APEX SOLAR

USER MANUAL

APEX 5220M/S

Version: 1.0



About this manual

This manual is intended for the APEX 5220M/S energy storage battery. These batteries can be installed in parallel and series configurations, particular attention must be paid to the power cable and communication cable connections.

Statement

The manufacturer declares that the APEX 5220M/S is compliant with the Best Practice Guide for Battery Storage Equipment—Electrical Safety Requirements-(version 1), meeting the mandatory requirements of Method 1 and the following optional requirements for pre-assembled integrated battery energy storage system equipment a), c), e), f), g), h), i), j), k), l), m), n), o), p), and q).

Declaration

The manufacturer declares that the APEX 5220M/S is compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU(RED).

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1. Safety Introduction

1.1 Important Safety Instructions

This manual contains important instructions for the APEX 5220M/S energy storage product and must be followed when installing and operating the product.

This product is designed and tested in accordance with international safety requirements for CE compliance. However, as with all electrical and electronic equipment, users must observe specific precautions during installation or operation. To reduce personal injury risks and ensure safe installation and operation, carefully read and follow all instructions, cautions, and warnings in this manual.

1.2 Warnings in this Document

A warning describes a hazard to equipment or personnel. It highlights procedures or practices that, if not performed correctly could result in damage to or destruction of part or all of the equipment ,connected devices, or personal injury.

Symbol	Description
	Caution, risk of electric shock
	Lifting this heavy object may cause severe injure
	Keep the battery away from open flame or ignition sources
	Keep the battery away from children
	Dispose of waste batteries according to local laws and regulations
	Green and Recyclable Recycling
	Read this manual before installation and operation

For safety reasons, installers must familiarize themselves with this manual and all warnings prior to installation.

1.3 Battery Handling Guide

- Use the battery pack only as directed.
- If the battery is defective, appears cracked, broken, or otherwise damaged, or fails to operate, contact the hotline immediately.
- Do not attempt to open, disassemble, repair, tamper, or modify the battery.

The battery is not suitable for independent user operation.

- Handle the battery with care during transportation to protect it and its components from damage.
- Do not subject the battery to mechanical stress.
- Do not insert foreign objects into any part of the battery pack.
- Do not clean the battery with solvents.
- Do not connect the battery directly to SELV circuit.

1.4 Response to Emergency Situations

The battery incorporates multiple safety strategies to prevent hazards from failures. However, the manufacturer cannot guarantee complete safety under all possible conditions.

1.4.1 Battery leakage

If the battery pack leaks electrolyte, avoid contact with the leaking substance, The electrolyte is highly corrosive and may cause skin irritation or chemical burns upon contact. If exposure occurs, immediately perform the following actions

Inhalation: Evacuate the contaminated area immediately and seek medical attention.
Eye contact: Rinse eyes with running water for least 15 minutes and seek medical attention immediately.
Skin contact: Wash the affected area thoroughly with soap and water and seek medical attention immediately.
Ingestion: Seek medical attention immediately. Do not induce vomiting unless instructed by medical personnel.

1.4.2 Fire

In case of a fire, make sure that an ABC or carbon dioxide extinguisher is



nearby and does not use water to extinguish the fire.

WARNING
The battery pack may catch fire when heated above 150°C

If a fire breaks out where the battery is installed, do these actions:

1. Extinguish the fire before the battery catches fire.
2. If the battery has caught fire, do not try to extinguish the fire. Evacuate people immediately.

WARNING
If the battery catches fire, it will produce poisonous gases. Do not approach.

1.4.3 Wet battery

If the battery is wet or submerged in water, do not try to access it. Contact **Apex Customer Service** or your distributor for technical assistance.

1.4.4 Damaged Battery Handling

If the battery damaged, please contact Apex **customer service** or your distributor for assistance,Damaged batteries pose significant risks including thermal runaway,electrolyte leakage,or fire and must be handled exclusively by trained personnel.Do not use or attempt to repair damaged batteries as they may endanger personnel and property.If damage is suspected,safely package the battery following UN38.3 guidelines and return it to Apex or your distributor.

