

SM-LFP-5.12K Battery System User Manual



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Version Revision History

Date	Version	Changes
2024/7/26	V1.0	Initial Release

1 About this manual

This manual is part of the SolarMax series SM-LFP-5.12K battery system (hereinafter referred to as the 5.12K battery system). The manual mainly introduces the assembly, installation, electrical connection, commissioning, maintenance and troubleshooting of the product. All or part of the products, services, or features described in this document may not be available for purchase, and this document is intended as a guide for use only.

All statements, information and recommendations in this document do not constitute any warranties of any kind, express or implied.

1.1 How to use this manual

Before installing and using the battery, please read this manual carefully for safety information and familiarize yourself with the functions and features of the battery.

The contents of the battery manual in later versions may change, and the latest manual can be found on the official website.

1.2 Reader Object

This manual is intended for professionally qualified electrical installers and end users who have the following skills:

- 1) Installation and commissioning training of electrical systems, as well as skills to deal with hazards.
- 2) Understand this manual and other relevant documents.
- 3) Understand local regulations and directives.

2 Safety Instruction

2.1 Safety precautions

Before installation, carefully read this manual and the warning label on the battery, and strictly follow the instructions in this manual.

2.2 Important Safety Instruction

Please save these important safety notes. Battery system installation and service instructions are premised on knowledge of high voltage electricity and can only be performed by SolarMax certified installers. The Distributor or manufacturer shall not be liable for personal injury or property damage caused by unqualified personnel attempting repairs or failing to properly follow these instructions. These warnings and precautions must be observed when using our products.

 Warning	Please read the full of this document before installing or using a 5.12K battery system. Failure to do so or to comply with any instructions or warnings in this document may result in electric shock, serious injury or death, or damage to the 5.12K battery system, potentially rendering it unusable.
 Warning	There might be risk of electric shock, fire, or explosion due to exhaust gas. Please follow appropriate precautions.
 Warning	Installation of the battery system must be carried out by an installer trained in high voltage handling.
 Warning	The product is heavy and difficult to handle.
 Warning	Do not use if the battery system is defective, cracked, broken, or otherwise damaged, or inoperable.
 Warning	Do not attempt to open, disassemble, repair, tamper with or modify the battery system. Battery system is not repairable. LFP batteries in the battery system are not replaceable. For repairs, contact the SolarMax authorized dealer that sells the battery system.

 Warning	Do not connect the battery system to a conductor with alternating current.
 Warning	Protect the battery system and its components from damage during transportation, handle them carefully. Do not shock, pull, drag or step on the battery system. Do not subject the battery system to any strong external forces.
 Warning	Do not insert foreign objects into any part of the battery system.
 Warning	Do not expose the battery system or its components directly to the flame.
 Warning	Do not install the battery system near the heating equipment.
 Warning	Do not immerse the battery system or its components in water or other liquids.
 CAUTION	Do not use cleaning solvents to clean the battery system or expose the battery system to flammable or irritating chemicals or vapors.
 CAUTION	Do not use fluids, parts, or accessories other than those specified in this manual, including non-original parts or accessories.
 CAUTION	Do not store the battery system for more than 3 months, or cut off the force charging device of the battery system for more than 3 months. If necessary, contact your installer for more information.
 CAUTION	Do not paint any part of the battery system, including any internal or external components such as the shell.

 CAUTION	Do not connect the battery system directly to a photovoltaic (PV) solar system.
 CAUTION	When installing the battery system in a garage or near a vehicle, keep it out of the driving path. If possible, mount the battery system on the side wall or above the height of the vehicle's bumper.

2.3 Environmental Condition

 WARNING	Install the battery system at a height that prevents flooding damage.
 WARNING	Operating or storing the battery system outside the specified temperature range may cause damage to the battery system.
 WARNING	Do not expose the battery system to ambient temperatures higher than 45°C or lower than 0°C.
 CAUTION	Make sure there is no water source above or near the battery system, including downspouts, sprinkler heads, or faucets.

2.4 Statement

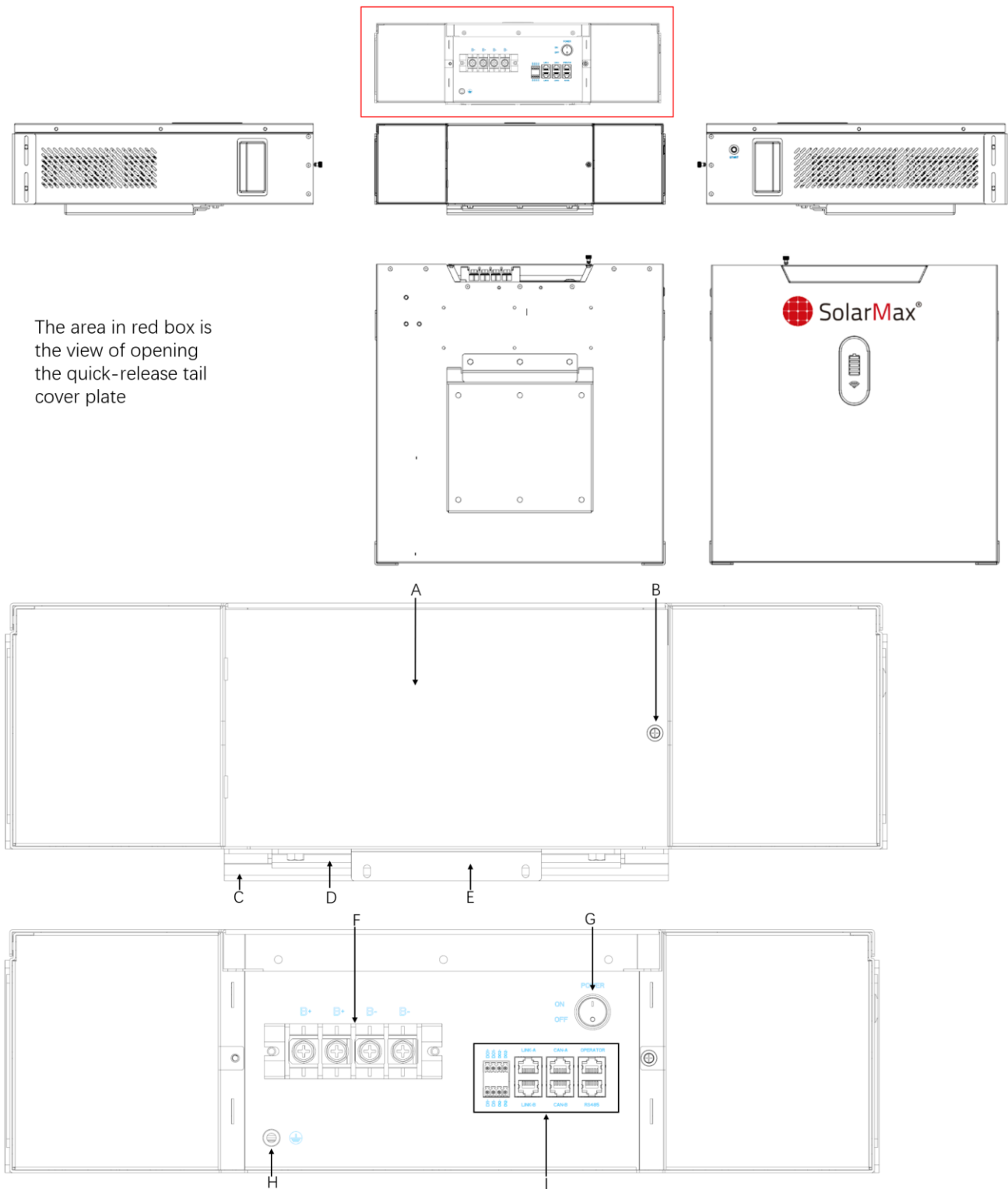
In any of the following cases, the manufacturer has the right not to assume responsibility for quality assurance:

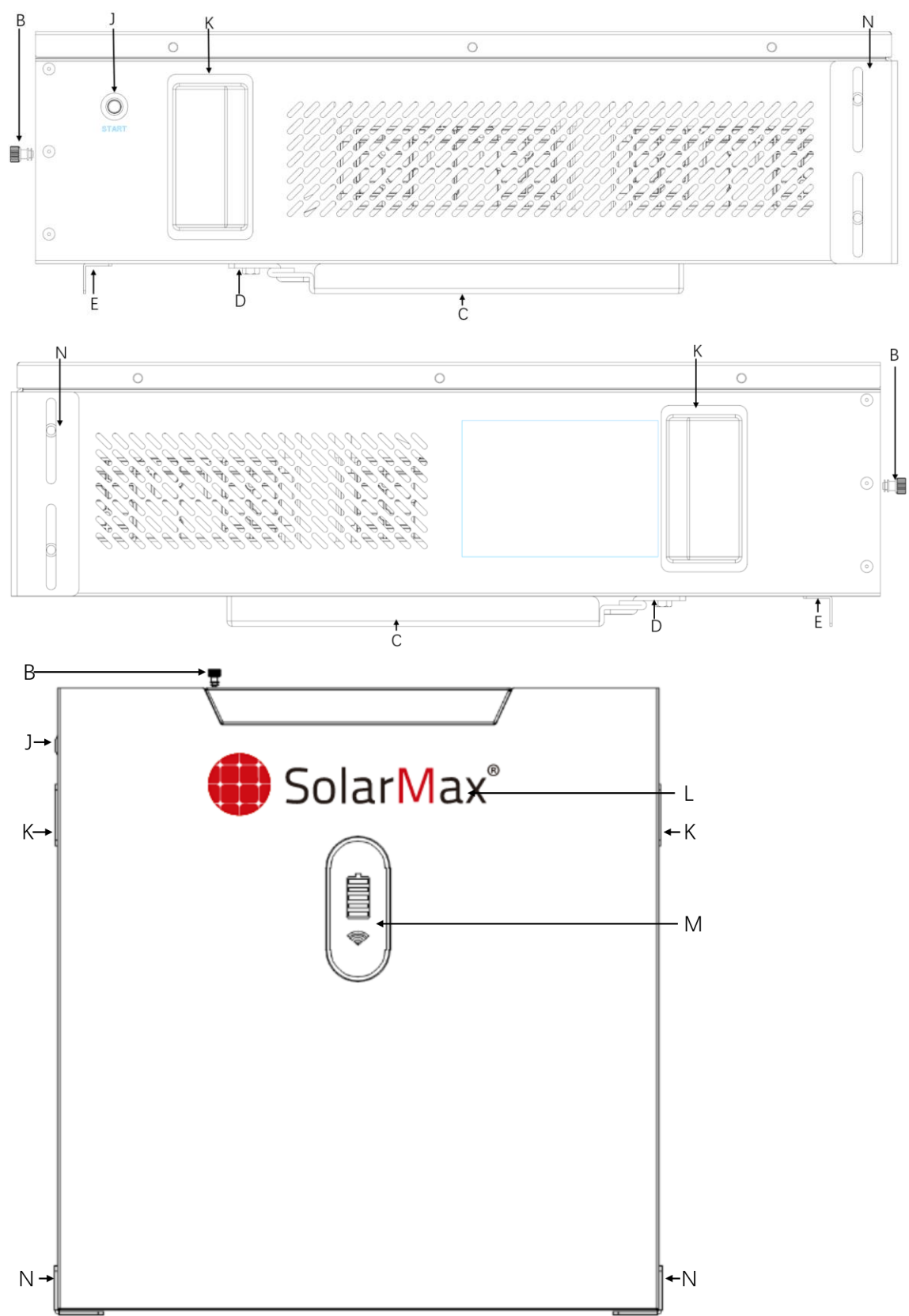
- 1) Damage caused by improper transportation.
 - 2) Damage caused by incorrect storage, installation or use.
 - 3) Damage caused by installation and use of equipment by non-professionals or untrained personnel.
 - 4) Damage caused by failure to follow the instructions and safety warnings in this document.
 - 5) Damage caused by operation in an environment that doesn't meet the requirements described in this document.
 - 6) Damage caused by operation beyond the parameters specified in the applicable technical specifications.
 - 7) Damage caused by unauthorized removal, alteration of the product, or modification of software code.
 - 8) Damage caused by abnormal natural environment (force majeure, such as lightning, earthquake, fire, storm, etc.)
 - 9) Any damage caused by non-compliance with local standards and regulations during installation and operation.
- Products that exceed the warranty period.

