



X1-IES

**2.5 kW / 3.0 kW / 3.7 kW / 4.6kW /
5.0kW / 6.0kW / 8.0kW**

User Manual

Version 7.0

www.solaxpower.com



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

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About This Manual

Scope of Validity

This manual is an integral part of X1-IES system. It describes the installation, electrical connection, commissioning, maintenance and troubleshooting of the product. Please read it carefully before operation.

This X1-IES system includes X1-IES series inverter and T-BAT-SYS-HV-S50E.

X1-IES series inverter models:

| | |
|-------------|-------------|
| X1-IES-2.5K | X1-IES-3K |
| X1-IES-3.7K | X1-IES-4.6K |
| X1-IES-5K | X1-IES-6K |
| X1-IES-8K | |

T-BAT-SYS-HV-S50E components:

| | |
|---------------------|--------------------------------|
| BMS (TBMS-MCS0800E) | Battery module (TP-HS50E) |
| Base | Cover (with series box inside) |

Note:

"X1-IES system" is a residential single-phase photovoltaic storage hybrid inverter system.

"X1-IES series inverter" (inverter for short) refers to the energy storage inverter that supports photovoltaic grid-connected.

"3K" means rated output power of 3kW.

"T-BAT-SYS-HV-S50E" (T-BAT-SYS for short) is the name of battery system. It includes BMS, battery modules, base, cover and series box.

"BMS" is an electronic system that manages rechargeable batteries. It is installed on battery module (s). Its model name is TBMS-MCS0800E.

"Battery module" is an electrical battery that can charge or discharge loads. It is installed under a BMS or a cover. Its model name is TP-HS50E.

"Base" is used to support the batteries. It is installed under the battery module (s).

"Cover" is installed on the top battery module of the expansion battery tower.

"Series box" is used to connect the two towers through wiring. It is installed on the top battery module of the expansion battery tower and inside the "cover".





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

Change History

Version 07 (2024-12-23)

Updated [7.2.7 Monitoring Connection](#) (Modified WiFi connection)

Version 06 (2024-09-25)

Updated [5.2 Scope of Delivery](#) (Modified CT into optional)

Version 05 (2024-08-15)

Updated Matebox

Version 04 (2024-07-30)

Updated [7.2.5.2 CT/Meter Connection](#) (Revised the content in this section)

Added [14 Appendix](#) (Added detailed description for connecting meters and CTs to the system)

Version 01 (2023-11-15)

Updated [2.3.2 Control Panel](#) (Added the description about idle state)

Updated [2.4.1 Working mode](#) (Modified TOU mode)

Updated [7.3.7 Monitoring Connection](#) (Modified WiFi and LAN mode)

Version 01 (2023-10-31)

Added 2.5kW inverter

Version 00 (2023-08-04)

Initial release

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1 Safety

1.1 General Safety

The X1-IES system has been meticulously designed and thoroughly tested to comply with all relevant state and international safety standards. Nevertheless, like all electrical and electronic equipment, safety precautions must be observed and followed during the installation of the X1-IES system to minimize the risk of personal injury and ensure a safe installation.

Please thoroughly read, comprehend, and strictly adhere to the comprehensive instructions provided in the user manual and any other relevant regulations prior to the installation of the X1-IES system. The safety instructions in this document serve as supplementary guidelines to local laws and regulations.

SolaX shall not be liable for any consequences resulting from the violation of the storage, transportation, installation, and operation regulations outlined in this document. Such consequences include, but are not limited to:

- Device damage caused by force majeure events, such as earthquakes, floods, thunderstorms, lightning, fire hazards, volcanic eruptions, and similar events.
- Device damage due to human causes.
- The bearing capacity of the ground and the wall can not bear the weight of the device.
- Usage or operation of the X1-IES system in violation of local policies or regulations.
- Failure to comply with the operation instructions and safety precautions provided with the product and in this document.
- Improper installation or usage of the inverter in unsuitable environmental or electrical conditions.
- Unauthorized modifications to the product or software.
- Device damage occurring during transportation by the customer.
- Storage conditions that do not meet the requirements specified in this document.
- Installation and commissioning performed by unauthorized personnel who lack the necessary licenses or do not comply with state and local jurisdiction regulations.

1.2 Safety Instructions

Save these important safety instructions. Failure to do so may result in damage to the X1-IES system and injury or even loss of life.

1.2.1 Safety Instructions of PV



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.
- PV modules should have an IEC61730 class A rating.



- 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.

1.2.2 Safety Instructions of Inverter



Lethal danger from electrical shock due to 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.



- During operation, avoid touching any parts of the inverter other than the DC switch and LCD panel (if any).
- 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!**

- The series inverter should be coupled with a high voltage battery. When handling the battery, follow all the safety instructions of the manufacturer.

 **CAUTION!**

- Make sure that children are supervised to prevent them from playing with the device.
- 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!

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

1.2.3 Safety Instructions of Utility Grid

NOTICE!

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

1.2.4 Safety Instructions of Battery (T-BAT-SYS)

General Safety Precautions

- Overvoltage or wrong wiring may damage the battery module and cause combustion which may be extremely dangerous;
- Leakage of electrolytes or flammable gas may be occurred due to any type of product breakdown;
- Do not install the battery module in places where flammable and combustible materials are stored, and in which an explosive atmosphere is present;
- The battery module wiring must be carried out by qualified personnel;
- Battery module must be serviced by qualified personal;
- Ensure that the grounding cable is connected before handling the battery module.

Battery Handling Guide

Do's

- DO keep the battery module away from flammables materials, heat sources, and water sources;
- DO keep the battery module out of reach of children and animals;
- DO practice proper battery storage by keeping the battery module in a clean environment, free of dust, dirt and debris;
- DO store the battery module in a cool and dry place;
- DO seal the outer cable connection hole to prevent ingress of foreign objects;
- DO confirm that the wiring of the device must be correct;
- DO install the device according to the local standards and regulations.

Don'ts

- DO NOT expose the battery module to an open flame, or the temperature in excess of 140°F/60°C;
- DO NOT install or operate the battery module in places where there is excessive moisture or liquids;
- DO NOT place the battery module in a high-voltage environment;
- DO NOT disconnect, disassemble or repair the device by unqualified personnel. Only a qualified personnel is allowed to handle, install and repair the device;

- DO NOT damage the device by dropping, deforming, impacting, cutting or penetrating with a sharp object. Otherwise, it may cause a fire or leakage of electrolytes;
- DO NOT touch the device if liquid spill on it. There is a risk of electric shock;
- DO NOT step on the packaging or the device may be damaged;
- DO NOT place any objects on top of the battery module;
- DO NOT charge or discharge a damaged battery module;
- DO NOT dispose of the battery module in a fire. It may cause leakage or rupture;
- DO NOT mix different types or makes of the battery module. It may cause leakage or rupture, resulting in personal injury or property damage.

Response to Emergency Situations

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.

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.
- 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.

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, DO NOT touch it.
- If the battery module is damaged, DO NOT use it. Otherwise, it may result in both personal injury and property damage.
- DO NOT use the submerged battery module again, and contact the qualified personnel for assistance.
- DO contact SolaX immediately for assistance if the user suspects that the battery module is damaged.

WARNING!

- Do not crush or impact battery; make sure dispose of it according to relevant safety regulations.
- The battery module may catch fire when heated above 150°C/302°F.
- In case of catching fire, the battery module will produce noxious and poisonous gases, please keep away the battery.
- Damaged batteries may leak electrolyte or produce flammable gas. If users suspect that the battery is damaged, please contact SolaX for advice and information immediately.
- All operations of T-BAT SYS-HV relating to electrical connection and installation must be carried out by qualified personnel.

CAUTION!

- If the battery module is not installed within a month after receipt, it must be charged for maintenance. Non-operational batteries should be discarded according to the local regulations.

1.3 Additional Safety Instructions

Surge protection devices (SPDs) for PV installation



- Over-voltage protection with surge arresters should be provided when the PV power system is installed. The grid connected inverter is fitted with SPDs in both PV input side and MAINS side.

Direct or indirect lightning strikes can cause failures. Surge is the main cause of lightning damage to most devices. Surge voltage may occur at photovoltaic input or AC output, especially in remote mountain areas where long distance cable is supplied.

Please consult professionals before installing SPDs.

The external lightning protection device can reduce the influence of direct lightning strike, and the lightning protection device can release surge current to the earth.

If the building installed with external light protection device is far away from the inverter location, in order to protect the inverter from electrical and mechanical damage, the inverter should also install an external lightning protection equipment.

In order to protect DC system, the level 2 surge protection equipment is needed between DC cable of inverter and photovoltaic equipment module.

In order to protect the AC system, the level 2 surge protection equipment should be installed at the AC output, located between the inverter and the grid. Installation requirements must comply with IEC61643-21 standard.

All DC cables shall be installed in a distance as short as possible, and the positive and negative cables of the same input need to be bundled together to avoid causing loops in the system. Minimum distance installation and binding requirements also apply to auxiliary grounding and shielding grounding conductors.

Anti-Islanding Effect

The islanding effect means that when the power grid is cut off, the grid-connected power generation system fails to detect the power outage and still supplies power to the power grid. This is very dangerous for the maintenance personnel and the power grid on the transmission line. The inverter's use active frequency offset method to prevent islanding effect.

PE Connection and Leakage Current

All inverters incorporate a certified internal Residual Current Monitoring (RCM) in order to protect against possible electrocution and fire hazard in case of a malfunction in the PV array, cables or inverter. There are 2 trip thresholds for the RCM as required for certification (IEC 62109-2:2011).

The default value for electrocution protection is 30mA, and for slow rising current is 300mA. the house loads. If an external RCD is required by local regulations, it is recommended to choose a Type-A RCD with the rating residual current of 300 mA.



- High leakage current!
- Earth connection essential before connecting supply.

A faulty ground connection can result in equipment failure, personal and death injuries, and electromagnetic interference. Ensure correct according to grounding to IEC62109 and conductor diameter according to STANDARD specification. Do not connect the grounding end of the equipment in series to prevent multi-point grounding. Electrical appliances must be installed in accordance with the wiring rules of each country.

For United Kingdom

The installation that connects the equipment to the supply terminals shall comply with the requirements of BS 7671. Electrical installation of PV system shall comply with requirements of BS 7671 and IEC 60364-7-712. All protective devices cannot be changed.

User shall ensure that equipment is so installed, designed and operated to maintain at all times compliance with the requirements of ESQCR22(1)(a).

2 Product Overview

2.1 System Description

System Overview

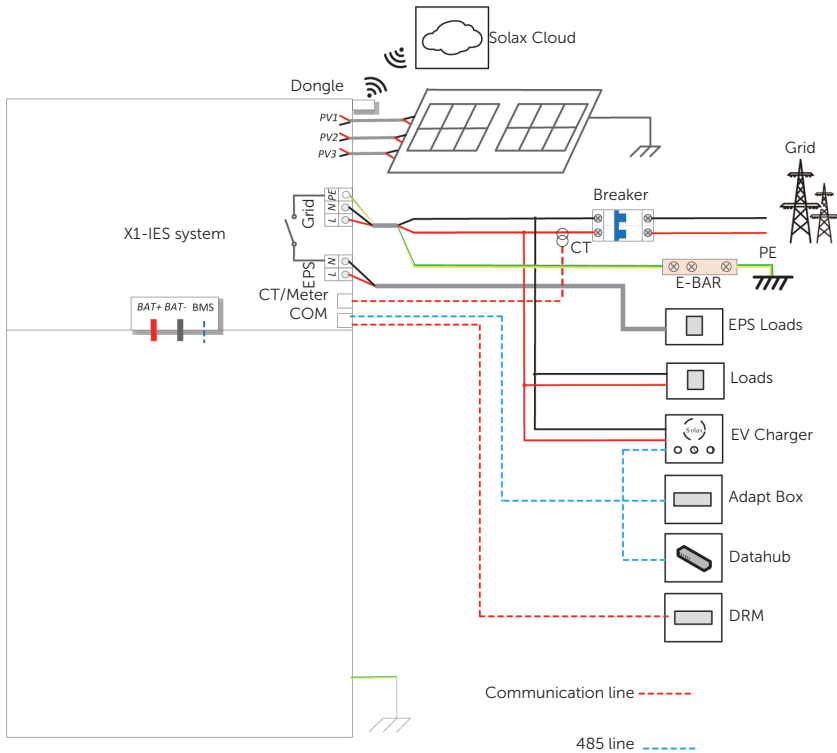


Figure 2-1 System overview diagram

X1-IES system

The X1-IES system is an energy storage system that integrates the inverter and T-BAT-SYS into one.

Inverter

The inverter is a transformerless single-phase PV grid-connected inverter which is designed to convert the direct current generated from the PV modules into grid-compatible AC current and feeds the AC current to the utility grid or store in the batteries for future use. The way it works depends on user preferences.

T-BAT-SYS

The T-BAT-SYS is a high voltage battery. The battery communicate with inverter via BMS and must comply with the specification of regulations.

PV Array

For 3 kW to 3.7 kW inverter, the number of PV string is two. For 4.6 kW to 8 kW inverter, the number of PV string is three.

CT

CT is a device that monitors the input and output current of the grid.

Grid

220V / 230V /240V grid are supported.

SolaX Cloud

SolaX Cloud is an intelligent, multifunctional monitoring platform that can be accessed through either wired or wireless connection. With the SolaX Cloud, the operators and installers can view the real-time data.

DRM

DRM is applicable for AS NZS 4777.2-2015. With the use of an external control box, active or reactive power regulation can be realized in a timely and fast manner, and the inverter can be operated stably during the process of regulation.

Adapter Box

SolaX Adapter Box is matched with a heat pump with the function of dry contact, which can realize heat pump integrated photovoltaic inverter energy system management.

Datahub

DataHub is a device for monitoring platforms of photovoltaic power generation systems, which enables data collection, storage, output control, centralized monitoring, and centralized maintenance of devices such as inverters, electricity meters, and environmental monitoring instruments in photovoltaic power generation systems.

EV Charger

SolaX EV Charger is used for charging electric vehicle.

X1-Matebox G2 (Optional)

X1-Matebox G2 is a device which includes integrated switches and bidirectional meter to control the whole household loads. It can only be used to match with a

single inverter and does not support parallel inverters. It is optionally installed in the X1-IES system.

2.2 Supported Power Grid

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

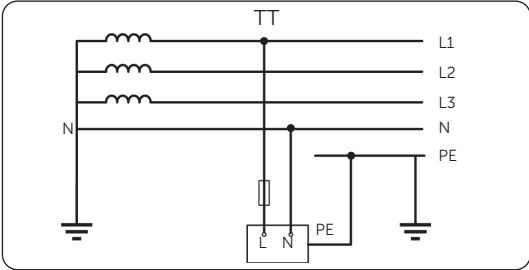


Figure 2-2 Supported power grid TT

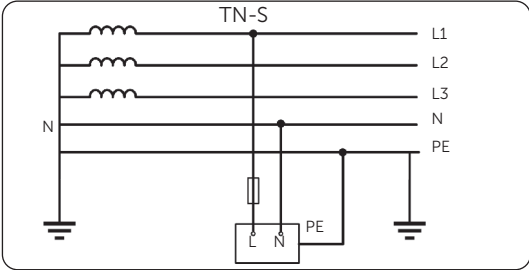


Figure 2-3 Supported power grid TN-S

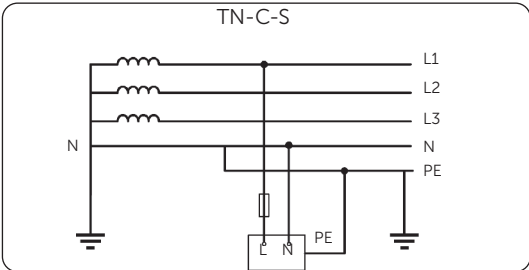


Figure 2-4 Supported power grid TN-C-S

2.3 Appearance

- Appearance of Inverter and Battery (T-BAT-SYS)

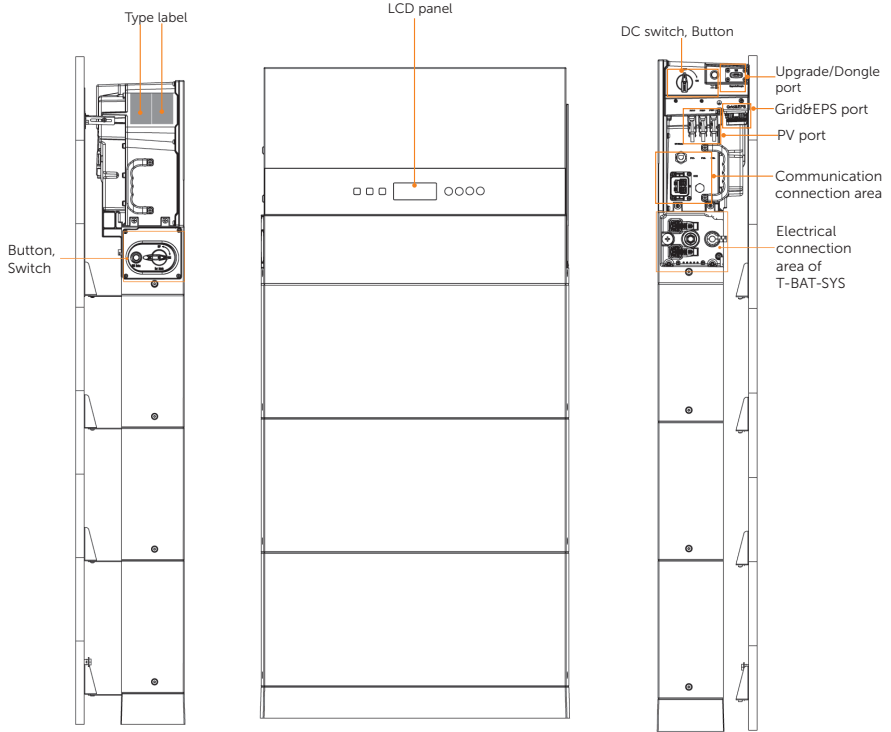


Figure 2-5 Appearance of Battery (T-BAT-SYS) and Inverter

Table 2-1 Description of appearance of Battery (T-BAT-SYS) and Inverter

| Item | Description |
|----------------|---|
| Type label | Type label identifies the device type, serial number, specific DC/AC parameters, certification, etc. |
| LCD panel | Including screen, indicators and keys. Screen displays the information; indicators indicates the operating status of inverter. Keys is used to perform the parameter setting. |
| DC switch | Connect or disconnect the PV input. |
| Button | Power on or off the X1-IES system. |
| Upgrade/Dongle | Port for Upgrading and Communication module connection. Communication module includes WiFi, LAN and 4G (optional). |

| Item | Description |
|---|---|
| Grid&EPS connection area | Connect Grid and EPS cables. |
| PV connection area | Connect PV modules. |
| Communication connection area | Including CT/Meter port, communication port. |
| Button, Switch | Power on or off the battery system. Please refer to 2.3.3 Ports of Battery BMS (TBMS-MCS0800E)P for details. |
| Electrical connection area of T-BAT-SYS | Including B+/B- ports, communication port, heat port, grounding port. Please refer to 2.3.3 Ports of Battery BMS (TBMS-MCS0800E) for details. |

2.3.1 Dimensions

- Dimension of Inverter

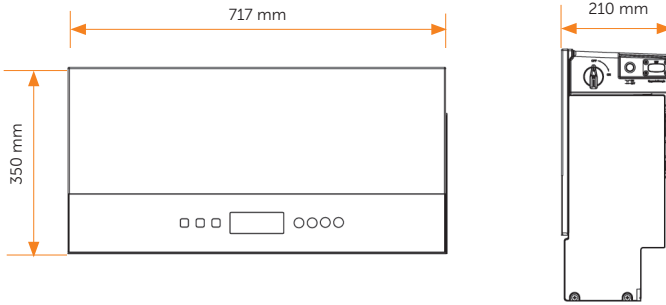


Figure 2-6 Dimension of Inverter

- Dimension of Battery (T-BAT-SYS)

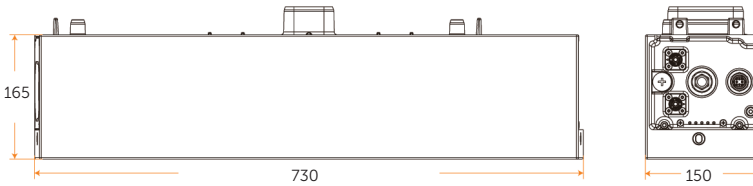


Figure 2-7 Dimension: BMS (TBMS-MCS0800E)

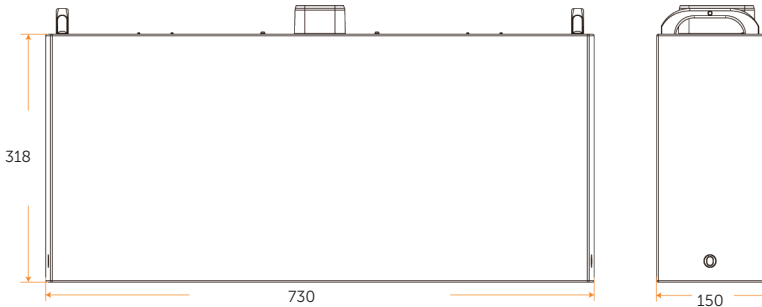


Figure 2-8 Dimension: Battery module (TP-HS50E)

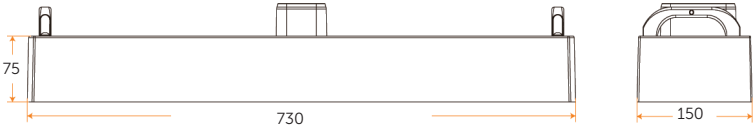


Figure 2-9 Dimension: Base

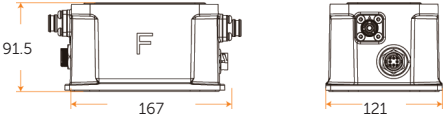


Figure 2-10 Dimension: Series box

2.3.2 Control Panel

- Control Panel of Inverter

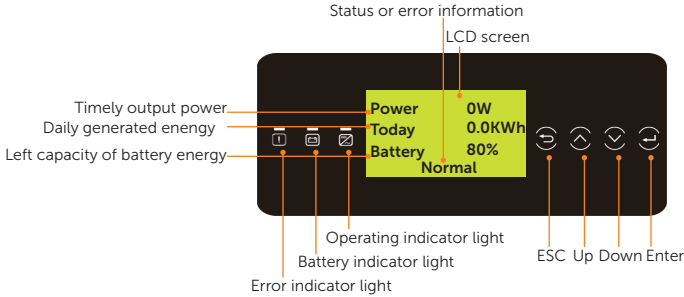


Figure 2-11 Control Panel of Inverter

* Please refer to the actual product for the color of the LCD screen. The screen displayed in the manual is for aesthetic purpose.

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 [11.1 Troubleshooting](#) for corresponding solutions.

Table 2-2 Definition of indicators of Inverter












| LED indicator | Status | | Definition |
|---|---|----------------|--|
|  Operating |  | Solid blue | The inverter is in normal status or EPS (Off-grid) mode. |
| |  | Blue blinking | The inverter is in waiting, checking status or the system switch is off. |
| |  | Light off | The inverter is in fault status. |
|  Error |  | Solid red | The inverter is in a fault state. |
| |  | Light off | The inverter is in normal status. |
|  Battery |  | Solid green | The battery communication is in normal status and working normally. |
| |  | Green blinking | The battery communication is in normal status and in an idle status. |
| |  | Light off | The communication between the inverter and the battery is disconnected. |

Table 2-3 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 |

Note:

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.

- Control Panel of Battery (T-BAT-SYS)

The power indicators show the current battery percentage. There are five indicators on the BMS, one status light and four SoC power indicators.

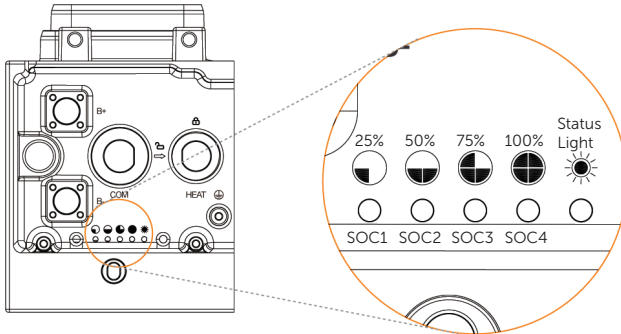


Figure 2-12 Control Panel of Battery (T-BAT-SYS)

Table 2-4 Definition of indicators of Battery (T-BAT-SYS)

| Status | Description |
|-------------|--|
| Startup | Press and hold the BMS Button for about 1 to 2 seconds to activate the system, at this point, the status light flashes yellow light every 0.1 seconds until finishing self test, the period lasts about 3 to 4 seconds. Then the status light flashes green light every 0.5 seconds. After successful communication to the inverter, the status light turns solid green light, and SoC power indicators go solid green light based on the actual remaining capacity. |
| Shutdown | After pressing and holding the BMS button for more than 1 second, the status light comes on solid green light, and the SoC power indicators flash blue in turn. Then all lights are off within 2.4 seconds after releasing the button. |
| Standby | The status light flashes green for 1 second and turns off for 4 seconds. The SoC power indicators are off. |
| Charging | The status light comes on solid green light, and the state of SoC power indicators depends on the actual situation. For details, please refer to the following Table 2-5 Indicator information while charging . |
| Discharging | The status light comes on solid green light, and the state of SoC power indicators depends on the actual situation. For details, refer to the following Table 2-6 Indicator information while discharging . |
| Fault | In case of failure, the status light will remain on solid red light for 10 minutes, and then such red light will flash for 1 second and then turn off for 4 seconds. For details, please refer to Table 2-7 Indicators information while reporting errors . |

| | |
|-------------|---|
| Warning | In case of warning, the status light will flash yellow light for 1 second, and then turn off for 4 seconds. |
| Black Start | For details, please refer to 2.3.2 Black Start . |

Table 2-5 Indicator information while charging

| SoC value | Status light | SoC1 | SoC2 | SoC3 | SoC4 |
|------------------------------|--------------|----------|-----------|-----------|-----------|
| $0\% \leq \text{SoC} < 25\%$ | Green | Flash | Light off | Light off | Light off |
| $\text{SoC} < 50\%$ | Green | Light on | Flash | Light off | Light off |
| $\text{SoC} < 75\%$ | Green | Light on | Light on | Flash | Light off |
| $\text{SoC} < 100\%$ | Green | Light on | Light on | Light on | Flash |
| $\text{SoC} \geq 100\%$ | Green | Light on | Light on | Light on | Light on |

Table 2-6 Indicator information while discharging

| SoC value | Status light | SoC1 | SoC2 | SoC3 | SoC4 |
|------------------------|--------------|-------|-----------|-----------|-----------|
| $\text{SoC} \geq 75\%$ | Green | Flash | Flash | Flash | Flash |
| $\text{SoC} \geq 50\%$ | Green | Flash | Flash | Flash | Light off |
| $\text{SoC} \geq 25\%$ | Green | Flash | Flash | Light off | Light off |
| $\text{SoC} \geq 0\%$ | Green | Flash | Light off | Light off | Light off |

Table 2-7 Indicators information while reporting errors

| Fault | SoC1 | SoC2 | SoC3 | SoC4 |
|--|-------|-------|-------|-------|
| Huge differential pressure | Flash | Off | Off | Off |
| Voltage fault (undervoltage and overvoltage of unit, overvoltage and undervoltage of total voltage) | Off | Flash | Off | Off |
| Temperature fault (high temperature, low temperature) | Flash | Flash | Off | Off |
| Current fault (overcurrent charging, overcurrent discharging) | Off | Off | Flash | Off |
| Hardware fault (MCU fault, external short circuit fault, AFE fault, voltage sampling disconnection fault, temperature sampling, or current sensor default) | Flash | Off | Flash | Off |
| Relay fault | Off | Flash | Flash | Off |
| Insulation fault | Flash | Flash | Flash | Off |
| Self test fault | Off | Off | Off | Flash |

| | | | | |
|--------------------------------------|-------|-------|-----|-------|
| Communication loss of inverter | Flash | Off | Off | Flash |
| Communication loss of battery module | Off | Flash | Off | Flash |

NOTICE!

In case of pressing and holding BMS button, there are two circumstances as follows:

- Press and hold BMS button for more than 5 seconds but less than 20 seconds, the system will enter a startup mode of inverter.
- Press and hold BMS button for more than 20 seconds, the system will enter the Black Start.

Black Start

The equipment can provide **Black Start** capacity, meaning that our energy storage inverter and battery can continue to run even if the power grid and photovoltaic module are out of service. The startup procedure for **Black Start** is as follows:

- First stage: in case of pressing and holding the **BMS button** for less than 20 seconds, the status light will flash green light for 1 second and then turn off for 4 seconds, with a period of 5 seconds.
- Second stage: after pressing and holding the **BMS button** for more than 20 seconds, the status light will come on solid green light, and SoC power indicators will flash as follows:
 - » Firstly, the indicator SoC3 comes on blue, and the rest of the indicators are off;
 - » Secondly, the indicators SoC2 and SoC4 come on blue, and the rest of the indicators are off;
 - » Thirdly, the indicator SoC1 comes on blue, and the rest of the indicators are off;
 - » Finally, all SoC power indicators are off. The time interval between each step is 0.1 seconds.

NOTICE!

- In the case of the second stage, the **BMS button** should be released at anytime in the process.

2.3.3 Ports

- Ports of Inverter

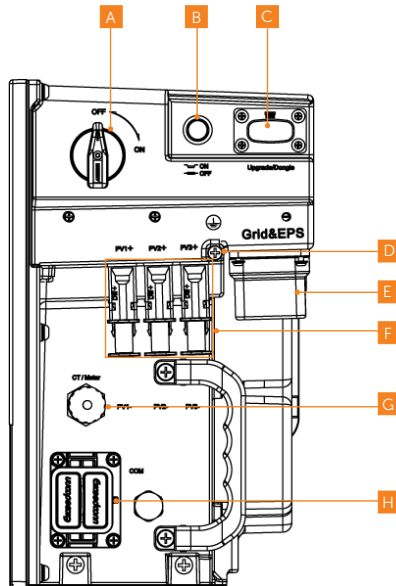


Figure 2-13 Ports of Inverter

Table 2-8 Description of ports of Inverter

| Item | Description | Decisive voltage class |
|------|---|------------------------|
| A | DC switch | - |
| B | Switch button | - |
| C | Dongle port. Port for Upgrading and Communication module connection. Communication module includes WiFi, LAN and 4G (optional). | DVC-A |
| D | Ground connection port | - |
| E | Grid and EPS Port | DVC-C |
| F | PV connection port | DVC-C |
| G | CT/ Meter Port | DVC-A |
| H | COM port | DVC-A |

- Ports of Battery (T-BAT-SYS)

BMS (TBMS-MCS0800E)

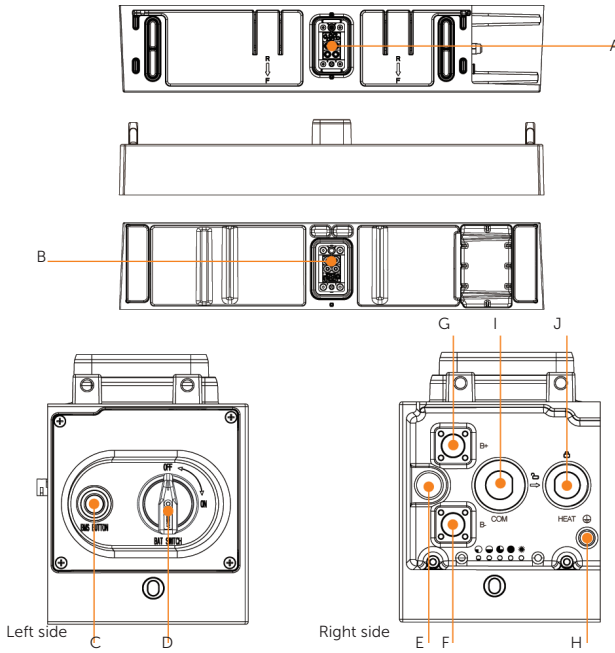


Figure 2-14 BMS (TBMS-MCS0800E)

Table 2-9 Description of ports

| Item | Description |
|------|---|
| A* | The hot-plug interface is connected to the inverter. |
| B | The hot-plug interface is connected to the battery module. |
| C | BMS Button: Start system. |
| D | BAT SWITCH: A switch for battery's input and output. |
| E | 2.3.3 DIP Switch : Realize battery's parallel function (a reserved function). |
| F | B-: Connect BMS's B- to BMS's B+ (or to the series box's B-) |
| G | B+: Connect BMS's B+ to BMS's B- (or to the series box's B+) |
| H | GND: Connect the grounding port of the series box (if any); or it doesn't need to be connected. |
| I | COM: Connect the COM port of the series box (if any); or it doesn't need to be connected. |

| Item | Description |
|------|---|
| J | HEAT: Connect the HEAT port of the series box (if any), or a short-circuit plug must be inserted into the port. |

NOTICE!

- The mark "*" indicates that when stacking the inverter onto the BMS, the inverter-battery grounding and communications are connected directly through the connector. Hence, no additional external wiring is required.

DIP Switch

A DIP Switch is equipped on the BMS.

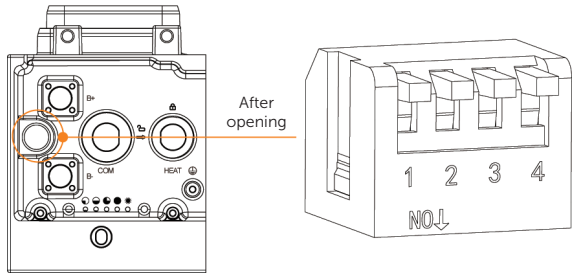


Figure 2-15 DIP Switch

Table 2-10 Definition of DIP switch

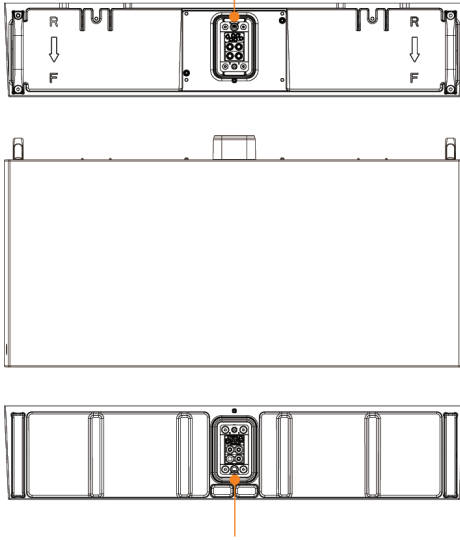
| | Description |
|--------------|---------------------|
| DIP Switch 1 | A reserved function |
| DIP Switch 2 | A reserved function |
| DIP Switch 3 | A reserved function |
| DIP Switch 4 | Terminal resistance |

NOTICE!

- The DIP switch 4 shall be flipped down (open the circuit) when connecting the BMS to inverter.
- In case of parallel connection, only shall be the DIP switch 4 on the last BMS be flipped down (open the circuit), and the DIP switch 4 on the rest of BMS shall be flipped up (close the circuit).
- The DIP switch 4 is pressed at the factory settings.
- To adjust the DIP switch, a small flat-head screwdriver shall be prepared by users.

Battery Module (TP-HS50E)

A hot-plug interface that is connected to the bottom of the battery module or the BMS.



A hot-plug interface that is connected to the bottom of the battery module or the base.

Figure 2-16 Details: Battery module (TP-HS50E)

Base

A hot-plug interface that is connected to the bottom of the battery module.

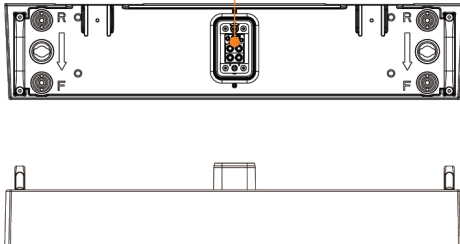


Figure 2-17 Details: Base

Series Box

The series box shall be installed in case the battery modules purchased exceed 4 sets (including 4).

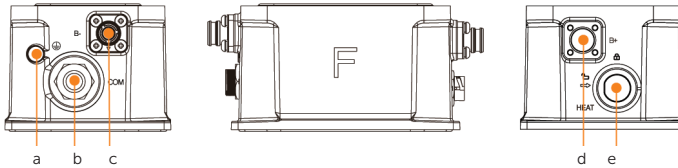















Figure 2-18 Details: Series box




Table 2-11 Description of ports

| Item | Description |
|------|--|
| A | GND: Connect to the grounding port of the BMS. |
| B | COM: Connect to the COM port of the BMS. |
| C | B-: Connect to the B- of the BMS. |
| D | B+: Connect to the B+ of the BMS. |
| E | HEAT: Connect to the HEAT port of the BMS. |

2.3.4 Symbols on the Label

Table 2-12 Description of symbols

| Symbol | Description |
|---|--|
|  | CE mark. The inverter complies with the requirements of the applicable CE guidelines. |
|  | TUV certified. |
|  | Additional grounding point |
|  | Beware of hot surface. The inverter can become hot during operation. Avoid contact during operation. |
|  | Danger of high voltages. Danger to life due to high voltages in the inverter! |
|  | Danger. Risk of electric shock! |
|  | Observe enclosed documentation. |
|  | The device can not be disposed together with the household waste. |
|  | Do not operate this inverter until it is isolated from battery, mains and on-site PV generation suppliers. |
|  | Danger to life due to high voltage. There is residual voltage existing in the inverter after powering off, which needs 5min to discharge. Wait 5min before you open the upper lid or the DC lid. |
|  | RCM mark of conformity. |
|  | The battery module may explode. |
|  | Keep the battery system away from children. |

| Symbol | Description |
|---|---|
|  | Keep the battery system away from open flames or ignition systems. |
|  | Do not dispose of the battery module together with household waste. |
|  | The battery system must be disposed of at a proper facility for environmentally-safe recycling. |

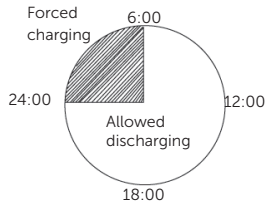
2.4 Working Principle

2.4.1 Working mode

The inverter has two configurable working periods: allowed discharging period and forced charging period.

For how to set the two working periods, please refer to [9.6.1 User Settings](#) to set the working modes.

The default value of allowed discharging period is 00:00~23:59, and the default value of forced charging period is 00:00~00:00(closed in default). You can configure the two work mode by yourself.



As shown in the example above, the allowed discharging period is 6 am to 24 pm, and the forced charging period is 24 pm to 6 am.

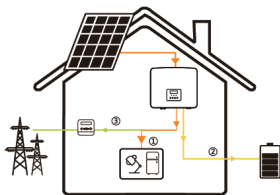
- Forced Charging Period

The priority of forced charging period is higher than all work modes. Under the forced charging period, the inverter will charge the battery first until the battery SoC reaches the setting value.

- Allowed Discharging Period

Under the allowed discharging period, the inverter will allow the battery to discharge (but not force the battery to discharge). The following work modes will take effect under the allowed discharging period.

For on-grid status, there are four work modes: Self Use, Feed-in Priority, Backup and Manual.

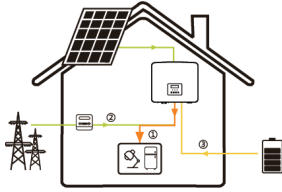


Self Use mode

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 surplus power will charge the battery, then the remaining power will feed into the grid.

Priority: Loads > Battery > Grid

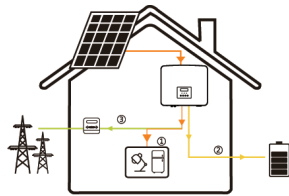


Feed-in Priority

The feed-in priority mode is suitable for areas with high feed-in subsidies.

The power of PV will supply the loads first, and surplus power will feed into the grid, then the remaining power will charge the battery.

Priority: Loads > Grid > Battery



Backup mode

The back-up mode is suitable for areas with frequent power outages.

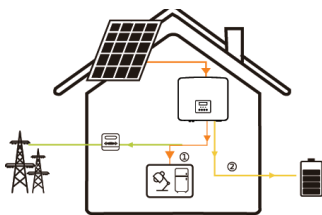
This mode will maintain the battery capacity at relatively high level, to ensure that the emergency loads can be used when the grid is off. Same working logic with "Self-use" mode.

Priority: Loads > Battery > Grid

* For the above three work modes, when the power of PV is insufficient to supply the loads, the battery will supply the loads. If the battery is insufficient, then the grid will supply the loads.

Manual: This work mode is for the after-sales team to do after-sales maintenance.

For off-grid status, there is only one work mode: EPS (Off-grid).



EPS (Off-grid)

In case of power failure, the system will supply EPS loads through PV and battery. (The battery must be installed. And the EPS loads must be less than the minimum of the following two values: the sum of the maximum battery discharge power and the maximum PV output power, or the overload limit power of the inverter.)

The power of PV will supply the loads first, and surplus power will charge the battery.

Priority: Loads > Battery

* The battery will stop discharging when $SoC = \min SoC$. But due to self consumption of the battery, sometimes the battery will stop discharging when $SoC < \min SoC$.

For on-grid status, if the battery $SoC \leq (\min SoC - 5\%)$, the inverter will take energy from grid to charge battery SoC to $(\min SoC + 1\%)$.

For off-grid status, if the battery $SoC \leq \min SoC$, the inverter can not enter EPS mode (the battery can not discharge unless its SoC reaches Min ESC SoC (Default: 20%, settable))

Peak shaving mode

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

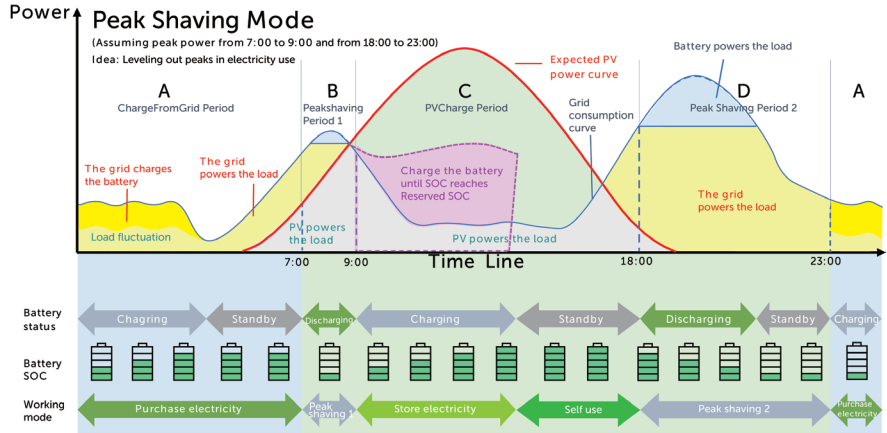


Figure 2-19 Peak shaving mode

| Time Period | Inverter working status |
|--------------|--|
| Period A | <ul style="list-style-type: none"> Battery charging period during which discharging is not allowed and the grid will charge the battery first for peak shaving. |
| Period B & D | <p>Load < Peaklimits (PV+grid → load)</p> <ul style="list-style-type: none"> The PV and grid will power the load. <p>Load > Peaklimits (PV + battery+grid → load)</p> <ul style="list-style-type: none"> The battery will discharge energy for loads and thus reduce the amount of energy purchased from the grid. |
| Period C | <p>(PV → battery → load → grid)</p> <ul style="list-style-type: none"> The battery does not discharge. The PV will charge the battery to the "Reserved SOC" first and then supply power for loads, with the surplus power feeding into the grid. Charging the battery first in this period is storing energy for the peak shaving. |

Note:

PeakLimits: The load consumption from grid side. The settable range: 0-60000 W.

