



X1-IES-A

3.7 kW / 5.0 kW / 6.0 kW / 8.0kW

User Manual

Version 0.0

www.solaxpower.com



eManual in the QR code or at
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About This Manual

Scope of Validity

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

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

X1-IES-A series inverter models:

X1-IES-3.7K-A	X1-IES-5K-A
X1-IES-6K-A	X1-IES-8K-A

T-BAT-SYS-HV-S50E components:

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

Note:

"X1-IES-A system" can be used to optimize self consumption, store in the battery for future use or feed into public grid.

"X1-IES-A series inverter" (inverter for short) refers to Single-phase energy storage inverter that can control battery and grid-connected charge or discharge.

"3.7K" means rated output power of 3.7kW.

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

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

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

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

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

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




Target Group

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

- Are licensed and/or satisfy state and local jurisdiction regulations.
- Have good knowledge of this manual and other related documents.

Conventions

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

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

Change History

Version 00 (2024-05-15)

Initial release

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1 Safety

1.1 General Safety

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

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

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

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

1.2 Safety Instructions

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

1.2.1 Safety Instructions of Inverter

DANGER!

Lethal danger from electrical shock due to the inverter

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

WARNING!

- During operation, avoid touching any parts of the inverter other than the LCD panel (if any).
- Never connect or disconnect the AC and DC connector while the inverter is running.
- Prior to conducting any maintenance, turn off the AC and DC power and disconnect them from the inverter. Wait for 5 minutes to fully discharge the energy.

WARNING!

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

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

WARNING!

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

CAUTION!

- Make sure that children are supervised to prevent them from playing with the device.
- Pay attention to the weight of the inverter and handle it properly to avoid personal injuries.
- Use insulated tools when installing the device, and always wear personal protective equipment during installation and maintenance.

NOTICE!

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

1.2.2 Safety Instructions of Utility Grid

NOTICE!

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

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

General Safety Precautions

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

Battery Handling Guide

Do's

- DO keep the battery module away from flammables materials, heat sources, and water sources;
- DO keep the battery module out of reach of children and animals;
- DO practice proper battery storage by keeping the battery module in a clean environment, free of dust, dirt and debris;

- DO store the battery module in a cool and dry place;
- DO seal the outer cable connection hole to prevent ingress of foreign objects;
- DO confirm that the wiring of the device must be correct;
- DO install the device according to the local standards and regulations.

Don'ts

- DO NOT expose the battery module to an open flame, or the temperature in excess of 140°F/60°C;
- DO NOT store or install the battery module in direct sunlight;
- DO NOT install or operate the battery module in places where there is excessive moisture or liquids;
- DO NOT place the battery module in a high-voltage environment;
- DO NOT disconnect, disassemble or repair the device by unqualified personnel. Only a qualified personnel is allowed to handle, install and repair the device;
- DO NOT damage the device by dropping, deforming, impacting, cutting or penetrating with a sharp object. Otherwise, it may cause a fire or leakage of electrolytes;
- DO NOT touch the device if liquid spill on it. There is a risk of electric shock;
- DO NOT step on the packaging or the device may be damaged;
- DO NOT place any objects on top of the battery module;
- DO NOT charge or discharge a damaged battery module;
- DO NOT dispose of the battery module in a fire. It may cause leakage or rupture;
- DO NOT mix different types or makes of the battery module. It may cause leakage or rupture, resulting in personal injury or property damage.

Response to Emergency Situations

In case the battery module leaks electrolyte or any other chemical materials, or gas may be generated due to the leakage of battery module, be sure to avoid contact with the discharge at all times. In case of accidentally coming into contact with them, please do as follows:

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

- In case of ingestion: Induce vomiting, and seek medical attention.

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

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

Effective ways to deal with accidents

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

- DO NOT use the submerged battery module again, and contact the qualified personnel for assistance.
- DO contact SolaX immediately for assistance if the user suspects that the battery module is damaged.

WARNING!

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

CAUTION!

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

2 Product Overview

2.1 System Description

System Overview

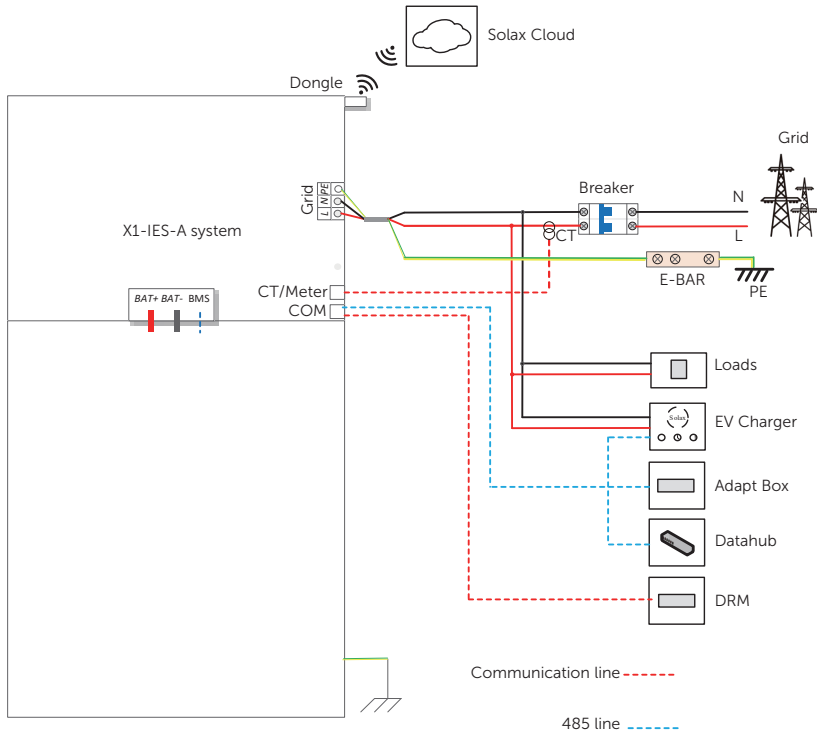


Figure 2-1 System overview diagram

X1-IES-A system

The X1-IES-A system can be used to optimize self consumption, store in the battery for future use or feed into public grid.

Inverter

The inverter refers to Single-phase energy storage inverter that can control battery and grid-connected charge or discharge

T-BAT-SYS

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

CT

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

Grid

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

SolaX Cloud

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

DRM

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

Adapter Box

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

Datahub

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

EV Charger

SolaX EV Charger is used for charging electric vehicle.

2.2 Supported Power Grid

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

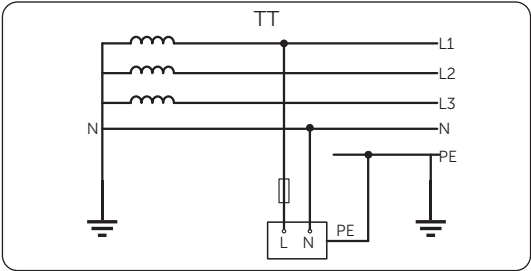


Figure 2-2 Supported power grid TT

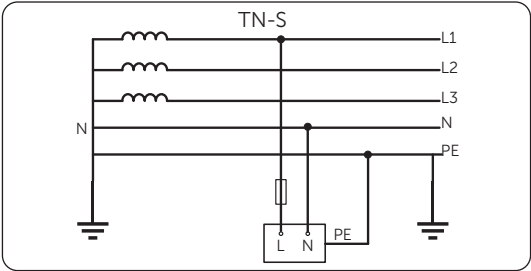


Figure 2-3 Supported power grid TN-S

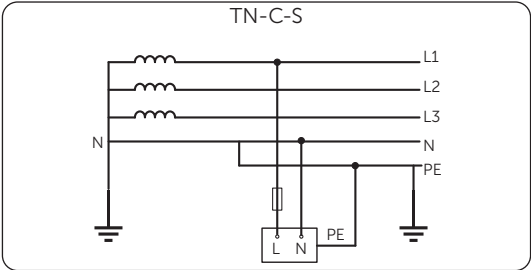


Figure 2-4 Supported power grid TN-C-S

2.3 Appearance

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

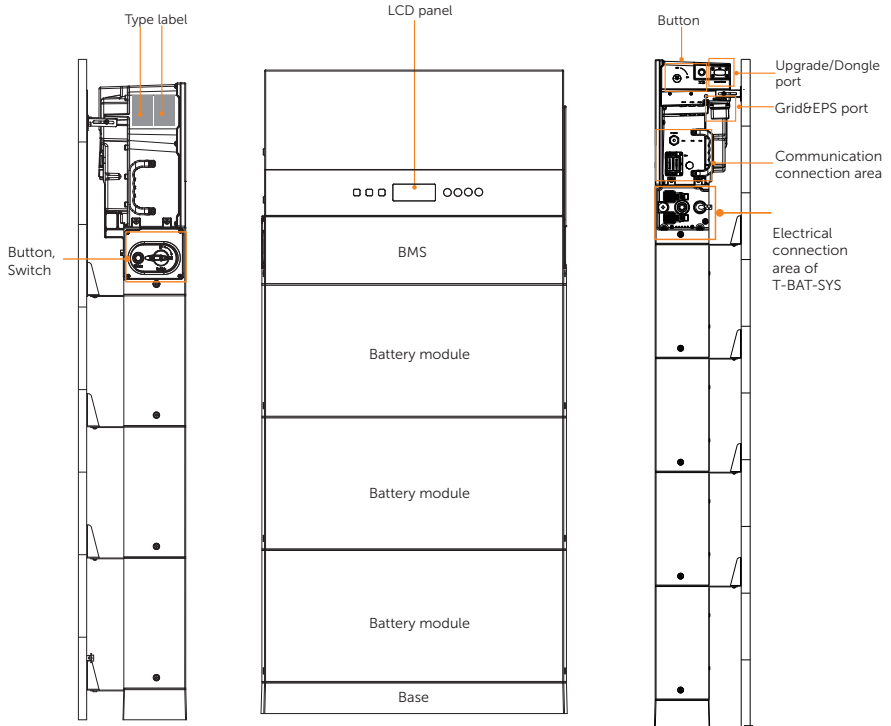


Figure 2-5 Appearance of Battery (T-BAT-SYS) and Inverter

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

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

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

2.3.1 Dimensions

- Dimension of Inverter

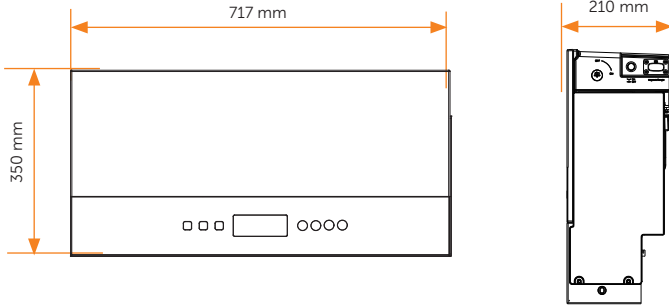


Figure 2-6 Dimension of Inverter

- Dimension of Battery (T-BAT-SYS)

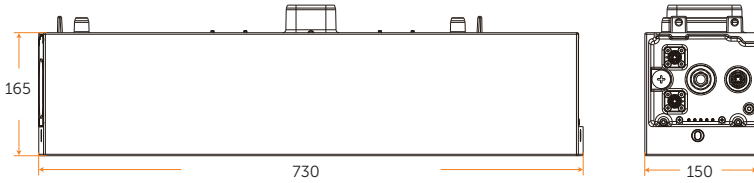


Figure 2-7 Dimension: BMS (TBMS-MCS0800E)



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

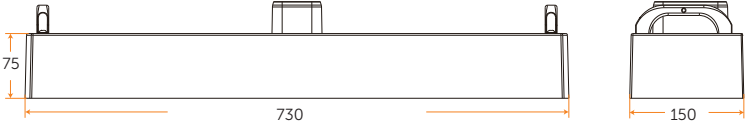


Figure 2-9 Dimension: Base

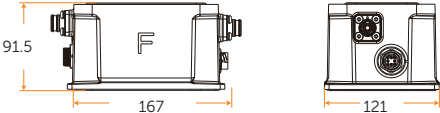


Figure 2-10 Dimension: Series box

2.3.2 Control Panel

- Control Panel of Inverter

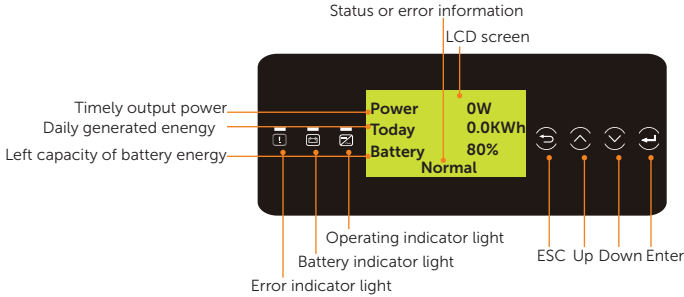


Figure 2-11 Control Panel of Inverter

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

In a normal state, the "Power", "Today" and "Battery" information will be displayed. You can press the keys to switch information.

In an error state, the fault message and error code will be displayed, please refer to [11.1 Troubleshooting](#) for corresponding solutions.

Table 2-2 Definition of indicators of Inverter

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

Table 2-3 Definition of keys

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

Note:

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

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

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

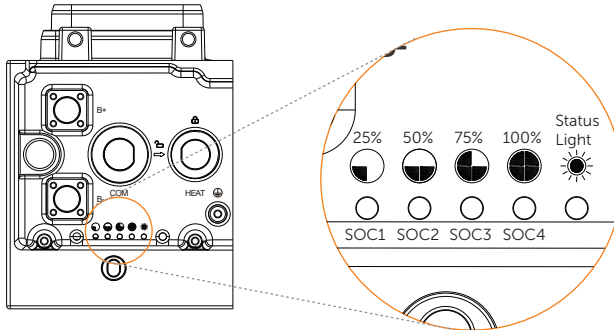


Figure 2-12 Control Panel of Battery (T-BAT-SYS)

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

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

Warning	In case of warning, the status light will flash yellow light for 1 second, and then turn off for 4 seconds.
---------	---

Black Start	For details, please refer to 2.3.2 Black Start .
-------------	--

Table 2-5 Indicator information while charging

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

Table 2-6 Indicator information while discharging

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

Table 2-7 Indicators information while reporting errors

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

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

NOTICE!

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

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

Black Start

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

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

NOTICE!

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

2.3.3 Ports

- Ports of Inverter

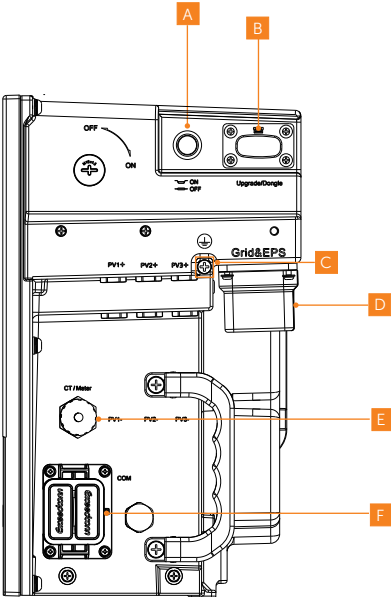


Figure 2-13 Ports of Inverter

Table 2-8 Description of ports of Inverter

Item	Description
A	Switch button
B	Port for Upgrading and Communication module connection. Communication module includes WiFi, LAN and 4G (optional).
C	Ground connection port
D	Grid&EPS Port (Only Grid port is available.)
E	CT/ Meter Port
F	COM port

- Ports of Battery (T-BAT-SYS)

BMS (TBMS-MCS0800E)

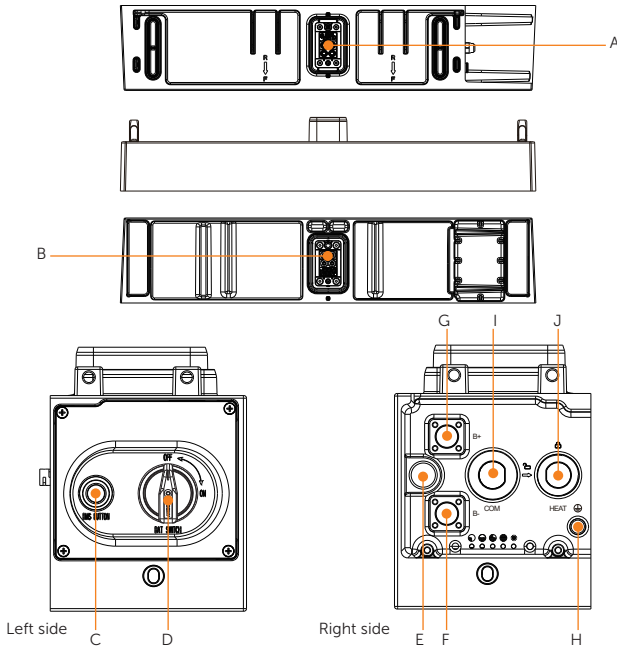


Figure 2-14 BMS (TBMS-MCS0800E)

Table 2-9 Description of ports

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

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

DIP Switch

A DIP Switch is equipped on the BMS.

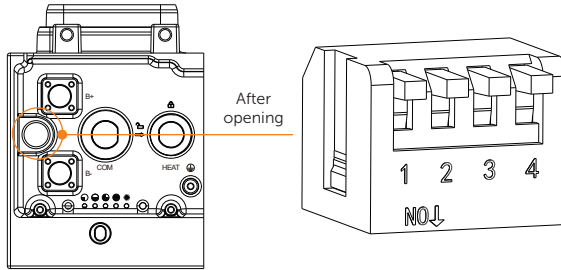


Figure 2-15 DIP Switch

Table 2-10 Definition of DIP switch

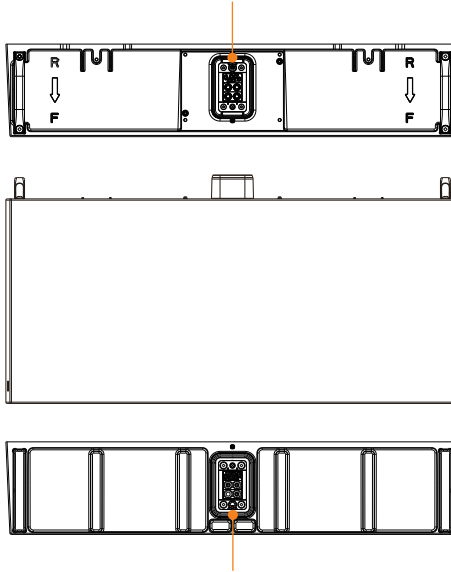
Description	
DIP Switch 1	A reserved function
DIP Switch 2	A reserved function
DIP Switch 3	A reserved function
DIP Switch 4	Terminal resistance

NOTICE!

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

Battery Module (TP-HS50E)

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



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

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

Base

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

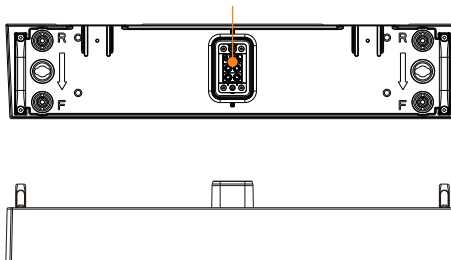


Figure 2-17 Details: Base

Series Box

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

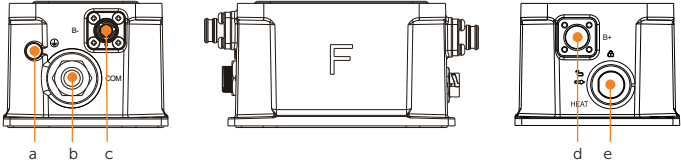















Figure 2-18 Details: Series box




Table 2-11 Description of ports

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

2.3.4 Symbols on the Label

Table 2-12 Description of symbols

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

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

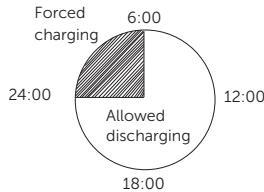
2.4 Working Principle

2.4.1 Working mode

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

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

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



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

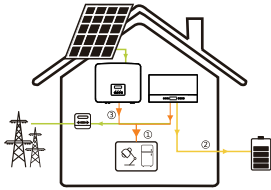
- Forced Charging Period

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

- Allowed Discharging Period

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

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



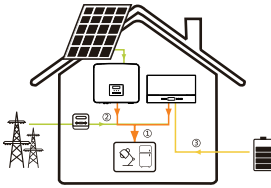
Self Use

The self-use mode is suitable for areas with low feed-in subsidies and high electricity prices.

With the grid-tied inverter, the power of PV will supply the loads first, and surplus power will charge the battery, then the remaining power will feed into the grid.

Priority: Loads > Battery > Grid

* Without the grid-tied inverter, the output power is adjusted with the load according to the charging and discharging period settings.



Feed-in Priority

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

With the grid-tied inverter, 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

* Without the grid-tied inverter, the output power is adjusted with the load according to the charging and discharging period settings.

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

Peak Shaving Mode (With Grid-tied Inverter)

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.

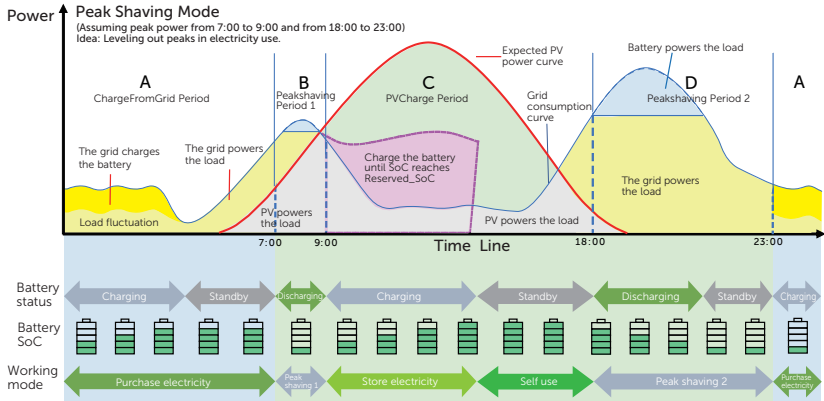


Figure 2-19 Peak Shaving time periods

Table 2-13 Description 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.