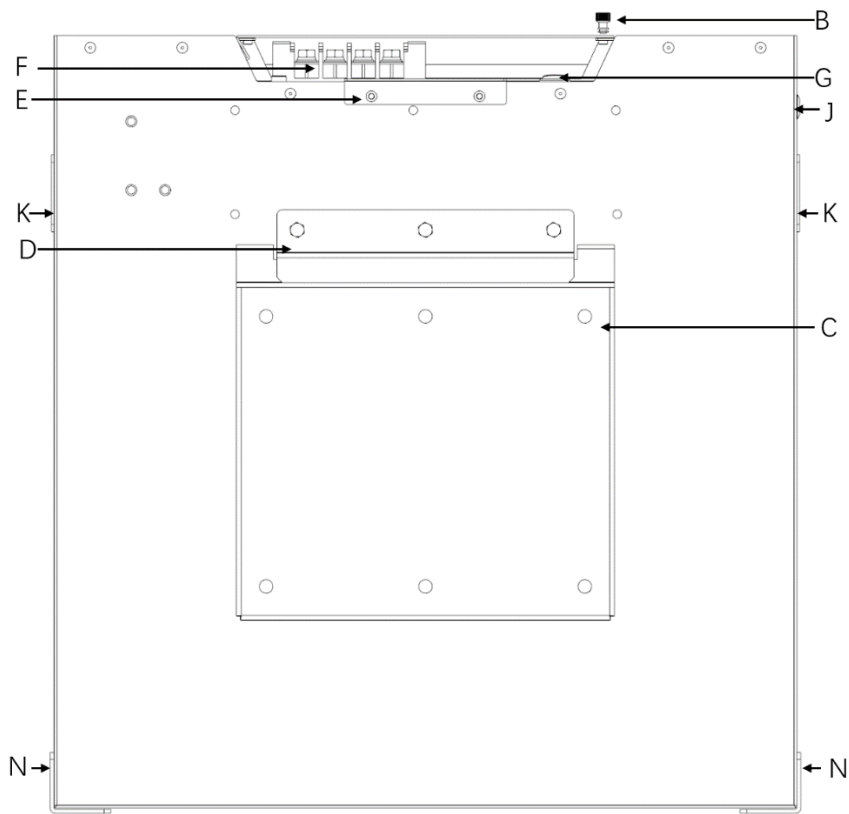
3 Product Introduction

SM-LFP-5.12K battery system, the system supports a maximum of 15 battery modules in parallel.

3.1 Appearance Overview



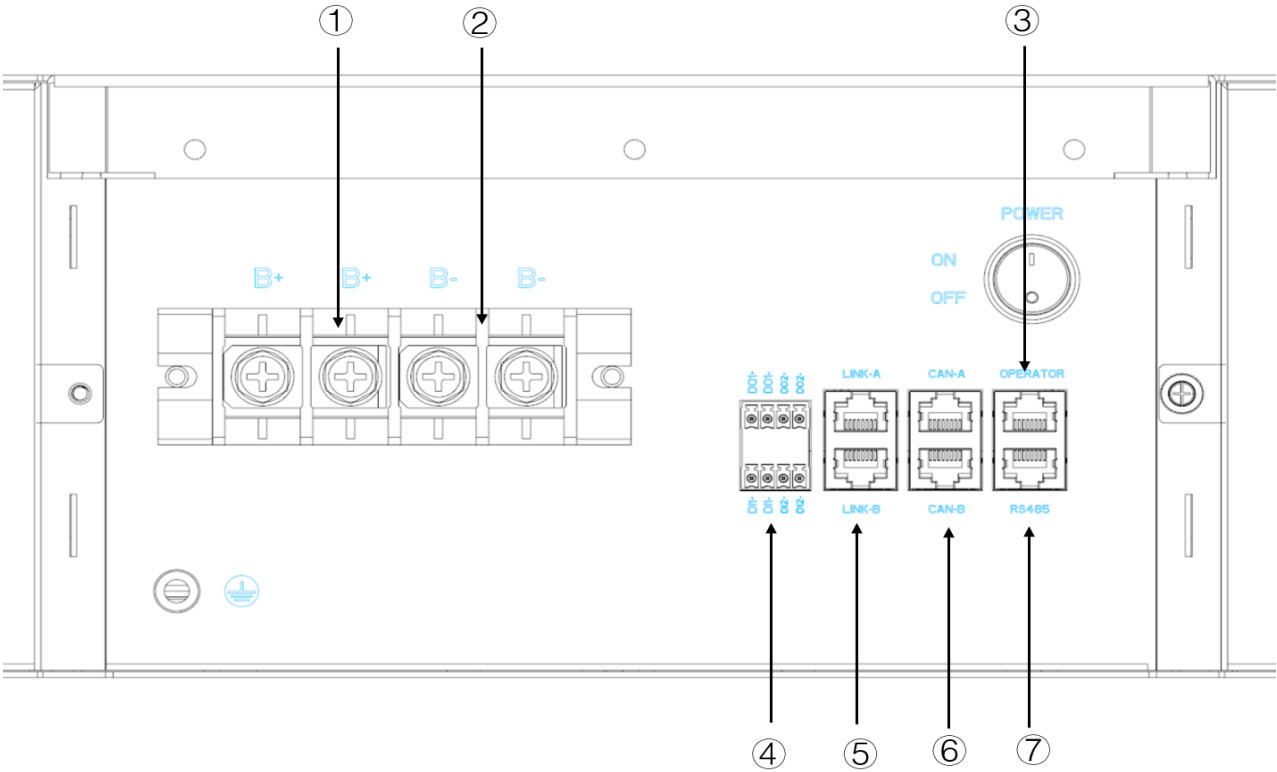




Item	Name	Function	Note
A	Quick-remove Cover plate	Cover the cable connection	
B	Screw	To fix the quick-remove cover plate	
C	Wall mount Bracket plate	For wall mount method	
D	Battery Bracket part	For wall mount method	
E	Stack mount Bracket	For stacking mount method	
F	Power connection Terminal	Positive and negative terminal	
G	Switch	BMS power switch	Avoid low power consumption
H	Protecting Earth Terminal	Connect to ground	M6*10Hex socket bolt with cylindrical head
I	Communication Terminal	External communication Terminal	
J	Startup Button	BMS startup/off	Sleep/Wake up
K	Plastic Handling	Handling for Transportation	
L	LOGO Zone	Brand LOGO	

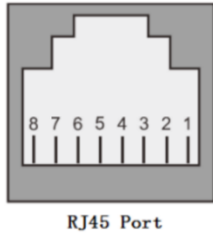
M	LED BAR	Capacity and WIFI status indicator	
N	Stack L shape part	For stacking method	

3.2Connection Terminal Instruction



Item	Name	ICON	Function	Note
1	Power cable connection terminal	B+	Positive Terminal	
2		B-	Negative Terminal	
3	RS232	OPERATOR	Communication	
4	2*4P Green color terminal	DI1+/DI1-	Reserve	
		DI2+/DI2-	Reserve	
		DO1+/DO1-	Reserve	
		DO2+/DO2-	Reserve	
5	LINK	LINKA	Battery parallel application	
		LINKB	Battery parallel application	
6	CAN	CAN-A	Communication with inverter	
		CAN-B	Communication with inverter	
7	RS485	RS485	Communication with inverter	

3.3 Communication Terminal Instruction

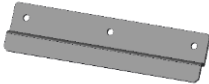
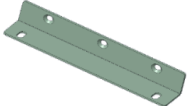


RJ45 PIN Sequence

LINK-A PIN Definition								
PIN	1	2	3	4	5	6	7	8
	CANH	CANL	N/C	N/C	N/C	N/C	WIN+	WIN-
LINK-B PIN Definition								
PIN	1	2	3	4	5	6	7	8
	CANH	CANL	N/C	N/C	N/C	N/C	WDO+	WDO-
CAN-A PIN Definition								
PIN	1	2	3	4	5	6	7	8
	N/C	N/C	N/C	CANH	CANL	N/C	N/C	N/C
CAN-B PIN Definition								
PIN	1	2	3	4	5	6	7	8
	N/C	N/C	N/C	CANH	CANL	N/C	N/C	N/C
OPERATOR PIN Definition								
PIN	1	2	3	4	5	6	7	8
	TX	RX	GND	VCC	N/C	N/C	N/C	N/C
RS485PIN Definition								
PIN	1	2	3	4	5	6	7	8
	N/C	N/C	N/C	N/C	N/C	N/C	485-A	485-B

4 Packing List

The SM-LFP-5.12K battery system package includes the following accessories. Please check the accessories in the package when receiving the goods.

