to Pack 5
6	OFF	ON	ON	OFF	NG	NG	Set to Pack 6
7	ON	ON	ON	OFF	NG	NG	Set to Pack 7
8	OFF	OFF	OFF	ON	NG	NG	Set to Pack 8
9	ON	OFF	OFF	ON	NG	NG	Set to Pack 9
10	OFF	ON	OFF	ON	NG	NG	Set to Pack10
11	ON	ON	OFF	ON	NG	NG	Set to Pack 11
12	OFF	OFF	ON	ON	NG	NG	Set to Pack 12
13	ON	OFF	ON	ON	NG	NG	Set to Pack13
14	OFF	ON	ON	ON	NG	NG	Set to Pack 14
15	ON	ON	ON	ON	NG	NG	Set to Pack 15

Inverter protocol dialing switch

ADD Switch:6 ADD switches,"0"and"1",refer to picture right.
When the host is connected with the inverter, the host computer needs to communicate. Hardware address configuration is required on the host, and the hardware address can be set through the dial switch on the board.

1. Inverter protocol setting function of dial switch 0 ~ 28: The inverter communication protocol can be changed directly by setting the dial switch, The definitions are shown in the following table.

Address Coding	Dial Code Switch Position						Definition
	#1	#2	#3	#4	#5	#6	
0	OFF	OFF	OFF	OFF	OFF	OFF	Monitoring Software setting mode
1	ON	OFF	OFF	OFF	OFF	OFF	ZRGP
2	OFF	ON	OFF	OFF	OFF	OFF	Studer_Xtender
3	ON	ON	OFF	OFF	OFF	OFF	Sofar_LV
4	OFF	OFF	ON	OFF	OFF	OFF	Solis_LV

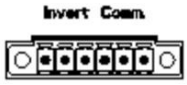
Address Coding	Dial Code Switch Position						Definition
	#1	#2	#3	#4	#5	#6	
5	ON	OFF	ON	OFF	OFF	OFF	Goodwe_LV
6	OFF	ON	ON	OFF	OFF	OFF	Victron_color_control
7	ON	ON	ON	OFF	OFF	OFF	SMA_LV
8	OFF	OFF	OFF	ON	OFF	OFF	Sermatec_LV
9	ON	OFF	OFF	ON	OFF	OFF	Reserved
10	OFF	ON	OFF	ON	OFF	OFF	Growatt_SPF
11	ON	ON	OFF	ON	OFF	OFF	Li_PLUS
12	OFF	OFF	ON	ON	OFF	OFF	Schneider_Gateway
13	ON	OFF	ON	ON	OFF	OFF	Reserved
14	OFF	ON	ON	ON	OFF	OFF	Reserved
15	ON	ON	ON	ON	OFF	OFF	Reserved
16	OFF	OFF	OFF	OFF	ON	OFF	Reserved
17	ON	OFF	OFF	OFF	ON	OFF	SOL-ARK_LV
18	OFF	ON	OFF	OFF	ON	OFF	Growatt_SPH&SPA
19	ON	ON	OFF	OFF	ON	OFF	Reserved
20	OFF	OFF	ON	OFF	ON	OFF	Reserved
21	ON	OFF	ON	OFF	ON	OFF	Reserved
22	OFF	ON	ON	OFF	ON	OFF	Reserved
23	ON	ON	ON	OFF	ON	OFF	Reserved
24	OFF	OFF	OFF	ON	ON	OFF	Reserved
25	ON	OFF	OFF	ON	ON	OFF	Reserved
26	OFF	ON	OFF	ON	ON	OFF	Reserved
27	ON	ON	OFF	ON	ON	OFF	GreenCell
28	OFF	OFF	ON	ON	ON	OFF	Reserved
29	ON	OFF	ON	ON	ON	OFF	Must

2. Automatic matching identification function of dial switches 50 ~ 63: this function can automatically identify the inverter and set the protocol after it is turned on, Slave machines module does not need to set the address and quantity. The main control performs automatic identification and re matching. The definitions are shown in the following table.

Address Coding	Dial Code Switch Position						Definition
	#1	#2	#3	#4	#5	#6	
50	OFF	ON	OFF	OFF	ON	ON	Reserved
51	ON	ON	OFF	OFF	ON	ON	
52	OFF	OFF	ON	OFF	ON	ON	
53	ON	OFF	ON	OFF	ON	ON	
54	OFF	ON	ON	OFF	ON	ON	
55	ON	ON	ON	OFF	ON	ON	
56	OFF	OFF	OFF	ON	ON	ON	
57	ON	OFF	OFF	ON	ON	ON	
58	OFF	ON	OFF	ON	ON	ON	
59	ON	ON	OFF	ON	ON	ON	
60	OFF	OFF	ON	ON	ON	ON	Reserved
61	ON	OFF	ON	ON	ON	ON	Reserved
62	OFF	ON	ON	ON	ON	ON	Find address: used when more than one system is connected
63	ON	ON	ON	ON	ON	ON	Find the number of modules attached to the system.

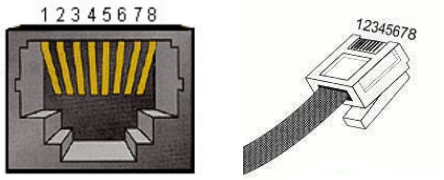
Inverter CAN/RS485 communication port

Inverter CAN/RS485 communication port: (3.81mm port) follows can protocol and RS485protocol.Fortheoutputsysteminformation,the system master uses this interface to communicate with External inverter PC and other equipment.

Portdefinitions	RJ45Pin	Function
 123456	1	RS485-B
	2	RS485-A
	3	RS485-GND
	4	CAN-L
	5	CAN-H
	6	CAN-GND

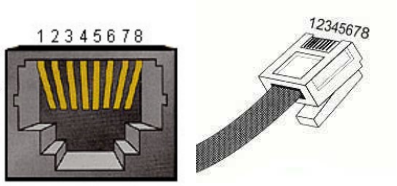
RS232 communication port

RS232 communication port: (RJ45 port) comply with RS232 protocol (baud rate: 9600), for manufacturers or professional engineers debugging or service.

