

APX 5.0~30.0P-S2 AU High Voltage Battery System User Manual

Download Manual

Growatt New Energy

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About this Document

This document introduces the APX 5.0~30.0P-S2 AU Battery System (short for APX) in terms of installation, electrical connection, operation, commission, maintenance, and troubleshooting. Before installing and operating the APX system, ensure that you are familiar with product features, functions, and safety precautions provided in this document.

Symbol	Description
 **WARNING**	Indicates a potentially hazardous situation, if not avoided, could result in serious injury or death.

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7.1 APX 98034-P2 (Power Module) 59

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1 Product Overview

1.1 Intended Use

The entire APX 5.0~30.0P-S2 AU high-voltage battery system is composed of a APX 98034-P2 (hereinafter referred to as Power Module) and multiple APX 5.0P-B1 battery modules (hereinafter referred to as Battery Module, the maximum number of Battery Module connected in parallel is 6).

Each Battery Module consists of 100Ah LFP battery cells and a DC-DC converter, which boosts a power source of 51.2V up to 380V. One to six Battery Modules can be connected in parallel to increase the capacity and power of the energy storage system.

The APX battery system powers the loads through the three-phase **hybrid** inverter MOD 3-10KTL3-XH (Backup version) or MID 11-30KTL3-XH whenever demanded; when solar becomes available during daytime, solar energy powers the loads as a priority and the surplus solar power is stored into the APX battery system.

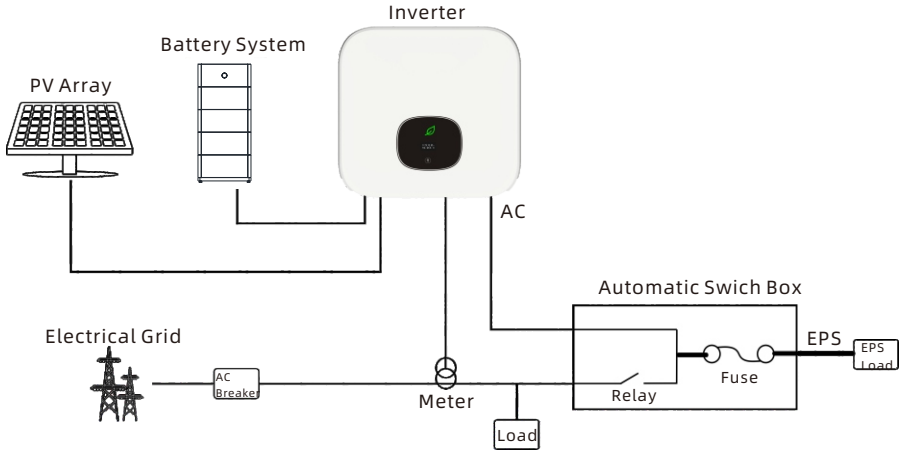


Figure 1-1: System diagram of APX High voltage battery system

1.2 Appearance

1.2.1 APX 98034-P2(Power Module)

Power Module is composed of Power control units, relay, fuse, DC switch, power supply and communication terminals. The appearance of the product is shown as below.

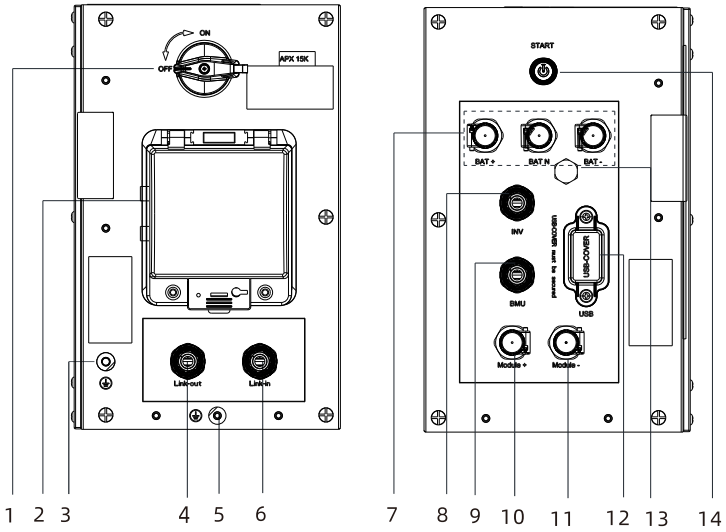


Figure 1-2: Schematic diagram of power panel

No.	Port	Function
1	DC switch	Turn on/off the power connection from Power Module to hybrid Inverter
2	FUSE	Provide overcurrent protection for a circuit
3	⏚	Ground terminal, connect to the hybrid inverter
4	Link-out	APX system parallel communication output port
5	⏚	Ground terminal, connect to the Battery Module
6	Link-in	APX system parallel communication input port
7	BAT+	The positive output from APX system to the hybrid inverter
	BAT N	The neutral output from APX system to the hybrid inverter
	BAT-	The negative output from APX system to the hybrid inverter

No.	Port	Function
8	INV	Port for communication with the hybrid inverter
9	BMU	Communication with the Battery Module
10	Module+	Connect to the positive power terminal of the Battery Module
11	Module-	Connect to the negative power terminal of the Battery Module
12	USB	USB port, connect to a USB flash drive to upgrade firmware
13	Pressure relief valve	Provide protection against excessive pressure
14	Start	Wake up the Battery Module (Press and hold for over 5 seconds)

LED display

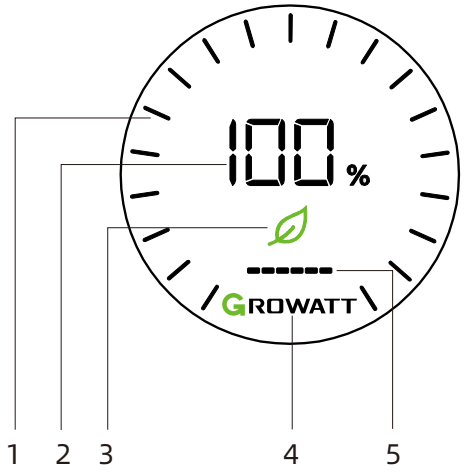


Figure1- 3: LED display

No.	Function	Function description
1	Display SOC	Display current SOC in a progress circle
	Display upgrade status	Eight light bars rotate clockwise when the program is updating
	Charging	When charging, light bars light up one by one clockwise
	Discharging	When discharging, light bars go off one by one anticlockwise
2	Display SOC	Display SOC in percentage
	Display upgrade status	When upgrading the firmware, "UP" is displayed
3	Power Module status indicator	Steady green during normal operations; Blinking green indicatesan alarm or the standby mode Blinking red due to a fault;
4	Logo	The light is steady on when the APX is on
5	Battery Module status indicator(Each bar represents one BM)	Steady green during normal operations; Blinking green to generate an alarm; Steady red due to a fault;

Dimensions (unit: mm)

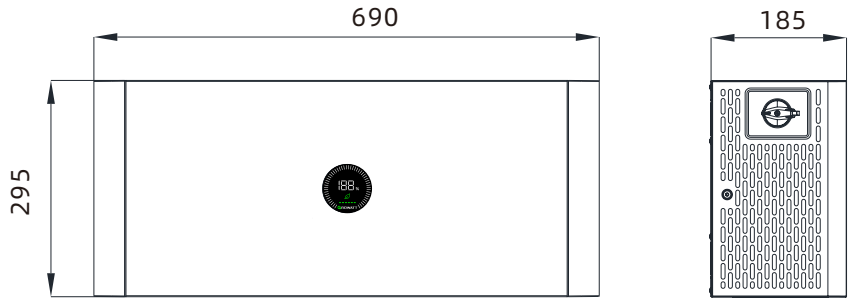


Figure 1-4: Dimensions of APX 98034-P2

1.2.2 APX 5.0P-B1 (Battery Module)

Battery Module consists of LFP battery cells, a DC-DC converter, mechanical parts, the battery management unit (BMU) as well as power and communication terminals. Product appearance is shown as below.

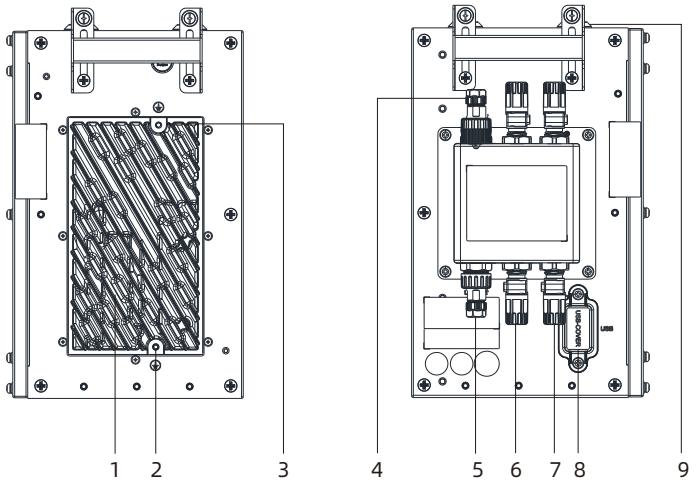


Figure 1-5: Schematic diagram of the power panel

Location	Port	Function
1	Heat sink	DC-DC converter heat sink
2	⏚	Ground terminal, connect to the next module
3	⏚	Ground terminal, connect to the previous module
4	Link in	Communicate with the previous module
5	Link out	Communicate with the next module
6	B+	Parallel battery module terminal B+
7	B-	Parallel battery module terminal B-
8	USB	USB port, connect to a USB flash drive to upgrade firmware
9	Stacking guide component	Module alignment

Dimensions (unit: mm)

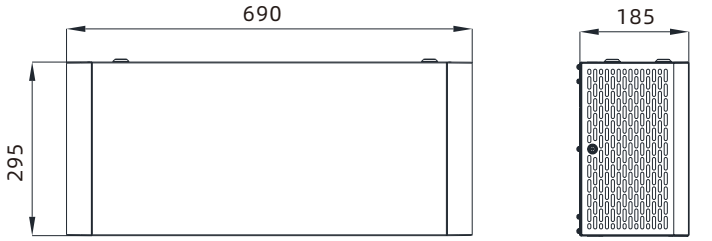


Figure 1-6: Dimensions of APX 5.0P-B1

1.3 Working Principle and Function

The APX 5.0~30.0P-S2 AU high voltage battery system is composed of a Power Module APX 98034-P2 and multiple Battery Modules APX 5.0P-B1 connected in parallel. It contains electrochemical batteries, battery control units, power control units, battery management units, power and signal terminals, and mechanical parts.

The APX distinguishes itself with better charging and discharging performance, higher charging and discharging efficiency, higher flexibility in capacity expansion, more accurate status monitoring, longer service life, and less self-discharge loss.

A single APX system can connect 1 to 6 Battery Modules in parallel to increase the capacity and power of the battery system; at the same time, it supports the cascading of 2 APX systems. The APX system communicates with the hybrid inverter through RS485 communications. For a cascaded system, one APX system communicates with another APX system through CAN communications. It also excels at operation stability.

- Monitoring: Monitor the voltage, current and temperature of each battery module and the battery system.
- Protection and Alarm: Generate alarms and provide protection in cases of overvoltage, undervoltage, overcurrent, over-temperature or under-temperature.
- Report: Report alarms and status data to the hybrid inverter.
- Parallel connection: Support the parallel connection of one to six Battery Modules.
- Cascading connection: Support the cascading of two APX systems.
- Battery cell balancing: passive battery balancing.
- Battery Module balancing: intelligent power distribution, active balancing
- System power-off: 12 minutes after the battery system and hybrid inverter communication is disconnected.

2 Safety

When installing or using a battery system, observe the safety precautions provided in this section. For personal safety, the operation personnel must read through this manual and follow the safety instructions.

2.1 General safety

The battery system has been designed and tested in accordance with strict rules to meet international safety certification requirements. Before installing or using the battery system, please read all safety instructions carefully and follow the rules. Growatt will not be liable for any consequence of the following circumstances:

- Damage during the transportation by the customer.
- Damage caused by improper operations in transportation, storage, installation and use, or the third party fails to convey the correct information about transportation, storage, installation and use to end users.
- Improper installation by unprofessional and unreliable personnel.
- Failure to follow the operation instructions and safety precautions in this document.
- Unauthorized modifications or removal of the software package.
- The product's tamper evident label is removed or any item is missing due to customer's negligence or intentional damage.
- Operation in environments that cannot meet the requirements specified in this document.
- Damage caused by repairing, disassembling, and modifying PACKs without authorization.
- Damage to labels on the chassis or modification on the date of production.
- Battery packs fail to be charged for more than six months.
- Damage due to force majeure, such as lightning, earthquakes, fire, and storms.
- Warranty expiration.

2.2 Safety Precautions

2.2.1 Environment requirements

- Do not expose the battery to temperature above 50°C or heat sources.
- Do not install or use the battery in wet environment with moisture, corrosive gases or liquids, such as in the bathroom.
- Do not expose the battery to direct sunlight for extended periods of time.
- Place the battery in a safe place and ensure that the battery is not accessible to children and animals.
- Battery power terminals shall not come in contact with conductive objects such as wires.
- Do not place the battery in a fire, which may cause an explosion.
- The battery system must be protected from liquids.