2.4.2 Circuit Diagram

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 side can realize the function of surge protection. The principle design of inverter is shown in the figure below:

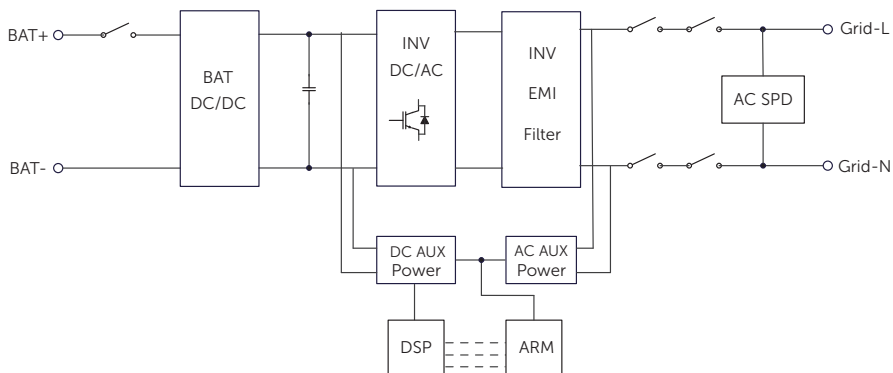


Figure 2-20 Circuit Diagram

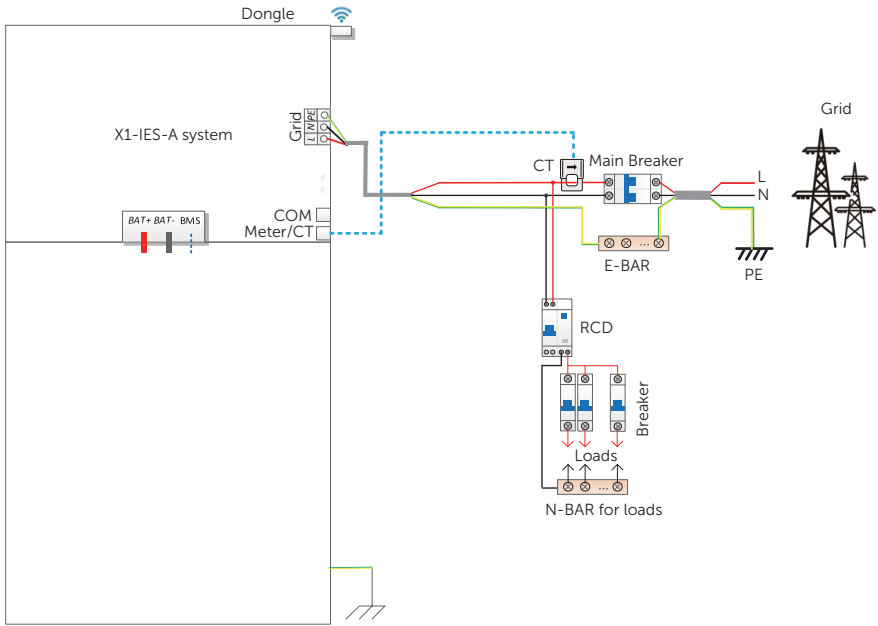


Figure 2-21 System diagram without grid-tied inverter

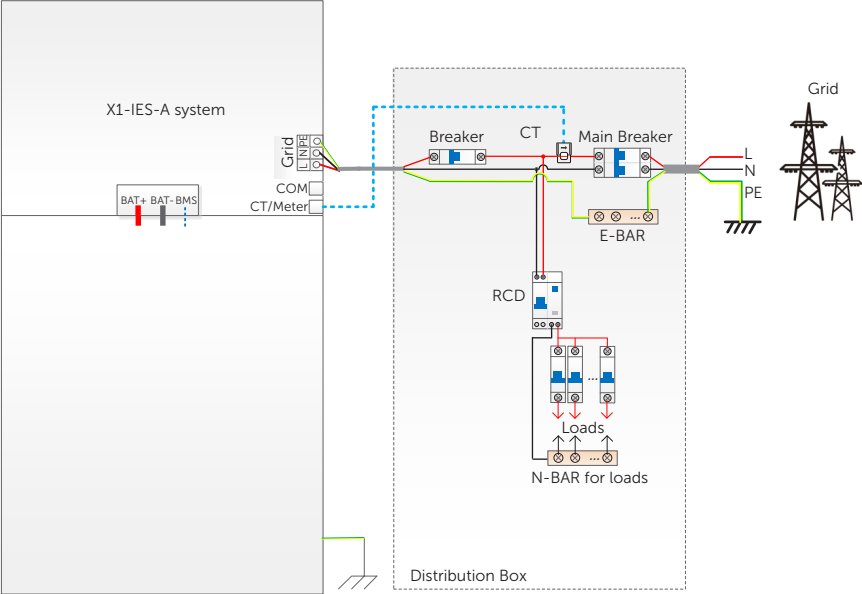


Figure 2-22 System diagram with grid-tied inverter

3 Transportation and Storage

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

Transportation

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

Storage

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

4 Preparation before Installation

4.1 Selection of Installation Location

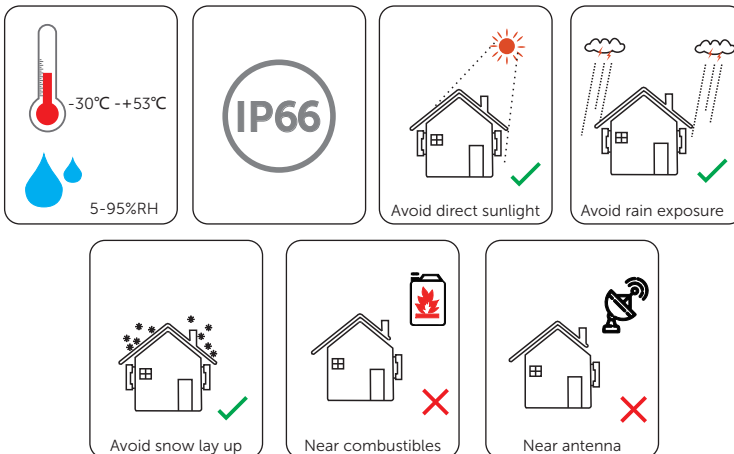
The installation location selected for the X1-IES-A system is quite critical in the aspect of the guarantee of machine safety, service life and performance.

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



NOTICE!

- For outdoor installation, precautions against direct sunlight, rain exposure and snow accumulation are recommended.
 - Exposure to direct sunlight raises the temperature inside the device. This temperature rise poses no safety risks, but may impact the device performance.
-
- Install the device 500 meters away from sea and at the place where the sea breeze does not directly hit.

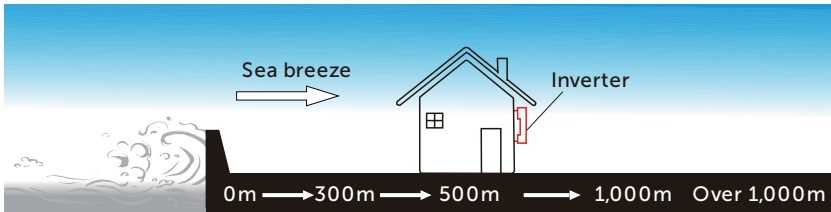


Figure 4-1 Recommended installation position

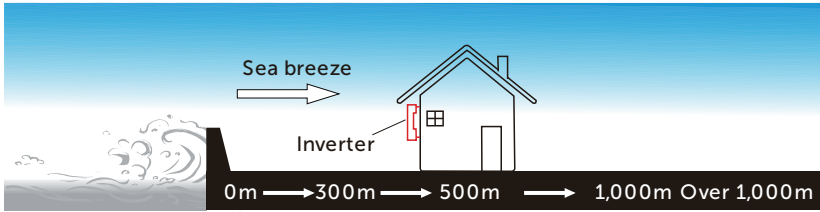


Figure 4-2 Incorrect installation position

4.1.2 Installation Options

NOTICE!

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

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

One Tower

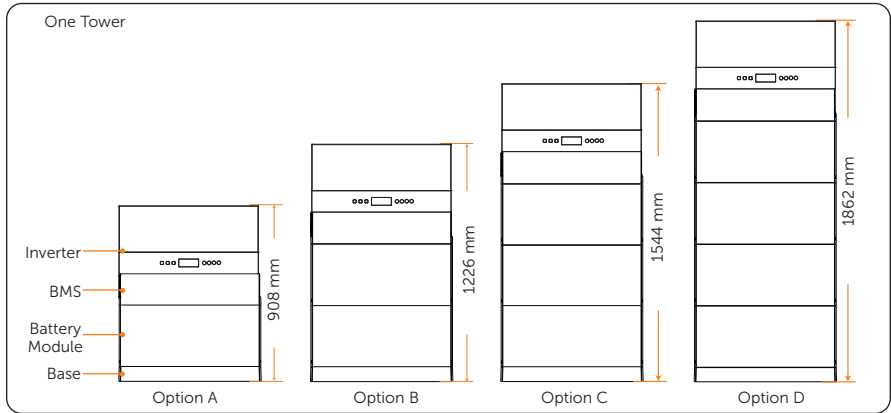


Figure 4-3 Installation option for one tower

Two Towers

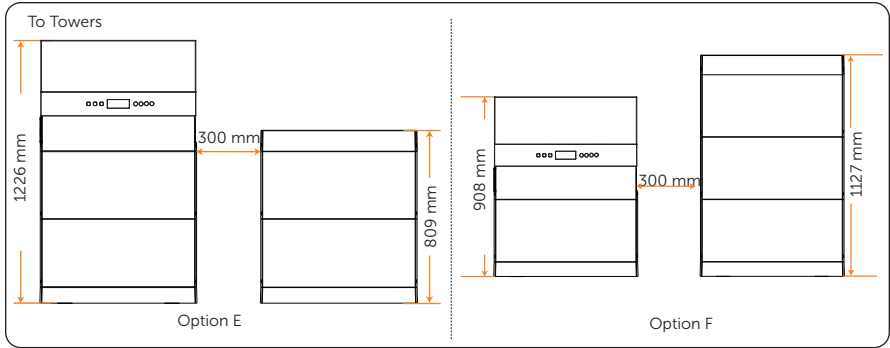


Figure 4-4 Installation option for two towers

Table 4-14 Components of different options

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

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

Net weight and dimension of X1-IES-A system

Table 4-15 Net weight and dimension of one tower

	Option A	Option B	Option C	Option D
Net Weight (kg)	82.7	129.7	176.7	223.7
Dimension (mm)	730*908*210	730*1226*210	730*1544*210	730*1862*210

Table 4-16 Net weight and dimension of two towers

	Option E		Option F	
	Left tower	Right tower	Left tower	Right tower
Net Weight (kg)	129.7	99.2	82.7	146.2
Dimension (mm)	730*1226*210	730*809*150	730*908*150	730*1127*210

Table 4-17 Weight and Dimension of the Inverter

Model	X1-IES-3.7K-A	X1-IES-5K-A	X1-IES-6K-A	X1-IES-8K-A
Weight (kg)	22.75	22.75	22.75	22.75
Dimension (mm)	717*350*210			

Table 4-18 Weight and Dimension of the Battery (T-BAT-SYS)

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

4.1.3 Installation Carrier Requirement

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

- Solid brick/concrete, or mounting surface with equivalent strength;
- Please ensure that the bearing capacity of the ground and the wall, respectively, that are used to install the X1-IES-A system must be over 922.5 kg, which is based on option C. If option D is chosen, the bearing capacity of the ground and the wall, respectively, must be over 1072.5 kg.
- The device must not be installed on the wood wall.

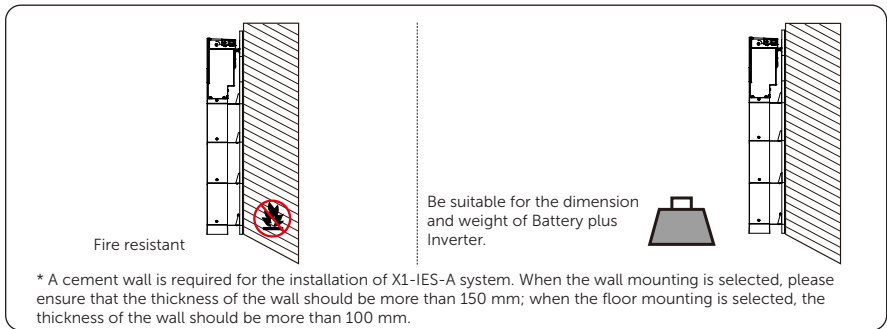


Figure 4-5 Installation carrier requirement

4.1.4 Clearance Requirement

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

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

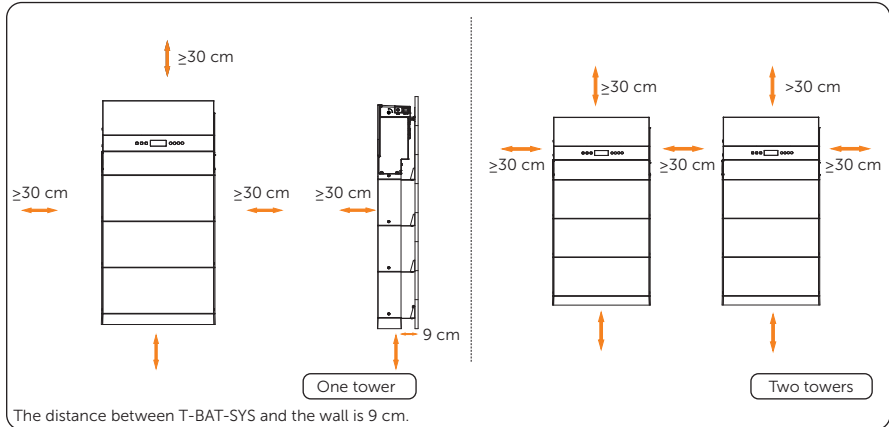


Figure 4-6 Clearance requirement

NOTICE!

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

4.2 Tools Requirement

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

 Hammer drill	 Multimeter	 Measuring tape	 Utility knife
 Marker	 Cross screwdriver	 Flat-head screwdriver	 Allen key
 Wire stripper	 Crimping tool for RJ45	 Crimping tool	 Diagonal plier
 Torque wrench (M4)	 Rubber mallet	 Crimping tool for ferrule	 Wire cutter
 Torque wrench	 Spirit level	 Heat gun	 Ø6 mm Heat shrink tubing
 Safety gloves	 Safety boots	 Safety goggles	 Anti-dust mask

4.3 Additionally Required Materials

- **Additionally Required Materials of Inverter**

Table 4-19 Additionally required wires of Inverter






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

Table 4-20 Grid wire and breaker recommended

Model	3.7 kW	5 kW	6 kW	8 kW
Three-core wire (copper) 	4 mm ²	4 mm ²	6 mm ²	10 mm ²
Breaker 	30 A	30 A	40 A	50 A

*The wire diameter of Grid cable should be within 13-21 mm.

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

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

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

5 Unpacking and Inspection

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

Table 5-1 Number of cartons

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

NOTICE!

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

5.1 Unpacking

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

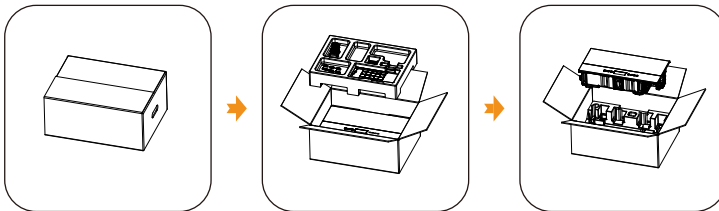


Figure 5-1 Unpacking the Inverter

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

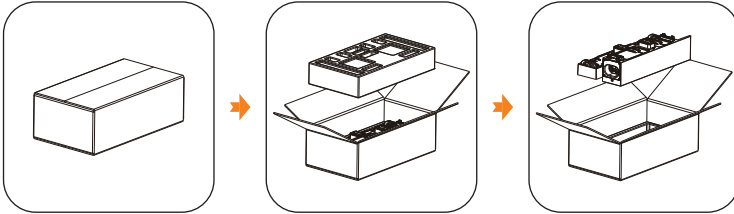


Figure 5-2 Unpacking the BMS

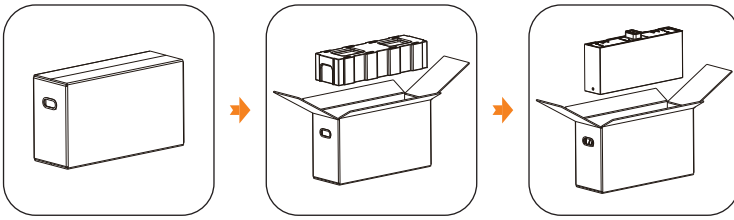


Figure 5-3 Unpacking the battery module

- Be careful when dealing with all package materials which may be reused for storage and relocation of the X1-IES-A system in the future.
- After opening the package, check whether the appearance of the inverter is damaged or lack of accessories. If any damage is found or any parts are missing, contact your dealer immediately.

5.2 Scope of Delivery

- Packing list of Inverter

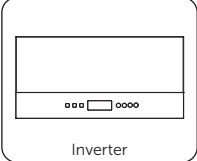
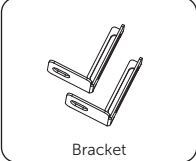
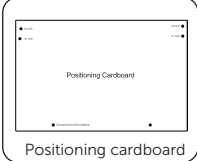
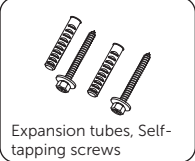

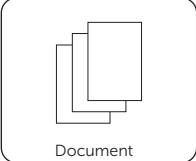

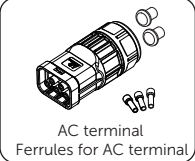



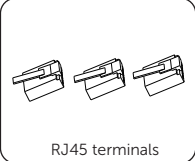

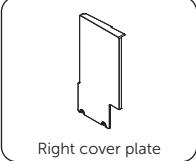
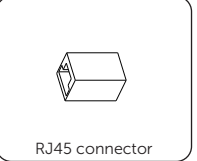

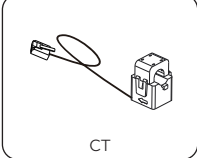
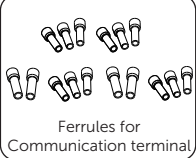
 <p>Inverter</p>	 <p>Bracket</p>	 <p>Positioning cardboard</p>	 <p>Expansion tubes, Self-tapping screws</p>
 <p>Waterproof connector with RJ45</p>	 <p>Document</p>	 <p>Dongle</p>	 <p>AC terminal Ferrules for AC terminal</p>
 <p>AC terminal tool</p>	 <p>M5*14 screws</p>	 <p>M5*10 screws</p>	 <p>RJ45 terminals</p>
 <p>Communication terminal</p>	 <p>Right cover plate</p>	 <p>RJ45 connector</p>	 <p>OT terminal</p>
 <p>CT</p>	 <p>Ferrules for Communication terminal</p>		

Table 5-2 Packing list of Inverter

Item	Quantity
Inverter	1 pc
Bracket	2 pcs
Positioning cardboard	1 pc
Expansion tube, Self-tapping screw	2 pairs
Waterproof connector with RJ45	1 pc
Document	1 pc
Dongle	1 pc
AC terminal	1 pc
Ferrules for AC terminal *	3 pcs of per type
AC terminal tool	1 pair
M5*14 screw	6 pcs
M5*10 screw	2 pcs
RJ45 terminal	3 pcs
Communication terminal	1 pc
Right cover plate	1 pc
RJ45 connector	1 pc
OT terminal	1 pc
CT	1 pc
Ferrules for Communication terminal	16 pcs

*Ferrules for AC terminal

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

For Grid cable, make sure to choose the appropriate ferrules based on the wire diameters.

- Packing list of T-BAT-SYS

BMS (TBMS-MCS0800E)

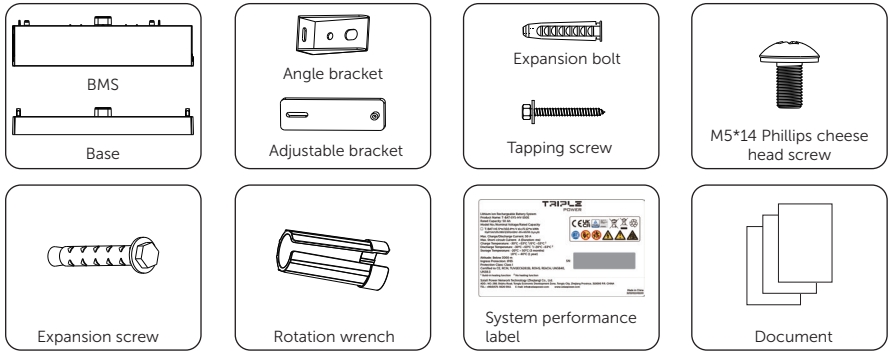


Table 5-3 Packing list of BMS

Item	Quantity
BMS	1 pc
Base	1 pc
Angle bracket	4 pcs
Adjustable bracket	4 pcs
Expansion bolt	6 pcs
Tapping screw	4 pcs
M5×14 Phillips cheese head screw	8 pcs
Expansion screw	2 pcs
Rotation wrench	1 pc
System performance label	1 pc
Document	1 pc

Battery Module (TP-HS50E)

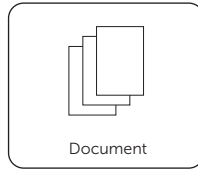
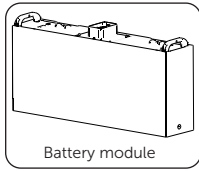


Table 5-4 Packing list of battery module

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

Series Box (For two towers only)

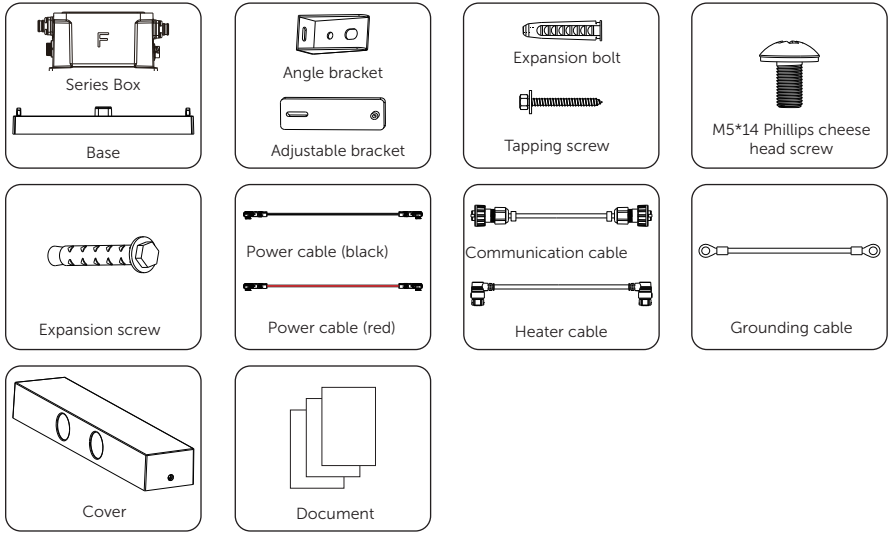


Table 5-5 Packing list of Series Box

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

Base Support (For wall mounting only)

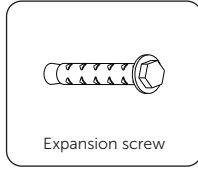
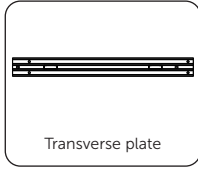
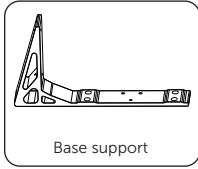


Table 5-6 Packing list of base support

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

6 Mechanical Installation

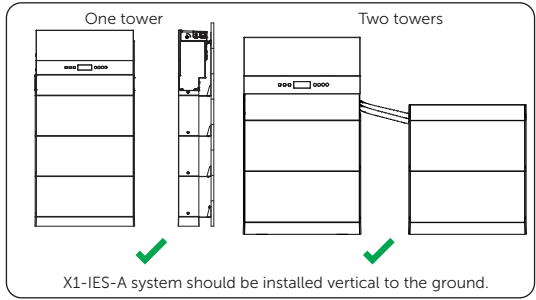


Figure 6-1 Correct installation angle

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

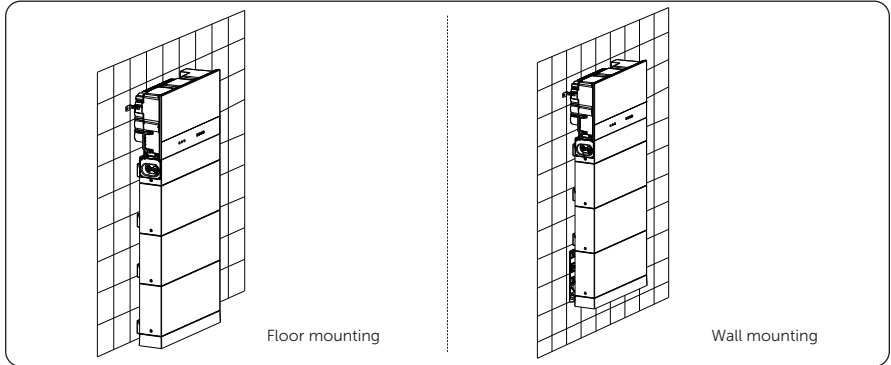


Figure 6-2 Installation modes

 **WARNING!**

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

 **CAUTION!**

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

NOTICE!

- Please ensure that the bearing capacity of the ground and the wall, respectively, that are used to install the X1-IES-A series must be over 922.5 kg, which is based on option C. If option D is chosen, the bearing capacity of the ground and the wall, respectively, must be over 1072.5 kg.
- The device must not be installed on the wood wall.
- At least two persons are required to move the devices of X1-IES-A system.
- Please reserve enough distance from the device to the ceiling (or the grounding) for capacity expansion.

6.1 Mechanical Installation of Battery and Inverter

6.1.1 Floor Mounting

One Tower for Floor Mounting

NOTICE!