Port definitions	RJ11 Pin	Function
	1	NC (No connect)
	2	NC (No connect)
	3	RS232-GND
	4	RS232-TX
	5	RS232-RX
	6	RS232-GND
	7	NC (No connect)
	8	NC (No connect)

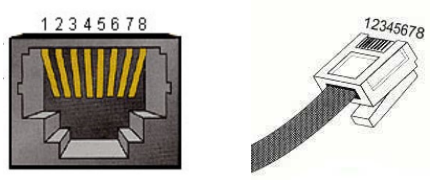
COM communication port

COM communication port:(RJ45 port) Connect the monitoring host computer

Port definitions	**RJ45 Pin**	**Function**
	1	RS485-B
	2	RS485-A
	3	CAN -GND
	4	RS485-GND
	5	RS485-GND
	6	CAN -GND
	7	CAN-L
	8	CAN-H

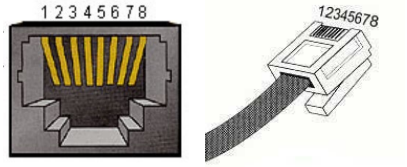
Inverter RS485 communication port

Rear panelRS485 communication port: (RJ45 port) follows can protocol and RS485 protocol. For the output system information, the system master uses this interface to communicate with External inverter PC and other equipment.

Port definitions	**RJ45 Pin**	**Function**
	1	RS485-B
	2	RS485-A
	3	RS485-GND
	4	NC (No connect)
	5	NC (No connect)
	6	RS485-GND
	7	RS485-A
	8	RS485-B

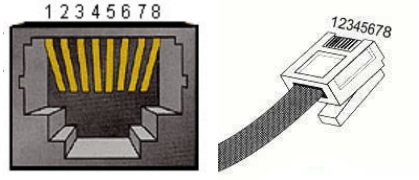
Inverter CAN communication port

Rear panel CAN communication port: (RJ45 port) follows CAN protocol and RS485 protocol. For the output system information, the system master uses this interface to communicate with External inverter PC and other equipment.

Port definitions	RJ45 Pin	Function
	1	CAN-H
	2	CAN-L
	3	CAN -GND
	4	CAN-H
	5	CAN-L
	6	CAN -GND
	7	CAN-H
	8	CAN-L

Rear panel Link A / Link B communication port

Link A / B communication port:(RJ45 port) the definition of link a and B on the rear panel of the interface main control module is the same. RS485 interface is used for parallel communication between the main control modules, and up to 15 devices can be connected in parallel.

Port definitions	RJ45 Pin	Function
	1	RS485-B
	2	RS485-A
	3	RS485-GND
	4	NC (No connect)
	5	NC (No connect)
	6	RS485-GND
	7	RS485-A
	8	RS485-B

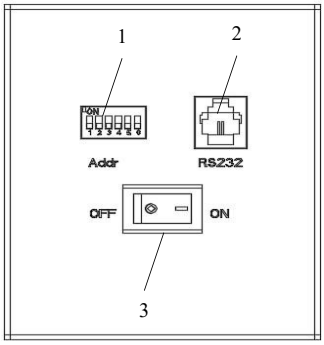


Figure2.4.Batterymoduleinterfacedefinition

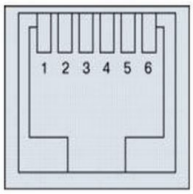
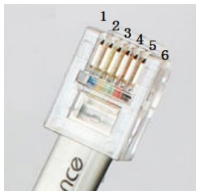
No.	Instructions	NO.	Instructions
1	Address Dial Switch	2	RS232communicati on interface
3	Power switch		

Power switch

Power switch: turn on/ off the input and output of the whole battery module.

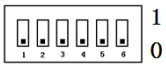
RS232 communication port

RS232communicationport: (RJ11 port) comply with RS232 protocol (baud rate: 9600), for manufacturers or professional engineers debugging or service.

Port definitions	RJ11 Pin	Function
 	1	NC (NO CONNECT)
	2	RS232-GND
	3	RS232-TX
	4	RS232-RX
	5	RS232-GND
	6	NC (NO CONNECT)

Address dial switch for modules

ADD Switch: 6 ADD switches,"0"and"1",refer to the picture at the right. The setting swill be active only after restart the module.

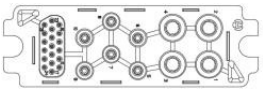


The top module needs to be "1" or the controller will not turn on.

Address Coding	Dial Code Switch Position						Definition
	#1	#2	#3	#4	#5	#6	
1	ON	OFF	OFF	OFF	OFF	OFF	Set to Module 1
2	OFF	ON	OFF	OFF	OFF	OFF	Set to Module 2
3	ON	ON	OFF	OFF	OFF	OFF	Set to Module 3
4	OFF	OFF	ON	OFF	OFF	OFF	Set to Module 4

5	ON	OFF	ON	OFF	OFF	OFF	Set to Module 5
6	OFF	ON	ON	OFF	OFF	OFF	Set to Module 6
7	ON	ON	ON	OFF	OFF	OFF	Set to Module 7
8	OFF	OFF	OFF	ON	OFF	OFF	Set to Module 8

Battery anode and Battery cathode



Positive and negative connection: the battery modules are connected in parallel through the connecting terminals, and finally the main control module is connected in parallel. The power cable adopts waterproof connector. When connecting the power plug, its corresponding interface must be aligned.

How to use the Monitoring Software Ems Tools

2.5. Monitoring Software Ems Tools connection

1) ConnecttheRS232interfaceofthebatterytothecomputerusingtheRS232communicationline (this accessory is an optional accessory, need to be purchased separately from the manufacturer).

2) Unzip the package file of the Monitoring Software Ems Tools in the same file directory, pay attention to the directory do not store other files.

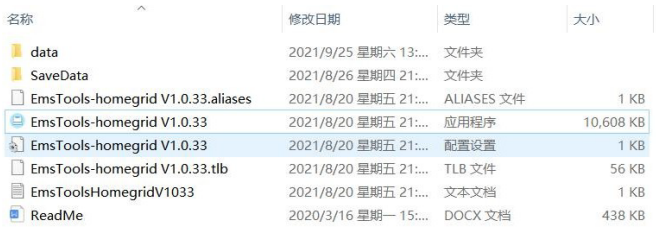


Figure3.1.1.UnzipofMonitoringSoftwareEms Tools

3) Open the Monitoring Software Ems tools icon, enter the protocol selection interface, select the EMS Low Voltage Protocol version and enter the password (please contact the manufacturer for the password) to log in the software.

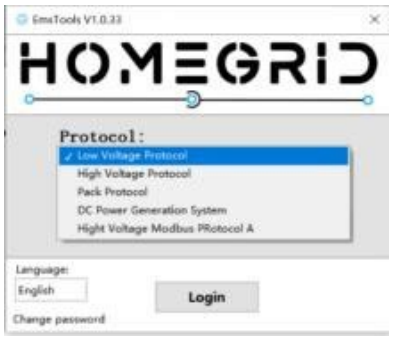


Figure3.1.2.Protocolselectioninterface

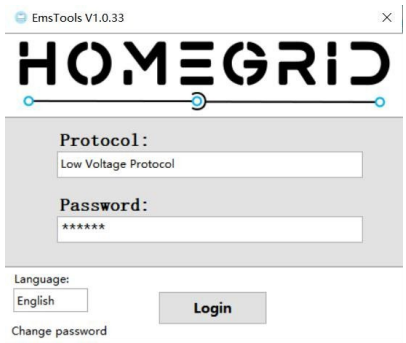


Figure3.1.3.Enterthepassword

4) Users can set different languages according to their own needs. We support four languages, which are Simplified Chinese, English, Japanese and Spanish.

