



# AELIO-P50B100

## User Manual

Version 0.0

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# STATEMENT

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# About This Manual

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## Scope of Validity

This manual is an integral part of AELIO-P50B100 system. It describes the transportation, storage, installation, electrical connection, commissioning, maintenance and troubleshooting of the product. Please read it carefully before operating.

This AELIO-P50B100 system includes a X3-AELIO series inverter and a AELIO-B100 battery cabinet.

X3-AELIO series inverter model list:

Model	X3-AELIO-50K	X3-AELIO-60K
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Battery cabinet model list:

Model	AELIO-B100
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### Model description

# AELIO-P50B100



No.	Definition	Description
1	Product name	Aelio: Refer to the name of hybrid project.
2	Power	P50: Indicate that the rate power of the inverter is 50 kW.
3	Battery capacity	B100: Indicate that the battery capacity is 100 kWh.




## Target Group

The installation, maintenance and grid-related 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.

## Conventions

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

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

## Change History

Version 00 (2024-05-28)

Initial release

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# 1 Safety

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## 1.1 General Safety

**Before transporting, storing, installing, operating, using and/or maintaining the equipment, please carefully read the document, and strictly follow the instructions and safety precautions given herein, as well as symbols affixed on the equipment.**

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 and regulations, and industry rules. **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 operator should comply with the local laws, regulations, standards and guidelines in the process of transportation, storage, installation, operation, and maintenance.

The device is well designed and tested to meet all applicable states 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.

Before installing the device, carefully read, fully understand and strictly follow the detailed instruction of the *User Manual* and other related regulations. And the safety instructions in this document are only supplements to local laws and regulations.

SolaX will not assume any responsibilities if any of the following circumstances occurs, 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 man-made cause.
- 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 Personal Safety

### DANGER!

- Do not power on while installing the device. If the device is powered on in the process of installation and disassembly of cables, an electric arc, electric spark or fire will occur at the moment that the cable core contacts conductors. It may cause a fire or result in physical and property damage.
- Do not improperly operate while powering on. Any improper operation may cause a fire, electric shock, or explosion, and it will result in physical and property damage.
- Must remove rings, bracelets, watches, and any other metal jewelry from fingers, hands, or wrists before operation, to avoid electrical shock or burn.
- Must use special insulation tools, of which the insulation grade and dielectric strength level must be consistent with local laws, regulations, standards, and guidelines, in the operation process, to avoid electrical shock, burn, or short circuit fault.

### WARNING!

- Must wear special personal protective equipment (PPE), such as a coverall, safety boots, safety glasses, safety helmet, safety gloves, etc.

### CAUTION!

- Do not stop the safety switch on the equipment, and neglect the "Danger" sign, "Warning" sign, "Caution" sign, and "Notice" sign on the equipment, as well as safety precautions in the document.
- Must stop working at once, report to the relevant person in charge, and activate protection schemes in case of possible danger that may cause human injury and damage to equipment in the installation and operation process.
- Do not power on during the installation process, or before obtaining confirmation from professionals after finishing installation.
- Do not directly contact power supply equipment, or contact it with other conductors or wet objects.
- Do not touch the running fan with parts, screws, or installation tools, or keep hands clear when the fan is running, to avoid personal injury or property damage.
- Please evacuate and press the fire bell immediately, or call fire department at once in the case of a fire.



## 1.3 Environment Requirement

### DANGER!

The equipment installation site shall meet the following requirements:

- Keep away from combustibles and explosive materials.
- Keep away from heat or fire sources, such as fireworks, candles, heaters, or any other heat-producing appliances. It may cause damage to equipment or a fire.
- Keep away from flammable and explosive gases, or smoky environments.

### WARNING!

- The equipment installation site should keep away from liquid areas, such as positions under a water pipe or air outlet where the condensed water is easy to form, or positions under an air-conditioning vent, ventilation opening or equipment room outlet where there is access to water. The water can seep into the internal components of the device, causing device damage and short circuits.
- Do not cover vents and cooling systems while running. Otherwise, it may cause a fire or equipment damage due to the high temperature.

### CAUTION!

- The storage area should be clean, dry, and well ventilated to prevent dust from entering, and condensed water from generating.
- Strictly observe technical specifications while installing and running the equipment. Or, it may affect the performance and safety of the equipment.
- Do not install, run or operate outdoor equipment or cables (including but not limited to carrying equipment, operating equipment, connecting cables, plugging or unplugging cables that connect to outdoor signal ports, working at heights, outdoor installation, etc.) in bad weather, such as thunderstorms, rain, snow, etc.
- Keep away from the following environments while installing the equipment: environments with dust, smoke, volatile gases, corrosive gases, infrared radiation, organic solvents, or a site with high salt.
- Keep away from environments with metal-conductive or magnetic-conductive dust.
- Keep away from areas suitable for fungus, mould, or other microorganism growth.
- Keep away from areas with strong shaking, serious noise pollution, or powerful electromagnetic interference.
- The installation site must conform to local laws and regulations, and relevant standards.
- The ground at the installation site must be firm and strong instead of having an adverse geological condition, such as soil with high water content, weak soils, or loose soils. And keep away from low-lying areas since they are prone to water or snow accumulation.
- Keep away from areas prone to water accumulation.
- If the equipment is installed on a grassy plantation, do weed regularly, and harden the ground under the equipment, such as cementing, gravelling, etc.

 CAUTION!

- When the operator plans to install, operate or maintain the equipment, water, snow, or other objects must be cleared on the top of the device before opening doors to keep them from entering into the device.
- Please check the ground is firm and strong enough to meet the load-bearing requirements of the equipment while it is being installed.
- Must seal the entry holes.
- Must clean the packing materials, such as cartons, foams, plastic bags, ties, etc., on the site after finishing installation.

## 1.4 Cabinet, Battery and Electric Safety

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

### 1.4.1 Cabinet Safety

 DANGER!

- A safety helmet, belt, or rope must be worn when performing work at height. If the safety rope is adopted, one end must be securely tied to a strong structural part instead of a movable and unsound object or a metal with sharp edges, to prevent fall incidents due to the slip of the rope hook.

 WARNING!

- To ensure that a complete set of tools is prepared, are firm and secure. They must pass the verification of professional authorities. DO NOT use any tools that are broken, failed to verify, or are expired.
- To prevent personal injury or equipment damage from slopping or collapsing of the cabinet because it is unstable, please check if the cabinet has been secured before placing any devices into it.
- To protect relevant people from injury, take care of the unstable or heavy devices in the cabinet when taking them out.
- Do not drill holes in the equipment. Otherwise, the sealing performance, electromagnetic shielding performance, or internal components or cables of the equipment will be destroyed, and it can even cause a short circuit on a circuit board if the metal dust generated by drilling enters into the device.

 CAUTION!**Safety precautions for lifting and handling heavy devices:**

- To prevent injury from oversize loads, assess the device you're about to lift before you start lifting.
- If more than 2 people lift a device, reasonably arrange to have a balanced weight distribution
- Wear personal protective equipment, such as, safety gloves, safety boots, etc., to prevent needless injuries when lifting devices with bare hands.
- Know the right body posture to prevent personal injuries when lifting devices, for instance, bend at your knees, not at your waist or back, and do not twist your back.
- Hold the handles on the device or put your hands underneath the device to move or lift, and do not hold the handles on the parts installed in it.
- To prevent injuries, do not quickly lift the heavy device above the waist.
- To prevent scratches and dents, or damage to components and cables, avoid impact and falling when moving.
- Be aware of workbenches, slopes, steps, and other places where it is easy to slip when moving devices. Ensure that the passageways are smooth, clean, and away from obstacles.
- To prevent tipover, the forklift's forks must be placed under the load. Center the weight of the load between the forks, and adjust the forks to distribute the weight evenly. Firmly attach the loads to the forks before lifting, and arrange for people to watch for when lifting.
- Sea and road (in good condition) transports are an idea for the device instead of rail and air transports. Transport staff should do their best to avoid bumpiness and inclination as much as possible.

 CAUTION!**Safety precautions for working at heights:**

- Arrange people to protect workers who work at 2 meters in height or higher.
- Workers who work at 2 meters in height or higher are required to be trained and obtain relevant qualifications.
- In the case of one of the following circumstances, workers should immediately stop operation until the device is inspected and confirmed safe by the relevant safety director and technicians.
  1. Wet steel pipe.
  2. Other situations may be dangerous.
- Should mark off a dangerous area, put up Danger signs, and keep unauthorized people from entering the area.
- Should install guardrails and put up "Watch Your Step" and Danger signs at the edges of workplace and holes.
- Do not stack scaffoldings, gangplanks, or other sundries, and keep the ground service staff from staying or passing under the area where the work is being carried out.
- Take caution with the apparatus and tools brought to ensure that they do not fall.

Continued to the next page

 CAUTION!

**Safety precautions for working at heights:**

- Workers who work at heights should take advantage of crane slings, baskets, elevating transfer vehicles, cranes, or other methods to transfer objects instead of throwing them from the air to the ground or from the ground to the air.
- Should avoid working on the up and down work platform at the same time. Or, a special protective shed should be built or some protective measures should be taken between two work platforms to protect workers. In addition, do not stack tools and materials on the upper work platform.
- The scaffoldings should be removed from top to bottom instead of being removed at the same time after finishing installation. Take caution when dismantling parts of scaffolding.
- Workers who work at heights must abide by the Safety Regulation for Working at Heights. SolaX will not be liable for personal injury or equipment damage due to violations of the Regulation.
- Do not play and have a break in the area while working at heights.

 CAUTION!

**Ladder safety:**

- A wood or insulated ladder should be used when working with electricity.
- A platform ladder with handrails is preferred instead of a straight ladder.
- Check that the ladder is in good condition, make sure that the load bearing meets requirements, and strictly prohibit overload.
- Place the ladder on a solid and firm surface, and designate a person to hold it.
- Balance your body to prevent injuries when climbing.
- Make sure that the rope is fastened and secured when using the herringbone ladder to prevent incidents.

 CAUTION!

**Crane safety:**

- Crane operators are required to be adequately trained, and certified and licensed to operate said equipment before starting work.
- Must install guardrails and put up Warning signs at the crane working area.
- The groundwork for the hoisting operation must meet the load bearing requirements of the crane.
- Make sure that the hoisting tools have been secured to an object or wall that meets the load bearing requirements before hoisting.
- Keep the ground service staff from staying or passing under the crane boom or suspended load where the work is being carried out.
- Do not drag steel wire rope, wire rope slings, etc., and hit hoisting equipment with hard objects, when hoisting work is being carried out.
- Make sure that the angle between two wire ropes do not exceed 90° when hoisting.

 CAUTION!**Drilling safety:**

- Wear personal protective equipment when drilling, such as safety glasses, safety gloves, etc.
- Avoid drilling around pipes, and light switches and sockets, as the electrical wires can go horizontally and vertically around these fixtures.
- Cover the device to protect it from dusts and debris entering when drilling, and clean it at once after finishing drilling.

## 1.4.2 Battery Safety

 DANGER!

- Do not connect the positive and negative poles of a battery together. Or, the battery may be short-circuited. A short circuit may cause enormous amounts of current and release large quantities of energy for a short time, which may cause the battery to leak, smoke, release flammable gases, or be in thermal runaway, catch fire, or explode. Therefore, power off the battery before maintenance.
- Overheating the battery can lead to significant risks, including leakage, smoke, release of flammable gases, thermal runaway, fire, or explosion. In case of one of the following circumstances, do not install battery:
  - a. Direct sunlight
  - b. Fire source
  - c. Heater
  - d. Others conditions that can cause overheating
- Never damage the device by crushing, deforming, dropping, impacting, cutting or penetrating with a sharp object. Otherwise, it may cause a fire or leakage of electrolytes;
- Never dismantle, change or damage battery, including penetrating with a sharp object, deforming, soaking in water or other liquids, to keep it away from leakage, smoke, release of flammable gases, thermal runaway, fire or explosion.
- Do not touch battery terminals with any other metal objects, which may cause heat or leak.
- Do not mix different types or makes of the battery module. It may cause leakage or rupture, resulting in personal injury or property damage.
- The battery electrolyte is toxic and volatile. Never get contact with the leaked liquids or inhale gases in the case of the battery leakage or odor. In such a case, keep away from the battery and contact professionals immediately. Those professionals must wear PPE, such as safety glasses, safety gloves, gas masks, protective clothing, etc., power off the equipment, remove the battery, and contact technical engineers.

Continued to the next page

 **DANGER!**

- Normally, the battery will not release any gases since it is an enclosed system. 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. To prevent fire or device corrosion, ensure that flammable gas is properly exhausted.
- Take steps to protect human beings from the gases released when burning the batteries.

 **WARNING!**

- Install batteries in a dry area. Do not install them under areas prone to water leakage, such as air conditioner vents, ventilation vents, feeder windows of the equipment room, or water pipes. Ensure that no liquid enters the equipment to prevent faults or short circuits.
- Equip with fire-fighting equipment, such as dry sand, carbon dioxide fire extinguisher, etc., when installing and commissioning according to construction standards and requirements. Make sure that the above-mentioned fire-fighting equipment conforms to local laws, regulations and standards.
- Before unpacking, and in the process of storage and transportation, ensure that the packing cabinets are intact and the batteries are correctly placed according to the labels on the packing cabinets. Do not place a battery upside down or vertically, lay it on one side, or tilt it. Stack the batteries according to the stacking requirements on the packing cabinets. Make sure that the batteries do not fall or get damaged. Otherwise, they will need to be scrapped.
- After packing, the batteries must be correctly placed in accordance with the requirements. Do not place a battery upside down or vertically, lay it on one side, or tilt or stack it. Make sure that the batteries do not impact, fall get damaged. Otherwise, they will need to be scrapped.
- Tighten the screws on copper bars or cables to the torque specified in this document. Periodically confirm whether the screws are tightened, check for rust, corrosion, or other foreign objects, and clean them up if any. Loose screw connections will result in excessive voltage drops and batteries may catch fire when the current is high.
- After batteries are discharged, charge them in time to avoid damage due to overdischarge.

 **CAUTION!**

- Please read the document carefully before installation, operation and maintenance.
- Charge the battery within the specific temperature range because the low temperature may result in short circuit. Hence, do not charge the battery if the temperature is below the low limit of the operating temperature.
- Ensure that the packing cabinets are intact before unpacking. Do not use if package is damaged, and contact forwarder and manufacturer immediately.

Continued to the next page

 CAUTION!

- May leak electrolytes or release flammable gases if the battery is damaged, including dropping, crashing, bulging, or housing indentation. Do not use in the case of the above-mentioned circumstances. Please immediately contact the installer or professional operation and maintenance staff to remove or change the battery in the case of leakage of electrolytes or structural distortion. Keep the damaged battery away from other devices or inflammable and explosive materials, and ensure that non-professional personnel do not contact the damaged batteries.
- Ensure that the pungent and burning smells go away before operating.
- Do not place any objects, like tools, metal parts, etc., on top of the battery. Check and clean them up if any.
- Do not install batteries in rain, snow, fog, or other extreme weather, to prevent moisture or corrosion.
- Do not install batteries after moisturizing, transport to an isolation area, and be scrapped.
- Check if the shell of the battery is deformed or damaged before installing. If yes, do not install it.
- Check whether the positive and negative terminals of the battery are accidentally grounded. If yes, disconnect them.
- Do not weld or grind near the battery. Because an electric spark or arc may cause a fire.
- Store or recharge the battery according to the document if it is not used for a long time.
- The devices used to charge or discharge the batteries must meet the requirements of local laws, regulations, and standards.
- Power off the battery when installing and maintaining.
- Inspect the damaged battery to ensure that there is no smoke, fire, leakage of electrolytes, or heat in the period of storage.
- Do not touch the battery when it fails because of the high temperature of the surface.
- Do not step, against, or stand on the battery.
- The batteries are not allowed to be used to provide a backup power source in the following circumstances:
  - a. Medical equipment that is directly related to human health.
  - b. Equipment, like trains, elevators, etc., that may cause injuries to human beings.
  - c. Computer systems that play an important role in societies and institutions.
  - d. Nearby area with medical equipment.
  - e. Other devices that play a similar role, as described above.

## NOTICE!

**Short-circuit protection**

- Use electrical tape to wrap the exposed wire outwards to prevent short circuit when installing and maintaining.
- Prevent any object from entering into batteries.

**NOTICE!**

**In case the battery module leaks electrolyte or any other chemical materials, or gas may be generated due to the leakage of battery module, be sure to avoid contact with the discharge 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 15 minutes, and seek medical attention;
- In case of contact with skin: Wash the contacted 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 module is installed, please do as follows:**

- In case the battery module is charging when the fire breaks out, provide it is safe to do so, disconnect the battery module circuit break to shut off the power charge;
- In case the device is not on fire yet, use a Class ABC fire extinguisher or a carbon dioxide extinguisher to extinguish the fire;
- If the battery module catches fire, do not try to put out the fire, and evacuate immediately. Others conditions that can cause overheating.
- The battery module may catch fire when it is heated above 302°F/60°C; and in case of catching fire, it will produce noxious and poisonous gas, DO not approach and keep away.

**NOTICE!**

**Effective ways to deal with accidents:**

- In case of the damaged battery module, place it into a segregated place, and call the local fire department at the place where the user lives or qualified personnel.
- If any part of the battery module, or wiring is submerged, do stay out of the water and do not touch anything; If the battery module gets wet, don't touch it.
- If the battery module is damaged, don't use it. Otherwise, it may result in both personal injury and property damage.
- Don't use the submerged battery module again, and contact the qualified personnel



**NOTICE!****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 in curbside recycling bins. Otherwise, it may cause environmental pollution or explosions.
- Contact our company or a battery recycling company to scrap the battery, if it leaks electrolytes, or is damaged.
- Contact a battery recycling company to scrap batteries if they are expired.
- Keep the damaged or wasted batteries away from high temperatures and direct sunlight.
- Ensure that the damaged or wasted batteries are not exposed to the following environments: high humidity, corrosion.
- Do not recycle the damaged or wasted batteries for a second use, and immediately contact a battery recycling company to scrap them. Or, it may cause environmental pollution.

### 1.4.3 Electrical Safety

** DANGER!**

- Before wiring, check that the device is intact to prevent electric shock or a fire.
- Improper operation may cause a fire, electric shock, etc.
- Prevent any objects from entering into the device when operating. Otherwise, the device may be short-circuited or damaged, the load's power supply may be derated or powered off, or personal injuries may occur.

** WARNING!**

- A device required to be grounding must be grounded firstly when conducting wiring. The PNGD cable must be disconnected finally after removing any other cables.

** CAUTION!**

- Do not install cables near air inlet (or outlet) of the device.

**NOTICE!**

- Please strictly follow the steps described in the document before installing, operating and maintaining the device. Do not modify or change the device, and adjust the installation procedure.
- Permission shall be obtained from the state or local electrical department before conducting the grid connection.
- Abide by the safety regulations stipulated by the power station.
- Mark off an operation area, install a temporary fencing or rope, and put up "No Entry" signs.
- Power off the device and shut down switches before connecting or disconnecting power cables.
- Power off the device at once and do not use again if there are any liquids entering into it.
- Check and confirm whether the tools meet the requirements described in the document before operating the device, and be registered. Check whether the number of tools is correct after installing and operating it.
- Check that the icons on the cable labels are correct before connecting power cables. Ensure that the terminals are completely covered with insulation.
- Ensure that protective shell or insulation sleeving on the electrical components are correctly installed to protect operators from electric shock.
- In the case of multiple inputs, disconnect them first; do not operate the device until it is completely powered off.
- Turn off the corresponding output switch of the power supply equipment while maintaining electrical terminal equipment and power distribution equipment connected to the power supply equipment.
- Must put up "Do Not Switch On" signs and warning signs, to prevent power connection. Do not switch on before the fault is repaired.
- Must follow the steps below if the device needs a power cut in the process of fault diagnosis and troubleshooting: power cut > electricity testing > connecting grounding cable > putting up warning signs and installing guardrails.
- Periodically check whether the screws are tightened fully.
- Only professionals can change the damaged cables.
- Do not alter, damage or obscure the logos and labels attached to the devices.
- Do not clean the internal and external parts of the device with solvents, like water, alcohol or oil.

**NOTICE!****Grounding requirement:**

- The equipment grounding impedance shall meet the requirements of the local electrical code.
- The equipment shall be permanently connected to a grounding wire within the building's electrical system. Check that the equipment is reliably grounded.
- Do not operate the equipment before connecting it to the equipment grounding connector.
- Do not damage the equipment grounding connector.
- Make sure that the grounding pin in the 3 pin plug is connected to a grounding wire within the building's electrical system in the case of the 3 pin plug.
- In the case of high-current equipment, it shall be ensured that the protective grounding terminal of the device shell has been grounded.

**NOTICE!****Wiring requirement:**

- Must abide by the local laws, regulations and standards to select, install, and route cables.
- Do not circle or twist cables. Change the power cable if the cable length is insufficient instead of joining it.
- Make sure that cables are secured and well-insulated, and meet specifications.
- Cable troughs or holes must be smooth, burr-free working surface to prevent cable damage.
- Suggest to use cable ties to bind cables to ensure that the cables inside the cabinet are tidied, and to prevent cable jacket damage. Do not circle or twist cables.
- Use fireproofing mud immediately to seal the cable holes if you need to leave for a while after finishing wiring or in the process of wiring, to prevent water vapor and small animals.
- If the external conditions (routing method, temperature, etc.) change, the cable type must be verified according to IEC-60364-5-52 or local laws, regulations and standards. For instance, verify whether the cable ampacity meets the requirements.
- The cable insulation layer may be aging, and even damaged in a high temperature environment. Therefore, at least 30 mm of distance shall be kept between the cables and heater or periphery of heat sources.
- Do as follows to prevent cables from brittle cracking due to shocking or shaking in the low temperature environment, and ensure operation safety:
  - a. Handle gently when installing cables in a low temperature environment above 0°C.
  - b. Must move the cables indoors and leave them for more than 24 hours before installing them, if the previous storage temperature is below 0°C.
- Do not throw cables to prevent damage and deteriorate performance, such as current capacity, temperature, etc.

**NOTICE!**

The static electricity generated by human beings can damage the static-sensitive components on the board, like large scale integrated circuit. Therefore, please follow the steps below to prevent static electricity:

- Operators must wear anti-static clothing, and anti-static gloves or wrist straps before contacting the boards, modules with exposed circuit boards, or application specific integrated circuits (ASIC). If the anti-static wrist strap is used, hook up the metal clip that's on one end to a grounded and unpainted metal surface.
- Hold the circuit board or the modules with exposed circuit board by its edges without components. Do not contact the components.
- Use anti-static materials to pack the removed boards or modules before storage or transportation.

## 1.5 Safety Instructions of PV, Inverter and Grid

Save these important safety instructions. Failure to do so may result in damage to the inverter and injury or even loss of life.

### 1.5.1 Safety Instructions of PV

 **DANGER!**

**Potential risk of lethal electrical shock associated with the photovoltaic (PV) system**

- 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.

 **WARNING!**

- 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.

## 1.5.2 Safety Instructions of Inverter

### DANGER!

#### Potential risk of lethal electrical shock associated with the inverter

- 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.

### DANGER!

- Prior to any wiring connection, establishing an earth connection is essential.

### WARNING!

- 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 5 minutes to fully discharge the energy.

### WARNING!

#### Potential danger of scalding due to the hot enclosure of the inverter

- Avoid touching the inverter while it is running, as it becomes hot during operation and may cause personal injuries.

### WARNING!

- When handling the battery, carefully follow all safety instructions provided in the battery manual. The battery used with the inverter must meet the specified requirements of the series inverter.

### 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.
- Use insulated tools when installing the device, and always wear personal protective equipment during installation and maintenance.

**NOTICE!**

- 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.

### 1.5.3 Safety Instructions of Utility Grid

**NOTICE!**

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

# 2 Product Overview

## 2.1 System Description

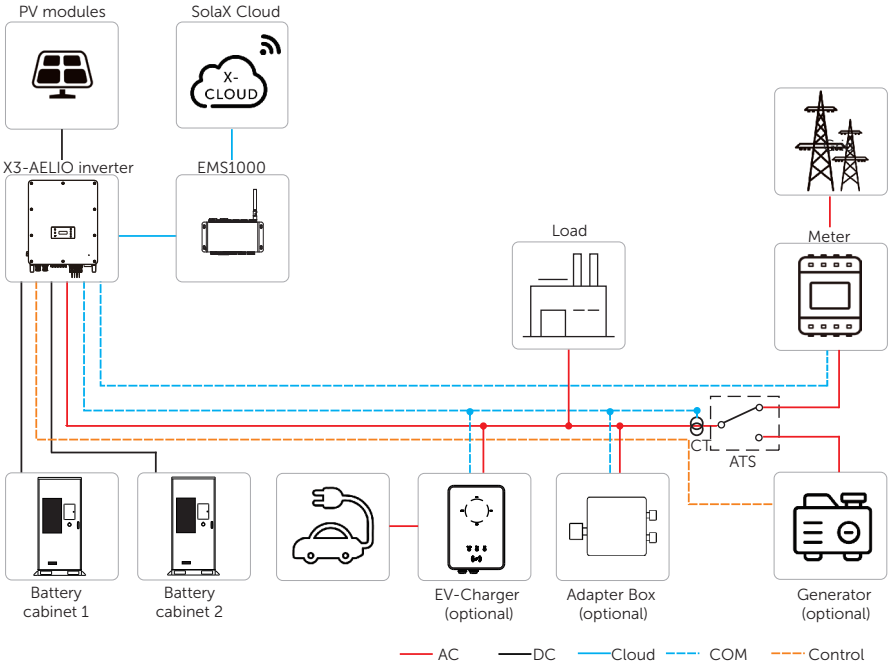


Figure 2-1 System overview diagram

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-B100 cabinet integrates high-performance 280Ah LFP battery cells, high voltage box, fire suppression system, air cooling system and optional EMS1000 and screen.
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.
Adapter Box (optional)	With SolaX Adapter Box, you can connect the smart heat pump to the energy storage systems, realizing the control of the heat pump through inverter.
EV-Charger (optional)	The inverter can communicate with SolaX EV-Charger to form an intelligent photovoltaic, storage and EV charging energy system, thus maximizing the utilization of photovoltaic energy.
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	400 V / 230 V and 380 / 220 V grid are supported. Power grid TT, TN-C, TN-C-S can be supported.
SolaX Cloud	SolaX Cloud is an intelligent, multifunctional monitoring platform that can be accessed either remotely or through a hard wired connection. With the SolaX Cloud, the operators and installers can always view key and up-to-date data. There are two SolaX Cloud platforms. Commercial platform can be connected through EMS1000 connection.



## 2.2 Product Introduction

The product "AELIO-P50B100", a smart outdoor energy storage system with easy installation and convenient expansion, integrates high-capacity battery packs, a high-performance inverter, smart EMS, 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 Hybrid Inverter, battery packs, EMS, high-voltage box, distribution box, IO module, HUB, UPS and cabinet.

### 2.2.1 Features

#### Safe

- Four-level fire safety protection
- IP66 protection for Inverter and IP55 for cabinet
- AFCI optional
- AC&DC SPD type II, always guarding the inverter
- Smart IV Curve scan for early panel diagnosis

#### Smart

- AI ready, forecasting solar generation and load consumption, smart energy management strategy
- Support smart scene function, intelligent loads management
- VPP ready, SolaX cloud supports resource aggregator
- Support Micro-grid and a variety of scenarios
- Support 7x24h remote O&M and schedule deployment
- Support wireless meter solution

#### Reliable

- Support both on-grid and off-grid operation
- Robust back-up ability, switch over time < 10ms, up to 150% EPS output for 10s
- Support unbalanced loads on three phases

### Economical

- Maximum 200% PV oversized input
- Maximum 40A input current per MPPT, support high power solar panel
- Global MPP SCAN boost solar energy harvest
- Advanced LFP battery, single cabinet with up to 200kWh, expandable to MWh

## 2.3 Supported Grid Type

There are different ways of wiring for different grid systems. TT / TN-S / TN-C-S are shown below:

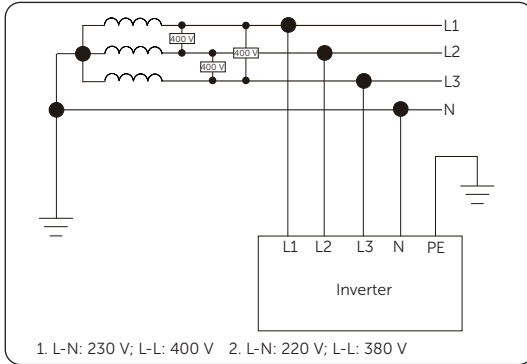


Figure 2-1 Supported power grid-TT

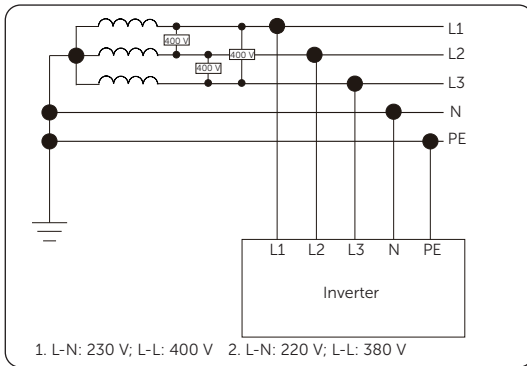


Figure 2-2 Supported power grid-TN-S

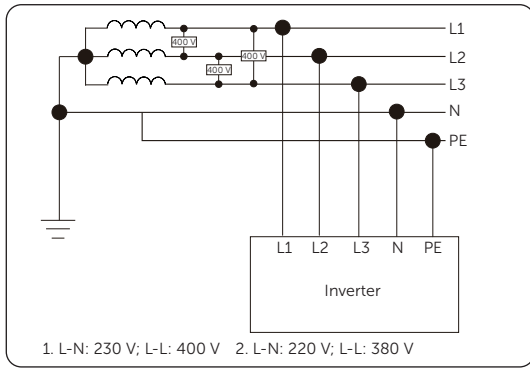


Figure 2-3 Supported power grid-TN-C-S

**NOTICE!**

- If a different power grid is required, please consult our SolaX after-sales team for confirmation.

## 2.4 Appearance

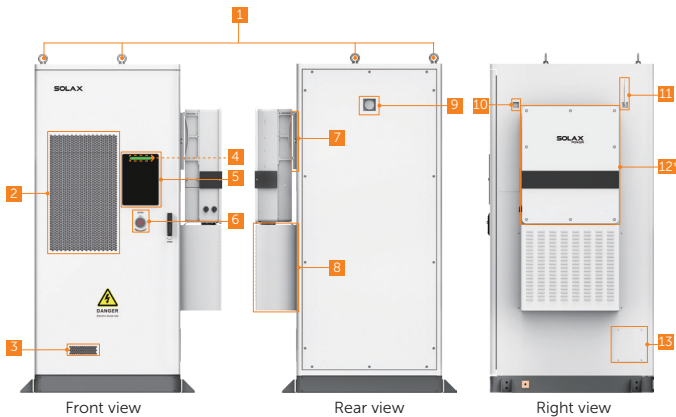


Figure 2-4 Parts description (in the closed state)

Table 2-1 Parts description

No.	Item	Description
1	Eye bolt	Cabinet hoisting position.
2	Air conditioner	To maintain the battery packs at the cabinet in a constant temperature.
3	Exhaust system	Air intake.
4	Indicator	To display status information of all processes running on the system.
5	Display screen	To display information of the whole system.
6	Emergency stop button	To shut down the system in emergency circumstances.
7	Wall bracket	To support the inverter.
8	Cable cover	To protect cables.
9	Pressure relief valve	To release excess pressure from the cabinet.
10	A reserved antenna port	To connect wireless meter.
11	Antenna	A 4G antenna, to connect EMS.
12*	Inverter	SolaX's X3-Aelio inverter which is not delivered with the cabinet.
13	Fire hose nozzle	To connect the water supply sources.

\*AELIO-B100 cabinet is adaptable to X3-AELIO-50K, X3-AELIO-60K, X3-AELIO-49.9K, X3-AELIO-49.9K-P and X3-AELIO-61K inverter.

### 2.4.1 Dimension

Unit: mm

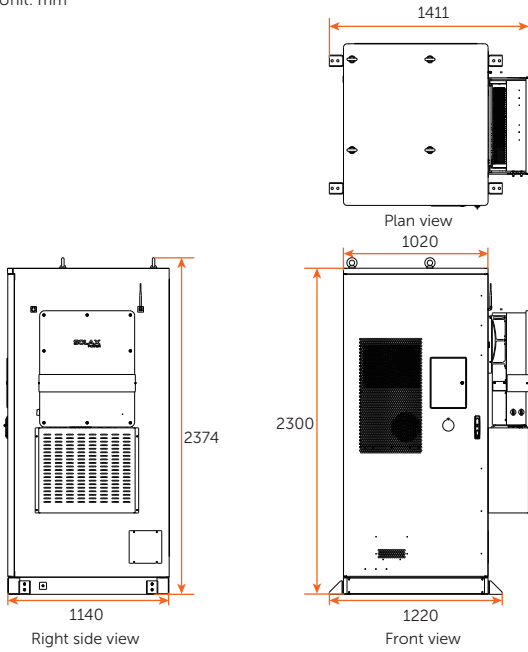



















Figure 2-5 Dimension

## 2.4.2 Symbols on the Label and Devices of AELIO-P50B100 System

Table 2-2 Symbol description

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 this inverter until it is isolated from battery, mains and on-site PV generation source.
	Danger to life due to high voltage. Residual voltage exists after the inverter is powered off, which needs 5 minutes to fully discharge. Wait 5 minutes before attempting any service.

Symbol	Description
	Danger of high voltage. Do not touch live parts for 15 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.

---



## 2.5 Battery Cabinet

### 2.5.1 Parts Description

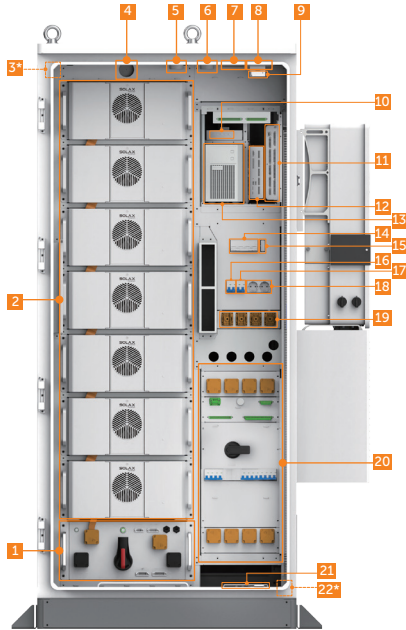


Figure 2-6 Parts description

Table 2-3 Parts description (in the opened state)

No.	Item	Description
1	High-voltage box	To collect current and voltage information on battery tower, and control the charge and discharge of battery pack.
2	Battery pack	/
3*	Temperature and humidity sensor	To measure temperature and humidity.
4	Automatic fire sprinkler	To control or suppress the spread of fire
5	Smoke detector	To detect smoke.
6	Temperature sensor	To detect temperature.
7	Audible and visible alarm	To alert you when the abnormal conditions occur, such as temperature, smoke.

No.	Item	Description
8	Toxic gases detector	To detect toxic gases.
9	Door sensor	To alert you when the door is open.
10	HUB	To exchange information among multiple TCP devices.
11	IO module	To collect signal and control other modules.
12	EMS	A energy management system.
13	UPS	To provide backup power to ensure that the device is in a normal operating condition.
14	EPS breaker	EPS protection breaker.
15	WI-BR	To connect WiFi (optional). For the installation procedure and wiring, refer to the WiFi User Manual.
16	Breaker (for maintenance)	A protective breaker.
17	UPS breaker	To protect UPS breaker.
18	Socket	Power socket.
19	EPS out	Connect EPS to loads.
20	Distribution box	To distribute AC power for the energy storage system.
21	Grounding bar	To provide a physical connection to the earth, and to be used to dissipate current.
22*	Water sensor	To detect water level based on the principle of potential difference between the two electrodes.

**NOTICE!**

- The mark "\*" indicates that parts in the front view (Figure 2-6) cannot be fully seen.



Figure 2-7 Parts description

Table 2-4 Parts description

No.	Item	Description
1	Fan	To improve air circulation and dissipate heat when the temperature rises.
2	Display screen cover	To protect display screen.
3	Wind baffle	To provide a channel of air to flow.
4	File pocket	To put documents.

### 2.5.2 High-voltage Box

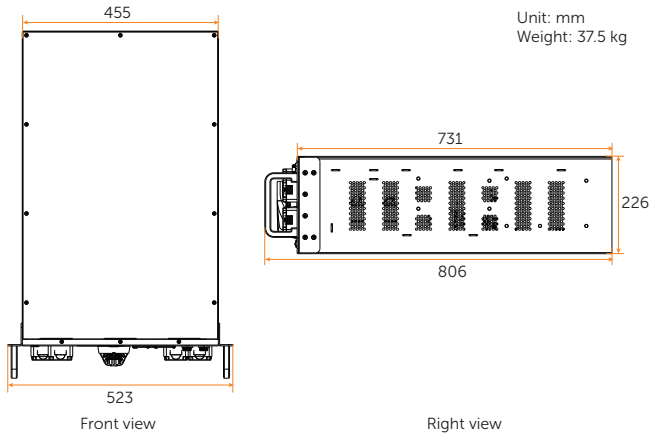


Figure 2-8 Dimension and weight

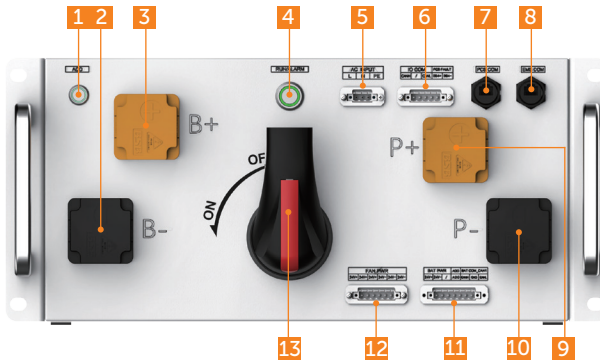


Figure 2-9 Front panel

Table 2-5 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.
4	Power button / status light	To start up or shut down system.
5	AC220V input terminal block	To connect distribution box's Cz1.

No.	Item	Description
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 EMS)	To connect EMS'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	Disconnecter	To disconnect the device on the DC side.

### 2.5.3 Battery Pack

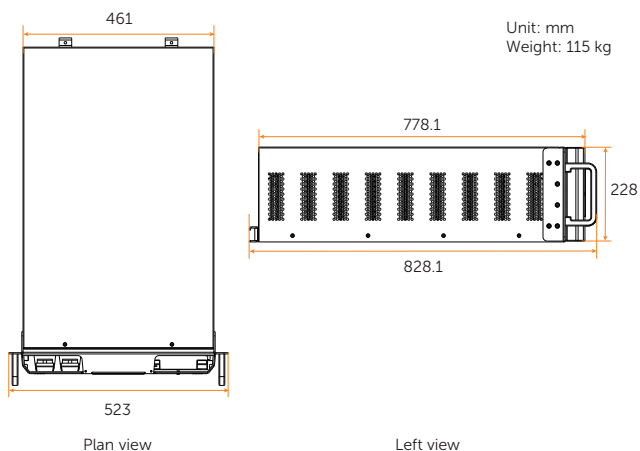


Figure 2-10 Dimension and weight

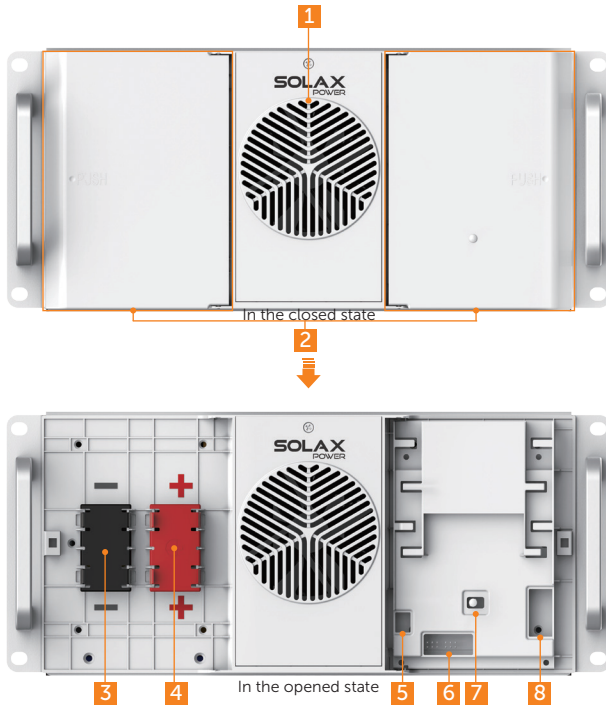


Figure 2-11 Front panel

Table 2-6 Description of front panel

No.	Item	Description
1	Fan	To keep components cool in the cabinet.
2	Left/right door	Please open the door while wiring.
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.

### 2.5.4 Distribution Box

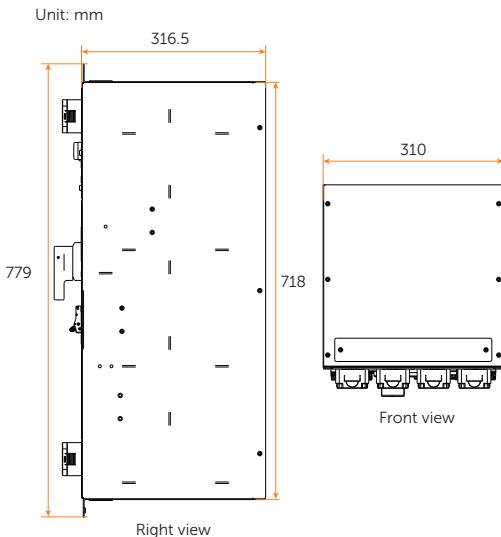


Figure 2-12 Dimension

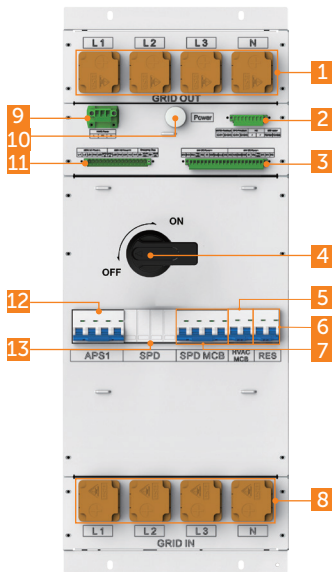


Figure 2-13 Front panel

Table 2-7 Description of front panel

No.	Item	Description
1	Grid out wire connector	For AC side
2	Circuit breaker's electrical control signal	To remotely turn off AC power for emergency.
3	24V power supply port	To provide power supply for the devices inside the cabinet.
4	Breaker handle	A switch for AC side.
5	Air conditioner/liquid cooling unit on/off breaker	/
6	A reserved breaker	/
7	SPD maintenance breaker	/
8	GRID IN wire connector	Port for connecting to power grid.
9	Power supply port for air conditioner	To connect to the air conditioner.
10	LED light	To display the operation state.
11	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.
12	Auxiliary power breaker of High-voltage box	/
13	Current terminal	To connect to the grid.



## 2.5.5 IO Module

Unit: mm

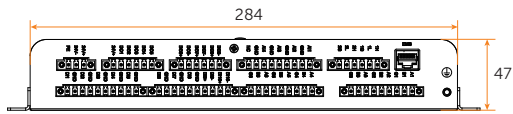
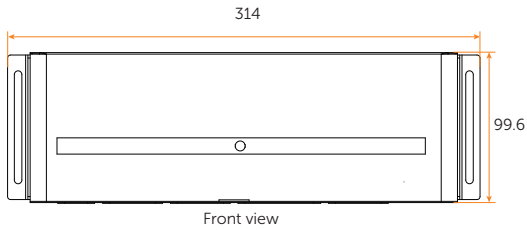


Figure 2-14 Dimension

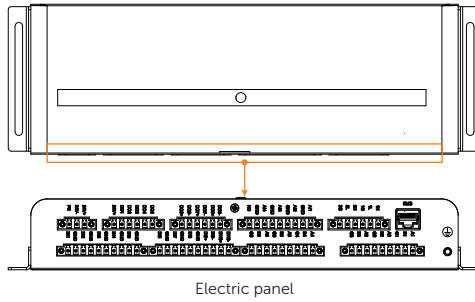


Figure 2-15 Electric panel

## 2.5.6 Other Parts

### Air conditioner

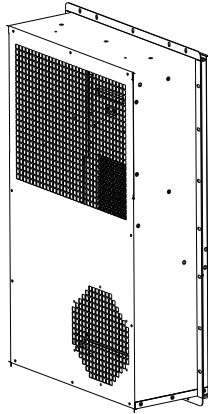


Figure 2-16 Appearance of air conditioner

### Automatic fire sprinkler

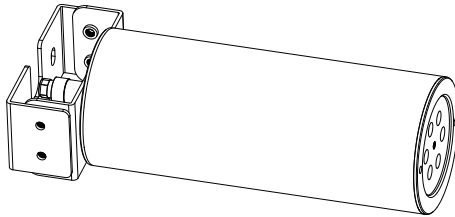


Figure 2-17 Appearance of automatic fire sprinkler

### Temperature sensor

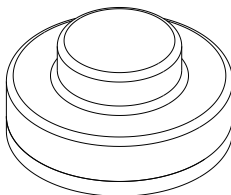


Figure 2-18 Appearance of temperature sensor

### Smoke detector

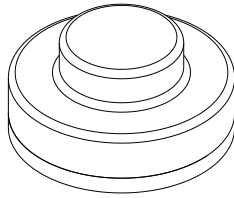


Figure 2-19 Appearance of smoke detector

### Toxic gases detector

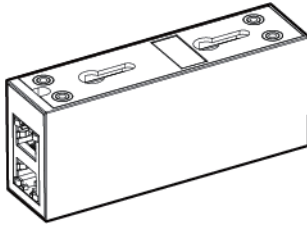


Figure 2-20 Appearance of toxic gas detector

### Temperature and humidity sensor

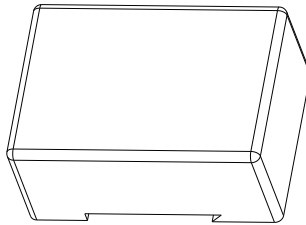


Figure 2-21 Appearance of temperature and humidity sensor

### Audible and visible alarm

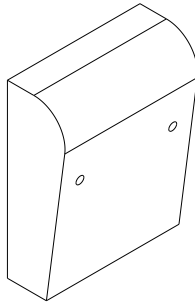


Figure 2-22 Appearance of audible and visible alarm

### Water sensor

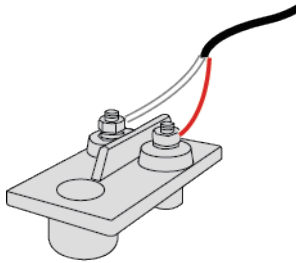


Figure 2-23 Appearance of water sensor

### Door sensor

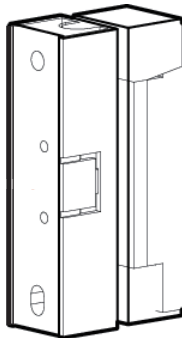


Figure 2-24 Appearance of door sensor

## 2.6 Inverter

### 2.6.1 Parts Description

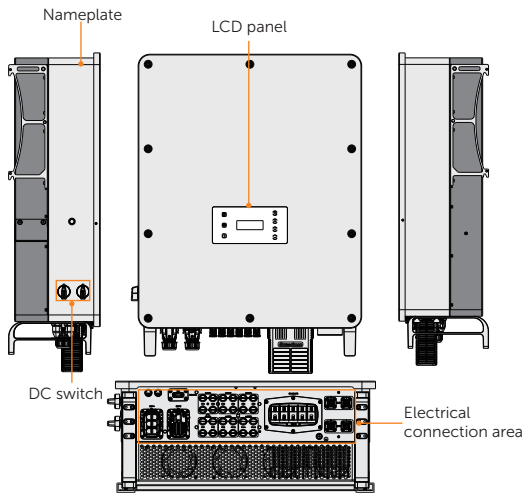


Figure 2-25 Appearance

Table 2-1 Description of appearance

Item	Description
Nameplate	Nameplate clearly identifies the device type, serial number, specific DC / AC parameters, certification, etc.
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.
DC switch	Disconnect the PV DC input when necessary. DC switch 1 controls MPPT 1, 2 and 3 trackers, DC switch 2 controls MPPT 4, 5 and 6 trackers.
Electrical connection area	Including PV terminals, battery terminals, Grid and EPS terminals, communication terminals, etc.

