Air Cooling Energy Storage System

AELIO-P50B200 / AELIO-P60B200

User Manual

Version 1.0

www.solaxpower.com

eManual in the QR code or at http://kb.solaxpower.com/

STATEMENT

Copyright

Trademarks

and other symbol or design (brand name, logo) that distinguishes the products or services offered by SolaX has been trademark protected. Any unauthorized use of the above stated trademark may infringe the trademark right.

Notice

Please note that certain products, features, and services mentioned in this document may not be within the scope of your purchase or usage. Unless otherwise specified in the contract, the contents, information, and recommendations presented in this document are provided "as is" by SolaX. We do not provide any warranties, guarantees, or representations, whether express or implied.

The content of the documents is reviewed and updated as needed. However, occasional discrepancies may occur. SolaX retains the right to make improvements or changes in the product(s) and the program(s) described in this manual at any time without prior notice.

The images included in this document are solely for illustrative purposes and may differ based on the specific product models.

For more detailed information, kindly visit the website of SolaX Power Network Technology (Zhejiang) Co., Ltd. at www.solaxpower.com.

SolaX retains all rights for the final explanation.

About This Manual

Scope of Validity

This manual is an integral part of AELIO-P50B200 and AELIO-P60B200. It describes the transportation, storage, installation, electrical connection, commissioning, maintenance and troubleshooting of the product. Please read it carefully before operating.

AELIO-P50B200 and AELIO-P60B200 system includes a X3-AELIO series inverter and a AELIO-B200 battery cabinet.

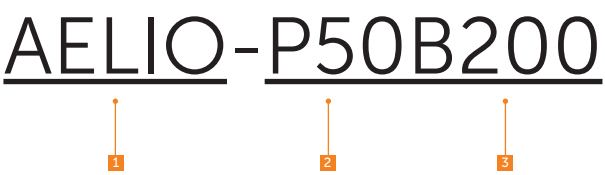
X3-AELIO series inverter model list:

Model	X3-AELIO-50K	X3-AELIO-60K

Battery cabinet model list:

Model	AELIO-B200

Model description



No.	Definition	Description
1	Product name	AELIO: Refer to the name of hybrid energy storage system.
2	Power	P50: Indicate that the rate power of the inverter is 50 kW.
3	Battery capacity	B200: Indicate that the battery capacity is 200 kWh.

Target Group

The installation, maintenance and grid connection setting can only be performed by qualified personnel who

- Are licensed and/or satisfy state and local jurisdiction regulations.
- Have good knowledge of this manual and other related documents.
- A medium-voltage operator is required to obtain any Certifications for High-voltage Electrician.

Conventions

The symbols that may be found in this manual are defined as follows.

Symbol	Description
DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION!	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE!	Provides tips for the optimal operation of the product.

Change History

Version 01 (2025-04-08)

Updated "2.4 Parts Description", added the description about the air conditioner working mode

Updated "Steel foundation".

Updated "7.3 EPS Connection" and "7.4 Grid Connection".

Updated AC side technical data in "13 Technical Data".

Version 01 (2024-12-30)

Updated safety regulation in "1 Safety", "3 Transportation and Storage" and "4 Preparation before Installation".

Updated AC side technical data in "13 Technical Data".

Version 00 (2024-09-09)

Initial release

Table of Contents

1 Safety

1.1 General Safety

Before transporting, storing, installing, operating, using and/or maintaining the device, please carefully read and understand the document, and strictly follow the instructions and safety precautions given herein, as well as symbols affixed on the device. The safety instructions herein are only supplements to local laws and regulations.

The operator should not only abide by all safety precautions provided in the document, including but not limited to the “Danger” sign, "Warning" sign, "Caution" sign, and "Notice" sign, but also comply with relevant international, national and local laws, regulations, standards, guidelines and industry rules in the process of transportation, storage, installation, operation, and maintenance. SolaX will not assume any responsibilities for the loss caused by improper operation, or violation of safety standards for design, production and equipment suitability.

SolaX will not be liable for maintenance for possible device failure, device malfunction, or parts damage, nor will the company assume any liability to pay compensation for the possible physical and property damage resulting from the installation environment that does not meet the design requirements.

The device is well designed and tested to meet all applicable state and international safety standards. However, like all electrical and electronic equipment, safety precautions must be observed and followed during the installation of the device to reduce the risk of personal injury and to ensure a safe installation.

SolaX will not assume any responsibilities if any of the following circumstances occur, including but not limited to:

- Device damage due to force majeure, such as earthquake, flooding, thunderstorm, lighting, fire hazard, volcanic eruption, war, typhoon, tornado, etc.
- Device damage due to human cause.
- Device damage caused by strong vibrations from external factors before, during and after installation.
- Device used or operated against local policy or regulations.
- Failure to follow the operation instructions and safety precautions on the product and in this document.
- Installation and use under improper environment or electrical condition.
- Unauthorized modifications to the product or software.
- Device damage caused during transportation by the customer or the third party.
- Storage conditions that do not meet the requirements specified in this document
- Use of incompatible inverters or devices.

- Installation and commissioning operated by unauthorized personnel who are not licensed and /or satisfy state and local jurisdiction regulations.

1.2 Device Safety

To prevent personal injury or property damage from improper operation, please carefully read the following installation precautions before installation.

1.2.1 Cabinet Safety

DANGER!

- According to the local laws and regulations related to high-altitude work, operators must wear PPE, e.g., a helmet, safety belt, or waist harness, when they work at heights, while the other end of the harness must connect to a secure structure to prevent fall incidents.

WARNING!

- Please prepare tools that meet the requirements before installation, and check the number of tools after installation, to avoid leaving them inside the equipment.
- Please ensure that the cabinet has been thoroughly secured before operating it. Otherwise, it may cause personal injury or equipment damage due to tilting or collapsing the cabinet.
- Please ensure that the cabinet's vents and cooling system are working properly when it is running. If the vents are blocked, it will lead to overheating, and even equipment damage or fire hazard.
- Please ensure that the cabinet's vents and cooling system are kept away from heat sources.
- Do not drill holes in the device to avoid equipment failure.
- If the circumstances that may cause personal injury or equipment failure occur, such as, fluid flowing into the equipment, stop operation and power off immediately. Otherwise, it may cause a short circuit or damage.
- Do not open the cabinet doors on a rainy or high humid day ($\geq$80% humidity). If the doors have to be opened on such days, please take proper protective measures.

CAUTION!

- Do not use a straight ladder. When electrical work is involved, a wooden ladder or an insulated ladder shall be used.
- The equipment shall not be used to provide a backup power source in the following circumstances:
  a. Equipment related to life;
  b. Sensitive precision instruments;
  c. Home appliances will be faulty in the case of a power failure during operation.

NOTICE!

- The signs and messages on the labels and nameplates attached to the device need to be visible and clear.

1.2.2 Battery Safety

DANGER!

- Do not connect the positive and negative poles of a battery together. Otherwise, it may be short-circuited. This will result in an excessive flow of current and large quantities of energy for a short time, and then will cause battery leakage, smoke, the emission of flammable gases, thermal runaway, fire, or even an explosion. Therefore, the battery must be powered off before maintenance.
- If a battery is overheated, it will cause leakage, smoke, release of flammable gases, thermal runaway, fire, or even an explosion. Therefore, please ensure that the installation site shall be well ventilated and kept away from high temperatures.
- Do not dismantle, change, shake, drop, crush, impact, cut, penetrate with a sharp object, or any other ways to damage the battery. Otherwise, it may cause leakage, smoke, emission of flammable gases, thermal runaway, fire, or even an explosion.
- Do not mix different types or makes of the battery. Otherwise, it may cause leakage or rupture, resulting in personal injury or property damage.
- The battery electrolyte is toxic and volatile. Never get in contact with the leaked liquids or inhale gases in the case of the battery leakage or odor, and contact professionals immediately. The professional must wear PPE (including but not limited to safety glasses, safety gloves, gas masks, and protective clothing) before powering off the device, and then contact our company at once after removing the damaged battery.
- Normally, the battery will not release any gases. However, in the following situations: burnt, needle-pricked, squeezed, struck by lightning, overcharged, or subject to other adverse conditions that may cause battery thermal runaway, the battery may be damaged or an abnormal chemical reaction may occur inside the battery, resulting in electrolyte leakage or production of gases. If the battery needs to exhaust flammable gas, safe emission measures must be taken to prevent fire and device corrosion.
- Do not use damaged batteries, and ensure that the installation site must be well ventilated.

WARNING!

- Please read the document carefully before installation, operation and maintenance.
- Must arrange fire-fighting equipment in advance according to the local laws, regulations, and standards while installing and commissioning the device.
- Please check that there is no damage to the outer packaging before and after unpacking, and in the process of storage and transportation. The battery shall be correctly placed or stacked in accordance with the requirements stipulated on the labels to prevent damaging or scrapping the battery resulting from crushing or falling.

⚠ WARNING!

- Must tighten screws securing cables and on the copper bars according to the torque information specified in the document, and check whether they are tightened periodically. For instance, whether there is any rust, corrosion, or any other foreign object on it, and then clean it up if any. Because the loose screw connections may result in excessive voltage drops and large currents, leading to generating a lot of heat and burning the battery.
- The battery should be charged in time after discharge, to prevent battery damage due to overdischarge. If a battery pack is stored for a long time, please periodically recharge it to protect it from damage according to the storage requirements specified in the document.
- Please charge the battery within the specific temperature range because the low temperature may result in a short circuit. Hence, do not charge it when the temperature is below the low limit of the operating temperature.
- Do not use the battery when you find a bulge, or dents on the battery housing, and contact the installer or professional maintenance personnel to dismantle and replace it. The damaged battery must be kept away from other devices and flammable and explosive articles, and do not contact it except for professionals.
- Before operation, ensure that there are no irritating or burning smells around the battery.
- Do not weld or grind near a battery. Because electric sparks or arcs may cause fires.
- Do not step, lead, stand, or set on the battery.

NOTICE!

Transportation requirements for battery:

- Relevant qualifications for the transport of dangerous goods must be obtained by the forwarding agent engaged in such businesses, and they must strictly abide by the local regulations for the transport of dangerous goods.
- Please check the battery before transportation. If a battery leaks, smells, or is damaged, do refuse to transport it.
- Please handle gently in the process of loading and unloading, transportation, and moving a battery to prevent bumping, and take effective moisture-proof measures to prevent personal injuries and battery damage.
- Unless otherwise specified, do not transport the batteries, which are classified as dangerous goods, together with food, medicine, or other additives on the same means of transport.

If the battery leaks electrolyte or any other chemical materials, the electrolyte leakage can lead to toxic gases. Therefore, do not contact with them at all times. In case of accidentally coming into contact with them, please do as follows:

- In case of inhalation: Leave the contaminated area immediately, and seek medical attention at once;
- In case of contact with eyes: Rinse eyes with running water for at least 15 minutes, and seek medical attention;
- In case of contact with skin: Wash the contact area thoroughly with soap, and seek medical attention;
- In case of ingestion: Induce vomiting, and seek medical attention.

NOTICE!

If a fire breaks out where the battery is installed, please do as follows:

- In case a battery is charging when the fire breaks out, provided it is safe to do so, press the emergency stop button and unplug the power cable;
- In case a battery is not on fire yet, use a water-based fire extinguisher or a carbon dioxide extinguisher to extinguish the fire;
- In case a battery catches fire, do not try to put it out, and evacuate immediately;
- A battery may catch fire when it is heated above 150°F/60°C. If the battery catches fire, please evacuate immediately since it will generate noxious and poisonous gases.

Recovery of damaged or wasted battery:

- Dispose of the damaged or wasted batteries according to local laws and regulations instead of placing them in the household trash or curbside recycling bins. Otherwise, it may cause environmental pollution or explosions.
- Ensure that the damaged or wasted batteries are not exposed to the following situations: high temperatures, high humidity, direct sunlight, or corrosive environments.
- Contact a battery recycling company to scrap the battery, which leaks electrolytes, or is damaged or expired.
- Please take protective steps to prevent battery short circuits before moving batteries.
- Please keep away from flammable material storage areas, residential areas, and other population centers when transporting and storing the damaged battery.

1.2.3 Inverter Safety

PV safety

DANGER!

- Exposure to sunlight can result in the generation of high DC voltage by PV modules, which can lead to electric shock causing severe injuries or even death.
- Never touch the positive or negative poles of the PV connecting device, and avoid touching both poles simultaneously.
- Do not ground the positive or negative poles of the PV modules.
- Only qualified personnel can perform the wiring of the PV modules.

WARNING!

- Overvoltage protection with surge arresters should be provided when the PV system is installed. The grid connected inverter is fitted with SPDs on both PV input side and MAINS side.
- Please consult professionals before installing SPDs.
- Make sure that the input DC voltage does not exceed the maximum DC input voltage specified for the inverter. Overvoltage can cause irreversible damage to the inverter, and such damage is not covered by the warranty.
- PV modules should have an IEC61730 class A rating.

Inverter Safety

DANGER!

- Only operate the inverter if it is in a technically faultless condition. Operating a faulty inverter may lead to electric shock or fire.
- Do not attempt to open the enclosure without authorization from SolaX. Unauthorized opening of the enclosure will void the warranty and can result in lethal danger or serious injury due to electric shock.
- Make sure that the inverter is reliably grounded before any operation to prevent the risk of electric shock causing lethal danger or serious injury.
- Only qualified personnel can perform the installation, wiring, maintenance of the inverter by following this document and the related regulations.

WARNING!

- Operators must wear PPE while installation and maintenance of the device.
- During operation, avoid touching any parts of the inverter other than the DC switch and LCD panel.
- Never connect or disconnect the AC and DC connector while the inverter is running.
- Prior to conducting any maintenance, turn off the AC and DC power and disconnect them from the inverter. Wait for 15 minutes to fully discharge the energy.
- Avoid touching the inverter while it is running, as it becomes hot during operation and may cause personal injuries.

CAUTION!

- Make sure that children are supervised to prevent them from playing with the inverter.
- Pay attention to the weight of the inverter and handle it properly to avoid personal injuries.

NOTICE!

- The inverter has an integrated Residual Current Monitoring Unit (RCMU). If an external Residual Current Device (RCD) is required by local regulations, verify the type of RCD required. It is recommended to use a Type-A RCD with a rating of 300 mA unless a lower value is required by the specific local electric codes. When required by local regulations, the use of an RCD type B is permitted.
- Keep all product labels and the nameplate on the inverter clearly visible and well-maintained.

1.2.4 Utility Grid Safety

NOTICE!

- Only connect the inverter to the grid with the permission of the local utility grid company.

1.3 Electrical Safety

DANGER!

- Please make sure that the unit is free from any damage before the electrical connection.
- Do not modify, change, or dismantle the device, do not change the power-on and power-off sequences and the installation procedure written in the document, and please properly and correctly operate it.
- Do not power on the device during installation. Otherwise, it may cause a fire, personal injury, or device damage.
- Must remove earrings, rings, bracelets, watches, and any other metal jewelry before operation, to avoid electrical shock, burns, or even death.
- During operation, special insulated tools must be used to avoid electric shock or short circuit failure. The insulated tools' voltage ratings must exceed the system voltage ratings. Please refer to "12 Technical Data" for system information.

WARNING!

- Please wear PPE, such as, protective clothing, insulating shoes, goggles, safety helmets, insulating gloves, etc., when conducting electrical wiring.
- Do not touch the power supply equipment directly, or through conductors or damp objects.
- Do not touch the parts of the equipment of which warning signs are attached, to avoid personal injury or device damage.

CAUTION!

- Do not power on the device until it has been installed and confirmed by professionals.
- In the event of a fire, evacuate immediately and call the local fire services.

NOTICE!

- Please operate according to the safety code for power station.
- Before installation, it is necessary to set up temporary safety fences or warning lines and hang warning signs in the operation area, to prohibit non-staff from entering here.
- Please make sure that the equipment and its associated switches are off before connecting and disconnecting power cables.

- Please check whether the protective housing and insulating sleeve for an electrical component have been installed correctly after finishing installation, to avoid electric shock.
- Must turn off the output switch of the power supply equipment when maintaining its electrical terminal device and power distribution device.
- If the device is required to be powered off during troubleshooting and diagnosis, please do as the following procedure: power off > electricity testing > connecting grounding cable > hanging warning signs and setting up guardrails.
- Must hang up "Do Not Switch On" warning signs on the relevant switches or circuit breakers before completing maintenance, to prevent power connection. Do not switch on before the fault is solved.
- Do not use water, alcohol, oil, or other solvents when cleaning electrical components inside and outside the device.

NOTICE!

Grounding Requirements:

- The device's grounding impedance shall meet the requirements of local electrical safety standards.
- The equipment shall be permanently connected to a grounding wire within the building's electrical system. Please check whether the device is reliably grounded before operation. The grounding cable should be removed last while dismantling and maintaining the device.
- Do not start the device if it is not fitted with a grounding conductor.
- All acts against the grounding conductor are prohibited.
- If the device is equipped with a three-pronged socket, make sure that the ground prong is reliably grounded.
- For the device that may generate large contact currents, please make sure that the grounding terminal on the housing has been grounded before powering on, to avoid electric shock.

NOTICE!

Cable Requirements:

- When deciding the wire diameter, and connecting or wiring cables, follow the local laws, regulations, and codes to ensure safety.
- When external conditions (e.g., placement method, ambient temperature, etc.) change, the cable type must be verified according to IEC-60364-5-52 or local laws, regulations and standards. For instance, whether the cable's current-carrying capacity meets the requirements.
- Before connecting power cables, please make sure that the cable labels are correctly labelled and the cable terminals are well insulated.
- Do not loop and twist cables while conducting electrical wiring. If the length of the power cable is not enough, please replace it instead of joining or welding. Ensure that all the cables of the correct type and size are fully connected and well insulated, and the edges of cable slots and crossing holes are smooth.

- It is recommended to bundle similar cables with cable ties, to ensure that the inside of the device is neat and tidy and to avoid cable jacket damage.
- Please use fireproof mud to seal the threading openings immediately after finishing wiring, to avoid the entry of water vapour or small animals.
- Cables should be kept away from heaters or other heat sources, because a high temperature environment may result in aging and damage to cable insulation.