Reserved SOC: The lower limit of SOC required for later peak shaving period. The default value is 50%. 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.

2.4.2 Circuit 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 DC into AC that meets the requirements of the power grid and feeds it into the power grid. The lightning arrester at AC / DC side can realize the function of surge protection. The principle design of inverter is shown in the figure below:

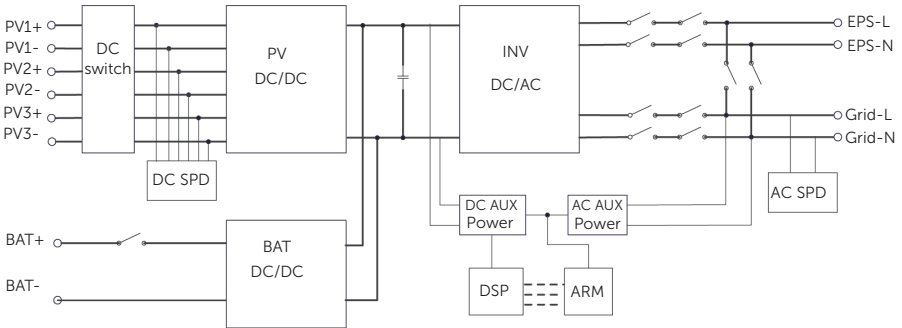


Figure 2-20 Circuit Diagram

Diagram A: N line and PE line are separated from each other, and the common load is connected to the EPS port; (For most countries)

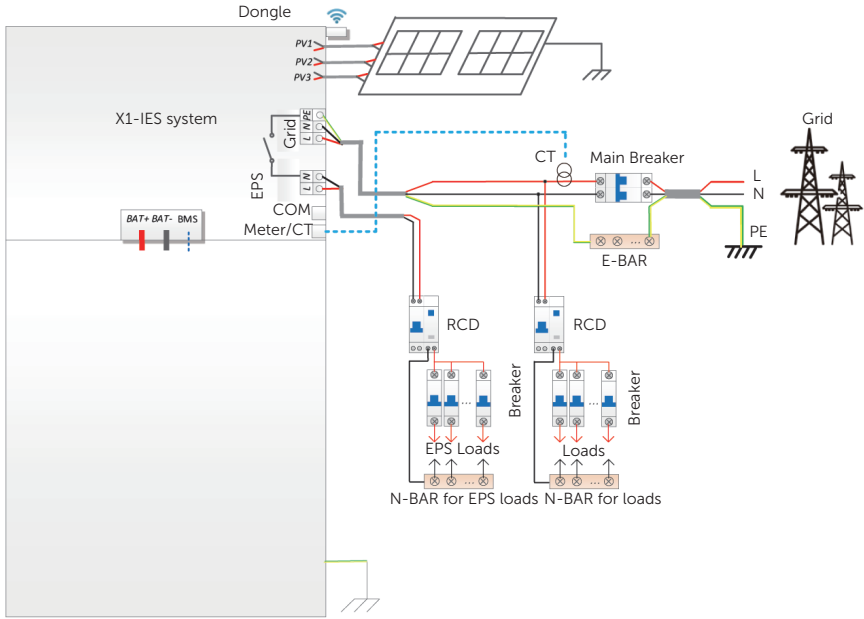


Figure 2-21 N line and PE line separate wiring, common load connected

Diagram B: N line and PE line are separated from each other, all loads connect to the EPS (Off-grid) port ; (For most countries)

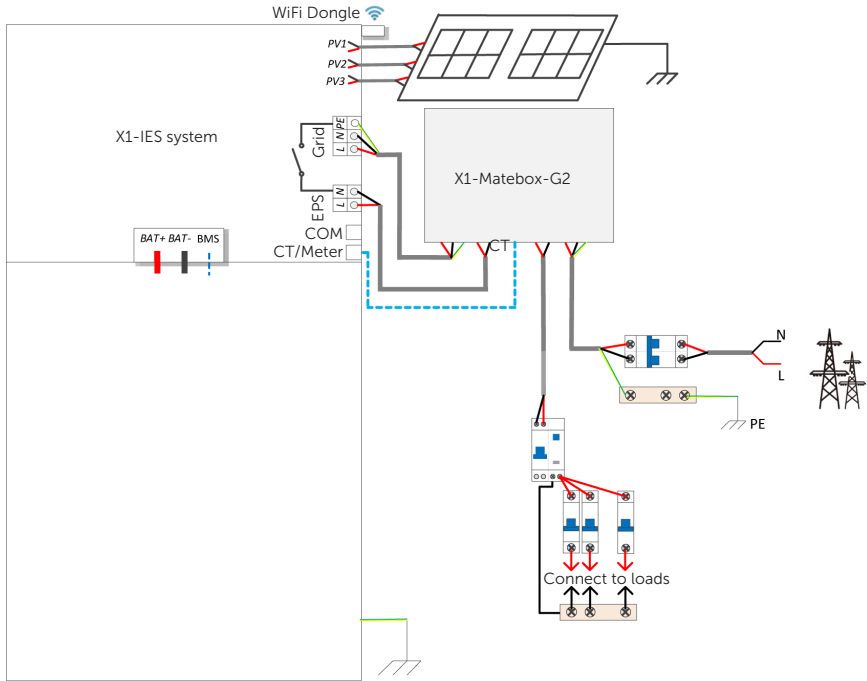


Figure 2-22 N line and PE line separate wiring, all loads connected

Diagram C: N line and PE line are combined together, and the common load is connected to the EPS port; (Apply to Australia)

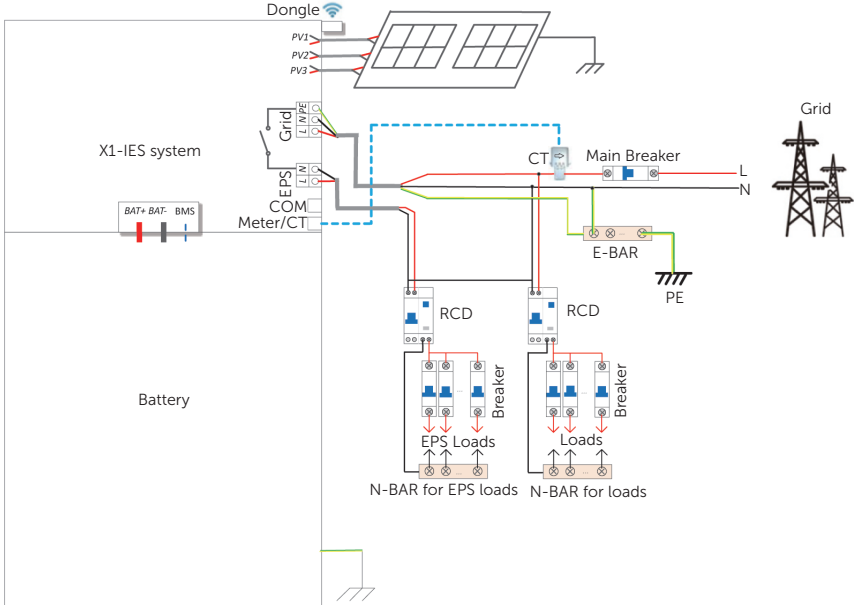


Figure 2-23 N line and PE line combine together, common load connected

NOTICE!

- The neutral wire is connected to the PE, and the diameter of the neutral wire must not be smaller than the diameter of the live wire. (Apply to Australia)

Diagram D: N line and PE line are combined together, all loads connect to the EPS (Off-grid) port; (Apply to Australia)

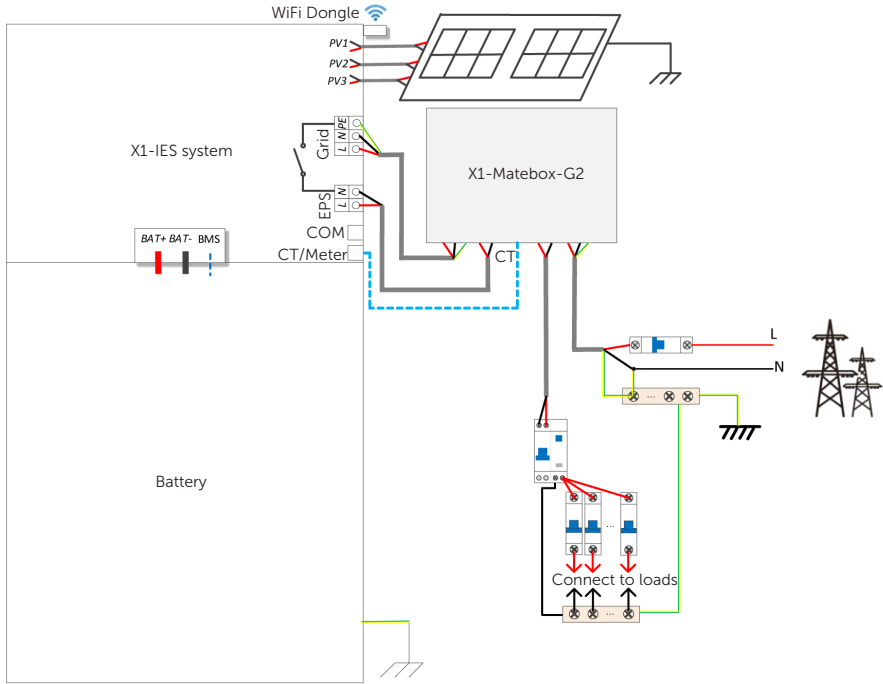


Figure 2-24 N line and PE line combine together, all loads connected

NOTICE!

- The neutral wire is connected to the PE, and the diameter of the neutral wire must not be smaller than the diameter of the live wire. (Apply to Australia)

NOTICE!

- When power cuts suddenly, the inverter connects the N line of EPS load with the ground through relay, providing a fixed zero potential for EPS load and ensuring the safety of electricity use by users. Make sure the value of the inverter load is less than that of EPS rated power, otherwise the inverter will stop and alarm overload fault. Confirm with the grid operator whether there are special regulations for grid connection.

2.5 Micro Grid

Due to islanding effect, on-grid inverters are unable to work during off-grid. This feature makes users lose the PV energy of on-grid inverter when off-grid. Micro-grid is a function that makes X1-IES series inverters stimulate the grid to active on-grid inverter during off-grid. By connecting on-grid inverter to the EPS port of the X1-IES series inverter, the X1-IES series inverter is able to use PV or battery energy to active on-grid inverter when utility lost.

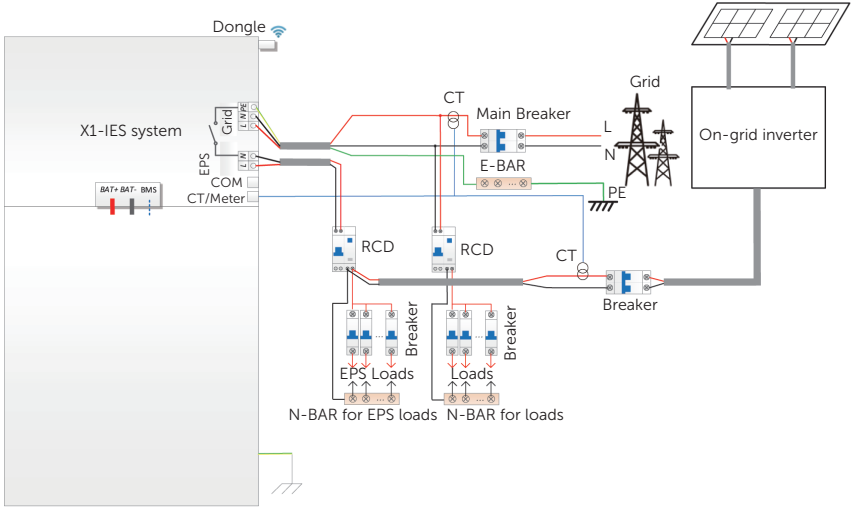


Figure 2-25 Micro grid diagram

Compatibility

On-grid inverter: Any brand on-grid inverter that supports "Response to an increase in frequency".

On-grid inverter outout power \leq Max X1-IES series inverter EPS output power

On-grid inverter outout power \leq Max battery charging power

| Battery Quantity | 1 | 2 | 3 | 4 |
|---|---------|----------|----------|----------|
| On-grid inverter power upper limitation for HS50E | 5.12 kW | 10.24 kW | 15.36 kW | 20.48 kW |

* Since X1-IES series inverter is unable to control on-grid inverter, therefore X1-IES series inverter can not achieve zero injection when loads power + battery power < on-grid inverter output power.

3 Transportation and Storage

If the X1-IES system is not put into use immediately, the transportation and storage requirements needs to be met:

Transportation

- Observe the caution signs on the packaging of the device before transportation.
- Pay attention to the weight of the device. Be cautious to avoid injury when carrying the device. Two installers are recommended.
- When carrying the equipment by hand, wear protective gloves to prevent injuries.
- When lifting up the device, hold the handle position and the bottom position of the device. Keep the device horizontal in case of falling down due to tilt.

Storage

- The device must be stored indoors.
- Do not remove the original packaging material and check the outer packaging material regularly.
- The storage temperature should be between -30°C and $+53^{\circ}\text{C}$. The humidity should be between 5% and 65%.
- Stack the device in accordance with the caution signs on the carton to prevent the device falling down and damage. Do not place it upside down.

4 Preparation before Installation

4.1 Selection of Installation Location

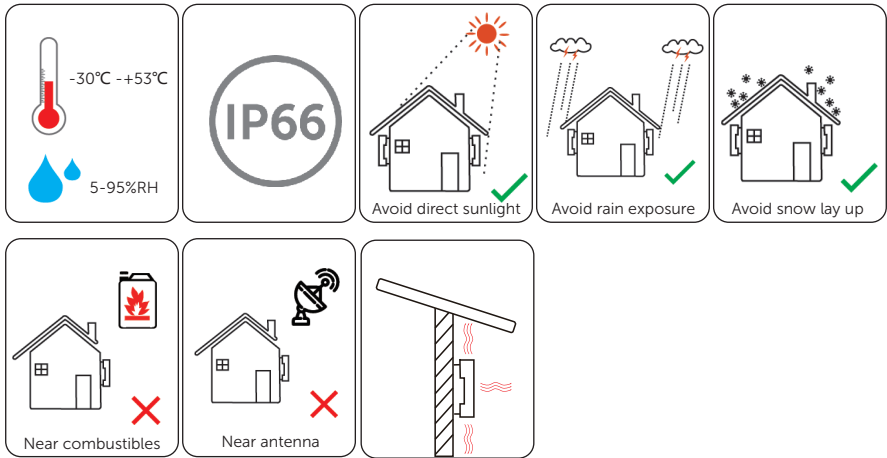
The installation location selected for the X1-IES system is quite critical in the aspect of the guarantee of machine safety, service life and performance.

- It has the IP66 ingress protection, which allows it to be installed indoors and outdoors;
- The installation position shall be convenient for wiring connection, operation and maintenance.

4.1.1 Environment Requirement

- The operating temperature: -30°C to $+53^{\circ}\text{C}$;
- The humidity shall be between 5-95%;
- Do not install the device in the areas where the altitude exceeds 3000 m;
- Install the device in a well-ventilated environment for heat dissipation; it is recommended to install an awning over it if the inverter is installed on a support outdoor;
- Do not install the device in areas with flammable, explosive and corrosive materials;
- Do not install the device in areas near combustibles and antenna
- You are recommended to install an awning over it. Avoid direct sunlight, rain exposure, and snow laying up.

Preparation before Installation



NOTICE!

- For outdoor installation, precautions against direct sunlight, rain exposure and snow layup are recommended.
- Exposure to direct sunlight raises the temperature inside the battery. This temperature rise poses no safety risks, but may impact the battery performance.

- Install the device 500 meters away from sea and at the place where the sea breeze does not directly hit.

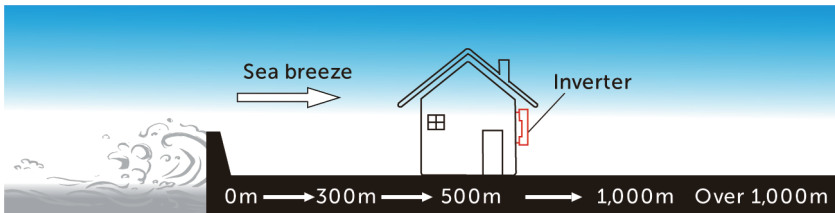


Figure 4-1 Recommended installation position

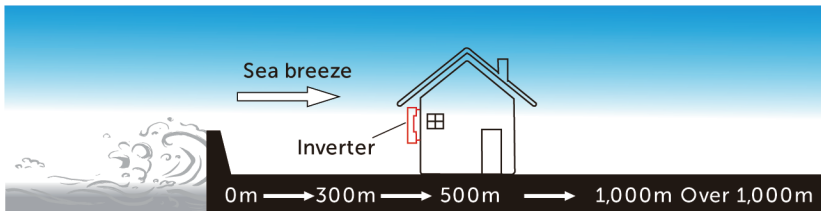


Figure 4-2 Incorrect installation position

4.1.2 Installation Options

NOTICE!

- X1-IES system inverter matches 1~4 battery modules. It is suitable for "option A/B/C/ D" in one tower and "option E/F" in two towers.
- Wall mounting is recommended.
- Up to three battery modules in one tower is recommended. When the installation space is limited, four battery modules in one tower can be chosen.
- The following installation options apply to the modes of floor mounting and wall mounting.

There are 6 installation options available, with details as follows:

One Tower

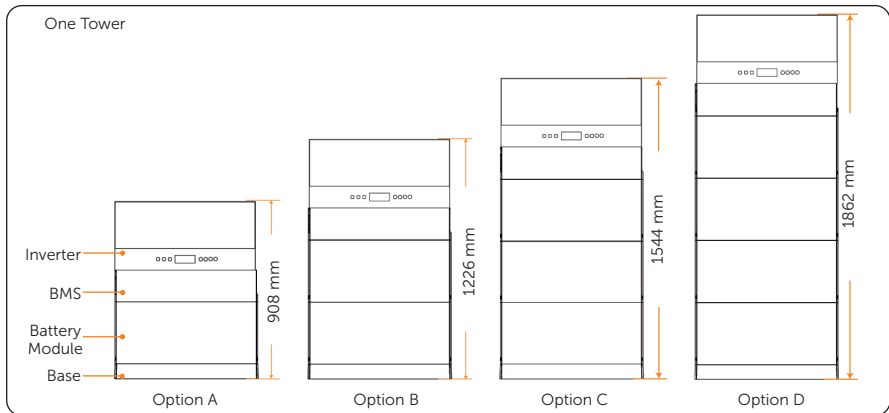


Figure 4-3 Installation option for one tower

Two Towers

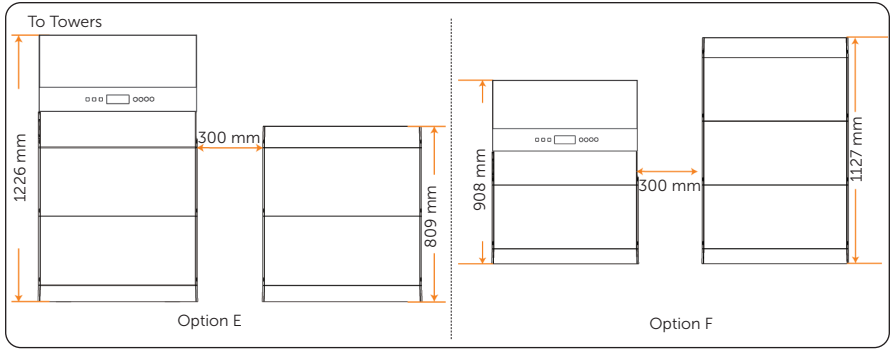


Figure 4-4 Installation option for two towers

Table 4-13 Components of different options

| | Option A | Option B | Option C | Option D | Option E | | Option F | |
|----------------|----------|----------|----------|----------|------------|-------------|------------|-------------|
| | | | | | Left tower | Right tower | Left tower | Right tower |
| Inverter | 1 | 1 | 1 | 1 | 1 | | 1 | |
| BMS | 1 | 1 | 1 | 1 | 1 | | 1 | |
| Battery Module | 1 | 2 | 3 | 4 | 2 | 2 | 1 | 3 |
| Base | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Series box | | | | | | 1 | | 1 |
| Cover | | | | | | 1 | | 1 |

* If the wall mounting is selected, the base support (s) is (are) necessary.

Net weight and dimension of X1-IES system

Table 4-14 Net weight and dimension of one tower

| | Option A | Option B | Option C | Option D |
|-----------------|-------------|--------------|--------------|--------------|
| Net Weight (kg) | 87.2 | 134.2 | 181.2 | 228.2 |
| Dimension (mm) | 730*908*210 | 730*1226*210 | 730*1544*210 | 730*1862*210 |

Table 4-15 Net weight and dimension of two towers

| | Option E | | Option F | |
|-----------------|--------------|-------------|-------------|--------------|
| | Left tower | Right tower | Left tower | Right tower |
| Net Weight (kg) | 134.2 | 99.2 | 87.2 | 146.2 |
| Dimension (mm) | 730*1226*210 | 730*809*150 | 730*908*150 | 730*1127*210 |

* The maximum net weight of an inverter (27kg) is taken as an example.

Table 4-16 Weight and Dimension of the Inverter

| Model | X1-IES- 2.5K | X1-IES- 3K | X1-IES- 3.7K | X1-IES- 4.6K | X1-IES- 5K | X1-IES- 6K | X1-IES- 8K |
|----------------|-----------------|---------------|-----------------|-----------------|---------------|---------------|---------------|
| Weight (kg) | 26.2 | 26.2 | 26.2 | 26.4 | 26.4 | 26.4 | 27 |
| Dimension (mm) | 717*350*210 | | | | | | |

Table 4-17 Weight and Dimension of the Battery (T-BAT-SYS)

| Item | TBMS- MCS0800E | TP-HS50E | Base | Series Box |
|-----------------|-------------------|----------|------|------------|
| Length (mm) | 730 | 730 | 730 | 167 |
| Width (mm) | 150 | 150 | 150 | 121 |
| Height (mm) | 165 | 318 | 75 | 91.5 |
| Net weight (kg) | 9.3 | 47 | 3.9 | 1.3 |

4.1.3 Installation Carrier Requirement

The mounting location must be suitable for the weight and dimension of the product and the support surface for installation must be made of a non-flammable material.

- Solid brick/concrete, or mounting surface with equivalent strength;
- Please ensure that the bearing capacity of the ground and the wall, respectively, that are used to install the X1-IES system must be over 927 kg, which is based on option C. If option D is chosen, the bearing capacity of the ground and the wall, respectively, must be over 1077 kg; (The maximum net weight of an inverter (27kg) is taken as an example.)
- The device must not be installed on the wood wall.

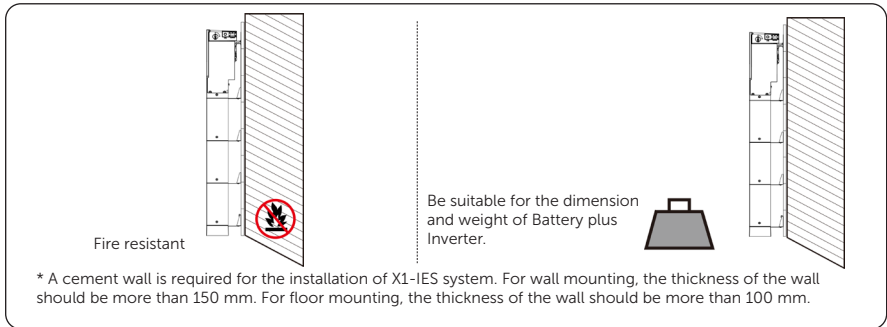


Figure 4-5 Installation carrier requirement

4.1.4 Clearance Requirement

To guarantee proper heat dissipation and ease of disassembly, the minimum space around the X1-IES system must meet the standards indicated below.

For installations with two towers, make sure to leave a minimum space of 30 cm between each system and 30 cm from the ceiling. In areas with high ambient temperatures, increase the clearances between the towers and provide adequate fresh air ventilation if feasible.

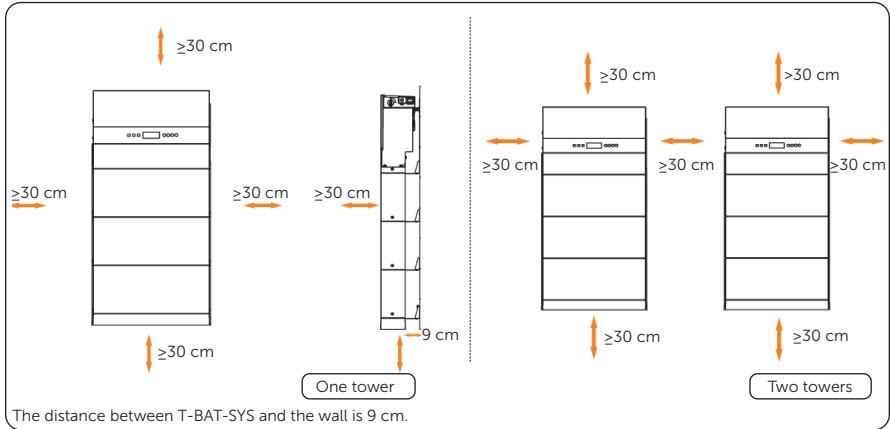


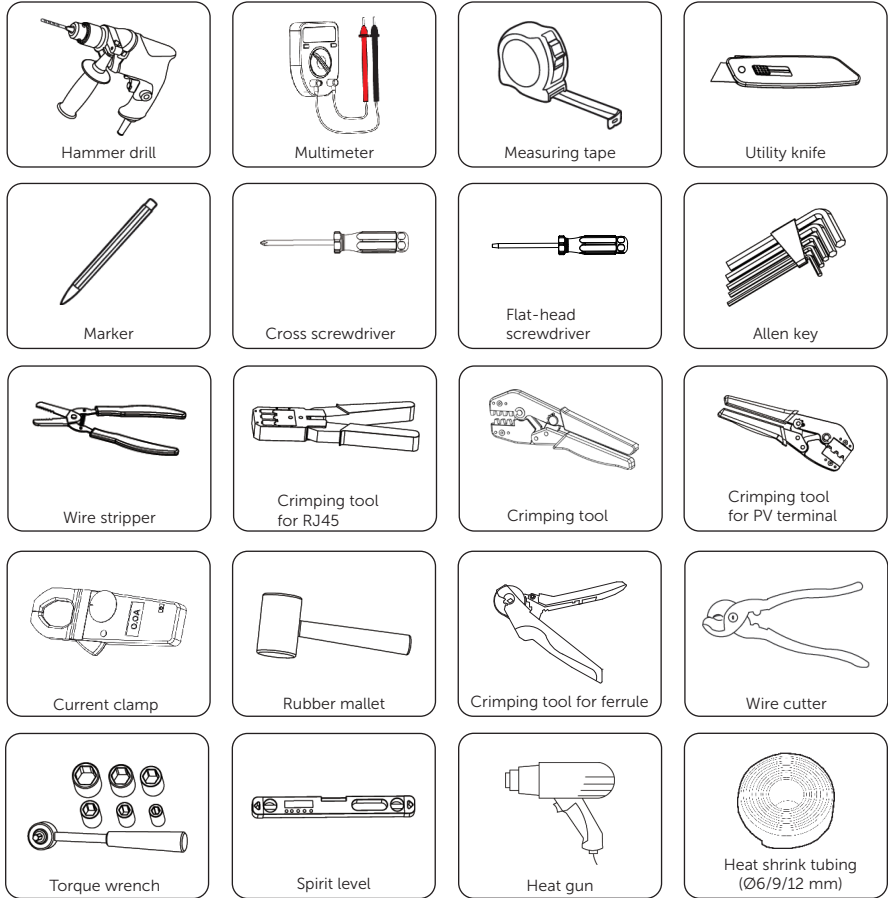
Figure 4-6 Clearance requirement

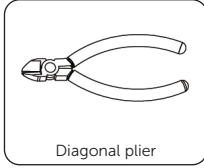
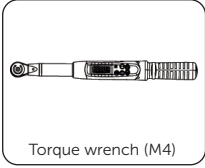
NOTICE!

- If wall mounting is selected, the distance between the base and the ground is decided by the corresponding requirement of the local regulations. For safety, it is suggested the base should be installed as low as possible.

4.2 Tools Requirement

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





4.3 Additionally Required Materials

- Additionally Required Materials of Inverter

Table 4-18 Additionally required wires of Inverter





| No. | Required Material | Type | Conductor Cross-section |
|-----|--|---|-------------------------------|
| 1 | PV wire  | Dedicated PV wire withstand voltage 600 V | 6 mm ² |
| 2 | Communication wire  | Network cable CAT5E | 0.2 mm ² |
| 3 | Additional PE wire  | Conventional yellow and green wire | 6 mm ² |
| 4 | Protective pipe  | White corrugated pipe | External diameter: over 60 mm |

Table 4-19 Grid wire and breaker recommended





| Model | 2.5 kW | 3 kW | 3.7 kW | 4.6 kW | 5 kW | 6 kW | 8 kW |
|--|-------------------|-------------------|-------------------|--------------------|--------------------|--------------------|--------------------|
| Three-core wire (copper)  | 4 mm ² | 6 mm ² | 6 mm ² | 10 mm ² | 10 mm ² | 10 mm ² | 10 mm ² |
| Breaker  | 32A | 32 A | 40 A | 50 A | 50 A | 50 A | 50 A |

Table 4-20 EPS wire and breaker recommended

| Model | 2.5 kW | 3 kW | 3.7 kW | 4.6 kW | 5 kW | 6 kW | 8 kW |
|--|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|
| Two-core wire (copper)  | 4 mm ² | 4 mm ² | 4 mm ² | 6 mm ² | 6 mm ² | 6 mm ² | 10 mm ² |
| Breaker  | 25 A | 25 A | 25 A | 32 A | 32 A | 32 A | 50 A |

*The wire diameter of Grid and EPS cables should be within 13-21 mm.

- **Additionally Required Materials of Battery (T-BAT-SYS)**

Table 4-21 Additionally required wire of T-BAT-SYS

| No. | Required Material | Type | Diameter |
|-----|-------------------|-----------------|---------------------------------|
| 1 | Protective pipe | Corrugated pipe | External diameter: over 67.2 mm |

5 Unpacking and Inspection

The number of cartons will be different due to different modes of mounting. Therefore, please check whether the number of cartons received are correct before unpacking. For details, please refer to the following table.

Table 5-1 Number of cartons

| | One Tower | Two Towers |
|----------------|---|---|
| Floor Mounting | A BMS carton, and carton(s) of battery modules | A BMS carton, a series box carton, and carton(s) of battery modules |
| Wall Mounting | A BMS carton, a base support carton, and carton(s) of battery modules | A BMS carton, two base support cartons, a series box carton, and carton(s) of battery modules |

NOTICE!

- As for the number of cartons of battery modules, it depends on how many battery modules the users purchased.

5.1 Unpacking

- The X1-IES system undergoes 100% testing and inspection before shipping from the manufacturing facility. However, transport damage may still occur. Before unpacking the X1-IES system, please verify that the model and outer packing materials for damage, such as holes and cracks.
- Unpacking the inverter according to the following figure.

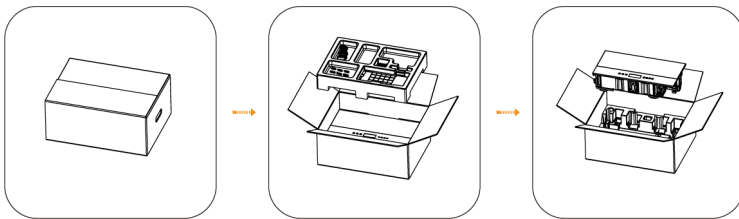


Figure 5-1 Unpacking the Inverter

- Unpacking the BMS and battery module according to the following figures. If there are other cartons, such as the base support carton, and series box carton, the unpacking procedure can also be referred to the following figures.

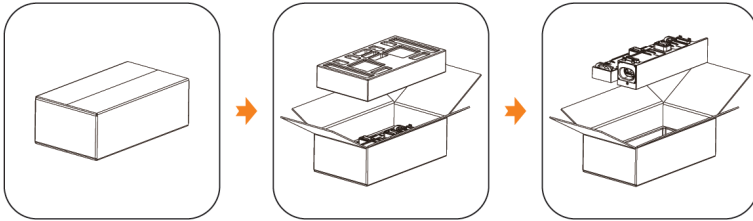


Figure 5-2 Unpacking the BMS

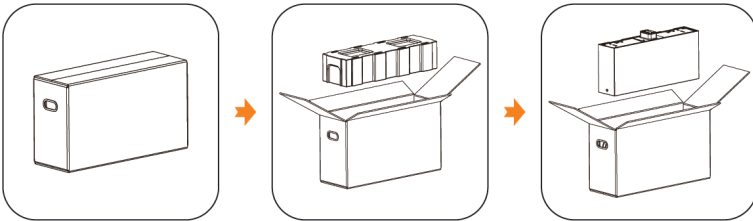


Figure 5-3 Unpacking the battery module

- Be careful when dealing with all package materials which may be reused for storage and relocation of the X1-IES system in the future.
- After 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 Scope of Delivery

- Packing list of Inverter

| | | | |
|--|--|--|---|
|  Inverter |  Bracket |  Positioning cardboard |  Expansion tubes, Self-tapping screws |
|  Waterproof connector with RJ45 |  Document |  Dongle |  Positive & Negative PV connector Positive & Negative PV pin contact |
|  AC terminal Ferrules for AC terminal |  AC terminal tool |  M5*14 screws |  M5*10 screws |
|  RJ45 terminals |  Communication terminal |  Right cover plate |  RJ45 connector |
|  OT terminal |  CT (optional) |  Ferrules for Communication terminal |  Disassembling tool for PV terminal |
|  Positive & Negative PV dustproof buckle |  WiFi connecting cable (with WiFi stand) (220mm) |  Anti-tamper bracket M4*10 screws |  Expansion tube Self-tapping screw |

Table 5-2 Packing list of Inverter

| Item | Quantity |
|--|--|
| Inverter | 1 pc |
| Bracket | 2 pcs |
| Positioning cardboard | 1 pc |
| Expansion tube, Self-tapping screw (ST6) | 2 pairs |
| Waterproof connector with RJ45 | 1 pc |
| Document | / |
| Dongle | 1 pc |
| Positive & Negative PV connector / pin contact | 2 pairs for 2.5kW~3.7kW inverters 3 pairs for 4.6kW~8kW inverters |
| AC terminal | 1 pc |
| Ferrules for AC terminal * | 5 pcs of per type |
| AC terminal tool | 1 pair |
| M5*14 screw | 6 pcs |
| M5*10 screw | 2 pcs |
| RJ45 terminal | 3 pcs |
| Communication terminal | 1 pc |
| Right cover plate | 1 pc |
| RJ45 connector | 1 pc |
| OT terminal | 1 pc |
| CT (optional)** | 1 pc |
| Ferrules for Communication terminal | 16 pcs |
| Disassembling tool for PV terminal | 1 pc |
| Positive & Negative PV dustproof buckle | 2 pairs for 2.5kW~3.7kW inverters 3 pairs for 4.6kW~8kW inverters |
| WiFi connecting cable (with WiFi stand) (220 mm) | 1 pc |
| Anti-tamper bracket | 1 pc |
| M4*10 screws | 2 pcs |
| Expansion tube | 2 pcs |
| Self-tapping screw (ST4.8) | 2 pcs |

For the optional accessories, please be subject to the actual delivery.

**According to the outer carton label, you can determine whether CT is standard. If the "Meter/CT" column on the outer carton label is filled with "CT," it indicates standard CT. If the label does not have a "Meter/CT" column, it indicates no CT.

*Ferrules for AC terminal

| Model | X1-IES-2.5K | X1-IES-3K X1-IES-3.7K | X1-IES-4.6K X1-IES-5K X1-IES-6K | X1-IES-8K |
|---------------------------|-------------------|--|---|--------------------|
| Ferrules | E 4012 (5 pcs) | E 4012 , E 6012 (5 pcs of per type, 10 pcs in total) | E 6012, E 1012 (5 pcs of per type, 10 pcs in total) | E 1012 (5 pcs) |
| Applicable wire diameters | 4 mm ² | 4 mm ² , 6mm ² | 6 mm ² , 10 mm ² | 10 mm ² |

For Grid and EPS cables, make sure to choose the appropriate ferrules based on the wire diameters.

- Packing list of T-BAT-SYS

BMS (TBMS-MCS0800E)

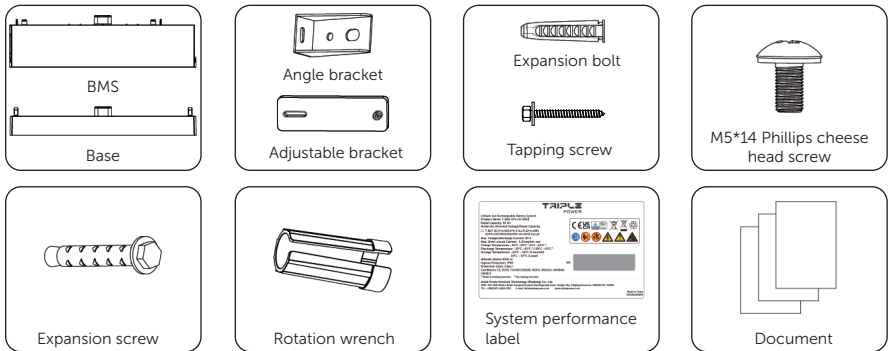


Table 5-3 Packing list of BMS

| Item | Quantity |
|----------------------------------|----------|
| BMS | 1 pc |
| Base | 1 pc |
| Angle bracket | 4 pcs |
| Adjustable bracket | 4 pcs |
| Expansion bolt | 6 pcs |
| Tapping screw | 4 pcs |
| M5x14 Phillips cheese head screw | 8 pcs |
| Expansion screw | 2 pcs |

| Item | Quantity |
|--------------------------|----------|
| Rotation wrench | 1 pc |
| System performance label | 1 pc |
| Document | / |

Battery Module (TP-HS50E)



Table 5-4 Packing list of battery module

| Item | Quantity |
|----------------------------------|----------|
| Battery module | 1 pc |
| M5x14 Phillips cheese head screw | 2 pcs |
| Document | / |

Series Box (For two towers only)

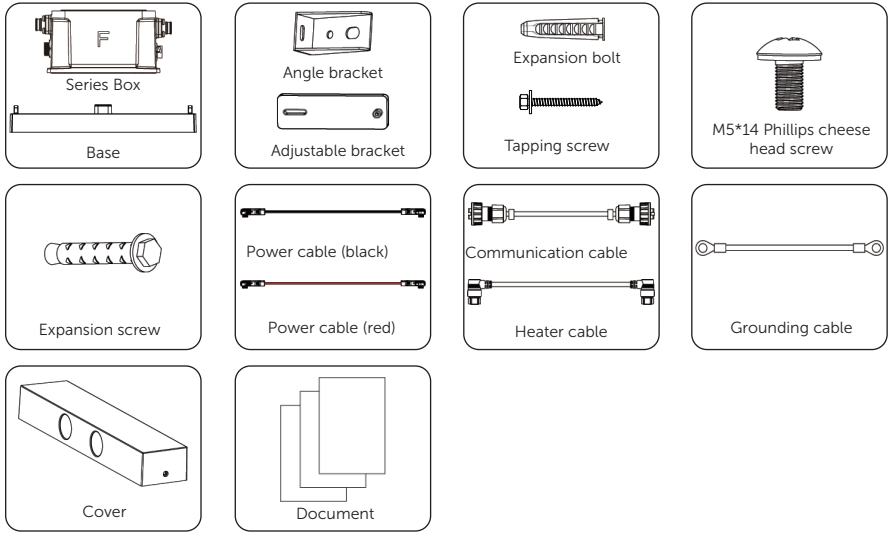


Table 5-5 Packing list of Series Box

| Item | Quantity |
|----------------------------------|----------|
| Series box | 1 pc |
| Base | 1 pc |
| Angle bracket | 4 pcs |
| Adjustable bracket | 4 pcs |
| Expansion bolt | 6 pcs |
| Tapping screw | 4 pcs |
| M5x14 Phillips cheese head screw | 12 pcs |
| Expansion screw | 2 pcs |
| Power cable (black) | 1 pc |
| Power cable (red) | 1 pc |
| Communication cable | 1 pc |
| Heater cable | 1 pc |
| Grounding cable | 1 pc |
| Cover | 1 pc |
| Document | / |

Base Support (For wall mounting only)

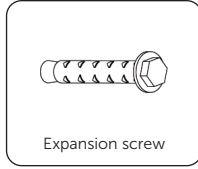
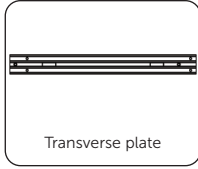
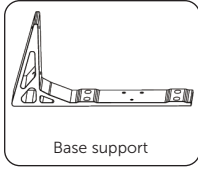
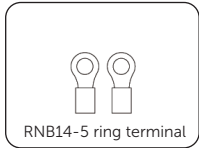
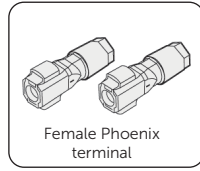
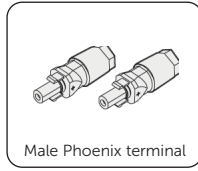
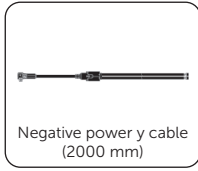
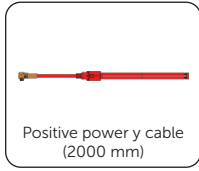


Table 5-6 Packing list of base support

| Item | Quantity |
|---------------------------------------|----------|
| Base support | 2 pcs |
| Transverse plate | 1 pc |
| Expansion screw | 6 pcs |
| M5x20 Phillips countersunk head screw | 6 pcs |
| M5x8 Phillips countersunk head screw | 4 pcs |

Cable (Optional)



| Item | Quantity |
|----------------------------------|----------|
| Positive power y cable (2000 mm) | 1 |
| Negative power y cable (2000 mm) | 1 |
| Male Phoenix terminal | 2 |
| Female Phoenix terminal | 2 |
| RNB14-5 ring terminal | 2 |

*Note:

1. As for the installation steps for power y cables, please refer to the inverter's *User Manual*.
2. Users can purchase the above-mentioned accessory kit based on their actual needs.
3. Do not use the above-mentioned power y cables if the equipment is in parallel.
4. The RNB14-5 ring terminal is suitable for 10 mm² grounding wire.

