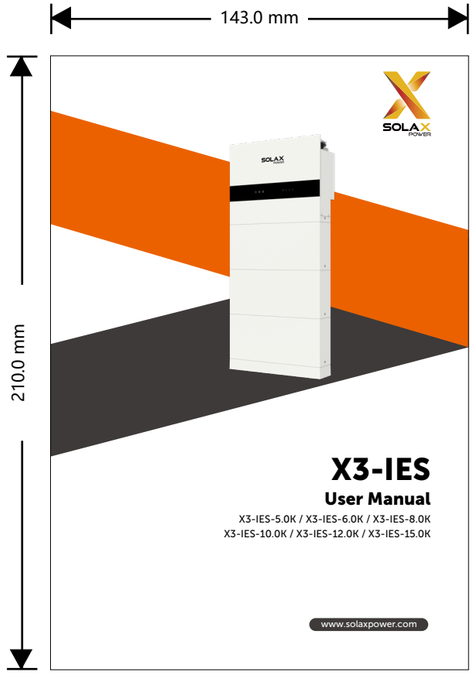
REV.	Description	REV.	Description
0.0	首次发行 熊小翠 2023/09/25		
1.0	5/10/15 kW 功率段下 Rated AC output apparent power 和 Max. AC output apparent power 增加澳洲认证参数 熊小翠 2023/10/24		

描述	说明书 X3-IES 系列 英文版 SolaX 01 版		
料号	320101071601		
单位	mm	页次	

浙江艾罗网络能源技术股份有限公司
SolaX Power Network Technology (Zhejiang) Co., Ltd.



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2. 装订方式：胶装或骑马钉，内页大于 60 页时须胶装；
3. 未注尺寸公差按 ±1.5 mm；
4. 图面、字体印刷清晰、无偏移、无毛边、不起边、油墨不脱落；
5. 黑色字体颜色为 PANTONE BLACK C, 无边框，底色为白色；
6. 符合 ROHS 要求。

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		审核	王克柔 2023/10/24
材料	双胶纸	核准	施鑫淼 2023/10/24
料号	320101071601	浙江艾罗网络能源技术股份有限公司	
单位	mm 页次		



X3-IES

User Manual

X3-IES-5.0K / X3-IES-6.0K / X3-IES-8.0K

X3-IES-10.0K / X3-IES-12.0K / X3-IES-15.0K

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About This Manual

Scope of Validity

This manual is an integral part of X3-IES system. It describes the installation, electrical connection, commissioning, maintenance and troubleshooting of the product. Please read it carefully before operating.

This X3-IES system includes a X3-IES series inverter and a T-BAT-SYS-HV-S50E.

X3-IES series inverter model list:

X3-IES-5K	X3-IES-6K
X3-IES-8K	X3-IES-10K
X3-IES-12K	X3-IES-15K

Components of T-BAT-SYS-HV-S50E:

BMS	Battery Module
TBMS-MCS0800E	TP-HS50E

Note:

"X3-IES system" is the name of three-phase residential energy storage system.

"X3-IES series inverter" (hereafter referred to as an "inverter") refers to the energy storage inverter that supports photovoltaic grid-connected.

“5K"means the rated output power is 5kW.

"T-BAT-SYS-HV-S50E” (hereafter referred to as an "T-BAT-SYS") is the name of battery system. lt includes a TBMS-MCS0800E, a TP-HS50E (s), a base (s), a cover and a series box.

"TBMS-MCS0800E" (hereafter referred to as an "BMS") is an electronic system manages a rechargeable battery.

"TP-HS50E" (hereafter referred to as an "battery module(s)") is a type of electrical battery which can charge or discharge loads.

"Base" is an accsssory of the battery system. lt is installed under the battery module (s).

"Cover" is an accessory of the battery system. lt is installed on the top battery module of the expansion battery tower.

"Series box" is designed to connect the second tower in series through BMS wiring.

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 00 (2023-09-25)

Initial release

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1 Safety

1.1 General Safety

The X3-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 inverter 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 inverter. 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:

- Devices damage caused by force majeure events, such as earthquakes, floods, thunderstorms, lightning, fire hazards, volcanic eruptions, and similar events.
- Devices damage due to human cause.
- Usage or operation of the devices 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 devices in unsuitable environmental or electrical conditions.
- Unauthorized modifications to the product or software.
- Devices damage occurring during transportation by the customer.
- Failure to adequately maintain the equipment. An on-site inspection should be carried out by a qualified technician after 120 months of continuous use. If more than 120 months have been passed since the date of commissioning, or the user cannot prove that the equipment has been adequately maintained
- 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.
- A cement wall is required for the installation of X3-IES system. When the wall mounting is selected, please ensure that the thickness of any section of the wall should be greater than 150 mm. When the floor mounting is selected, the wall thickness of should be larger than 100 mm.

1.2 Safety Instructions of PV, Inverter, Grid and Battery

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

1.2.1 Safety Instructions of PV

DANGER!

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

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

DANGER!

- Overvoltage protection with surge arresters should be provided when the PV power system is installed. The grid connected inverter is fitted with SPDs on both PV input side and MAINS side.
- Please consult professionals before installing SPDs.

WARNING!

- Make sure that the input DC voltage does not exceed the maximum DC input voltage specified for the inverter. Overvoltage can cause irreversible damage to the inverter, and such damage is not covered by the warranty.

1.2.2 Safety Instructions of Inverter

DANGER!

Potential risk of lethal electrical shock associated with the inverter

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

WARNING!

- 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!

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

CAUTION!

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

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

1.2.3 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

- DON'T expose the battery module to an open flame, or the temperature in excess of 140°F/60°C;
- DON'T store or install the battery module in direct sunlight;
- DON'T install or operate the battery module in places where there is excessive moisture or liquids;
- DON'T place the battery module in a high-voltage environment;
- DON'T disconnect, disassemble or repair the device by unqualified personnel.

Only a qualified personnel is allowed to handle, install and repair the device;

- DON'T damage the device by dropping, deforming, impacting, cutting or penetrating with a sharp object. Otherwise, it may cause a fire or leakage of electrolytes;
- DON'T touch the device if liquid spill on it. There is a risk of electric shock;
- DON'T step on the packaging or the device may be damaged;
- DON'T place any objects on top of the battery module;
- DON'T charge or discharge a damaged battery module;
- DON'T dispose of the battery module in a fire. It may cause leakage or rupture;
- DON'T 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 DON'T touch anything; If the battery module gets wet, DON'T touch it.
- If the battery module is damaged, DON'T use it. Otherwise, it may result in both personal injury and property damage.
- DON'T use the submerged battery module again, and contact the qualified personnel 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, and always 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, and please keep away the battery.
- Damaged batteries may leak electrolyte or produce flammable gas. If users suspect that the battery is damaged, please immediately contact SolaX for advice and information.
- All operations of T-BAT SYS 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

DANGER!

- 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, a two-phase surge protection device is needed between DC cable of inverter and photovoltaic equipment module.

In order to protect the AC system, a two-phase surge protection device 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 inverter's 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.

DANGER!

- 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

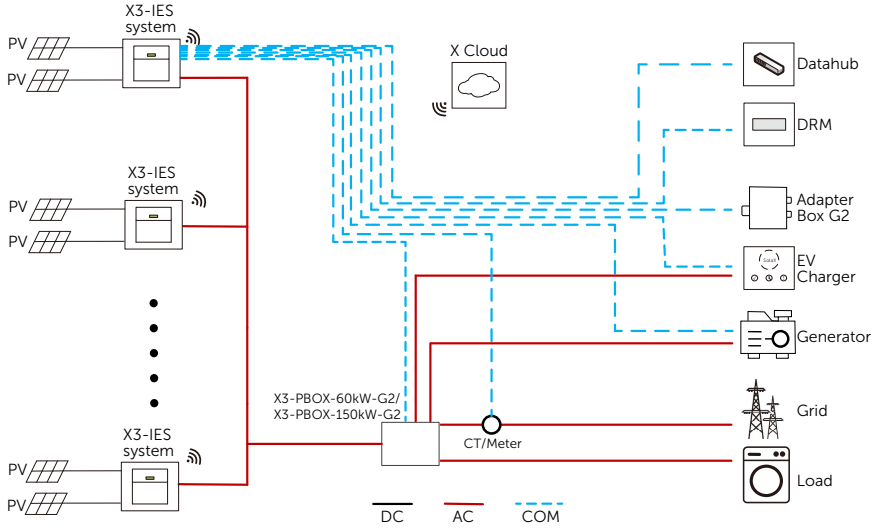


Figure 2-1 System overview diagram

X3-IES System

X3-IES series residential energy storage system integrates the inverter and a T-BAT-SYS into one.

Inverter

The X3-IES series inverter is a transformerless three-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 communicates with inverter via BMS and must comply with the specification of regulations.

PV Array

The PV array works in MPPT mode. For 5.0 kW and 6.0 kW inverter, the number of PV string is two. For 8.0 kW, 10.0 kW, 12.0 kW and 15.0 kW inverter, the number of PV string is three.

CT/ Meter

A CT or meter is used for detecting the input and output current on the grid side.

Grid

380V / 400V grid are supported.

SolaX Cloud

SolaX Cloud is an intelligent, multifunctional monitoring platform that can be accessed via wired or wireless connections. With the SolaX Cloud, the operators and installers can always 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 dry contact function, which can realize heat pump integrated photovoltaic inverter energy system management.

Datahub

SolaX DataHub is a device for monitoring platforms of photovoltaic power generation systems, which enables data detection, 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.

Generator

A generator is a device which can be matched with X3-IES system to supply energy in places where there are frequent power outages.

X3-PBOX-60kW-G2/ X3-PBOX-150kW-G2

SolaX X3-PBOX-60kW/ 150kW-G2 is a changeover device used for parallel connection of multiple SolaX three-phase hybrid inverters within a single system, which facilitates the delivery of a larger, steady output power to important loads in both on-grid and off-grid conditions. The X3-PBOX-60kW-G2 can connect up to 6 inverters in one system, while up to 10 inverters can be connected with the X3-PBOX-150kW-G2 in one 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:

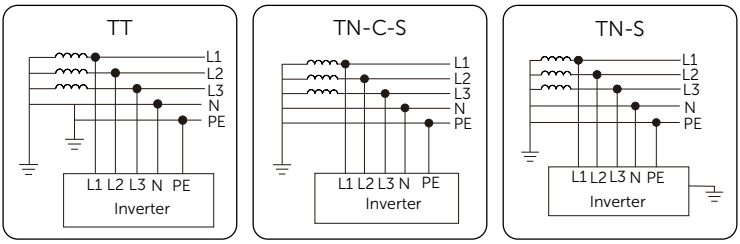


Figure 2-2 Supported power grid

* Note: Please confirm with our SolaX after-sales team whether other grid systems are applicable.

2.3 Appearance

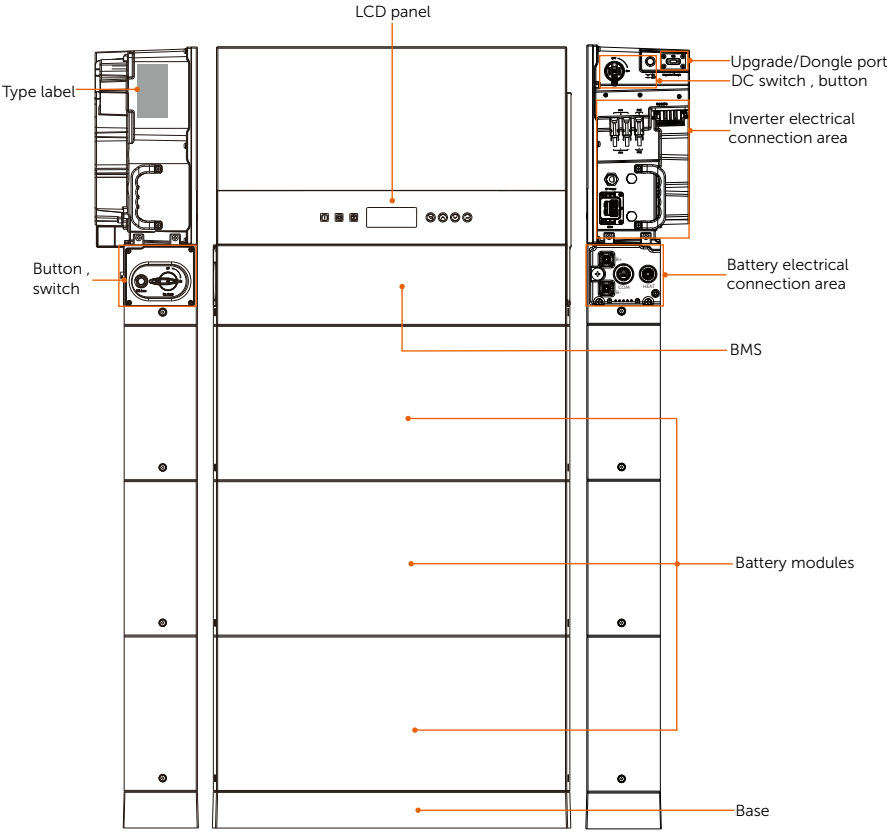


Figure 2-3 Appearance

Table 2-1 Desciption of appearance

Item	Description
Type label	Type label clearly identifies the device type, serial number, specific DC/AC parameters, certification, etc.
Button, switch	Power on or off the battery system. Please refer to "Figure 2-5 BMS" for details.
LCD panel	Including screen, indicators and keys. Screen displays the information; indicators indicates the operating status of inverter. Keys is used to perfom the parameter setting.

Item	Description
Upgrade/ Dongle	USB port for upgrading and communication module connection. Communication module includes a WiFi/ LAN (optional)/4G (optional) dongle.
DC switch	Disconnect the PV input when necessary.
Button	Power on or off the inverter system.
Inverter electrical connection area	Including PV terminals, battery terminals, AC terminals, communication terminals, etc.
Battery electrical connection area	Including B+/B- ports, communication port, heat port, grounding port. Please refer to "Figure 2-5 BMS" for details.

2.3.1 Dimensions

Inverter Dimensions

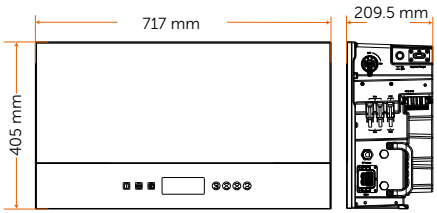


Figure 2-4 Inverter

Battery Dimensions

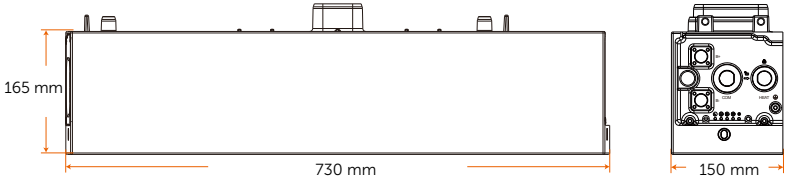


Figure 2-5 BMS

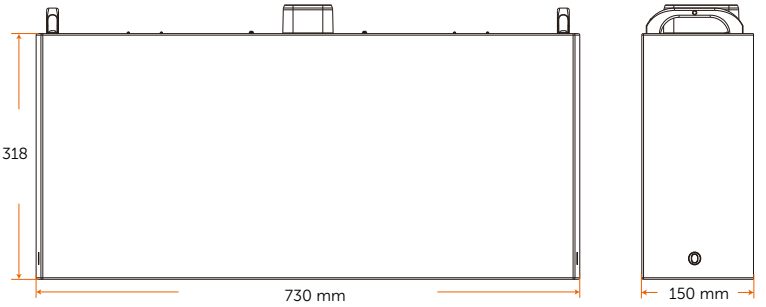


Figure 2-6 Battery module

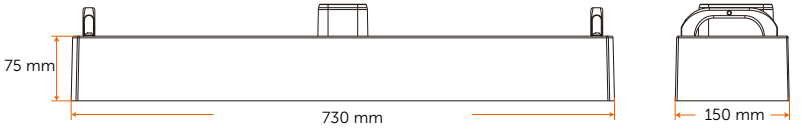


Figure 2-7 Base

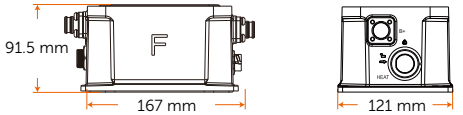


Figure 2-8 Series box

2.3.2 Control Panel and Indicators

Inverter control panel

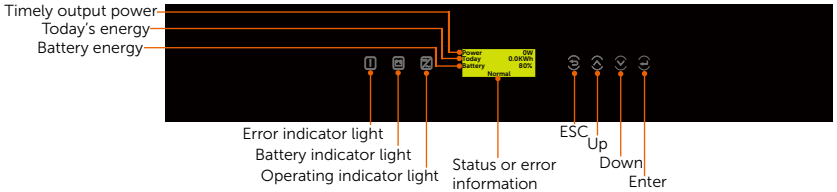


Figure 2-9 Control Panel

* The LCD screen in the whole passage is subject to the actual screen.

- 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" in the user manual.

Table 2-2 Definition of indicators

LED indicator	Status		Definition
Operating	●	Solid blue	The inverter is in a normal state.
	◔	Blue blinking	The inverter is in a waiting state.
	○	Light off	The inverter is in a fault status.
Error	●	Solid red	The inverter is in a fault state.
	○	Light off	The inverter is in a normal state.
Battery	●	Solid green	The battery communication is in a normal state.
	◔	Green blinking	The battery communication is in an idle state.
	○	Light off	The battery is in a fault state.

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

Battery indicators

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

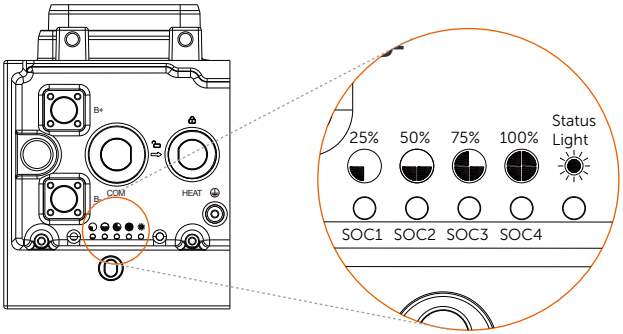


Figure 2-10 Indicators

Table 2-4 Definition of indicators

Status	Description
Startup	Press and hold the BAT BUTTON for about 1 to 2 seconds to activate the system, at this point, the status light flashes a yellow light every 0.1 seconds until finishing self test, of which the period lasts about 3 to 4 seconds. Then the status light flashes green light every 0.5 seconds after finishing self test. During the whole period, all the SoC power indicators were off. After successful communication to the inverter, the status light turns solid green light, and SoC power indicators come on 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 "Figure 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 "Figure 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 "Figure 2-7 Indicators information while reporting errors".

Status	Description
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 "Black Start".

Table 2-5 Indicator information while charging

SoC value	Status light	SoC1	SoC2	SoC3	SoC4
0% ≤ SoC < 25%	Green	Flash	Light off	Light off	Light off
SoC < 50%	Green	Light on	Flash	Light off	Light off
SoC < 75%	Green	Light on	Light on	Flash	Light off
SoC < 100%	Green	Light on	Light on	Light on	Flash
SoC ≥ 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
SoC ≥ 75%	Green	Flash	Flash	Flash	Flash
SoC ≥ 50%	Green	Flash	Flash	Flash	Light off
SoC ≥ 25%	Green	Flash	Flash	Light off	Light off
SoC ≥ 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

Fault	SoC1	SoC2	SoC3	SoC4
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 panel 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 of Devices of X3-IES System

Ports of Inverter

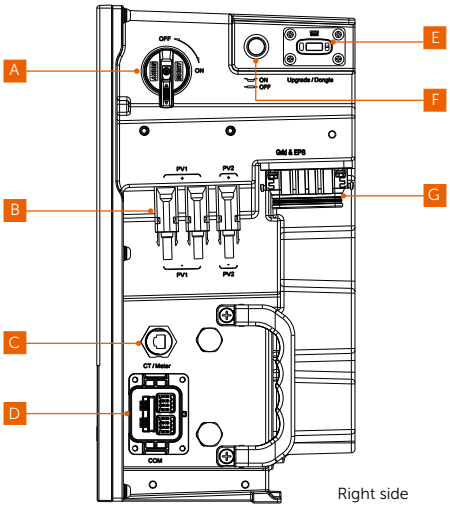


Figure 2-11 Ports of an inverter

Table 2-8 Description of ports

Item	Description
A	DC switch: Turn on or turn off to connect or disconnect the PV input
B	PV connection port: Connect PV cables
C	CT/ Meter port: Connect a CT or a meter
D	COM port: Connect communication cables
E	USB port for upgrading and communication module connection Communication module includes WiFi, LAN (optional), 4G (optional) dongle
F	System button: Press to turn on or turn off the inverter system
G	Grid & EPS port: Connect Grid and EPS cables

Ports of Battery (T-BAT-SYS)

- BMS

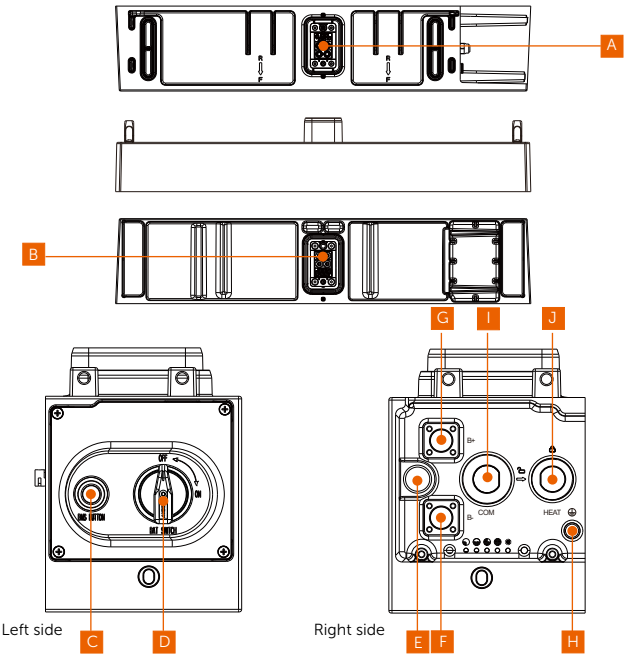


Figure 2-12 Ports of a BMS

Table 2-9 Description of ports

Item	Description
A	The hot-plug interface connected to the inverter
B	The hot-plug interface connected to the battery module
C	BAT BUTTON: Start system
D	BAT SWITCH: A switch for battery's input and output
E	"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

- DIP Switch

A DIP Switch is equipped on the BMS.

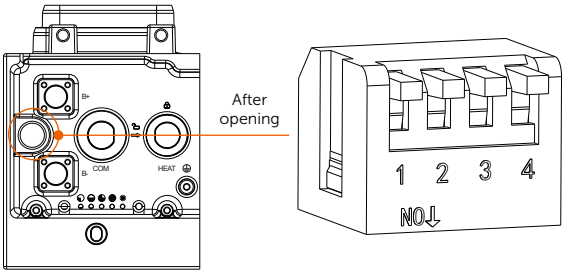


Figure 2-13 DIP switch

Table 2-9 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 themselves.

- Battery module

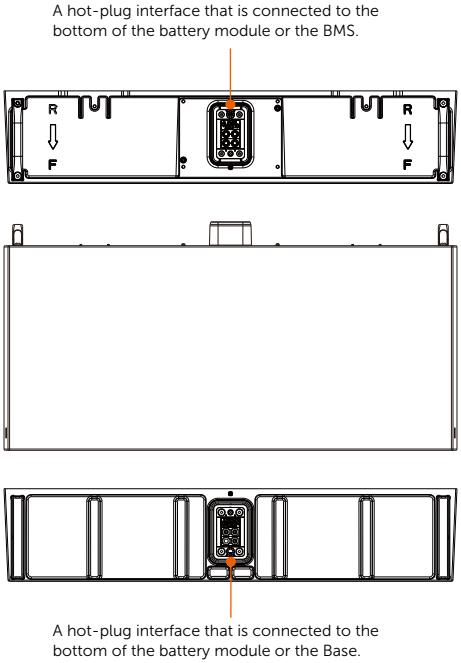


Figure 2-14 Ports of a battery module

- Base

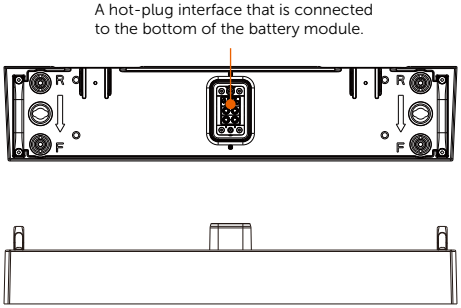


Figure 2-15 Ports of a base

- Series box

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

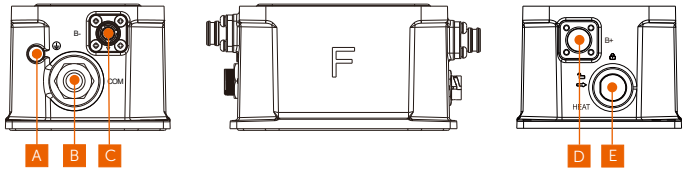


Figure 2-16 Ports of a series box

Table 2-10 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 and Devices of X3-IES System

Table 2-11 Description of symbols

Symbol	Description
	CE mark. The inverter complies with the requirementsof the applicable CE guidelines.
	TUV certified.
	UKCA mark. The inverter complies with the requirements of the applicable UKCA guidelines.
	RCM mark. The inverter complies with the requirementsof the applicable RCM guidelines.
	Additional grounding point
	Beware of hot surface. The inverter can become hot during operation. Avoid contact during operatior.
	Danger of high voltages. Danger to life due to high voltages in the inverter!
	Danger. Risk of electric shock!
	The battery module may explode.
	Keep the battery system away from open flames or ignition systems.
	Keep the battery system away from children.
	Observe enclosed documentation.
	The inverter and battery modules can not be disposed together with the household waste. Disposal information can be found in the enclosed documentation.

Symbol	Description
	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.
	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. Residual voltage exists after the inverter is powered off, which needs 5 minutes to fully discharge. Wait 5 minutes before attempting any service.

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 "9.7 Settings" to set 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.

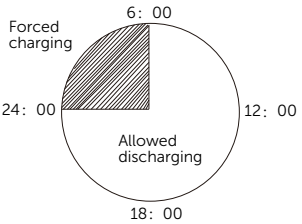


Figure 2-17 Figure 2-17 Time period

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.

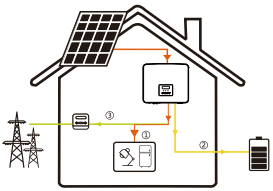
- Forced Charging Period

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

- Allowed Charging 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.

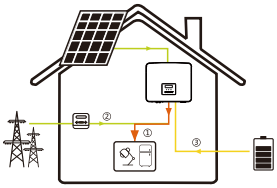


Self Use

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

Priority: Loads > Battery > Grid

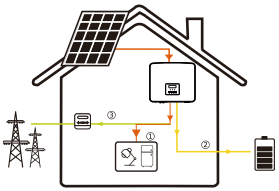


Feed-in Priority

The feed-in priority mode is suitable for areas with high feed-in subsidies, but has feed-in power limitation.

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.

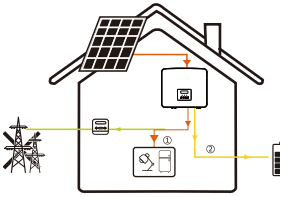
This mode will maintain the battery capacity at relatively high level, to ensure that the emergency loads can be used when the grid is off. Same working logic with "Self-use" mode.

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 charge 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 battery self consumption, sometimes SoC may < min SoC.

For on-grid status, if the battery SoC ≤ (min SoC-5%), the inverter will take utility energy to charge battery SoC back to (min SoC+1%).

For off-grid status, if the battery SoC ≤min SoC, the inverter will be unable to enter EPS mode (the battery will be unable to discharge unless SoC is back to 31%.)

Peak shaving mode

Peak shaving mode is set for leveling out peaks in electricity use. System is controlled to charge up during off-peak hours and discharged during peak hours.

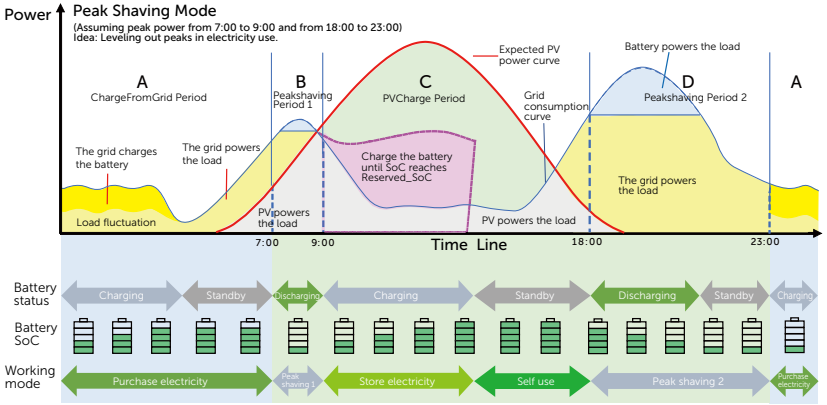


Figure 2-18 Peak shaving time periods

Table 2-12 Descripton of peak shaving mode

Time period	Battery SOC	Load and peaklimits conditions	Inverter working status
Period A	X	X	Battery charging period during which discharging is not allowed and the PV will charge the battery first for peak shaving.
Period B and D	X	Load < Peaklimits	The PV will charge the battery first. When the battery is fully charged, the PV will supply power for loads, and the surplus power will feed into the grid.
	X	Load > Peaklimits	The PV and battery will discharge energy for loads and thus reduce the amount of energy purchased from the grid.
Period C	X	X	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 these periods is storing energy for the peak shaving.

Note:

PeakLimits (W): The load consumption from grid side

Reserved SOC (%): Refers to the lower limit of SoC required for later peak shaving period. The default value is 50%. The adjustment range is 10~100%.

X: Not applicable

Schedule Mode

In the Schedule mode, different working modes, i.e Self-use, Feed-in Priority, Peaking shaving, Charging and Discharging can be set for different time periods in accordance with actual needs and environment conditions through SolaX Cloud App or Web. The day is divided into 24 time slots, each representing one hour. 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 Schedule mode.

Table 2-13 Descripton of schedule mode

Time Slot	Working Mode
0:00~1:00	Choose one mode from Self-use / Feed-in Priority / Peaking shaving / Charging / Discharging
1:00~2:00	Choose one mode from Self-use / Feed-in Priority / Peaking shaving / Charging / Discharging
2:00~3:00	Choose one mode from Self-use / Feed-in Priority / Peaking shaving / Charging / Discharging
3:00~4:00	Choose one mode from Self-use / Feed-in Priority / Peaking shaving / Charging / Discharging
4:00~5:00	Choose one mode from Self-use / Feed-in Priority / Peaking shaving / Charging / Discharging
5:00~6:00	Choose one mode from Self-use / Feed-in Priority / Peaking shaving / Charging / Discharging
6:00~7:00	Choose one mode from Self-use / Feed-in Priority / Peaking shaving / Charging / Discharging
7:00~8:00	Choose one mode from Self-use / Feed-in Priority / Peaking shaving / Charging / Discharging
8:00~9:00	Choose one mode from Self-use / Feed-in Priority / Peaking shaving / Charging / Discharging
9:00~10:00	Choose one mode from Self-use / Feed-in Priority / Peaking shaving / Charging / Discharging
10:00~11:00	Choose one mode from Self-use / Feed-in Priority / Peaking shaving / Charging / Discharging
11:00~12:00	Choose one mode from Self-use / Feed-in Priority / Peaking shaving / Charging / Discharging
12:00~13:00	Choose one mode from Self-use / Feed-in Priority / Peaking shaving / Charging / Discharging
13:00~14:00	Choose one mode from Self-use / Feed-in Priority / Peaking shaving / Charging / Discharging

Time Slot	Working Mode
14:00~15:00	Choose one mode from Self-use / Feed-in Priority / Peaking shaving / Charging / Discharging
15:00~16:00	Choose one mode from Self-use / Feed-in Priority / Peaking shaving / Charging / Discharging
16:00~17:00	Choose one mode from Self-use / Feed-in Priority / Peaking shaving / Charging / Discharging
17:00~18:00	Choose one mode from Self-use / Feed-in Priority / Peaking shaving / Charging / Discharging
18:00~19:00	Choose one mode from Self-use / Feed-in Priority / Peaking shaving / Charging / Discharging
19:00~20:00	Choose one mode from Self-use / Feed-in Priority / Peaking shaving / Charging / Discharging
20:00~21:00	Choose one mode from Self-use / Feed-in Priority / Peaking shaving / Charging / Discharging
21:00~22:00	Choose one mode from Self-use / Feed-in Priority / Peaking shaving / Charging / Discharging
22:00~23:00	Choose one mode from Self-use / Feed-in Priority / Peaking shaving / Charging / Discharging
23:00~24:00	Choose one mode from Self-use / Feed-in Priority / Peaking shaving / Charging / Discharging

Note:

Self-use: Same working logic with "Self-use Mode", but it is not limited by the charging and discharging time slots.

Feed-in Priority: Same working logic with "Feed-in Priority, but it is not limited by the charging and discharging time slots.

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

Charging: If allowed by the battery, the system charges the battery from the grid with a specified power 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 Charging mode.

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.