2 Product Overview

2.1 System Overview

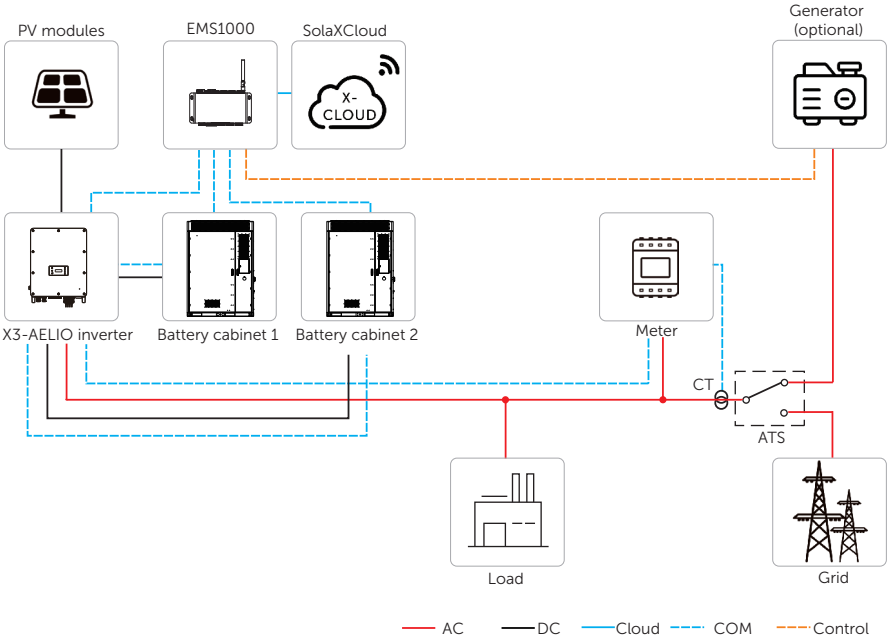


Figure 2-1 System overview diagram

Table 2-1 System item description

Item	Description
X3-AELIO series inverter	The X3-AELIO series inverter manages battery and system energy.
PV modules	PV modules work in MPPT mode. The maximum number of PV MPP tracker is five for 50 kW inverter and six for 60 kW inverter.
Battery cabinet	The AELIO-B200 cabinet integrates high-performance 280Ah LFP battery cells, high voltage box, fire supression system, air cooling system and optional EMS1000 and screen.

Item	Description
Expansion box (optional)	The expansion box provides standardized wiring interfaces. When the battery system needs to increase storage capacity, the expansion box serves as the interface for connecting newly added battery cabinets.
CT/Meter	The CT/meter is used by the inverter for import / export or consumption readings, and manages the battery charge / discharge accordingly for smart energy management applications.
Generator (optional)	SolaX PV-Genset solution ensures optimum interaction between the photovoltaics and diesel generator, which saves fuel, lowers energy costs and ensures a stable and reliable power supply.
Grid	380 / 220 V, 400 V / 230 V and 415 / 240 V grid are supported. Power grid TT, TN-C, TN-C-S can be supported.
EMS1000	EMS1000 is an all-in-one device for photovoltaic energy management. It integrates multiple functions involving the energy system, such as data acquisition, transmission and storage, and real-time interaction with SolaXCloud.
SolaXCloud	SolaXCloud is an intelligent, multifunctional monitoring platform that can be accessed either remotely or through a hard wired connection. With the SolaXCloud, the operators and installers can always view key and up-to-date data. There are two SolaXCloud platforms. Commercial platform can be connected through EMS1000 connection.

2.2 Product Introduction

The product "**AELIO-P50B200**" and "**AELIO-P60B200**", a smart outdoor energy storage system with easy installation and convenient expansion, integrates high-capacity battery packs, a high-performance inverter, EMS1000, high-voltage box, and fire extinguishing system in a cabinet based on the design concept of "ALL-IN-ONE". The industrial and commercial scenarios are designed to be broadly applicable.

The entire system consists of X3-AELIO series inverter, cabinet, battery packs, high-voltage box, distribution box, IO module, EMS1000, switch, and UPS.

2.3 Appearance and Dimension

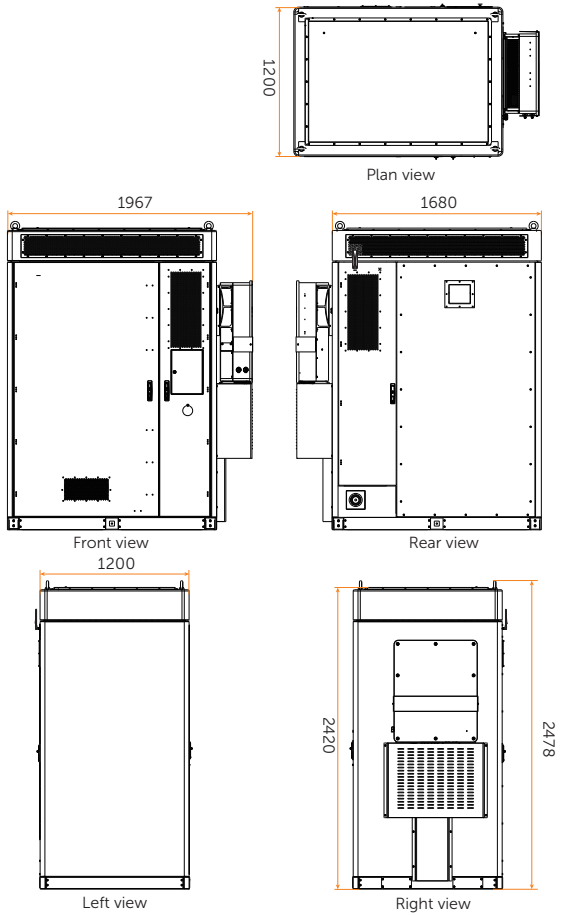


Figure 2-2 Dimension (unit: mm)

2.4 Parts Description

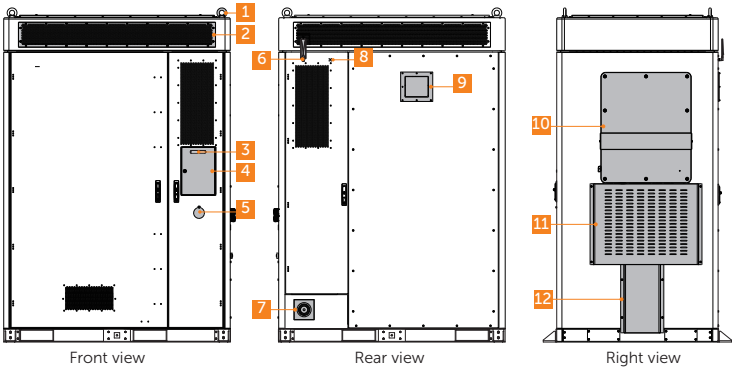


Figure 2-3 Parts description (in the closed state)

Table 2-2 Parts description

No.	Item	Description
1	Eye bolt	Material lifting applications.
2	Air conditioner	Energy storage system air conditioner.
3	LED light	To display status information of all processess running on the system.
4	Display screen	To display information of the whole system (The screen can be seen after opening the screen door).
5	Emergency stop button	To shut down the system in emergency circumstances.
6	Antenna	A 4G antenna, to connect EMS1000.
7	Fire hose nozzle	To connect the water supply sources.
8	A reserved antenna port	To connect wireless meter.
9	Expansion-proof valve	To exhaust the combustible gas out of the cabinet.
10	Inverter	SolaX's X3-AELIO inverter which is not delivered with the cabinet.
11	Large cable cover	To protect and secure cables.
12	Small cable cover	To protect and secure cables.

Inverter

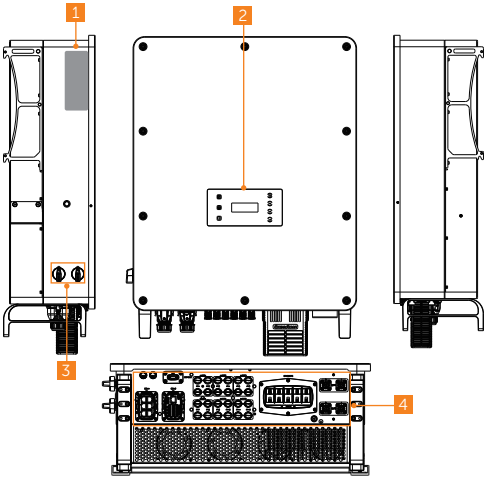


Figure 2-4 Parts description

Table 2-3 Parts description

No.	Item	Description
1	Type label	Type label clearly identifies the device type, serial number, specific DC / AC parameters, certification, etc.
2	LCD panel	Including screen, indicators and keys. Screen displays the information; indicators indicate the status of inverter. Keys are used to perform the parameter setting.
3	DC switch	Disconnect the PV DC input when necessary. DC switch 1 controls MPPT 1, 2 and 3, DC switch 2 controls MPPT 4, 5 and 6.
4	Electrical connection area	Including PV terminals, battery terminals, Grid and EPS terminals, communication terminals, etc.

Battery cabinet

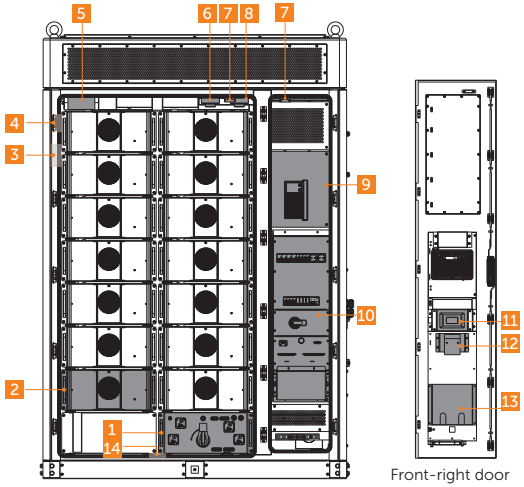
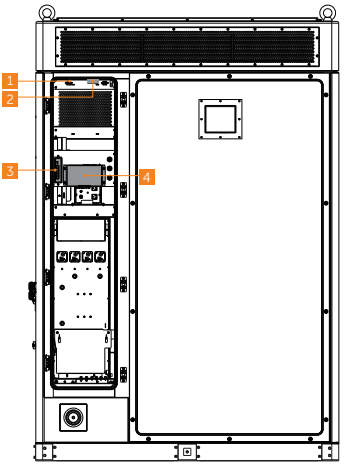


Figure 2-5 Parts description (in the opened state)

Table 2-4 Parts description

No.	Item	Description
1	High-voltage box	To collect current and voltage information on battery tower, ad control the charge and discharge of battery pack.
2	Battery pack	/
3	Temperature and humidity sensor	To measure temperature and humidity.
4	CO detector	To detect CO gases.
5	Automatic fire sprinkler	To control or suppress the spread of fire
6	Smoke detector	To detect smoke.
7	Door sensor	To alert you when the door is open.
8	Temperature sensor	To detect smoke.
9	Control area	Including IO module, UPS, etc. See Figure 2-7 for details.
10	Distribution box	To distribute AC power for the energy storage system.
11	Control panel of air conditioner	To monitor the air conditioner and show relevant parameter.

No.	Item	Description
12	Audible and visible alarm	To alter you when the abnormal conditions occur, such as temperature, smoke.
13	File pocket	To put documents.
14	Water sensor	To detect water level based on the principle of potential difference between the two electrodes.



Rear view

Figure 2-6 Parts description (in the opened state)

No.	Item	Description
1	Temperature sensor	To detect temperature.
2	Door sensor	To alert you when the door is open.
3	Switch	/
4	EMS1000	A energy management system.

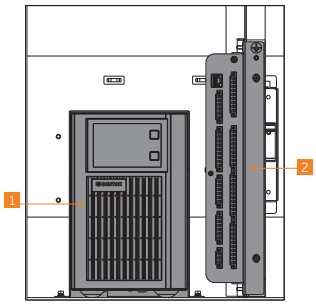


Figure 2-7 Parts description (control area)

Table 2-5 Parts description

No.	Item	Description
1	UPS	To provide backup power to ensure that the device is in a normal operating condition.
2	IO module	To collect signal and control other modules.

High-voltage box

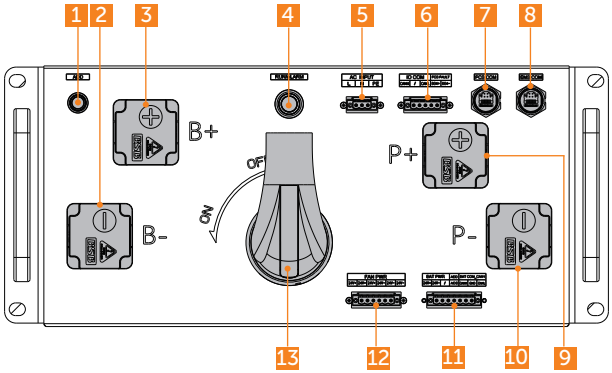


Figure 2-8 Front panel

Table 2-6 Description of front panel

No.	Item	Description
1	ADD button	To assign address.
2	Negative output port	To connect battery pack's negative terminal.
3	Positive output port	To connect battery pack's positive terminal.

No.	Item	Description
4	Power button / status light	To start up or shut down system.
5	AC220V input terminal block	To connect distribution box's CZ1.
6	Communication terminal block (for IO module)	To connect the IO module's CAN port and dry contact of the inverter.
7	Communication port (for inverter)	To connect inverter's communication port.
8	Communication port (for EMS1000)	To connect EMS1000's communication port.
9	P+ port	To connect inverter's positive terminal.
10	P- port	To connect inverter's negative terminal.
11	Terminal block (for battery pack)	To connect battery pack's communication cable and power cable.
12	Terminal block (for fan)	To connect fan's power cable.
13	Disconnect switch	To disconnect the device on the DC side.

Battery pack

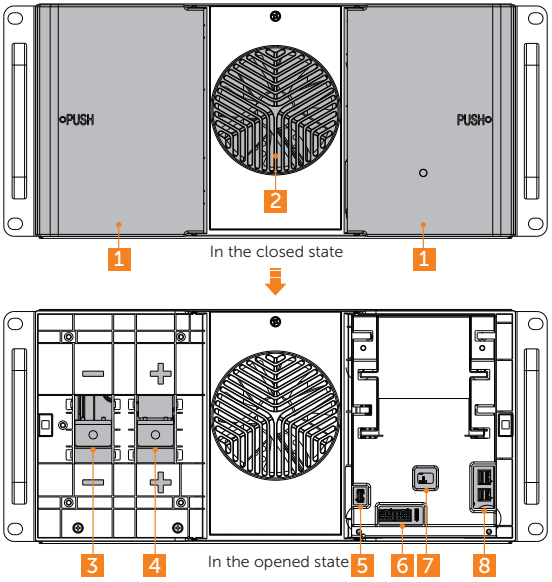


Figure 2-9 Front panel

Table 2-7 Description of front panel

No.	Item	Description
1	Left/right door	Please open the door while wiring.
2	Fan	To keep components cool in the cabinet.
3	Negative terminal	To connect negative terminal of high-voltage box or battery pack.
4	Positive terminal	To connect positive terminal of high-voltage box or battery pack.
5	Connection port (for fan)	To connect the fan.
6	Power connector (for fan)	To provide power to the fan.
7	BMS's status light	To display the running status of BMS.
8	Communication port	To connect communication cable.

Distribution box

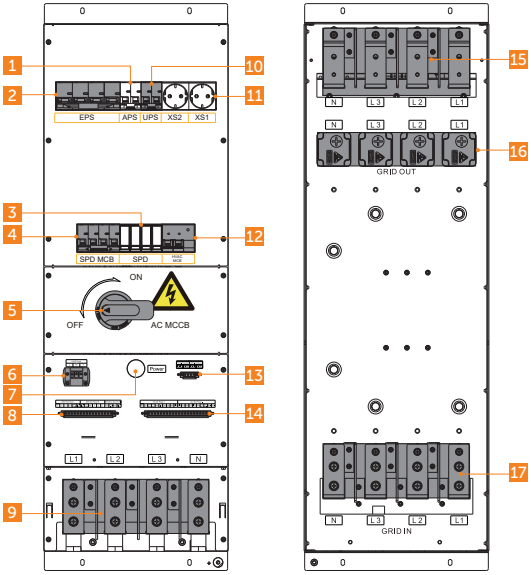


Figure 2-10 Front panel

Table 2-8 Description of front panel

No.	Item	Description
1	EPS breaker	EPS protection breaker.
2	Auxiliary power breaker of high-voltage box	/
3	Current terminal	To connect to the grid.
4	SPD maintenance breaker	/
5	Breaker handle	A switch for AC side.
6	Power supply port for air conditioner	To connect to the air conditioner.
7	LED light	To display the operation state.
8	220 V power supply port for controlling emergency stop switch	Provides 220V power for other devices in the cabinet. To manually turn off AC side for emergency.
9	EPS out	Connect EPS to loads.
10	UPS breaker	To protect UPS breaker.
11	Socket	Power socket.
12	Air conditioner/liquid cooling unit on/off breaker	/
13	Circuit breaker's electrical control signal	To remotely turn off AC power for emergency.
14	24V power supply port	To provide power supply for the devices inside the cabinet.
15	EPS in	
16	Grid out wire connector	For AC side
17	Grid in wire connector	Port for connecting to power grid.

Air Conditioner

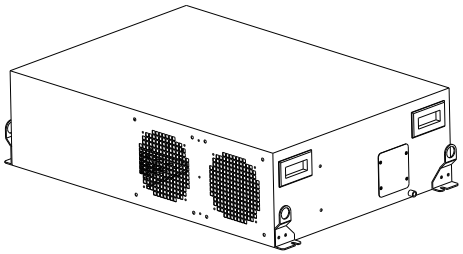


Figure 2-11 Appearance of air conditioner

The air conditioner is capable of temperature control and humidity adjustment, with two modes: automatic mode and forced mode.

Automatic mode

Table 2-9 Information on automatic mode

Type	Description
Cooling settings	Includes the cooling point temperature and cooling return difference. The air conditioner will turn on cooling when the cabinet temperature exceeds their sum, and turn off cooling when the temperature falls below their difference. For example, you can set the cooling point temperature to 26°C, and the cooling return difference to 2°C, and then the air conditioner will turn on cooling when the cabinet temperature exceeds 28°C (26°C+2°C), and turn off cooling when the temperature falls below 24°C (26°C-2°C).
Heating settings	Includes the heating point temperature and heating return difference. The air conditioner will turn on heating when the cabinet temperature falls below the their difference, and turn off heating when the temperature exceeds their sum. For example, you can set the heating point temperature to 15°C, and the heating return difference to 2°C, and then the air conditioner will turn on heating when the cabinet temperature falls below 13°C (15°C-2°C), and turn off heating when the temperature exceeds 17°C (15°C+2°C).