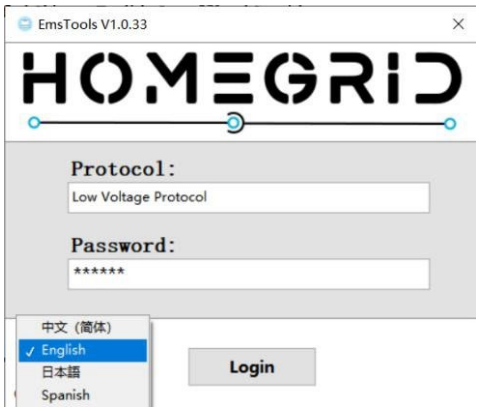


Figure3.1.4.MonitoringSoftwareEmslanguageselection

5) Select the serial port number in the EMS low voltage version of the Monitoring Software EMS tool, and the default baud rate is 9600. Click the open com and monitor open buttons.

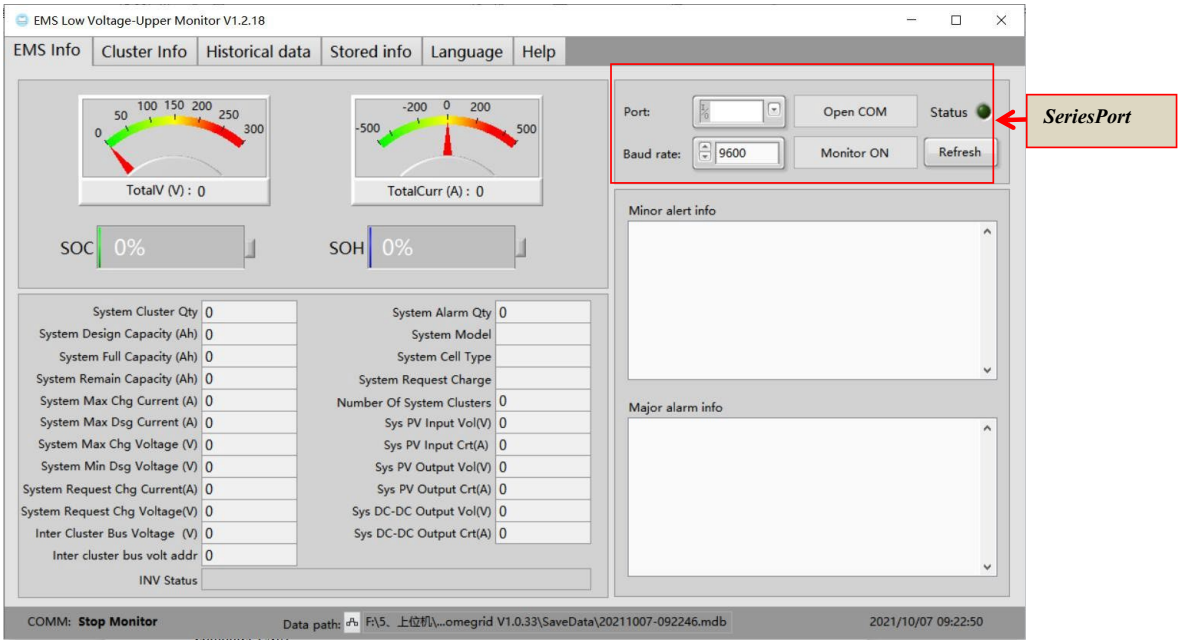


Figure3.1.5.MonitoringSoftwareEmsserialportsettings

6) The corresponding functions can be selected through the navigation bar of the Monitoring Software EMS.

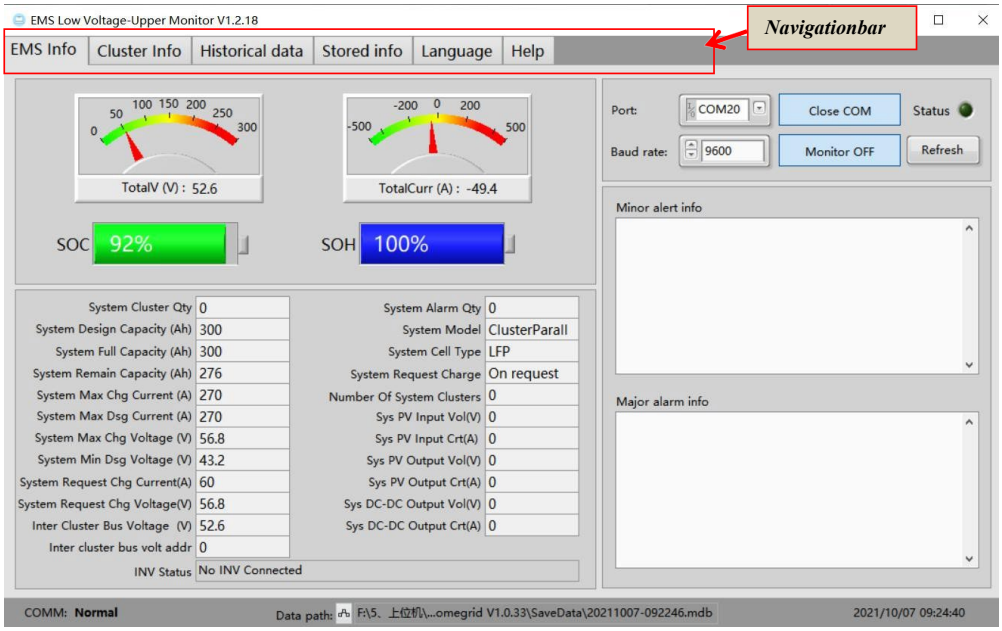


Figure3.1.6.MonitoringSoftwareEmsdataacquisition

7) Cluster information operation information, you can select the corresponding operation information through the navigate on bar. total of 15 clusters can be monitored.