Application schemes

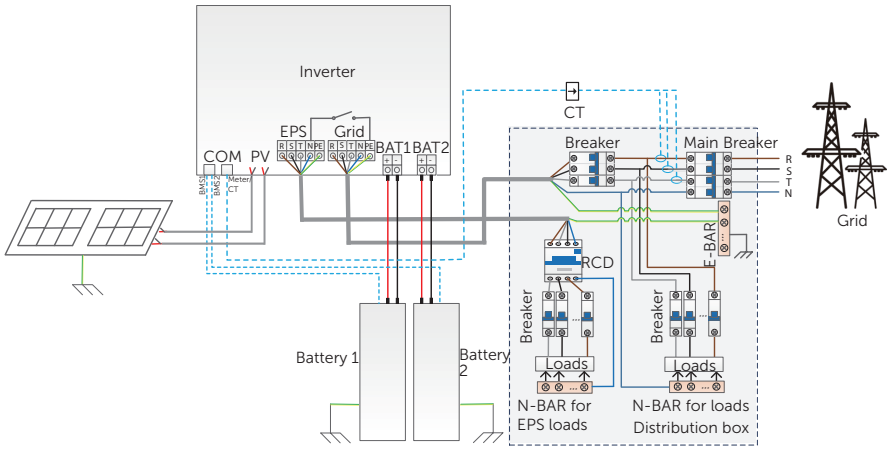


Figure 2-26 Partial load backup for Europe

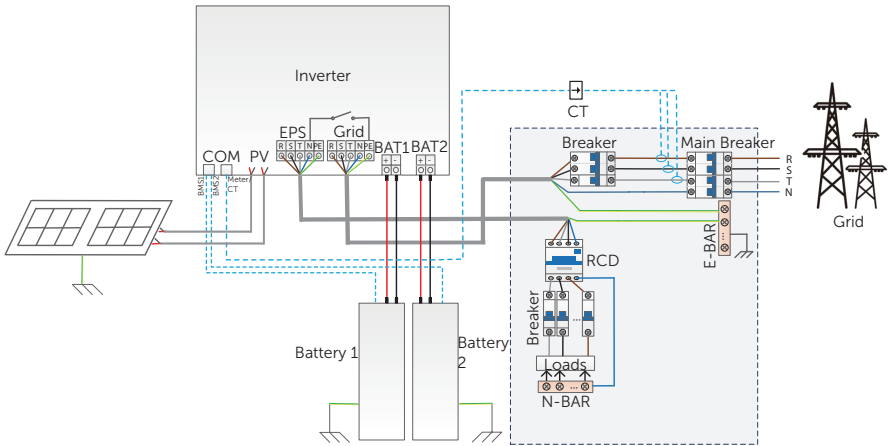


Figure 2-27 Whole load backup for Europe

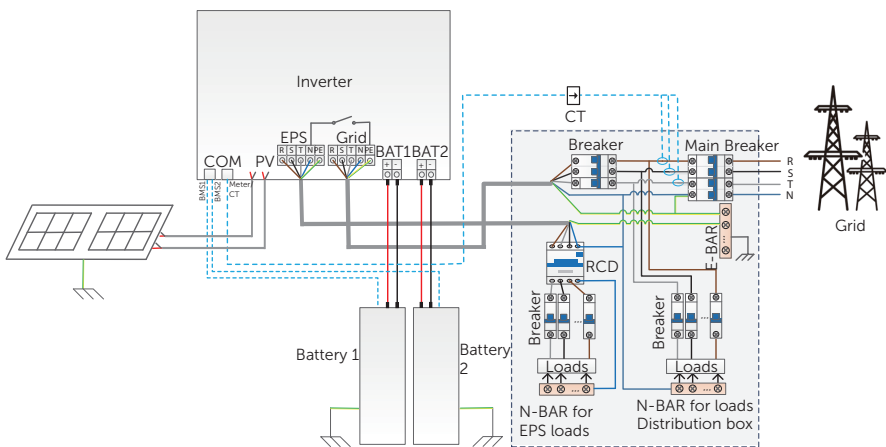


Figure 2-28 Partial load backup for Australia

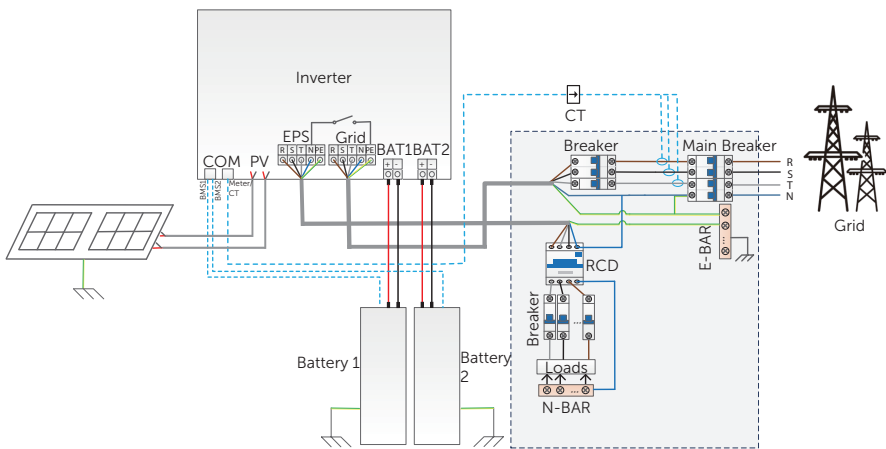


Figure 2-29 Whole load backup for Australia

**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.

### 2.6.2 Working State

The series inverter has Waiting, Checking, Normal, EPS Checking, EPS, Fault, Idle and Standby state.

Table 2-2 Description of working state

State	Description
Waiting	The inverter is waiting for the conditions to be met in order to enter the Checking state.
Checking	<ul style="list-style-type: none"> <li>The inverter is checking for conditions to enter Normal state.</li> </ul>
Normal	<ul style="list-style-type: none"> <li>The inverter is working normally.</li> </ul>
EPS Checking	<ul style="list-style-type: none"> <li>The inverter is checking for conditions to enter EPS state.</li> </ul>
EPS	<ul style="list-style-type: none"> <li>The inverter is working in off-grid state.</li> </ul>
Fault	<ul style="list-style-type: none"> <li>The inverter detects error occurred and prompts error code.</li> </ul>
Idle	<ul style="list-style-type: none"> <li>A standby state when the battery SOC reaches the minimum SOC and there is no sufficient PV input voltage.</li> </ul>
Standby	<ul style="list-style-type: none"> <li>A standby state when the power of load is extremely low and there is no sufficient PV input voltage, or a state when the battery SOC is less than or equal to 10% and there is no sufficient PV input voltage.</li> <li>In this state, it detects PV connection, load power, battery forced charged, etc. to determine whether to exit Standby state and enter Normal state.</li> </ul>

**NOTICE!**

- When the inverter is in an Idle state, you can reset the work mode, the Min SOC and the charging periods through the inverter LCD or the SolaX APP to charge the battery to the Min SOC in the charging periods and then awaken the inverter. Please make sure that the actual battery SOC - the modified Min SOC  $\geq$  2% under a specific work mode, so that other modifications are effective. When the current system time is within the new charging periods you reset, the battery begins charging.

### 2.6.3 Working Mode

The inverter has Self Use, Feed-in Priority, Backup, Manual, Peak Shaving, TOU working modes, please refer to "9.4 Mode Select" for specific mode settings and information.



## 2.7 Indicator

### Cabinet's LED light

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

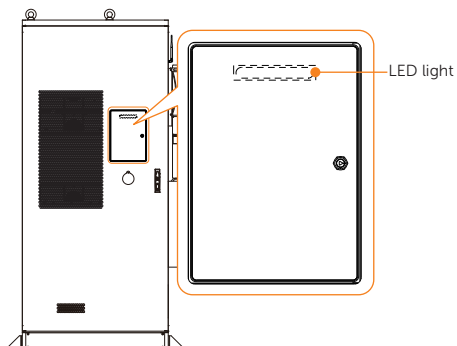





Figure 2-30 LED light

Table 2-3 Description

Status		Description
Solid green light		Conduct charging or discharging during standby / In operation
Flashing yellow light		Not in charged or discharged state during standby
Solid red light		System failure

### High-voltage box's LED light

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

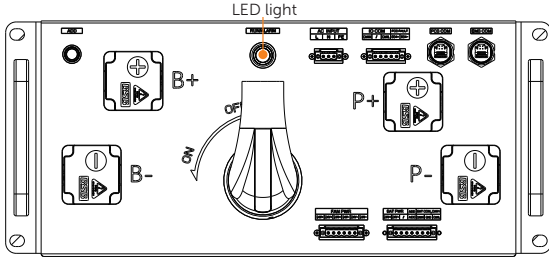






Figure 2-31 LED light

Table 2-4 Description

Status	Description
Solid green light 	Not in charged or discharged state during standby
Flashing green light 	Conduct charging or discharging during standby
Solid green light 	In operation
Solid red light 	System failure

### Battery pack's LED light

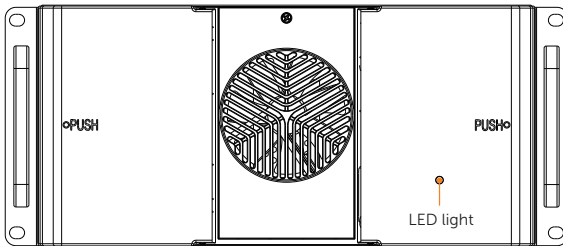


Figure 2-32 LED light

Table 2-5 Description

Status	Description
Flashing green light 	In operation

## Inverter's LED light

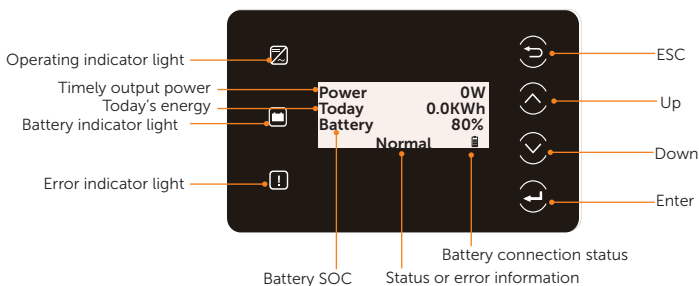











Figure 2-33 Control Panel

Table 2-1 Definition of indicators

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.
	 Blinking	Both of the battery terminals are connected in an idle state.
 Battery	 Light on	One of the battery terminal is connected in a normal state at least.
	 Blinking	Both of the battery terminals are disconnected.

## 2.8 Operating Principle

### 2.8.1 Electrical Block Diagram

The label on Electrical Block Diagram should be pasted on the back door. For the position, refer to the figure below.

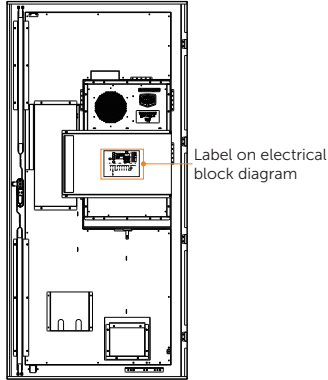


Figure 2-34 Label position

For the detailed information about the label, see Figure 2-42.

System schematic diagram

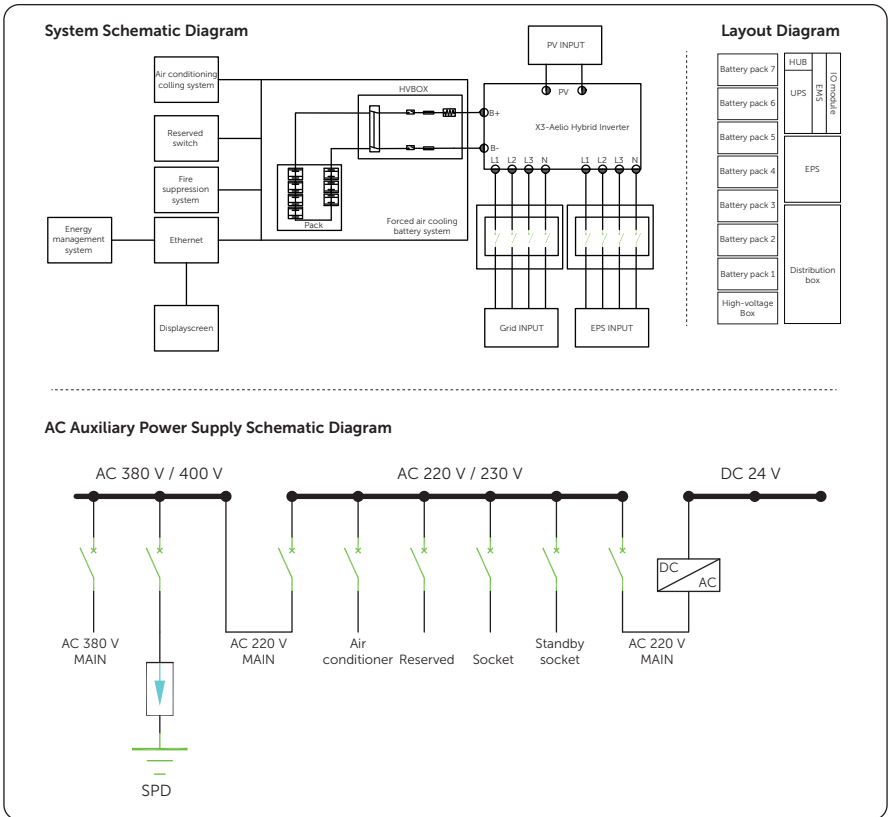


Figure 2-35 System schematic diagram

### Inverter schematic diagram

The inverter is equipped with multi-channel MPPT for DC input to ensure maximum power even under different photovoltaic input conditions. The inverter unit converts direct current into alternating current that meets the requirements of the power grid and feeds it into the power grid. The lightning arrester at AC / DC side realizes the function of surge protection. The principle design of inverter is shown in the figure below:

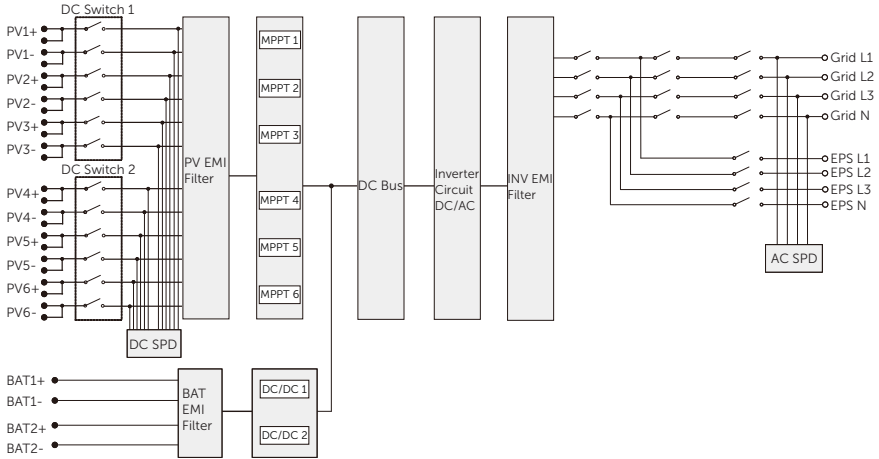


Figure 2-36 X3-AELIO series inverter schematic diagram

**NOTICE!**

- MPPT 6 is unavailable for the 50 kW inverter but available for the 60 kW inverter.

# 3 Transportation and Storage

## 3.1 Transportation

### 3.1.1 Battery Cabinet Transportation

**⚠ DANGER!**

- Do not disassemble the battery violently. Otherwise, it may lead to battery pack short circuit, damage to the device (leakage, rupture), fire, or explosion.

**⚠ WARNING!**

- Hold the handles on the device or put your hands underneath the device to move or lift, and do not hold the handles on the parts installed in it.
- Strictly follow the document to carry or move the battery pack. Ensure that the device is correctly placed. Do not place a battery upside down or vertically, lay it on one side, or tilt it. And keep away from rain and water.

General requirements are shown as follows:

- Please pay attention to the signs on the package.
- To prevent injury from oversize loads, assess the device you're about to lift before you start lifting.

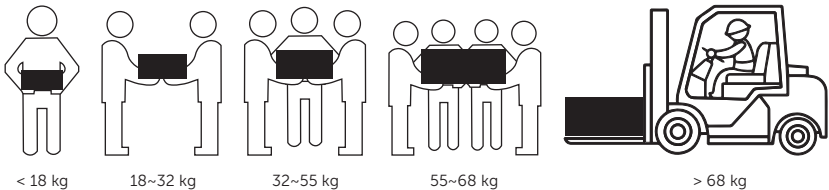


Figure 3-1 Lifting requirement

- If more than 2 people lift a device, reasonably arrange to have a balanced weight distribution
- Wear personal protective equipment, such as, safety gloves, safety boots, etc., to prevent needless injuries when lifting devices with bare hands.
- Know the right body posture to prevent personal injuries when lifting devices, for instance, bend at your knees, not at your waist or back, and do not twist your back.

- Hold the handles on the device or put your hands underneath the device to move or lift, and do not hold the handles on the parts installed in it.
- To prevent injuries, do not quickly lift the heavy device above the waist.
- To prevent scratches and dents, or damage to components and cables, avoid impact and falling when moving.
- Be aware of workbenches, slopes, steps, and other places where it is easy to slip when moving devices. Ensure that the passageways are smooth, clean, and away from obstacles.
- To prevent tipover, the forklift's forks must be placed under the load. Center the weight of the load between the forks, and adjust the forks to distribute the weight evenly. Firmly attach the loads to the forks before lifting, and arrange for people to watch for when lifting.
- Sea and road (in good condition) transports are an idea for the device instead of rail and air transports. Transport staff should do their best to avoid bumpiness and inclination as much as possible.
- The tilt angle of the cabinet must meet the requirement as shown in Figure 3-2. The angle before unpacking:  $a \leq 15^\circ$ ; the angle after unpacking:  $a \leq 15^\circ$ .

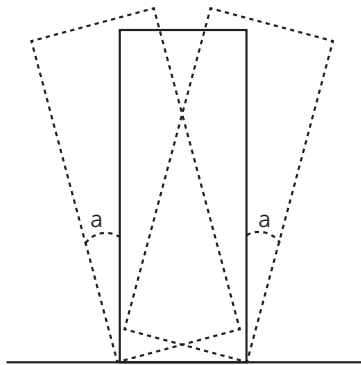


Figure 3-2 Tilt angle

- The battery pack has been certified according to UN38.3: *Section 38.3 of the Sixth Revised Edition of the Recommendations on the Transport of Dangerous Goods: Manual of Tests and Criteria* and SN/T 0370.2-2009 *Rules for the Inspection of Packaging for Export Dangerous--Part 2: Performance Test*. Therefore, the battery pack is classified in Class 9.
- Relevant qualifications for transport of dangerous goods must be obtained by the forwarding agent engaged in such businesses. Do not transport it in an open trailer.
- Strictly abide by the international regulations on the transport of dangerous goods, and meet the supervision requirements stipulated by the transport authority of the departure country, transit country, and country of destination, respectively.



- Before transportation, check that the battery package is intact and that there is no abnormal odor, leakage, smoke, or sign of burning. Otherwise, the batteries cannot be transported.
- The packing case must be secured for transportation. Handle the case with care during loading, unloading, and transportation, and take measures to prevent moisture damage to the device during transportation.
- Handle gently when moving the battery pack to prevent bumping and damage to individuals.
- Unless otherwise specified, dangerous goods shall not be mixed with goods containing food, medicine, animal feed, or their additives in the same vehicle or container.
- Unless otherwise specified, do not transport dangerous goods together with food, medicine, animal feeds, or other additives on the same means of transport (e.g., vehicle, container).
- Before moving a faulty battery pack (with scorch, leakage, bulge, or water intrusion), insulate its positive and negative terminals, pack it, and place it in an insulated explosion-proof box as soon as possible. Record information such as the site name, address, time, and fault symptom on the box.
- Keep away from flammable material storage areas, residential areas, and other population centers (e.g., public transport, elevators) when transporting the faulty battery pack.

### 3.1.2 Inverter Transportation

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

- 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 equipment is recommended.
- The inverter with a package should be transported by forklift to the location where it needs to be placed.

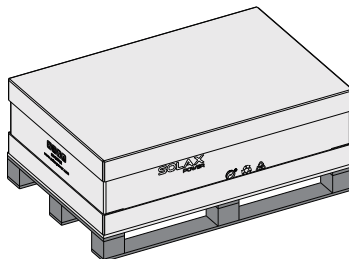


Figure 3-1 Caution signs on the packaging

## 3.2 Storage

### 3.2.1 Battery Cabinet Storage

- Do not remove the original packaging material and check the outer packaging material regularly.
- The required storage temperature:  $-30^{\circ}\text{C} \sim 55^{\circ}\text{C}$ .
- The relative humidity should be between 5% and 95%.
- Store the device according to the caution signs on the packaging to prevent equipment damage.

### Battery pack storage

#### DANGER!

- Ensure that batteries are stored in a dry, clean, and ventilated indoor environment that is free from sources of strong infrared or other radiations, organic solvents, corrosive gases, and conductive metal dust. Do not expose batteries to direct sunlight or rain and keep them far away from sources of heat and ignition.
- If a battery is faulty (with scorch, leakage, bulge, or water intrusion), move it to a dangerous goods warehouse for separate storage. And it must be scrapped as soon as possible.
- Store the device according to the caution signs on the packaging to prevent equipment damage. Do not place a battery upside down or vertically, lay it on one side, or tilt it.
- Store the battery packs in a separate place. Do not store them together with other devices. Do not stack too high. The storage site should be equipped with qualified fire fighting facilities, such as fire sand and fire extinguishers.

#### NOTICE!

- If a battery pack is stored for a long time, please periodically recharge it to protect from damage. For details, please refer to "[Maintenance of Battery Pack](#)".

- The required storage temperature, see the following table 3-1.

Table 3-1 Storage temperature and time

Storage Temperature	Storage Time
$50^{\circ}\text{C}$ to $60^{\circ}\text{C}$	3 months
$30^{\circ}\text{C}$ to $50^{\circ}\text{C}$	6 months
$-20^{\circ}\text{C}$ to $30^{\circ}\text{C}$	12 months

- The relative humidity should be between 5% and 95%.

- If the rechargeable battery has been stored for more than 1 year, it must be checked and tested by professionals before use.

### 3.2.2 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  $-40^{\circ}\text{C}$  and  $+70^{\circ}\text{C}$  . 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

Given the importance of the installation site to the security, service life and performance of the equipment, the site should be selected according to NFPA 855 *Standard for the Installation of Stationary Energy Storage Systems* and local regulations, and based on the principles of wiring, operation and maintenance for convenience.

### NOTICE!

- During the installation, commissioning, and operation, fire extinguishers shall be equipped nearby the device according to the fire requirements. The number of fire extinguishers shall be over 2.
- The minimum distance between air exhaust of the equipment and buildings or other equipment's heating ports, ventilation opening, air conditioner vent, windows, doors, or hot sources shall be 4.6 m.
- A port for water fire extinguishing system shall be reserved.
- Measures, for instance, setting up water baffles or drainage facilities, or raising the ground, shall be taken in an unavoidable situation, like an installation site where rainwater may accumulate.

The installation site shall meet the following requirements:

- The device is intended only for outdoor use.
- The surface level of the site must be at least 300 mm above the highest water level in the area. Do not install the equipment in a low-lying area.
- Ensure that no plants have been grown within 3 meters of the site and its surroundings, to avoid wildfires due to the high temperature in the summer which results in equipment on fire.
- Given safety reasons, the distance between the equipment and residential housing shall be over 12, as well as at least a distance of 30.5 meters between the equipment and schools, hospitals, or other population centers. Otherwise, a fire wall must be constructed between the equipment and buildings.
- The safe distance between the equipment and industrial buildings shall meet the local fire safety codes and standards.

Table 4-1 Safe distance

	Safe Distance
The safe distance between the equipment and Class A industrial buildings	≥ 12 m
The safe distance between the equipment and Class B industrial buildings	≥ 10 m

The safe distance between the equipment and Class C and D industrial buildings which meet the requirements of Class I and II fire resistance rating	$\geq 10$ m
The safe distance between the equipment and industrial buildings which meet the requirements of Class III fire resistance rating	$\geq 12$ m
If the external wall of the adjacent building with fire-resistant materials, and without windows, doors, and extended eaves, the safe distance shall	$(3 - 25\% * 3)$ m

- If the above-mentioned safe distance cannot be met, a fire wall between the equipment room, storage room, or installation area and Class C, D and E buildings shall have a 3-hour fire-resistance rating. The height and thickness of the fire wall shall be 1 meter over the equipment. In addition, the factors, such as transportation, installation, and maintenance, should be considered before construction.
- Keep away from flammable and combustible.
- Convenient transportation and reliable fire suppression systems are required to be equipped at the installation site.
- Please reserve enough space for capacity expansion.
- The site shall be well ventilated.
- Since the salt-damaged and polluted areas may corrode the equipment, do not install this equipment in those areas. Please strictly follow the requirements below when installing the equipment.
  - » If the installation site of the equipment is selected at the coast, the distance from the equipment to the shore should be over 2000 m. In case the distance from the equipment to the shore is between 500 m and 2000 m, it is not recommended to install (if the user wants to install here, do not install until gets to an actual approval from the distributor or our company's engineer). Additionally, do not install the equipment if the distance from it to the shore is less than 500 m.
  - » The distance from the equipment to the smelters, coal mines, thermal power plants, and other heavy pollution sources should be between 1500 m and 3000 m.
  - » The distance from the equipment to the chemical plants, rubber plants, electroplate factory, and other moderately polluted sources should be between 1000 m and 2000 m.
  - » The distance from the equipment to the light pollution sources, such as food processing plants, leather processing plants, heating boiler factory, slaughter houses, dumping sites, and sewage treatment stations, should be between 500 m and 1000 m.

Table 4-2 Installation spacing requirements

	Safe 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

- Keep away from the sand and dust environment.
- Keep away from areas with high vibration, strong noise sources, or strong electromagnetic interference.
- Keep away from places that are easily to generate dust, oil fumes, harmful gases, corrosive gases, etc.
- Keep away from places that store corrosive, flammable and explosive materials.
- Keep away from places where underground facilities have been built.
- Keep away from areas at poor geological conditions (such as rubber soil, weak soil), as well as the waterlogged ground or land subsidence.
- Keep away from places below water reservoirs, water landscapes, and water intake rooms.
- Keep away from seismic zone and earthquake areas of which a seismic fortification intensity is over 9 degrees.
- Keep away from areas where natural disasters (such as debris flow, landslide, quicksand) are likely occur, as well as karst caves.
- Do not install the equipment within the boundaries of mining subsidence (impact) areas.
- Keep away from an area where there is a risk of explosion.
- Keep away from areas that are likely to be flooded if levees or dams broke.
- Keep away from important water source protection areas.
- Keep away from heritage protected areas.
- Keep away from population centers, high-rise buildings, and underground structures.
- Keep away from intersections of urban main roads and heavily travelled roads.
- Please strictly select the installation site in accordance with the following requirements for flood prevention and rainwater control:
  - » The height of the foundation for the large, medium and small

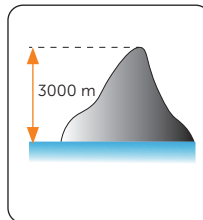
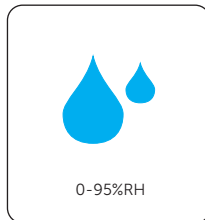
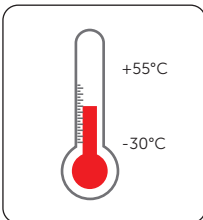
electrochemical energy storage systems must be over the highest water level in history.

- » If the installation site cannot meet the above-mentioned requirements, please find another site, or take measures to prevent flooding and waterlogging based on the actual situation.
- » Regarding the energy storage power stations affected by wind and wind-waves from rivers, lakes, and seas, the height of the foundation must be 0.5 m above the highest wave height in history.
- » If a large amount of water flows in or through the foundation, a side ditch or drainage channel is recommended to be built.
- The installation site needs to be equipped with a "Stop" sign:
  - » Solid walls or fences around the energy storage equipment area are recommended to be built. In the case of fences, they have to be lockable, with a height of over 2.2 m. The firewall can be built in place of part or the entire fence based on comprehensive considerations.

#### 4.1.1 Environment Requirement

Installation environment shall meet the following requirements:

- Temperature:  $-30^{\circ}\text{C} \sim +55^{\circ}\text{C}$
- Relative humidity:  $0 \sim 95\% \text{RH}$
- Altitude: Below 3000 meters.
- Good ventilation.
- Keep away from flammable, explosive, and corrosive substances, and antennas.



### 4.1.2 Installation Foundation Requirements

The requirements for foundation are shown as follows:

- The foundation must be made of non-combustible materials, such as solid bricks or concrete. And ensure that the foundation is level, smooth and firm, and has sufficient bearing capacity to withstand the load from the equipment.
- The bearing capacity of the foundation shall be over 3 t. If the above-mentioned requirement cannot be met, re-inspection is required.

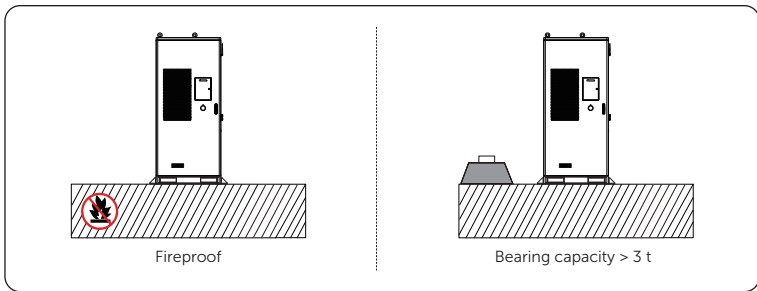


Figure 4-2 Foundation requirement

- The bottom of the foundation pit must be strengthened and filled.
- Do not water or disturb the foundation after starting to dig it. If the foundation is watered or disturbed, continue to dig down and remove the bad soil, and then refill with quality materials.
- The angle of depression between the foundation and cabinet shall be less than 5°, as well as the height of less than 3 mm.
- The foundation is not only higher than the local high-water mark, but also at least 300 mm above the ground.
- Construct drainage facilities based on local geological conditions and municipal drainage standards to ensure that there is no water accumulation at the foundation. The foundation construction should meet the drainage requirements for maximum volume of rainfall in the locality, and the discharged water needs to be treated in accordance with local laws and regulations.
- Dig a trench or reserve a cable entry hole by considering the electrical wiring of the equipment before construction of the foundation.
- Both the reserved holes on the foundation and the cable entry holes on the equipment should be sealed.
- The foundation drawing is only for reference, and cannot be regarded as the final construction drawing. Operators shall recheck the basic parameters according to the environment, geological conditions, seismic requirements, etc. of the installation site.



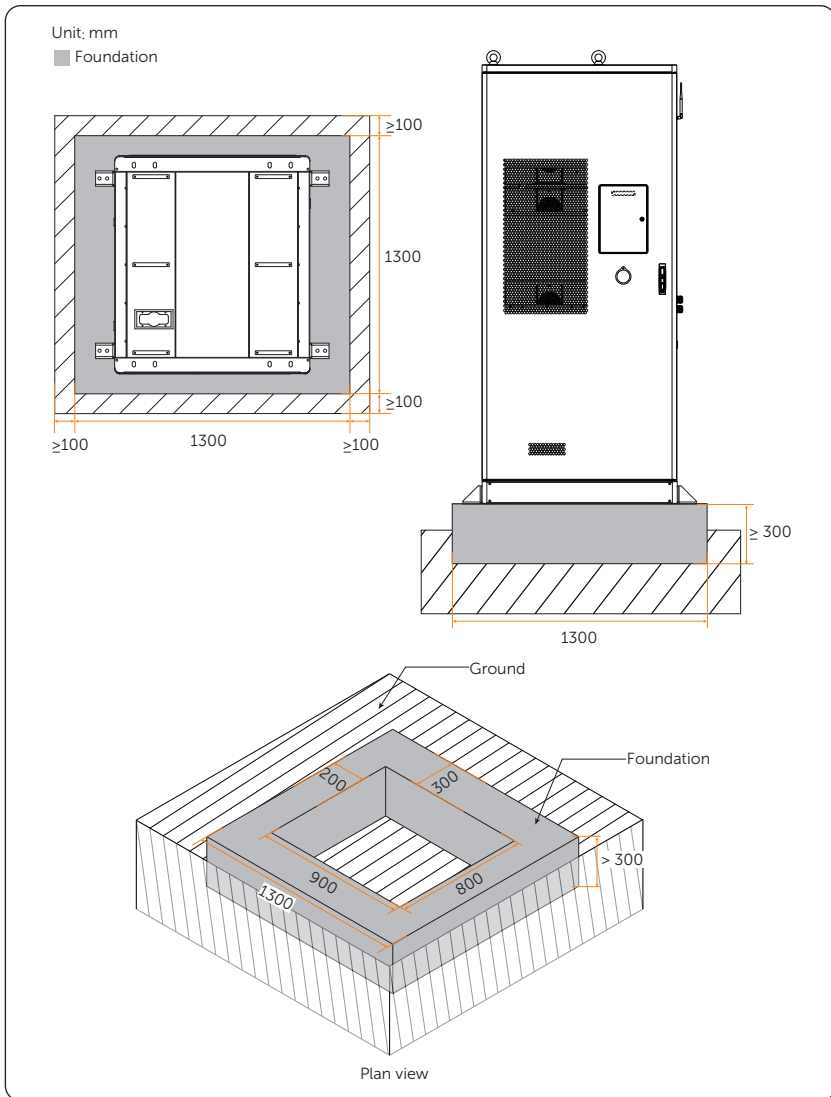


Figure 4-3 Foundation Parameter Requirements

### 4.1.3 Forklift Requirements

- Before using the forklift, ensure that it meets the load requirements: load capacity  $\geq 3$  t;
- The recommended forklift should meet the following requirements: length of fork blade  $> 1.2$  m, width of fork blade between 60 cm and 160 cm, and thickness of fork shank between 25 cm and 70 cm;

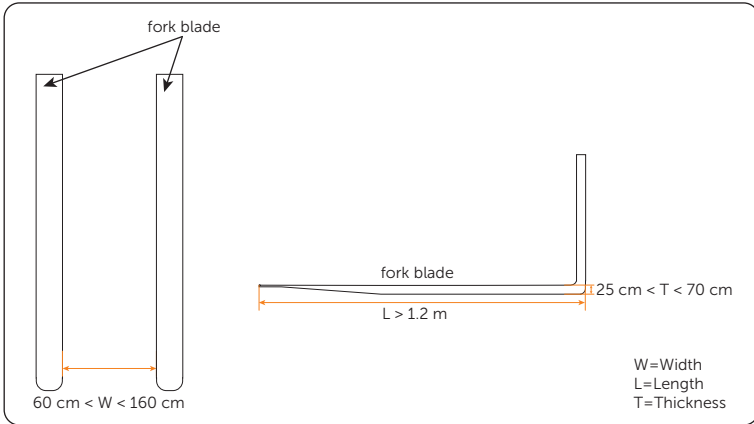


Figure 4-4 Requirements for forklift

- When using the forklift, the lifting height of the forklift must meet the following requirements:
- When the foundation height  $\leq 0.3\text{m}$ , the lifting height should be  $\geq 2$  m;
- When the foundation height  $> 0.3$  m, the lifting height should be increased accordingly.

#### 4.1.4 Hoisting Requirements

- Ensure that the crane and steel wire rope meet the load-bearing requirements.
- To prevent the cabinet from scratching, do not drag it when installing and removing hoisting equipment.

Table 4-3 Precaution

Precaution	
Before hoisting	The crane's lifting capacity shall equal or exceed 3 t, as well as the working radius of equalling or exceeding 2 m. If the above requirements cannot be met, it is required to be evaluated by professional personnel.
	A trained and qualified lifting personnel is required.
	Check to ensure that the hoisting tools are in good condition and complete.
	Ensure that the hoisting tools are fixed securely to the fixture or wall that meets the load-bearing requirements.
	Do not operate a hoist if severe weather or wind is apparent when conducting hoisting outdoors.
	Ensure that the crane and steel wire ropes meet the requirements.
	Ensure that all the doors of the equipment are closed and locked.
During hoisting	Ensure that the knots among steel wire ropes are securely fastened.
	To ensure that the lifting can proceed successfully, it is suggested to conduct it according to the order from left to right or right to left.
	Keep unauthorized people from entering the area and standing under crane boom.
	Ensure that the crane is parked in place and avoid long-distance lifting.
	Keep stability, and dutch angle of the cabinet should be less than or equal 5°.
	Ensure that the angle between the two steel wire ropes is less than or equal 90°.
	To avoid impacting the internal components of the equipment, the lifting equipment should be lifted and lowered gently, as well as the cabinet.
Do not dismantle the steel wire ropes until the cabinet lands smoothly, when it contacts the foundation.	
Do not drag steel wire ropes and lifting tools, and crash the equipment.	
Do not dismantle the steel wire ropes to hoist the next cabinet until the cabinet lands smoothly.	

### 4.1.5 Clearance Requirement

This equipment has multiple installation methods:

- Single cabinet
- Multiple cabinets: 1. Install separately; 2. Install multiple devices together.

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.

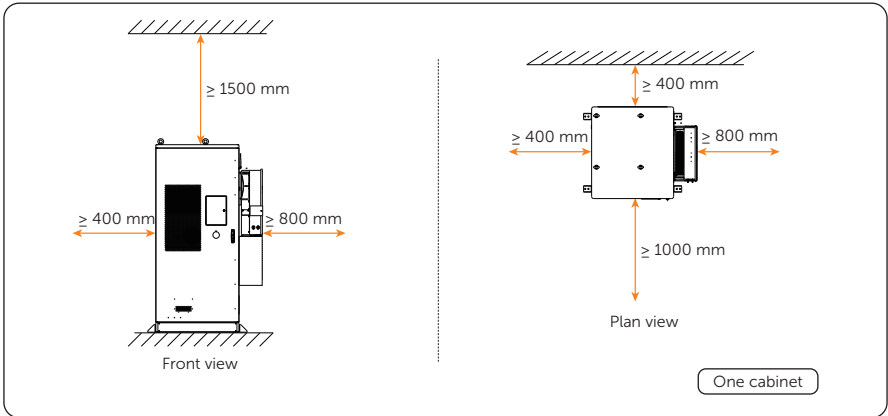


Figure 4-5 Single cabinet

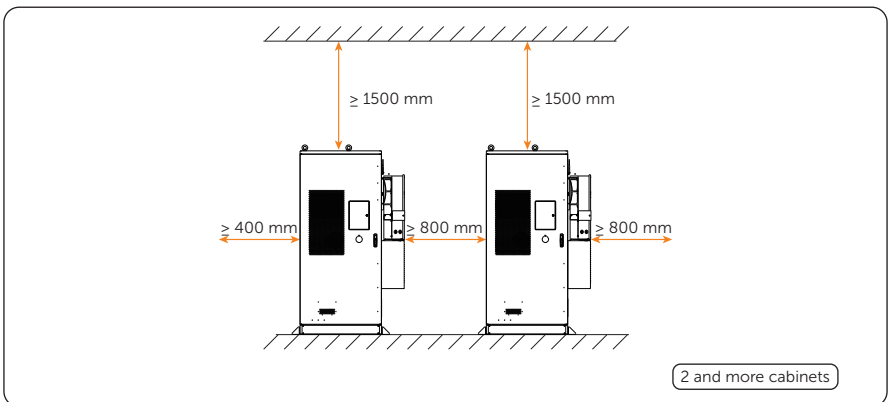
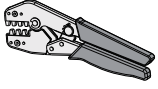


Figure 4-6 2 and more cabinets

## 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 (drill bit: Ø18 mm)	 Multimeter (≥ 1000 V DC)	 Measuring tape	 Utility knife
 Marker	 Spirit level	 Torque screwdriver (Flat-head: M2 / M3 / M10) (Phillips head: M2.5 / M3 / M5 / M6)	 Flat-head screwdriver
 Cross screwdriver	 Wire stripper	 Crimping tool for RJ45	 Diagonal pliers
 Crimping tool	 Crimping tool for ferrules	 Wire cutter	 Rubber mallet (hammer diameter < 34 mm)
 Torque wrench (M4~M12)	 Heat gun	 Heat shrink tubing Ø15~60 mm	 Cable tie
 Slings	 Hydraulic plier	 Hydraulic wire crimper	 Safety goggles

## Preparation before Installation



## 4.3 Additionally Required Materials

Table 4-4 Additionally required wires

No.	Required Material	Type	Conductor Cross-section
1	PV wire	 Dedicated PV wire with a voltage rating of 1000 V, a temperature resistance of 105 C , a fire resistance grade of VW-1	6 mm <sup>2</sup>
2	Communication wire 1	 Network cable CAT5E	/
3	Communication wire 2	 Four-core signal cable	0.25 mm <sup>2</sup> -0.3 mm <sup>2</sup>





4	Grid wire		Five-core copper cable (copper wire)	$35 \text{ mm}^2 * 4 + 16 \text{ mm}^2 * 1$
5	EPS wire		Four-core copper cable (copper wire)	$25 \text{ mm}^2 * 4$
6	Additional PE wire		Conventional yellow and green wire	$25 \text{ mm}^2$
7	Battery power wire		One-core copper cable	$25 \text{ mm}^2$

Table 4-5 Circuit breaker recommended for Grid connection


	Model	50 kW	60 kW
Circuit breaker		>100A	>125A

Table 4-6 Micro-breaker recommended for EPS connection



	Model	50 kW	60 kW
Circuit breaker		>100A	>125A

Table 4-7 RCD recommended

	Model	50 kW	60 kW
RCD		< 500 mA	< 600 mA

**Note:**

Please prepare according to the actual requirements.

# 5 Unpacking and Inspection

## 5.1 Unpacking

### 5.1.1 Battery Cabinet Unpacking

- The equipment 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.

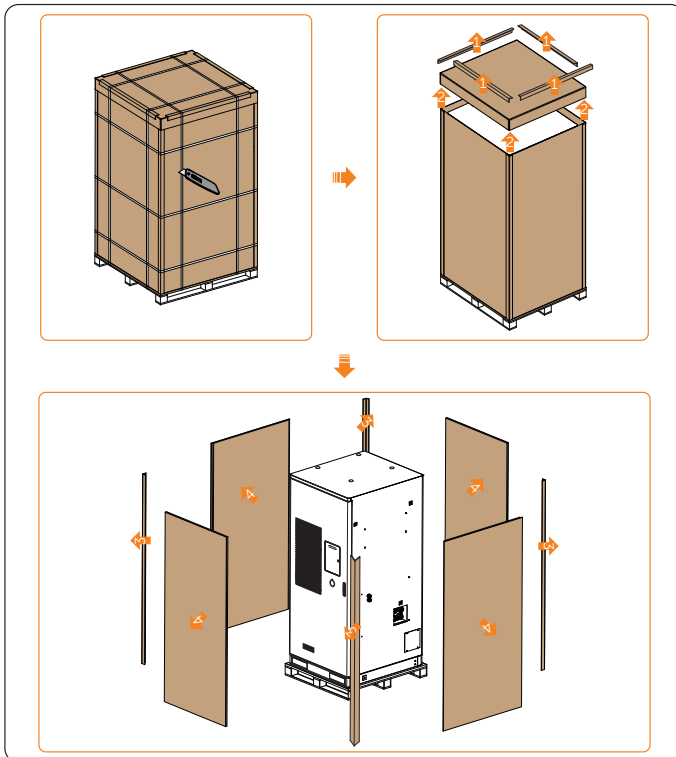


Figure 5-7 Unpacking



- When unpacking, please handle all packaging materials properly for future storage or relocation of this equipment.
- After unpacking, please check if the equipment 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 Inverter 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.

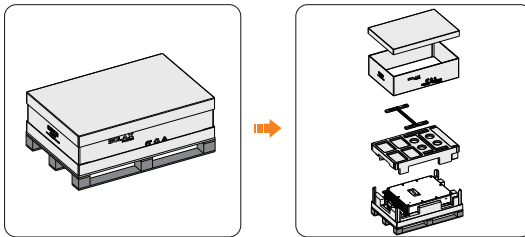


Figure 5-1 Unpacking the inverter

- 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 Packing List

### 5.2.1 Battery Cabinet Packing List

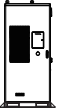
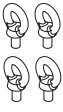
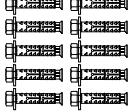
















 <p>Cabinet</p>	 <p>A Eye bolt</p>	 <p>B Expansion bolt</p>	 <p>C Fireproof mud</p>
 <p>D TLK35-8 Terminal (EPS side)</p>	 <p>E TLK35-8 Terminal (Grid side)</p>	 <p>F TLK16-8 Grounding terminal</p>	 <p>G Power cable (3000 mm)</p>
 <p>H Power cable (2000 mm)</p>	 <p>I M12*40 Hexagon head screw</p>	 <p>J Allen key</p>	 <p>K Key (to open screen)</p>
 <p>L M6*12 Hexalobular socket screw</p>	 <p>M Cable cover</p>	 <p>N Antenna</p>	 <p>O Key (to open cabinet door)</p>
 <p>P Cable tie</p>	 <p>Q Angle support</p>	 <p>R Hexalobular key</p>	

Table 5-1 Packing list

Item No.	Items	Quantity
/	Cabinet	1 pc
A	Eye bolt	4 pcs
B	Expansion bolt	10 pcs
C	Fireproof mud	2 pcs
D	TLK35-8 Terminal (EPS side)	5 pcs
E	TLK35-8 Terminal (Grid side)	5 pcs
F	TLK16-8 Grounding terminal	1 pc
G*	Power cable (3000 mm)	1 pc
H*	Power cable (2000 mm)	1 pc
I	M12*40 Hexagon head screw	10 pcs
J*	Allen key	1 pc
K	Key (to open screen)	1 pcs
L	M6*12 Hexalobular socket screw	5 pcs
M	Cable cover	1 pc
N	Antenna	1 pc
O	Key (to open cabinet door)	2 pcs
P	Cable tie	20 pcs
Q	Angle supports	4 pcs
R*	Hexalobular key	1 pc

**Note:**

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.

Allen key is used to open the cabinet door, Hexalobular key is used for cable cover installation.

### 5.2.2 Inverter Packing List



\* Refer to the actual delivery for the optional accessories.

Table 5-2 Packing list

Item	Description	Quantity	Remark
/	Inverter	1 pc	

Item	Description	Quantity	Remark
A	Mounting bracket	1 pc	For wall mounting or battery cabinet mounting
B	M5*50 screw	4 pcs	For securing inverter on the bracket
C	Cable clamp	1 pc	For COM 1 connection
D	OT terminal	1 pc	For grounding
E	RJ45 terminal	7 pcs	For COM 1 and COM 2 connection
F	8-pin terminal block	2 pcs	For ripple control connection and DIO connection
G	Positive battery connector	2 pcs	For battery connection
H	Negative battery connector	2 pcs	For battery connection
I	Positive PV connector & pin contact	10 pairs for 50kW 12 pairs for 60kW	For PV connection
J	Negative PV connector & pin contact	10 pairs for 50kW 12 pairs for 60kW	For PV connection
K	M10*100 expansion bolt	4 pcs	For wall mounting bracket installation * When the inverter is installed on the cabinet, screws or bolts for securing the mounting bracket is provided in the accessory of a battery cabinet.
L	Eye bolt	2 pcs	For lifting the inverter
M	Removal tool for PV connector	1 pc	For dismantling PV connectors from the inverter
N	AC terminal	10 pcs	For assembling the Grid and EPS cable
O	AC connector	1 pc	For Grid and EPS connection
P	M6 screw	10 pcs	For securing the Grid and EPS cable with AC terminals on the inverter
Q	M4*12 screw	2 pcs	For securing AC connector

## Unpacking and Inspection

---

Item	Description	Quantity	Remark
R	Negative PV dustproof buckle	12 pcs	For sealing negative PV terminals
S	Positive PV dustproof buckle	12 pcs	For sealing positive PV terminals
T	M4*10 screw	2 pcs	For securing the inverter screen cover
U	Inverter screen cover	1 pc	For covering the inverter screen
V	RJ45 connector	1 pc	For CT connection
W	CT	1 pc	
X	Documents	/	
/	Meter (optional)	1 pc	

### NOTICE!

- The inverter shares the same accessories when it is installed on the wall or on the battery cabinet.
- Refer to the actual delivery for the optional accessories.

## 6 Mechanical Installation

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After determining the installation site, please take out the underground electrical wiring which is buried beneath the ground. Thread the electrical wiring through the foundation.

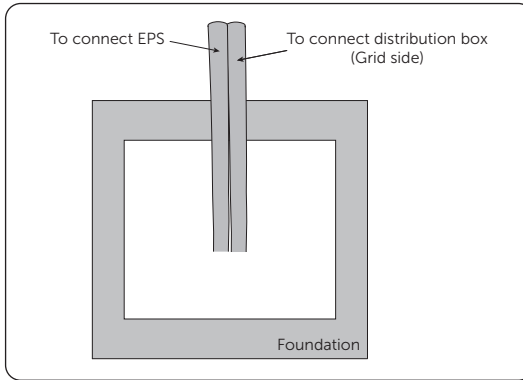


Figure 6-1 Threading underground wiring

### WARNING!

- This equipment must be installed by professionals in accordance with local regulations and standards.
- Before drilling, please check and avoid wiring inside the wall to prevent accidents.
- Use insulated tools and wear personal protective equipment (PPE) during installation and maintenance.

### CAUTION!

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

## 6.1 Installation of Battery Cabinet

### 6.1.1 Installation Dimensions

Before installation, ensuring sufficient space is reserved for the installation and heat dissipation of the entire equipment.

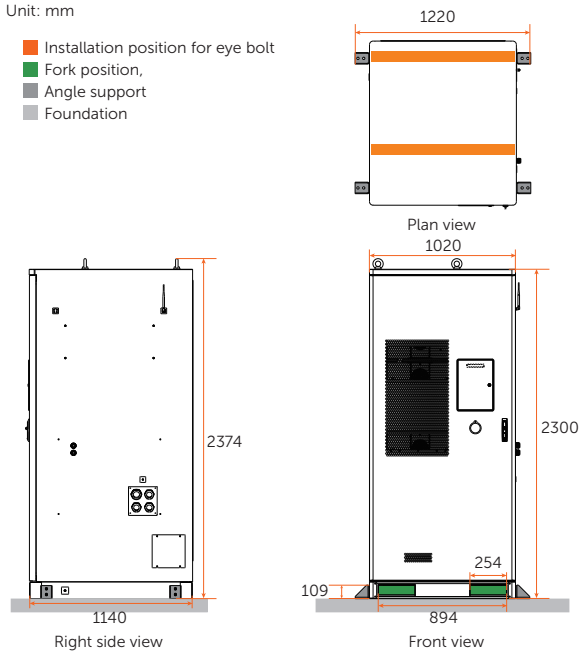


Figure 6-2 Battery cabinet dimension (without inverter)

### 6.1.2 Handling

#### Hoisting

If the eye bolts are required to be installed based on the actual situation, please strictly follow the steps below.

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



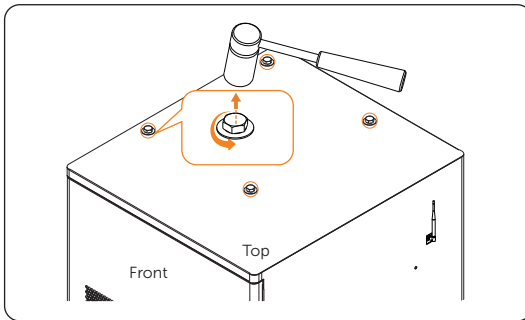


Figure 6-2 Unscrewing M20 screws

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

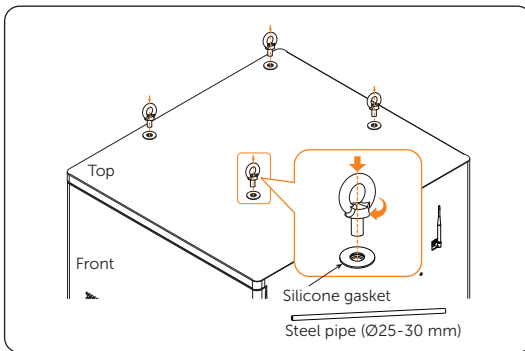


Figure 6-3 Tightening eye bolts

**NOTICE!**

- Put the silicone gaskets in place before inserting the eye bolts.