Type	Description
Dehumidification settings	Includes humidity setting, humidity difference, humidity dead zone and dehumidification temperature. Dehumidification starts when both conditions are met: the cabinet temperature is at least 2°C higher than the dehumidification temperature, and the cabinet humidity is higher than the sum of the humidity setting value and humidity difference. Dehumidification stops when any of the conditions are met: The cabinet temperature is lower than the dehumidification temperature, or the cabinet humidity is lower then the sum of humidity setting value and humidity dead zone. For example, if you set these values respectively to 50%RH, 10%RH, 5%RH and 20°C, then dehumidification starts when the cabinet temperature exceeds 22°C (20°C+2°C) and humidity exceeds 60%RH (50%+10%), and dehumidification stops when the cabinet temperature is lower than 20°C, or the humidity is lower than 55%RH (50%+5%).

- Forced mode

The air conditioner can be set through the upper computer to enter the forced mode.

Table 2-10 Information on forced mode

Value	Definition
0	Automatic mode
1	Forced refrigeration
2	Forced heating
3	Forced air supply
4	Forced standby

NOTICE!

- Please refer to when "11.4.1 Disassembly and Clean of Air Conditioner Filter" it's time to clean or replace the air conditioner filter.

IO module

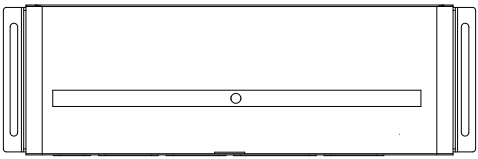


Figure 2-12 IO module

Other parts

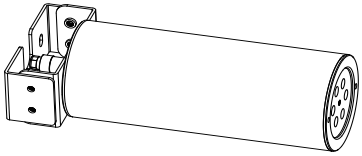


Figure 2-13 Appearance of automatic fire sprinkler

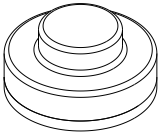


Figure 2-14 Appearance of temperature sensor

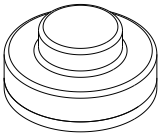


Figure 2-15 Appearance of smoke detector

NOTICE!

- A cover has been fitted on the temperature sensor and smoke detector, respectively, at the factory. Therefore, the please remove covers before using them.

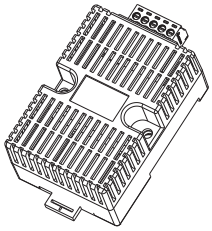


Figure 2-16 Appearance of temperature and humidty sensor

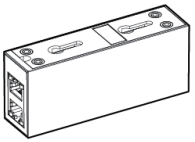


Figure 2-17 Appearance of CO detector

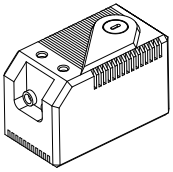


Figure 2-18 Appearance of temperature sensor

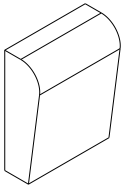


Figure 2-19 Appearance of audible and visible alarm

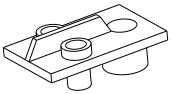


Figure 2-20 Appearance of water sensor

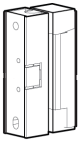


Figure 2-21 Appearance of door sensor

2.5 Indicator

Cabinet's LED light

The cabinet is equipped with a tri-colour indicator (green/yellow/red) to show the system operating status.

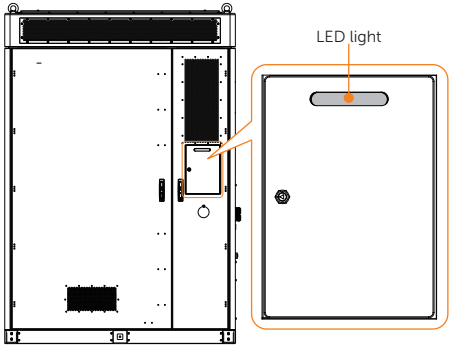


Figure 2-22 LED light

Table 2-11 Description

Status		Description
Light on		In standby
Light on		In operation
Light on		System failure

Hight-voltage box's indicator light

The box is equipped with a bi-colour indicator (green/red) to show its operating status.

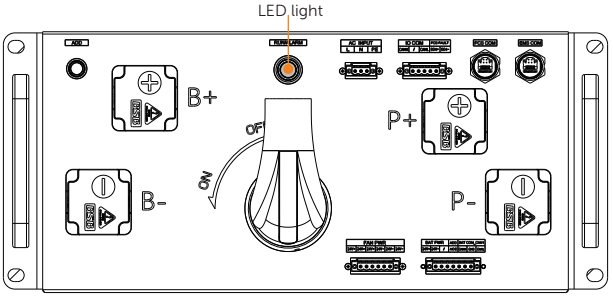


Figure 2-23 LED light

Table 2-12 Description

Status		Description
Blinking		In operation
Light on		Rely in off state
Light on		System failure

Battery pack's LED light

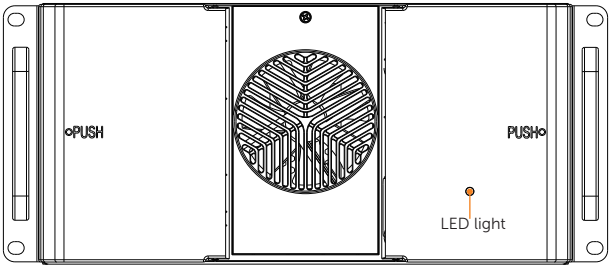


Figure 2-24 LED light

Table 2-13 Description

Status		Description
Blinking		In operation

Inverter control panel

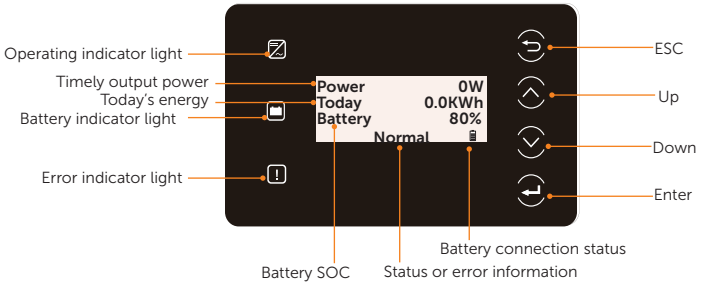


Figure 2-25 Control Panel

Table 2-14 Description

LED indicator	Status		Definition
Operating	Light on		The inverter is in a normal state.
	Blinking		The inverter is in a waiting or checking state.
Error	Light on		The inverter is in a fault state.
Battery	Light on		One of the battery terminal is connected in a normal state at least.
	Blinking		Both of the battery terminals are connected are in an idle state.
	Solid display		One of the battery terminals is connected normally at least.
	Blinking		Both of the battery terminals are disconnected.

2.6 Symbols

Table 2-15 Description of symbols

Symbol	Description
	CE mark of conformity.
	TUV certification.
	RCM mark of conformity
	Protective grounding point.
	Grounding point.
	Caution, hot surface. The enclosure temperature may be high while running. Therefore, do not contact to avoid scalding.
	Danger, electric shock. Do not touch the device after it is powered on. Otherwise, an electric shock may occur.
	Danger. Due to possible risks, do not touch the device after it is powered on.
	Observe enclosed documentation.
	The device cannot be disposed together with the household waste.
	Do not operate the inverter until it is isolated from mains and on-site PV generation suppliers.
	Danger of high voltage. Do not touch live parts of the cabinet for 15 minutes after disconnection from the power sources.
	Danger of high voltage. Do not touch live parts of the inverter for 5 minutes after disconnection from the power sources.
	The battery system must be disposed of at a proper facility for environmentally-safe recycling.

	The battery module may explode. The rechargeable battery can become hot during operation. Avoid touch during operation.
	Keep the device away from children.
	Keep the device from open flames or ignition sources.

2.7 Working Mode

Six working modes are available for you to choose in on-grid status, i.e Self use, Feed-in priority, Backup, Peak shaving, Schedule and Manual. You can choose the working modes according to your lifestyle and environment.

When the power supply from the electric power company is stopped due to a power outage, it automatically switches to EPS mode and connects to the distribution board for a specific load, thereby providing power to important electrical appliances.

For how to set the working mode, please refer to the X3-AELIO Series User Manual.

2.7.1 Self-use Mode (Priority: Loads > Battery > Grid)

The self-use mode is suitable for areas with low feed-in subsidies and high electricity prices. The power of PV will supply the loads first, and the surplus power will charge the battery, then the remaining power will feed into the grid.

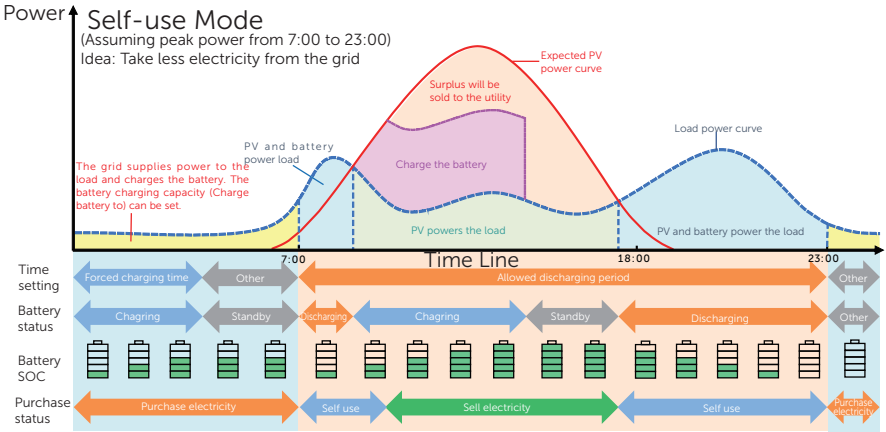


Figure 2-26 Self-use mode

Table 2-16 Description of self-use mode

Time period	Inverter working status
Forced charging period	• Charge the battery firstly untill the battery SOC reaches the specified **Charge battery to** value. You can configure the inverter to either draw power from the grid or not.
Allowed discharging period	PV is sufficient (PV → load → battery → grid) • The power generated from PV prioritizes supplying the load. Any excess power is then directed towards charging the battery, and if there is still surplus electricity, it can be sold to the grid. In the event that the local utility restricts the sale of electricity to the grid, the export control value can be set on the inverter.
	PV is insufficient (PV+battery → load) • The battery discharges power to the load, and once its capacity reaches **Min SOC**, it automatically ceases discharging.

Note:

Charge battery to: The battery SOC charged from grid. 10% by default, the settable range is 10%~100%.

Min SOC: Minimum SOC of the battery under grid connection. 10% by default, the settable range is 10%~100%.

Charge & Discharge period

You can set two configurable working periods: forced charging period and allowed discharging period. The interval not in the charging & discharging period belongs to other time periods.

- Forced charging period (Default period: 00:00~00:00, closed by default)

The priority of forced charging period is higher than all working modes. In the forced charging period, the inverter will charge the battery first untill the battery SOC reaches the specified **Charge battery to** value set in each working mode. You have the option to configure the inverter to either draw power from the grid or not.

- Allowed discharging period (Default period: 00:00~23:59)

In the allowed discharging period, the inverter will allow the battery to discharge and charge power in accordance with the working mode and load conditions.

- Period not set as forced charging or allowed dicharging period

In this period, the inverter will allow the battery to charge but can not discharge power.

NOTICE!

- The charging and discharging period is only applicable for self-use mode, feed-in priority and backup mode.

2.7.2 Feed-in Priority (Priority: Loads > Grid > Battery)

The feed-in priority mode is suitable for areas with high feed-in subsidies, but has feed-in power limitation. The power generated from PV is directed towards supplying the loads. Any excess power beyond the load requirements will be fed into the grid.

Note: If the amount of electricity sold to the grid is limited, the remaining power will be utilized to charge the battery.

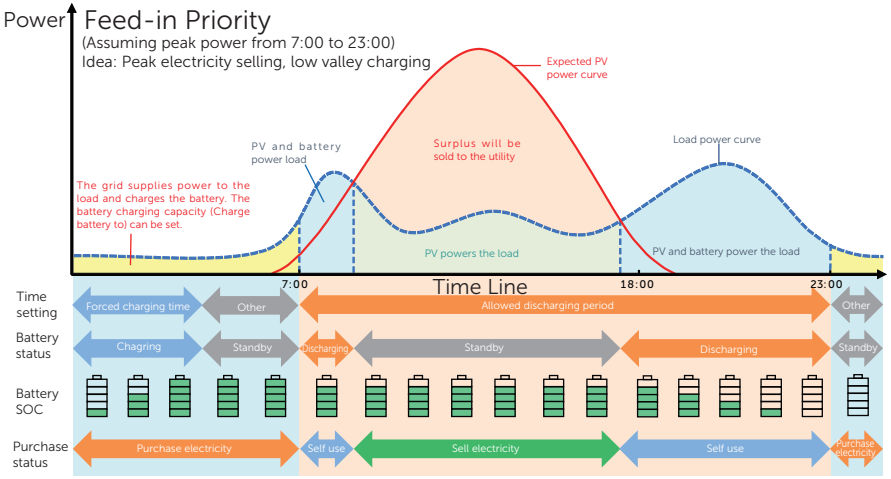


Figure 2-27 Feed-in priority

Table 2-17 Description of feed-in priority

Time period	Inverter working status
Forced charging period	• Charge the battery firstly untill the battery SOC reaches the specified **Charge battery to** value. You can configure the inverter to either draw power from the grid or not.
Allowed discharging period	PV is sufficient (PV → load → grid) • The power generated from PV is directed towards supplying the loads. Any excess power beyond the load requirements will be fed into the grid,
	PV is insufficient (PV+battery → load) • PV and battery supply power to the load at the same time, and once the battery capacity reaches **Min SOC**, it automatically ceases discharging.

Note:

Charge battery to: The battery SOC charged from grid. 50% by default, the settable range is 10%~100%.

Min SOC: Minimum SOC of the battery under grid connection. 10% by default, the setttable range is 10%~100%.

NOTICE!

- You can set two configurable working periods: forced charging period and allowed discharging period in feed-in priority mode. Please refer to "Charge & Discharge period" for details.

2.7.3 Backup Mode (Priority: Loads > Battery > Grid)

The backup mode is suitable for areas with frequent power outages.

This mode will maintain the battery capacity at relatively high level to ensure that the emergency loads can be used when grid is off. Same working logic with self-use mode.

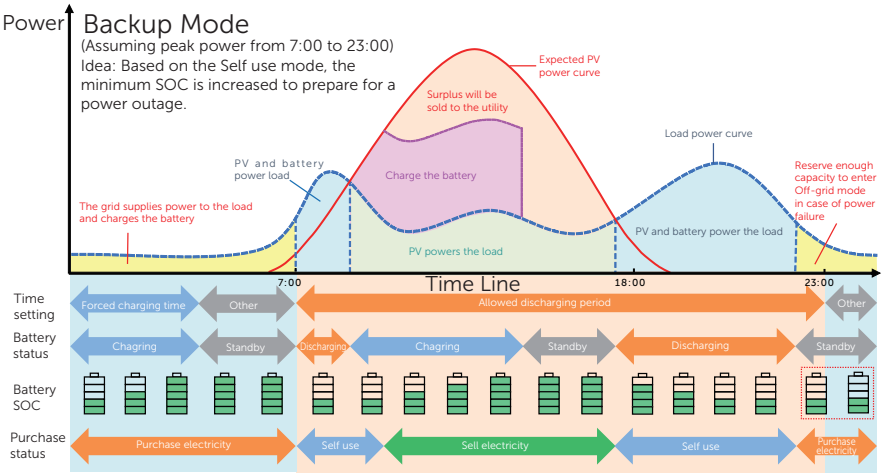


Figure 2-28 Backup mode

Table 2-18 Description of backup mode

Time period	Inverter working status
Forced charging period	• Charge the battery firstly untill the battery SOC reaches the specified **Charge battery to** value. You can configure the inverter to either draw power from the grid or not.
Allowed discharging period	• The working logic remains the same as for self-use mode, but it enters a standby state when PV input is not available and the battery SOC reaches **Min SOC** (on-grid min SOC). In the event of a grid outage, it will switch to EPS mode until the battery discharges to **Min SOC** (Off-grid min SOC).

Note:

Min SOC (on-grid min SOC): Minimum SOC under grid connection. 30% by default, the settable range is 30%~100%.

Min SOC (off-grid min SOC): Minimum SOC under off-grid conditions. 10% by default, the settable range is 10%~100%.

NOTICE!

- You can set two configurable working periods: forced charging period and allowed discharging period in backup mode. Please refer to "Charge & Discharge period" for details.

2.7.4 Peak Shaving Mode

Peak shaving mode is set for leveling out peaks in electricity use. The system is intelligently controlled to ensure charging takes place during off-peak hours and discharging occurs during peak hours.

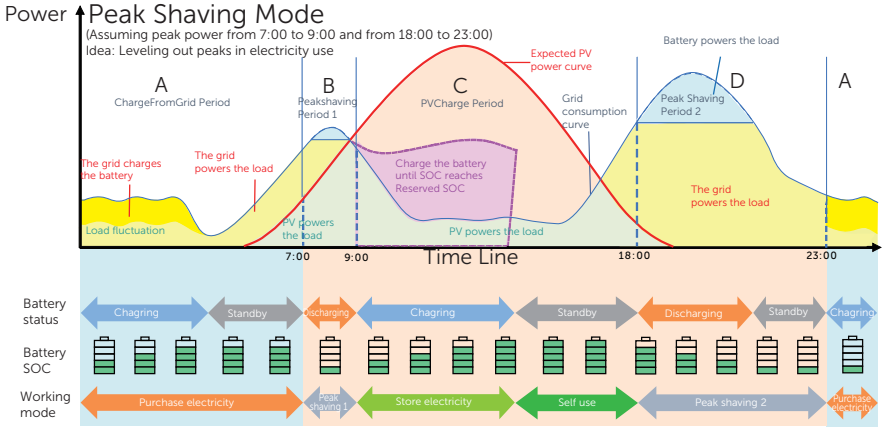


Figure 2-29 Peakshaving mode

Table 2-19 Description of peakshaving mode

Time Period	Inverter working status
Period A	• The grid can charge the battery to **MaxSOC** within the set **ChargePowerLimits**. In this period, the battery will not discharge power.
Period B & D	Grid consumption power < **PeakLimits** (PV+grid → load) • The PV and grid will power the load. The battery will not charge or discharge power.
	Grid consumption power > **PeakLimits** (PV + battery+grid → load) • The battery will discharge energy for loads and thus reduce the amount of energy purchased from the grid.
Period C	(PV → battery → load → grid) • The battery does not discharge power. The PV charges the battery up to the **Reserved SOC** before supplying power to the loads. Any excess power beyond the load requirements is fed into the grid.