Item	Name	Specification	Number	Figure
1	Positive power cable	Red color, 1.5 m / 25mm ² OT terminals on both ends of the cable	1	
2	Negative power cable	Black color, 1.5 m / 25mm ² OT terminals on both ends of the cable	1	
3	Parallel communication cable	1.5m, RJ45 terminals on both ends of the cable	1	
4	Wall mount part1	bracket	1	
5	Wall mount part2	Bracket plate	1	
6	Stack mount part 1	Stack fixing part	1	
7	Screw	M6*12 (for wall Mounting)	3	
8	Screw	M4*8 (for wall Mounting)	2	
9	Expansion Screw	M8*60/ 10*50mmPlastic expansion pipe (for wall Mounting)	4	
10	Screw	M4*8 (for stacking)	2	
11	Rubber pad	50mm*90mm*2mm	4	

5 Installation

5.1 Installation Environment

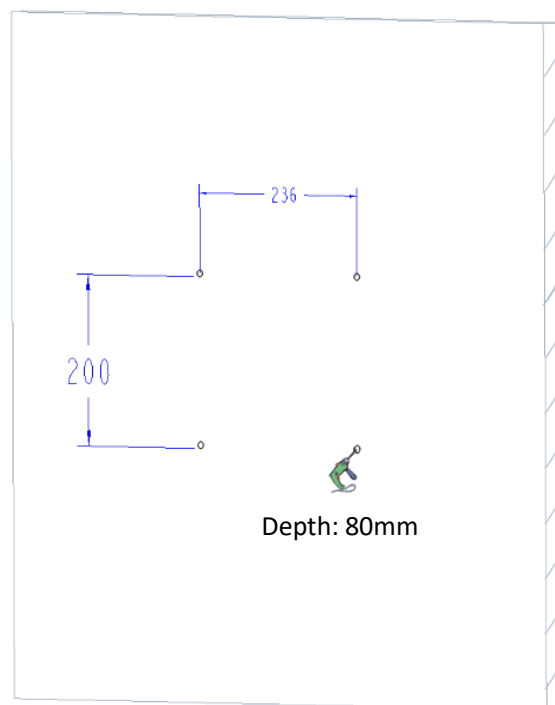
- 1) The area is completely waterproof. Ground is level.
- 2) There's no flammable or explosive materials in the area.
- 3) The environment temperature is between from 0 to 45°C.
- 4) Temperature and humidity remain constant, and dust and dirt are minimal.
- 5) The distance from the heat source is greater than 2 meters.
- 6) Do not place batteries where children or pets could touch it. Keep the installation area away from direct sunlight.
- 7) Battery modules do not require forced ventilation, but please avoid installation in confined areas (at least 300 mm from top/top/bottom).
- 8) Ventilation should avoid high salinity, high humidity or high temperature.

5.2 Installation Procedure

Before you begin any operation on the system, ensure that it is installed in the proper position and that all modules in the system are properly connected and securely installed.

5.2.1 Wall Mount Installation

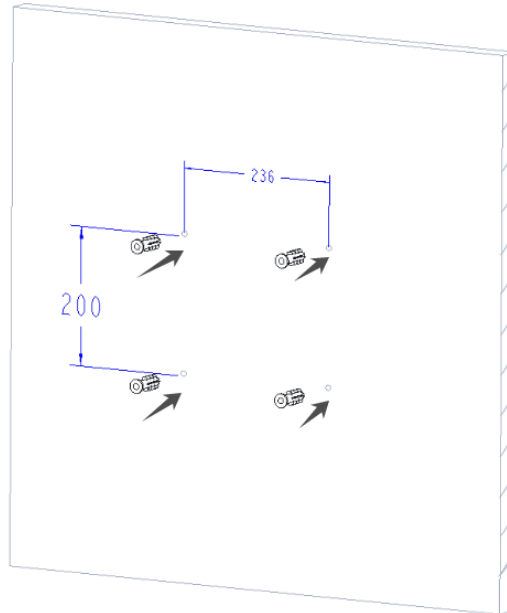
- 1) Place the bracket on the wall and level it by level gauge, then make the marks for drilling. Then Use an electric drill with a diameter of 8 mm to drill 4 holes in the wall with a depth of 80 mm;



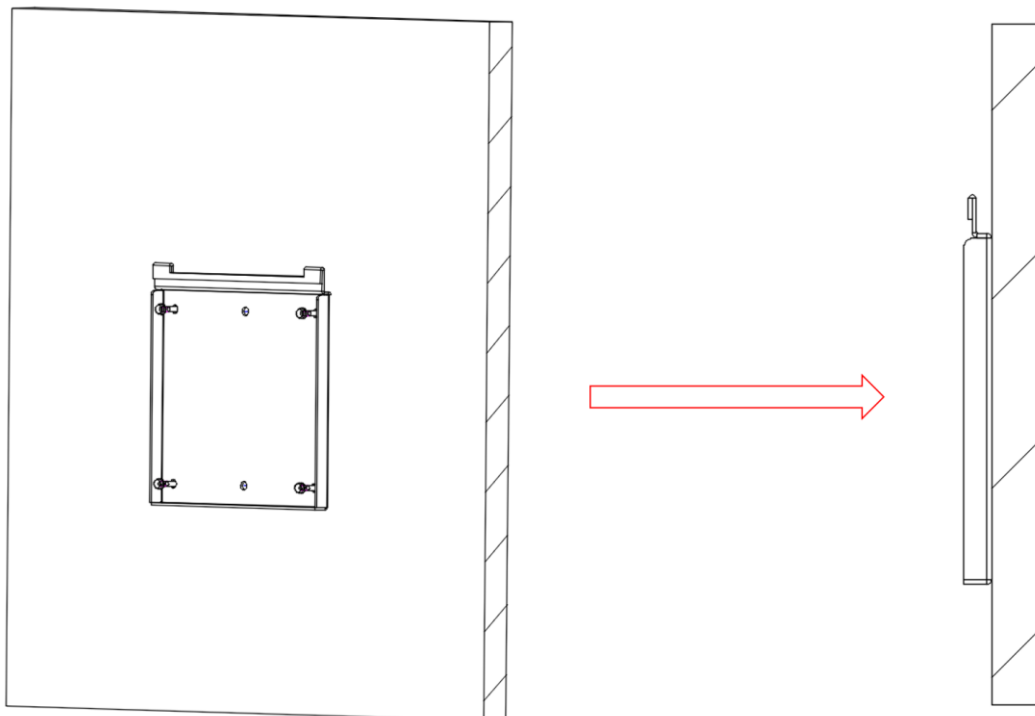


Before drilling, be sure to avoid water pipes and wires buried in the wall. Strictly follow the instructions during installation and secure the battery to the wall to prevent falling.