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:

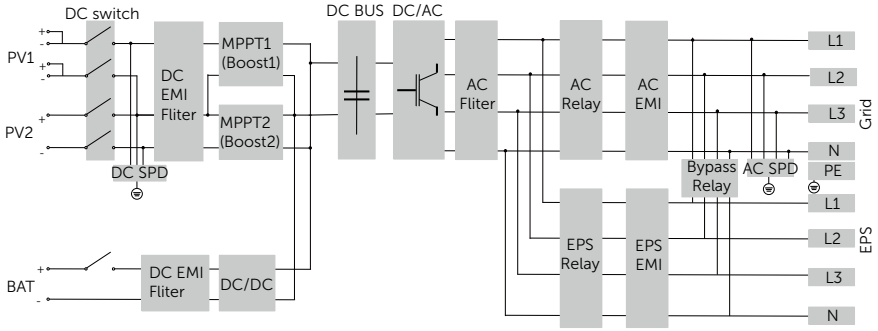


Figure 2-19 Circuit Diagram

System Diagram A (applicable to most countries)

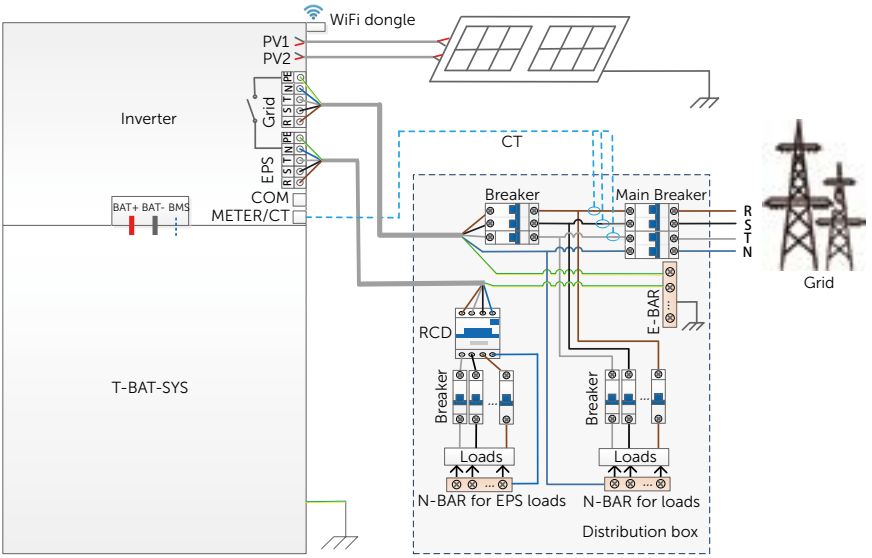


Figure 2-20 System diagram for most countries

System Diagram B (applicable to Australia)

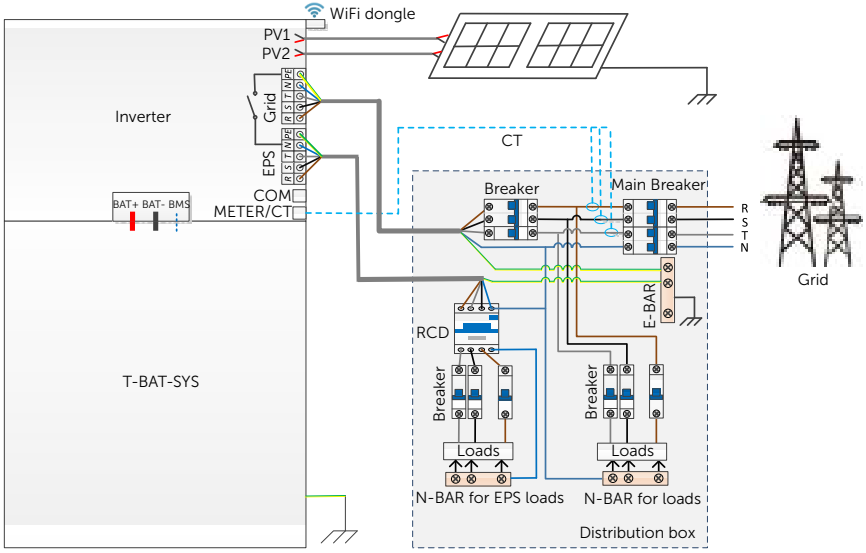


Figure 2-21 System diagram for Australia

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 power 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 the islanding effect, on-grid inverters are unable to work off-grid. This feature makes users lose the PV energy of on-grid inverters when off-grid. Micro-grid is a function that makes hybrid inverters simulate the grid to activate an on-grid inverter during off-grid. By connecting the on-grid inverter to the EPS port of the hybrid inverter, the hybrid inverter is able to use PV or battery energy to activate the on-grid inverter when utility is lost.

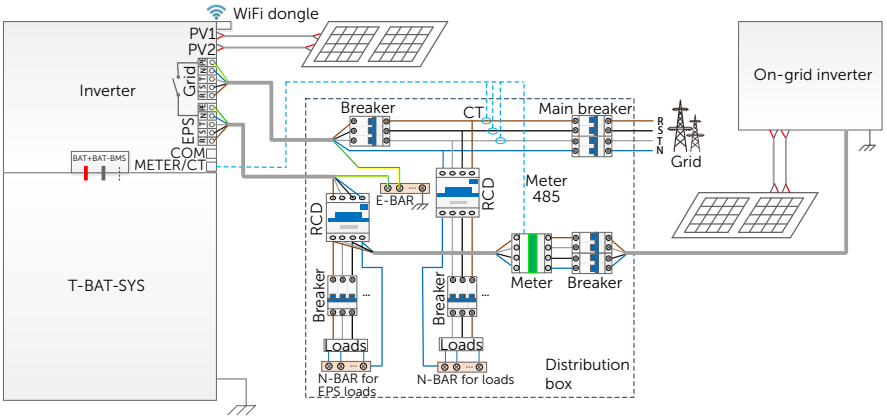


Figure 2-22 Micro grid system diagram

Compatibility

On-grid inverter: Any brand on-grid inverter that supports "frequency adaptation".

On-grid inverter outout power ≤ Max hybrid inverter EPS output power

On-grid inverter outout power ≤ Max battery charging power

Battery Quantity	2	3	4	5	6
On-grid inverter power upper limitation for HS50E	10.0kW	15.0kW	15.0kW	15.0kW	15.0kW

* The hybrid inverter is unable to control an on-grid inverter, therefore a hybrid inverter cannot achieve zero export to the grid when loads power + battery power < on-grid inverter output power.

3 Transportation and Storage

If the devices of X3-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 devices before transportation.
- Pay attention to the weight of the devices. Be cautious to avoid injury when carrying the devices. Two installers are recommended.
- Wear protective gloves when carrying the equipment by hand to prevent injuries.
- Lifting up the devices in accordance with the handling signs on the cartons.

Storage

- The inverter must be stored indoors.
- Do not remove the original packaging material and check the outer packaging material regularly.
- The storage temperature of the inverter should be between -40℃ and +65℃ . The humidity of the inverter should be between 5% and 65%.
- The required storage temperature of T-BAT-SYS: the service life may be up to 6 months in case the temperature is between -30°C and +50°C, or it may be up to 12 months in case the temperature is between -20°C and +30°C. The relative humidity should be between 5% and 95%. Stack the inverter and T-BAT-SYS in accordance with the caution signs on cartons of the devices to prevent their falling down and device damage. Do not place it upside down.
- If the T-BAT-SYS have been stored for more than 1 year, it must be checked and tested by professionals before use.

4 Preparation before Installation

4.1 Selection of Installation Location

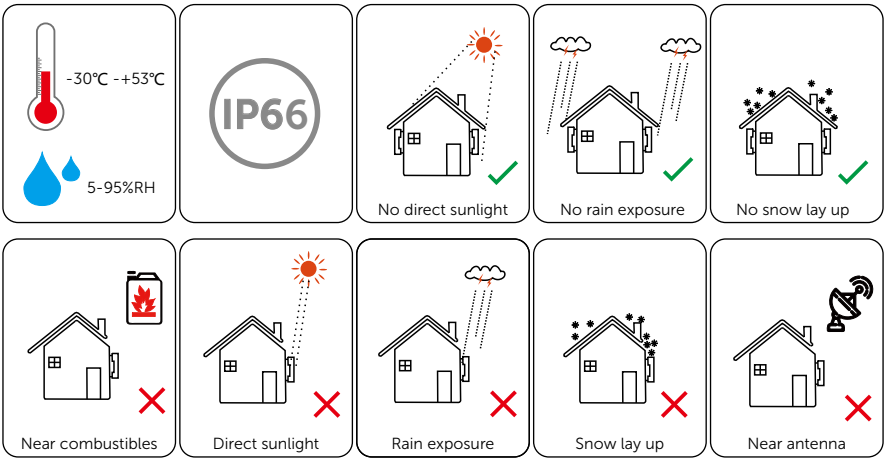
The installation location selected for the devices of X3-IES system is quite critical in the aspect of the guarantee of machine safety, service life and performance.

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

4.1.1 Environment Requirement

Make sure the installation site meets the following conditions:

- The operating temperature: -30℃ to +53℃ ;
- The humidity shall be between 5-95%;
- Do not install the devices in the areas where the altitude exceeds 3000 m;
- Install the devices in a well-ventilated environment for heat dissipation;
- Do not install the devices in areas with flammable, explosive and corrosive materials;
- Do not install the devices in areas near combustibles and antenna
- You are recommended to install an awning over it. Direct sunlight, rain exposure and snow laying up is not allowed.



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

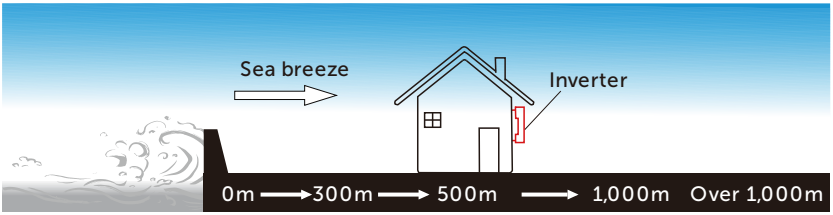


Figure 4-1 Recommended installation position

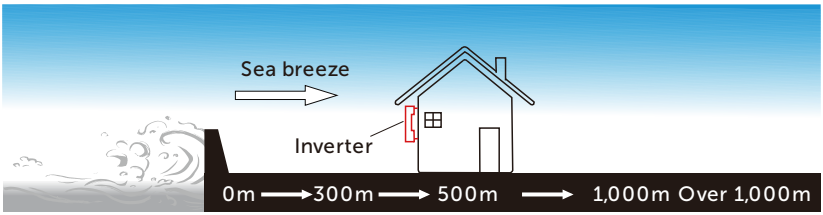


Figure 4-2 Incorrect installation position

4.1.2 Installation Options

NOTICE!

- X3-IES series inverter can match 2~6 battery modules. "Option A/ B/ C" is for one tower and "option D/ E/ F/ G" is for two towers.
- Generally, up to three battery modules in one tower are recommended. Four battery modules in one tower can be selected when installation space is limited.
- The following installation options apply to the modes of floor mounting and wall mounting.

There are 7 installation options available, with details as follows:

One Tower

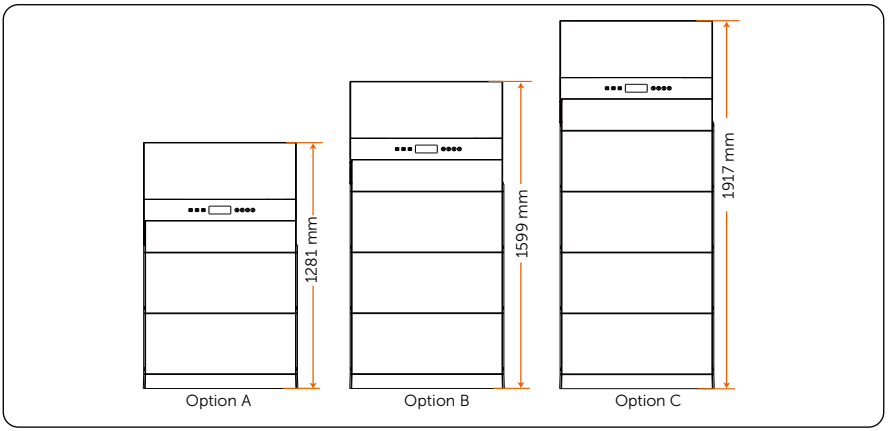


Figure 4-3 Installation options for one tower

Two Towers

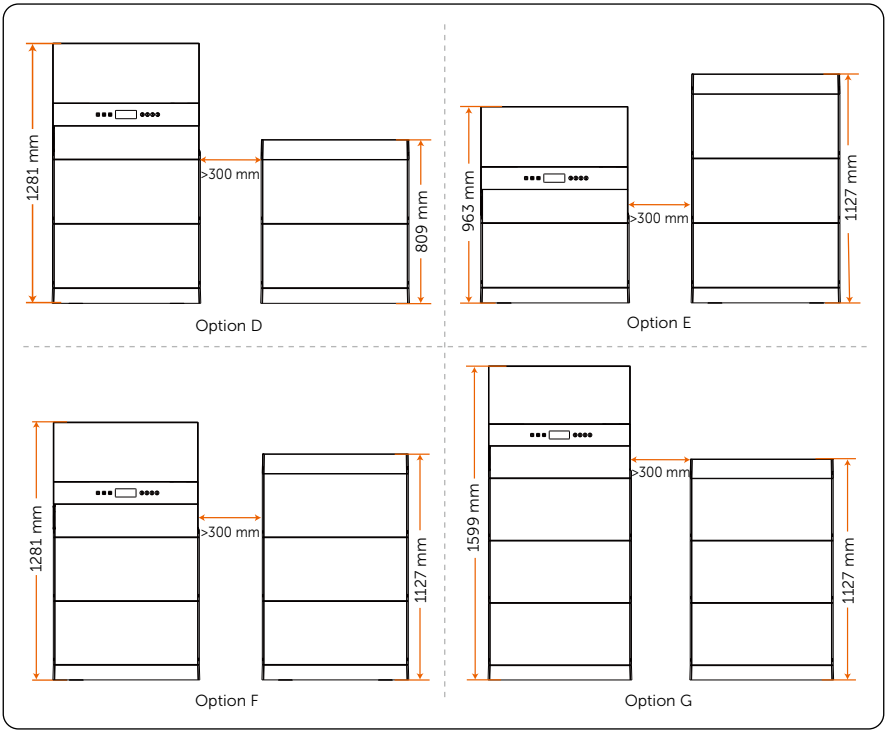


Figure 4-4 Installation options for two towers

Table 4-1 Net weight and dimensions of components

	Option A	Option B	Option C	Option D		Option E		Option F		Option G	
				Left tower	Right tower	Left tower	Right tower	Left tower	Right tower	Left tower	Right tower
Inverter	1	1	1	1	/	1	/	1	/	1	/
BMS	1	1	1	1	/	1	/	1	/	1	/
Battery module(s)	2	3	4	2	2	1	3	2	3	3	3
Base	1	1	1	1	1	1	1	1	1	1	1
Series box	/	/	/	/	1	/	1	/	1	/	1
Cover	/	/	/	/	1	/	1	/	1	/	1

* A base support (s) is (are) necessary if the wall mounting is selected for all installation options.

Net Weight and Dimensions of X3-IES system

- One Tower

Table 4-2 Net weight and dimensions of X3-IES system in one tower

	Option A	Option B	Option C
Net weight [kg]	144.2	191.2	238.2
Dimension [mm]	730 × 1281 × 209.5	730 × 1599 × 209.5	730 × 1917 × 209.5

- Two Towers

Table 4-3 Net weight and dimensions of X3-IES system in two towers

	Option D		Option E	
	Left Tower	Right Tower	Left Tower	Right Tower
Net weight [kg]	144.2	100.5	97.2	147.5
Dimensions [mm]	730 × 1281 × 209.5	730 × 809 × 150	730 × 963 × 209.5	730 × 1127 × 150

Figure 4-5

Table 4-4 Net weight and dimensions of X3-IES system in two towers

	Option F		Option G	
	Left Tower	Right Tower	Left Tower	Right Tower
Net weight [kg]	144.2	147.5	191.2	147.5
Dimensions [mm]	730 × 1281 × 209.5	730 × 1127 × 150	730 × 1599 × 209.5	730 × 1127 × 150

NOTICE!

- The maximum net weight of an inverter (37kg) is taken as an example.
- The net weight of inverters of different powers differs. Please check the specific net weight of the X3-IES series inverter when calculating the total weight of the devices of X3-IES system.
- Please consider the distance between the left tower and right tower under limited installation space.

Table 4-5 Net weight and dimensions of the inverter

Model	X3-IES-5K	X3-IES-6K	X3-IES-8K	X3-IES-10K	X3-IES-12K	X3-IES-15K
Net weight [kg]	35	35	35	35	37	37
Dimension [mm]	717 * 405 * 209.5					

Table 4-6 Net weight and dimensions of T-BAT-SYS

	BMS	Battery module	Base	Series box	Cover
Length (mm)	730	730	730	167	730
Width (mm)	150	150	150	121	150
Height (mm)	165	318	75	91.5	98
Net weight (kg)	9.3	47	3.9	1.3	1.3

4.1.3 Installation Carrier Requirement

The mounting location must be suitable for the weight and dimensions 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 X3-IES system must be over 940 kg, which is determined based on option B. If option C is chosen by the user, the bearing capacity of the ground and the wall, respectively, must be over 1090 kg;
- If you choose wall mounting, please make sure that the thickness of any section of the wall is greater than 150 mm. When choosing floor mounting, the wall thickness should be larger than 100 mm.
- The devices must not be installed on the wood wall.

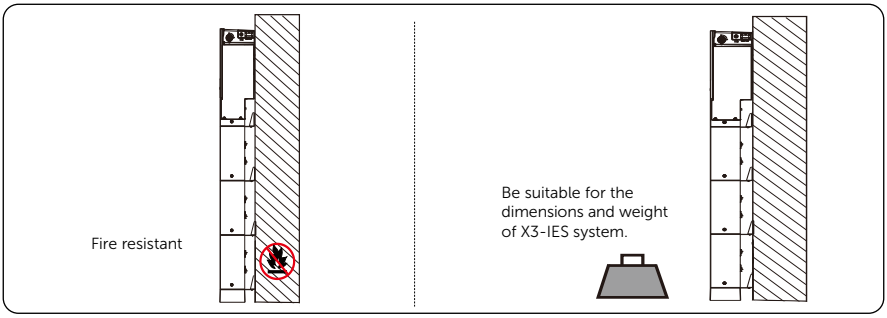


Figure 4-6 Installation carrier requirement

4.1.4 Clearance Requirement

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

- For installations with multiple devices, make sure to leave a minimum space of 300 mm between the left and right tower and 300 mm from the ceiling.
- If wall mounting is selected, the distance between the base support and the ground is decided by the corresponding requirement of the local regulations. For safety, it is suggested the base support be installed as low as possible.
- In areas with high ambient temperatures, increase the clearances between the devices and provide adequate fresh air ventilation if feasible.

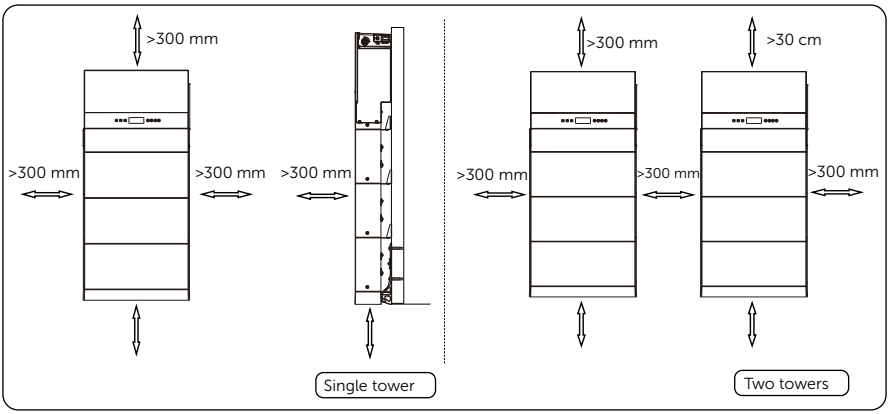
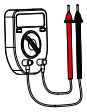


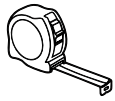
Figure 4-7 Clearance requirement

4.2 Tools Requirement

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


Hammer drill

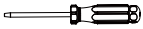

Multimeter

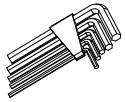

Measuring tape


Utility knife

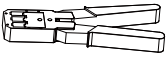

Marker

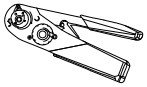

Cross screwdriver

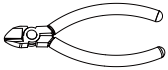

Flat-head screwdriver

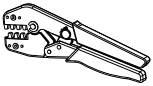

Allen key

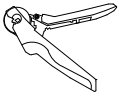

Wire stripper


Crimping tool for RJ45

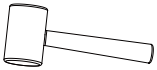

Crimping tool for PV terminals

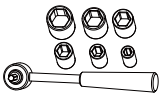

Diagonal pliers

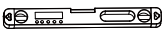

Crimping tool


Crimping tool for ferrules


Wire cutter


Rubber mallet

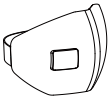

Torque wrench


Spirit level

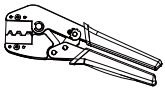

Safety gloves


Safety boots


Safety goggles


Anti-dust mask


Torque wrench (M4)


MC4 crimping tool

4.3 Additionally Required Materials

Battery

Table 4-7 Additionally required wires

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

Inverter

Table 4-8 Additionally required wires

No.	Required Material	Type	Conductor Cross-section
1	PV wire	6 mm^2 dedicated PV wire with a voltage rating of 1000 V, a temperature resistance of 105℃ , a fire resistance grade of VW-1	6 mm^2
2	Communication wire	Network cable CAT5E	0.2 mm^2
3	Protective pipe	White corrugated pipe	External diameter: over 50 mm

Table -9 Grid wire and breaker recommended

Model	X3-IES -5K	X3-IES -6K	X3-IES -8K	X3-IES -10K	X3-IES -12K	X3-IES -15K
Five-core wire (copper)	4-6 mm^2	4-6 mm^2	4-6 mm^2	6 mm^2	6 mm^2	6 mm^2
Breaker	20 A	20 A	32 A	40 A	40 A	40 A

Table -10 EPS wire and breaker recommended

Model	X3-IES -5K	X3-IES -6K	X3-IES -8K	X3-IES -10K	X3-IES -12K	X3-IES -15K
Five-core wire (copper) 	4-6 mm^2	4-6 mm^2	4-6 mm^2	6 mm^2	6 mm^2	6 mm^2
Breaker 	16 A	16 A	20 A	25 A	32 A	32 A

Note:

1. The outer diameter of Grid and EPS cables should be 19~21 mm.

2. For a 5.0~8.0 kW inverter, please select suitable Grid and EPS ferrules from the inverter accessory pack in accordance with the diameter of the Grid and EPS cables actually used.

5 Unpacking and Inspection

The number of battery 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 devices of X3-IES system undergo 100% testing and inspection before shipping from the manufacturing facility. However, transport damage may still occur. Before unpacking the devices, please verify that the model and outer packing materials for damage, such as holes and cracks.
- Unpacking the inverter according to the following figure.

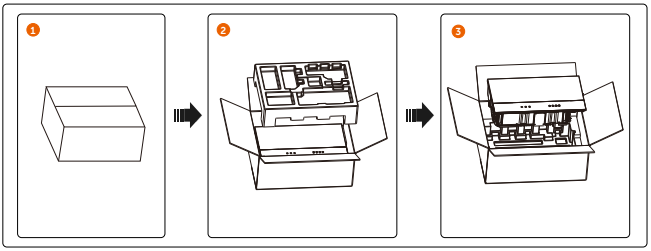


Figure 5-1 Unpacking the inverter

- Unpacking the BMS and battery module(s) 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.

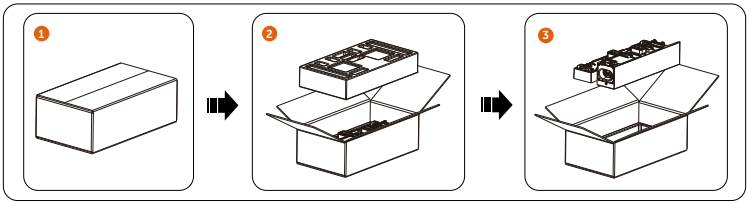


Figure 5-2 Unpacking the BMS

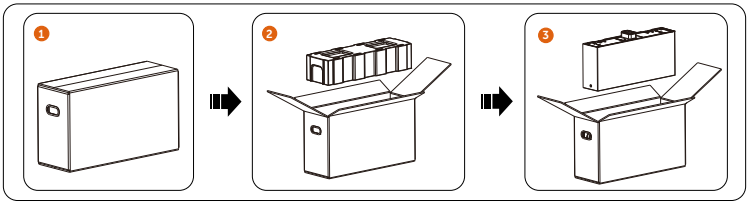
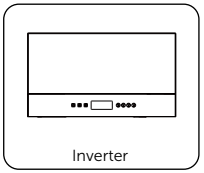


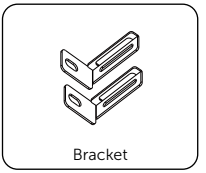
Figure 5-3 Unpacking the battery module

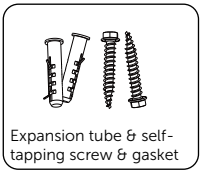
- Be careful when dealing with all package materials which may be reused for storage and relocation of the devices of X3-IES system in the future.
- Upon opening the package, check whether the appearance of the devices is damaged or lack of accessories. If any damage is found or any parts are missing, contact your dealer immediately.

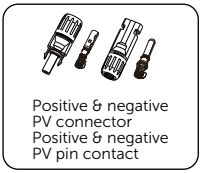
5.2 Scope of Delivery

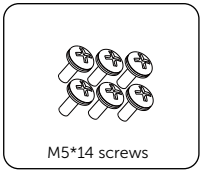
Inverter

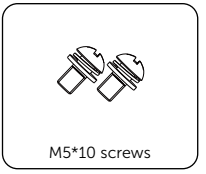

Inverter

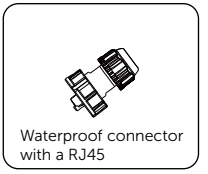

Bracket

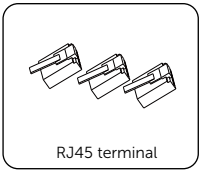

Expansion tube & self-tapping screw & gasket

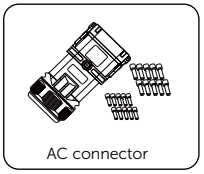

Positive & negative PV connector
Positive & negative PV pin contact

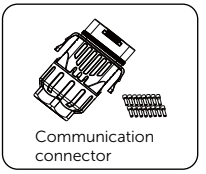

M5*14 screws

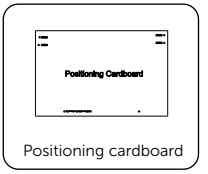

M5*10 screws


Waterproof connector with a RJ45

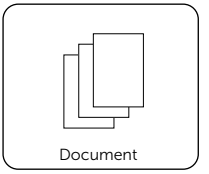

RJ45 terminal

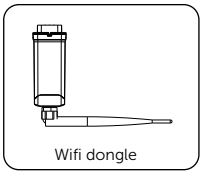

AC connector

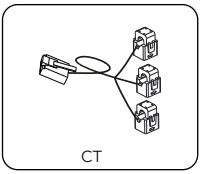

Communication connector

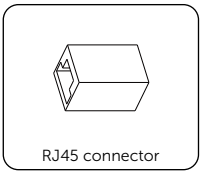


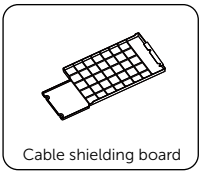
Positioning cardboard


Document


Wifi dongle


CT


RJ45 connector


Cable shielding board

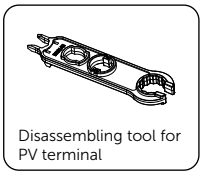

Disassembling tool for PV terminal

Table 5-2 Packing list of inverter

Items	Quantity
Inverter	1 pc
Brackets	2 pcs
Expansion tubes & self-tapping screws	2 pairs

Items	Quantity
Positive & negative PV connectors and PV pin contacts	2 pairs for 5.0/ 6.0 kW inverter; 3 pairs for 8.0 ~ 15.0 kW inverter
M5*14 screws	6 pcs
M5*10 screws	2 pcs
Waterproof connector with RJ45	1 pair
RJ45 terminals	3 pcs
AC connector	1 pc
AC ferrules[1]	20 pieces of AC ferrules (10 ferrules each for 4 mm^2 and 6 mm^2) for a 5.0 ~ 8.0kW inverter
	10 pieces of AC ferrules (6 mm^2) for a 10.0 ~ 15.0kW inverter
Communication connector	1 pc
Communication ferrules	16 pcs
Positioning cardboard	1 pc
Document	1 pc
Wifi dongle	1 pc
CT	1 pc
RJ45 connector	1 pc
Cable shielding board	1 pc
Disassembling tool for PV terminal	1 pc

Note:

"1" means for a 5.0 ~ 8.0kW inverter, select suitable AC ferrules that match the diameter of the Grid and EPS cables.

BMS

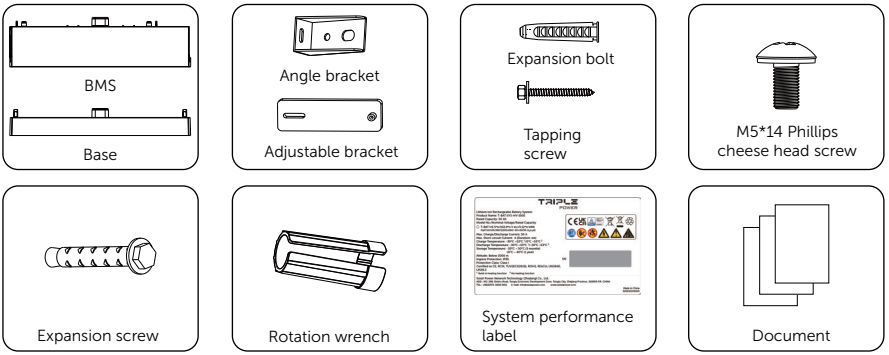
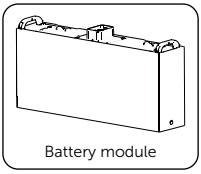


Table -3 Packing list of BMS

Item	Quantity
BMS	1 pc
Base	1 pc
Angle brackets	4 pcs
Adjustable brackets	4 pcs
Expansion bolts	6 pcs
Tapping screws	4 pcs
M5*14 Phillips cheese head screws	8 pcs
Expansion screws	2 pcs
Rotation wrenches	4 pcs
System performance label	1 pc
Document	1 pc

Battery Module


Battery module


M5*14 Phillips cheese head screw

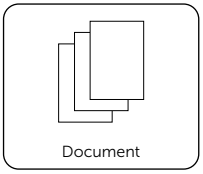
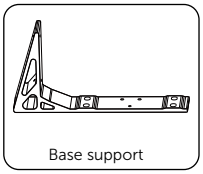
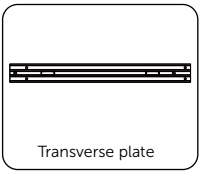

Document

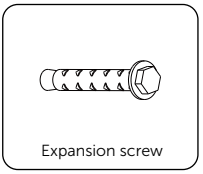
Table -4 Packing list of battery module

Item	Quantity
Battery module	1 pc
M5*14 Phillips cheese head screws	2 pcs
Document	1 pc

Base Support (For wall mounting only)


Base support


Transverse plate


Expansion screw


M5*20 Phillips countersunk head screw


M5*8 Phillips countersunk head screw

Table -5 Packing list of base support

Item	Quantity
Base supports	2 pcs
Transverse plate	1 pc
Expansion screws	6 pcs
M5*20 Phillips countersunk head screws	6 pcs
M5*8 Phillips countersunk head screws	4 pcs

Series Box (For two towers only)

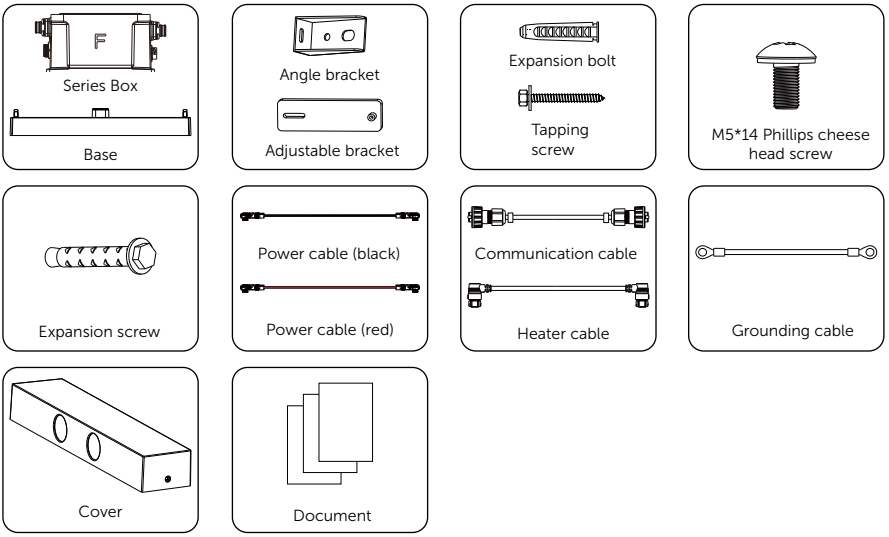


Table -6 Packing list of Series Box

Item	Quantity
Series box	1 pc
Base	1 pc
Angle brackets	4 pcs
Adjustable brackets	4 pcs
Expansion bolts	6 pcs
Tapping screws	4 pcs
M5*14 Phillips cheese head screws	12 pcs
Expansion screws	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	1 pc

6 Mechanical Installation

6.1 Mechanical Installation of X3-IES System

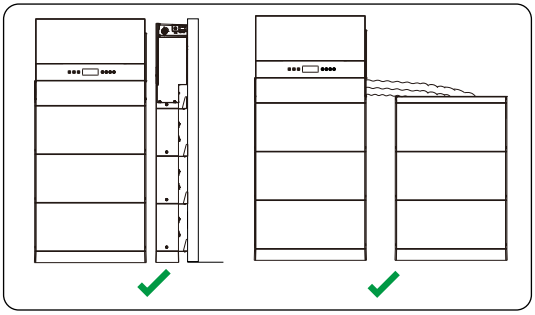


Figure 6-1 Correct installtion angle

NOTICE!
• The wall selected for installation should be flat and perpendicular to the floor.