6 Unpacking and Inspection

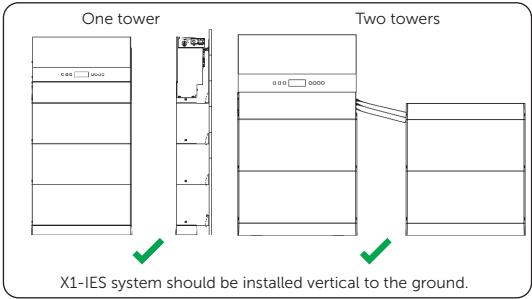


Figure 6-1 Correct installtion angle

There are two mechanical installation modes of X1-IES system, floor mounting and wall mounting. The following is the two installation modes. Option C (with three battery modules) is taken as an example.

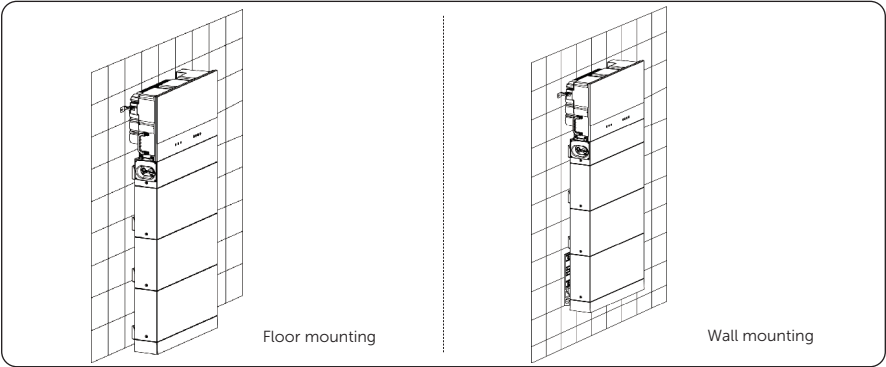


Figure 6-2 Installation modes

 **WARNING!**

- Only the qualified personnel can perform the mechanical installation following the local standards and requirements.
- Check the existing power cables or other piping in the wall to prevent electric shock or other damage.

 **CAUTION!**

- Always be aware of the weight of the X1-IES system. Personal injuries may result if the inverter is lifted improperly or dropped while being transported or mounted.
- Use insulated tools and wear individual protective tools when installing the X1-IES system.

NOTICE!

- Please ensure that the bearing capacity of the ground and the wall, respectively, that are used to install the X1-IES series must be over 927 kg, which is based on option C. If option D is chosen, the bearing capacity of the ground and the wall, respectively, must be over 1077 kg;(The maximum net weight of an inverter (27kg) is taken as an example.)
- The device must not be installed on the wood wall.
- At least two persons are required to move the devices of X1-IES system.
- Please reserve enough distance from the device to the ceiling (or the grounding) for capacity expansion.

NOTICE!

Notice for Battery:

- The connector of the BMS is completely insulated through insulating head.
- No circuit presents on male terminals until female terminals or another module connected.
- Access to directly touch female terminals by fingers is not available as they are IP2X rated.
- In case of measuring the battery's voltage, the battery must be placed on the base, ensuring male and female terminals are in contact before they present circuit.

6.1 Mechanical Installation of Battery and Inverter

6.1.1 Floor Mounting

One Tower for Floor Mounting

NOTICE!

- The mode of floor mounting is given priority for installation.
- Take the installation procedure Option C (With 3 battery modules) as an example.

1. Prepare and install the base and battery modules

Step 1: Remove dust covers from the base, battery module(s) and BMS before conducting installation.

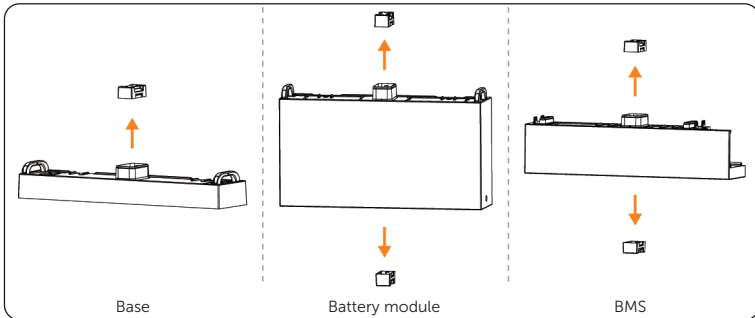


Figure 6-3 Removing dust covers

⚠ CAUTION!

- The dust cover can only be removed during installation and must be reattached after removing the battery.
- Do not touch the terminals during installation or removal of the battery.

Step 2: Place a spirit level to check whether the base is even. If yes, refer to the Step 4; if no, refer to the Step 3. The side with "R" shall be against the wall.

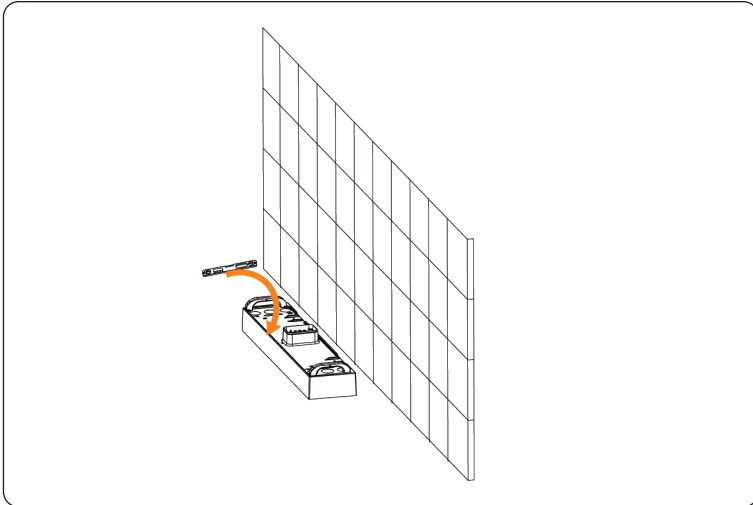


Figure 6-4 Determining whether the Base is level

Step 3: Rotate the adjustment screws clockwise to ensure that it is even.
Turn clockwise to lower the base, and turn anticlockwise to raise the base.

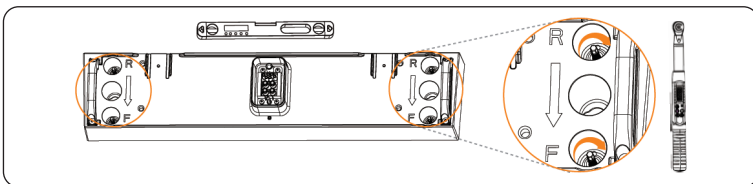
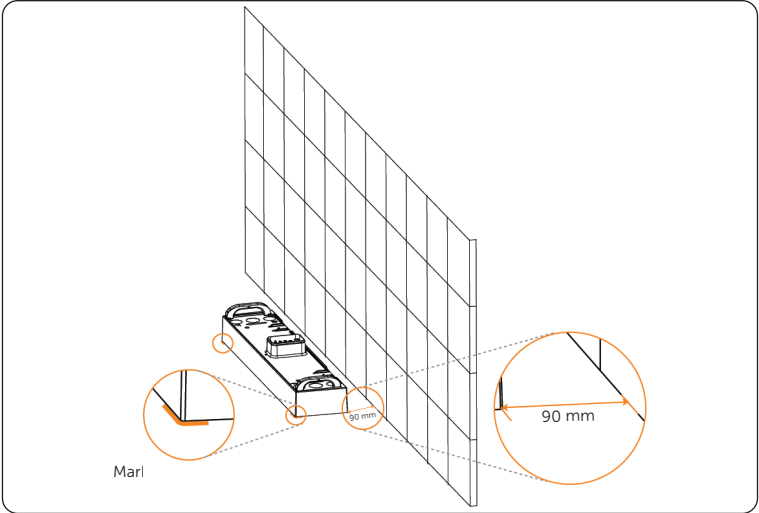


Figure 6-5 Rotating adjustment screws

NOTICE!

- Use a spirit level to measure both side of the base to ensure that the base is even. If not, please rotate the adjustment screws by a torque wrench to ensure that the base is even.

Step 4: Locate the base 90 mm away from the wall, mark the location of the base on both sides with a marker.



Step 5: Attach the angle bracket and adjustable bracket together by using M5x14 screws, but do not tighten them for a while.

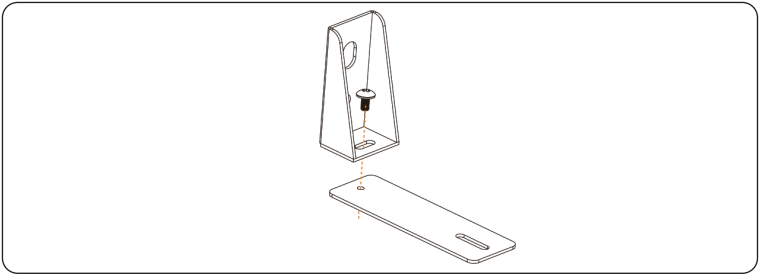


Figure 6-6 Attaching two brackets

Step 6: Place the assembled bracket on the wall, align the hole to the hole on the battery module; and circle along the inner ring of the holes on the angle brackets. Totalling 2 assembled brackets need to be installed.

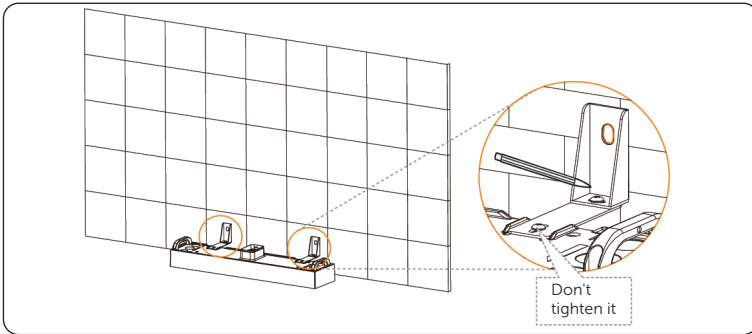


Figure 6-7 Circling inner ring of holes

Step 7: Remove the assembled bracket, and then drill two holes at a depth of more than 60 mm in the concrete wall by using a Drill ($\varnothing 10$ mm).

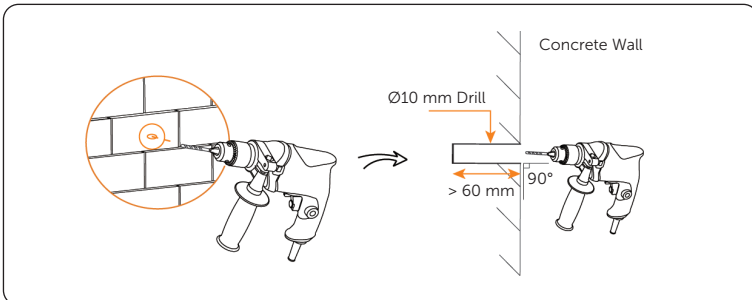


Figure 6-8 Drilling holes

NOTICE!

- An electric drill dust collector is recommended.
- When drilling holes, make sure the already installed part is covered to prevent dust from falling onto the device.

Step 8: Insert the expansion bolts into two holes, tighten the tapping screws to secure the assembled bracket on the wall (torque: 8-10 N·m), and then tighten M5x14 screws on both sides (torque: 2.2-2.5 N·m).

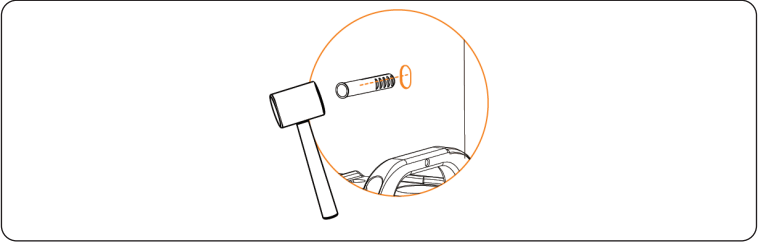


Figure 6-9 Inserting the expansion bolt

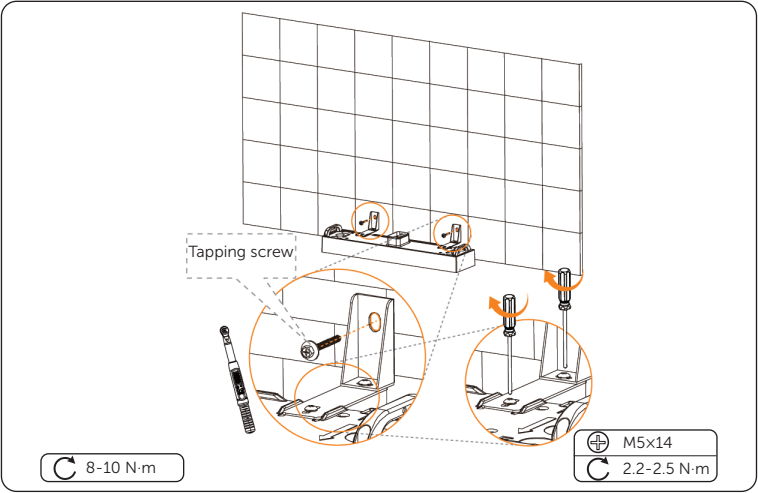


Figure 6-10 Securing the assembled bracket

NOTICE!

- If the base is shifted before securing assembled bracket, move it to its original location according to the mark previously drawn.

Step 9: Place a battery module on the base.

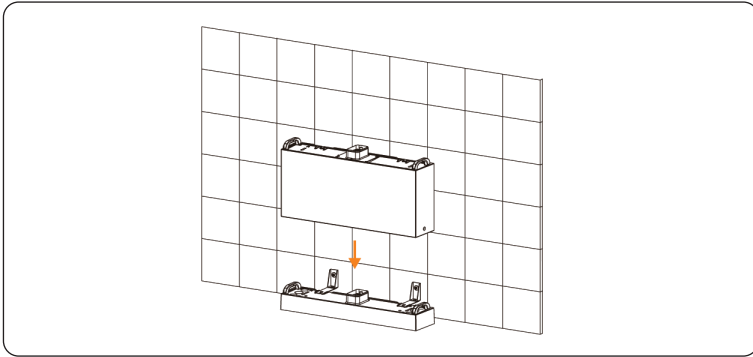


Figure 6-11 Placing the battery module

NOTICE!

- At least two persons are required to move the battery module.
- please ensure that the side with "R" shall be lean against the wall.

Step 10: Insert and tighten M5x14 screws on both sides (torque: 2.2-2.5 N·m).

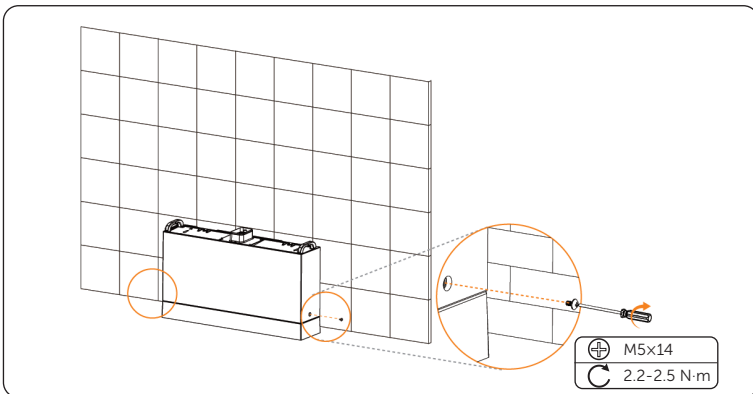


Figure 6-12 Tightening screws

NOTICE!

- Please make sure that the corners and edges of the base and battery module are aligned before tightening screws.

Step 11: Place the second and third battery modules, and make sure that the corners and edges of the battery modules are aligned.

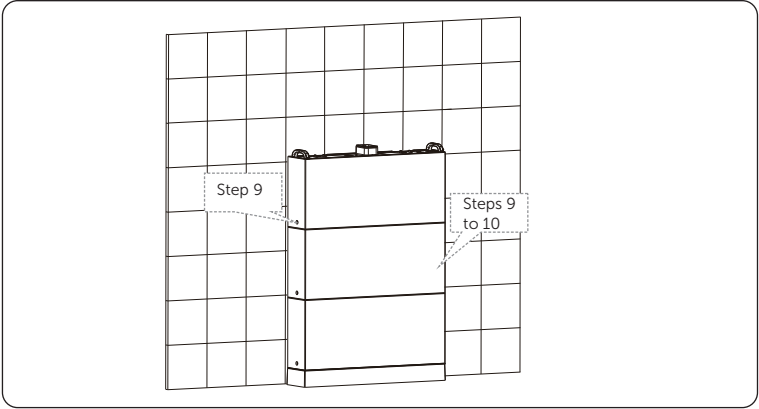


Figure 6-13 Placing battery modules

2. Install the bracket of the top battery module

Step 1: Assemble the bracket of the battery module, secure the bracket with M5*14 screw, but not tighten it for a while.

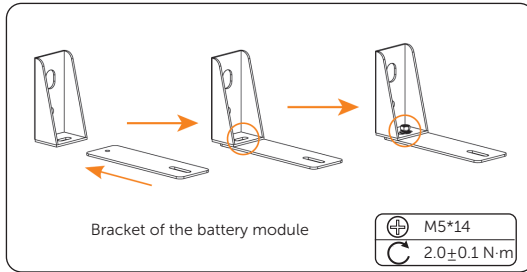


Figure 6-14 Securing the bracket

Step 2: Align the bracket of the battery module with the mounting holes on the battery module, and mark the position of the mounting holes.

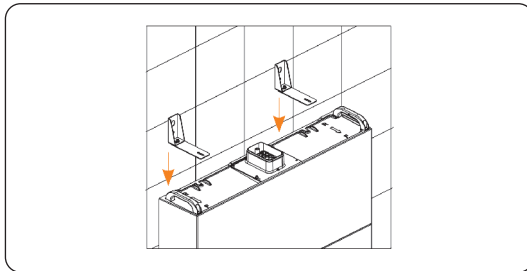
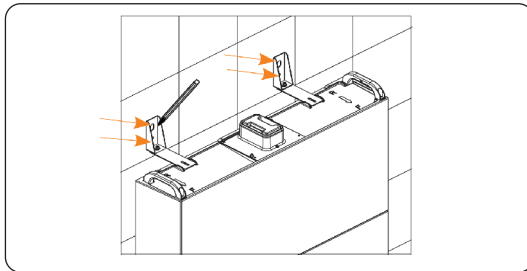


Figure 6-15 Aligning the bracket with the mounting holes



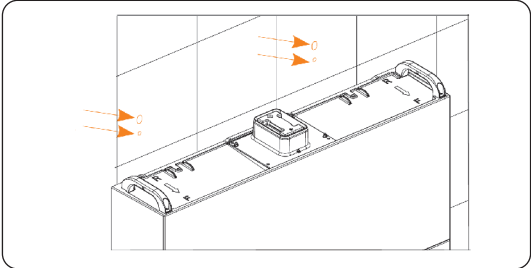
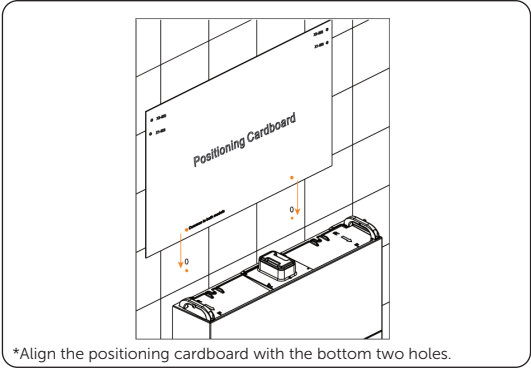


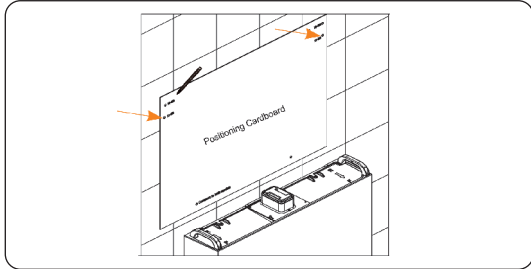
Figure 6-16 Marking the position of the mounting holes

Step 3: Align the positioning cardboard with the bottom two mounting holes, and mark the position of the mounting holes of X1-IES.



*Align the positioning cardboard with the bottom two holes.

Figure 6-17 Aligning the positioning cardboard



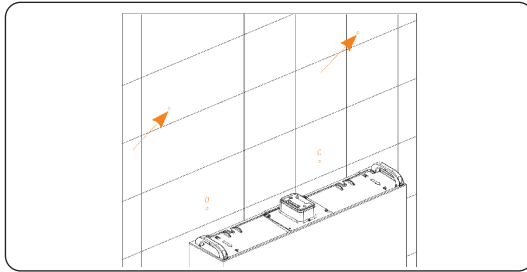


Figure 6-18 Marking the position of the mounting holes

Step 4: Drill the upper four holes with $\text{\O}10$ drill bit, and make sure the depth of the holes should be over 60 mm. Then insert the expansion tubes into the holes.

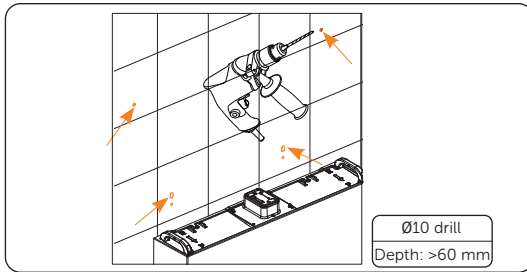


Figure 6-19 Drilling the upper four holes

NOTICE!

- When drilling holes, make sure the already installed part is covered to prevent dust from falling onto the device.

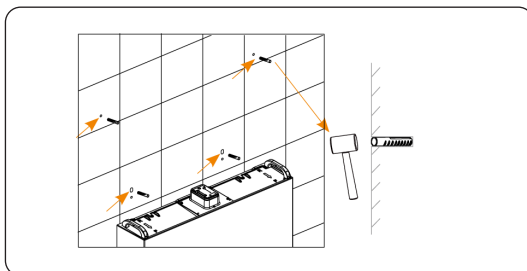


Figure 6-20 Inserting the expansion tubes into the holes

Step 5: Secure the assembled brackets on the wall by using tapping screws, and then tighten M5×14 screws (torque: 2.2-2.5 N·m).

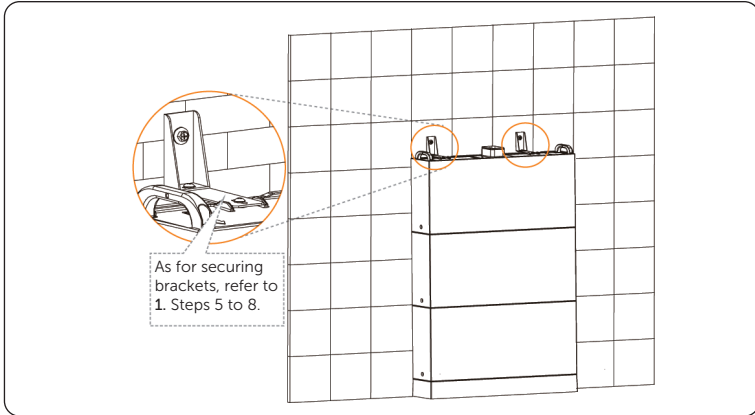


Figure 6-21 Securing assembled bracket

Step 6: Remove the dust cover of top battery module.

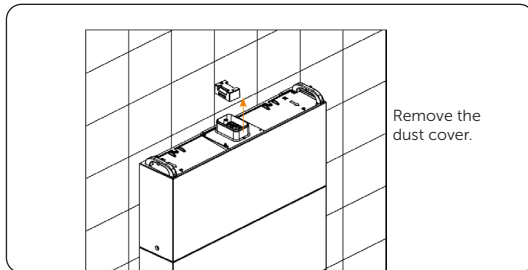


Figure 6-22 Removing the dust cover

3. Install the BMS

Step 1: Remove the dust cover of the BMS. Place the BMS, and then tighten the M5x14 screws on both sides (torque: 2.2-2.5 N·m)

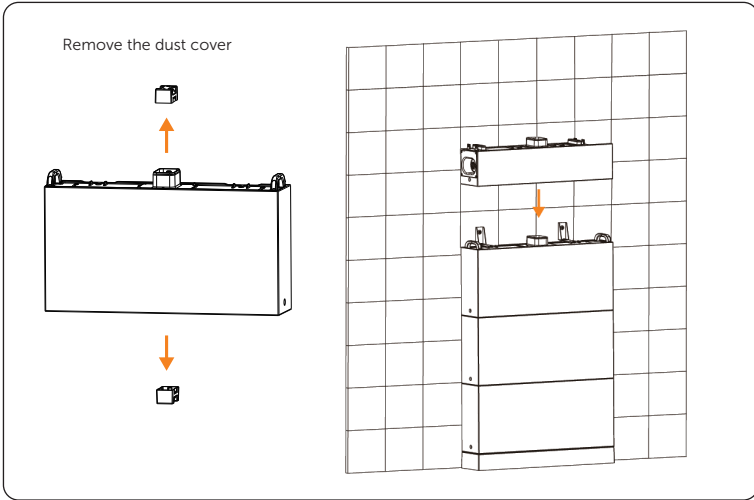


Figure 6-23 Placing the BMS

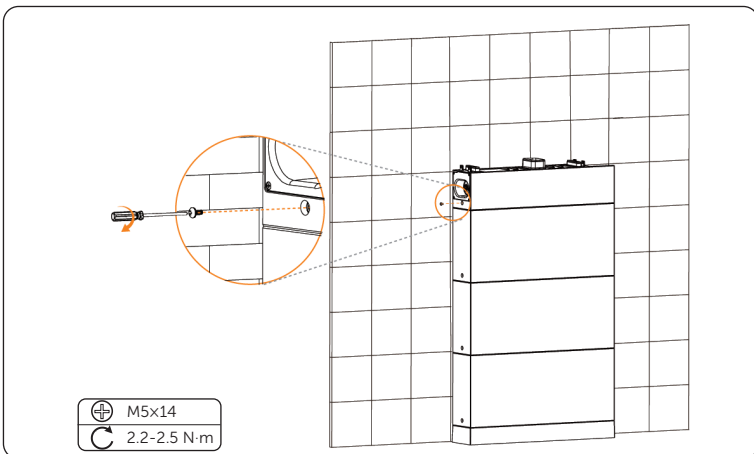


Figure 6-24 Tightening M5 screws

NOTICE!

- Please make sure that the corners and edges of the BMS and battery module are aligned before tightening screws.

Step 2: Install the anti-tamper bracket for later use to lock the cover plate of the inverter.

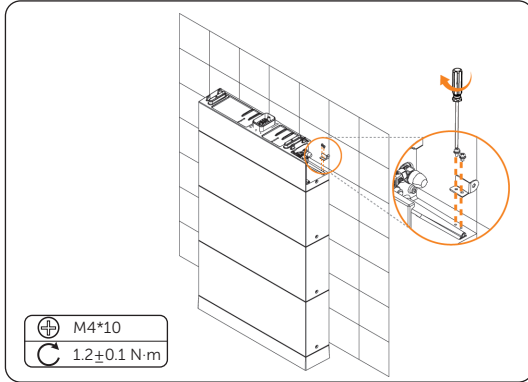


Figure 6-25 Install the anti-tamper bracket

4. Install the inverter

Step 1: Remove the dust cover of the inverter, and stack the inverter into the BMS.

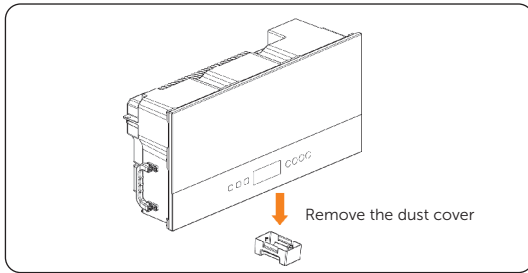


Figure 6-26 Removing the dust cover

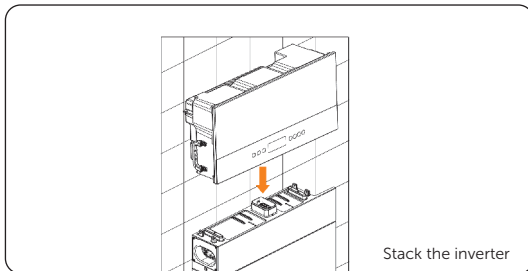


Figure 6-27 Stacking the inverter

Step 2: Tighten the M5*14 screws between the inverter and the BMS (torque: 2.0 ± 0.1 N·m).

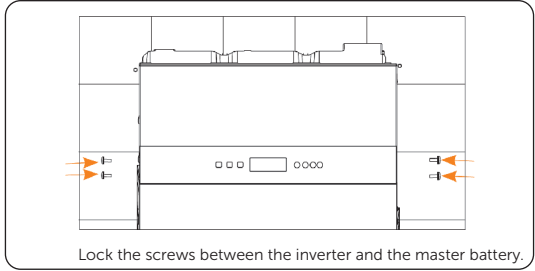


Figure 6-28 Lock the M5*14 screws

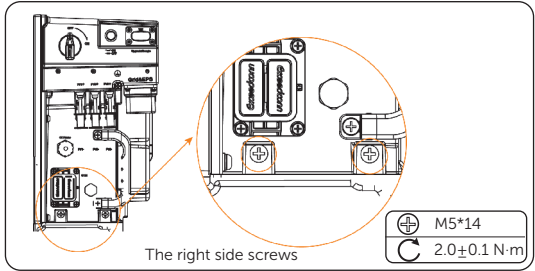


Figure 6-29 Locking the right side screws

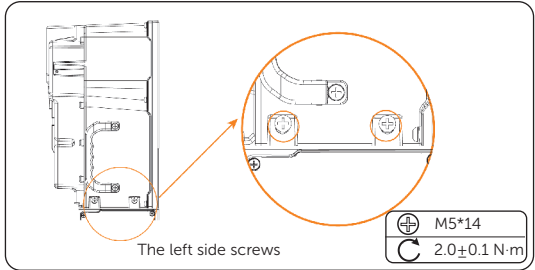


Figure 6-30 Locking the left side screws

Step 3: Install the bracket of the inverter. Slightly tighten but not lock the M5*10 screws on both sides of the inverter (torque: 2.0 ± 0.1 N·m).

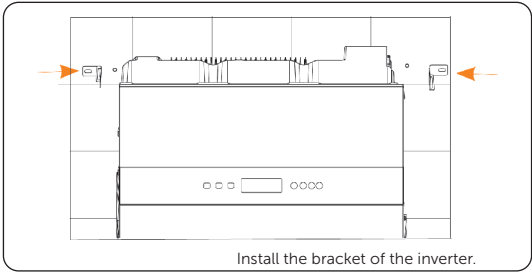


Figure 6-31 Installing the bracket of the inverter

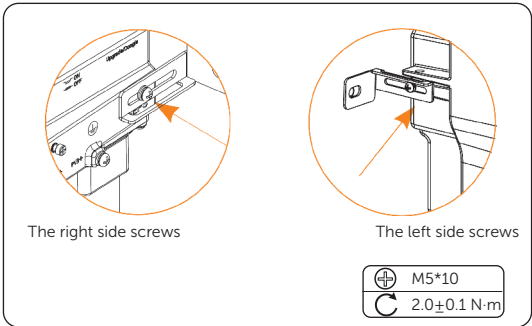


Figure 6-32 Tightening but not locking the screws

Step 4: Lock the self-tapping screws on the wall, then lock the M5*10 screws on both sides of the inverter.

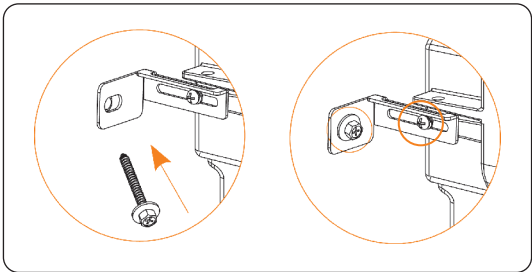


Figure 6-33 Locking the left side self-tapping screw and M5*10 screw

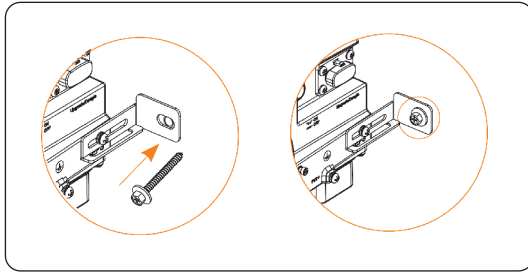


Figure 6-34 Locking the right side self-tapping screw and M5*10 screw

Step 5: (Optional) Users can choose to lock the bracket on the left side of the inverter with a lock, thus providing the device a double guarantee. The aperture of the bracket is 8 mm, make sure the aperture of the lock is less than 8 mm.

Two Tower for Floor Mounting

NOTICE!

- Take the installation procedure Option E (with 2+2 battery modules) as an example.

Step 1: As for the installation steps for the following figure, please refer to the installation procedure for [6.1.1 One Tower for Floor Mounting](#). The installation procedure for both left and right towers is the same.

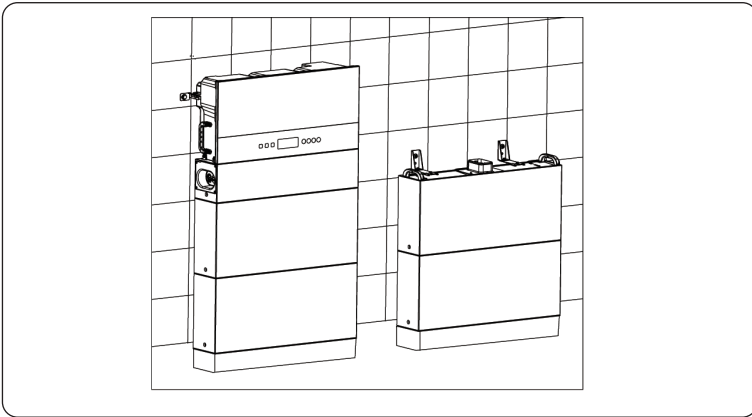


Figure 6-35 Installing two towers

Step 2: Place the series box, insert and tighten M5×14 screws, with totalling 4 screws (torque: 2.2-2.5 N·m).

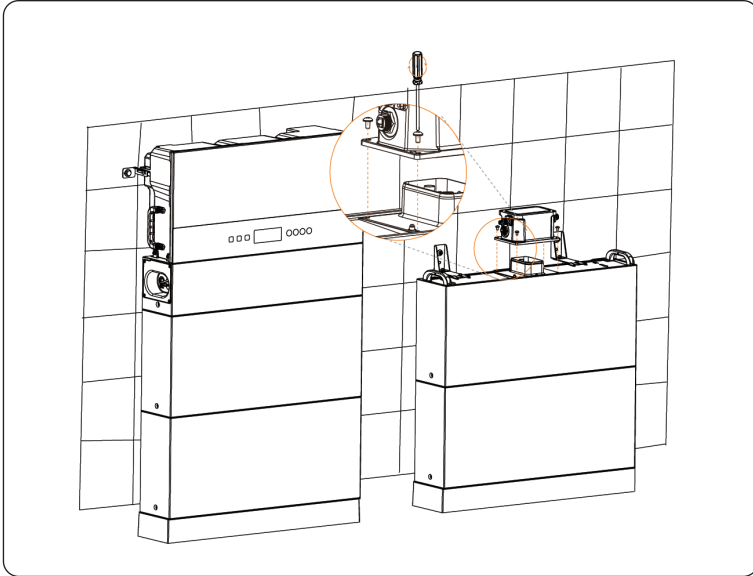


Figure 6-36 Placing the series box

NOTICE!

- The side of the series box with "R" shall be lean against the wall.
- The cover that covers on the series box shall be installed after finishing wiring. As for the installation procedure of the cover, please refer to the section of [7.2.3 Installation of Cover](#).

6.1.2 Wall Mounting

One Tower for Wall Mounting

NOTICE!

- Ensure that the bearing capacity of ground and the wall is greater than the weight of X1-IES system. Otherwise, the wall mounting mode is not recommended.
- Take the installation procedure Option C (With 3 battery modules) as an example.

1. Prepare and install the base and battery modules

Step 1: Remove dust covers from the base, battery module(s) and BMS before conducting installation.

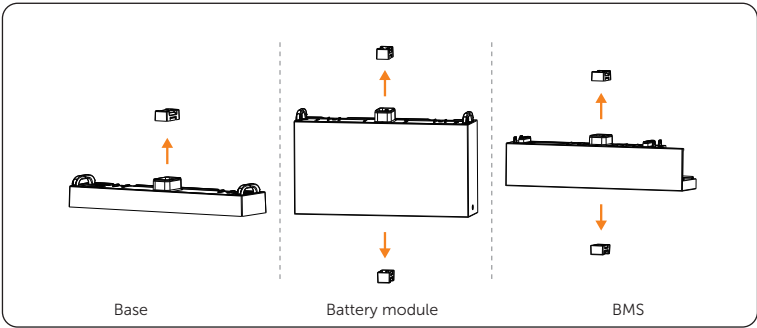


Figure 6-37 Removing dust covers

Step 2: Tighten M5x8 screws on both sides to attach the base support and transverse plate together (torque: 2.2-2.5 N·m).

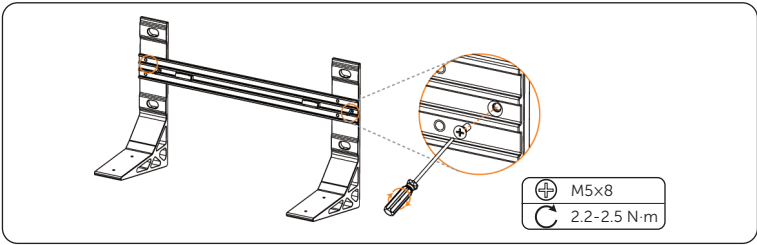


Figure 6-38 Attaching base support and transverse plate

Step 3: Place the assembled base support and transverse plate on the wall, check the cylindrical plastic bubble spirit level on the transverse plate. If the bubble is not in the centre, slightly bow it to the horizontal.

Then circle along the inner ring of the four holes.

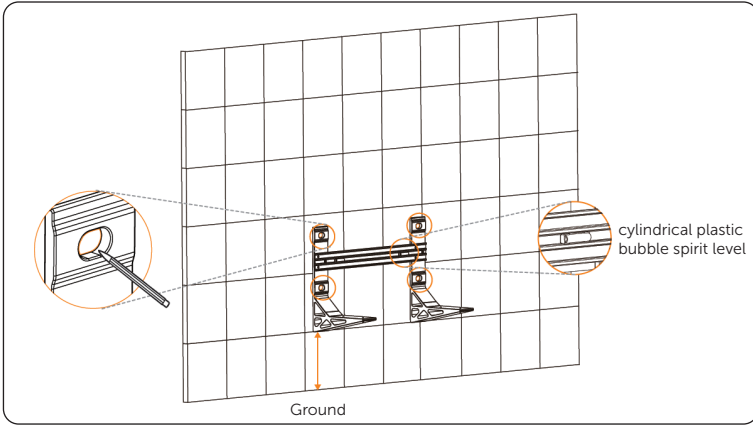


Figure 6-39 Drawing circles

NOTICE!

- The distance between the base support to the ground is decided according to the local regulations. And it is also the distance between the base to the ground. For the safety concerns, it is suggested that the height from the ground not be too high.
- Please leave enough distance to the ceiling to install the inverter.

Step 4: Remove the assembled base support and transverse plate, and then drill four holes at a depth of at least 110 mm by using a Drill ($\varnothing 15$ mm).

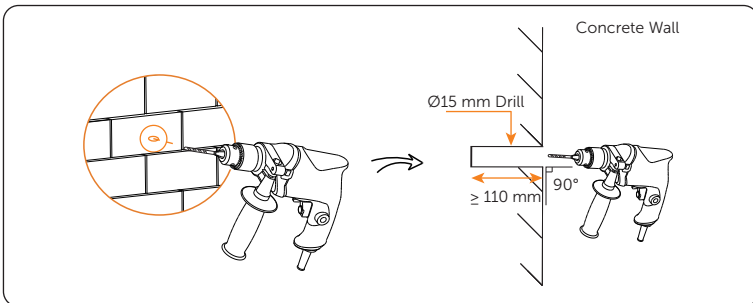


Figure 6-40 Drilling holes

NOTICE!

- An electric drill dust collector is recommended.
- When drilling holes, make sure the already installed part is covered to prevent dust from falling onto the device.

Step 5: Place the assembled base support and transverse plate on the wall again, and check whether the bubble is in the centre.

Attach the expansion screws to such four holes, hit it by using rubber mallet, and then tighten it by using torque wrench (torque: 20-25 N·m)

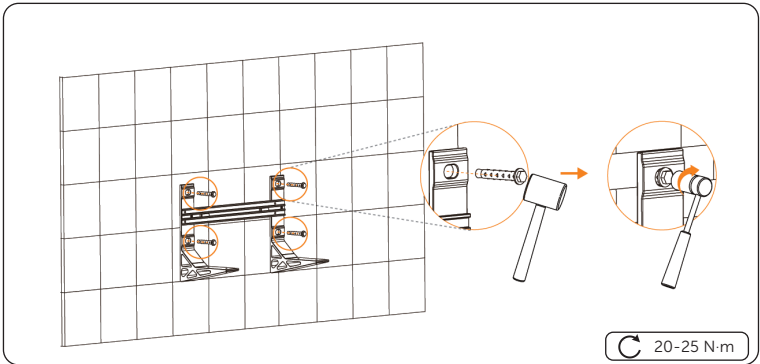


Figure 6-41 Tightening expansion screws

Step 6: Place the base on the base support, and secure both left and right sides with M5x20 screws (torque: 2.2-2.5 N·m). There are totalling 4 M5x20 screws shall be tightened.