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

1. Prepare and install the base and battery modules

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

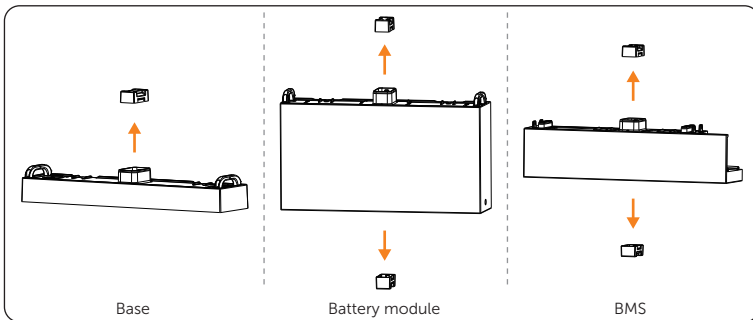


Figure 6-3 Removing dust covers

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

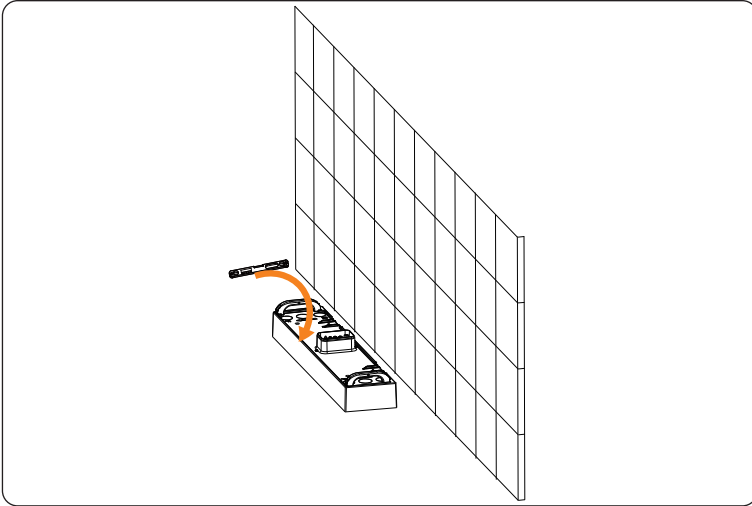


Figure 6-4 Determining whether the Base is level

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

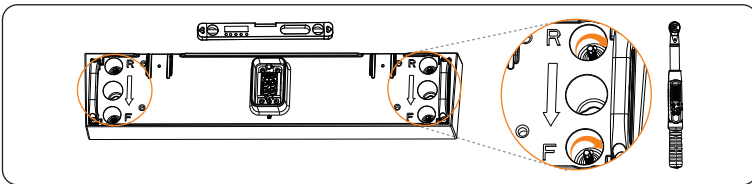
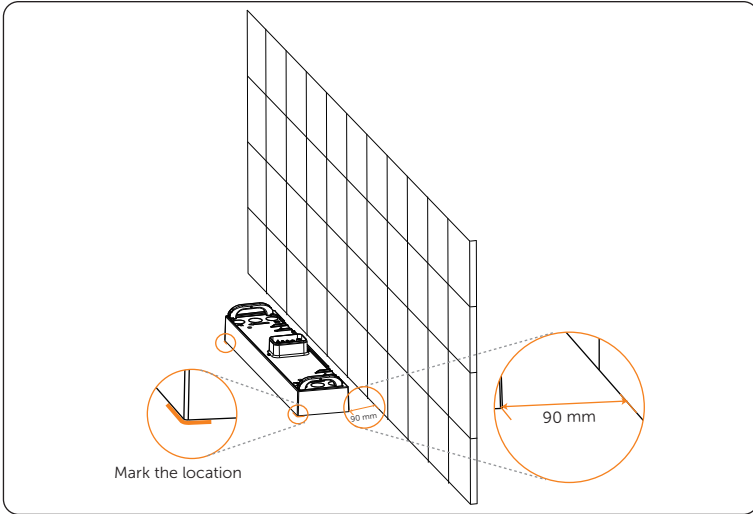


Figure 6-5 Rotating adjustment screws

NOTICE!

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

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



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

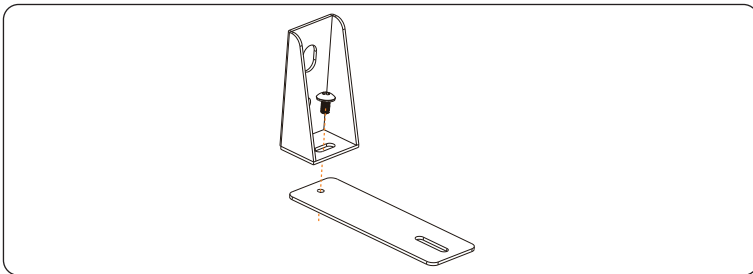


Figure 6-6 Attaching two brackets

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

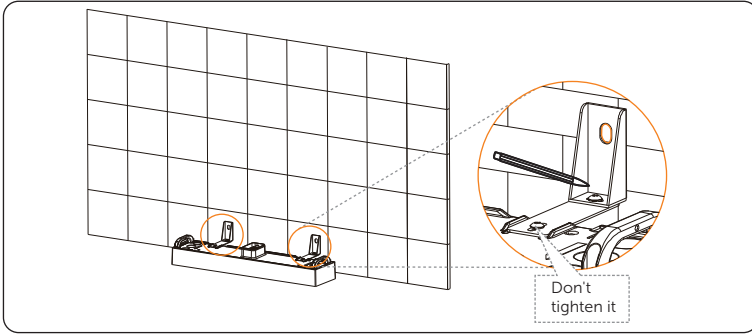


Figure 6-7 Circling inner ring of holes

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

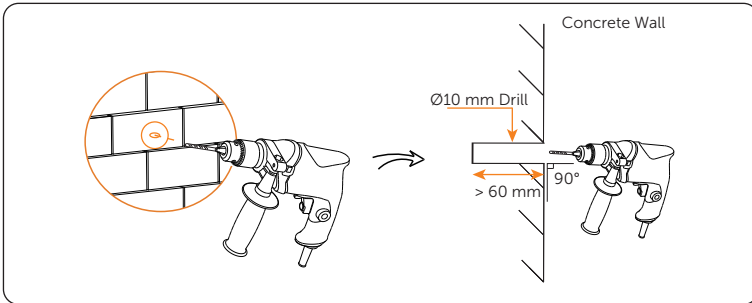


Figure 6-8 Drilling holes

NOTICE!

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

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

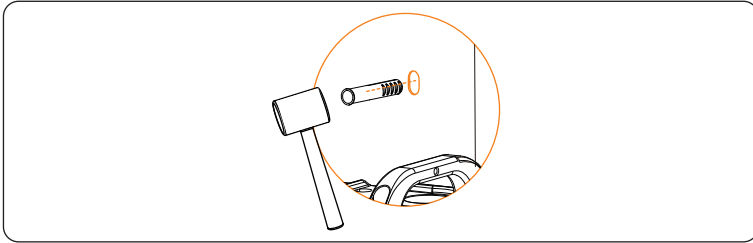


Figure 6-9 Inserting the expansion bolt

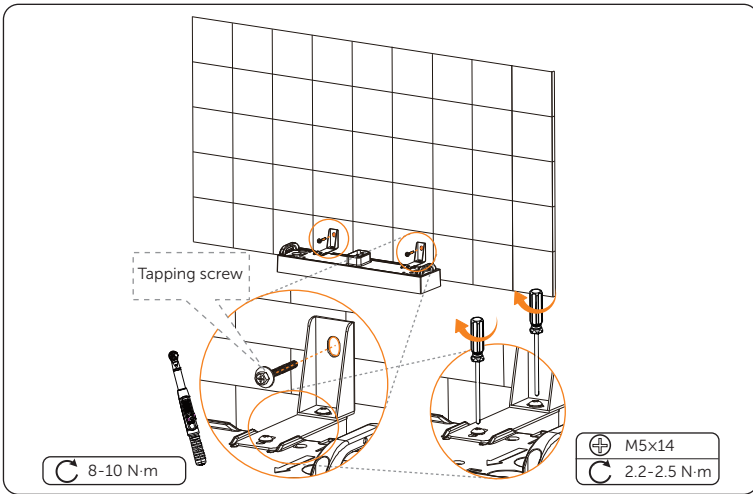


Figure 6-10 Securing the assembled bracket

NOTICE!

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

Step 9: Place a battery module on the base.

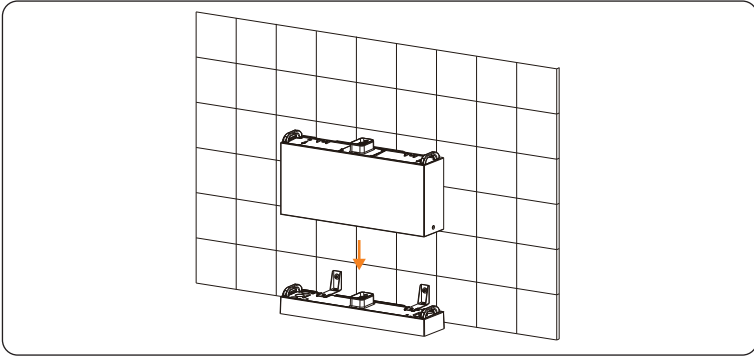


Figure 6-11 Placing the battery module

NOTICE!

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

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

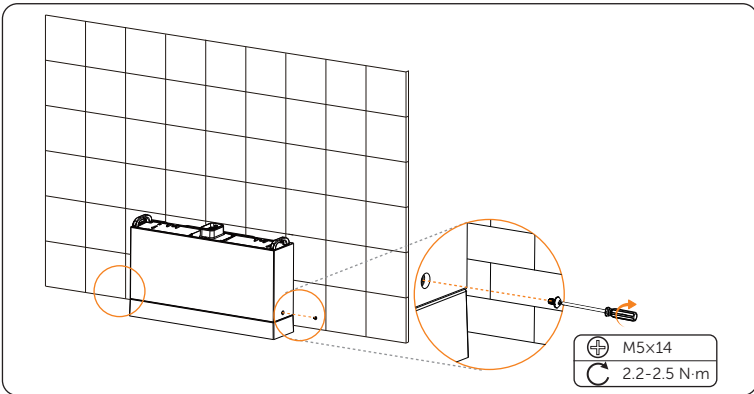


Figure 6-12 Tightening screws

NOTICE!

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

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

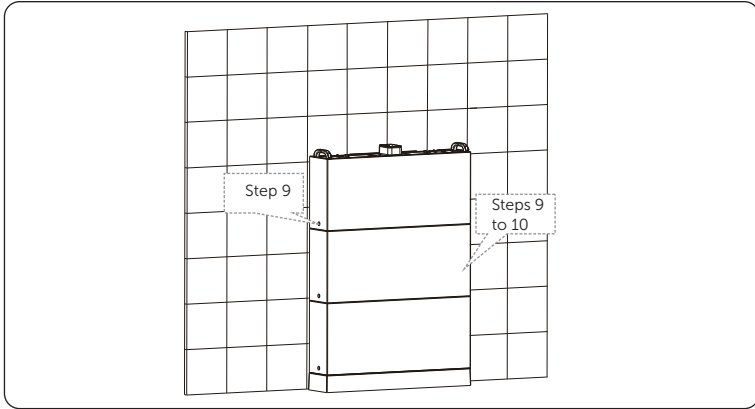


Figure 6-13 Placing battery modules

2. Install the bracket of the top battery module

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

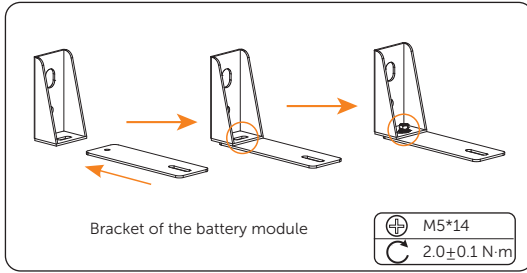


Figure 6-14 Securing the bracket

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

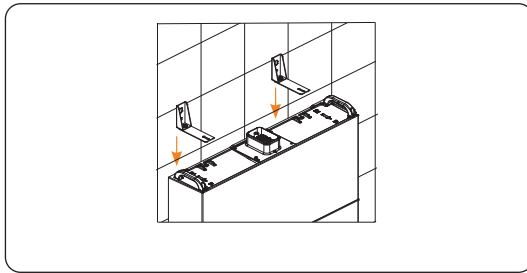
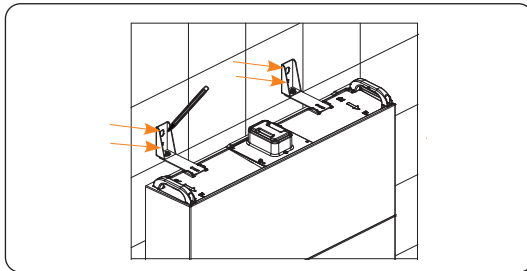


Figure 6-15 Aligning the bracket with the mounting holes



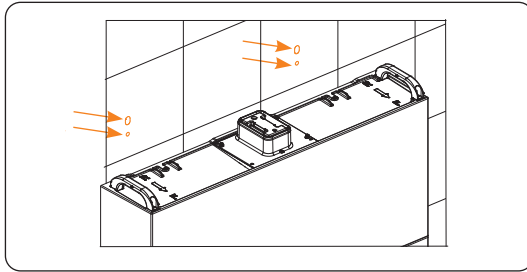


Figure 6-16 Marking the position of the mounting holes

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

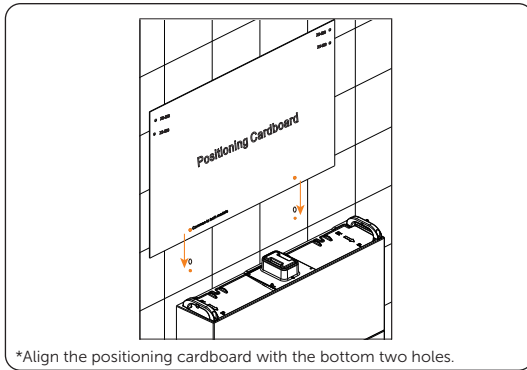
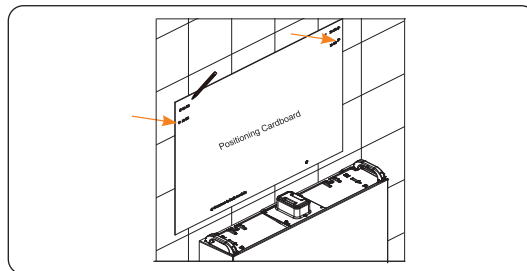


Figure 6-17 Aligning the positioning cardboard



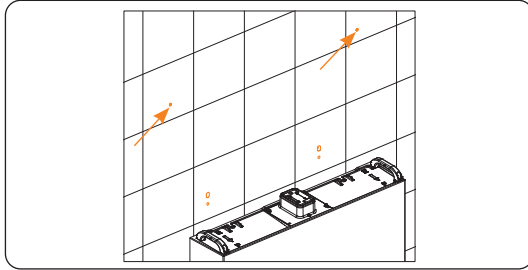


Figure 6-18 Marking the position of the mounting holes

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

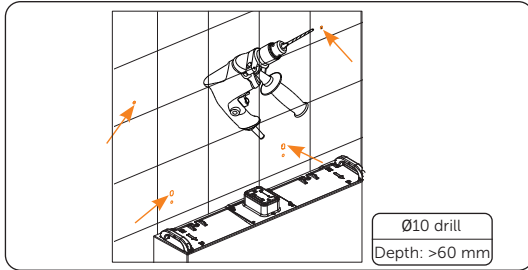


Figure 6-19 Drilling the upper four holes

NOTICE!

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

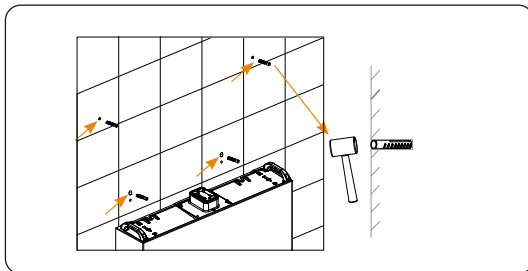


Figure 6-20 Inserting the expansion tubes into the holes

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

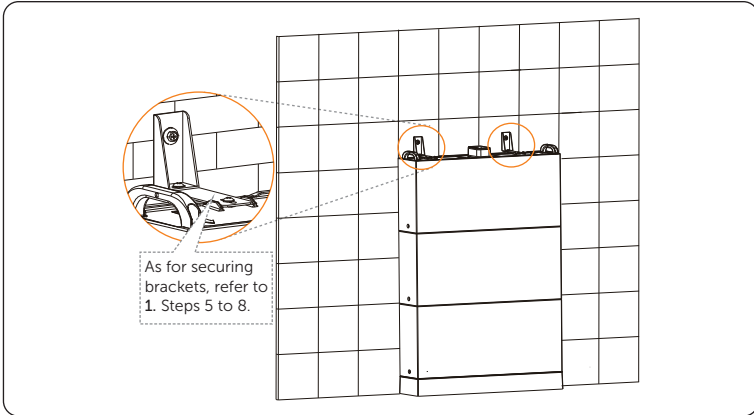


Figure 6-21 Securing assembled bracket

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

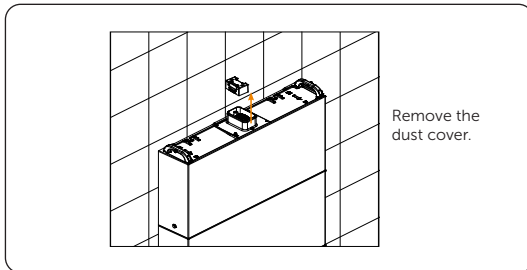


Figure 6-22 Removing the dust cover

3. Install the BMS

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

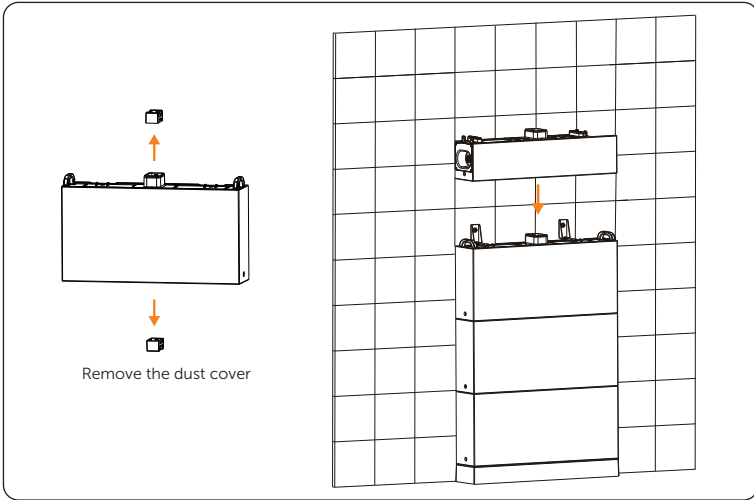


Figure 6-23 Placing the BMS

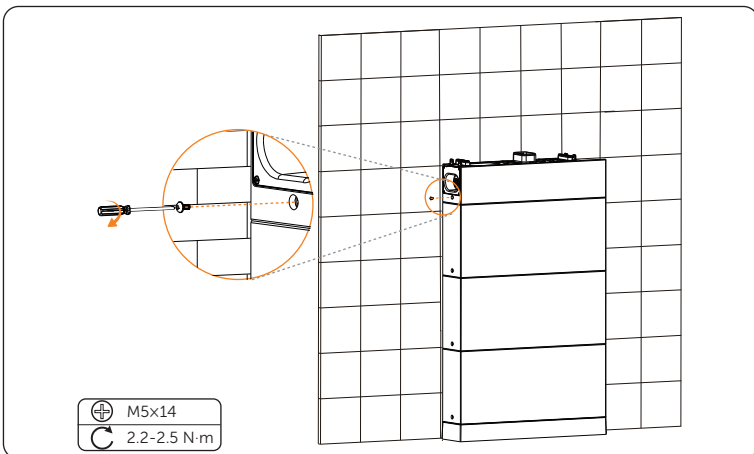


Figure 6-24 Tightening M5 screws

NOTICE!

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

4. Install the inverter

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

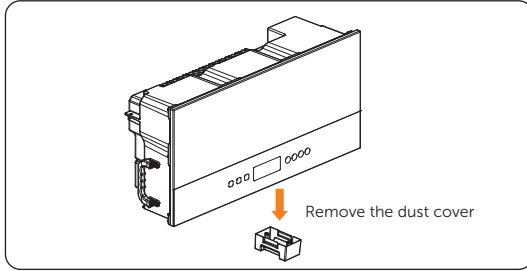


Figure 6-25 Removing the dust cover

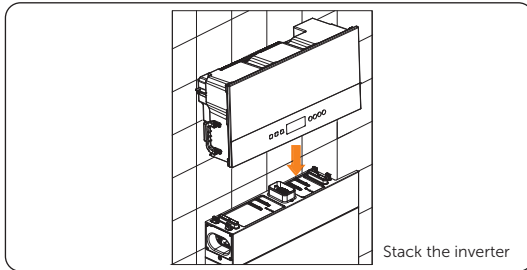
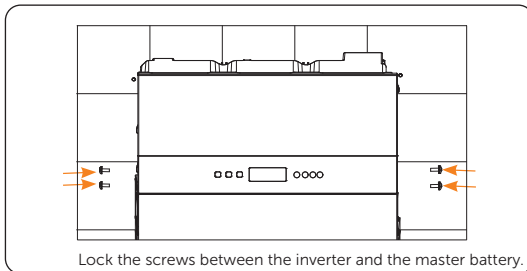


Figure 6-26 Stacking the inverter

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



Lock the screws between the inverter and the master battery.

Figure 6-27 Lock the M5*14 screws

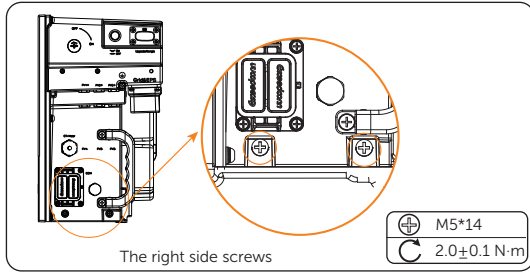


Figure 6-28 Locking the right side screws

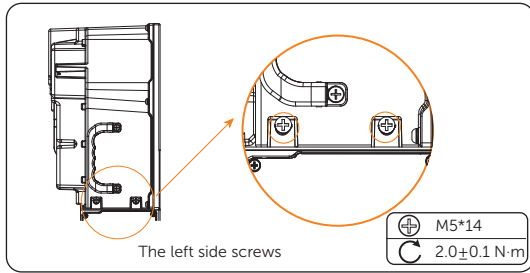


Figure 6-29 Locking the left side screws

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

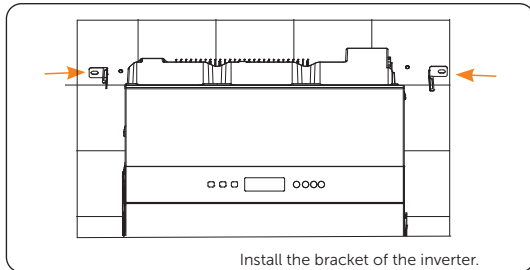


Figure 6-30 Installing the bracket of the inverter

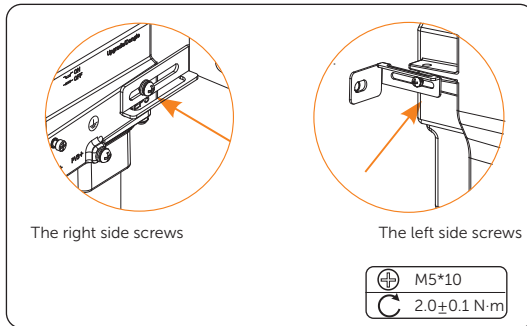


Figure 6-31 Tightening but not locking the screws

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

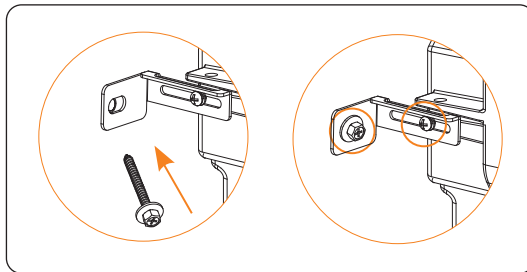


Figure 6-32 Locking the left side self-tapping screw and M5*10 screw

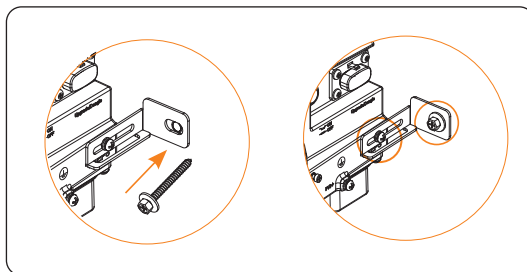


Figure 6-33 Locking the right side self-tapping screw and M5*10 screw

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

Two Tower for Floor Mounting

NOTICE!