The mechanical installation of the X3-IES system supports floor mounting and wall mounting. The two installation methods are illustrated below. Option B with three battery modules is taken as an example.

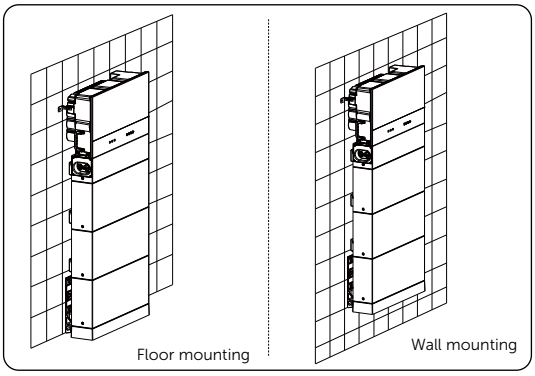


Figure 6-2 Installation modes

WARNING!

- Only the qulalified personel 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 devices. Personal injuries may result if the devices are lifted improperly or dropped while being transported or mounted.
- Use insulated tools and wear individual protective tools when installing the devices.

NOTICE!

- In the case of no more than 3 (including 3) battery modules in a tower, please ensure that the bearing capacity of the supporting surface for the system must be over 940 kg.
- In the case of 4 battery modules in a tower, please ensure the bearing capacity of the supporting surface for the system must be over 1090 kg.
- The devices must not be installed on the wood wall.
- Please ensure that the thickness of any part of the wall should not be less than 150 mm if the wall mounting is selected.
- At least two persons are required to move the devices of X3-IES system.
- Please reserve enough distance from the device to the ceiling (or the grounding) for capacity expansion.

6.2 Floor Mounting

6.2.1 One Tower for Floor Mounting

NOTICE!

- The mode of floor mounting is given priority for installation.
- Take the installation procedure for Option B (three battery modules in one tower) as an example.

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

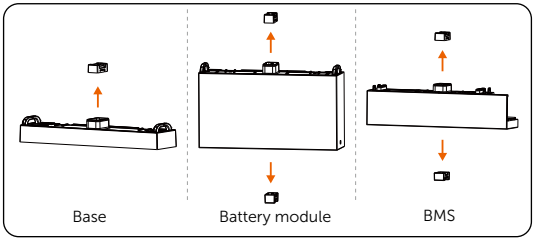


Figure 6-3 Removing dustproof covers

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.

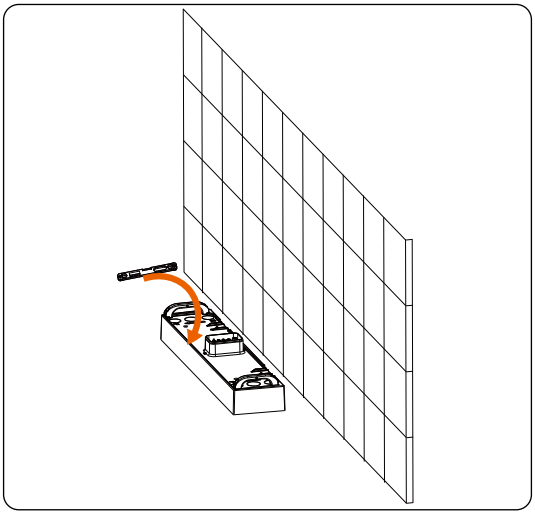


Figure 6-4 Determining whether the base is level

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.

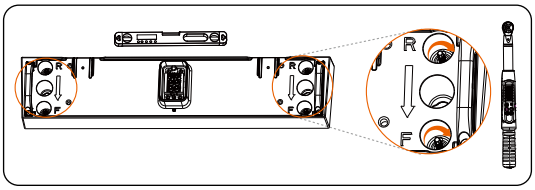


Figure 6-5 Rotating adjustment screws

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 being to ensure that the base is even.

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

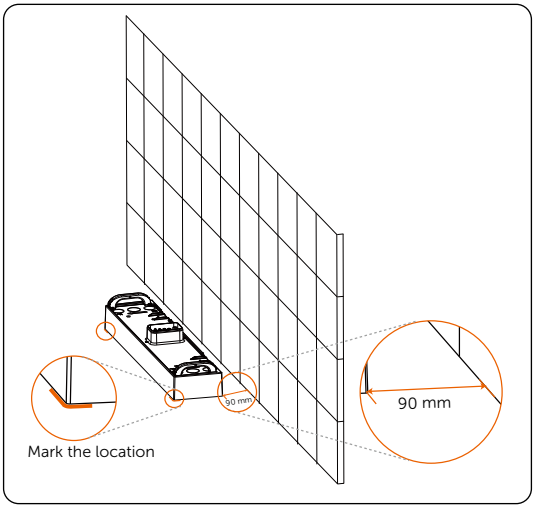


Figure 6-6 Placing the base

Step 5: Attach the angle bracket and adjustable bracket together by using M5*14 screws, but do not tighten them for a while.

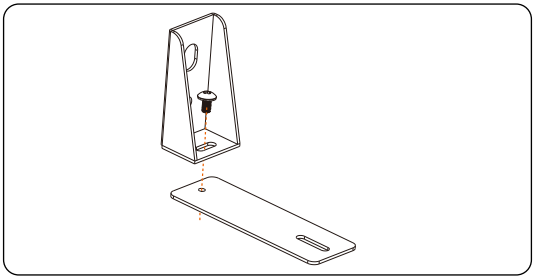


Figure 6-7 Attaching two brackets

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.

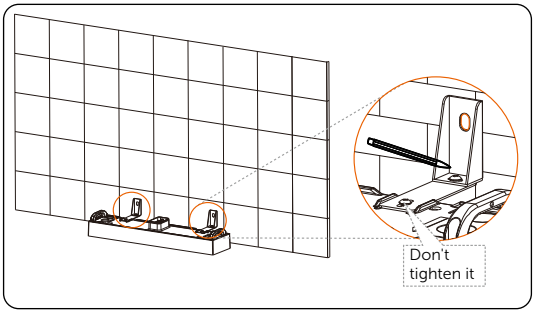


Figure 6-8 Circling inner ring of holes

NOTICE!
• Don't tighten screws fully until the angle bracket is secured on the wall.

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 (Ø10 mm).

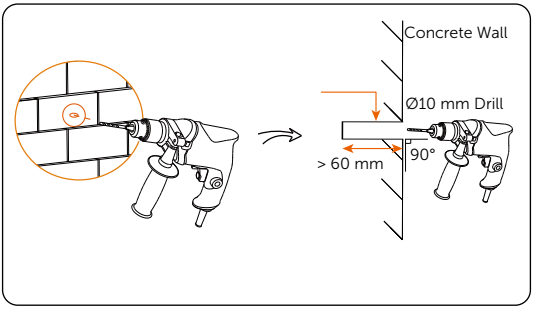


Figure 6-9 Drilling holes

NOTICE!

- An electric drill dust collector is recommended.
- To prevent dust from being released into the hot plug when drilling holes, users may use the package bag of the device or other materials to fully cover the battery module.

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 M5*14 screws on both sides (torque: 2.2-2.5 N·m).

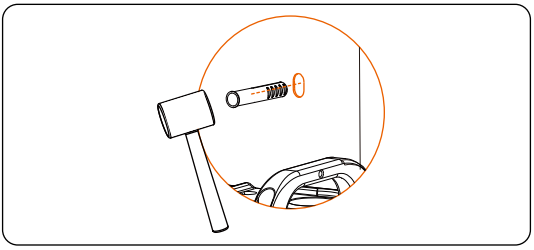


Figure 6-10 Inserting the expansion bolt

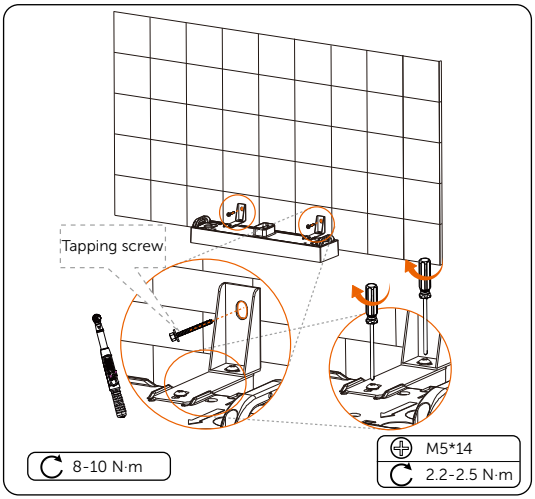


Figure 6-11 Securing the assembled bracket

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.

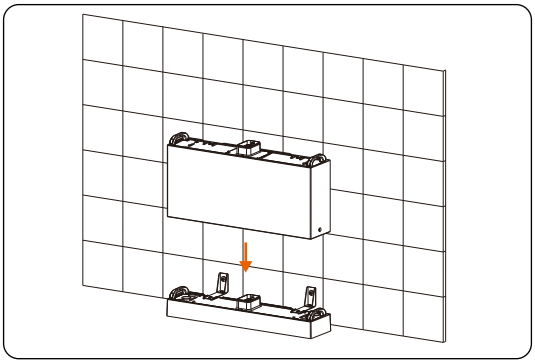


Figure 6-12 Placing the battery module

NOTICE!

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

Step 10: Insert and tighten M5*14 screws on both sides (torque: 2.2-2.5 N·m).

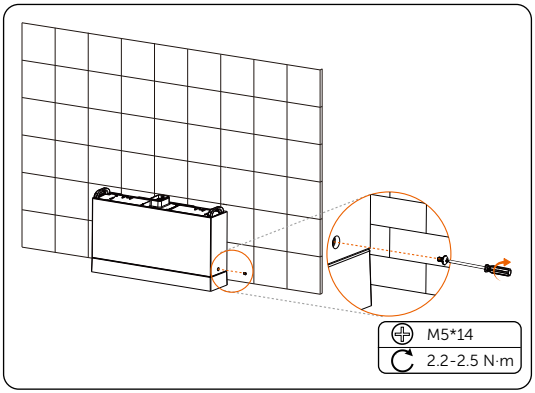


Figure 6-13 Tightening screws

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.

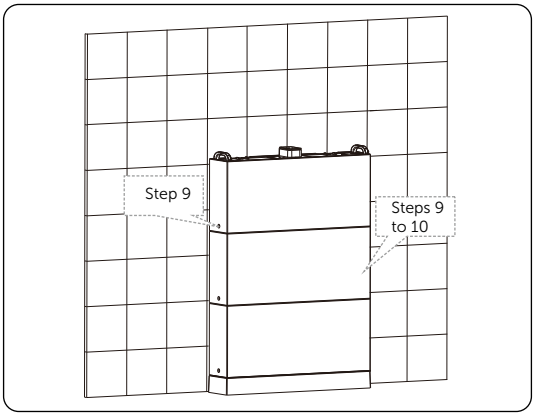


Figure 6-14 Placing battery modules

Step 12: Locate the position of the BMS and the inverter.

1. Attach the angle bracket and adjustable bracket together, tighten but not lock them with a M5*14 screw for a while;

2. Align the bracket with the holes on the BMS. Mark four dots through the

brackets on the wall;

3. Align the holes on the positioning cardboard with the dots in the second row on the wall;

4. Mark the dots where "X3-IES" is noted on the positioning cardboard.

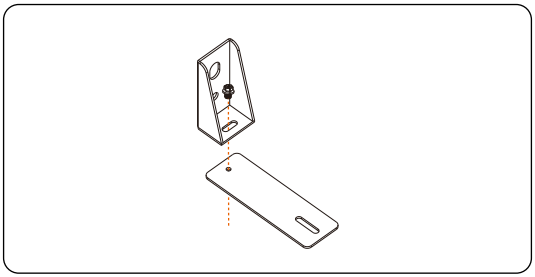


Figure 6-15 Attaching two brackets

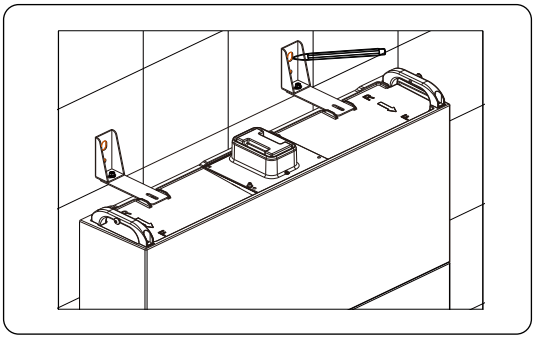


Figure 6-16 Marking the position of BMS

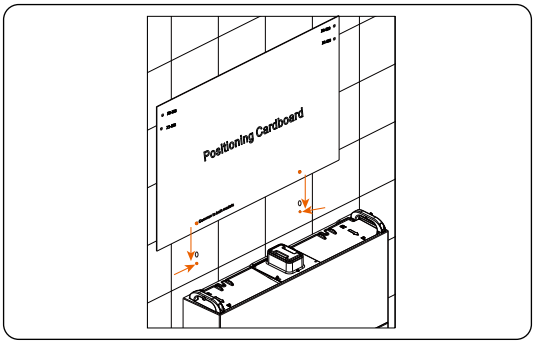


Figure 6-17 Aligning the positioning cardboard with the dots on the wall

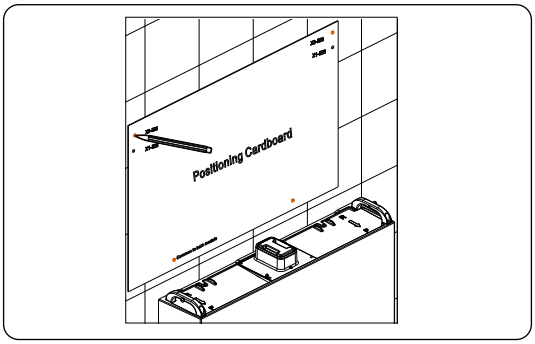


Figure 6-18 Marking the position of the brackets of the inverter

Step 13: Drill the holes for the BMS and the inverter and tighten them.

1. Remove the assembled brackets on the battery module, and then drill the four holes at a depth of more than 60 mm in the concrete wall by using a Drill (Ø10 mm);

2. Insert the expansion tubes into the four holes and knock them into the wall with a rubber hammer;

3. Thread the screw through the assembled bracket and into the holes on the battery module, and then tighten the screws. Thread the self-tapping screws through a washer and then the assembled bracket, insert the screws into the holes on the wall and tighten the screws.

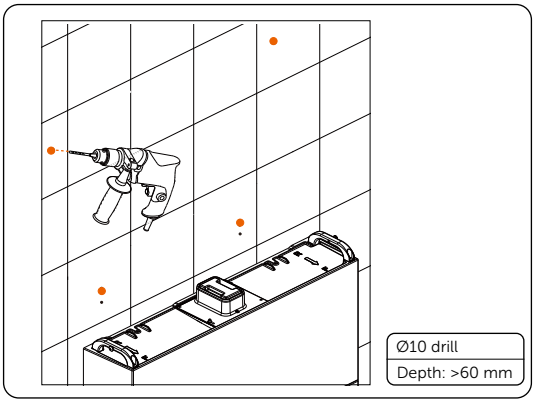


Figure 6-19 Drilling holes

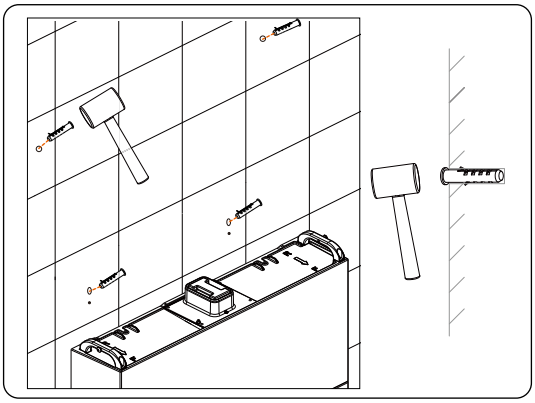


Figure 6-20 Knocking expansion tubes into the wall

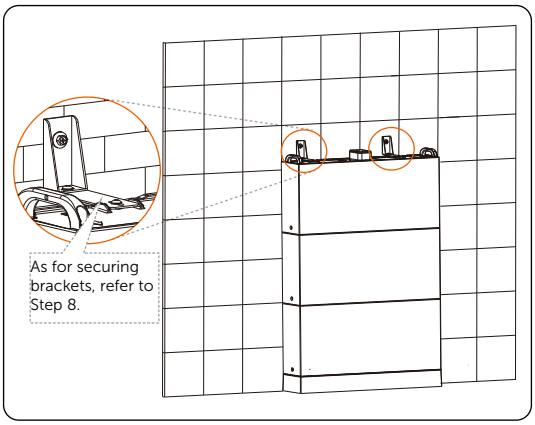


Figure 6-21 Tightening the BMS brackets

NOTICE!

- An electric drill dust collector is recommended.
- To prevent dust from being released into the hot plug when drilling holes, users may use the package bag of the device or other materials to fully cover the battery module.

Step 14: Place the BMS, and then tighten the M5*14 screws on both sides (torque: 2.2-2.5 N·m)

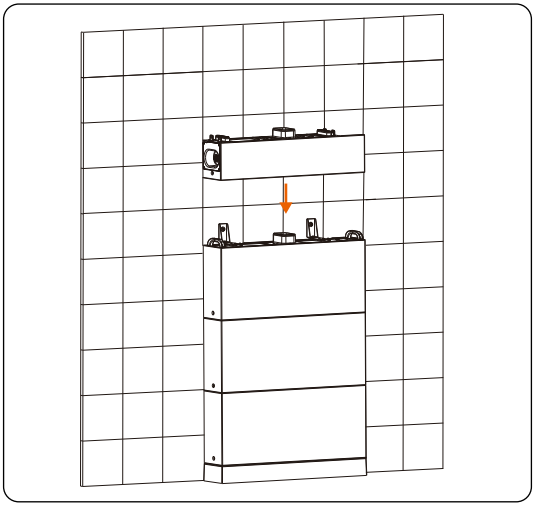


Figure 6-22 Placing the BMS

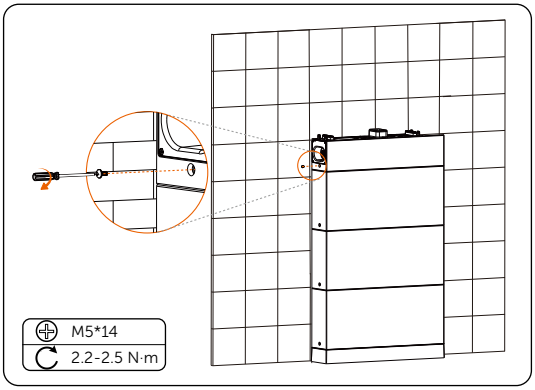


Figure 6-23 Tightening M5 screws

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

Step 15: Remove the dustproof cover from the bottom of the inverter.

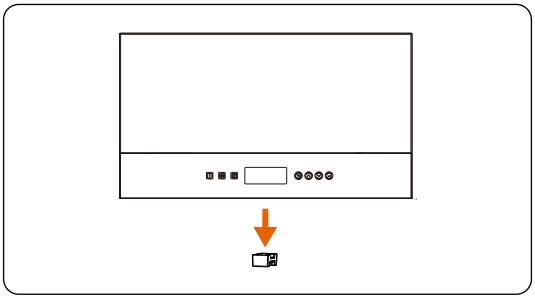


Figure 6-24 Removing the dustproof cover

Step 15: Install the inverter on the BMS.

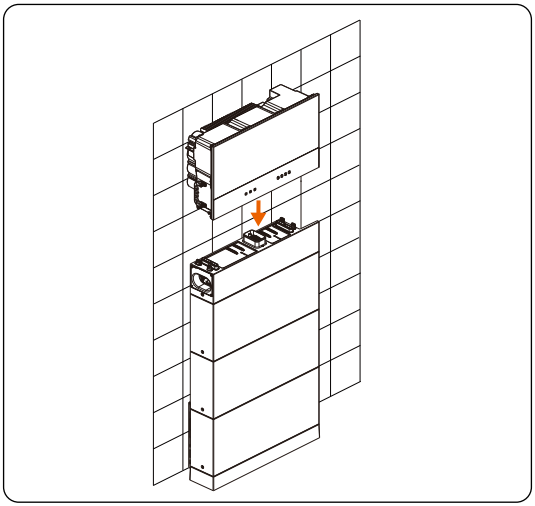


Figure 6-25 Installing the inverter

NOTICE!
• At least two persons are required to move the inverter.

Step 16: Lock the screws on both sides of the inverter with the BMS.

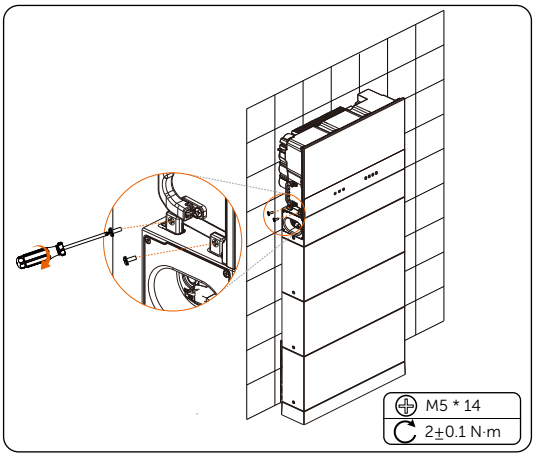


Figure 6-26 Locking the inverter with the BMS

Step 17: Lock the inverter brackets on both sides of the inverter.

1. Tighten but not lock the self-tapping screws into the wall.
2. Lock screws on the inverter.
3. Lock screws into the wall.

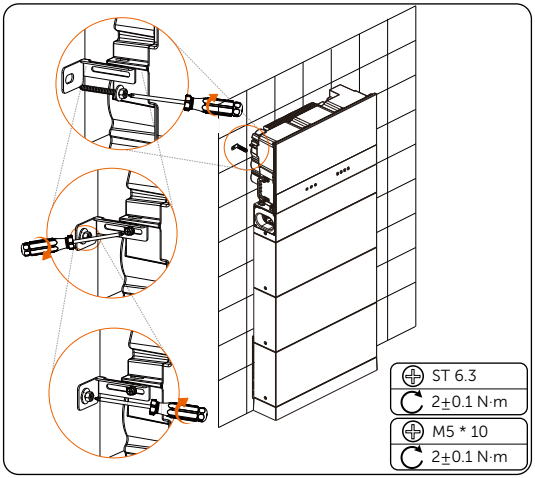


Figure 6-27 Locking the inverter brackets

Step 18: (Optional) Lock the inverter as needed. (The lock's diameter doesn't exceed 5mm.)

6.2.2 Two Towers for Floor Mounting

NOTICE!

- Take the installation procedure for option G as an example.

Step 1: As for the installation steps for the following figure, please refer to the installation procedure for "6.2.1 One Tower for Floor Mounting" (Steps 1 to 19). The installation procedure for both left and right towers is the same.

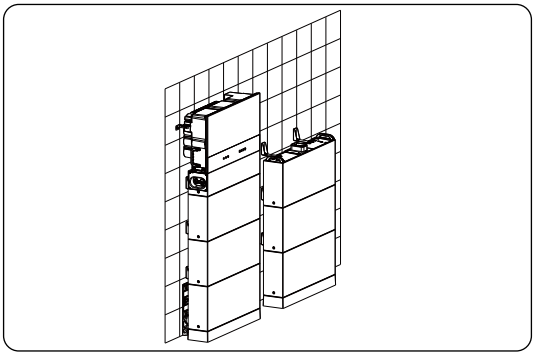


Figure 6-28 Installing two towers

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

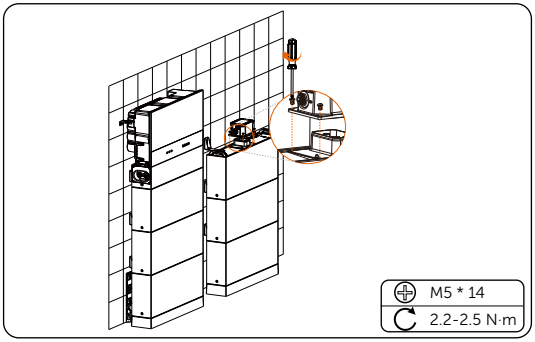


Figure 6-29 Placing the series box

NOTICE!

- The side of the series box with "R" shall be 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 "7.1.3 Installation of Cover".

6.3 Wall Mounting

6.3.1 One Tower for Wall Mounting

NOTICE!
• Take the installation procedure for three battery modules as an example.

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

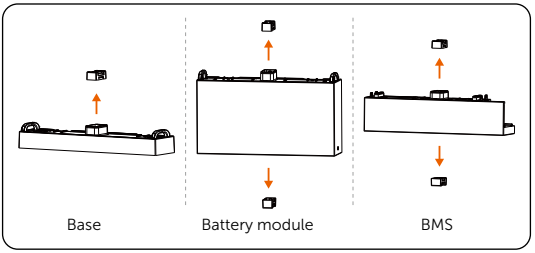


Figure 6-30 Removing dust covers

Step 2: Tighten M5*8 screws on both sides to attach the base support and transverse plate together (torque: 2.2-2.5 N·m).

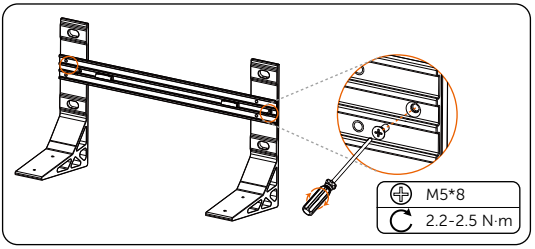


Figure 6-31 Attaching base support and transverse plate

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 isn't in the centre, slightly bow it to the horizontal.

Then circle along the inner ring of the four holes.

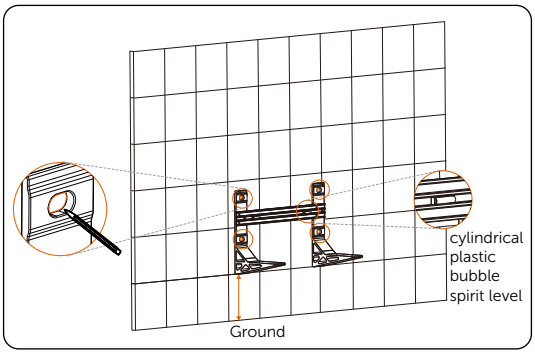


Figure 6-32 Drawing circles

NOTICE!

- The distance from the base support to the ground is decided according to the local regulations. And it is also the distance from 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 (Ø15 mm).

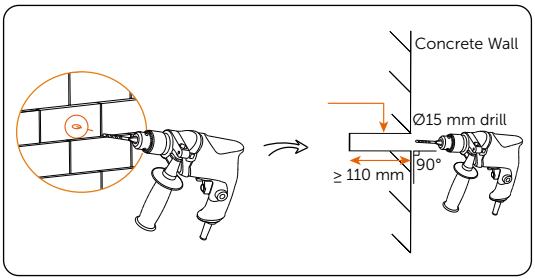


Figure 6-33 Drilling holes

NOTICE!

- An electric drill dust collector is recommended.
- To prevent dust from being released into the hot plug when drilling holes, users may use the package bag of the device or other materials to fully cover the base.

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)

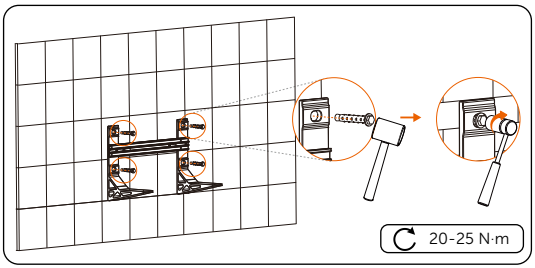


Figure 6-34 Tightening expansion screws

Step 6: Place the base on the base support, and secure both left and right sides with M5*20 screws (torque: 2.2-2.5 N·m). There are totalling 4 M5*20 screws shall be tightened.

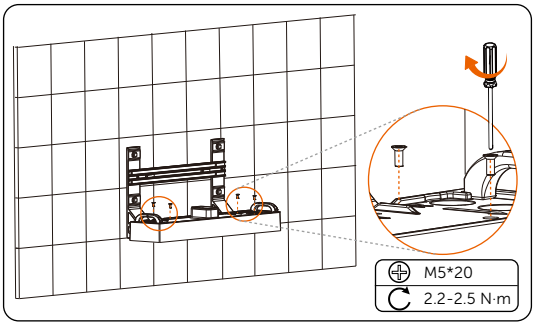


Figure 6-35 Securing the base

Step 7: Place the battery module on the base.

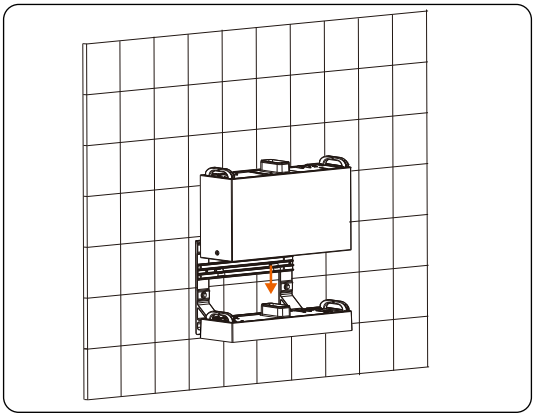


Figure 6-36 Placing battery module

NOTICE!

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

Step 8: Insert and tighten M5*14 screws on both sides (torque: 2.2-2.5 N·m).

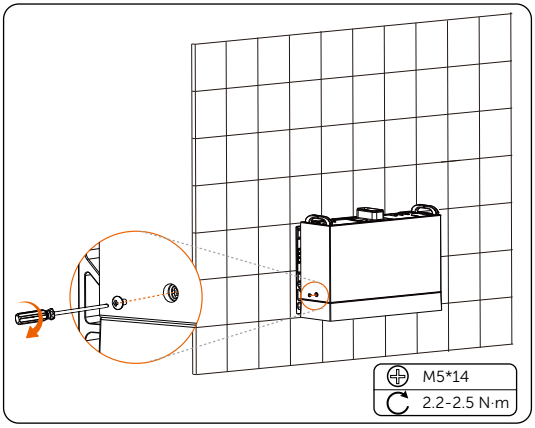


Figure 6-37 Tightening screws

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.

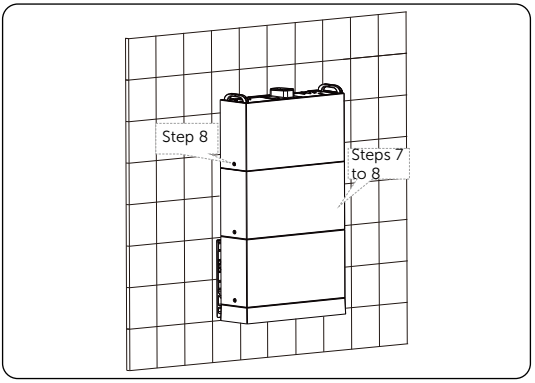


Figure 6-38 Placing battery modules

Step 10: Locate the position of the BMS and the inverter.

1. Attach the angle bracket and adjustable bracket together, tighten but not lock them with a M5*14 screw for a while;

2. Align the bracket with the holes on the BMS. Mark four dots through the brackets on the wall;

3. Align the holes on the positioning cardboard with the dots in the second row on the wall;

4. Mark the dots where "X3-IES" is noted on the positioning cardboard.

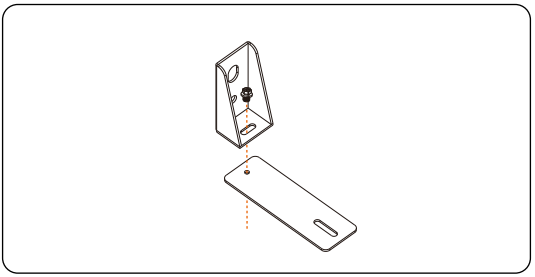


Figure 6-39 Attaching two brackets

NOTICE!
• Don't tighten screws fully until the angle bracket is secured on the wall.