CAUTION
Damaged battery might export electrolyte or flammable gas, so contact Apex for advice and information immediately we will deal with it.

1.5 Installers

The Energy Storage battery is suggested installing by skilled worker or electrician.
A skilled worker is defined as a people who had been trained and qualified electrician or had all of the following skills and experience:

- Knowledge of the functional principles and operation of on-grid Energy Storage systems.
- Knowledge of the dangers and risks associated with installing and using electrical devices and acceptable mitigation methods.
- Knowledge of the installation of electrical devices
- Knowledge of and adherence to this manual and all safety precautions and best practices.

1.6 Scrap Battery

Scrap batteries must be recycled or disposed of in strict compliance with local hazardous waste regulations. Contact licensed electronic waste treatment facilities for proper handling.

2.Guidance for Disconnection of Batteries During Shipment

- The APEX 5220M/S battery is not approved for air transport.
- Cartons that have been crushed, punctured, or torn in such a way that contents are revealed shall be set aside in an isolated area and inspected by a skilled person. If the package is deemed to be not shippable, the contents shall be promptly collected, segregated, and either the consignor or consignee contacted.
- The DC circuit of APEX 5220M/S battery has been disconnected before outgoing.
- We have conducted comprehensive tests to ensure the equipment distribute around the world is safe for shipping. These products shall be handled with care and immediately inspected if visibly damaged. If the carton visibly damaged, please contact with customer service to confirm whether the battery could be used safely or not.

3. Product Introduction

3.1 Technical Specifications

Model	APEX 5220M	APEX 5220S
Battery Type	Semi-solid state Prismatic	
Nominal Energy	5.12kWh	
Nominal Capacity	100Ah	
Nominal Voltage	51.2V	
Operating Voltage	48-56V	
Recommended Charge/Discharge Current	30A/30A	
Max Charge/Discharge Current	50A/50A	
Peak Discharge Current	100A(3S)	
Peak Discharge Power	5kW（3S)	
Recommended Discharge Depth (DOD)	0.93	
Charging Temperature Range	从 0-50℃	
Discharge Temperature Range	从 -10-55℃	
Cycle Life	≥6000@25℃	
Scalability	1 Master series	Up to 12 Slave series
WIFI Module	Built-in	
Wi-Fi Frequency Range	2.4GHz	
Communication	CAN/RS485	
IP Rate	IP65	
Recommended humidity	5%~95%(No condensed water)	
Cooling Type	Forced Air Cooling	
Color	White (Optional)	
Installation	Stack-mounting	
Net Weight	58±2kg	56±2kg
Dimension	635*170*400mm	
Protection	Over-current/Over-voltage/Short Circuit/Under-voltage/Over-temperature	
Certification	/	

Testing conditions based on temperature 25℃ at the beginning of life.
*Total Energy/Usable Energy measured under specific conditions from Apex 0.2C CC-CV.

Model	20.48kWh	25.6kWh	30.72kWh	35.84kWh	40.96kWh
Battery Type	Semi-solid state Prismatic				
Nominal Energy	20. 48kWh	25. 6kWh	30. 72kWh	35. 84kWh	40. 96kWh
Nominal Capacity	100Ah				
Nominal Voltage	204. 8Vdc	256Vdc	307. 2Vdc	358. 4Vdc	409. 6Vdc
Operating Voltage	192–224Vdc	240–280Vdc	288–336V	336–392Vdc	384–448Vdc
Recommended Charge/Discharge Current	30A/30A				
Max Charge/Discharge Current	50A/50A				
Peak Discharge Current	100A(3S)				
Peak Discharge Power	20kW（3S)	25kW（3S)	30kW（3S)	35kW（3S)	40kW（3S)
Recommended Discharge Depth (DOD)	93%				
Charging Temperature Range	从 0-50℃				
Discharge Temperature Range	从-10-55℃				
Cycle Life	≥6000@25℃				
Scalability	4S	5S	6S	7S	8S
WIFI Module	Built-in				
Wi-Fi Frequency Range	2.4GHz				
Communication	CAN/RS485				
IP Rate	IP65				
Recommended humidity	5%~95%(No condensed water)				
Cooling Type	Forced Air Cooling				
Color	White (Optional)				
Installation	Stack-mounting				
Net Weight	226±8kg	282±10kg	338±12kg	394±14kg	450±16kg
Dimension	635*680*400mm	635*850*400mm	635*1020*400mm	635*1190*400mm	635*1360*400mm
Protection	Over-current/Over-voltage/Short Circuit/Under-voltage/Over-temperature				
Certification	/				

Testing conditions based on temperature 25℃ at the beginning of life.