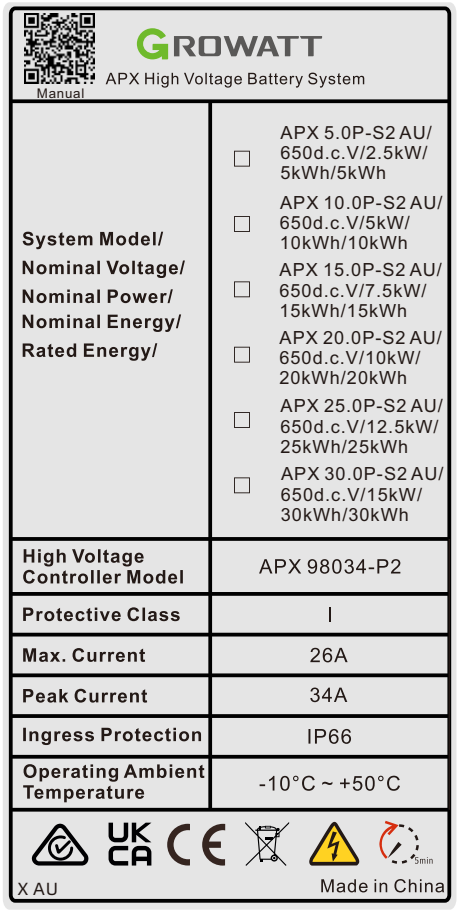
2.2.2 Operation Precautions

- Do not touch the battery system with wet hands.
- Do not disassemble the battery system without authorization.
- Do not crush, drop or pierce the battery pack and the high voltage controller.
- Dispose of the batteries according to local safety regulations.
- Store and recharge the battery in accordance with this manual.
- Ensure that the PE cable is securely connected.
- Remove all metal objects such as watches and rings that could cause a short circuit before installation, replacement and maintenance.
- The Pack shall be repaired, replaced or maintained by qualified and well-trained personnel.
- When storing or handling the batteries, do not stack batteries without package.
- Handle the battery with caution to avoid leakage. The leaked electrolyte is toxic and hazardous to skin and eyes.
- Stack battery packing cases in compliance with the stacking requirements on the external package.
- Do not use damaged, faulty or deformed batteries, which may release flammable gases that may cause a fire or other safety hazards.

2.3 Label Description

Symbols	Description
	Do not dispose of the system with the household waste but in accordance with the local regulations
	Lithium-Ion batteries can be recycled
	The system complies with the requirements of the applicable EU directives.
	Be aware of the electric shock
	Be aware of the explosive gas
	Be aware of the battery leak
	Heavy objects. Lift with care
	Keep the Pack away from children
	Ensure that the positive and negative terminals are correctly connected

Symbols	Description
	Keep away from open flame or ignition sources
	Observe the manual



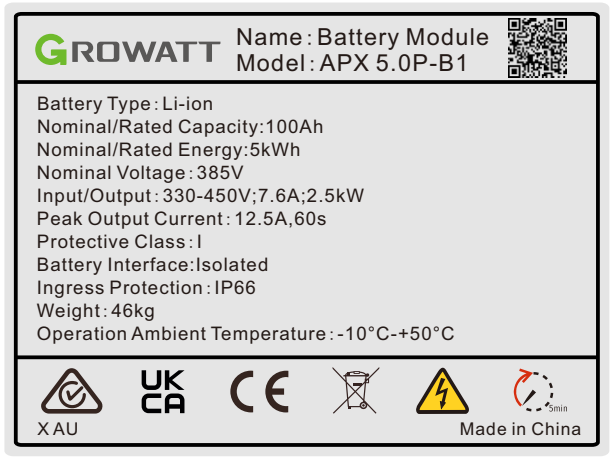


Figure 2-1: Nameplate



Figure 2-2: Label

WARNING	Performance de-rate may be initiated when the temperature is below 10°C or above 45°C.

WARNING

Do not remove the label unauthorized !

The Warning label on the battery side ensures the connection between the battery enclosure and the cover. Users must not tear off this label to remove the cover.

2.4 Emergency Responses

Manufacturer has taken foreseeable risk scenarios into consideration and designed the battery system to mitigate the hazards. In case of an emergency, do as below:

Emergency	Description and measures
Leakage emergency	➢ Avoid contact with leaked liquids or gases. Should you come into direct contact with the battery electrolyte, do as follows: Inhalation: Evacuate from the contaminated area, and seek immediate medical attention. Eye contact: Flush your eyes with flowing water for 15 minutes, and seek immediate medical attention. Skin contact: Wash the affected area with soap and water, and seek immediate medical attention. Ingestion: seek immediate medical attention.
Fire emergency	Normally, the battery system won't ignite spontaneously. If a fire occurs, do not try to extinguish the fire but evacuate people immediately.
Flood emergency	If the battery system is soaked or submerged in water, do not touch the batteries to avoid electric shock. Contact Growatt or your distributor immediately for technical assistance.
Shell damage	The shell damage requires extra attention as it is of high risk. Do not use batteries with a damaged shell, which may cause safety hazards. Contact Growatt or a distributer to dispose of them.

Storage and Transportation 3

3.1 Storage Requirements

➢ Place the batteries according to the signs on the packing case.
➢ Do not put batteries upside down or on their side.
➢ Do not store damaged batteries near undamaged ones.
➢ The storage environment requirements are as follows:
• Install the batteries in a dry, clean and well-ventilated place.
• The battery module is recommended to be stored in an environment within the temperature range of -20°C~30°C and charged regularly.

Storage temperature	Storage RH	Storage period	Recharge period
< -20°C	/	Not permitted	/
-20℃~10℃	5%~95%	≤12 months	≤12 months
10℃~30℃	5%~95%	≤9 months	≤9 months
30℃~50℃	5%~95%	≤6 months	≤6 months
> 50℃	/	Not permitted	/

Note:
If the battery is not charged when the permitted storage period illustrated above is exceeded, it might result in battery damage. Currently, the battery can only be charged via the inverter.

• Do not expose batteries to corrosive environments.
• Avoid direct exposure to sunlight and rain.
• Keep the batteries at least two meters away from heat sources (such as a radiator).
• Avoid exposure to intense infrared radiation.
➢ If the battery is over-discharged, recharge it to 40% SOC within 7 days.

NOTICE	If not follow the above instructions for long-term storage, the battery cycle life will be reduced or even damaged.

3.2 Transportation Requirements

The battery pack passes the certifications of the UN38.3 (Section 38.3 of the sixth Revised Edition of the Recommendations on the Transport of Dangerous Goods: Manual of Tests and Criteria) and SN/T 0370.2-2009 (Part 2: Performance Test of the Rules for the Inspection of Packaging for Exporting Dangerous Goods). The battery pack belongs to Class 9 dangerous goods.

- The battery pack shall not be transported with other inflammable, explosive or toxic materials.
- Ensure that the original package and label are intact and identifiable.
- Avoid direct exposure to sunlight, rain, condensing water caused by temperature difference and mechanical damages.
- Do not pile up more than six Battery Modules.
- There will be a drop in capacity during transportation and storage.
- Transportation temperature is between-20°C to 40°C, relative humidity: 5%~95%RH.

Installation 4

WARNING

- Read through the Guidance before installation to understand product information and safety precautions;
- Only qualified and well-trained technicians who fully understand the whole photovoltaic system, grid network, battery system, working principle and national/local standards are allowed to perform operations on the battery;
- Installers must use insulating tools and wear safety equipment;
- Device damages caused by failure to comply with storage, transportation, installation and use requirements specified in Guidance are not covered under any Warranty.
- Do not install or use the battery near explosive or inflammable materials.
- Use the battery in a well-ventilated environment with temperature ranging from -10°C to 50°C . For outdoor installation, build a sun & rain shade to avoid direct exposure to sunlight and rain.
- The batteries should be protected from dust and dirt. Do not expose batteries to high humidity.

4.1 Basic Installation Requirements

- The ambient temperature for the installation of the battery system shall be above -10°C, below 50°C, recommended operating temperature 10°C~30°C, and the humidity shall between 5% and 95%.
- The battery system can be installed indoors or outdoors. The angle and space requirements are as follows:

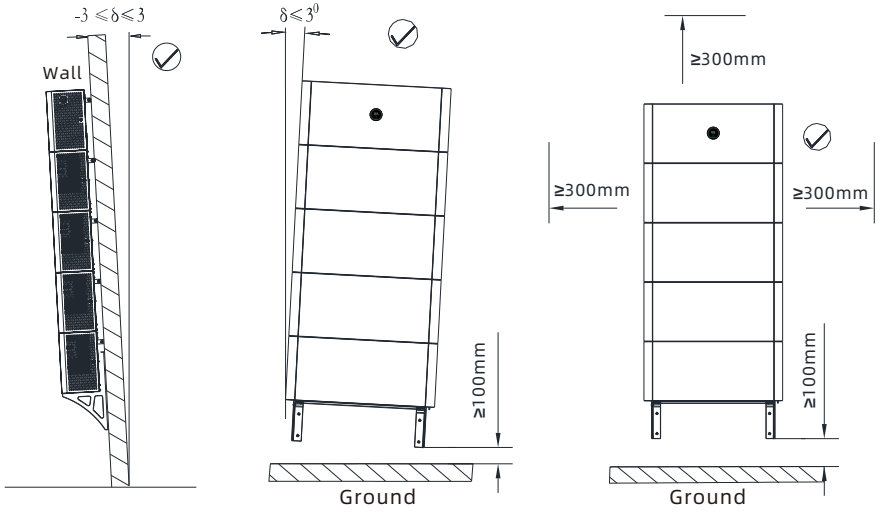


Figure 4-1: Wall-mounted installation

Note: When mounted on the wall, a maximum of six battery modules can be configured.
If the number of the battery modules to be installed is greater than four, you are advised to install them in 2 columns.
Ensure that the load-bearing capacity of the wall exceeds the total weight of the system (each PM weighs 16 kg and each BM weighs 50 kg).

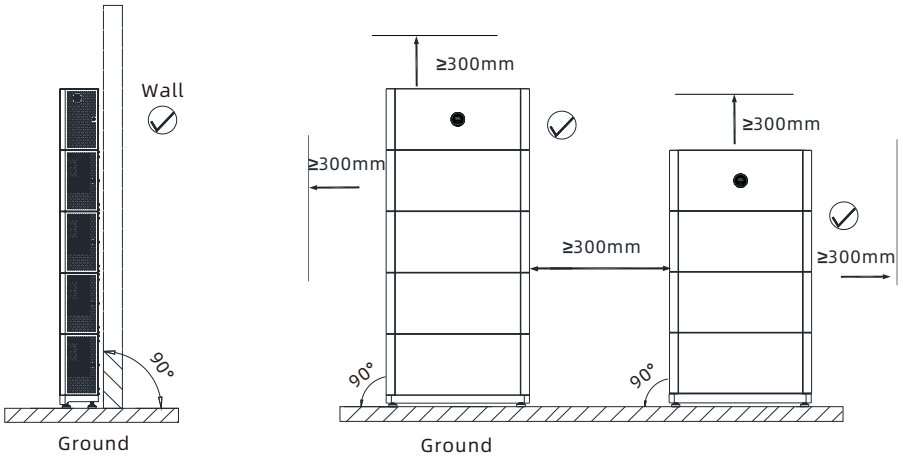


Figure 4-2: Floor-mounted installation

Note: A maximum of six battery modules may be installed in a single row in a floor-mounted configuration (subject to local installation requirements).

WARNING	Do not place the battery pack upside down.

➢ When installed outdoors, build a sun/rain shelter to protect the battery system from direct sunlight and rain.

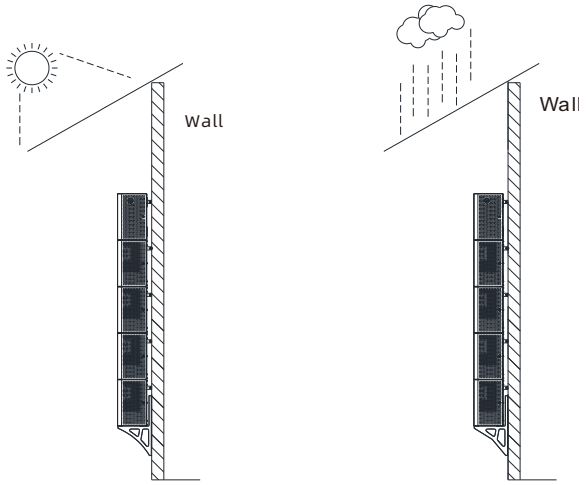


Figure 4-3: Build a sun/rain shelter

4.2 Installation Tools

Prepare the following tools to install the battery system:

 M6 Drill	 M4-1N·m Screw Driver	 M6-2N·m Socket Wrench
 Pencil	 Tap Measure	 Multimeter

It is recommended to wear the personal protective equipment when operating the battery system.