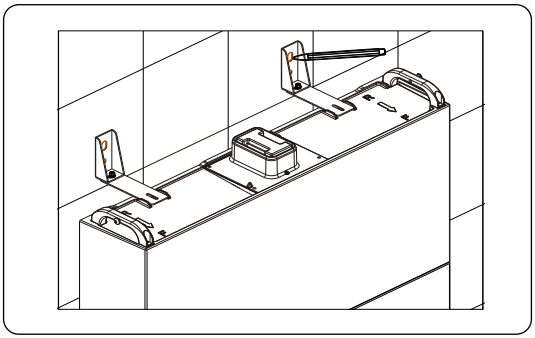


Figure 6-40 Marking the position of BMS

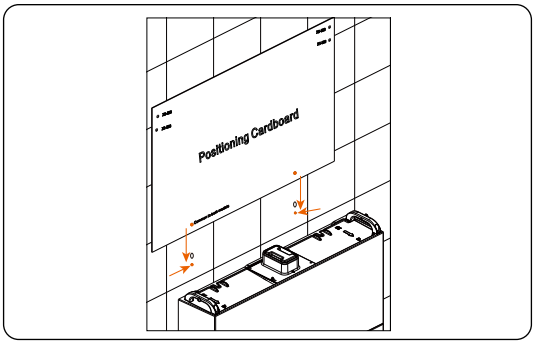


Figure 6-41 Aligning the positioning cardboard with the dots on the wall

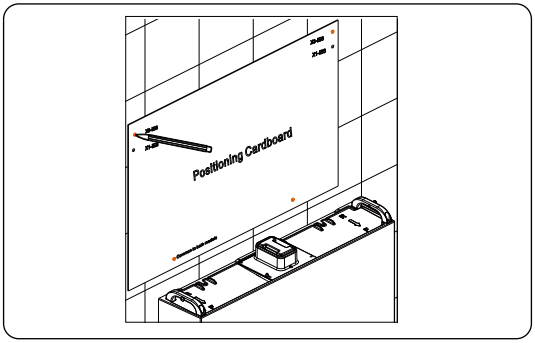


Figure 6-42 Marking the position of the brackets of the inverter

Step 11: Drill the holes for the BMS and the inverter and tighten them.

1. Remove the assembled brackets on the battery module, and then drill the four holes at a depth of more than 60 mm in the concrete wall by using a drill (Ø10 mm);

2. Insert the expansion tubes into the four holes and knock them into the wall with a rubber hammer;

3. Thread the screw through the assembled bracket and into the holes on the battery module, and then tighten the screws. Thread the self-tapping screws through a washer and then the assembled bracket, insert the screws into the holes on the wall and tighten the screws.

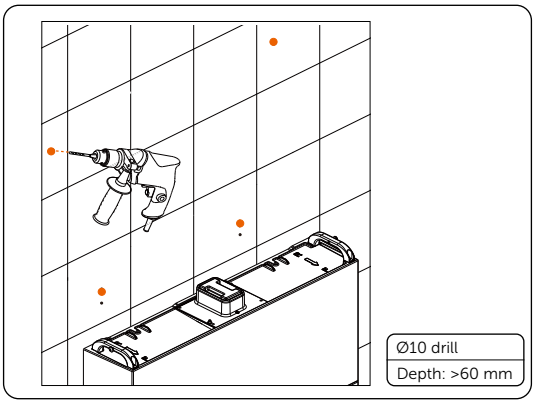


Figure 6-43 Drilling holes

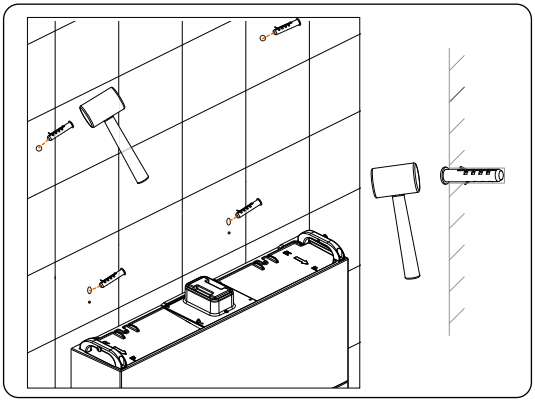


Figure 6-44 Knocking expansion tubes into the wall

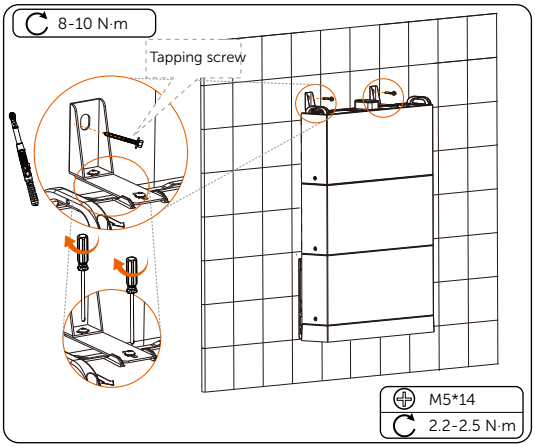


Figure 6-45 Securing the assembled bracket

NOTICE!

- An electric drill dust collector is recommended.
- To prevent dust from being released into the hot plug when drilling holes, users may use the package bag of the device or other materials to fully cover the battery module.

Step 12: Place the BMS, and then tighten the M5*14 screws on both sides (torque: 2.2-2.5 N·m)

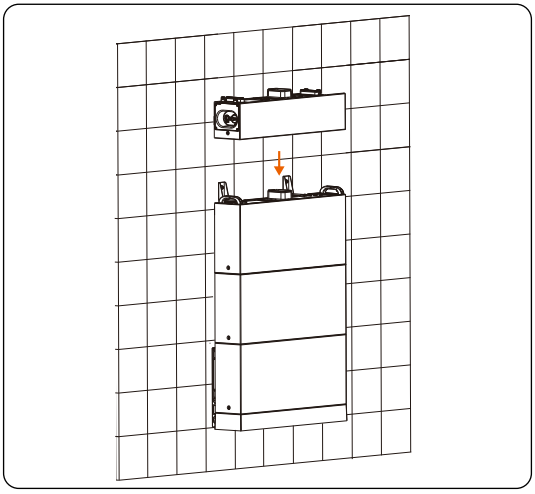


Figure 6-46 Placing the BMS

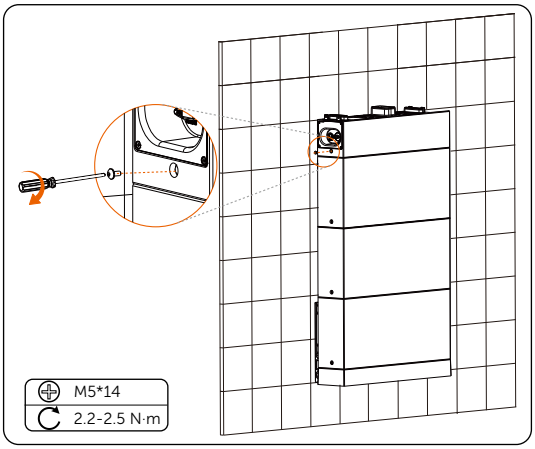


Figure 6-47 Tightening M5 screws

NOTICE!

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

Step 13: Remove the dustproof cover from the bottom of the inverter.

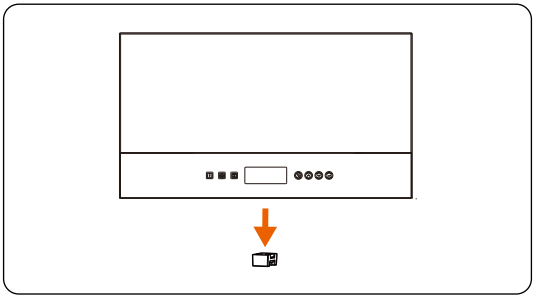


Figure 6-48 Removing the dustproof coverr

Step 14: Install the inverter on the BMS.

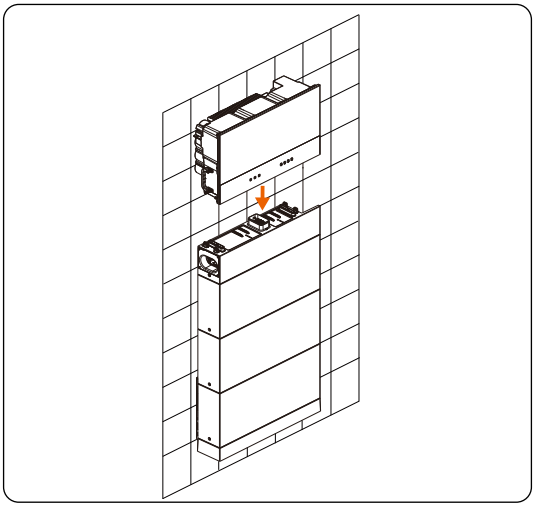


Figure 6-49 Installing the inverter

NOTICE!
• At least two persons are required to move the inverter.

Step 15: Lock the screws on both sides of the inverter with the BMS.

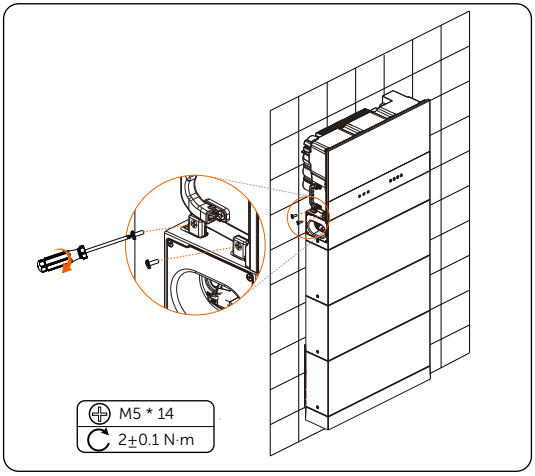


Figure 6-50 Locking the inverter with the BMS

Step 16: Lock the inverter brackets on both sides of the inverter.

1. Tighten but not lock the self-tapping screws into the wall.
2. Lock screws on the inverter.
3. Lock screws into the wall.

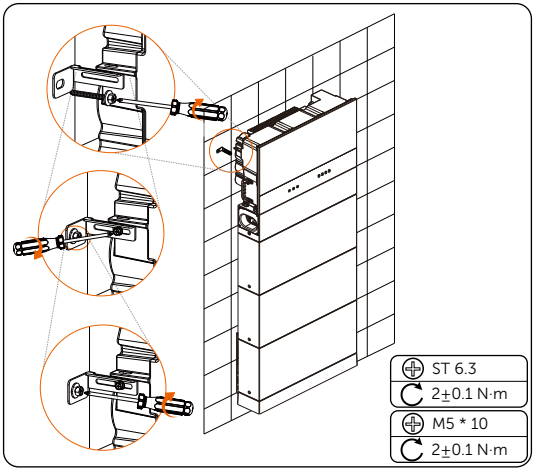


Figure 6-51 Locking the inverter brackets

Step 17: (Optional) Lock the inverter as needed. (The lock's diameter doesn't exceed 5mm.)

6.3.2 Two Towers for Wall Mounting

NOTICE!
• Take the installation procedure for six battery modules as an example.

Step 1: As for the installation steps for the following figure, please refer to the installation procedure for "6.3.1 One Tower for Wall Mounting" (Steps 1 to 17). The installation procedure for both left and right towers is the same.

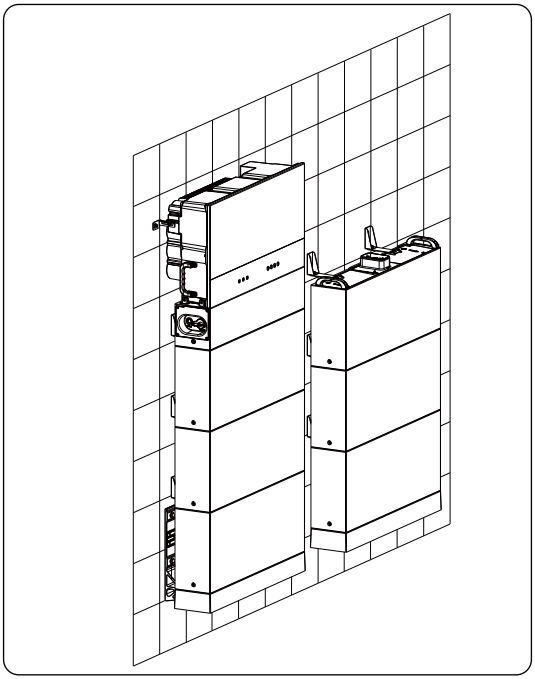


Figure 6-52 Installing two towers

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

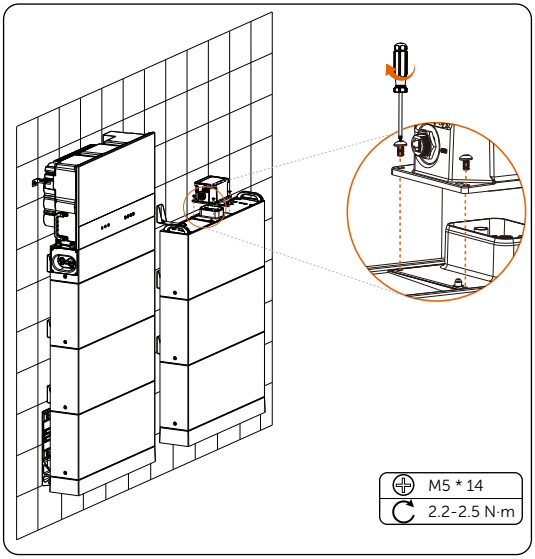


Figure 6-53 Placing the series box

NOTICE!

- The side of the series box with "R" shall be 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 "7.1.3 Installation of Cover".

6.4 Battery Capacity Expansion

The device is allowed to increase the number of battery modules to achieve capacity expansion.

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!

- 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 of Battery

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.

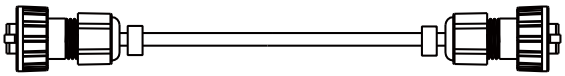


Figure 7-1 Communication cable

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.

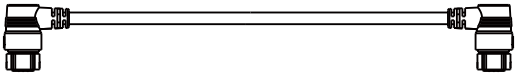


Figure 7-2 Heater cable

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.

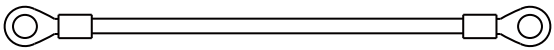


Figure 7-5 Grounding cable

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 for two towers in the mode of 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.

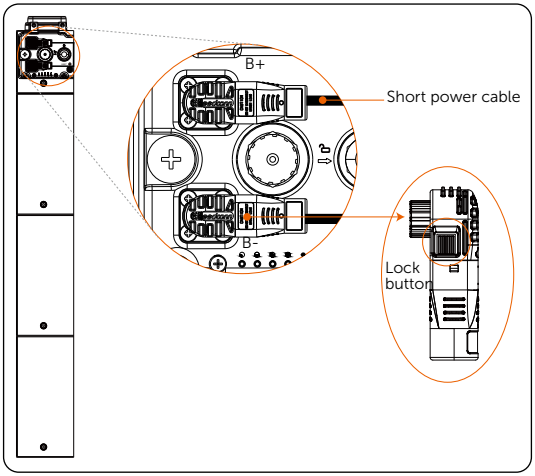


Figure 7-6 Removing short power cable

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 removed.

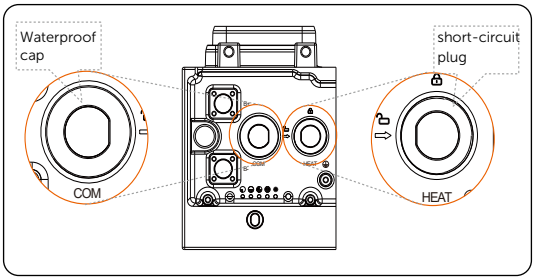


Figure 7-7 Removing waterproof cap

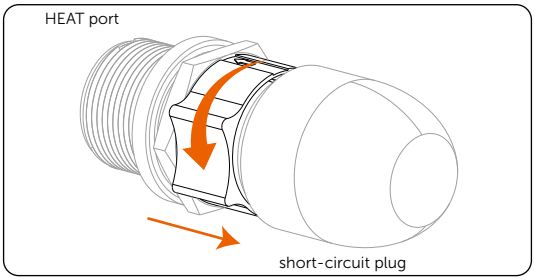


Figure 7-8 Closing short-circuit plug

NOTICE!

- Press and hold the lock button while unplugging the power cable, or it cannot be pulled out.
- Don't violently remove the short-circuit plug before the arrow on the rotating ring is aligned with the arrow on the panel.
- Don't 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.

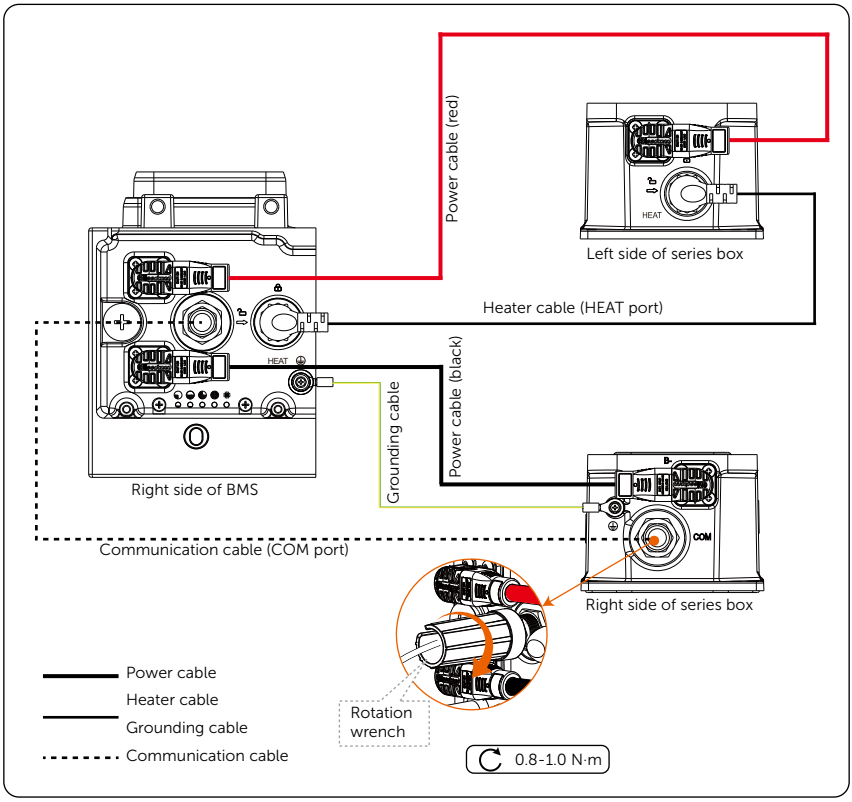


Figure 7-9 Connecting cables

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.

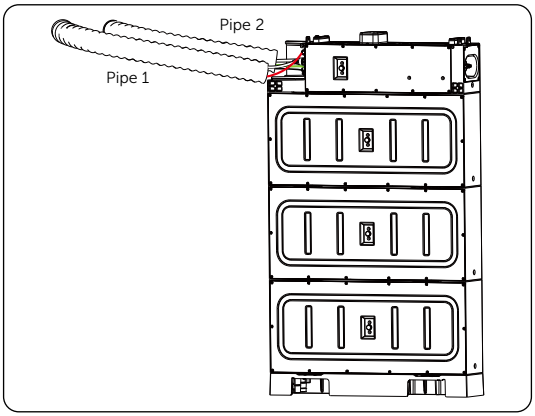


Figure 7-10 Pulling cables

NOTICE!
• A corrugated pipe should be prepared by the users themselves.

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

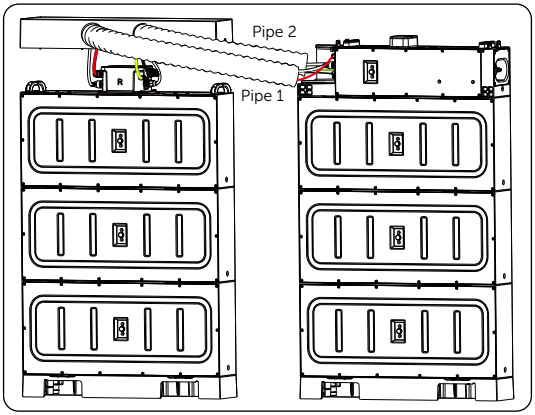


Figure 7-11 Inserting pipes into the cover

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.

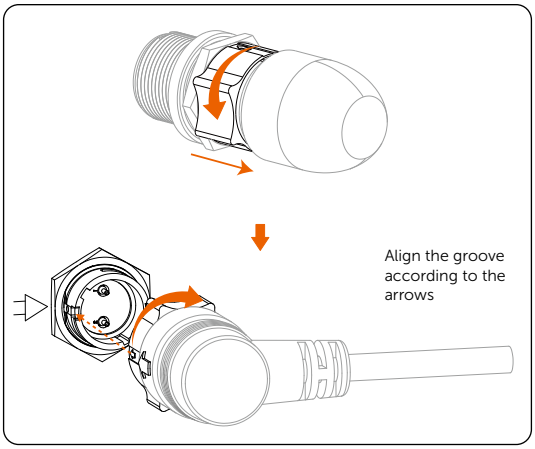


Figure 7-12 Locking heater cable

NOTICE!

- A rotation wrench is used to tighten both ends of the communication cable, and it may be removed after tightening.
- Don't 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 M5*14 screws on both sides to secure the cover (torque: 2.2-2.5 N·m).

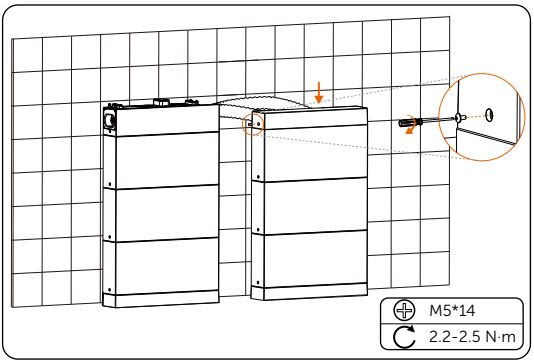


Figure 7-13 Tightening M5 screws

NOTICE!

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

7.2 Electrical Connection of Inverter

DANGER!

- Before electrical connection, make sure the DC switch and AC breaker are turned off. Otherwise, an electrical shock may be caused by high voltage, resulting in serious personal injury or death.

WARNING!

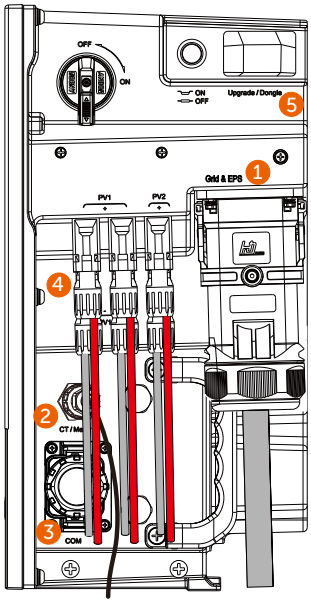
- Only the qulalified personel can perform the electrical connection following the local standards and requirements.
- Follow this manual or other related documents to wire cables. The device damage caused by incorrect wiring is not in the scope of warranty.

CAUTION!

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

7.2.1 Wiring Sequence of the Inverter

Users should strictly follow the wiring sequence of the inverter.



Step 1 Connect the Grid & EPS port.
Step 2 Connect the CT/Meter port.
Step 3 Connect the COM port.
Step 4 Connect the PV port
Step 5 Plug in the WiFi Dongle.

7.2.2 Grid and EPS Connection

NOTICE!
• Before connecting the inverter to the grid, approval must be received by the 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 380/400V, 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 AC breaker of Grid and EPS.
- 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 "**Overload**" warning. When "overload" 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 and lead acid will decrease linearly.
  - » The inverter support less than 2kW half-wave EPS load.

Wiring procedures

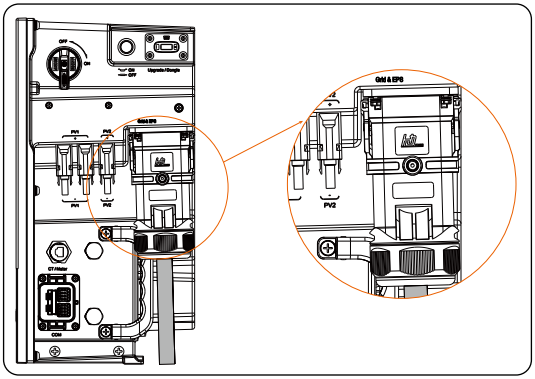


Figure 7-14 Well connected Grid & EPS cables

Step 1: Prepare a Grid cable (five-core wire) and an EPS cable (five-core wire) and strip the insulation jacket as below.

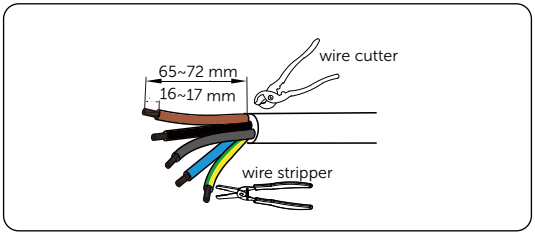


Figure 7-15 Striping the Grid and EPS cables

Step 2: Insert L1, L2, L3 and PE wires of the Grid and EPS cables into ferrules. Use a crimping tool for ferrules to crimp the ferrules. Make sure the conductors are correctly assigned and firmly seated in the ferrules.

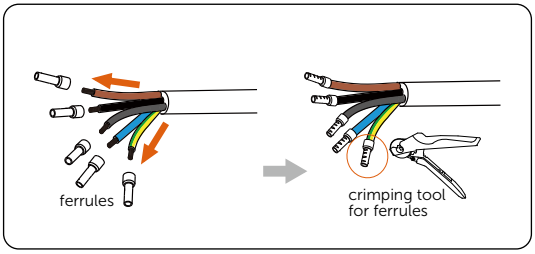


Figure 7-16 Crimping the Grid and EPS cables

NOTICE!

- For a 5.0~8.0 kW inverter, please select suitable Grid and EPS ferrules from theinverter accessory pack in accordance with the diameter of the Grid and EPS cables actually used.

Step 3: Loosen the swivel nut of the AC connector, pull out the rubber sealing stopper and cut the membrane of the stopper with an utility knife.

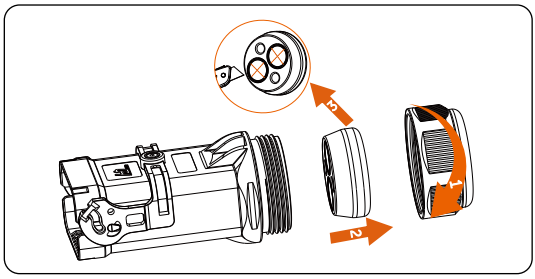


Figure 7-17 Disassembling the AC connector

Step 4: Press the tool into the terminal block in the AC connector and use a screwdriver to poke the terminal block out from the other end of the AC connector.

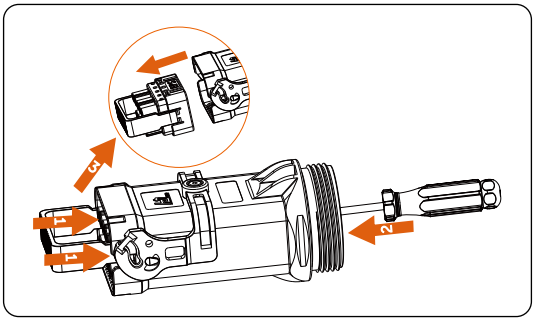


Figure 7-18 Poking the terminal block out of the AC connector

Step 5: Connect Grid and EPS cables to the AC connector.

» Thread the Grid and EPS cables through the swivel nut, the rubber sealing stopper and the AC connector. Plug L1, L2, L3, N and PE wires of the Grid and EPS cables into the L1, L2, L3, N and PE port of the Grid and EPS terminal block respectively.

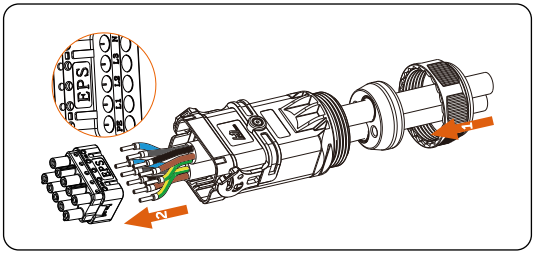


Figure 7-19 Inserting Grid and EPS cables into the AC connector

» Tighten the screws with an Allen key to ensure wires are well locked. (Torque: 2.5±0.1N·m)

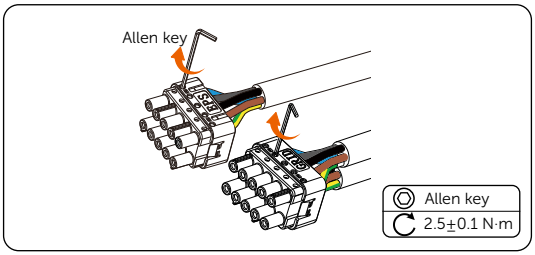


Figure 7-20 Locking wires in the AC connector

Step 6: Put the terminal block, the rubber sealing stopper into the AC connector. Screw the swivel nut tightly.

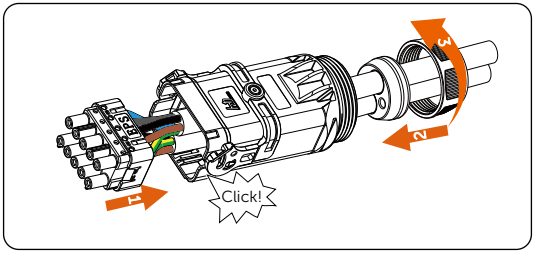


Figure 7-21 Wiring the AC connector

Step 7: Pull up the latch on the AC connector.

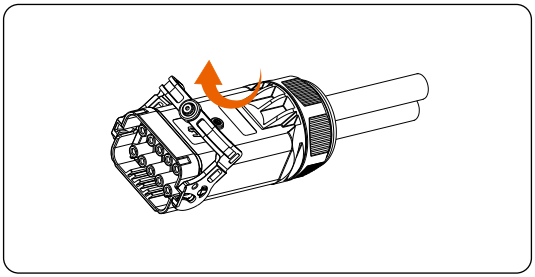


Figure 7-22 Pulling up the latch

Step 8: Remove the dustproof cover on the Grid & EPS port of the inverter.

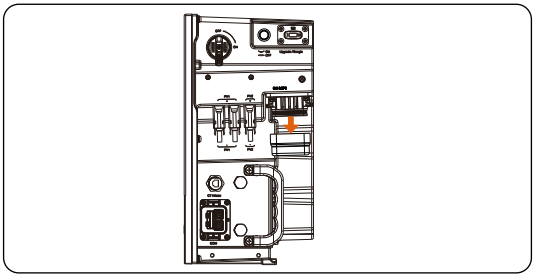


Figure 7-23 Removing the dustproof cover

Step 9: Plug the AC connector into the Grid & EPS port of the inverter and tighten the lock on the AC connector.

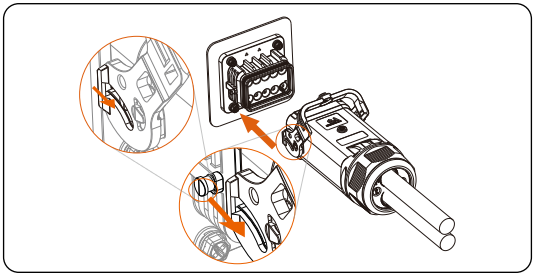


Figure 7-24 Plugging the AC connector into the port on the inverter

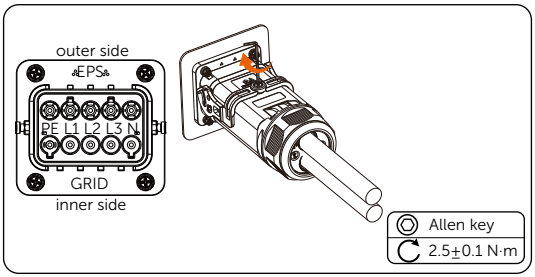


Figure 7-25 Tightening the lock on the AC connector

7.2.3 PV Connection

DANGER!

- High DC voltage will be generated by PV modules when exposed to sunlight. Death or lethal injuries will occur due to electric shock.
- Make sure the DC switch are turned off and AC breaker are disconencted from the inverter before PV 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 (1000 V) by the inverter.
  - » The working voltage should be within the MPPT voltage range (110-950 V). Consider the impact of low temperature on the voltage of the photovoltaic panels, as lower temperatures tend to result in higher voltages.
- PV module
  - » PV modules within the same MPPT channel should be of the same type, same model, same number, aligned and tilted identically.
  - » The positive or negative pole of the PV modules is not grounded.
  - » The positive cables of the PV modules must be connected with positive DC connectors. The negative cables of the PV modules must be connected with negative DC connectors.
- Multi PV module connection mode

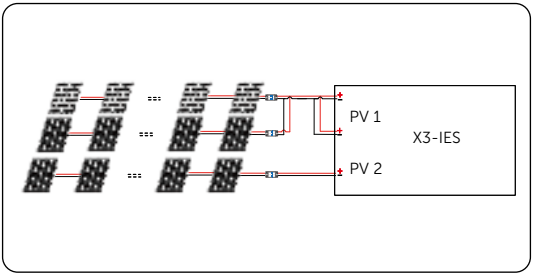


Figure 7-26 "Multi" mode connection diagram

Wiring procedures

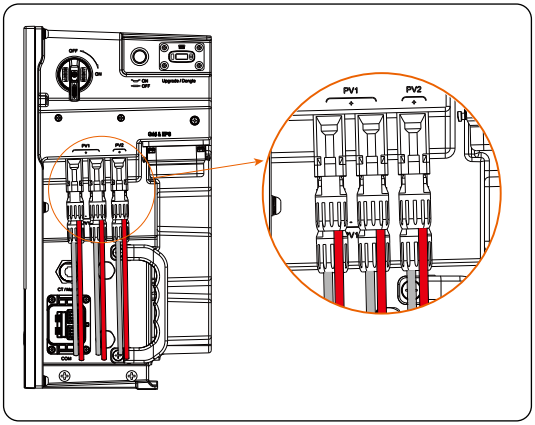


Figure 7-27 Well connected PV cables

Step 1: Strip 7 mm insulation jacket off PV cables. Insert the stripped ends of PV cables (+/-) into PV pin contacts (+/-). Ensure that the stripped cable and the PV pin contact are of the same polarity. Crimp them with a MC4 crimping tool .