*Total Energy/Usable Energy measured under specific conditions from Apex 0.2C CC-CV.

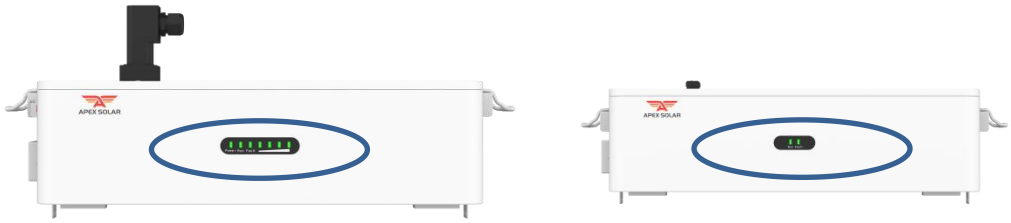
Model	46.08kWh	51.2kWh	56.32kWh	61.44kWh
Battery Type	Semi-solid state Prismatic			
Nominal Energy	46. 08kWh	51. 2kWh	56. 32kWh	61. 44kWh
Nominal Capacity	100Ah			
Nominal Voltage	460. 8Vdc	512Vdc	563. 2Vdc	614. 4Vdc
Operating Voltage	432-504Vdc	480-560Vdc	528-616V	576-672Vdc
Recommended Charge/Discharge Current	30A/30A			
Max Charge/Discharge Current	50A/50A			
Peak Discharge Current	100A(3S)			
Peak Discharge Power	45kW（3S)	50kW（3S)	55kW（3S)	60kW（3S)
Recommended Discharge Depth (DOD)	93%			
Charging Temperature Range	从 0-50℃			
Discharge Temperature Range	从-10-55℃			
Cycle Life	≥6000@25℃			
Scalability	9S	10S	11S	12S
WIFI Module	Built-in			
Wi-Fi Frequency Range	2.4GHz			
Communication	CAN/RS485			
IP Rate	IP65			
Recommended humidity	5%~95%(No condensed water)			
Cooling Type	Forced Air Cooling			
Color	White (Optional)			
Installation	Stack-mounting			
Net Weight	506±18kg	562±20kg	618±22kg	674±24kg
Dimension	635*1530*400mm	635*1700*400mm	635*1870*400mm	635*2040*400mm
Protection	Over-current/Over-voltage/Short Circuit/Under-voltage/Over-temperature			
Certification	/			

Testing conditions based on temperature 25℃ at the beginning of life.
*Total Energy/Usable Energy measured under specific conditions from Apex 0.2C CC-CV.

3.2 Product Appearance

3.2.1 Indicator

The front of the battery is equipped with an LED indicator light to display the operating status.



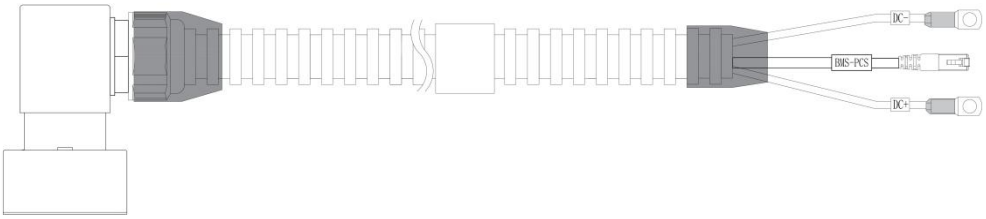
Project	Name	Definition
1	SOC	Displays the battery's SOC

3.2.2 Power and Communication Interface

The batteries use a plug-and-play structure, requiring no additional wiring:



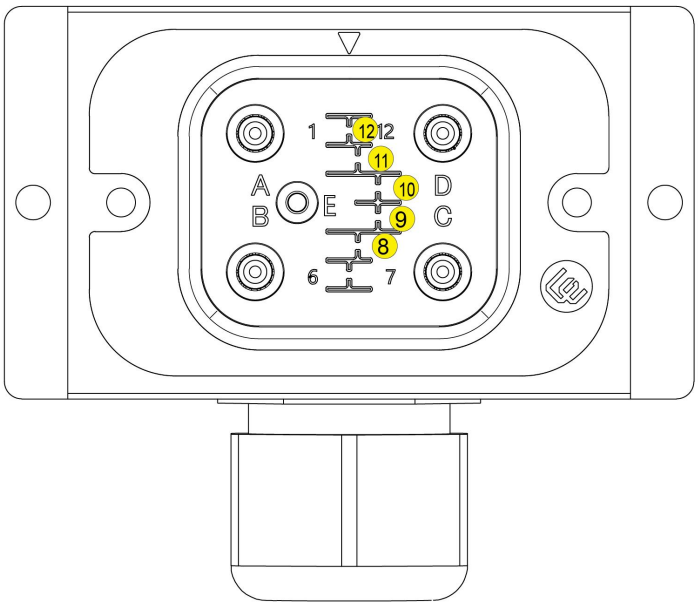
From the main battery to the inverter:



CAUTION
By CAN communicating with inverter. connect INV_CANH and INV_CANL to the inverter.
By RS485 communicating with inverter. connect INV_RS485_A and INV_RS485_B to the inverter.
The communication cable of BAT_CANH and BAT_CANL are used for after sales team to configure program by CAN box (monitor).

Battery pin definition

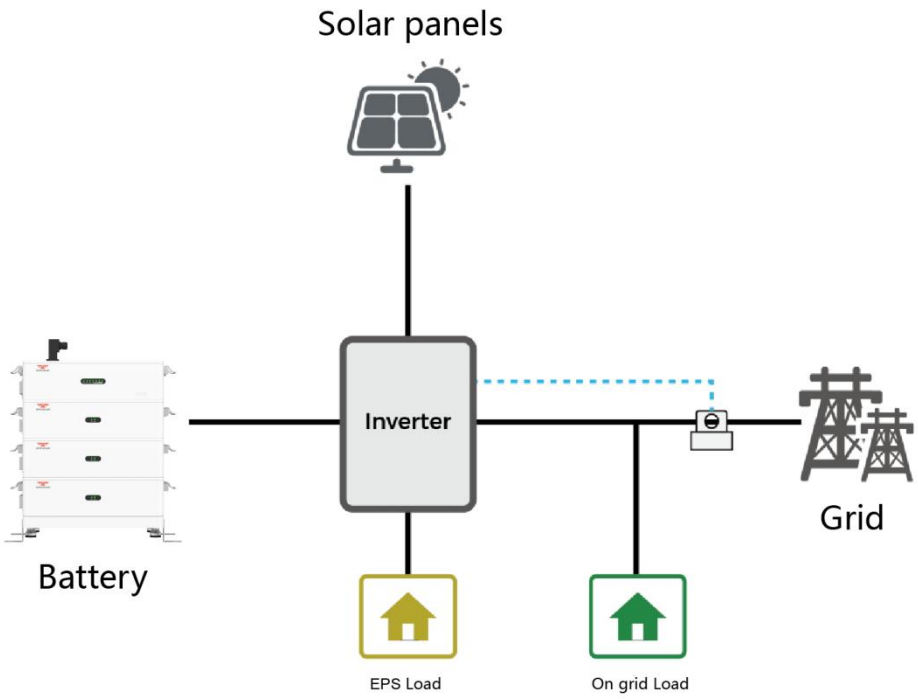
Battery RJ45		
PIN	Color	Signal Name
4	Blue	INV_CANH
5	Blue&white	INV_CANL
6	Green	GND
7	Brown&white	INV_RS485_A
8	Brown	INV_RS485_B