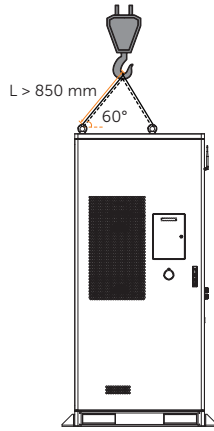


Figure 6-4 Lifting

**NOTICE!**

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

## 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.

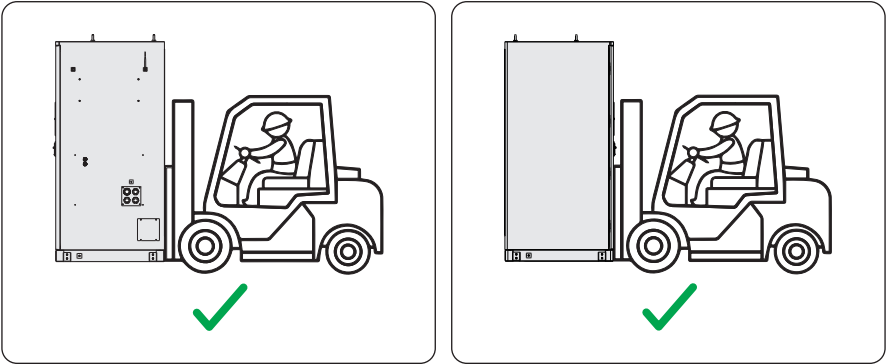


Figure 6-1 Right positions

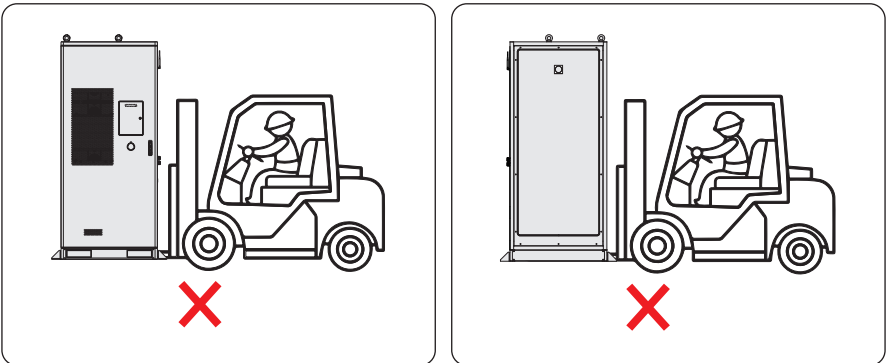


Figure 6-2 Wrong positions

## NOTICE!

- For installation space requirements, please refer to "4.1.5 Clearance Requirement".
- For foundation requirements, please refer to "4.1.2 Installation Foundation Requirements".

### 6.1.3 Installation Procedure for Angle Support and Cover

**NOTICE!**

- The angle supports delivered with the cabinet are required to be installed.

**Step 1:** Before using the forklift, the covers on the forklift holes shall be removed. There are two covers.

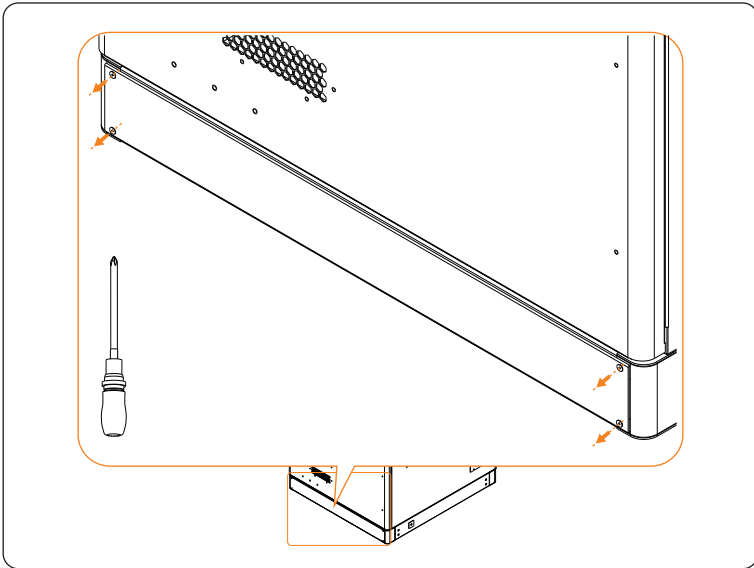


Figure 6-3 Removing covers

**Step 2:** After determining the installation position of the cabinet, align the holes on the angle support 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.

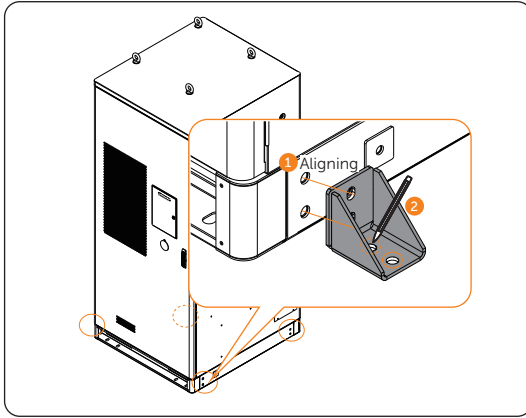


Figure 6-4 Aligning holes and marking hole position

**Step 3:** Drill holes at the previously marked positions (drill bit:  $\text{\O}16\text{ mm}$ ; hole depth:  $95\sim 105\text{ mm}$ ). After drilling, clean the foundation surface with a vacuum cleaner.

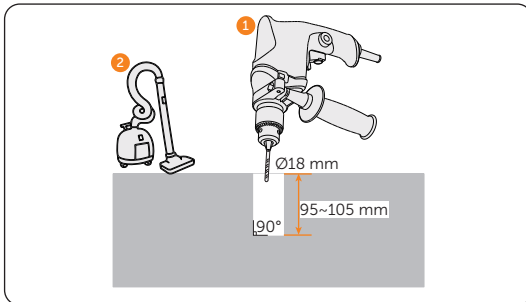


Figure 6-5 Drilling

**Step 4:** Attach the angle supports to the cabinet, and insert M12 screws and tighten them clockwise using a torque wrench (torque:  $42\pm 4.2\text{ N}\cdot\text{m}$ ). Each angle support has two screws, with a total of four angle supports.

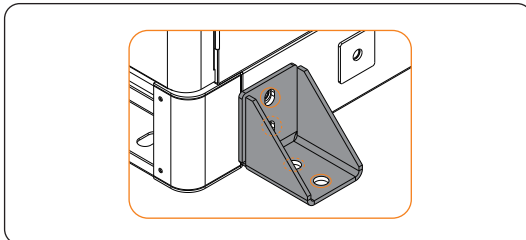


Figure 6-6 Aligning screw holes

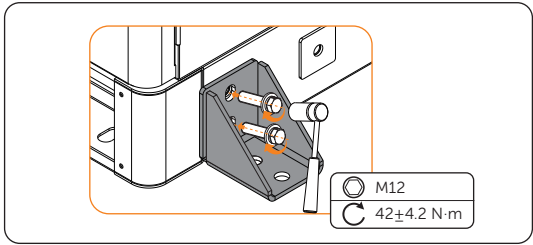


Figure 6-7 Tightening M12 screws

**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 5:** Use a rubber hammer to drive the expansion bolts into the foundation screw holes, and then tighten them clockwise with a torque wrench (M12) (torque:  $42 \pm 4.2$  N·m).

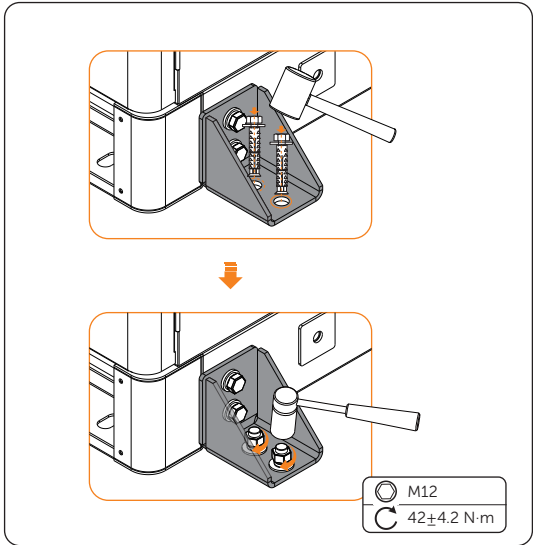


Figure 6-8 Tightening expansion bolts

**Step 6:** Reinstall covers to seal the forklift hole and tighten the screws (M5) (torque:  $3\pm 0.3$  N·m). Each cover has 4 screws, with a total of 2 covers.

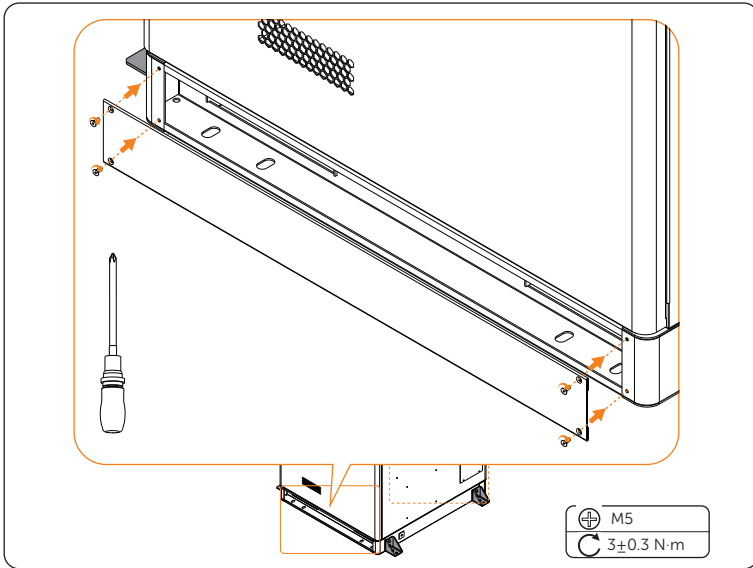


Figure 6-9 Fixed covers

## 6.2 Installation of Inverter.

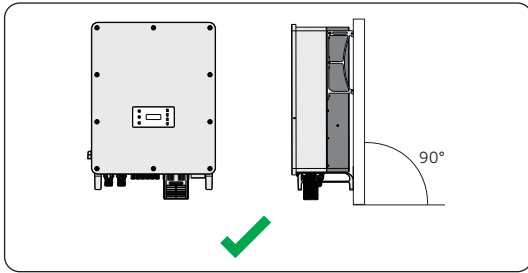


Figure 6-1 Correct installation

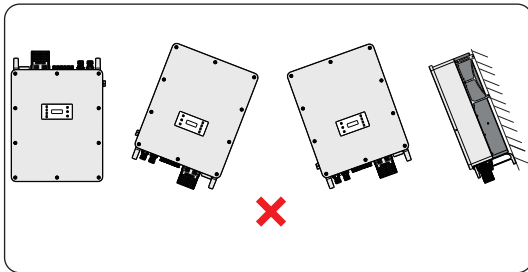


Figure 6-2 Incorrect installation



### 6.2.1 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.

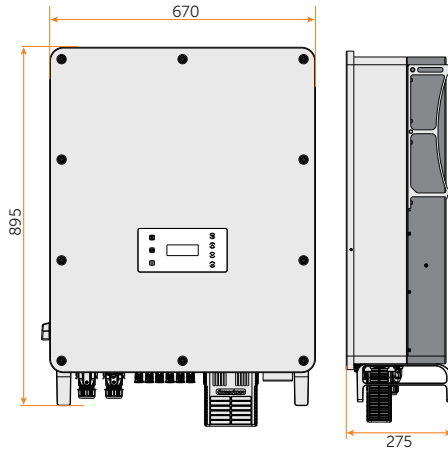


Figure 6-3 Dimensions 1 (Unit: mm)

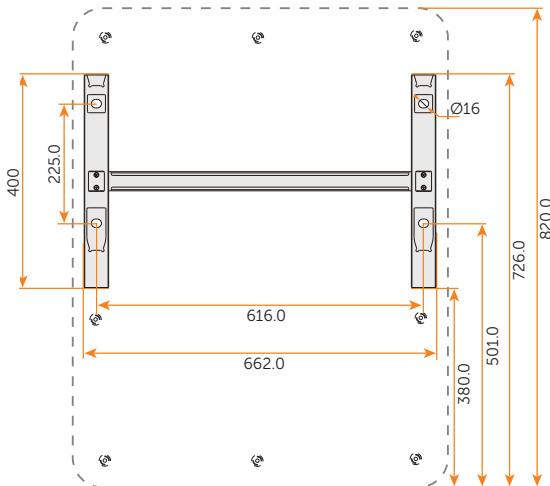


Figure 6-4 Dimensions 2 (Unit: mm)

### 6.2.2 Installation Procedures

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

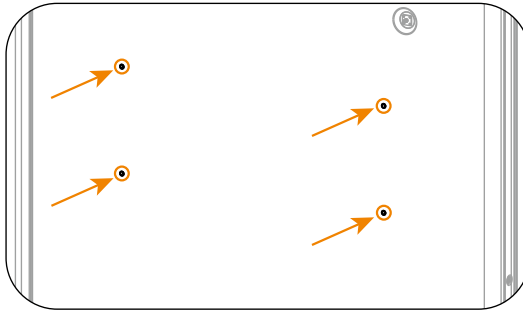


Figure 6-5 Confirming the position of the mounting bracket

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

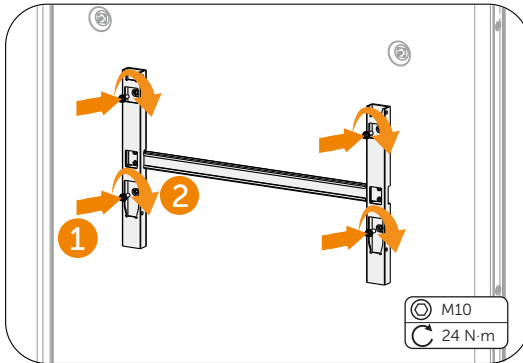


Figure 6-6 Securing the mounting bracket

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

#### NOTICE!

- If the inverter is temporarily 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 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.

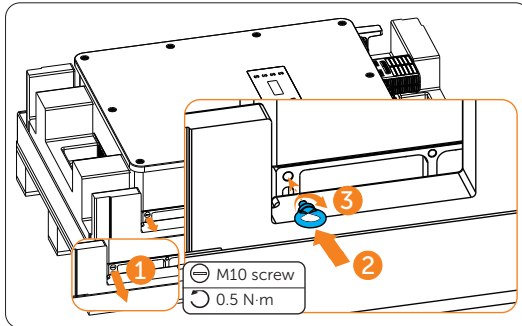


Figure 6-7 Installing the eye bolts

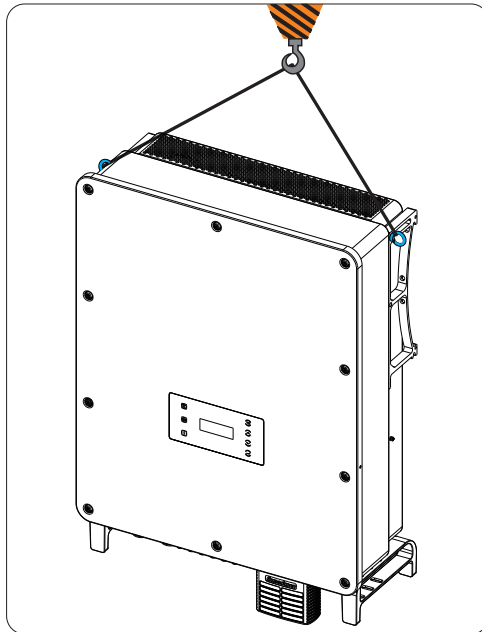


Figure 6-8 Hanging the inverter

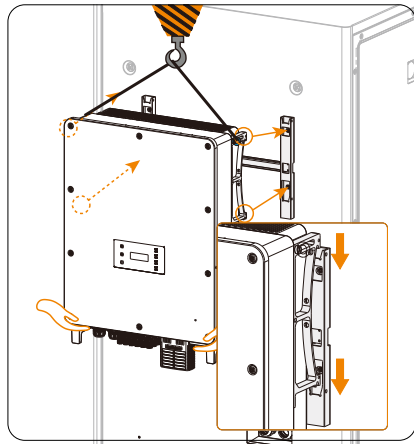


Figure 6-9 Hooking the inverter on the bracket

**NOTICE!**

- When the inverter is lifted up from the carton or the inverter is close to the mounting bracket, use hands to adjust the inverter position to prevent any damage to the inverter.
- Ladders will be helpful for installers to stand in a proper position and adjust the inverter position.

**Step 5:** Remove the eye bolts when the inverter is hooked on the mounting bracket and tighten the M10 screws with a flat-head screwdriver.

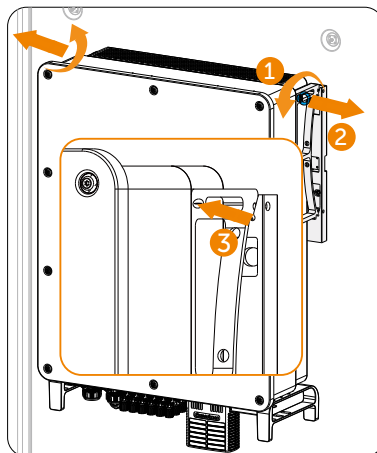


Figure 6-10 Removing the eye bolts

**NOTICE!**

- After removing the eye bolts from the inverter, keep them in a safe place. They are needed when the inverter is relocated or disassembled.

**Step 6:** Secure the inverter to the mounting bracket with M5\*50 screws. (Torque:  $2\pm 0.2$  N·m)

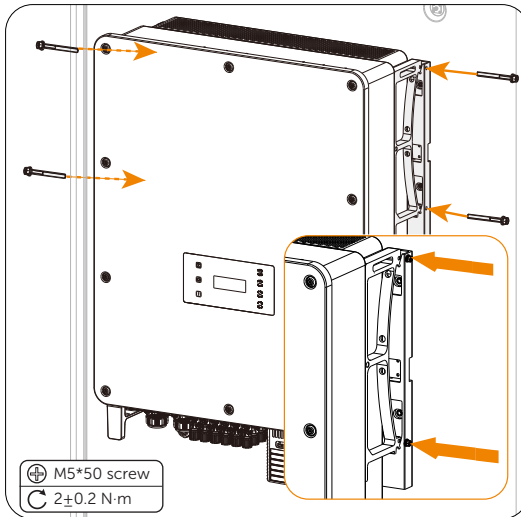


Figure 6-11 Securing the inverter

### 6.3 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 right one), the antenna is delivered with the accessories kit.
- **The antenna shall be installed after finishing installation of the inverter.**

There are two antenna ports in the cabinet. The right one is required to be installed an antenna, and the left one is a reserved port. For the antenna installation steps, please do as follows.

**Step 1:** Remove the silicone cap.

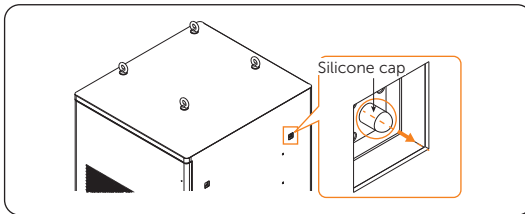


Figure 6-12 Removing silicone cap

**Step 2:** Take out the antenna, and make sure that it is securely inserted and tightened by turning it clockwise.

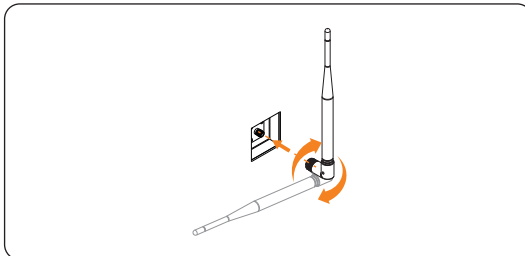


Figure 6-13 Installing antenna

After installing the antenna, see Figure 6-12.

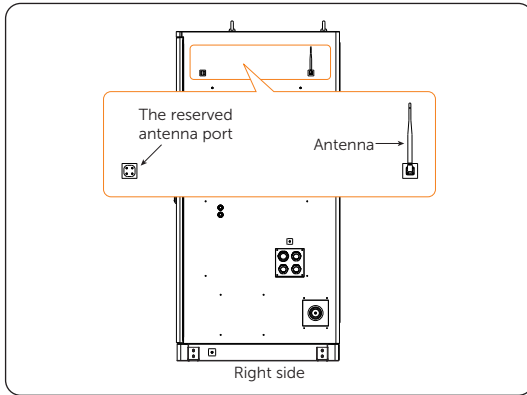


Figure 6-14 Installing an antenna

# 7 Electrical Connection

## 7.1 Operation before Connection

**NOTICE!**

- Before wiring, operators are required to learn which parts need to be conducted wiring. For details, please refer to Figure 7-1.

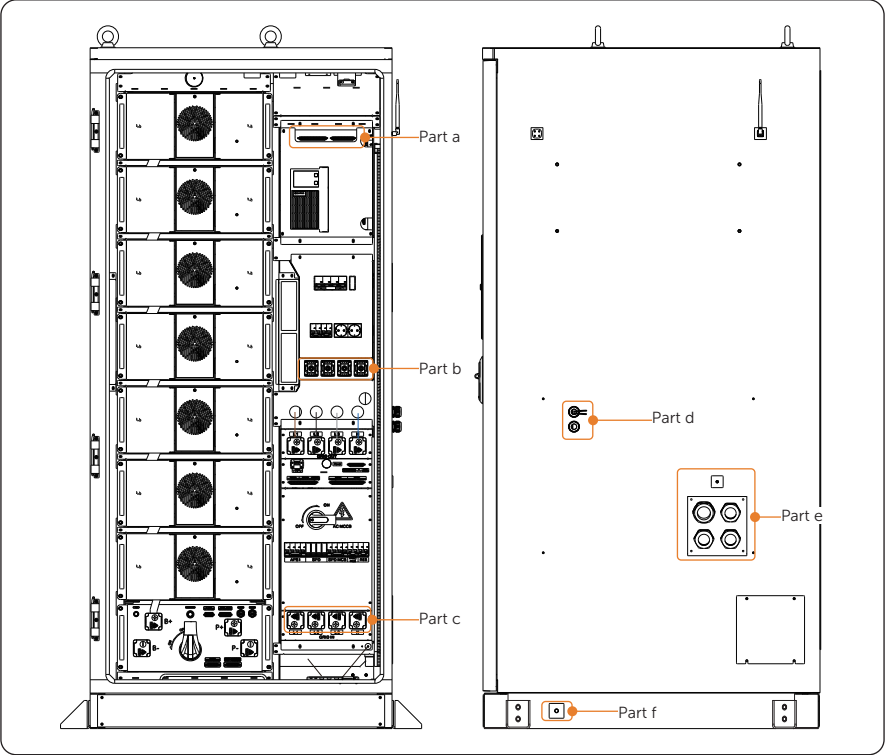


Figure 7-1 Parts that need wiring



**Step 1:** Use an Allen key (Part J) and a key (Part O) to open the door before wiring.

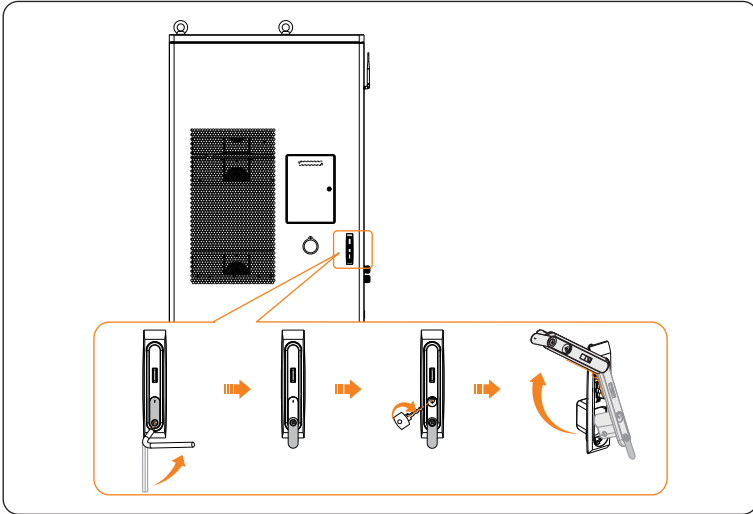


Figure 7-2 Opening the door

**NOTICE!**

- Please keep the keys properly.

**Step 2:** Unscrew M4 screws, and remove the cover. There are totalling M4 screws (x 4).

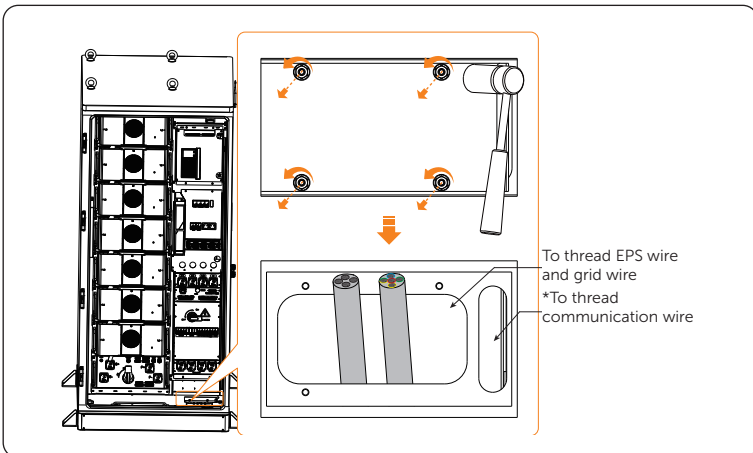


Figure 7-3 Unscrewing M4 screws and removing cover

## 7.2 Reserved Wire Interface

The **Part a** in “[Figure 7-1 Parts that need wiring](#)”, the reserved wire interfaces, is reserved for users to connect to other devices.

The requirements for the acceptable cables are shown as the following table.

Table 7-1 Requirements for acceptable cables

	Cross-section
CSA of cable	0.5 mm <sup>2</sup>

### 7.3 PE Connection

Regarding the PE connection, namely **Part f** in "Figure 7-1 Parts that need wiring", please strictly follow the steps below.

**Step 1:** Strip the cable jacket about 15 mm to 20 mm from the end.

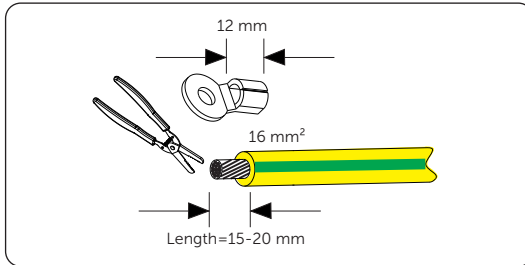


Figure 7-4 Stripping cable jacket

**Step 2:** Cut the heat-shrink tubing (Ø15-20 mm) to about 30 mm to 40 mm long, carefully slide it onto the end of the cable, and then carefully slip the wires all the way into the ring terminal.

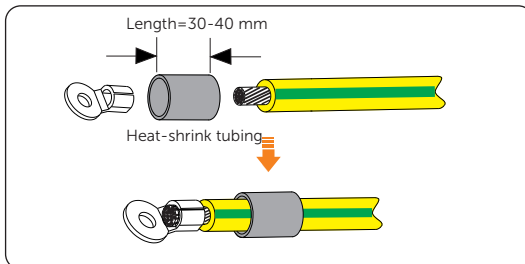


Figure 7-5 Cutting heat-shrink tubing

**Step 3:** Crimp the terminal, and heat the heat-shrink tubing after it wraps the end of terminal.

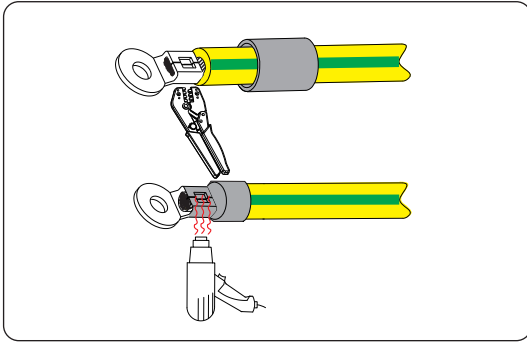


Figure 7-6 Crimping and heating

**Step 4:** Unscrew the M12 screw, and then connect the assembled grounding cable to the grounding port of the battery module, and then tighten M12 screw (torque:  $42 \pm 2$  N·m).

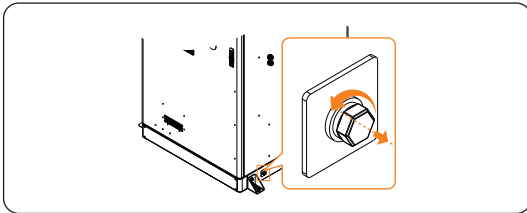


Figure 7-7 Unscrewing M12 screw

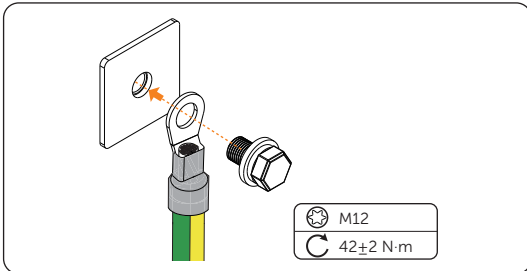


Figure 7-8 Tightening M12 screw

**NOTICE!**

- The cable cover must be installed after finishing wiring. For detailed installation procedure, please refer to "7.8 Installation Procedure for Cable Cover".

## 7.4 Inverter Electrical Connection

### ! DANGER!

- Before electrical connection, make sure the DC switches and AC breakers are disconnected. Otherwise, electrical shock may be caused by high voltage, resulting in serious personal injury or death.

### ! WARNING!

- Only the qualified personnel can perform the electrical connection following the local standards and requirements.
- Follow this manual or other related document to wire connection. The inverter damage caused by incorrect cabling is not in the scope of warranty.
- Use insulated tools and wear personal protective equipment throughout the electrical connection process.

### 7.4.1 Terminals of Inverter

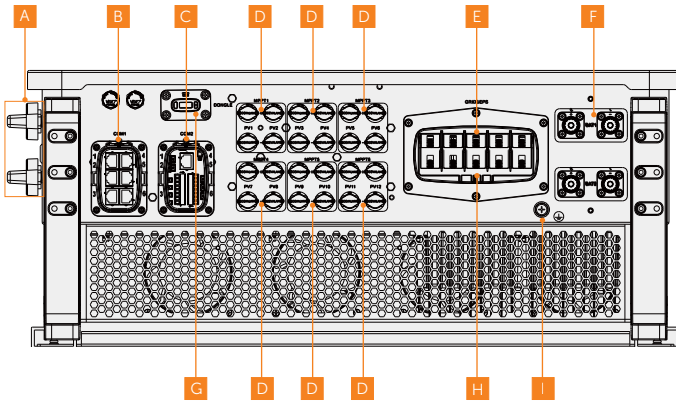


Figure 7-1 Terminals of Inverter

Table 7-1 Description of terminals

Item	Description
A	DC switch (including DC switch 1 and DC switch 2)
B	COM 1 communication terminal (including Parallel-1, Parallel-2, BMS-1, BMS-2, RS485, DRM)
C	COM 2 communication terminal (including Ripple control, DIO, Meter/CT)

Item	Description
D	PV connection terminal (including six MPPT trackers)
E	EPS connection terminal
F	Battery connection terminal (including BAT 1 and BAT 2)
G	Dongle terminal
H	Grid connection terminal
I	Ground connection point

---

### 7.4.2 AC Connection

**NOTICE!**

- Before connecting the inverter to the grid, approval must be received by local utility as required by national and state interconnection regulations.

The inverter has an EPS function. When the grid is connected, the inverter outputs go through the Grid terminal, and when the grid is disconnected, the inverter outputs go through the EPS terminal.

#### Requirements for AC connection

- Grid voltage requirement
  - » The grid voltage must be within the permissible range. The inverter is suitable for rated voltage 400V/230V, 380/220V, frequency 50/60Hz. Other technical requests should comply with the requirement of the local public grid.
- RCD requirement
  - » The inverter does not require an external residual-current device when operating. If an external RCD is required by local regulations, it is recommended to use a Type-A RCD with the value of 300 mA. When required by local regulations, the use of an RCD type B is permitted.
- AC breaker requirement
  - » An AC breaker that matches the power of the inverter must be connected between the inverter output and the power grid, and each inverter must be equipped with an independent breaker or other load disconnection unit to ensure the safe disconnection from the grid. Refer to ["4.3 Additionally Required Materials"](#) for specific data of AC breaker of Grid and EPS.
- Load requirement

- » It is prohibited to connect any load between inverter and AC switch that directly connects to the inverter.
- EPS load requirement
  - » Do not connect sensitive precision instruments or medical equipment to the EPS terminal.
  - » Ensure that the EPS load rated power is within the EPS rated output power range. Otherwise, the inverter will report an **Overload Fault** warning. When **Overload Fault** occurs, turn off some loads to make sure it is within the EPS rated output power range, and the inverter will return to normal after **ESC** key on the LCD screen pressed.
  - » For inductive load such as fridge, air conditioner, washing machine, etc., ensure that the start power does not exceed the EPS peak power.

Table 7-2 EPS load information

Type of load	Equipment	Start power
Resistive load	Lamp	Equal to rated power
	Fan	Equal to rated power
	Hairdryer	Equal to rated power
Inductive load	Fridge	3-5 times rated power
	Air conditioner	3-6 times rated power
	Washing machine	3-5 times rated power
	Microwave oven	3-5 times rated power

\* Please refer to the nominal current of the equipment for the actual start current.

Wiring procedures

NOTICE!

- When the inverter is connected to a battery cabinet, Grid and EPS cable crimped with AC connectors are prepared in the accessory of the cabinet and installers do not need to make cables.

**Step 1:** Anti-clockwise loosen the swivel nut and pull out the sealing plugs to disassemble the AC connector as below. Keep the sealing plugs still in the cable support sleeve if you choose not to connect the cable.

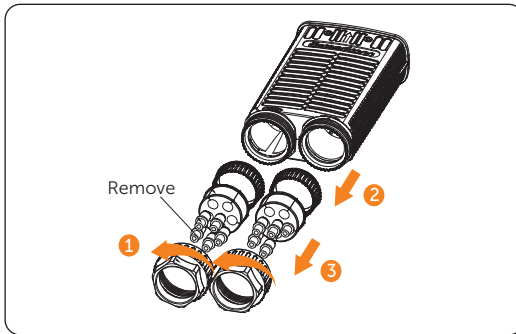


Figure 7-2 Disassembling the AC connector

**Step 2:** Thread the Grid and EPS cable through the AC connector.

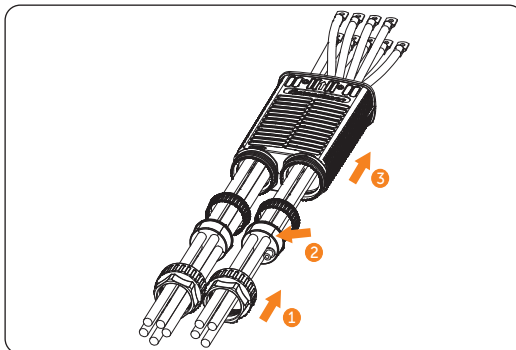


Figure 7-3 Threading cables through the AC connector

**Step 3:** Secure the L1, L2, L3, N and grounding conductors of the assembled Grid cable with M6 screws. (Torque:  $5.0 \pm 1$  N·m) Make sure the conductors are correctly assigned and firmly seated in the terminals.



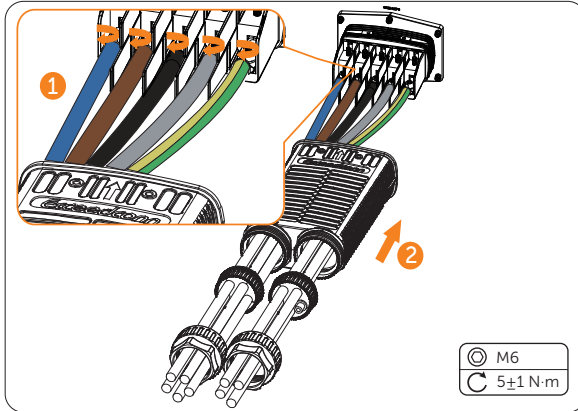


Figure 7-4 Connecting the Grid cable

- Step 4:** Secure the L1, L2, L3, N conductors of the assembled EPS cable with M6 screws. (Torque:  $5.0 \pm 1$  N·m) Make sure the conductors are correctly assigned and firmly seated in the terminals. Connect the enclosure of the AC connector to the inverter, insert the waterproof seals into the AC connector, and tighten the swivel nuts of the connector.

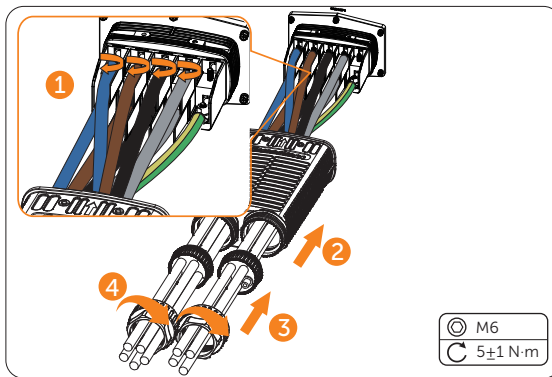


Figure 7-5 Connecting the EPS cable

- Step 5:** Connect the assembled AC connector to the AC port of the inverter, tighten the two M4\*12 screws on the AC connector enclosure (Torque:  $1.5 \pm 0.3$  N·m) and tighten the swivel nuts clockwise.

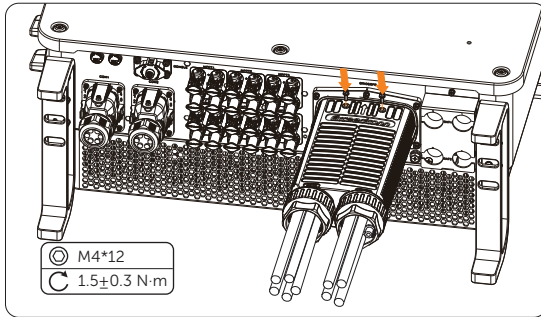


Figure 7-6 Securing the AC connector on the inverter

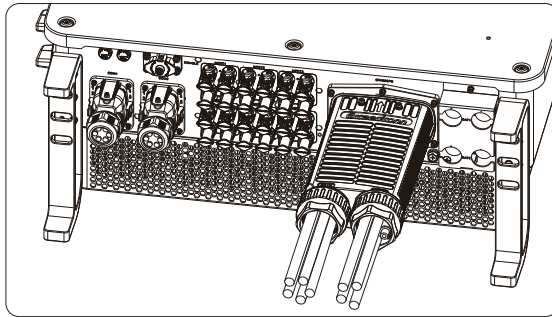


Figure 7-7 Well connected aAC connector

**! DANGER!**

- Before powering on the inverter, make sure the AC connector has been installed correctly on the Grid and EPS terminal even if the EPS terminal is not wired. Otherwise, electrical shock may be caused by high voltage, resulting in serious personal injury or death.

**! WARNING!**

- Reinstall AC terminal caps immediately after removing the connectors from terminals.

### 7.4.3 PV Connection

#### DANGER!

- High DC voltage will be generated by PV modules when exposed to sunlight. Death or lethal injuries will occur due to electric shock.
- Make sure the DC switch and AC breaker are disconnected from the inverter before connection.
- Make sure that the PV module output is well insulated to ground.

#### CAUTION!

- Power is fed from more than one source and more than one live circuit.

### Requirements for PV connection

- Open circuit voltage and working voltage
  - » The open circuit voltage of the module array should be less than the maximum PV input voltage (1000 V) of the inverter. Otherwise the inverter may be damaged.
  - » The working voltage should be within the MPPT voltage range (160-950 V). Otherwise, the inverter will prompt **PV Volt Fault**. Consider the impact of low temperature on the voltage of the photovoltaic panels, as lower temperatures tend to result in higher voltages.
  - » The working voltage should be within the full load MPPT range (320-800V). Otherwise, the inverter will prompt derating protection.
- PV module
  - » The PV modules within the same MPPT channel are of the same brand. Additionally, the strings within the same channel should have identical quantities, and be aligned and tilted identically.
  - » The positive or negative pole of the PV modules is not grounded.
  - » The positive cables of the PV modules must be connected with positive DC connectors.
  - » The negative cables of the PV modules must be connected with negative DC connectors.

### Wiring procedures

**Step 1:** Strip approx. 7 mm of the cable insulation.

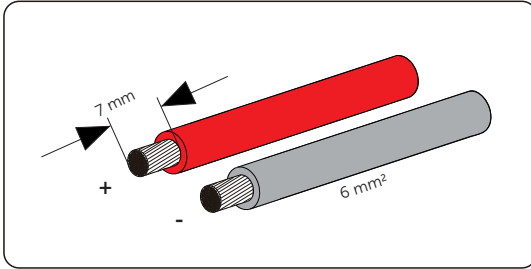


Figure 7-8 Stripping the PV cable

**Step 2:** Insert the stripped cable into the PV pin contact. Ensure that the stripped cable and the PV pin contact are of the same polarity. Crimp it with a crimping tool for PV terminal.

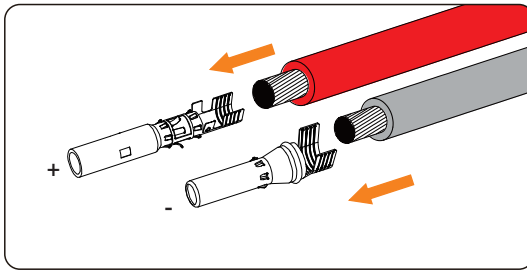


Figure 7-9 Inserting the PV pin contact

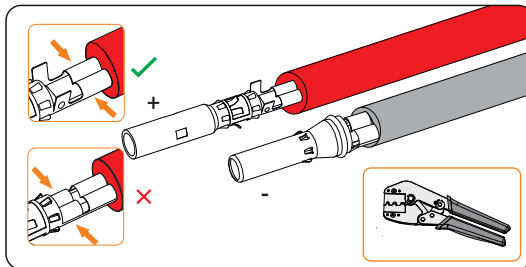


Figure 7-10 Crimping the terminal

**WARNING!**

- To mitigate the risk of fire, it is crucial to utilize a dedicated crimping tool specifically designed for PV installations to ensure secure and reliable connections.

**Step 3:** Thread the PV cable through the swivel nut and insert the cable into the PV connector until a "Click" is heard. Gently pull the cable backward to ensure a firm connection. Tighten the swivel nut clockwise. Verify that the PV connectors have the correct polarity before connection.

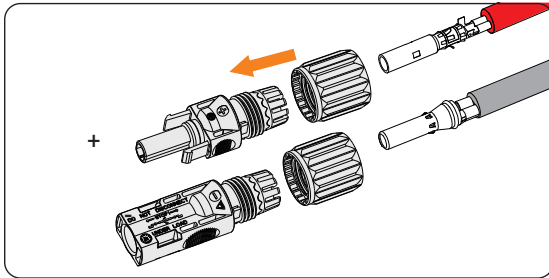


Figure 7-11 Threading the PV cable

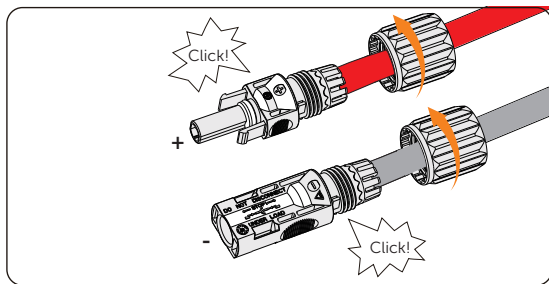


Figure 7-12 Securing the PV cable

**Step 4:** Use a multimeter to measure the positive and negative voltage of the assembled PV connectors. Make sure the open circuit voltage does not exceed the input limit of 1000 V.

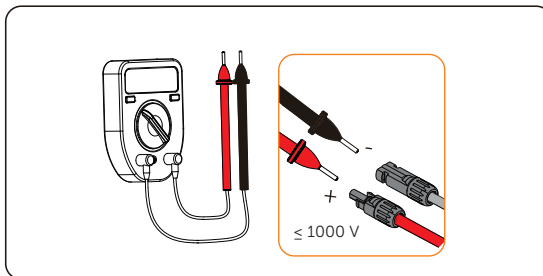


Figure 7-13 Measuring the voltage of PV connectors

NOTICE!

- If the voltage reading is negative, it indicates an incorrect DC input polarity. Please check if the wiring connections on the multimeter is correct or PV connectors are not mistakenly connected.

**Step 5:** Remove the PV terminal caps and connect the assembled PV connectors to corresponding terminals until there is an audible "Click". The PV+ on the string side must be connected to the PV+ on the inverter side, and the PV- on the string side must be connected to the PV- on the inverter side.

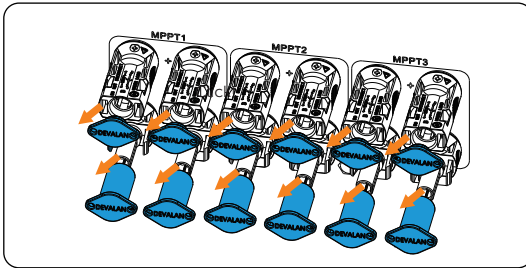


Figure 7-14 Connecting the PV cable

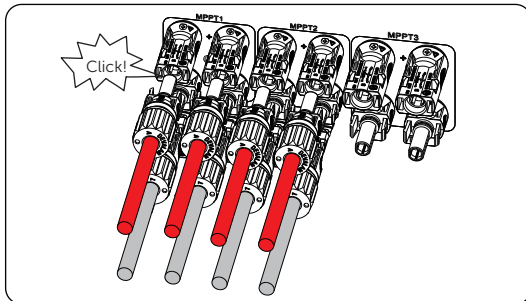


Figure 7-15 Connecting assembled PV cables to the inverter

**Step 6:** Seal the unused positive and negative PV terminals with corresponding PV dustproof buckles. Reinstall them immediately after removing the connectors from terminals.

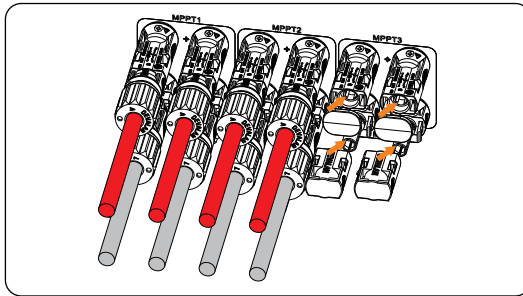


Figure 7-16 Installing PV dustproof buckles

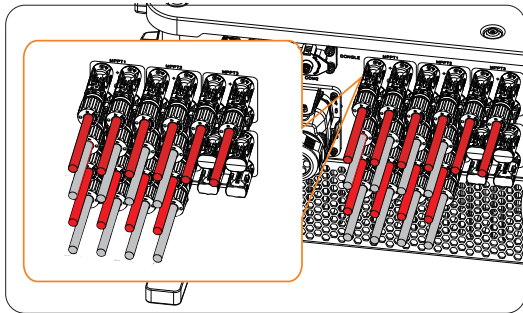


Figure 7-17 Well connected PV cables and dustproof buckles

#### 7.4.4 Battery Power Cable Connection



- Make sure the breaker of battery is in OFF position.
- Always ensure correct polarity. Never reverse the polarity of the battery cables as this will result in inverter damage.

#### Requirements for battery connection

- Required battery
  - » Lithium-ion battery
  - » The inverter is equipped with two independent battery terminals, allowing for connection to two separate battery towers. Max charge and discharge current is 160 (80\*2) A for each BAT terminal.
  - » Make sure the input voltage of each BAT terminal is higher than minimum voltage 180 V and lower than maximum input voltage 820 V.

- Micro circuit breaker (MCB)
  - » If local regulations mandate the use of a DC MCB between the battery and the inverter, install a non-polar DC MCB.
  - » Nominal voltage of DC MCB should be larger than maximum voltage of battery.
  - » See the documentation of battery for the current.

### Wiring procedures

#### NOTICE!

- The power cable of battery is in the battery accessory pack. NOT in the scope of inverter's delivery.

**Step 1:** Disassemble the battery connectors.

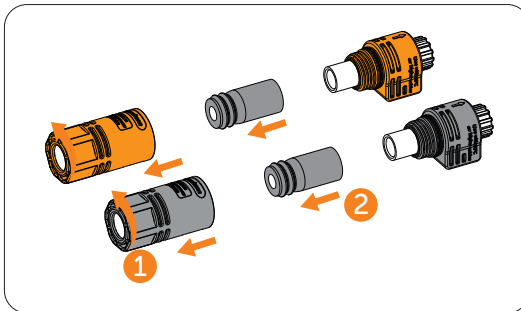


Figure 7-18 Disassembling battery connectors

**Step 2:** Thread the battery power cable through the swivel nut and then the cable support sleeve. Strip  $15 \pm 1$  mm insulation off.

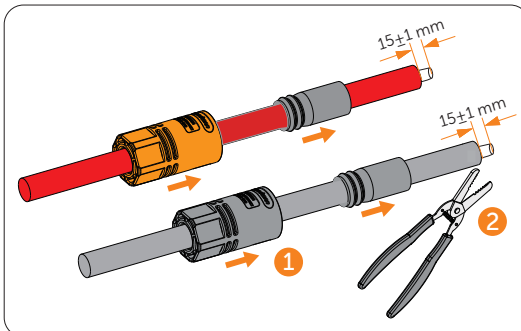


Figure 7-19 Stripping the battery power cable



**Step 3:** Insert the stripped cable into the connector enclosure. Ensure that the stripped cable and the enclosure are of the same polarity. Crimp it with a hydraulic plier and ensure that the exposed core of the cable is no more than 1 mm.

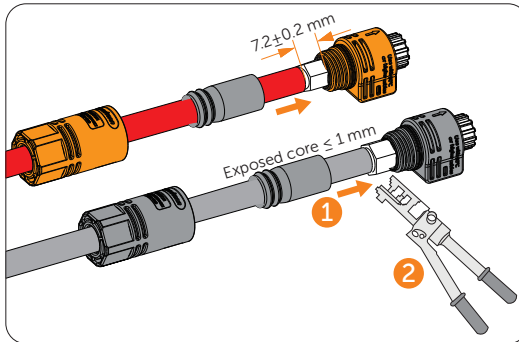


Figure 7-20 Crimping the terminal

#### NOTICE!

- Before the battery power cables are stripped, please ensure that the exposed core of cables should be less than 1 mm when the battery connectors are crimped.

**Step 4:** Pull the cable support sleeve over the crimped battery connector enclosure and then the swivel nut to the enclosure. Tighten the swivel nut.