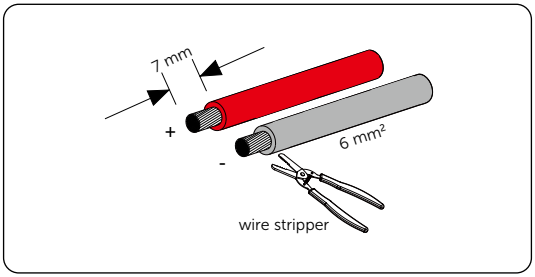


Figure 7-28 Stripping PV cables

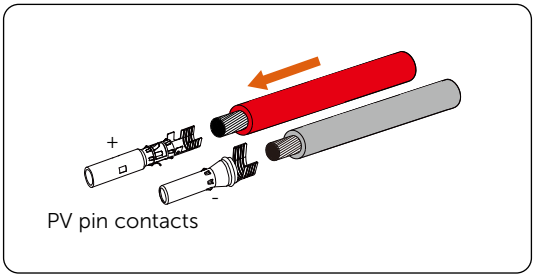


Figure 7-29 Inserting PV pin contacts into PV cables

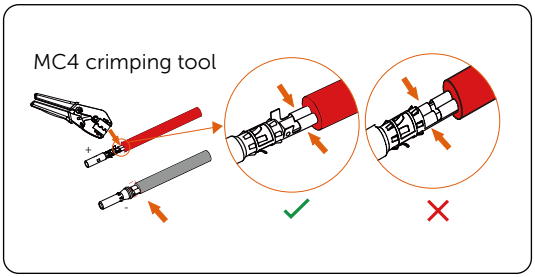


Figure 7-30 Crimping cables with PV pin contacts

Step 2: Thread PV cables through swivel nuts and insert cables (+/-) into PV connectors (+/-) until a "Click" is heard. Gently pull cables backward to ensure firm connection. Tighten swivel nuts clockwise.

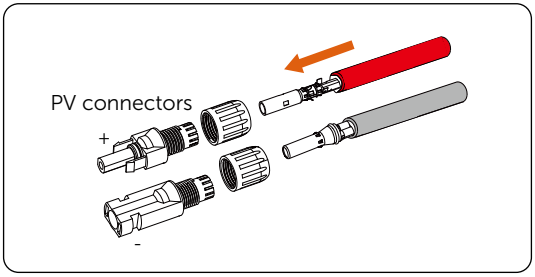


Figure 7-31 Threading PV cables with PV pin contacts connected

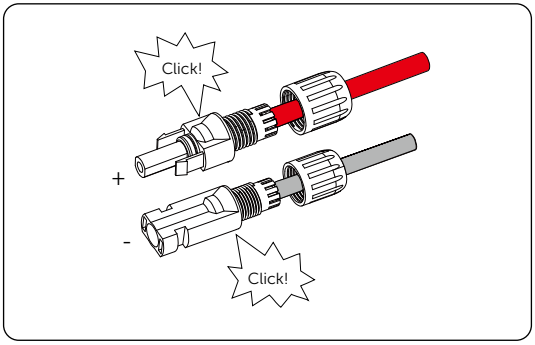


Figure 7-32 Securing PV cables

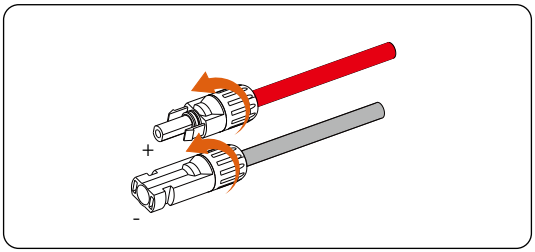


Figure 7-33 Tightening swivel nuts of PV connectors

Step 3: Check whether the PV connectors have the correct polarity. Use a multimeter to measure the positive and negative voltage of the assembled PV connectors. Make sure the open circuit voltage does not exceed the input limit of 950 V.

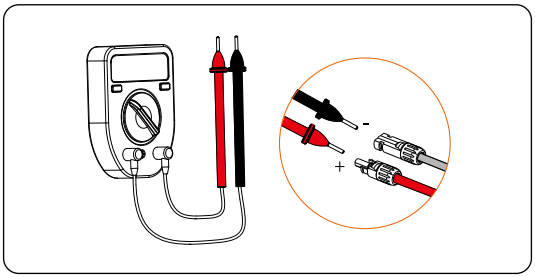


Figure 7-34 Measuring the voltage of PV connectors

NOTICE!

- If the voltage is a negative value, the DC input polarity is incorrect. You need to correct the positive and negative polarity.
- If the measured voltage exceeds 950 V, too many PV modules are configured to the same string. Remove some PV modules.

Step 4: Remove the PV dustproof cover. Seal the unused PV ports with original PV dustproof cover.

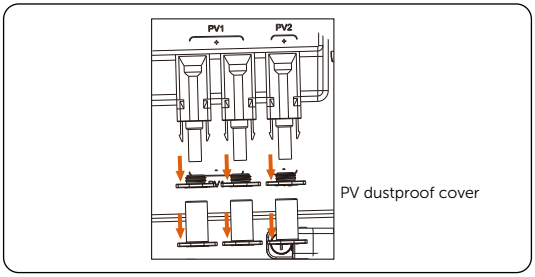


Figure 7-35 Removing the dustproof cover

NOTICE!

- Please ensure the AC breaker is disconnected and secure against reconnection.
- Please ensure the DC switch of the inveter and the battery is switched off.

Step 5: Connect the assembled PV connectors to corresponding ports on the inverter until there is an audible click. The PV+ on the string side must be connected to the PV+ on the inverter side, and the PV– on the string side must be connected to the PV– on the inverter side.

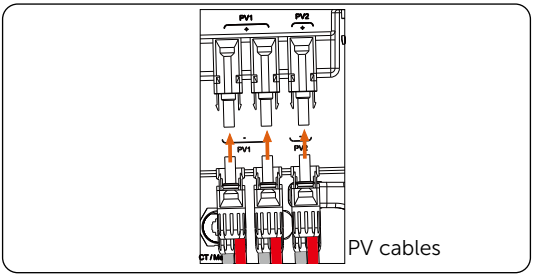


Figure 7-36 Connecting PV cables

7.2.4 Communication Connection

COM and CT/Meter ports are for the communication function of the inverter.

Communication Port Introduction

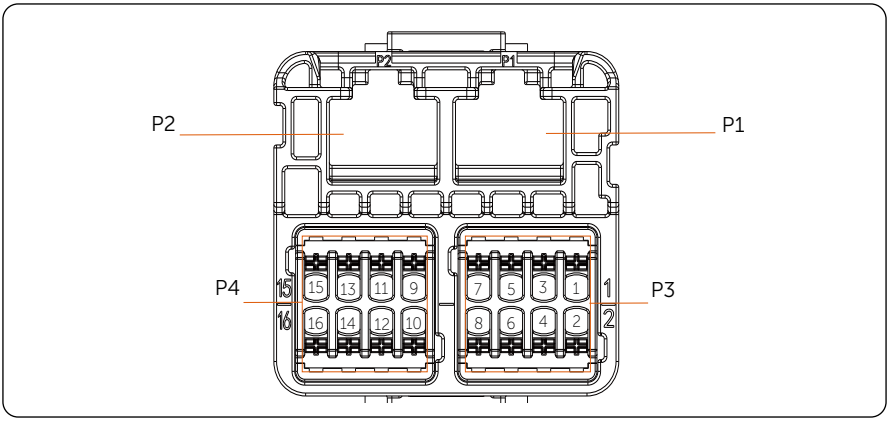


Table 7-1 Description of COM

P1	1	PARALLE_SYNC1	Parallel signal output	Parallel signal port (RJ45)
	2	PARALLE_SYNC2		
	3	EPSBOX_RELAY_VCC		
	4	PARALLE485A		
	5	PARALLE485B		
	6	GND_COM		
	7	CAN_L		
	8	CAN_H		
P2	1	PARALLE_SYNC1	Parallel signal input	
	2	PARALLE_SYNC2		
	3	N/A		
	4	PARALLE485A		
	5	PARALLE485B		
	6	GND_COM		

Icon	PIN	Definition	Function	Comment
P2	7	CAN_L	Parallel signal input	Parallel signal port (RJ45)
	8	CAN_H		
P3	1	DRM1/5	Logic interface signal	Logical interface is for Australia (AS4777) and other standards
	2	DRM2/6		
	3	DRM3/7		
	4	DRM4/8		
	5	+3.3V_COM		
	6	COM/DRM0		
	7	remote 485A	RS485 differential signal-A	communication with SolaX's datahub, EV-Charger and other external devices
	8	remote 485B	RS485 differential signal-B	
P4	9	12V_COM	12V	Energy supply
	10	GND	GND	Ground connection
	11	modulbus 485A	Modulbus485	485 port for communication with other external devices
	12	modulbus 485B		
	13	DO_1	Output drycontact	Output drycontact
	14	DO_2		
	15	DI_1	Input drycontact	Input drycontact
	16	DI_2		

* Professional personnel can use pins 11 and 12 to realize data acquisition and external control functions. The communication protocol is Modbus RTU. For details, please contact us.
* If customers want to use the inverter dry contact to control external equipment (such as a heat pump), it can be used with our Adapter Box.
* Only DRM 0/1/5 are available, others are under development.
* The inverter can be shut down through DRM0.

Parallel Connection (P1/P2 Port)

The inverter provides the parallel connection function. Up to 10 inverters can be connected in one system with an X3-PBOX-60kW-G2/ X3-PBOX-150kW-G2 (hereafter referred to as X3-PBOX device). Up to 3 inverters can be connected in one system if no X3-PBOX device is equipped. One inverter will be set as the "Master inverter" to control the other "Slave inverters" in the system via P1/P2 port of the COM port of the inverter.

Requirments for parallel connection

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

System diagram

- Diagram 1: System diagram with SolaX X3-PBOX device

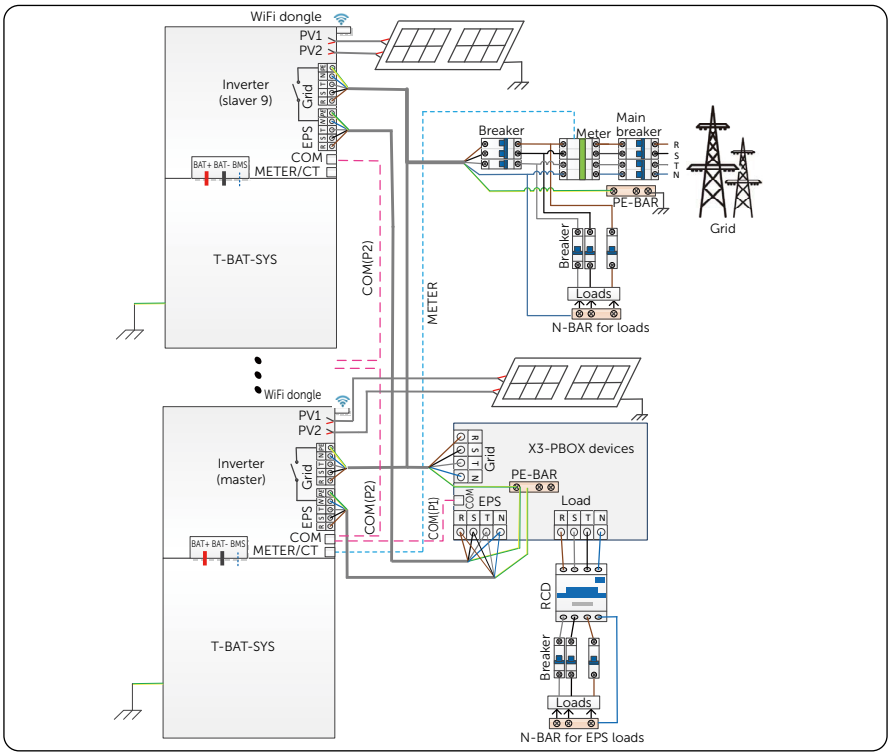


Figure 7-37 System diagram with SolaX X3-PBOX device

- Diagram 2: System diagram without SolaX X3-PBOX device

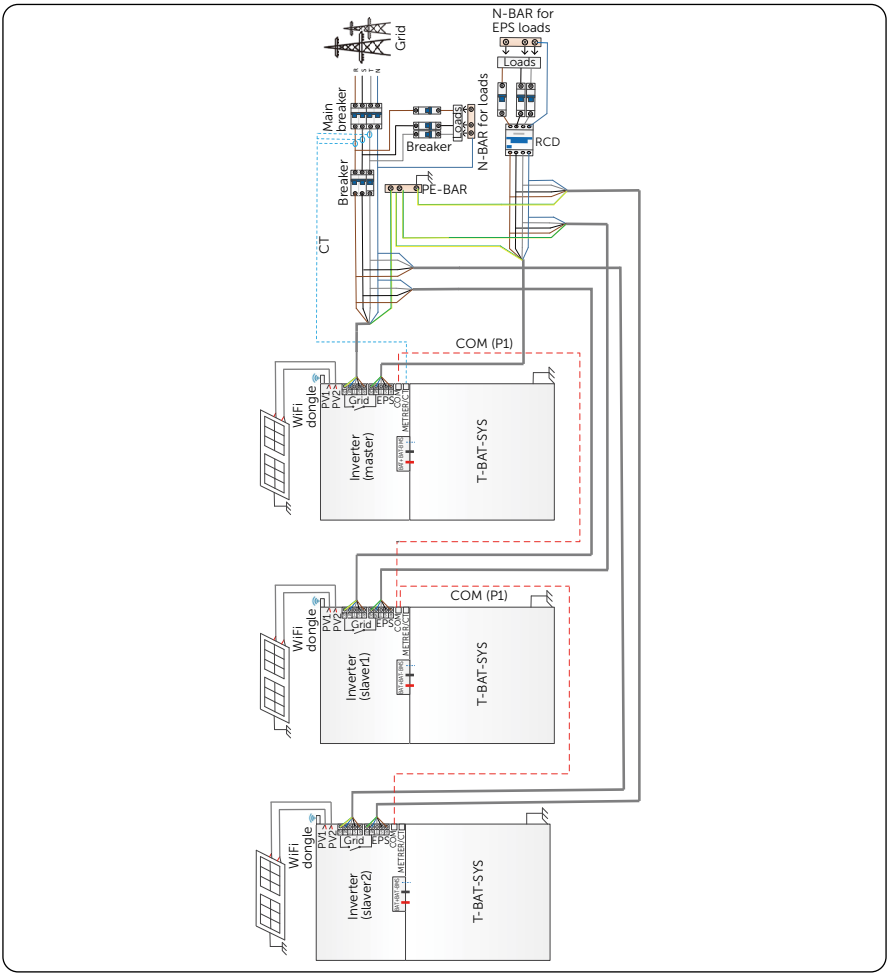


Figure 7-38 System diagram without SolaX X3-PBOX device

WARNING!

- Many cables are connected in these parallel systems, therefore it is strongly required that cables must be connected according to **correct line sequence** (R-R, S-S, T-T, N-N). Otherwise, any misoperation may cause the system running failed.
- In diagram 2, INCORRECT line sequence (R-R, S-S, T-T, N-N) will damage the inverter. To avoid the damage, set the default **Enable** in External ATS interface under the Advance Settings as **Disable**.

Parallel connection diagram

- Diagram 1: Parallel connection with SolaX X3-PBOX device
  - » Use standard network cables for P2-P1 connection.
  - » Connect Master inverter P1 to the COM port of X3-PBOX device.
  - » Connect Master inverter P2 to Slaver 1 inverter P1.
  - » Connect Slaver 1 P2 to Slaver 2 P1; other inverters are connected in such way.
  - » A meter connects to the meter port of the master inverter.

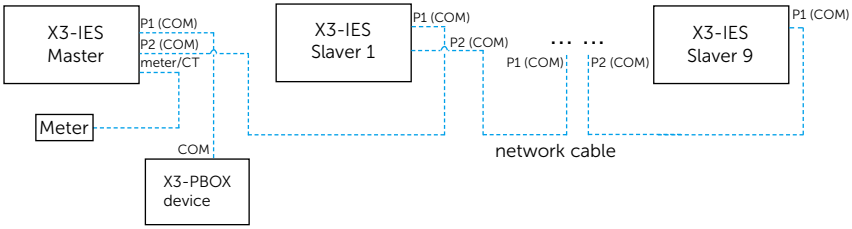


Figure 7-39 Parallel connection with SolaX X3-PBOX device

- Diagram 2: Parallel connection without SolaX X3-PBOX device
  - » Use standard network cables for P2-P1 connection.
  - » Master inverter P2 to Slave 1 inverter P1;
  - » Slave 1 inverter P2 to Slave 2 inverter P1
  - » Meter connects to meter port of the master inverter.

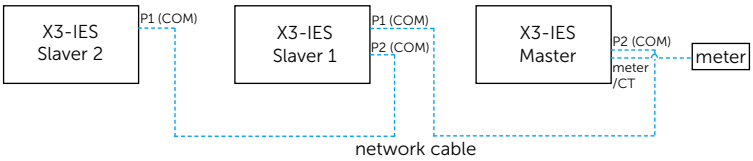


Figure 7-40 Parallel connection without SolaX X3-PBOX device

Table 7-2 Master inverter and slaver inverter connection

P2 (COM) port of the master inverter		P1 (COM) port of slaver 1 inverter	
Pin	Pin definition	Pin	Pin definition
1	PARALLE_SYNC1	1	PARALLE_SYNC1
2	PARALLE_SYNC2	2	PARALLE_SYNC2
4	PARALLE485A	4	PARALLE485A
5	PARALLE485B	5	PARALLE485B
6	GND_COM	6	GND_COM
7	CAN_L	7	CAN_L
8	CAN_H	8	CAN_H

Other slave inverters connects in the same way.

Table 7-3 Slaver 1 and slaver 2 inverter connection

P2 (COM) port of slaver 1 inverter		P1 (COM) port of slaver 2 inverter	
Pin	Pin definition	Pin	Pin definition
1	PARALLE_SYNC1	1	PARALLE_SYNC1
2	PARALLE_SYNC2	2	PARALLE_SYNC2
4	PARALLE485A	4	PARALLE485A
5	PARALLE485B	5	PARALLE485B
6	GND_COM	6	GND_COM
7	CAN_L	7	CAN_L
8	CAN_H	8	CAN_H

Table 7-4 Master inverter and X3-PBOX-60kW-G2/ X3-PBOX-150kW-G2 connection

P1 (COM) port of the master inverter		COM port of X3-PBOX-60kW-G2/ X3-PBOX-60kW-G2	
Pin	Pin definition	Pin	Pin definition
3	EPSBOX_RELAY_VCC	A3	DRIVER+13V
6	GND_COM	A6	GND_COM

- Refer to "Figure 7-2 Master inverter and slaver inverter connection" and "Figure 7-3 Slaver 1 and slaver 2 inverter connection" for specific parallel connection on inverter; refer to "Figure 7-4 Master inverter and X3-PBOX-60kW-G2/ X3-PBOX-150kW-G2 connection" for parallel connenction on parallel box; refer to "Meter/CT Connection (Meter/CT Port)" for specific meter connection.

DRM Connection (COM Port)(Applicable to AS/NZS 4777)

According to Australia AS/NZS 4777, the inverter need to support the function of demand response mode (DRM), DRM 0, DRM 1 and DRM 5 are available now.

Table 7-5 Desciptions of DRM

Mode	Requirement
DRM 0	Operate the disconnection device.
DRM 1	Do not consume power.
DRM 2	Do not consume at more than 50% of rated power.
DRM 3	Do not consume at more than 75% of rated power and source reactive power if capable.
DRM 4	Increase power consumption (subject to constraints from other active DRMs).
DRM 5	Do not generate power.
DRM 6	Do not generate at more than 50% of rated power,
DRM 7	Do not generate at more than 75% of rated power and sink reactive power if capable.
DRM 8	Increase power generation (subject to constraints from other active DRMs.

External Devices 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.

External connection with a datahub

Pin Assignment

Table 7-6 Inverter connected with a SolaX datahub

COM port of X3-IES series inverter		RS485-1/-2/-3/-4 port of SolaX datahub
Pin	Pin definition	Pin definition
7 (P3)	remote 485A	RS485A
8 (P3)	remote 485B	RS485B
10 (P4)	GND	GND

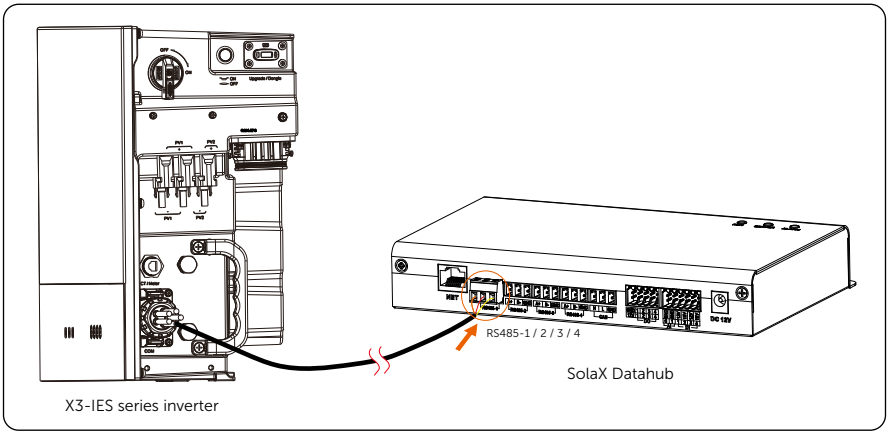


Figure 7-41 Inverter connected with a SolaX datahub

External connection with an EV Charger

Pin Assignment

Table 7-7 Inverter connected with an SolaX EV Charger

COM port of X3-IES series inverter		COM port of SolaX EV Charger	
Pin	Pin definition	Pin	Pin definition
7 (P3)	remote 485A	3	A1
8 (P3)	remote 485B	4	B1

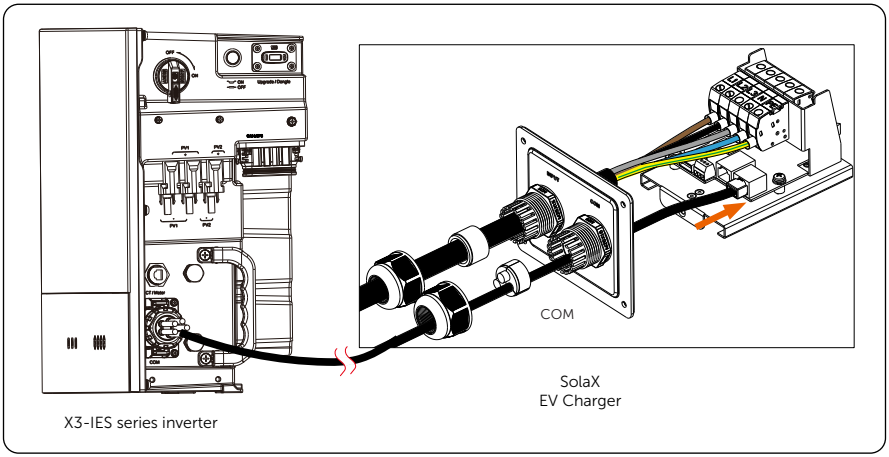


Figure 7-42 Inverter connected with a SolaX EV Charger

External connection with an adapter box G2

Pin Assignment

Table 7-8 Inverter connected with an SolaX adapter box G2

COM port of X3-IES series inverter		485_INV port of SolaX Adapter Box G2	
Pin	Pin definition	Pin	Pin definition
7 (P3)	remote 485A	4	RS485-A
8 (P3)	remote 485B	5	RS485-B
9 (P4)	12V_COM	3	+13 V
10 (P4)	GND	6	GND

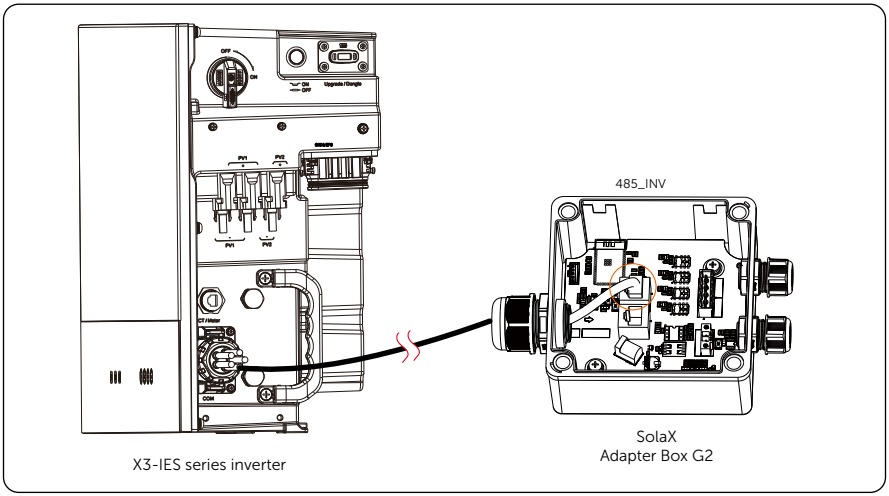


Figure 7-43 Inverter connected with a SolaX adapter box G2

Wiring procedures

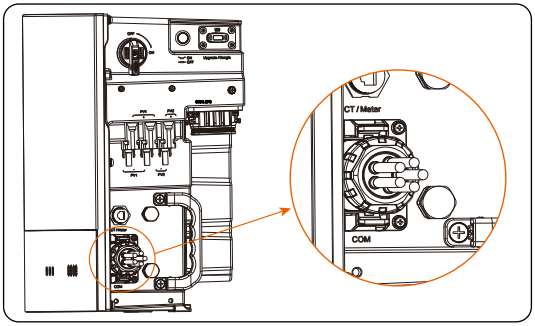


Figure 7-44 Well connected COM port

Step 1: Loosen the swivel nut and pull out the rubber stoppers inside. Press the bricks on the terminal block and pull the block out.

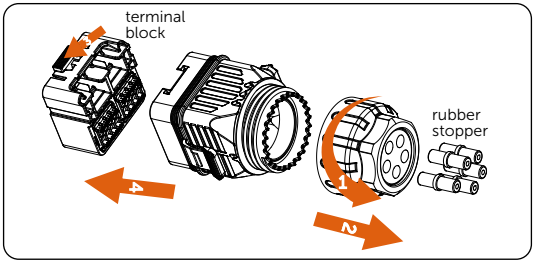


Figure 7-45 Disassembling the communication connector

Step 2: Thread two communication cables through the swivel nut and the communication connector. Slightly tighten the swivel nut but not lock it in case of its falling down. Strip 15 mm insulation jacket off.

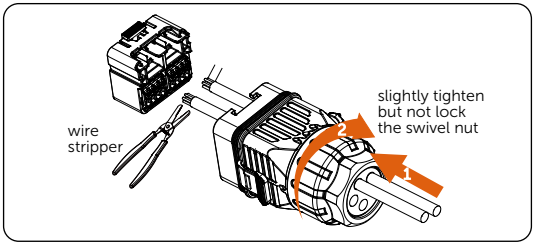


Figure 7-46 Stripping cables

NOTICE!
• Screw the swivel nut slightly in case of its falling down.

Step 3: Crimp the stripped end with RJ45 terminals with a crimping tool for RJ45.

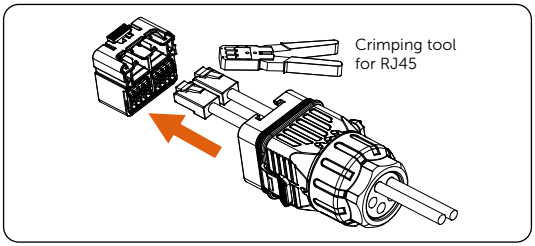


Figure 7-47 Crimping terminals

Step 4: Strip communication cables as needed as below.

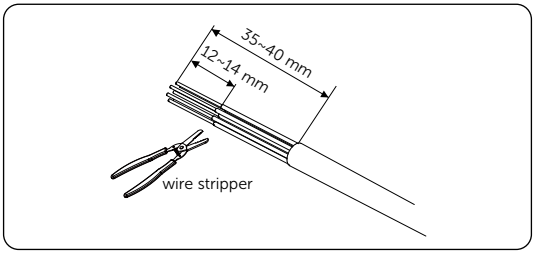


Figure 7-48 Stripping cables

Step 5: Thread communication cables through the swivel nut and the communication connector. Slightly tighten the swivel nut but not lock it in case of its falling down. Insert the wires into ferrules.

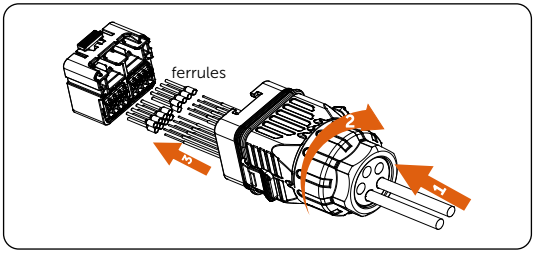


Figure 7-49 Inserting wires into ferrules

NOTICE!
• Screw the swivel nut slightly in case of its falling down.

Step 6: Crimp ferrules and plug well crimped wires into the terminal block as needed.

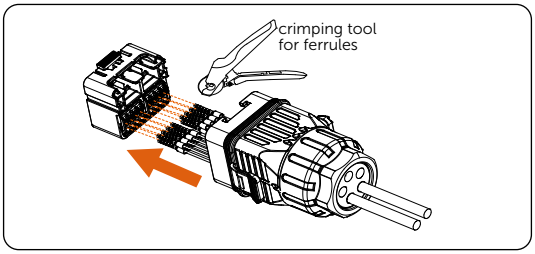


Figure 7-50 Crimping ferrules

Step 7: Insert the terminal block connected with cables into the communication connector until there is an audible click. Screw the swivel nut tightly.

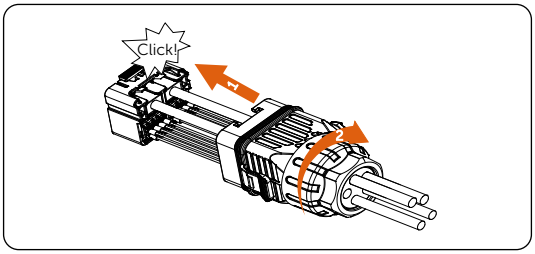


Figure 7-51 Inserting the terminal block into the connector

NOTICE!
• Please ensure ports of the communication connector are well sealed.

Step 8: Remove the dustproof cover on the COM port of the inverter. Plug the communication connector into the port.

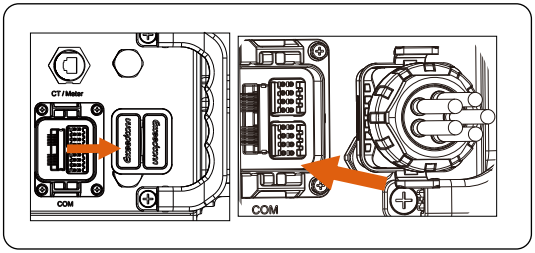


Figure 7-52 Removing the dustproof cover and plugging in the connector

Meter/CT Connection (Meter/CT Port)

The inverter should work with an electric meter or current transformer (CT for short) to monitor household electricity usage. The electricity meter or CT can transmit the relevant electricity data to the inverter or platform, which is convenient for users to read it at anytime.

CAUTION!

- The meter or CT must be connected to the inverter, otherwise the inverter will shut down and prompt "**Meter Failure**" alarm. Smart meters must be authorized by our company, third party or other companies, Unauthorized meter may be incompatible with the inverter.
- SolaX will not be responsible for the impact caused by the use of other appliances.

NOTICE!

- Do not place the CT on the N wire or ground wire.
- Do not put CT on the N line and L line at the same time.
- Do not place the CT on the side where the arrow points to the inverter.
- Do not place the CT on non-insulated wires.
- The cable length between CT and inverter should not exceed 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.

Connection Diagram

- Meter connection diagram

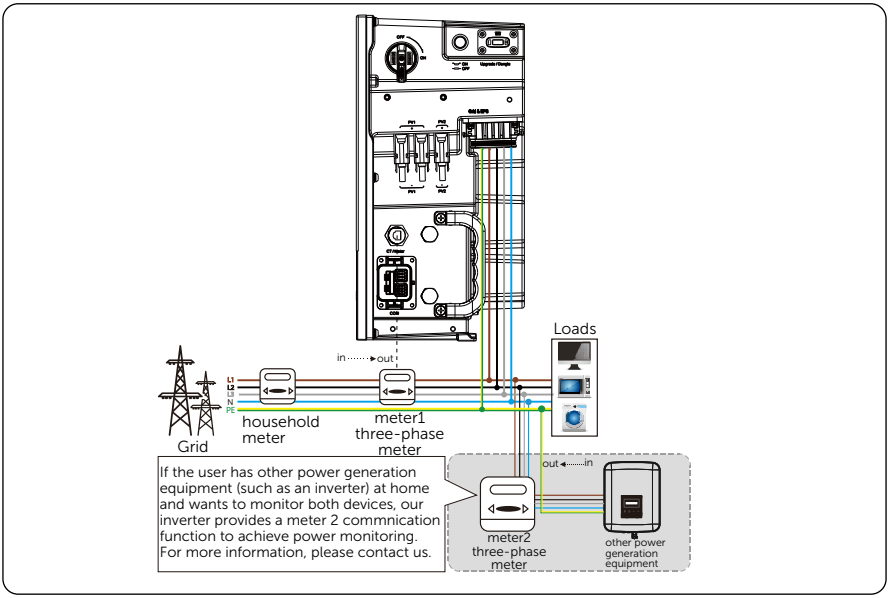


Figure 7-53 Meter connection diagram

* Please ground the GND terminal of Meter1 and Meter2 if you want to connect a meter.