Integrated interface definition

NO.	Signal Name
8	GND
9	CANH
10	CANL
11	RS485A
12	RS485B
A	PACK+
D	PACK-

3.3 Solution of Apex



3.4 Feature

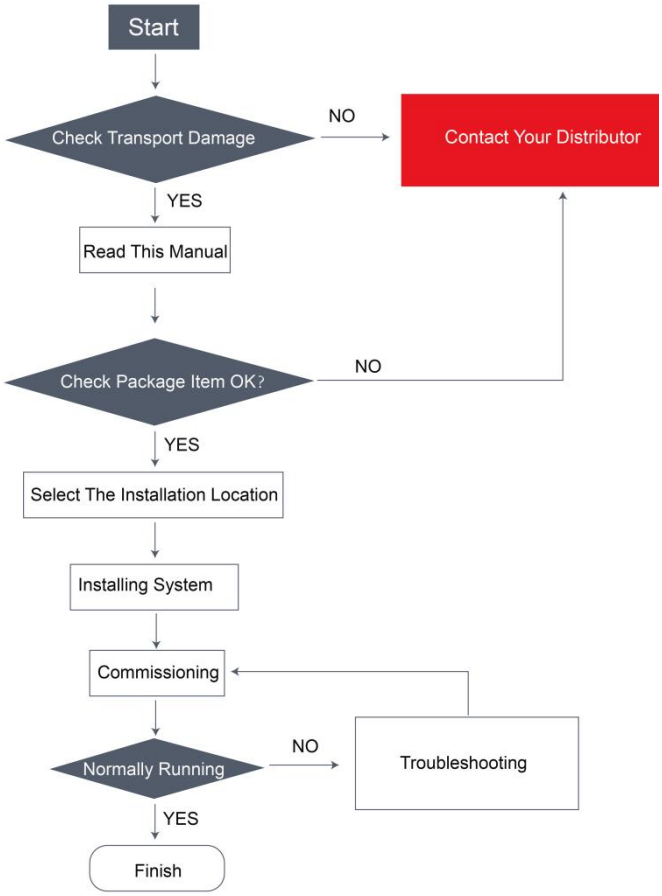
The Apex Energy Storage battery has the following features:

- **Energy storage unit**: This battery is suitable for photovoltaic system compatibility.
- **Battery management system (BMS)**: The built-in battery BMS monitors its operation and prevents the battery from operating outside design limitations.
- **Monitor:** The built-in battery BMS has WIFI module, and the battery operating information can be seen on mobile phones and computers.
- **Easy firmware update**: The BMS firmware can be updated to the latest version.
- **Expansibility:** The battery capacity can be increased by adding another battery.

4. Installation Prerequisites

4.1 Installation Process

The battery should be installed according to the following flow chart. The detail installation process described in chapter **5 Install process**.



4.2 Installation Position

Make sure that the installation position meets the following conditions:

- The building is designed to withstand earthquakes.
- Far away from the sea to avoid salt water and humidity.
- The floor is flat and level.
- No flammable or explosive materials nearby.
- Optimal ambient temperature is between 15℃ and 30°C.
- Temperature and humidity stays at a constant level.
- Minimal dust and dirt in the area.
- No corrosive gases present, including ammonia and acid vapor.
- The battery is rated at IP20, therefore the battery is only suit for indoor usage.

If the ambient temperature is out of the operating range, battery will protect itself by shutting down. The battery optimal operate temperature is 15°C to 30°C. Frequent exposure to severe operating condition would exacerbate the performance and lifetime of the battery.

4.3 Tools

The following tools are required for installing the battery pack:

			
Phillips screwdriver	**Torque wrench**	**Cable crimper**	**Wire clamp**
			
Voltmeter	**Tape measure**	**Drill**	**Flat-head screwdriver**

In order to protect operator and installer's safety, please select and use suitable tools and measuring instruments that are certified for precision and accuracy.