 Insulated Glove	 Safety Goggle	 Safety Shoes

4.3 Installation Procedures

4.3.1 Pre-installation Check

- Check the package before unpack it. If any damage is found, do not unpack the package and contact your distributor.
- Check the quantity of all components according to the package list. If any damage is found or any component is missing, please contact your distributor.

4.3.1.1 Check the APX Battery System of different capacities

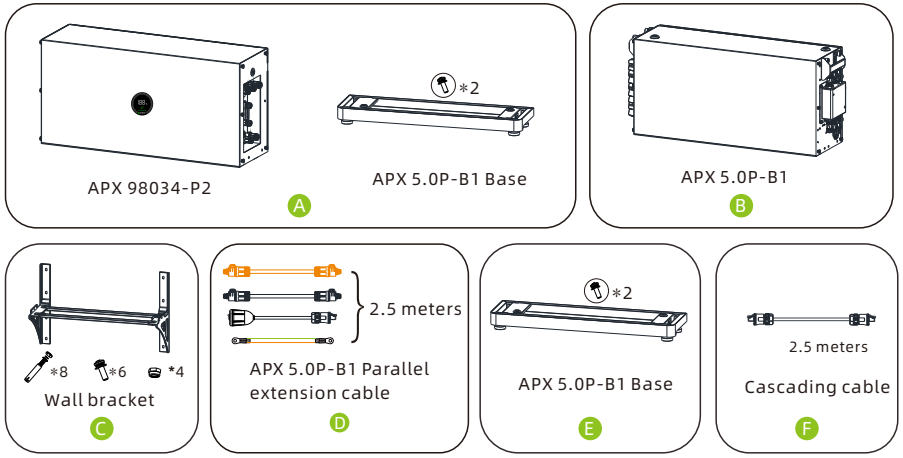


Figure 4-4: Components of the APX Battery System of different capacities

Battery System Capacity	Standard Wall-Mounted Installation Compound Mode	Standard Floor-mounted Installation Compound Mode	Matching inverter model
5kWh	A+B+C	A+B	MOD 3-10K TL3-XH (BP)
10kWh	A+B*2+C	A+B*2	
15kWh	A+B*3+C	A+B*3	
20kWh	A+B*4+C	A+B*4	
25kWh	A+B*5+C*2+D	A+B*5	
30kWh	A+B*6+C*2+D	A+B*6	
40kWh	A*2+B*8+C*2+F	A*2+B*8+F	MID 11-30K TL3-XH
50kWh	A*2+B*10+C*4+D*2+F	A*2+B*10+F	
60kWh	A*2+B*12+C*4+D*2+F	A*2+B*12+F	

4.3.1.2 Check the components of the APX 98034-P2

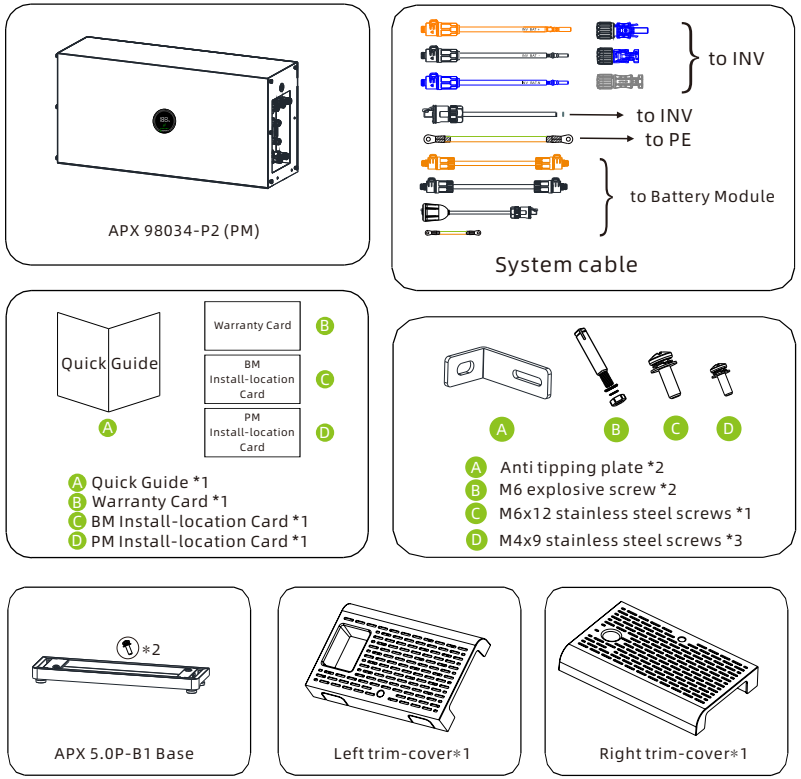


Figure 4-5: Components of the APX 98034-P2

4.3.1.3 Check the components of the APX 5.0P-B1

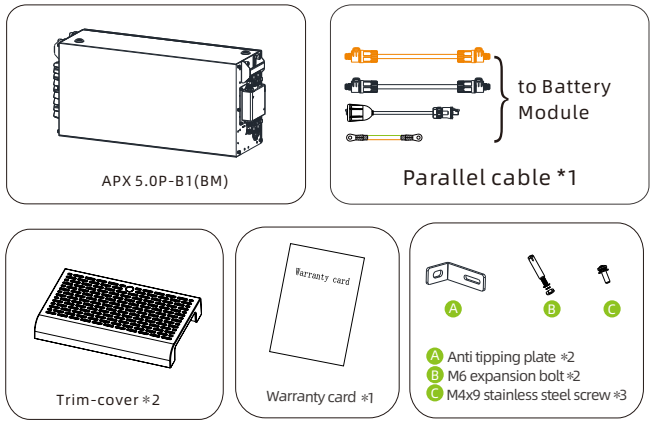


Figure 4-6: Components of the APX 5.0P-B1

NOTICE

- Ensure that you have the standard accessories - the Power Module (APX 98034-P2) and the Battery Module (APX 5.0P-B1) . The APX battery system consists of a Power Module (APX 98034-P2) and 1 to 6 Battery Modules (APX 5.0P-B1). To build a system with a capacity over 30kWh, you need to cascade 2 APX battery systems.
- The support base or the mounting bracket is optional based on the installation method.
- You need to separately purchase the cascading communication cables if you need to cascade 2 APX battery systems.
- If you want to install one APX battery system in two lines, you need to purchase a parallel extension cable separately.

4.3.2 Wall-mounted Installation

Mounting Hole Dimensions

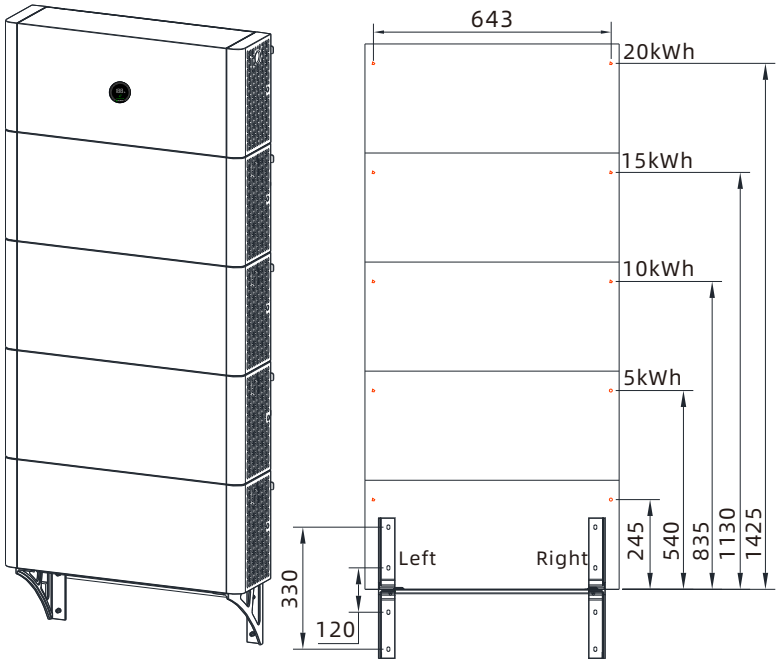


Figure 4-7: Mounting Hole Dimensions

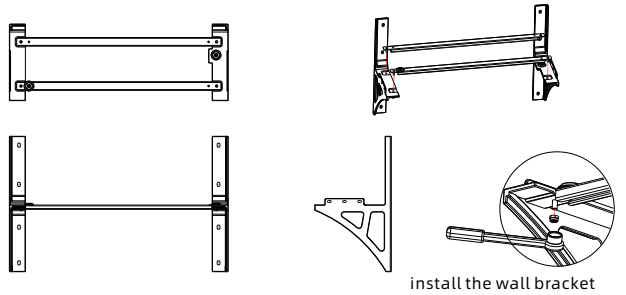
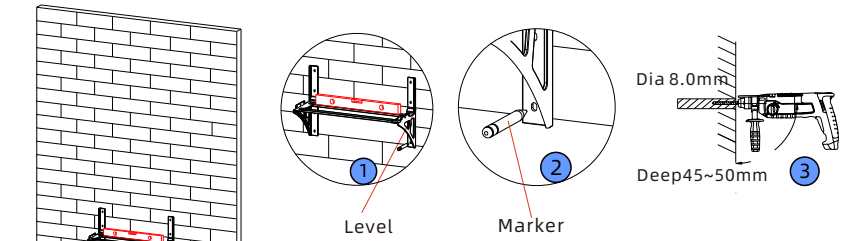


Figure 4-8: Install the mounting bracket

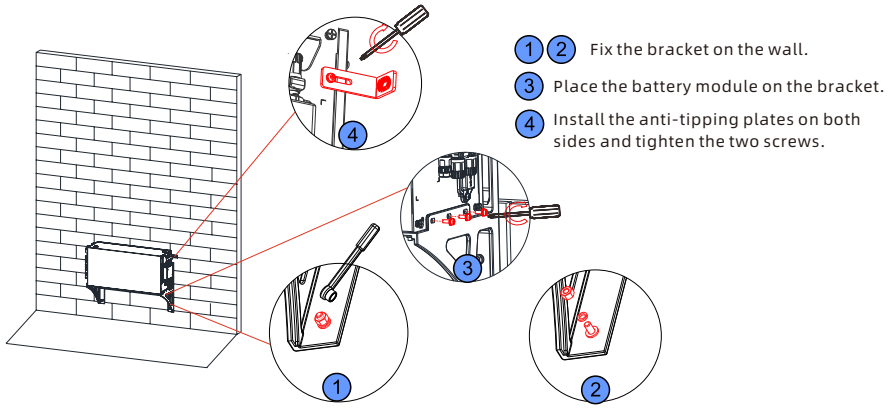
Step 1: Install the mounting bracket.



1. Level the bracket using a level.
2. Mark the hole positions for installing the bracket.
3. Drill eight holes.

Figure 4-9: Determine the hole positions for installing the bracket

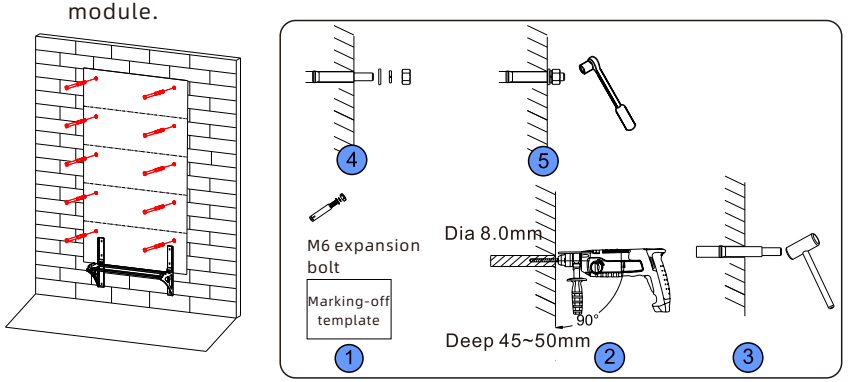
Step 2: Level the mounting holes using a level, and mark the hole positions for installing the bracket using a marker. Drill 8 holes (alloy drill diameter: 8mm; hole depth: 45mm to 50mm).



1 2 Fix the bracket on the wall.
3 Place the battery module on the bracket.
4 Install the anti-tipping plates on both sides and tighten the two screws.

Figure 4-10: Fix the bracket to the wall

Step 3: Fix the wall bracket on the wall and place the first battery module on the mounting bracket. Install the anti-tipping plates on both sides and tighten the two screws. Mark the hole positions for installing the first battery module.

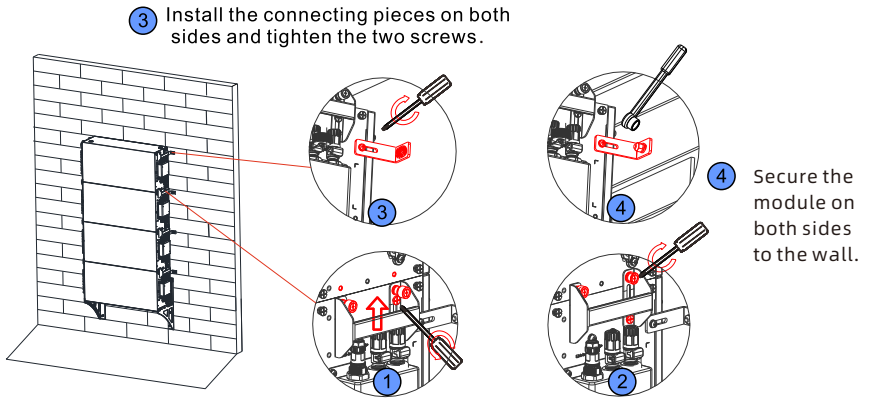


1 The marking-off template ensures that the alignment marks are properly placed on the wall.

2 3 4 5 Fix the M6 expansion bolt into the wall.