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

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

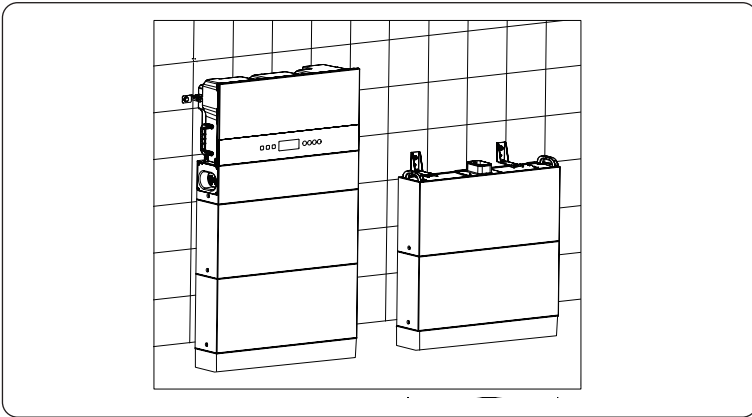


Figure 6-34 Installing two towers

Step 2: Place the series box, insert and tighten M5X14 screws, with totalling 4 screws (torque: 2.2-2.5 N·m).

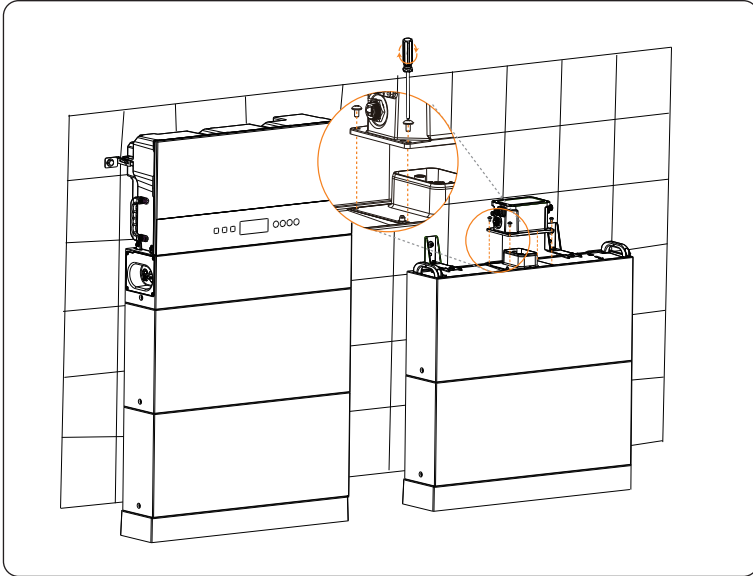


Figure 6-35 Placing the series box

NOTICE!

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

6.1.2 Wall Mounting

One Tower for Wall Mounting

NOTICE!

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

1. Prepare and install the base and battery modules

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

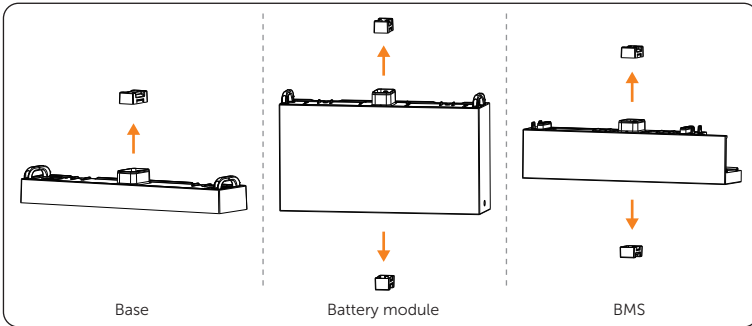


Figure 6-36 Removing dust covers

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).

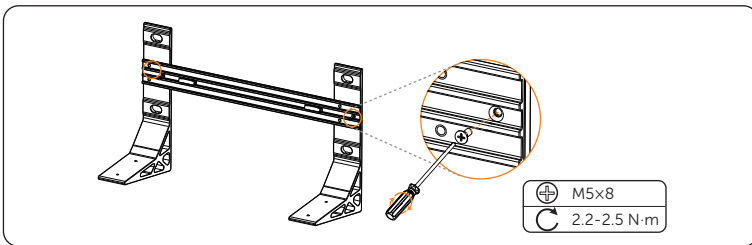


Figure 6-37 Attaching base support and transverse plate

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

Then circle along the inner ring of the four holes.

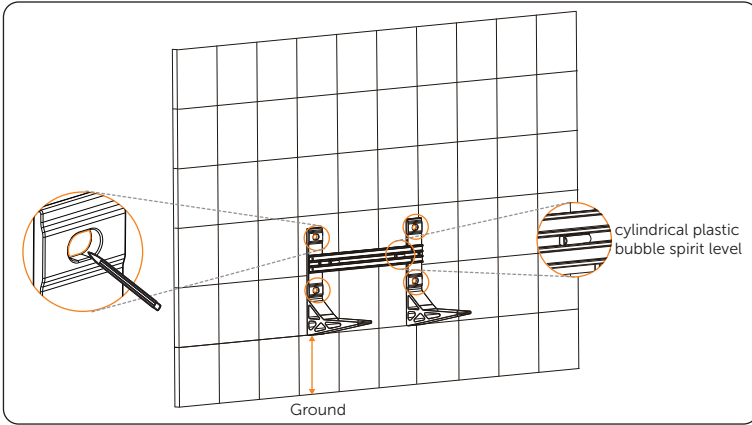


Figure 6-38 Drawing circles

NOTICE!

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

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

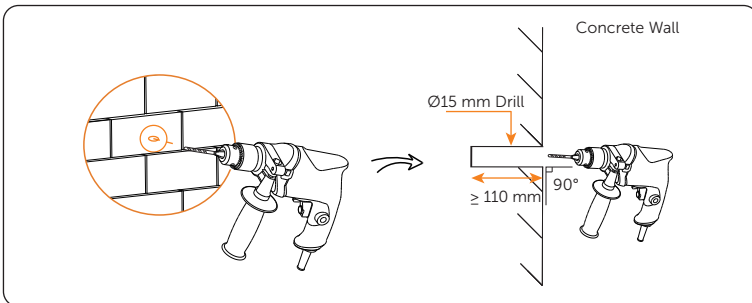


Figure 6-39 Drilling holes

NOTICE!

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

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

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

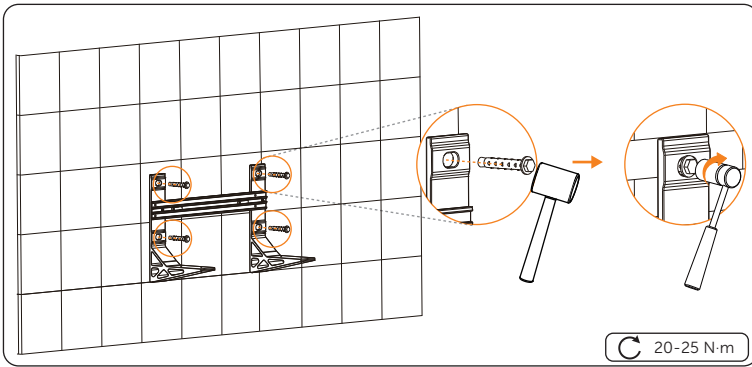


Figure 6-40 Tightening expansion screws

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.

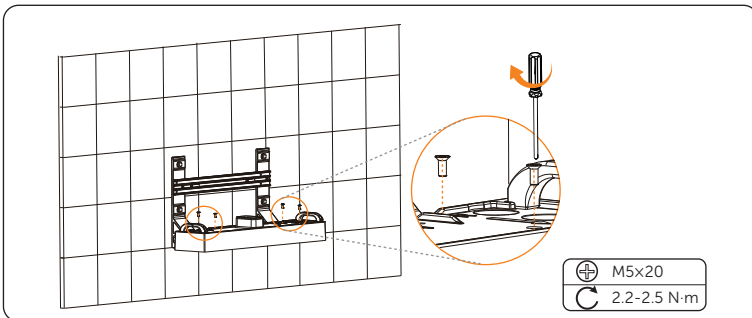


Figure 6-41 Securing the base

Step 7: Place the battery module on the base.

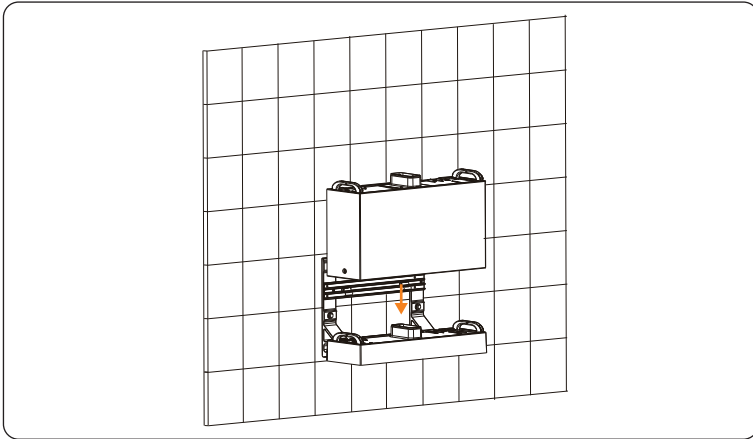


Figure 6-42 Placing battery module

NOTICE!

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

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

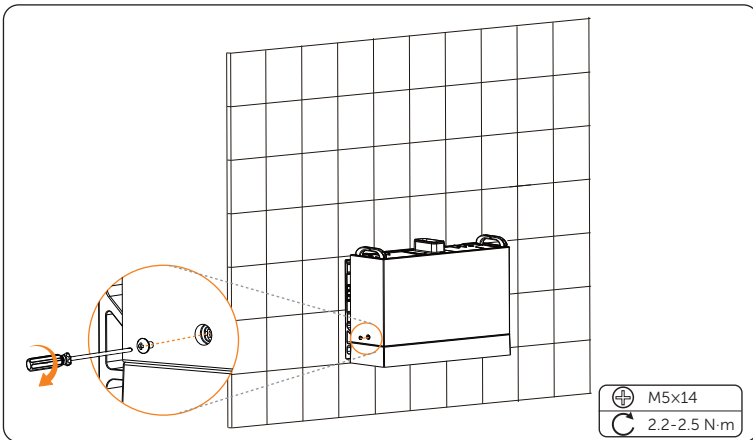


Figure 6-43 Tightening screws

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.

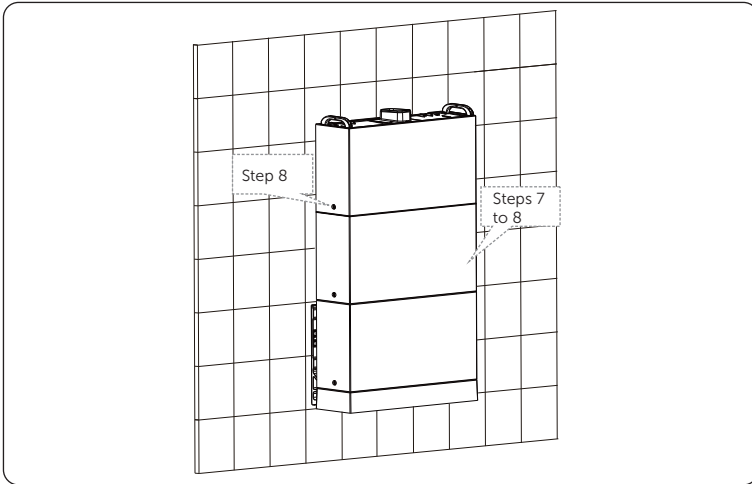


Figure 6-44 Placing battery modules

2. Install the bracket of the top battery module

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

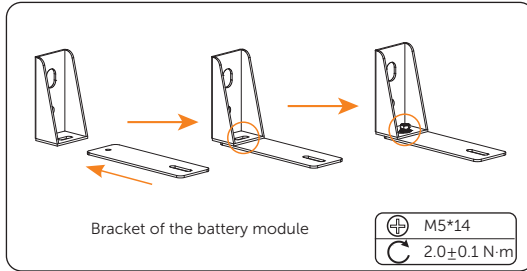


Figure 6-45 Securing the bracket

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

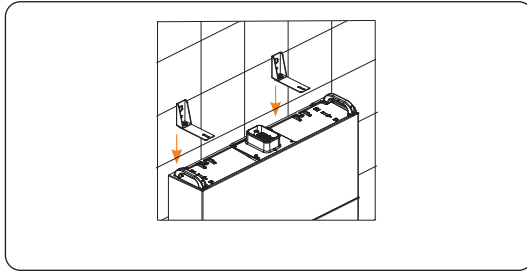
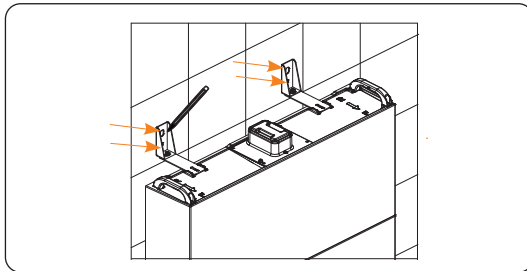


Figure 6-46 Aligning the bracket with the mounting holes



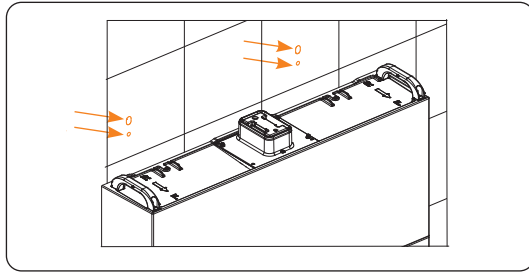
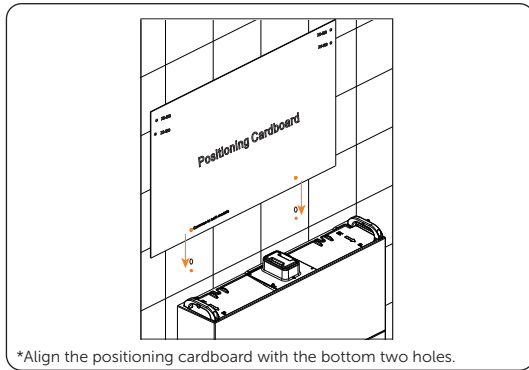


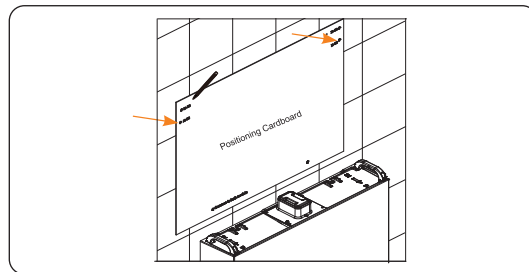
Figure 6-47 Marking the position of the mounting holes

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



*Align the positioning cardboard with the bottom two holes.

Figure 6-48 Aligning the positioning cardboard



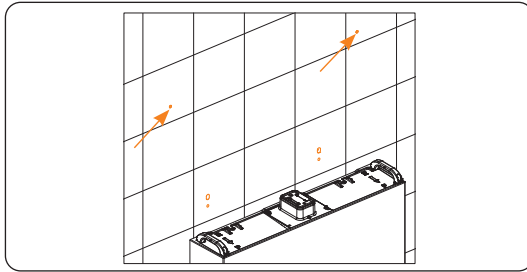


Figure 6-49 Marking the position of the mounting holes

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

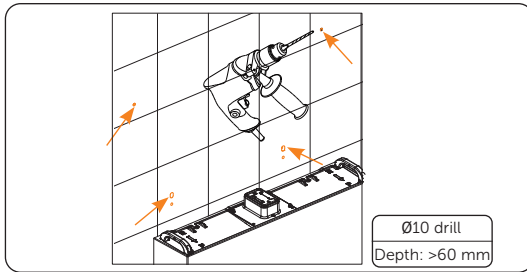


Figure 6-50 Drilling the upper four holes

NOTICE!

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

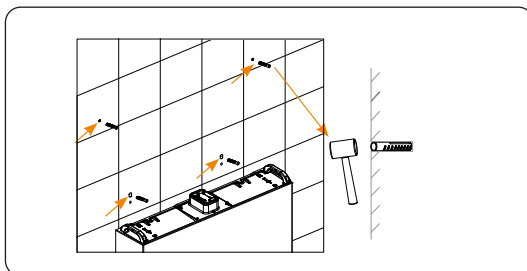


Figure 6-51 Inserting the expansion tubes into the holes

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

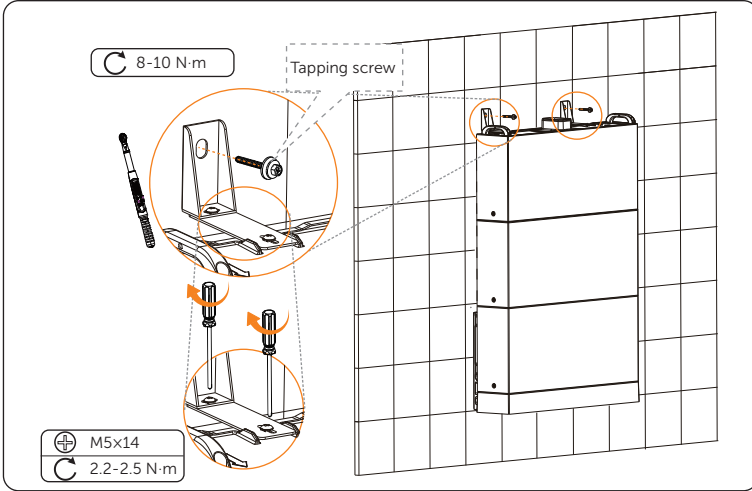


Figure 6-52 Securing the assembled bracket

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

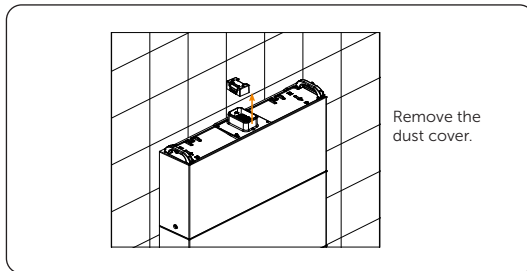


Figure 6-53 Removing the dust cover

3. Install the BMS

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

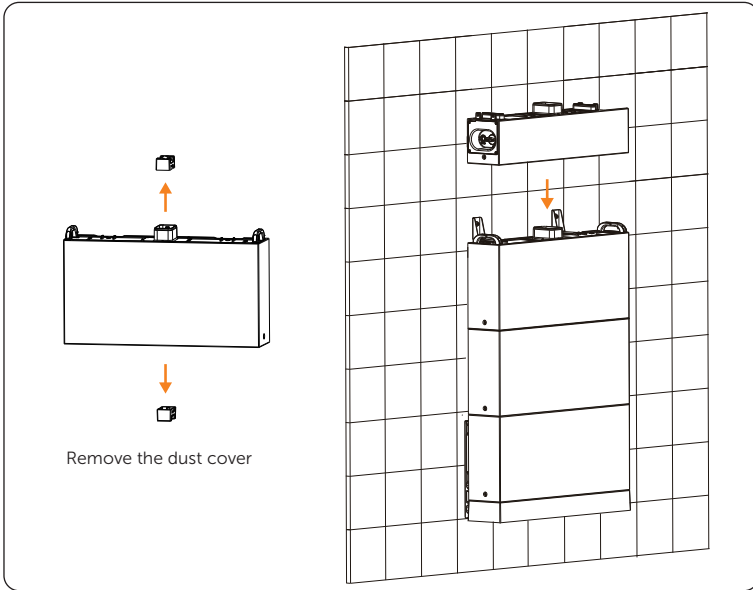


Figure 6-54 Placing the BMS

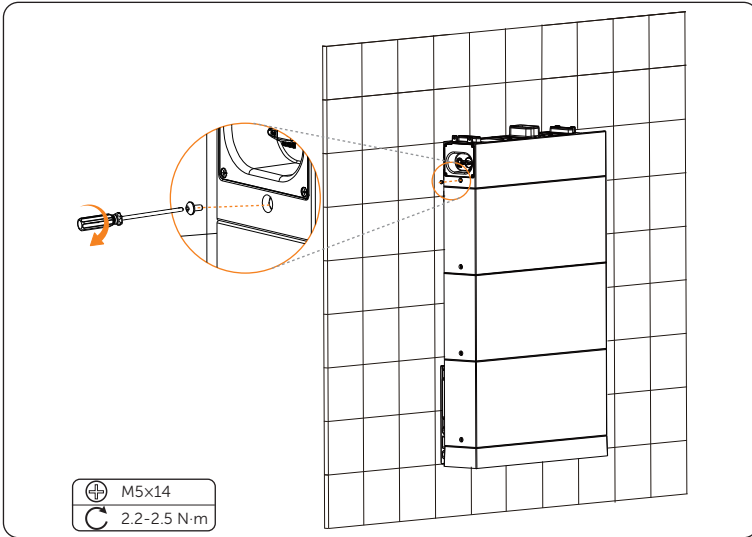


Figure 6-55 Tightening M5 screws

NOTICE!

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

4. Install the inverter

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

Two Towers for Wall Mounting

NOTICE!

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

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

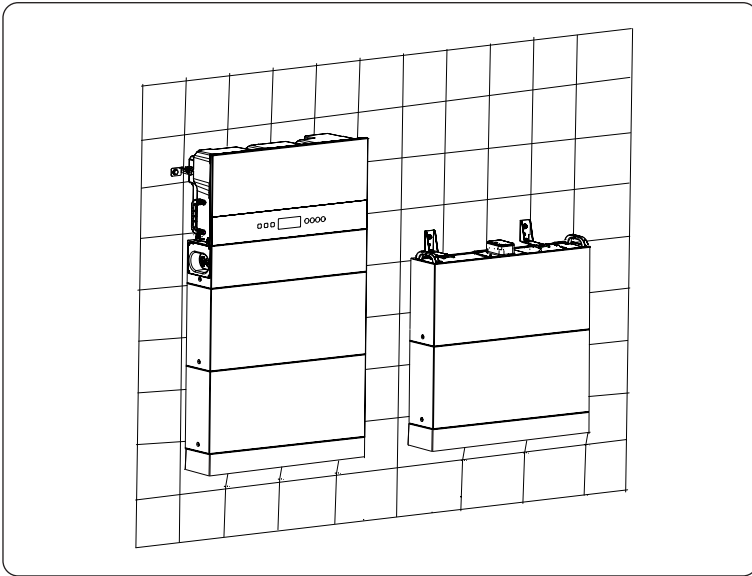


Figure 6-56 Installing two towers

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

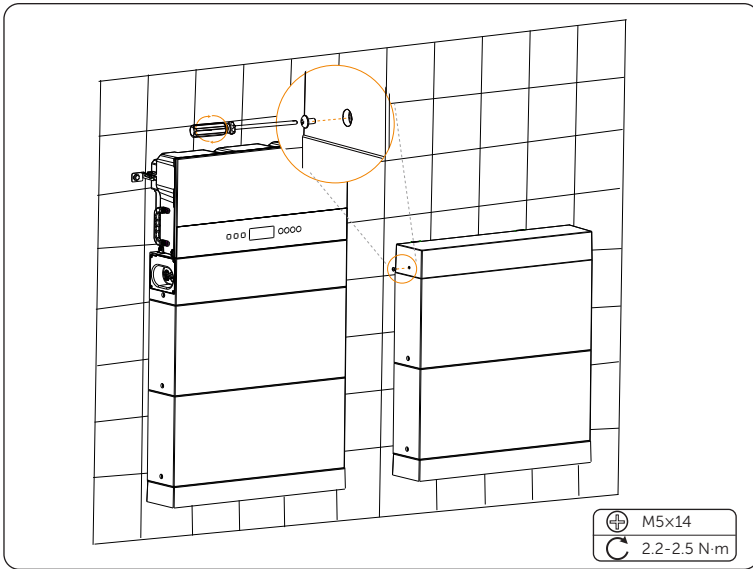


Figure 6-57 Placing the series box

NOTICE!