Note:

MaxSOC: The energy taken from grid to charge the battery. 50% by default, the settable range is 10%-100%.

ChargePowerLimits: The charging power from grid. 1000 W by default, the settable range

is 0-60000 W

PeakLimits: The load consumption from grid side. 0 W by default, the settable range: 0-60000 W.

Reserved SOC: The lower limit of battery SOC required for later peak shaving period. 50% by default, the settable range is 10~100%.

2.7.5 TOU Mode

In the TOU mode, different working modes, i.e Self-use, Feedin-priority, Peaking shaving, Charging and Discharging can be set for different time periods in accordance with actual needs and environment conditions through SolaXCloud App or Web.

The day can be divided into up to 24 time slots, and the minimum time slot is 15 minutes, independent working mode can be set for each time slot. Please refer to Web Guide or App Guide for details about how to set the TOU mode.

Time Slot	Working Mode
x:xx~x:xx (e.g 0:00~0:15)	Choose one mode from Self-use / Feedin-priority / Peaking shaving / Charging / Discharging

Note:

Self-use: Same working logic with "Self-use Mode", but it is not limited by the charging and discharging time slots. The priority of PV: Loads > Battery > Grid.

Feedin-priority: Same working logic with "Feedin-priority Mode", but it is not limited by the charging and discharging time slots. The priority of PV: Loads > Grid > Battery.

Peak Shaving: The working logic is that when the power consumption from the grid exceeds the set **PeakLimit** value, the battery is allowed to discharge power. The excess power beyond the limit is provided by the combination of photovoltaic and battery to ensure that the maximum power purchased from the grid does not exceed the set limit. You need to set the **PeakLimit** value through Web or App when choosing Peak Shaving mode.

Charging: The power of PV will charge the battery as much as possible to the set SOC of **Charge BAT to** (%). You can set whether to Charge from grid. The default value of **Charge BAT to** (%) is 100%. When the battery reaches the set SOC, the surplus power will perform "Self-use Mode" or supply to the grid (based on the system setup), at this point, **Charge from grid** is not allowed.

Discharging: If allowed by the battery, the system outputs a specified power from the grid based on the set output percentage, controlling the power at the AC port. You need to set the **RatePower** (%) through Web or App when choosing Discharging mode. When the battery **Discharge to** (%) reaches the set SOC, the inverter performs "Self-use Mode".

2.7.6 EPS Mode (Priority: Loads > Battery)

During a power failure, the system will provide uninterrupted power supply to the EPS loads using the power from PV and the battery. It is important to ensure that a battery is installed, and the EPS loads should not exceed the maximum output power of the battery.

The power generated by PV will prioritize supplying power to the loads, while any surplus power will be utilized to charge the battery.

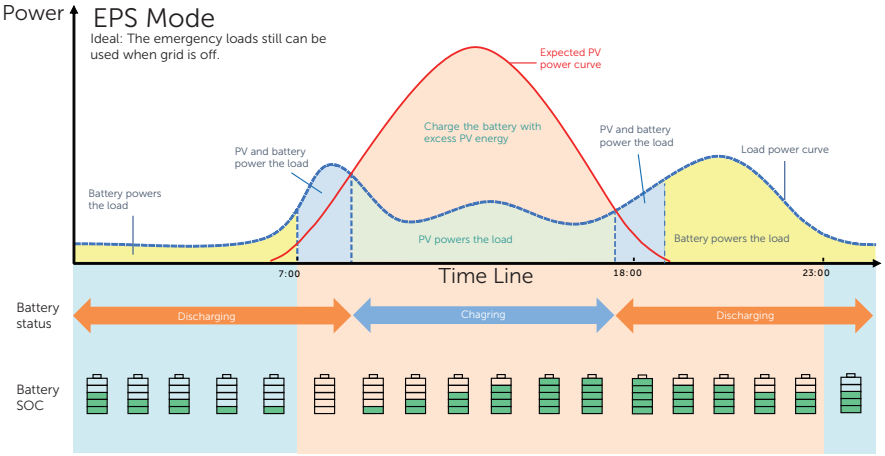


Figure 2-30 EPS mode

Table 2-20 Description of EPS mode

Battery SOC	Inverter working status
Battery SOC >**Min SOC** (off-grid min SOC)	PV is sufficient (PV → load → battery) • The PV prioritizes supplying power to the load, with any excess energy being directed towards charging the battery.
	PV is insufficient (PV+battery → load) • The PV prioritizes supplying power to the load. If the energy is not enough, the battery will discharge power until the battery SOC reaches **Min SOC** and then error of **BatPowerLow** will be reported.
Battery SOC ≤**Min SOC** (off-grid min SOC)	The inverter reports **BatPowerLow**. When there is PV, it will charge the battery first. After charging to the set **Min ESC SOC** value, it will be automatically recovered and enter EPS mode again.

Note:

Min SOC: Minimum SOC of the battery under off-grid conditions. 10% by default, the settable range: 10%-100%.

Min ESC SOC: The minimum SOC of the battery to enter EPS mode. 30% by default, the settable range: 15%-100%.

2.7.7 Manual Mode

This working mode is only for the after-sales team to do after-sales maintenance. It includes **Forced Discharge**, **Forced Charge** and **Stop chrg&dischrg**. The system will restore to the original working mode after six hours Manual mode set.

2.7.8 Export Control Function

Solar export control is a limit on the amount of energy that your solar system can export into the grid. You have a set limit on how much energy you can export to the grid.

How export control works

- CT/meter required
- Correct setting of the limit value of **Export Control** through inverter. (For parallel system, set on the master inverter)

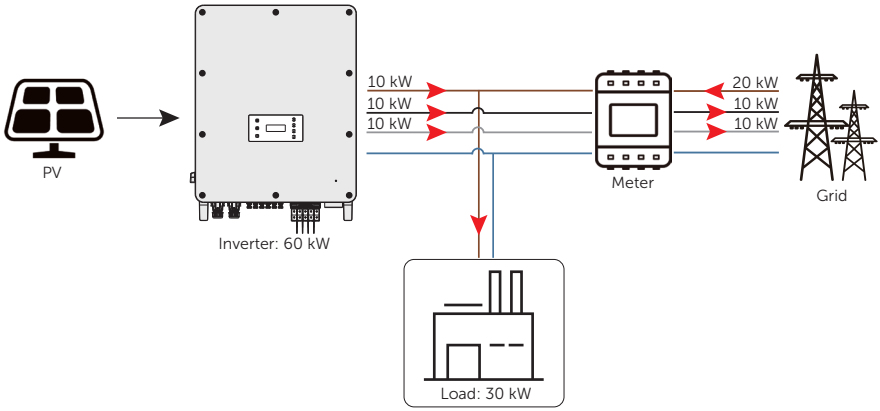


Figure 2-31 Zero export control with **Phase Unbalance** disabled

NOTICE!
• The power taken from the grid is equal to the power fed into the grid.

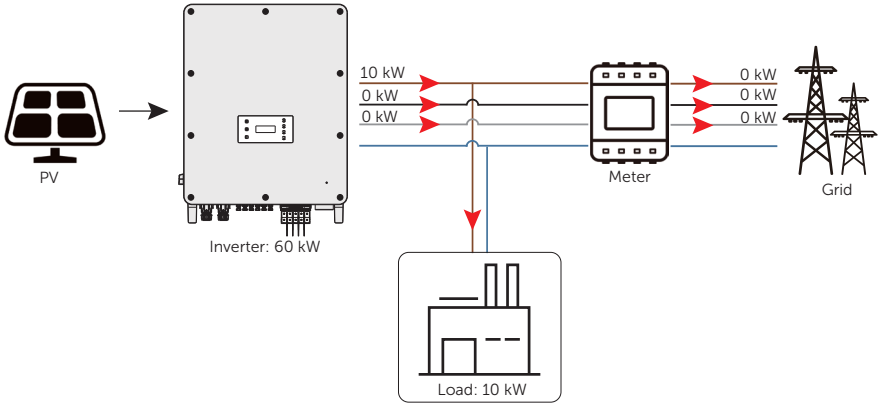


Figure 2-32 Zero export control with **Phase Unbalance** enabled

Note:

Export Control value can be set from 0W to more than the rated output power.

2.8 Application Schemes

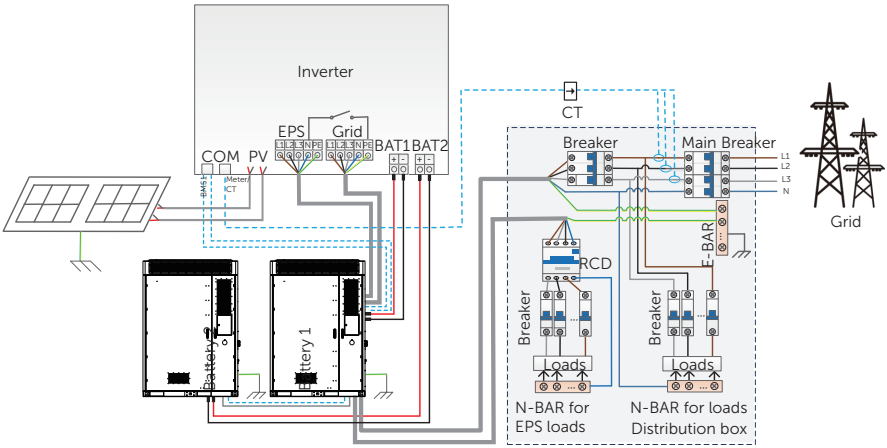


Figure 2-33 Partial load backup for Europe

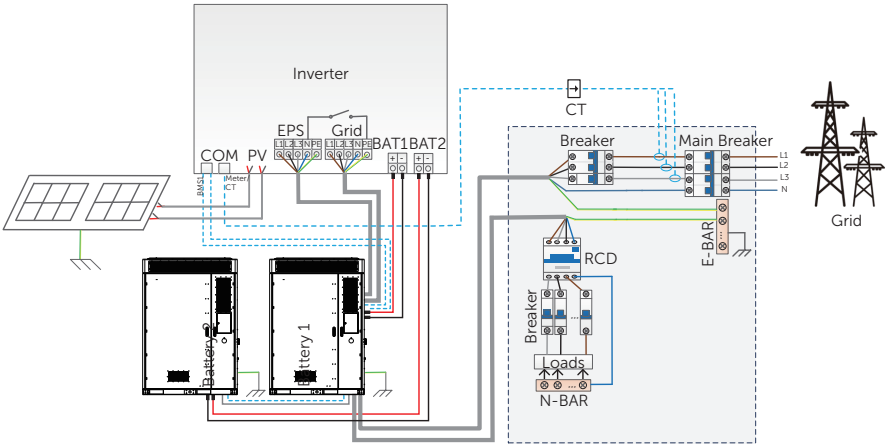


Figure 2-34 Whole load backup for Europe

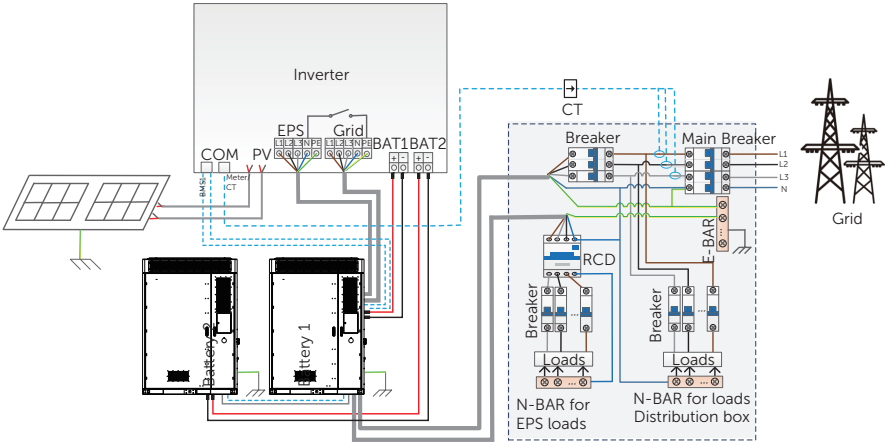


Figure 2-35 Partial load backup for Australia

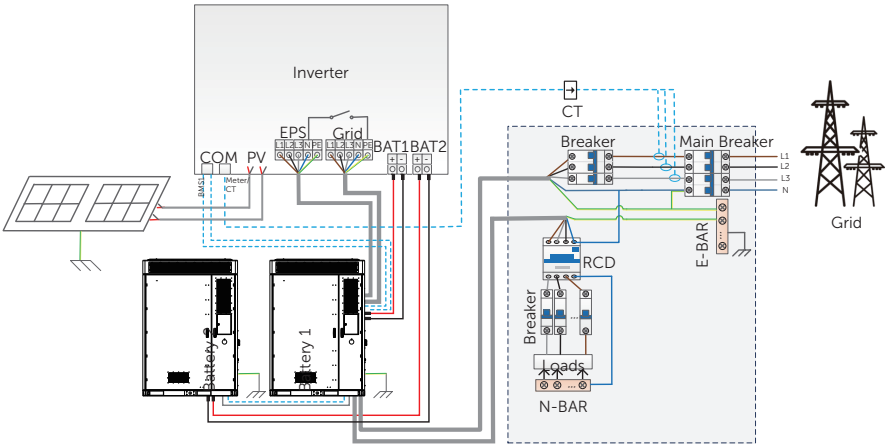


Figure 2-36 Whole load backup for Australia

NOTICE!

- The BAT 1 and BAT2 terminals of the inverter are positioned vertically, with the positive pole on the left side and the negative pole on the right side. The battery terminals shown in the figure above are for illustrative purposes only, please refer to the actual product for accurate information.

2.9 Operating Principle

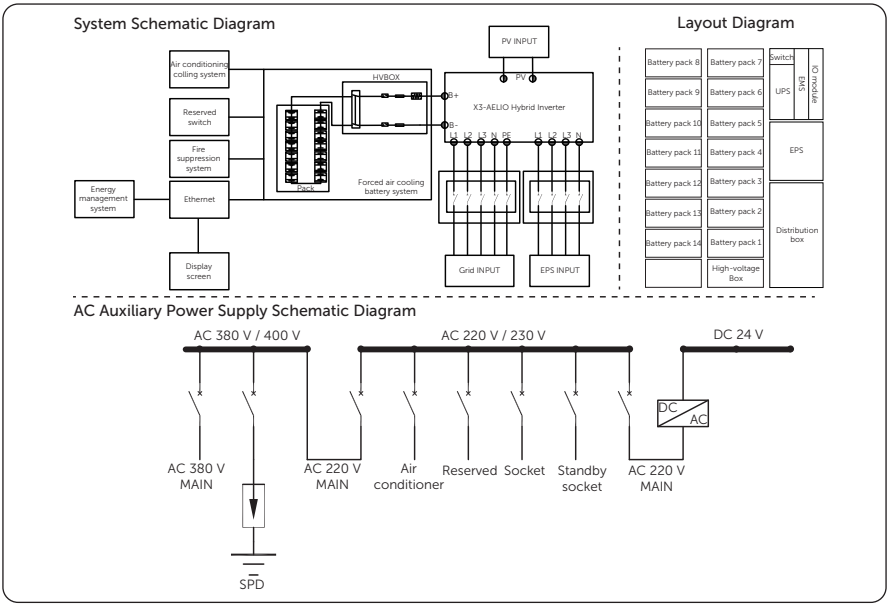


Figure 2-37 Electrical block diagram

NOTICE!

- In an off-grid situation, the current will vary due to the types of electrical loads. The common electrical load can be classified into following types, resistive load, inductive load, capacitive load, half-wave load, etc. Therefore, the types of electrical loads shall be fully considered when designing and configuring a system. In the case of a half-wave load, the load power shall not exceed 1 kW; in the case of an uncertain electrical load, please contact the supplier for evaluation of output supply to special loads.

3 Transportation and Storage

3.9.1 Battery Cabinet Transportation

DANGER!

- Please be careful to avoid physical collisions during transportation. Do not place the equipment upside down, be exposed to water, etc., which may result in equipment damage, or even a fire or an explosion.

NOTICE!

- Please strictly comply with the transportation requirements of the warning signs on the packaging and equipment.
- The tilt angle of the cabinet should be ≤10° while transporting and moving it.
- To reduce product damage caused by shocking, tilting or impacting during transportation, it is recommended to consider sea or road (with better conditions) transport instead of rail and air transports.
- Relevant qualifications for the transport of dangerous goods must be obtained by the forwarding agent engaged in such businesses, and they must strictly abide by the local regulations for the transport of dangerous goods. Please check the battery before transportation. If a battery leaks, smells, or is damaged, do refuse to transport it.

Forklift

- Please confirm that the forklift's load-bearing capacity shall be ≥ 5 t before using it.
- The forklift should meet the following requirements: length of fork blade > 1.2 m, width of fork blade between 80 cm and 160 cm, and thickness of fork blade between 25 cm and 70 cm.