Figure 4-11: The marking-off template and install the expansion bolt

Step 4: Remove the battery module, determine the hole positions to mount the battery modules from bottom to top using the marking-off template, mark the hole positions using a marker. Install the M6 expansion bolts.

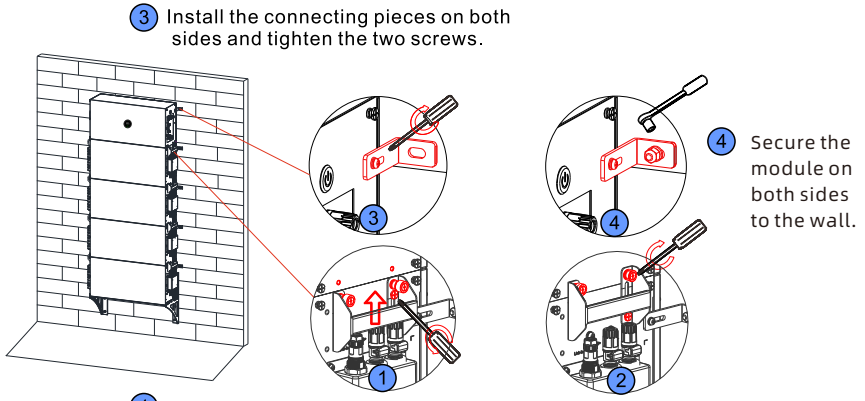


1 Loosen two screws, move up handle on both sides.

2 Tighten the two screws, fix the two battery modules.

Figure 4-12: Install the battery module

Step 5: Install the remaining battery modules (no more than 4 of them), raise the handles on both sides, tighten the two screws that secure the battery module. Install the connecting pieces on both sides and tighten the two screws, secure the modules on both sides to the wall.



1 Loosen two screws, move up handle on both sides.

2 Tighten the two screws, fix the battery and the power modules.

Figure 4-13: Install the power module

Step 6: Install the power module, raise the battery module handles on both sides, tighten the two screws that secure the power module and battery module. Install the connecting pieces on both sides and tighten the two screws, secure the module on both sides to the wall.

NOTICE

- A single battery system can contain a maximum of 6 battery modules.
- For wall-mounted installation, no more than 4 modules are allowed per column. If more than 4 modules are required, they shall be arranged in two separate columns with a clearance of ≥ 300mm

4.3.3 Floor-mounted Installation

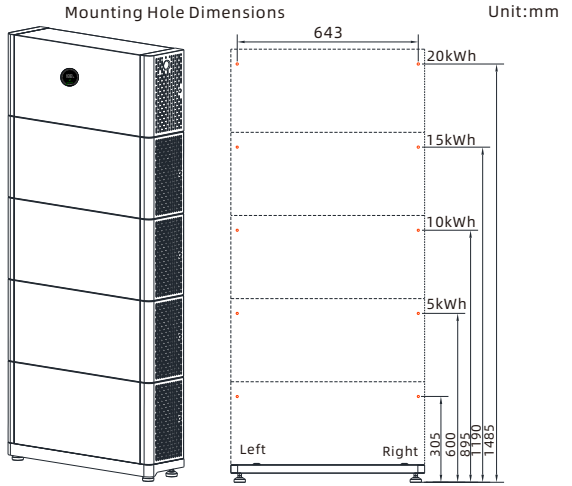
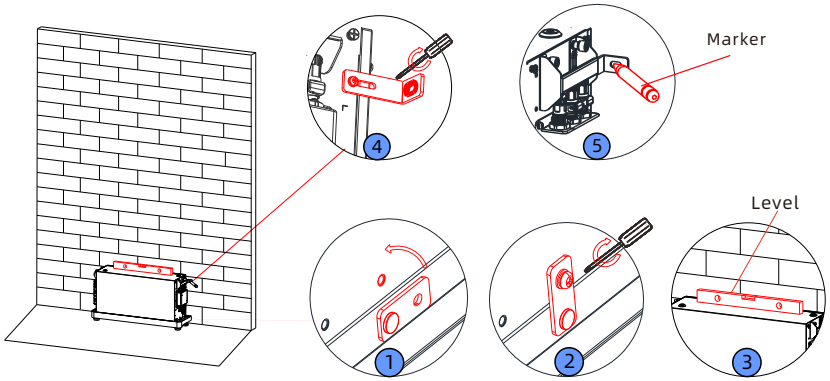


Figure 4-14: Mounting Hole Dimensions



1 2 Install the connecting pieces on both sides and tighten the two screws.

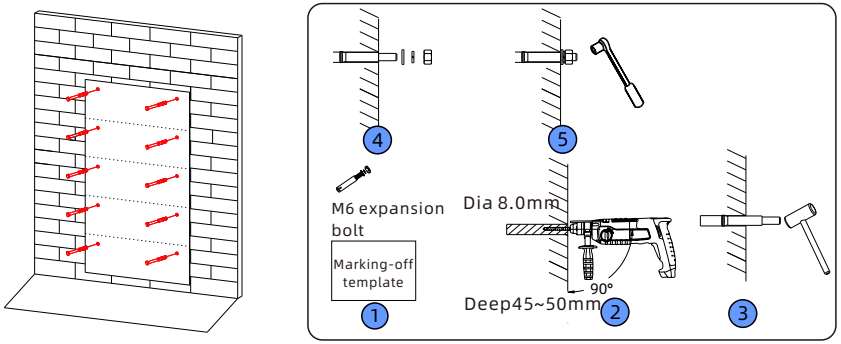
4 Install the anti-tipping plate on both sides and tighten the two screws.

3 Keep the Battery Module level.

5 Mark the hole positions for installing the module.

Figure 4-15: Installing the battery support

Step 1: Install connecting pieces on both sides of the battery support and tighten the two screws. Place the first battery module on the floor support and keep the module level. Install the anti-tipping plates on both sides and tighten the two screws. Mark the hole positions for installing the battery module.



1 The marking-off template ensures that the alignment marks are properly placed on the wall.

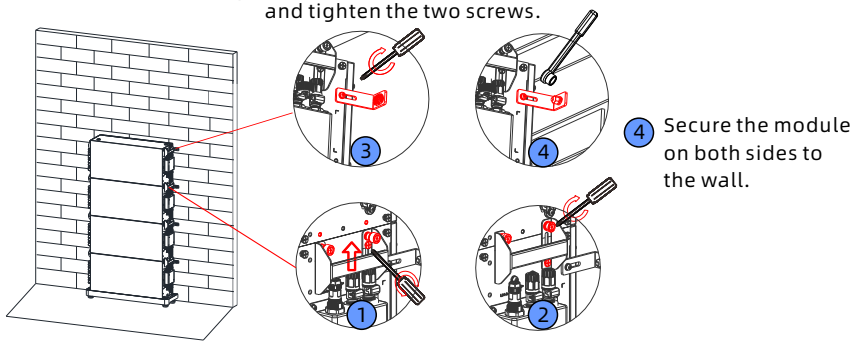
2 3 4 5 Fix the M6 expansion bolt into the wall.

Figure 4-16: The marking-off template and install the expansion bolt

Step 2: Move away the battery module, determine the hole positions to mount the battery modules from bottom to top using the marking-off template, mark the hole positions using a marker. Drill holes using the impact drill (alloy drills with a diameter of 8mm;the hole depth: 45mm to 50mm). Install the M6 expansion bolts.

3 Install the connecting pieces on both sides and tighten the two screws.

4 Secure the module on both sides to the wall.

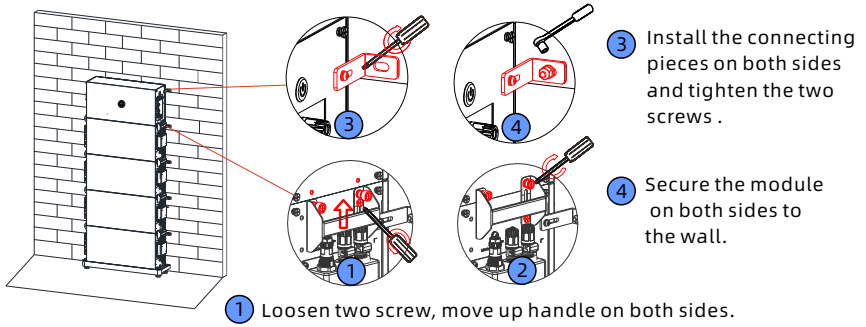


1 Loosen two screw, move up handle on both sides.

2 Tighten the two screws, fix the two battery modules.

Figure 4-17: Install the battery module

Step 3: Install the remaining battery modules (no more than 4 of them), raise the handles on both sides, tighten the two screws that secure the battery module. Install the connecting pieces on both sides and tighten the two screws, secure the modules on both sides to the wall.



3 Install the connecting pieces on both sides and tighten the two screws .

4 Secure the module on both sides to the wall.

1 Loosen two screw, move up handle on both sides.

2 Tighten the two screws, fix the battery and the power modules.

Figure 4-18: Install the power module

Step 4: Install the power module, raise the battery module handles on both sides, tighten the two screws that secure the power module and battery module. Install the connecting pieces on both sides and tighten the two screws, and secure the module on both sides to the wall.

NOTICE	➢ A maximum of six battery modules may be installed in a single row in a floor-mounted configuration (subject to local installation requirements).

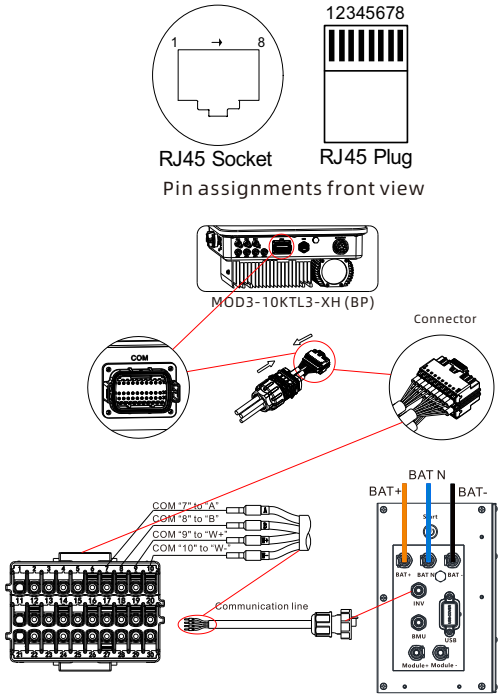
4.4 Electrical Connection

WARNING	Do not forget to wear ESD wrist strap and gloves, safety gloves and goggles.