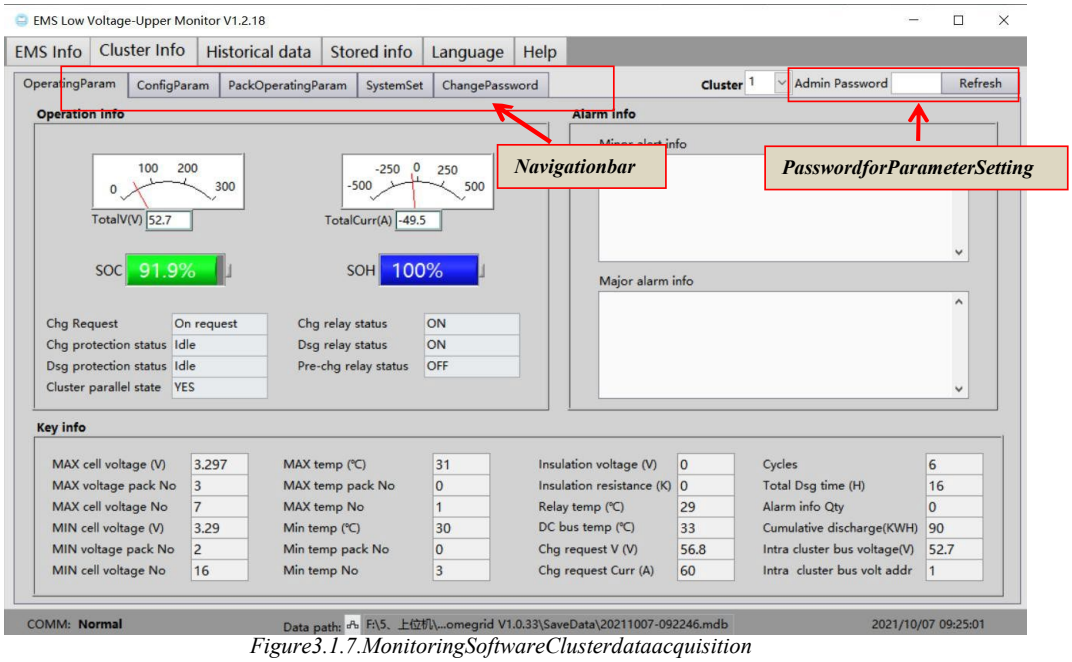


Figure3.1.7.MonitoringSoftwareClusterdataacquisition

8) The configuration parameter interface displays the manufacturer identification, software version, hardware version, production serial number, temperature quantity and module battery quantity of a cluster in real time.

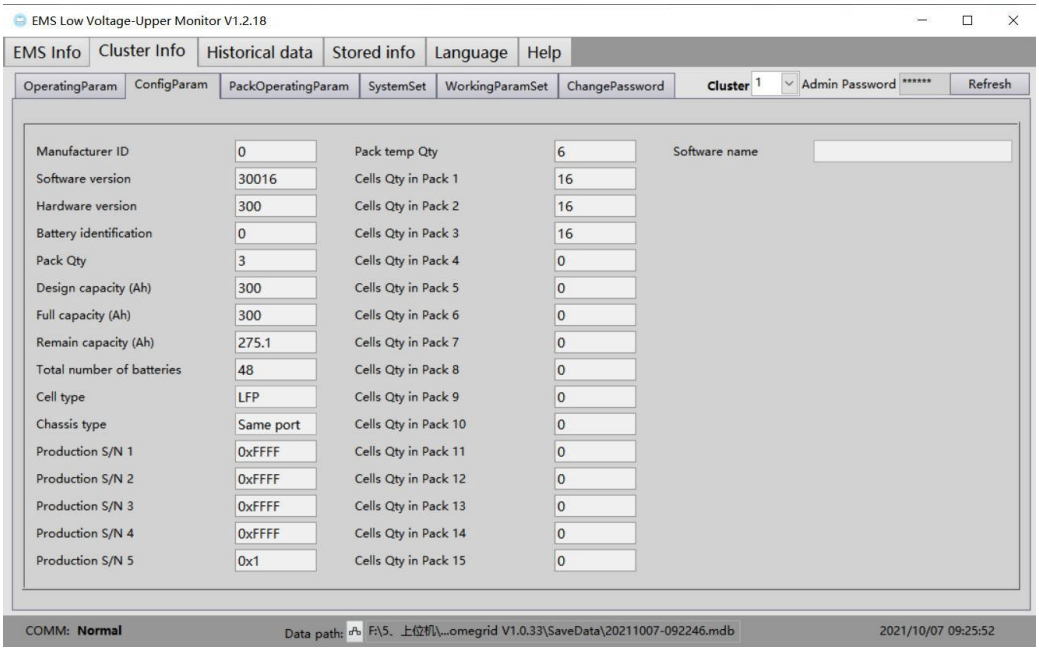


Figure3.18.MonitoringSoftwareClusterMatchingparameters

NOTE:

- *The above contents only show the basic functions and operations of the monitoring software EMS tool. If you encounter any problems, please contact the supplier for solution.*

3. How to match communication with Inverter

3.1. Supported brands

At present, the energy storage products of our company have completed matching tests with some series inverters of the following brands, and we will continue matching tests with inverters of other companies. Please check our official website for the latest list of supporting brands.

3.2. Inverter matching list

The list tab only lists the inverter manufacturers one of the same series products, general inverter manufacturers in the same series of other products, the communication protocol are the same, so our battery can be communicated with the other products of same series inverter, if encounter a series of products can't communication, please contact us.

The following inverter matching list may not be up to date. The list may change according to the software version upgrade, and the reference manual may does not change immediately according to the software version upgrade. Therefore, if the user wants to get the latest inverter matching support, please browse our the official website to check the relevant documents。

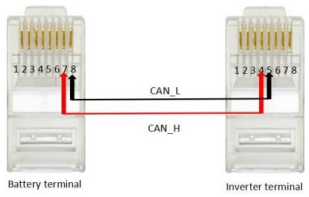
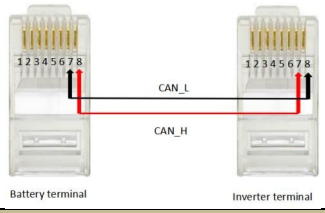
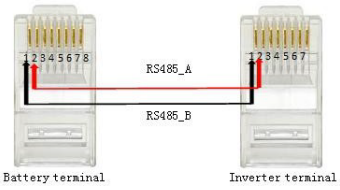
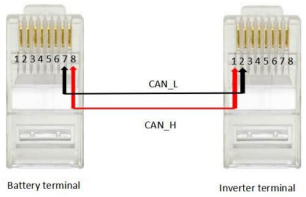
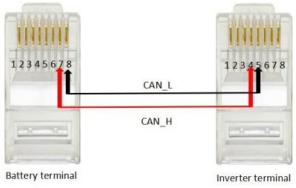
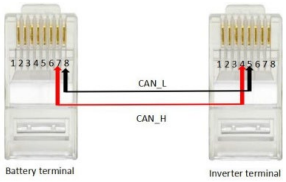
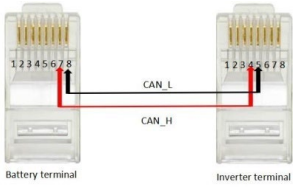
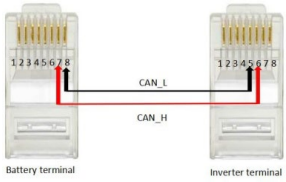
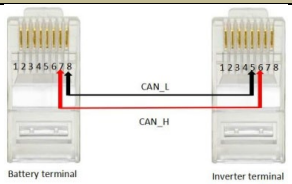
The inverter manufacturer may upgrade its software version, which may cause problems in the communication between our battery and the inverter. Therefore, before communicating with the inverter, please confirm whether the software version of the inverter is consistent with the list. If not, please contact us.