- CT connection diagram

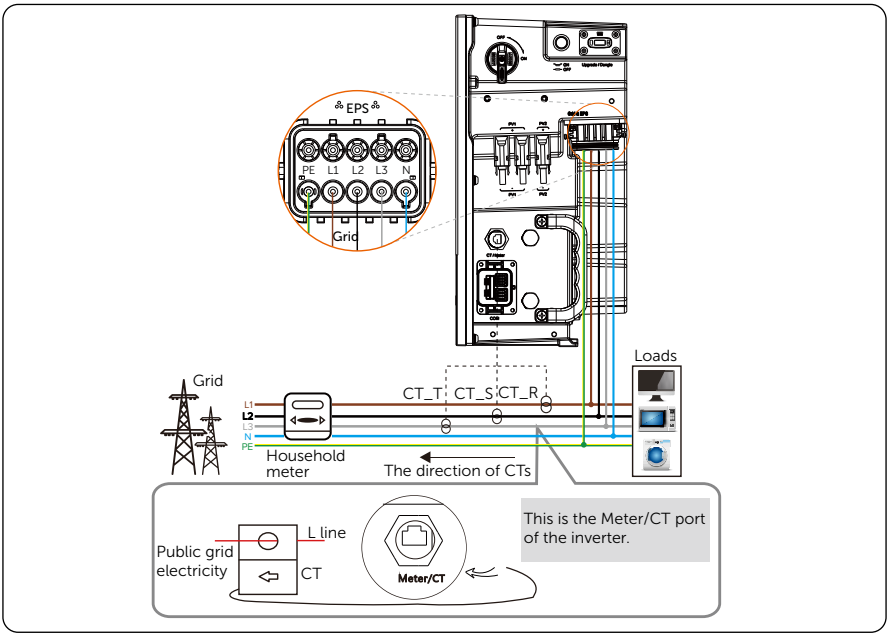


Figure 7-54 CT connection diagram

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

* CT-R must be connected to L1, CT-S connected to L2, and CT-T connected to L3 in accordance with the L1, L2 and L3 of the inverter's Grid port.

Pin Assignment

Table 7-9 Pin assignment for Meter/CT

Item	CT			Meter		CT		
Pin	1	2	3	4	5	6	7	8
Pin Definition	CT_R1	CT_S1	CT_T1	METER485A	METER485B	CT_T2	CT_S2	CT_R2

Wiring procedures

Step 1: Prepare a waterproof connector with RJ45, a RJ45 terminal and a communication cable. An additional RJ45 terminal is not needed in meter connection. Disassemble the waterproof connector and the RJ45 terminal inside the connector.

» For CT connection, strip 15 mm insulation jacket off the cable, crimp terminal B with the cable. Thread the unstripped end of the cable through the waterproof connector. Strip 15 mm insulation jacket off and crimp the end with terminal A in accordance with the pin definition of CT.

» For meter connection, strip the cable with the requirement of the *Meter Quick Installation Guide*. Thread the unstripped end through the waterproof connector. Strip 15 mm insulation jacket off and crimp the end with terminal A in accordance with the pin definition of meter.

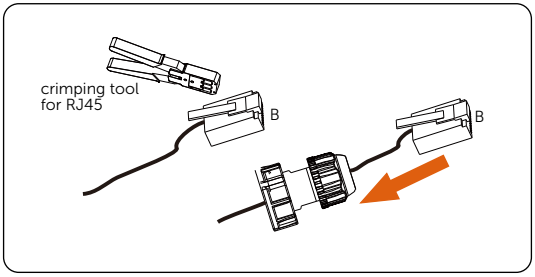


Figure 7-55 CT connection diagram

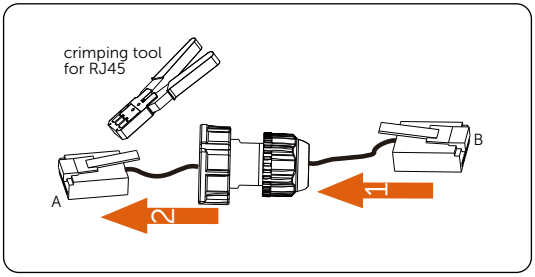


Figure 7-56 CT connection diagram

Step 2: Remove the dustproof cover from the Meter/CT port.

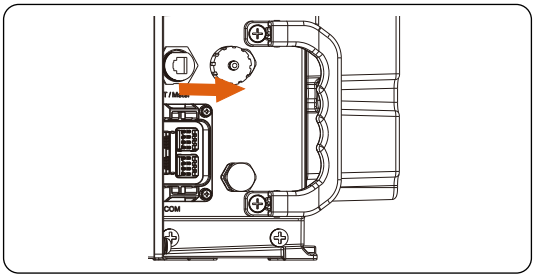


Figure 7-57 Removing the dustproof cover

Step 3: Insert the communication cable into the Meter/CT port. An audiable "Click" will be heard if it is successfully connected.

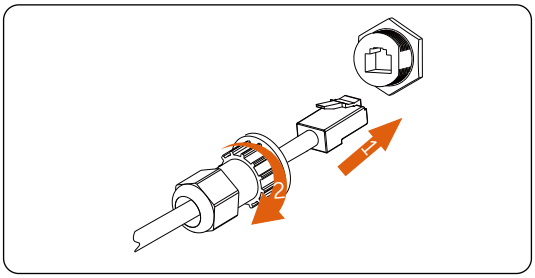


Figure 7-58 Connecting cable to the Meter/CT port

Step 4: For a CT connection, plug the terminal B to RJ45 connector. For a meter connection, connect pin 4 and pin 5 of the stripped end directly to the pin 24 and pin 25 of a meter. Please refer to a meter manual for a specific connection method.

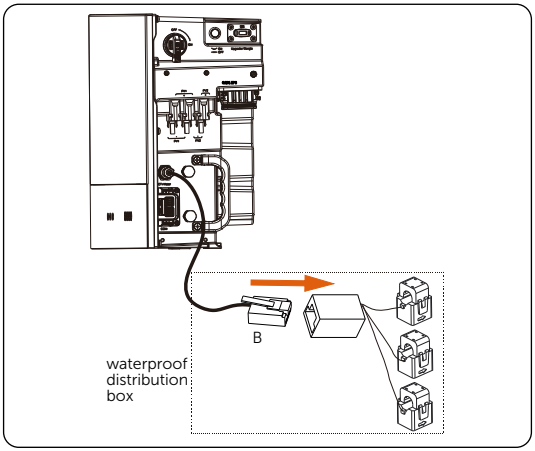


Figure 7-59 CT connection

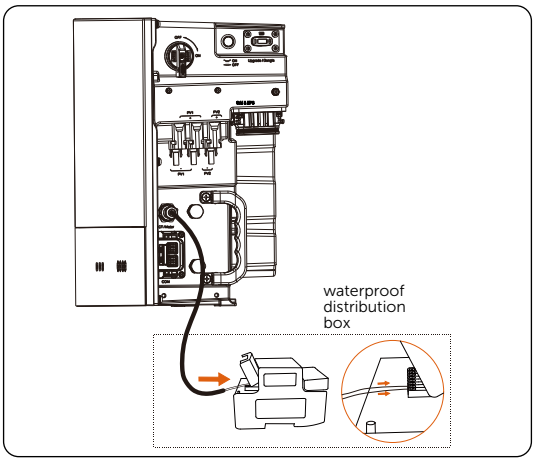


Figure 7-60 Meter connection

Step 5: Hang the cable shielding board on the screws on the inverter and lock the screws at the bottom of the inverter.

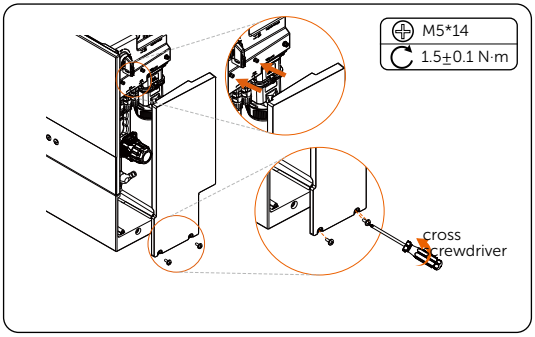


Figure 7-61 Locking the cable shielding board

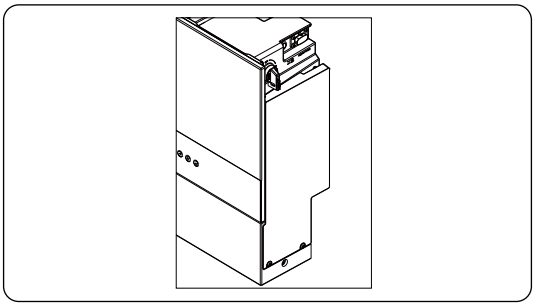


Figure 7-62 Locking the board well

7.2.5 Monitoring Connection (UPGRADE/DONGLE Port)

The inverter provides a DONGLE port, which can transmit data of the inverter to the monitoring website via WiFi dongle, LAN dongle (optional) and 4G dongle (optional). A WiFi dongle can be matched with the other two optional monitoring modules.

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 WiFi isn't 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
- 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.)

NOTICE!

- Ensure the WiFi dongle port is sealed with the dustproof cover when no device is plugged in. Otherwise, it may cause inverter damage.

Monitoring connection diagram

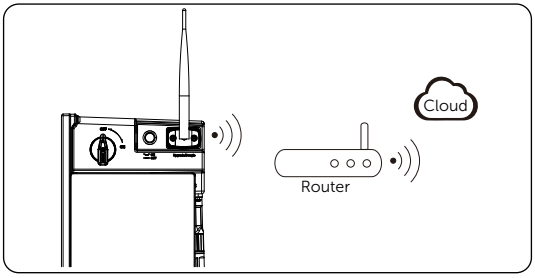


Figure 7-63 WiFi connection

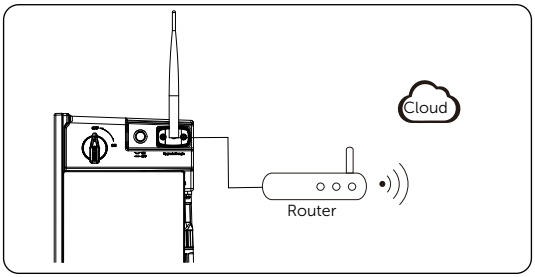


Figure 7-64 WiFi and LAN connection (optional)

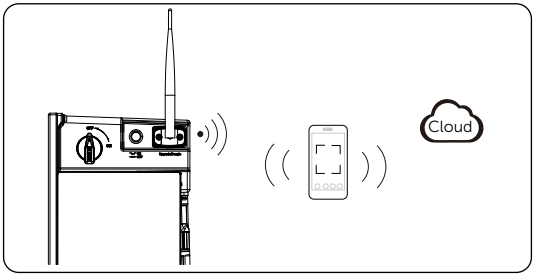


Figure 7-65 WiFi and 4G connection (optional)

Wiring procedures

Find the DONGLE port of the inverter and plug WiFi dongle into the DONGLE port.

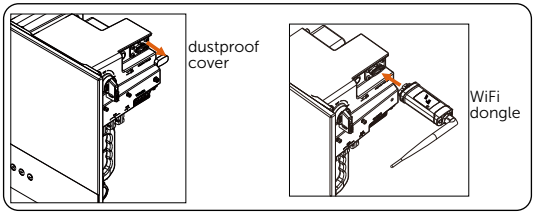


Figure 7-66 Pulling out the dustproof cover and plugging in the WiFi dongle

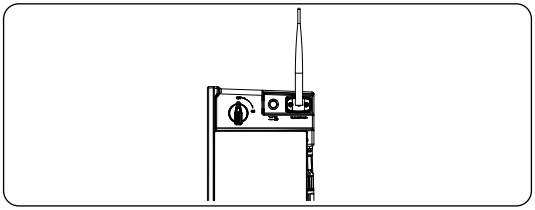


Figure 7-67 Well connected WiFi dongle

8 System Commissioning

8.1 Checking before Power-on

a. Check the device installed correctly and securely;

b. Make sure that the DC switch and system BUTTON on the inverter and the AC breakers connected to the inverter are OFF;

c. Make sure that all the BAT BUTTON and BAT SWITCH are OFF;

d. All Grid and EPS cables are connected correctly and securely;

e. Make sure the PE wires of the Grid and EPS cables are correctly and securely;

f. Make sure the inverter is connected to the battery correctly and securely;

g. All communication cables are connected correctly and securely;

h. Make sure the CT/meter is connected correctly and securely;

i. Make sure the battery is connected correctly and securely;

j. Make sure all photovoltaic panels are connected correctly and securely;

k. Make sure all the connectors which are not used sealed by covers;

l. The covers and lids of the inverter is closed and the cover screws are tightened.

8.2 Powering on the System

Step 1: Turn on the AC breaker and check whether the LCD screen lights on.

» If the LCD screen is not on, turn off the AC breaker and check whether the Grid cable is conected correctly and securely.

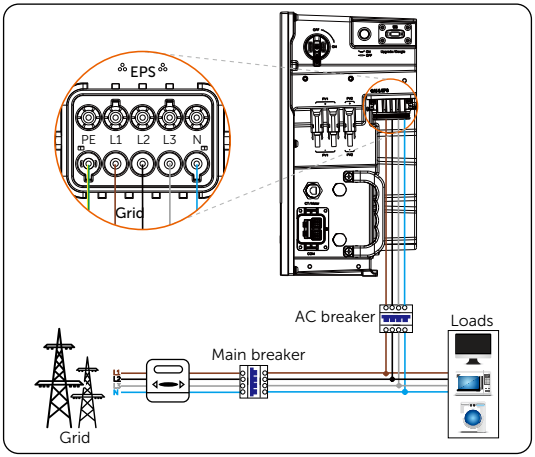


Figure 8-1 Turning on AC breaker

Step 2: Turn on the inverter DC switch and check the LCD screen, refer to "PV1 and PV2" to check the PV voltage . If the PV voltage is 0, turn off the DC switch, pull out the PV connetors, and then measure the voltage of the positive and negative PV port (in MPPT voltage range 110-950 V) or check whether the positive and negative poles of PV cables are reversed.

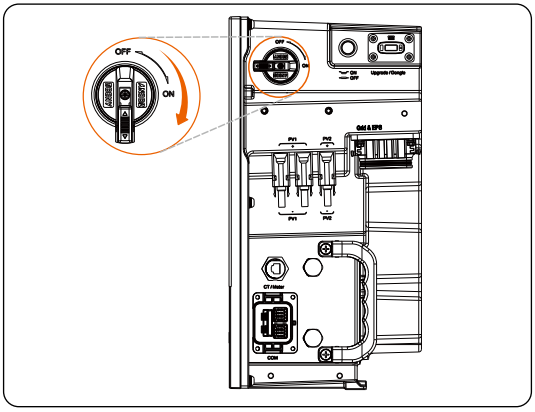


Figure 8-2 Turning on the DC switch

Step 3: Switch the BAT switch to the "ON" position. Press and hold the BAT button for 1-2 seconds (at the point, the SoC indicators will rapidly flash yellow lights and then turn to flash green lights).

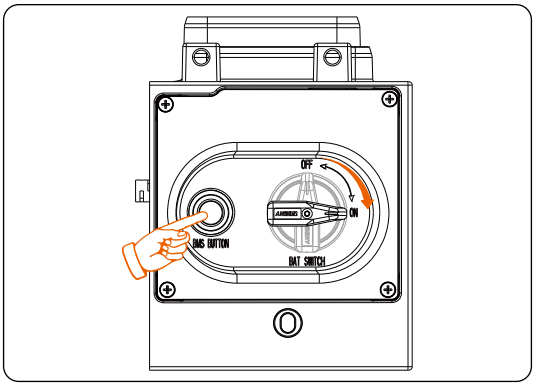


Figure 8-3 Turning on the battery

NOTICE!

- The button is in OFF status 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 4: Turn on the inverter system BUTTON.

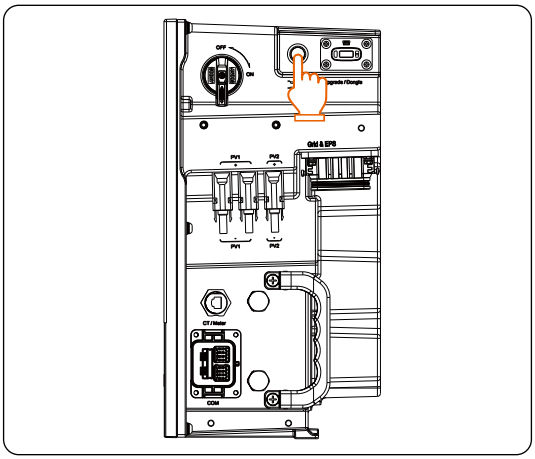


Figure 8-4 Pressing the inverter button

NOTICE!

- The button is in OFF status 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 5: Check whether the current "Safety Code" complys with the local grid-tied regulations. Normally, the factory setting is set with the local regulations.

NOTICE!

- When the **Safety Code** is selected, parameters in **Power Factor**, **Pu Function**, **DRM function** and **FVRT function** under the **Advanced setting** interface can be automatically adjusted in accordance with the local grid-tied regulations.

Step 6: Set "System ON/OFF" as ON status on the inverter LCD screen, and the LCD displays waiting status.

Step 7: When the photovoltaic panels generate enough power, the inverter will start automatically. The inverter will go Waiting, Checking and Normal status in sequence.

NOTICE!

- Waiting: When the DC output voltage of the photovoltaic panel is higher than 110V (lowest starting voltage) and lower than 140V (lowest working voltage), the inverter waits for checking.
- Checking: The inverter will automatically detect the DC input. When the DC input voltage of the photovoltaic panel is higher than 140V and the photovoltaic panel has enough energy to start the inverter, the inverter will enter the checking state.
- Normal: When the inverter is working normally, the blue light is always on. At the same time, the LCD displays the output power.

Step 8: Check whether the meter/CT is correctly connected.

» If CT is connected, please perform the "Meter/CT Check" on the inverter LCD screen to check the correct connection.

» If meter is connected, please set "Meter/CT Settings" on the inverter LCD .

NOTICE!

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

8.3 Checking after Power-on

a. Check whether the inverter has any abnormal noise.

b. Check whether the indicator lights report an error and whether the LCD screen displays the error message.

c. Check whether the data of PV, grid and battery are normal through the LCD screen.

d. Check whether the Work Mode is consistent with what had been set through LCD screen or the SolaX Cloud App.

8.4 Power off

a. Turn off the inverter system BUTTON;

b. Turn off the AC breaker between the inverter and the power grid;

c. Set the inverter DC switch to "OFF";

d. Turn off the BAT switch and press for 1-2 seconds to turn off the BAT BUTTON.

WARNING!

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

8.5 Operation of Australian DC switch

This series of inverters are provided with two kinds of DC switches: general version (optional; without lock; applied to most countries and regions) and Australian version (standard; with lock; applied to Australia and New Zealand).

- For Australian version:

The Australian version includes 3 states: ON, OFF, and OFF+Lock. The DC switch is in the OFF state by default.

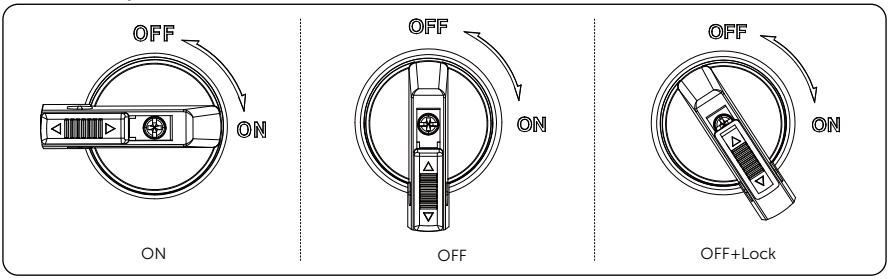


Figure 8-5 Status of DC switch

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

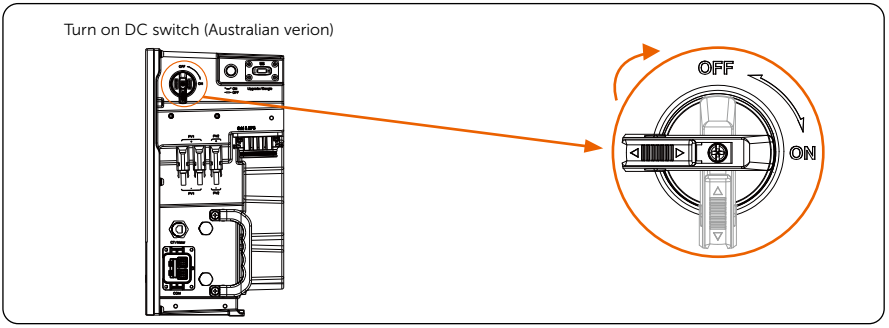


Figure 8-6 Turning on DC switch

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

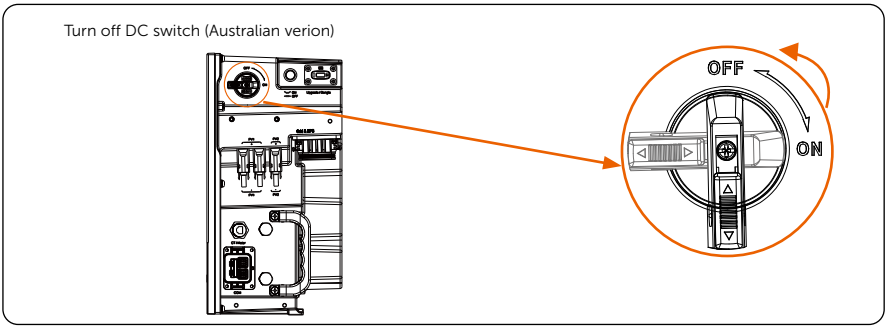


Figure 8-7 Turning off DC switch

- To lock the DC switch
  - » Rotate the lock to the left side;
  - » Push the lock upward (as shown in the diagram below).

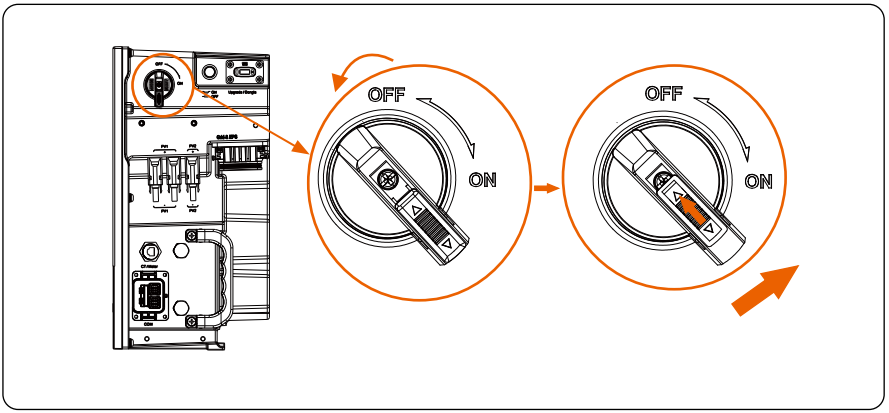


Figure 8-8 Locking DC switch

- To unlock the DC switch
  - » Push the lock down (as shown in the diagram below);
  - » Wait for it to return to OFF state.

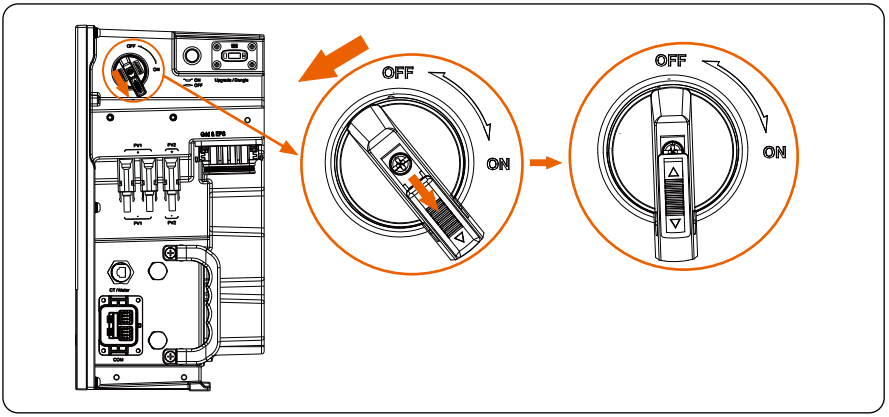


Figure 8-9 Unlocking DC switch

9 Operation on LCD

9.1 Overview of LCD

Press **Up** and **Down** to select the setting item and press Enter to confirm it.

If there is no operation on the inverter's LCD screen for 10 minutes, it will go black. Press any key to illuminate the screen again.

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 inverterl; **Battery** means the left capacity of the battery.

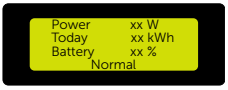


Figure 9-1 Information of the main interface

When the inverter is in the default control panel, press **Enter** to enter the menu interface. The screen only displays 4 items with the title included. You can press **Up** or **Down** to get full information.



Figure 9-2 Overview of the menu interface

- "System ON/OFF"
- "Work Mode"

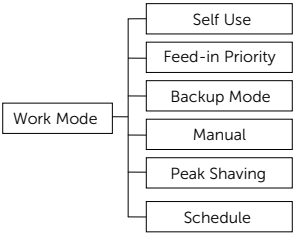


Figure 9-3 Work mode diagram

- "System Status"

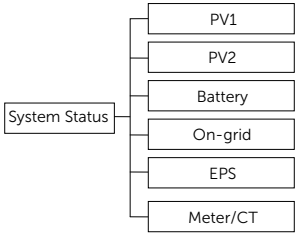


Figure 9-4 System status diagram

- "Parallel Status"
- "History Data"

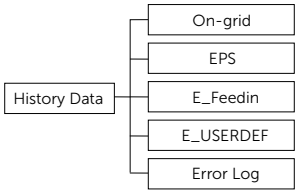


Figure 9-5 History data diagram

- Setting

User Setting and **Advance Setting** are included in **Setting**. Here below display the specific items under the two settings.

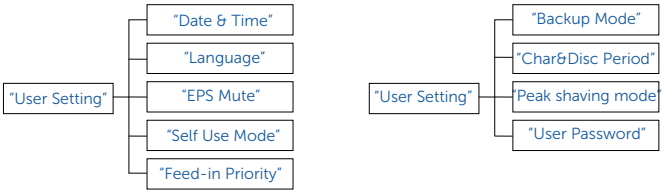


Figure 9-6 User setting diagram

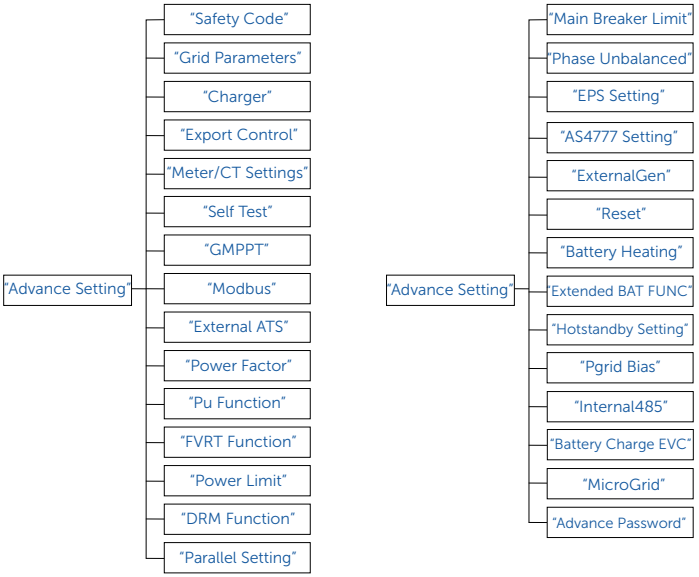


Figure 9-7 Advance setting diagram

- "About"

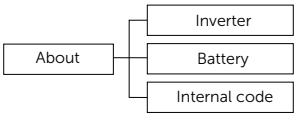


Figure 9-8 About diagram

NOTICE!

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

- System ON/OFF, Work Mode can be set and System Status, Parallel Status, History Data and About can be browsed 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.

- Date time, language, work mode, dry contact ect. under the User Setting can be set under the permission of user password by users. Replace the user password with a new secure password immediately. Advance Setting can only be set by installers.

9.2 System ON/OFF

Setting path: Menu > System ON/OFF

Setting System ON/OFF

ON means the inverter is turned on, and it is the default status.

OFF means the inverter is shut down, but the LCD screen is still on.

Default: OFF

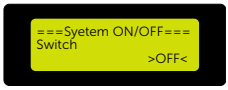


Figure 9-9 Turning on/off the system

9.3 Work Mode

Setting path: Menu > Work Mode

You can select a specific work mode to decide the working principle of the inverter in this interface.

Setting Work Mode

After entering the **Work Mode** interface, you can select **Self Use**, **Feed-in Priority**, **Backup Mode**, **Manual**, **Peak shaving**, **Schedule** as follows.

» Selecting Self Use

Self Use is the default work mode. Select a work mode and press **Enter** to confirm the work mode if another mode is to be selected. Select **Feed-in Priority**, **Backup Mode** and **Peak shaving** with the same logic as Self Use.

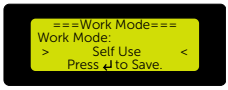
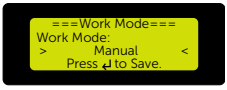


Figure 9-10 Selecting a work mode

» Selecting Manual

Manual is for after-sale team for maintaining devices.

Select **Manual** and enter the Manual interface. **Forced Discharge**, **Forced Charge** and **Stop Chrg&Dischrg** can be set in this interface.



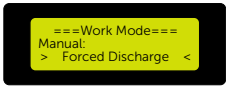




Figure 9-11 Setting items in Manual interface

» Selecting Schedule

Schedule can only be set in SolaX Cloud App. After setting the Schedule in the App, the well set Schedule mode will be diaplayed in the Schedule interface on the interter LCD screen. Self Use mode in the following interface is taken for an example.



Figure 9-12 Displaying the current work mode in Schedule interface

9.4 System Status

Displaying path: Menu > System Status

Displaying System Status

After entering the System Status interface, the status of **PV1**, **PV2**, **Battery**, **On-grid**, **EPS** and **Meter/CT** as follows.

» PV1 and PV2

Here display the input voltage, input current and input power of the PV1 and PV2 respectively in the interface.

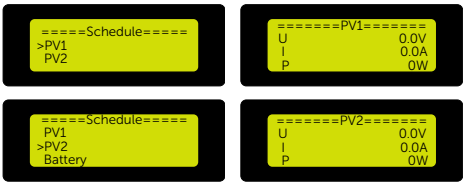


Figure 9-13 Displaying PV1 and PV2 status

» Battery

Here displays the battery status including the voltage, current and power of the BAT port, the present battery capacity, the battery cell temperature and BMS connection status.



Figure 9-14 Displaying battery status

» On-grid

Here display the voltage, current, power and frequency of each phase of the Grid port.

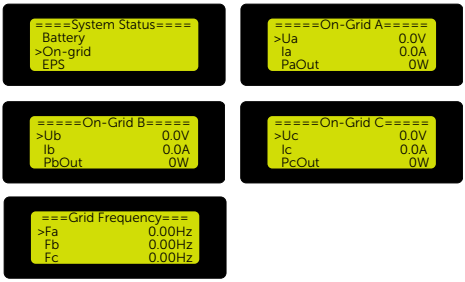


Figure 9-15 Displaying on-grid status

» EPS

Here display the voltage, current, power and frequency of each phase of the EPS port.

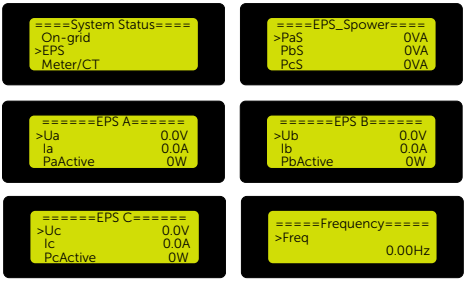


Figure 9-16 Displaying EPS status

» Meter/CT

Here display the feedin power of each phase of Meter/CT1 and the power of each phase of Meter2. The third LCD below will display if a Meter2 is connected.

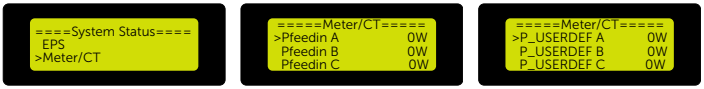


Figure 9-17 Displaying Meter/CT status

9.5 Parallel Status

Displaying path: Menu > Parallel Status

It displays only when X3-IES devices have a parallel connection. X3-IES supports another 9 slave devices connected.

Displaying Parallel Status

Here displays the number of devices and the devices in a parallel status Press **Down** and get all slaver inverters.

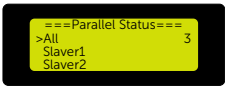


Figure 9-18 Displaying paralleling status

9.6 History Data

Displaying path: Menu > History Data

Displaying History Data

After entering the **History Data** interface, the status of **On-grid**, **EPS**, **E_Feedin**, **E_USERDEF** and **Error Log** as follows.

» On-grid

Here display today's output and input energy, total output and input energy under the on-grid condition.