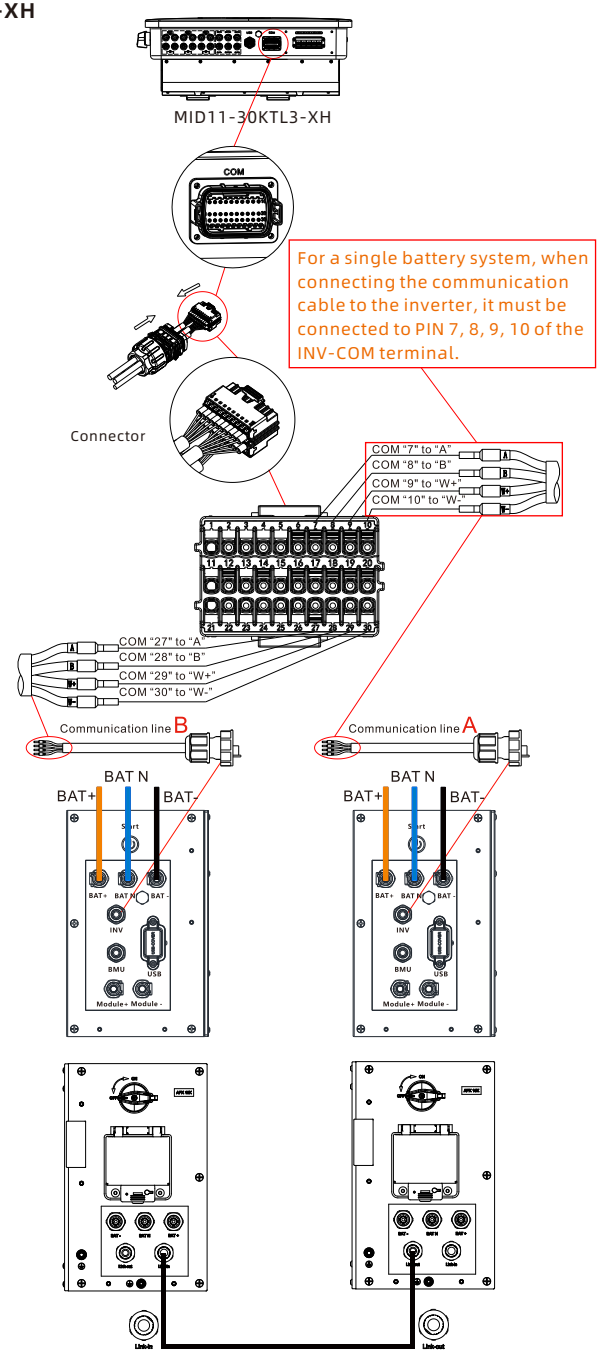
4.4.1 Communication port definition

APX 5.0~30.0P-S2 AU			MOD 3-10KTL3-XH (BP)			MID 11-30KTL3-XH			
Silk screen	Terminal serial number	Definition	Silk screen	Terminal serial number	Definition	Silk screen	Terminal serial number		Definition
							A	B	
INV	1	WAKE-(W-)	COM	10	BAT.EN-	COM	10	30	BAT.EN-
	2	WAKE+(W+)		9	BAT.EN+		9	29	BAT.EN+
	7	RS485_B(B)		8	RS485B2		8	28	RS485B2
	8	RS485_A(A)		7	RS485A2		7	27	RS485A2

MOD 3-10KTL3-XH (BP)



MID 11-30KTL3-XH



4.4.2 System connection

NOTICE	➢ A DC switch (switch-disconnector) has been installed in the Power Module. Therefore, a DC circuit breaker is not recommended to be installed between the battery system and the hybrid inverter system. If you have installed a DC circuit breaker, do not perform operations on the DC circuit breaker with power-on, otherwise the machine may be damaged. And you need to purchase the breaker with the following specifications by yourself: a. Voltage: 1000Vdc b. Current: 35A

4.4.2.1 Battery Capacity Description

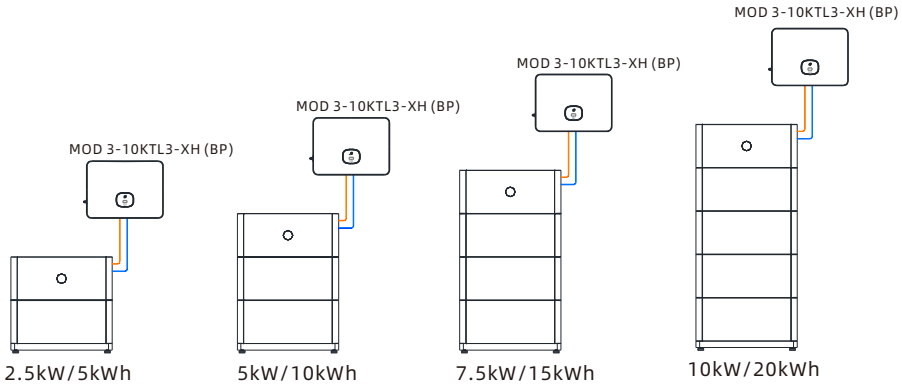


Figure 4-19: Installation diagram of the battery system with a battery capacity of 5kWh to20kWh

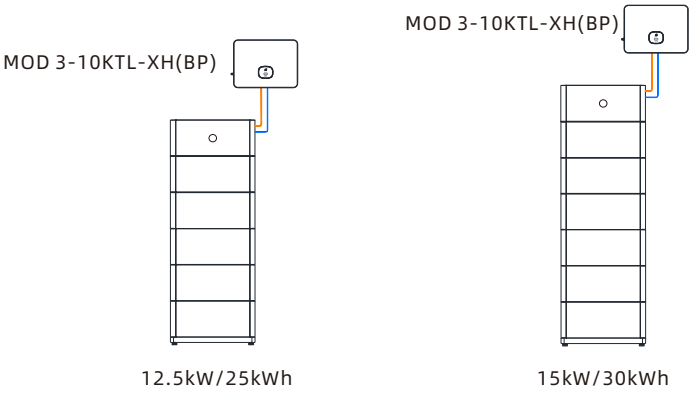


Figure 4-20: Installation diagram of the battery system with a battery capacity of 25kWh and 30kWh

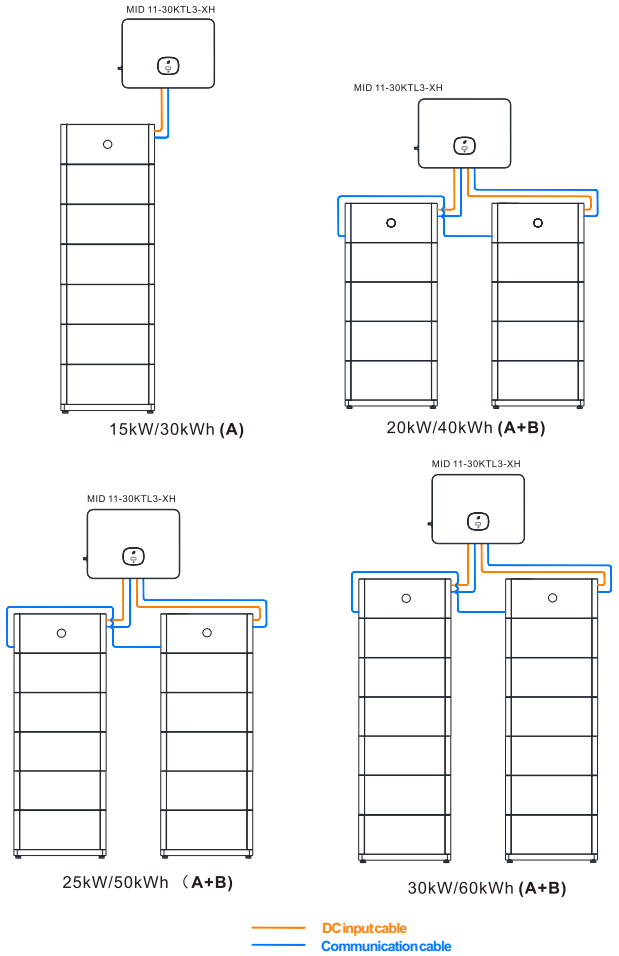


Figure 4-21: Installation diagram of the battery system with a battery capacity of 40kWh to 60kWh

Fig 4-20 Note:
When installing in two columns, please purchase two bases and the parallel extension cables, which include power cables, communication cables, and ground cables.

Fig 4-21 Note:ee:
If two APXs are cascaded, please purchase the cascade communication cable and select the positions for installing the APX and hybrid inverters considering the length of the cables.

4.4.2.2 System connection diagram

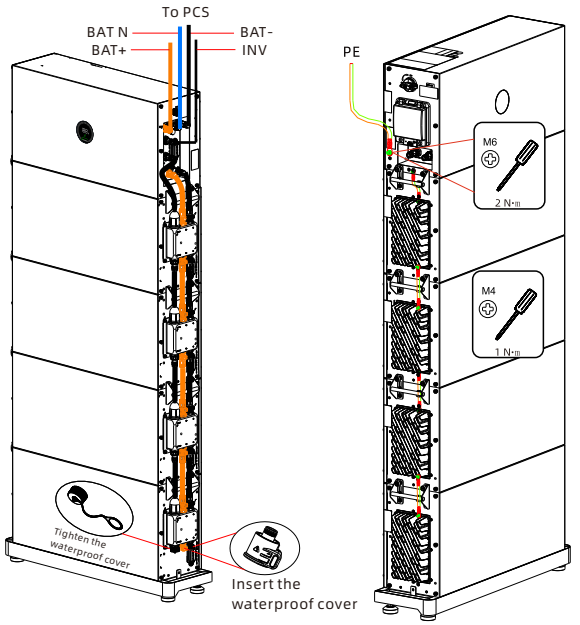
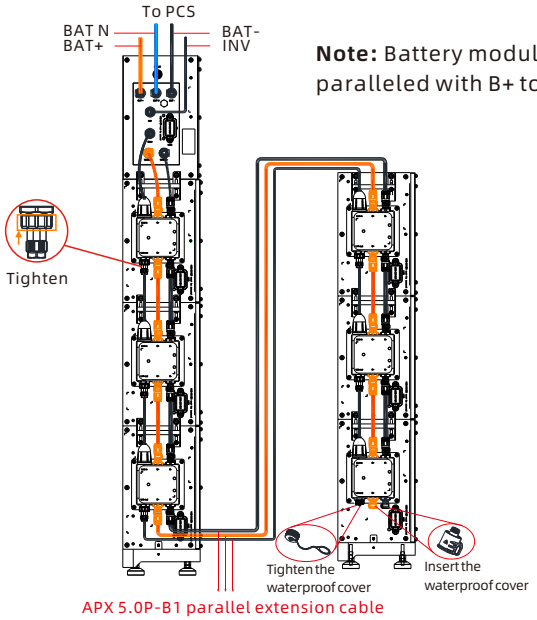


Figure 4-22: Single-column installation



Note: Battery modules must be paralleled with B+ to B+,B- to B-

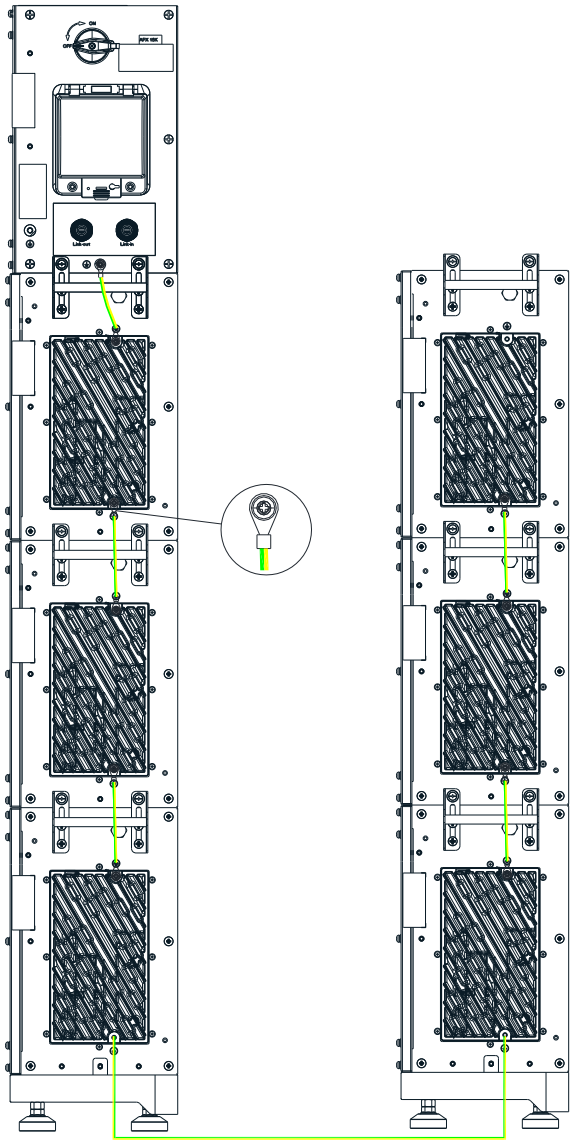
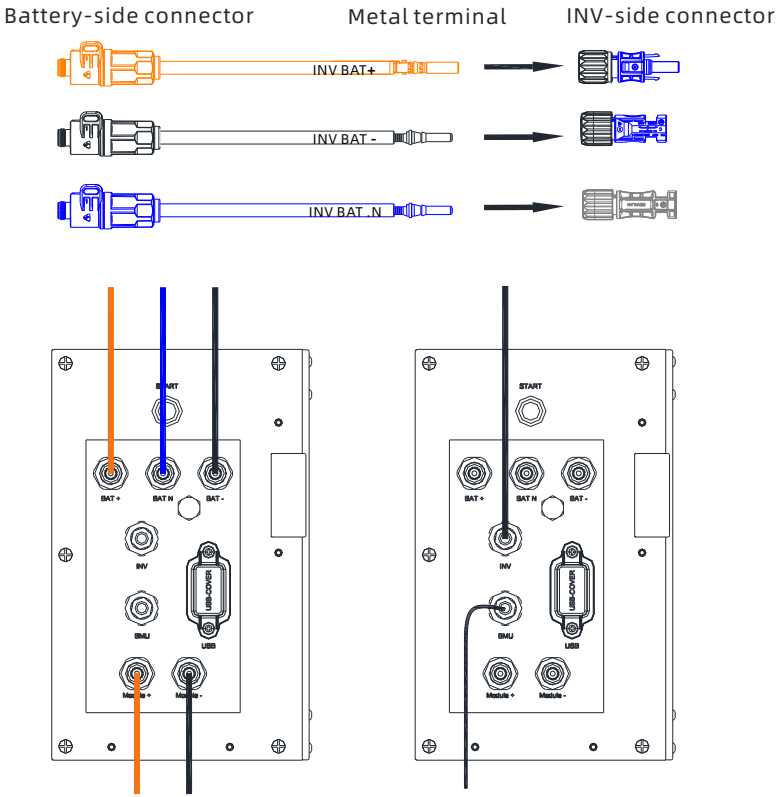