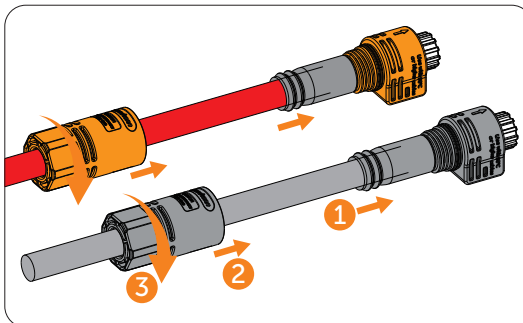


Figure 7-21 Tightening the battery connector

**Step 5:** Loosen the screws on the battery protective cover and remove the cover. Pull out the battery caps.

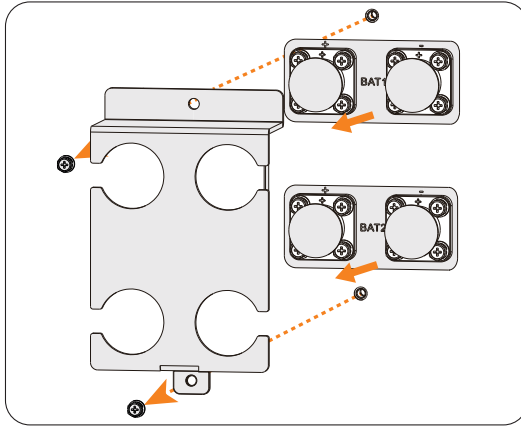


Figure 7-22 Removing the battery protective cover

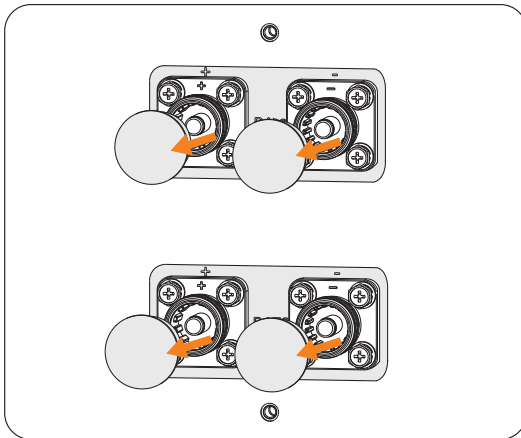


Figure 7-23 Removing battery caps

**Step 6:** Connect the assembled battery connectors to corresponding terminals until there is an audible "Click". The BAT+ on the string side must be connected to the BAT+ on the inverter side, and the BAT- on the string side must be connected to the BAT- on the inverter side. Gently pull the cable backward to ensure firm connection.

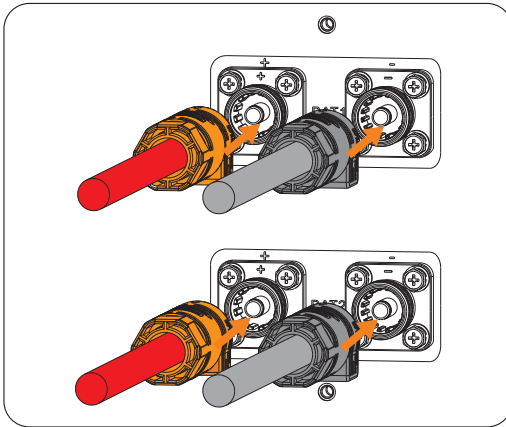


Figure 7-24 Connecting assembled battery cables

**Step 7:** After the battery cables are connected, install the battery protective cover and secure the cover on the inverter with screws.

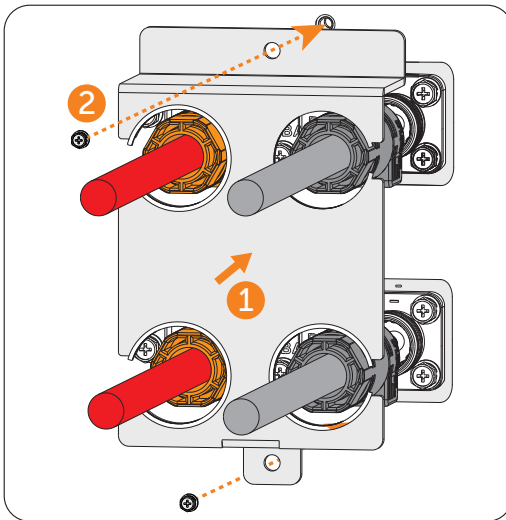


Figure 7-25 Installing the battery protective cover

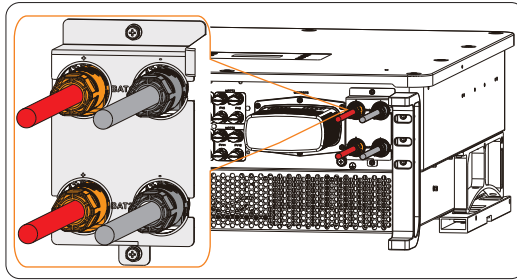


Figure 7-26 Well connected battery cables

 **WARNING!**

- Seal the unused battery terminals with original terminal caps.
- Keep the terminal caps in a safe place if battery cables are connected to the inverter.
- Reinstall it immediately after removing the connectors from terminals.

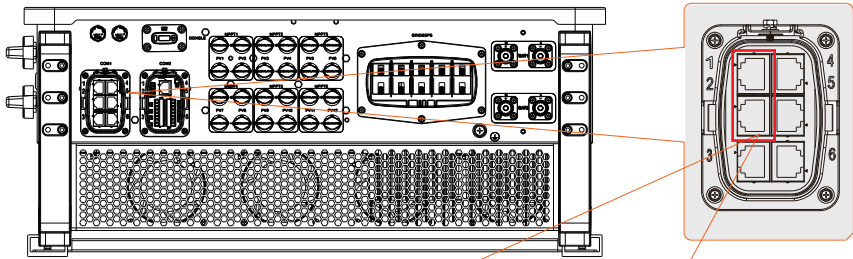
**NOTICE!**

- Please refer to the battery document for specific wiring procedures on the battery side.

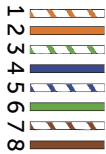
## 7.4.5 COM 1 Communication Connection

### Pin assignment of COM 1 terminal

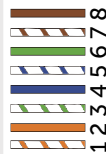
The COM 1 terminal is used for parallel connection via Parallel-1 and Parallel-2 communication terminal, battery communication via BMS-1 and BMS-2 terminal, external equipment communication via RS485 and DRM function. Please wiring according to the actual requirements.



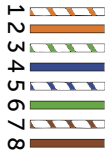
**PARALLEL 1**  
 1: PARALLEL\_485A  
 2: PARALLEL\_485B  
 3: DATA\_BUS  
 4: PARALLEL\_CANH  
 5: PARALLEL\_CANL  
 6: GND\_COM  
 7: PARALLEL\_SYNC1  
 8: PARALLEL\_SYNC2



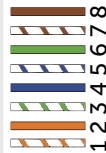
**PARALLEL 2**  
 1: PARALLEL\_485A  
 2: PARALLEL\_485B  
 3: DATA\_BUS  
 4: PARALLEL\_CANH  
 5: PARALLEL\_CANL  
 6: GND\_COM  
 7: PARALLEL\_SYNC1  
 8: PARALLEL\_SYNC2



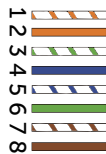
**BMS1**  
 1: BAT\_TEMP  
 2: GND\_COM  
 3: GND\_COM  
 4: BMS1\_CANH  
 5: BMS1\_CANL  
 6: BAT\_WAKEUP\_POWER  
 7: BMS1\_485A  
 8: BMS1\_485B



**BMS2**  
 1: BAT\_TEMP  
 2: GND\_COM  
 3: GND\_COM  
 4: BMS2\_CANH  
 5: BMS2\_CANL  
 6: BAT\_WAKEUP\_POWER  
 7: BMS2\_485A  
 8: BMS2\_485B



**RS485**  
 1: REMOTE\_485A  
 2: REMOTE\_485B  
 3: NC  
 4: PARALLEL\_485AA  
 5: PARALLEL\_485BB  
 6: NC  
 7: REMOTE\_485A  
 8: REMOTE\_485B



**DRM**  
 1: DRM1/5  
 2: DRM2/6  
 3: DRM3/7  
 4: DRM4/8  
 5: +3.3V\_COM  
 6: COM/DRM0  
 7: GND\_COM  
 8: GND\_COM



### Parallel connection

The inverter provides the parallel connection function. One inverter will be set as the "Master inverter" to control the other "Slave inverters" in the system. For details, please refer to "13.2 Application of Parallel Function".

- Parallel connection wiring procedure

**Step 1:** Loosen the screws on the COM 1 terminal. Pinch the tabs on the sides of the COM 1 connector enclosure and pull it at the same time to disassemble it.

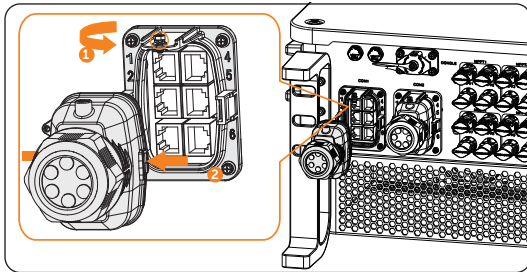


Figure 7-27 Removing the connector enclosure

**Step 2:** Anti-clockwise loosen the swivel nut and pull out the sealing plugs. Keep the sealing plugs still in the cable support sleeve if you choose not to connect the cable.

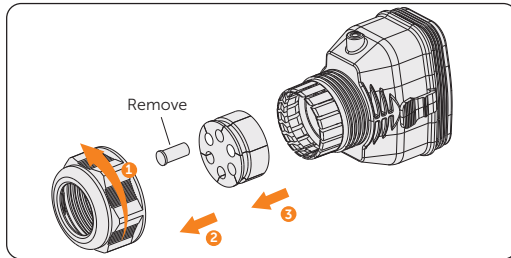


Figure 7-28 Disassembling the connector

**Step 3:** Thread the network cables.

- » Method 1: If your network cable has already been connected with RJ45 terminal, you can directly thread the cable through the swivel nut, cable support sleeve and connector enclosure in sequence.

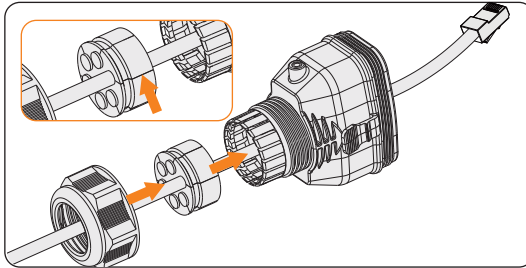


Figure 7-29 Threading the cables with RJ45 terminal

- » Method 2: If your network cable is not connected to an RJ45 terminal, you will need to assemble the cable before proceeding.

Thread the cables without RJ45 terminal through the swivel nut, cable support sleeve, and connector enclosure in sequence. Strip approx. 15 mm of the cable insulation.

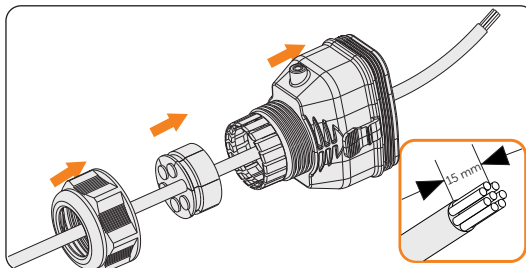


Figure 7-30 Threading the cables and stripping the insulation

Insert the stripped section into the RJ45 terminal. Crimp it tightly with a crimping tool for RJ45. Pay attention to pin order of RJ45 terminal.

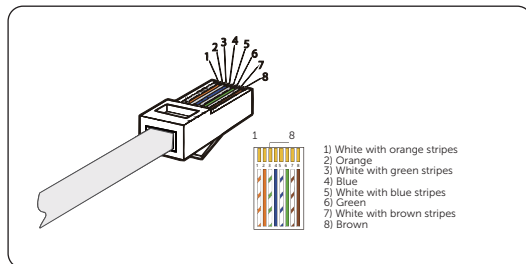


Figure 7-31 Crimping the communication cable

**NOTICE!**

- Use network cable tester to test the crimped cable before connecting to the inverter.

**Step 4:** Install the network cables with a crimped RJ45 terminal to Parallel-1 and Parallel -2 of cable fixture according to the labeling.

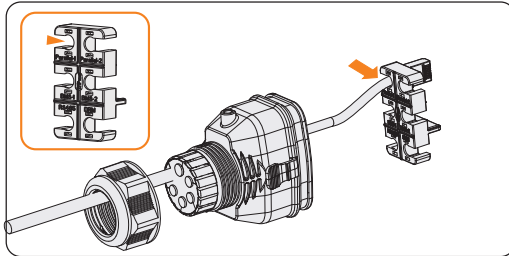


Figure 7-32 Installing the cable to the cable fixture

**Step 5:** Connect the assembled connector to COM 1 terminal. Ensure the cable fixture tongue is well inserted into the slot of terminal. You will hear an audible "Click" if it is connected securely. Lightly pull the cable for double check its connection.

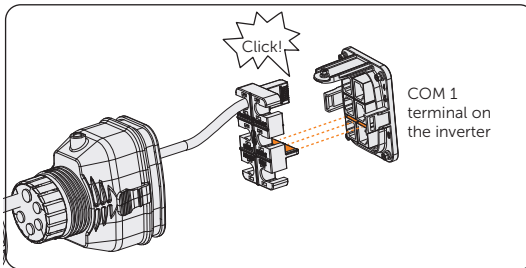


Figure 7-33 Inserting the connector to COM 1

- Step 6:** Secure the assembled connector on COM 1 terminal.
- Install the connector enclosure back into the COM 1 terminal.
  - Install the cable support sleeve into the enclosure.
  - Tighten M3 screw to secure it. (Torque:  $1.2 \pm 0.1$  N·m)
  - Clockwise tighten the swivel nut to finish the COM 1 wiring connection.



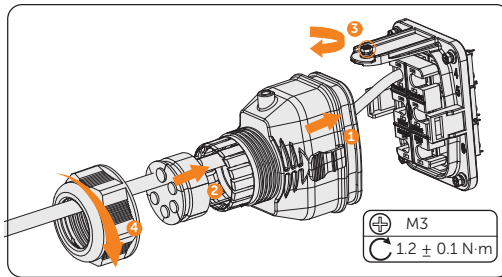


Figure 7-34 Securing the connector

### BMS communication connection

Through BMS-1 communication terminal, the inverter can be connected to the battery cabinet.

- BMS connection diagram

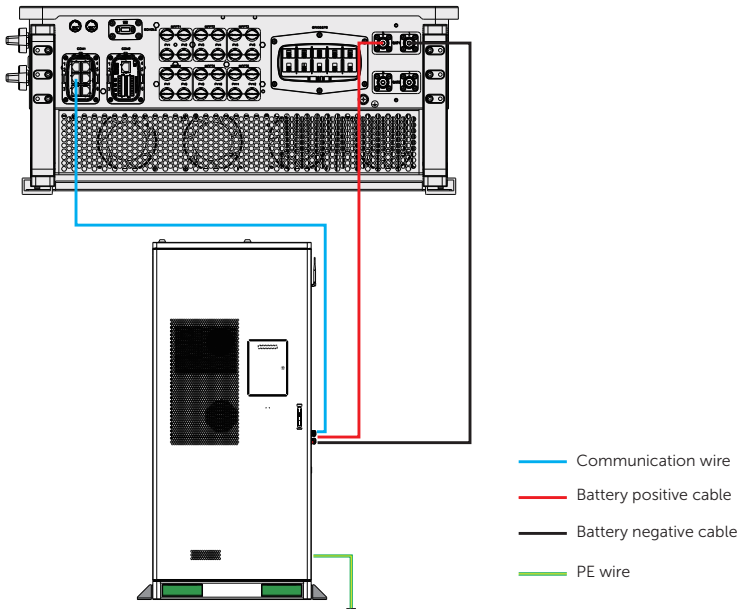


Figure 7-35 BMS connection diagram

- BMS wiring procedure

- Step 1:** Loosen the screws on the COM 1 terminal. Pinch the tabs on the sides of the COM1 connector enclosure and pull it at the same time to remove it.
- Step 2:** Anti-clockwise loosen the swivel nut and pull out the sealing plugs. Keep them still in the cable support sleeve if you choose not to connect the cable.
- Step 3:** Thread the cables through the swivel nut, cable support sleeve, and connector enclosure in sequence.
- Step 4:** Install the network cables to BMS-1 and BMS -2 of cable fixture according to the labeling.

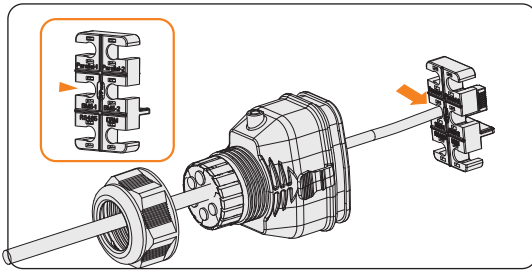


Figure 7-36 Installing RJ45 terminal to the cable fixture

- Step 5:** Connect the assembled connector to COM 1 terminal. Make sure the cable fixture tongue is well inserted into the slot of terminal. You will hear an audible "Click" if it is connected securely. Lightly pull the cable backward for double check its connection.
- Step 6:** Secure the assembled connector on COM 1 terminal.
- e. Install the connector enclosure back into the COM 1 terminal.
  - f. Install the cable support sleeve into the enclosure.
  - g. Tighten M3 screw to secure it. (Torque:  $1.2 \pm 0.1$  N·m)
  - h. Clockwise tighten the swivel nut to finish the COM 1 wiring connection.

## 7.4.6 COM 2 Communication Connection

### Pin assignment of COM 2 terminal

The COM 2 terminal is used for Meter/CT connection, ripple control and DIO function.

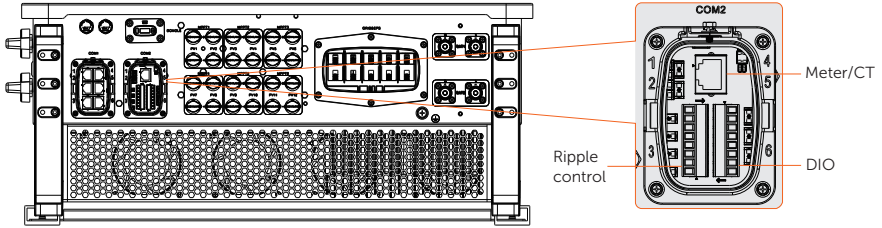


Table 7-3 Pin assignment of COM 2 terminal

Pin	Pin assignment
Meter/CT	
1	CT_R1_CON
2	CT_S1_CON
3	CT_T1_CON
4	METER_485A
5	METER_485B
6	CT_T2_CON
7	CT_S2_CON
8	CT_R2_CON
Ripple control	
1	RP_K4
2	GND_COM
3	RP_K3
4	GND_COM
5	RP_K2
6	GND_COM
7	RP_K1

Pin	Pin assignment
8	GND_COM
DIO port	
1	DO_1
2	DO_2
3	DI_1+
4	DI_1-
5	DI_2+
6	DI_2-
7	GND_COM
8	EPSBOX_RELAY_VCC

### CT/Meter connection

The inverter should work with an electric meter or current transformer (CT for short) to monitor household electricity usage. The electricity meter or CT can transmit the relevant electricity data to the inverter or platform.

#### CAUTION!

- The inverter will shut down and prompt **Meter Fault** alarm if meter is not connected to inverter. Smart meters must be authorized by our company. Unauthorized meter may be incompatible with the inverter. SolaX will not be responsible for the impact caused by the use of other appliances.

#### NOTICE!

- Do not place the CT on the N wire or ground wire.
- Do not put CT on the N line and L line at the same time.
- Do not place the CT on the side where the arrow points to the inverter.
- Do not place the CT on non-insulated wires.
- The cable length between CT and inverter should not exceed 10 meters.
- It is recommended to wrap the CT clip around in circles with insulating tape.

- CT connection diagram

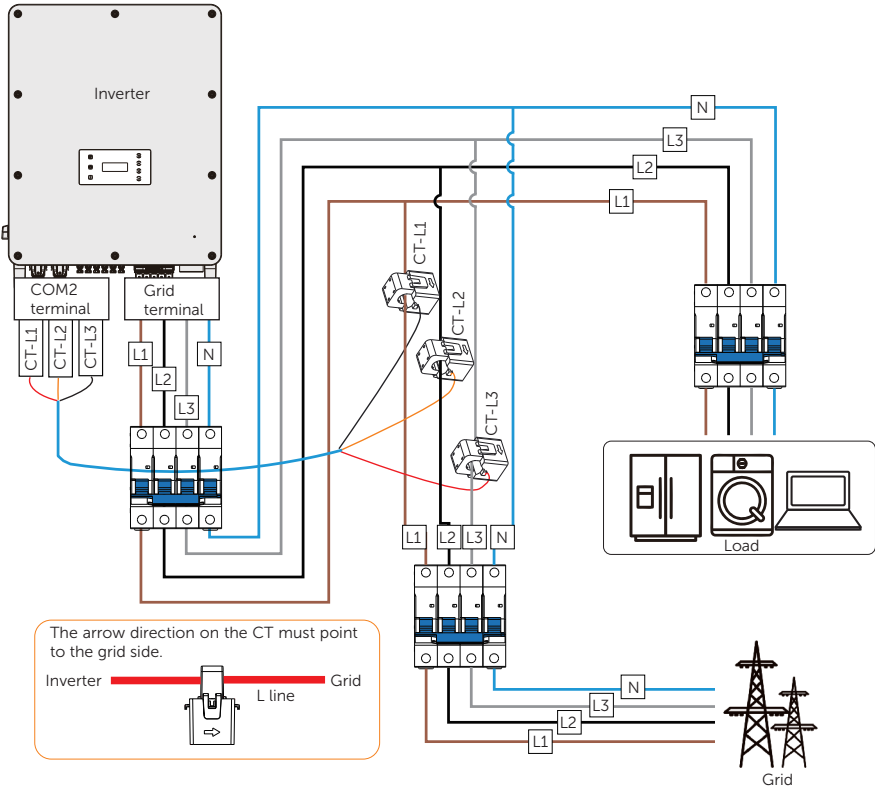


Figure 7-37 CT connection diagram

**NOTICE!**

- The arrow on the CT must point at the public grid.

**NOTICE!**

- The following figures take inverter with Meter DTSU666-CT as an example.
- If you have other power generation equipment (such as an inverter) at home and wants to monitor both equipment, our inverter provides Meter 2 communication function to monitor the power generation equipment. For more information, please contact us.
- Please make PE connection for Meter if the meter has ground terminal.

- Meter connection diagram

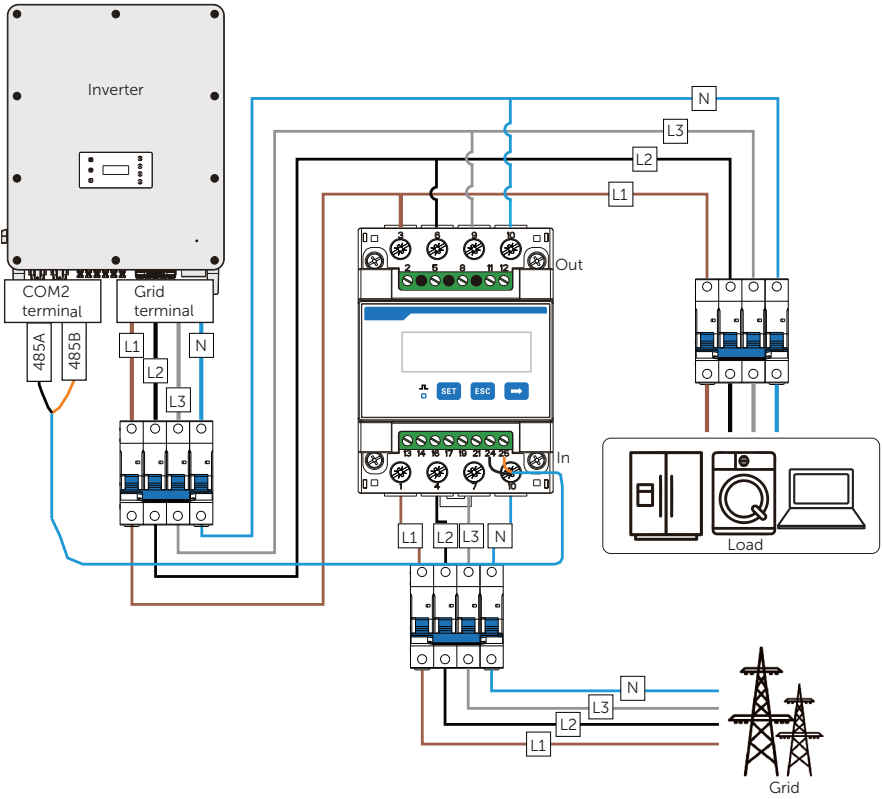


Figure 7-38 Meter connection diagram 1

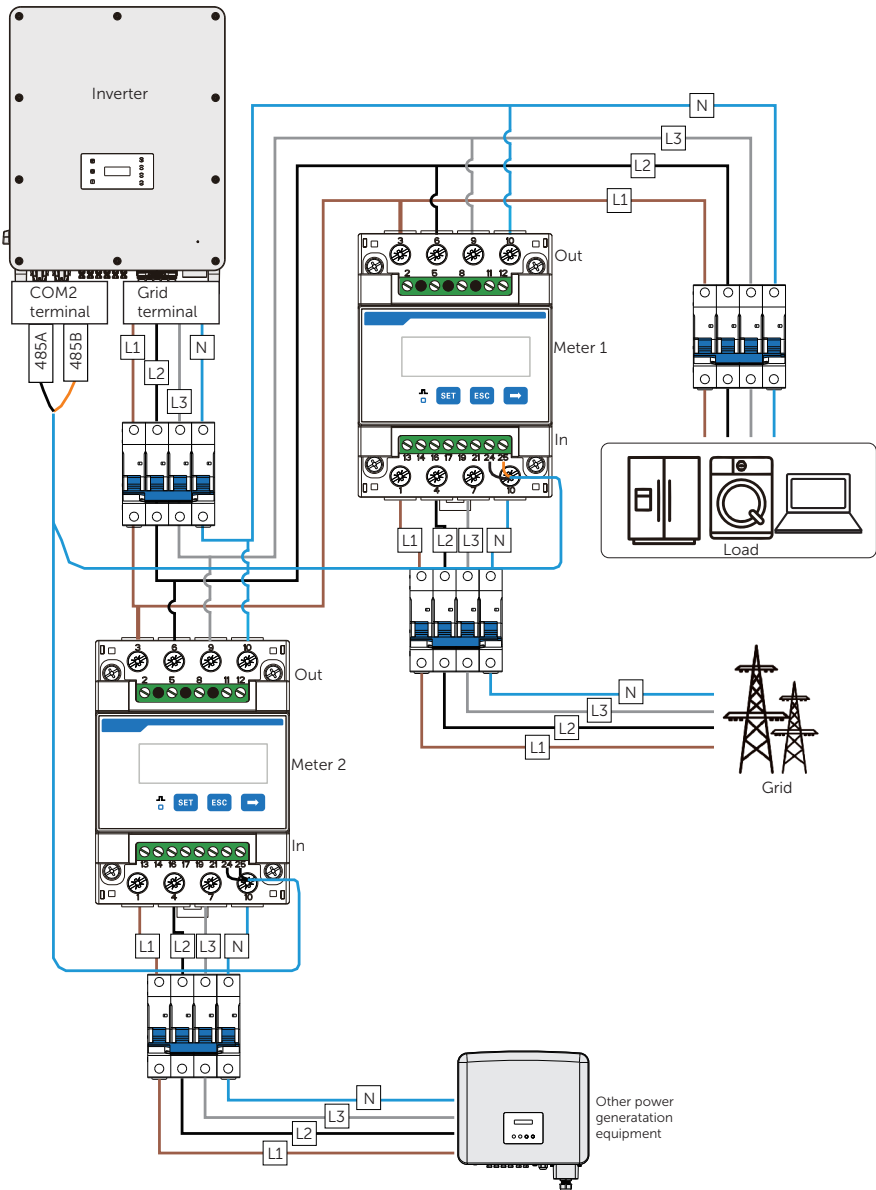


Figure 7-39 Meter connection diagram 2

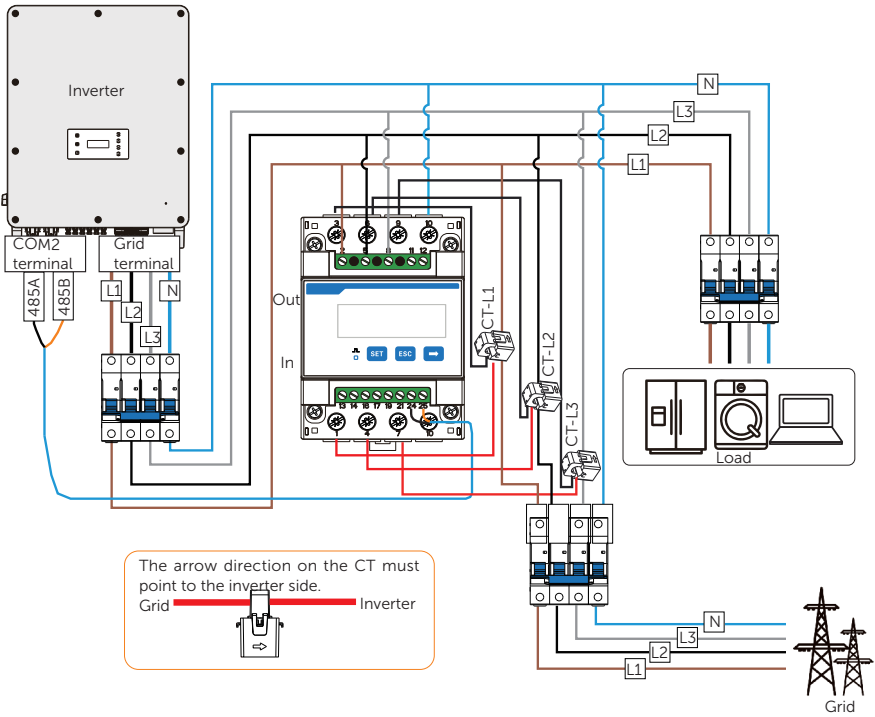


Figure 7-40 Meter with CT connection diagram

**NOTICE!**

- The arrow on the CT must point at the inverter.



- CT/Meter pin definition

	Pin	Pin assignment
For CT connection	1	CT_R1_CON
	2	CT_S1_CON
	3	CT_T1_CON
For Meter connection	4	METER_485A
	5	METER_485B
For CT connection	6	CT_T2_CON
	7	CT_S2_CON
	8	CT_R2_CON

- CT/Meter wiring procedure

**Step 1:** Loosen the screws on the COM 2 terminal. Pinch the tabs on the sides of the COM 2 connector enclosure and pull it at the same time to remove it.

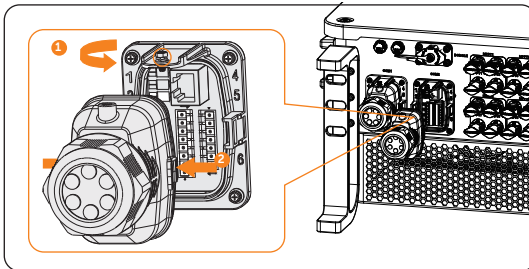


Figure 7-41 Disassembling the COM 2 terminal

**Step 2:** Loosen the swivel nut and pull out the sealing plugs. Keep them still in the cable support sleeve if you choose not to connect the cable.

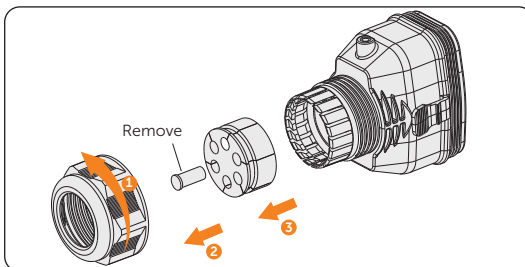


Figure 7-42 Disassembling the connector

**Step 3:** Directly thread the cable through the swivel nut, cable support sleeve and connector enclosure in sequence.

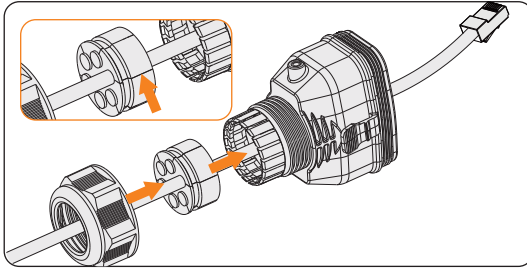


Figure 7-43 Threading the cable with RJ45 terminal

**NOTICE!**

- Use network cable tester to test the crimped cable before connection.

**Step 4:** Connect the assembled communication cable into the COM 2 terminal. Secure the assembled connector on COM 2 terminal.

- » Install the connector enclosure back into the COM 2 terminal.
- » Install the cable support sleeve into the enclosure.
- » Tighten M3 screw to secure it. (Torque:  $1.2 \pm 0.1$  N·m)
- » Clockwise tighten the swivel nut to finish the COM 2 wiring connection.

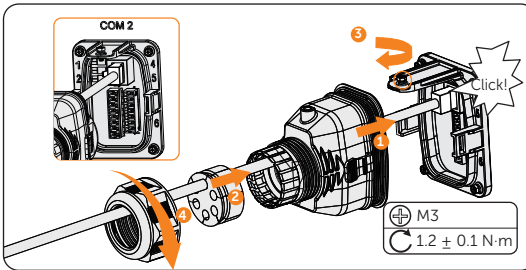


Figure 7-44 Connecting to COM 2

**Step 5:** For a meter connection, insert another side of the communication cable into meter. For CT connection, connect the other side to CT.

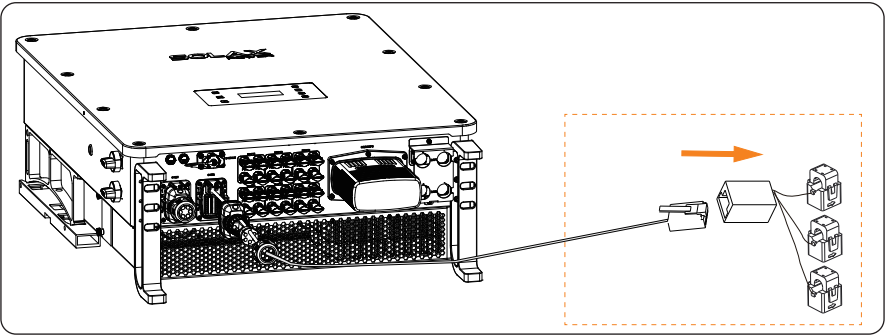


Figure 7-45 Connecting to CT

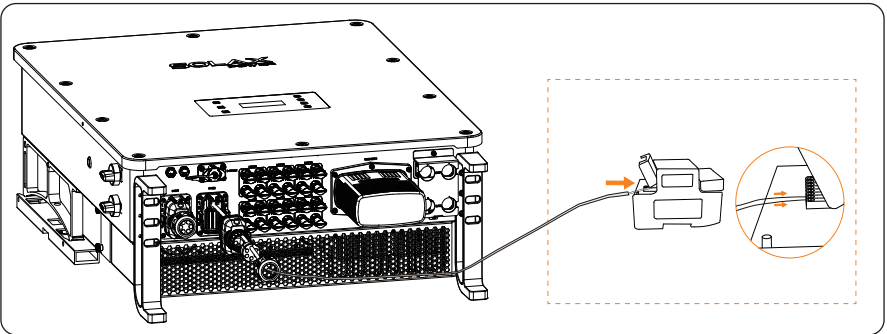


Figure 7-46 Connecting to wire meter

### Ripple control communication connection

Ripple Control is a common form of grid management. Its communication is based on superimposing a very high frequency signal onto the 50 / 60 Hz mains power. The inverter supports to connect a digital signal source (e.g. ripple control receiver) to the digital input.

- Requirements for Ripple control
  - The signal source must be technically suitable for connection to the digital inputs. (see technical data)
  - The connected digital signal source has a safe separation to the grid potential.
- Connection diagram for ripple control

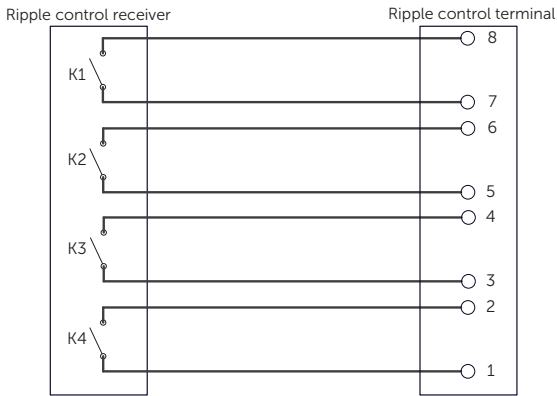


Figure 7-47 Connection diagram for ripple control

- Ripple control wiring procedure
- Step 1:** Loosen the screws on the COM 2 terminal. Pinch the tabs on the sides of the COM 2 connector enclosure and pull it at the same time to remove it.

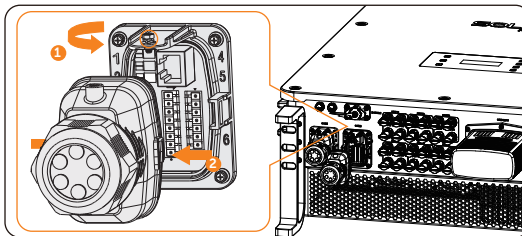


Figure 7-48 Disassembling the COM 2 terminal

- Step 2:** Loosen the swivel nut and pull out the sealing plugs. Keep them still in the cable support sleeve if you choose not to connect the cable.

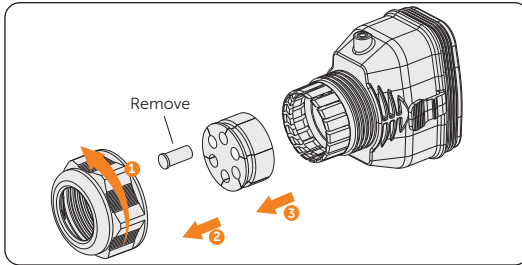


Figure 7-49 Disassembling the connector

- Step 3:** Prepare two four-core signal cables. Thread the cables through the swivel nut, cable support sleeve, and connector enclosure in sequence.

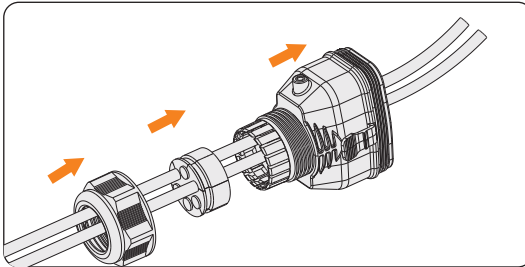


Figure 7-50 Threading the cables

- Step 4:** Strip approx. 6 mm of the cable insulation. Insert the conductors into the 8-pin terminal block and tighten the terminal block screws. (torque:  $0.4 \pm 0.1$  N·m) Ensure that the conductors are firmly seated in the terminal.

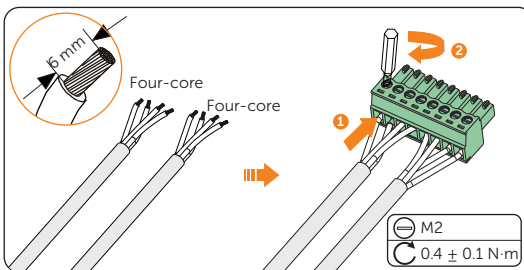


Figure 7-51 Connecting to 8-pin terminal block

- Step 5:** Connect the assembled communication cable into the COM 2 terminal. Lightly pull the cable backward to confirm tight insertion and then install the connector back.

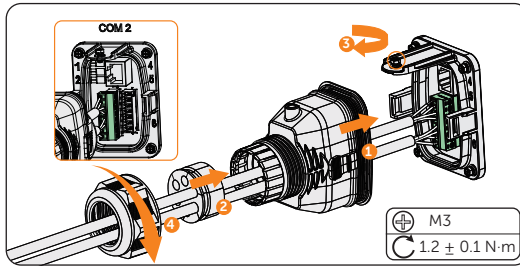


Figure 7-52 Connecting to the inverter

**DIO communication connection**

DIO terminal is designed to support generator and system switch connection through dry contact.

To enhance safety and reduce the risk of injury, you can install the system switch in a readily accessible location through dry contact connection. In the event of an emergency, the system switch can be easily reached and pressed to promptly switch off the entire system, ensuring a swift response and preventing further harm.

- DIO pin definition

	Pin	Pin assignment
For generator dry contact output	1	DO_1
	2	DO_2
For system switch dry contact input	3	DI_1+
	4	DI_1-
Reserved	5	DI_2+
	6	DI_2-
Reserved	7	GND_COM
For power supply	8	EPSBOX_RELAY_VCC

**NOTICE!**

- If there is strong interference in the surroundings, it is recommended to use shielding cables and ground the shielding layer of the cables through Pin 7.

- System switch connection diagram

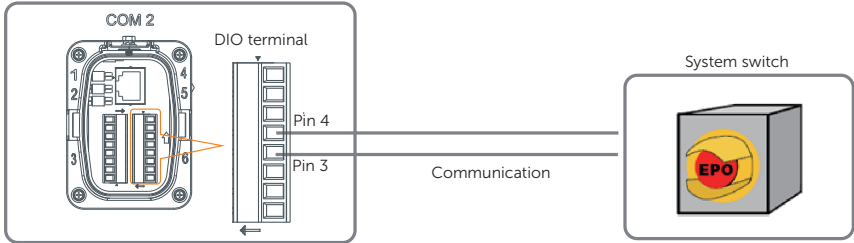


Figure 7-53 System switch connection diagram

Choose a self-locking switch for the system. When system switch is pressed, **OFF MODE (DIO SW)** will be displayed on the LCD screen and the system will be powered off. To release the switch, press it again.

- DIO wiring procedure

- Step 1:** Loosen the screws on the COM 2 terminal. Pinch the tabs on the sides of the COM 2 connector enclosure and pull it at the same time to remove it.
- Step 2:** Loosen the swivel nut and pull out the sealing plugs. Keep them still in the cable support sleeve if you choose not to connect the cable.
- Step 3:** Prepare two four-core signal cable. Thread the cables through the swivel nut, cable support sleeve, and connector enclosure in sequence.
- Step 4:** Strip approx. 6 mm of the cable insulation. Insert the conductors into the 8-pin terminal block and tighten the terminal block screws. (torque:  $0.4 \pm 0.1$  N·m) Ensure that the conductors are firmly seated in the terminal.

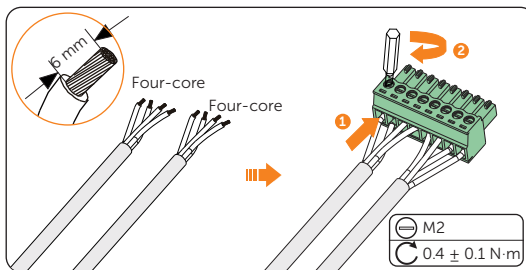


Figure 7-54 Connecting to 8-pin terminal block

- Step 5:** Connect the assembled communication cable into the COM 2 terminal. Lightly pull the cable backward to confirm tight insertion and then install the connector back.

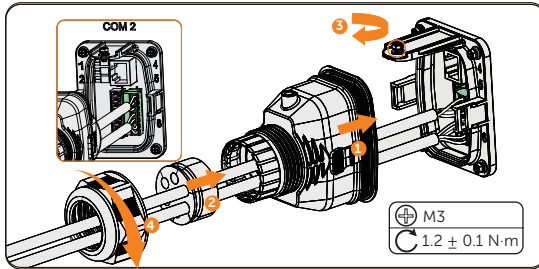


Figure 7-55 Connecting to the inverter



## 7.5 Battery Cabinet Electrical Connection

## 7.6 EPS Connection

Regarding the EPS connection, namely **Part b** in **Z**, please strictly follow the steps below.

### NOTICE!

- Take out the underground electrical wiring which is buried beneath the ground.
- Regarding the terminal requirements, please refer to “13.3 Requirements for OT/DT/OT Terminal”.

**Step 1:** Strip the five-core cable about 45 cm to 55 cm.  
Strip the cable jacket (for L1/L2/L3/N) about 20 mm to 30 mm.

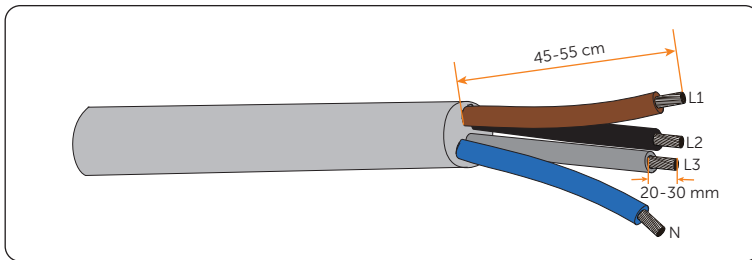


Figure 7-56 Striping cable jacket

### NOTICE!

- It's important to give the power cable a health check before stripping it.
- It's necessary to use controlled motion to strip the insulation down the wire, to prevent damage to the wires.
- Make sure that the insulation layer has been stripped to a sufficient length so that the center conductor is fully exposed without any damage or nicks. In addition, make sure that no extra insulation remains beyond the connector once it's crimped on.

**Step 2:** Cut the heat-shrink tubing (Ø15-20 mm) to about 50 mm to 60 mm long for L1/L2/L3/N wires;  
Carefully slide it onto the end of the cable, and then carefully slip the wires all the way into the copper terminals (Part D).

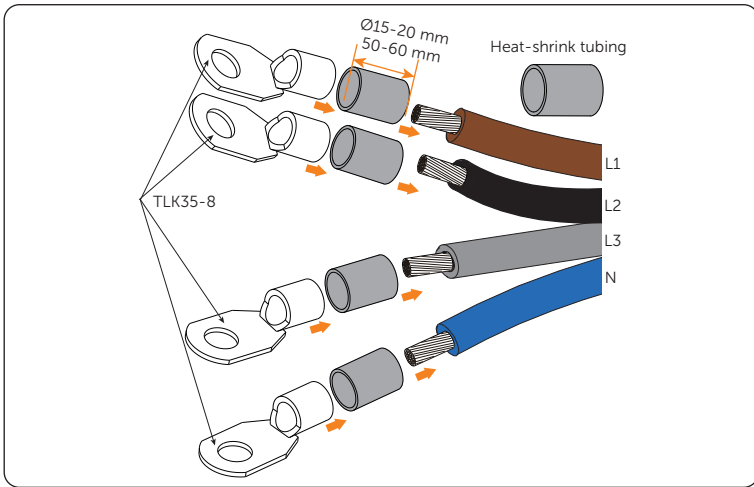


Figure 7-57 Cutting heat-shrink tubing

**Step 3:** Crimp the terminal using hydraulic wire crimper. Since the procedure for installing a terminal is same, the following steps take the L1 wire as an example.

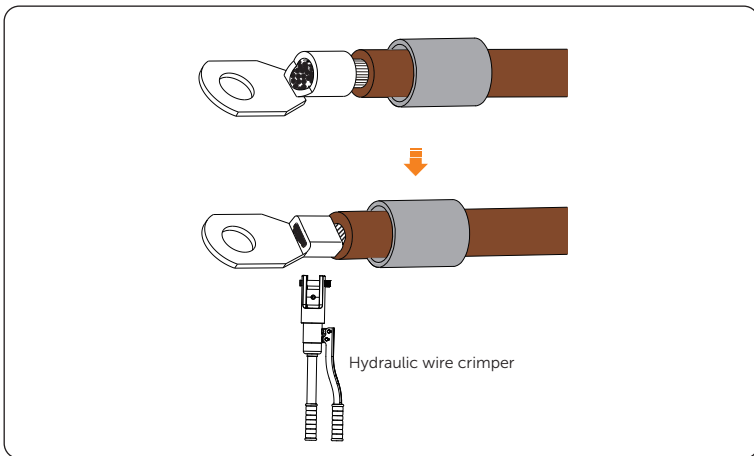


Figure 7-58 Crimping

**NOTICE!**

- Do not damage the conductor insulation while crimping.
- Do not place the conductor insulation into the terminal.

**Step 4:** Heat the heat-shrink tubing after it wraps the end of terminal.

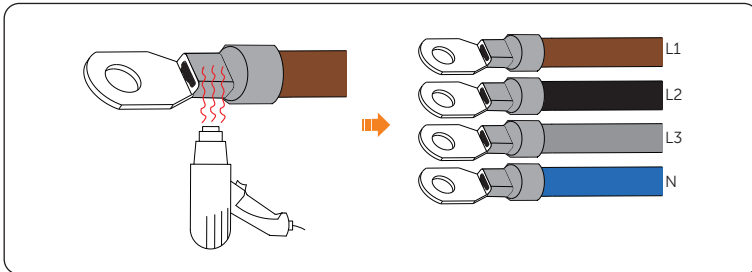


Figure 7-59 Heating

**NOTICE!**

- Move the heat gun back and forth slowly to distribute the heat evenly across the surface of heat shrink tubing.