2) Insert the expansion tube into the hole



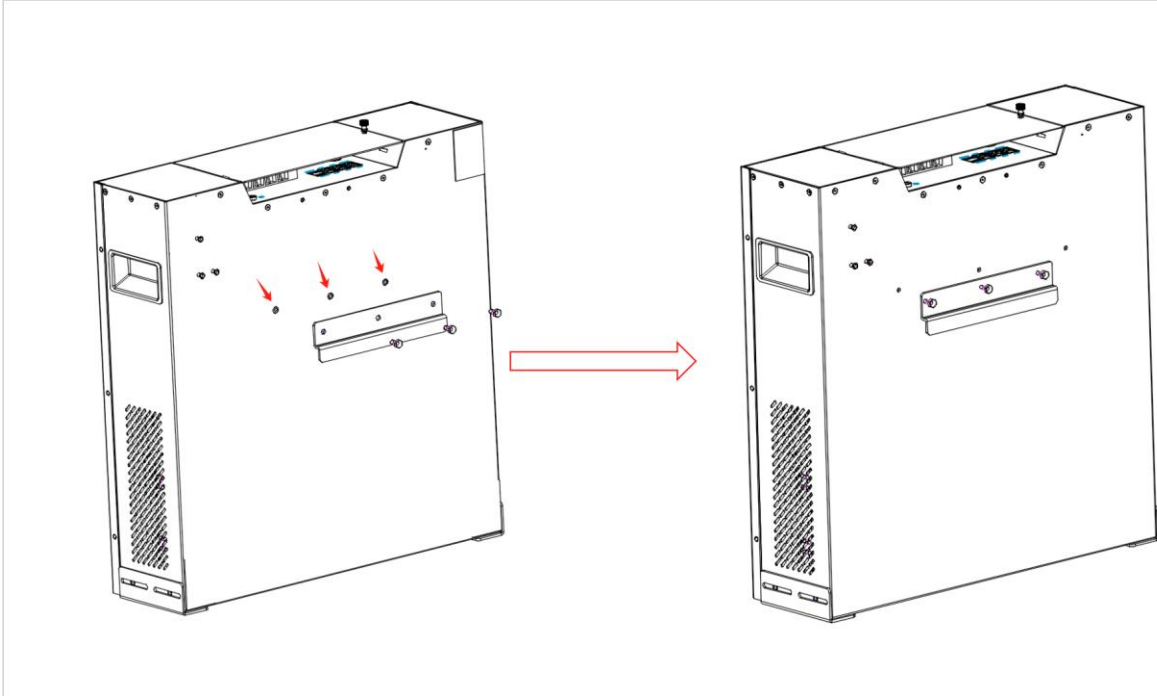
3) Align the wall bracket plate with the holes, place expansion screws, and tighten the expansion screws;



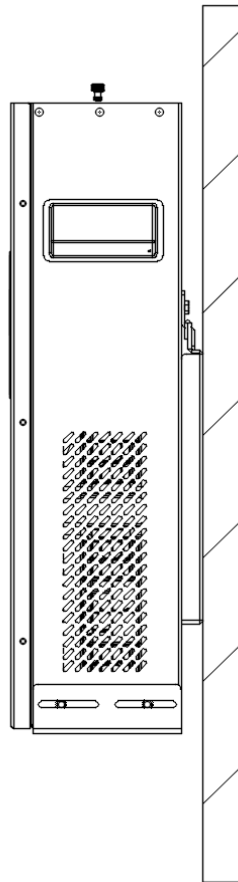


When the total height of the battery pack is less than 1.2 meters, installation is allowed by one person. When more than 1.2 meters, due to the risk of falling, bruising, etc., at least two peoples need to do the installation .

4) Fix the battery bracket on the back of the battery module by using three hexagonal screws;



5) Place the battery module on a wall bracket;



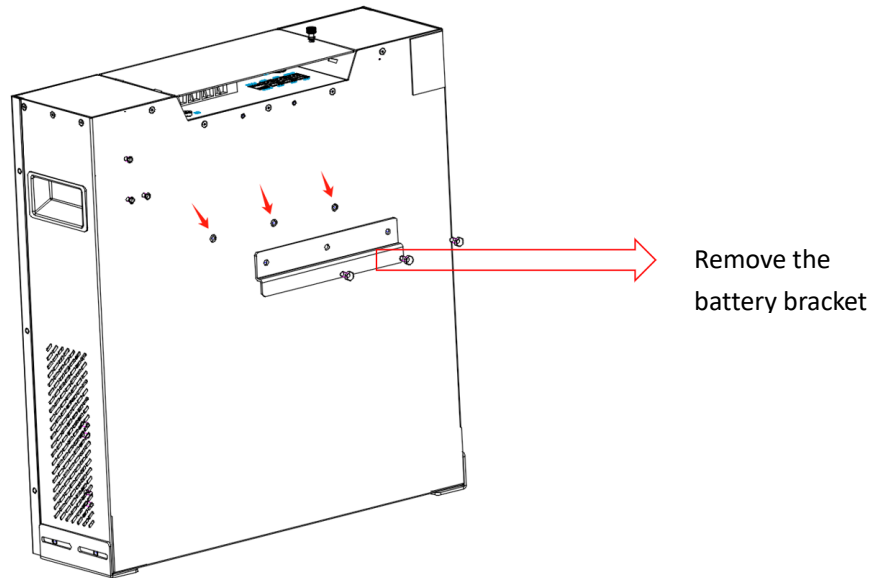
6) Check that the battery module is securely placed on the wall bracket;