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

6.1.3 Battery Capacity Expansion

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

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

NOTICE!

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

7 Electrical Connection

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

7.1.1 Details of Cables

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

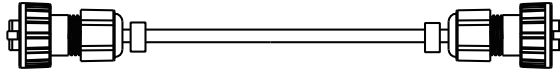


Figure 7-1 Communication cable

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

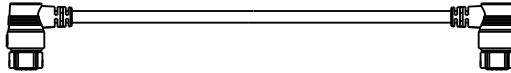


Figure 7-2 Heater cable

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



Figure 7-3 Power cable (black)

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



Figure 7-4 Power cable (red)

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

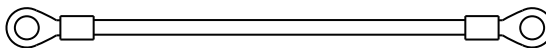


Figure 7-5 Grounding cable

NOTICE!

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

7.1.2 Wiring Procedure

 **WARNING!**

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

 **CAUTION!**

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

NOTICE!

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

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

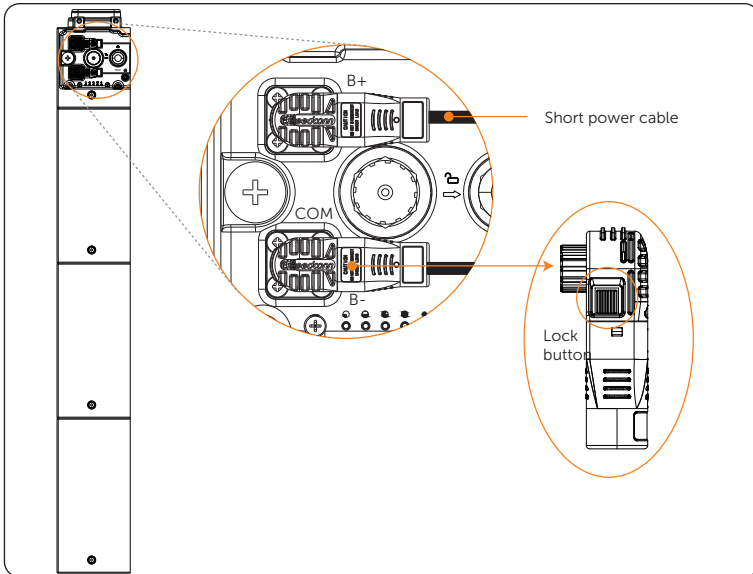


Figure 7-6 Removing short power cable

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

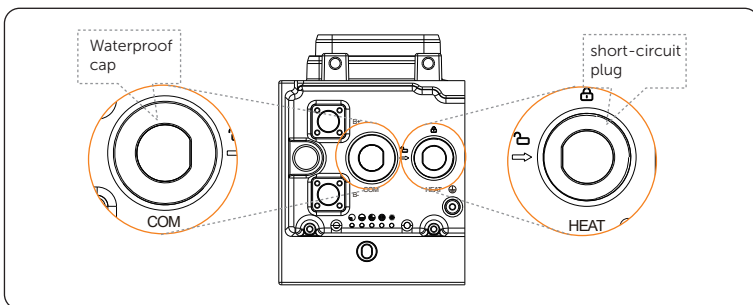


Figure 7-7 Removing waterproof cap

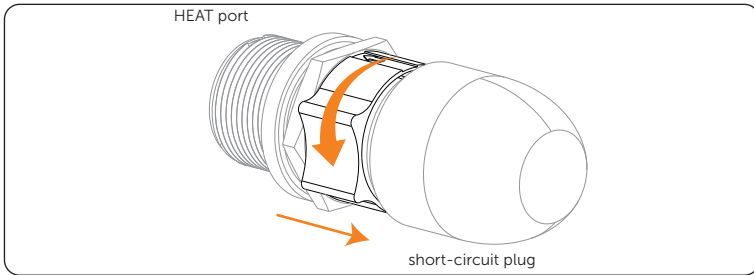


Figure 7-8 Closing short-circuit plug

NOTICE!

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

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

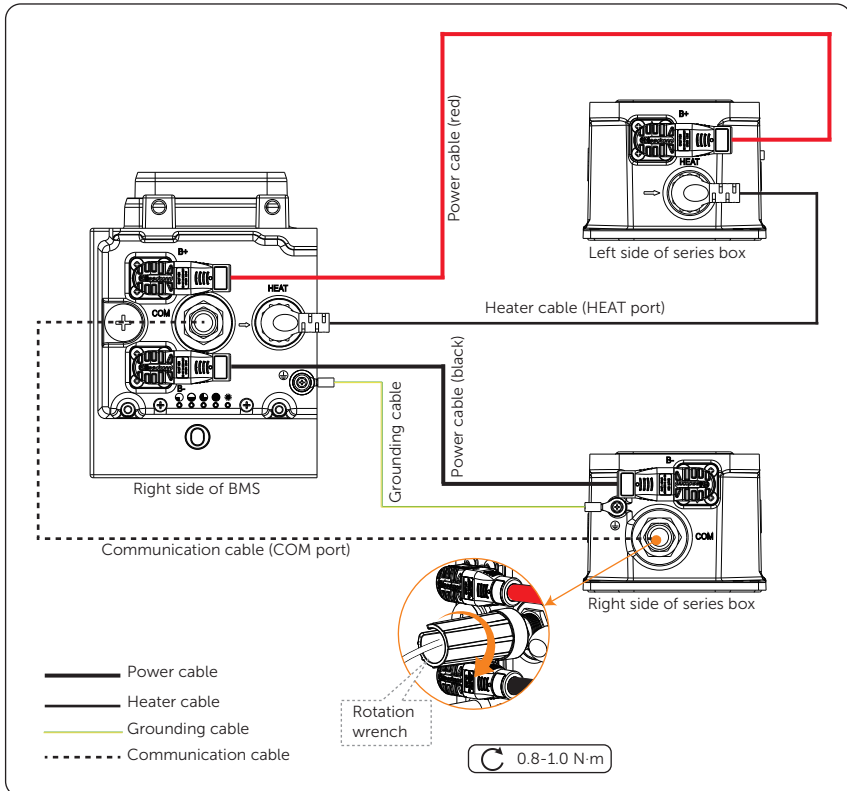


Figure 7-9 Connecting cables

NOTICE!

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

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

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

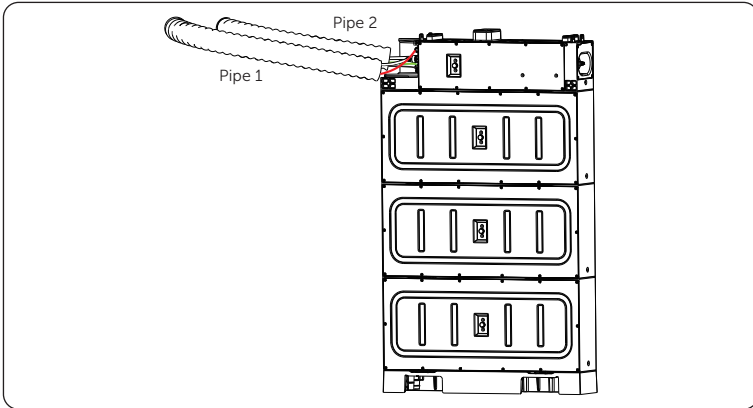


Figure 7-10 Pulling cables

NOTICE!

- A corrugated pipe should be prepared by the users.

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

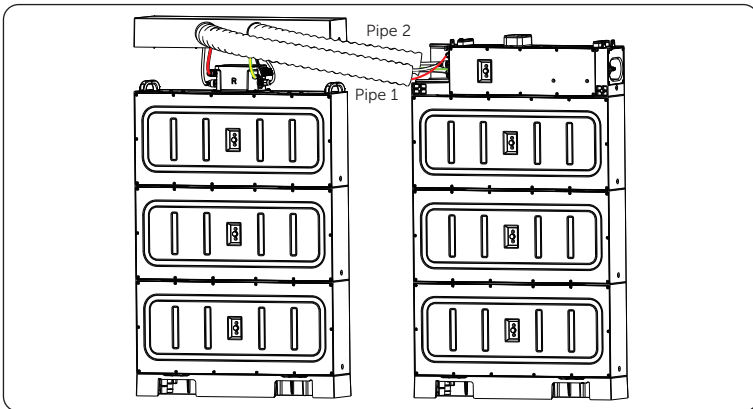


Figure 7-11 Inserting pipes into the cover

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

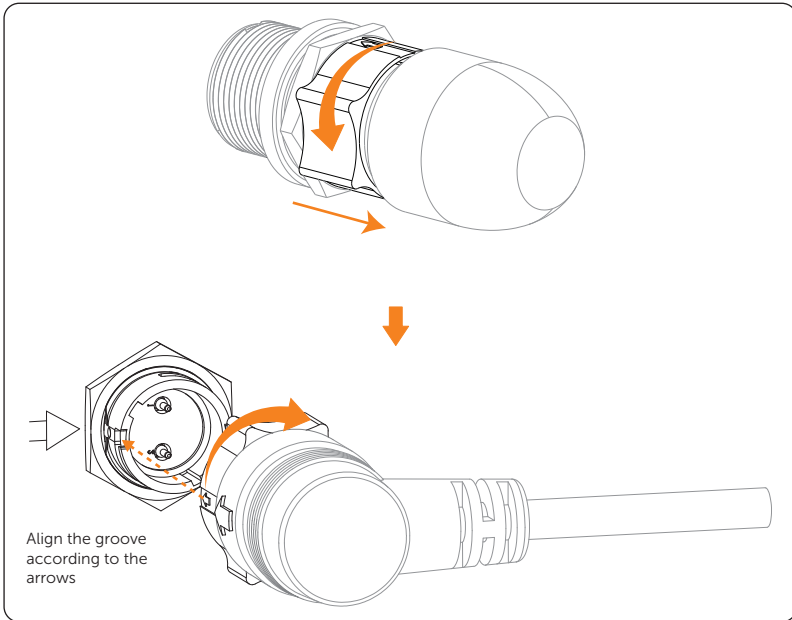


Figure 7-12 Locking heater cable

NOTICE!

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

7.1.3 Installation of Cover

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

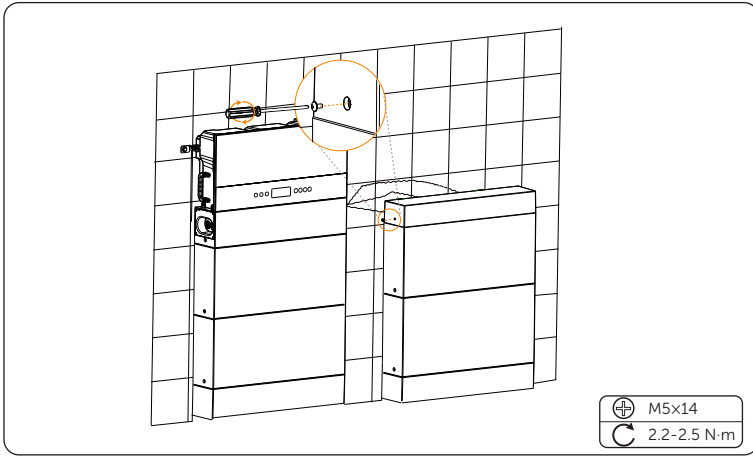


Figure 7-13 Tightening M5 screws

NOTICE!

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

7.2 Electrical Connection on the Inverter

DANGER!

- Before electrical connection, make sure the DC switch on the battery (T-BAT-SYS); the AC breakers between the inverter and the power grid are disconnected. Otherwise, electrical shock may be caused by high voltage, resulting in serious personal injury or death.

WARNING!

- Only the qualified personnel can perform the electrical connection following the local standards and requirements.
- Follow this manual or other related document to wire connection. The device damage caused by incorrect cabling is not in the scope of warranty.

CAUTION!

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

7.2.1 Wiring Sequence

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

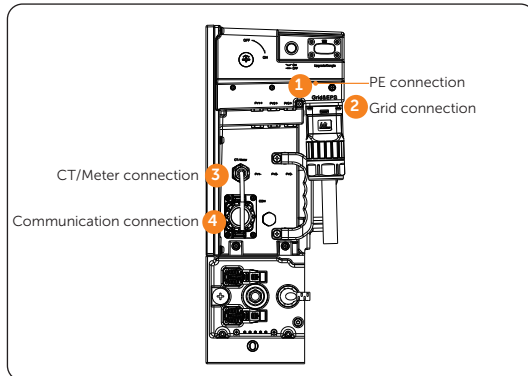


Figure 7-14 Wiring sequence

7.2.2 PE Connection

All non-current carrying metal parts of the equipment must be grounded reliably. We recommend that the inverter is earthed to a nearby ground point. For a system with multiple inverters connected in parallel, connect the ground points of all inverters to ensure equipotential connections to ground cables.

PE connection procedures

Step 1: Strip the PE cable by wire stripper;

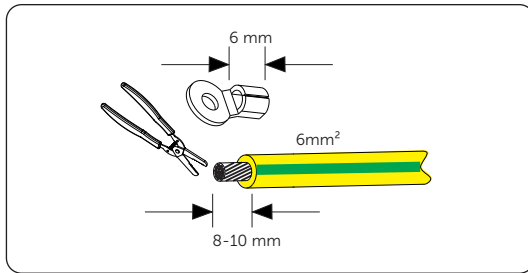


Figure 7-15 Stripping the PE cable

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

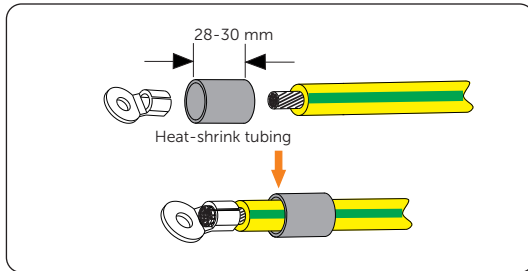


Figure 7-16 Inserting the stripped section into OT terminal

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

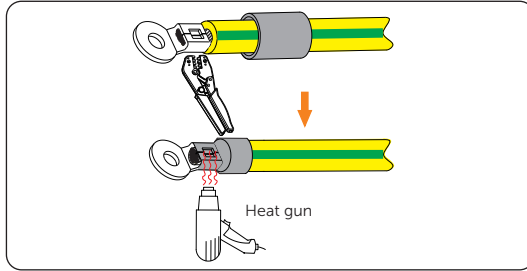


Figure 7-17 Crimping the cable

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

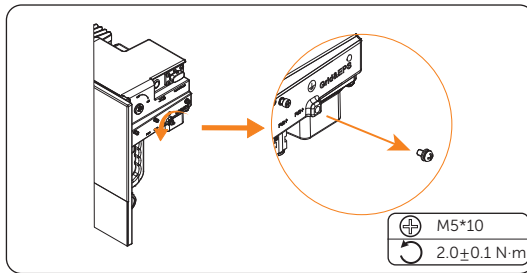


Figure 7-18 Removing the M5*10 screw

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

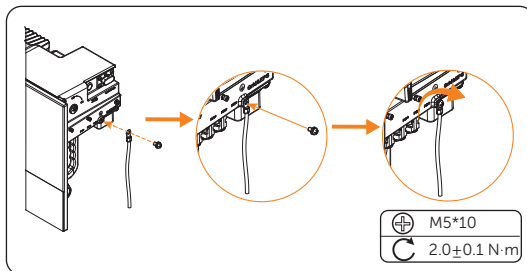


Figure 7-19 Securing the PE cable

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

7.2.3 AC Connection

NOTICE!

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

Requirements for AC side connection

- Grid Voltage requirement
 - » The grid voltage must be within the permissible range. The inverter is suitable for rated voltage 220/230/240V, frequency 50/60Hz. Other technical requests should comply with the requirement of the local public grid.
- RCD requirement
 - » The inverter does not require an external residual-current device when operating. If an external RCD is required by local regulations, It is recommended to use a Type-A RCD with the value of 300 mA.
- AC breaker requirement
 - » An AC breaker that matches the power of the inverter must be connected between the inverter output and the power grid, and each inverter must be equipped with an independent breaker or other load disconnection unit to ensure the safe disconnection from the grid. Refer to [4.3 Additionally Required Materials](#) for specific data of breaker of Grid.
- Load requirement
 - » It is prohibited to connect any load between the inverter and the AC breaker.

Wiring procedures

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

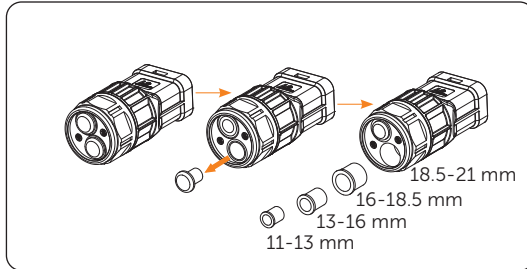


Figure 7-20 Removing the sealing plug

Step 2: Prepare a Grid cable (three-core cable), then strip the cable as below.

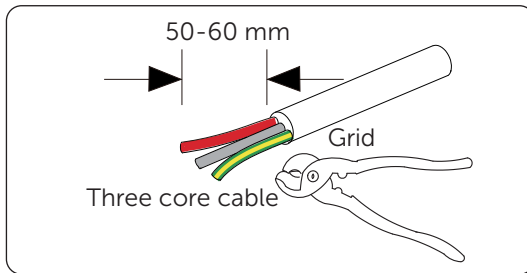


Figure 7-21 Stripping the Grid cable

Step 3: Thread the Grid cable through the AC terminal.

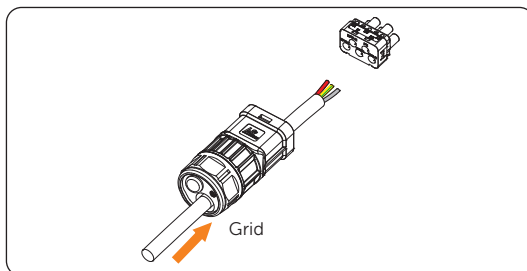


Figure 7-22 Threading the Grid cable

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

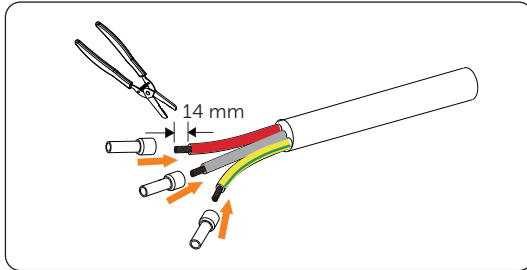


Figure 7-23 Inserting the stripped cables into ferrules

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

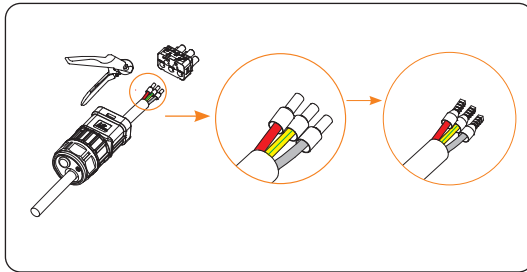


Figure 7-24 Crimping the ferrules

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

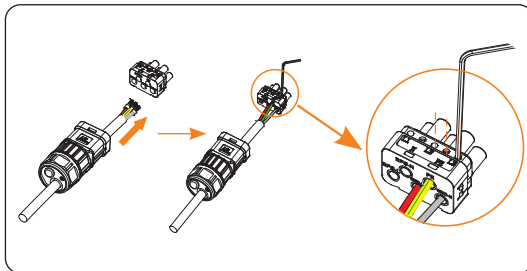


Figure 7-25 Threading the crimped cables

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

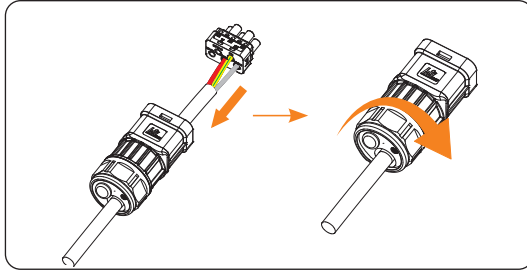


Figure 7-26 Installing the AC terminal

Step 8: Remove the AC protective cover.

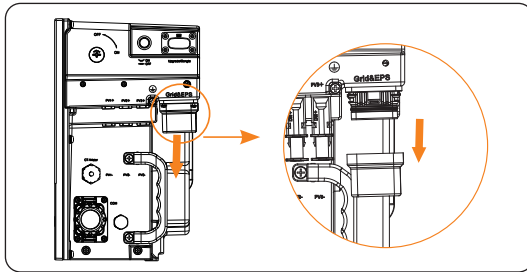


Figure 7-27 Removing the AC protective cover

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

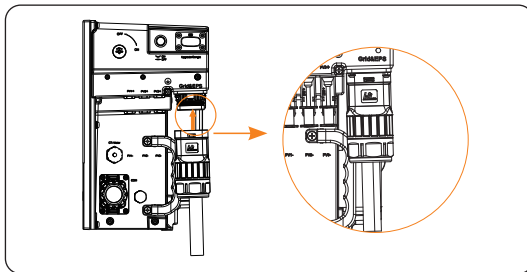


Figure 7-28 Plugging the AC terminal into the Grid&EPS port

7.2.4 Communication Connection

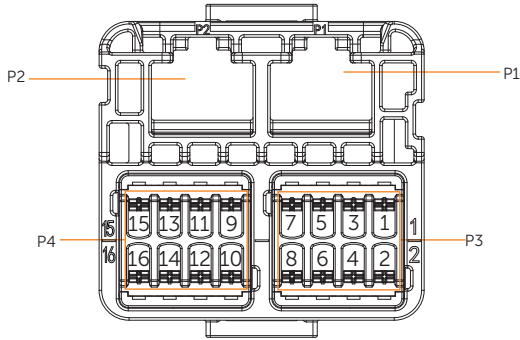


Figure 7-29 COM port

7.2.4.1 Parallel Connection (P2 port of COM port)

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

Requirments for parallel connection

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

System diagram

- Diagram 1: System diagram applied to CT.

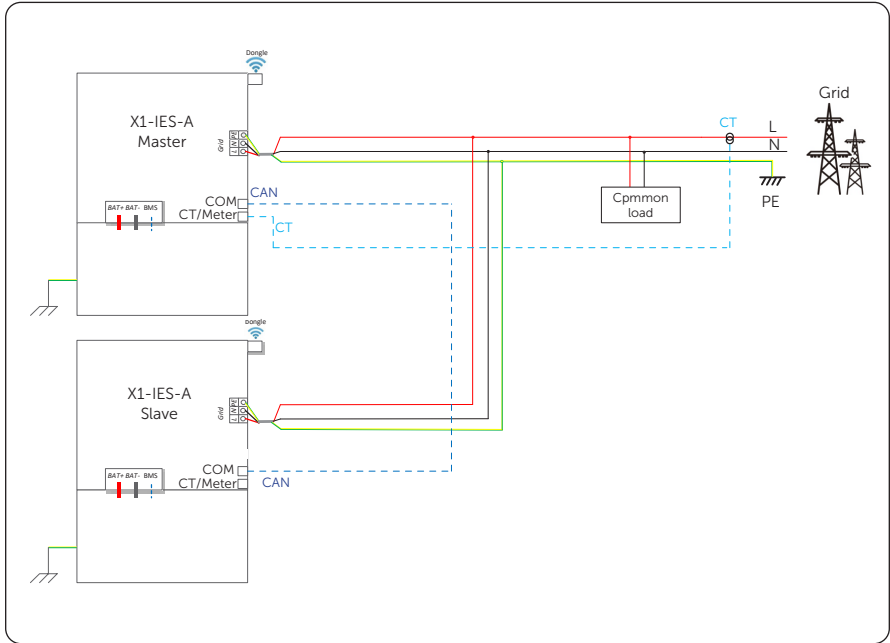


Figure 7-30 System diagram applied to CT

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

- Diagram 2: System diagram applied to electric Meter.