**Step 5:** Unscrew M5 screws using cross screwdriver to remove the metal cable cover. There are a total of M5 screws (x 3);

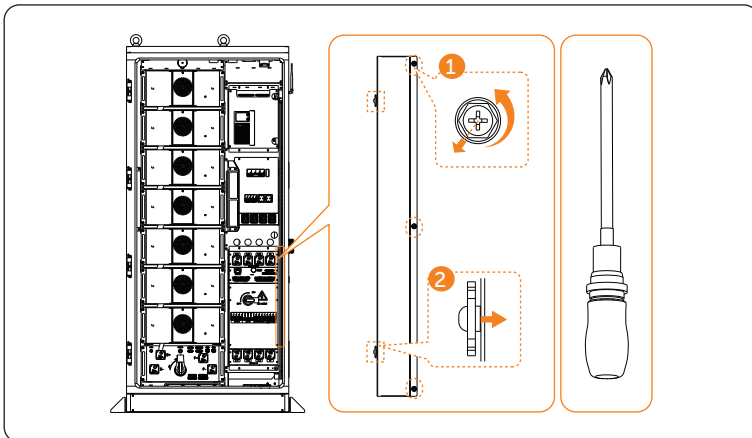


Figure 7-60 Unscrewing M5 screws

**Step 6:** Thread these wires through the metal cable cover, and tighten the M5 screws (torque:  $3 \pm 0.3$  N·m).

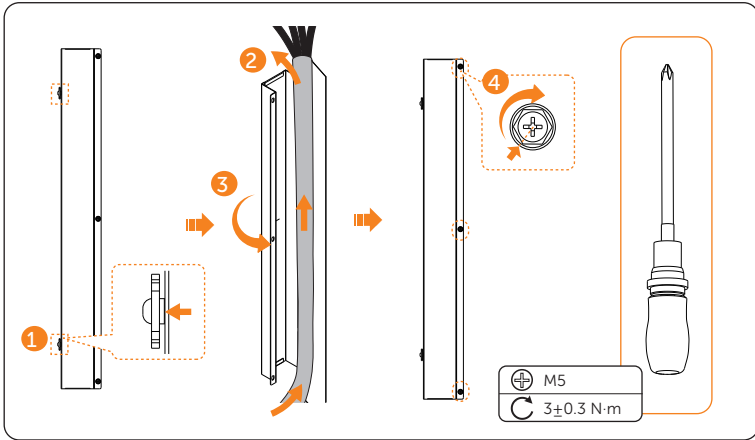


Figure 7-61 Threading wires

**Step 7:** Pull out terminal covers by pressing the buttons on both sides of the cover.

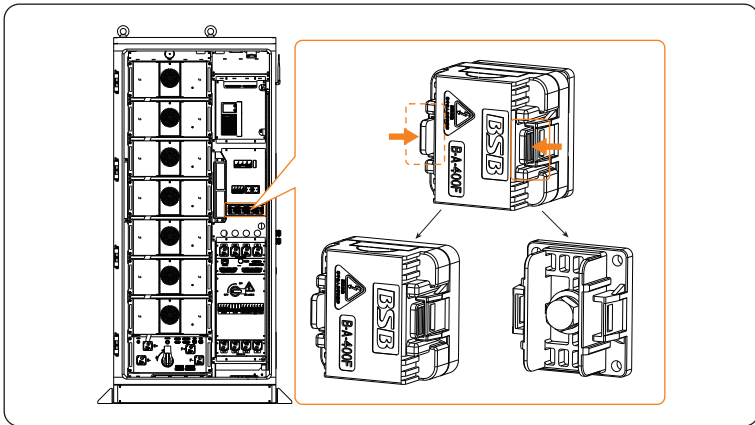


Figure 7-62 Pulling out covers

**NOTICE!**

- Please keep the covers properly.

**Step 8:** Unscrew the M8 screws using torque wrench, connect the assembled L1/L2/L3/N wires to the wire interface, and then tighten them (torque:  $12\pm 1$  N·m). There are a total of 4 pieces of M8 screws.

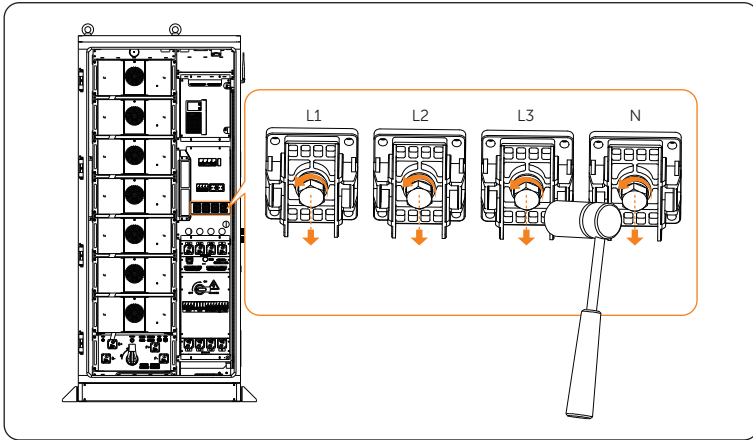


Figure 7-63 Unscrewing M8 screws

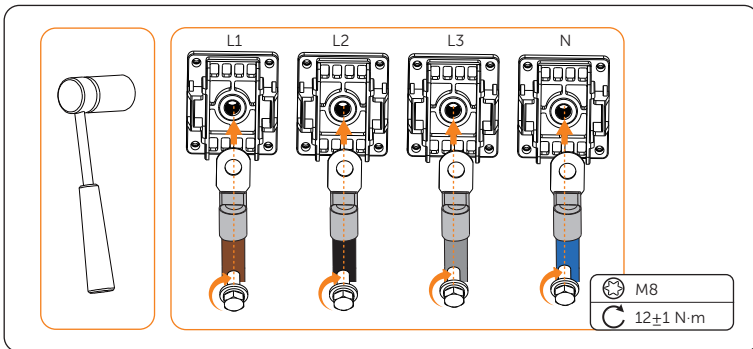


Figure 7-64 Tightening M8 screws

### NOTICE!

- Label on the cable must correspond to silk screen on the device.

**Step 9:** Reinstall the covers back after finishing wiring.

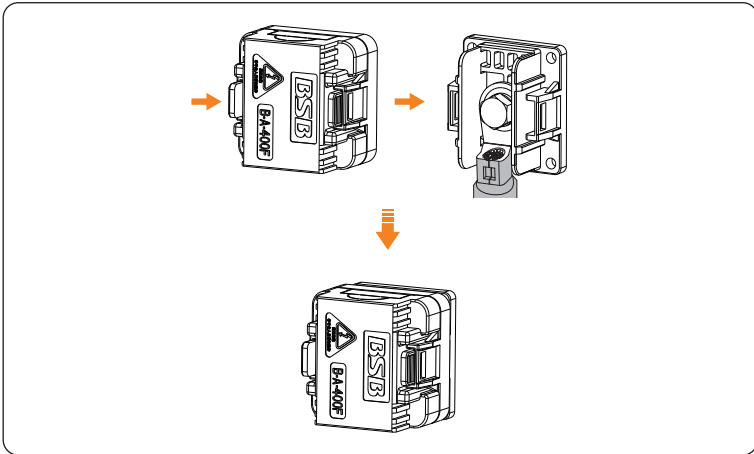


Figure 7-65 Reinstalling covers

## 7.7 Grid Connection

Regarding the grid connection, namely **Part c** in “Figure 7-1 Parts that need wiring”, please strictly follow the steps below.

### NOTICE!

- Regarding the terminal requirements, please refer to “13.3 Requirements for OT/DT/OT Terminal”.

- Step 1:** Strip the five-core cable about 35 cm to 45 cm;  
Strip the cable jacket (for L1/L2/L3/N) about 20 mm to 30 mm;  
Strip the PE cable jacket about 15 mm to 20 mm.

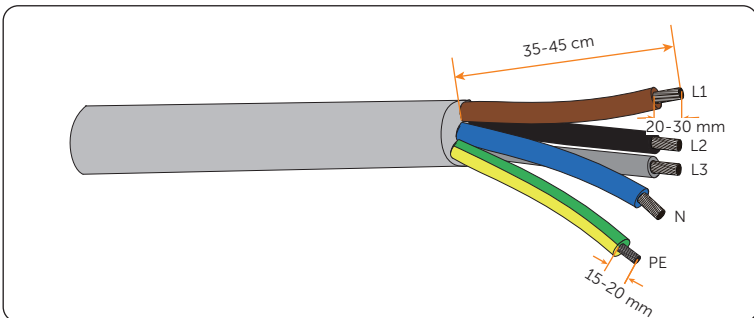


Figure 7-66 Striping cable jacket

## NOTICE!

- It's important to give the power cable a health check before stripping it.
- It's necessary to use controlled motion to strip the insulation down the wire, to prevent damage to the wires.
- Make sure that the insulation layer has been stripped to a sufficient length so that the center conductor is fully exposed without any damage or nicks. In addition, make sure that no extra insulation remains beyond the connector once it's crimped on.

**Step 2:** Cut the heat-shrink tubing ( $\text{Ø}17\text{-}25\text{ mm}$ ) to about 50 mm to 60 mm long for L1/L2/L3/N wires;  
Cut the heat-shrink tubing ( $\text{Ø}10\text{-}15\text{ mm}$ ) to about 30 mm to 40 mm long for PE wire;  
Carefully slide it onto the end of the cable, and then carefully slip the wires all the way into the copper terminals (Part E).

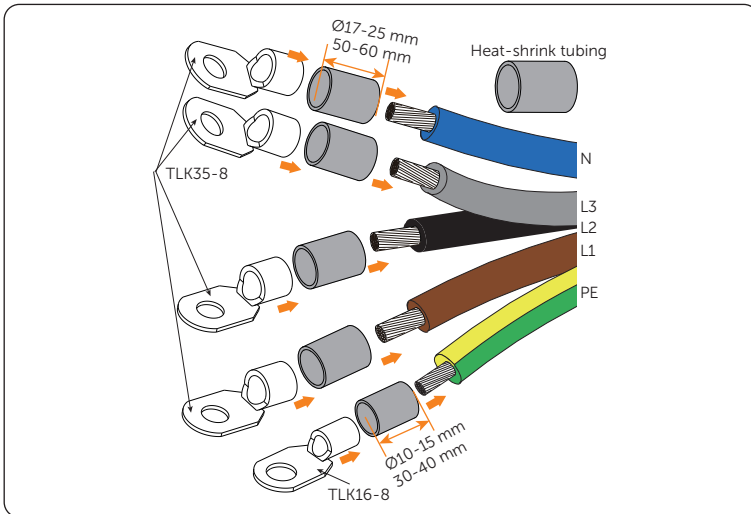


Figure 7-67 Cutting heat-shrink tubing

**Step 3:** Crimp the terminal using hydraulic wire crimper. Since the procedure for installing a terminal is same, the following steps take the L1 copper wire as an example.

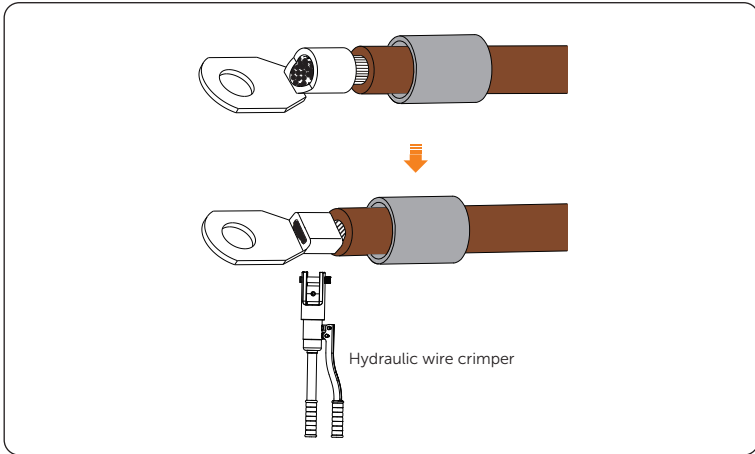


Figure 7-68 Crimping

**NOTICE!**

- Do not damage the conductor insulation while crimping.
- Do not place the conductor insulation into the terminal.

**Step 4:** Heat the heat-shrink tubing after it wraps the end of terminal.

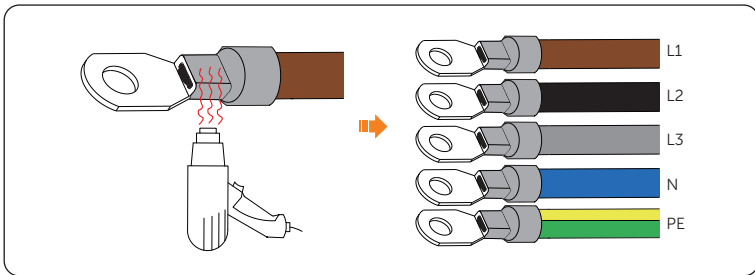


Figure 7-69 Heating

**NOTICE!**

- Move the heat gun back and forth slowly to distribute the heat evenly across the surface of heat shrink tubing.

**Step 5:** Pull out terminal covers by pressing the buttons on both sides of the cover.



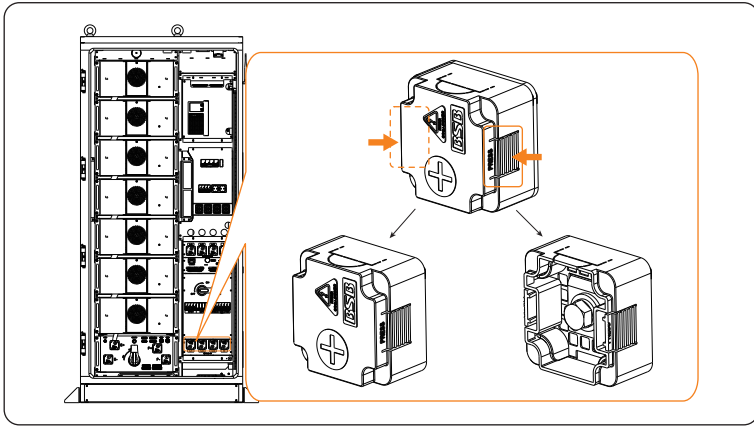


Figure 7-70 Pulling out covers

**NOTICE!**

- Please keep the covers properly.

**Step 6:** Unscrew the M8 screws using torque wrench, connect the assembled L1/L2/L3/N wires to the wire interface, and then tighten them (torque:  $12\pm 1$  N·m). There are a total of 4 pieces of M8 screws.

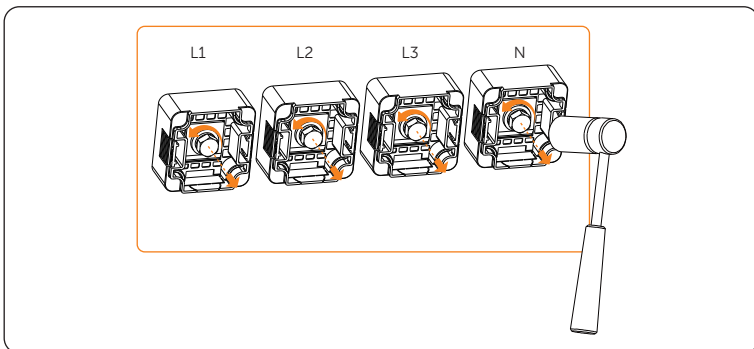


Figure 7-71 Unscrewing M8 screws

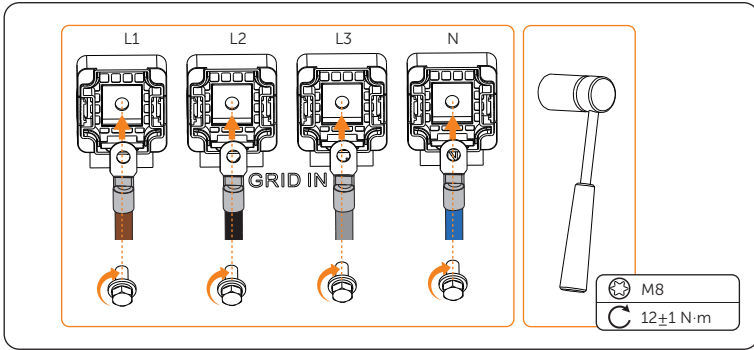


Figure 7-72 Tightening M8 screws

**Step 7:** Reinstall the terminal covers on L1/L2/L3/N ports.

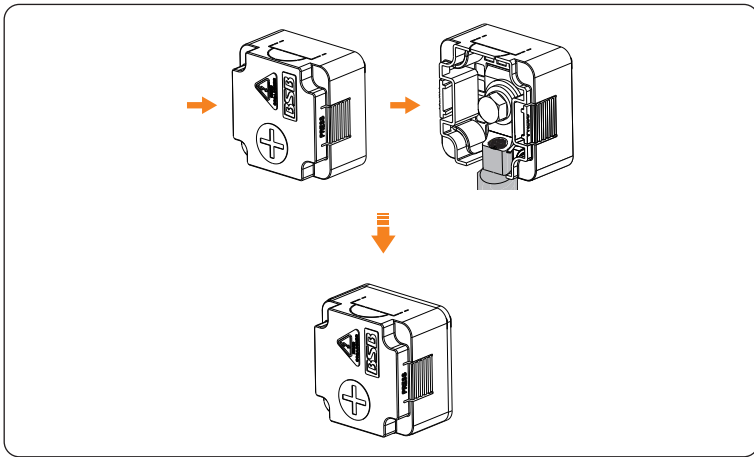


Figure 7-73 Reinstalling terminal cover

**Step 8:** Unscrew M8 screw using torque wrench, connect the assembled PE wire to the copper bar, and then tighten it (torque:  $12\pm 1$  N·m).

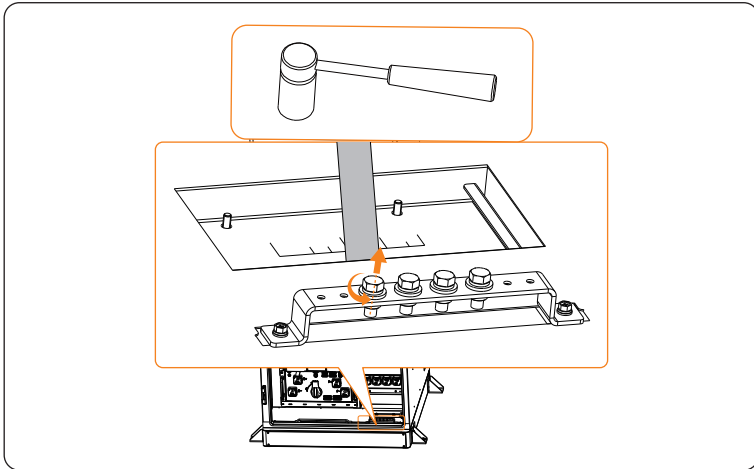


Figure 7-74 Unscrewing M8 screws

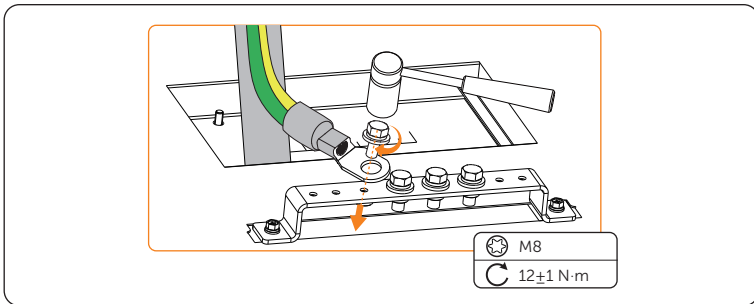


Figure 7-75 Tightening M8 screws

### NOTICE!

- There are four common grounding points in the copper bar. Any one of these point can be selected.

**Step 9:** Lay the fireproof mud (Part C) to plug of the hole.

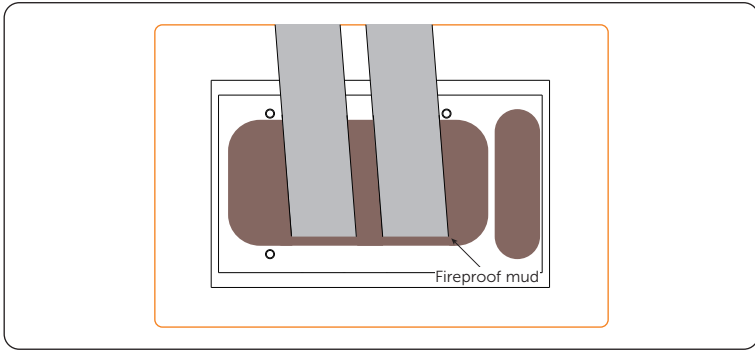


Figure 7-76 Laying fireproof mud

**NOTICE!**

**Notice for fireproofing mud:**

- Take out the fireproof mud delivered with the cabinet and knead it into a ball shape. In the case of the low temperature, place it into warm water, of which the temperature range is between 40°C and 70 °C, with its package until it is soft.
- Clean the area around the cable threading hole before sealing it.
- The fireproof mud should be evenly spread, embedded, or filled in the cable threading hole. If such a hole is too large, a fireproofing board can be placed to enhance fire protection before using the mud.
- The fireproof mud needs to be cured after sealing the cable threading hole. Prevent water from entering and colliding during curing.

## 7.8 Installation Procedure for Cable Cover

### NOTICE!

- Do not install the cable cover until the all the cables are wired.

**Step 1:** Tighten M6 screws to secure the cable cover, with a total of 4 screws (torque:  $5 \pm 0.5$  N·m).

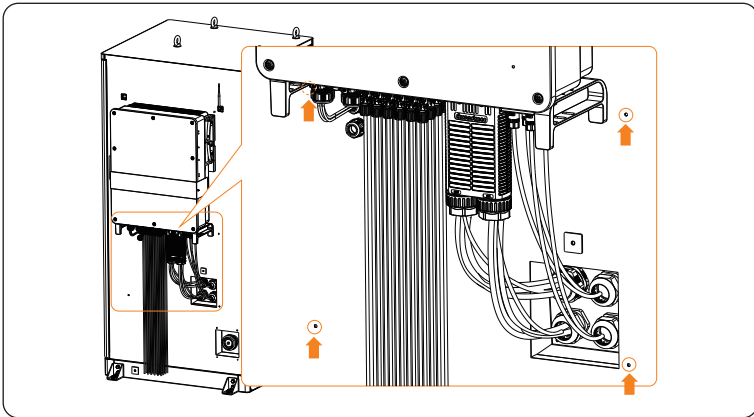


Figure 7-77 Hole location

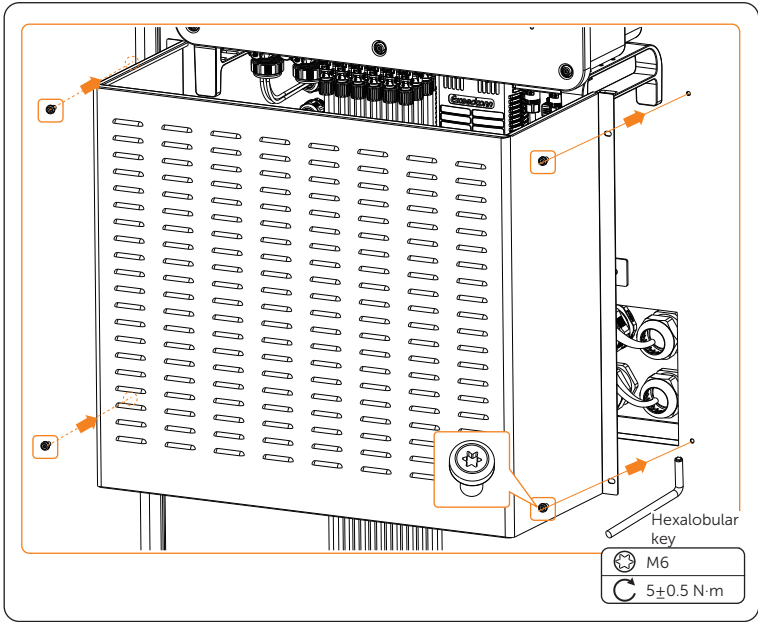


Figure 7-78 Tightening screws

# 8 System Commissioning

## 8.1 Checking before Power-on

Ensure that all the cables connecting to the EPS and distribution box (grid side) are wired and securely fastened. For details, please refer to the following Table 8-1 and Table 8-2.

Table 8-1 Battery Cabinet Checklist

No.	Item	Description
1	Equipment appearance	<ul style="list-style-type: none"> <li>• Check the equipment is in good condition, with a clean, non-peeling paint, and rust-free surface.</li> <li>• Ensure that the labels on the equipment are clear and easy to read. If it is damaged, the label shall be replaced at once.</li> </ul>
2	Cable appearance	<ul style="list-style-type: none"> <li>• Check that the cable jacket is in good condition.</li> <li>• Check that the protective pipes are in good condition.</li> </ul>
3	Cable connection	<ul style="list-style-type: none"> <li>• Check that the cable connection position is consistent with the design principles.</li> <li>• Ensure that the procedure for crimping terminals strictly observe the requirements, and the terminals are securely fastened.</li> <li>• Check that the labels on the both sides of cables are clear, and the direction of both labels is the same.</li> </ul>
4	Wiring	<ul style="list-style-type: none"> <li>• Ensure that the wiring procedure is consistent with the principle of separation of strong and weak electricity.</li> <li>• Ensure that the cables are neatly places.</li> <li>• Leave a little extra length for adjustments.</li> <li>• Keep cables tidy in the cabinet.</li> </ul>
5	Copper bars in the battery pack	<ul style="list-style-type: none"> <li>• Check to make sure the copper bars are not deformed.</li> </ul>
6	Button/Switch	<ul style="list-style-type: none"> <li>• Check the distribution box's switch is "OFF".</li> <li>• Check the battery packs' switches are "OFF".</li> </ul>

Table 8-1 Inverter Checklist

No.	Item	Checking details
1	Installation	<p>The inverter is installed correctly and securely.            The battery is installed correctly and securely.            Other device (if any) is installed correctly and securely.</p>
2	Wiring	<p>All DC, AC cables and communication cables are connected correctly and securely;            The meter/CT is connected correctly and securely.            The ground cable is connected correctly and securely;</p>

3	Breaker	All the DC breakers and AC breakers are OFF;
4	Connector	The external AC and DC connectors are connected; The connectors on the Grid and EPS terminal are connected correctly and securely.
5	Unused terminal	Unused terminals and ports are locked by waterproof caps.
6	Photovoltaic panel	All photovoltaic panels are connected correctly and securely.
7	Screw	All the screws are tightened.

## 8.2 Powering on the System

Regarding the detailed location of the modules in the cabinet, please refer to ["Figure 2-6 Parts description \(in the opened state\)"](#).

**Step 1:** Rotate the switch on the distribution box 90° counter-clockwise to "ON".

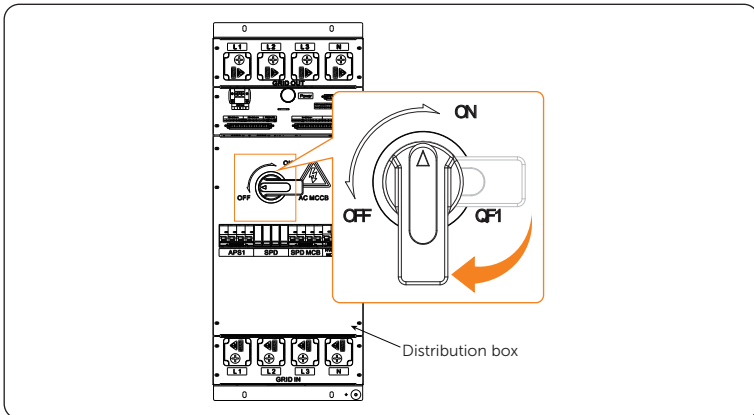


Figure 8-1 Rotating switch

**Step 2:** Flip up breakers on the distribution box orderly, with correct order of "auxiliary power breaker of high-voltage box (APS1)", "lightning protection breaker (SPD MCB)", "air conditioner/liquid cooling unit on/off breaker (HVAC MCB)", and "reserve breaker (RES)".



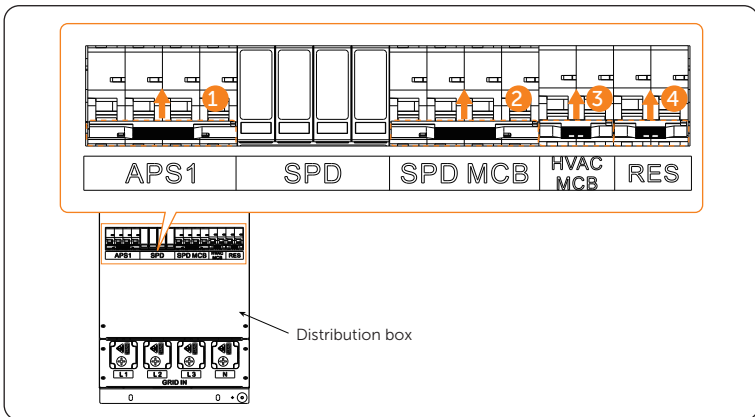


Figure 8-2 Flipping up breakers

**Step 3:** Flip up breakers on the EPS orderly, with correct order of "breaker for maintenance (APS2)" and "UPS breaker (UPS)", and insert the plugs of UPS into the sockets (XS1, XS2).

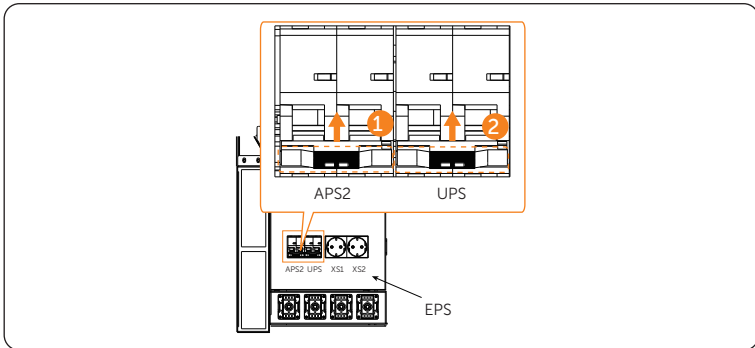


Figure 8-3 Flipping up breakers

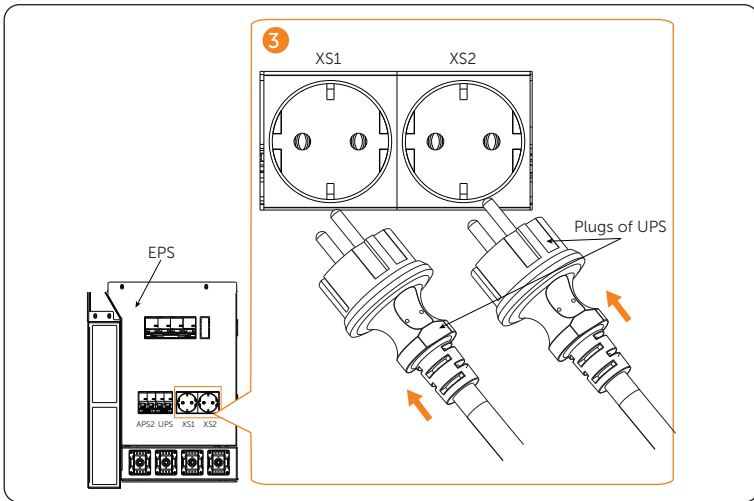


Figure 8-4 Inserting plugs

**Step 4:** The startup sound on boot will be heard when holding and pressing the "Power on/off" button to start the UPS.

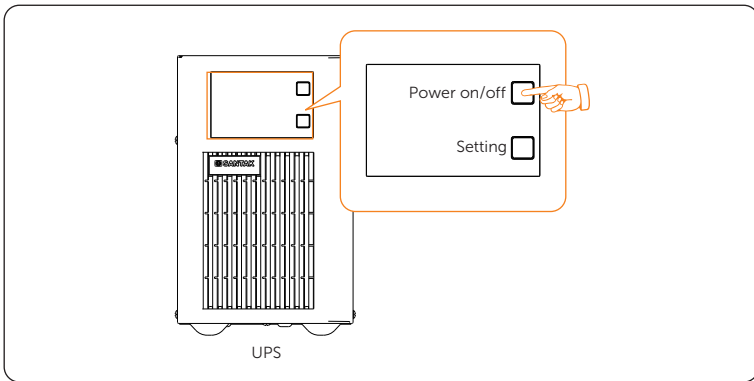


Figure 8-5 Holding and pressing "ON" button

**Step 5:** Rotate the disconnector of the high-voltage box to "ON", and gently press the power button. At the point, the LED light will come on green.

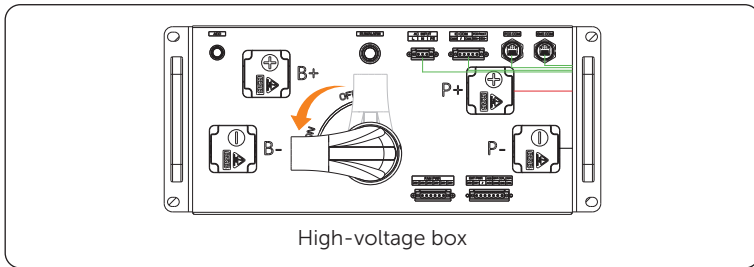


Figure 8-6 Rotating the disconnector

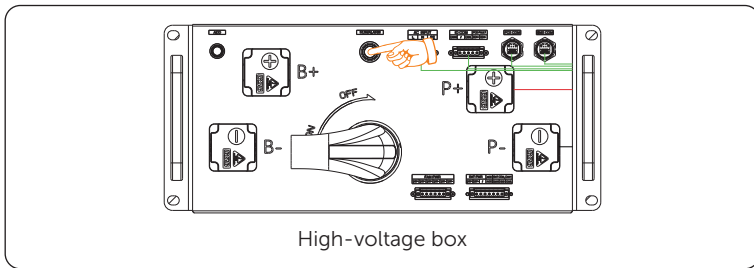


Figure 8-7 Pressing power button

**Step 6:** Flip up EPS breaker.

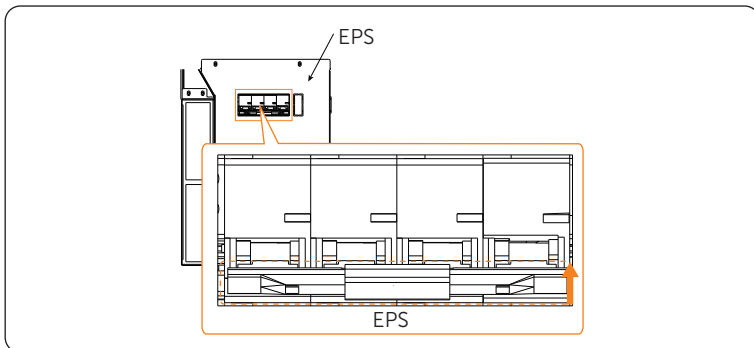


Figure 8-8 Flipping up breaker

**Step 7:** Start the inverter.

- a. Turn on the AC breakers and check whether the LCD screen lights on.
  - » If the LCD screen is not on, turn off the AC breakers and check whether the Grid cable is connected correctly and securely.
- b. Switch on the inverter DC switch and check the LCD screen, refer to "PV status" to check the PV voltage.

- » If the PV voltage is 0, turn off the DC switch, pull out the PV connectors and then measure the voltage of the positive and negative PV port (in MPPT voltage range 160-950 V) or check whether the positive and negative poles of PV cables are reversed.
- c. Switch on the battery or the breaker, button, DC switch of the battery. (see documentation of the battery manufacturer)
- d. Press and turn on the inverter system button.
- e. Set "System ON/OFF" as ON status on the inverter screen, and the LCD displays waiting status.
- f. When the photovoltaic panels generate enough power or the battery supplies power, the inverter will start automatically. The inverter will go Waiting, Checking and Normal status in sequence.
- g. Check whether the meter/CT is correctly connected.
  - » If CT is connected, please perform the Meter/CT Check to check the correct connection through the setting path: **Menu>Setting>Advance Setting>Meter/CT Settings>Meter/CT Check**
  - » If meter is connected, please set the connection of Meter through the setting path: **Menu>Setting>Advance Setting>Meter/CT Settings.**

**NOTICE!**

- When the meter or CT is correctly connected, the meter/CT power displays on the METER/CT check interface; when the connection method is wrong, "Meter Fault" displays on this interface.

**Step 8:** Close the door after the equipment has been started.

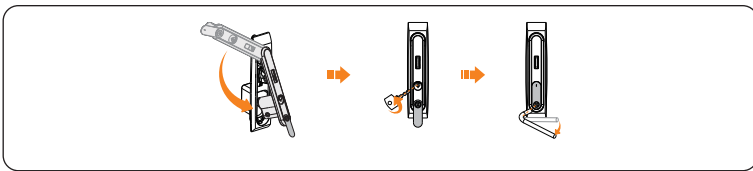


Figure 8-9 Closing the door

**NOTICE!**

- Please properly keep the key.

### 8.3 Checking after Power-on

- a. Check whether the system has any abnormal noise.
- b. Check whether the indicator lights report an error and whether the LCD screen displays the error message.
- c. Check whether the data of PV, grid and battery are normal through the LCD screen.
- d. Check whether the Work Mode is consistent with what had been set through LCD screen or the SolaX Cloud App.

# 9 Operation on LCD

## 9.1 Introduction of Control Panel

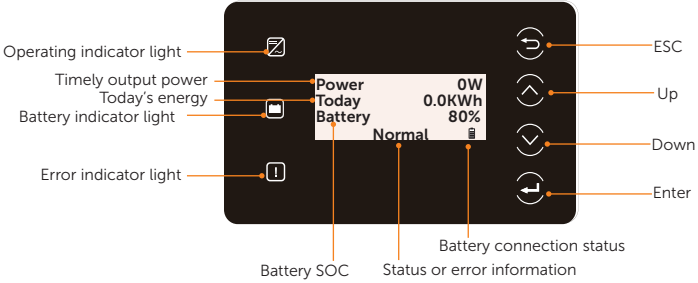






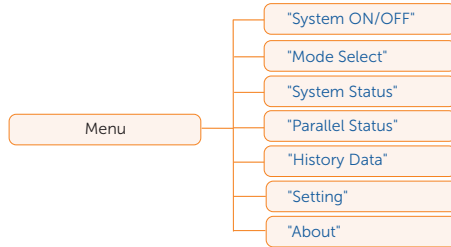
Figure 9-1 Control Panel

- In a normal state, the "Power", "Today" and "Battery" information will be displayed. You can press the keys to switch information.
- In an error state, the fault message and error code will be displayed, please refer to "10.2 Troubleshooting" for corresponding solutions.

Table 9-2 Definition of keys

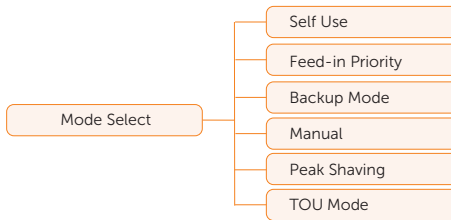
Key	Definition
 ESC key	Exit from the current interface or function
 Up key	Move the cursor to the upper part or increase the value
 Down key	Move the cursor to the lower part or decrease the value
 Enter key	Confirm the selection

## 9.2 Introduction of Menu Interface

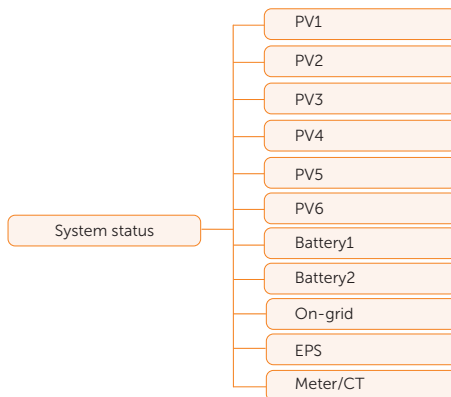


There are seven submenus in the menu that can be selected for relevant setting operations.

- **System ON/OFF:** Switch on and off the inverter.
- **Mode Select:** Select the working mode of the inverter, including **Self Use, Feed-in Priority, Backup Mode, Manual, Peaking Shaving** and **TOU Mode**.

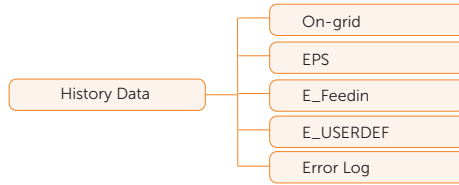


- **System Status:** Display the real-time value of PV, battery, etc. Including **PV1, PV2, PV3, PV4, PV5, PV6, Battery 1, Battery 2, On-grid, EPS** and **Meter/CT**.

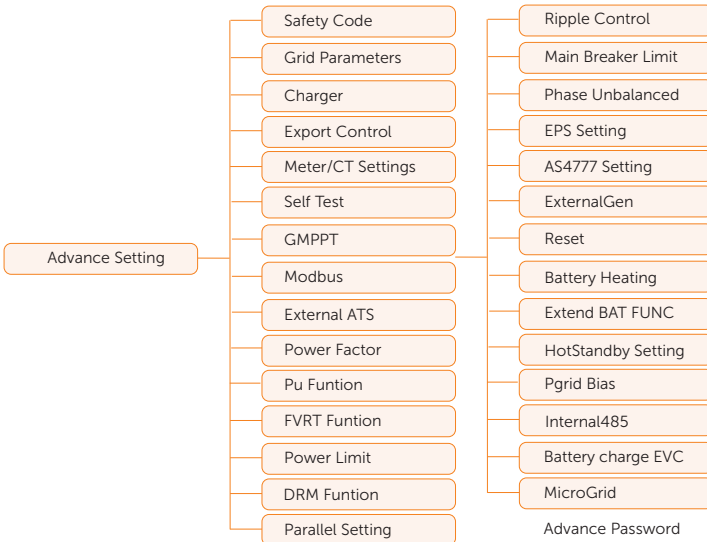
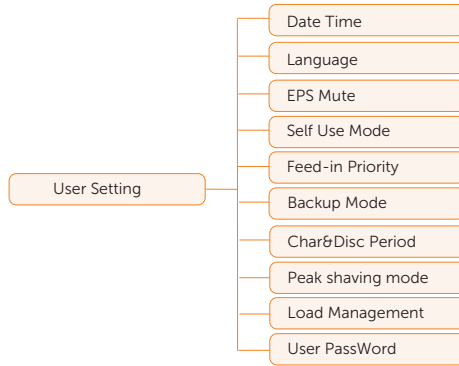


- **Parallel Status:** Display all the status data from master inverter when the inverters are parallel-connected.
- **History Data:** Display the history data of **On-grid, EPS, E\_Feedin, E\_USERDEF**

and **Error Log**.

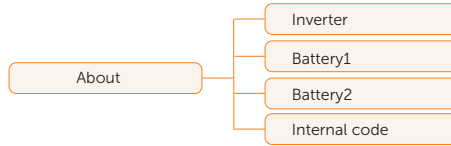


- **Setting:** Set the parameters of inverter, including **User Setting** and **Advance Setting**.





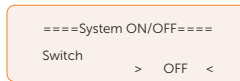
- **About:** Display the information about **Inverter**, **Battery 1**, **Battery 2** and **Internal code**.



## 9.3 System ON/OFF

Setting path: **Menu>System ON/OFF**

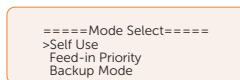
Select **ON** or **OFF** to switch on and off the inverter. The interface is displayed **ON** by default. When you select **OFF**, the inverter stops running and display **System OFF**.



## 9.4 Mode Select

Selecting path: **Menu>Mode Select**

Here you can only select the working mode. Six working modes are available for you to choose in on-grid status, i.e Self-use mode, Feedin Priority, Backup, Peak shaving mode, TOU Mode and Manual. You can choose the working modes according to your lifestyle and environment. Please refer "9.8.1 User Setting" for specific setting of each mode.



### 9.4.1 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.

### 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.

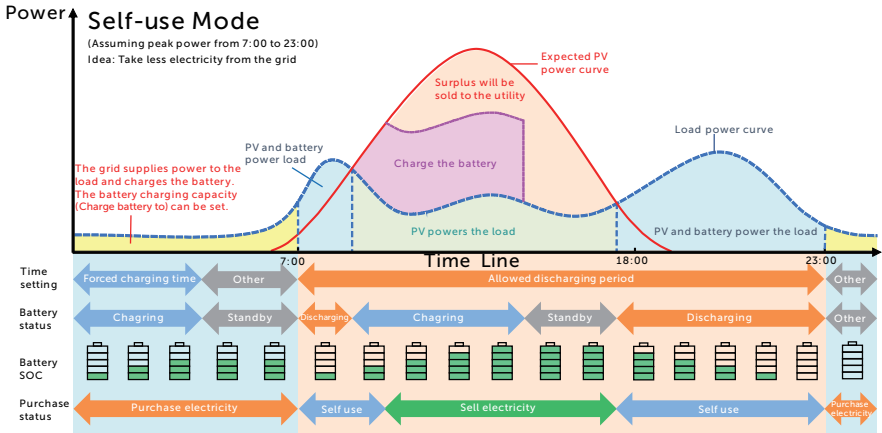


Figure 9-2 Self-use mode

Table 9-3 Description of self-use mode

Time period	Inverter working status
Forced charging period	<ul style="list-style-type: none"> <li>Charge the battery firstly until the battery SOC reaches the specified <b>Charge battery to</b> value. You can configure the inverter to either draw power from the grid or not.</li> </ul>
Allowed discharging period	<p>PV is sufficient                      (PV → load → battery → grid)</p> <ul style="list-style-type: none"> <li>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.</li> </ul> <p>PV is insufficient                      (PV+battery → load)</p> <ul style="list-style-type: none"> <li>The battery discharges power to the load, and once its capacity reaches <b>Min SOC</b>, it automatically ceases discharging.</li> </ul>

**Note:**

**Charge battery to:** The battery SOC charged from grid. 30% 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 until 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 discharging 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.

### 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.

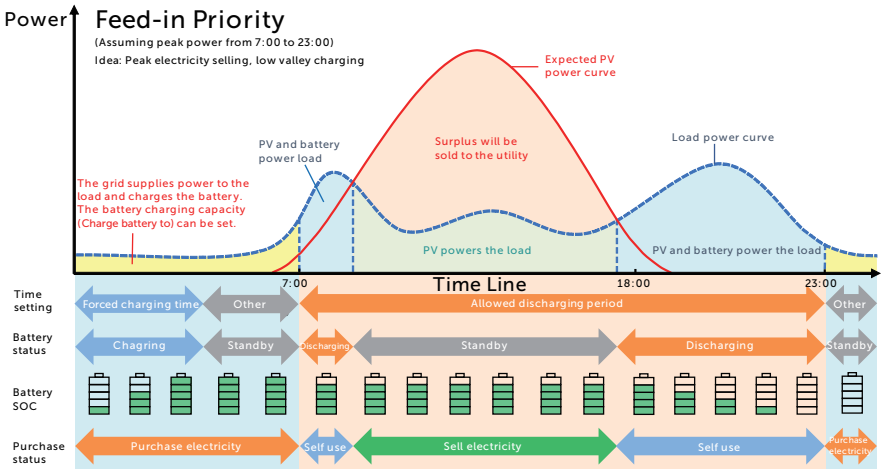


Figure 9-3 Feed-in priority

Table 9-4 Description of feed-in priority

Time period	Inverter working status
Forced charging period	<ul style="list-style-type: none"> <li>Charge the battery firstly until the battery SOC reaches the specified <b>Charge battery to</b> value. You can configure the inverter to either draw power from the grid or not.</li> </ul>
Allowed discharging period	<p>PV is sufficient (PV → load → grid)</p> <ul style="list-style-type: none"> <li>The power generated from PV is directed towards supplying the loads. Any excess power beyond the load requirements will be fed into the grid,</li> </ul> <p>PV is insufficient (PV+battery → load)</p> <ul style="list-style-type: none"> <li>PV and battery supply power to the load at the same time, and once the battery capacity reaches <b>Min SOC</b>, it automatically ceases discharging.</li> </ul>

**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 settable 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.

### 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.

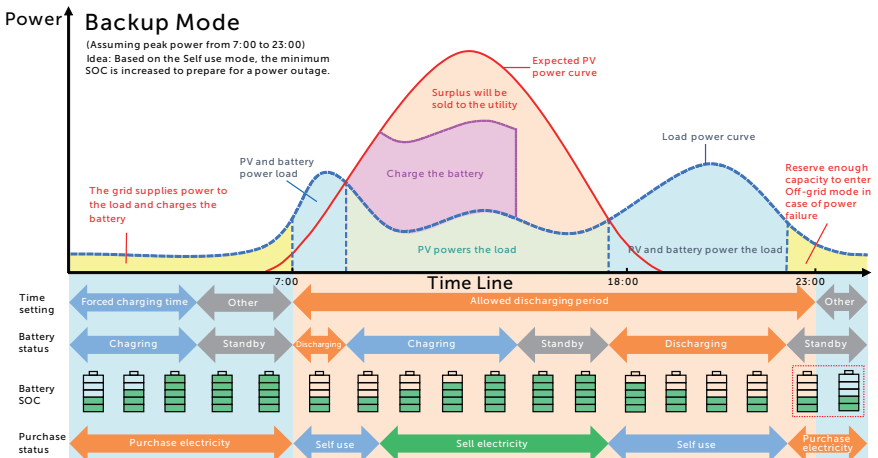


Figure 9-4 Backup mode

Table 9-5 Description of backup mode

Time period	Inverter working status
Forced charging period	<ul style="list-style-type: none"> <li>Charge the battery firstly until the battery SOC reaches the specified <b>Charge battery to</b> value. You can configure the inverter to either draw power from the grid or not.</li> </ul>
Allowed discharging period	<ul style="list-style-type: none"> <li>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 <b>Min SOC</b> (on-grid min SOC). In the event of a grid outage, it will switch to EPS mode until the battery discharges to <b>Min SOC</b> (Off-grid min SOC).</li> </ul>

**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.

**Peak shaving mode**

Peak shaving mode is set for levelling 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.

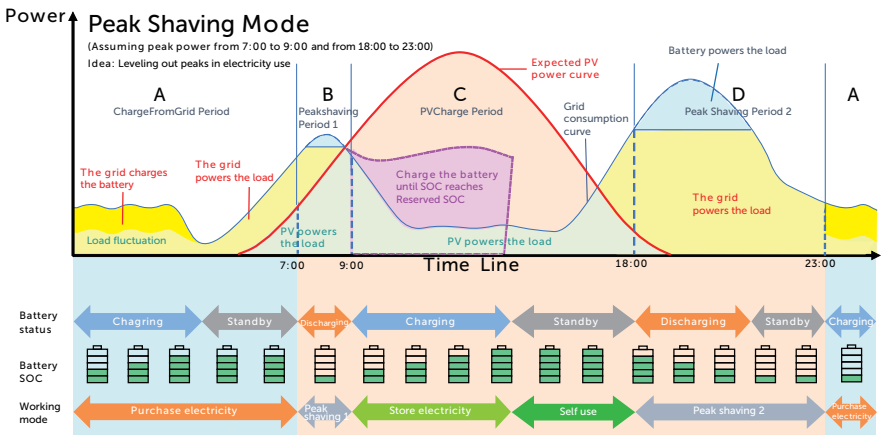


Figure 9-5 Peakshaving mode

Table 9-6 Description of peakshaving mode

Time Period	Inverter working status
Period A	<ul style="list-style-type: none"> <li>The grid can charge the battery to <b>MaxSOC</b> within the set <b>ChargePowerLimits</b>. In this period, the battery will not discharge power.</li> </ul>

Time Period	Inverter working status
Period B & D	Grid consumption power < <b>PeakLimits</b> (PV+grid → load) <ul style="list-style-type: none"> <li>The PV and grid will power the load. The battery will not charge or discharge power.</li> </ul>
	Grid consumption power > <b>PeakLimits</b> (PV + battery+grid → load) <ul style="list-style-type: none"> <li>The battery will discharge energy for loads and thus reduce the amount of energy purchased from the grid.</li> </ul>
Period C	(PV → battery → load → grid) <ul style="list-style-type: none"> <li>The battery does not discharge power. The PV charges the battery up to the <b>Reserved SOC</b> before supplying power to the loads. Any excess power beyond the load requirements is fed into the grid.</li> </ul>

**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%.

## TOU mode

In the TOU mode, different working modes, i.e Self-use, Charging, Discharging, Peaking shaving and Battery off can be set for different time periods in accordance with actual needs and environment conditions through SolaX Cloud 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 / Charging / Discharging / Battery off / Peaking shaving

---

### 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.

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".