Inverter			Communication mode
Brand	Type	Protocol Version	
Growatt	SPF12KT HVM	V1.22	RS485
	SPH3000	V1.26	CAN
Studer	Xtender-XTH-8000-48	V1.0.3	Xcom-CAN
Sofar	HYD5000-ES	V6.0	CAN
Solis	RHI-5K-48ES	V1.2	CAN
Goodwe	GW5048-EM	V1.5	CAN
Victron	MultiPlus-II	V6.0	CAN
SMA	S16.0H-12	V2.0	CAN
Sermatec	SMT-5K-TL-UN	V1.2	CAN
Schneider	Conext Gateway	V2.0	CAN
Li_PLUS	ZR Standard	V1.2	CAN
Sol-ark	Sol-ark-12k	V1.31	CAN
GreenCell	PV1800VHM	V1.04.04	CAN
Must	PV1800VHM	V1.04.04	CAN

3.3. Connection with inverter

This section will introduce how to hardware connect HOMEGRID series products with 8.2 section "Inverter Matching List". Inverters manufacturers may upgrade their products, resulting in hardware communication interface changes. If communication is not possible in the application according to the following wiring method, please contact with us.

The CAN/RS485 communication port of HOMEGRID is connected with the communication interface of inverter.

Connect to the Sol Ark Inverter	Connect to Victron inverter
	
Connect to the Growatt inverter	**Connect to the Sofar inverter**
	
Connect to the Solis inverter	**Connect to the Goodwe inverter**
	
Connect to the Sermatec inverter	**Connect to the Must inverter**
	
Connect to the GreenCell inverter	**Connect to the Must inverter**
	

NOTE:

●The above CAN and RS485 communication connections are not connected the ground wire, in the application of relatively large interference, it is recommended to connect the ground wire, the ground wire connection method is a single-ended shielding line.

4. Safe handling of lithium batteries Guide

4.1. Schematic Diagram of Solution

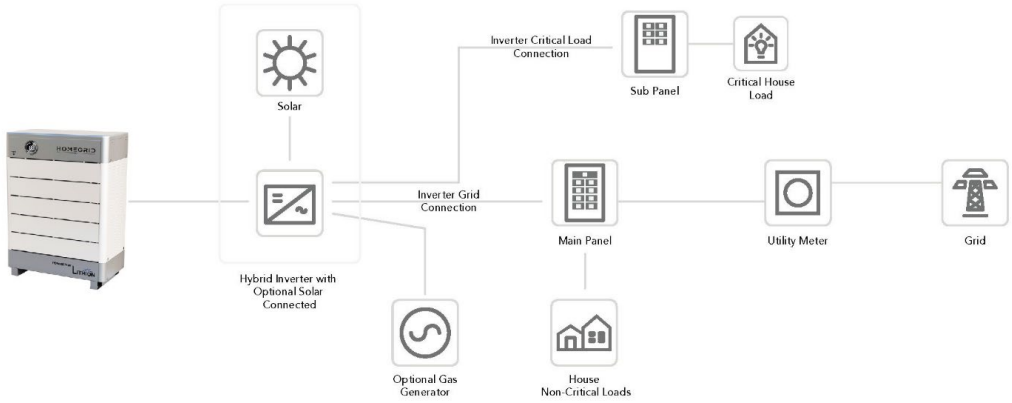


Figure5.1.1.Schematicdiagramofsolution

4.2. Unpacking the system

Be careful when unpacking the system. The whole system is heavy. Don't lift it with poles or sharp tools or by yourself, team lift is required. . Each modules weighs over 100lbs. The weight of the battery can be found in the chapter "specifications".

The battery poles are located on the right side of the battery. The battery polarity is shown on the left side of the battery. The positive pole is represented by "+" and the negative pole by "-".

Figure5.2.1.Sideview of the whole system

4.3. Precautions before installation

Before installation, be sure to read the contents in Chapter 1 Safety Precautions, which is related to the operation Safety of installation personnel, please pay attention to.

4.4. Tools

The following tools are required to install the battery pack:

Wire cutter

Cable clamp

Screw Driver

NOTE:

●*Use properly insulated tools to prevent accidental electric shock or short circuits. If insulated tools are not available, cover the entire exposed metal surfaces of the available tools, except their tips, with electrical tape.*

4.5. Safety Gear

It is recommended to wear the following safety gear when dealing with the battery pack:

Insulated gloves

Safety goggles

Safety shoes

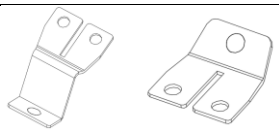
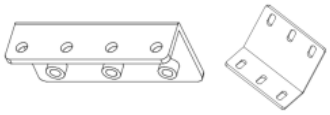
5. Installation

5.1. Package Items

Unpacking and check the Packing List:

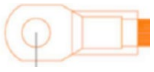
1）PACKING LIST

After receiving the complete system, please check to ensure that all the following components are not lost or damaged

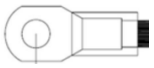
 ESSsystem×1	 Positive negative terminals ×2	 Battery terminal ×2
 Main control fixing bracket×2	 M8*16x2	 M6*10x6
 M4*10x8	 M3*12x15	 User'smanualx1

2) Connector

Each system will be equipped with a positive connector and a negative connector. The two connectors are not connected to the cable, and users can wire according to the actual application needs.