4.4 Safety Instruments

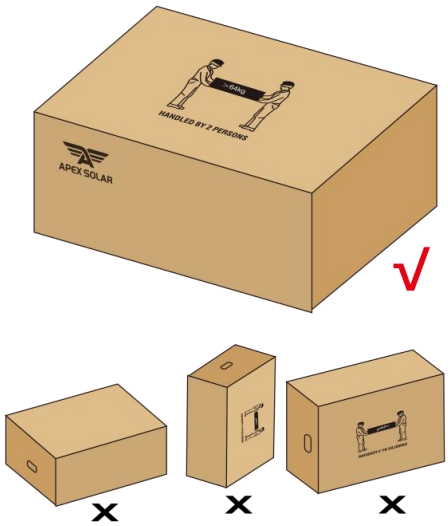
When dealing with the battery, following safety gears should be equipped. Installers must meet the relevant requirements of IEC 62040 and IEC 62619 or the domestic legislation and other relevant international standards.

		
Insulated gloves	**Safety goggles**	**Safety shoes**

4.5 Storage

If the battery is not to be installed immediately, and needs to be stored for a long period, please choose an appropriate location to store it. Instructions for storage are:

- Do not stack more than four battery boxes.
- The temperature of battery stored recommended in the range of -20°C to 30°C.
- Do not expose to water
- The battery box should be upright as shown in the following figure and not stacked upside down when storing the battery box.



- If the battery needs to be stored over 3 months, the battery would discharge at a minimum rate and capacity degrades depended on storage time.
- If the battery stored over 6 months, it is suggested to connect the battery with inverter and commissioning the system.

5. Battery installation

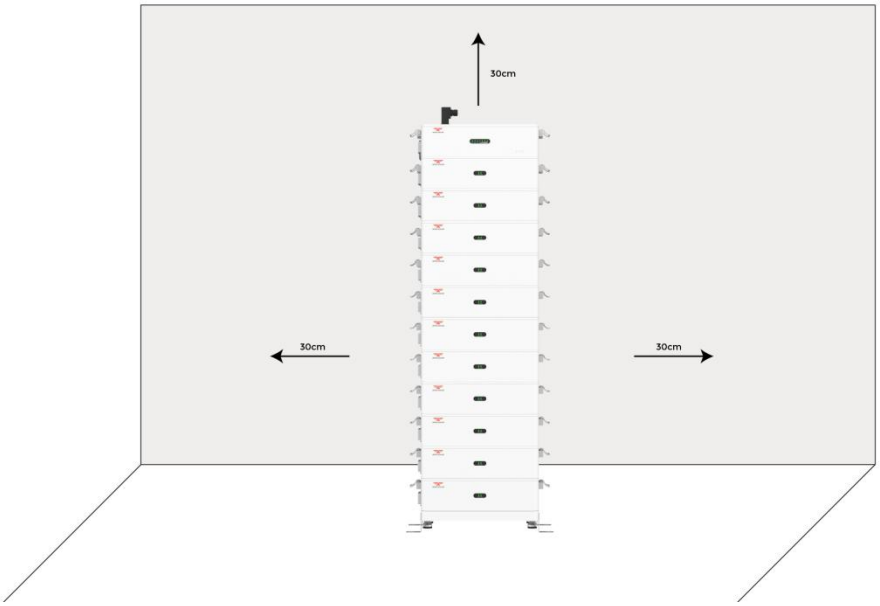
5.1 Pre-installation inspection

Before installing the battery, the following checks must be performed to ensure the battery is free of defects.
Please check the battery voltage according to the following instructions.

- Press the panel button for 4 seconds, and release it when the indicator light turns on.
- Measure the voltage at the terminal interface using a voltmeter. If the voltage is below 96V, do not use the battery and contact customer service.

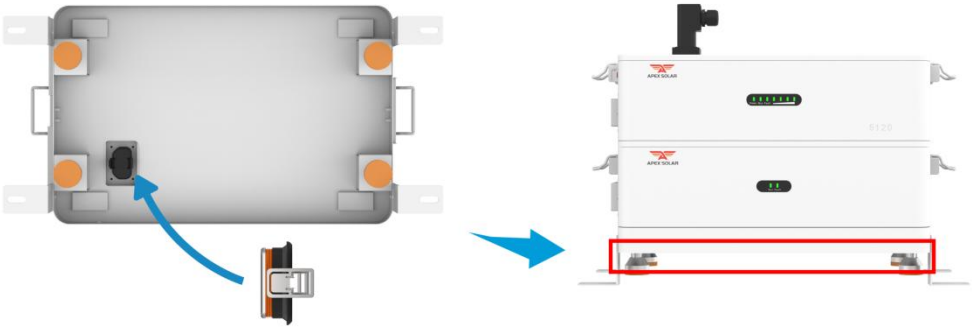
5.2 Battery Installation

Place the battery in the correct position (installation location details can be found in Chapter 4.2).
If installed outdoors, set up a shielding facility, ensuring the battery is not rained on or exposed to direct sunlight.