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.

Battery off: The battery neither charges nor discharges. The power of PV will supply to loads or the grid. Only when the battery SOC is lower than the system (TOU) **Min SOC**, the battery can be charged.



**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.

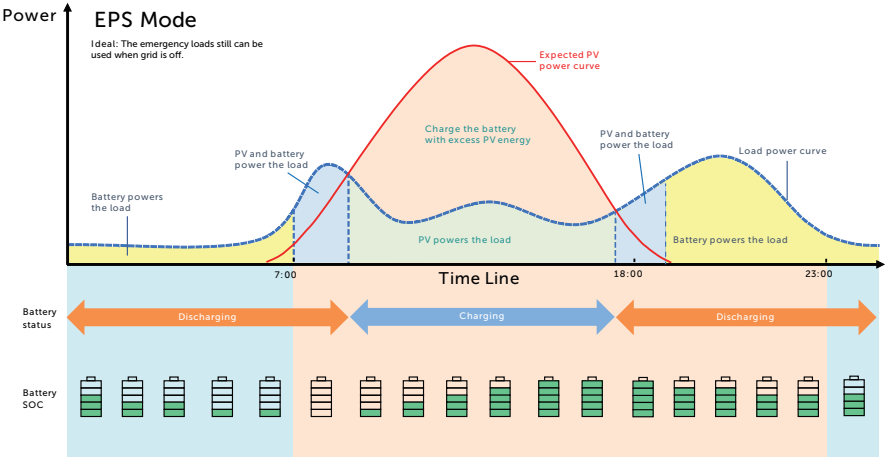


Figure 9-6 EPS mode

Table 9-7 Description of EPS mode

Battery SOC	Inverter working status
Battery SOC >Min SOC (off-grid min SOC)	PV is sufficient (PV → load → battery)
	<ul style="list-style-type: none"> <li>The PV prioritizes supplying power to the load, with any excess energy being directed towards charging the battery.</li> </ul>
Battery SOC ≤Min SOC (off-grid min SOC)	PV is insufficient (PV+battery → load)
	<ul style="list-style-type: none"> <li>The PV prioritizes supplying power to the load. If the energy is not enough, the battery will discharge power until the battery SOC reaches <b>Min SOC</b> and then error of <b>BatPowerLow</b> will be reported.</li> </ul>
Battery SOC ≤Min SOC (off-grid min SOC)	The inverter reports <b>BatPowerLow</b> . When there is PV, it will charge the battery first. After charging to the set <b>Min ESC SOC</b> 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%.

### 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.

### 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)

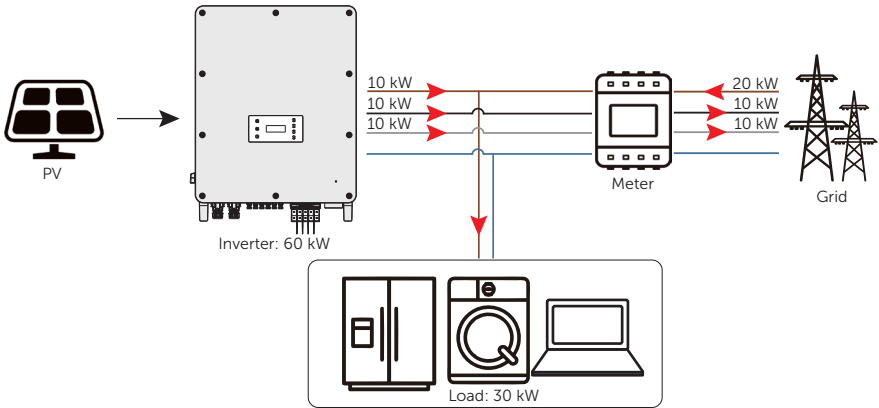


Figure 9-7 Zero export control with **Phase Unbalance** disabled

#### NOTICE!

- The power taken from the grid is equal to the power fed into the grid.

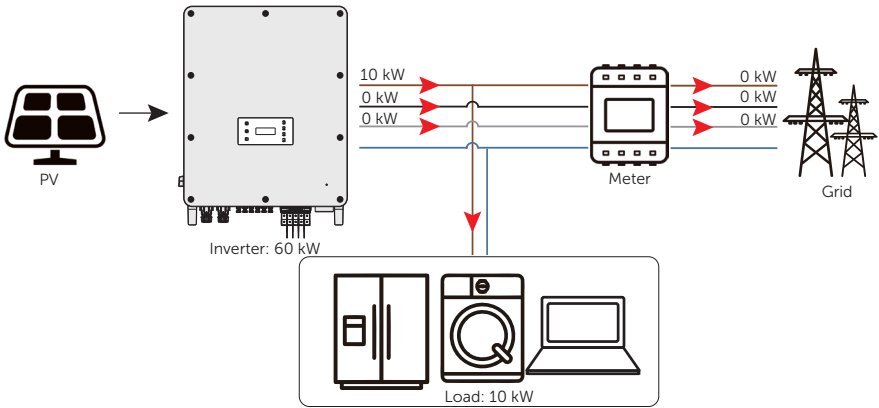


Figure 9-8 Zero export control with **Phase Unbalance** enabled

**Note:**

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

For how to set the **Export Control** function, please refer to "[Setting Export Control](#)".

## 9.5 System Status

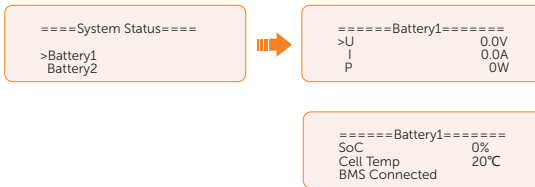
Displaying path: **Menu>System Status**

After entering into the **System Status** interface, the status of PV, Battery, On-grid, EPS, Meter/CT will be displayed on the LCD as follows:

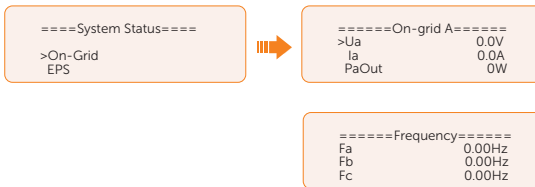
- PV status: You can see information of **PV1, PV2, PV3, PV4, PV5** and **PV6**. Information contains input voltage, current and power of each PV. For 50 kW inverter, the value in one string of PV is 0.



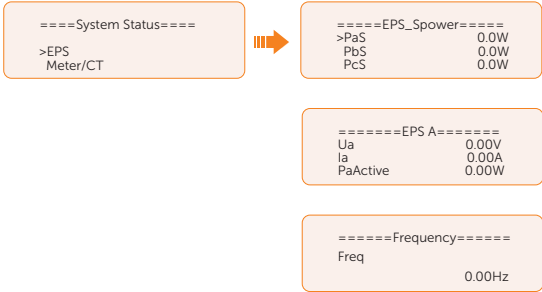
- Battery status: There will be information of **Battery1** and **Battery2** displayed here. It shows the status of each battery terminal, including the voltage, current, power, SOC, temperature and BMS connection status. "+" with current and power means charging; "-" means discharging.



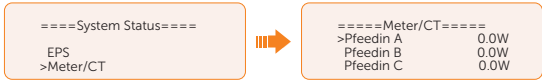
- On-grid status: Information contains the voltage, current, frequency, and output power of **Grid** terminal. The "A", "B" and "C" in On-grid A, On-grid B and On-grid C refers to L1, L2 and L3 respectively. The figure below will take On-grid A as an example.



- EPS status: Information contains apparent power, voltage, current, active power and frequency of **EPS** terminal when it is disconnected from the grid. The "A", "B" and "C" in EPS A, EPS B and EPS C refers to L1, L2 and L3 respectively. The figure below will take EPS A as an example.



- Meter/CT status: Information contains feed-in power of L1, L2 and L3 detected by the connected meter or CT.



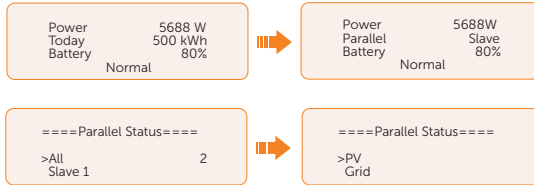
## 9.6 Parallel Status

Displaying path: **Menu>Parallel Status**

### NOTICE!

- Once inverter enters parallel system, the **Today** yield will be replaced by **Parallel**.

In **Parallel Status** interface, the whole system power and individual slave inverter power can be obtained in **Parallel Status** interface of master inverter. The number displayed in the **Parallel Status** interface refers to the total number of online inverters, for example two inverters in parallel in the below figure.

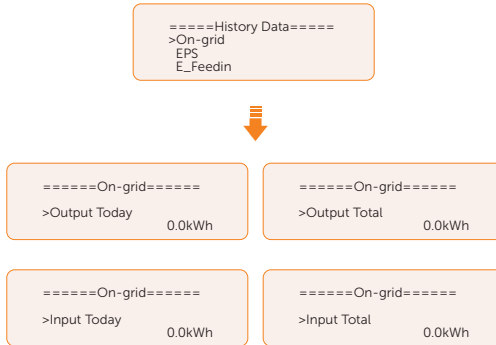


## 9.7 History Data

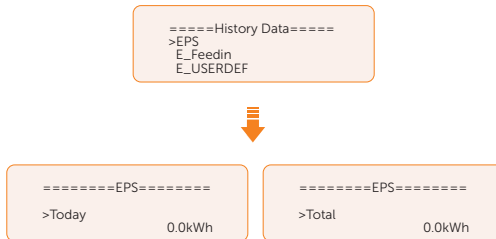
Displaying path: **Menu>History Data**

After entering into the **History Data** interface, the status of **On-grid**, **EPS**, **E\_Feedin**, **E\_USERDEF**, **Error Log** will be displayed on the LCD as follows:

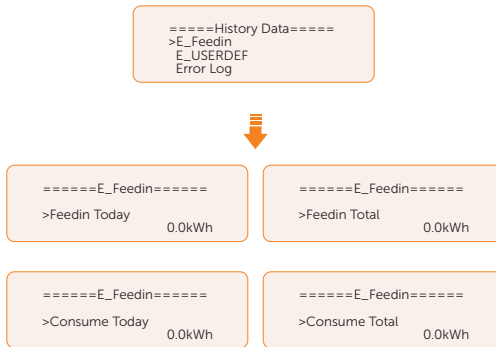
- **On-grid**: A record of the output and input electric energy of inverter from grid today and the total. (through **Grid** terminal)
  - » **Output Today**: Output electric energy of inverter today.
  - » **Output Total**: Total output electric energy since the inverter activated for the first time.
  - » **Input Today**: Input electric energy of inverter today.
  - » **Input Total**: Total input electric energy since the inverter activated for the first time.



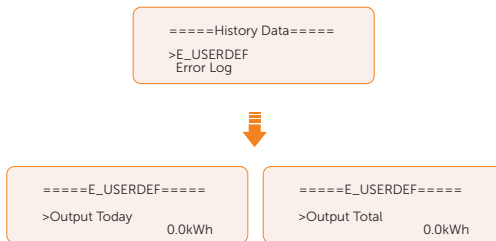
- **EPS:** A record of the output electric energy of the inverter today and the total when it is disconnected from grid. (through EPS terminal)



- **E\_Feedin:** The total electricity fed into or taken from the grid since the inverter activated for the first time and on that day. (detected by Meter/CT)
  - » **Feedin Today:** Electricity sold to grid today.
  - » **Feedin Total:** Total electricity sold to grid since the inverter activated for the first time.
  - » **Consume Today:** Electricity bought from grid today.
  - » **Consume Total:** Total electricity bought from grid since the inverter activated for the first time.



- **E\_USERDEF:** The output electricity of the connected on-grid inverter totay and the total.(detected by Meter 2) This function is only available when meter 2 is connected.



- **Error Log:** Display the recent six error messages. Information contains date and time error happened, error code and error description.





## 9.8 Setting

Settings includes User Settings and Advanced Settings.

### 9.8.1 User Setting

Setting path: **Menu>Setting ("0 0 0 0")>User Setting**

#### NOTICE!

The default password for **User Setting** is "0 0 0 0".

### Setting Date & Time

You can set the current date and time of the installation site.

The display format is "2023-06-16 14:00", in which the first four numbers represent the year (e.g. 2000~2099); the fifth and sixth numbers represent the month (e.g. 01~12); the seventh and the eighth numbers represent the date (e.g. 01~31). The remaining numbers represent the time.



### Setting Language

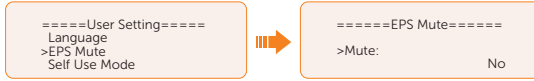
This inverter provides multiple languages for customers to choose, such as English, Deutsch, Francais, Polskie, Espanol, Português. The default language is English.



### Setting EPS Mute

When the inverter is running in EPS Mode, you can choose whether the buzzer is turned on or not.

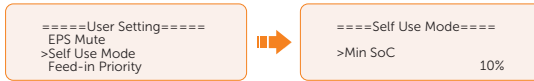
- Select **Yes**, the buzzer mutes.
- Select **NO**, the buzzer will sound once every 4 seconds if the battery SOC is > EPS min. SOC. When the battery SOC is equal to EPS min SOC, the buzzer will sound with higher frequency at every 400 ms. And turn off the sound when the battery SOC is < EPS min SOC. This function is turned off by default.



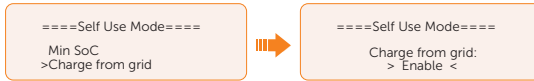
### Setting Self Use Mode

Please refer to "Self-use Mode" for working logic of this mode.

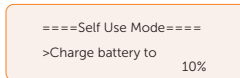
- **Min SOC:** Default: 10%; range: 10%~100%
  - » The minimum SOC of the battery. The battery will not discharge power when the SOC of the battery reaches this value.



- **Charge from grid:**
  - » You can set whether the power can be taken from the grid to charge the battery. When **Charge from grid** is set to **Enable**, the utility power is allowed to charge the battery; when it is set to **Disable**, the utility power is not allowed to charge the battery.



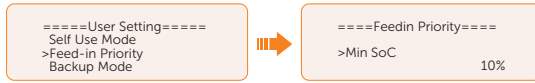
- **Charge battery to:** Default: 10%; range: 10%~100%
  - » Set the SOC to charge the battery from grid (applicable only when the **Charge from grid** is enabled).
  - » You can set your own target value, i.e. during the forced charging period, the inverter will use both PV & GRID energy to charge the battery SOC to the target SOC value, after the battery SOC meets the target value, if the PV energy is still sufficient (enough for load and there is excess power), the inverter will continue to use PV energy to charge the battery.



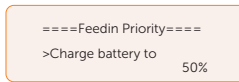
### Setting Feed-in Priority

Please refer to "Feed-in Priority" for working logic of this mode.

- **Min SOC:** Default: 10%; range: 10%~100%
  - » The minimum SOC of the battery. The battery will not discharge power when the SOC of the battery reaches this value.



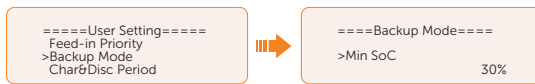
- **Charge battery to:** Default: 50%; range: 10%~100%
  - » Set the SOC to charge the battery from grid.
  - » You can set your own target value, i.e. during the forced charging period, the inverter will use both PV & GRID energy to charge the battery SOC to the target SOC value, after the battery SOC meets the target value, if the PV energy is still sufficient, the surplus power will be fed into the grid.



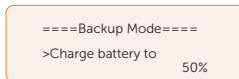
### Setting Backup Mode

Please refer to "Backup Mode" for working logic of this mode.

- **Min SOC:** Default: 30%; range: 30%~100%
  - » The minimum SOC of the battery. The battery will not discharge power when the SOC of the battery reaches this value.



- **Charge battery to:** Default: 50%; range: 30%~100%
  - » In this mode, the charge from grid function is turned on by default, and customers can set the target value by themselves, that is, during the forced charging period, the inverter will cooperate with PV&GRID to charge the battery to the target value. if the PV energy is still sufficient (enough for load and there is excess power), the inverter will continue to use PV energy to charge the battery.



### Setting Char&Disc Period

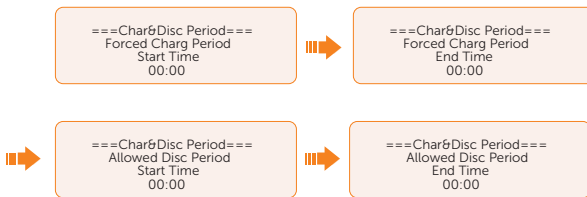
#### NOTICE!

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

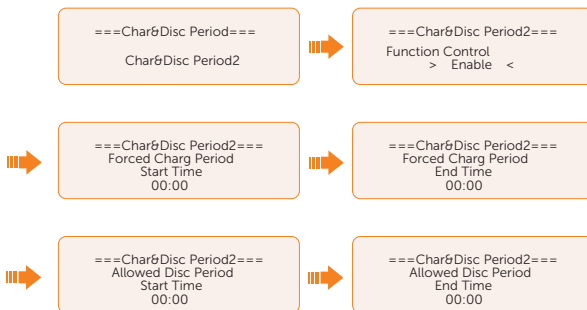
Here you can set the **Forced Charge Period** and **Allowed Disc Period**.

If two charging and discharging periods are needed, enable the **Function Control** to activate the **Char&DischrgPeriod2**.

- **Char&Disc Period:** You can set the charge and discharge time according to your own needs. The default time axis of the system is 24h.
  - » **Forced Charge Period Start Time:** Time to start charging; default:00:00; range: 00:00~23:59
  - » **Forced Charge Period End Time:** Time to stop charging; default:00:00; range: 00:00~23:59
  - » **Allowed Disc Period Start Time:** Time allows to start discharging (The charging or discharging of the battery depends on the work mode.) default:00:00; range: 00:00~23:59
  - » **Allowed Disc Period End Time:** Time to stop discharging; default:23:59; range: 00:00~23:59



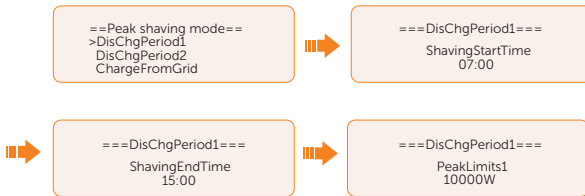
- **Char&Disc Period2:** The second time axis is closed by default, If two charging and discharging periods are needed, turn on the charging and discharging period 2. This period will hold the same setting logic as **Char&Disc Period**.



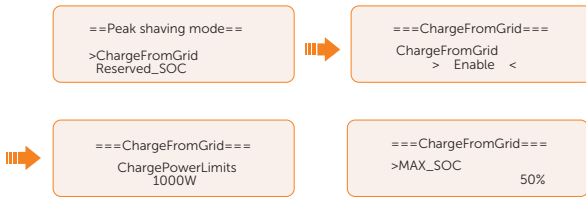
### Setting Peak shaving mode

- **DisChgPeriod1:** To set **ShavingStartTime**, **ShavingEndTime** and **PeakLimits**. **DisChgPeriod1** can be regarded as Peak shaving period. This period should be set to cover load peaks . Battery will be discharged to shave load peak until battery SOC drops to **Min SOC** (10% by default)

- » **PeakLimits1:** Default:0 W, range: 0-60000 W  
Once the consumption (grid side) reaches this value, the inverter will start shaving to keep the consumption lower than this value.
- » **ShavingStartTime:** Default: 7:00  
The battery starts discharging to shave consumption from the set time.
- » **ShavingEndTime:** Default: 15:00  
The battery stops discharging at the set time.



- **DisChgPeriod2:** Same working logic with DisChgPeriod1
  - » **PeakLimits2:** Default:0 W, range: 0-60000 W
  - » **ShavingStartTime:** Default: 19:00  
The battery starts discharging to shave consumption from the set time.
  - » **ShavingEndTime:** Default: 23:00  
The battery stops discharging at the set time.
- **ChargeFromGrid:** It can be used in specific time period. This period allows inverter to take energy from grid to charge battery in order to have enough backup for peak shaving. Please note that this period starts from ShavingEndTime2, end until ShavingStartTime1.
  - » **Enable:** Activate the function of **ChargeFromGrid** to allow the inverter taking grid energy to charge battery. The **ChargePowerLimits** and **MAX\_SOC** will be displayed only when **ChargeFromGrid** is enabled.
  - » **ChargePowerLimits:** Default: 1000 W; range: 0-60000 W  
Settable target power taken from grid. Inverter will use this target power taken from grid to charge battery.
  - » **MAX\_SOC:** Default: 50%; range: 10%-100%  
Inverter will take grid energy to charge battery until battery SOC reaches this value.



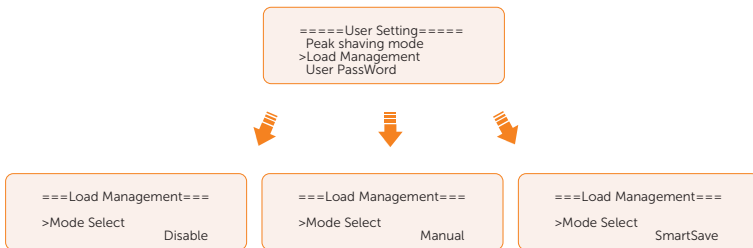
- **Reserved\_SOC:** Default: 50%; range: 10%-100%
  - » It can be used in specific time period. In this period, inverter does not allow taking grid energy to charge battery. PV is the only way to charge battery and PV will charge the battery first. Inverter will not supply power to loads until battery SOC higher than this value in order to save enough energy for later shaving period.



### Setting Load Management

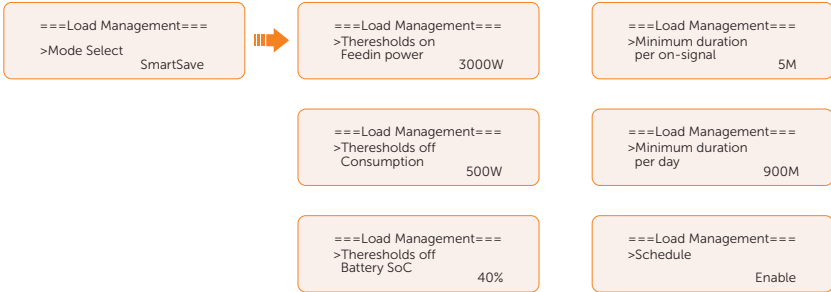
To use the heat pump function, you need to set the relevant parameters on LCD screen. This function is applicable for the first generation of SolaX Adapter Box.

- a. Enter the **Load Management** interface through the path: **Menu>Setting>User Setting>Load Management**
- b. Set the **Load Management** mode. Overall three heat pump operation modes are available for you to choose:



- » **Mode 1 Disable:** The Adapter Box function is disabled under this operation mode.
- » **Mode 2 Manual:** In this operating mode, you can change the Adapter Box from on to off, or from off to on through settings on the inverter or through SolaX App.
- » **Mode 3 SmartSave:** In this operating mode, users can set a series of parameters on the SolaX inverter to intelligently control how and when the heat pump works for them. (see Step C)

- c. Set the parameters for mode **SmartSave**. In this mode, you can set **Thresholds on Feedin power**, **Thresholds off Consumption**, **Thresholds off Battery SOC**, **Minimum duration per on-signal**, **Minimum duration per day** and **Schedule** in accordance with your actual needs.



- Setting thresholds on/off
  - » **Thresholds on Feedin power:** Once the feed-in power is greater than or equal to the set value, the Adapter Box will turn on and the heat pump will heat the water up to a higher temperature.
  - » **Thresholds off Consumption:** Once the power consumption (from the grid) is greater than or equal to the set value, the Adapter Box will be turned off, SolaX system stops providing electricity to heat pump.
  - » **Thresholds off Battery SOC:** Once the battery SOC drops to the set value, the Adapter Box will turn off, SolaX system stops providing electricity to heat pump.
- Setting minimum / maximum duration
  - » **Minimum duration per on-signal:** Minimum working hours, heat pump will work at least the time set here every time it is activated. High priority than other power threshold settings.
  - » **Maximum duration per day:** Maximum working hour limitation per day. High priority than other power threshold settings.
- Setting schedule
  - » **Schedule:** Set the heat pump working periods flexibly (heat pump on and off periods). High priority than other power threshold settings. Two work periods can be set.



- Mode Priority: **Minimum/Maximum duration > Schedule >Thresholds on/off**

### Setting User Password

The default password is "0 0 0 0". You can reset the password here.

#### 9.8.2 Advance Setting

Setting path: **Menu>Setting>Advance Setting**

#### NOTICE!

Property losses or system damage due to unauthorized access to adjustable parameters.

- All the adjustable parameters including safety code, grid parameter, export control, etc can be modified under the permissions of installer password. Unauthorized use of the installer password by unauthorized persons can lead to incorrect parameters being input, resulting in power generation loss or violation of local regulation. Get the installer password from the dealer and never open the password to unauthorized person.

### Setting Safety Code

#### NOTICE!

- The inverter cannot be connected to the grid before the safety code is correctly set. If there is any doubt about your safety code where the inverter installed, please consult your dealer or SolaX service for details.
- The setup will vary from different safety codes.

Here you can set safety code according to different countries and grid-tied standards.

There are several standards to choose from, please refer to the LCD screen on the inverter. (May be changed or added without notice)

- When you select safety code **CEI 0-21**, there will be additional **Self Test** option for setting under the path of **Menu>Setting>Advance Setting**.
- When you select safety code **AS4777**, there will be additional **AS4777 Setting** option for **General Control** and **Export Control** under the path of **Menu>Setting>Advance Setting**.

### Setting Grid parameters

The default value is the specified value under the current safety regulations. The contents will be displayed according to the requirements of local laws and regulations. Please refer to the actual contents displayed on the LCD screen on the inverter.



```
====Grid Parameters====
>Overvoltage
Undervoltage
OverFreq_L1
```

Please select Australia Region A / B / C in compliance with AS4777. Only after the safety code setting is completed, some designated parameters in the inverter system will take effect according to the corresponding safety regulations.

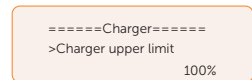
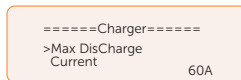
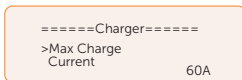
Region	Australia A	Australia B	Australia C	New Zealand	
Standard Code Name	AS4777_2022_A	AS4777_2022_B	AS4777_2022_C	New Zealand	Setting Range
OV-G-V	265 V	265 V	265 V	265 V	230-300 V
OV-GV1-T	1.5 s	1.5 s	1.5 s	1.5 s	
OV-G-V2	275 V	275 V	275 V	275 V	230-300 V
OV-GV2-T	0.1 s	0.1 s	0.1 s	0.1 s	
UN-G-V1	180 V	180 V	180 V	180 V	40-230 V
UNGV1-T	10 s	10 s	10 s	10 s	
UN-G-V2	70 V	70 V	70 V	70 V	40-230 V
UNGV2-T	1.5 s	1.5 s	1.5 s	1.5 s	
OV-G-F1	52 Hz	52 Hz	55 Hz	55 Hz	50-55 Hz
OVGF1-T	0.1 s	0.1 s	0.1 s	0.1 s	
OV-G-F2	52HZ	52HZ	55HZ	55HZ	50-55 Hz
OVGF2-T	0.1 s	0.1 s	0.1 s	0.1 s	
UN-G-F1	47 Hz	47 Hz	45 Hz	45 Hz	40-50 Hz
UNGF1-T	1.5 s	1.5 s	5 s	1.5 s	
UN-G-F2	47 Hz	47 Hz	45 Hz	45 Hz	45-50 Hz
UNGF2-T	1.5 s	1.5 s	5 s	1.5 s	
Startup-T	60 s	60 s	60 s	60 s	15-1000 s
Restore-T	60 s	60 s	60 s	60 s	15-600 s

Region	Australia A	Australia B	Australia C	New Zealand	
Standard Code Name	AS4777_2022_A	AS4777_2022_B	AS4777_2022_C	New Zealand	Setting Range
Recover-VH	253 V	253 V	253 V	253 V	
Recover-VL	205 V	205 V	205 V	198 V	
Recover-FH	50.15 Hz	50.15 Hz	50.15 Hz	50.15 Hz	
Recover-FL	47.5 Hz	47.5 Hz	47.5 Hz	47.5 Hz	
Start-VH	253 V	253 V	253 V	253 V	
Start-VL	205 V	205 V	205 V	198 V	
Start-FH	50.15 Hz	50.15 Hz	50.15 Hz	50.15 Hz	
Start-FL	47.5 Hz	47.5 Hz	47.5 Hz	47.5 Hz	

### Setting Charger

The inverter is compatible with lithium-ion battery. You can set the charge & discharge parameters of battery.

- **Max Charge:** Maximum charging current of battery
- **Max Discharge:** Maximum discharging current of battery
- **Charger upper limit:** Default: 100%, range: 10%-100%.
  - » The maximum battery SOC when charging.



### Setting Export Control

This function allows the inverter to control the amount of electricity output to the grid. The **User Value** set here must be less than the maximum value. If the user does not want to supply power to the grid, set **User Value** to "0".

NOTICE!

- Under Safety Code AS4777, **Export Control** is in the path of **Advance Setting> AS4777 Setting**. You can set the **Soft Limit** and **Hard Limit** of **Export Control** to control the power output to grid. Please refer to section "[AS4777 Setting](#)" for details.



### Meter/CT Setting

CT or electricity meter is needed to connect with the inverter. Meter is set by default.

**NOTICE!**

- If the user has other power generation equipment (such as inverter) at home and wants to monitor both, the inverter provides Meter2 communication function to monitor the power generation equipment.

- a. Select and enter the **Meter/CT Setting** according the setting path.
- b. Set the address and direction of Meter/CT:
  - » Case 1: Only CT is connected for the series inverter. No power generation equipment in the whole system. Please activate the CT selection. You can check the connection status in **Meter/CT Check**.



- » Case 2: Only Meter 1 is connected for the series inverter. No power generation equipment in the whole system. Please activate the meter 1 selection and set the meter address and direction. You can check the connection status in **Meter/CT Check**.

**NOTICE!**

- CT and meter 1 can not be used simultaneously.



- » Case 3: CT and Meter 2 are connected. (CT for SolaX Hybrid inverter, Meter 2 for another power generation equipment or CT for another power generation equipment, Meter 2 for SolaX Hybrid inverter) For CT setting, please refer to Case 1. For meter 2 setting, please set the address and direction of Meter2 based on actual connection. You can check the connection status in **Meter/CT Check**.



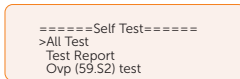
- » Case 4: Meter 1 and Meter 2 are connected. (Meter1 for SolaX Hybrid inverter, Meter 2 for another power generation equipment or Meter 1 for another power generation equipment, Meter 2 for SolaX Hybrid inverter). Please refer to Case 2 for Meter 1 setting and Case 3 for Meter 2 setting. You can check the connection status in **Meter/CT Check**.

### Setting Self Test (only for CEI 0-21)

The self test function allows users to test the following items: **Full Test**, **Ovp(59.S2) test**, **Uvp (s1) test**, **Uvp (27. s2) test**, **Ofp (81> .S1) test**, **Ufp (81 <.S1) test**, **Ufp (81> .S2) test**, **Ufp (81 <.S2) test**, **Ovp10 (59. s1) test**.

In the **Self Test** interface, the user can select **All Test** or a single test item for testing. All tests take about 6 minutes. And it will display **Success**. For a single test item, it takes about a few seconds or minutes.

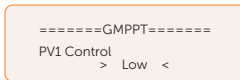
Before testing, make sure that the inverter is connected to the grid. Click **Test Report** to view the test results of all items.



### Setting GMPPT

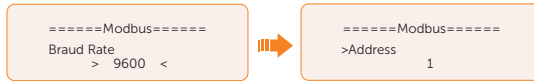
You can set the shadow tracking speed with four options, which are **Off**, **Low**, **Middle**, and **High**. This function is off by default.

- **Off**: Switch off the shadow tracking function.
- **Low**: Scan the shadow every four hours.
- **Middle**: Scan the shadow every three hours.
- **High**: Scan the shadow per hour.



### Setting Modbus

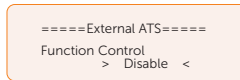
You can set the address and select the baud rate of the external communication protocol for communicating with external equipment.



### Setting External ATS

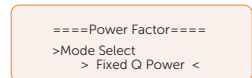
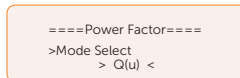
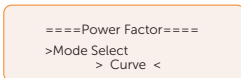
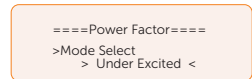
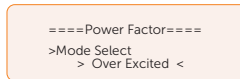
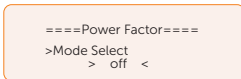
External ATS function is used to achieve automatic switching from grid connection mode to off grid mode or from off grid mode to grid connection model by using external ATS equipment. The function is disabled by default. When the X3-PBOX-150K G2 is connected in the parallel system, please enable the function.

- **Enable:** on/off-grid switching by external equipment.
- **Disable:** inverter internal on/off-grid switching.



### Setting Power Factor

The default value is the specified value under the current safety regulations. The contents will be displayed according to the requirements of local laws and regulations. Please refer to local grid requirements.



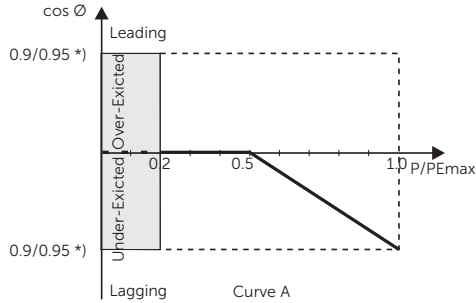
## Operation on LCD

---

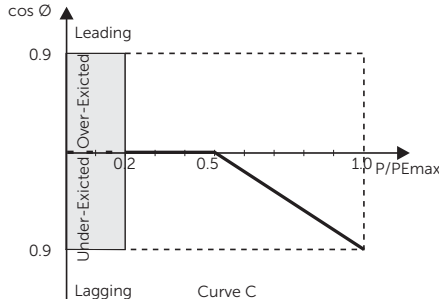
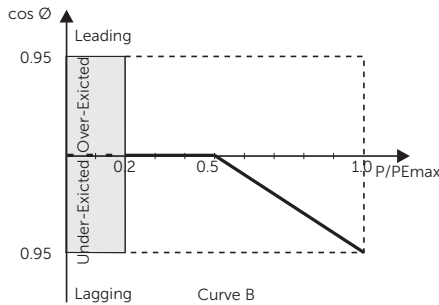
Off	
Over Excited	PF Value
Under Excited	PF Value
Curve	P1 PF
	P2 PF
	P3 PF
	P4 PF
	Power 1
	Power 2
	Power 3
	Power 4
	PflockInPoint
	PflockOutPoint
	3Tua
Q(u)	SetQuPower1
	SetQuPower2
	SetQuPower3
	SetQuPower4
	QuRespondV1
	QuRespondV2
	QuRespondV3
	QuRespondV4
	K
	3Tua
	QuDelayTimer
QuLockEn	
Fixed Q Power	Q Power

---

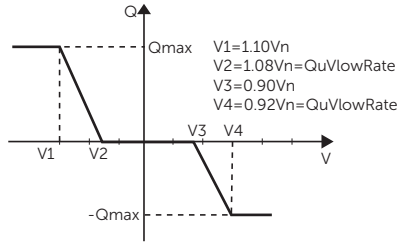
- Reactive power control, reactive power standard curve  $\cos \varnothing = f(P)$ 
  - » For VDE ARN 4105, the curve  $\cos \varnothing = f(P)$  should refer to curve A. The set default value is shown in curve A.
  - » For TOR, the curve  $\cos \varnothing = f(P)$  should be curve B. The set default value is shown in curve B.
  - » For CEI 0-21, the default value of PFLockInPoint is 1.05. When  $V_{ac} > 1.05V_n, P_{ac} > 0.2 P_n$ , curve  $\cos \varnothing = f(P)$  corresponds to curve C.



- » \*) If the grid-connected power of the inverter  $\leq 4.6kW$ , the Power Factor is 0.95 at 1.0 power; if the grid-connected power of the inverter  $> 4.6kW$ , the Power Factor is 0.90 at 1.0 power.



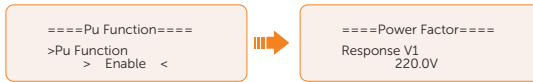
» \*) Depend on the required Q capacity



### Setting Pu Function

(Applicable to specific countries, please refer to local grid requirements.)

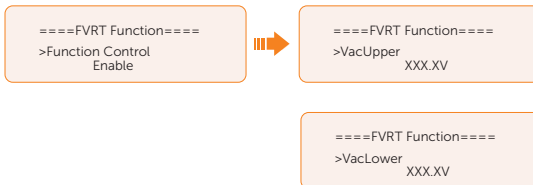
The PU function is a volt-watt response mode required by certain national standards such as AS 4777. This function can control the active power of the inverter according to the grid voltage. You can set **Response Voltage**, **3Tau**, **PuPower**, **3Tau\_Charge** and **Pu Type**.



### Setting FVRT function

FVRT consists of HVRT (High Voltage Ride Through) and LVRT (Low Voltage Ride Through). With FVRT function, the series inverter can ensure continuous operation without disconnecting from the grid within a certain range of voltage sudden rise and drop in a certain time interval.

- **Enable:** Enable the FVRT function
- **VacUpper:** The voltage for high voltage ride through
- **VacLower:** The voltage for low voltage ride through





## Setting Power Limit

Here you can set the rated output power by percentage.

The percentage of rated output power is used as the actual output power.

**Proportion:** Default: 1.00; range: 0.00~1.10

```
====Power Limit====
Proportion
  1.00
```

## Setting DRM function (Applicable to AS4777)

The DRM Function is a demand response method required by the AS4777 standard and is only applicable to Australia and New Zealand.

The function is enabled by default.

```
====DRM Function====
>Func Select
  Enable
```

## Setting Parallel Connection

In parallel system, there are three status: **Free**, **Slave** and **Master**.

Free	Only if no one inverter is set as a <b>Master</b> , all inverters are in free mode in the system.
Slave	Once one inverter is set as a <b>Master</b> , all other inverters will enter slave mode automatically. Slave mode can not be changed from other modes by LCD setting.
Master	When one inverter is set as a <b>Master</b> , this inverter enters master mode. Master mode can be changed to free mode.

### NOTICE!

- Refer to section "Parallel Connection" for specific parallel connection diagram.

NOTICE!

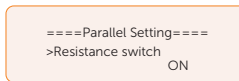
- Master inverter has an absolute lead in the parallel system to control all slave inverter's energy management and dispatch control. Once master inverter has some error and stop working, all slave inverter will be stop simultaneously. But master inverter is independent of all slave inverter to work and will not be affected by slave inverter's fault.
- Overall system will be running according to master inverter's setting parameters, and most setting parameters of slave inverter will be kept but not be cancelled.
- Once slave inverter exits from system and be running as an independent unit (the network cable is disconnected simultaneously), its all setting will be re-activated.

How to build the parallel connection

- a. Turn on the power of the entire system, find the inverter connected to the meter, enter the setting page of the inverter LCD screen, select the Parallel Setting, and select **Master**; then enter the **Resistance Switch** and set it to **ON**;

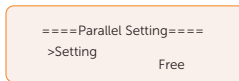


- b. Find the last slave in the parallel system and enter the setting page of the inverter LCD screen and set the **Resistance Switch** to **ON**.



How to remove the parallel connection

- a. Select the **Parallel Settings** and select **Free** for Master and slave inverter.



- b. Disconnect all the network cables on the Parallel-1 and Parallel-2 port.

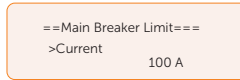
NOTICE!

- If a slave inverter is set to **Free** mode but not disconnect the network cable, this inverter will return to **Slave** mode automatically.
- If a slave inverter is disconnected with master inverter but not be set to **Free** mode, this slave inverter will stop working and prompt **ParallelFault**.

## Setting Main Breaker Limit

Due to power limit, the current of Meter or CT must be abide by the utility's requirements. You can set the corresponding amperage according to the utility's requirements. Failure to set the current may cause a circuit breaker fault of main switchboard, thus affecting the charging and discharging of battery.

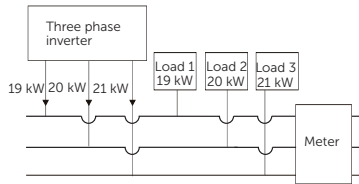
The default value is 100 A, range: 10-250 A



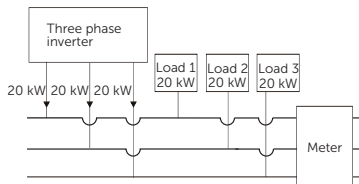
## Setting Phase Unbalanced

This function controls the distribution of AC output power. **Disable** is the default setting .

- **Enable** mode: If 60 kW AC power can be exported, each phase power will be divided as below according to different loads connected with each phase.



- **Disable** mode: If 60 kW AC power can be exported, each phase power will be divided equally as below and it is unrelated with the loads connected with each phase.



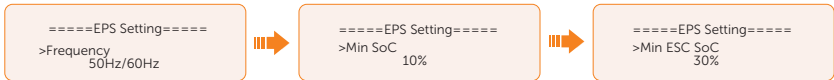
## EPS Setting

Select and enter **EPS Setting** interface and set **Frequency**, **Min SOC**, **Min ESC SOC**, **Super-Backup** and **EPSVoltChange**.

- **Frequency**: Default: 50Hz. Output frequency of EPS
- **Min SOC**: Default: 10%, range: 10%-100%
  - » If the battery SOC is lower than the Min SOC set in the inverter, the battery will not discharge the power to the load. The inverter will enter EPS waiting

mode waiting for battery to be charged.

- **Min ESC SoC:** Default: 30%, range: 15%-100%
  - » The minimum SOC to enter EPS mode. When the battery SOC reaches the Min ESC SOC, the inverter will automatically enter EPS mode from EPS Waiting mode.

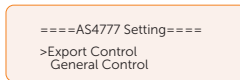


- To enable the "**Super-Backup**" mode and allow only PV without battery to enter EPS. **Disable** is the default setting.

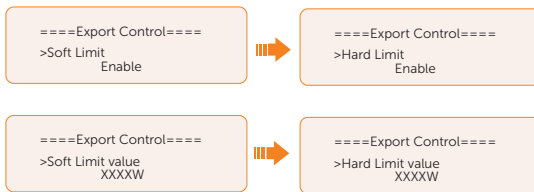
### AS4777 Setting

The function of AS4777 Setting is only activated when the Safe Code is set to AS4777 and New Zealand, which is only applicable to Australia and New Zealand.

- Select and enter **AS4777 Setting** in **Advance Setting** interface. You will see **Export Control** (for active power output control) and **General Control** (for apparent power output control).



- Set the **Soft Limit** value and **Hard Limit** value for Export Control and General Control. The figure below will take the setup of Export Control as an example.



### NOTICE!

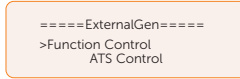
- **Soft Limit:** Control the output value to grid within the set **Soft Limit Value**.
- **Hard Limit:** If the actual output value reaches the set **Hard Limit Value**, the system will automatically disconnect from grid and prompt error message on the LCD.

### Setting ExternalGen

Two modes are available for you to choose according to actual needs when connecting generator: i.e. ATS Control and Dry Contact.

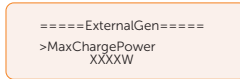
How to make connection with generator through ATS control

- a. Select and enter **ExternalGen** interface and select **ATS Control**.

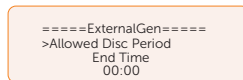
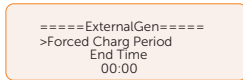
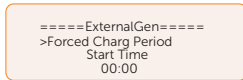


- b. You can set the relative parameters as below in accordance with actual needs.

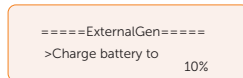
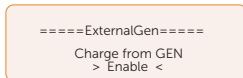
- » **MaxChargePower**: Maximum battery charging power from generator. (0-30000 W, 5000W by default)



- » **Char&Disc Period**: Including **Forced Charge Period** and **Allowed Disc Period**. Two periods can be set. These period settings are associated with the same settings under **Work Mode** for no need to jump to work mode page to set the working period when using generator mode.

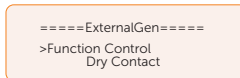


- » **Charge from Gen and Charge battery to**: The SOC which allows the system charging from generator. (10-100%, 10% by default)



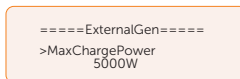
How to make connection with generator through Dry Contact

- a. Select and enter **ExternalGen** interface and select **Dry Contact**.



- b. Set the relative parameters in accordance with actual needs.

- » **MaxChargePower**: Maximum battery charging power from generator. (0-30000 W, 5000W by default).



- » **Start Gen Method: Reference SOC and Immediately** can be selected.  
**Reference SOC:** Turn on/off generator according to the set SOC.  
**Immediately:** Turn on /off the generator when grid status changed.

```
====ExternalGen====
>Start Gen Method
Reference soc
```

```
====ExternalGen====
>Start Gen Method
Immediately
```

- » **Switch on/off SOC:** the option is activated when you select **Reference SOC** for **Start Gen Method**. Inverter will turn on the generator when the battery reaches the set **Switch on SOC** and turn it off when the battery reaches the set **Switch off SOC**.

```
====ExternalGen====
>Switch on SoC
0%
```

```
====ExternalGen====
>Switch off SoC
0%
```

- » **MaxRunTime:** Maximum operating time of generator. (30 Min by default)

```
====ExternalGen====
>MaxRunTime
30Min
```

- » **MinRestTime:** Minimum time interval for two consecutive starts to avoid frequent generator switching ON/OFF.

```
====ExternalGen====
>MaxRestTime
0Min
```

- » **Char&Disc Period:** Including **Forced Charge Period** and **Allowed Disc Period**. Two periods can be set. These period settings are associated with the same settings under **Work Mode** for no need to jump to work mode page to set the working period when using generator mode.

```
====ExternalGen====
>Forced Charge Period
Start Time
00:00
```

```
====ExternalGen====
>Allowed Disc Period
Start Time
00:00
```

```
====ExternalGen====
>Forced Charge Period
End Time
00:00
```

```
====ExternalGen====
>Allowed Disc Period
End Time
00:00
```

- » **Allow Work:** Allowed time period for generator operating. You can set the start time and end time.

```
====ExternalGen====
>Allow Work
Start Time
00:00
```

```
====ExternalGen====
>Allow Work
End Time
00:00
```

- » **Charge from Gen and Charge battery to:** The SOC which allows the system charging from generator. (10-100 W from generator, 10% by default)



## Reset

Here you can reset value of Error Log, Meter/CT, INV Energy and Wifi; and restore to the factory set.

- **Reset Error Log**



- **Reset Meter/CT**



- **Reset INV Energy**



- **Reset Wifi**



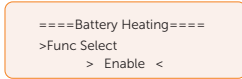
- **Factory Reset**



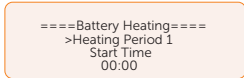
## Setting Battery Heating

This function is disabled by default and is only valid when the battery has the heating function. You can enable **Battery Heating** function to make the battery heated. And set the heating period.

- Enable the **Battery Heating** function.

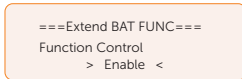


- b. Set the heating start time and end time for the battery. Two heating periods can be set.



### Setting Extend BAT FUNC

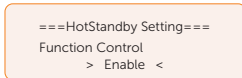
This function allows for the extension of battery modules, such as adding a new battery module to an existing system. It is only applicable and functional in on-grid mode and cannot be used in EPS mode. In on-grid mode, enabling this function will make the inverter to charge or discharge the battery SOC to approximately 38%. This function will turn to **Disable** automatically after 48 hours this function enabled.



### Setting HotStandby Setting

This function is mainly to reduce the energy losses of the system. when the power of load is extremely low and there is no sufficient PV input voltage, or when the battery SOC is less than or equal to 10% and there is no sufficient PV input voltage, the inverter will enter "HotStandby" status. When the power of loads is higher than 150 W, or there is sufficient PV input voltage, or the battery is forced charged, the inverter will exit "HotStandby" status.

It is disabled by default.



### Setting Pgrid Bias

This function is disabled by default.

For the country with zero export limit:

- a. Check the **Meter/CT** value in **Menu>System Status>Meter/CT** when the function is disabled.



- b. If the **Meter/CT** displayed in **System Status** is negative value, please select **Grid** for **Pgrid Bias** to discharge power to the mains. If the **Meter/CT** displayed in **System Status** is positive value, please select **INV** for **Pgrid Bias** to take power from the mains.

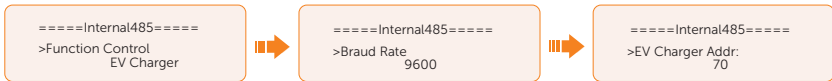
```

=====Pgrid Bias=====
      > Grid <
  
```

## Setting Internal485

You can communicate with other SolaX equipment, such EV Charger, Datahub and Adapter Box G2 through **Internal485**.

- Select and enter **Internal485** interface;
- Select the equipment which needs to be connected and set the corresponding Braud Rate and Address. Take EV Charger as an example.



### NOTICE!

- When two equipments need to be connected at the same time, the braud rate and address of the two equipments shall be set to the same.

- Check the connecting status. For the connection status of Datahub, please check it on the Datahub.

```

=====Internal485=====
>EV Charger COM STAT
  Connected
  
```

## Battery Charge EVC

You can set **Enable** to allow the battery to discharge energy to EV Charger. When you set to **Disable**, battery discharging energy to EV Charger is not allowed.

```

===Battery charge EVC===
>Function Control
  Enable
  
```

## Advance Password

You can reset the advanced password here.

## 9.9 About

Displaying path: **Menu > About**

Here shows the basic information of the inverter, battery and internal code. After entering the **About** interface, you can check those information.