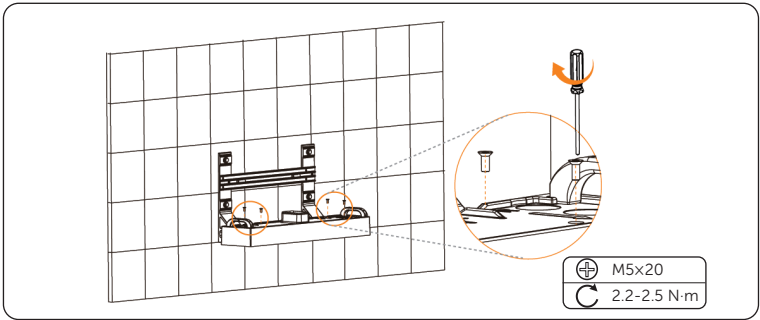


Figure 6-42 Securing the base

Step 7: Place the battery module on the base.

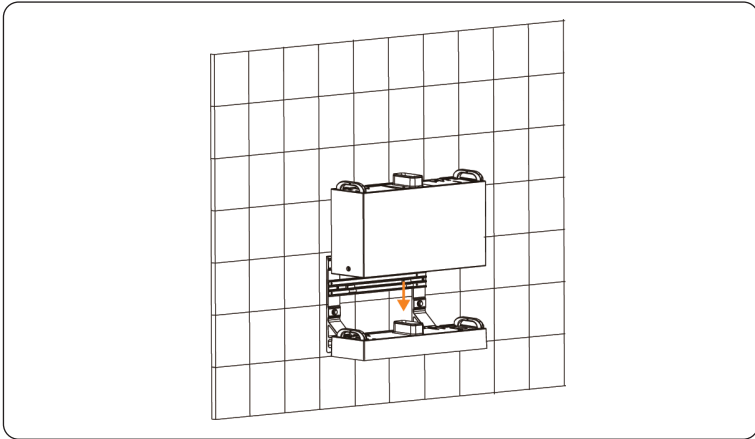


Figure 6-43 Placing battery module

NOTICE!

- At least two persons are required to move the battery module.
- Make sure that the side of the series box with "R" shall be lean against the wall.

Step 8: Insert and tighten M5x14 screws on both sides (torque: 2.2-2.5 N·m).

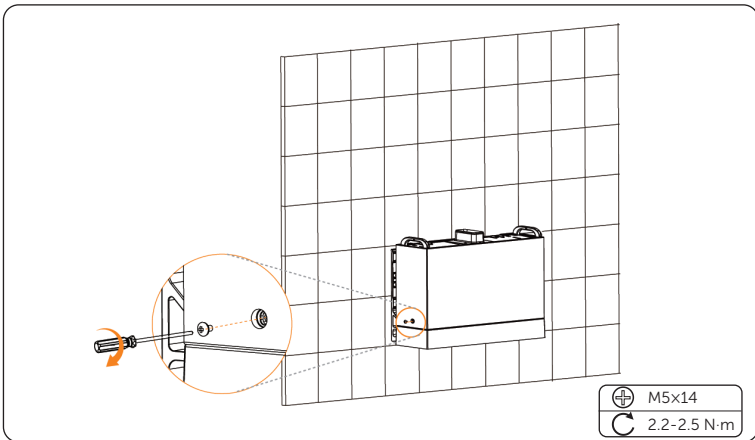


Figure 6-44 Tightening screws

NOTICE!

- Please make sure that the corners and edges of the base and battery module are aligned before tightening screws.

Step 9: Place the second and third battery modules, and make sure that the corners and edges of the battery modules are aligned.

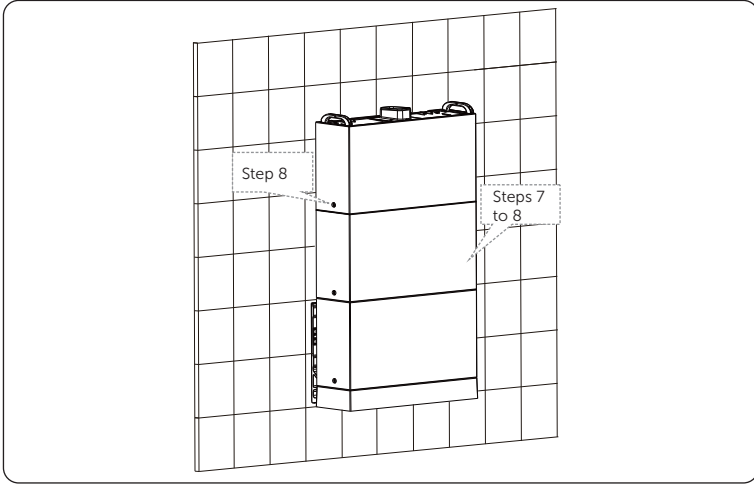


Figure 6-45 Placing battery modules

2. Install the bracket of the top battery module

Step 1: Assemble the bracket of the battery module, secure the bracket with M5*14 screw, but not tighten it for a while.

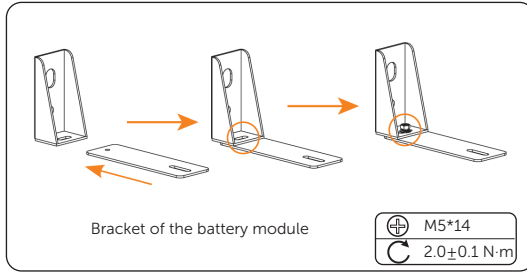


Figure 6-46 Securing the bracket

Step 2: Align the bracket of the battery module with the mounting holes on the battery module, and mark the position of the mounting holes.

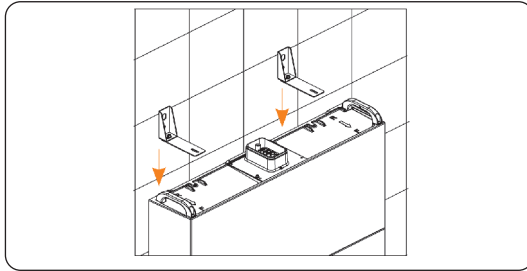
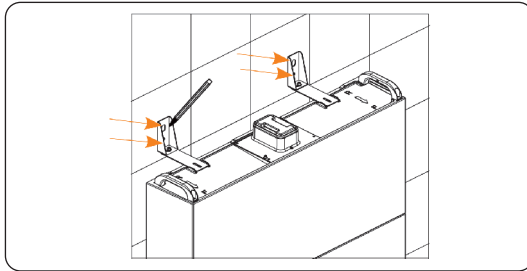


Figure 6-47 Aligning the bracket with the mounting holes



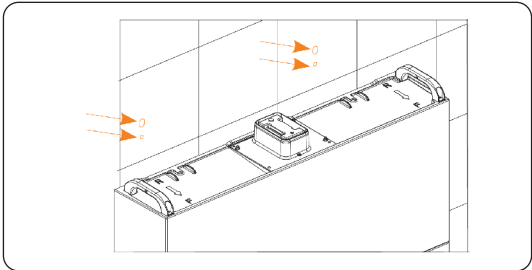
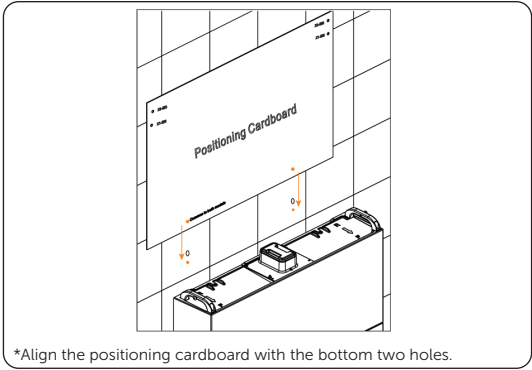


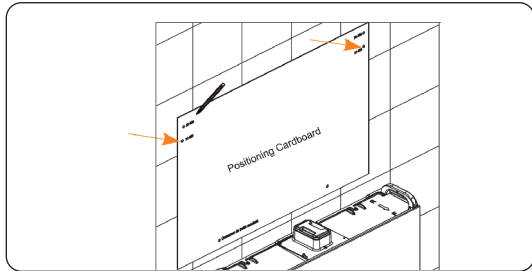
Figure 6-48 Marking the position of the mounting holes

Step 3: Align the positioning cardboard with the bottom two mounting holes, and mark the position of the mounting holes of X1-IES .



*Align the positioning cardboard with the bottom two holes.

Figure 6-49 Aligning the positioning cardboard



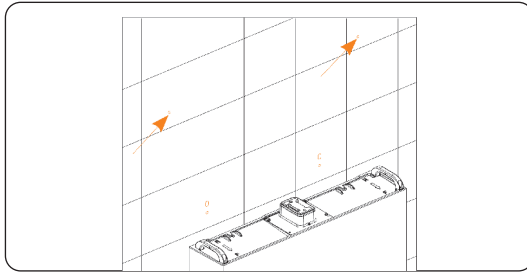


Figure 6-50 Marking the position of the mounting holes

Step 4: Drill the upper four holes with $\text{Ø}10$ drill bit, and make sure the depth of the holes should be over 60 mm. Then insert the expansion tubes into the holes.

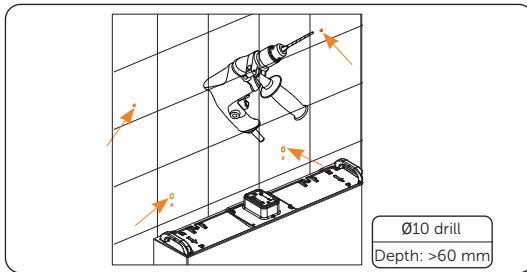


Figure 6-51 Drilling the upper four holes

NOTICE!

- When drilling holes, make sure the already installed part is covered to prevent dust from falling onto the device.

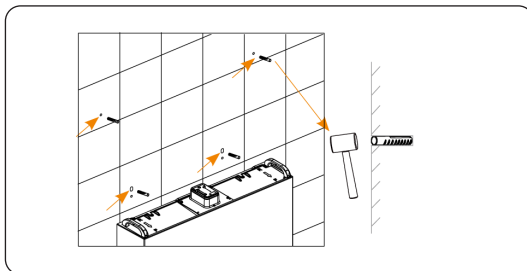


Figure 6-52 Inserting the expansion tubes into the holes

Step 5: Tighten the tapping screws to secure the assembled bracket on the wall (torque: 8-10 N·m), and then tighten M5x14 screws on both sides (torque: 2.2-2.5 N·m).

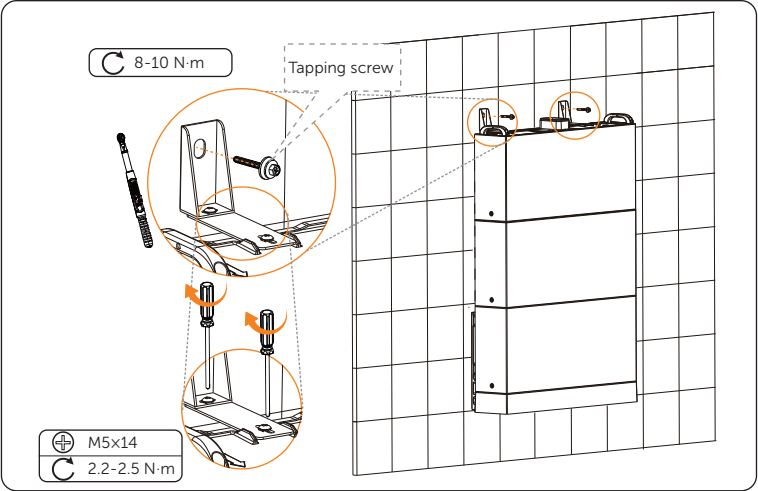


Figure 6-53 Securing the assembled bracket

Step 6: Remove the dust cover of top battery module.

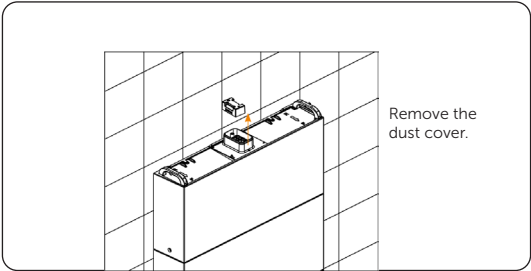


Figure 6-54 Removing the dust cover

3. Install the BMS

Step 1: Remove the dust cover of the BMS. Place the BMS, and then tighten the M5x14 screws on both sides (torque: 2.2-2.5 N·m)

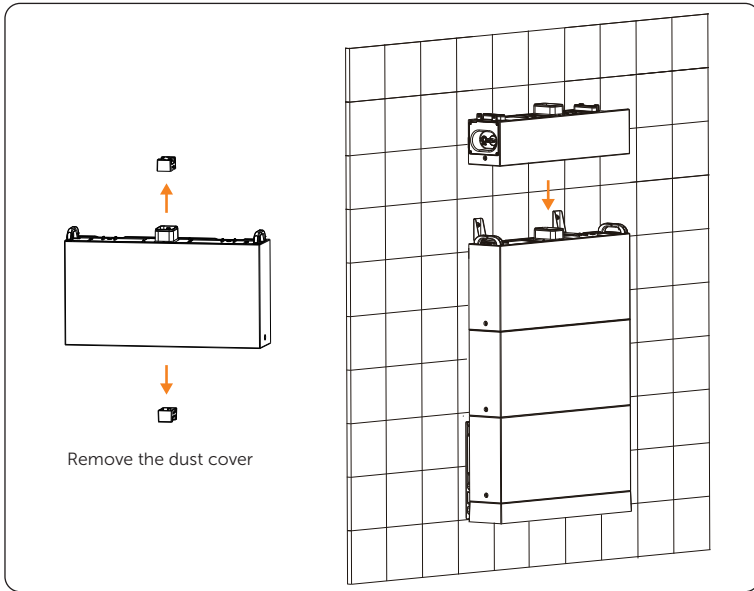


Figure 6-55 Placing the BMS

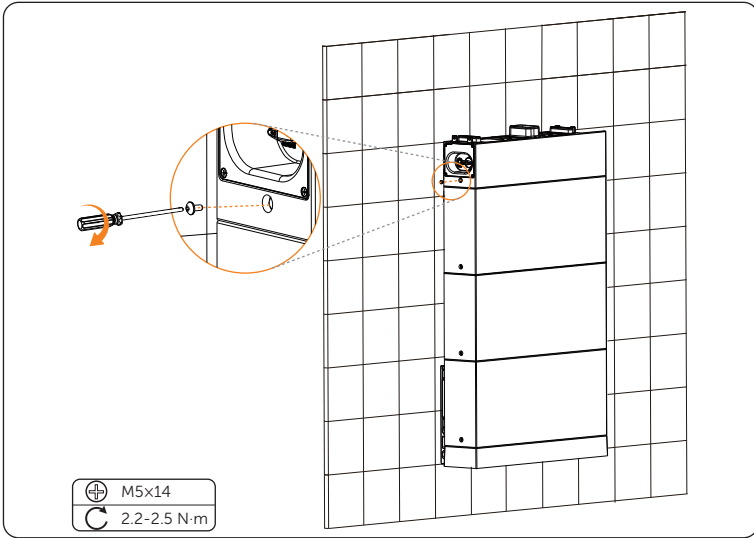


Figure 6-56 Tightening M5 screws

NOTICE!

- Please make sure that the corners and edges of the BMS and battery module are aligned before tightening screws.

Step 2: Install the anti-tamper bracket for later use to lock the cover plate of the inverter.

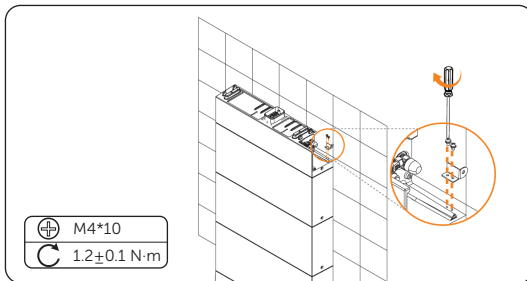


Figure 6-57 Installing the anti-tamper bracket

4. Install the inverter

For the steps of installing the inverter, please refer to [4. Install the inverter](#) in One Tower for Floor Mounting.

Two Towers for Wall Mounting

NOTICE!

- Take the installation procedure Option E (with 2+2 battery modules) as an example.

Step 1: As for the installation steps for the following figure, please refer to the installation procedure for [6.1.2 One Tower for Wall Mounting](#) The installation procedure for both left and right towers is the same.

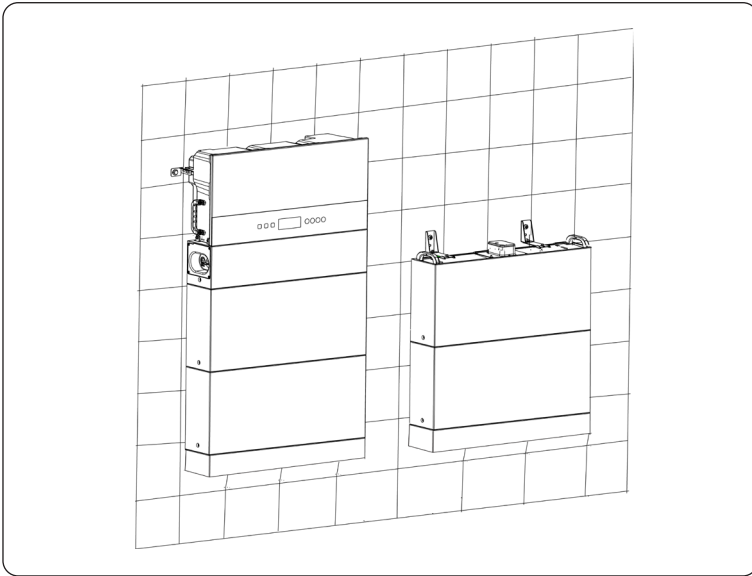


Figure 6-58 Installing two towers

Step 2: Place the series box, insert and tighten M5×14 screws, with totalling 4 screws (torque: 2.2-2.5 N·m).

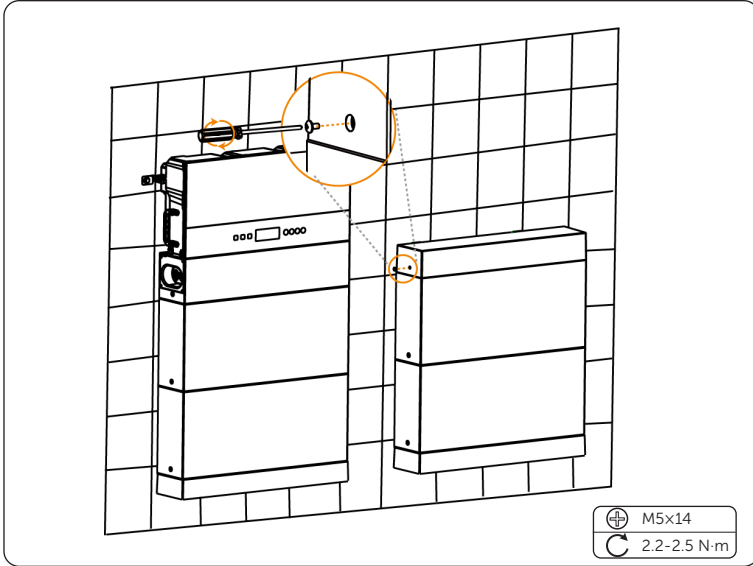


Figure 6-59 Placing the series box

NOTICE!

- The side of the series box with "R" shall be lean against the wall.
- The cover that covers on the series box shall be installed after finishing wiring. As for the installation procedure of the cover, please refer to the section of [7.2.3 Installation of Cover](#)

6.1.3 Battery Capacity Expansion

The device is allowed to increase the number of battery modules to achieve capacity expansion. After the system is installed, if users need to add batteries for capacity expansion, perform this operation.

As for the battery capacity expansion, it may have to dismantle the inverter. In that case, please strictly follow the *User Manual* to remove or install the inverter.

NOTICE!

- Do not mix different types or makes of the battery module. It may cause leakage or rupture, resulting in personal injury or property damage.
- Please confirm that there is enough space to increase the number of battery modules.
- Please make sure that the ground and wall that are used to install the new battery modules can handle the additional weight.

7 Electrical Connection

7.1 Electrical Connection on the Battery (T-BAT-SYS)

7.1.1 Details of Cables

Communication cable: There are two terminals at both ends. One connects to the COM port of the BMS, and the other connects to the COM port of the series box.



Figure 7-1 Communication cable

Heater cable: There are two terminals at both ends. One connects to the HEAT port of the BMS, and the other connects to the HEAT port of the series box.



Figure 7-2 Heater cable

Power cable (black): There are two terminals with the same function at both ends. One connects to the "BAT-" of the BMS, and the other connects to the "BAT-" of the series box.



Figure 7-3 Power cable (black)

Power cable (red): There are two terminals with the same function at both ends. One connects to the "BAT+" of the BMS, and the other connects to the "BAT+" of the Series Box.



Figure 7-4 Power cable (red)

Grounding cable: There are two terminals at both ends. One connects the grounding port of the BMS, and the other connects to the grounding port of the series box.



Figure 7-5 Grounding cable

NOTICE!

- The above-mentioned cables are delivered with the **Accessories of Series Box**.

7.1.2 Wiring Procedure

WARNING!

- Only the qualified personnel can perform the wiring.
- Follow this manual to wire connection. The device damage caused by incorrect cabling is not in the scope of warranty.

CAUTION!

- Use insulated tools and wear individual protective tools when connecting cables.

NOTICE!

- In the case of one tower, the BMS does not need to conduct wiring. The short power cable, short-circuit plug, and waterproof cap will be connected before delivery. And in that case, please don't remove the short power cable, short-circuit plug, or waterproof cap.
- The wiring procedure for both floor mounting and wall mounting is the same.
- Take the wiring procedure of two towers in floor mounting as an example.

Step 1: Before conducting wiring between the BMS and series box, press and hold the lock button to unplug the short power cable.

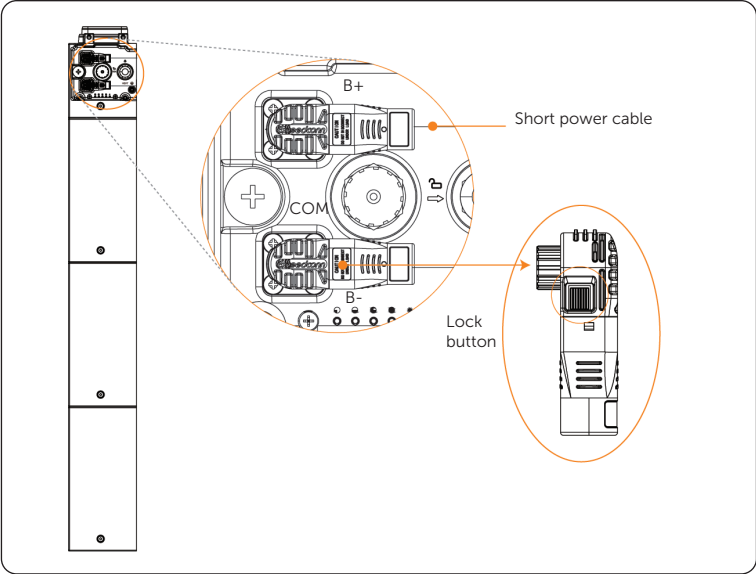


Figure 7-6 Removing short power cable

Step 2: Rotate the waterproof cap anti-clockwise to remove it. And rotate the short-circuit plug anti-clockwise. When the arrow on the rotating ring is aligned with the arrow on the panel, the short-circuit plug can be remove.

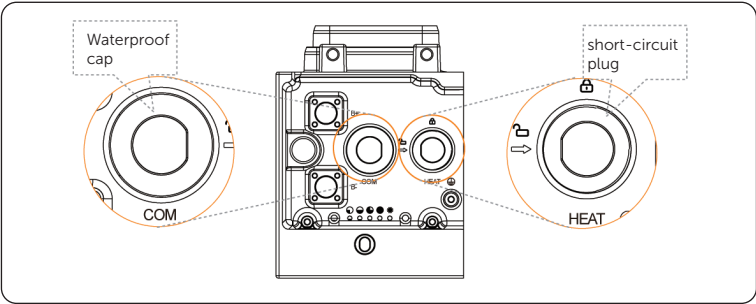


Figure 7-7 Removing waterproof cap

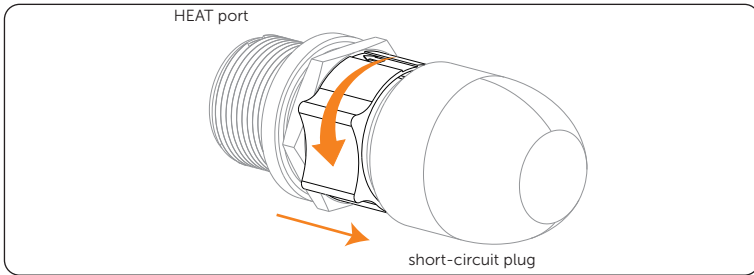


Figure 7-8 Closing short-circuit plug

NOTICE!

- Press and hold the lock button while unplugging the power cable, or it can not be pulled out.
- Do not violently remove the short-circuit plug before the arrow on the rotating ring is aligned with the arrow on the panel.
- Do not violently remove the cable when it is locked.

- Step 3:** Connect B+ of the BMS to B+ of the series box;
 Connect B- of the BMS to B- of the series box;
 Connect COM port of the BMS to COM port of the series box;
 Connect HEAT port of the BMS to HEAT port of the series box;
 Connect the grounding port of the BMS to the grounding port of the series box.

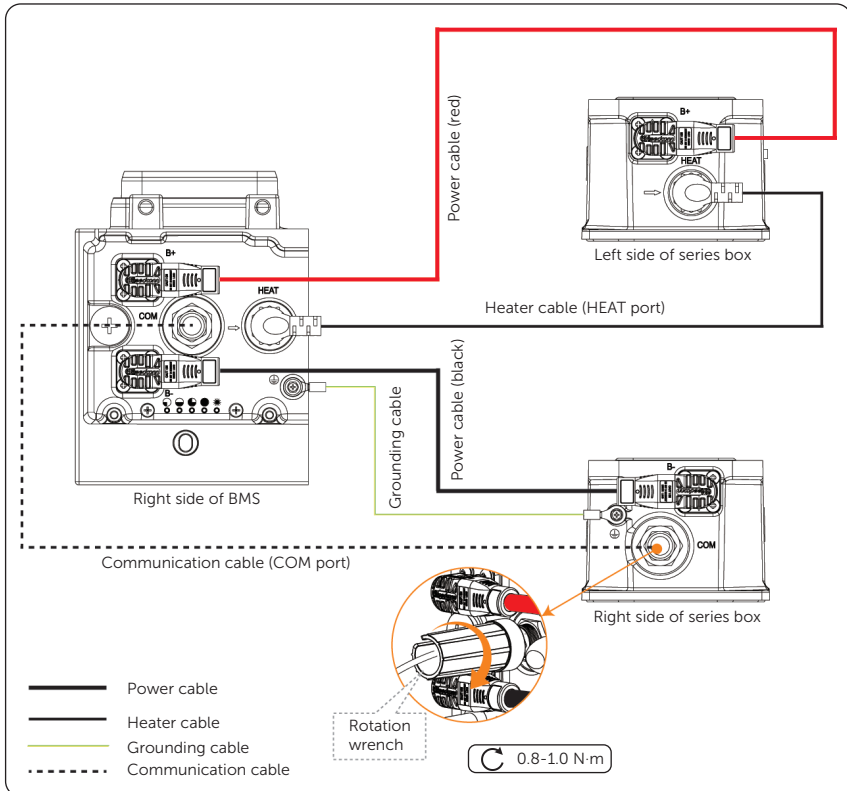


Figure 7-9 Connecting cables

NOTICE!

- There are two terminals on both ends of the power cable;
- Both ends of the communication cable shall be closed by using a rotation wrench.

Step 4: Pull cables through pipes after connecting cables to the BMS.

Pull the power cable (red) and heater cable through pipe 1, and pull the power cable (black), communication cable and grounding cable through pipe 2.

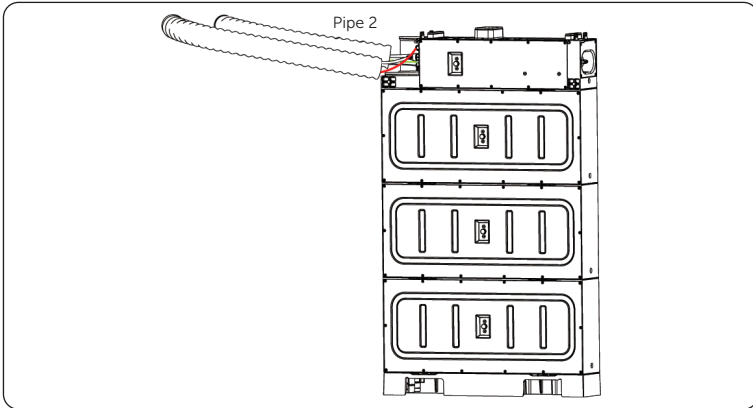


Figure 7-10 Pulling cables

NOTICE!

- A corrugated pipe should be prepared by the users.

Step 5: Insert pipes into the holes on the cover, and then connect the cables to the series box.

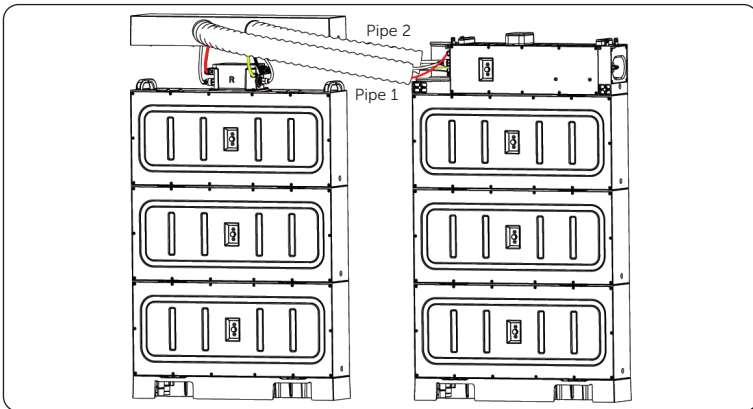


Figure 7-11 Inserting pipes into the cover

Step 6: Firstly rotate the rotating ring until the arrow on it is aligned with the arrow on the panel before removing the short-circuit plug, and then insert the heater cable into the HEAT port and rotate clockwise to close it.

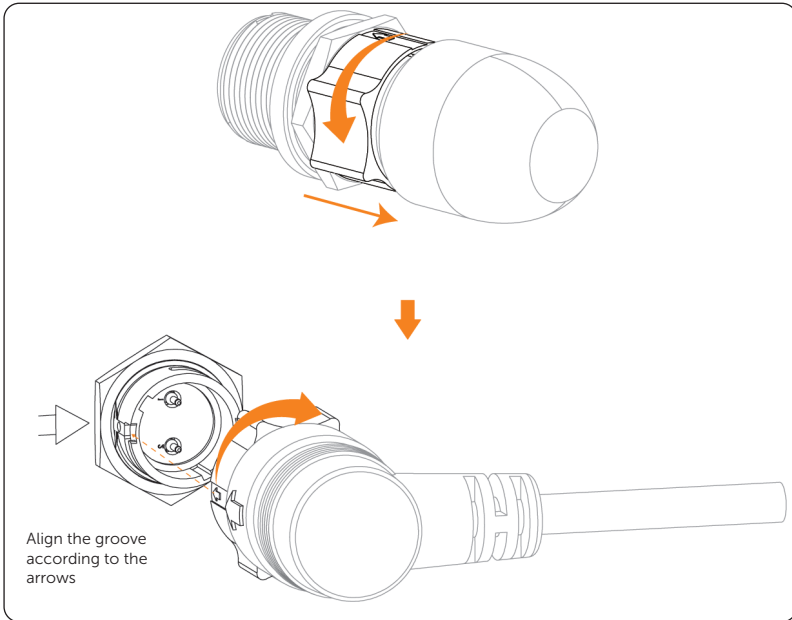


Figure 7-12 Locking heater cable

NOTICE!

- A rotation wrench is used to tighten both ends of the communication cable, and it may be removed after tightening.
- Do not violently remove the cable when it is locked.
- A corrugated pipe with an external diameter of 67.2 mm is recommended for use to keep cable insulation in place and avoid potential damages.

7.1.3 Installation of Cover

After finishing wiring, push the cover to the series box, and tighten M5x14 screws on both sides to secure the cover (torque: 2.2-2.5 N·m).

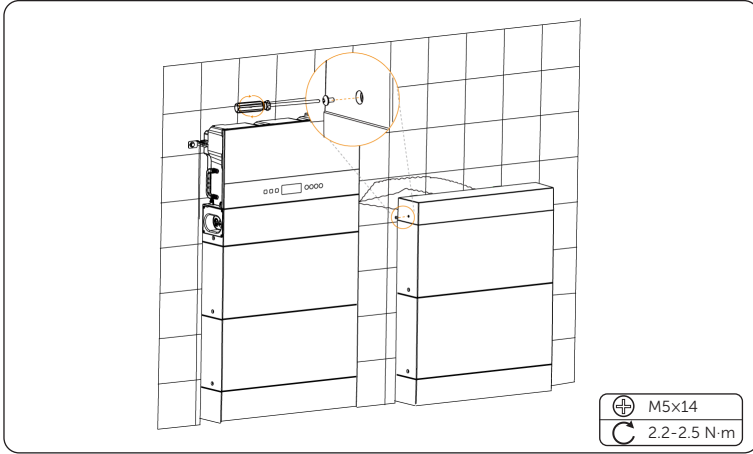


Figure 7-13 Tightening M5 screws

NOTICE!

- Please make sure that the corners and edges of the cover and battery module are aligned before tightening screws.
- The above steps for installing the cover also apply to the mode of wall mounting.

7.2 Electrical Connection on the Inverter

DANGER!

- Before electrical connection, make sure the DC switch on the battery (T-BAT-SYS); the DC switch on the inverter, and the AC and EPS breakers between the inverter and the power grid 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 device damage caused by incorrect cabling is not in the scope of warranty.

CAUTION!

- Use insulated tools and wear individual protective tools when connecting cables.

7.2.1 Wiring Sequence

The recommended wiring sequence is as follows: PE connection, Grid & EPS connection, CT/Meter connection, Communication connection and PV connection.

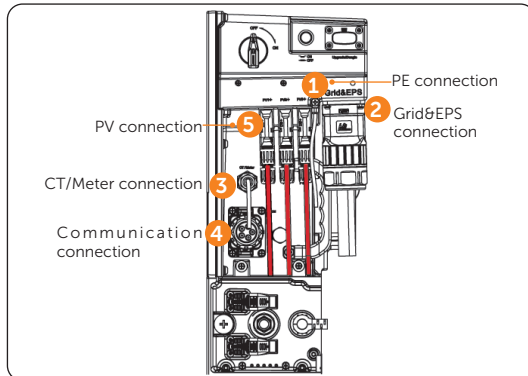



Figure 7-1 Wiring sequence

7.2.2 PE Connection

The inverter must be reliably grounded. The PE connection point has been marked with  It is recommended to connect the inverter to a nearby grounding point. For a system with multiple inverters connected in parallel, connect the ground points of all inverters to ensure equipotential connections to ground cables.

PE connection procedures

Step 1: Strip the PE cable by wire stripper;

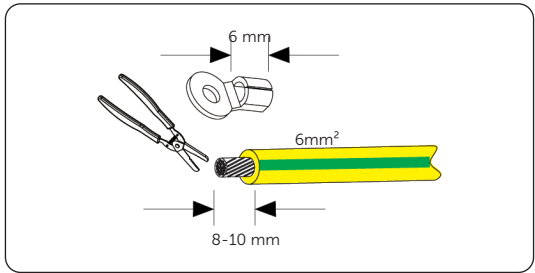


Figure 7-2 Stripping the PE cable

Step 2: Pull the heat-shrink tubing over the PE cable and insert the stripped section into OT terminal;

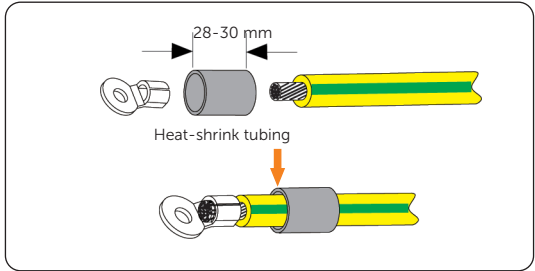


Figure 7-3 Inserting the stripped section into OT terminal

Step 3: Crimp OT terminal with crimping tool, pull the heat-shrink tubing over the stripped section of the OT terminal and use a heat gun to shrink it so that it can be firmly contacted with the terminal;

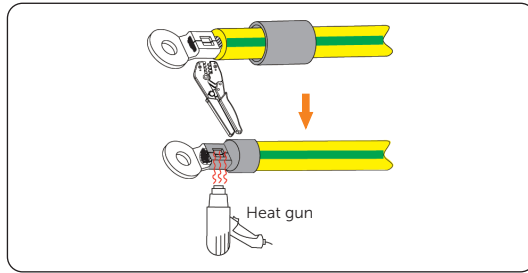


Figure 7-4 Crimping the cable

Step 4: Remove the M5*10 screw at the ground port (Torque: 2.0 ± 0.1 N·m);

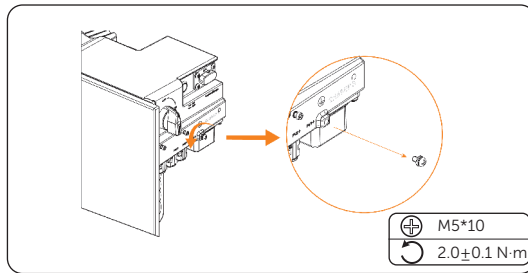


Figure 7-5 Removing the M5*10 screw

Step 5: Connect the PE cable to the inverter, and secure the M5*10 screw (Torque: 2.0 ± 0.1 N·m).

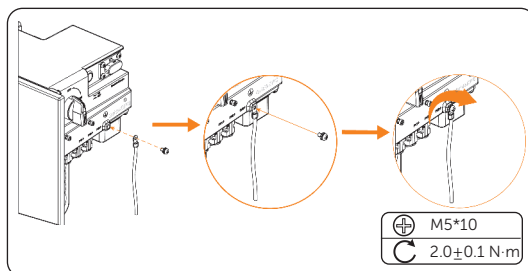


Figure 7-6 Securing the PE cable

Step 6: Connect the other end of the PE cable to the PE bar on the grid inlet wire.

7.2.3 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 port, and when the grid is disconnected, the inverter outputs go through the EPS port.

Requirements for AC side connection

- Grid Voltage requirement
 - » The grid voltage must be within the permissible range. The inverter is suitable for rated voltage 220/230/240V, 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.
- 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 breaker of Grid and EPS (Off-grid).
- Load requirement
 - » It is prohibited to connect any load between the inverter and the AC breaker.
 - » Ensure that the EPS load rated power is within the EPS rated output power range, otherwise, the inverter will report an **EPS Overload Fault** warning. When **EPS Overload Fault** occurs, adjust the load power to make sure it is within the EPS rated output power range, and the inverter will automatically return to normal. For non-linear loads, ensure that the inrush current power is within the EPS rated output power range. When the configuration current is less than the maximum DC input current, the capacity and voltage of lithium will decrease linearly.

Table 7-1 Load requirement

| Content | Power | | Common equipment | Instance | | |
|----------------|-------|-------|------------------|--------------|------------------|--------------|
| | Start | Rated | | Equipment | Start | Rated |
| Resistive load | × 1 | × 1 | Lamp | 100 W lamp | 100 VA (W) | 100 VA (W) |
| Inductive load | × 3-5 | × 2 | Fan/Fridge | 150 W fridge | 450-750 VA (W) | 300 VA (W) |

* The EPS (Off-grid) load of the inverter does not support a half-wave load, and the half-wave load cannot be used here.

Wiring procedures

Step 1: Remove the sealing plug of the AC terminal, and select the appropriate sealing plug according to the outer diameter of the cable.

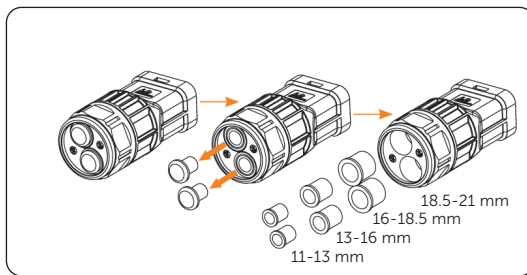


Figure 7-7 Removing the sealing plug

Step 2: Prepare a Grid cable (three-core cable) and an EPS cable (two-core cable), then strip the cables as below.

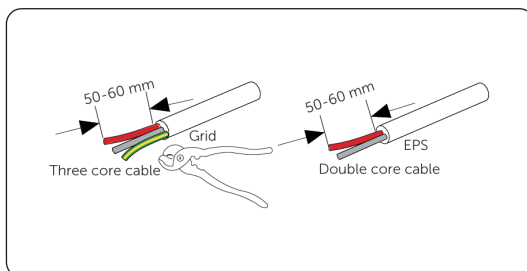


Figure 7-8 Stripping the Grid and EPS cables

Step 3: Thread the Grid and EPS cables through the AC terminal.

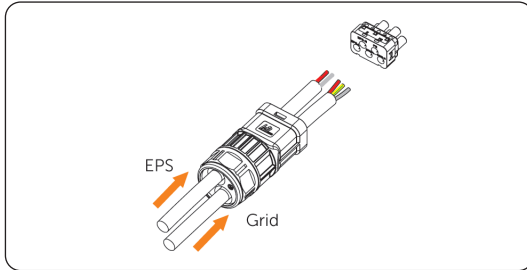


Figure 7-9 Threading the Grid and EPS cables

Step 4: Strip 14 mm of Grid and EPS cables, and Insert the stripped cables into ferrules.

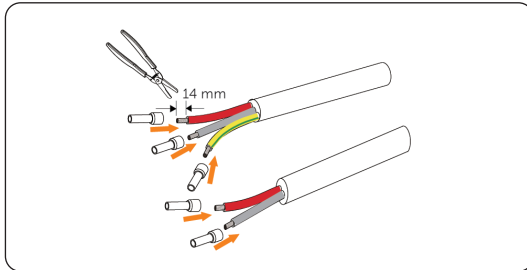


Figure 7-10 Inserting the stripped cables into ferrules

Step 5: Use crimping tool for ferrules to crimp the ferrules. Make sure the the conductors are correctly assigned and firmly seated in the ferrules.