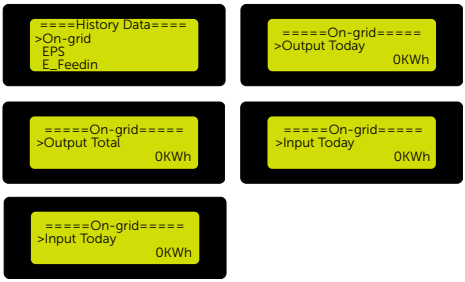


Figure 9-19 Displaying on-grid data

» EPS

Here display today's output energy and total output energy under the off-grid condition.

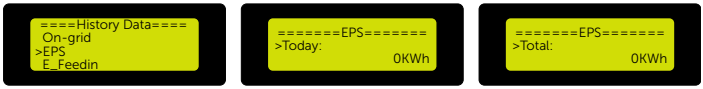


Figure 9-20 Displaying EPS data

» E_Feedin

Here display today's and total energy feeding into the grid, today's and total energy taking from the grid.

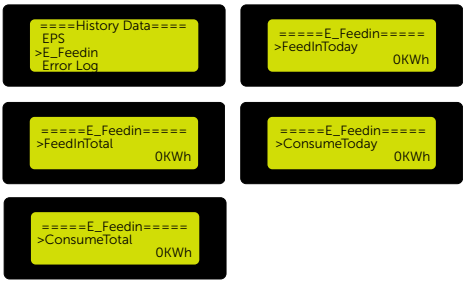


Figure 9-21 Displaying E_Feedin data

» E_USERDEF

It diaplays only when a meter2 is enabled

Here display today's output energy, total output energy under on-grid condition.

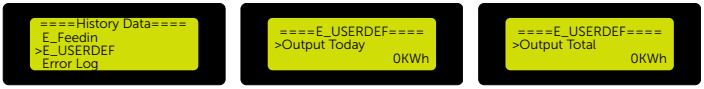


Figure 9-22 Displaying E_USERDEF data

» Error Log

Here display error logs of the device. The default status is "No Error".

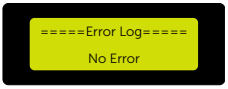


Figure 9-23 Displaying Error Log

9.7 Settings

Setting path: Menu > Settings

Enter the **Settings** interface and input the default password "**0000**" to enter the **User setting** interface. Contact SolaX after-sales team for the Advance setting password.



Figure 9-24 Entering a password

NOTICE!

- Professional installers can contact SolaX after-sales team for the password to revise items in the Advance setting interface. Users are porbidden to modify any settings under the Advance setting interface.

9.7.1 User Setting

Setting path: Menu > Setting > Password (0000) > User Setting

Users can set the items (refer to "Figure 9-6 User setting diagram") in the **User Setting** interface.

Setting Date & Time

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

The display format is "2023-07-06 10:05", in which the first four numbers represent the year (e.g. 2000~2099); the fifth and sixth numbers represent the month (e.g. 01~12); the seventh and the eighth numbers represent the date (e.g. 01~31). The remaining numbers represent the time.

Select **Date & Time** and press **Enter** to enter the interface. Press **Enter** to lock a specific number, press **Up** or **Down** to adjust the number and then press **Enter** to confirm this number and jump to set the next number with the same method until all numbers are well set. Press **Enter** to confirm your settings.

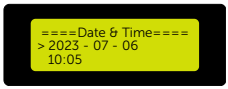


Figure 9-25 Setting the system date and time

Setting Language

This inverter provides multiple languages for customers to choose, such as English, Deutsch, francais, Polskie, Espanol, Português and Italiano.

Select **Language** in the **User Setting** interface, press **Enter** to enter the **Language** interface. Press **Up** or **Down** to select the display language based on actual need. Press **Enter** to confirm the language.

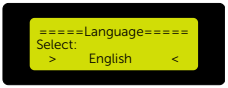


Figure 9-26 Setting system language

Setting EPS Mute

You set **Yes** in the **EPS Mute** interface, the buzzer mutes when the inverter enters EPS mode. When you set **No**, the buzzer can be heard every 4 seconds when the inverter enters EPS mode.

Default setting: No.

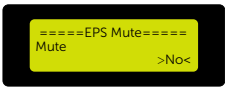


Figure 9-27 Turning on/off the EPS reminder

Setting Self Use Mode

» Setting Min SoC

Min SoC means the minimum battery SoC, and the battery won't discharge power when the actual battery SoC reaches this value.

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



Figure 9-28 Set Min SoC

» Setting Charge from grid

Charge from grid means you can set whether the inverter can charge from the grid. **Disable** means the inverter is not allowed to charge from the grid.

Default setting: Disable

Charge battery to means the utility grid is allowed to charge the battery to this value when **Charge from grid** is set **Enable**.

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

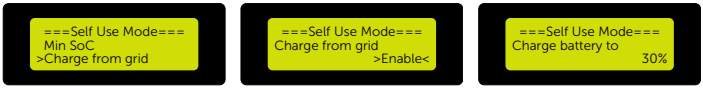


Figure 9-29 Setting Charge battery to

Setting Feed-in Priority

» Setting Min SoC

Min SoC means the minimum battery SoC, and the battery won't discharge power when the actual battery SoC reaches this value.

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



Figure 9-30 Setting Min SoC

» Setting Charge battery to

Charge battery to means the utility grid is allowed to charge the battery to this value.

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



Figure 9-31 Setting Charge battery to

Setting Backup Mode

» Setting Min SoC

Min SoC means the minimum battery SoC, and the battery won't discharge power when the actual battery SoC reaches this value.

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



Figure 9-32 Setting Min SoC

» Setting Charge battery to

Charge battery to means the utility grid is allowed to charge the battery to this

value.

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



Figure 9-33 Setting Charge battery to

Setting Char&Disc Period

There are two setable time period need to be set: Char&Disc Period and Char&Disc Period2.

» Setting Char&Disc Period

Here you can set the start time and end time of a forced charging period and an allowed discharging period.

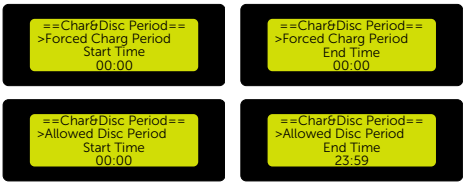


Figure 9-34 Setting Char&Disc Period

» Setting Char&Disc Period2

If another time period is needed, set Function Control as Enable in the Char&Disc Period2 interface. Please set the time period with the same logic with Char&Disc Period.

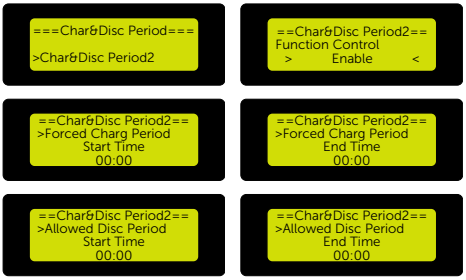


Figure 9-35 Setting Char&Disc Period2

Setting Peak shaving mode

There are four parts to set: DischgPeriod1, DischgPeriod2, ChargeFromGrid and Reserved_SoC.

» Setting Dischg Period1

DischgPeriod1 is the discharging period for peak shaving during which the PV and battery discharge energy for loads to leveling out peaks in electricity use.

You can set the **ShavingStartTime** and **ShavingEndTime** to define the peak shaving time period.

Default ShavingStartTime: 7:00

Default ShavingEndTime: 15:00

PeakLimits1 is set to limit the power that loads charge from the grid. Once the power of loads exceeds PeakLimits1 during DischgPeriod1, the PV and battery discharge power for loads.

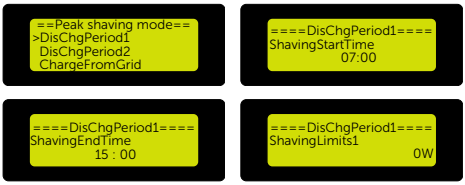


Figure 9-36 Setting Dischg Period1

» Setting DischgPeriod2

DischgPeriod2 is another discharging period for peak shaving during which the PV and battery discharge energy for loads to leveling out peaks in electricity use.

You can set the **ShavingStartTime** and **ShavingEndTime** to define the peak shaving time period.

Default ShavingStartTime: 19:00

Default ShavingEndTime: 23:00

PeakLimits2 is set to limit the power that loads charge from the grid. Once the power of loads exceeds PeakLimits2 during DischgPeriod2, the PV and battery discharge power for loads.

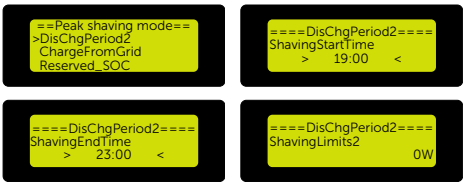


Figure 9-37 Setting Dischg Period2

» Setting ChargeFromGrid

The battery is not allowed to diacharge in non-peak hours. Set **Enable** in the **ChargeFromGrid** interface if you want to get electricity from the grid.

Default setting: Disable.

After you set **Enable,** set **ChargePowerLimits** and **MAX_SoC**.

ChargePowerLimits range: 0 W~rated power (W)

Default MAX_SoC: 50%; range: 10%–100%

Set **ChargePowerLimits** to limit the power at no more than which the battery charges from the grid when the actual battery SoC is less than MAX_SoC.

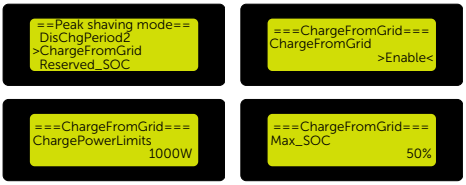


Figure 9-38 Setting ChargeFromGrid

» Reserved_SoC

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

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



Figure 9-39 Setting Reserved_SoC

Setting User Password

You can reset the password in the **User Password** interface.

Default user password: 0000.

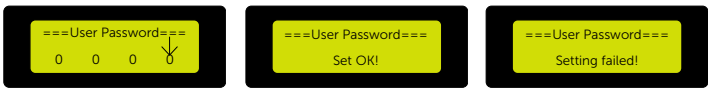


Figure 9-40 Resetting User Password

9.7.2 Advance Setting

Setting path: Menu > Setting > Password > Advance Setting

Only professional installers can modify the items (refer to "Figure 9-7 Advance setting diagram") in the **Advance Setting** interface under the permission of SolaX company.

Setting Safety Code

In order for the inverter to be able to feed in, the safety code must be set as the installation site correctly. Here you can set safety code according to different countries and grid-tied standards.

Nine standards are avaiable.(may be changed without notice)

Table 9-1 Standards

Standard	Country	Standard	Country
VDE 0126	German	EN 50438_NL	Netherland
ARN 4015	German	CEI 0-21	Italy
AS 4777	Australia	IEC61727_In	India
EN 50549_EU	Netherland	C10/11	Belgium
G98/G99	UK		

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.

NOTICE!

- For the Australian, please select Australia Region A/B/C in complicance with AS/NZS 4777.2:2020. Only after the safety code setting is completed, some designated parameters in the inverter system will take effect according to the corresponding safety regulations.

» Select and enter **Safety Code** interface. Select the correct safety code.



Figure 9-41 Setting the safety code

» For the Australian market, select the specific region in compliance with AS/NZS 4777.2:2020. The default setting for different regions are as follows for

your reference:



Figure 9-42 Setting suitable grid regulations

Table 9-2 Setting the region

Region	Australia A	Australia B	Australia C	New Zealand	
Standarad Code Name	AS4777_2022 _A	AS4777_2022 _B	AS4777_2022 _C	New Zealand	Setting Range
OV-G-V	265 V	265 V	265 V	265 V	230-300 V
OV-GV1-T	1.5 s	1.5 s	1.5 s	1.5 s	
OV-G-V2	275 V	275 V	275 V	275 V	230-300 V
OV-GV2-T	0.1 s	0.1 s	0.1 s	0.1 s	
UN-G-V1	180 V	180 V	180 V	180 V	40-230 V
UNGV1-T	10 s	10 s	10 s	10 s	
UN-G-V2	70 V	70 V	70 V	70 V	40-230 V
UNGV2-T	1.5 s	1.5 s	1.5 s	1.5 s	
OV-G-F1	52 Hz	52 Hz	55 Hz	55 Hz	50-55 Hz
OVGF1-T	0.1 s	0.1 s	0.1 s	0.1 s	
OV-G-F2	52HZ	52HZ	55HZ	55HZ	50-55 Hz
OVGF2-T	0.1 s	0.1 s	0.1 s	0.1 s	
UN-G-F1	47 Hz	47 Hz	45 Hz	45 Hz	40-50 Hz
UNGF1-T	1.5 s	1.5 s	5 s	1.5 s	
UN-G-F2	47 Hz	47 Hz	45 Hz	45 Hz	45-50 Hz
UNGF2-T	1.5 s	1.5 s	5 s	1.5 s	
Startup-T	60 s	60 s	60 s	60 s	15-1000 s
Restore-T	60 s	60 s	60 s	60 s	15-600 s
Recover-VH	253 V	253 V	253 V	253 V	
Recover-VL	205 V	205 V	205 V	198 V	

Region	Australia A	Australia B	Australia C	New Zealand	
Standarad Code Name	AS4777_2022 _A	AS4777_2022 _B	AS4777_2022 _C	New Zealand	Setting Range
Recover-FH	50.15 Hz	50.15 Hz	50.15 Hz	50.15 Hz	
Recover-FL	47.5 Hz	47.5 Hz	47.5 Hz	47.5 Hz	
Start-VH	253 V	253 V	253 V	253 V	
Start-VL	205 V	205 V	205 V	198 V	
Start-FH	50.15 Hz	50.15 Hz	50.15 Hz	50.15 Hz	
Start-FL	47.5 Hz	47.5 Hz	47.5 Hz	47.5 Hz	

Setting Grid Parameters

In Grid Parameters interface, the protection value of grid voltage and frequency can be set. The default setting will be adjusted by default under the current safety regulations.

The display content will be displayed according to the requirements of local laws and regulations. Please refer to the contents displayed on the inverter screen.

Setting Charger

The inverter is compatible with the lithium battery. You can set Max Charge, Max DisCharge and Charger upper limit to control the charge and discharge of the battery.

Default current: 50A; range: 0~50A.



Figure 9-43 Setting battery charging and discharging limits

Setting Export Control If Necessary

This function allows the inverter to control the output power to the grid. The user value set must be less than the maximum value. If the user does not want to supply power to the grid, set it to 0.

NOTICE!

- Under Safety Code AS4777, "Export Control" is in the path of **Advance Setting**> **AS4777 Setting**. You can set the **Soft Limit** and **Hard Limit** of **Export Control** to control the power output to grid.

- Setting the Export Control under Safety Code AS4777

  » Set the **Safety Code** (refer to "Safety Code" for details)

  » Select and enter **AS 4777 Settings** in **Advance Settings** interface . You will see **Exprot Control** (for active power output control) and **General Control** (for apparent power output control).



Figure 9-44 Setting items in AS4777 settings for Australian area

  » Set the **Soft Limit** value and **Hard Limit** value.

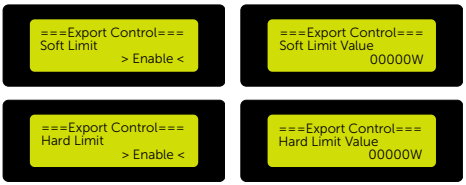


Figure 9-45 Setting the soft limit and hard limit in export control

NOTICE!

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

- Setting the Export Control under Other Safety Codes

  » Set the **Safety Code** (refer to "Safety Code" for details)

  » Select **Export Control** in **Advance Settings** and set the **User Value** you needed. For the countries with zero export controllimit, set the user value to "0".



Figure 9-46 Setting the export control limit

Setting Meter/CT Settings

You need to select the CT or electricity meter to connect the inverter. CT is set by default.

NOTICE!

- If the user has other power generation equipment (such as inverter) at home and wants to monitor both, the inverter provides Meter2 communication function to monitor the power generation equipment. Please refer to section "Meter/CT Connection (Meter/CT Port)" for specific meter connection diagram.
- Generally, the address and direction of the meter do not need to be set, reset them if you want to change them.

a. Select the **Meter/CT Setting** in the **Adcance Settings** interface and enter the interface.

b. Set the Meter/CT:

» Case 1: CT and Meter 2 are connected. (CT for SolaX inverter, Meter 2 for another power generation equipment) CT is set by default. Check the address and direction of Meter2 are set based on actual connection.



Figure 9-47 Selecting CT and set Meter2 data

» Case 2: Meter 1 and Meter 2 are connected. (Meter 1 for SolaX inverter, Meter 2 for another power generation equipment). Select **Meter** and enble the Meter function. Check the address and direction of Meter1 and Meter2 are set based on actual connection.

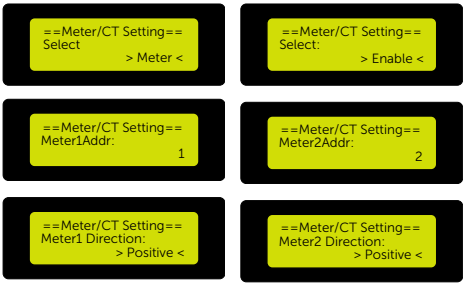


Figure 9-48 Selecting meter and set Meter1 and Meter2 data

c. Set the CT type: select 100A or 200A CT.



Figure 9-49 Setting the limits

» Setting Meter/CT Check

Installation Check: it is for checking whether the meter/CT is properly connected when the inverter is well installed.

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

You can set **Enable** in the **Installation Check** interface to check the connection status of the meter/CT. Set **Enable** in the **Cyclic Check** interface to periodically check the condition of the meter/CT.



Figure 9-50 Checking CT/Meter status

Setting Self Test (only for CEI 0-21)

In the **Self Test** interface, you can select **All Test** or a specific test item for testing.

Before testing, make sure that the inverter is connected to the grid. All Test takes about 6 minutes. For a specific test item, it takes about a few seconds or minutes.

Select and check **Test Report** to view the test results.



Figure 9-51 Setting to do tests

Setting GMPPT

GMPPT is the shadow tracking function. It can adapt to changing weather conditions and maintain power output continuously and effectively through tracking shadows on PV panels. You can set in this interface in accordance with the real-time situation of each string of PV panels.

There are 4 scanning mode you can choose to set:

OFF means scanning is not required for no shading.

Low means scanning every 4 hours for small amount of shading.

Middle means scanning every 3 hours for medium amount of shading.

High means scanning every 1 hour for large amount of shading

Please set **OFF** to turn off this function when no shadow is on PV panels.



Figure 9-52 Turning on/off shadow tracking function

Setting Modbus

Here items in **Modbus** interface can be set to achieve communication with external devices.



Figure 9-53 Setting the baud rate and address

Setting External ATS

When the inverter is connected to X3-Matebox G2, X3-PBOX-60kW-G2 or X3-PBOX-150kW-G2, keep "Enable" in External ATS interface. Otherwise, set it "Disable".

Default setting: Enable.

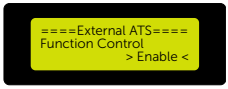


Figure 9-54 Enabling/disabling external ATS

Setting Power Factor (applicable to the local grid requirements of a specific country)

The items in the Power Factor interface will be adjusted in accordance with the local safety requirements and law regulations, casual modification is prohibited. Off, Over Excited, Under Excited, Curve, Q(u) and Fixed Q Power can be selected in Power Factor interface. Adjust the parameters under each setting in the table.

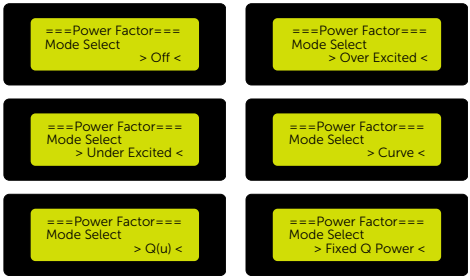


Figure 9-55 Selecting a mode in power factor

Table 9-3 Items under each mode

Mode Select	Items
Off	/
Over Excited	PF value
Under Excited	PF value
Curve	P1_PF
	P2_PF
	P3_PF
	P4_PF
Curve	Power 1
	Power 2
	Power 3
	Power 4
	PfLockInPoint
	PfLockOutPoint
	3Tau

Q(u)	SetQuPower1
	SetQuPower2
	SetQuPower3
	SetQuPower4
	QuRespondV1
	QuRespondV2
	QuRespondV3
	QuRespondV4
	K
	3Tau
	QuDelayTimer
	QuLockEn
Fixed Q Power	Q Power

In the Q(u) interface, when QuLockEn is selected, the following items need to be set.



Figure 9-56 Enabling QuLockSetting

Setting Pu Function

The **PU function** is a volt-watt response mode required by certain national standards such as AS4777.2. This function can control the active power of the inverter according to the grid voltage. "Enable" means that this function is turned on. It is the default setting.

The items in the Pu Function interface will be adjusted in accordance with the local safety requirements and law regulations, casual modification is prohibited.

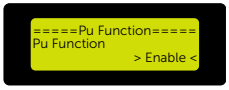


Figure 9-57 Enabling/disabling Pu Function

Table 9-4 Setting items in Pu Function

Pu Functiion	Items
	ResponseV1
	ResponseV2
	ResponseV3
	ResponseV4
	3Tau
	SetPuPower1
	SetPuPower2
	SetPuPower3
	SetPuPower4
	3Tau_Charge
	Pu Type

Setting FVRT Function (apply to 50549)

The items in the FVRT interface will be adjusted in accordance with the local safety requirements and law regulations, casual modification is prohibited.

Default VacUpper: 265 V

Default VacLower: 115 V

The default parameters adjust with the "Safety Code" selected.



Figure 9-58 Enabling FVRT function

Setting Power Limit

Set **Proportion** in the **Power Limit** interface to limit the power of the AC output of the inverter.

Default proportion: 1.00 (the max value)

If you set 0.5, the AC output of the inverter will be limited to 50%

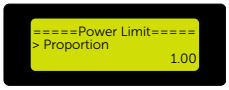


Figure 9-59 Setting proportion in power limit interface

- Reactive power control, reactive power standard curve cos φ = f(P)

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

  For TOR, the curve cos φ = 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 Vac> 1.05Vn,

  Pac> 0.2 Pn, curve cos φ = f(P) corresponds to curve C.

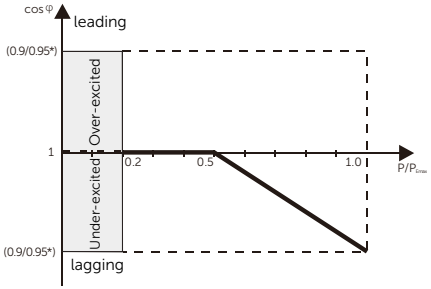


Figure 9-60 Figure 9-63 Curve A

*) If the grid-connected power of the inverter ≤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.

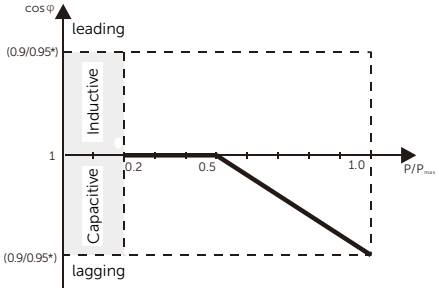


Figure 9-61 Curve B

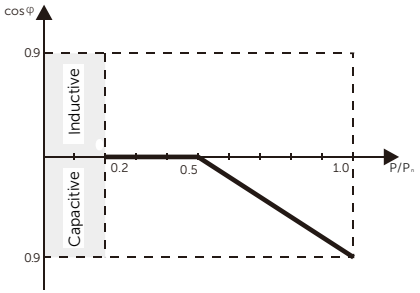


Figure 9-62 Curve C

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

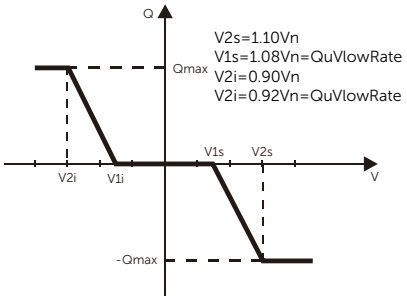


Figure 9-63 Curve Q=f(V)

Setting DRM Function (applied to NZS4777.2)

The DRM function is a demand response method required by the NZS4777.2 standard and is only applicable to NZS4777.2.

Default setting: Disable.



Figure 9-64 Enabling DRM function

Setting Parallel Setting

The inverter provides the parallel connection function. Up to 10 inverters can be connected in one system with an X3-PBOX-60kW-G2 or X3-PBOX-150kW-G2. Up to 3 inverters can be connected in one system if no X3-PBOX device is equipped. one inverter will be set as the “Master inverter” to control the other "Slave inverters" in the system via P1/P2 port.

There are three modes in parallel system, and your acknowledge of different inverter's work modes will help you understand parallel system better, therefore please read it carefully before operating.

Table 9-5 Mode selection

Free mode	Only if no one inverter is set as a **Master**, all 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**, all other inverters will enter slave mode automatically. slave mode can not be changed from other modes by LCD setting.

NOTICE!

- Refer to section "7.2.4 Communication Connection" for specific parallel connection diagram.

NOTICE!

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

How to build the parallel connection

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



Figure 9-65 Switching on the master inverter

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



Figure 9-66 Switching on the last slave inverter

How to remove the parallel connection

c. Select the Parallel Settings, set the master inverter as Free and then set all slave inverters as Free.



Figure 9-67 Removing parallel connection

d. Disconnect all the network cables on the COM port.

NOTICE!

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

LCD Display after Parallel Connection

- Once inverter enters parallel system, the **Today** yield will be replaced by the **Parallel Status of the inverter**, and parallel relevant fault has a higher priority than other faults and will be showed firstly on main display.

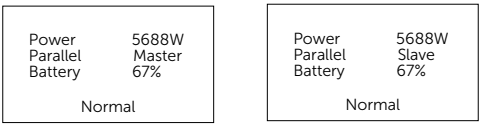


Figure 9-68 Displaying the master and slave inverter data

- User can obtain all the status data from master inverter. System power and individual slave inverter power can be obtained in status display of master inverter.

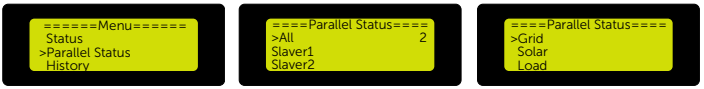


Figure 9-69 Getting all information from the master inverter

Setting Main Breaker Limit

For the power limit of a smart meter or CT, the current must be set in line with the utility's contract requirements. In the event of a failure to set, it may cause a circuit breaker fault on the main switchboard, adversely affecting the charging or discharging of the battery.

Enter the Main Break Limit interface and then set the current limit according to the utility's requirements.

Default main breaker limit current: 250A; range: 10~250A.

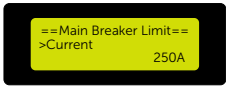


Figure 9-70 Setting main breaker current limit

Setting Phase Unbalanced

This function controls the distribution of AC output power.

Enable means each phase will be divided according to the loads connected with each phase.

Disable means each phase power will be divided equally. Disable is the default setting.



Figure 9-71 Enabling/disabling phase unbalanced function

Setting EPS Setting

There are 4 items to set in the EPS Setting interface. They are Frequency, Min SoC, Min ESC SoC and Super-Backup.

Frequency: it can self-adapt to the current frequency of the grid.

Frequency range: 50Hz or 60Hz.

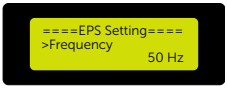
Min SoC: when the actual battery SoC is lower than Min SoC, the battery stops discharging energy to EPS loads. If there is PV, the PV will charge the battery.

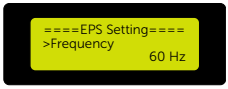
Default Min SoC: 10%; range: 10%~25%.

Min ESC SoC: When the actual battery SoC reaches the "Min SoC", the PV charges the battery capacity to "Min ESC SoC" and then the battery will restart to charge EPS loads and the inverter will automatically enter EPS mode.

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

Super-Backup: when no battery is connected and the PV can generate power, users can set Enable in the Super-Backup interface, which means the PV energy is used as backup power to allow the inverter to enter EPS mode and supply power for emergency loads.





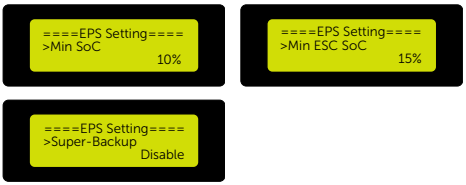


Figure 9-72 Setting data in EPS setting

Setting AS4777 Setting (applicable to Austrialian and New Zealand safety)

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

» Export Control

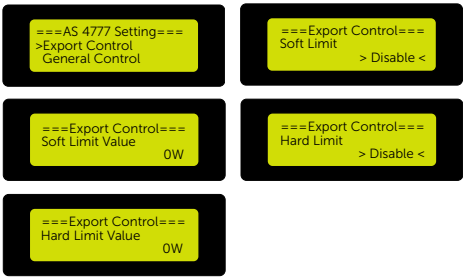


Figure 9-73 Setting export control in AS4777 setting interface

» General Control

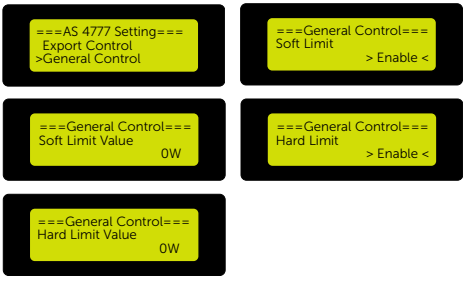


Figure 9-74 Setting general control in AS4777 setting interface

Setting ExternalGen

ExternalGen is set for controlling the generator connected.

- Set **Enable/Disable** in the **ExternalGen** interface. The following settings display when **Enable** is set.

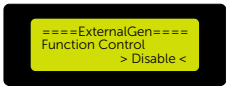


Figure 9-75 Enabling/ disabling ExternalATS function

Max Charge Power to be set in the interface must meet the following two conditions when the maximum charging power of batteries is to be set.

1) Max Charge Power < Rated Power of the Generator - Total Load Power

2) Max Charge Power ≤ Rated Power of the Inverter

- ATS Control

When you set **ATS Control**, you can set **MaxChargePower**, **Char&Disc period**, **Char&Disc period2** and **Charge from grid** in the following LCD screen.

» Setting MaxChargePower



Figure 9-76 Setting MaxChargePower

» Setting Char&Disc period



Figure 9-77 Setting Char&Disc period

» Setting Char&Disc period2





Figure 9-78 Setting Char&Disc period2

» Setting Charge from grid

Default Charge battery to: 10%, setable range: 10%~100%.



Figure 9-79 Setting Charge from grid

- Dry Contact

  When you set **Dry Contact**, you can set **MaxChargePower**, **Start Gen Method**, **Char&Disc period**, **Char&Disc period2** and **Charge from grid** in the following LCD screen.

  » Setting MaxChargePower



Figure 9-80 Setting MaxChargePower

  » Setting Start Gen Method



Figure 9-81 Setting Start Gen Method

» Setting MaxRunTime, MinRestTime, Allow Work



Figure 9-82 Setting MaxRunTime, MinRestTime, allow working period

» Setting Char&Disc period



Figure 9-83 Setting Char&Disc period

» Setting Char&Disc period2

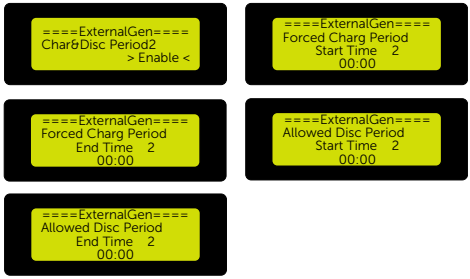


Figure 9-84 Setting Char&Disc period2

» Setting Charge from grid

Default Charge battery to: 10%, setable range: 10%~100%.



Figure 9-85 Setting Charge from grid

Setting Reset

You can set Reset Error Log, Reset Meter/CT, Reset INV Energy. Reset Wifi, Factory Reset in the Reset interface.

» Reset Error Log



Figure 9-86 Resetting Error Log

» Reset Meter/CT

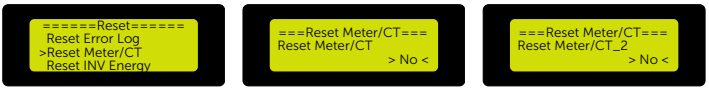


Figure 9-87 Resetting Meter/CT

» Reset INV Energy



Figure 9-88 Resetting INV Energy

» Reset Wifi



Figure 9-89 Resetting Wifi

» Factory Reset



Figure 9-90 Factory Reset

Setting Battery Heating

Battery heating setting is used to restore the charging and discharging function of the battery in a low temperature environment. This function works when the battery connected supports battery heating.

Set **Enable** to define the battery heating periods as follows. If the battery does not support this function, then set it **Disable**.

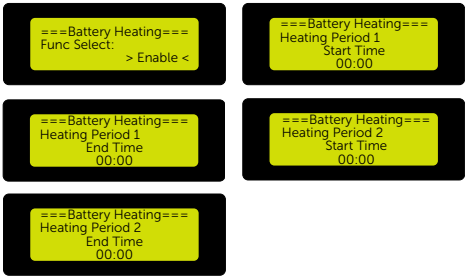


Figure 9-91 Enabling battery heating and setting working periods

Setting Extended BAT FUNC

This function is for averaging the capacity of every battery before battery expansion. This setting shall be invalid under the EPS mode. When it is on-grid, enabling this setting shall make the inverter charge or discharge the battery SoC to about 40%, which is convenient for adding new batteries.



Figure 9-92 Enabling/ disabling battery expansion function

Setting Hotstandby Setting

Enable is the default setting. The inverter cannot enter standby status when **Disable** is set.