Positive connector



Negative connector

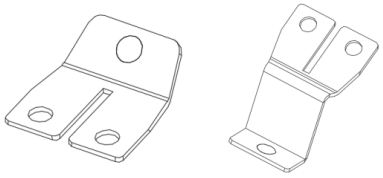
Model	Nominal voltage(Vdc)	Cable specification	
		AWG	mm²
PF5-LFP04800-2A01	51.2Vdc	4	25
PF5-LFP09600-2A01	51.2Vdc	1/0	50
PF5-LFP14400-2A01	51.2Vdc	3/0	95
PF5-LFP19200-2A01	51.2Vdc	4/0	120

NOTE:

•Safety and compliance with regulations require the installation of independent DC overload protector or disconnecting device between battery and inverter. Even if disconnecting devices are not required in some applications, overload protection is still required. Refer to the table below for typical amperes as the required fuse or circuit breaker standard.

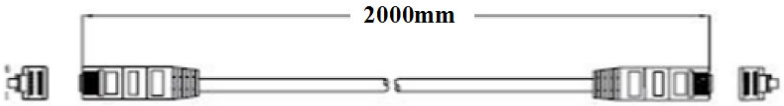
Warning! All wiring must be performed by professionals. warning! It is very important to connect the battery with proper cable for the safe and efficient operation of the system. To reduce the risk, use the correct cable and terminal sizes recommended below.

3)Each system will be equipped with a positive terminal and a negative terminal. The two connectors are not connected with cables, so users can connect wires according to actual application needs.



Positive connector Negative connector

4) Communication connecting line between system and inverter(Optional)



5.2. Installation Location

Make sure that the installation location meets the following conditions:

◆The area will not puddle water or be folded.
◆The floor is flat and level.
◆There are no flammable or explosive materials.
◆The ambient temperature is within the range from 0°C to 50°C.
◆The temperature and humidity is maintained at a constant level.
◆There is minimal dust and dirt in the area.
◆The distance from heat source is more. than 2 meters.
◆The distance from air outlet. of inverter is more than 0.5 meters.
◆Do not install outside directly.
◆Do not cover or wrap the battery case or cabinet.
◆Do not place where there are children or pets.
◆Do not install where it will be in direct sunlight.
◆There is no ventilation required for ESS, but due to the heat given off from the battery and inverters take note when installation in a small space or closed off area. Avoid areas of high salinity, humidity or temperature.

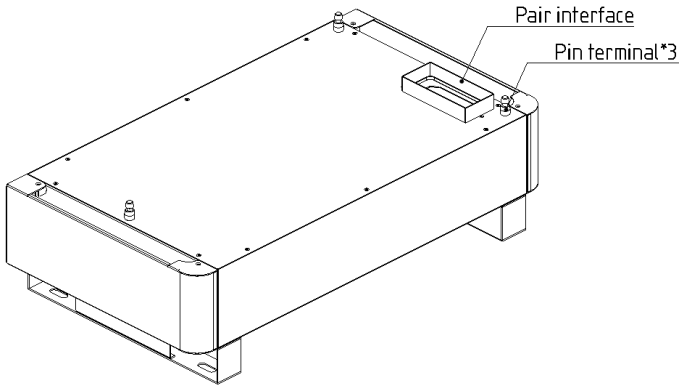
CAUTION

If the ambient temperature is outside the operating range, the battery pack stops operating to protect, itself. The optimal temperature range for the battery pack to operate is 0°C to 55°C.Frequent exposure, to harsh temperatures may deteriorate the performance and life of the battery pack.

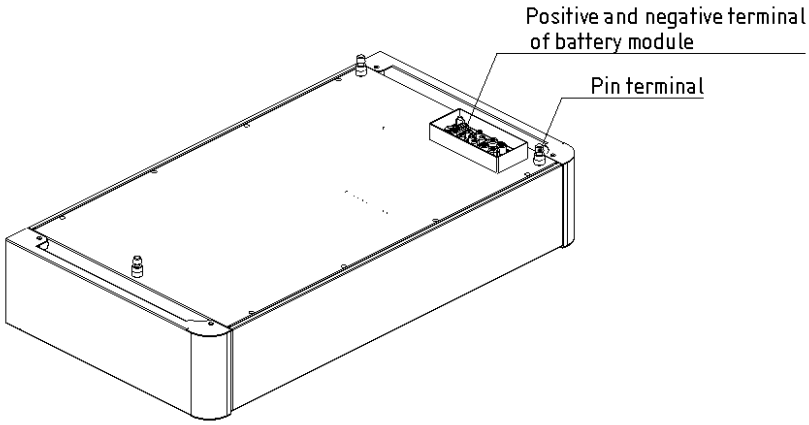
5.3. Parallel Installation

A. Stack the whole system (team lift)

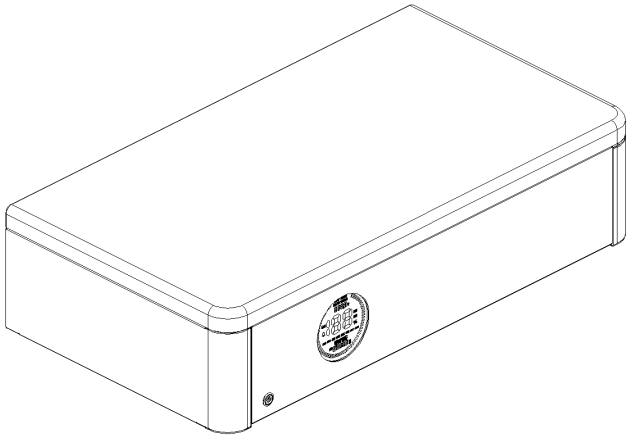
(1) Place the system base at the bottom



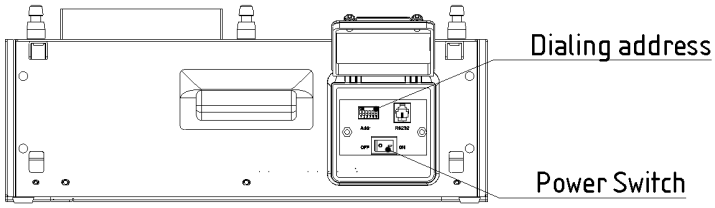
(2) The corresponding interface terminals are stacked one by one to connect the battery modules (team lift)



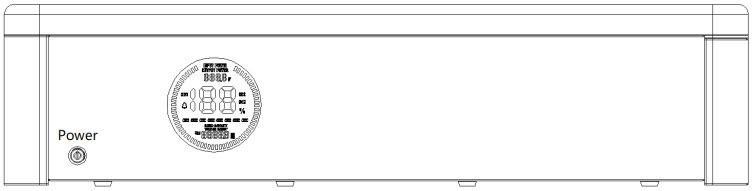
(3) Finally, place the main control module at the top of the system