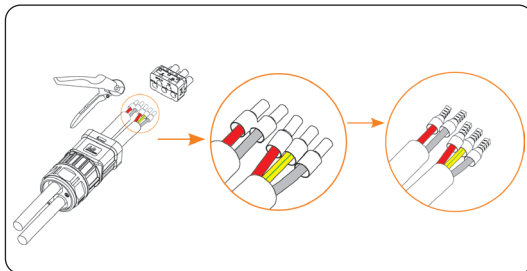


Figure 7-11 Crimping the ferrules

Step 6: Thread the crimped cables into the corresponding EPS and Grid ports. Then lock the cables with the Allen key. (Torque: $2.0 \pm 0.1 \text{N.M}$)

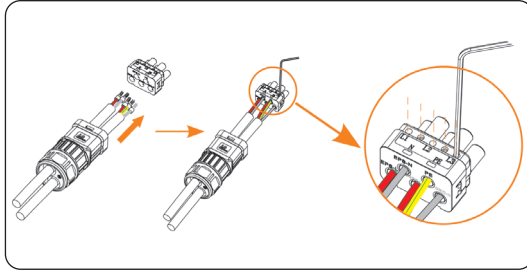


Figure 7-12 Threading the crimped cables

Step 7: Install the head of AC terminal into the AC terminal block. Make sure the side with silk screen is upward. Then tighten the fastening head.

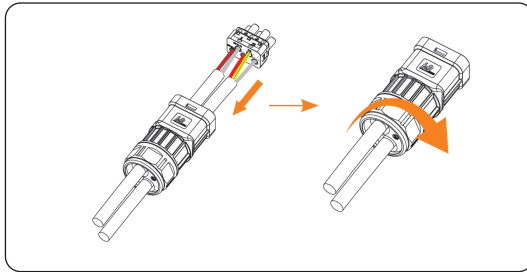


Figure 7-13 Installing the AC terminal

Step 8: Remove the AC protective cover.

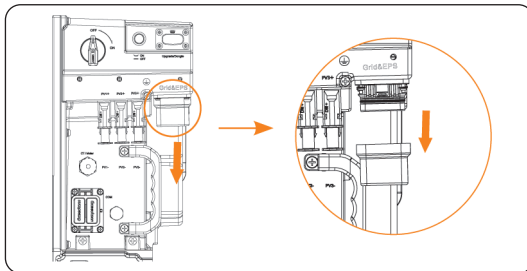


Figure 7-14 Removing the AC protective cover

Step 9: Plug the wired AC terminal into the Grid&EPS port.

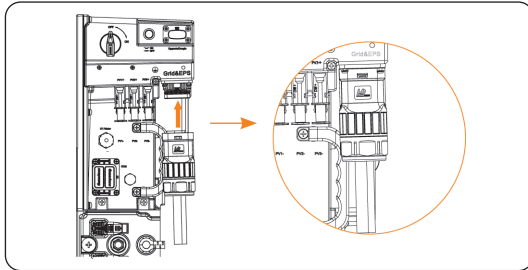


Figure 7-15 Plugging the AC terminal into the Grid&EPS port

7.2.4 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 on the battery (T-BAT-SYS); the DC switch on the inverter, and the AC and EPS breakers between the inverter and the power grid are disconnected before connection and no live voltages are present on the PV input and AC output circuit.
- 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. Note that all DC and AC terminals may carry current even without connected wires.

Requirements for PV connection

- Open circuit voltage
 - » The open circuit voltage of the module array should be less than the maximum PV input voltage (600 V) by the inverter, and the working voltage should be within the MPPT voltage range (40-560 V).
- PV module
 - » The positive or negative pole of the PV modules is not grounded.
 - » The polarities of electric connections are correct on the DC input side. Incorrect polarity could permanently damage the equipment.
- PV module connection mode

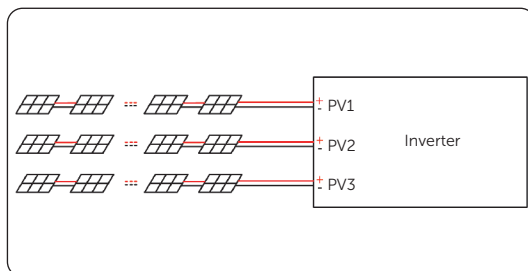


Figure 7-16 "Multi" mode connection diagram

Wiring procedures

Step 1: Remove the terminal caps of PV terminals. (For 3.0kW~3.7kW inverters, remove 2 pairs of PV terminal caps. And the third PV terminal is unavailable. For 4.6kW~8kW inverters, remove 3 pairs of PV terminal caps.)

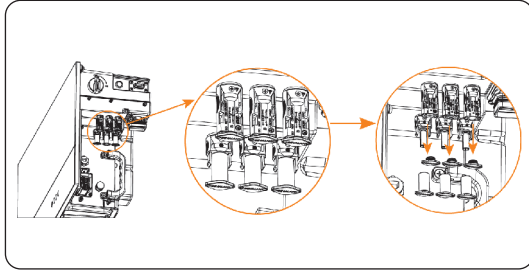


Figure 7-17 Removing the PV terminal caps

Step 2: Strip 7 mm of the PV cables and insert the stripped cables into the PV pin contact. Make sure the stripped cables and the PV pin contact are of the same polarity. Then crimp the PV cables with crimping tool for PV terminal.

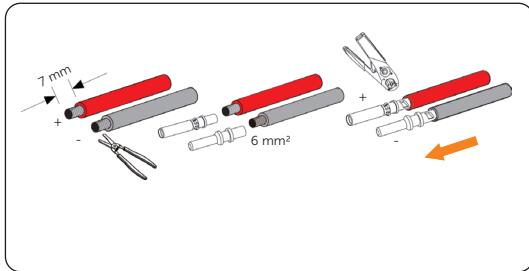


Figure 7-18 Stripping the PV terminals

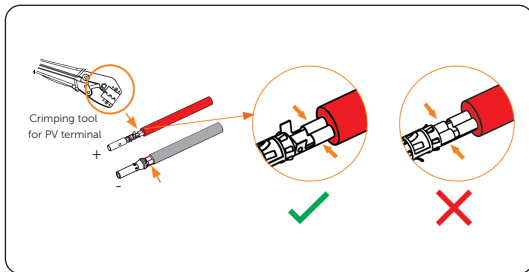


Figure 7-19 Crimping the PV terminals

Step 3: Thread the PV cables through the fastening head and insert the PV pin contact into the PV connectors until a "Click" is heard. Gently pull the cable backward to ensure firm connection. Then tighten the fastening head.

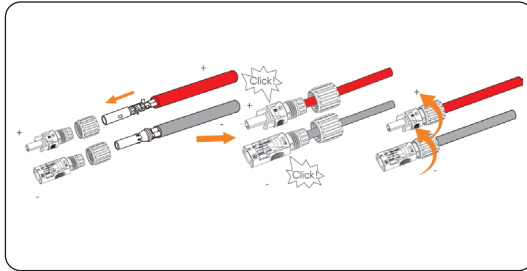


Figure 7-20 Inserting the PV pin contact into PV connectors

Step 4: Check whether the PV cables have the correct polarity. Use a multimeter to measure the positive and negative voltage of the assembled PV cables. Make sure the open circuit voltage does not exceed the input limit of 600 V.

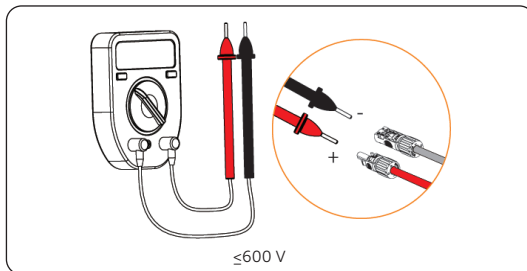


Figure 7-21 Measuring the voltage of PV cables

Step 5: Disconnect the AC breaker and secure against reconnection; turn the DC switch of the inverter to position OFF; make ensure the battery is switched off.

Step 6: Connect the assembled PV cables to corresponding terminals. Make sure 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.

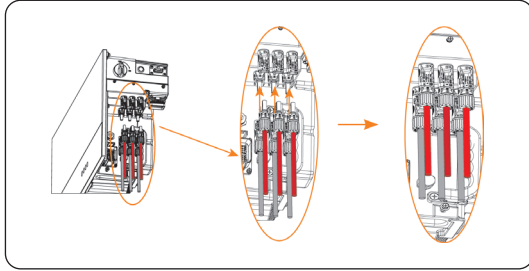


Figure 7-22 Connecting the PV cables

Step 7: Then seal the unused PV terminals with dustproof buckles.

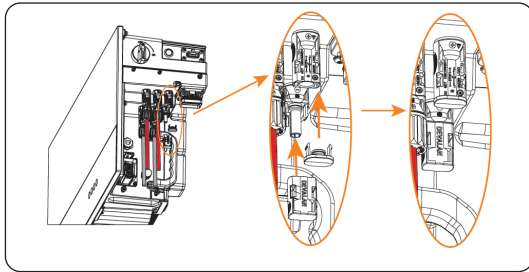
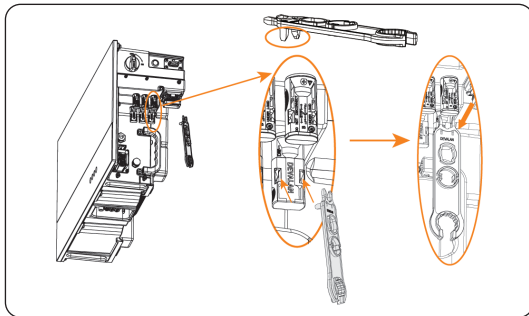


Figure 7-23 Sealing the unused PV terminals

Disassembling the dustproof buckles



7.2.5 Communication Connection

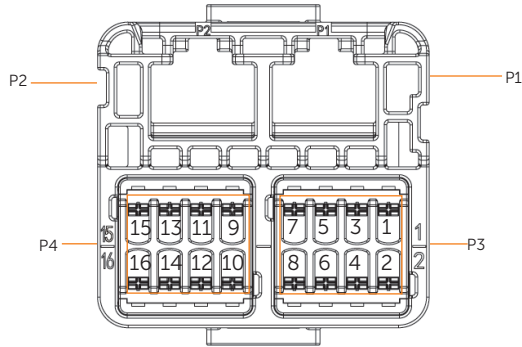


Figure 7-24 COM port

7.2.5.1 Parallel Connection (P2 port of COM port)

The inverter provides the parallel connection function. Up to 2 inverters can be connected in a system. In this system, one inverter will be set as the "Master inverter" to control the other "Slave inverter" in the system via CAN.

The inverter has not been tested to AS/NZS 4777.2:2020 for multiple inverter combinations and/or multiple phase inverter combinations such combinations should be used or external devices should be used in accordance with the requirements of AS/NZS 4777.1.

Requirments for parallel connection

- The two inverters should be of the same software version.
- The two inverter models should be of the same power range.
- The type and quantity of batteries connected to the two inverters should be the same.

System diagram

- Diagram 1: System diagram applied to temperature sensor CT.

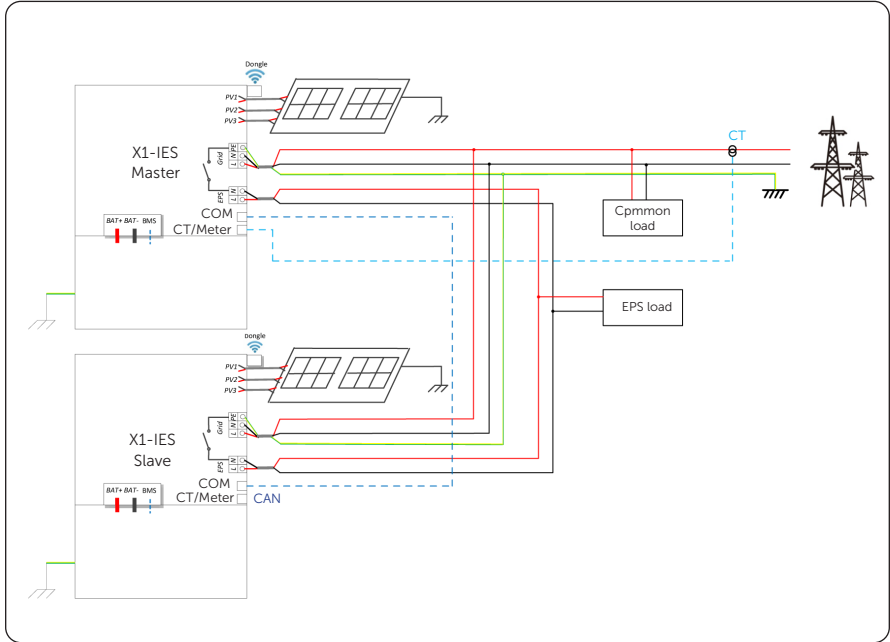


Figure 7-25 System diagram applied to temperature sensor CT

* The CT is in the packing list, and CT cable has already connected to the CT.

- Diagram 2: System diagram applied to electric Meter.

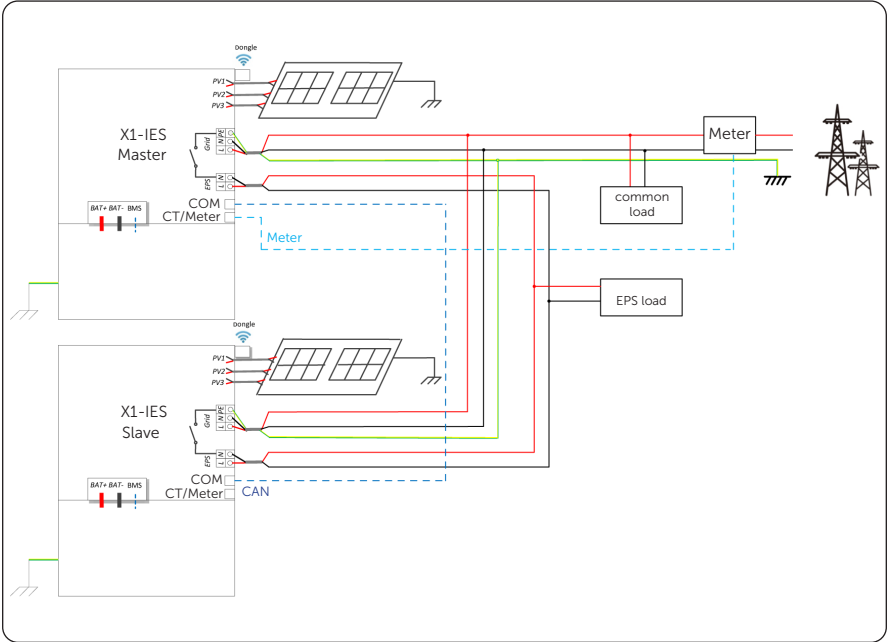


Figure 7-26 System diagram applied to electric Meter

* The Meter needs to be purchased additionally, and the cable connecting the meter needs to be made by users.

Parallel connection diagram

- Diagram 1: Parallel connection with Meter
 - » Use standard CAT5E network cables for CAN(P2) - CAN(P2) connection.
 - » Master inverter CAN(P2) to the Slave inverter CAN(P2).
 - » Meter connects to meter port of the master inverter.

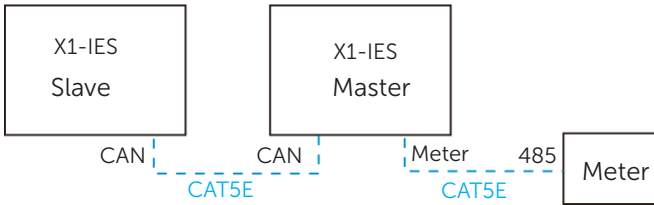


Figure 7-27 Parallel connection with Meter

- Diagram 2: Parallel connection with CT
 - » Use standard network cables for CAN(P2)-CAN(P2) connection.
 - » Master inverter CAN(P2) to Slave inverter CAN(P2).
 - » CT connects to CT port of the master inverter.

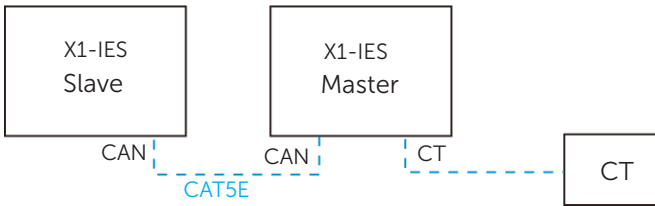


Figure 7-28 Parallel connection with CT

* CAN refers to Parallel port (P2) of COM port.

7.2.5.2 CT/Meter Connection (CT/Meter Port)

This section only introduces the wiring of the CT/Meter port of the inverter. For wiring procedures of the CT and meter side, see "14 Appendix".


 CAUTION!

- Compatible meters and CTs must be properly connected to the inverter, otherwise, the inverter will shut down and prompt a **Meter Fault** alarm.
- Meters and CTs that will be connected to the inverter must be authorized by SolaX. Unauthorized meters and CTs might be incompatible and cause damages to the inverter. SolaX will not be responsible for the impact caused by the use of other appliances.

NOTICE!

- For CT connection, we offer an RJ45 coupler for attaching extension cables. If needed, prepare a standard 8-pin communication cable of proper length in advance.

Table 7-2 Pin assignment of the inverter CT/Meter port

| CT / Meter  | Item | CT1 | | | Meter | | | CT2 | |
|---|------------|-----------|------------|-------------|-------------|------------|-----------|------------|---|
| | Pin No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Definition | CT_11_ CON | GND_ COM1 | CT_21_ CON | METER_ 485A | METER_ 485B | CT_22_ CON | GND_ COM1 | CT_12_ CON | |

Wiring Procedure

Step 1: Disassemble the waterproof RJ45 connector to a waterproof connector and an RJ45 terminal (terminal A).

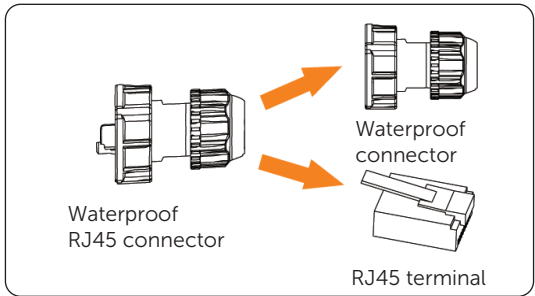


Figure 7-29 Disassembling the waterproof RJ45 connector

Step 2: Thread the communication cable through the waterproof connector.

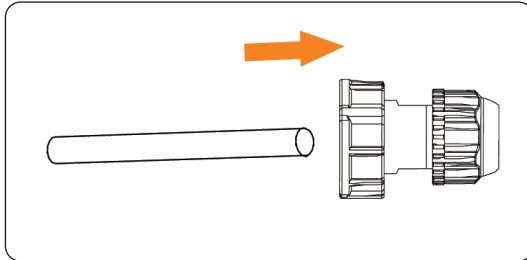


Figure 7-30 Threading the communication cable

Step 3: Strip and crimp the communication cable.

» For CT connection

a. Strip around 15 mm wire insulation off both ends of the cable.

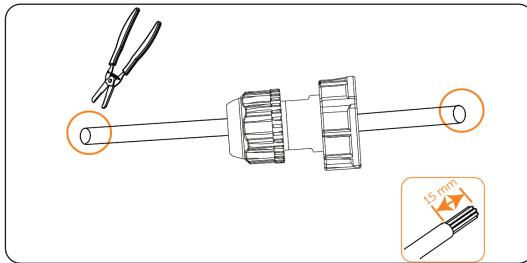


Figure 7-31 Stripping the communication cable for CT

b. Insert the conductors at both ends respectively to terminal A and another RJ45 terminal (Terminal B) based on the pin definition of the inverter CT/Meter port, and then use a crimping tool to crimp both cable ends.

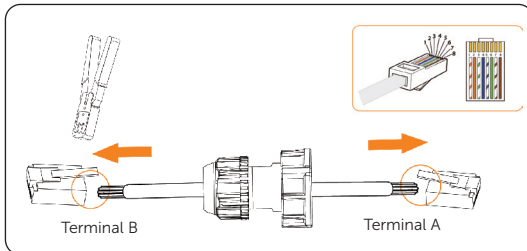


Figure 7-32 Crimping the communication cable for CT

Table 7-3 Pin number and color

| PIN No. | Color | PIN No. | Color |
|---------|--------------|---------|-------------|
| 1 | Orange-White | 5 | Blue-White |
| 2 | Orange | 6 | Green |
| 3 | Green-White | 7 | Brown-White |
| 4 | Blue | 8 | Brown |



» For meter connection

- a. Strip around 15 mm wire insulation off one end of the communication cable.

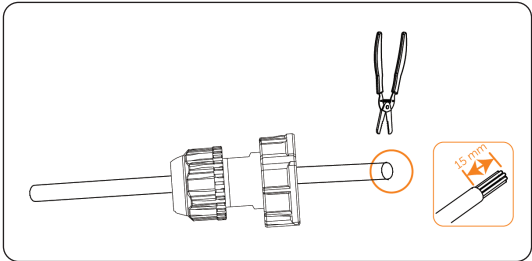


Figure 7-33 Stripping the communication cable for meter

- b. Insert the conductors respectively into pin 4 and pin 5 of the RJ45 terminal, and then use a crimping tool to crimp them.

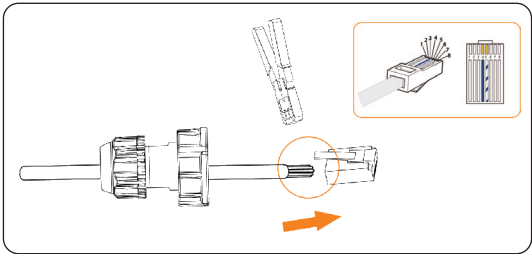


Figure 7-34 Crimping the communication cable for meter

Step 1: Remove the dustproof cover from the CT/Meter port of the inverter, insert the RJ45 terminal into the port, and then secure the waterproof connector.

An audible "Click" will be heard if it is successfully connected.

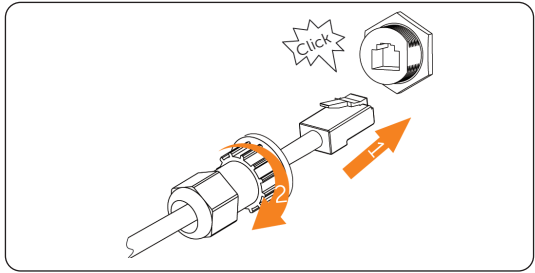


Figure 7-35 Connecting cable to the Meter/CT port

7.2.5.3 COM Connection (COM Port)

COM is a standard communication interface, through which the monitoring data of the inverter can be directly obtained. Also the external equipment can be controlled through COM communication.

Pin assignment

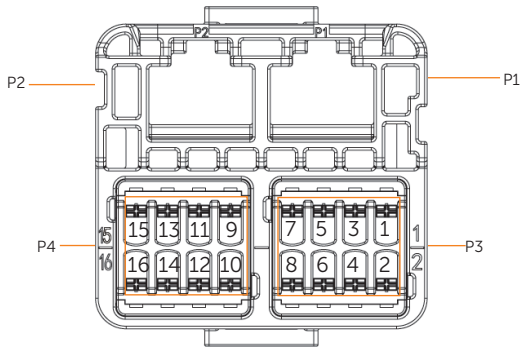


Figure 7-36 COM port

Table 7-4 Pin assignment for COM

| Icon | PIN | PIN Definition | Function |
|-----------------------|-----|------------------|--|
| P1 (DRM Port) | 1 | DRM1/5 | DRM |
| | 2 | DRM2/6 | |
| | 3 | DRM3/7 | |
| | 4 | DRM4/8 | |
| | 5 | +3.3V_COM | |
| | 6 | COM/DRM0 | |
| | 7 | GND_COM | |
| | 8 | GND_COM | |
| P2 (Parallel Port) | 1 | REMOTE_485A | RS485 |
| | 2 | REMOTE_485B | |
| | 3 | GND_COM | / |
| | 4 | PARALLEL_SYN2 | Parallel synchronization signal |
| | 5 | PARALLEL_SYN1 | |
| | 6 | EPSBOX_RELAY_VCC | / |
| | 7 | PARALLEL_CANL | Parallel CAN |
| | 8 | PARALLEL_CANH | |
| P3 | 1 | / | / |
| | 2 | / | |
| | 3 | / | |
| | 4 | / | |
| | 5 | GND_COM | / |
| | 6 | GND_COM | Communication with SolaX's Datahub, EV Charger, Adapter Box and other internal devices |
| | 7 | REMOTE_485A | |
| | 8 | REMOTE_485B | |
| P4 | 9 | ARM_POWER | / |
| | 10 | GND_COM | / |
| | 11 | MODBUS_485A | Communication with other external devices |
| | 12 | MODBUS_485B | |
| | 13 | DO_1 | Output drycontact |
| | 14 | DO_2 | |
| | 15 | DI_1 | Input drycontact |
| | 16 | DI_2 | |

External devices connection

- Connection with a SolaX datahub

| COM port of X1-IES series inverter | | RS485-1/-2/-3/-4 port of SolaX datahub |
|------------------------------------|----------------|--|
| Pin | Pin definition | Pin definition |
| 6 (P3) | GND_COM | GND |
| 7 (P3) | REMOTE_485A | RS485A |
| 8 (P3) | REMOTE_485B | RS485B |

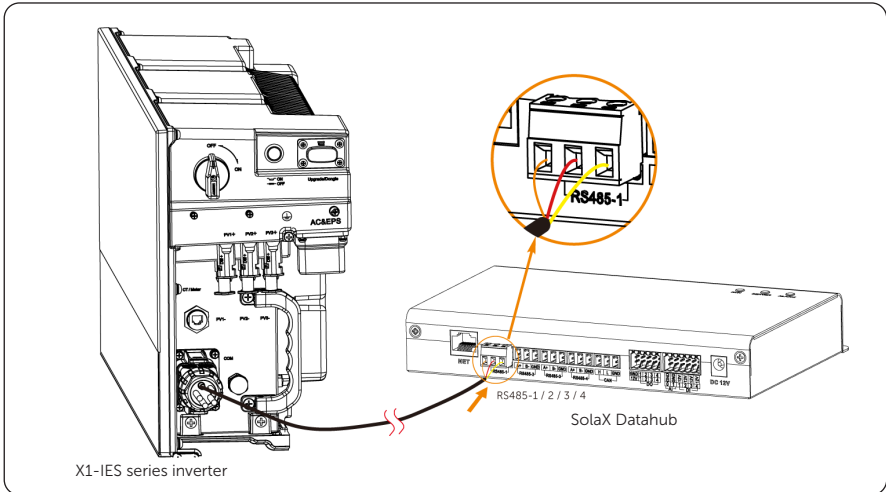


Figure 7-37 Connecting with a SolaX datahub

- Connection with a SolaX EV Charger

| COM port of X1-IES series inverter | | COM port of SolaX EV Charger | |
|------------------------------------|----------------|------------------------------|----------------|
| Pin | Pin definition | Pin | Pin definition |
| 7 (P3) | REMOTE_485A | 4 | A1 |
| 8 (P3) | REMOTE_485B | 5 | B1 |

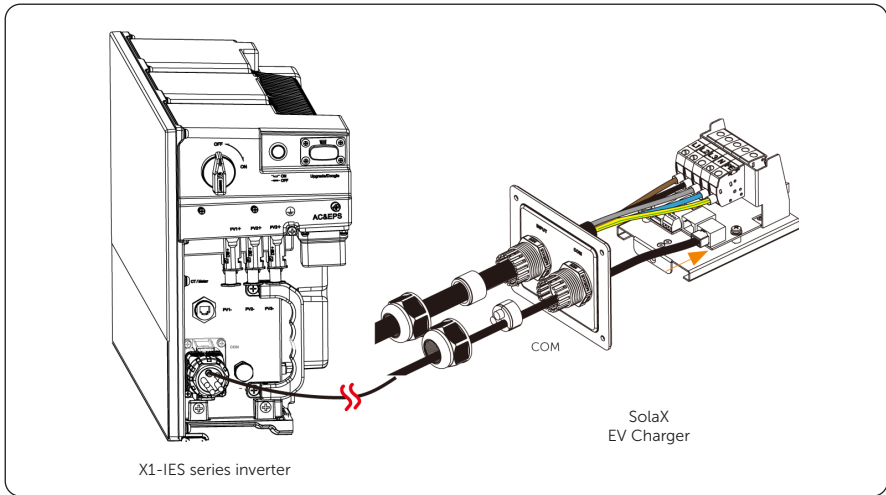


Figure 7-38 Connecting with a SolaX EV Charger

- Connection with a SolaX Adapter Box G2

| COM port of X1-IES series inverter | | 485_INV port of SolaX Adapter Box G2 | |
|------------------------------------|----------------|--------------------------------------|----------------|
| Pin | Pin definition | Pin | Pin definition |
| 9 (P4) | ARM_POWER | 3 | +13 V |
| 7 (P3) | REMOTE_485A | 4 | RS485-A |
| 8 (P3) | REMOTE_485B | 5 | RS485-B |
| 6 (P3) | GND_COM | 6 | GND |

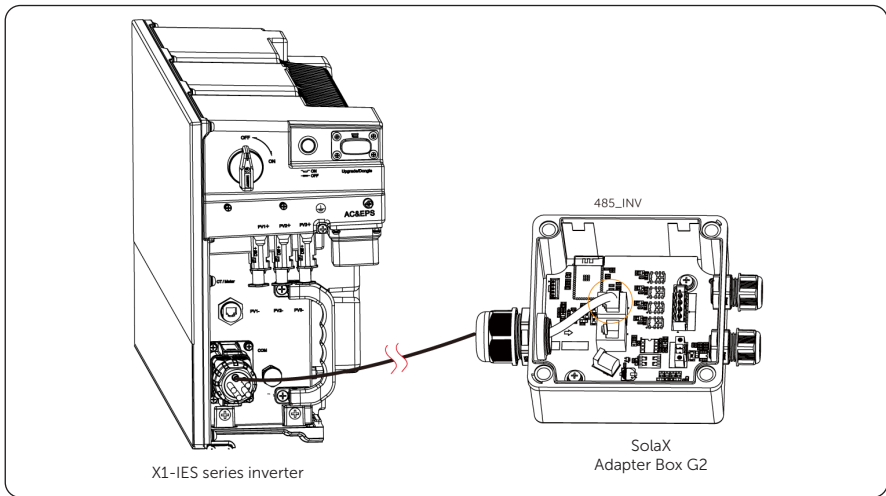


Figure 7-39 Connecting with a SolaX Adapter Box G2

Wiring procedure

Step 1: Unscrew the rear end of the communication terminal, and remove the waterproof plug.

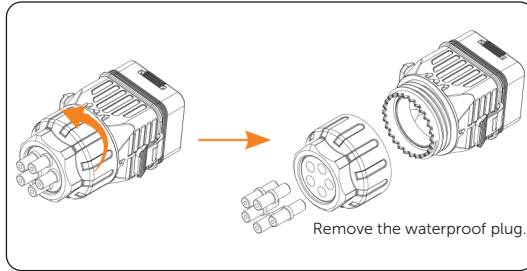


Figure 7-40 Unscrewing the communication terminal

Step 2: Press the position indicated by the arrow, and remove the wiring terminal block.

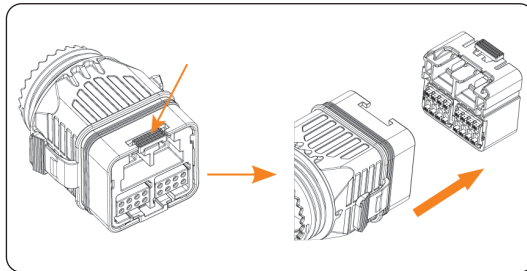


Figure 7-41 Removing the wiring terminal block

- DRM and Parallel connection (P1 P2)

Step 1: Take two CAT5E network cables. Thread the two cables into the communication terminal, and strip 15 mm of the two cables.

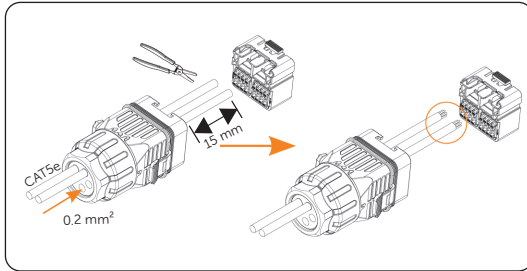


Figure 7-42 Stripping CAT5E network cables

Step 2: Insert the stripped cables through the RJ45 terminals, and crimp it with the crimping tool for RJ45 terminal according to the pin order. Then insert the crimped two RJ45 terminals into the wiring terminal block.

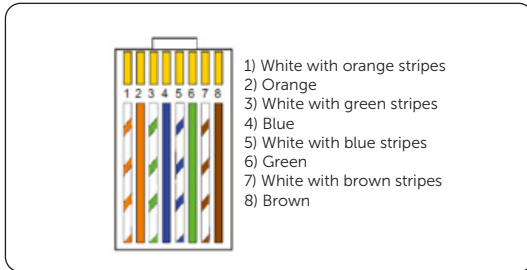


Figure 7-43 Pin order of RJ45 terminal

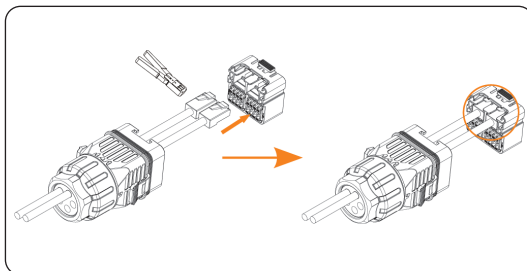


Figure 7-44 Crimping the RJ45 terminals

- PIN 1-16 connection (P3 P4)

Step 1: Take another two CAT5E network cables. Strip 35-40 mm of the two cables, then strip 12-14 mm of the front end of the two cables.

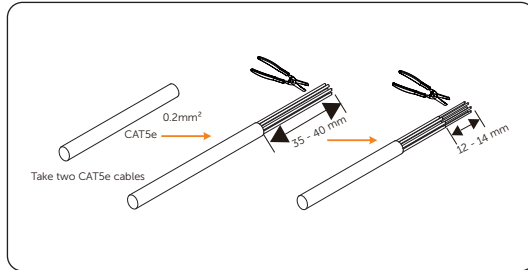


Figure 7-45 Stripping CAT5E network cables

Step 2: Thread the stripped cables through the communication terminal. Then insert the ferrules into the stripped cables.

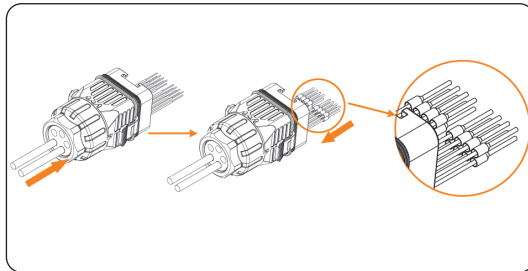


Figure 7-46 Inserting ferrules into the stripped cables

Step 3: Crimp the ferrules with the crimping tool for ferrule.

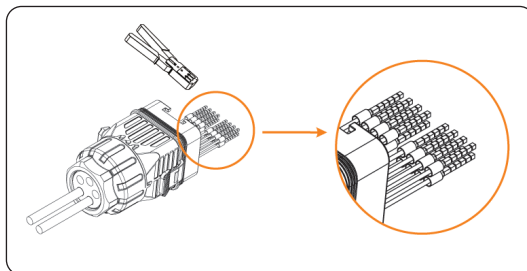


Figure 7-47 Crimping the ferrules

Step 4: Insert the crimped ferrules into the wiring terminal block. Then assemble the communication terminal.

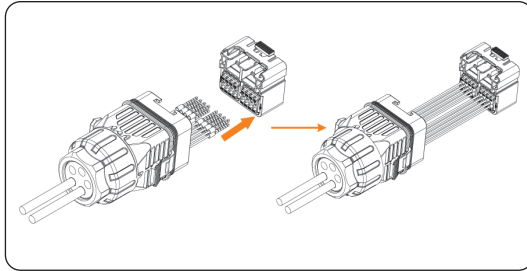


Figure 7-48 Inserting the ferrules

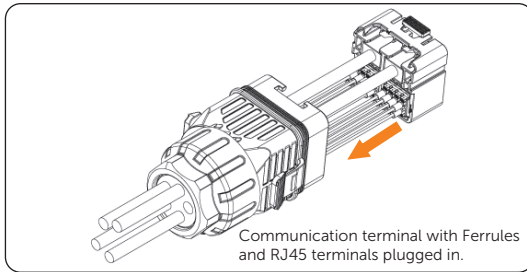


Figure 7-49 Assemble the communication terminal

Step 5: Seal the unused terminals with the waterproof plug.

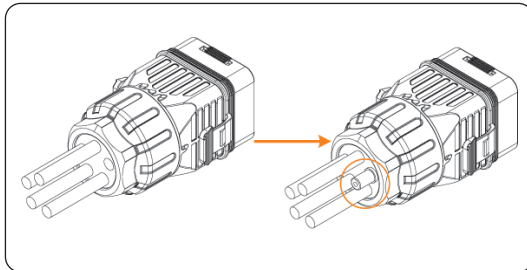


Figure 7-50 Sealing the unused terminals

Step 6: Remove the dust cover of the communication terminal.

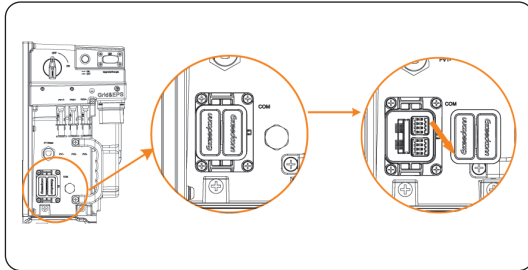


Figure 7-51 Removing the dust cover

Step 7: Plug the wired communication terminal into the communication port on the inverter.

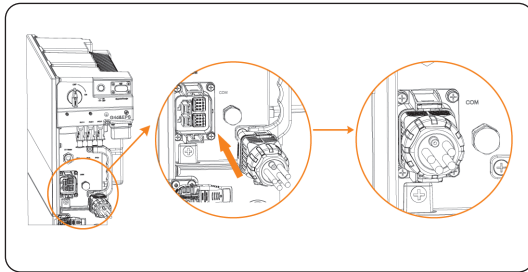


Figure 7-52 Plugging the wired communication terminal

7.2.6 Cover Plate Installation

Step 1: Hang the cover plate on the inverter and lock the screws at the bottom of the inverter. (This cover plate is made of galvanized steel.)

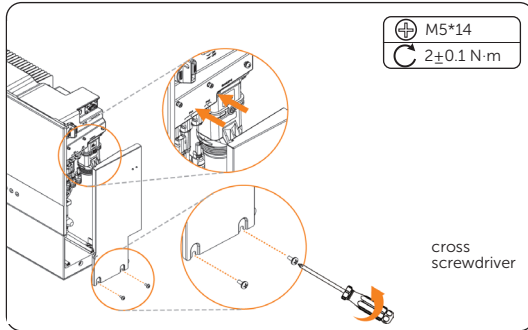


Figure 7-53 Hanging the cover plate

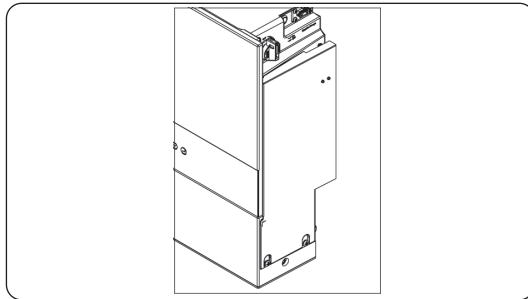


Figure 7-54 Hanging the cover plate well

Step 2: Then install the lock. Prepare a lock with a diameter less than 5 mm.

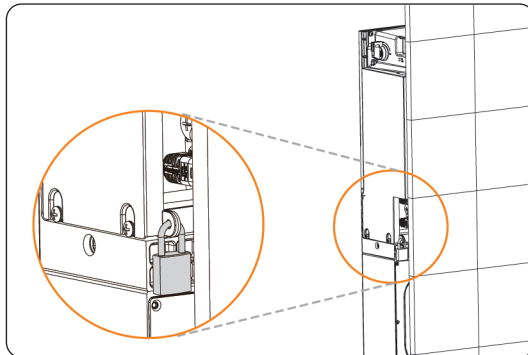


Figure 7-55 Installing the lock

7.2.7 Monitoring Connection (Upgrade/Dongle Port)

The inverter provides a Upgrade/Dongle port, which can transmit data of the inverter to the monitoring website via WiFi+LAN dongle. A WiFi+LAN dongle can be matched with two kinds of communication modes (WiFi mode or LAN mode).

NOTICE!

- When no device is plugged into Upgrade/Dongle port, ensure the port is covered with a dust cover. Otherwise, it may cause damage to the inverter.

NOTICE!

WiFi dongle

- Harness the power of WiFi with WiFi dongle, connect to a local network within 50m of the installation to enable access to the Cloud monitoring platform.

NOTICE!

LAN dongle

- If Wi-Fi is not suitable for your situation, the LAN dongle enables you to connect to your network via an ethernet cable. Ethernet allows for a much more stable connection with less interference.

NOTICE!