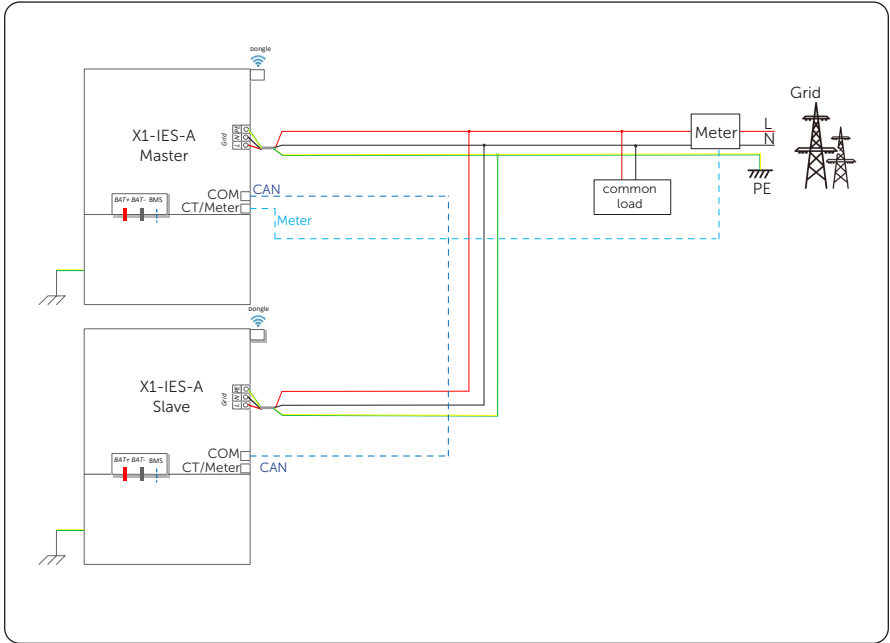


Figure 7-31 System diagram applied to electric Meter

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

Parallel connection diagram

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

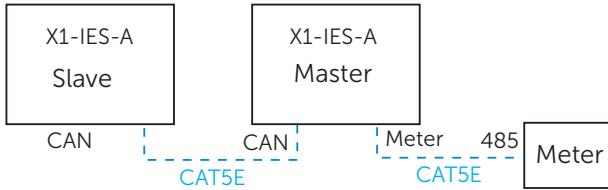


Figure 7-32 Parallel connection with Meter

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

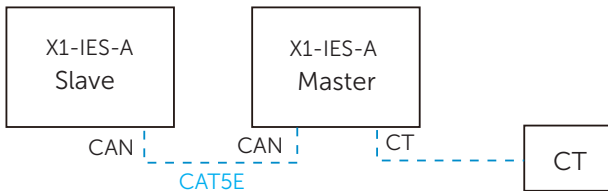


Figure 7-33 Parallel connection with CT

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

7.2.4.2 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 prompt "Meter fault" or "Missed CT fault" (If Cyclic Check is enabled)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.

Table 7-7 Pin assignment for Meter/CT

Pin	1	2	3	4	5	6	7	8
Function	CT		Meter		CT			
Pin Definition	CT_11_ CON	GND_ COM1	CT_21_ CON	METER_ 485A	METER_ 485B	CT_22_ CON	GND_ COM1	CT_12_ CON

* Only one of the Meter and CT connections can be selected. Meter cable goes to pin terminal 4 and 5; CT cable goes to pin terminal 1 and 8; reserve CT cable goes to pin terminal 3 and 6.

Connection Diagram

- CT connection diagram

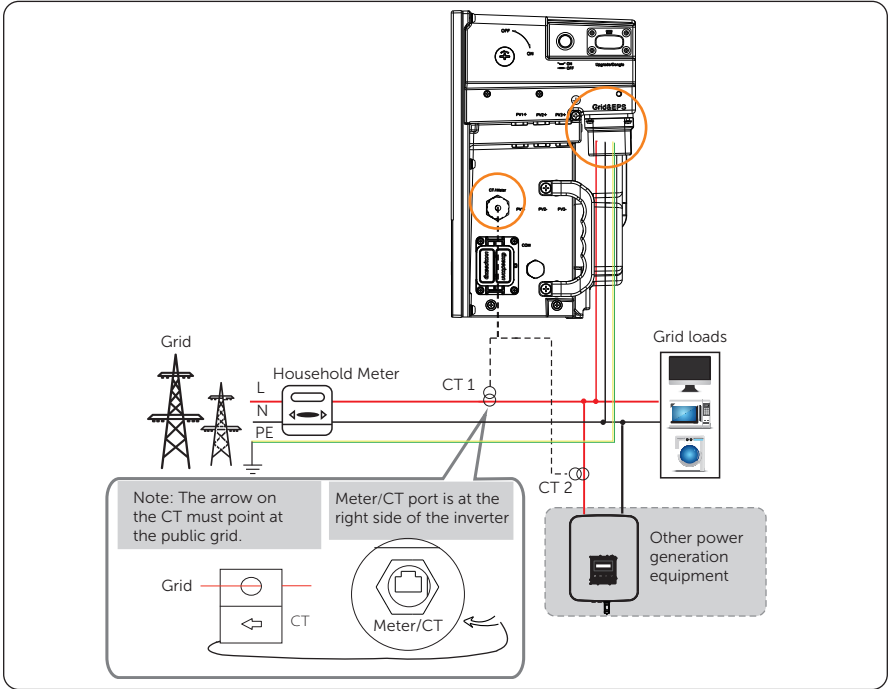


Figure 7-34 CT connection diagram

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

- Meter connection diagram

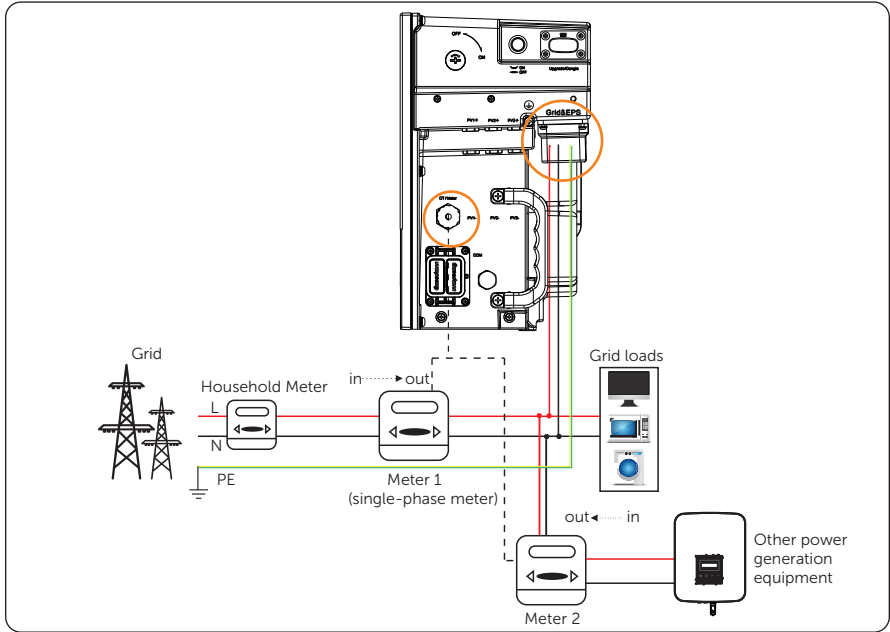


Figure 7-35 Meter connection diagram

* If two meters were to be connected in the system, the communication cables of the meters should be connected in parallel, i.e. 485A of meter1 should be connected with 485A of meter2, 485B of meter1 should be connected with 485B of meter2, then connect the two cables to the corresponding 485A and 485B on the inverter.

Wiring procedures

Step 1: Crimp one RJ45 terminal with crimping tool for RJ45, and thread the communication cable through waterproof connector. Then crimp another RJ45 terminal. Pay attention to the pin order of RJ45. When connecting meter, crimp only one RJ45 terminal.

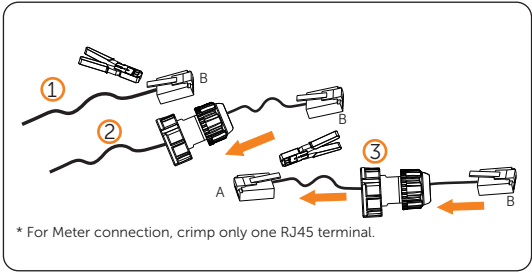


Figure 7-36 Crimping RJ45 terminals

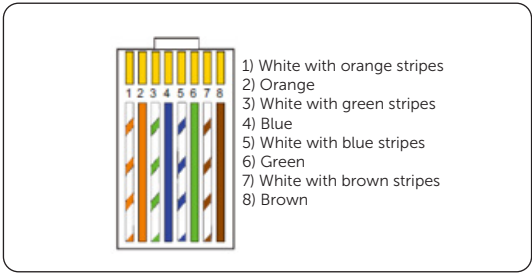


Figure 7-37 Pin order of RJ45 terminal

Step 2: Remove the terminal cap of the CT/Meter port.

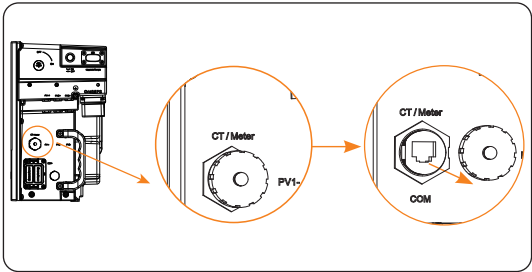


Figure 7-38 Removing the terminal cap

Step 3: Plug the terminal A to the Meter/CT port. An audible "Click" will be heard if it is successfully connected.

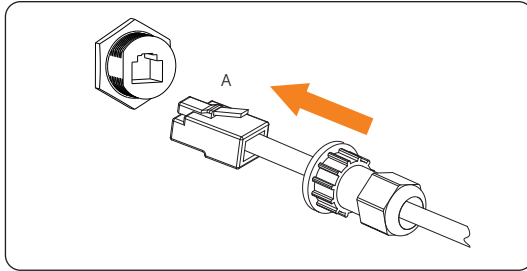


Figure 7-39 Plugging the terminal A to CT/Meter port

Step 4: For CT, plug the terminal B to RJ45 connector. For Meter, directly plug the terminal A to the Meter/CT port. Refer to Meter document for specific.

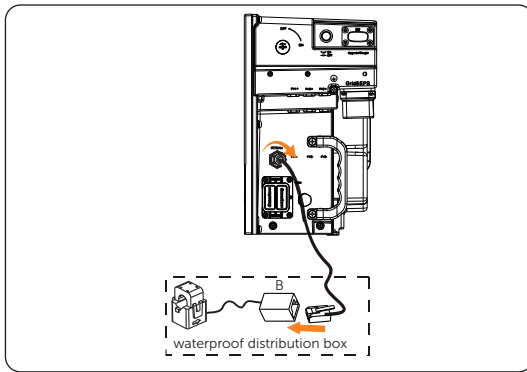


Figure 7-40 CT connection diagram

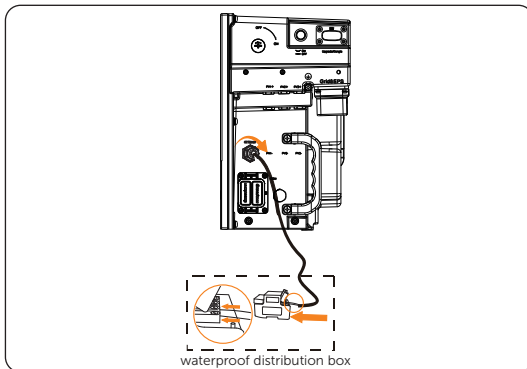


Figure 7-41 Meter connection diagram

7.2.4.3 COM Connection (COM Port)

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

Pin assignment

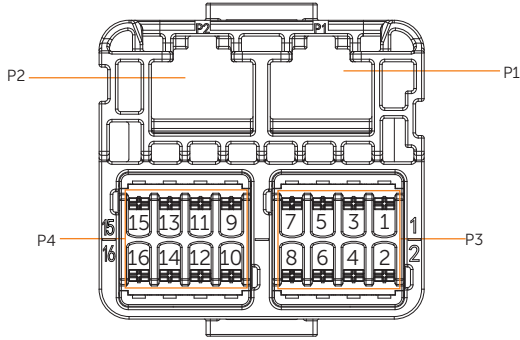


Figure 7-42 COM port

Table 7-8 Pin assignment for COM

Icon	PIN	PIN Definition	Function
P1 (DRM Port)	1	DRM1/5	DRM
	2	DRM2/6	
	3	DRM3/7	
	4	DRM4/8	
	5	+3.3V_COM	
	6	COM/DRM0	
	7	GND_COM	
	8	GND_COM	
P2 (Parallel Port)	1	REMOTE_485A	RS485
	2	REMOTE_485B	
	3	GND_COM	/
	4	PARALLEL_SYN2	Parallel synchronization signal
	5	PARALLEL_SYN1	
	6	EPSBOX_RELAY_VCC	/
	7	PARALLEL_CANL	Parallel CAN
	8	PARALLEL_CANH	

Electrical Connection

P3	1	/	/
	2	/	
	3	/	
	4	/	
	5	GND_COM	/
	6	GND_COM	Communication with SolaX's Datahub, EV Charger, Adapter Box and other internal devices
	7	REMOTE_485A	
	8	REMOTE_485B	
P4	9	ARM_POWER	/
	10	GND_COM	/
	11	MODBUS_485A	Communication with other external devices
	12	MODBUS_485B	
	13	DO_1	Output drycontact
	14	DO_2	
	15	DI_1	Input drycontact
	16	DI_2	

External devices connection

- Connection with a SolaX datahub

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

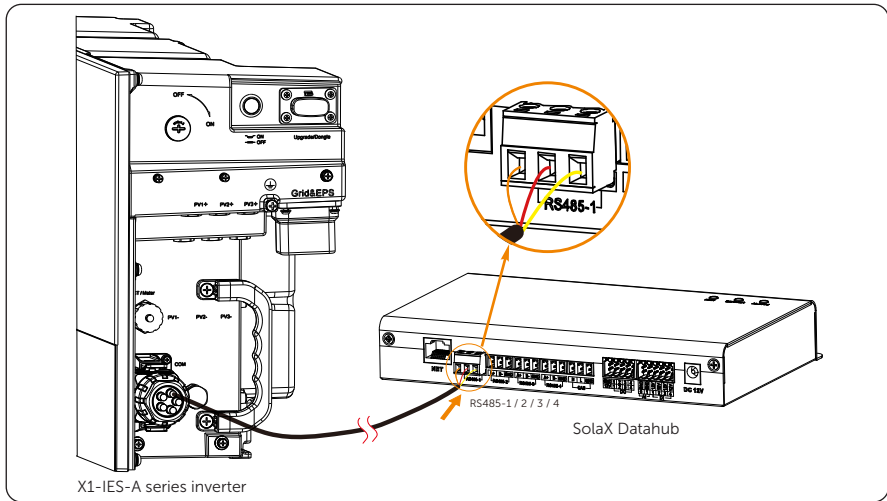


Figure 7-43 Connecting with a SolaX datahub

- Connection with a SolaX EV Charger

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

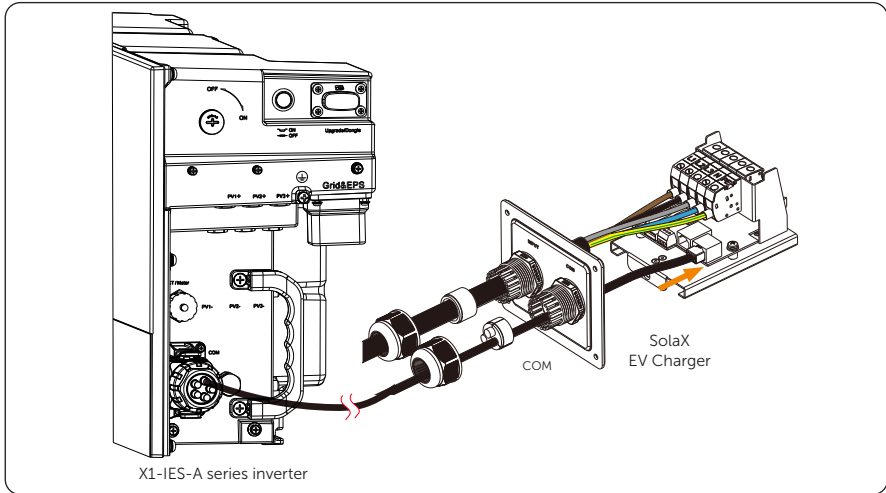


Figure 7-44 Connecting with a SolaX EV Charger

- Connection with a SolaX Adapter Box G2

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

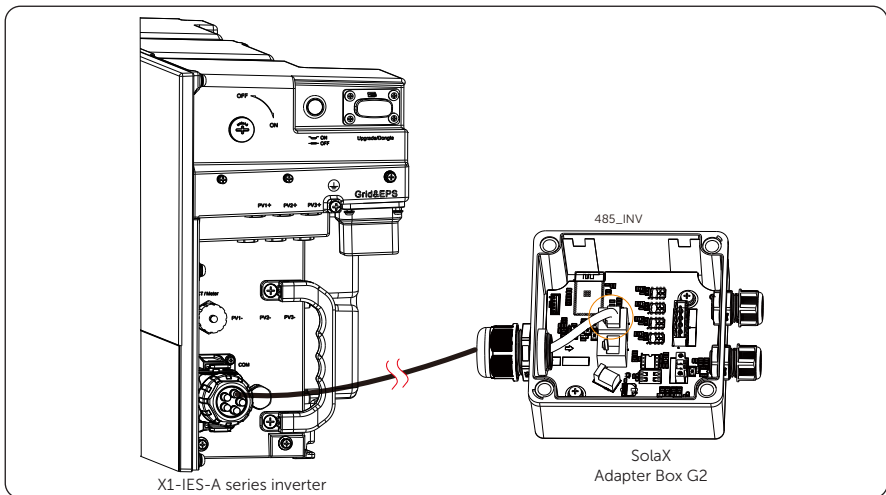


Figure 7-45 Connecting with a SolaX Adapter Box G2

Wiring procedure

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

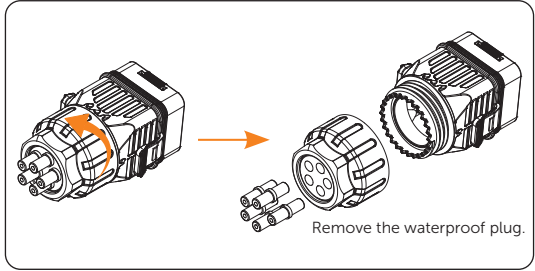


Figure 7-46 Unscrewing the communication terminal

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

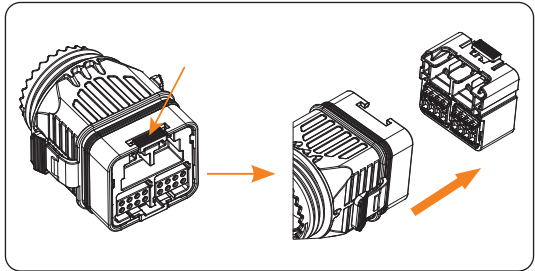


Figure 7-47 Removing the wiring terminal block

- DRM and Parallel connection (P1 P2)

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

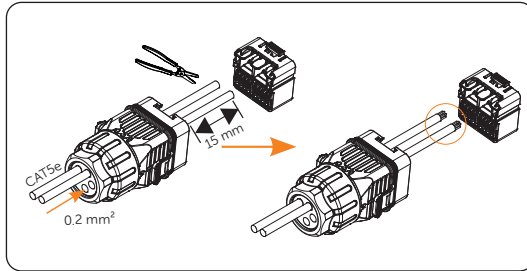


Figure 7-48 Stripping CAT5E network cables

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

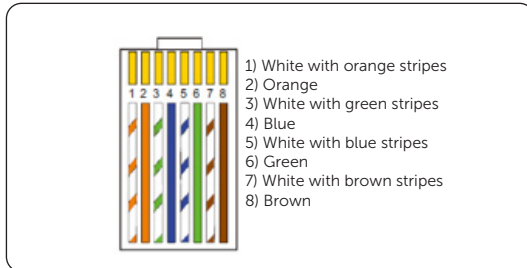


Figure 7-49 Pin order of RJ45 terminal

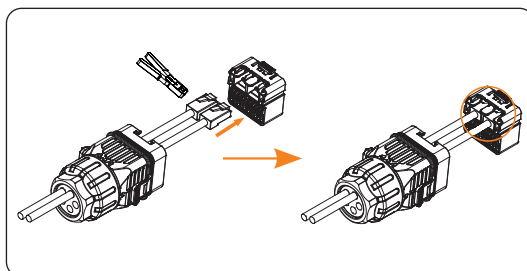


Figure 7-50 Crimping the RJ45 terminals

- PIN 1-16 connection (P3 P4)

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

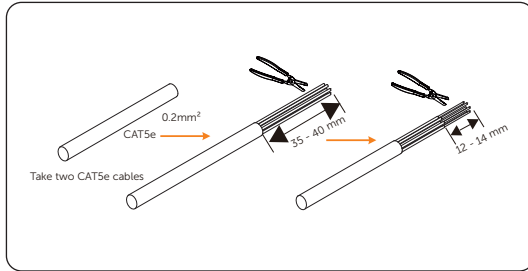


Figure 7-51 Stripping CAT5E network cables

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

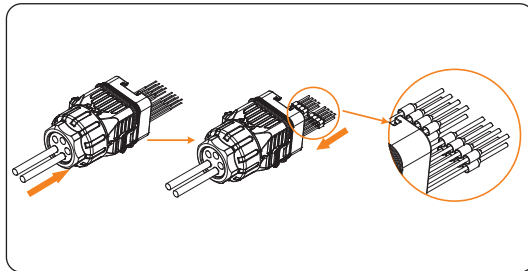


Figure 7-52 Inserting ferrules into the stripped cables

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

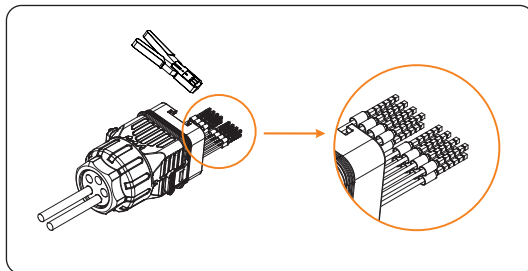


Figure 7-53 Crimping the ferrules

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

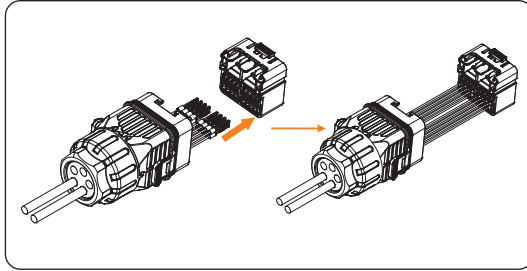


Figure 7-54 Inserting the ferrules

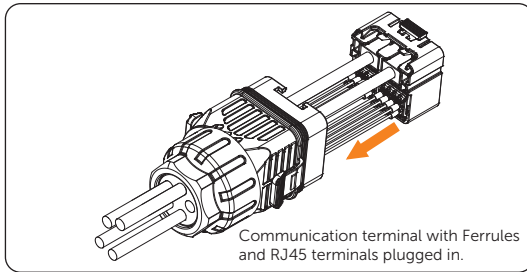


Figure 7-55 Assemble the communication terminal

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

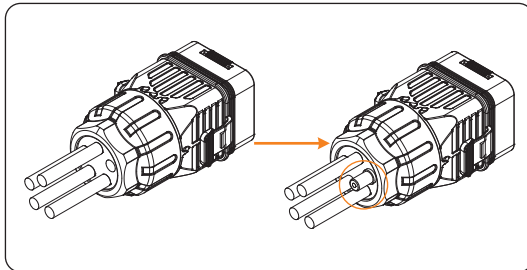


Figure 7-56 Sealing the unused terminals

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

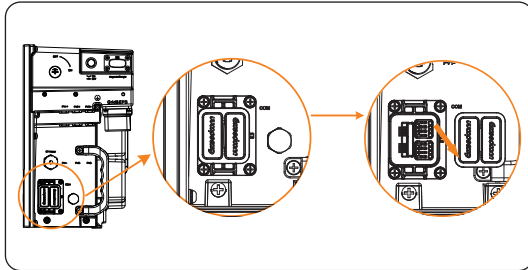


Figure 7-57 Removing the dust cover

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

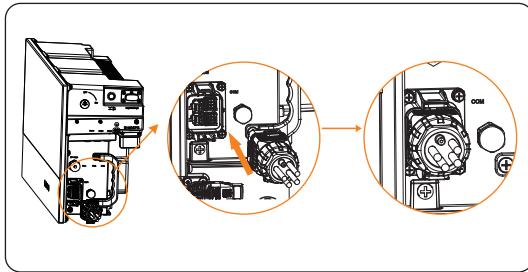


Figure 7-58 Plugging the wired communication terminal

7.2.5 Cover Plate Installation

Step 1: Hang the cover plate on the two screws indicated by the arrow.