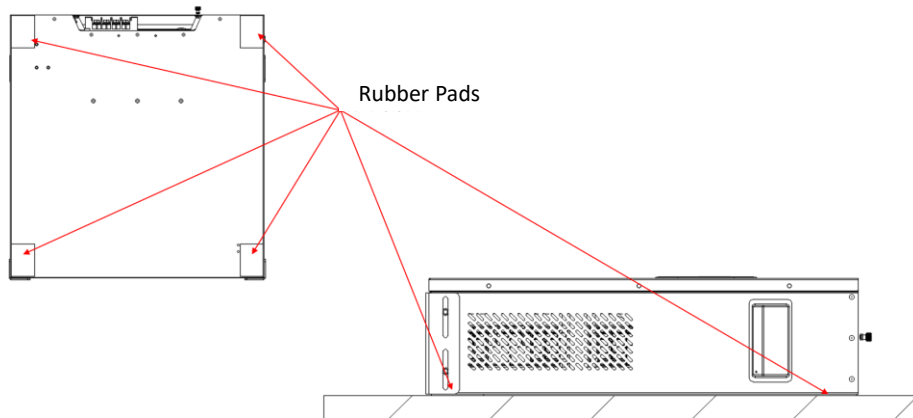
	The battery must be reliably grounded, and for systems with only one battery, the PE cable needs to be grounded.
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5.2.2 Stack Mount Installation

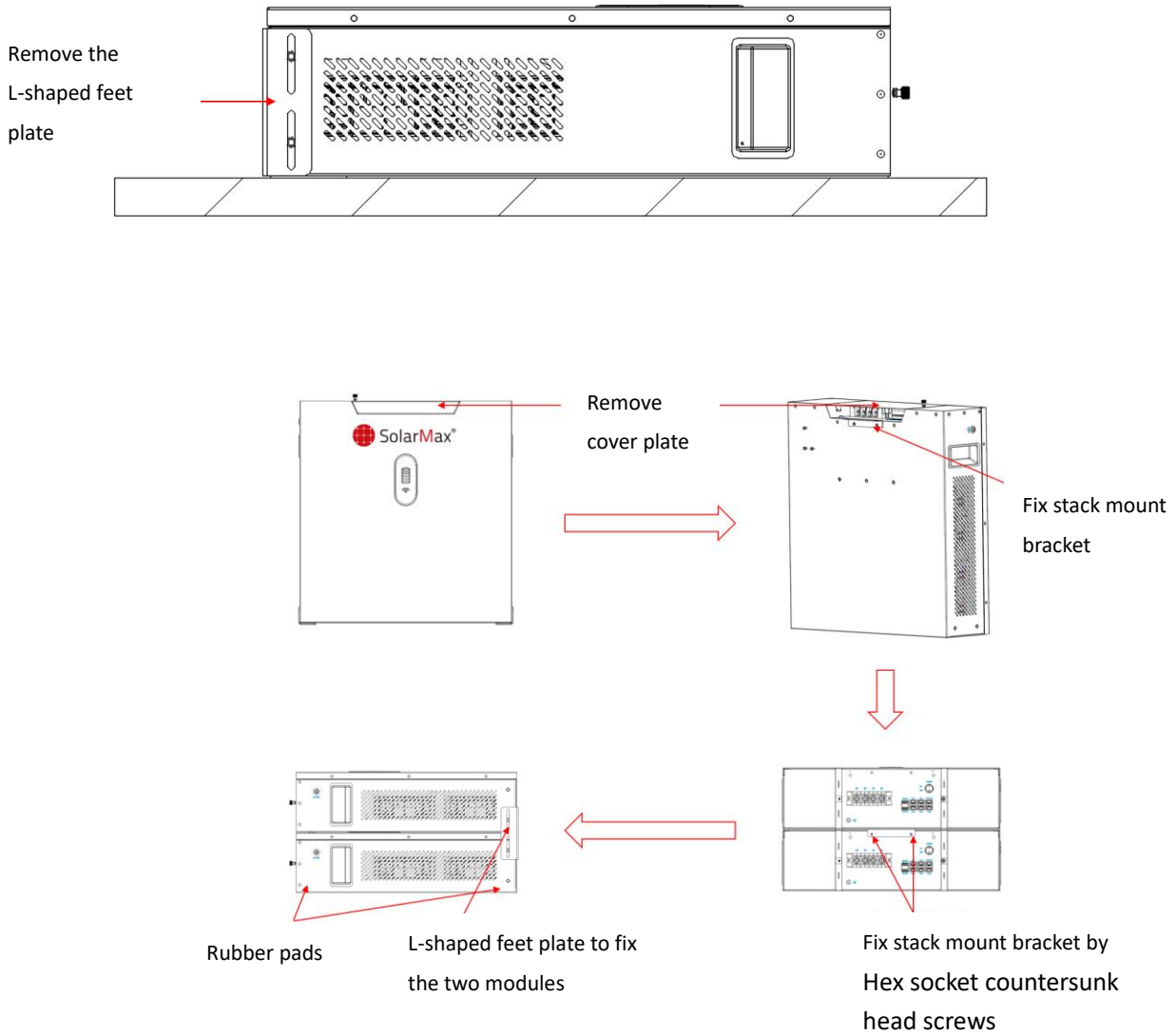
1) When stacking battery modules, check whether battery bracket are installed. If they are installed, remove the battery bracket;