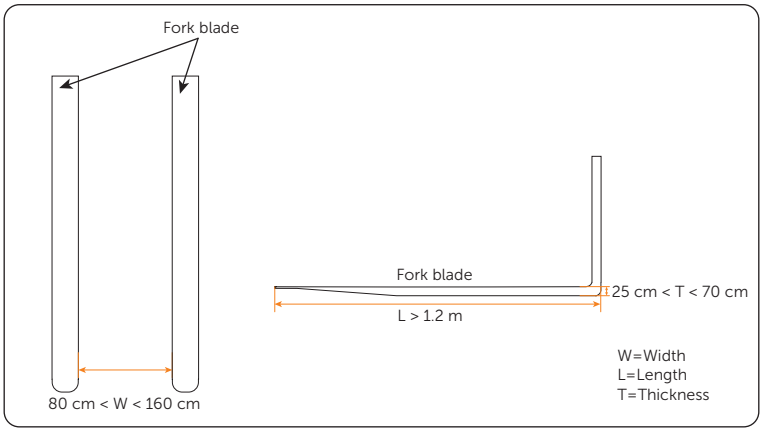


Figure 3-1 Forklift requirements

- Before moving the device, please pay attention to the center of gravity position of the load, and fully secure the load on the forklift by securing measures, such as ropes or bindings. In addition, please designate a person to supervise for safety concerns during transportation.
- Before unpacking, please accurately insert the fork blade into the fork holes on the carton when moving the device.

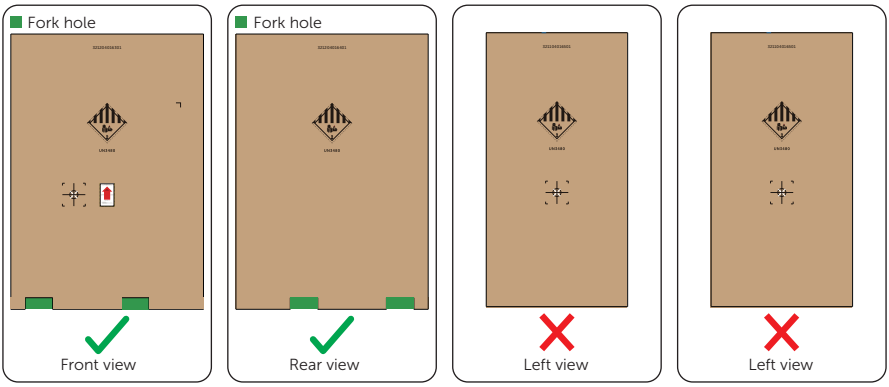


Figure 3-2 Carton fork holes

- For specific fork holes after unpacking, please refer to "6.1 Cabinet Handling".
- The equipment can only be transported by forklift before unpacking.

Hoisting

- A hoist operator with good operational skills and safety awareness, who must be trained and certified, shall be operated according to the local laws and regulations.
- After unpacking, the following requirements must be met when working with cranes and lifting ropes: crane hoisting capacity ≥ 5 t, hoisting operating radius ≥ 2 m.
- Before hoisting, please check:
  - » Lifting tools are complete, tested and fully secured.
  - » The device door is closed and locked to avoid accidental opening.
  - » The lifting rope's quality must meet standards, and it shall be fully secured, to avoid falling and fraying.
- Do not hoist outdoors in rain, snow, wind and other bad weather.
- It is recommended to hoist devices in sequence and to ensure that the hoist moves in the same direction.

3.9.2 Inverter Transportation

If the inverter is not put into use immediately, the transportation and storage requirements needs to be met:

- The inverter must be transported in its original packaging. SolaX will not be held responsible for any damage to the inverter caused by improper transportation or by transportation after it has been installed.
- Observe the caution signs on the packaging of inverter before transportation.
- Pay attention to the weight of inverter. Be cautious to avoid injury when carrying X3-AELIO (gross weight: 130 kg). Lifting device is recommended.
- The inverter with a package should be transported by forklift to the location where it needs to be placed.

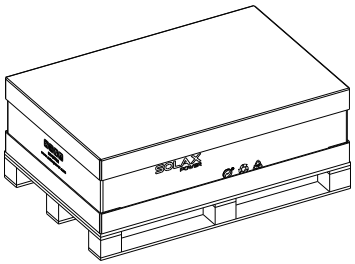


Figure 3-3 Caution signs on the packaging

3.1 Storage

3.1.1 Cabinet Storage

- For long-term storage, do not remove the original packaging and check the packaging regularly.
- Please strictly comply with the storage requirements of the warning signs and other information on the packaging to avoid device damage.
- Storage temperature: -20°C ~ +60°C.
- Relative humidity for device storage: 5% ~ 95%.

NOTICE!

- Since the batteries have been installed in the cabinet in the factory, the storage requirements for the battery must also be abided by when storing the cabinet.

Battery storage

DANGER!

- The battery must be stored indoors, which the environment should meet the following requirements: 1. Avoiding direct sunlight and keeping out of rain; 2. Dry and well-ventilated; 3. Keeping away from heat and fire sources; 4. Keeping away from radiation; 5. Keeping away from chemicals; 6. Keeping away from dust and metal conductive dust; 7. Being equipped with fire facilities.
- Batteries must be stored in accordance with the requirements of the warning signs and other information on the packaging.
- Do not store with any other electronic equipment, chemicals, or other items that may cause interference or danger.
- Please pay attention to the height when stacking batteries to avoid deforming or damaging the battery at the bottom.

NOTICE!

- Do not store the batteries for a long time. If long periods of storage are unavoidable, please recharge it periodically to avoid battery damage. For details, see the table below.

Table 3-1 Maintenance of battery pack

Circumstance	Measure
If the ambient temperature for storage is between 30°C and 50°C	Recharge the battery packs at least once every 6 months
If the ambient temperature for storage is between -20°C and 30°C	Recharge the battery packs at least once every 12 months.
In the first installation	The interval among manufacture dates of battery packs shall not be exceed 3 months.
If a battery module is replaced or added for capacity expansion	Each battery's SOC should be consistent. The max. SOC difference should be ±5%.
If users want to increase their battery system capacity	Ensure that the SOC of the existing system capacity is about 40%. The manufacture date of the new battery pack shall not exceed 6 months. If the manufacture date of the new one exceeds 6 months, please charge it to around 40%.

- Regarding with the storage information, see the following table:

Table 3-2 Storage information

Storage temperature range	Storage time
50°C to 60°C	3 months
30°C to 50°C	6 months
-20°C to 30°C	12 months

- Relative humidity for device storage: 5% ~ 95%.
- If the battery has been stored for more than 1 year, it must be checked and tested by professionals before use.

3.1.2 Inverter Storage

- The inverter must be stored indoors.
- Do not remove the original packaging material and check the outer packaging material regularly.
- The storage temperature should be between -40℃ and +70℃ . The humidity should be between 0% and 65%.
- Stack the inverter in accordance with the caution signs on the inverter carton to prevent their falling down and device damage. Do not place it upside down.

4 Preparation before Installation

4.1 Installation Site Selection

The installation site is critical to the safety, service life, and performance of the device, and it should be convenient for electrical connections, operation, and maintenance. Therefore, the installation site should be selected according to the *NFPA 855 Standard for the Installation of Stationary Energy Storage Systems* and the local laws and regulations.

The installation site shall meet the following requirements:

- Laws, regulations and industry standards: The selection of installation sites must strictly comply with local laws, regulations, and related industry standards.
- Fire safety: Fire extinguishers must be configured at the installation site according to the local fire codes, and a port for the water fire extinguishing system shall be reserved.
- Installation location: It is recommended to install the device outdoors.
- Safety spacing:
  - » The installation distance between the device and residential areas, population centers, or production buildings should meet the requirements of the local fire codes and standards.
  - » If the safety spacing cannot be met, a firewall that meets the requirements of the local fire codes must be built between the device and adjacent buildings. During the planning phase, it is crucial to consider the space for transportation, installation and maintenance of the device.
- Flood and waterlogging prevention:
  - » Avoid low-lying and flood-prone areas. The installation site that the device is to be located must be at least 300 mm higher than the highest water level in history.
  - » Since winds and wind-driven waves from rivers, lakes, and seas can affect the device, the foundation must be built at least 0.6 m higher than the maximum wave height in history.
  - » If a large amount of water flows in or through the energy storage power station, drainage facilities should be set up.
  - » If the installation site is prone to water accumulation, take waterproof measures, including but not limited to installing water baffles, configuring a drainage system, or raising the height of the foundation to prevent device damage.
- Avoid liquid intrusion: The installation area should be far away from the area where liquid is likely to be generated or leaked to avoid device failure.

- Good transportation: Good transportation for the installation site.
- Reserve space: During the planning phase, please consider the space for capacity expansion or connection in parallel in the future.
- Avoiding bad soil: Do not install devices on the undesirable soil that are prone to deformation and settlement.
- Keeping away from salt-damaged and polluted areas: Since the salt-damaged and polluted areas may corrode the device, the installation site must meet the following requirements:

Table 4-1 Installation spacing requirements

	Safety Distance
Distance from coastal areas	> 2000 m
Distance from heavy pollution sources, such as smelters, coal mines, thermal power plants	> 1500 m
Distance from moderate pollution sources, such as chemical plants, rubber plants, and electroplate factory	> 1000 m
Distance from light pollution sources, such as food processing plants, leather processing plants, heating boiler factory, slaughter houses, dumping sites, and sewage treatment stations	> 500 m

- Additional fence: For security reasons, the installation area should be surrounded by locking fences or walls accessible to qualified persons only.
- Installation environment requirements:
  - » Temperature: -30°C ~ +50°C.
  - » Relative humidity: 0 ~ 100% RH.
  - » Altitude: Below 3000 meters.
  - » Good ventilation.
  - » Keep away from sandy and dusty environments.
  - » Keep away from high temperature environment such as heat source and fire source, etc.
  - » Keep away from flammable and explosive materials and areas with dust.
  - » Keep away from corrosive substances.
  - » Keep away from strong electromagnetic fields and antenna.
  - » Keep away from strong vibration and noise sources.
  - » Keep away from areas with radiation.
  - » Keep away from areas with metal conductive and magnetic dust.
  - » Keep away from areas that produce or have toxic and harmful gases.
  - » Keep away from environments that are prone to microbial growth.

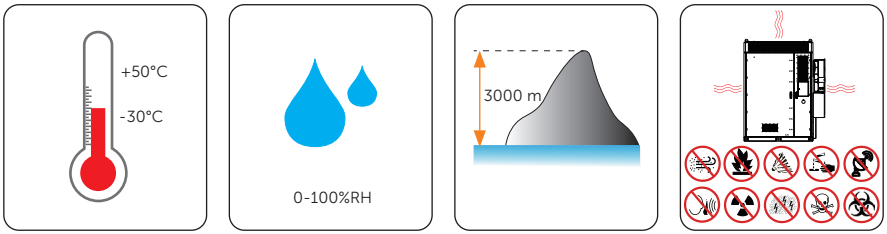


Figure 4-1 Installation environment requirements

4.1.1 Installation Foundation Requirements

The requirements for foundation are shown as follows:

- Type of foundation material: 1. Non-combustible materials such as solid bricks or concrete; 2. Steel.
- The bottom of the foundation pit must be strengthened and filled. The surface of the foundation shall be solid, flat and level (horizontal error ≤ 3mm, tilt angle ≤ 5°). Sunken or tilted foundation is not acceptable.
- The foundation's bearing capacity shall exceed 5 t. Otherwise, a retest is required.

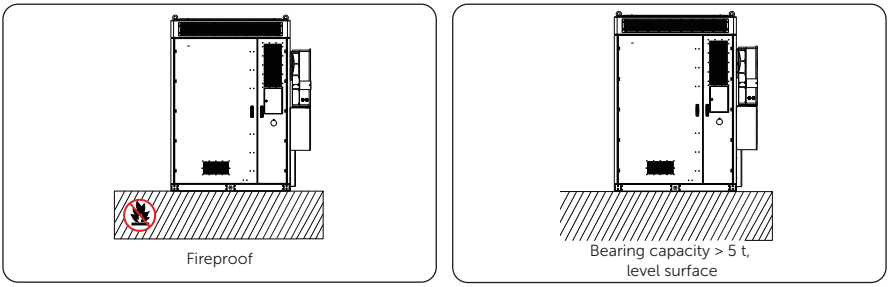


Figure 4-2 Foundation requirement

- A qualified drainage facility, of which the drainage capacity meets the requirements of the heaviest rain records in local history,shall be established according to the local geological conditions and municipal drainage standards.
- Reserve a trench or cable entry hole during the design phase.
- Avoid cables buried underground when constructing the foundation.
- The foundation drawing is only for reference. Operators shall recheck and revise it according to the environment, geological conditions, seismic requirements, etc. of the installation site.

Concrete foundation

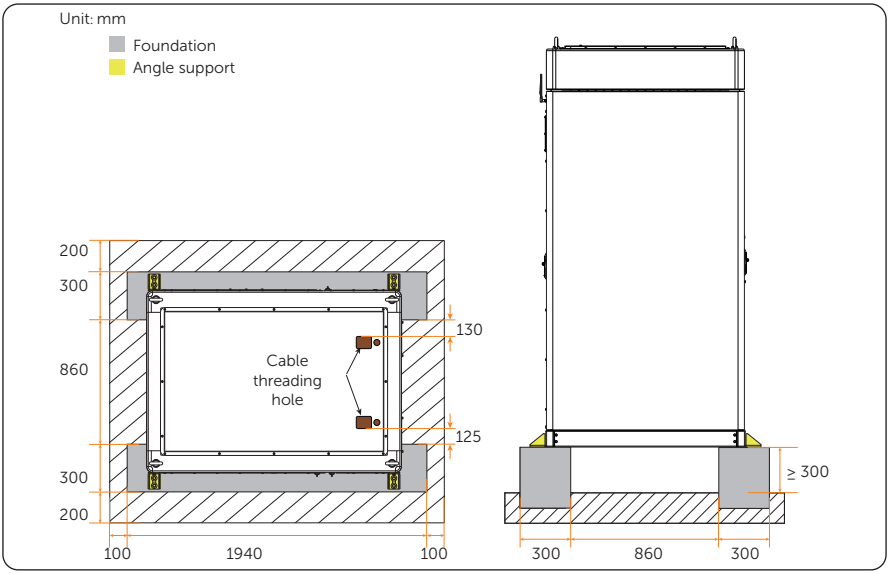


Figure 4-3 Foundation requirements for angle supports installed at front and rear sides

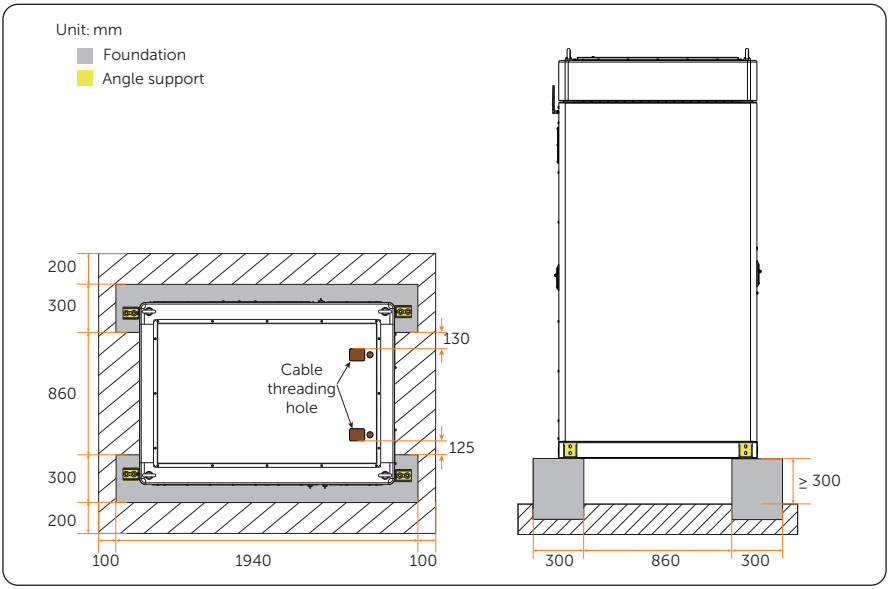


Figure 4-4 Foundation requirements for angle supports installed at left and right sides

Steel foundation

If users want the foundation to be made of steel, the foundation must meet the following requirements:

- Bearing capacity: > 5 t;
- Corrosion resistance: it is recommended to be subjected to a 720 hrs salt spray test;
- Dimension and others: see the following figures.