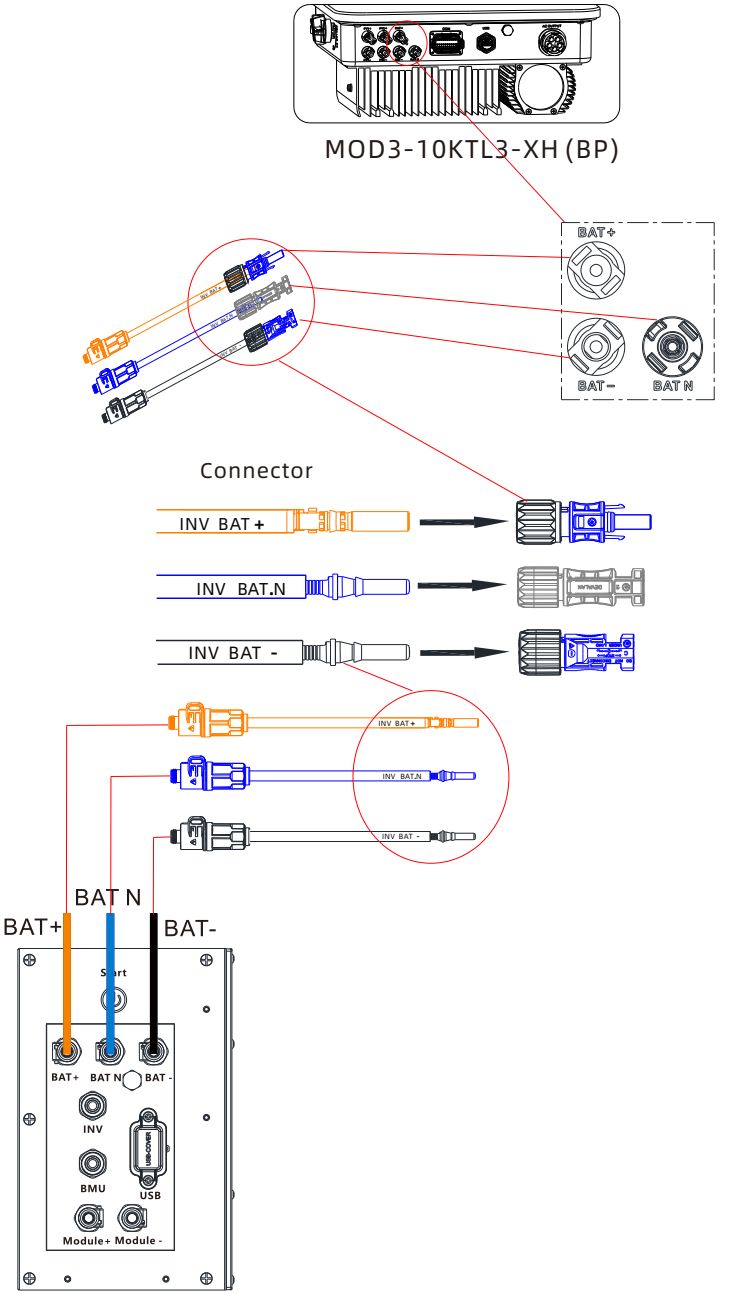
Figure 4-23: Two-column installation

Note:
The battery is not allowed to be installed when the machine is running. Ensure that all the lights indicating “RUN” of battery modules are off before installation. Ensure that the PE cable is securely connected.

4.4.2.3 Electrical wiring connection

A. APX 98034-P2 (Power Module) wiring





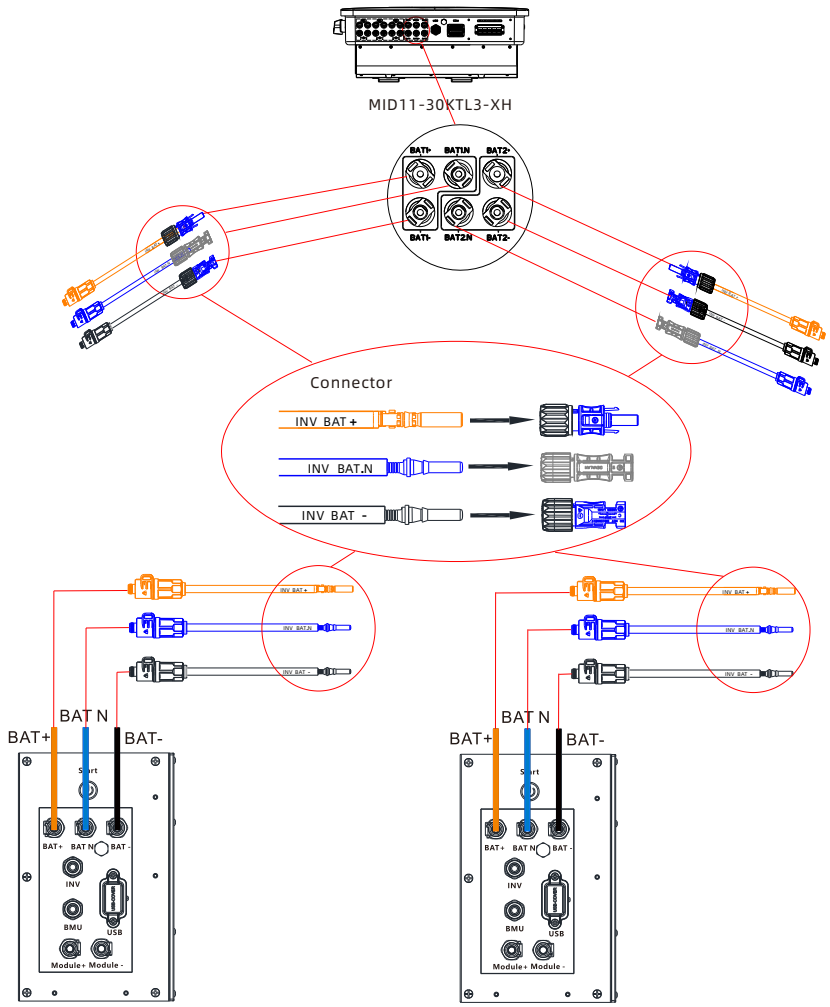


Figure 4-24: APX 98034-P2 wiring diagram

Step 1: Check the diagram carefully and insert the metal terminal to the corresponding connectors referring to the diagram.

Step 2: Insert the power cable into the corresponding port. The click sound indicates a robust connection. The power cables are delivered with the Power Module.

Step 3: Insert the communication cable into the "INV " port and "BMU" port, and then tighten the communication terminal clockwise. The INV communication port is used for communication connection with the hybrid inverter, and the BMU communication port is used for communication connection with the Battery Module by connecting to the "Link-in" port of the Battery Module. The communication cables are delivered with the Power Module.

NOTICE

- For a single APX battery system, the “Link-in” and “Link out” port of the Power Module don't need to be connected as they are only used for cascading the APX battery systems. For the cascaded system, connect the “Link out” port of the Power Module to the “Link in” port of another Power Module. Please pay attention to the connector color when connecting the power cables. Stick to the color conventions - orange to orange and black to black.
- Ensure that the PE cable is securely connected.
- This area is a restricted access area, which is explained below:
  - Area accessible only to electrically skilled persons and electrically instructed persons with the proper authorization.
  - Note 1 to entry: An electrically skilled person is a person who has received special education and adequate training in safety rules for the operation of the electrical installations.
  - Note 2 to entry: An electrically instructed person is a person who are informed of the safety rules for operating electrical equipment and can perform some operations under the supervision of skilled persons.
- When wiring the communication cable, remember to tighten the protective cover of the communication cable; otherwise it might undermine the waterproof performance. (Water penetration caused by failure to do so is beyond the scope of warranty.)
- Upon completion of firmware upgrade, you must secure the USB COVER.
- The waterproof cover for the power module accessory kit must be connected to the power terminals B+ and B- at the base of the final battery module.

B. APX 5.0P-B1 (Battery module) wiring

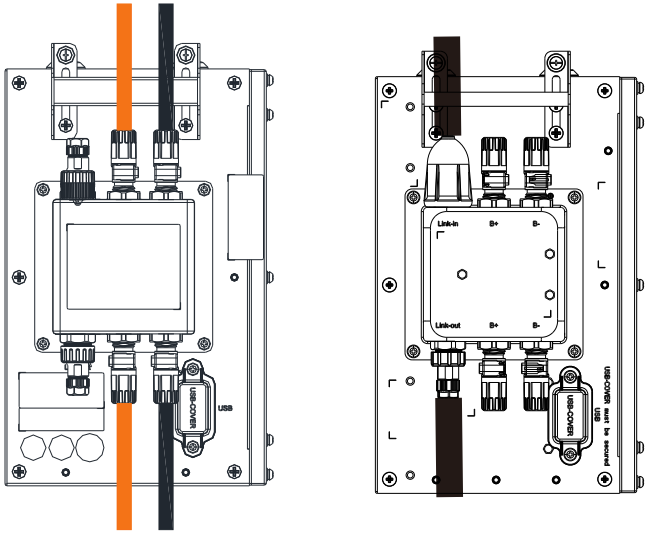


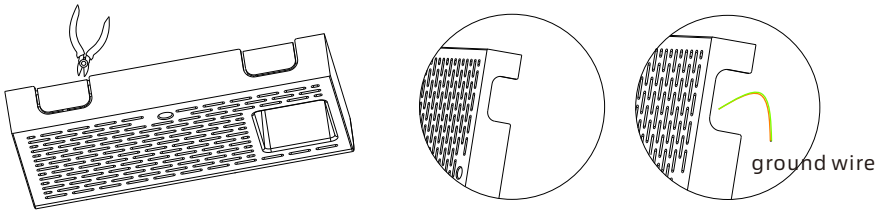
Figure 4-25: APX 5.0P-B1 wiring diagram

Step 1: Insert the power cable into the corresponding port. The click sound indicates a robust connection.
Step 2: Insert the communication cables into the "Link-in" and "Link out" port, and then tighten the communication terminals clockwise.
Step 3: The "Link out" port of the last battery module does not need to be connected. Tighten the dust cover.

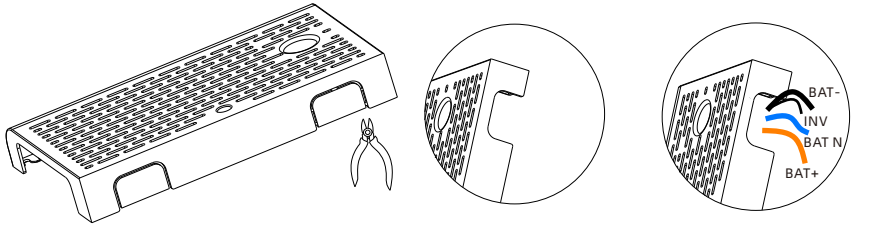
NOTICE	➢ The last battery module refers to the battery module that is the most distant from the power module. ➢ Please pay attention to the connector color when connecting the power line. Stick to the color conventions - orange to orange,blue to blue,black to black. ➢ When wiring the communication cable, remember to tighten the protective cover of the communication cable; otherwise it might undermine the waterproof performance. (Water penetration caused by failure to do so is beyond the scope of warranty.) ➢ Upon completion of firmware upgrade, you must secure the USB COVER.

4.4.2.4 External Electrical Connections of the APX

Step 1: Cut the cable hole according to the wiring mode.
Step 2: Cover it with a protective rubber ring, and route external cables through the cable hole.



APX 98034-P2 Left trim-cover



APX 98034-P2 Right trim-cover

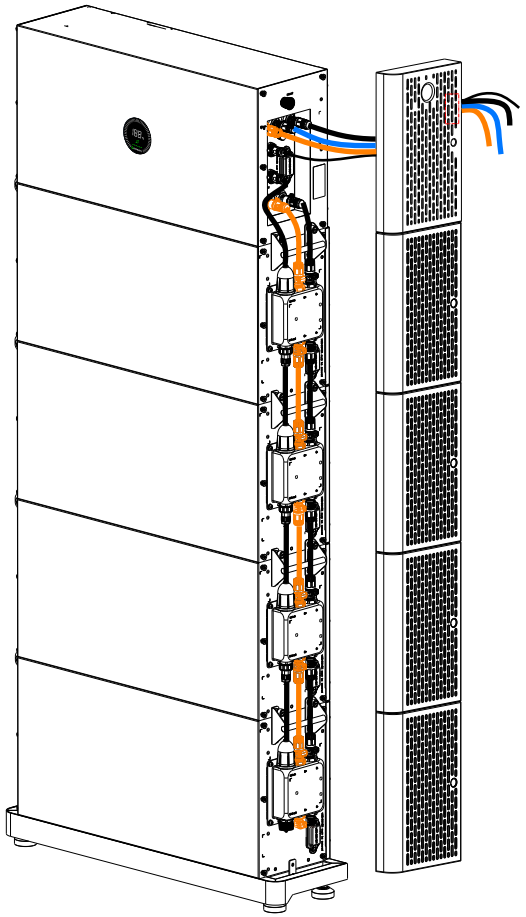


Figure 4-26: Installing external cables

Power on/off the APX Battery 5 system

NOTICE	➢ Personnel who install and operate the Battery System must receive thorough training and possess the local national required qualifications before operation. Only qualified professionals and trained personnel are allowed to install, operate and maintain the equipment. ➢ Please stand on dry insulating objects and do not wear conductive material such as watches and necklace during operation. Insulated tools should be used. ➢ Avoid contact with any parts with electric potential difference. ➢ Hang the warning sign: Do not touch. Authorized personnel only. ➢ If abnormality is found when the equipment is energized, turn off the DC switch of the power module immediately. After the fault is rectified, turn on the switches again. ➢ Make sure the inverter is off before checking the APX battery system. ➢ When connected to an inverter, the APX 5.0~30.0P-S2 AU high voltage battery system can be monitored via RS485 **communication**. If an external monitoring module is used, user can monitor the battery modules via the server remotely. Additionally, the APX 5.0-30.0P-S2 HV battery system can be remotely monitored via the inverter.