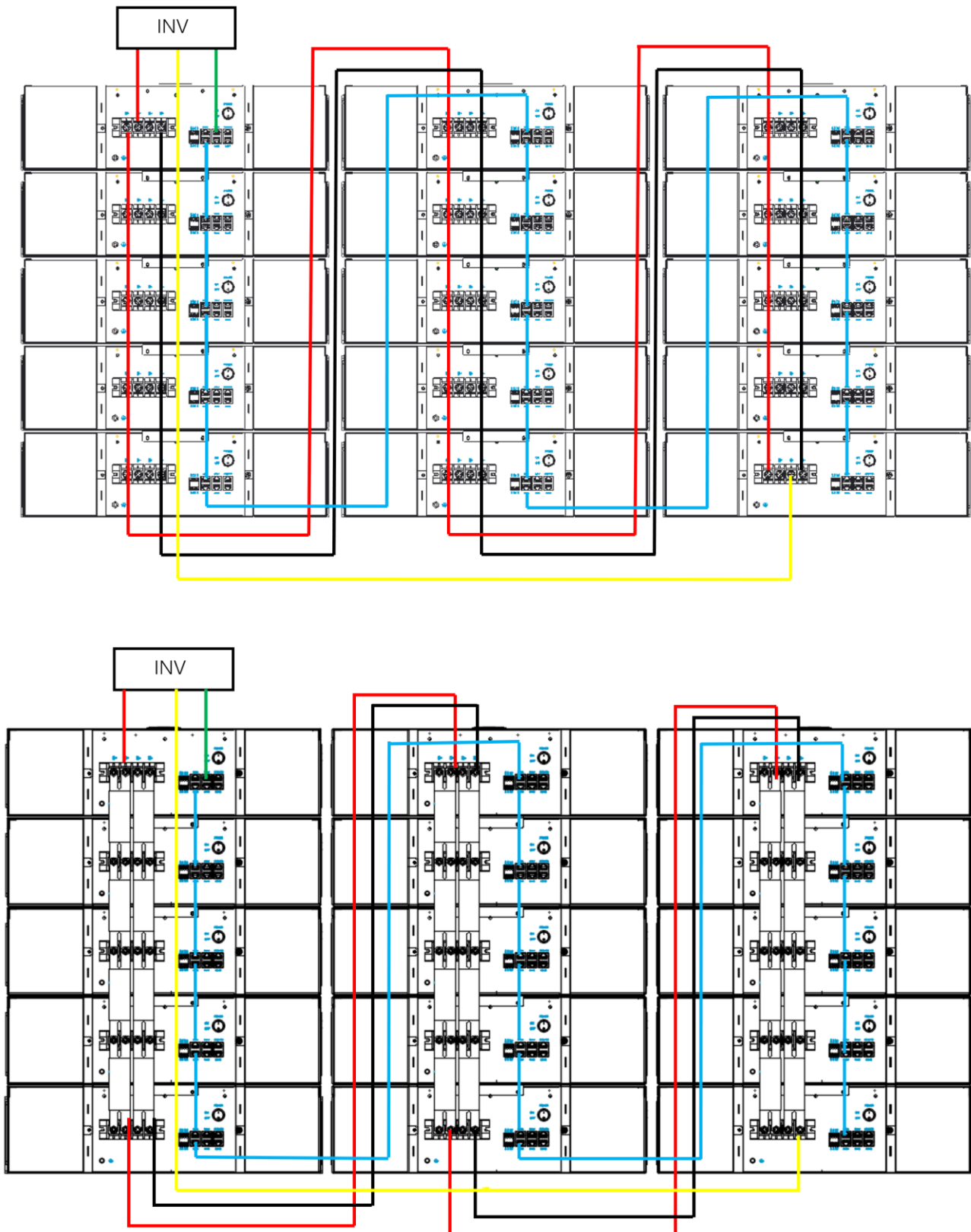
2) Attach four rubber pads to the bottom four corners of the battery and place the first battery flat on the ground



3) Place the second battery module on the top of the first battery module which is already installed on the ground. Then remove the L shaped feet plate and the cover plate for back-up use. Then install the stacking mount bracket. Use the removed feet plate to lock the neighboring two modules and use the Hex socket countersunk head screws to fix the stacking mount bracket.



- 4) Check all the modules are installed securely then install the covers; a maximum of 15 battery modules in parallel is supported.



Note: For parallel power cables, use cables with diameters greater than or equal to 25 mm^2 . The cable marked yellow is the negative cable connected to inverter and must be at least 2.5 meters length.

	Each battery weighs approximately 50 kg and must be installed with the help of lifting equipment and at least two people equipped with suitable suction cups or lifting straps;
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	The battery must be reliably grounded, and for systems with only one battery, the PE cable needs to be grounded.
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PE Connection Procedures:

- 1) The external ground terminal is located at the lower left of the wiring panel.
- 2) Secure the ground terminal to the PE cable using appropriate tools, and lock the ground terminal to the ground hole on the left of the function area of the battery module.
- 3) The cross-sectional area of the external ground cable is 6 mm².

6 Electrical Connection

 DANGER	Excessive voltage at the battery terminal may result in electric shock. When installing the battery, ensure that the DC side of the battery is completely powered off. Before performing electrical operations, ensure that all cables have no voltage.
 WARNING	Do not connect the positive or negative terminal of the battery output to ground; otherwise, the battery may be seriously damaged.
 WARNING	Static electricity may damage the battery's electronic components. Take ESD-preventive measures during installation and maintenance.
 CAUTION	Do not use terminals of other brands or types than those in the package.
 CAUTION	Moisture and dust can damage the battery. Ensure that the cable connector is firmly tightened during installation. If the battery is damaged due to the use of a poorly connected cable connector, the warranty will be void.

6.1 Electrical Connection Diagram

After the product is installed, connect the positive power cable, negative power cable, communication cable, and ground cable between the inverter SM-LFP-5.12K battery system. The cable connection diagram is shown in 6-1. Follow the instructions to ensure that all cables are correctly connected.

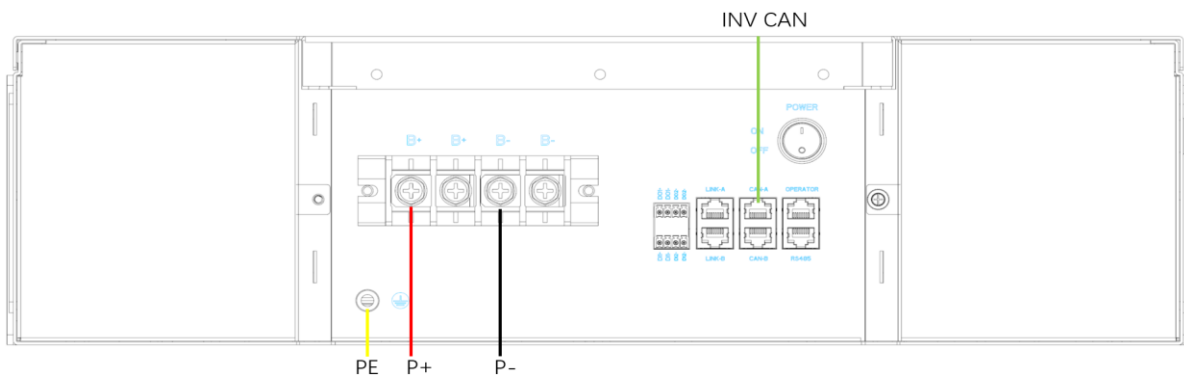
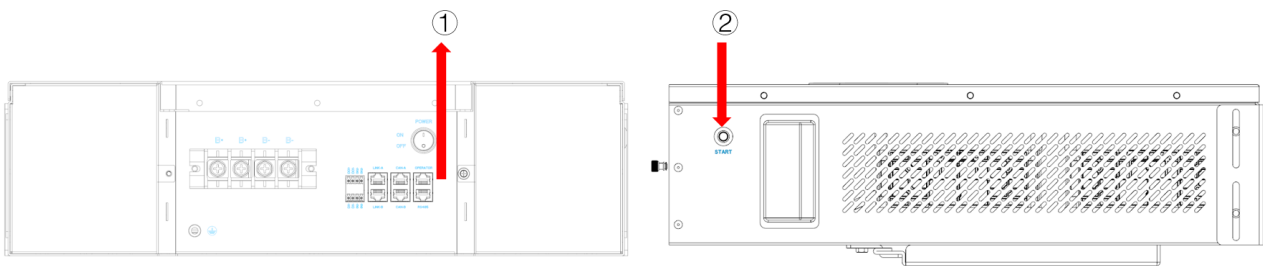


Figure 6-1

7.Commission

7.1 Single Battery Startup

- 1) Turn on the power switch
- 2) Press and hold the start button at least one second until it shows green flashing color to enter self inspection status.
- 3) Observe the status indicator. If the indicator blinks green, means it is normal
- 4) The light board displays the current SOC value and WIFI connection status as well as various fault displays (see 7-2 for details).