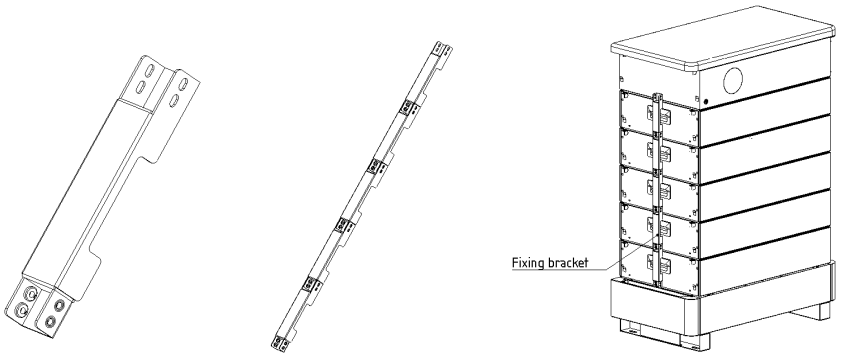
(4) When the battery modules are stacked and installed, it is necessary to check whether the switch is closed and sort from top to bottom according to 1 ~ 5 addresses, After installation and setting, press the switch button on the right panel of the lithium battery module from bottom to top.



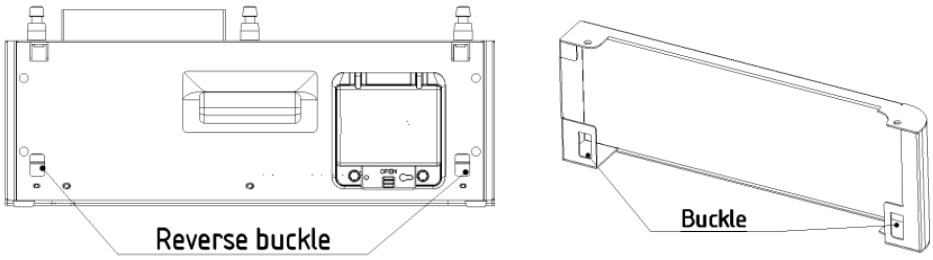
(5) Turn on the main control switch, observe that the display screen has no alarm protection status, the number of battery modules has no loss and flicker, and the system parameters and status display are normal



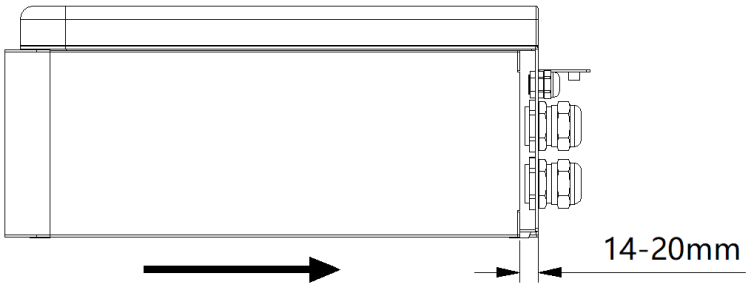
（6）Assemble the fixing brackets for the battery module accessories into a long strip and mount them in the middle of the left-hand side of the system.



（7）After normal operation, the system protection side plate shall be installed on the battery module and the main control device to prevent scratches and bumps inside the battery Connect and fix the barbs at both ends of the battery module with the snap of the protective side plate



（8）Install the protective side plate and fix the screws, the right side of the main control board shall be 14~20mm away from the side of the main control box, and put the side plate to the right against the box until it is closed. Finally, completing the installation of the main control side plate.



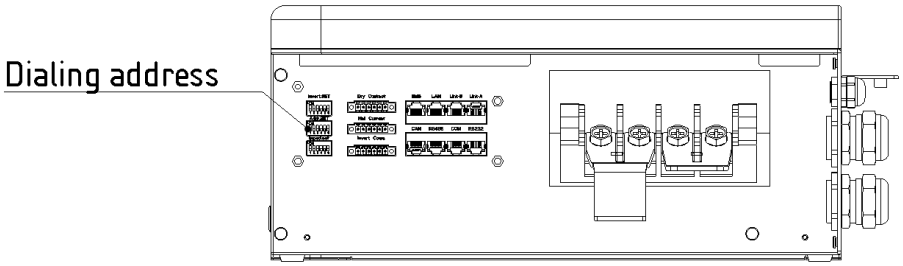
NOTE:

●Before starting the system, the operator should strictly check the connection terminal to ensure that the terminal is firmly connected, check whether the battery address is set correctly, and whether the inverter switches are in the off state. Do a good job in safety protection and turn on the inverter in the following order, When installing the system, the battery module bottom insulation skin remove The lower connector of the battery module is covered by a PC piece, which should be torn off before installation;

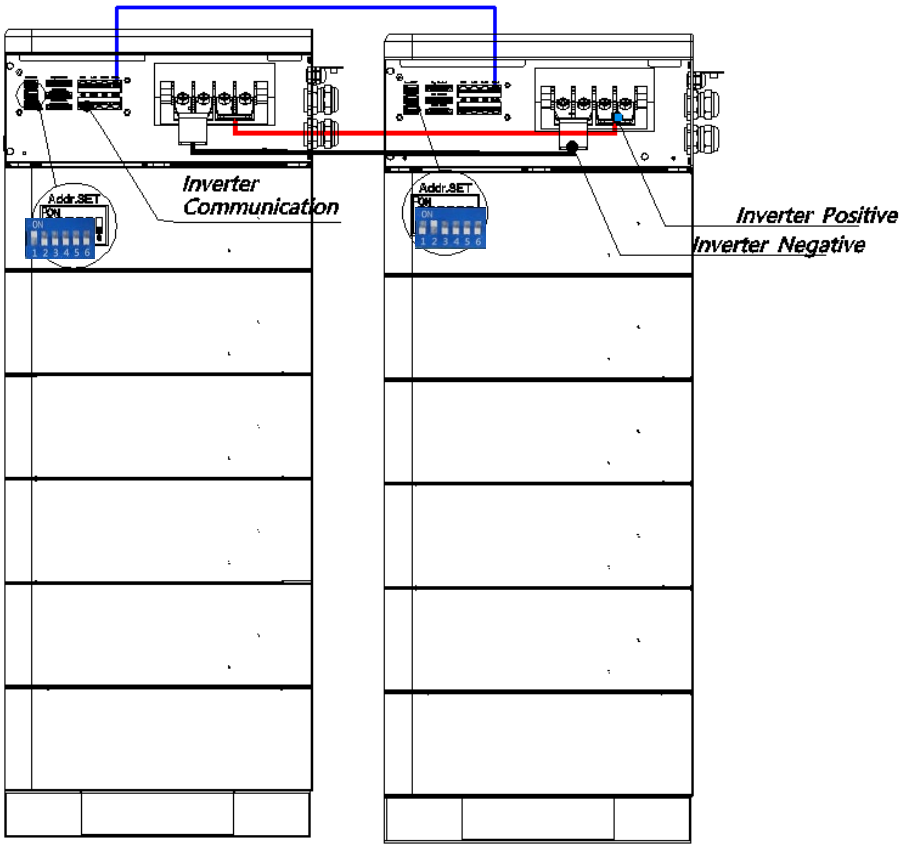
B. Parallel connection

Check all connection terminals and communication lines carefully.