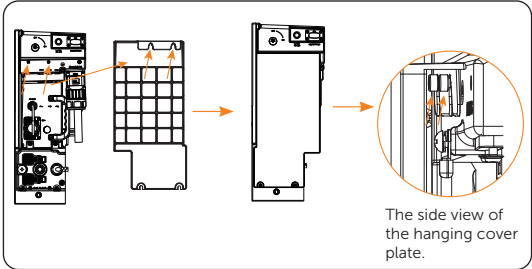


Figure 7-59 Hanging the cover plate

Step 2: Tighten the two M5*14 screws (Torque: 2.0 ± 0.1 N·m).

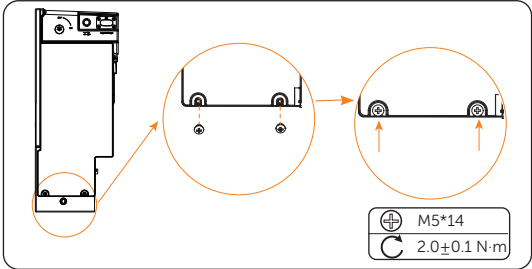


Figure 7-60 Tightening the screws

7.2.6 Monitoring Connection (Upgrade/Dongle Port)

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

NOTICE!

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

NOTICE!

WiFi dongle

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

NOTICE!

LAN dongle

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

NOTICE!

4G dongle (optional)

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

Monitoring connection diagram

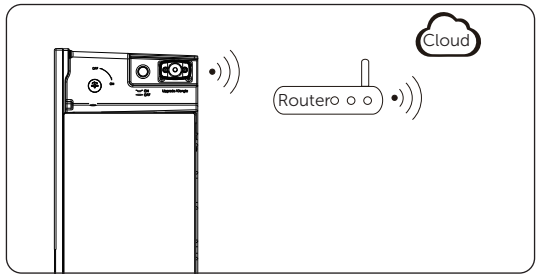


Figure 7-61 WiFi mode connection diagram

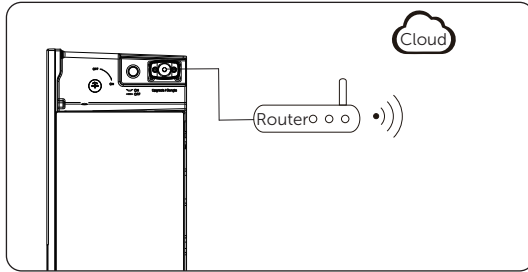


Figure 7-62 LAN mode connection diagram

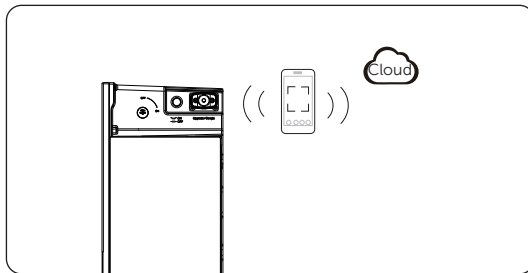


Figure 7-63 WiFi+4G connection diagram

Wiring procedure

WiFi mode:

Step 1: Assemble the dongle;

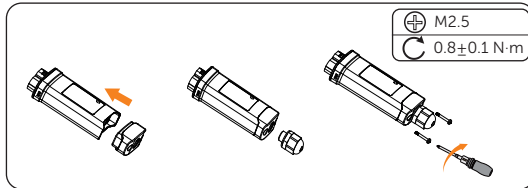


Figure 7-64 Assembling the dongle

Step 2: Plug the dongle to the inverter.

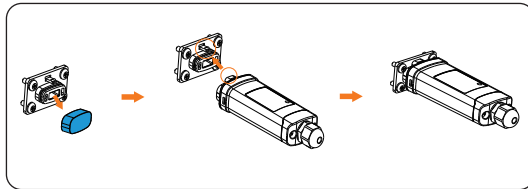


Figure 7-65 WiFi connection procedure

CAUTION!

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

NOTICE!

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

NOTICE!

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

LAN mode:

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

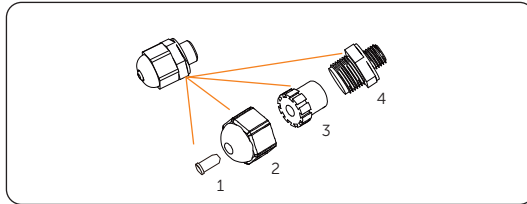


Figure 7-66 Disassembling the waterproof connector

Step 2: Assemble the dongle;

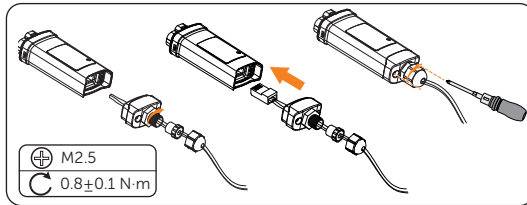


Figure 7-67 Assembling the LAN dongle

Step 3: Plug the dongle to the inverter.

8 System Commissioning

8.1 Checking before Power-on

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

8.2 Powering on the System

Step 1: Press the button on the inverter.

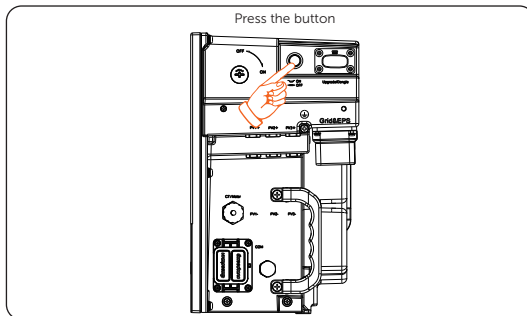


Figure 8-68 Pressing the button

NOTICE!

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

Step 2: Set **Safety Code** according to different countries and grid-tied standards on the LCD screen. The inverter cannot be connected to the grid before the safety code is correctly set. Refer to [9.6.2 Setting Safety Code](#) for details.

Step 3: Set the System ON/OFF to ON state on the LCD screen.

Step 4: Power on the inverter.

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

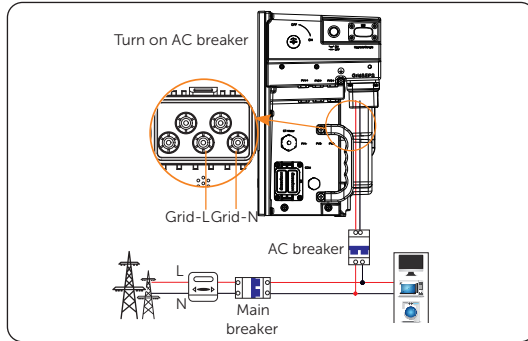


Figure 8-69 Turning on AC breaker

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

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

Step 5: Switch the BAT switch to the "ON" position. Press and hold the BMS Button for about 1 to 2 seconds, at the point, the status light flashes yellow light until finishing self test. Then the status light flashes green light. After successful communication to the inverter, the status light turns solid green light, and the SoC power indicators go solid green light.

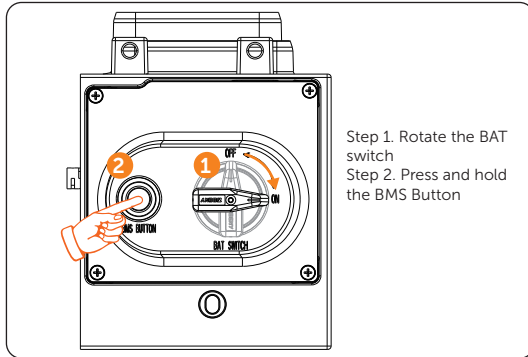


Figure 8-70 Turning on the battery

NOTICE!

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

Step 6: When the battery turns on, the inverter will restart automatically. The inverter will go Waiting, Checking and Normal status in sequence.

*Note:

Waiting: When there is only grid power, or there are battery and grid power but the grid power is not within the starting range, and there are no other abnormal conditions, the inverter will enter the waiting state.

Checking: When there is grid power and the power is within the starting range, and there are no other abnormal conditions, the inverter will enter the checking state.

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

8.3 Checking after Power-on

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



- After the X1-IES-A system powers off, there will still be the remaining electricity and heat which may cause electric shocks and body burns. Please wear personal protective equipment (PPE) and begin servicing the inverter and the battery five minutes after power off.

9 Operation on LCD

9.1 Overview of LCD

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

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

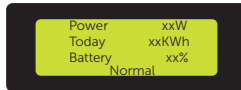


Figure 9-1 Information of main interface

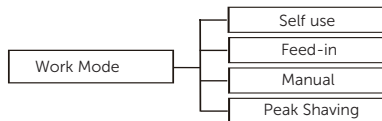
The menu interface is for users to change settings or obtain information.

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

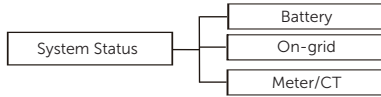


Figure 9-2 Overview of menu interface

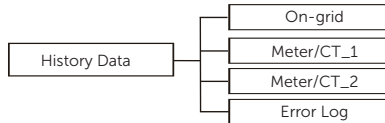
- [System ON/OFF](#)
- [Work Mode](#)



- System Status



- History Data



- Settings

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

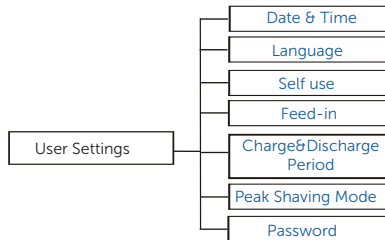


Figure 9-3 User Settings

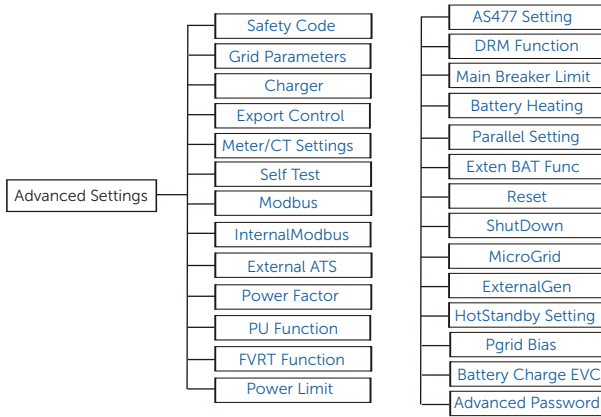
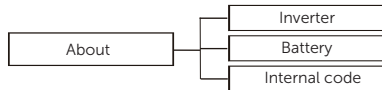


Figure 9-4 Advanced Settings

- About



NOTICE!

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

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

NOTICE!

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

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

NOTICE!

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

9.2 System ON/OFF

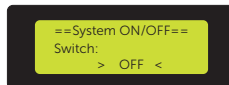
Setting path: Menu > System ON/OFF

Setting System ON/OFF

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

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

Default: OFF



9.3 Work Mode

Selecting path: Menu > Work Mode

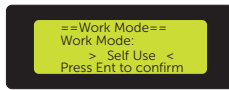
You can select one of the work modes to operate the inverter.

Selecting Work Mode

After entering into the Work Mode interface, you can set **Self Use**, **Feed-in**, **Peak Shaving**, **Manual** as follows:

» Selecting **Self Use**

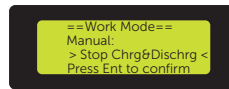
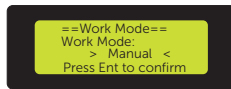
Feed-in Priority and **Peak Shaving** have the same setting logic as **Self Use**.



» Selecting **Manual**

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

Default: **Stop Chrg&Dischrg**



9.4 System Status

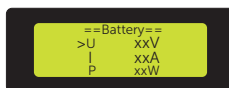
Displaying path: Menu > System Status

Displaying System Status

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

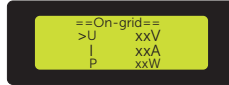
» Displaying **Battery**

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



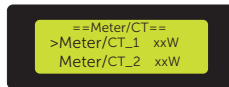
» Displaying On-grid

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



» Displaying Meter/CT

Here shows the data of Meter or CT



9.5 History Data

Displaying path: Menu > History Data

Displaying History Data

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

» Displaying On-grid

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



» Displaying Meter/CT_1

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



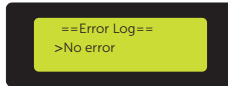
» Displaying **Meter/CT_2**

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



» Displaying **Error Log**

Here shows the recent six error messages of the inverter.



9.6 Settings

Settings includes User Settings and Advanced Settings.

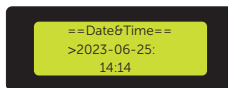
The default password of entering into **Settings** is "0000", and the default password of entering into **User Settings** is "2014".

9.6.1 User Settings

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

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

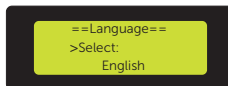
1) Setting Date & Time



2) Setting Language

The inverter provides multiple languages for users to choose.

Default: English

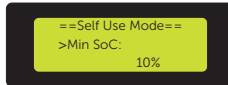


3) Setting Self Use Mode

» Setting Min SoC

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

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

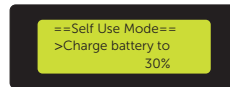
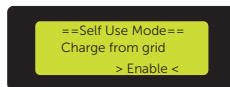


» Setting Charge from grid

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

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

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



4) Setting Feed-in Priority

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

» Setting Min SoC

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

» Setting Charge from grid

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

5) Setting Charge&Discharge Period

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

» **Setting Charge & Discharge Period**

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

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

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

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



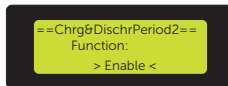
» **Setting Charge & Discharge Period 2**

Default: Disable

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

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

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



6) Setting Peak Shaving Mode

» **Setting DischgPeriod1 and DischgPeriod2**

"DisdchgPeriod1" and "DischgPeriod2" are two discharging periods you can set. Set "ShavingStartTime1" (7:00 by default) and "ShavingEndTime1" (15:00 by default) under "DisdchgPeriod1", and "ShavingStartTime2" (19:00 by default) and "ShavingEndTime2" (23:00 by default) under "DisdchgPeriod2".

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

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

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

PeakLimit1&2: Default:0W; range:0W~60000W



» Setting ChargeFromGrid

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

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

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



» Setting Reserved_SoC

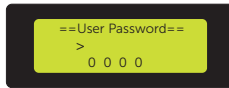
Reserved_SoC is the battery capacity saved for the next peak shaving in the non-peak shaving period.

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



7) Setting Password

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



9.6.2 Advanced Settings

NOTICE!

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

- All the adjustable parameters including safety code, grid parameter, export control, etc can be modified under the permissions of installer password. Unauthorized use of the installer password by unauthorized persons can lead to incorrect parameters being input, resulting in property losses and system damage. Get the installer password from the dealer and never open the password to unauthorized person.

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

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

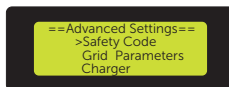
1) Setting Safety Code

NOTICE!

- The inverter cannot be connected to the grid before the safety code is correctly set. If there is any doubt about your safety code where the inverter installed, please consult your dealer or SolaX service for details.
- When the **Safety Code** is selected, the information of **Grid Parameters/ Power Factor/ PU Function/ FVRT Function** corresponding to the selected safety code will be automatically matched.

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

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

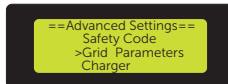


2) Setting Grid Parameters

Here you can set the protective voltage and frequency value of the grid. The default value is the specified value under the current safety regulations.

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

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



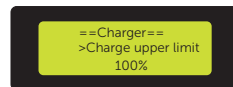
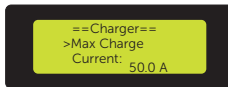
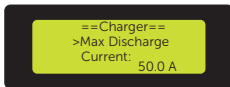
3) Setting Charger

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

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

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

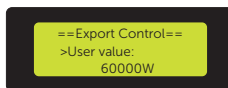
Charge upper limit: Default: 100; range: 10~100



4) Setting Export Control

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

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



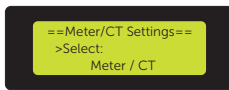
5) Setting "Meter/CT Settings"

Here you can select Meter or CT 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 "7.5.4" for specific meter connection diagram.

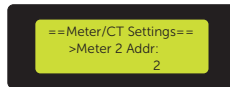
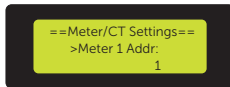
» Setting **Meter/CT Select**



» Setting **Meter 1 Addr/Meter 2 Addr**

The address of the meter should be set. CT does not need to select the address. So when selecting CT, there is only Meter2Addr can be set.

Meter 2 Addr: Default: 2; range: 1~255

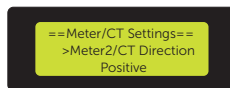
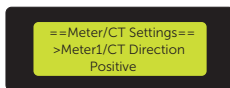


» Setting **Meter 1 Direction/Meter 2 Direction**

If the Meter/CT is reversely connected, select the Negative direction.

Meter1/CT Direction: Default: Positive

Meter2/CT Direction: Default: Positive



» Setting Meter/CT Check

Installation Check is for active detection of Meter/CT status after the first installation. If this function is enabled, the Meter/CT status will be checked one time.

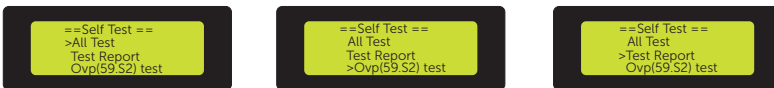
Cyclic Check is a function that if it is enabled, the Meter/CT status will be checked every half hour.

Installation/Cyclic Check: Default: Disable



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

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



7) Setting Modbus

You can control the external communication device through this function.

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

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



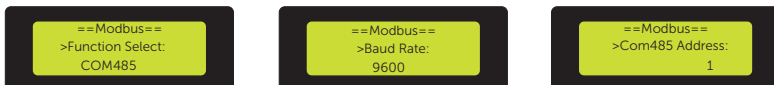
8) Setting InternalModbus

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

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

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

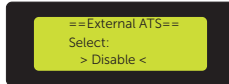
Com485 Address: Default: 1; range: 1~255



9) Setting External ATS

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

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

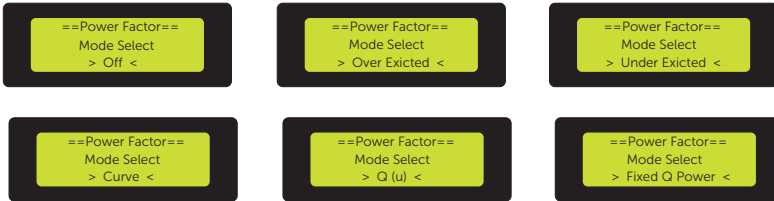


10) Setting Power Factor

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

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

Default : Off



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

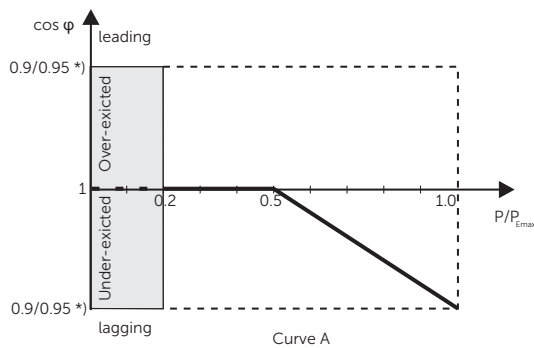
Q (u)	VoltRatio1
	VoltRatio4
	QUResponseV1
	QUResponseV2
	QUResponseV3
	QUResponseV4
	K
	QuDelayTimer
	QuLockEn
	QuLockIn
	QuLockOut
	VoltRatio2
	VoltRatio3
	Fixed Q Power

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

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

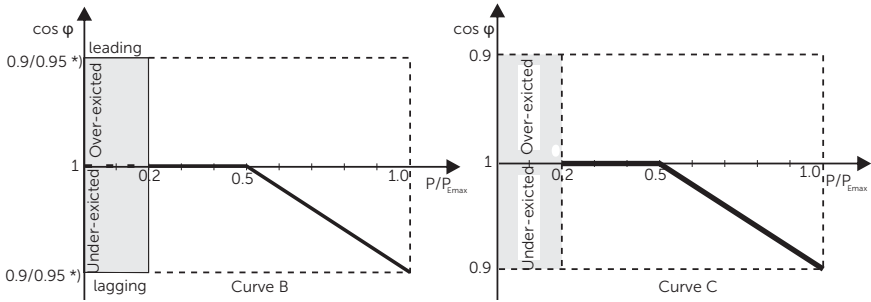
For TOR, the curve $\cos \varphi = f(P)$ should be curve B. The set default value is shown in curve B.

For CEI 0-21, the default value of PFLockInPoint is 1.05. When $V_{ac} > 1.05V_n, P_{ac} > 0.2 P_n$, curve $\cos \varphi = f(P)$ corresponds to curve C.

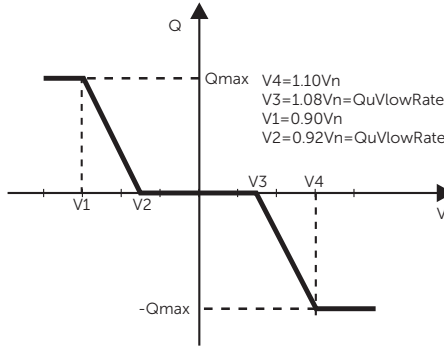


*) If the grid-connected power of the inverter $\leq 4.6kW$, the Power Factor is 0.95 at 1.0 power; if the grid-connected power of the inverter $> 4.6kW$, the Power Factor is 0.90 at 1.0 power.

*) Depend on the required Q capacity



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



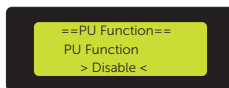
11) Setting PU Function

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

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

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

Default: Disable



12) Setting FVRT Function

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

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

Default: Disable

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

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

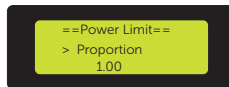


13) Setting Power Limit

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

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

Proportion: Default: 1.00; range: 0.00~1.10



14) Setting "AS477 Setting"

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

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

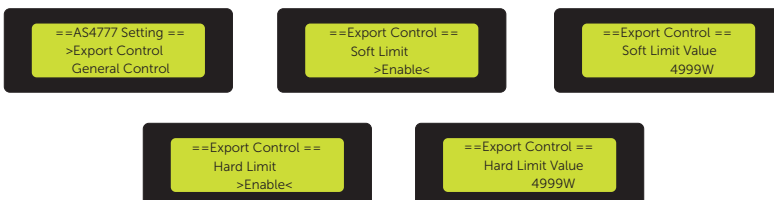
Soft Limit: Control the output value to a certain range.

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

» Setting Export Control

Export Control is to control active power.