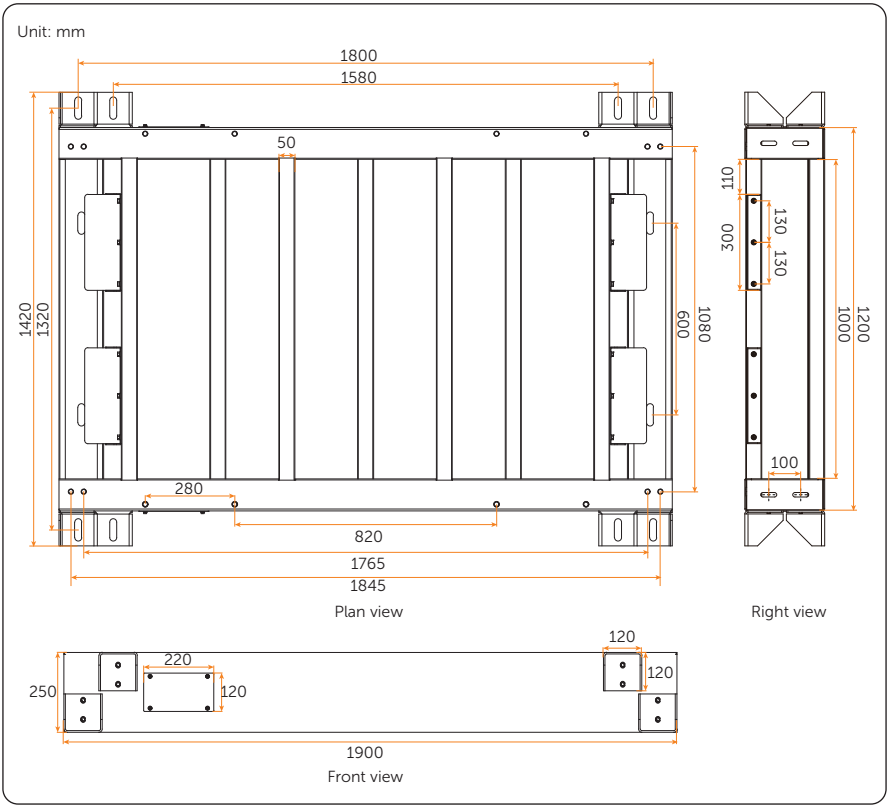


Figure 4-5 Dimension of steel foundation

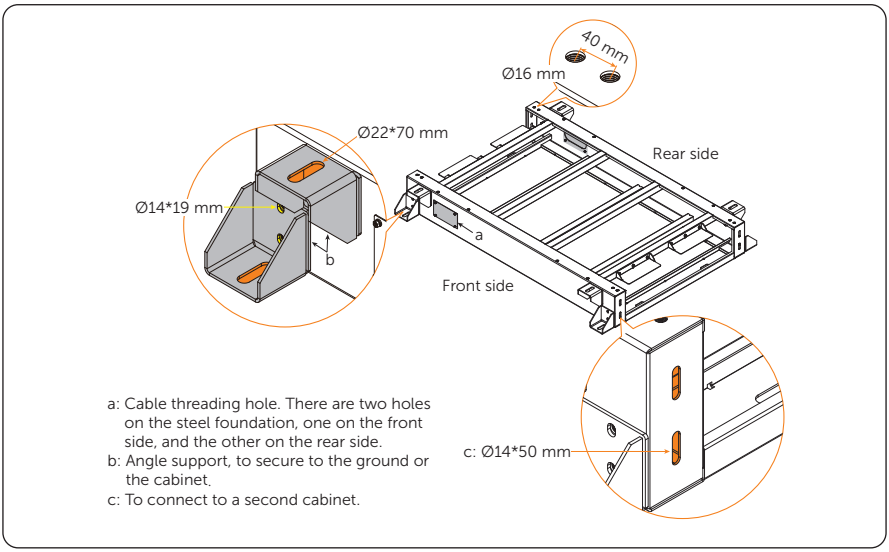


Figure 4-6 Detail description of steel foundation

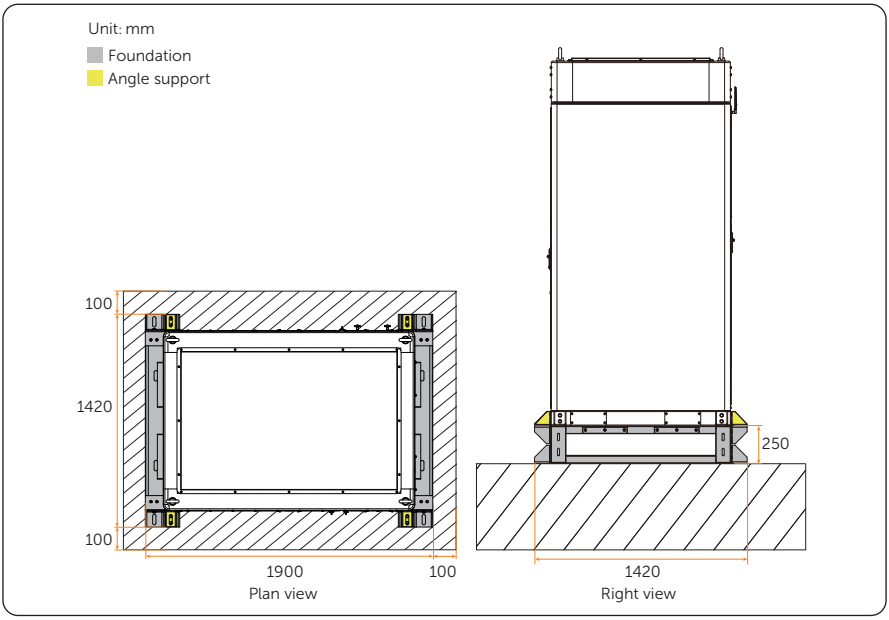


Figure 4-7 Angle supports at front and rear sides

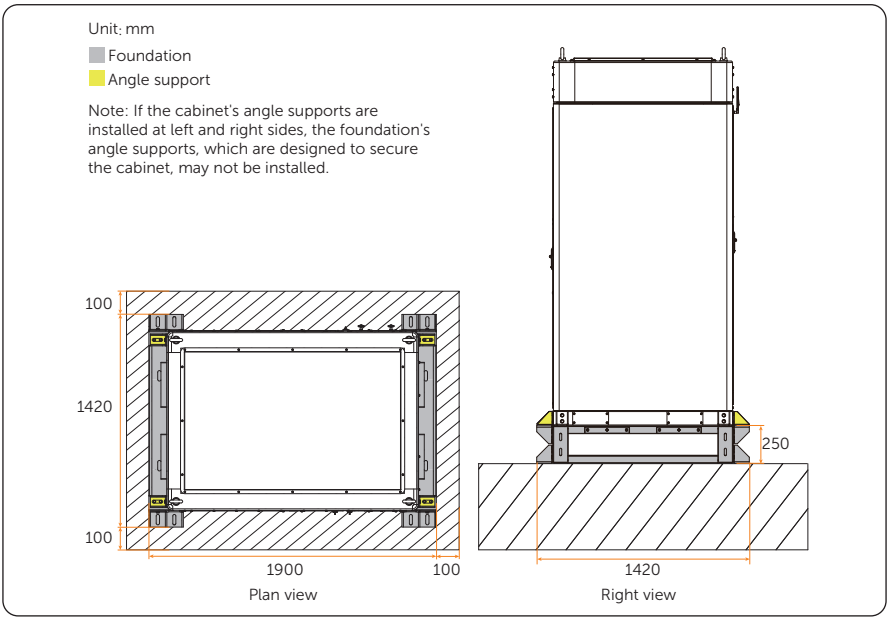


Figure 4-8 Angle supports at left and right sides

NOTICE!

After completing construction of the steel foundation, please strictly comply with the following steps:

a. Install the bottom angle support first to secure the foundation to the ground;
b. Install the top angle support (if any);
c. Finally, install the cabinet onto the steel foundation.

After the steel foundation is finished, the installation procedure for cabinet can be referred to "6.3 Installation Procedure for Angle Support and Cover".

4.1.2 Clearance Requirement

This device has multiple installation methods:

- Single cabinet (see Figure 4-9)
- Multiple cabinets (see Figure 4-10 and Figure 4-11)

In order to ensure the heat dissipation of the inverter and facilitate disassembly, the minimum space to be reserved around the cabinet must meet the following standards.

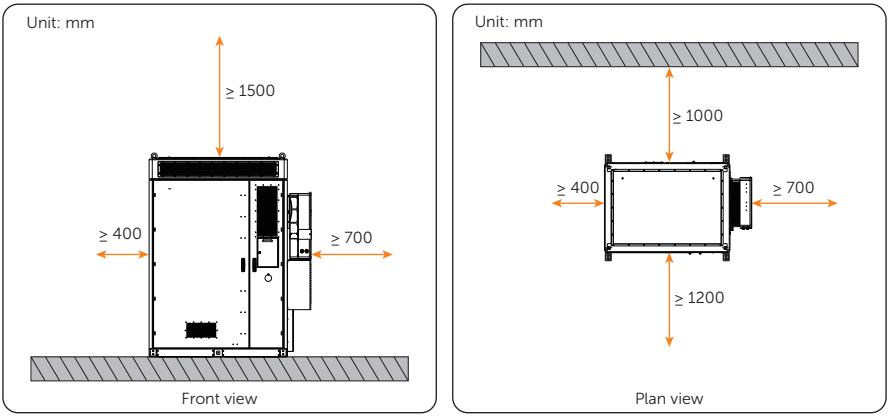


Figure 4-9 Single cabinet

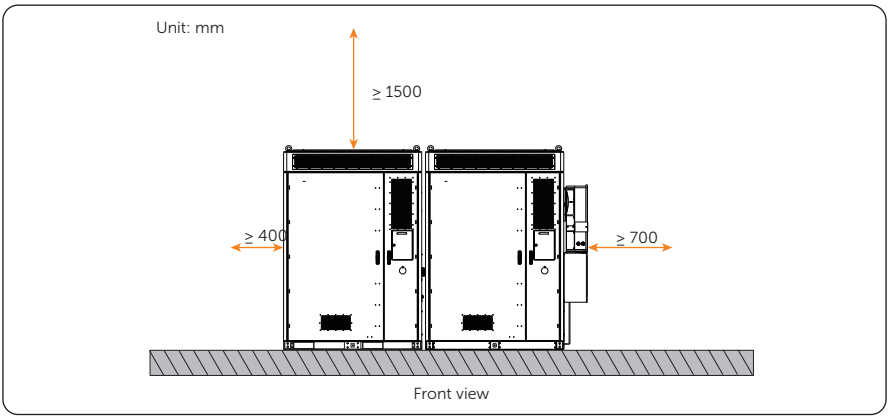


Figure 4-10 2 and more cabinets

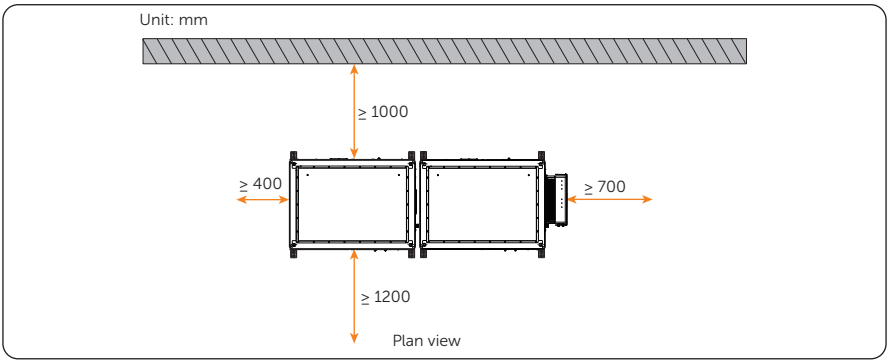
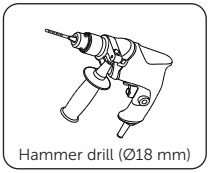
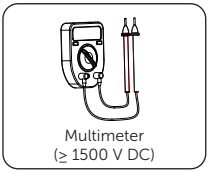


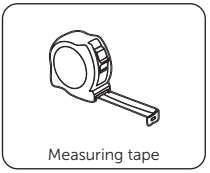
Figure 4-11 2 and more cabinets

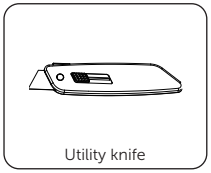
4.2 Tools Requirement

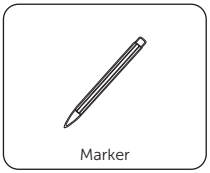
Installation tools include but are not limited to the following recommended ones. If necessary, use other auxiliary tools on site.

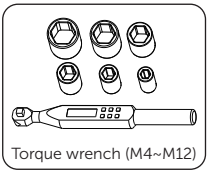

Hammer drill (Ø18 mm)

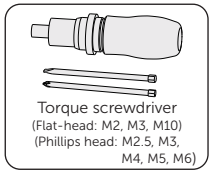

Multimeter
(≥ 1500 V DC)

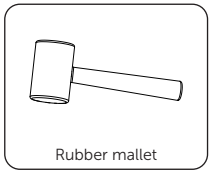

Measuring tape

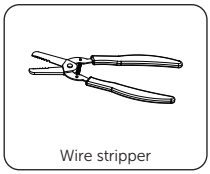

Utility knife

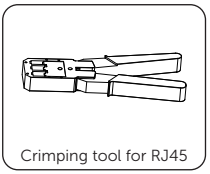

Marker

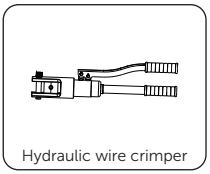

Torque wrench (M4~M12)

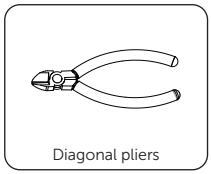

Torque screwdriver
(Flat-head: M2, M3, M10)
(Phillips head: M2.5, M3, M4, M5, M6)

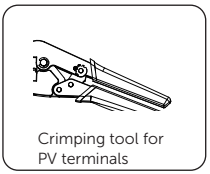

Rubber mallet

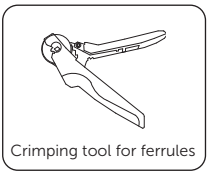

Wire stripper

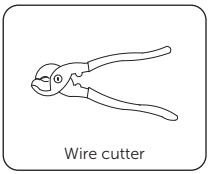

Crimping tool for RJ45

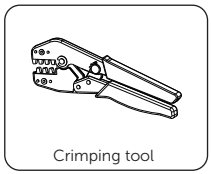

Hydraulic wire crimper

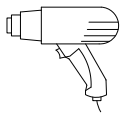

Diagonal pliers


Crimping tool for
PV terminals


Crimping tool for ferrules


Wire cutter


Crimping tool


Heat gun


Heat shrink tubing
(Ø13, Ø30~60 mm)


Cable tie


Steel pipe
Ø25~30 mm


Insulated ladder


Spirit level


Vacuum cleaner


Electric forklift


Crane


Steel wire rope
(Length > 2000 mm*4)

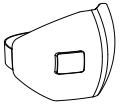

Slings
carrying capacity ≥ 150 kg
length ≥ 0.8 m

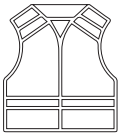

Safety belt


Insulating gloves


Safety boots


Safety goggles


Anti-dust mask


Safety vest


Safety helmet

4.3 Additionally Required Materials

Table 4-2 Additionally required wires

No.	Required Material		Type	Conductor Cross-section
1	PV cable		Dedicated PV cable with a voltage rating of 1000 V, a temperature resistance of 105℃, a fire resistance grade of VW-1	6 mm^2
2	Communication wire 1		Network cable CAT5E	/
3	Communication wire 2		Four-core signal cable	0.25 mm^2-0.3 mm^2
4	Grounding plate		Galvanized iron plate	Width: 40 mm Depth: 4mm
5	Grid wire		Five-core copper cable * The conductor cross-section of copper cables connecting to the distribution box (a total of 4 copper cables) is 35 mm^2, as well as 16 mm^2 for a copper cable that is connected to the grounding.	35 mm^2 * 4 + 16 mm^2 * 1
6	EPS wire		Four-core copper cable * The conductor cross-section of copper cables connecting to the cabinet (a total of 4 copper cables) is 35 mm^2.	35 mm^2 * 4
7	Additional PE wire		Conventional yellow and green wire	> 25 mm^2

Table 4-3 Additionally required materials

No.	Required Material		Type
1	Ring terminal		TLK16-8 ring terminal

5 Unpacking and Inspection

5.1 Battery Cabinet Unpacking

5.1.1 Unpacking

- The device undergoes 100% testing and inspection before shipping from the manufacturing facility. However, transport damage may still occur. Before unpacking the rechargeable battery, please verify that the model and outer packing materials for damage, such as holes and cracks.
- Due to the cabinet height exceeding 2m, please take necessary precautions for working at heights when removing the outer packaging. The unpacking procedure can be referred to the following Figure.

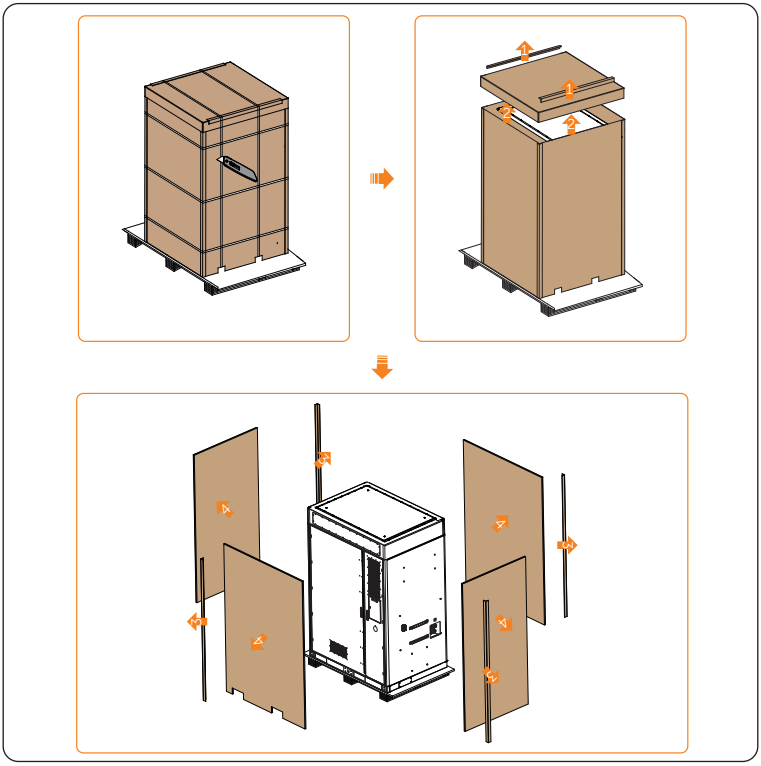


Figure 5-1 Unpacking

- When unpacking, please handle all packaging materials properly for future storage or relocation of this device.
- After unpacking, please check if the device is intact and if all accessories are complete. If there is any damage or missing accessories, please contact your dealer immediately for assistance.