- Inverter
  - » Inverter SN, Register SN, ARM Version, DSP version, On-grid Runtime, EPS Runtime
- Battery1 and Battery2
  - » BatBrand, Bat\_M SN (SN of BMS), Bat\_PS1 SN (SN of battery module 1), Bat\_PS2 SN (SN of battery module 2), Bat\_PS3 SN (SN of battery module 3), Bat\_PS4 SN (SN of battery module 4), Battery M Version (software version of BMS) and Battery S version (software version of battery module).
- Internal Code
  - » Internal code of inverter, battery1 and battery2

## 9.10 Inverter Screen Cover Installation

After the inverter is well installed on the wall or on the cabinet, all cables are wired on the inverter, the process of powering on and powering off is checked and all necessary Settings are set on the inverter LCD screen, the inverter screen cover should be installed. Here below the inverter installed on the cabinet is taken for an example. Wall-mounting inverter shares the same screen cover installation method.

**Step 1:** Put the inverter screen cover on the inverter and secure the cover on the two sides of the inverter with M4\*10 screws (Torque:  $1.5 \pm 0.3$  N·m).

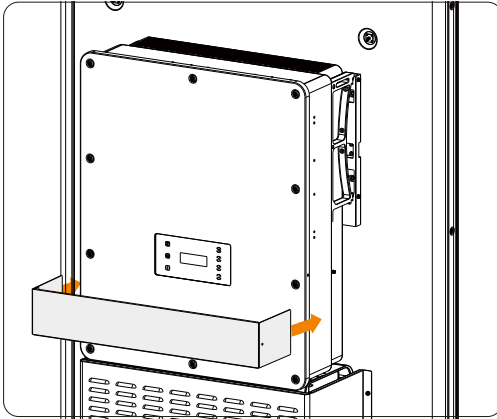


Figure 9-9 Putting the screen cover on the inverter

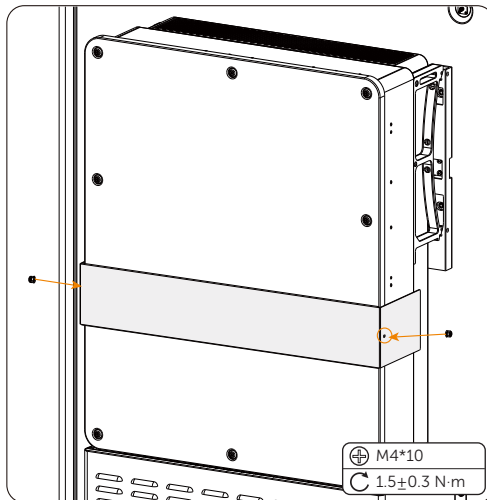


Figure 9-10 Securing the cover with the inverter

**Step 2:** Here is the well installed inverter screen cover.

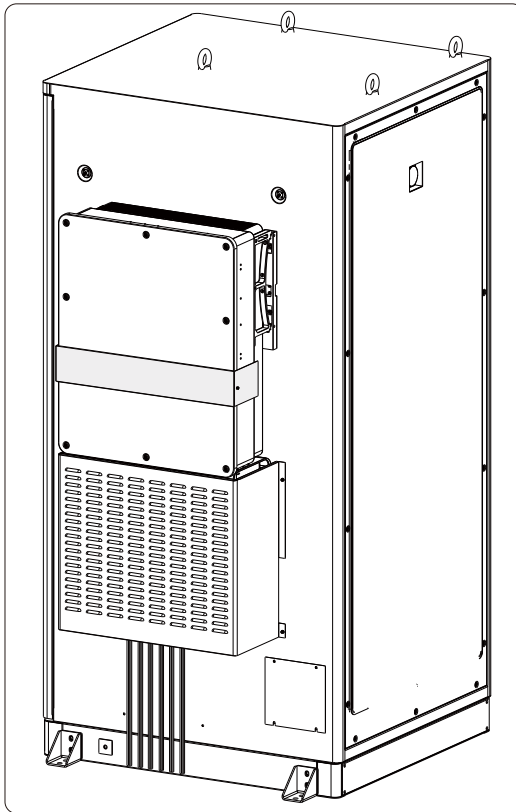


Figure 9-11 Well installed screen cover

# 10 Troubleshooting and Maintenance

## 10.1 Power Off

Check whether the system is still running before power off. Do not power off if the device is "under load".

There are two circumstances: 1. Normal power off; 2. Emergency power off.

Regarding the detailed location of the modules in the cabinet, please refer to "Figure 2-6 Parts description (in the opened state)".

### Normal power off

**Step 1:** Open the door.

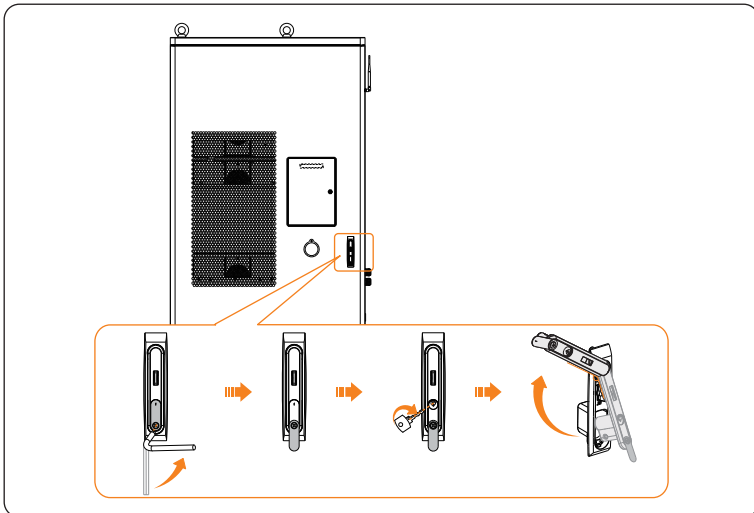


Figure 10-1 Opening the door

**Step 2:** Flip down breakers on the distribution box orderly, with correct order of "auxiliary power breaker of high-voltage box (APS1)", "lightning protection breaker (SPD MCB)", "air conditioner/liquid cooling unit on/off breaker (HVAC MCB)", and "reserve breaker (RES)".

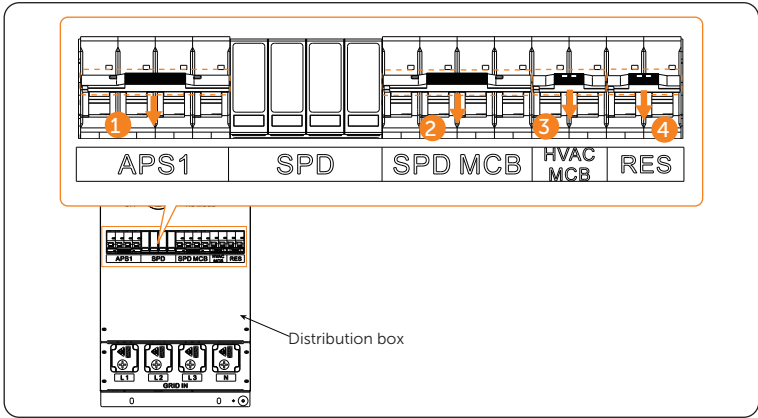


Figure 10-2 Flipping down breakers

**Step 3:** Flip down breakers on the EPS orderly, with correct order of "breaker for maintenance (APS2)" and "UPS breaker (UPS)", and unplug the plugs of UPS into the sockets (XS1, XS2).

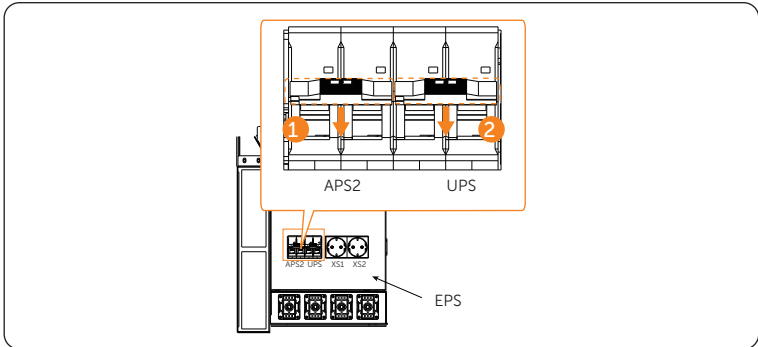


Figure 10-3 Flipping down breakers

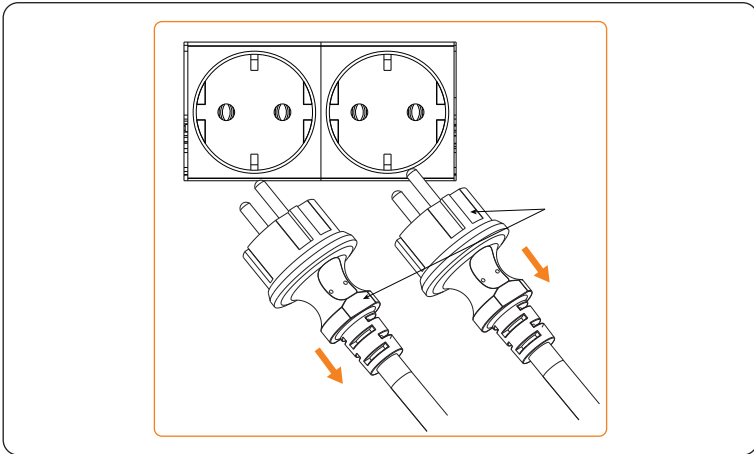


Figure 10-4 Unplugging plugs

**Step 4:** Rotate the switch on the distribution box 90° clockwise to "OFF".

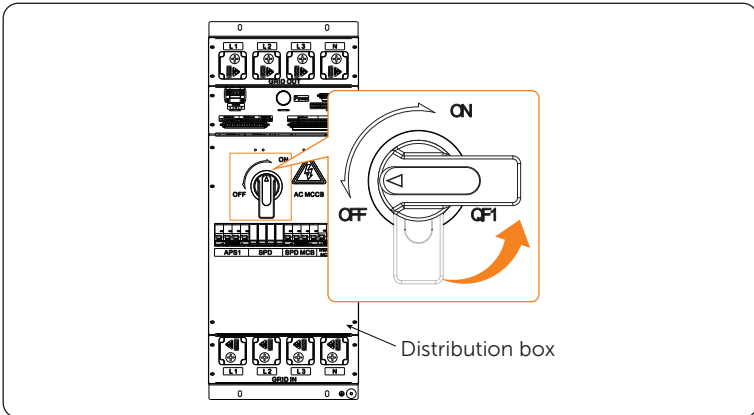


Figure 10-5 Rotating switch

**Step 5:** Gently press the power button, and rotate the disconnecter of the high-voltage box to "OFF".

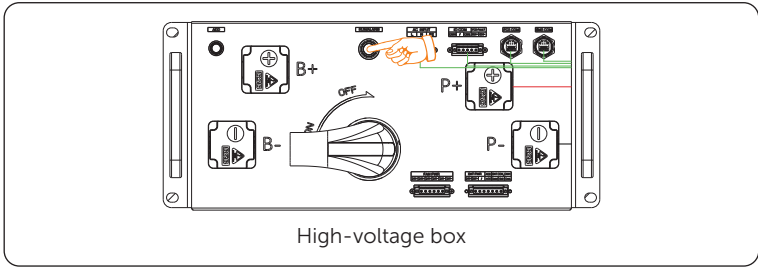


Figure 10-6 Pressing power button

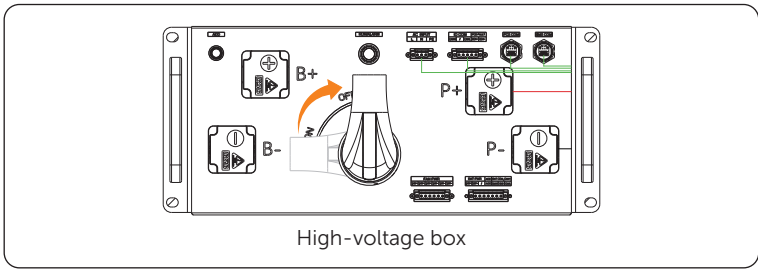


Figure 10-7 Rotating the disconnecter

**Step 6:** Hold and press the "Power on/off" button to power off the UPS.

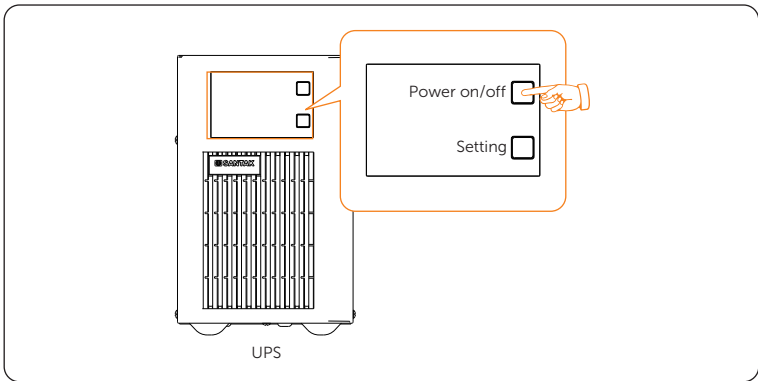


Figure 10-8 Holding and pressing OFF button

**! WARNING!**

- The device may still have power and heat after turning off, which may cause electric shock and personal injuries. Therefore, please allow it to cool for at least 5 minutes and wear PPE before conducting maintenance.



**Step 7:** Inverter power off.

- a. Set **OFF** in the **System ON/OFF** on the inverter LCD screen.
- b. Turn off the inverter system button.
- c. Turn off the AC breakers between the inverter and the power grid.
- d. Set the DC switch1 and DC switch2 to "OFF".
- e. Switch off the battery or the breaker, button, DC switch of the battery (see documentation of the battery manufacturer).

**WARNING!**

- After the inverter powers off, there will still be the remaining electricity and heat which may cause electric shocks and body burns. Please wear personal protective equipment (PPE) and begin servicing the inverter five minutes after power off.

**Emergency power off**

**WARNING!**

- Do not press the emergency stop button except for emergencies.

**Step 1:** Rotate the cover

**Step 2:** Press the emergency stop button.

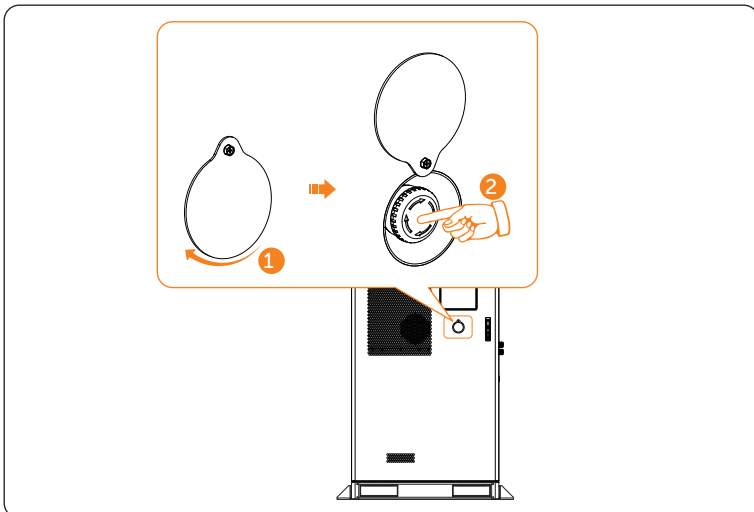


Figure 10-9 Pressing emergency stop button

**Step 3:** Turn off the inverter system button.

**Step 4:** Set the DC switch1 and DC switch2 of the inverter to "OFF".

NOTICE!

**If it has been pressed, the emergency stop button must be reset before starting the equipment. The reset steps are shown as follows:**

- a. Rotate the cover;
- b. Rotate the button according to the arrow direction shown on the button. Then the button will spring back to its original position.

## 10.2 Troubleshooting

### 10.2.1 Battery Cabinet Troubleshooting

This section lists the possible problems with the equipment, and provides information and procedures for identifying and resolving them. In case of any errors, check for the warnings or error messages on the system control panel or App, and then refer to the suggestions below. For further assistance, contact SolaX Customer Service. Please provide the model and SN of the cabinet, and be prepared to describe the system installation details.

Table 10-1 Troubleshooting list

Fault	Description and Diagnosis
UCellHi_4	<p>Single Cell Overvoltage Category IV</p> <ul style="list-style-type: none"> <li>• Do not power on, and the charging current is limited to 0 A. If the relay does not receive a power-off instruction from the inverter, it will be turned off forcefully after 3 seconds.</li> <li>• Or contact SolaX for help.</li> </ul>
UCellHi_5	<p>Single Cell Overvoltage Category V</p> <ul style="list-style-type: none"> <li>• Do not power on, and the charging current is limited to 0 A. If the relay does not receive a power-off instruction from the inverter, it will be turned off forcefully after 1 second.</li> <li>• Or contact SolaX for help.</li> </ul>
UCellLow_4	<p>Single Cell Undervoltage Category IV</p> <ul style="list-style-type: none"> <li>• Do not power on, and the charging current is limited to 0 A. If the relay does not receive a power-off instruction from the inverter, it will be turned off forcefully after 3 seconds.</li> <li>• Or contact SolaX for help.</li> </ul>
UCellLow_5	<p>Single Cell Undervoltage Category V</p> <ul style="list-style-type: none"> <li>• Do not power on, and the charging current is limited to 0 A. If the relay does not receive a power-off instruction from the inverter, it will be turned off forcefully after 3 seconds.</li> <li>• Or contact SolaX for help.</li> </ul>
UCellDiff	<p>Voltage difference fault</p> <ul style="list-style-type: none"> <li>• Or contact SolaX for help.</li> </ul>

Fault	Description and Diagnosis
HVBOVer_4	<p>Overvoltage category IV of total voltage</p> <ul style="list-style-type: none"> <li>• The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the inverter, it will be turned off forcefully after 3 seconds.</li> <li>• Or contact SolaX for help.</li> </ul>
HVBOVer_5	<p>Overvoltage category V of total voltage</p> <ul style="list-style-type: none"> <li>• The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the inverter, it will be turned off forcefully after 1 second.</li> <li>• Or contact SolaX for help.</li> </ul>
HVBLow	<p>Undervoltage category IV of total voltage</p> <ul style="list-style-type: none"> <li>• The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the inverter, it will be turned off forcefully after 1 second.</li> <li>• Or contact SolaX for help.</li> </ul>
HVBLow	<p>Undervoltage category V of total voltage</p> <ul style="list-style-type: none"> <li>• The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the inverter, it will be turned off forcefully after 1 second.</li> <li>• Or contact SolaX for help.</li> </ul>
PosRlyAdh	<p>Sticking contacts of main positive relay</p> <ul style="list-style-type: none"> <li>• The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the inverter, it will be turned off forcefully after 1 second.</li> <li>• Or contact SolaX for help.</li> </ul>
PosRlyOpen	<p>Open circuit of main positive relay</p> <ul style="list-style-type: none"> <li>• The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the inverter, it will be turned off forcefully after 1 second.</li> <li>• Or contact SolaX for help.</li> </ul>
TempHigh	<p>Overtemperature fault</p> <ul style="list-style-type: none"> <li>• The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the inverter, it will be turned off forcefully after 1 second.</li> <li>• Or contact SolaX for help.</li> </ul>
TLineFlt_1	<p>Temperature sampling fault level 1</p> <ul style="list-style-type: none"> <li>• Check if the temperature sensor is short-circuited.</li> <li>• Or contact SolaX for help.</li> </ul>

Fault	Description and Diagnosis
TLineFlt_4	<p>Temperature sampling fault level 4</p> <ul style="list-style-type: none"> <li>• The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the inverter, it will be turned off forcefully after 3 seconds.</li> <li>• Or contact SolaX for help.</li> </ul>
TempLow	<p>Low-temperature fault</p> <ul style="list-style-type: none"> <li>• The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the inverter, it will be turned off forcefully after 1 second.</li> <li>• Or contact SolaX for help.</li> </ul>
DsgOver_4	<p>Discharge overcurrent fault level 4</p> <ul style="list-style-type: none"> <li>• The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the inverter, it will be turned off forcefully after 3 seconds.</li> <li>• Or contact SolaX for help.</li> </ul>
DsgOver_5	<p>Discharge overcurrent fault level 5</p> <ul style="list-style-type: none"> <li>• The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the inverter, it will be turned off forcefully after 1 second.</li> <li>• Or contact SolaX for help.</li> </ul>
ChgOver_4	<p>Charge overcurrent fault level 4</p> <ul style="list-style-type: none"> <li>• The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the inverter, it will be turned off forcefully after 3 seconds.</li> <li>• Or contact SolaX for help.</li> </ul>
ChgOver_5	<p>Charge overcurrent fault level 5</p> <ul style="list-style-type: none"> <li>• The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the inverter, it will be turned off forcefully after 1 second.</li> <li>• Or contact SolaX for help.</li> </ul>
ICOMFault	<p>Internal communication fault</p> <ul style="list-style-type: none"> <li>• Do not power on, and the charging current is limited to 0 A. If the relay does not receive a power-off instruction from the inverter, it will be turned off forcefully after 1 second.</li> <li>• Or contact SolaX for help.</li> </ul>

Fault	Description and Diagnosis
OCOMFault	External communication fault <ul style="list-style-type: none"><li>• Do not power on, and the charging current is limited to 0 A. If the relay does not receive a power-off instruction from the inverter, it will be turned off forcefully after 1 second.</li><li>• Or contact SolaX for help.</li></ul>
MCOMFault	Intermediate network communication fault <ul style="list-style-type: none"><li>• Do not power on, and the charging current is limited to 0 A.</li><li>• Or contact SolaX for help.</li></ul>
UCellLineOpenFlt	Voltage sampling fault <ul style="list-style-type: none"><li>• The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the inverter, it will be turned off forcefully after 1 second.</li><li>• Or contact SolaX for help.</li></ul>
VoltSensorFlt	Voltage sensor fault <ul style="list-style-type: none"><li>• The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the inverter, it will be turned off forcefully after 1 second.</li><li>• Or contact SolaX for help.</li></ul>
CurrSensorFlt	Current sensor fault <ul style="list-style-type: none"><li>• Contact SolaX for help.</li></ul>
NegRlyAdh	Sticking contacts of main negative relay <ul style="list-style-type: none"><li>• Restart the device.</li><li>• Or contact SolaX for help.</li></ul>
NegRlyOpen	Open circuit of main negative relay <ul style="list-style-type: none"><li>• Restart the device.</li><li>• Or contact SolaX for help.</li></ul>
FlashFlt	Flash fault <ul style="list-style-type: none"><li>• Check if the external Flash communication is normal.</li><li>• Or contact SolaX for help.</li></ul>
ChgReqFlt	Charging request fault <ul style="list-style-type: none"><li>• Check the device is properly charged.</li><li>• Or contact SolaX for help.</li></ul>
InsFlt	Insulation fault <ul style="list-style-type: none"><li>• The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the inverter, it will be turned off forcefully after 1 second.</li><li>• Or contact SolaX for help.</li></ul>

Fault	Description and Diagnosis
SOCLowFlt	<p>Low SOC</p> <ul style="list-style-type: none"> <li>• Check if the device is running out of power.</li> <li>• Or contact SolaX for help.</li> </ul>
PreChgFailFlt	<p>External short-circuit fault</p> <ul style="list-style-type: none"> <li>• The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the inverter, it will be turned off forcefully after 1 second.</li> <li>• Or contact SolaX for help.</li> </ul>
AFEProtectFlt	<p>Battery's hardware protection fault</p> <ul style="list-style-type: none"> <li>• The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the inverter, it will be turned off forcefully after 1 second.</li> <li>• Or contact SolaX for help.</li> </ul>
SelfCheckFlt	<p>Self-test fault</p> <ul style="list-style-type: none"> <li>• The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the inverter, it will be turned off forcefully after 1 second.</li> <li>• Or contact SolaX for help.</li> </ul>
LinkerTempHiFlt_3	<p>Fault on overtemperature of high-voltage connector</p> <ul style="list-style-type: none"> <li>• Check whether the charge/discharge current is over 50% of rated charge/discharge current.</li> <li>• Or contact SolaX for help.</li> </ul>
LinkerTempHiFlt_5	<p>Fault on overtemperature of high-voltage connector</p> <ul style="list-style-type: none"> <li>• Check whether the charge/discharge current is over 50% of rated charge/discharge current.</li> <li>• Or contact SolaX for help.</li> </ul>
BatLinkerTempHi_5	<p>High-temperature fault of pole</p> <ul style="list-style-type: none"> <li>• The charging current is limited to 0 A. If the relay does not receive a power-off instruction from the inverter, it will be turned off forcefully after 3 seconds.</li> <li>• Or contact SolaX for help.</li> </ul>
FanFault	<p>Fan fault</p> <ul style="list-style-type: none"> <li>• Check whether any foreign objects stick to the fan.</li> <li>• Contact SolaX for help.</li> </ul>
FuseSt	<p>Fuse fault</p> <ul style="list-style-type: none"> <li>• Contact SolaX for help.</li> </ul>
DCSwitch	<p>DC switch fault</p> <ul style="list-style-type: none"> <li>• Contact SolaX for help.</li> </ul>

## 10.2.2 Inverter Troubleshooting

This section contains information and procedures for resolving possible problems with the inverter, and provides the troubleshooting tips to identify and solve most problems that may occur. Please check the warning or fault information on the system control panel or on the App and read the suggested solutions below when error occurs. Contact SolaX Customer Service for further assistance. Please be prepared to describe the details of your system installation and provide the model and serial number of the inverter.

Error Code	Fault	Descriptions and Diagnosis
IE 01	TZ Protect Fault	<p>Overcurrent fault.</p> <ul style="list-style-type: none"> <li>• Wait for a while to check if it returns to normal.</li> <li>• Disconnect PV+ PV- and batteries, reconnect.</li> <li>• If the system is in off-grid state, check if the power of EPS loads exceeds the maximum limit of the system or exceeds the current power supply of battery.</li> <li>• If the system fails to restore to its normal state, please contact SolaX for help.</li> </ul>
IE 02	Grid Lost Fault	<p>Grid Lost Fault</p> <ul style="list-style-type: none"> <li>• Check the grid connection status</li> <li>• Or contact SolaX for help.</li> </ul>
IE 03	Grid Volt Fault	<p>Power grid voltage overrun</p> <ul style="list-style-type: none"> <li>• Wait a moment, if the utility returns to normal, the system will reconnect.</li> <li>• Please check if the grid voltage is within normal range.</li> <li>• Or contact SolaX for help.</li> </ul>
IE 04	Grid Freq Fault	<p>Grid overfrequency</p> <ul style="list-style-type: none"> <li>• Wait a moment, If the utility returns to normal, the system reconnects.</li> <li>• Or contact SolaX for help.</li> </ul>
IE 05	PV Volt Fault	<p>PV overvoltage</p> <ul style="list-style-type: none"> <li>• Check the output voltage of the PV panel.</li> <li>• Check if the DC switch is OFF.</li> <li>• Or contact SolaX for help.</li> </ul>
IE 06	Bus Volt Fault	<ul style="list-style-type: none"> <li>• Press the <b>ESC</b> key to restart the inverter.</li> <li>• Check if the PV input open circuit voltage is in the normal range.</li> <li>• Check if the power of half-wave load exceeds the system limit.</li> <li>• Or contact SolaX for help.</li> </ul>



Error Code	Fault	Descriptions and Diagnosis
IE 07	Bat Volt Fault	<p>Battery voltage fault</p> <ul style="list-style-type: none"> <li>• Check if the battery input voltage is within normal range</li> <li>• Or contact SolaX for help.</li> </ul>
IE 08	AC10mins Volt	<p>Grid voltage out of range in the last 10 minutes.</p> <ul style="list-style-type: none"> <li>• The system will return to normal if the grid returns to normal.</li> <li>• Or contact SolaX for help.</li> </ul>
IE 09	DCI OCP Fault	<p>DCI overcurrent protection fault.</p> <ul style="list-style-type: none"> <li>• Wait for a while to check if it's back to normal.</li> <li>• Or contact SolaX for help.</li> </ul>
IE 10	DCV OVP Fault	<p>DCV EPS(Off-grid) overvoltage protection fault.</p> <ul style="list-style-type: none"> <li>• Wait for a while to check if it's back to normal.</li> <li>• Or contact SolaX for help.</li> </ul>
IE 11	SW OCP Fault	<p>Software detection of overcurrent Fault.</p> <ul style="list-style-type: none"> <li>• Wait for a while to check if it's back to normal.</li> <li>• Shut down photovoltaic, battery and grid connections.</li> <li>• Or contact SolaX for help.</li> </ul>
IE 12	RC OCP Fault	<p>Overcurrent protection fault.</p> <ul style="list-style-type: none"> <li>• Check the impedance of DC input and AC output.</li> <li>• Wait for a while to check if it's back to normal.</li> <li>• Or contact SolaX for help.</li> </ul>
IE 13	Isolation Fault	<p>Insulation fault</p> <ul style="list-style-type: none"> <li>• Please check the wire insulation for damage.</li> <li>• Wait for a while to check if it's back to normal.</li> <li>• Or contact SolaX for help.</li> </ul>
IE 14	Temp Over Fault	<p>Temperature out of range</p> <ul style="list-style-type: none"> <li>• Check if the ambient temperature exceeds the limit.</li> <li>• Or contact SolaX for help.</li> </ul>
IE 15	Bat Con Dir Fault	<ul style="list-style-type: none"> <li>• Battery direction fault</li> <li>• Check if the battery lines are connected in the opposite direction.</li> <li>• Or ask for help from the installer if it can not return to normal.</li> </ul>
IE 16	EPS Overload	<p>EPS(Off-grid) overload fault</p> <ul style="list-style-type: none"> <li>• Shutdown the high-power device and press the <b>ESC</b> key to restart the inverter.</li> <li>• Or contact SolaX for help if it can not return to normal.</li> </ul>

Error Code	Fault	Descriptions and Diagnosis
IE 17	Overload Fault	<p>On-grid mode overload fault</p> <ul style="list-style-type: none"> <li>• Shutdown the high-power device and press the <b>ESC</b> key to restart the inverter.</li> <li>• Or contact SolaX for help if it can not return to normal.</li> </ul>
IE 18	BatPowerLow	<p>Bat Power Low</p> <ul style="list-style-type: none"> <li>• Shutdown the high-power device and press the <b>ESC</b> key to restart the inverter.</li> <li>• Please charge the battery to a level higher than the protection capacity or protection voltage.</li> </ul>
IE 19	BMS Lost	<p>Battery communication lost</p> <ul style="list-style-type: none"> <li>• Check that the communication cable between the battery and the inverter are properly connected.</li> <li>• Or contact SolaX for help if it can not return to normal.</li> </ul>
IE 20	Fan Fault	<p>Fan Fault</p> <ul style="list-style-type: none"> <li>• Check for any foreign matter that may have caused the fan not to function properly.</li> <li>• Or contact SolaX for help if it can not return to normal.</li> </ul>
IE 21	Low TempFault	<p>Low temperature fault.</p> <ul style="list-style-type: none"> <li>• Check if the ambient temperature is too low.</li> <li>• Or contact SolaX for help if it can not return to normal.</li> </ul>
IE 25	InterComFault	<p>Inter_Com_Fault</p> <ul style="list-style-type: none"> <li>• Restart the inverter.</li> <li>• Or contact SolaX for help if it can not return to normal.</li> </ul>
IE 26	INV EEPROM	<p>Inverter EEPROM Fault.</p> <ul style="list-style-type: none"> <li>• Shut down photovoltaic, battery and grid, reconnect.</li> <li>• Or contact SolaX for help if it can not return to normal.</li> </ul>
IE 27	RCD Fault	<p>Residual Current Device fault</p> <ul style="list-style-type: none"> <li>• Check the impedance of DC input and AC output.</li> <li>• Disconnect PV + PV - and batteries, reconnect.</li> <li>• Or contact SolaX for help if it can not return to normal.</li> </ul>
IE 28	Grid Relay Fault	<p>Electrical relay fault</p> <ul style="list-style-type: none"> <li>• Disconnect PV+ PV- grid and batteries and reconnect.</li> <li>• Or contact SolaX for help if it can not return to normal.</li> </ul>

Error Code	Fault	Descriptions and Diagnosis
IE 29	EPS Relay	<p>EPS(Off-grid) relay fault</p> <ul style="list-style-type: none"> <li>• Disconnect PV+ ,PV-, grid and batteries and reconnect.</li> <li>• Or contact SolaX for help if it can not return to normal.</li> </ul>
IE 30	PV ConnDirFault	<p>PV direction fault</p> <ul style="list-style-type: none"> <li>• Check if the PV input lines are connected in the opposite direction.</li> <li>• Or contact SolaX for help if it can not return to normal.</li> </ul>
IE 31	Battery Relay	<p>Charge relay fault</p> <ul style="list-style-type: none"> <li>• Press the <b>ESC</b> key to restart the inverter.</li> <li>• Or contact SolaX for help if it can not return to normal.</li> </ul>
IE 32	Earth Relay	<p>EPS(Off-grid) earth relay fault</p> <ul style="list-style-type: none"> <li>• Press the <b>ESC</b> key to restart the inverter.</li> <li>• Or contact SolaX for help if it can not return to normal.</li> </ul>
IE 100	PowerTypeFault	<p>Power type fault</p> <ul style="list-style-type: none"> <li>• Upgrade the software and press the <b>ESC</b> key to restart the inverter.</li> <li>• Or contact SolaX for help if it can not return to normal.</li> </ul>
IE 102	Mgr EEPROM Fault	<p>Mgr E2prom Error.</p> <ul style="list-style-type: none"> <li>• Shut down photovoltaic ,battery and grid, and then reconnect.</li> <li>• Or contact SolaX for help if it can not return to normal.</li> </ul>
IE 103	Fan4 Fault	<p>FAN4 Fault</p> <ul style="list-style-type: none"> <li>• Check if the foreign objects stuck in the fan.</li> <li>• Or contact SolaX for help.</li> </ul>
IE 104	NTC Sample Invalid	<p>NTC Sample Fault</p> <ul style="list-style-type: none"> <li>• Make sure the NTC is properly connected and the NTC is in good condition.</li> <li>• Please confirm that the installation environment is normal</li> <li>• Or contact SolaX for help if it can not return to normal.</li> </ul>

Error Code	Fault	Descriptions and Diagnosis
IE 107	CT Fault	<p>CT Fault</p> <ul style="list-style-type: none"> <li>• Check if the CT is working properly</li> <li>• Or contact SolaX for help if it can not return to normal.</li> </ul>
IE 109	Meter Fault	<p>Meter Fault</p> <ul style="list-style-type: none"> <li>• Check if the meter is working properly</li> <li>• Or contact SolaX for help if it can not return to normal.</li> </ul>
IE 110	BypassRelayFlt	<p>Bypass Relay Fault</p> <ul style="list-style-type: none"> <li>• Press the <b>ESC</b> key to restart the inverter.</li> <li>• Or contact SolaX for help if it can not return to normal.</li> </ul>
IE 111	FAN3 Fault	<p>FAN3 Fault</p> <ul style="list-style-type: none"> <li>• Check if the foreign objects stuck in the fan.</li> <li>• Or contact SolaX for help.</li> </ul>
IE 112	ARMParaComFlt	<p>ARM Parameter Communication fault</p> <ul style="list-style-type: none"> <li>• Check that the communication cables of inverters are well connected and the baud rate of COMM setting of inverters are the same.</li> <li>• Or contact SolaX for help if it can not return to normal.</li> </ul>
IE 113	FAN1 Fault	<p>FAN1 Fault</p> <ul style="list-style-type: none"> <li>• Check if the foreign objects stuck in the fan.</li> <li>• Or contact SolaX for help.</li> </ul>
IE 114	FAN2 Fault	<p>FAN2 Fault</p> <ul style="list-style-type: none"> <li>• Check if the foreign objects stuck in the fan.</li> <li>• Or contact SolaX for help.</li> </ul>
IE 115	20305Com Fault	<p>Com Fault</p> <ul style="list-style-type: none"> <li>• Check the connection of the monitoring module, reinsert the module.</li> <li>• Please contact SolaX for help.</li> </ul>
BE 01	BMS1_UCellOver BMS2_UCellOver	<p>Battery Error - Cell Overvoltage Fault</p> <ul style="list-style-type: none"> <li>• Please contact SolaX for help.</li> </ul>
BE 02	BMS1_UCellLow BMS2_UCellLow	<p>Battery Error - Cell Undervoltage Fault</p> <ul style="list-style-type: none"> <li>• Please contact SolaX for help.</li> </ul>
BE 03	BMS1_UCellDiff BMS2_UCellDiff	<p>Battery Error - Large Cell Differential Pressure Fault</p> <ul style="list-style-type: none"> <li>• Please contact SolaX for help.</li> </ul>

Error Code	Fault	Descriptions and Diagnosis
BE 04	BMS1_HVBOVer	Battery Error - Total Voltage Overvoltage Fault • Please contact SolaX for help.
	BMS2_HVBOVer	
BE 05	BMS1_HVBLow	Battery Error - Total Voltage Undervoltage Fault • Please contact SolaX for help.
	BMS2_HVBLow	
BE 06	BMS1_TempOver	Over temperature in battery system • Please contact SolaX for help.
	BMS2_TempOver	
BE 07	BMS1_SelfCheck	Self check fault in battery system • Please contact SolaX for help.
	BMS2_SelfCheck	
BE 08	BMS1_PoRlyAdh	Battery Error - Main Positive Relay Adhesion Fault • Please contact SolaX for help.
	BMS2_PoRlyAdh	
BE 09	BMS1_PoRlyOpen	Battery Error - Main Positive Open Relay Fault • Please contact SolaX for help.
	BMS2_PoRlyOpen	
BE 10	BMS1_NeRlyAdh	Battery Error - Main Negative Relay Adhesion Fault • Please contact SolaX for help.
	BMS2_NeRlyAdh	
BE 11	BMS1_NeRlyOpen	Battery Error - Main Negative Open Relay Fault • Please contact SolaX for help.
	BMS2_NeRlyOpen	
BE 12	BMS1_PreChgFail	Battery Error - Battery Precharge Fault • Please contact SolaX for help.
	BMS2_PreChgFail	
BE 13	BMS1_CellSample	Battery Error - Battery Cell Sampling Fault • Please contact SolaX for help.
	BMS2_CellSample	
BE 14	BMS1_TempSample	Battery Error - Battery Temperature Sampling Fault • Please contact SolaX for help.
	BMS2_TempSample	
BE 15	BMS1_Sys	Battery Error - Battery System Fault • Please contact SolaX for help.
	BMS2_Sys	
BE 16	BMS1_DsgOver	Battery Error - Battery Discharge Overcurrent Fault • Please contact SolaX for help.
	BMS2_DsgOver	
BE 17	BMS1_ChgOver	Battery Error - Battery Charge Overcurrent Fault • Please contact SolaX for help.
	BMS2_ChgOver	

Error Code	Fault	Descriptions and Diagnosis
BE 18	BMS1_AFCom	Battery Error - Battery AFE communication Fault • Please contact SolaX for help.
	BMS2_AFCom	
BE 19	BMS1_InvCom	Battery Error - Extranet Communication Fault • Please contact SolaX for help.
	BMS2_InvCom	
BE 20	BMS1_MidCom	Battery Error - Intermediate Network Communication Fault • Please contact SolaX for help.
	BMS2_MidCom	
BE 21	BMS1_VoltSensor	Battery Error - Voltage Sensor Fault • Please contact SolaX for help.
	BMS2_VoltSensor	
BE 22	BMS1_IDRepet	Battery Error - Repetitive ID Fault • Please contact SolaX for help.
	BMS2_IDRepet	
BE 23	BMS1_TempLow	Battery Error - Low Temperature Fault • Please contact SolaX for help.
	BMS2_TempLow	
BE 24	BMS1_CurrSensor	Battery Error - Current Sensor Fault • Please contact SolaX for help.
	BMS2_CurrSensor	
BE 25	BMS1_Line	Battery Error - Open Power Cable Fault • Please contact SolaX for help.
	BMS2_Line	
BE 26	BMS1_Flash	Battery Error - Flash Fault • Please contact SolaX for help.
	BMS2_Flash	
BE 27	BMS1_AFEProtect	Battery Error - AFE Self-protection Fault • Please contact SolaX for help.
	BMS2_AFEProtect	
BE 28	BMS1_ChgReq	Battery Error - Charge Request Fault • Please contact SolaX for help.
	BMS2_ChgReq	
BE 29	BMS1_Ins	Battery Error - Battery Insulation Fault • Check that the battery is properly grounded and restart the battery. • Please contact SolaX for help.
	BMS2_Ins	
BE 30	BMS1_MCB	Battery Error - Micro Circuit Breaker Fault • Please contact SolaX for help.
	BMS2_MCB	
BE 31	BMS1_LinkerTemp	Battery Error - Contactor Over Temperature Fault • Please contact SolaX for help.
	BMS2_LinkerTemp	

Error Code	Fault	Descriptions and Diagnosis
BE 32	BMS1_BatLinker	Battery Error - Internal contact point Abnormally high in the battery <ul style="list-style-type: none"> <li>• Please contact SolaX for help.</li> </ul>
	BMS2_BatLinker	
BE 33	BMS1_Fan	Battery Error - Fan Fault <ul style="list-style-type: none"> <li>• Check if the foreign objects stuck in the fan.</li> <li>• Or contact SolaX for help.</li> </ul>
	BMS2_Fan	

### 10.3 Maintenance

Regular maintenance is required for the device. The table below lists the operational maintenance for expressing the optimum device performance. More frequent maintenance service is needed in the worse work environment. Please make records of the maintenance.



- Only qualified person can perform the maintenance for the device.
- Only use the spare parts and accessories approved by SolaX for maintenance.

#### 10.3.1 Battery Cabinet Maintenance

##### Maintenance routine

Table 10-1 Maintenance list

Check Item	Description	Interval Time
The operating status and environment of the system	<ul style="list-style-type: none"> <li>• Check whether there is any damage to the distributed energy system, and the equipment is deformed.</li> <li>• Check whether there are any abnormal noise in the running system.</li> <li>• Check whether the parameter is correct shown in the screen.</li> <li>• Check whether there is any damage to the main components.</li> <li>• Check whether the temperature of the equipment shell is normal. Meanwhile, it is suggested to use a thermal imager or any other monitoring systems to identify signs of heat.</li> <li>• Check whether the surrounding is at normal humidity level, and there is any damage to the dust and air filters.                             <ul style="list-style-type: none"> <li>a. Must ensure that the air intake is well ventilated. Otherwise, the battery pack failure will be caused due to overheating.</li> <li>b. Please gently open the door to prevent raising dust from the filter cotton. Otherwise, the smoke detector will alarm and give a command to the automatic fire sprinkler to spray gas.</li> </ul> </li> </ul>	Every 6 months



Check Item	Description	Interval Time
System cleaning	<ul style="list-style-type: none"> <li>• Check whether the circuit boards and components are clean.</li> <li>• If necessary, clean the modules by air compressor.</li> </ul> <p><b>Note: The system must be shut down before cleaning.</b></p>	Every 6 months
Electrical connection	<ul style="list-style-type: none"> <li>• Check whether the power cables are fastened securely. If not, please tighten them again according to the torque written in the document.</li> <li>• Check there is any damage to the cables, especially the cable jacket connecting with the metal parts.</li> <li>• Check whether the electrical insulation tape is in good condition and no peeling.</li> </ul>	Every 6 months
Terminal and block connection	<ul style="list-style-type: none"> <li>• Check whether the screws are fastened securely. If not, please tighten them again according to the torque written in the document.</li> <li>• Check whether there is any fading to the screws and copper bars.</li> <li>• Check whether the wiring arrangement is reasonable.</li> <li>• Check whether the loop terminals are in good condition, and the temperature of the screws is normal.</li> </ul>	Every 6 months
Relay maintenance	<ul style="list-style-type: none"> <li>• Do a routine inspection for the corrosion of all metal components.</li> <li>• Do an annual inspection for the connectors (auxiliary switches and microswitches) to make sure that the equipment is in good running condition.</li> <li>• Check whether the parameter is correct (especially the voltage and insulation).</li> </ul>	Every 6 months
Aerosol inspection	<ul style="list-style-type: none"> <li>• Check whether the aerosol is in good condition, and wiring are fastened securely.</li> </ul>	Every 6 months
Safety function	<ul style="list-style-type: none"> <li>• Check whether the emergency stop button and LED is in good working condition.</li> <li>• Check the stopping signal and communication by simulating the shutdown operation.</li> <li>• Check whether there are any damages to warning signs and other labels pasted on the equipment. If so, please replace them in time.</li> </ul>	Every 6 months

### 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 $\pm 5\%$ .
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%.

 **WARNING!**

- Only qualified person can perform the maintenance for the device.

## 10.3.2 Inverter Maintenance

### Maintenance routines

Item	Check notes	Maintenance interval
Fans	<ul style="list-style-type: none"> <li>• Check if the cooling fans on the bottom of the inverter are covered by dirt or if there is abnormal sound.</li> <li>• Clean the cooling fans with a soft dry cloth or brush or replace it if necessary.</li> </ul>	Every 6-12 months
Electrical connection	<ul style="list-style-type: none"> <li>• Ensure that all cables are firmly connected.</li> <li>• Check the integrity of the cables, ensuring that there are no scratches on the parts touching the metallic surface.</li> <li>• Verify that the sealing caps on idle terminals are and not falling off.</li> </ul>	Every 6-12 months
Grounding reliability	<ul style="list-style-type: none"> <li>• Check whether the ground terminal and ground cable are securely connected. Use Ground Resistance Tester to test the ground resistance from inverter enclosure to PE bar in the power distribution box.</li> </ul>	Every 6-12 months
Heat sink	<ul style="list-style-type: none"> <li>• Check whether the heat sink is covered with foreign objects.</li> </ul>	Every 6-12 months
General status of inverter	<ul style="list-style-type: none"> <li>• Check if there is any damage on the inverter.</li> <li>• Check if there is any abnormal sound when the inverter is running.</li> </ul>	Every 6 months

### Replacement of fans

When the fan is not rotating and the feedback speed of the fan is 0, the LCD screen will display FAN1FAULT / FAN2FAULT / FAN3FAULT / FAN4FAULT error. Refer to the following steps for replacement.

**Step 1:** Before the maintenance of fans, the AC connection must be disconnected, then the DC switch 1 and DC switch 2 must be disconnected and wait 5 minutes till the inverter is completely OFF.

**Step 2:** Loosen the screws on the right side of the inverter with a cross screwdriver, and the nuts on the left side of the inverter.

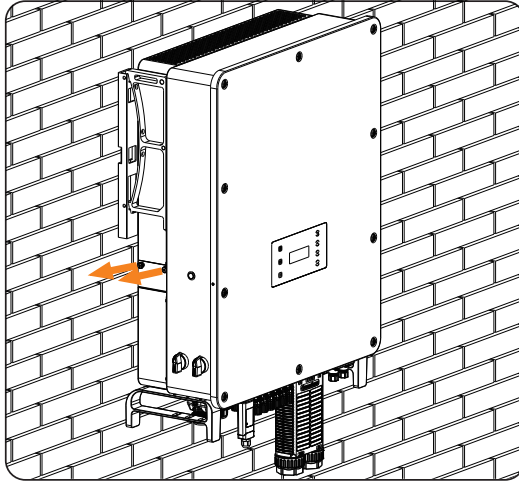


Figure 10-10 Dismantling screws

**Step 3:** Pull out the fan bracket, stop at the position about 150 mm, then press the protruding block with a screwdriver to release the fan waterproof connectors, then pull the fan bracket again to pull out the whole bracket.

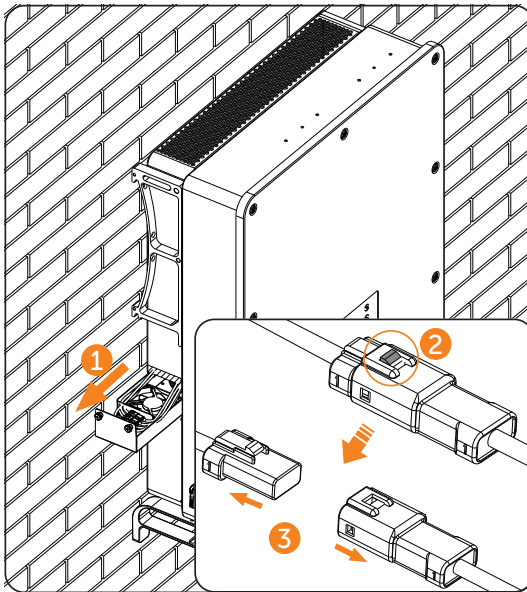


Figure 10-11 Releasing the fan waterproof connectors

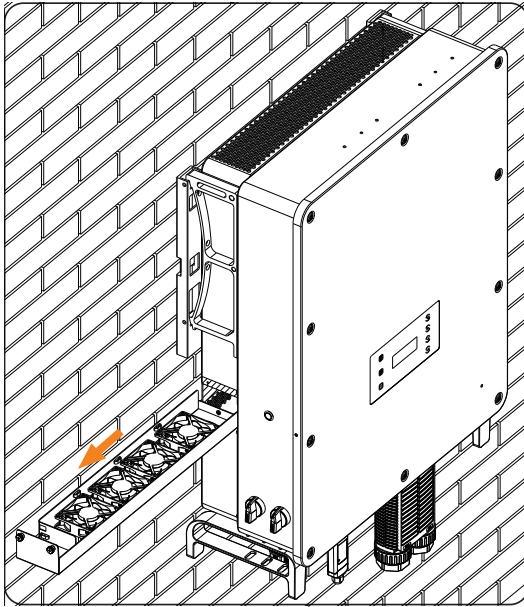


Figure 10-12 Pulling put the whole fan bracket

**Step 4:** Clean, repair, or replace the fan.

**Step 5:** Restore the installation of fan bracket and tighten the fixing screws.

## Upgrading firmware

- Upgrade precautions

### WARNING!

- Please make sure that the category format is correct. Do not modify the firmware file name. Otherwise, the inverter may not work!
- Do not modify the folder name and file path where the firmware files are located, as this may cause the upgrade to fail.

### WARNING!

- Before proceeding with the upgrade process, ensure that the PV input voltage is above 180 V (preferably on sunny days), or that the battery (SOC) is above 20%, or the battery input voltage is above 180 V. Failure to meet these conditions may result in upgrade process failure.

- Upgrade preparation
  - Prepare a USB drive (USB 2.0/3.0, ≤32 GB, FAT 16/32).
  - Check for the current firmware version of the inverter.
  - Contact our service support for the update firmware file, and save it to the USB drive.
    - » For ARM file: XXX.XXXXX.XX\_AELIO\_3P\_ARM\_VXXX.XX\_XXXX.usb
    - » For DSP file: XXX.XXXXX.XX\_AELIO\_3P\_DSP\_VXXX.XX\_XXXX.usb
  - Check the folder name and file path:

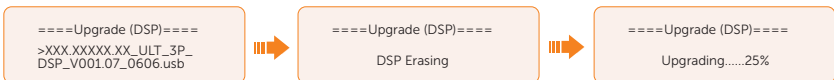


Figure 10-13 Folder name and path

- Upgrade steps
  - a. Press and hold the **Enter** key on the inverter LCD for 5 seconds to enter the **OFF** mode.
  - b. Remove the dongle (if configured) from the Dongle terminal of the inverter by hand, and then insert the USB drive. The inverter will automatically display the **Upgrade Selection** interface.
  - c. On the **Upgrade Selection** interface, select **ARM** or **DSP** based on the file type, and then tap **OK**.