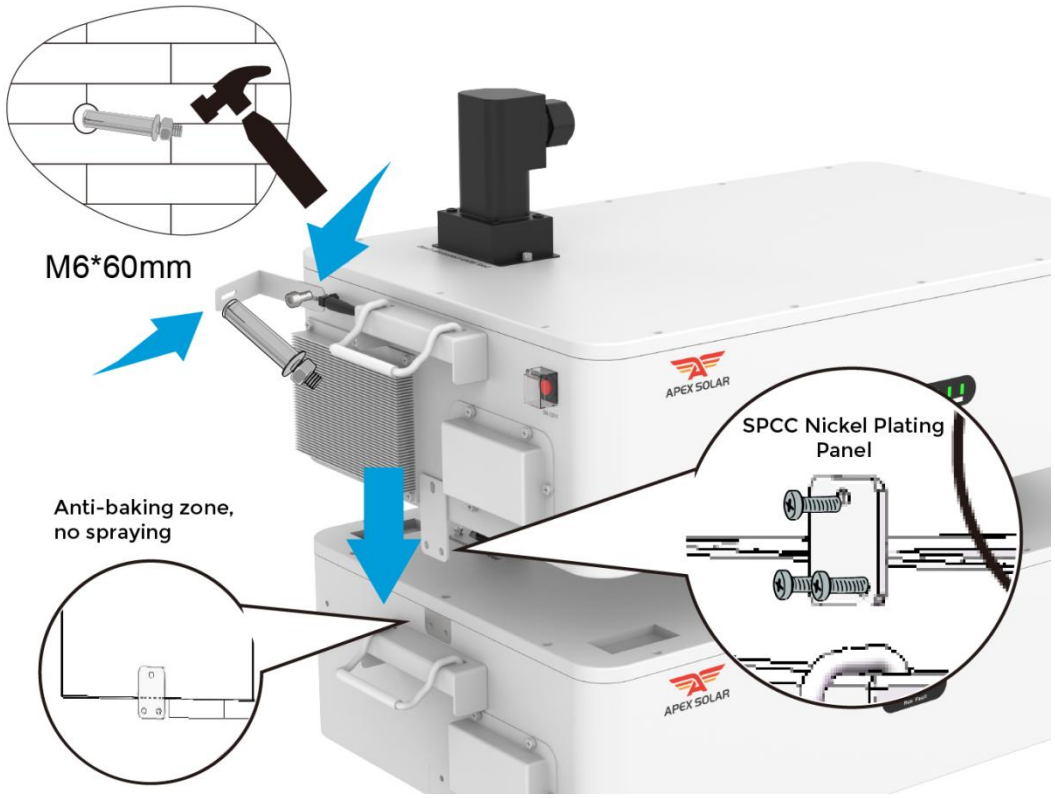


5.3 Battery Interconnection

1. Install the tail plug: Install the tail plug at the bottom of the last battery in the battery pack to complete the circuit.

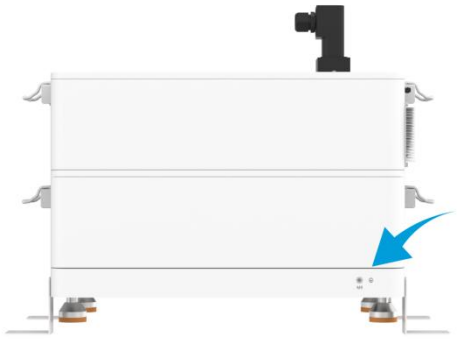


2. This product is easy to install, simply insert the upper battery into the lower battery as shown in the figure. Then use M6 expansion screws to firmly fix the device to the wall.