7-1

start:	1	Normal	1		1		1		1		1		1		1		
7S	2	SOC	2	SOC	2	SOC	2	SOC	2	SOC	2	SOC	2	WiFi	2		
	3	[100,98	3	(98,80]	3	(80,60]	3	(60,40]	3	(40,20]	3	(20,0]	3		3		
	4		4		4		4		4		4		4		4		
	5		5		5		5		5		5		5		5		
	wifi		wifi		wifi		wifi		wifi		wifi				wifi		
Alarm:	1		1		1		1		1		1		1				1
MosErr	2	ChgOc	2	ChgLT	2	ChgOT	2	UvAlar	2	OvAlar	2	Remot	2	Interna	2	firmware	2
	3	DsgOC	3	DsgLT	3	DsgOT	3		3	OvErr	3	LVslave	3	Fault	3	update	3
	4		4		4		4		4		4		4		4		4
	5		5		5		5		5		5		5		5		5
	wifi		wifi		wifi		wifi		wifi		wifi		wifi		wifi		wifi

7-2



The preceding steps apply only to battery startup. For more information about system startup, see the debugging steps in the inverter user's manual.

7.2 Single Battery Power Down

- 1) Turn off the inverter (see the inverter manufacturer's manual).
- 2) Press and hold the start button for 5 seconds until the light flashes.

- 3) Turn off the power switch.

7.3 Parallel System Startup

- 1) Connect the battery modules by using stacked copper bars or cables (no less than 25 square millimetres), connect the Link B port of battery 1 to the Link A port of battery 2 by using a parallel communication cable, and repeat the operation in parallel with the other batteries. Connect the inverter communication cable to the CAN A/485 communication port (select the suitable inverter communication protocol).
- 2) Turn on the power switch of all parallel batteries
- 3) Press and hold the start button for more than 1 second until the green light flashes to enter the self-test status
- 4) Observe the status indicator, the green blinking indicates that the output is normal, battery starts up, and wake up the subsequent parallel battery.
- 5) The LED bar displays the current SOC status and WIFI connection status as well as various fault displays (see 7-2 for details)

7.4 Parallel System Power Down

- 1) Turn off the inverter (see the inverter manufacturer's manual).
- 2) Press and hold the start button for 5 seconds until the light flashes.
- 3) Turn off the power switch.

8 Maintenance

To ensure that the battery pack has the longest life cycle, the service technician should perform regular inspections and maintenance, and the maintenance records should be complete and routine to follow up the verification of the battery pack management parameters.

8.1 Electrical Maintenance

 DANGER	Incorrect maintenance may result in battery damage or personal injury!
 CAUTION	Keep unqualified people away! Temporary warning signs or barriers must be set up during electrical connection and repair work to prevent non-qualified personnel from entering.
 NOTICE	The battery should only be restarted after a fault affecting the safety performance has been eliminated. Do not replace any internal components.
 NOTE	Do not repair equipment without proper tools, test equipment, or a clear and thorough understanding of the latest revision of the manual.

Item	Check Point	Method	Maintenance Condition	Maintenance Solution
Voltage	Check whether the voltage output is normal	multimeter	The battery voltage exceeds the set range	Please contact the distributor or manufacturer
Fault Inspection	Check whether the indicator is normal	Visual Inspection	Battery warning	
Cable	Check cable insulation protection		Insulation cracking, aging, peeling or corrosion	Replace the cable and the wiring terminal

8.2 Battery Maintenance

Frequency	Item	Solution
Every Month	Check the working environment	Keep away from heat and direct sunlight.。
	Visually check the battery	If there is any damage, leakage or deformation, isolate the defective battery module , take pictures and replace the battery.。
Every Quarter	Ensure battery cleanliness	Use a cotton cloth to carefully clean the battery
	Check connection status	Check whether the bolts of each terminal are loose and tighten them again if they are loose.

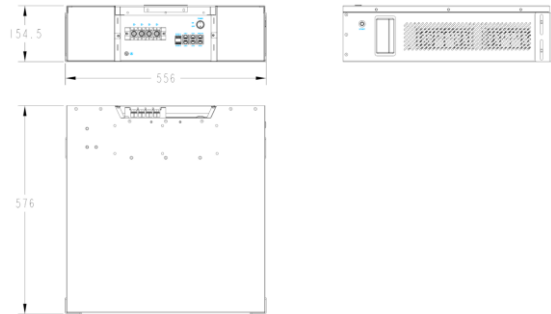
8.3 Trouble shooting

If the battery is not working normally in any way, record the fault information, follow the shutdown procedure to turn off the battery, and contact the distributor or manufacturer. Do not handle the fault by yourself.

8.4 Storage

1. The product should be stored in a ventilated, clean and dry room that meets the technical requirements of storage temperature. Avoid direct sunlight, the distance from the heat source should not be less than 2 meters.
2. When the storage time is less than or equal to three months, the SOC of the battery system should be maintained at 20% ~ 50%, the temperature should be maintained at 0 ~ 45 ° C, and the humidity should be less than or equal to 65%RH.
3. When the storage time is greater than three months, the SOC of the battery system should be maintained at 20% ~ 50%, the temperature should be maintained at 15 ~ 35 ° C, and the humidity should be less than or equal to 65%RH.
4. When the storage time is greater than six months, it is necessary to charge and discharge the battery to make the SOC of the battery to 20% ~ 50%SOC.
5. The product should not be placed upside down or lying down, and should be protected from mechanical impact or heavy pressure.

9 Technical Specification

Item	Name	Description
Battery Pack Parameter	Rated Voltage	51.2V
	Cell module	1P16S
	Voltage Range	44.8-57.6V
	Rated AH	100Ah
	Rated Capacity	5.12kWh
	Cell Type	LFP 3.2V/100Ah
	(80% DOD, 25°C, 0.5C/0.5C) Cycle Times	5000
	Continues Charge Current	100A
	Continues Discharge Current	100A
	Charge Temperature Range	0-55°C
	Discharge Temperature Range	-20-55°C
	IP Class	IP20
	Battery Dimension: W×H×D	556*576*154.5mm
	Weight	49Kg
	Picture	 The image contains three technical drawings of the battery pack. The top-left drawing is a front view showing a width of 556mm and a height of 154.5mm. The top-right drawing is a side view showing a depth of 576mm. The bottom drawing is a top-down view showing the overall dimensions of the pack.

*Due to the heavy battery, please pay attention to safety when installing. 。

*Strictly follow the instructions when installing and secure the battery to the wall to prevent falling.