Figure 9-93 Enabling/ disabling hotstandby function

Setting Pgrid Bias

That the inverter dischages more energy to the grid or charges more from the grid can be selected or set in the Pgrid Bias interface.

Disable: disabling this function

Grid: the inverter will discharge more energy to the grid.

INV: the inveter will be biased to charge power from the grid.

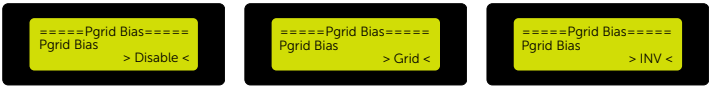


Figure 9-94 Setting the Pgrid bias

Setting Internal485

Here items in Internal485 interface can be set to achieve communication with SolaX devices.

» Set COM485 / EV Charger / DataHub / AdaptBoxG2 / EVC&AdaptBoxG2



Figure 9-95 Selecting the external device

» Set Braud Rate



Figure 9-96 Setting the braud rate

» Set the Address of different devices

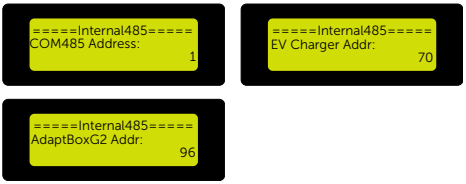


Figure 9-97 Setting the address of the external device

» Set EV Charger / AdaptBoxG2 COM STAT Connected or Disconnected



Figure 9-98 Connecting or disconnecting the external device

Setting Battery Charge EVC

You can set Enable/Disable to control whether the battery can discharge energy to an EV Charger.

Enable: the battery can discharge energy to an EV Charger.

Disable: the battery cannot discharge energy to an EV Charger.



Figure 9-99 Enabling/ disabling Battery Charge EVC function

Setting MicroGrid

Here you can enable MicroGrid fuction if an on-grid inverter is connected.

Default setting: Disable.

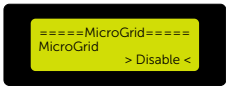


Figure 9-100 Enabling/ disabling MicroGrid function

Setting Advance Password

You can reset the password in the **Advance Password** interface. Please contact the SolaX after-sales team for the default Advance Password to enter Advance Setting or reset Advance Password.



Figure 9-101 Resetting Advance Password

9.8 About

Displaying path: Menu > About

Users and Installers can enter the **About** interface to view the information about the **inverter**, the **battery** and the **internal code**.

Displaying Inverter Information

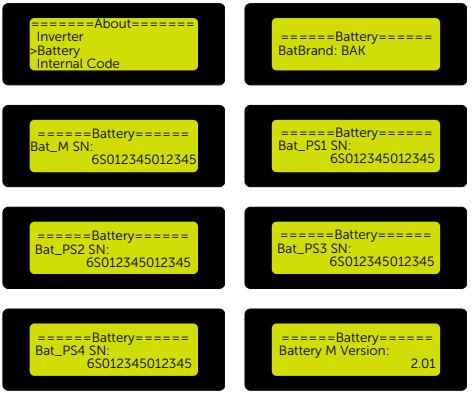
You can view the SN, register SN, DSP version, ARM version, the total time of on-grid status, the total time of EPS status of the inverter in the Inverter interface.



Figure 9-102 Displaying the inverter information

Displaying Battery Information

You can view battery cell brand, BMS SN, Slave 1 SN, Slave 2 SN, Slave 3 SN, Slave 4 SN, BMS FW version and slave FW version in the Battery interface.



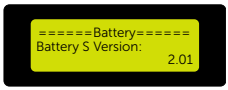


Figure 9-103 Displaying the battery information

Displaying Internal Code Information

You can view BMS FW version and slave FW versions in the Internal Code interface.

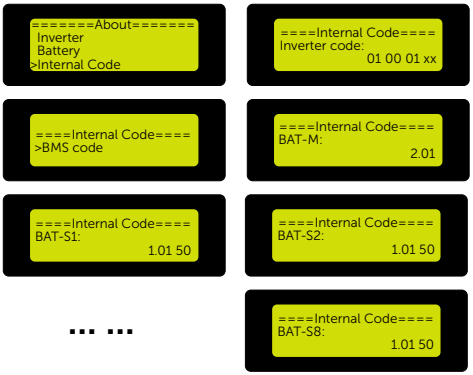


Figure 9-104 Displaying the internal code information

10 Operation on SolaX App and Web

10.1 Introduction of SolaX Cloud App

Solax Cloud 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, improve the revenue of power generation, and meet the unknown energy challenges.

10.2 Operation Guide on SolaXCloud App

10.2.1 Downloading and installing App

Select and scan the QR code below to download SolaxCloud APP. You can also find the QR codes at the top left of the login page of www.solaxcloud.com or on the user manual of Pocket series communication module. In addition, you can search with the key word "SolaxCloud" in Apple Store or Google Play to download it.

App Store Google play

Figure 10-1 QR code

Please check the online App guide, Wifi connection guide or Setup tutorial video on the SolaXCloud App for relevant operation.



Figure 10-2 App guide on SolaXCloud

NOTICE!
• The screenshots in this chapter correspond to the SolaX Cloud App V4.2.8.

10.3 Operation Guide on SolaX Cloud Web

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.

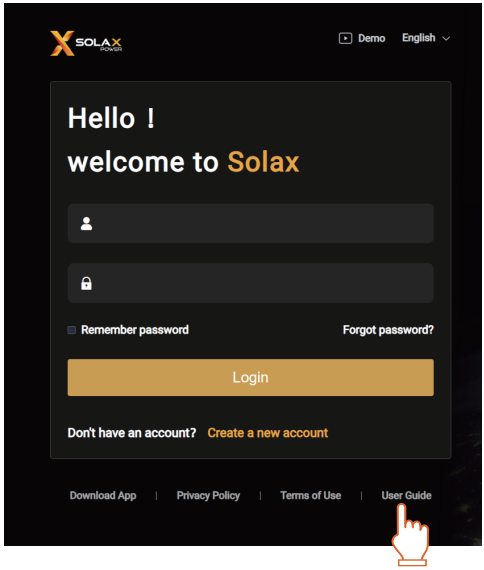


Figure 10-3 User guide Web

11 Troubleshooting and Maintenance

Before troubleshooting or maintenance operation, please ensure the system has been powered off (refer to "8.4 Power off" for specific steps).

11.1 Troubleshooting

This section contains information and procedures for resolving possible problems with the inverter and 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 system, check the warning or fault information on the system control panel or on the App 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 system'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 devices.

Error Code	Fault	Descriptions and Diagnosis
IE 01	TZ Protect Fault	Overcurrent fault. • Wait for a while to check if you're 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 Fault	• Check the grid connection status. • Or ask the installer for help.
IE 03	Grid Volt Fault	Power grid voltage overrun • 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 • If the utility returns to normal, the system reconnects. • Or ask the installer for help.
IE 05	PV Volt Fault	PV voltage out of range • Check the output voltage of the PV panel • Or ask the installer for help.

Error Code	Fault	Descriptions and Diagnosis
IE 06	Bus Volt Fault	• 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 • Check battery input voltage if it's within normal range • Or ask the installer for help.
IE 08	AC 10mins Volt	• 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. • Wait for a while to check if it's back to normal. • Or ask the installer for help.
IE 10	DCV OVP Fault	DCV EPS(Off-grid) overvoltage protection failure. • 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. • 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. • 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	Insulation Fault • 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 • Check if ambient temperature exceeds the limit. • Or ask the installer for help.
IE 15	Bat Con Dir Fault	EPS(Off-grid) mode current is too strong. • 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.

Error Code	Fault	Descriptions and Diagnosis
IE 16	EPS Overload Fault	EPS(Off-grid) over load fault. • 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	On-grid mode over load • 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	Bat Power Low	• 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	External fault of BMS. Unable to establish communication with inverter. • Restart the BMS. • Contact the after-sales personnel of our company.
IE 20	Fan Fault	Fan Fault • 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	Low Temp Fault	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 25	InterCom Fault	Mgr InterCom Fault • Shut down photovoltaic, battery and grid, reconnect. • Or ask for help from the installer if it can not return to normal.
IE 26	INV EEPROM	Inverter EEPROM Fault. • Shut down photovoltaic, battery and grid, reconnect. • Or ask for help from the installer if it can not return to normal.

Error Code	Fault	Descriptions and Diagnosis
IE 27	RCD Fault	Fault of Residual Current Device • 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	Electrical relay failure • 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 Relay	EPS(Off-grid) relay failure • 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 ConnDir Fault	PV direction fault • 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 Relay	Charge relay fault • 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	EPS(Off-grid) earth relay fault • Press the ESC" key to restart the inverter. • Or ask for help from the installer if it can not return to normal.
IE 33	Parallel Fault	Parallel Fault • Check the communication and earth cable connection and matching resistor settings. • Or ask for help from the installer if it can not return to normal.
IE 36	Hard Limit Fault	HardLimitFault • Check the power value set in the HardLimit setting, increase the value larger if the value. • Or ask for help from the installer if it can not return to normal.
IE 37	CtMeterCon Fault	CT Meter ConFault • Check whether the cable connection of the CT or meter is proper or not. • Or ask for help from the installer if it can not return to normal.

Error Code	Fault	Descriptions and Diagnosis
IE 101	Power Type Fault	Power type fault • 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	EPS(Off-grid) port over current fault • 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	Manager EEEPROM Fault. • 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	NTC invalid • 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	Battery temp low • 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	Battery temp high • 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 109	Meter Fault	Meter Fault • Please check that the instrument is working properly • Or seek help from the installer if it can not return to normal.
IE 110	Bypass Raley Flt	Bypass relay fault • 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 111	ARM ParaCom FIt	ARMParaComFIt • 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.
IE 112	FAN1 Fault	FAN1 Fault • Please change the fan. • Or seek help from the installer if it can not return to normal.
IE113	FAN2 Fault	FAN2 Fault • Please change the fan. • Or seek help from the installer if it can not return to normal.
BE 01	BMS_ExterErr	Battery Error - External Communication Fault • Please contact the battery supplier.
BE 02	BMS_InterErr	Internal fault of BMS. Unable to establish communication among battery modules. • Restart the BMS. • Check whether the wire connections among battery modules are correct. • Contact the after-sales personnel of our company.
BE 03	BMS_OverVolt	BMS overvoltage Overvoltage of a single battery module. • Contact the after-sales personnel of our company.
BE 04	BMS_LowerVolt	BMS undervoltage Undervoltage of a single battery module. • Battery module is forced to charge through inverter. • Contact the after-sales personnel of our company.
BE 05	BMS_ChargeOCP	Overcurrent charging of BMS. • Restart the BMS. • Contact the after-sales personnel of our company.
BE 06	DischargeOCP	Discharge overcurrent of BMS. • Restart the BMS. • Contact the after-sales personnel of our company.
BE 07	BMS_TemHigh	The temperature of the BMS is too high. • Cool down the BMS to normal temperature, and then restart it. • Contact the after-sales personnel of our company.

Error Code	Fault	Descriptions and Diagnosis
BE 08	BMS_TempLow	The temperature of the BMS is too low. • Warm up the BMS, and restart it. • Contact the after-sales personnel of our company.
BE 09	CellImblance	Cell imbalance of BMS. Inconsistency of battery module. • Restart the BMS. • Contact the after-sales personnel of our company.
BE 10	BMS_Hardware	Battery hardware protection failure • Please contact the battery supplier.
BE 11	BMS_Circuit	Circuit fault of the BMS. • Restart the BMS. • Contact the after-sales personnel of our company.
BE 12	BMS_ISO_Fault	Insulation fault of the BMS. • Restart the BMS. • Contact the after-sales personnel of our company.
BE 13	BMS_VolSen	Voltage sampling fault of the BMS. • Restart the BMS. • Contact the after-sales personnel of our company.
BE 14	BMS_TempSen	Temperature sensor failure • Restart the battery. • Please contact the battery supplier.
BE 15	BMS_CurSen	Current sampling fault of the BMS. • Restart the battery. • Please contact the battery supplier.
BE 16	BMS_Relay	Relay contact adhesion fault of the BMS. • Restart the BMS. • Contact the after-sales personnel of our company.
BE 17	TypeUnmatch	Battery type failure • Upgrade the battery BMS software. • Please contact the battery supplier.
BE 18	Ver Unmatched	Battery version mismatch failure • Upgrade the battery BMS software. • Please contact the battery supplier.
BE 19	MFR Unmatched	Battery manufacturer did not match the fault • Upgrade the battery BMS software. • Please contact the battery supplier.
BE 20	SW Unmatched	Battery hardware and software mismatch failure • Upgrade the battery BMS software. • Please contact the battery supplier.

Error Code	Fault	Descriptions and Diagnosis
BE 21	M&S Unmatched	Battery master slave control mismatches • Upgrade the battery BMS software. • Please contact the battery supplier
BE 22	CR NORespond	Inverter does not respond the charging request. • Restart the BMS or the inverter. • Contact the after-sales personnel of our company.
BE 23	BMS SW Protect	Battery slave software protection failure • Upgrade the battery BMS software. • Please contact the battery supplier.
BE 24	BMS 536 Fault	BMS voltage sampling fault. • Restart the BMS. • Contact the after-sales personnel of our company.
BE 25	BMS SelfCheck	Self-test fault of the BMS. • Restart the BMS. • Contact the after-sales personnel of our company.
BE 26	BMS Tempdiff	BMS temperature varies greatly. • Restart the BMS. • Contact the after-sales personnel of our company.
BE 27	BMS_BreakFault	BMS sampling fault. • Restart the BMS. • Contact the after-sales personnel of our company.
BE 28	BMS_FlashFault	Battery hardware protection failure • Please contact the battery supplier.
BE 29	BMS_Precharge	External short circuit of the BMS. • Check the external connection and restart the BMS. • Contact the after-sales personnel of our company.
BE 30	AirSwitchBreaker	Battery air switch failure • Check that the battery breaker is off. • Please contact the battery supplier.

11.2 Maintenance

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

WARNING!

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

11.2.1 Maintenance routines

Inverter Maintenance

Item	Check Notes	Maintenance Inverval
Safety check	• 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
Fans	• Check if the cooling fans on the rear of the inverter are covered by dirt or there is abnormal sound. • Clean the cooling fans with a soft dry cloth or brush or replace it if necessary.	Every 6-12 months
Indicators	• 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	• Cables are securely connected. • Cables are intact, and in particular, the parts touching the metallic surface are not scratched. Check whether the sealing caps of idle DC input terminals fall off. • Check that the idle ports are locked by waterproof caps.	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

Item	Check Notes	Maintenance Inverval
Heat sink	Check whether the heat sink is covered with dirt, clean the machine and absorb dust if necessary	Every 6-12 months

Battery Maintenance

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 ±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%.

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 180V (upgrade on sunny days), the battery SoC is greater than 20% or the battery input voltage is greater than 180V. 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 upgrading process. If the power is off, try restoring power and then repeat the upgrading process.

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\323101047300_IES_3P_ARM_V003.04_0729.usb
  - » For DSP file: update\DSP\323101047200_IES_3P_DSP_V005.00_20230801.usb

NOTICE!

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

Upgrade steps

a. Please save the Upgrade firmware in your U disk first.

b. Find the **Upgrade** port of the inverter, unplug the monitoring module (Wifi dongle/ 4G dongle) by hand, and insert the USB flash drive. (Refer to "7.2.5 Monitoring Connection (UPGRADE/DONGLE Port)" for the specific position of **Dongle/Upgrade** port.)

c. Select **ARM** and **OK** to enter the software version interface;



Figure 11-1 Entering the ARM interface

d. 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.



Figure 11-2 Upgrading the ARM version

e. 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.



Figure 11-3 Upgrading the DSP version

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



Figure 11-4 Upgrading the DSP version successfully

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 X3-IES system

WARNING!

- When disassembling the X3-IES system, strictly follow the steps as below.
- Only use measuring devices with a DC input voltage range of 600 V or higher.

Disassembling X3-IES series inverter

Step 1: Press the buttons on the inverter and the battery to shut down the system.

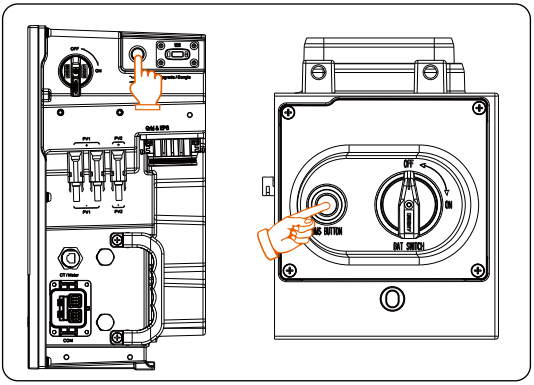


Figure 12-1 Pressing the buttons on the inverter and the battery

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

Step 3: Turn off the DC switch on the inverter and the BAT switch on the battery to "OFF".

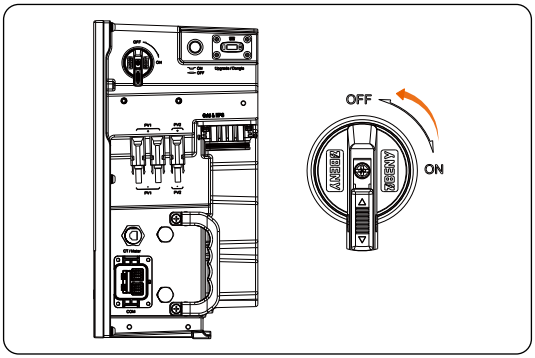


Figure 12-2 Turning off the DC switch

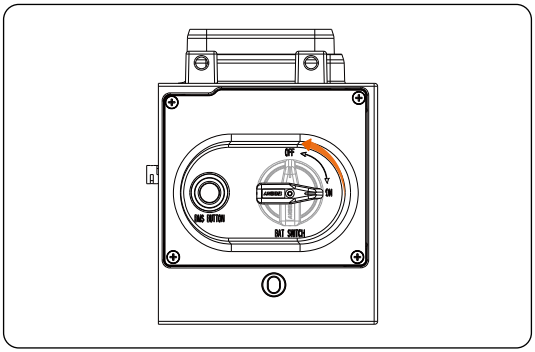


Figure 12-3 Turning off the BAT switch

Step 4: Turn off the breakers between the inverter and the power grid.

Step 5: Wait for at least 5 minutes to fully discharge the capacitors inside the inverter.

Step 6: Use a current clamp to ensure there is no current present in the PV cables.

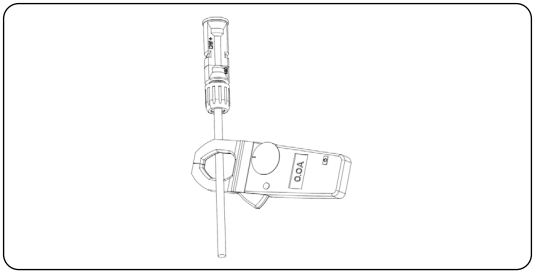


Figure 12-4 Detecting the current

Step 7: Use a disassembling tool to disconnect the PV connecters. Slightly pull out the connectors.

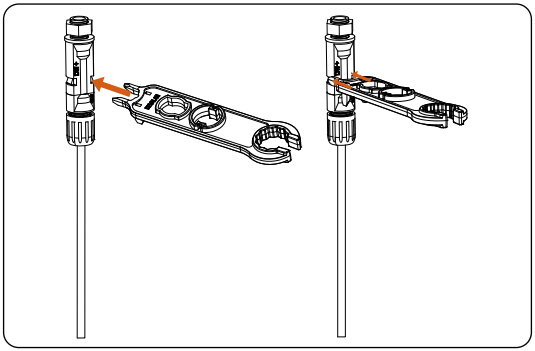


Figure 12-5 Inserting the tool into the PV connector

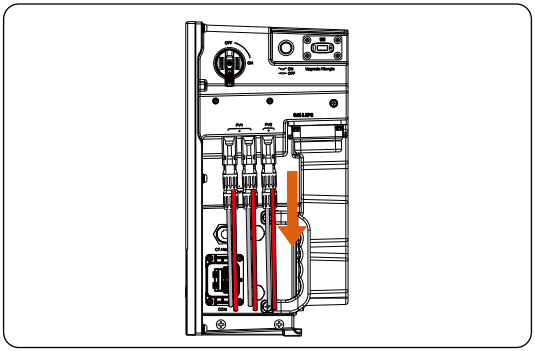


Figure 12-6 Pulling out PV connectors

Step 8: Ensure that no voltage is present between the positive terminal and negative terminal at the DC inputs using a suitable measuring device.

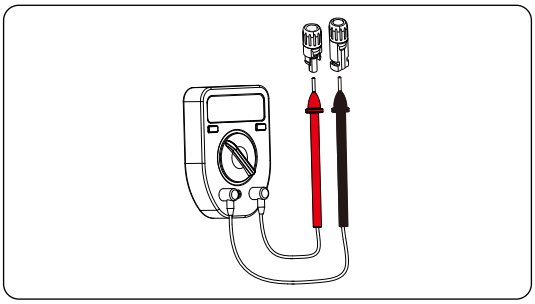


Figure 12-7 Measuring the voltage of PV connectors

Step 9: Disassemble the AC connector and disconnect the Grid&EPS cable.

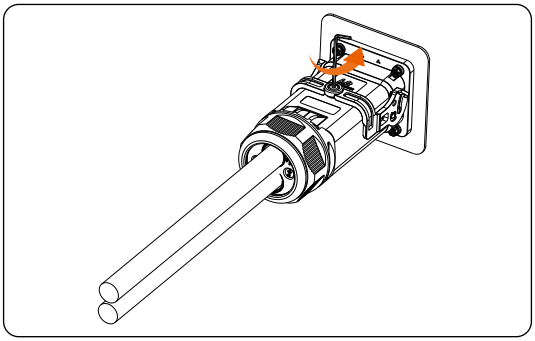


Figure 12-8 Loosening the AC connector

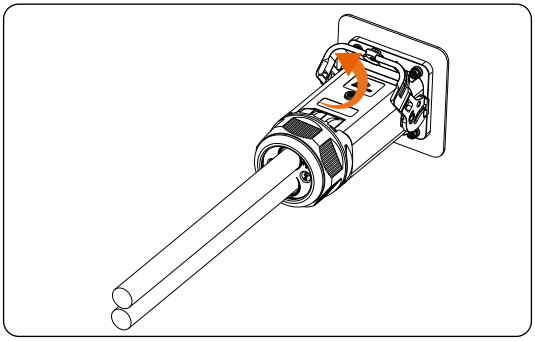


Figure 12-9 Pulling up the latch of the AC connector

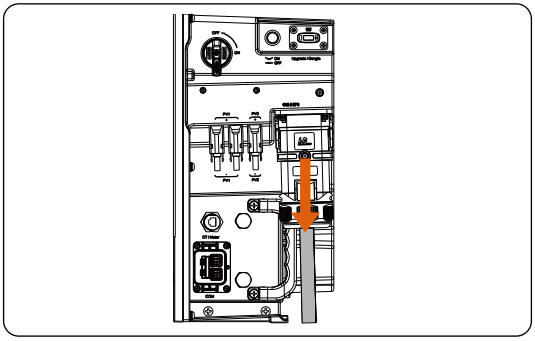


Figure 12-10 Disconnecting the Grid&EPS cable

Step 10: Disconnect the Communication cable.

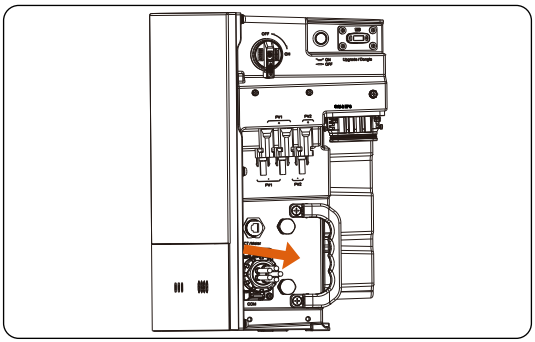


Figure 12-11 Disconnecting the communication connector

Step 11: Loosen the swivel nut and disconnect the Meter/CT cable.

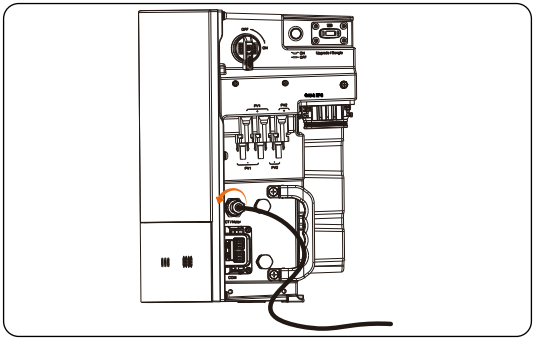


Figure 12-12 Disconnect the meter/CT cable

Step 12: Disconnect the WiFi dongle.

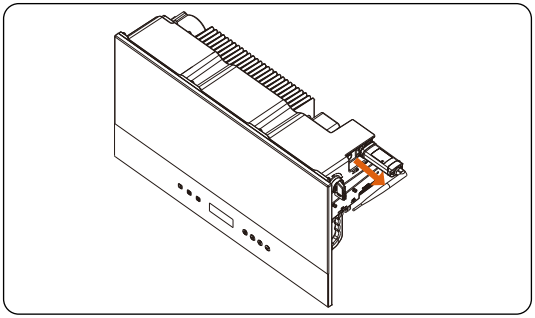


Figure 12-13 Unplugging the WiFi dongle

Step 13: Put the original protective cap on the terminals.

Step 14: Unscrew the screws of fastening the wall mounting bracket and remove the wall mounting bracket.

Disassembling T-BAT-SYS-HV-S50E battery system

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.

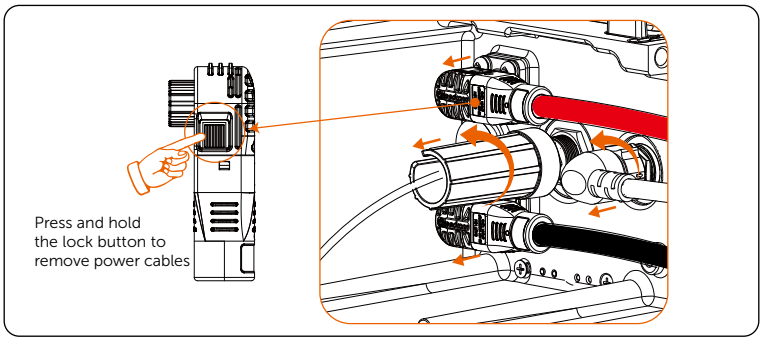


Figure 12-14 Disconnecting battery connectors

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

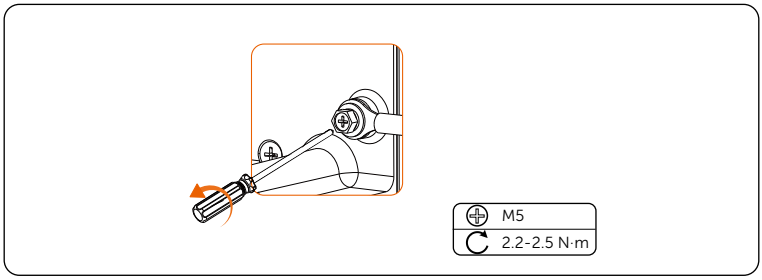


Figure 12-15 Disconnecting grounding cable

NOTICE!

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

12.2 Packing the devices of X3-IES system

- Load the inverter, the devices of battery 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 devices of X3-IES system

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

13 Technical Data

- **Inverter**

DC Input

Model	X3-IES-5K	X3-IES-6K	X3-IES-8K	X3-IES-10K	X3-IES-12K	X3-IES-15K
Max. recommended PV array power [W]	10000	12000	16000	20000	24000	30000
Max. input power [W]	10000	12000	16000	20000	24000	30000
Max. PV voltage [d.c. V]	1000					
Nominal DC operating voltage [d.c. V]	600					
MPPT voltage range [d.c. V]	110-950					
Max. PV current [d.c. A]	20/20	20/20	32/20	32/20	32/20	32/20
Isc PV array short circuit current [d.c. A]	25/25	25/25	40/25	40/25	40/25	40/25
Max. inverter backfeed current to the array	0	0	0	0	0	0
Start output voltage [d.c. V]	140					
No. of MPPT trackers	2					
Strings per MPPT tracker	A:1/B:1	A:1/B:1	A:2/B:1	A:2/B:1	A:2/B:1	A:2/B:1
DC connection switch	YES					

AC Output/Input

Model	X3-IES-5K	X3-IES-6K	X3-IES-8K	X3-IES-10K	X3-IES-12K	X3-IES-15K
Rated AC output apparent power [VA]	5000 (4999 for AS4777)	6000	8000	10000 (9999 for AS4777)	12000	15000 (14999 for AS4777)
Rated AC input apparent power [VA]	10000	12000	16000	20000	20000	20000
Max. AC output apparent power [VA]	5500 (4999 for AS4777)	6600	8800	10000 (9999 for AS4777)	13200	16500 (14999 for AS4777)
Nominal AC voltage [a.c. V]	380/400					
Nominal AC frequency [Hz]	50/60					
Max. AC output continuous current [a.c. A]	8.0	9.6	12.8	14.5	19.2	24.0
Rated AC output current [a.c. A]	7.3	8.7	11.6	14.5	17.4	21.8
Max. AC input current [a.c. A]	16.1	19.3	25.8	32.0	32.0	32.0
Current (inrush) (at 50 µs) [a.c. A]	15					
Maximum output fault current (at 5ms) [a.c. A]	80					
Maximum output overcurrent protection [a.c. A]	80					
Power factor range	1 (0.8 leading ... 0.8 leading)					
Total harmonic distortion(THDv, linear Load)	< 3%					
Load control	YES					

Battery

Model	X3-IES-5K	X3-IES-6K	X3-IES-8K	X3-IES-10K	X3-IES-12K	X3-IES-15K
Battery type	Lithium batteries					
Battery voltage range [d.c. V]	160-800					
Recommended battery voltage [V]	600					
Max. charge/ discharge current [d.c. A]	50					
Battery connection	1					
Communication interface	CAN/RS485					

EPS Output

Model	X3-IES-5K	X3-IES-6K	X3-IES-8K	X3-IES-10K	X3-IES-12K	X3-IES-15K
EPS peak power [VA]	2Pn, 10s (Full sun)					
Rated EPS apparent power [VA]	5000	6000	8000	10000	12000	15000
Nominal EPS voltage [V]	380/400					
Nominal EPS frequency [Hz]	50/60					
EPS rated current [A]	7.3	8.7	11.6	14.5	17.4	21.8
Switching time [s]	< 10ms					
Total harmonic distortion (THDv, linear load)	< 3%					
Parallel operation	YES (supporting 10 parallel inverters)					
Half wave loads	< 2kW					

Efficiency, Power Consumption, Protection and Standard

Model	X3-IES-5K	X3-IES-6K	X3-IES-8K	X3-IES-10K	X3-IES-12K	X3-IES-15K
MPPT efficiency	99.9%					
Euro-efficiency	97.7%					
Max. efficiency	98.0%					
Max. battery charge efficiency (PV to BAT)(@ full load)	98.5%					
Max. battery discharge efficiency (BAT to AC)(@ full load)	97.0%					
Rated battery charge/ discharge efficiency	98.5%/ 97.0%					
Internal consumption (night) [W]	< 40W for hot standby, < 5W for cold standby					
Idle mode	YES					
SPD	Type2, DC and AC					
AFCI	YES					
Safety	IEC 62109-1/-2					
EMC	EN 61000-6-1/-2/-3					
Grid monitoring	VDE 0126-1-1 a1:2012/ VDE-AR-N 4105/ G98/ G99/ AS4777/ EN50549/ CEI 0-21					

Generic Data

Model	X3-IES-5K	X3-IES-6K	X3-IES-8K	X3-IES-10K	X3-IES-12K	X3-IES-15K
Dimensions (W/ H/D) [mm]	717 * 405 * 209.5					
Net weight [kg]	35	35	35	35	37	37
Cooling concept	Natural Cooling					
Inverter topology	Transformerless					
Communication	RS485 (Meter), Pocket-X, USB, RS485 (Modbus, EV charger, Datahub), Parallel (CAN+RS485), DO (SG ready controlled by Adapter Box), DI (OFF signal input)					
LCD display	LCD					
Ingress Protection	IP66					
Protective class	I					
Cold standby consumption	< 5W					
Pollution degree	III					
Installation mode	Stacked installation					
Operating Ambient Temperature Range [℃]	-35 to 60 (derating at +45℃)					
Humidity [%]	0%-100% (condensing)					
Altitude [m]	≤ 3000					
Storage temperature [℃]	-40 to 65					
Noise emission (typical) [dB]	< 33					
Overvoltage category	III (electrical supply side), II (PV side)					

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

- Battery

Configuration List

No.	Model	BMS	Battery Module	Nominal Energy (kWh)	Operating Voltage (Vdc)
1	T-BAT HS 5	TBMS-MCS0800E x 1	TP-HS50E x 1	5.1	90-116
2	T-BAT HS 10	TBMS-MCS0800E x 1	TP-HS50E x 2	10.2	180-232
3	T-BAT HS 15	TBMS-MCS0800E x 1	TP-HS50E x 3	15.3	270-348
4	T-BAT HS 20	TBMS-MCS0800E x 1	TP-HS50E x 4	20.4	360-464
5	T-BAT HS 25	TBMS-MCS0800E x 1	TP-HS50E x 5	25.6	450-580
6	T-BAT HS 30	TBMS-MCS0800E x 1	TP-HS50E x 6	30.7	540-696

Performance

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	3.57kA (0.333 ms)					
Battery Round-trip Efficiency (0.2 C, 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), 0.2 C 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 pack.
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.

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