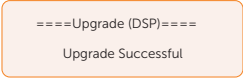


- d. Select and confirm the firmware version, and then tap the **Enter** key to start updating. ARM update takes about 20 seconds, and DSP update takes about 2 minutes.



- e. After the upgrade is completed, the LCD screen displays **Upgrade Successful**. If

the upgrades fail, the LCD screen displays **Upgrade failed**.



 **CAUTION!**

- If the ARM firmware upgrade fails or stops, do not unplug the U disk. Please power off the inverter and restart it. Then repeat the upgrade steps.

 **CAUTION!**

If the DSP firmware upgrade fails or stops, please follow these steps:

- Check if the DC switch is turned off. If it is off, turn it on.
- If the DC switch is already on, check if the battery and PV parameters in **Menu>System Status** meets the upgrade requirements (PV or battery input voltage is larger than 180V, or battery SOC is above 20%)
- (Not recommended) Alternatively, you can try charging the battery by navigating to **Menu > Mode Select > Manual > Forced Charge**. This process can help wake up the battery for DSP upgrade.

**NOTICE!**

- If the display screen is stuck after the upgrade, please turn off the DC switch and restart, and the inverter will restart and return to normal. If not, please contact us for help.

# 11 Decommissioning

## 11.1 Disassembling the Inverter



- When disassembling the inverter, strictly follow the steps as below.
- Only use measuring devices with a DC input voltage range of 1000 V or higher.

**Step 1:** Disconnect the external AC breaker of the inverter.

**Step 2:** Turn the DC switch 1 and DC switch 2 to "OFF" position. Turn off the inverter system button.

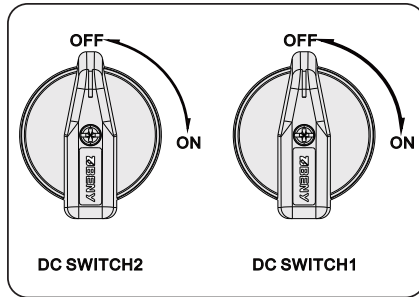


Figure 11-1 Turning off the DC switch

**Step 3:** Turn off the battery switch / button / breaker (if any). (See documents of battery)

**Step 4:** Wait until the LCD screen turns off.

**Step 5:** Disconnect the PV connectors: Insert the removal tool into the notch of PV connectors and slight pull out the connectors.

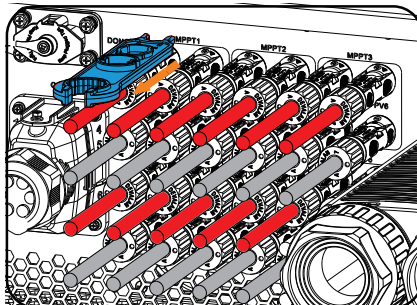


Figure 11-2 Releasing the PV connector



**Step 6:** Disconnect the battery connectors.

**Step 7:** Disconnect the AC connector: Loosen the M4 screws on the AC connector. Pull out the AC enclosure and release the screws securing the AC terminals.

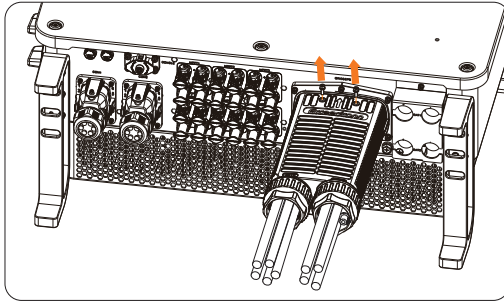


Figure 11-3 Removing AC connector

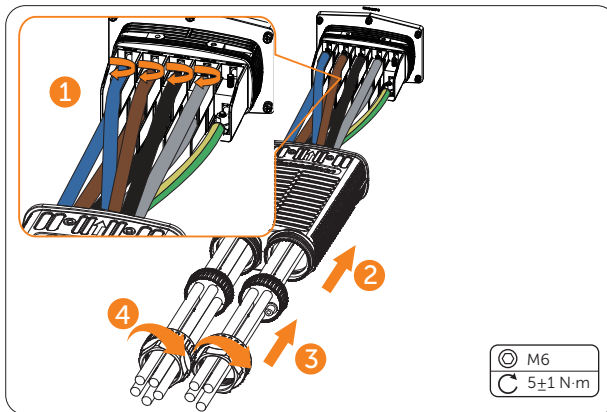


Figure 11-4 Removing AC terminals

**Step 8:** Disconnect the COM 1 connector and COM 2 connector: Please loosen the swivel nut of the COM connector and anti-clockwise loosen M3 screw of the communication connector by cross screwdriver. Pinch the tabs on the sides of the connector and pull the connector at the same time to remove it.

**Step 9:** Put the original terminal cap on the terminals.

**Step 10:** Unscrew the grounding screw by crosshead screw and remove the grounding cable.

**Step 11:** Unscrew the M5\*50 screws on the sides of inverter. (The inverter installed on the wall is taken for an example.)

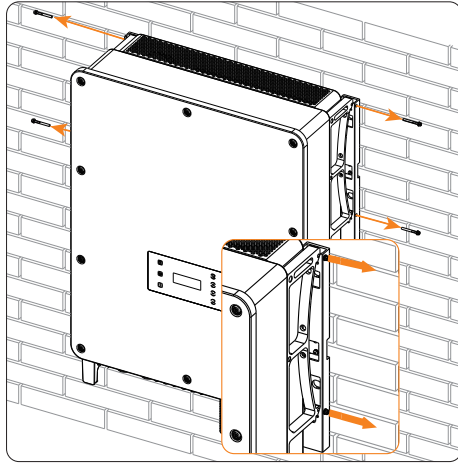


Figure 11-5 Unscrewing screws on the inverter

**Step 12:** Reinstall the eye bolts on the top of the inverter, use a crane to lift down the inverter. (The inverter installed on the wall is taken for an example.)

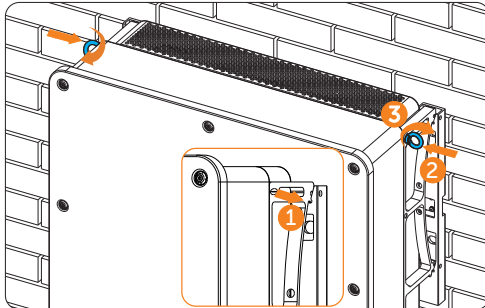


Figure 11-6 Reinstalling the eye bolt

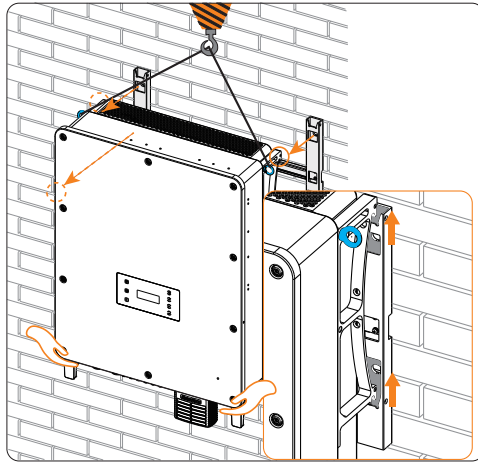


Figure 11-7 Lifting down the inverter

#### NOTICE!

- In case of personal injury or device damage, ladders will be helpful for installers to stand high and to adjust the inverter position when the inverter is lifted down from the wall mounting bracket.

**Step 13:** Unscrew the screws for fastening the wall mounting bracket and remove the wall mounting bracket.

## 11.2 Packing the Inverter

- Load the inverter into the original packing material if possible.

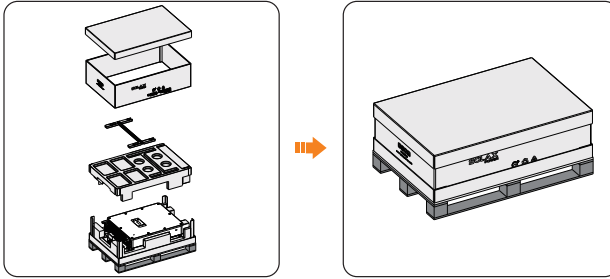


Figure 11-8 Packing the inverter

- If the original packing material is not available, use the packing material which meets the following requirements:
  - » Suitable for the weight of product
  - » Easy to carry
  - » Be capable of being closed completely

## 11.3 Disposing of the Wasted and Damaged Battery Pack and Inverter

Please dispose of the inverters, rechargeable battery or accessories in accordance with the disposal regulations for electronic waste which is applied at the installation site.

### NOTICE!

- The expenses for dispose of the wasted or damaged battery packs incurred shall be borne by the user.

# 12 Technical Data

## Inverter technical data

- DC input

Model	X3-AELIO-50K	X3-AELIO-60K
Max. recommended PV array power [kWp]	100	120
Max. PV input power per MPPT [kW]		30
Max. PV input voltage [V] <sup>①</sup>		1000
Nominal PV input voltage [V]		650
MPPT voltage range [V]		160-950
Full load MPPT voltage range [V] <sup>②</sup>		320-800
Start-up voltage [V]		200
No. of MPP trackers		5
Strings per MPP tracker		2
Max. input current per MPPT [A] <sup>③</sup>		40
Max. input short circuit current per MPPT [A] <sup>③</sup>		50
Max. inverter backfeed current to the array [A]		0
DC disconnection switch		YES

### Note:

- ① The maximum input voltage represents the highest DC voltage threshold for the inverter, approaching which power derating occurs and any further increase might lead to potential damage to the inverter.
- ② PV voltage out of the full load MPPT range will trigger the inverter derating protection or possibly cause damage to the inverter if it exceeds the Max. input voltage.
- ③ Max. current for each PV input string is 35A

## Technical Data

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- AC output

Model	X3-AELIO-50K	X3-AELIO-60K
Rated AC power [kW]	50	60
Max. apparent AC power [kVA]	55	66
Rated grid voltage [V] (AC voltage range)	3/N/PE,400V/230V, 380V/220V	
Rated grid frequency [Hz]	50/60, $\pm 5$ Hz	
Rated AC current [A]	72.2	86.6
Max. AC current [A]	83.6	100.3
Current (inrush) (at 50 $\mu$ s) [A] (AC 280V, 90°)	104.0	
Adjustable power factor range	1 (-0.8~0.8)	
Total harmonic distortion (THDi, rated power)	<3%	
Maximum output fault current [A]	195	240
Maximum output overcurrent protection [A]	225	260
Feedin phases	3	
Parallel operation	Yes	
Unbalanced output	Yes	

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- Battery

Model	X3-AELIO-50K	X3-AELIO-60K
Battery voltage range [V]	180-820	
Recommended battery voltage [V]	650	
Max.charge/discharge power [kW]	50/50	60/60
Max.charge/discharge current [A]	160 (80*2)	
Battery connection	2	

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- EPS output (with battery)

Model	X3-AELIO-50K	X3-AELIO-60K
Rated EPS voltage [V], Frequency [Hz]	400/230V, 50/60Hz	
Rated EPS output power [kW]	50	60
Peak EPS output power [kW]	55/ 75kVA for 10s	66/ 90kVA for 10s
Switch time [s]	<10ms	
Total harmonic distortion (THDi)	<3%	
Parallel operation	Yes	

- Efficiency

Model	X3-AELIO-50K	X3-AELIO-60K
Euro-efficiency	97.20%	
Max. efficiency	98.00%	
Rated battery charge/discharge efficiency	98.5%/97.00%	

- Power consumption

Model	X3-AELIO-50K	X3-AELIO-60K
Internal consumption (night) [W]	<25	

- Environment limit

Model	X3-AELIO-50K	X3-AELIO-60K
Protection class	IP66	
Operating temperature range [°C ]	-35~60	
Relative Humidity (condensing) [%]	0~100	
Altitude [m]	< 3000	
Storage temperature [°C ]	-40°C~+70°C	
Noise emission (Typical) [dB]	< 65	
Over voltage category	PV:II + Main:III	

## Technical Data

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- General data

Model	X3-AELIO-50K	X3-AELIO-60K
Dimensions (WxHxD) [mm]	820×670×257	
Weight [kg]	<100	<105
Cooling concept	Smart air cooling	
Topology	Non-isolated	
Communication	RS485, CAN-BMS,CAN-Parallel,USB,DI,DO, DRM	
LCD display	Optional	
SPD	PV Type II+AC Type II	
AFCI	Optional	

**Note:**

\* The specific gross weight is subject to the actual situation of the whole machine.

- Standard

Model	X3-AELIO-50K	X3-AELIO-60K
Safety	EN/IEC 62109-1/-2	
EMC	EN/IEC 61000-6-1/-2/-3/-4; EN/IEC 61000-3-2/-3/-11/-12; EN 55011; IEC 62920	
Cetification	VDE4105, G99, AS4777, EN50549, CEI 0-21, IEC 61727, PEA/MEA, NRS-097-2-1, RD1699, TOR	



## Battery cabinet technical data

- DC Side

Model	AELIO-P50B100	AELIO-P60B100
Max. PV input power [W]	100	120
Max. PV input voltage [V]	1000	1000
Start output voltage [V]	200	200
Rated input voltage [V]	650	650
MPPT voltage range [V]	160~950	160~950
No. of MPP trackers / Strings per MPP tracker	5 (2 per MPPT)	6 (2 per MPPT)
Max. input current [A]	40	40
Max. input short circuit current [A]	50	50

- AC Side

Model	AELIO-P50B100	AELIO-P60B100
Rated AC output power [kW]	49.9	60
Rated AC output current [A]	72	86.6
Max. AC output apparent power [kVA]	54.9	66
Max. AC output current [A]	83.4	100.3
Nominal grid voltage [V]	3P/(N)/PE, 400/230, 380/220	
Nominal grid frequency [Hz]	50/60	
Auxiliary Power Input Voltage [a.c. V]	L/N/PE, 230, 220	
Auxiliary Power Input Current [a.c. A]	Max. 10	
Auxiliary Power Frequency [Hz]	50/60	
Auxiliary Power Short Current [A]	350	
Adjustable power factor range	1 (0.8 Leading ~ 0.8 Lagging)	
THDi (Rated power) [%]	< 3	

## Technical Data

- Battery

Model	AELIO-P50B100	AELIO-P60B100
Battery type	LiFePO4	
Rated battery capacity [kWh]	100	
Rated battery voltage [V]	358.4	
Battery voltage range [V]	280~408.8	
Discharge depth [%]	90	
Rated charge/discharge current [A]	140	
Max charge/discharge current [A]	160 (80 × 2)	

- General Parameter

Model	AELIO-P50B100	AELIO-P60B100
Dimensions (with Inverter) (W×H×D) [mm]	1310 × 2300 × 1140	
Dimensions (without Inverter) (W×H×D) [mm]	1020 × 2300 × 1140	
Weight (with Inverter) [kg]	1600	
Weight (without Inverter) [kg]	1500	
Operating ambient temperature range [°C]	-30~50	
Relative humidity(Non-condensing) [%]	0~95	
Max. operating altitude [m]	3000	
Cooling concept	Smart air cooling	
Ingress protection	Cabinet: IP55; Inverter: IP65	
Fire protection	Aerosol / Water	
Topology	Non-isolated	
Standard	IEC62619, IEC63056:2000, IEC61000, IEC62477-1, UN38.3	

# 13 Appendix

## 13.1 Micro-grid Application

### 13.1.1 Introduction of Micro-grid Application

Due to Islanding Effect, on-grid inverter is unable to work during off-grid. This characteristic makes user losing the on-grid inverter PV energy when off-grid. Micro-grid is the function that making hybrid inverter simulate the grid to active on-grid inverter during off-grid by connecting on-grid inverter to hybrid inverter's EPS terminal.

### 13.1.2 Wiring Connection Diagram

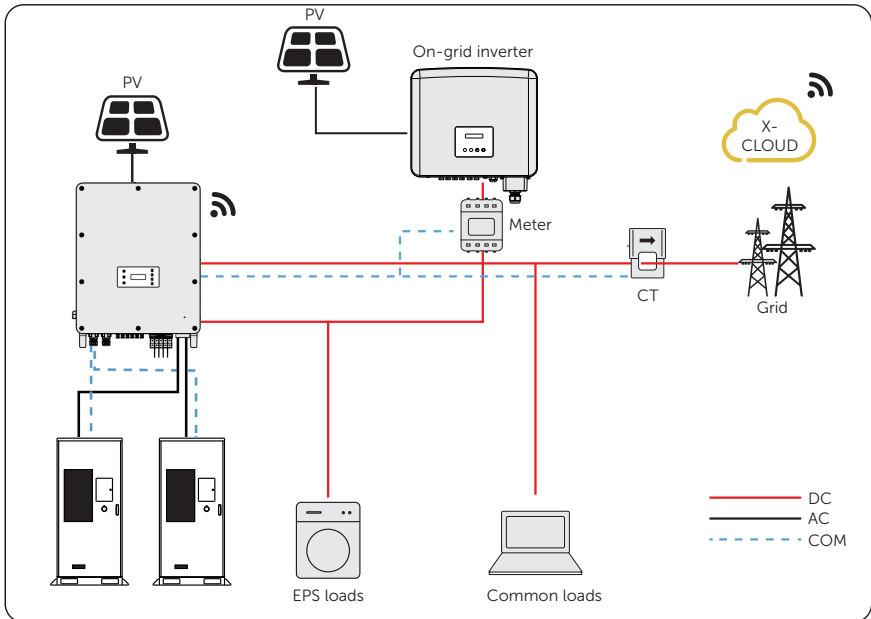


Figure 13-9 Micro-grid wiring connection

### 13.1.3 Working Modes

#### Grid on

- When PV is sufficient, the hybrid and on-grid inverters power the general and critical loads together. When there is surplus energy on the on-grid inverter, it will also charge the battery connected to the hybrid inverter.
- When PV is insufficient, the hybrid, on-grid inverter and grid power all the loads.

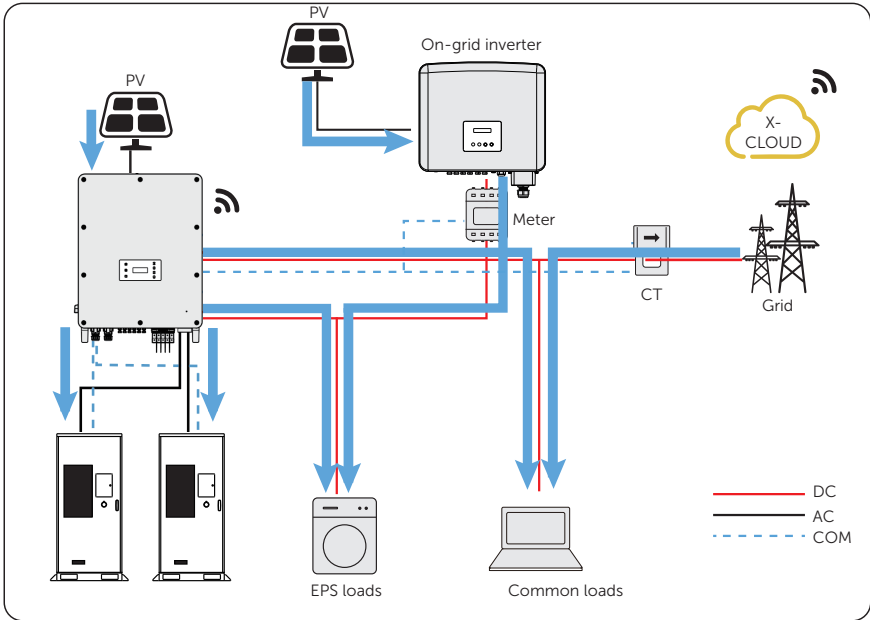


Figure 13-10 Power flowing when grid on and PV sufficient

## Grid off

In this case, the hybrid inverter will simulate the grid so as to make the on-grid inverter can still work. Hybrid and on-grid inverter will power the EPS loads together. If there is surplus energy, it will charge the battery.

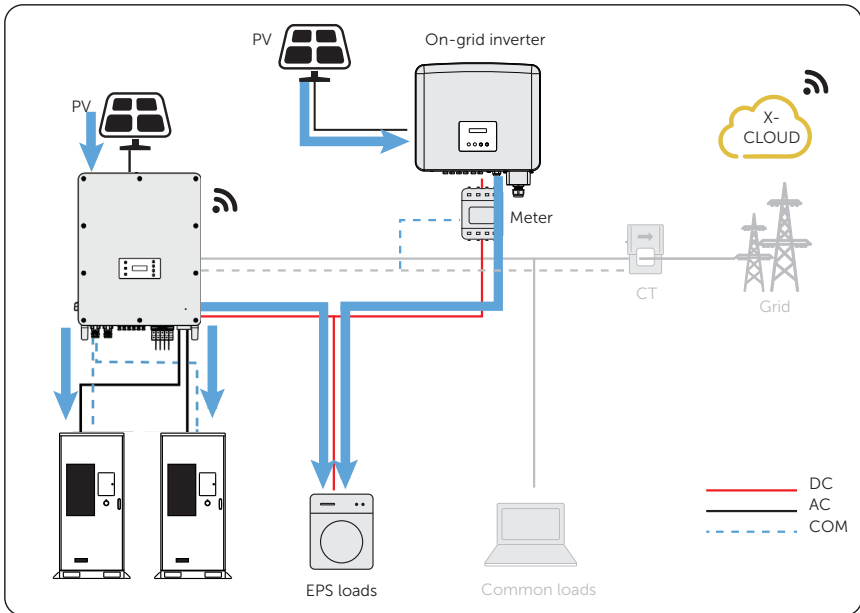


Figure 13-11 Power flowing when grid off

## Notice for Micro-grid application

- Any brand of on-grid inverter that supports "frequency adaptation"
- On-grid inverter output power  $\leq$  Max hybrid inverter EPS output power
- On-grid inverter output power  $\leq$  Max battery charging power, refer to the table below:

### NOTICE!

- Since X3-AELIO series inverter is unable to control the output power of on-grid inverter in grid connection mode, therefore X3-AELIO series inverter can not achieve zero export when loads power + battery charging power < on-grid inverter output power.

### 13.1.4 Cable Connection (Hybrid inverter)

Please refer to "7.4.2 AC Connection" for Grid and EPS connection on X3-AELIO series inverter.

### 13.1.5 Cable Connection (On-grid Inverter)

Please connect the AC cable of on-grid inverter to the EPS terminal of X3-AELIO series inverter through a circuit breaker. Please refer to the user manual of specific on-grid inverter.

### 13.1.6 Cable Connection (Meter)

To detect and monitor the power data generated from the on-grid inverter, you can install a meter on the on-grid inverter side. Otherwise, the relevant power data of on-grid inverter can not be monitored.

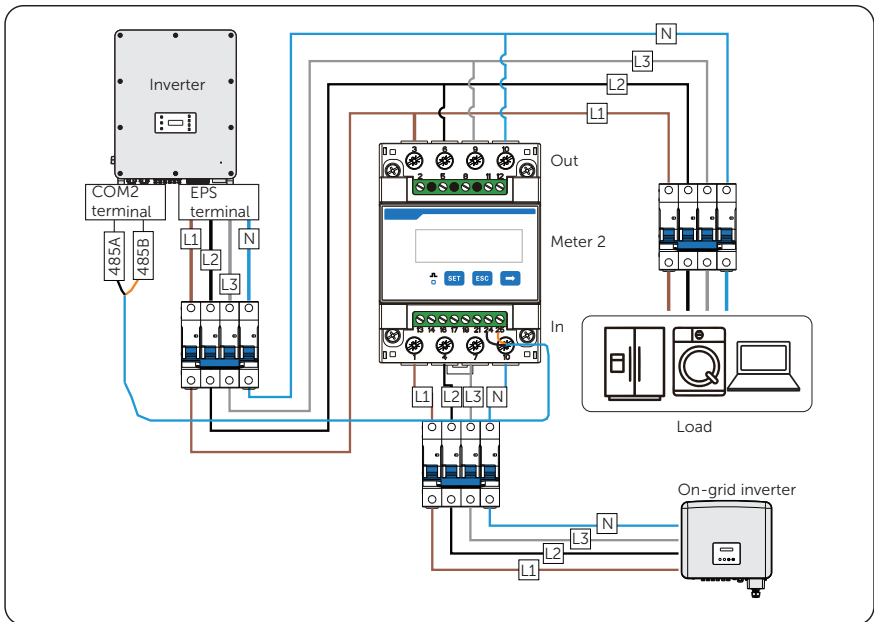


Figure 13-12 Connection diagram of Meter on EPS terminal

## NOTICE!

- If one-to-two adapter for RJ45 terminal is used, it should be placed in a waterproof enclosure.

- Pin definition

Table 13-2 Pin definition for meter and CT

Application	For CT1			For meter		For CT2		
Pin	1	2	3	4	5	6	7	8
Assignment	CT_ R1_ CON	CT_ S1_ CON	CT_ T1_ CON	METER _485A	METER _485B	CT_ T2_ CON	CT_ S2_ CON	CT_ R2_ CON

- Meter/CT connection steps

Please refer to "[Meter/CT Connection](#)" and meter/CT user manual for specific connection steps.

- Setting on the LCD

Setting path: **Menu>Setting>Advance Setting>Meter/CT Setting**

① For meter 1 and meter 2 solution (Meter 1 for girdi connection, Meter 2 for EPS connection)

- Select and enter the **Meter/CT Setting** according the setting path.
- Set the address and direction of Meter 1: You can check the connection status in **Meter/CT Check**.



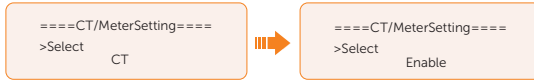
- Set the address and direction of Meter 2: And Enable the **External INV**. You can check the connection status in **Meter/CT Check**.



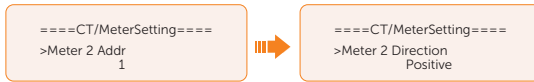
- After connection succeeded, check the feed-in power of Meter 1 in the path of **Menu>System Status>Meter/CT** and check the output power (**Output Today** and **Output Total**) of Meter 2 in the path of **Menu>History Data>E\_USERDEF**.

② For CT and meter 2 solution (CT for grid connection, Meter 2 for EPS connection)

- a. Select and enter the **Meter/CT Setting** according the setting path.
- b. Select and enable the CT function, select the CT. You can check the connection status in **Meter/CT Check**.



- c. Set the address and direction of Meter 2: And Enable the **External INV**. You can check the connection status in **Meter/CT Check**.



- d. After connection succeeded, check the feed-in power of Meter 1 in the path of **Menu>System Status>Meter/CT** and check the output power (**Output Today** and **Output Total**) of Meter 2 in the path of **Menu>History Data>E\_USERDEF**.



## 13.2 Application of Parallel Function

### 13.2.1 Introduction of Parallel Application

The series inverters supports parallel operation in both Grid and EPS modes. It supports up to 3 units in the parallel system when not equipped with a parallel cabinet, and supports up to 5 units in the parallel system when equipped with a 300kW parallel cabinet. Details as follows:

Table 13-3 Maximum inverter number in parallel system

Model	X3-AELIO-50K	X3-AELIO-60K	X3-AELIO-49.9K	X3-AELIO-61K	X3-AELIO-49.9K-P
Without X3-PBOX-300kW			3		
With X3-PBOX-300kW	6	5	6	5	6

### 13.2.2 Notice for Parallel Application

- All inverters should be of the same software version.
- For optimal efficiency, it is recommended that all inverters have the same model, and are connected to batteries of the same model and quantity.
- In parallel system, there are three status: **Free**, **Slave** and **Master**.

Table 13-4 Three status

Free	Only if no one inverter is set as a <b>Master</b> , all inverters are in <b>Free</b> mode in the system.
Slave	Once one inverter is set as a <b>Master</b> , all other inverters will enter <b>Slave</b> mode automatically. <b>Slave</b> mode can not be changed from other modes by LCD setting.
Master	When one inverter is set as a <b>Master</b> , this inverter enters <b>Master</b> mode. <b>Master</b> mode can be changed to <b>Free</b> mode.

- Master inverter has an absolute lead in the parallel system to control all slave inverter's energy management and dispatch control. Once master inverter has some error and stop working, all slave inverters will be stop simultaneously. But master inverter is independent of all slave inverters to work and will not be affected by slave inverter's fault.
- Overall system will be running according to master inverter's setting parameters, and most setting parameters of slave inverter will be kept but not be cancelled.
- Once slave inverter exits from the system and be running as an independent unit (the network cable is disconnected simultaneously), its all setting will be re-activated.

- The parallel system is extremely complex and requires a large number of cables to be connected. Therefore, the cables must be connected in the correct wire sequence. Otherwise, any small mistake can lead to system failure.
- The communication cable length should not exceed 40 m.

### 13.2.3 System Wiring Diagram

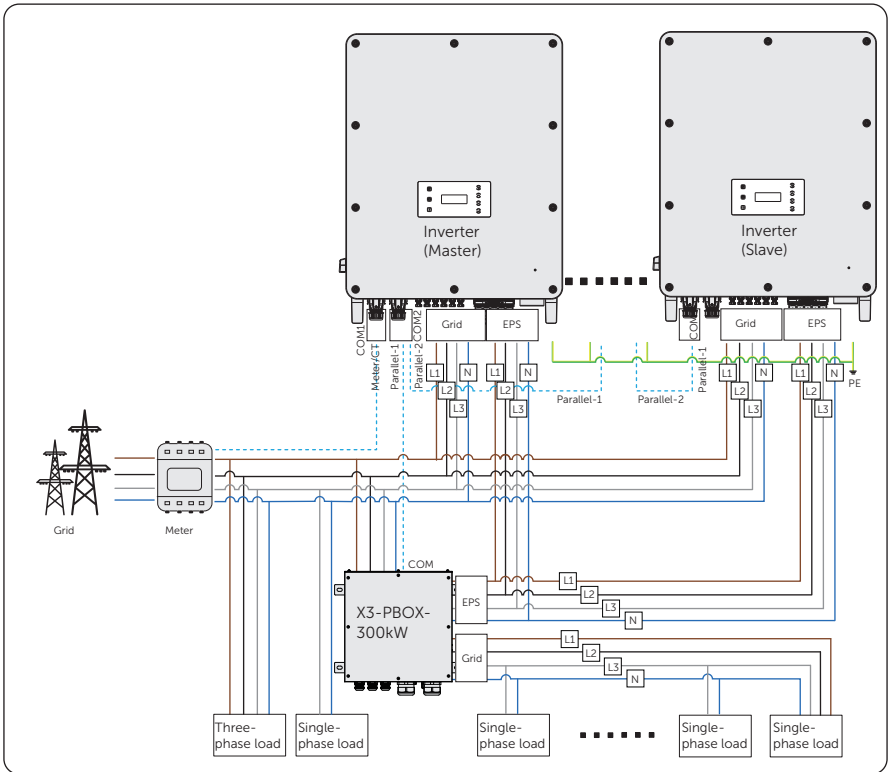


Figure 13-13 With X3-PBOX-300kW system wiring diagram

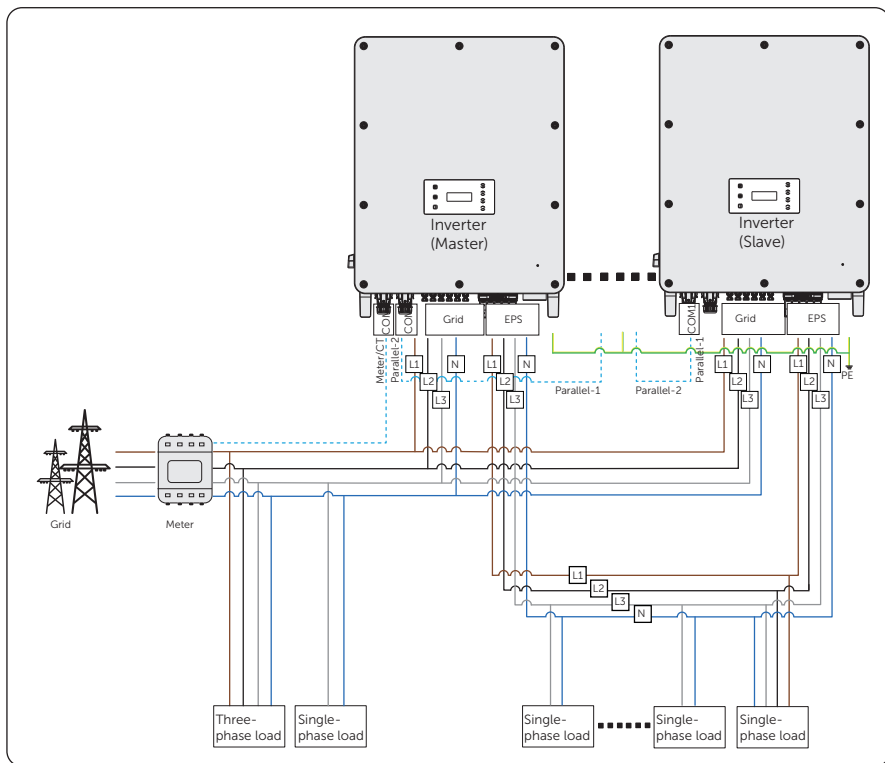


Figure 13-14 Without X3-PBOX-300kW system wiring diagram

### 13.2.4 System Wiring Procedure

#### Power cable Wiring-Grid and EPS terminal

- With X3-PBOX-300kW:
  - a. User five-core copper cable to connect Master-Slave inverter and Master-X3-PBOX-300kW.
  - b. Grid terminal of Master, Slave inverter and X3-PBOX-300kW: L1 connects to L1, L2 connects to L2, L3 connects to L3 and N connects to N,
  - c. EPS terminal of Master, Slave inverter and X3-PBOX-300kW: L1 connects to L1, L2 connects to L2, L3 connects to L3 and N connects to N,
  - d. All PE cable connects to the same E-BAR nearby.

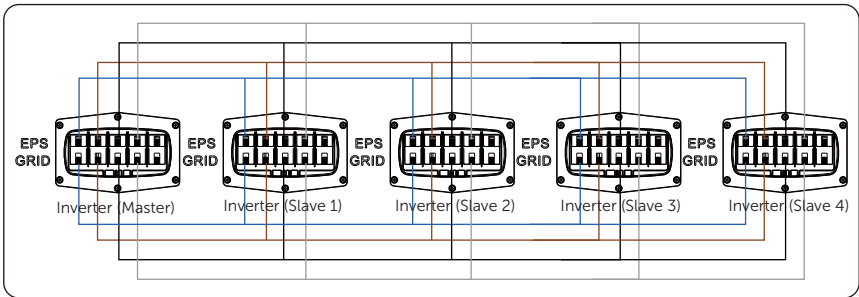


Figure 13-15 Power cable wiring with X3-PBOX-300kW

- Without X3-PBOX-300kW:
  - a. User five-core copper cable to connect Master-Slave inverter.
  - b. Grid terminal of Master and Slave inverter: L1 connects to L1, L2 connects to L2, L3 connects to L3 and N connects to N,
  - c. EPS terminal of Master and Slave inverter: L1 connects to L1, L2 connects to L2, L3 connects to L3 and N connects to N,
  - d. All PE cable connects to the same E-BAR nearby.

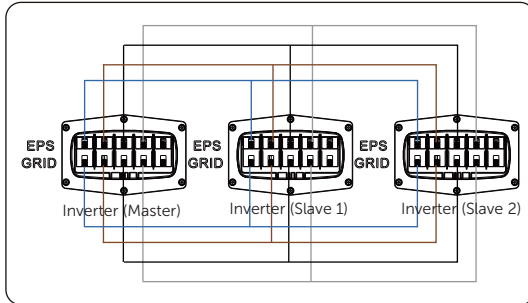


Figure 13-16 Power cable wiring without X3-PBOX-300kW

### Communication cable Wiring-COM1 terminal and COM2 terminal

- With X3-PBOX-300kW:
  - a. Use standard network cables for Master-Slave inverter connection.
  - b. Master inverter Parallel-1 connects to the COM terminal of X3-PBOX-300kW.
  - c. Master inverter Parallel-2 connects to Slave 1 inverter Parallel-1;
  - d. Slave 1 Parallel-2 connects to Slave 2 Parallel-1; other inverters are connected in such way.
  - e. Meter connects to Meter/CT terminal of the Master inverter. Please refer to "[Meter/CT Connection](#)".

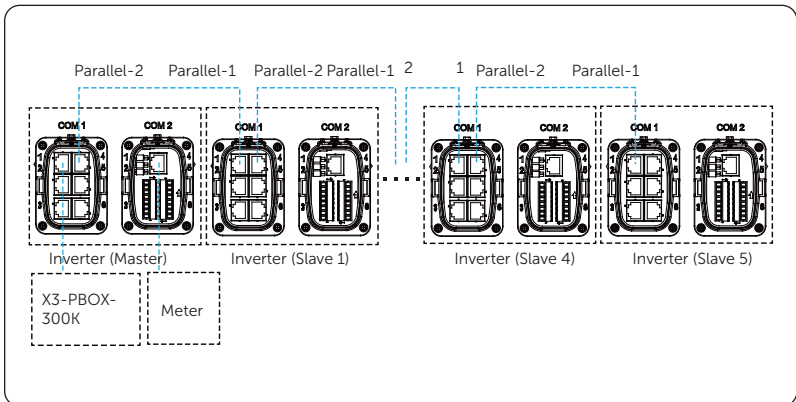


Figure 13-17 Communication wiring with X3-PBOX-300kW

- Parallel connection without X3-PBOX-300kW:
  - a. Use standard network cables for Master-Slave inverter connection.

- b. Master inverter Parallel-2 connects to Slave 1 inverter Parallel-1.
- c. Slave 1 inverter Parallel-2 connects to Slave 2 inverter Parallel-1.
- d. Meter connects to Meter/CT terminal of the Master inverter. Please refer to "Meter/CT Connection".

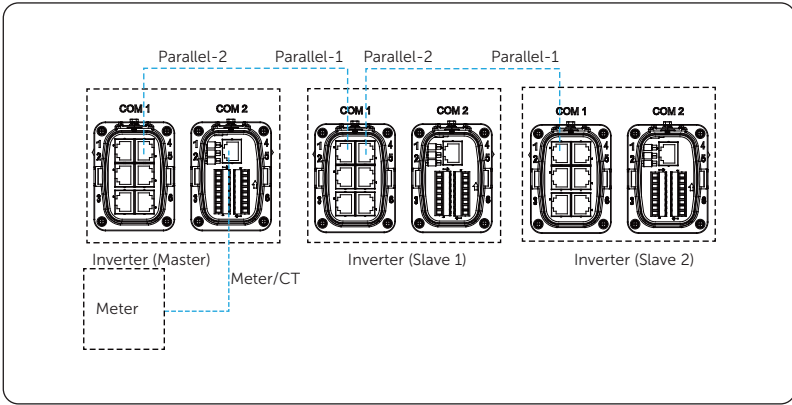


Figure 13-18 Communication wiring without X3-PBOX-300kW

**NOTICE!**

- For details on the parallel connection of X3-PBOX-300kW, see *X3-PBOX-300kW Installation Guide*.
- For details on the specific wiring of the inverter, see "7.4.2 AC Connection" and "Parallel Connection".

### 13.2.5 Settings for Parallel Connection

#### Meter/CT setting

Setting path: **Menu>Setting>Advance Setting>Meter/CT Setting.**

#### Parallel setting

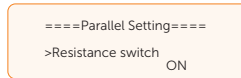
Setting path: **Menu>Setting>Advance Setting>Parallel Setting.**

How to build the parallel connection

- Turn on the power of the entire system, find the inverter which needs to be set as Master and connect the meter to Master inverter, enter the setting page of the Master inverter LCD screen, select the **Parallel Setting**, and select **Master**; then enter the **Resistance Switch** and set it to **ON**;

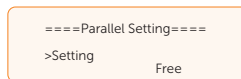


- Find the last slave in the parallel system and enter the setting page of the inverter LCD screen and set the **Resistance Switch** to **ON**.



How to remove the parallel connection

- Find the inverter which needs to be set as Free. Select the **Parallel Settings** and select **Free** for the inverter.



- Disconnect all the network cables on the Parallel-1 and Parallel-2 port.

#### NOTICE!

- If a slave inverter is set to **Free** mode but not disconnect the network cable, this inverter will return to **Slave** mode automatically.
- If a slave inverter is disconnected with master inverter but not be set to **Free** mode, this slave inverter will stop working and prompt **ParallelFault**.

#### External ATS setting

Setting path: **Menu>Setting>Advance Setting>External ATS.**

When the X3-PBOX-300K is connected in the parallel system, enable the function.

```
====External ATS====  
Function Control  
> Disable <
```

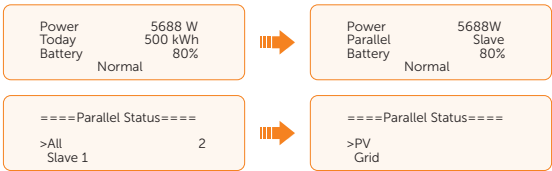
### Parallel display

Displaying path: **Menu>Parallel Status**

**NOTICE!**

- Once inverter enters parallel system, the **Today** yield will be replaced by **Parallel**.

In **Parallel Status** interface, the whole system power and individual slave inverter power can be obtained in **Parallel Status** interface of master inverter. The number displayed in the **Parallel Status** interface refers to the total number of online inverters, for example two inverters in parallel in the below figure.





### 13.3 Requirements for OT/DT/OT Terminal

- In the case of a copper cable, please use a copper wiring terminal.
- In the case of a copper-clad aluminum cable, please use a copper wiring terminal.
- In the case of an aluminum alloy cable, please use a copper-to-aluminum wiring terminal or an aluminum wiring terminal with a copper-to-aluminum washer.
  - » Do not connect the aluminum wiring terminal to the terminal block. Otherwise, electrochemical corrosion may occur, compromising the reliability of the cable connection.
  - » The copper-to-aluminum wiring terminal or the aluminum wiring terminal with a copper-to-aluminum washer used must meet the IEC61238-1 requirements.
  - » When using the copper-to-aluminum washer, you must confirm that the aluminum side of the washer contacts the aluminum wiring terminal, as well as the copper side of the washer contacting the terminal block.

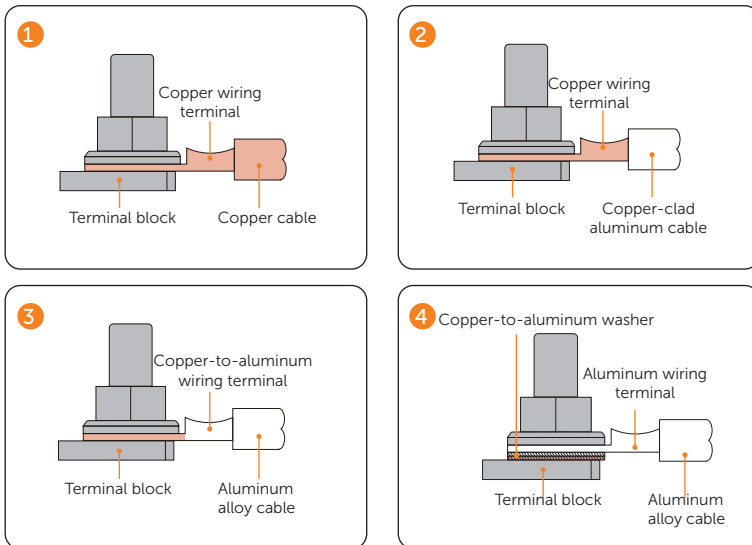


Figure 13-1 Requirement for OT/DT/OT terminal

### 13.4 How to Repaint the Cabinet

In bad weather conditions, such as rain, snow, gales, sandstorms, etc., stop carrying out repainting even if the equipment is installed outside.

Strictly comply with the pantone color described in the document while repainting.

#### Repainting description

To keep the equipment appearance intact, please repaint it immediately in the case of flaking and peeling paint.

**NOTICE!**

- Prepare tools and sufficient materials according to the On-site Assessment Report of the Extent of the Paint Damage.

Table 13-1 Repainting description

Extent of the paint damage	Tools and materials	Procedure	Description
Light scratches on equipment (without reaching the steel substrate)	Spray paint or oil paint, hairbrush (for small scratched area), fine sandpaper, absolute alcohol, cotton cloth, paint	Steps 1, 2, 4, and 5	<ol style="list-style-type: none"> <li>1. Regarding the painting, the pantone color (Pantone 11-4800TCX) is for reference.</li> <li>2. Regarding the light scratches or small area of stubborn stains, it is suggested to use spray paint and hairbrush.</li> </ol>
Stubborn stains on equipment	sprayer (for large scratched area).		
Deep scratches on equipment (the damaged primer, reaching the steel substrate)	Spray paint or oil paint, zinc-rich primer, hairbrush (for small scratched area), fine sandpaper, absolute alcohol, cotton cloth, paint sprayer (for large scratched area).	Steps 1, 2, 3, 4, and 5	<ol style="list-style-type: none"> <li>3. Regarding the deep scratches or the large area of stubborn stains, it is suggested to use oil paint and paint sprayer.</li> <li>4. Make sure that the damaged area with even coverage and thin, to create a consistent and even appearance.</li> </ol>
The damaged logo or pattern, dents and dings	<p>If the logo or any other patterns are damaged, contact your local spraying company to customize a repainting plan in accordance with the size, color, and extent of the damage to the logo or patterns.</p> <ol style="list-style-type: none"> <li>1. If the damaged area is &lt; 100 mm<sup>2</sup> and the depth is &lt; 3 mm, it is recommended to use a poly-putty base to fix the dents and dings first and then deal with them according to the Procedure for Deep Scratches.</li> <li>2. If the damaged area is &gt; 100 mm<sup>2</sup> or the depth is &gt; 3 mm, contact your local supplier to make a repair plan based on the actual situation.</li> </ol>		

## Procedure

**Step 1:** Gently sand the scratched surface with a fine sandpaper to remove rust or stains.

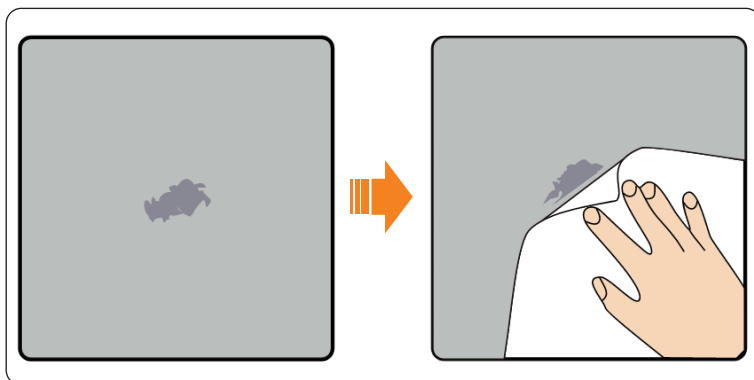


Figure 2-2 Sanding the scratched surface

**Step 2:** Clean the scratched area properly with a wet cotton cloth to remove dirt, and then wipe it with a dry cotton cloth.

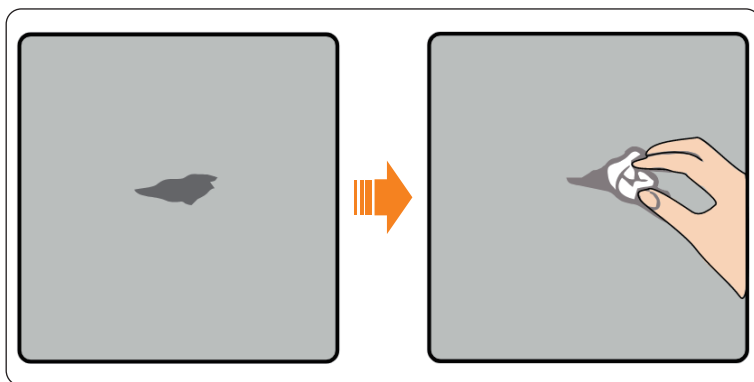


Figure 2-3 Cleaning the scratched area

**Step 3:** Apply the zinc-rich primer to the scratched area through a hairbrush or paint sprayer.

**NOTICE!**

- If the bare metal underneath can be seen,
  - » Firstly, the epoxy zinc-rich primer must be applied;
  - » Secondly, apply the acrylic top coat until the primer is dry and the bare metal cannot be seen.
- The epoxy zinc-rich primer and the acrylic top coat shall be decided according to the surface coating of the equipment.

**Step 4:** Given the damage degree, one of the following methods, self painting, brush painting, or paint sprayer can be chosen to evenly paint the damaged area.

**NOTICE!**

- Make sure that the damaged area with even coverage, smooth and thin, to create a consistent and even appearance.
- If there are any other colors on the equipment, carefully position the tape or paper over the undamaged area before painting, to avoid staining these colors.

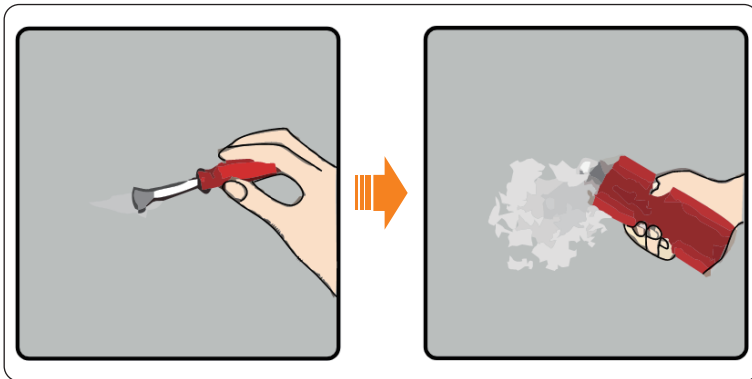


Figure 2-4 Painting the damaged area

**Step 5:** Allow the paint to dry for at least 30 minutes, and then check whether the repaired area meets requirements.

**NOTICE!**




- The color of the repaired area shall be consistent with the surrounding area. Use a colorimeter to measure the color difference, of which Delta E shall be  $\leq 3$ . If the color cannot be measured by a colorimeter, please confirm that there is no obvious color difference at the edges between the repaired area and the surrounding area, as well as no bumps, scratches, flakings, or breaks.
- In the case of spray painting, it is suggested to paint 3 times first before checking whether it meets the requirements. If not, please repeat spray painting until it meets the requirements.



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