4G dongle (optional)

- 4G dongle allows you to use a 4G connection to monitor your system without the option of connecting to a local network. (This product is not available in the UK)

Monitoring connection diagram

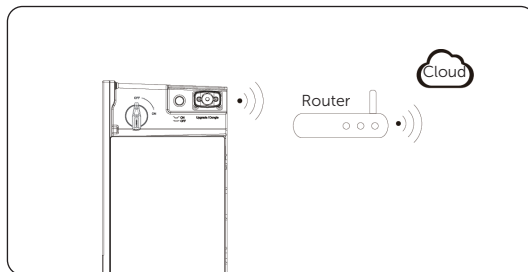


Figure 7-56 WiFi mode connection diagram

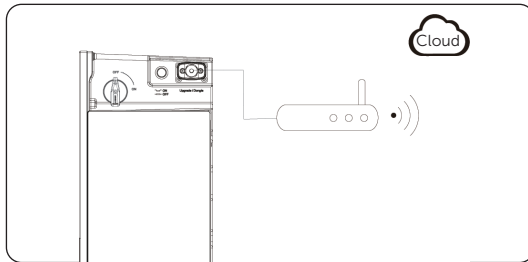


Figure 7-57 LAN mode connection diagram

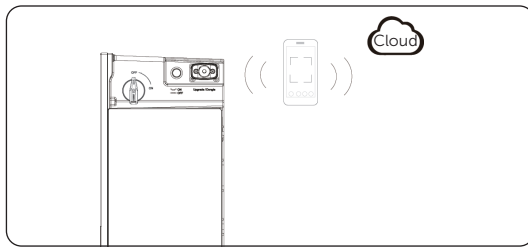


Figure 7-58 WiFi+4G connection diagram

Wiring procedure

WiFi mode:

Step 1: Assemble the dongle;

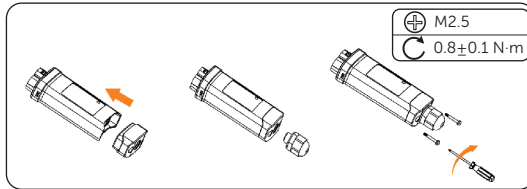


Figure 7-59 Assembling the dongle (for WiFi+LAN in boxes)

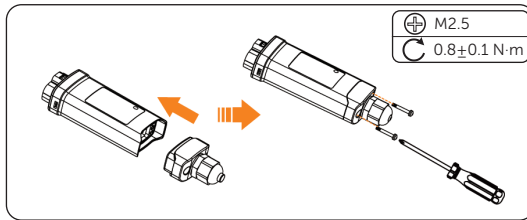


Figure 7-60 Assembling the dongle (for WiFi+LAN in bags)

Step 2: Plug the dongle to the inverter.

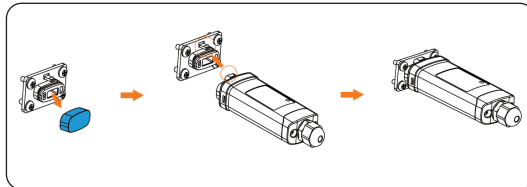


Figure 7-61 WiFi connection procedure

⚠ CAUTION!

- The buckles must be on the same side. Otherwise, the dongle may be damaged.

NOTICE!

- The longest connection distance between the router and the equipment should be no more than 100 meters; if there is a wall between the router and the equipment, the longest connection distance is 20 meters.
- When the WiFi signal is weak, please install a WiFi signal booster at the appropriate location.

NOTICE!

- Please refer to Pocket WiFi + LAN Installation Guide for instructions on configuring the WiFi. It is important to note that the WiFi configuration should be performed after powering on the inverter..

LAN mode:

Step 1: Disassemble the waterproof connector into components 1, 2, 3 and 4; Component 1 is not used. Keep it in a safe place;

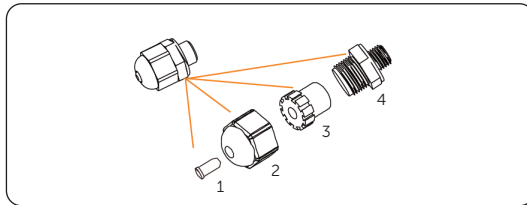


Figure 7-62 Disassembling the waterproof connector

Step 2: Assemble the dongle;

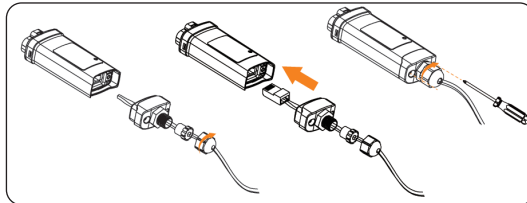


Figure 7-63 Assembling the LAN dongle

Step 3: Plug the dongle to the inverter.

For network configuration of the dongle, see "[Operation on SolaX App and Web](#)".

NOTICE!

- Install dongle with WiFi connecting cable (with WiFi stand) according to the actual needs.

Install the dongle on the right cover plate of the inverter.

Step 1: Remove the M5 screws on the right cover plate.

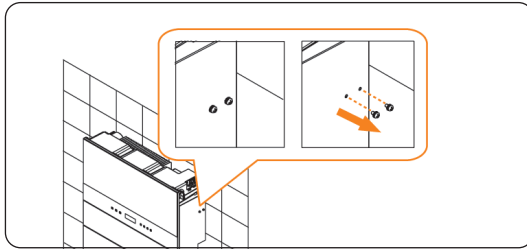


Figure 7-64 Plugging the WiFi connecting cable

Step 2: Plug one end of the WiFi connecting cable into the Dongle port of the inverter, and install the other end with WiFi stand to the cover plate by M5 screws.

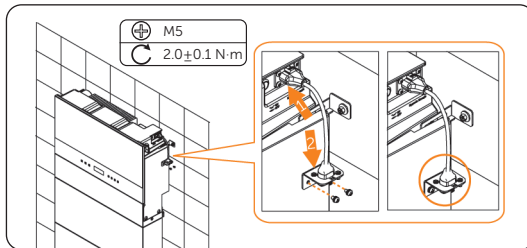


Figure 7-65 Mounting the WiFi connecting cable

Step 3: Plug the dongle into the WiFi stand.

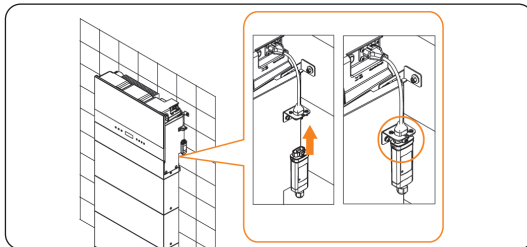


Figure 7-66 Plugging the dongle

Install the dongle on the wall.

Step 1: Drill two holes with $\varnothing 6$ drill bit, and make sure the depth of the holes should be over 50 mm. Then insert the expansion tubes into the holes.

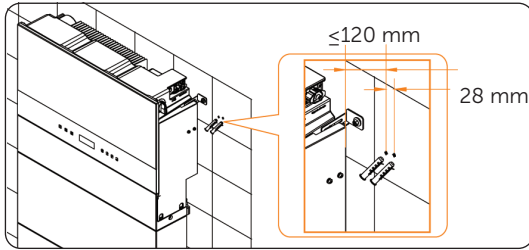


Figure 7-67 Drilling holes

Step 2: Plug one end of the WiFi connecting cable into the Dongle port of the inverter, and install the other end with WiFi stand to the wall by self-taping screws.

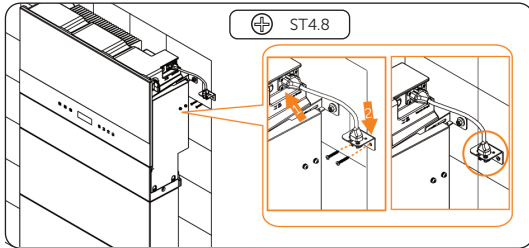


Figure 7-68 Mounting the WiFi connecting cable

Step 3: Plug the dongle into the WiFi stand.

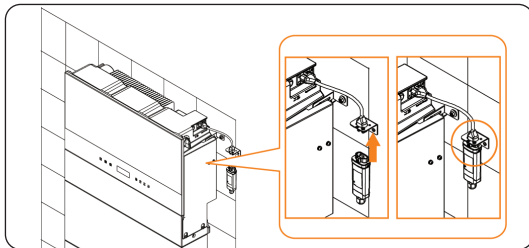


Figure 7-69 Plugging the dongle

8 System Commissioning

8.1 Checking before Power-on

- a. Check the device installed correctly and securely;
- b. Make sure the DC switch and the button on the inverter are OFF;
- c. Make sure the BMS Button and BAT switch are OFF.
- d. Make sure the AC and EPS breakers between the inverter and the power grid are OFF.
- e. Make sure all Grid and EPS cables are connected correctly and securely;
- f. Make sure the inverter is connected to the battery correctly and securely ;
- g. Make sure the communication cable is connected correctly and securely;
- h. Make sure the CT/Meter cable is connected correctly and securely;
- i. Make sure all photovoltaic modules are connected correctly and securely;
- j. Make sure all the connectors which are not used sealed by covers;
- k. The cover plate of the inverter is closed and the cover screws are tightened.

8.2 Powering on the System

Step 1: Turn on the DC switch and check the LCD screen.

- » If the LCD screen is not on, turn off the DC switch and check whether the PV connection is conected correctly.

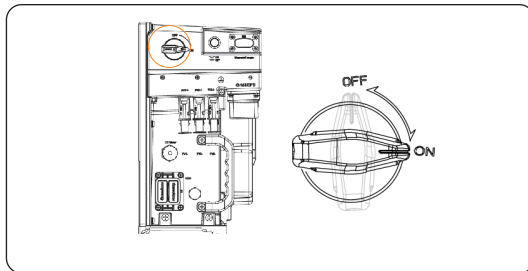


Figure 8-1 Turning on DC switch

Step 2: Press the button on the inverter.

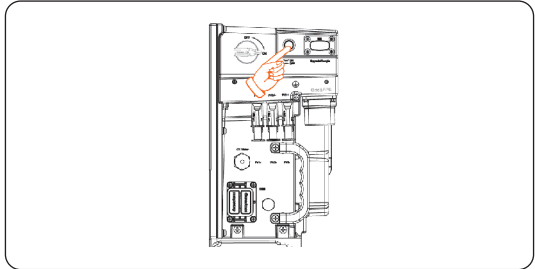


Figure 8-2 Pressing the button

NOTICE!

- The button is in OFF state by default.
- A system problem may be encountered while pressing the button frequently. The user may need to wait at least 10 seconds and then try again.

Step 3: Set **Safety Code** according to different countries and grid-tied standards on the LCD screen. The inverter cannot be connected to the grid before the safety code is correctly set. Refer to [9.6.2 Setting Safety Code](#) for details.

Step 4: Set the System ON/OFF to ON state on the LCD screen.

Step 5: Power on the inverter.

- » Turn on the AC breaker and wait for the inverter to power on.

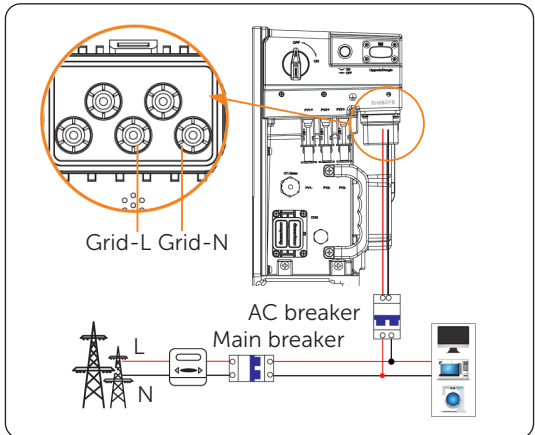
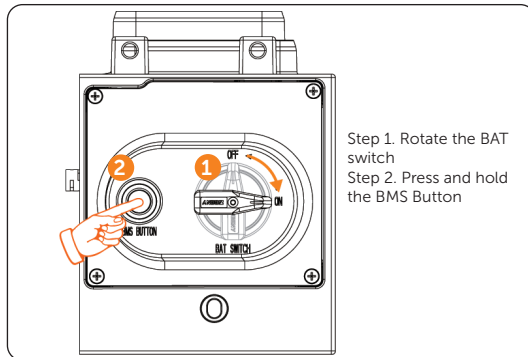


Figure 8-3 Turning on AC breaker

After powering on the inverter, you can check whether Meter/CT is correctly connected.

- » If CT is connected, please perform the [Installation Check](#) on the LCD screen to check the correct connection.
- » If meter is connected, please set the connection of meter through [Meter/CT Settings](#) on the LCD screen.
- » If Meter/CT is successfully connected, the power information of Meter/CT will be displayed on the LCD screen. If the Meter/CT connection fails, the screen will prompt "Meter Fault" or "Missed CT Fault".

Step 6: Switch the BAT switch to the "ON" position. Press and hold the BMS Button for about 1 to 2 seconds, at the point, the status light flashes yellow light until finishing self test. Then the status light flashes green light. After successful communication to the inverter, the status light turns solid green light, and the SoC power indicators go solid green light.



Step 1. Rotate the BAT switch
Step 2. Press and hold the BMS Button

Figure 8-4 Turning on the battery

NOTICE!

- The button is in OFF state by default.
- A system problem may be encountered while pressing the button frequently. The user may need to wait at least 10 seconds and then try again.

Step 7: When the battery turns on, the inverter will restart automatically. The inverter will go Waiting, Checking and Normal status in sequence.

NOTICE!

- After the installation is complete, cut off the AC breaker between Grid terminal and the grid, and then switch on all the EPS loads to ensure that the system work properly. Repeat the above operations each time the load on the EPS terminal increases.

*Note:

Waiting: When the DC output voltage of the photovoltaic module is higher than 50V (minimum starting voltage) and there are no other abnormal conditions, the inverter will enter the waiting state.

Checking: The inverter will automatically detect the DC input. When the DC output voltage of the photovoltaic module is higher than 40V, the photovoltaic module has enough energy to start the inverter and there are no other abnormal conditions, the inverter will enter the checking state.

Normal: When the inverter is working normally, the green light is always on. At the same time, the power is fed back to the grid, and the LCD displays the output power.

8.3 Checking after Power-on

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

8.4 Power off

- Press the Button on the inverter to shut down the system;
- Turn off the AC and EPS breakers between the inverter and the power grid;
- Turn off the DC switch on the inverter.
- Turn off the BAT switch and button on the battery.

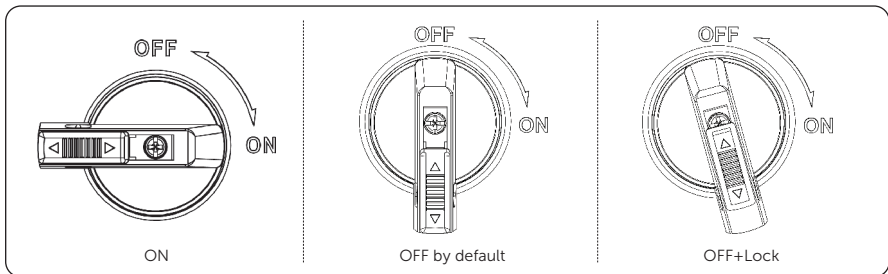
WARNING!

- After the X1-IES system 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 and the battery five minutes after power off.

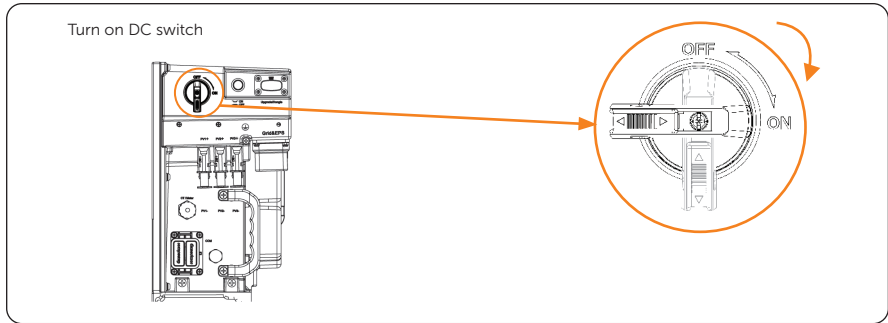
8.5 Operation of Lockable DC Switch

There are two kinds of DC switch for the series inverters.

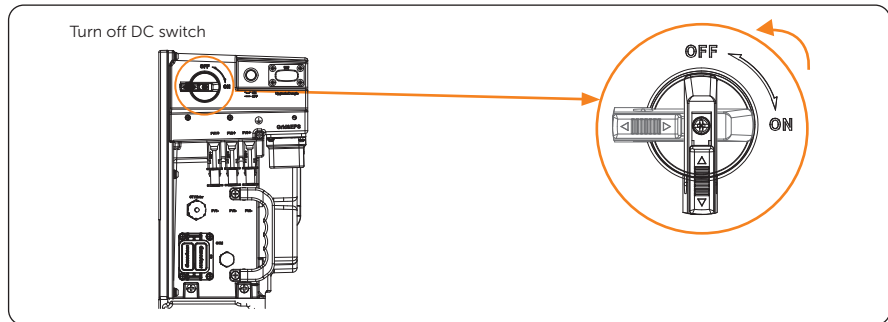
- Unlockable DC switch (without lock);
- Lockable DC switch (with lock).



- To turn on the DC switch
Turn on the DC switch from OFF state to ON state.

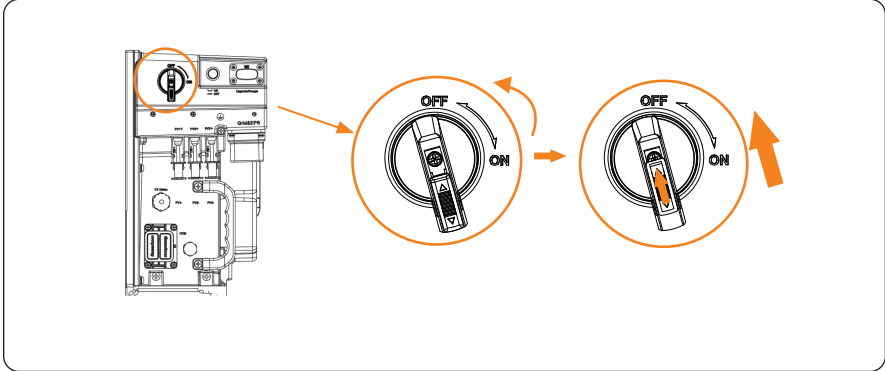


- To turn off the DC switch
Rotate the DC switch from ON state to OFF state.



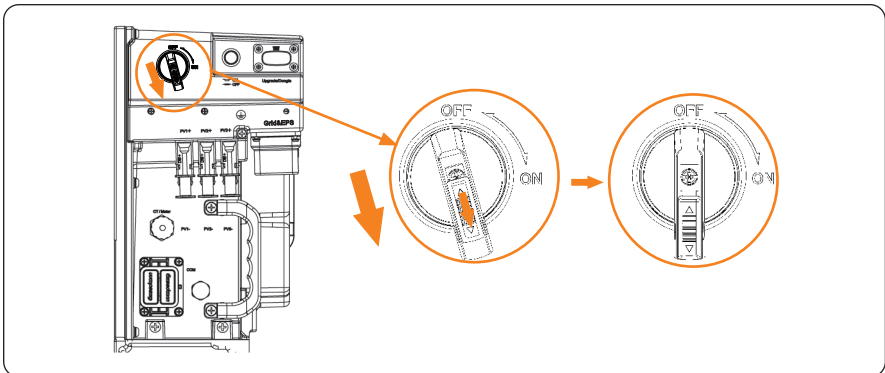
- To lock the DC switch

- 1) Rotate the DC switch to OFF state, then rotate the DC switch to the left side;
- 2) Push the position indicated by the arrow upward (as shown in the diagram below).
- 3) (Optional) After pushing the position upward, users can choose to lock the DC switch with a lock.



- To unlock the DC switch

- 1) Remove the lock. (If any);
- 2) Push the position indicated by the arrow down (as shown in the diagram below);
- 3) Wait for it to return to OFF state.



9 Operation on LCD

9.1 Overview of LCD

The main interface is the default interface, the inverter will automatically return to this interface when the system starts successfully or does not operate for a period of time.

The information of the main interface is as below. **Power** means the current output power of the inverter; **Today** means daily generated power of the inverter; **Battery** means the left capacity of the battery.

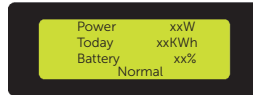


Figure 9-1 Information of main interface

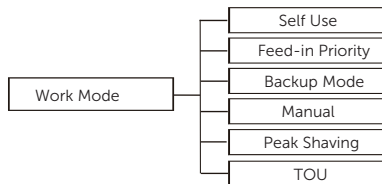
The menu interface is for users to change settings or obtain information.

When the LCD displays the main interface, press **Enter** to enter the menu interface. Press **Up/Down** to display the full information.

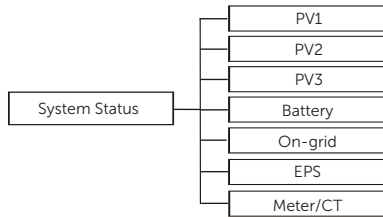


Figure 9-2 Overview of menu interface

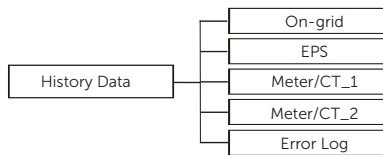
- System ON/OFF
- Work Mode



- System Status



- History Data



- Settings

Settings includes User Settings and Advanced Settings. Among them, **User Settings** includes (Figure 9-3); **Advanced Settings** includes (Figure 9-4).

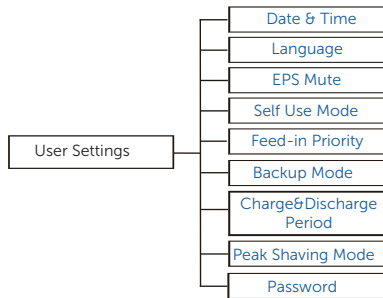


Figure 9-3 User Settings

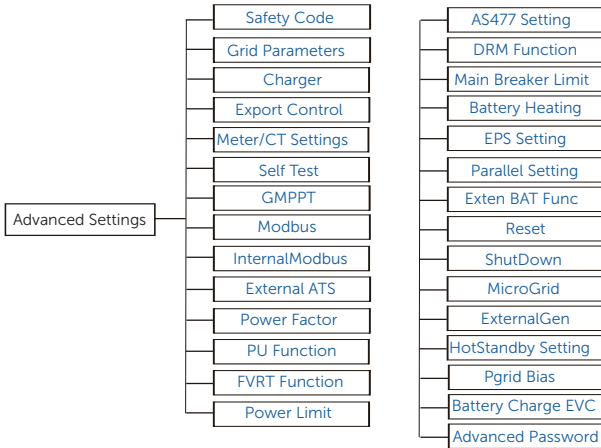
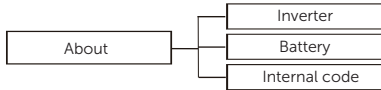


Figure 9-4 Advanced Settings

- About



NOTICE!

Property losses or system damage due to unauthorized access to the system when the keys on the LCD is mistakenly pressed.

- System ON/OFF, Work Mode, System Status, History Data, and About can be set without any password. Keep the system out of reach of children.

NOTICE!

Property losses or system damage due to unauthorized access to the system when the user password is used.

- Settings can be set with password. User settings can be set by the users, replace the user password with a new secure password. Advanced settings can only be set by the installer.

NOTICE!

- The LCD screen can only display 4 datas. Press **UP** and **Down** to display the full information.

9.2 System ON/OFF

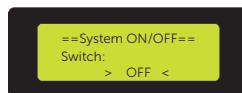
Setting path: Menu > System ON/OFF

Setting System ON/OFF

After entering into the System ON/OFF interface, you can set the **System ON** or **OFF**.

"ON" means the inverter is in working status. "OFF" means the inverter stops running and only the LCD screen is turned on.

Default: OFF



9.3 Work Mode

Selecting path: Menu > Work Mode

Default: Self Use

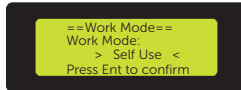
You can select one of the work modes to operate the inverter.

Selecting Work Mode

After entering into the Work Mode interface, you can set **Self Use**, **Feed-in Priority**, **Backup Mode**, **Manual**, **Peak shaving** and **TOU** as follows:

» Selecting **Self Use**

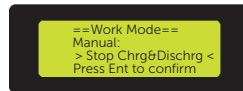
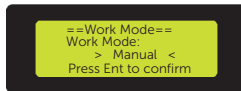
Feed-in Priority, **Backup Mode** and **Peak Shaving** have the same setting logic as **Self Use**.



» Selecting **Manual**

There are three options to choose from: **Forced Discharge**, **Forced Charge** and **Stop Chrg&Dischrg**

Default: **Stop Chrg&Dischrg**

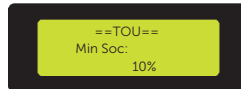
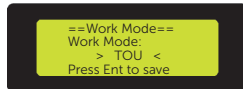


» Selecting **TOU**

TOU can only be set in SolaX Cloud App. Aftering setting the TOU in the App, the selected TOU mode will be displayed in TOU interface on the LCD.

Min SoC: The minimum SoC of the system.

Min Soc: Default: 10%

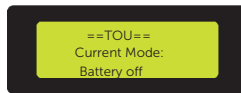


Self-use: Same working logic with "Self-use Mode", but it is not limited by the charging and discharging time slots. The priority of PV: Loads > Battery > Grid.

Min Soc: Default: 10%



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.



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.

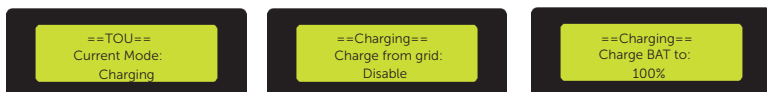
Peaklimits: Default: 0W



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.

Charge from grid: Default: Disable

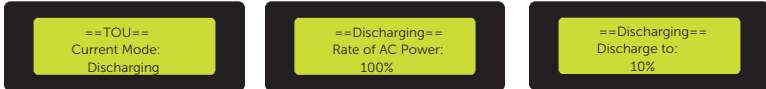
Charge BAT to: Default: 100%



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".

Rate of AC Power: Default: 100%

Discharge to: Default: 10%



9.4 System Status

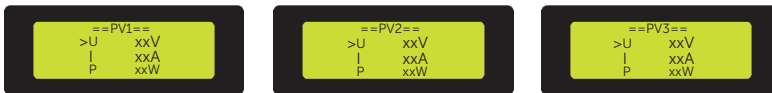
Displaying path: Menu > System Status

Displaying System Status

After entering into the System Status interface, the status of **PV1**, **PV2**, **PV3**, **Battery**, **On-grid**, **EPS** and **Meter/CT** will be displayed on the LCD as follows:

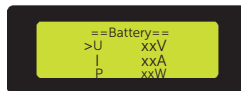
» Displaying PV1, PV2, PV3

Here shows the input voltage, current and power of PV1, PV2 and PV3.



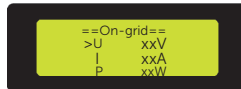
» Displaying Battery

Here shows the status of battery, including its voltage, current, power, capacity, temperature and BMS connected status.



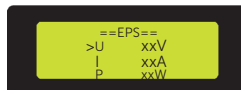
» Displaying On-grid

Here shows the voltage, current, power and frequency of the grid.



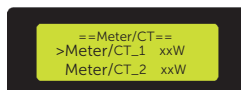
» Displaying EPS

Here shows the voltage, current, power and frequency of the inverter when it is disconnected from the grid.



» Displaying Meter/CT

Here shows the data of Meter or CT



9.5 History Data

Displaying path: Menu > History Data

Displaying History Data

After entering into the History Data interface, the status of **On-grid**, **EPS**, **Meter/CT_1**, **Meter/CT_2**, **Error Log** will be displayed on the LCD as follows:

» Displaying On-grid

Here shows the inverter's daily and total Input/Output energy when it is connected to the grid.



» Displaying EPS

Here shows the inverter's daily and total Output energy when it is disconnected to the grid.



» Displaying Meter/CT_1

Here shows the inverter's daily selling and buying electricity, and its total selling and buying electricity.



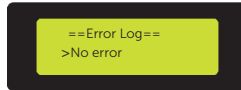
» Displaying Meter/CT_2

Here shows the inverter's daily and total Output energy.



» Displaying Error Log

Here shows the recent six error messages of the inverter.



9.6 Settings

Settings includes User Settings and Advanced Settings.

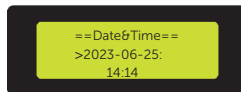
The default password of entering into **Settings** is "0000", and the default password of entering into **User Settings** is "2014".

9.6.1 User Settings

Setting path: Menu > Settings (0000) > User Settings (2014)

After entering into the User Settings interface, you can set the following settings:

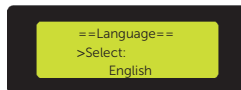
1) Setting Date & Time



2) Setting Language

The inverter provides multiple languages for users to choose.

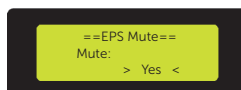
Default: English



3) Setting EPS Mute

When the inverter is running in EPS Mode, you can choose whether turn the buzzer on. Selecting Yes , the buzzer will mute. Select No, the buzzer will sound every 4s when the battery is fully charged, the closer the battery is to the empty state, the higher the buzzer will sound, to remind users to avoid battery loss.

Default: Yes

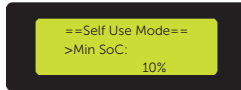


4) Setting Self Use Mode

» Setting Min SoC

The minimum SoC of the system. When the SoC of the battery reaches this value, the battery will not discharge power.

Min SoC: Default: 10%; range: 10%~100%



» Setting Charge from grid

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: 30%; range: 10%~100%

Set the amount of power to charge the battery from grid (applicable only when the "Charge from grid" is enabled).



5) Setting Feed-in Priority

The same setting logic as **Self Use Mode**.

» Setting Min SoC

Min SoC: Default: 10%; range: 10%~100%

» Setting Charge battery to

Charge battery to: Default: 100%; range: 10%~100%

6) Setting Backup Mode

The same setting logic as **Self Use Mode**.

» Setting Min SoC

Min SoC: Default: 30%; range: 15%~100%

» Setting Charge battery to

Charge battery to: Default: 50%; range: 30%~100%

7) Setting Charge&Discharge Period

Here you can set **Charge and Discharge Period**. If two charge and discharge periods are needed, turn on the **Charge and Discharge Period 2** and set the period.

» Setting Charge & Discharge Period

Forced Chrg Period Start&End Time: Default:00:00; range: 00:00~23:59

Allowed Disc Period Start Time: Default:00:00; range: 00:00~23:59

Allowed Disc Period End Time: Default:23:59; range: 00:00~23:59

Forced Charge only takes effect during the forced charge period and when the battery SoC is lower than the target charging SoC.



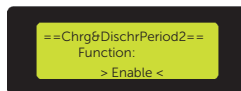
» Setting Charge & Discharge Period 2

Default: Disable

After **Enabling** the Charge & Discharge Period 2, the period will hold the same setting logic as Charge & Discharge Period.

Forced Chrg Period Start&End Time: Default:00:00; range: 00:00~23:59

Allowed Disc Period Start&End Time: Default:00:00; range: 00:00~23:59



8) Setting Peak Shaving Mode

» Setting DischgPeriod1 and DischgPeriod2

"DisdchgPeriod1" and "DischgPeriod2" are two discharging periods you can set. Set "ShavingStartTime1" (7:00 by default) and "ShavingEndTime1" (15:00 by default) under "DischgPeriod1", and "ShavingStartTime2" (19:00 by default) and "ShavingEndTime2" (23:00 by default) under "DischgPeriod2".

Shaving Start&End Time 1: Range: 00:00~23:59

Shaving Start&End Time 2: Range: 00:00~23:59

Set "PeakLimit1" and "PeakLimit2" to limit the power that gets from the grid. Once the power of loads exceeds "PeakLimits" during the peak hours, the PV and battery will discharge energy to loads and thus reduce the amount of energy purchased from the grid. In non-peak hours, discharging of the battery is not allowed.

PeakLimit1&2: Default:0W; range:0W~6000W

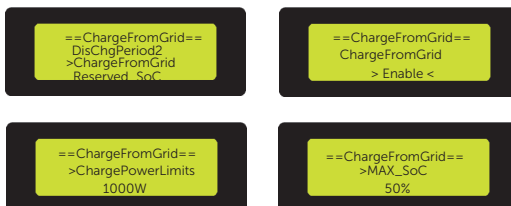


» Setting ChargeFromGrid

ChargePowerLimits: When the actual battery SoC is less than "MAX_SoC" (settable), the battery can be charged from the grid at no more than "ChargePowerLimits" (settable) power.

ChargePowerLimits: Default:0W, range: 0W~8000W

MAX_SoC: Default: 50%; range:10%~100%



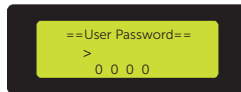
» Setting **Reserved_SoC**

Reserved_SoC is the battery capacity saved for the next peak shaving in the non-peak shaving period.

Reserved_SoC:Default: 50%; range:10%~100%

**9) Setting Password**

The default password of the User Settings is "0000". You can reset the new password. Press **Enter** to confirm the value and jump to the next number. When all passwords have been entered and confirmed, press **Enter** to set the password successfully.



9.6.2 Advanced Settings

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 property losses and system damage. Get the installer password from the dealer and never open the password to unauthorized person.

Setting path: Menu > Settings (0000) > Advanced Settings

After entering into the Advanced Settings interface, you can set the following settings:

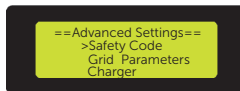
1) Setting Safety Code

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.
- When the **Safety Code** is selected, the information of **Grid Parameters/ Power Factor/ PU Function/ FVRT Function** corresponding to the selected safety code will be automatically matched.

In order for the inverter to be fed in, the safety code must be set correctly to the installation site. 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)

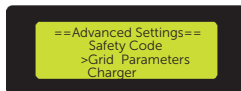


2) Setting Grid Parameters

Here you can set the protective voltage and frequency value of the grid. 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 contents displayed on the LCD screen on the inverter.

When the **Safety Code** is selected, the information of **Grid Parameters** corresponding to the selected safety code will be automatically matched.



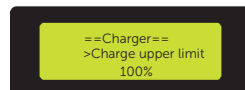
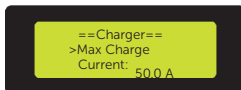
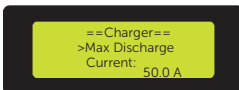
3) Setting Charger

The inverter is compatible with lithium battery. Here you can set the Max Discharge/Charge current and Charge upper limit of the battery.

Max Discharge: Default: 50; range: 0~50

Max Charge: Default: 50; range: 0~50

Charge upper limit: Default: 100; range: 10~100



4) Setting Export Control

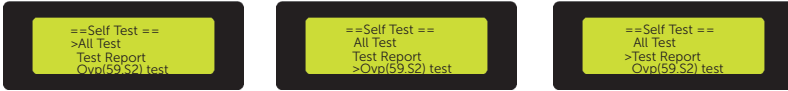
This function allows the inverter to control the amount of power output to the grid. If the user does not want to supply power to the grid, set it to 0.

User value: Default: 60000W; range: 0~60000W



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

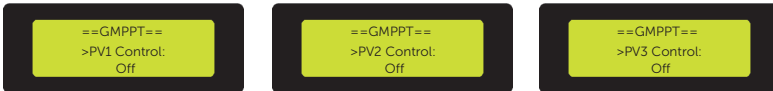
Here you can select "All Test" or a single item for testing. Before testing, make sure the inverter is connected to the grid. "All Test" takes about 6 minutes. For a single test item, it takes about a few seconds or minutes. Click "Test Report" to view the test results.



7) Setting GMPPT

Here you can set the shadow tracking with four options, which are Off, Low, Middle and High.

PV1/2/3 Control: Default: OFF



8) Setting Modbus

You can control the external communication device through this function.

Baud Rate: Default: 19200; range: 1400, 9600, 19200, 38400, 56000, 57600, 115200

Com485 Address: Default: 1; range: 1~255



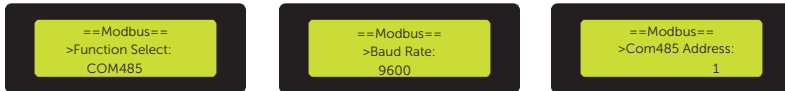
9) Setting InternalModbus

You can control SolaX's internal communication device through this function.

Function Select: Default: Com 485; range: Com 485, Datahub, EV Charger, AdapterBoxG2, EVC&AdapterBoxG2

Baud Rate: Default: 9600; range: 1400, 9600, 19200, 38400, 56000, 57600, 115200

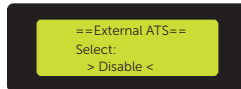
Com485 Address: Default: 1; range: 1~255



10) Setting External ATS

Enable means the inverter achieves grid and off-grid switching through the advanced matebox. **Disable** means the inverter achieves grid and off-grid switching by the inverter itself. (Disable by default)

External ATS needs to be set to **Enable** only when an advanced matebox is connected. In other cases, **Disable** this function is required. When the inverter is in Parallel state, **Enable** can not be set.

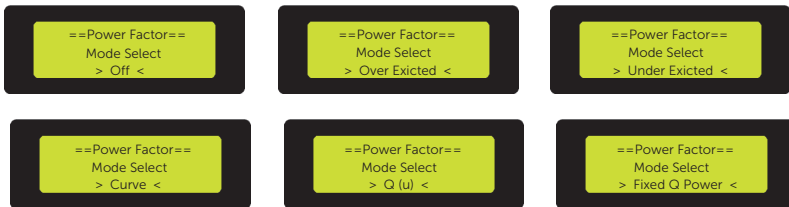


11) Setting Power Factor

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

After selecting the **Safety Code** according to different countries and grid-tied standards, the **Power Factor** corresponding to safety code will be automatically matched.

Default : Off



| | |
|---------------|----------------|
| Off | / |
| Over-Exicted | PF Value |
| Under-Exicted | PF Value |
| Curve | P1_PF |
| | P2_PF |
| | P3_PF |
| | P4_PF |
| | Power1 |
| | Power2 |
| | Power3 |
| | PflockInPoint |
| | PflockOutPoint |
| 3Tua | |

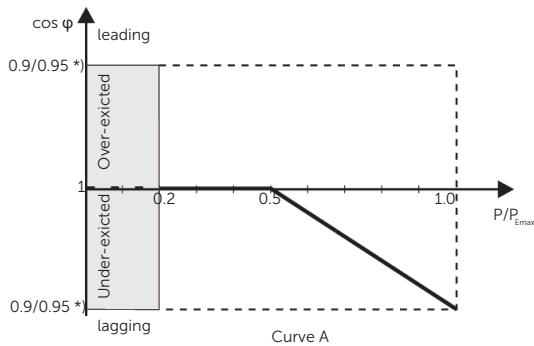
| | |
|-------|---------------|
| Q (u) | VoltRatio1 |
| | VoltRatio4 |
| | QUResponseV1 |
| | QUResponseV2 |
| | QUResponseV3 |
| | QUResponseV4 |
| | K |
| | QuDelayTimer |
| | QuLockEn |
| | QuLockIn |
| | QuLockOut |
| | VoltRatio2 |
| | VoltRatio3 |
| | Fixed Q Power |

- Reactive power control, reactive power standard curve $\cos \varphi = f(P)$

For VDE ARN 4105, the curve $\cos \varphi = f(P)$ should refer to curve A. The set default value is shown in curve A.

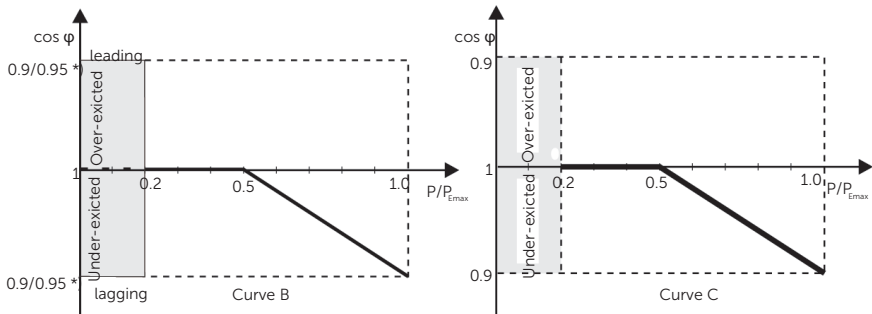
For TOR, the curve $\cos \varphi = f(P)$ should be curve B. The set default value is shown in curve B.

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 $\cos \varphi = f(P)$ corresponds to curve C.

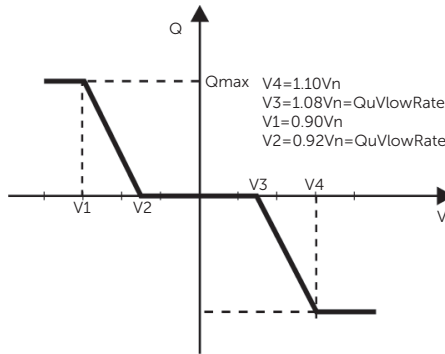


*) If the grid-connected power of the inverter $\leq 4.6kW$, the Power Factor is 0.95 at 1.0 power; if the grid-connected power of the inverter $> 4.6kW$, the Power Factor is 0.90 at 1.0 power.

*) Depend on the required Q capacity



- Reactive power control, reactive power standard curve $Q = f(V)$



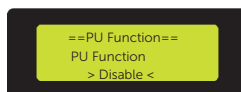
12) Setting PU Function

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

When the **Safety Code** is selected, the information of **PU Function** corresponding to the selected safety code will be automatically matched.

The PU function is a volt-watt response mode required by certain national standards such as AS4777. This function can control the active power of the inverter according to the grid voltage. Here you can Enable or Disable the PU Function.

Default: Disable



13) Setting FVRT Function

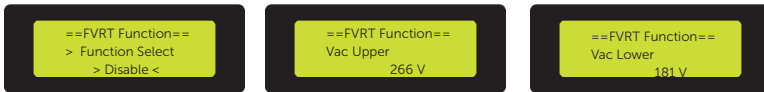
When the **Safety Code** is selected, the information of **FVRT Function** corresponding to the selected safety code will be automatically matched.

Here you can Enable or Disable the FVRT Function, and set the parameters of Vac Upper and Vac Lower when this function is enabled.

Default: Disable

Vac Upper: Default: 266V; range: 230~288V

Vac Lower: Default: 181V; range: 46~240V

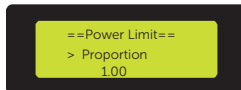


14) Setting Power Limit

Here you can set the maximum power of grid port by percentage.

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

Proportion: Default: 1.00; range: 0.00~1.10



15) Setting "AS477 Setting"

When the **Safety Code** is selected, the information of **AS477 Setting** corresponding to the selected safety code will be automatically matched.

It is the same function as Export Control, but it is only applicable to Australia and New Zealand.

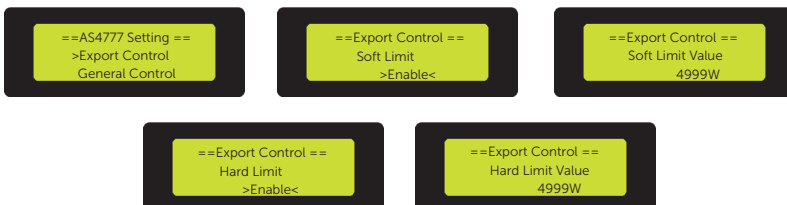
Soft Limit: Control the output value to a certain range.

Hard Limit: If the actual output value reaches the setting **Hard Limit Value**, the system will automatically disconnect from grid and display error message on the LCD.

» Setting Export Control

Export Control is to control active power.