5.1 Power on the APX Battery System

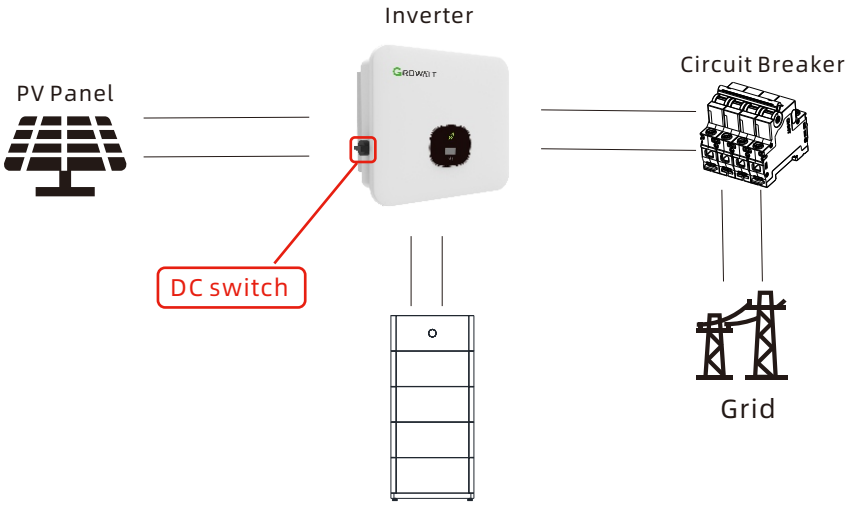


Figure 5-1

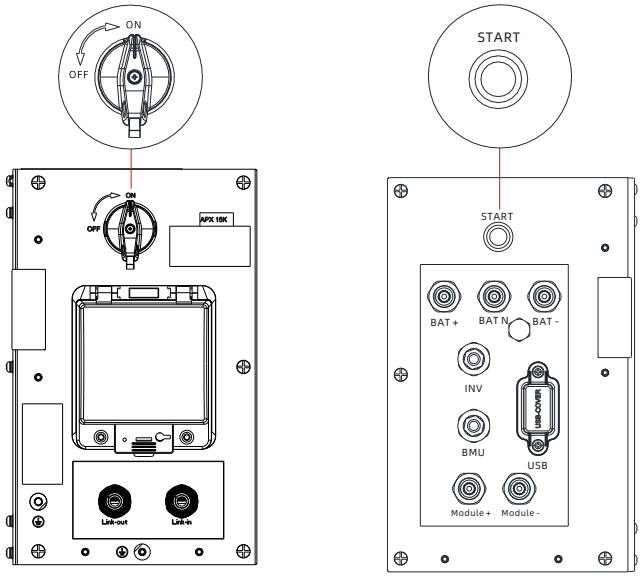


Figure 5-2

➢ Before turning on the battery, please check if the cable is properly connected.

Power on the APX battery system:

Step 1: Turn on the DC switch of the Power Module(Figure 5-2).
Step 2: Turn on the DC switch of the inverter(Figure 5-1).
Step 3: Turn on the circuit breaker connecting the inverter and the load on the back-up box(if the inverter is connected to the back up box).
Step 4: Turn on the circuit breaker connecting the inverter to the grid(Figure 5-1).
Step 5: Press the START key and hold for five to eight seconds(Figure 5-2).
Step 6: Observe the LED on the Power Module and inverter.

NOTICE	➢ In case that the switch is OFF when energizing the equipment, do not turn it on immediately; otherwise, the fuse may be damaged. The APX battery system will automatically shut down in a few minutes after the LED indicator and the logo “Growatt” go off. Do not turn on the switch until it is completely powered off.

5.2 Power off the APX Battery system

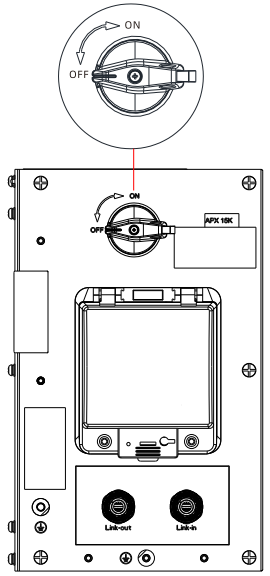


Figure 5-3

Step 1: Turn off the circuit breaker connecting the inverter to the grid(Figure 5-1).
Step 2: Turn off the DC switch of the inverter(Figure 5-1).
Step 3: Turn off the DC switch of the Power Module(Figure 5-2).
Step 4: Wait for 15 minutes until the LOGO indicator (GROWATT) on the APX turns off, indicating that the system is completely powered off.

NOTICE	➢ The APX battery system cannot be restarted until it is powered off completely.

6 Maintenance Guide

6.1 Preparation

After the system is powered off, the remaining electricity and heat still exist in the chassis, which may cause electric shocks or burns. Therefore, you need to wear protective gloves and perform operations 10 minutes after the system is powered off.

6.2 Replace a fuse

Step 1: Power off the APX system.
Step 2: Loosen the screws on the fuse shell.
Step 3: Lift the fuse box opening, remove the fuse, insert a new fuse into the slot, and close the fuse box.
Step 4: Tighten the screws on the fuse shell.

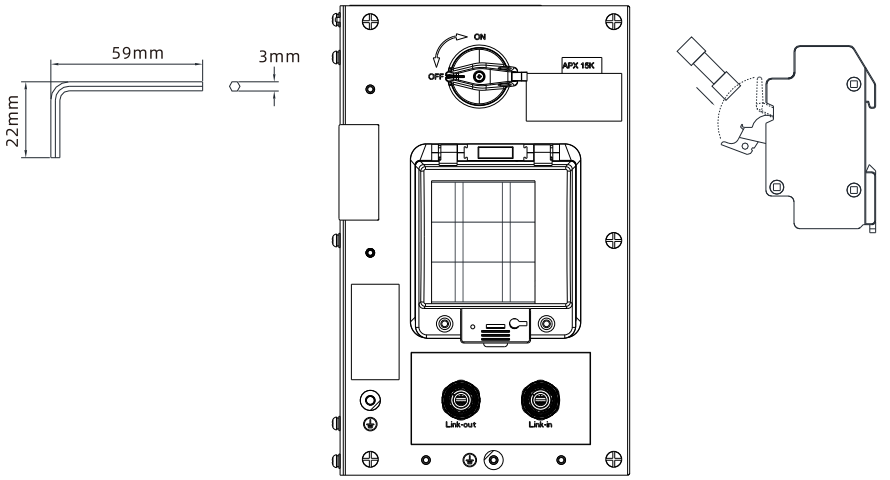


Figure 6-1: Replace a fuse (PN:021.0012400)

NOTICE	➢ After the system is powered off, the remaining electricity and heat still exist in the chassis, which may cause electric shocks or burns. Therefore, you need to wear protective gloves and perform operations 10 minutes after the system is powered off.

6.3 Battery Module or Power Module replacement

- **NOTE:** Replace the Battery Module if the following conditions occur: The internal circuit of the Battery Module is faulty, the battery health reaches the end point, the Battery Module appearance is deformed, damaged, or leaks.
- Wear safety gloves.
- Turn off the switches to power off the battery system and wait for 10 minutes.
- Remove the trim covers on both sides.
- Disconnect power cables and CAN communication cables of the battery system.
- Wall-mounted battery system: unscrew the safety screws on both sides of the battery pack or the high voltage controller. Lift up the battery pack or the high voltage controller.
- Floor-mounted battery system: unscrew the safety screws on both sides of the battery pack or the high voltage controller. Lift up the Battery Module or the Power Module.
- Put the battery pack or the high voltage controller back into the packing case according to the repair procedures and transport the Battery Module or the Power Module to the designated site.
- Install new Battery Module or Power Module following the procedures specified in Section 4.

NOTICE	➢ The Battery Module contains batteries. Dispose of them in compliance with local laws and regulations. ➢ After the system is powered off,beware the residual heat of the heat sink to avoid burns.

6.4 LED indicators

			Meaning 指示含义
Steady white 白灯常亮	Blinking green at long intervals 绿灯慢闪	Steady green 绿灯常亮	Standby mode 待机模式
Blink in a clockwise direction 顺时针转	Steady green 绿灯常亮	N/A	Charging mode 充电模式
Blink in an anti-clockwise direction 逆时针转	Steady green 绿灯常亮	N/A	Discharge mode 放电模式
N/A	Blinking green at short intervals 绿灯快闪	N/A	Protect 保护
N/A	Steady red 红灯常亮	N/A	System failure 系统故障
N/A	Blinking red at long intervals 红灯慢闪	Steady red 红灯常亮	Battery module failure 电池模块故障
8 LED indicators blink clockwise and “UP” is displayed 8个LED顺时针转和数显显示UP	N/A	N/A	Upgrade 升级
Off	Off	Off	Hibernation mode休眠模式
Blinking green at short intervals (on for 0.5s and then off for 0.5s,on for 0.5s and then off for 2s) 绿灯快闪(亮0.5s,灭0.5s/亮0.5s,灭2s)			
Blinking green at long intervals (on for 0.5s and then off for 2s) 绿灯慢闪(亮0.5s,灭2s)			
Blinking red at long intervals (on for 1s and then off for 1s) 红灯慢闪(亮1s,灭1s)			

Figure 6-2: LED indicators

➢ If the LED indicators are not displayed, you can knock the enclosure below the display to activate the screen.

6.5 Troubleshooting

Indicator ALM	Description	Suggested measures
 (Steady red) Power Module	System failure	Please refer to Section 6.6 Power Module Fault Code List
 (Blinking green at short intervals) Power Module	Protection	Please refer to Section 6.6 Power Module Protect Code List

Indicator ALM	Description	Suggested measures
 (Steady red) Batter Module	System failure	Please refer to Section 6.6 Battery Module Fault Code List
 (Blinking green at short intervals) Batter Module	Protection	Please refer to Section 6.6 Battery Module Protect Code List

6.6 System fault information list and troubleshooting suggestions

PM (Power Module) Error Code List

Error Code	Fault Description	Troubleshooting suggestions
Error 407(0)	BM output power cable connection is abnormal	1. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then check if the power cables between BM and PM are connected properly. After confirming they are securely connected, turn on the breaker and long press the START button to power on the machine; 2. If the fault message persists, contact the manufacturer.
Error 411(0)	Communication between the PM and Inverter is abnormal	1. Check if the communication cable between PM and INV is properly connected after shutdown; 2. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the START button to power on the machine; 3. If the fault message persists, contact the manufacturer.
Error 411(1)	Communication between the PM's monitoring and main control chip is abnormal	1. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the START button to power on the machine. 2. If the fault message persists, contact the manufacturer.
Error 411(5)	Communication between the PM and BM is abnormal	1. Observe if the PM and BM are powered on normally; 2. Check if the communication cable between PM and BM is properly connected after shutdown; 3. Turn on the breaker and long press the START button to power on the machine; 4. If the fault message persists, contact the manufacturer.

Error Code	Fault Description	Troubleshooting suggestions
Error 411(6)	PM parallel operation failed	1. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the START button to power on the machine. 2. If the fault message persists, contact the manufacturer.
Error 411(7)	PM detects that the parallel operation with multi-master failed	1. Check if the communication cable between BM and BM is properly connected after shutdown; 2. Turn on the breaker and long press the START button to power on the machine; 3. If the fault message persists, contact the manufacturer.
Error 417(1)	When a mismatch between software and hardware MODEL is detected, it is set immediately.	Turn off the air circuit breaker of the PM and disconnect the communication cable between the PM and BM. Wait 12 minutes. Confirm that the whole system has been completely powered off, and contact the manufacturer.
Error 419(5)	PM's software and hardware versions are inconsistent	1. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the START button to power on the machine. 2. If the fault message persists, contact the manufacturer.
Error 506(2)	PM fuse blown	1. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the STARTto power on the machine and check if it is in normal operation; 2. If the fault message persists, contact the manufacturer.