Notes
Ensure the connectors are installed correctly to guarantee the grounding connection between the batteries.

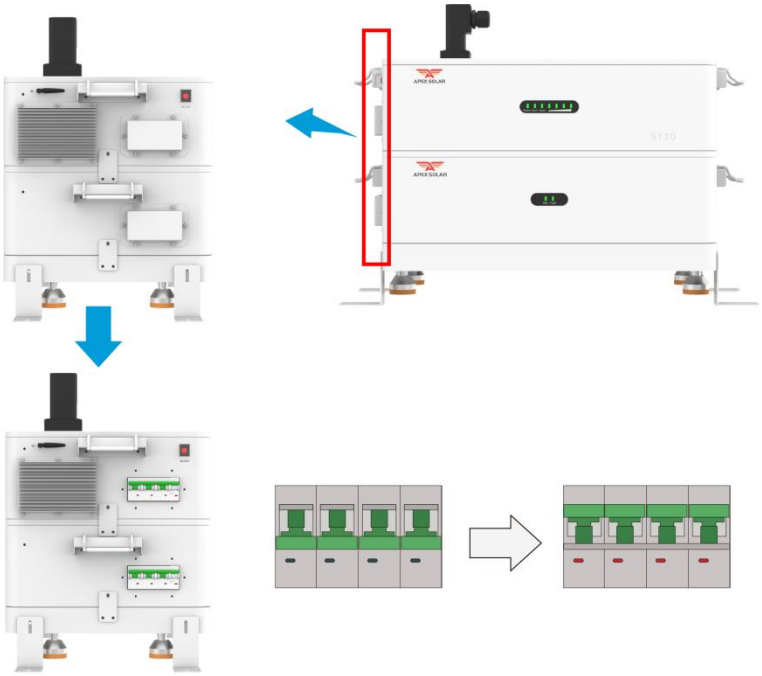
Notes



This product does not include grounding wire accessories. Please prepare your own grounding wire and connect it as shown in the figure above.

3. Turn on the circuit breaker: The circuit breaker is located on the top of the battery and covered by the panel. Open the panel to turn on the circuit breaker, then reinstall the panel.

   The circuit breaker on the top battery must be turned off after voltage testing until all cables are connected and the entire system is ready to start.



6 Debugging

6.1 Step-by-step installation and debugging guide

1. Test the voltage of each battery pack: Insert the tail plug into the bottom of each battery pack and open the top circuit breaker. This will provide a complete circuit and correct voltage. The voltage of each pack should be over 96V, otherwise please contact customer service.
2. Ensure the maximum voltage difference within a single system's battery packs is less than 2V, otherwise please contact customer service.
3. Check battery pack: Press the panel button for 4 seconds, release when the indicator light turns on, then turn off the battery pack power. Turn off the circuit breaker.
4. The battery base is located at the bottom of the entire system.
5. The first group of batteries needs to be pre-inserted into the tail plug. After turning on the circuit breaker, reinstall the panel and place it on the top of the battery base.
6. The second battery is placed directly on the top with the circuit breaker in the "on" position. Copy this process in sequence and place the third, fourth, fifth and sixth batteries.
7. The topmost battery is located at the very top of the system. Turn off the circuit breaker to prevent electric shock. Stack to the top.
8. Connect the power line and communication line between the battery pack and the inverter.
9. Check all cable connections, open the circuit breaker of the top battery, and cover the panel again.
10. Turn on the inverter power, the inverter will wake up the battery pack, and the battery indicator light will light up. Or turn on the top battery power by holding the panel button for 4 seconds, wait until all indicator lights turn on.
11. Inverter settings: battery type, charge and discharge mode, etc.
12. Configure WiFi on the APP. LFP 20.5~61.2kWh
13. Fix the battery on the base, fix the batteries together, and fix the battery pack on the wall.

6.2 Battery shutdown

It can only be turned off when the battery is in a non-charge and discharge state (can be confirmed on the mobile phone via the APP).

1. Hold the panel button for 5 seconds, and release it after all indicator lights turn off.