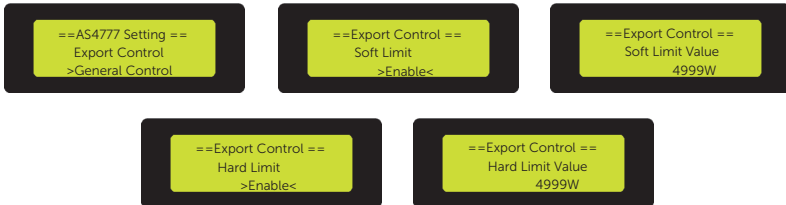
Soft/Hard Limit Value: Default: 4999W; range: 0~15000W



» Setting **General Control**

General Control is to control apparent power.

Soft/Hard Limit Value: Default: 4999W; range: 0~15000W



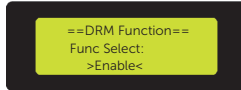
16) Setting DRM Function (Applied to AS4777)

When the **Safety Code** is selected, the information of **DRM Function** corresponding to the selected safety code will be automatically matched.

The **DRM Function** is a demand response method required by the **NZS4777** standard and is only applicable to Australia and New Zealand.

Here you can enable or disable this function.

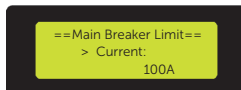
Default: Enable



17) 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.

Main Breaker Limit : range: default:100A; range:32A~100A



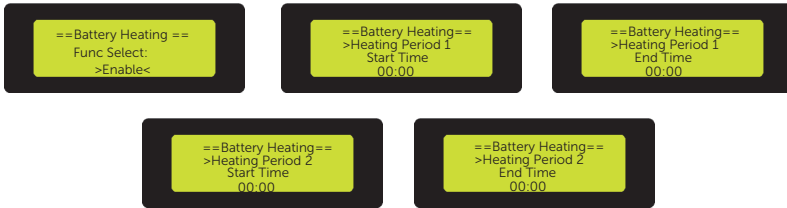
18) Setting Battery Heating

Here you can enable the battery heating function, and set the time period that the battery needs to be heated. There are two time periods can be set.

Default: Disable

Heating Period 1 Start/End Time: Default: 00:00; range: 00:00~23:59

Heating Period 2 Start/End Time: Default: 00:00; range: 00:00~23:59



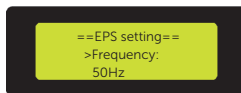
19) Setting "EPS Setting"

Here you can set the Frequency, Min SoC and Min ESC SoC in EPS mode.

» Setting Frequency

Here you can choose to set the frequency of 50Hz or 60Hz.

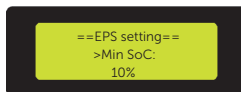
Default: 50Hz



» Setting Min SoC

When the inverter is in EPS mode, once the battery SoC is lower than the Min SoC , the inverter will display "Bat Power Low". If there is PV, the energy of PV will charge the battery.

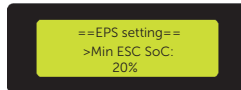
Min SoC: Default: 10%; range: 10%~25%



» Setting Min ESC SoC

When the battery SoC reaches the Min ESC SoC, the inverter will automatically enter EPS mode.

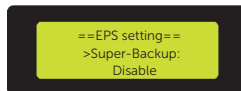
Min ESC SoC: range: Default: 20%; range: 15%~100%.



» Setting Super-Backup

When the **Super-Backup** is enabled, if there is only PV and no battery is available, the inverter can also enter EPS mode when there is a loss of grid.

Super-Backup: Default: Disable



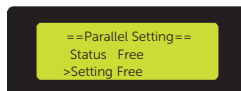
20) Setting "Parallel Setting"

If a parallel operation is required, the user may set it with Parallel Setting.

Status shows whether the inverter is in parallel status. **Free** means the inverter is not in parallel. **Master** means the inverter has been set in parallel and has become the master inverter.

Setting means you can set the inverter's status. There are two status to choose: Free and Master.

Default: Free



NOTICE!

- Master inverter has an absolute lead in the parallel system to control slave inverter's energy management and dispatch control.
- 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 exit from system and be running as an independent unit, its all setting will be re-activation.

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 the Master inverter but not be set to **Free** mode, the slave inverter will report "Parallel Fault".

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

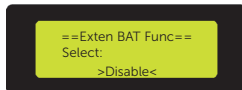
NOTICE!

- Refer to section "7.3.5.1 Parallel Connection" for specific parallel connection diagram.

21) Setting Exten BAT Func

This function is for extending new batteries. The setting is invalid under the EPS Mode. When the inverter is on-grid, enabling this setting will make the inverter charge or discharge the battery SoC to about 40%, which is convenient for adding new batteries. After enabling 48 hours, this function will turn to Disable automatically

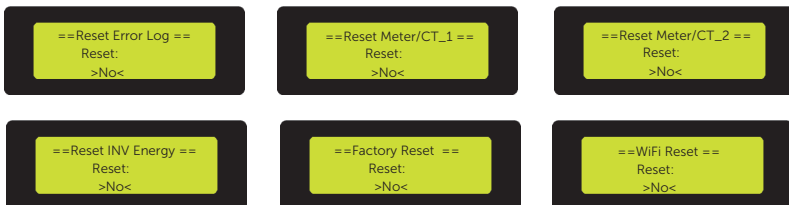
Default: Disable



22) Setting Reset

Here you can choose to reset the Error Log, Meter/CT, INV energy, Factory and WiFi settings or not.

Default: No

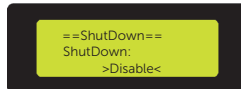


23) Setting ShutDown

ShutDown is an Enable Switch, it determines whether to allow the external switch to turn on and off the inverter. If you want to use the external switch, the Enable mode can be set.

When the ShutDown function is enabled, connecting Pins 15 and 16 (DI_1 and DI_2 in the communication port of P4) can shut down the inverter.

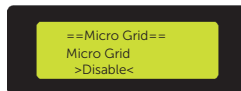
Default: Disable



24) Setting MicroGrid

Here you can Enable the function of MicroGrid.

Default: Disable



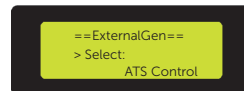
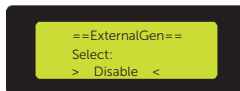
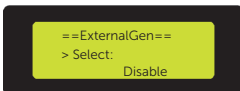
25) Setting ExternalGen

Setting path: Menu Main > Settings > Advanced Settings

You can select **ATS Control** or **Dry Contact** to control ExternalGen. ExternalGen is disable by default.

Setting ATS Control to control ExternalGen

- a. Select **ExternalGen** and enter the interface, the default Disable interface will be displayed. Then press **Enter** to select **ATS Control** and enter the interface.

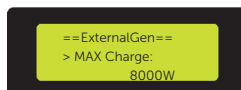


- b. After entering into the ATS Control interface, you can set **MAX Charge**, **Forced Charge Period** and **Allowed Disc Period**, Charge from Gen as follows:

» Setting **MAX Charge**

MAX Charge means the maximum power of the generator charged to the battery.

Max Charge: Default: 3000W; range: 0~8000W



» Setting Forced Charg Period and Allowed Disc Period

Forced Charg Period Start/End Time: Default: 00:00; range: 00:00~23:59

Allowed Disc Period Start Time: Default: 00:00; range: 00:00~23:59

Allowed Disc Period End Time: Default: 23:59; range: 00:00~23:59

Chrg&DischrgPeriod2 has the same setting logic as Forced Charg Period and Allowed Disc Period.

Forced Charg Period Start/End Time: Default: 00:00; range: 00:00~23:59

Allowed Disc Period Start/End Time: Default: 00:00; range: 00:00~23:59



» Setting Charge from Gen

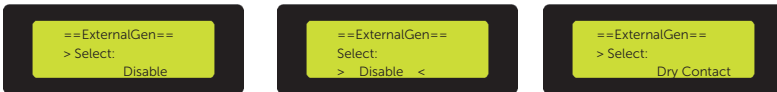
Charge battery to can only be set after Charge from Gen is enabled.

Charge battery to: Default: 30%; range: 10%~100%



Setting Dry Contact to control ExternalGen

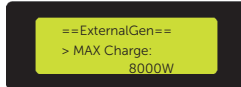
- a. Select **ExternalGen** and enter the interface, the default Disable interface will be displayed. Then press **Enter** to select **Dry Contact** and enter the interface.



- b. After entering into the Dry Control interface, you can set **MAX Charge**, **Start Gen Method**, **Max Run Time**, **Min Rest Time**, **Allow Work Time**, **Charge and Discharge Period** (Refer to Setting ATS Control [Setting Forced Charg Period and Allowed Disc Period](#) for details), **Charge from Gen** (Refer to Setting ATS Control [Setting Charge from Gen](#) for details) as follows:

» **Setting Max Charge**

Max Charge: Default: 3000W; range: 0~8000W



» **Setting Start Gen Method**

immediately: When the grid is disconnected from the inverter and the ExternalGen is enabled, the generator will start immediately.

reference SoC: The generator will start or close according to the Switch on/off SoC.

Switch on SoC: Default: 20%; range: 10%~100%

Switch off SoC: Default: 80%; range: 10%~100%



» **Setting Max. Run Time and Min. Rest Time**

Max. Run Time means the maximum time that the generator can run at a single start, and when the single start time reaches the maximum running time, the generator will actively shutdown.

Default: 1000min; range: 1~60000min

Min. Rest Time means once the generator is turned on, the generator can be turned off only after the minimum running time is reached.

Default: 60min; range: 1~60000min



» Setting Allow Work Time

Start Time: Default: 00:00; range: 00:00~23:59

Stop Time: Default: 23:59; range: 00:00~23:59

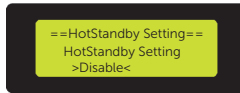


26) Setting "HotStandby Setting"

This function is mainly to save the capacity of the battery. When PV has no power and the inverter has no output power, the inverter will enter "HotStandby" status. When the power of loads is higher than 100W, the inverter will exit "HotStandby" status.

Here you can choose to enable or disable this function.

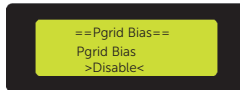
Default: Disable



27) Setting Pgrid Bias

Here you can set whether to bias to discharge power to the grid or take power from the grid. **Disable** means do not bias to discharge power or take power. **Grid** means the inverter will be biased to discharge to the grid. **INV** means the inverter will be biased to take power from the grid.

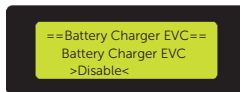
Default: Disable



28) Setting Battery Charge EVC

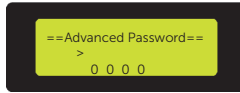
Enable means allowing the battery to discharge energy to EV Charger. **Disable** means battery discharging energy to EV Charegr is not allowed.

Default: Disable



29) Setting Advanced Password

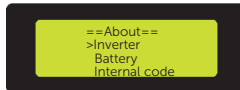
Here you can reset the advanced password. When setting successfully, the LCD screen will display "Set Successfully!". While setting failed, the LCD screen will display "Setting Failed!"



9.7 About

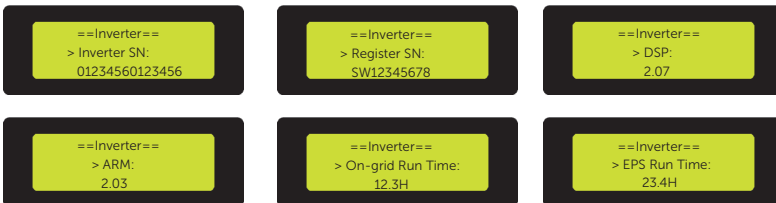
Displaying path: Menu > About

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



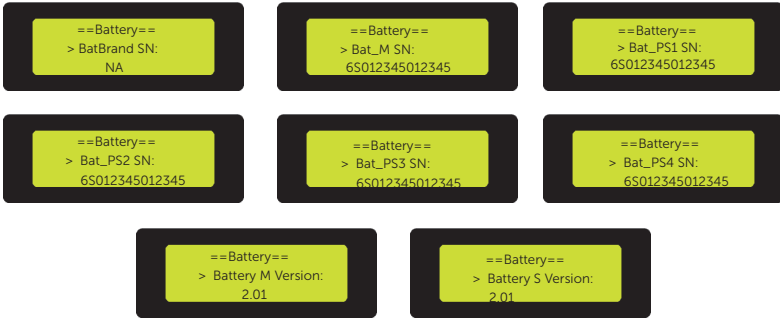
» Inverter

Here shows the basic information of the inverter, including Inverter SN, Register SN, DSP, ARM, On-grid Run Time and EPS Run Time.



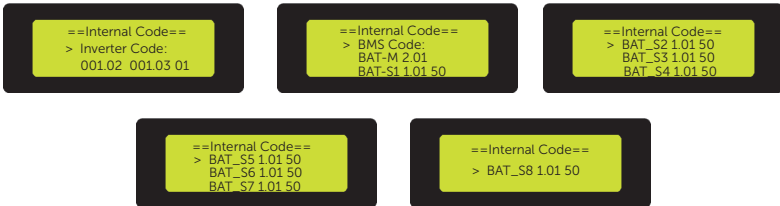
» Battery

Here shows the basic information of the battery.



» Internal code

Here shows the basic information of the internal code.



10 Operation on SolaX App and Web

10.1 Introduction of SolaXCloud

SolaXCloud is an intelligent management platform for home energy, which integrates energy efficiency monitoring, device management, data security communication and other integrated capabilities. While managing your home energy device, it helps you optimize the efficiency of electricity consumption and improve the revenue of power generation.

10.2 Operation Guide on SolaXCloud App

10.2.1 Downloading and Installing App

Method 1: Select and scan the QR code below to download the app.



Figure 10-1 QR code for downloading SolaXCloud App

Method 2: Search for **SolaXCloud** iPhone APP Store, Google Play or Appstore of Android phones, and then download the app.

10.2.2 Operations on App

For instructions on related operations, see the Documents on the SolaXCloud App.

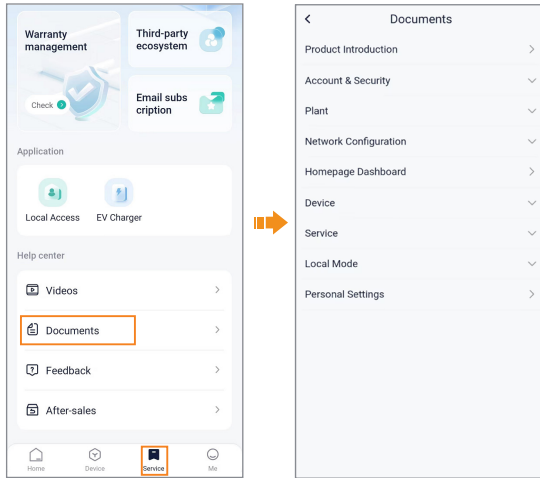


Figure 10-1 App guide on SolaXCloud

NOTICE!

- The App pages above are from the SolaXCloud App V6.0.0., which might change with version update and should be subject to the actual situations.

10.3 Operations on SolaXCloud Webpage

Open a browser and enter www.solaxcloud.com to complete registration, login, add site and other related operations according to the guidelines of User guide.

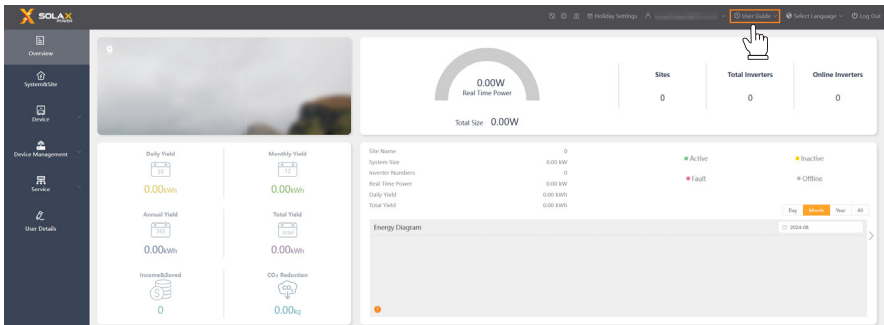


Figure 10-1 User guide on Web

11 Troubleshooting and Maintenance

Before troubleshooting and maintenance, make sure the X1-IES system is powered off.

For how to power off, please refer to [8.4 Power off](#).



- After the X1-IES system 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 and the battery five minutes after power off.

11.1 Troubleshooting

• Troubleshooting of Inverter

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 | Overcurrent fault. <ul style="list-style-type: none">• Wait for a while to check if it is back to normal.• Disconnect PV+ PV- and batteries, reconnect.• Or ask for help from the installer if it can not return to normal. |
| IE 02 | Grid Lost Fult | <ul style="list-style-type: none">• Check Grid input voltage if it's within normal range• Or ask the installer for help. |
| IE 03 | Grid Volt Fault | Power grid voltage overrun <ul style="list-style-type: none">• Wait a moment, if the utility returns to normal, the system will reconnect.• Please check if the grid voltage is within normal range.• Or ask the installer for help. |
| IE 04 | Grid Freq Fault | Electricity frequency beyond range <ul style="list-style-type: none">• If the utility returns to normal, the system reconnects.• Or ask the installer for help. |

Troubleshooting and Maintenance

| Error Code | Fault | Descriptions and Diagnosis |
|------------|-----------------|--|
| IE 05 | PV Volt Fault | PV voltage out of range <ul style="list-style-type: none">• Check the output voltage of the PV module• Or ask the installer for help. |
| IE 06 | Bus Volt Fault | <ul style="list-style-type: none">• Press the "ESC" key to restart the inverter.• Check that the PV input open circuit voltage is in the normal range.• Or ask the installer for help. |
| IE 07 | Bat Volt Fault | Battery voltage fault <ul style="list-style-type: none">• Check battery input voltage if it's within normal range• Or ask the installer for help. |
| IE 08 | AC10mins Volt | <ul style="list-style-type: none">• The grid voltage was out of range in the last 10 minutes.• The system will return to normal if the grid returns to normal.• Or ask the installer for help. |
| IE 09 | DCI OCP Fault | DCI overcurrent protection fault. <ul style="list-style-type: none">• Wait for a while to check if it's back to normal.• Or ask the installer for help. |
| IE 11 | SW OCP Fault | Software Detection of Overcurrent Fault. <ul style="list-style-type: none">• Wait for a while to check if it's back to normal.• Shut down photovoltaic, battery and grid connections• Or ask the installer for help. |
| IE 12 | RC OCP Fault | Overcurrent protection fault. <ul style="list-style-type: none">• Check the impedance of DC input and AC output.• Wait for a while to check if it's back to normal.• Or ask the installer for help. |
| IE 13 | Isolation Fault | Isolation Fault or earth fault, is normally caused by insulation issues. <ul style="list-style-type: none">• Please check the wire insulation for damage.• Wait for a while to check if it's back to normal.• Or ask the installer for help. |
| IE 14 | Temp Over Fault | Temperature beyond limit <ul style="list-style-type: none">• Check if ambient temperature exceeds the limit.• Or ask the installer for help. |

| Error Code | Fault | Descriptions and Diagnosis |
|------------|--------------------|--|
| IE 15 | Bat Con Dir Fault | <p>EPS(Off-grid) mode current is too strong.</p> <ul style="list-style-type: none"> • Ensure that the load power is within the EPS(Off-grid) power range. • Check for any non-linear load connections on the EPS(Off-grid). • Move this load to check for recovery. • Or ask for help from the installer if it can not return to normal. |
| IE 16 | EPS Overload Fault | <p>EPS(Off-grid) over load fault.</p> <ul style="list-style-type: none"> • Shutdown the high-power device and press the "ESC" key to • Restart the inverter. • Or ask for help from the installer if it can not return to normal. |
| IE 17 | Overload Fault | <p>On-grid mode over load</p> <ul style="list-style-type: none"> • Shutdown the high-power device and press the "ESC" key to • Restart the inverter. • Or ask for help from the installer if it can not return to normal. |
| IE 18 | BatPowerLow | <ul style="list-style-type: none"> • Close the high-power device and press the "ESC" key to restart the inverter. • Please charge the battery to a level higher than the protection capacity or protection voltage. |
| IE 19 | BMS Lost | <p>Battery communication loss</p> <ul style="list-style-type: none"> • Check that the communication lines between the battery and the inverter are properly connected. • Or ask for help from the installer if it can not return to normal. |
| IE 20 | Fan Fault | <p>Fan Fault</p> <ul style="list-style-type: none"> • Check for any foreign matter that may have caused the fan not to function properly. • Or ask for help from the installer if it can not return to normal. |
| IE 21 | LowTemp Fault | <ul style="list-style-type: none"> • Low temperature fault. • Check if the ambient temperature is too low. • Or ask for help from the installer if it can not return to normal. |
| IE 23 | Other Device Fault | <p>Other device Fault</p> <ul style="list-style-type: none"> • update the software and press the "ESC" key to restart the inverter. • Or ask for help from the installer if it can not return to normal . |

| Error Code | Fault | Descriptions and Diagnosis |
|------------|---------------------------|--|
| IE 24 | Missed CT Fault | <p>Missed CT Fault</p> <ul style="list-style-type: none"> • Please check if the CT is connected properly • Or seek help from the installer if it can not return to normal. |
| IE 25 | InterComms Error | <ul style="list-style-type: none"> • Internal communication errors • Shut down photovoltaic, battery and grid connections. • Or ask for help from the installer if it can not return to normal. |
| IE 26 | INV EEPROM | <p>Inverter EEPROM Fault.</p> <ul style="list-style-type: none"> • Shut down photovoltaic, battery and grid, reconnect. • Or ask for help from the installer if it can not return to normal. |
| IE 27 | RCD Fault | <p>Fault of Residual Current Device</p> <ul style="list-style-type: none"> • Check the impedance of DC input and AC output. • Disconnect PV + PV - and batteries, reconnect. • Or ask for help from the installer if it can not return to normal. |
| IE 28 | Grid Relay Fault | <p>Electrical relay failure</p> <ul style="list-style-type: none"> • Disconnect PV+ PV- grid and batteries and reconnect. • Or ask for help from the installer if it can not return to normal. |
| IE 29 | EPS(Off-grid) Relay Fault | <p>EPS(Off-grid) relay failure</p> <ul style="list-style-type: none"> • Disconnect PV+ ,PV-, grid and batteries and reconnect. • Or ask for help from the installer if it can not return to normal. |
| IE 30 | PV ConnDirFault | <p>PV direction fault</p> <ul style="list-style-type: none"> • Check if the PV input lines are connected in the opposite direction. • Or ask for help from the installer if it can not return to normal. |
| IE 31 | Battery Realy | <p>Charge relay fault</p> <ul style="list-style-type: none"> • Press the ESC" key to restart the inverter. . • Or ask for help from the installer if it can not return to normal. |
| IE 32 | Earth Relay | <p>EPS (Off-grid) earth relay fault</p> <ul style="list-style-type: none"> • Press the ESC" key to restart the inverter. . • Or ask for help from the installer if it can not return to normal. |

| Error Code | Fault | Descriptions and Diagnosis |
|------------|--------------------|---|
| IE 35 | Parallel Fault | <p>Parallel Fault</p> <ul style="list-style-type: none"> • Check if the parallel communication line is correctly connected. • Or ask for help from the installer if it can not return to normal. |
| IE 36 | HardLimit Fault | <p>HardLimit Fault</p> <ul style="list-style-type: none"> • Check if the limit value of grid-connected power is appropriate. • Or ask for help from the installer if it can not return to normal. |
| IE 101 | PowerTypeFault | <p>Power type fault</p> <ul style="list-style-type: none"> • Upgrade the software and press the ESC" key to restart the inverter. • Or ask for help from the installer if it can not return to normal. |
| IE 102 | Port OC Warning | <p>EPS(Off-grid) port over current fault</p> <ul style="list-style-type: none"> • Check that the EPS(Off-grid) load does not exceed the system requirements, and press the ESC" key to restart the inverter. . • Or ask for help from the installer if it can not return to normal. |
| IE 103 | Mgr Eeprom Fault | <p>Manager EEPROM Fault.</p> <ul style="list-style-type: none"> • Shut down photovoltaic ,battery and grid ,reconnect. • Or seek help from the installer if it can not return to normal. |
| IE 105 | NTC Sample Invalid | <p>NTC invalid</p> <ul style="list-style-type: none"> • Make sure the NTC is properly connected and the NTC is in good condition. • Please confirm that the installation environment is normal • Or ask for help from the installer, if it can not return to normal. |
| IE 106 | Bat Temp Low | <p>Battery temp low</p> <ul style="list-style-type: none"> • Check the battery installation environment to ensure good heat dissipation. • Or ask for help from the installer, if it can not return to normal. |
| IE 107 | Bat Temp High | <p>Battery temp high</p> <ul style="list-style-type: none"> • Check the battery installation environment to ensure good heat dissipation. • Or ask for help from the installer, if it can not return to normal. |

Troubleshooting and Maintenance

| Error Code | Fault | Descriptions and Diagnosis |
|------------|----------------|---|
| IE 109 | Meter Fault | Meter Fault <ul style="list-style-type: none">• Please check if the Meter is connected properly• Or seek help from the installer if it can not return to normal. |
| IE 110 | BypassRaleyFlt | Bypass relay fault <ul style="list-style-type: none">• Press the ESC" key to restart the inverter.• Or ask for help from the installer if it can not return to normal. |
| IE 111 | ARMParaComFlt | ARMParaComFlt <ul style="list-style-type: none">• Please check that the communication cables of inverters are well connected and the baud rate of COMM setting of inverters are the same.• Or seek help from the installer if it can not return to normal. |
| BE 01 | BMS_Exter_Err | Battery Error - External Communication Fault <ul style="list-style-type: none">• Please contact the battery supplier. |
| BE 02 | BMS_InterErr | Battery Error - Internal Communication Fault <ul style="list-style-type: none">• Please contact the battery supplier. |
| BE 03 | BMS_OverVolt | Over voltage in battery system <ul style="list-style-type: none">• Please contact the battery supplier. |
| BE 04 | BMS_LowerVolt | Low voltage in battery system <ul style="list-style-type: none">• Please contact the battery supplier. |
| BE 05 | BMS_ChargeOCP | Battery fault - over charge fault <ul style="list-style-type: none">• Please contact the battery supplier. |
| BE 06 | DischargeOCP | Battery fault-discharge over current fault <ul style="list-style-type: none">• Please contact the battery supplier. |
| BE 07 | BMS_TemHigh | Over temperature in battery system <ul style="list-style-type: none">• Please contact the battery supplier. |
| BE 08 | BMS_TemLow | Lower temperature in battery system <ul style="list-style-type: none">• Please contact the battery supplier. |
| BE 09 | CellImblance | Battery Unbalanced Failure <ul style="list-style-type: none">• Please contact the battery supplier. |
| BE 10 | BMS_Hardware | Battery hardware protection failure <ul style="list-style-type: none">• Please contact the battery supplier. |
| BE 11 | BMS_Circuit | Battery circuit failure <ul style="list-style-type: none">• Restart the battery .• Please contact the battery supplier. |

| Error Code | Fault | Descriptions and Diagnosis |
|------------|----------------|--|
| BE 12 | BMS_ISO_Fault | Battery insulation failure <ul style="list-style-type: none"> • Check that the battery is properly grounded and restart the battery. • Please contact the battery supplier |
| BE 13 | BMS_VolSen | Battery voltage sensor fault <ul style="list-style-type: none"> • Please contact the battery supplier |
| BE 14 | BMS_TempSen | Temperature sensor failure <ul style="list-style-type: none"> • Restart the battery. • Please contact the battery supplier. |
| BE 15 | BMS_CurSen | Battery current sensor fault <ul style="list-style-type: none"> • Please contact the battery supplier. |
| BE 16 | BMS_Relay | Battery relay failure <ul style="list-style-type: none"> • Please contact the battery supplier. |
| BE 17 | TypeUnmatched | Battery type failure <ul style="list-style-type: none"> • Upgrade the battery BMS software. • Please contact the battery supplier. |
| BE 18 | Ver Unmatched | Battery version mismatch failure <ul style="list-style-type: none"> • Upgrade the battery BMS software. • Please contact the battery supplier. |
| BE 19 | MFR Unmatched | Battery manufacturer did not match the fault <ul style="list-style-type: none"> • Upgrade the battery BMS software. • Please contact the battery supplier. |
| BE 20 | SW Unmatched | Battery hardware and software mismatch failure <ul style="list-style-type: none"> • Upgrade the battery BMS software. • Please contact the battery supplier. |
| BE 21 | M&S Unmatched | Battery master slave control mismatches <ul style="list-style-type: none"> • Upgrade the battery BMS software. • Please contact the battery supplier |
| BE 22 | CR NORespond | Battery charging request does not respond to a fault <ul style="list-style-type: none"> • Upgrade the battery BMS software. • Please contact the battery supplier. |
| BE 23 | BMS SW Protect | Battery slave software protection failure <ul style="list-style-type: none"> • Upgrade the battery BMS software. • Please contact the battery supplier. |
| BE 24 | BMS 536 Fault | Battery fault-discharge over current fault <ul style="list-style-type: none"> • Please contact the battery supplier. |
| BE 25 | BMS SelfCheck | Over temperature in battery system <ul style="list-style-type: none"> • Please contact the battery supplier. |
| BE 26 | BMS_Tempdiff | Battery temperature sensor malfunction <ul style="list-style-type: none"> • Please contact the battery supplier. |

| Error Code | Fault | Descriptions and Diagnosis |
|------------|----------------|--|
| BE 27 | BMS_BreakFault | Battery Unbalanced Failure <ul style="list-style-type: none">• Please contact the battery supplier. |
| BE 28 | BMS_FlashFault | Battery hardware protection failure <ul style="list-style-type: none">• Please contact the battery supplier. |
| BE 29 | BMS_Precharge | Battery precharge failure <ul style="list-style-type: none">• Please contact the battery supplier. |
| BE 30 | AirSwitchBreak | Battery air switch failure <ul style="list-style-type: none">• Check that the battery breaker is off.• Please contact the battery supplier. |

- **Troubleshooting of Battery (T-BAT-SYS)**

This section contains information and procedures for resolving possible problems with the rechargeable battery and provides the troubleshooting tips to identify and solve most problems that may occur. Please conform the state of the indicators to check the status of the T-BAT-SYS, check the warning or fault information via the monitoring software on the inverter, and read the suggested solutions below when error occurs.

In case of the following circumstances, e.g. voltage or temperature exceeds the limit specified, a warning state will be triggered.

T-BAT-SYS's BMS will periodically report its operating state to the inverter. Therefore, when a warning is reported, the inverter will stop working immediately.

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 rechargeable battery.

| Error Code | Fault | Diagnosis and Solution |
|--------------------------|------------------------------|---|
| BMS_Lost | External fault of BMS | Unable to establish communication with inverter. <ul style="list-style-type: none"> Restart the BMS. Contact the after-sales personnel of our company. |
| BMS_Internal_Err | Internal fault of BMS | Unable to establish communication among battery modules. <ul style="list-style-type: none"> Restart the BMS. Check whether the wire connections among battery modules are correct. Contact the after-sales personnel of our company. |
| BMS_OverVoltage | BMS overvoltage | Overvoltage of a single battery module. <ul style="list-style-type: none"> Contact the after-sales personnel of our company. |
| BMS_LowerVoltage | BMS undervoltage | Undervoltage of a single battery module. <ul style="list-style-type: none"> Battery module is forced to charge through inverter. Contact the after-sales personnel of our company. |
| BMS_ChargeOverCurrent | Overcurrent charging of BMS | Overcurrent charging of BMS. <ul style="list-style-type: none"> Restart the BMS. Contact the after-sales personnel of our company. |
| BMS_DischargeOverCurrent | Discharge overcurrent of BMS | Discharge overcurrent of BMS. <ul style="list-style-type: none"> Restart the BMS. Contact the after-sales personnel of our company. |
| BMS_TemHigh | High temperature of BMS | The temperature of the BMS is too high. <ul style="list-style-type: none"> Cool down the BMS to normal temperature, and then restart it. Contact the after-sales personnel of our company. |
| BMS_TemLow | Low temperature of BMS | The temperature of the BMS is too low. <ul style="list-style-type: none"> Warm up the BMS, and restart it. Contact the after-sales personnel of our company. |
| BMS_CellImbalance | Cell imbalance of BMS | Inconsistency of battery module. <ul style="list-style-type: none"> Restart the BMS. Contact the after-sales personnel of our company. |

| Error Code | Fault | Diagnosis and Solution |
|------------------------|--------------------------------|---|
| BMS_Circuit_Fault | Circuit fault | Circuit fault of the BMS. <ul style="list-style-type: none"> Restart the BMS. Contact the after-sales personnel of our company. |
| BMS_Insulation_Fault | Insulation fault | Insulation fault of the BMS. <ul style="list-style-type: none"> Restart the BMS. Contact the after-sales personnel of our company. |
| BMS_VoltSensor_Fault | Voltage sensor fault | Voltage sampling fault of the BMS. <ul style="list-style-type: none"> Restart the BMS. Contact the after-sales personnel of our company. |
| BMS_CurrSensor_Fault | Current sensor fault | Current sampling fault of the BMS. <ul style="list-style-type: none"> Restart the BMS. Contact the after-sales personnel of our company. |
| BMS_Relay_Fault | Relay fault | Relay contact adhesion fault of the BMS. <ul style="list-style-type: none"> Restart the BMS. Contact the after-sales personnel of our company. |
| BMS_CR_Unresponsive | Charging request not responded | Inverter does not respond the charging request. <ul style="list-style-type: none"> Restart the BMS or the inverter. Contact the after-sales personnel of our company. |
| BMS_536_Fault | 536 fault of the BMS | BMS voltage sampling fault. <ul style="list-style-type: none"> Restart the BMS. Contact the after-sales personnel of our company. |
| BMS_Selfchecking_Fault | Self-test fault of the BMS | Self-test fault of the BMS. <ul style="list-style-type: none"> Restart the BMS. Contact the after-sales personnel of our company. |
| BMS_Temdiff_Fault | Temperature different fault | BMS temperature varies greatly. <ul style="list-style-type: none"> Restart the BMS. Contact the after-sales personnel of our company. |
| BMS_Break | Disconnection fault of the BMS | BMS sampling fault. <ul style="list-style-type: none"> Restart the BMS. Contact the after-sales personnel of our company. |

| Error Code | Fault | Diagnosis and Solution |
|---------------------|---------------------|--|
| BMS_Precharge_Fault | BMS precharge fault | External short circuit of the BMS. <ul style="list-style-type: none"> • Check the external connection and restart the BMS. • Contact the after-sales personnel of our company. |

11.2 Maintenance

Regular maintenance is required for the X1-IES system. Pay attention to the following maintenance routines of inverter and battery 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 X1-IES system.
- Only use the spare parts and accessories approved by SolaX for maintenance.

11.2.1 Maintenance routines

Table 11-1 Maintenance routines of Inverter

| Item | Check Notes | Maintenance Interval |
|-------------------------|--|----------------------|
| Safety check | <ul style="list-style-type: none"> • Check the items mentioned in section 1 "Safety" • The safety check shall be performed by manufacturer's qualified person who has adequate training, knowledge, and practical experience. | Every 12 months |
| Indicators | <ul style="list-style-type: none"> • Check if the indicators of the inverter are in normal state. • Check if the display of the inverter (if it has screen) is normal. | Every 6 months |
| Input and output cables | <ul style="list-style-type: none"> • Cables are securely connected. • Cables are intact, and in particular, the parts touching the metallic surface are not scratched. Check whether the terminal caps of idle PV terminals fall off. • Check whether the fastening heads of CT/Meter, COM and Grid&EPS ports are securely tightened. | Every 6 months |
| Grounding reliability | Check whether the grounding terminal and ground cable are securely connected and all terminals and ports are properly sealed. | Every 6 months |
| Dongle | Check whether the Dongle is securely connected. | From time to time |

Table 11-2 Maintenance routines of Battery (T-BAT-SYS)

Precautions

- If the ambient temperature for storage is between 30°C and 50°C (86°F to 122°F), please recharge the battery modules at least once every 6 months.
 - If the ambient temperature for storage is between -20°C and 30°C (-4°F to 86°F), please recharge the battery modules at least once every 12 months.
 - For the first installation, the interval among manufacture dates of battery modules 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, please ensure that the SoC of the existing system capacity is about 40%. The manufacture date of the new battery module shall not exceed 6 months. If the manufacture date of the new one exceeds 6 months, please charge it to around 40%.
 - Batteries typically do not require maintenance by the installer or end user. If a battery is reporting an error message, SolaX can view the error message via Cloud online monitoring and then arrange for an on-site technical support engineer to go to the site to resolve the issue, as well as contacting an electrician if required.
-

11.2.2 Upgrading Firmware

Upgrade precautions

 **WARNING!**

- If the DSP and ARM firmware need to be upgraded, please note that ARM firmware must be upgraded first, then DSP firmware!
- Please make sure that the category format is correct, do not modify the firmware file name. Otherwise, the inverter may not work!

 **WARNING!**

- For the inverter, ensure that the PV input voltage is greater than 60V (upgrade on sunny days). please ensure that the battery SoC is greater than 20% or the battery input voltage is greater than 90V. Otherwise, it may cause serious failure during the upgrade process!

 **CAUTION!**

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

 **CAUTION!**

- If the DSP firmware upgrade fails or stops, please check whether the power is off. If it is normal, plug in the U disk again and repeat the upgrade.

Upgrade preparation

- Please check the inverter version and prepare a U disk (USB 2.0/3.0) and personal computer before upgrading. Please make sure that the size of the U disk is smaller than 32G, and the format is FAT 16 or FAT 32.
- Please contact our service support to obtain the firmware, and store the firmware in the U disk according to the following path.
 - » For ARM file: update\ARM\323101038300_IES_1P_ARM_VX.XX_XX.XX.usb
 - » For DSP file: update\DSP\323101038300_IES_1P_DSP_VX.XX_XX.XX.usb

NOTICE!

- VX.XX refers to the file version, XX.XX refers to date.

Upgrade steps

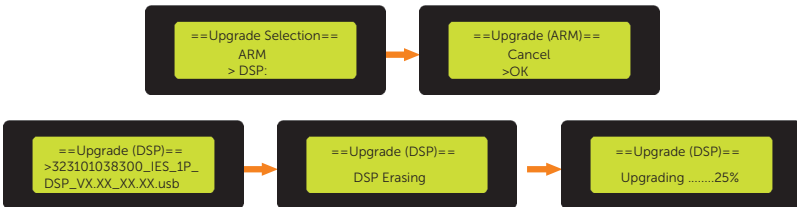
- Please save the Upgrade firmware in your U disk first, and press the **Enter** button on the inverter screen for 5 seconds to enter the OFF mode.
- Find the **Upgrade** port of the inverter, unplug the monitoring module (WiFi Dongle / LAN Dongle / 4G Dongle) by hand, and insert the USB flash drive. (Refer to section [7.3.7 Monitoring Connection](#) for the specific position of **Dongle/Upgrade** port.
- Select **ARM** and **OK** to enter the software version interface;



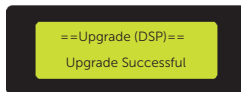
- Please confirm the new firmware version again and select the firmware to upgrade. The upgrade takes about 20 seconds. When it is completed, the LCD screen returns to the **Update** page.



- For DSP: Please wait for 10 seconds. When "Update" page shown as below, press down to select **DSP** and then press **Enter**. Please confirm the firmware version again and press **Enter** to upgrade. The upgrade takes about 2 minutes.



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



NOTICE!

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

12 Decommissioning

12.1 Disassembling the X1-IES system



- When disassembling the X1-IES system, strictly follow the steps as below.
- Only use measuring devices with a DC input voltage range of 600 V or higher.

Disassembling the inverter

Step 1: Press the button on the inverter to shut down the system.

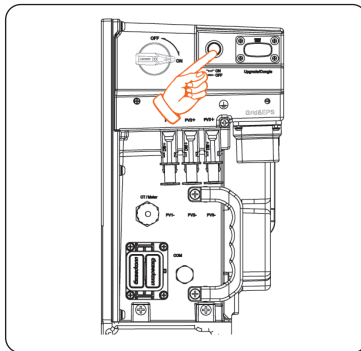


Figure 12-1 Pressing the button

Step 2: Turn off the AC and EPS breakers between the inverter and the power grid.

Step 3: Turn off the DC switch on the inverter

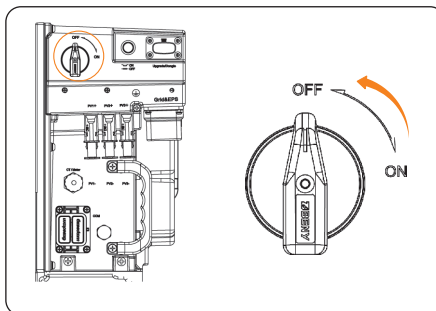


Figure 12-2 Turning off the DC switch

Step 4: Press the BMS Button to shut down the battery, then turn off the BAT switch.

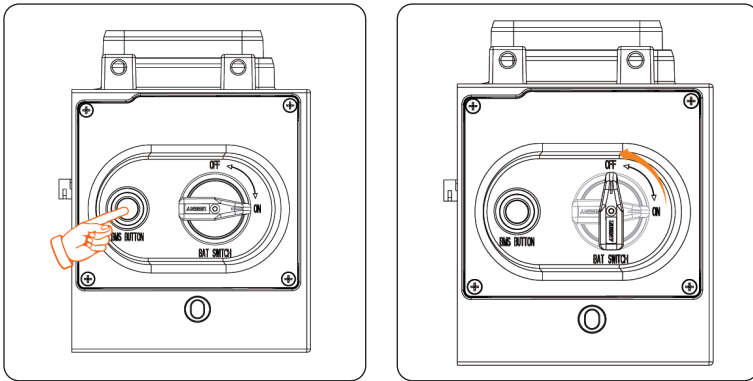


Figure 12-3 Pressing the button and turning off the switch

WARNING!

- Wait for at least 5 minutes to fully discharge the capacitors inside the X1-IES system.

Step 5: Use a current clamp to ensure there is no current present in the PV cables.

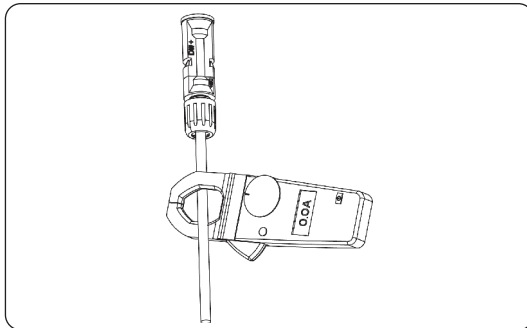


Figure 12-4 Measuring the current

Step 6: Use the disassembling tool for PV terminal to disassemble the PV cables. Then remove the PV cables, and slightly pull out the cables.