Error Code	Fault Description	Troubleshooting suggestions
Erro506(3)	PM output short-circuited	1. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the STARTto power on the machine and check if it is in normal operation; 2. If the fault message persists, contact the manufacturer.
Error 510(0)	PM is in production aging mode	Contact the manufacturer to replace the PM.
Error 700(0)	Internal temperature sampling resistor is open-circuited	If the device temperature is higher than -20 ℃ and the fault message persists after restart, please contact the manufacturer to replace the PM.

PM (Power Module) Protect Code List

ProtectCode	Fault description	Troubleshooting suggestions
Protect 408(0)	Temperature of heat sink in BM or PM is too high	1. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press theSTART button to power on the machine; 2. If the fault message persists, contact the manufacturer.
Protect 410(2)	Battery USB communication is abnormal	1. Re-insert the USB flash drive; 2. Replace the USB flash drive; 3. If the fault message persists, contact the manufacturer.
Protect 416(1)	Hardware malfunction	1. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then check if the PV configuration is oversized and if the PV open-circuit voltage is excessively high (1100V for 15k, 12k and 7.5k models; and 560V for the 6.2k model); 2. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press theSTART button to power on the machine; 3. If the fault message persists, contact the manufacturer.
Protect 500(7)	PM detects that a BM comes offline	1. Check if any BM is shut down; if so, long press theSTART button to power it on, then check if the fault is cleared; 2. If the fault message persists, turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then check if the communication cable between the BM and BM is properly connected. After that, turn on the breaker and long press theSTART button to power on the machine; 3. If the fault message persists, contact the manufacturer.

ProtectCode	Fault description	Troubleshooting suggestions
Protect 500(9)	Communication between PMs in the system with multiple clusters in parallel is abnormal	1. Power off the system, then check if the communication cable between PM and PM is properly connected; 2. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the START button to power on the machine; 3. If the fault message persists, contact the manufacturer.
Protect 603(1)	PM output soft start failed	1. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Disconnect the power cables between PM and INV. Then turn on the breaker and long press theSTART button to check if PM soft start is successful. 2. If the fault message persists, contact the manufacturer.
Protect 707(0)	Overload protection	1. Check the output load and reduce the load power; 2. Wait for 10 minutes and it will recover automatically.

BM (Battery Module) Protect Code List

Error Code	Fault Description	Troubleshooting suggestions
Error 411(1)	Communication between the PM's monitoring and main control chip is abnormal	1. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the START button to turn on the machine; 2. If the fault message persists, contact the manufacturer.
Error 411(5)	BM communication is abnormal	1. Observe whether both PM and BM are normally powered on; 2. Shut down the machine. Check whether the communication cable between PM and BM is normal; 3. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the START button to turn on the machine;4. If the fault message persists, contact the manufacturer.
Error 411(6)	BM parallel operation failed	1. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the START button to turn on the machine; 2. If the fault message persists, contact the manufacturer.
Error 411(7)	BM parallel operation with multi-master failed	1. Shut down the machine. Check if the communication cable between BM and BM is normal; 2. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the START button to turn on the machine; 3. If the fault message persists, contact the manufacturer.
Error 416(6)	LLC resonant inductor is abnormal	Contact the manufacturer to replace the BM.

Error Code	Fault Description	Troubleshooting suggestions
Error 419(5)	BM's software and hardware versions are inconsistent	1. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the START button to turn on the machine; 2. If the fault message persists, contact the manufacturer.
Error 502(0)	Battery voltage is low	Check if the battery-side voltage is within normal range (single pack > 32V or so) through web monitoring data. If the battery voltage is lower than 32V, please contact the manufacturer to replace BM.
Error 700(0)	Internal temperature sampling resistor is open-circuited	If the temperature of the device is higher than -20 ℃ and the fault persists after reboot, please contact the manufacturer to replace the BM.
Error 1030	Single cell failure	1. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the “START button to turn on the machine; 2. If the fault message persists, contact the manufacturer.
Error 1035	Front-end chip failure	1. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the “START button to turn on the machine; 2. If the fault message persists, contact the manufacturer.
Error 1062	Single cell overvoltage protection failure	1. The battery has been fully charged and it will recover automatically. 2. If the fault message persists, contact the manufacturer.

Error Code	Fault Description	Troubleshooting suggestions
Error 1074	FUSE failure	1. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the “START button to turn on the machine; 2. If the fault message persists, contact the manufacturer.
Error 1075	UART communication failure	1. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the “START button to turn on the machine; 2. If the fault message persists, contact the manufacturer.
Error 1105	High temperature failure	1. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the “START button to turn on the machine; 2. If the fault message persists, contact the manufacturer.

BM (Battery Module) Protect Code List

ProtectCode	Fault description	Troubleshooting suggestions
Protect 408(0)	BM heat sink temperature is too high	1. The system will automatically recover after the battery cools down; 2. If the fault message persists, contact the manufacturer.
Protect 410(2)	Battery USB communicatio n is abnormal	1. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the START button to turn on the machine; 2. If the fault message persists, contact the manufacturer.
Protect 416(1)	Hardware malfunction	1. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the START button to turn on the machine. If the fault message persists, please check the alarm message via the monitoring data on the web, and take corrective measures according to the BMS fault info. 2. If the BMS does not report an alarm, but report the hardware failure for a couple of days in a row, contact the manufacturer to replace the device.
Protect 502(1)	BM output voltage is low	1. It will automatically recover after one hour, or turn off the air circuit breaker of the PM, confirm that the whole system has been completely powered off, then restart it; 2. If the fault message persists, contact the manufacturer.
Protect 507(0)	Received the battery operating status “Fault” from the BMS	1. Check the BMS battery fault info and take corrective measures according to the BMS battery fault info table.

ProtectCode	Fault description	Troubleshooting suggestions
Protect 603(2)	BUS soft start failed	1. It will automatically recover after 1 hour, or turn off the air circuit breaker of the PM, confirm that the whole system has been completely powered off, then restart it; 2. If it still reports protection after restarting and continues to report Protection 603-2 for several days in a row, please contact the after-sales personnel.
Protect 707(0)	Overload fault	1. If it is running in off-grid mode, reduce the load at home, and it will automatically recover after 10 minutes. If an error is reported in grid-connected mode, please contact the manufacturer.
Protect 1001	Cell charging overvoltage protection (level 1)	1. The battery is fully charged and charging is limited. It will recover automatically.
Protect 1003	Discharge undervoltage protection	1. The battery has been discharged completely and discharging is limited. It will recover automatically.
Protect 1005	Large single cell voltage difference protection	1. The battery voltage difference is large, charging and discharging are limited, and it can automatically recover; 2. If the fault message persists, contact the manufacturer.
Protect 1007	Charging total voltage overvoltage protection	1. The battery is fully charged and charging is limited. It will recover automatically.
Protect 1009	Discharge total voltage undervoltage protection	1. The battery has been discharged completely and discharging is limited. It will recover automatically.
Protect 1013	Discharge high temperature protection	1. The battery temperature is too high, charging and discharging are limited, and it can automatically recover.

ProtectCode	Fault description	Troubleshooting suggestions
Protect 1015	Discharge low temperature protection	1. The battery temperature is too low, charging and discharging are limited, and it can automatically recover.
Protect 1017	Large PACK temperature difference protection	1. The battery temperature difference is too large, charging and discharging are limited, and it can automatically recover; 2. If the fault message persists, contact the manufacturer.
Protect 1021	Discharge overcurrent protection	1. The battery current is too large, and discharging is limited. It can automatically recover.
Protect 1023	Charging overcurrent protection	1. The battery current is too large, and charging is limited. It can automatically recover.
Protect 1025	External CAN communicatio n protection	1. Observe whether PM and BM are powered on normally; 2. After shutdown, check if the communication cable between PM and BM is properly connected; 3. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the START button to power on the machine;4. If the fault message persists, contact the manufacturer.
Protect 1029	Precharge timeout	1. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the “START button to power on the machine; 2. If the fault message persists, contact the manufacturer.
Protect 1031	Current sampling fault protection	1. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the “START button to power on the machine; 2. If the fault message persists, contact the manufacturer.

ProtectCode	Fault description	Troubleshooting suggestions
Protect 1034	Charging high temperature protection	1. The battery temperature is too high, and charging is limited. It can automatically recover.
Protect 1038	EEPROM fault protection	1. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the “START button to power on the machine; 2. If the fault message persists, contact the manufacturer.
Protect 1039	Low temperature charging and current limiting no response protection	1. The temperature is too low. Charging current exists, while charging is limited. It can automatically recover when the temperature rises; 2. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the START button to power on the machine; 3. If the fault message persists, contact the manufacturer.
Protect 1041	Charging low temperature protection	1. The temperature is too low, and charging is limited. It can automatically recover.
Protect 1042	Module voltage (sampling) abnormality protection	1. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the “START button to power on the machine; 2. If the fault message persists, contact the manufacturer.
Protect 1044	EEPROM calibration parameter fault protection	1. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the “START button to power on the machine; 2. If the fault message persists, contact the manufacturer.

ProtectCode	Fault description	Troubleshooting suggestions
Protect 1047	Internal ambient temperature over-high protection	1. The internal ambient temperature is too high. Charging and discharging are limited. 2. It can automatically recover.
Protect 1087	SOH too low protection	1. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the “START button to power on the machine; 2. If the fault message persists, contact the manufacturer.
Protect 1088	Low temperature charging overcurrent protection	1. The temperature is too low, charging current exists, charging is limited, and it can automatically recover.
Protect 1099	Low temperature overvoltage protection	1. The temperature is too low and the voltage has reached full charge. It can automatically recover; 2. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the START button to power on the machine; 3. If the fault message persists, contact the manufacturer.
Protect 1128	BOOT area flash is damaged	1. Turn off the air circuit breaker of the PM. Confirm that the whole system has been completely powered off. Then turn on the breaker and long press the “START button to power on the machine; 2. If the fault message persists, contact the manufacturer.

6.7 Cleaning

➢ Checking the heat dissipation

In case that output reduction of the APX battery system occurs regularly due to high temperature, please improve the heat dissipation conditions, such as cleaning the heat sink.

➢ Cleaning the APX battery system

If the enclosure of the battery system gets dirty, shut down the system and wait until it is completely powered off. Clean the enclosure and the display with a moistened cloth. Do not use any cleaning agents, e.g. solvents or abrasives.

➢ Checking the DC switch and cables

Check for any externally visible damage and discoloration of the DC switch and cables regularly. If any visible damage of the DC switch is found, or the cable is damaged or discolored, please contact the installer.

Turn the knob switch from On to Off 5 times in a row every year, which cleans the touch area of the knob switch and extends its electrical endurance.

6.8 Expansion

➢ New battery module selection:

The model number of the battery modules must be consistent.

➢ Steps to add a new battery module:

Step 1: Power off the APX battery system (see Chapter 5).

Step 2: Connect the new battery module to the system (see Chapter 4).

Step 3: Power on the APX battery system (see Chapter 5).

Step 4: Set the Battery First mode and charge the battery system to 100% SOC.

Step 5: Complete the installation of the new battery module.

NOTICE	➢ Failure to follow the instructions specified in this manual might affect the performance of the battery system and the system may even fail to operate normally.

7 Technical Specifications

7.1 APX 98034-P2 (Power Module)

No.	Items	Specifications
1	Model	APX 98034-P2
2	B+/B- voltage range	330V-450V
3	BAT+/BAT- voltage range	600V-980V
4	Maximum current	26A
5	Peak current	34A
6	Operating temperature range	-10~50℃
7	IP rating	IP66
8	Communication method	CAN2.0
9	Dimensions (W/D/H)	690*185*295 mm ±2mm
11	Weight	16±1kg
11	Certification & Licensing	IEC62040/IEC62477/IEC62619/CE /RCM/VDE2510-50/UKCA
12	Environment requirements	RoHS

7.2 APX 5.0P-B1 (Battery Module)

No.	Items	Specifications
1	Module	APX 5.0P-B1
2	Nominal Capacity/Energy	100Ah/5kWh
3	Rated Usable Capacity/Energy	100Ah/5kWh
4	Rated Voltage	385V
5	Operating Voltage	330-450V
6	Rated current (25℃)	7.6A
7	Maximum current (25℃)	12.5A
8	Battery Type	Cobalt Free Lithium Iron Phosphate (LFP)
9	Operating temperature range	-10~50℃
10	Storage conditions	-20℃~10℃/12 months; 10℃~30℃/9 months; 30℃~50℃/6months; 5%-95%RH
11	Cooling	Natural cooling
12	Dimensions (W/D/H)	690/185/295mm±2mm
13	Weight	50±1kg
14	Installation	Wall-mounted installation/ floor-mounted installation
15	IP rating	IP66
16	Certification & Licensing	IEC62040/IEC62477/IEC62619/CE /RCM/VDE2510-50/UKCA/UN38.3
17	Environment requirements	RoHS
18	Cycle life	4800 cycles(@25±2°C, 0.5C, 60%EOL)

IFpP/51/161/119/[1P16S]M/-10+50/90
Formula for calculating the rated capacity:
Rated capacity of the measured module: 100 Ah
N (Number of modules connected in Parallel): 1~6
Rated capacity (Ah) = 100 Ah *N