(2) The main control address shall be set to "1" for communication between the main control and the inverter (a host system can be configured with up to 15 slave systems). Turn off the main control switch before connecting the inverter



(3) Connect the parallel port of the slave to the communication cable of the host, connect the positive pole of the slave to the positive pole of the host, connect the negative pole of the slave to the negative pole of the host, connect the parallel cable of the slave to the host, and finally connect the communication cable of the host to the frequency converter. Battery stack units should be installed a minimum of 6" apart.



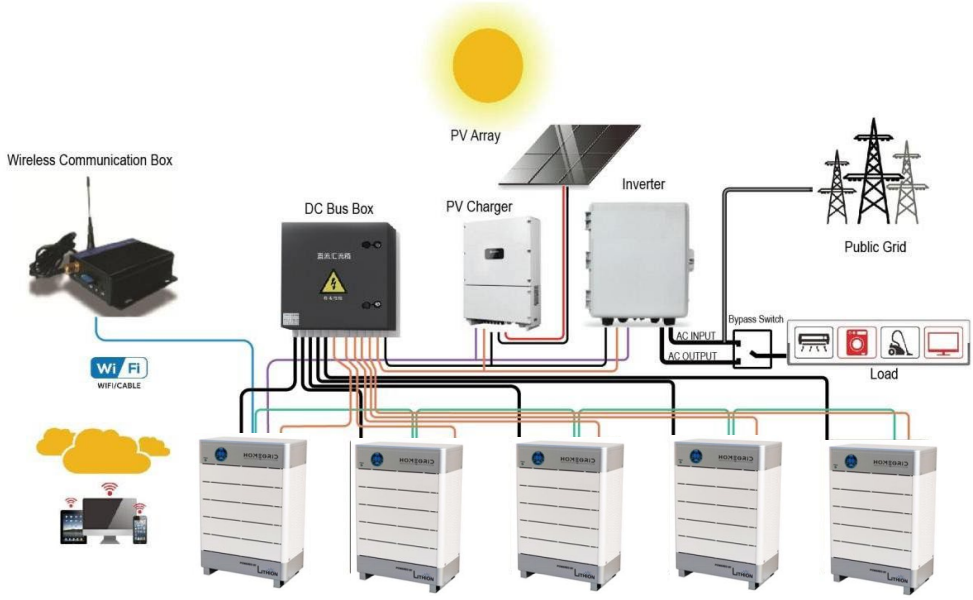


Figure5.4.Schematic diagram of parallel solution

Note: after installation, please do not forget to contact the supplier to register online for full warranty

NOTE:

- In order to avoid current pulse during start-up, pre-discharge function should be added to high voltage system. All connected batteries should be turned on first, and then the circuit breaker between high voltage system and inverter should be turned on.
- Circuit breaker shall be installed between high voltage system and inverter to protect system safety.
- All installation and operation must comply with local electrical standards.

6. Trouble Shooting Steps

6.1. Problem determination based on

1) Whether the battery can be turned on or not;

2) If battery is turned on, check the red light is off, flashing or lighting;

3) If the red light is off, check whether the battery can be charged/discharged or not.

6.2. Preliminary determination steps

1) The system cannot be turned on and the system display is not illuminated. If the external switch of the system is turned on and the external power supply voltage exceeds 48V, the system still cannot be started and operated, please contact the dealer.

2) The system can be turned on, but the display shows a fault and cannot be charged or discharged. If the red light is on, it indicates that the system is abnormal. Please check the following values:

- Temperature: Above 55℃ or under -20℃ , the system could not work in discharging. Above 55℃ orunder0℃, the system could not work in charging.
- Current: If current is greater than300A, battery protection will turn on.

  Solution: Check whether current is too large or not, if it is, to change the settings on power Supply side.
- High Voltage: If charging voltage above 55.5V, battery protection will turn on.

  Solution: Check whether voltage is too high or not, if it is, to change the settings on power supply side.
- Low Voltage: When the battery discharges to40.5V or less, battery protection will turn on.

  Solution: Charge the battery for some time.

  Excluding the four points above, if the faulty is still cannot be located, turn off battery and repair.

6.3. The battery cannot be charged or discharged

1) Cannot be charged:

Disconnect the power cables, measure voltage on power side, if the voltage is 53~54V restart the battery, connect the power cable and try again, if still not work, turn off battery and contact distributor.

2) Unable to discharge:

Disconnect the power cables and measure voltage on battery side, if it is under 44V please charge the battery; if voltage is above 48V and still cannot discharge, turn off battery and contact distributor.

7. Storage, Transportation and Emergency Situations

7.1. Storage

Recharge and maintain the battery pack regularly every three months to ensure the battery is in the best condition.

7.2. Transportation

Battery pack Battery packs need to be packed before they can be shipped, during transportation, severe impact, extrusion, direct sunlight and rain should be protected.

7.3. Emergency Situations

1) Leaking Batteries

If the battery pack leaks electrolyte, avoid contact with the leaking liquid or gas. If one is exposed to the leaked substance, immediately perform the actions described below. Inhalation: Evacuate the contaminated area, and seek medical attention.

Contact with eyes: Rinse eyes with flowing water for15minutes, and seek medical attention.

Contact with skin: Wash the affected area thoroughly with soap and water, and seek medical attention.

Ingestion: Induce vomiting, and seek medical attention.

2) Fire

NOWATER! Only dry powder fire extinguisher can be used; if possible, move the battery pack to a safe area before it catches fire.

3) Wet Batteries

If the battery pack is wet or submerged in water, do not allow any person access, and then contact HOMEGRID or an authorized dealer for technical support.

4) Damaged Batteries

Damagedbatteriesaredangerousandmustbehandledwithextremecare.Theyarenotsuitableforusea ndmaycausedangertopersonsorproperty.Ifthebatterypackappearstobedamaged, place it in the original container and return it to an authorized dealer.

NOTE:

- Damaged batteries may leak electrolyte or produce flammable gas.

- In case a damaged battery needs recycling; it shall follow the local recycling regulation (ie. Regulation (EC) Nº 1013/2006 among European Union) to process, and using the best available techniques to achieve a relevant recycling efficiency.

- Any further questions, please contact HOMEGRID: info@homegridenergy.com

HOMEGRID

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