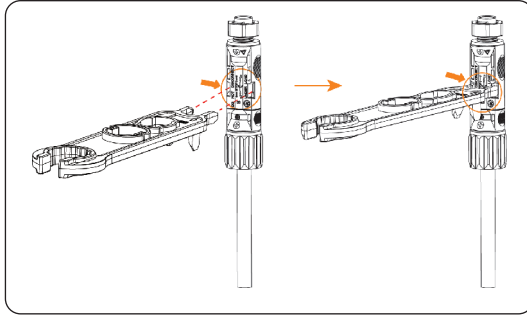


Figure 12-5 Disassembling the PV cables

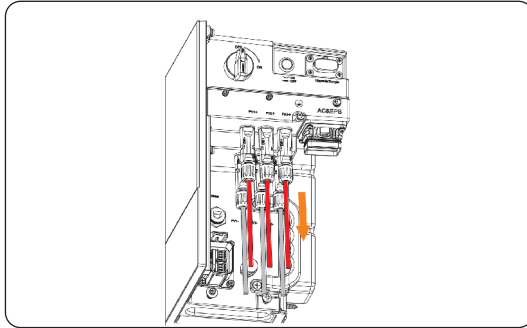


Figure 12-6 Removing the PV cables

Step 7: Use a flat-head screwdriver to prise open the position indicated by the arrow to remove the Grid&EPS cable.

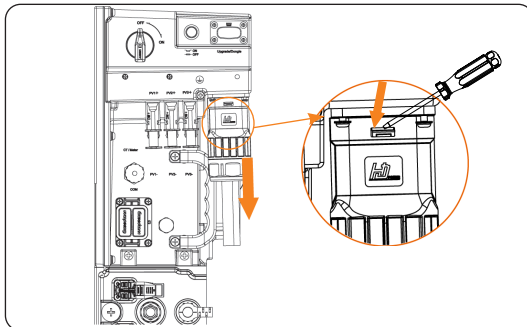


Figure 12-7 Removing the Grid&EPS cable

Step 8: Remove the Communication cable.

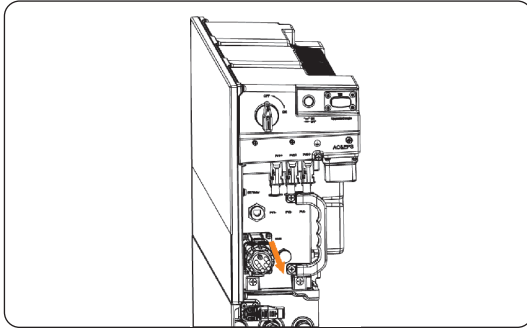


Figure 12-8 Removing the communication cable

Step 9: Remove the Meter/CT cable.

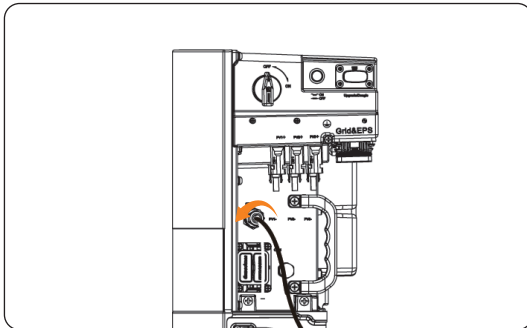


Figure 12-9 Removing the Meter/CT cable

Step 10: Remove the PE cable.

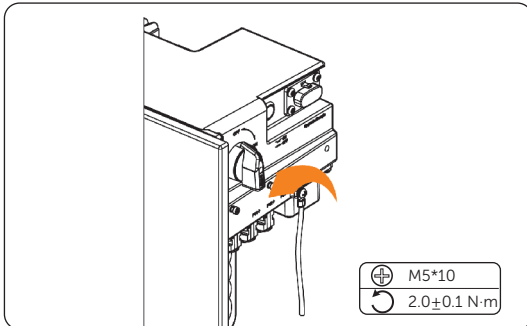


Figure 12-10 Removing the PE cable

Step 11: Remove the Dongle.

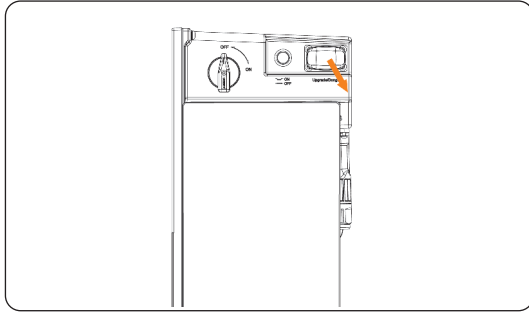


Figure 12-11 Removing the Dongle

Step 12: Put the original protective caps on the terminals.

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

Step 14: Remove the inverter.

Disassembling the Battery (T-BAT-SYS)

Step 15: Press and hold the lock button on the terminals to unplug the short power cable in the case of one tower;

Or press and hold the lock button on the terminals to unplug power cables in the case of two towers.

Step 16: Rotate the ring anti-clockwise to unplug the heater cable after two arrows are aligned in the case of two towers.

Step 17: Use and rotate anti-clockwise a rotation wrench to unplug the communication cable in the case of two towers.

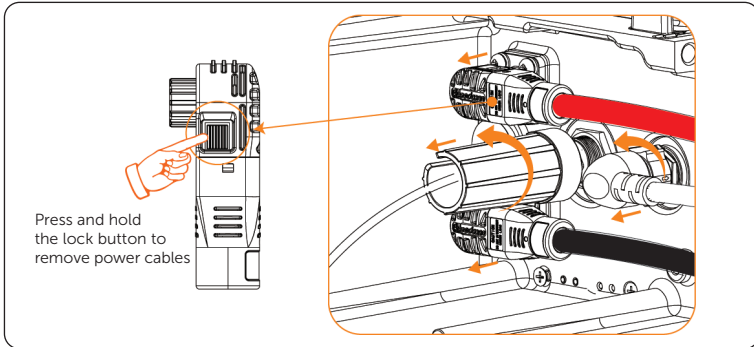


Figure 12-12 Unplugging cables

Step 18: Unscrew the screws to remove the grounding cable.

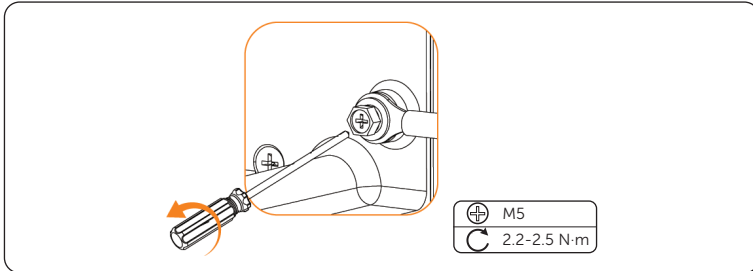


Figure 12-13 Removing grounding cable

NOTICE!

- The above steps for disconnecting cables apply to both the BMS and series box.

12.2 Packing the X1-IES system

- Load the X1-IES system into the original packing material if possible.
- If the original packing material is not available, you can also use the packing material which meets the following requirements:
 - » Suitable for the weight of product.
 - » Easy to carry
 - » Be capable of being closed completely

12.3 Disposing of the X1-IES system

Please dispose of the X1-IES system in accordance with the disposal regulations for electronic waste which is applied at the installation site.

13 Technical Data

- Inverter

DC input

| Model | X1-IES-2.5K | X1-IES-3K | X1-IES-3.7K | X1-IES-4.6K | X1-IES-5K | X1-IES-6K | X1-IES-8K |
|--|-------------|-----------|-------------|-------------|-------------|-------------|-------------|
| Max. recommended PV power ¹ [W] | 5000 | 6000 | 7400 | 9200 | 10000 | 12000 | 16000 |
| Max PV voltage [d.c. V] | 600 | | | | | | |
| Nominal DC operating voltage [d.c. V] | 360 | | | | | | |
| MPPT voltage range [d.c. V] | 40-560 | | | | | | |
| MPPT full power voltage range [d.c. V] | 115-460 | 115-460 | 115-460 | 115-460 | 125-460 | 150-460 | 200-460 |
| Max. PV current [d.c. A] | 20/20 | 20/20 | 20/20 | 20/20/20 | 20/20/20 | 20/20/20 | 20/20/20 |
| Isc PV array short circuit [d.c. A] | 30/30 | 30/30 | 30/30 | 30/30/30 | 30/30/30 | 30/30/30 | 30/30/30 |
| Start output voltage [d.c. V] | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| Max. inverter backfeed current to the array [d.c. V] | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| No. of MPP trackers | 2 | 2 | 2 | 3 | 3 | 3 | 3 |
| Strings per MPP trackers | A:1/B:1 | A:1/B:1 | A:1/B:1 | A:1/B:1/C:1 | A:1/B:1/C:1 | A:1/B:1/C:1 | A:1/B:1/C:1 |

*Marked with "1" indicates that a single channel MPPT can only input a maximum of 8000W.

AC output/ input

| Model | X1-IES-2.5K | X1-IES-3K | X1-IES-3.7K | X1-IES-4.6K | X1-IES-5K | X1-IES-6K | X1-IES-8K |
|----------------------------------|-------------|-----------|-------------|-------------|--|-----------|-----------|
| AC output | | | | | | | |
| Rated output apparent power [VA] | 2500 | 3000 | 3680 | 4600 | 5000 (4600 for VDE4105, 4999 for AS4777) | 6000 | 8000 |
| Max. output apparent power [VA] | 2500 | 3300 | 3680 | 4600 | 5000 (4600 for VDE4105, 4999 for AS4777, 5000 for C10/11) | 6600 | 8000 |
| Nominal AC voltage [a.c. V] | 220/230/240 | | | | | | |
| Frequency [Hz] | 50/60 | | | | | | |
| Rated output current [a.c. A] | 10.9 | 13.1 | 16 | 20 | 21.8 | 26.1 | 34.8 |

| Model | X1-IES-2.5K | X1-IES-3K | X1-IES-3.7K | X1-IES-4.6K | X1-IES-5K | X1-IES-6K | X1-IES-8K |
|--|---------------------------|-----------|-------------|-------------|-----------|-----------|-----------|
| Max. output continuous current [a.c. A] | 10.9 | 14.4 | 16 | 20 | 21.8 | 28.7 | 34.8 |
| Current (inrush) (at 50µs) [a.c. A] | 53A | | | | | | |
| Maximum output fault current (at 1ms) [a.c. A] | 55 | 55 | 55 | 75 | 75 | 100 | 100 |
| Maximum output overcurrent protection [a.c. A] | 65 | 65 | 65 | 100 | 100 | 125 | 125 |
| Power factor range | 0.8 leading - 0.8 lagging | | | | | | |
| Total harmonic distortion (THDi) | < 3 % | | | | | | |
| AC input | | | | | | | |
| Max. apparent power [VA] | 6576 | 6576 | 7680 | 9600 | 9600 | 9600 | 9600 |
| Rated AC power [W] | 6300 | 6300 | 7360 | 9200 | 9200 | 9200 | 9200 |
| Nominal AC voltage [a.c. V] | 220/230/240 | | | | | | |
| Frequency [Hz] | 50/60 | | | | | | |
| Max. AC input current [a.c. A] | 27.4 | 27.4 | 32 | 40 | 40 | 40 | 40 |
| Power factor range | 0.8 leading - 0.8 lagging | | | | | | |

Battery

| Model | X1-IES-2.5K | X1-IES-3K | X1-IES-3.7K | X1-IES-4.6K | X1-IES-5K | X1-IES-6K | X1-IES-8K |
|--|-------------------|-----------|-------------|-------------|-----------|-----------|-----------|
| Battery type | Lithium batteries | | | | | | |
| Battery voltage range [d.c. V] | 80-480 | | | | | | |
| Max. continuous charge/ discharge current [d.c. A] | 50 | | | | | | |
| Communication interface | CAN/RS485 | | | | | | |
| Reverse connection protection | Yes | | | | | | |

Technical Data

Efficiency, Safety and Protection

| Model | X1-IES-2.5K | X1-IES-3K | X1-IES-3.7K | X1-IES-4.6K | X1-IES-5K | X1-IES-6K | X1-IES-8K |
|---------------------------------------|---|-----------|-------------|-------------|-----------|-----------|-----------|
| Efficiency | | | | | | | |
| MPPT efficiency | 99.9% | 99.9% | 99.9% | 99.9% | 99.9% | 99.9% | 99.9% |
| European efficiency | 97.0% | 97.0% | 97.0% | 97.0% | 97.0% | 97.0% | 97.0% |
| Maximum efficiency | 97.6% | 97.6% | 97.6% | 97.6% | 97.6% | 97.6% | 97.6% |
| Rated battery charge efficiency | 98.5% | 98.5% | 98.5% | 98.5% | 98.5% | 98.5% | 98.5% |
| Rated battery discharge efficiency | 97.0% | 97.0% | 97.0% | 97.0% | 97.0% | 97.0% | 97.0% |
| Safety and Protection | | | | | | | |
| Safety | IEC62109-1/IEC62109-2 | | | | | | |
| Grid monitoring | VDE0126-1-1 A1:2012/VDE-AR-N 4105/G98/G99/AS4777/EN50549/CEI 0-21 | | | | | | |
| DC SPD protection | Integrated | | | | | | |
| AC SPD protection | Integrated | | | | | | |
| Over/ under voltage protection | Yes | | | | | | |
| Grid protection | Yes | | | | | | |
| DC injection monitoring | Yes | | | | | | |
| Back feed current monitoring | Yes | | | | | | |
| Residual current detection | Yes | | | | | | |
| Active anti-islanding method | Frequency Shift | | | | | | |
| Over load protection | Yes | | | | | | |
| Over heat protection | Yes | | | | | | |
| Array insulation resistance detection | Yes | | | | | | |

EPS (Off-grid) output

| Model | X1-IES-2.5K | X1-IES-3K | X1-IES-3.7K | X1-IES-4.6K | X1-IES-5K | X1-IES-6K | X1-IES-8K |
|-------------------------------------|--|-----------|-------------|-------------|-----------|-----------|-----------|
| Rated EPS apparent power [VA] | 2500 | 3000 | 3680 | 4600 | 5000 | 6000 | 8000 |
| Nominal EPS voltage [a.c. V] | 220/230/240 | | | | | | |
| Frequency | 50/60 | | | | | | |
| Rated EPS current [a.c. A] | 10.9 | 13.1 | 16 | 20 | 21.8 | 26.1 | 34.8 |
| EPS (Off-grid) peak power [VA] | $\leq 1.1P_n$ continuous operation; $1.1P_n - 2P_n$ 10s; $> 2P_n$ report error immediately | | | | | | |
| Switching time (typical value) [ms] | < 10 | | | | | | |
| Total harmonic distortion (THDv) | < 3 % | | | | | | |

Generic data

| Model | X1-IES-2.5K | X1-IES-3K | X1-IES-3.7K | X1-IES-4.6K | X1-IES-5K | X1-IES-6K | X1-IES-8K |
|--|--|-----------|-------------|-------------|-----------|-----------|-----------|
| Dimensions (W/H/D) [mm] | 717*350*210 | | | | | | |
| Dimensions of packing (W/H/D) [mm] | 790*590*350 | | | | | | |
| Net weight [kg] | 26.2 | 26.2 | 26.2 | 26.4 | 26.4 | 26.4 | 27 |
| Gross weight * [kg] | 30.9 | 30.9 | 30.9 | 31.1 | 31.1 | 31.1 | 31.7 |
| Heat dissipation treatment | Natural cooling | | | | | | |
| Noise emission (typical) [dB(A)] | < 35 | | | | | | |
| environmental category | outdoor | | | | | | |
| Storage temperature range [°C] | -40 to +65 | | | | | | |
| Operating ambient temperature range [°C] | -35 to +60 (derating at 45) | | | | | | |
| Humidity [%] | 0% to 100% (condensing) | | | | | | |
| Altitude [m] | ≤ 3000 | | | | | | |
| Ingress protection | IP66 | | | | | | |
| Protective class | I | | | | | | |
| Cold standby consumption | < 5W | | | | | | |
| Overvoltage category | III(electric supply side), II(PV side) | | | | | | |
| Pollution degree | III | | | | | | |
| Installation mode | Wall mounted | | | | | | |
| Inverter topology | Non-isolated | | | | | | |
| Communication interface | RS485 (Meter), Pocket-X, USB, RS485 (Modbus, EV Charger, Datahub), Parallel (CAN+RS485), DO (SG ready), DI | | | | | | |

* The specific gross weight is subject to the actual situation of the whole machine, which may be a little different due to the influence of the external environment.

Technical Data

- Battery (T-BAT-SYS)

Configuration List

| Model | BMS | Battery Module | Nominal Energy (kWh) | Operating Voltage (Vdc) |
|-------------|-------------------|----------------|----------------------|-------------------------|
| T-BAT HS 5 | TBMS-MCS0800E × 1 | TP-HS50E × 1 | 5.1 | 90-116 |
| T-BAT HS 10 | TBMS-MCS0800E × 1 | TP-HS50E × 2 | 10.2 | 180-232 |
| T-BAT HS 15 | TBMS-MCS0800E × 1 | TP-HS50E × 3 | 15.3 | 270-348 |
| T-BAT HS 20 | TBMS-MCS0800E × 1 | TP-HS50E × 4 | 20.4 | 360-464 |
| T-BAT HS 25 | TBMS-MCS0800E × 1 | TP-HS50E × 5 | 25.6 | 450-580 |
| T-BAT HS 30 | TBMS-MCS0800E × 1 | TP-HS50E × 6 | 30.7 | 540-696 |

Performance Parameter

| Module | T-BAT HS 5 | T-BAT HS 10 | T-BAT HS 15 | T-BAT HS 20 | T-BAT HS 25 | T-BAT HS 30 |
|---|--|-------------|-------------|-------------|-------------|-------------|
| Nominal Voltage (Vdc) | 102.4 | 204.8 | 307.2 | 409.6 | 512 | 614.4 |
| Operating Voltage (Vdc) | 90-116 | 180-232 | 270-348 | 360-464 | 450-580 | 540-696 |
| Nominal Capacity (Ah) ¹ | 50 | 50 | 50 | 50 | 50 | 50 |
| Nominal Energy (kWh) ¹ | 5.1 | 10.2 | 15.3 | 20.4 | 25.6 | 30.7 |
| Usable Energy 90% DOD (kWh) ² | 4.6 | 9.2 | 13.8 | 18.4 | 23.0 | 27.6 |
| Max. Charge/Discharge Current (A) ³ | 50 | 50 | 50 | 50 | 50 | 50 |
| Recommend Charge/Discharge Current (A) ⁴ | 30 | 30 | 30 | 30 | 30 | 30 |
| Standard Power (kW) | 3 | 6.1 | 9.2 | 12.2 | 15.3 | 18.4 |
| Max. Power (kW) | 5.1 | 10.2 | 15.3 | 20.4 | 25.6 | 30.7 |
| Short-circuit current | 3.57 kA (0.333 ms) | | | | | |
| Battery Round-trip Efficiency (0.2C, 25°C) ⁵ | 95% | | | | | |
| Expected Lifetime (25°C) | 10 years | | | | | |
| Cycle Life 90% DOD (25°C) | 6000 cycles | | | | | |
| Charge Temperature | 0°C ~ 53°C (Off heating function) ³ / -30°C ~ 53°C (In heating function) ³ | | | | | |
| Discharge Temperature | -20°C ~ 53°C (Off heating function) ³ / -30°C ~ 53°C (In heating function) ³ | | | | | |
| Storage Temperature | 30°C ~ 50°C (6 months); -20°C ~ 30°C (12 months) | | | | | |
| Ingress Protection | IP66 | | | | | |
| Protection Class | I | | | | | |

NOTICE!

1. Test conditions: 25°C .100 %, depth of discharge (DoD), 0.2C charge & discharge.
2. System usable energy may vary with inverter different setting.
3. Discharge: In case of battery cell's temperature range of -20°C ~ 10°C and 45°C ~ 53°C, the discharge current will be reduced; Charge: In case of battery cell's temperature range of 0°C ~ 25°C and 45°C ~ 53°C, the charge current will be reduced. Product charge or discharge power depends on the actual temperature of the battery cell.
4. The battery can only be discharged and can not be charged when the battery cell's temperature range is between -20°C and 0°C.
5. Test conditions: 25°C .100 %, depth of discharge (DoD), 0.2C charge & discharge.

Fuse Parameter

| Component Type | Assembled fuse |
|---------------------------|----------------|
| Fuse Type | EV / HEV |
| Rated Voltage (Vdc & Vac) | 750 |
| Rated Current (A) | 80 |

14 Appendix

14.1 CT/Meter Connection Scenarios

X1-IES inverter series can be connected to a CT, a direct-connected meter, or a CT-connected meter. It also supports a Meter 2 function for you to monitor another power generation equipment at home.

Followings are the detailed wiring and setting procedures of these scenarios. For wiring procedure of the inverter CT/Meter port, see "[7.3.5.2 CT/Meter Connection \(CT/Meter Port\)](#)".

14.1.1 Connection of CT

NOTICE!

- Do not place the CT on the N wire or ground wire.
- Do not place CT on the N line and L line at the same time.
- Do not place the CT on non-insulated wires.
- The cable length between CT and inverter should not exceed 100 meters.
- After CT is connected, prevent the CT clip from falling off. It is recommended to wrap the CT clip around in circles with insulating tape.

NOTICE!

- The CT referred to in this section is the CT delivered with the inverter.

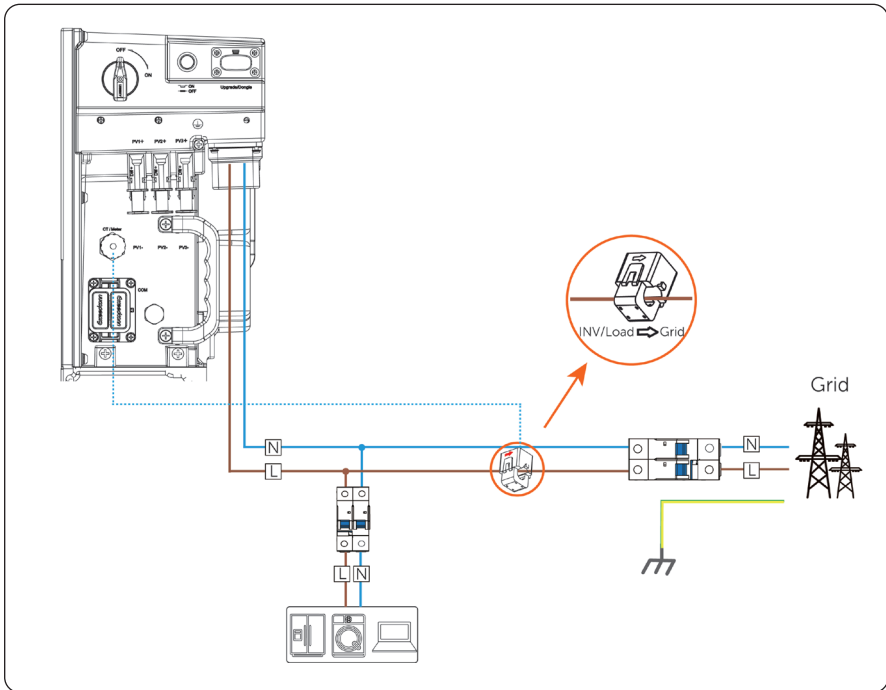


Figure 14-1 System wiring with CT

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

*The emergency load is connected to the EPS terminal of the inverter, which is not shown in the diagram.

Wiring Procedure

Step 1: Clip the CT to the L cable of the grid.

Make sure the arrow on the CT is pointing to the grid side from the inverter.

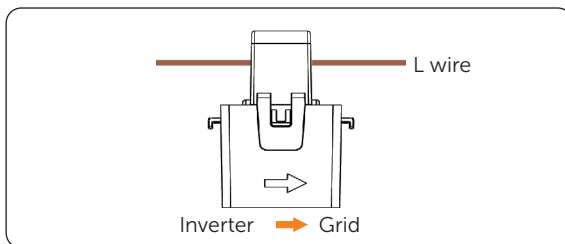


Figure 14-2 Clipping CT to grid cables

Step 2: Use the RJ45 coupler to connect the extension communication cable and the CT.

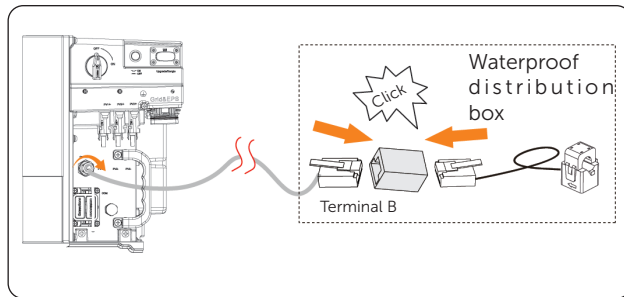


Figure 14-3 Connecting the inverter to the CT

Setting Procedure

After connecting CT to the inverter, you need to enable it on the inverter before it can be used.

Select **Advance Settings > Meter/CT Setting**, and then select **CT**.

You can check the CT connection status in **Meter/CT Check**. For details, see "[Setting Meter/CT Check](#)".

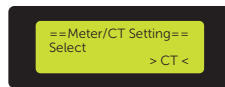


Figure 14-4 Setting CT for the inverter

14.1.2 Connection of Direct-connected Meter

NOTICE!

- SolaX DDSU666 is used for example.

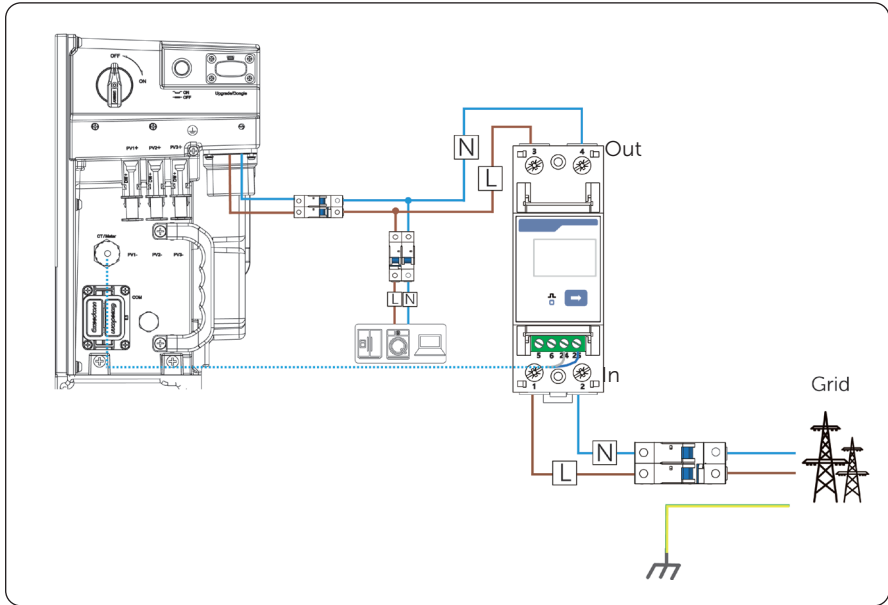


Figure 14-3 System wiring with SolaX DDSU666

*Terminal 1 and 2 of the meter must be connected to the grid side, and terminal 3 and 4 be connected to the inverter side of the system. Otherwise, the system power data might be misread.

*The emergency load is connected to the EPS terminal of the inverter, which is not shown in the diagram.

Meter Terminal Definition

Table 14-1 Terminal definition of DDSU666

| Terminal No. | Definition | Description |
|--------------|------------|--|
| 1, 3 | UL | Voltage input and output terminal, connected to the L wire |
| 2, 4 | UN | Phase N voltage input and output terminal, connected to the N wire |
| 24 | RS485A | RS485 terminal A |
| 25 | RS485B | RS485 terminal B |

Wiring Procedure

Step 1: Strip around 10 mm wire insulation off the L and N cables, and then connect the L wire to terminal 1 and 3, and the N wire to terminal 2 and 4 in sequence.

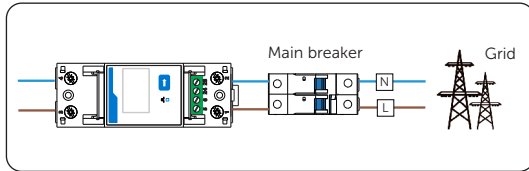


Figure 14-5 Connecting DDSU666 to the grid

Step 2: Strip 15 mm wire insulation off the other end of the communication cable.

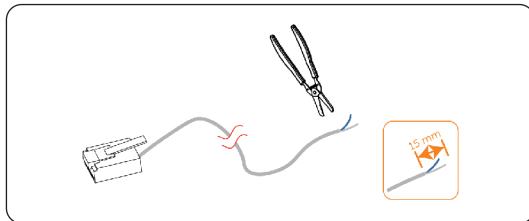


Figure 14-6 Stripping communication cable for meter

Step 3: Connect the conductors to terminal 24 and 25 of the meter.

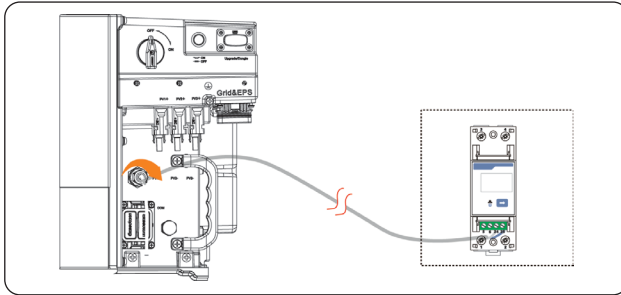


Figure 14-7 Connecting inverter to DDSU666

Setting Procedure

After connecting meter to the inverter, you need to enable it on the inverter before it can be used.

Select **Advance Settings > Meter/CT Setting**, and then select **Meter**.

You can check the meter connection status in **Meter/CT Check**. For details, see [Meter/CT Check](#).

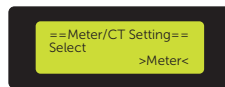


Figure 14-8 Setting meter for the inverter (1)

14.1.3 Connection of CT-connected Meter

NOTICE!

- SolaX DDSU666-CT is used for example.
- The CT referred to in this section is the CT delivered with DDSU666-CT.

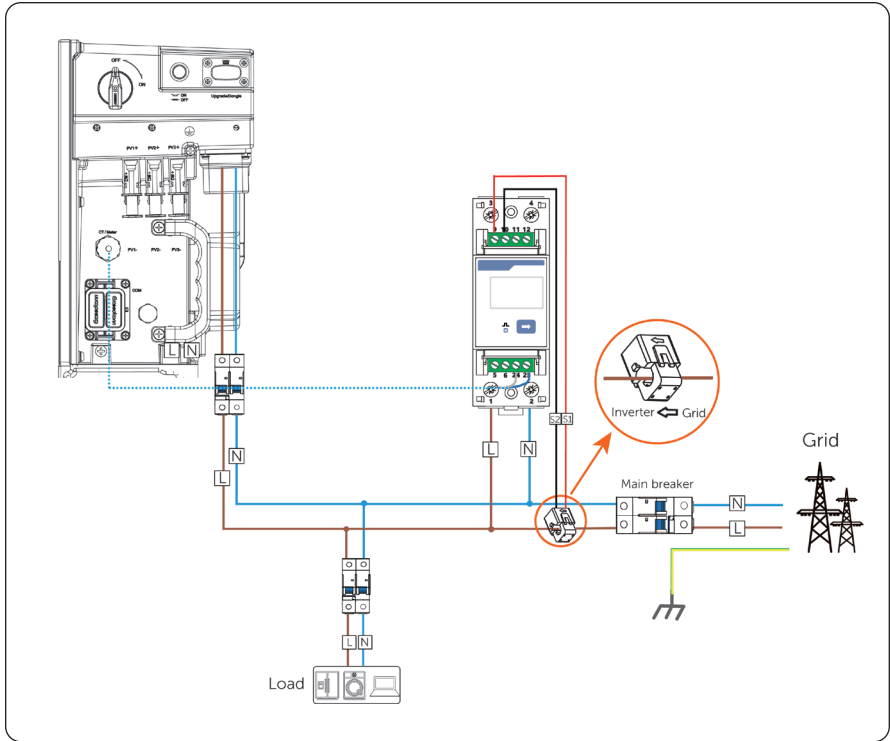


Figure 14-9 System wiring with SolaX DDSU666-CT

*The arrow on the CT must point at the inverter side.

*Terminal 1 and 2 of the meter must be connected to the grid side. Terminal 9 must be connected to the S1 wire of the CT, and terminal 10 be connected to the S2 wire of the CT. Otherwise, the system power data might be misread.

*The emergency load is connected to the EPS terminal of the inverter, which is not shown in the diagram.

Meter Terminal Definition

Table 14-2 Terminal definition of SolaX DDSU666-CT

| Terminal No. | Definition | Description |
|--------------|------------|---|
| 1 | UL | Voltage input terminal, connected to the L wire |
| 2 | UN | Phase N voltage input terminal, connected to the N wire |
| 9 | I* | Current input terminal, connected to S1 wire of CT |
| 10 | I | Current output terminal, connected to S2 wire of CT |
| 24 | RS485A | RS485 terminal A |
| 25 | RS485B | RS485 terminal B |

Wiring Procedure

- Step 1:** Strip around 10 mm wire insulation off the L and N cables, and then connect L and N wires respectively to terminal 1 and 2 of the meter.
- Step 2:** Clip the CT onto the L wire in the direction from grid to inverter.
- Step 3:** Connect S1 wire of the CT to terminal 9, and S2 wire of the CT to terminal 10.

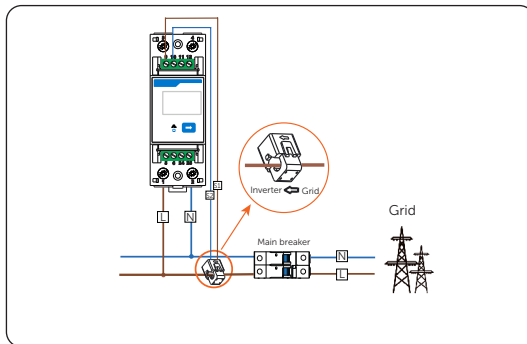


Figure 14-10 Connecting DDSU666-CT to the grid

Step 4: Strip 15 mm wire insulation off the other end of the communication cable.

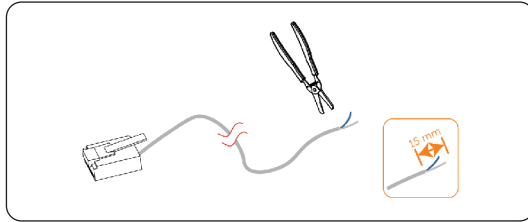


Figure 14-11 Stripping communication cable for meter

Step 5: Connect the conductors to terminal 24 and 25 of the meter.

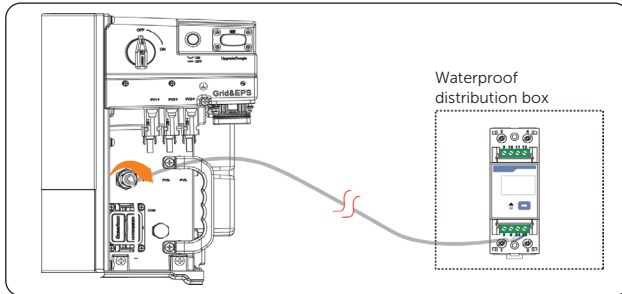


Figure 14-12 Connecting inverter to meter

Setting Procedure

After connecting meter to the inverter, you need to enable it on the inverter before it can be used.

Select **Advance Settings > Meter/CT Setting**, and then select **Meter**.

You can check the meter connection status in **Meter/CT Check**. For details, see [Meter/CT Check](#).

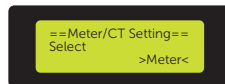


Figure 14-13 Setting meter for the inverter (2)

14.1.4 Connection of Two Meters

If you have another power generation equipment (such as an inverter) at home and wants to monitor both equipment, our inverter provides a Meter 2 Communication function to monitor the other power generation equipment.

NOTICE!

- For connecting CT and meter, or connecting two meters, prepare an RJ45 splitter adapter and a proper waterproof enclosure for it in advance.
- For X1-IES inverter series, Meter 1 and meter 2 can both be CT, direct-connected meter and CT-connected meter. The following diagrams use double CTs and double direct-connected meters for example.

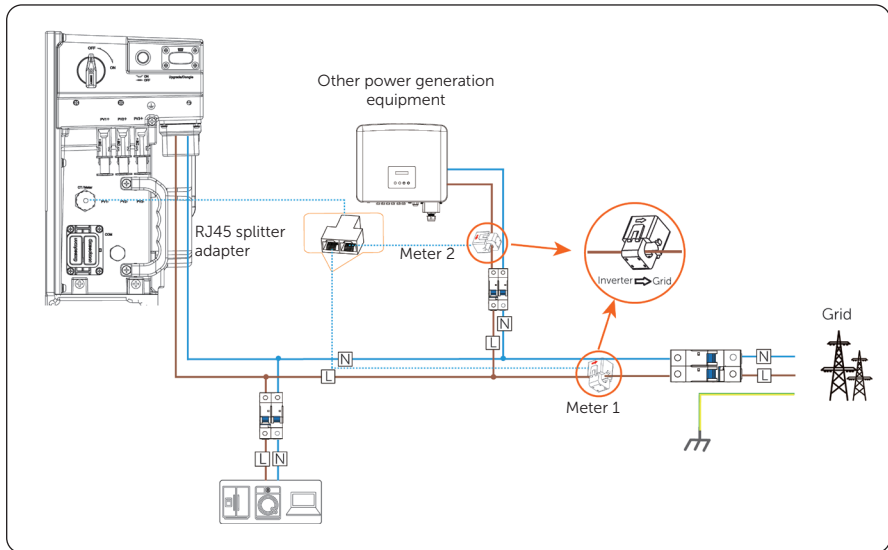


Figure 14-14 Connecting to double CTs

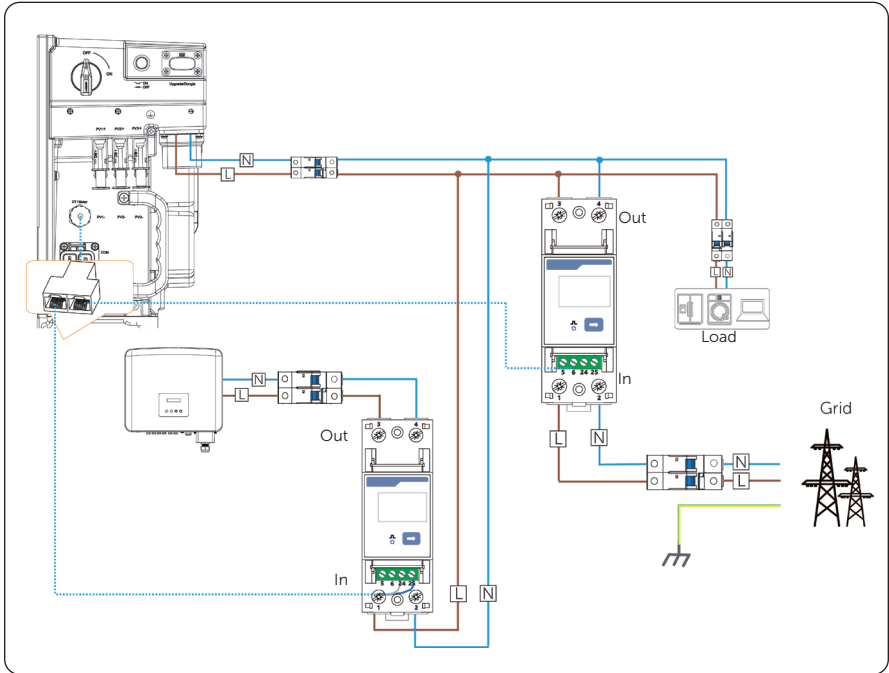


Figure 14-15 Connecting to double direct-connected meters

Wiring Procedure

Step 1: Follow the above steps to connect the meter, CT and inverter.

Step 2: Connect the RJ45 terminals to the RJ45 splitter adapter.

Setting Procedure

After connecting the CT and meter to the inverter, you need to set parameters on the inverter LCD before they can work normally for the system.

Step 1: Select **Advance Settings > Meter/CT Setting**.

Step 2: Set the Meter/CT:

- » Case 1: Double CTs are connected respectively to the position of Meter 1 and Meter 2. In this case, you only need to select CT, and the inverter will identify the CTs automatically.

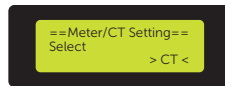


Figure 14-16 Setting CT for the inverter

- » Case 2: CT and Meter 2 are connected (CT for SolaX inverter, Meter 2 for another power generation equipment). CT is set by default. Check whether the address and direction of Meter2 are set based on actual connection.

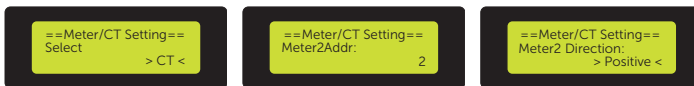


Figure 14-17 Selecting CT and set Meter2 data

- » Case 3: Meter 1 and Meter 2 are connected (Meter 1 for SolaX inverter, Meter 2 for another power generation equipment). Select **Meter** and enable the Meter function. Check whether the address and direction of Meter 1 and Meter 2 are set based on actual connection.

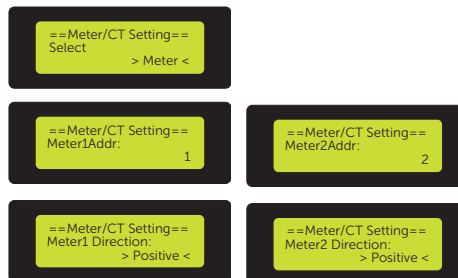


Figure 14-18 Selecting meter and set Meter 1 and Meter 2 data

Related Operation

Setting Meter/CT Check

- **Installation Check:** It is for checking whether the meter/CT has been correctly connected. It is vital to the normal function of the whole system. Therefore, we recommend performing installation check after connecting the meter/CT.

Select **Meter/CT Setting > Meter/CT Check**, and then enable **Installation Check**.

The system will perform meter/CT check immediately after you enable it, and then automatically restores to the disabled status after the check completes.



- **Cyclic Check:** It is for periodically checking whether the meter/CT is in good condition when the inverter is running.

Select **Meter/CT Setting > Meter/CT Check**, and then enable **Cyclic Check**.

Once Cyclic Check is enabled, the system will check the meter/CT status periodically based on the defined cycle.



Figure 14-19 Checking CT/Meter status

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