5.1.2 Packing List

- **Battery cabinet**

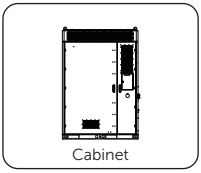
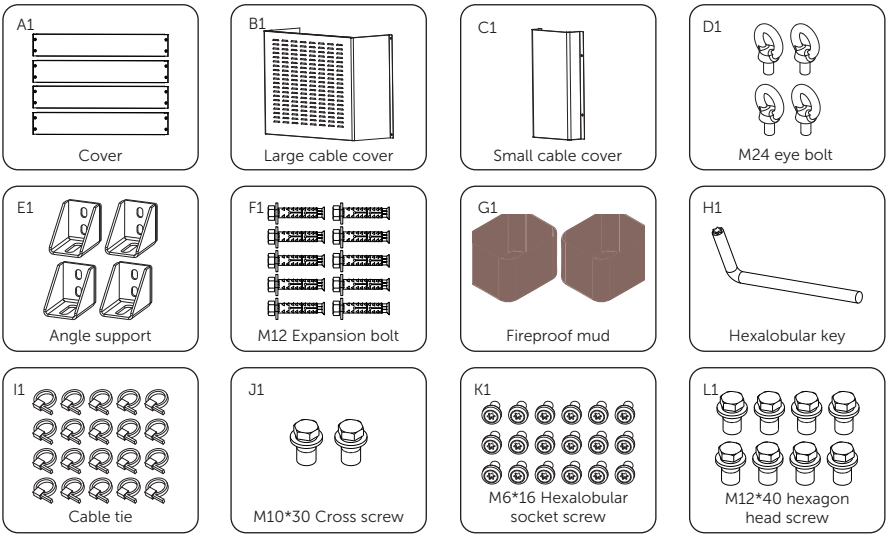
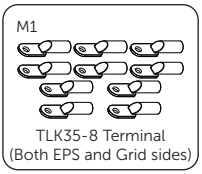


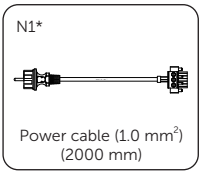
Table 5-1 Packing list

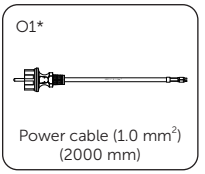
Item No.	Items	Quantity
/	Cabinet	1 pc

- **Accessory pack**









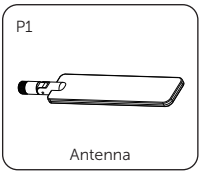


Table 5-2 Packing list

Item No.	Items	Quantity
A1	Cover	4 pcs
B1	Large cable cover	1 pc
C1	Small cable cover	1 pc
D1	M24 eye bolt	4 pcs
E1	Angle support	4 pcs
F1	M12 Expansion bolt	10 pcs
G1	Fireproof mud	2 pcs
H1	Hexalobular key	1 pc
I1	Cable tie	20 pcs
J1	M10*30 Cross screw (for grounding port)	2 pcs
K1	M6*16 Hexalobular socket screw	18 pcs
L1	M12*40 hexagon head screw (for angle support)	8 pcs
M1	TLK35-8 Terminal (Both EPS and Grid sides)	10 pcs
N1*	Power cable (1.0 mm^2) (2000 mm)	1 pc
O1*	Power cable (1.0 mm^2) (2000 mm)	1 pc
P1	Antenna	1 pc

NOTICE!

- The mark "*" indicates that if one of the cables connecting the high-voltage box AC input and AC power is damaged, the power cable (3000 mm) can be used as a replacement cable to connect to the AC input and the power cable (2000 mm) can be used as a replacement cable to connect to the AC power.
- Before installing the cabinet, you should check whether all the accessories and their respective quantities are complete and correct.

5.2 Inverter Unpacking

5.2.1 Unpacking

- The inverter undergoes 100% testing and inspection before shipping from the manufacturing facility. However, transport damage may still occur. Before unpacking the inverter, please check the outer packing materials for damage, such as holes and cracks.
- Unpacking the inverter according to the following figure.

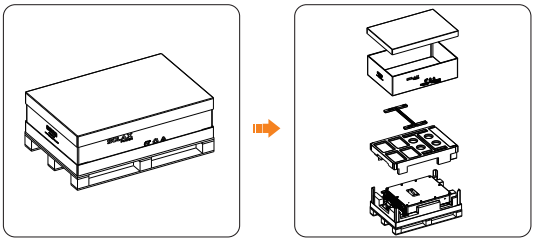
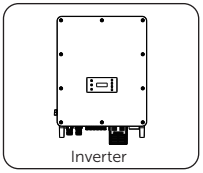
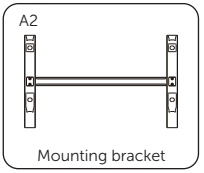


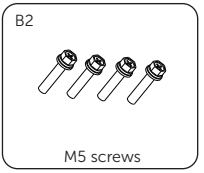
Figure 5-2 Unpacking the inverter

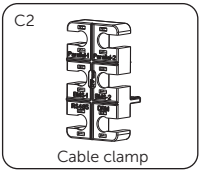
- Be careful when dealing with all package materials which may be reused for storage and relocation of the inverter in the future.
- Upon opening the package, check whether the appearance of the inverter is damaged or lack of accessories. If any damage is found or any parts are missing, contact your dealer immediately.

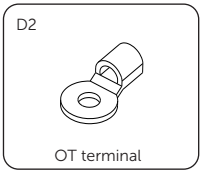
5.2.2 Packing List

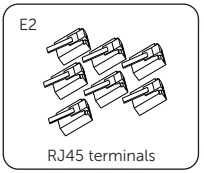

Inverter

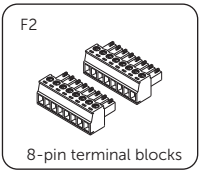

A2
Mounting bracket

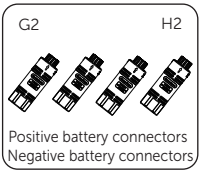

B2
M5 screws

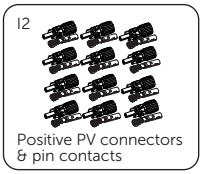

C2
Cable clamp

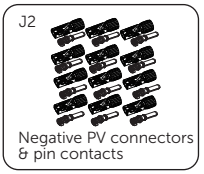

D2
OT terminal

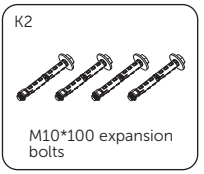

E2
RJ45 terminals

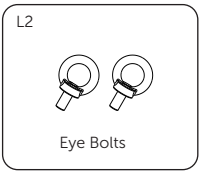

F2
8-pin terminal blocks

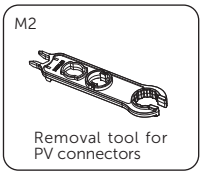

G2
H2
Positive battery connectors
Negative battery connectors

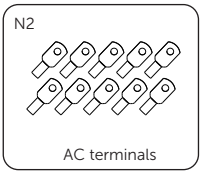

I2
Positive PV connectors & pin contacts

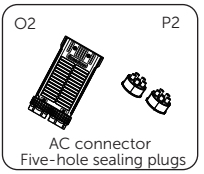

J2
Negative PV connectors & pin contacts

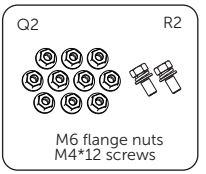

K2
M10*100 expansion bolts

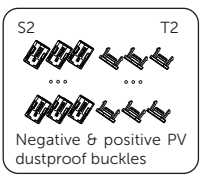

L2
Eye Bolts

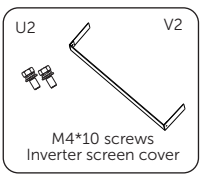

M2
Removal tool for PV connectors

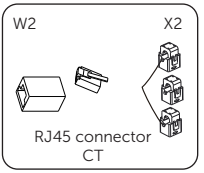

N2
AC terminals

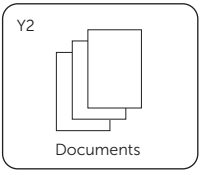

O2
P2
AC connector
Five-hole sealing plugs

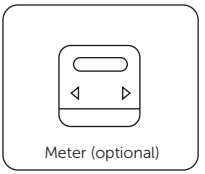

Q2
R2
M6 flange nuts
M4*12 screws

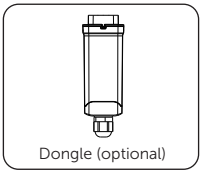

S2
T2
Negative & positive PV dustproof buckles


U2
V2
M4*10 screws
Inverter screen cover


W2
X2
RJ45 connector
CT


Y2
Documents


Meter (optional)


Dongle (optional)

* Refer to the actual delivery for the optional accessories.

Table 5-3 Packing list

Item	Description	Quantity
/	Inverter	1 pc

Item	Description	Quantity
A2	Mounting bracket	1 pc
B2	M5 screw	4 pcs
C2	Cable clamp	1 pc
D2	OT terminal	1 pc
E2	RJ45 terminal	7 pcs
F2	8-pin terminal block	2 pcs
G2	Positive battery connector	2 pcs
H2	Negative battery connector	2 pcs
I2	Positive PV connector & pin contact	10 pairs for X3-AELIO-50K 12 pairs for X3-AELIO-60K
J2	Negative PV connector & pin contact	10 pairs for X3-AELIO-50K 12 pairs for X3-AELIO-60K
K2	M10*100 expansion bolt	4 pcs
L2	Eye bolt	2 pcs
M2	Removal tool for PV connectors	1 pc
N2	AC terminal	10 pcs
O2	AC connector	1 pc
P2	Five-hole sealing plug	2 pcs
Q2	M6 screw	10 pcs
R2	M4*12 screw	2 pcs
S2	Negative PV dustproof buckle	12 pcs
T2	Positive PV dustproof buckle	12 pcs
U2	M4*10 screws	2 pcs
V2	Inverter screen cover	1 pc
W2	RJ45 connector	1 pc
X2	CT	1 pc
Y2	Documents	/
/	Meter (optional)	1 pc
/	Dongle (optional)	1 pc

6 Mechanical Installation

After determining the installation site, please take out the required underground cables.

WARNING!

- Avoid installing, operating and maintaining the device or cables outdoors under severe weather conditions such as lightning, rain or snow.
- The device must be installed by professionals in accordance with local regulations and standards.
- Use insulated tools and wear personal protective equipment (PPE) during installation and maintenance.
- Do not destroy the cabinet's anti-corrosion coating during the process of installation.
- Before drilling, please check and ensure that the area is free of pipes, light switches, sockets, and wires, and safe to drill into.
- Please take steps to cover the device to prevent debris from entering it while drilling holes.
- After drilling, clean up the site in time.

CAUTION!

- Pay attention to the weight of the equipment at all times during transportation and installation, improper lifting or dropping of the equipment may cause personal injury.

6.1 Battery Cabinet Installation Dimensions

Angle supports installed at front and rear sides

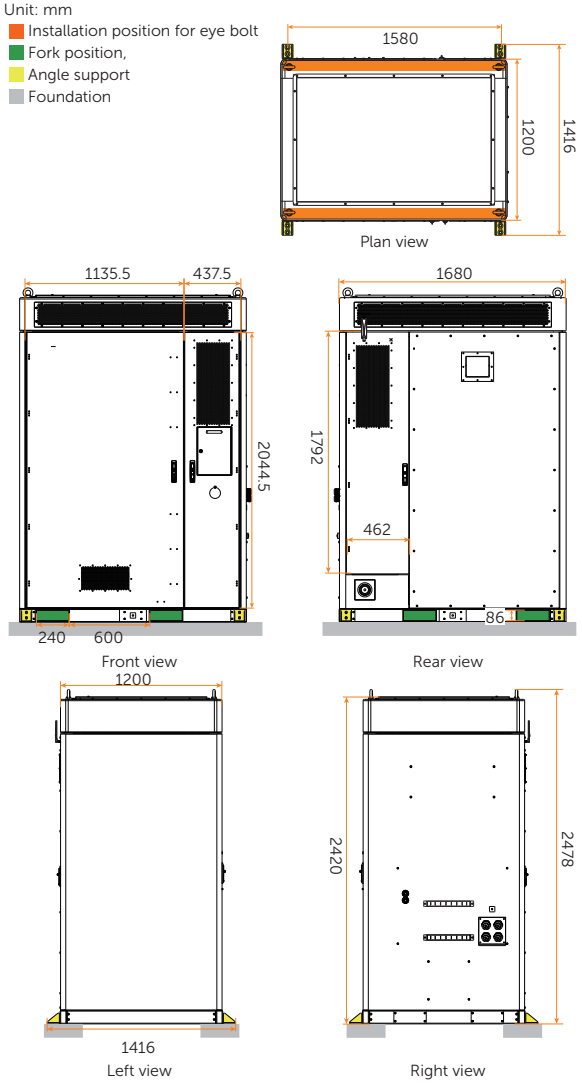


Figure 6-1 Dimension of battery cabinet

Angle supports installed at left and right sides

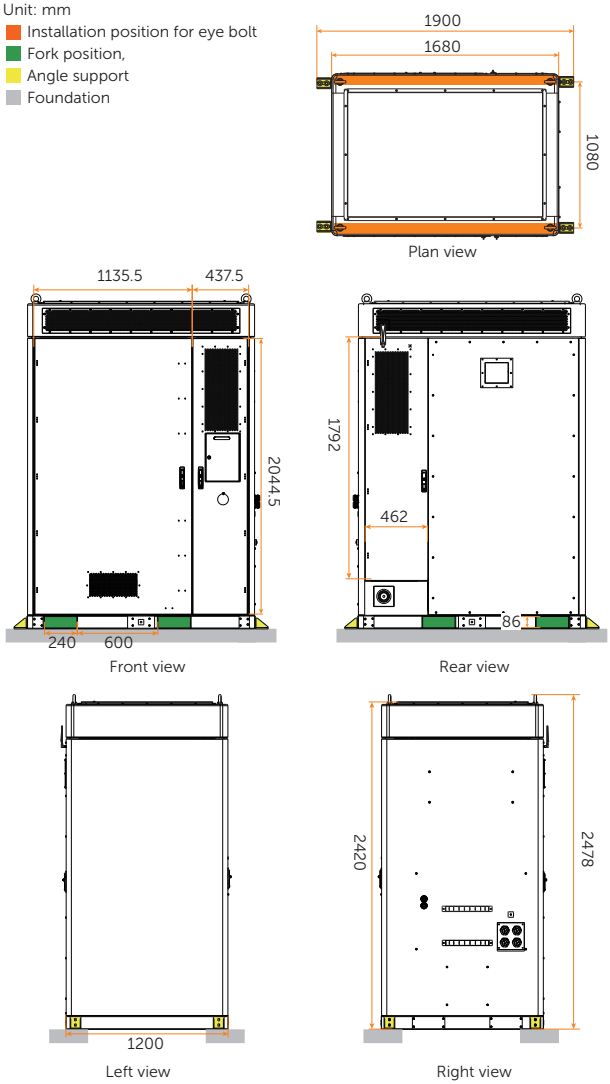


Figure 6-2 Dimension of battery cabinet

6.2 Battery Cabinet Handling

NOTICE!

- There are two ways to move a cabinet: using a crane or a forklift. Please refer to "3.9.1 Battery Cabinet Transportation" for related handling precautions.

6.2.1 Hoisting

NOTICE!

When hoisting:

- Temporary warning signs or fences should be set up in the hoisting area, and only the qualified persons can access it.
- Never stand and walk under or near the device being lifted or lowered.
- For safety reasons, avoid long-distance hoisting operations.
- Please be careful when hoisting and placing the device, and do not remove the ropes before it is seated on the foundation. Please make sure that the boom lift moves level and the cabinet's tile angle is ≤ 5° during hoisting.
- The angle in both the diagonal ropes shall be ≤60°.
- Do not lift the next one before the previous cabinet has been installed on the foundation.

Installation of eye bolt

Step 1: Remove the M20 screws (with a total of 4 pieces) inside the top eye bolt holes using a torque wrench.

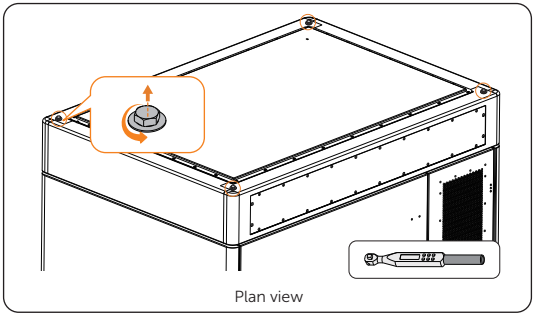


Figure 6-3 Unscrewing M20 screws

Step 2: Insert and clockwise the eye bolts (M20) (Part D1) (with a total of 4 pieces).

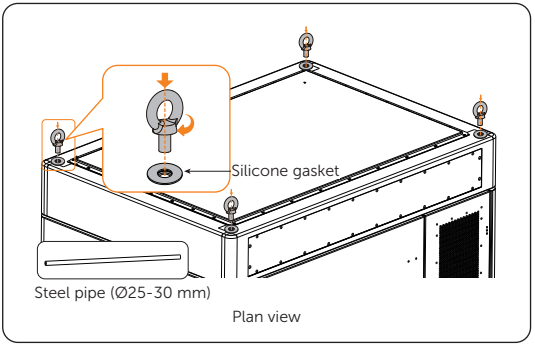


Figure 6-4 Tightening eye bolts

NOTICE!

- Put the silicone gaskets in place before inserting the eye bolts.
- Please ensure that the eye bolt's shoulder makes total contact with the silicone gasket.

NOTICE!

- When you hoist the cabinet, please strictly do the following requirements.

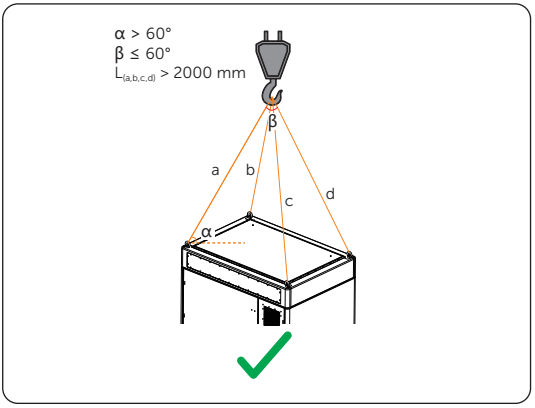


Figure 6-5 Proper way of hoisting

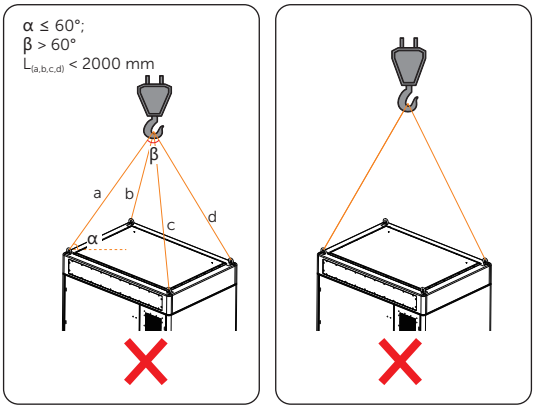


Figure 6-6 Improper way of hoisting

NOTICE!

- Before lifting, please prepare sufficient length of lifting ropes according to the actual situation.
- L=Length

6.2.2 Forklift

NOTICE!

- When using a forklift to move the cabinet, please secure it according to the actual situation to ensure that the cabinet does not pose a risk of tipping over.

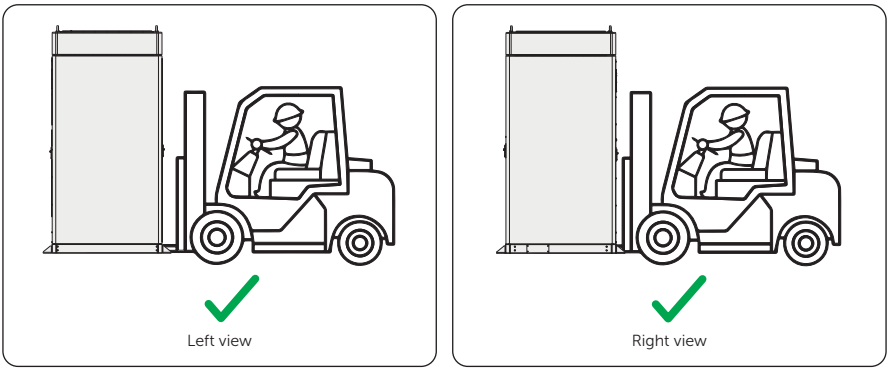


Figure 6-7 Right positions

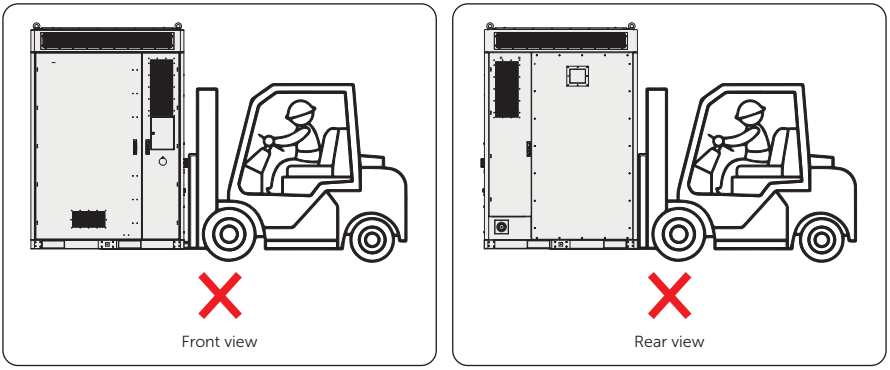


Figure 6-8 Wrong positions

NOTICE!

- For installation space requirements, please refer to "6.1 Battery Cabinet Installation Dimensions".
- For foundation requirements, please refer to "4.1.1 Installation Foundation Requirements".

6.3 Installation Procedure for Angle Support and Cover

The cabinet allows the angle supports to be installed at the front and-rear sides or at the left and-right sides. Since the installation procedure for the angle support is the same, take the angle support installed at the front and-rear sides, for instance.

Step 1: After determining the installation position of the cabinet, align the holes on the angle support (Part E1) with the holes on the cabinet, and draw a circle on the bottom of the angle support. There are totalling 4 angle supports for a cabinet.

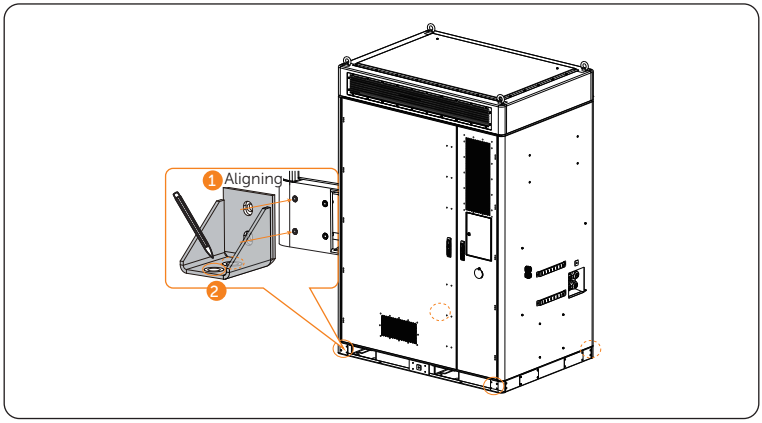


Figure 6-9 Marking hole position

Step 2: Drill holes at the previously marked positions (drill bit: Ø18 mm; hole depth: 95~105 mm). After drilling, clean the foundation surface with a vacuum cleaner.

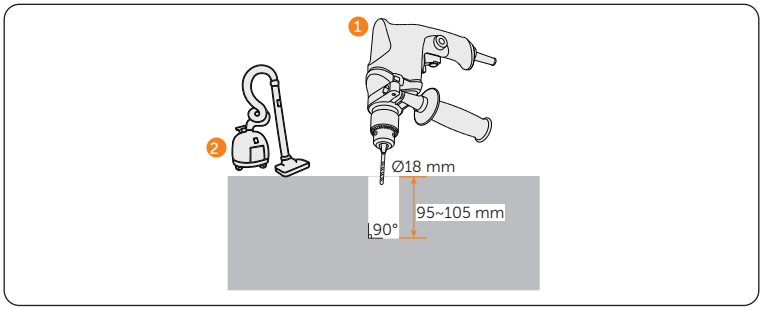


Figure 6-10 Drilling

Step 3: Attach the angle supports to the cabinet and ensure that holes are aligned, and insert M12 screws (Part L1) and tighten them clockwise using a torque wrench (torque: 42±4.2 N·m). Each angle support has two M12 screws, with a total of eight M12 screws.

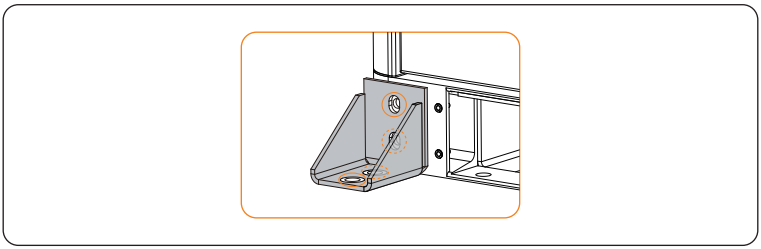


Figure 6-11 Aligning screw holes

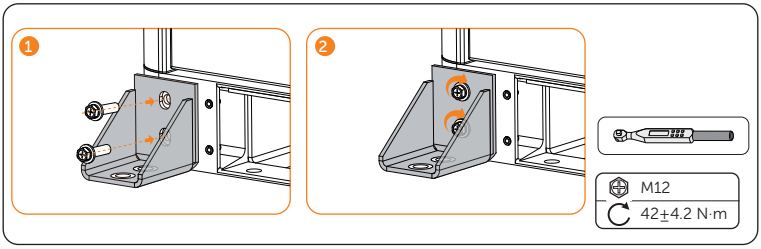


Figure 6-12 Tightening M12 screws

NOTICE!

- Reinstall the angle supports, ensuring that the screw holes on the angle support align with the screw holes on the cabinet and foundation.

Step 4: Use a rubber hammer to drive the expansion bolts (Part F1) into the foundation screw holes, and then tighten them clockwise with a torque wrench (M12) (torque: 42±4.2 N·m). Each angle support has 2 expansion bolts, with a total of 8 expansion bolts.

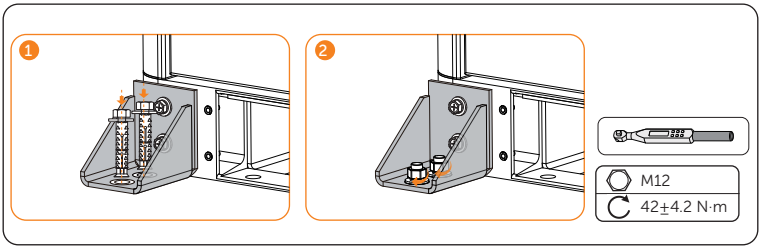


Figure 6-13 Tightening expansion bolts

Step 5: After the angle supports have been installed, take out the covers (Part A1) to seal the forklift hole and tighten the M6 hexalobular screws (Part K1) with the hexalobular key (Part H1). Each cover has 4 screws, with a total of 4 covers.

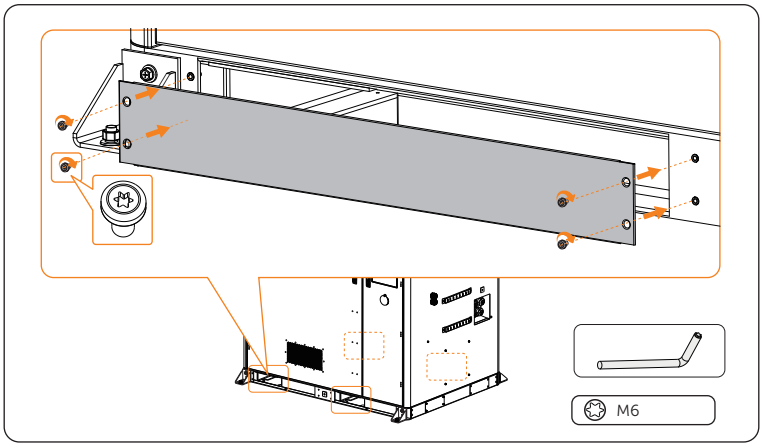


Figure 6-14 Fixed covers

NOTICE!

- The above-mentioned installation steps also apply to the angle supports, which are installed on both the left and right sides.

6.4 Antenna Installation

NOTICE!

- The user can decide whether the reserved port connects an antenna based on the actual situation.
- Regarding the other antenna port, the antenna is delivered with the accessories kit.

There are two antenna ports on the rear side of the cabinet. The left one shall be connected to an antenna, and the right one is a reserved port. Regarding the antenna installation steps, please do as follows.

Step 1: Remove the silicone cap.

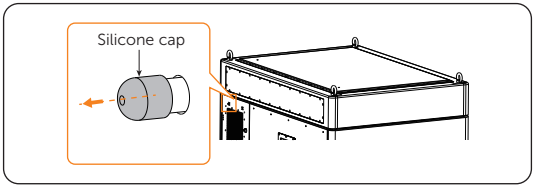


Figure 6-15 Removing silicone cap

Step 2: Correctly insert and tighten the antenna (Part P1) by turning it clockwise.

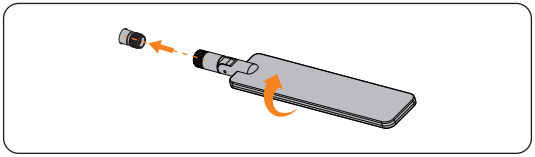


Figure 6-16 Installing antenna

Step 3: Fold the antenna up 90°.

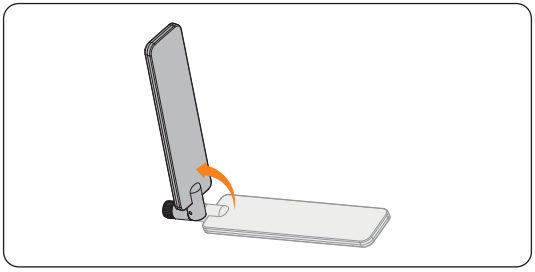


Figure 6-17 Folding the antenna

After installing the antenna, see following figure.

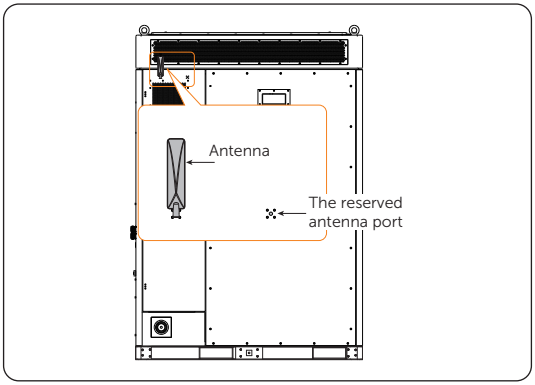


Figure 6-18 Installing an antenna

6.5 Inverter Installation

WARNING!

- Only the qualified personnel can perform the mechanical installation following the local standards and requirements.

CAUTION!

- Always be aware of the weight of the inverter. Personal injuries may result if the inverter is lifted improperly or dropped while being transported or mounted.
- Use insulated tools when installing the inverter. Personal protective equipment must be worn during installation and maintenance.

NOTICE!

- Install the inverter at a maximum back tilt of 5 degrees and avoid forward tilted, side tilted, or upside down.

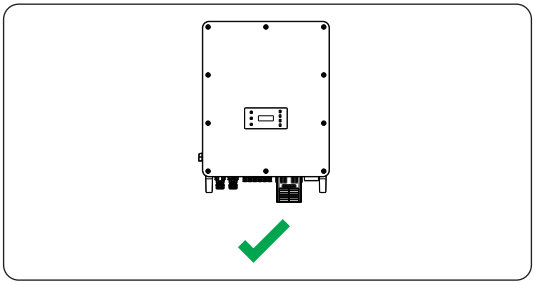


Figure 6-19 Correct installation

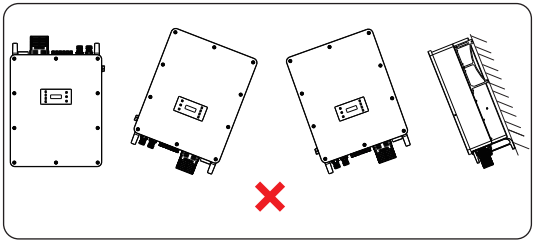


Figure 6-20 Incorrect installation

6.5.1 Inverter Installation Dimensions

Check the dimensions of the wall mounting bracket before mounting and reserve sufficient space for heat dissipation and installation of the whole system.

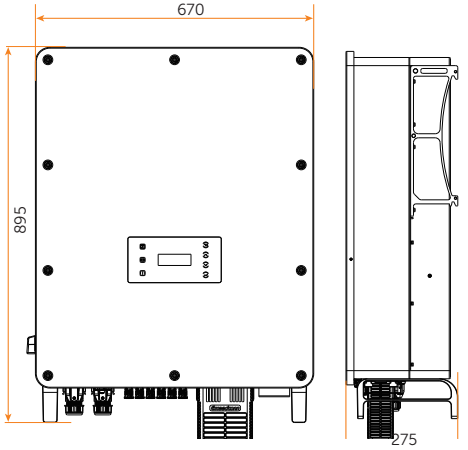


Figure 6-21 Dimensions (Unit: mm)

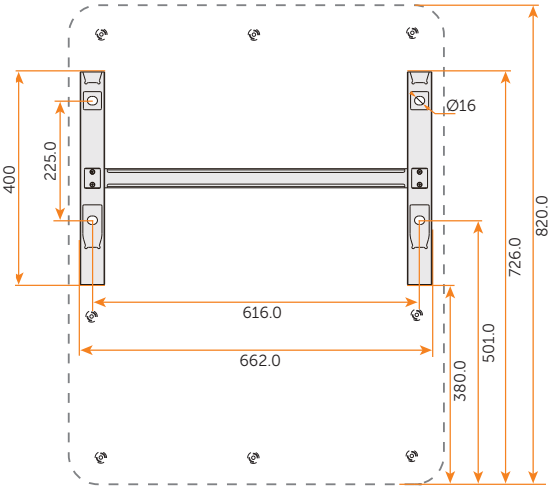


Figure 6-22 Dimensions 2 (Unit: mm)

6.5.2 Installation Procedures

Step 1: Confirm the four holes for the position of the mounting bracket on the battery cabinet.

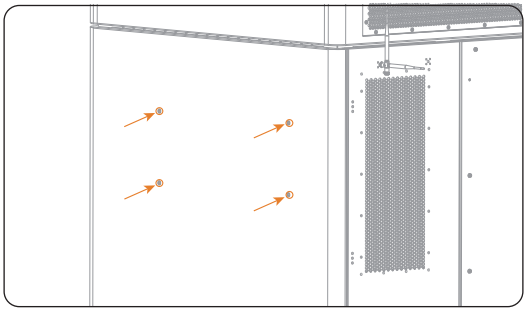


Figure 6-23 Confirming the position of the mounting bracket

Step 2: Take out the mounting bracket (Part A2) from the carton. Attach the mounting bracket on the battery cabinet. Knock the expansion screws (Part E1) into the holes and secure it to the cabinet by torque wrench. (Torque: 24 N·m)

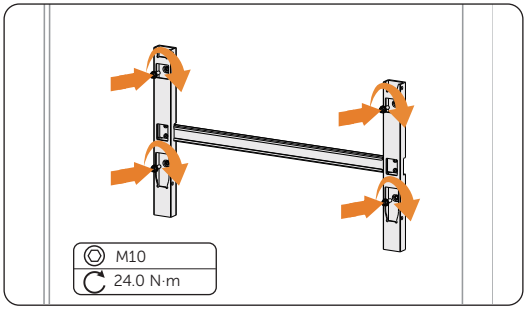


Figure 6-24 Securing the mounting bracket

Step 3: Open the anti-static bag and take out the machine.

NOTICE!
• If the inverter is temporally needed to be placed on the ground, use foam or other protective materials to prevent any damage to the inverter.

Step 4: Remove the carton, loosen and pull out the M10 screws on the sides of the inverter with a flat-head screwdriver. Tighten the two eye bolts (Part L2) on the two sides of the inverter and tie them with a sling. Lift up the inverter with a crane and hang the device on the mounting bracket. The keyways of the inverter must be hooked into the buckles of the mounting bracket.

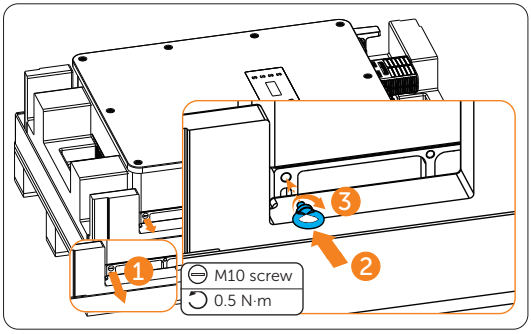


Figure 6-25 Installing the eye bolts

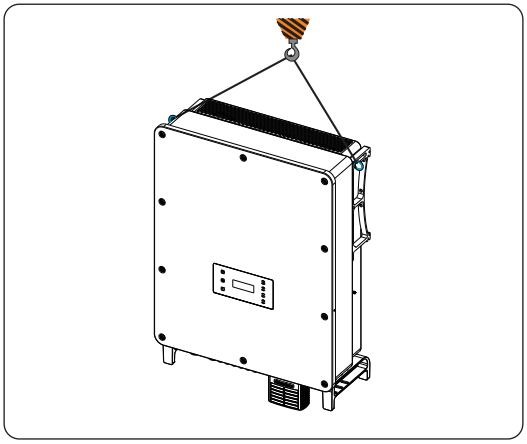


Figure 6-26 Hanging the inverter