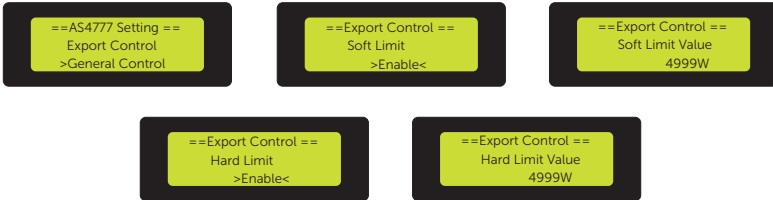
Soft/Hard Limit Value: Default: 4999W; range: 0~15000W



» Setting **General Control**

General Control is to control apparent power.

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



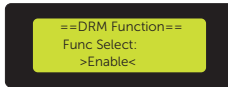
15) Setting DRM Function (Applied to AS4777)

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

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

Here you can enable or disable this function.

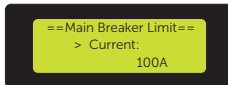
Default: Enable



16) Setting Main Breaker Limit

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

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



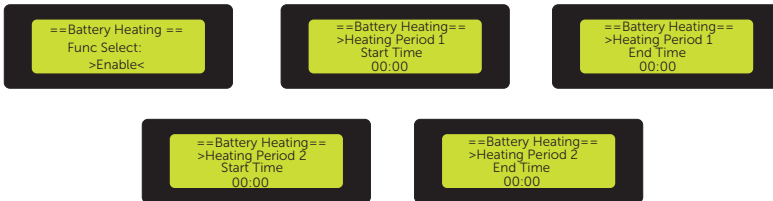
17) Setting Battery Heating

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

Default: Disable

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

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



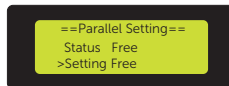
18) Setting "Parallel Setting"

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

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

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

Default: Free



NOTICE!

- Master inverter has an absolute lead in the parallel system to control slave inverter's energy management and dispatch control.
- Overall system will be running according to master inverter's setting parameters, and most setting parameters of slave inverter will be kept but not be cancelled.
- Once slave inverter exit from system and be running as an independent unit, its all setting will be re-activation.

NOTICE!

- If a slave inverter is set to **Free** mode but not disconnect the network cable, this inverter will return to **Slave** mode automatically.
- If a slave inverter is disconnected with the Master inverter but not be set to **Free** mode, the slave inverter will report "Parallel Fault".

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

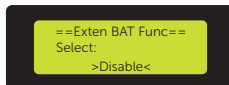
NOTICE!

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

19) Setting Exten BAT Func

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

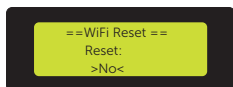
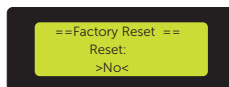
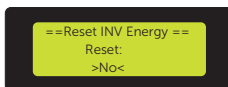
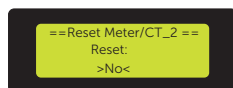
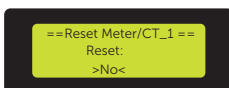
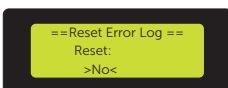
Default: Disable



20) Setting Reset

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

Default: No

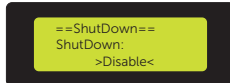


21) Setting ShutDown

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

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

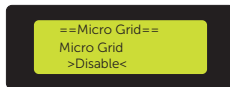
Default: Disable



22) Setting MicroGrid

Here you can Enable the function of MicroGrid.

Default: Disable



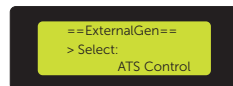
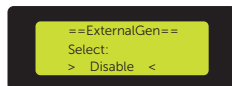
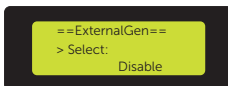
23) Setting ExternalGen

Setting path: Menu Main > Settings > Advanced Settings

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

Setting ATS Control to control ExternalGen

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

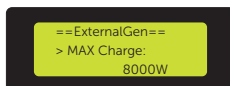


- b. After entering into the ATS Control interface, you can set **MAX Charge**, **Forced Charge Period** and **Allowed Disc Period**, **Charge from Gen** as follows:

» Setting MAX Charge

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

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



» Setting Forced Charge Period and Allowed Disc Period

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

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

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

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

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

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



» Setting Charge from Gen

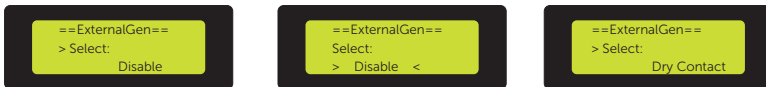
Charge battery to can only be set after Charge from Gen is enabled.

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



Setting Dry Contact to control ExternalGen

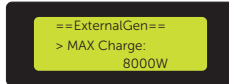
- a. Select **ExternalGen** and enter the interface, the default Disable interface will be displayed. Then press **Enter** to select **Dry Contact** and enter the interface.



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

» **Setting Max Charge**

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



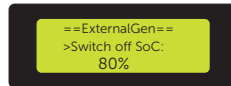
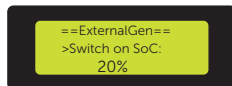
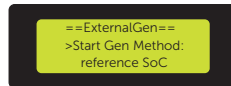
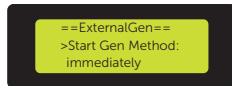
» **Setting Start Gen Method**

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

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

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

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



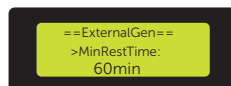
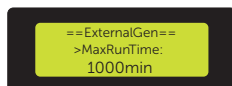
» **Setting Max. Run Time and Min. Rest Time**

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

Default: 1000min; range: 1~60000min

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

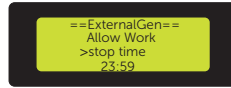
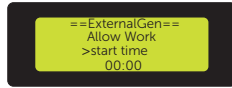
Default: 60min; range: 1~60000min



» Setting Allow Work Time

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

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



24) Setting "HotStandby Setting"

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

Here you can choose to enable or disable this function.

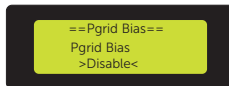
Default: Disable



25) Setting Pgrid Bias

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

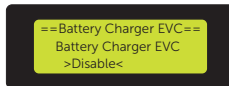
Default: Disable



26) Setting Battery Charge EVC

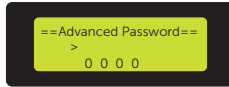
Enable means allowing the battery to discharge energy to EV Charger. **Disable** means battery discharging energy to EV Charegr is not allowed.

Default: Disable



27) Setting Advanced Password

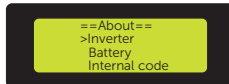
Here you can reset the advanced password. When setting successfully, the LCD screen will display "Set Successfully!". While setting failed, the LCD screen will display "Setting Failed!"



9.7 About

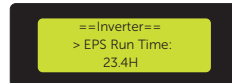
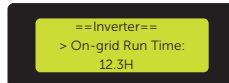
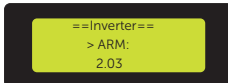
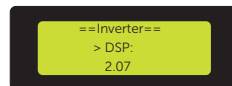
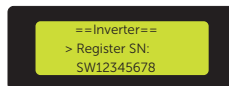
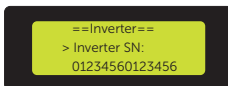
Displaying path: Menu > About

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



» Inverter

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



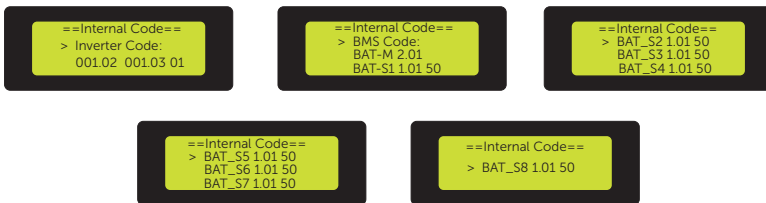
» Battery

Here shows the basic information of the battery.



» Internal code

Here shows the basic information of the internal code.



10 Operation on SolaX App and Web

10.1 Introduction of SolaXCloud

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

10.2 Operation Guide on SolaXCloud App

10.2.1 Downloading and Installing App

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



Figure 10-1 QR code for downloading SolaXCloud App

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

10.2.2 Operations on App

For instructions on related operations, see the online App guide, Wifi connection guide and Setup tutorial video on the SolaXCloud App.

10.3 Operations on SolaXCloud Webpage

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

11 Troubleshooting and Maintenance

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

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



- After the X1-IES-A system powers off, there will still be the remaining electricity and heat which may cause electric shocks and body burns. Please wear personal protective equipment (PPE) and begin servicing the inverter and the battery five minutes after power off.

11.1 Troubleshooting

• Troubleshooting of Inverter

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

Error Code	Fault	Descriptions and Diagnosis
IE 01	TZ Protect Fault	Overcurrent fault. <ul style="list-style-type: none"> • Wait for a while to check if it is back to normal. • Disconnect batteries, reconnect. • Or ask for help from the installer if it can not return to normal.
IE 02	Grid Lost Fult	<ul style="list-style-type: none"> • Check Grid input voltage if it's within normal range • Or ask the installer for help.
IE 03	Grid Volt Fault	Power grid voltage overrun <ul style="list-style-type: none"> • Wait a moment, if the utility returns to normal, the system will reconnect. • Please check if the grid voltage is within normal range. • Or ask the installer for help.
IE 04	Grid Freq Fault	Electricity frequency beyond range <ul style="list-style-type: none"> • If the utility returns to normal, the system reconnects. • Or ask the installer for help.
IE 06	Bus Volt Fault	<ul style="list-style-type: none"> • Press the "ESC" key to restart the inverter. • Or ask the installer for help.

Error Code	Fault	Descriptions and Diagnosis
IE 07	Bat Volt Fault	<p>Battery voltage fault</p> <ul style="list-style-type: none"> • Check battery input voltage if it's within normal range • Or ask the installer for help.
IE 08	AC10mins Volt	<ul style="list-style-type: none"> • The grid voltage was out of range in the last 10 minutes. • The system will return to normal if the grid returns to normal. • Or ask the installer for help.
IE 09	DCI OCP Fault	<p>DCI overcurrent protection fault.</p> <ul style="list-style-type: none"> • Wait for a while to check if it's back to normal. • Or ask the installer for help.
IE 11	SW OCP Fault	<p>Software Detection of Overcurrent Fault.</p> <ul style="list-style-type: none"> • Wait for a while to check if it's back to normal. • Shut down battery and grid connections • Or ask the installer for help.
IE 12	RC OCP Fault	<p>Overcurrent protection fault.</p> <ul style="list-style-type: none"> • Check the impedance of DC input and AC output. • Wait for a while to check if it's back to normal. • Or ask the installer for help.
IE 13	Isolation Fault	<p>Insulation Fault</p> <ul style="list-style-type: none"> • Please check the wire insulation for damage. • Wait for a while to check if it's back to normal. • Or ask the installer for help.
IE 14	Temp Over Fault	<p>Temperature beyond limit</p> <ul style="list-style-type: none"> • Check if ambient temperature exceeds the limit. • Or ask the installer for help.
IE 17	Overload Fault	<p>On-grid mode over load</p> <ul style="list-style-type: none"> • Shutdown the high-power device and press the "ESC" key to • Restart the inverter. • Or ask for help from the installer if it can not return to normal.
IE 18	BatPowerLow	<ul style="list-style-type: none"> • Close the high-power device and press the "ESC" key to restart the inverter. • Please charge the battery to a level higher than the protection capacity or protection voltage.
IE 19	BMS Lost	<p>Battery communication loss</p> <ul style="list-style-type: none"> • Check that the communication lines between the battery and the inverter are properly connected. • Or ask for help from the installer if it can not return to normal.

Error Code	Fault	Descriptions and Diagnosis
IE 20	Fan Fault	<p>Fan Fault</p> <ul style="list-style-type: none"> • Check for any foreign matter that may have caused the fan not to function properly. • Or ask for help from the installer if it can not return to normal.
IE 21	LowTemp Fault	<ul style="list-style-type: none"> • Low temperature fault. • Check if the ambient temperature is too low. • Or ask for help from the installer if it can not return to normal.
IE 23	Other Device Fault	<p>Other device Fault</p> <ul style="list-style-type: none"> • update the software and press the ESC" key to restart the inverter. • Or ask for help from the installer if it can not return to normal .
IE 24	Missed CT Fault	<p>Missed CT Fault</p> <ul style="list-style-type: none"> • Please check if the CT is connected properly • Or seek help from the installer if it can not return to normal.
IE 25	InterComms Error	<ul style="list-style-type: none"> • Internal communication errors • Shut down battery and grid connections. • Or ask for help from the installer if it can not return to normal.
IE 26	INV EEPROM	<p>Inverter EEPROM Fault.</p> <ul style="list-style-type: none"> • Shut down battery and grid, reconnect. • Or ask for help from the installer if it can not return to normal.
IE 27	RCD Fault	<p>Fault of Residual Current Device</p> <ul style="list-style-type: none"> • Check the impedence of DC input and AC output. • Disconnect batteries, reconnect. • Or ask for help from the installer if it can not return to normal.
IE 28	Grid Relay Fault	<p>Electrical relay failure</p> <ul style="list-style-type: none"> • Disconnect grid and batteries and reconnect. • Or ask for help from the installer if it can not return to normal.
IE 31	Battery Realy	<p>Charge relay fault</p> <ul style="list-style-type: none"> • Press the ESC" key to restart the inverter. . • Or ask for help from the installer if it can not return to normal.
IE 32	Earth Relay	<p>EPS (Off-grid) earth relay fault</p> <ul style="list-style-type: none"> • Press the ESC" key to restart the inverter. . • Or ask for help from the installer if it can not return to normal.

Error Code	Fault	Descriptions and Diagnosis
IE 35	Parallel Fault	<p>Parallel Fault</p> <ul style="list-style-type: none"> • Check if the parallel communication line is correctly connected. • Or ask for help from the installer if it can not return to normal.
IE 36	HardLimit Fault	<p>HardLimit Fault</p> <ul style="list-style-type: none"> • Check if the limit value of grid-connected power is appropriate. • Or ask for help from the installer if it can not return to normal.
IE 101	PowerTypeFault	<p>Power type fault</p> <ul style="list-style-type: none"> • Upgrade the software and press the ESC" key to restart the inverter. • Or ask for help from the installer if it can not return to normal.
IE 103	Mgr Eeprom Fault	<p>Manager EEPROM Fault.</p> <ul style="list-style-type: none"> • Shut down battery and grid,reconnect. • Or seek help from the installer if it can not return to normal.
IE 105	NTC Sample Invalid	<p>NTC invalid</p> <ul style="list-style-type: none"> • Make sure the NTC is properly connected and the NTC is in good condition. • Please confirm that the installation environment is normal • Or ask for help from the installer, if it can not return to normal.
IE 106	Bat Temp Low	<p>Battery temp low</p> <ul style="list-style-type: none"> • Check the battery installation environment to ensure good heat dissipation. • Or ask for help from the installer, if it can not return to normal.
IE 107	Bat Temp High	<p>Battery temp high</p> <ul style="list-style-type: none"> • Check the battery installation environment to ensure good heat dissipation. • Or ask for help from the installer, if it can not return to normal.
IE 109	Meter Fault	<p>Meter Fault</p> <ul style="list-style-type: none"> • Please check if the Meter is connected properly • Or seek help from the installer if it can not return to normal.

Error Code	Fault	Descriptions and Diagnosis
IE 110	BypassRaleyFlt	Bypass relay fault <ul style="list-style-type: none"> • Press the ESC™ key to restart the inverter. • Or ask for help from the installer if it can not return to normal.
IE 111	ARMParaComFlt	ARMParaComFlt <ul style="list-style-type: none"> • Please check that the communication cables of inverters are well connected and the baud rate of COMM setting of inverters are the same. • Or seek help from the installer if it can not return to normal.
BE 01	BMS_Exter_Err	Battery Error - External Communication Fault <ul style="list-style-type: none"> • Please contact the battery supplier.
BE 02	BMS_InterErr	Battery Error - Internal Communication Fault <ul style="list-style-type: none"> • Please contact the battery supplier.
BE 03	BMS_OverVolt	Over voltage in battery system <ul style="list-style-type: none"> • Please contact the battery supplier.
BE 04	BMS_LowerVolt	Low voltage in battery system <ul style="list-style-type: none"> • Please contact the battery supplier.
BE 05	BMS_ChargeOCP	Battery fault - over charge fault <ul style="list-style-type: none"> • Please contact the battery supplier.
BE 06	DischargeOCP	Battery fault-discharge over current fault <ul style="list-style-type: none"> • Please contact the battery supplier.
BE 07	BMS_TemHigh	Over temperature in battery system <ul style="list-style-type: none"> • Please contact the battery supplier.
BE 08	BMS_TemLow	Lower temperature in battery system <ul style="list-style-type: none"> • Please contact the battery supplier.
BE 09	CellImblance	Battery Unbalanced Failure <ul style="list-style-type: none"> • Please contact the battery supplier.
BE 10	BMS_Hardware	Battery hardware protection failure <ul style="list-style-type: none"> • Please contact the battery supplier.
BE 11	BMS_Circuit	Battery circuit failure <ul style="list-style-type: none"> • Restart the battery . • Please contact the battery supplier.
BE 12	BMS_ISO_Fault	Battery insulation failure <ul style="list-style-type: none"> • Check that the battery is properly grounded and restart the battery. • Please contact the battery supplier
BE 13	BMS_VolSen	Battery voltage sensor fault <ul style="list-style-type: none"> • Please contact the battery supplier

Error Code	Fault	Descriptions and Diagnosis
BE 14	BMS_TempSen	Temperature sensor failure <ul style="list-style-type: none"> Restart the battery. Please contact the battery supplier.
BE 15	BMS_CurSen	Battery current sensor fault <ul style="list-style-type: none"> Please contact the battery supplier.
BE 16	BMS_Relay	Battery relay failure <ul style="list-style-type: none"> Please contact the battery supplier.
BE 17	TypeUnmatched	Battery type failure <ul style="list-style-type: none"> Upgrade the battery BMS software. Please contact the battery supplier.
BE 18	Ver Unmatched	Battery version mismatch failure <ul style="list-style-type: none"> Upgrade the battery BMS software. Please contact the battery supplier.
BE 19	MFR Unmatched	Battery manufacturer did not match the fault <ul style="list-style-type: none"> Upgrade the battery BMS software. Please contact the battery supplier.
BE 20	SW Unmatched	Battery hardware and software mismatch failure <ul style="list-style-type: none"> Upgrade the battery BMS software. Please contact the battery supplier.
BE 21	M&S Unmatched	Battery master slave control mismatches <ul style="list-style-type: none"> Upgrade the battery BMS software. Please contact the battery supplier
BE 22	CR NORespond	Battery charging request does not respond to a fault <ul style="list-style-type: none"> Upgrade the battery BMS software. Please contact the battery supplier.
BE 23	BMS SW Protect	Battery slave software protection failure <ul style="list-style-type: none"> Upgrade the battery BMS software. Please contact the battery supplier.
BE 24	BMS 536 Fault	Battery fault-discharge over current fault <ul style="list-style-type: none"> Please contact the battery supplier.
BE 25	BMS SelfCheck	Over temperature in battery system <ul style="list-style-type: none"> Please contact the battery supplier.
BE 26	BMS_Tempdiff	Battery temperature sensor malfunction <ul style="list-style-type: none"> Please contact the battery supplier.
BE 27	BMS_BreakFault	Battery Unbalanced Failure <ul style="list-style-type: none"> Please contact the battery supplier.
BE 28	BMS_FlashFault	Battery hardware protection failure <ul style="list-style-type: none"> Please contact the battery supplier.

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

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

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

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

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

Contact SolaX Customer Service for further assistance. Please be prepared to describe the details of your system installation and provide the model and serial number of the rechargeable battery.

Error Code	Fault	Diagnosis and Solution
BMS_Lost	External fault of BMS	Unable to establish communication with inverter. <ul style="list-style-type: none"> • Restart the BMS. • Contact the after-sales personnel of our company.
BMS_Internal_Err	Internal fault of BMS	Unable to establish communication among battery modules. <ul style="list-style-type: none"> • Restart the BMS. • Check whether the wire connections among battery modules are correct. • Contact the after-sales personnel of our company.
BMS_OverVoltage	BMS overvoltage	Overvoltage of a single battery module. <ul style="list-style-type: none"> • Contact the after-sales personnel of our company.
BMS_LowerVoltage	BMS undervoltage	Undervoltage of a single battery module. <ul style="list-style-type: none"> • Battery module is forced to charge through inverter. • Contact the after-sales personnel of our company.

Error Code	Fault	Diagnosis and Solution
BMS_ChargeOverCurrent	Overcurrent charging of BMS	Overcurrent charging of BMS. <ul style="list-style-type: none"> Restart the BMS. Contact the after-sales personnel of our company.
BMS_DischargeOverCurrent	Discharge overcurrent of BMS	Discharge overcurrent of BMS. <ul style="list-style-type: none"> Restart the BMS. Contact the after-sales personnel of our company.
BMS_TemHigh	High temperature of BMS	The temperature of the BMS is too high. <ul style="list-style-type: none"> Cool down the BMS to normal temperature, and then restart it. Contact the after-sales personnel of our company.
BMS_TemLow	Low temperature of BMS	The temperature of the BMS is too low. <ul style="list-style-type: none"> Warm up the BMS, and restart it. Contact the after-sales personnel of our company.
BMS_CellImbalance	Cell imbalance of BMS	Inconsistency of battery module. <ul style="list-style-type: none"> Restart the BMS. Contact the after-sales personnel of our company.
BMS_Circuit_Fault	Circuit fault	Circuit fault of the BMS. <ul style="list-style-type: none"> Restart the BMS. Contact the after-sales personnel of our company.
BMS_Insulation_Fault	Insulation fault	Insulation fault of the BMS. <ul style="list-style-type: none"> Restart the BMS. Contact the after-sales personnel of our company.
BMS_VoltSensor_Fault	Voltage sensor fault	Voltage sampling fault of the BMS. <ul style="list-style-type: none"> Restart the BMS. Contact the after-sales personnel of our company.
BMS_CurrSensor_Fault	Current sensor fault	Current sampling fault of the BMS. <ul style="list-style-type: none"> Restart the BMS. Contact the after-sales personnel of our company.
BMS_Relay_Fault	Relay fault	Relay contact adhesion fault of the BMS. <ul style="list-style-type: none"> Restart the BMS. Contact the after-sales personnel of our company.

Error Code	Fault	Diagnosis and Solution
BMS_CR_Unresponsive	Charging request not responded	Inverter does not respond the charging request. <ul style="list-style-type: none"> Restart the BMS or the inverter. Contact the after-sales personnel of our company.
BMS_536_Fault	536 fault of the BMS	BMS voltage sampling fault. <ul style="list-style-type: none"> Restart the BMS. Contact the after-sales personnel of our company.
BMS_Selfchecking_Fault	Self-test fault of the BMS	Self-test fault of the BMS. <ul style="list-style-type: none"> Restart the BMS. Contact the after-sales personnel of our company.
BMS_Temdiff_Fault	Temperature different fault	BMS temperature varies greatly. <ul style="list-style-type: none"> Restart the BMS. Contact the after-sales personnel of our company.
BMS_Break	Disconnection fault of the BMS	BMS sampling fault. <ul style="list-style-type: none"> Restart the BMS. Contact the after-sales personnel of our company.
BMS_Precharge_Fault	BMS precharge fault	External short circuit of the BMS. <ul style="list-style-type: none"> Check the external connection and restart the BMS. Contact the after-sales personnel of our company.

11.2 Maintenance

Regular maintenance is required for the X1-IES-A system. Pay attention to the following maintenance routines of inverter and battery for expressing the optimum device performance. More frequent maintenance service is needed in the worse work environment. Please make records of the maintenance.



- Only qualified person can perform the maintenance for the X1-IES-A system.
- Only use the spare parts and accessories approved by SolaX for maintenance.

11.2.1 Maintenance routines

Table 11-1 Maintenance routines of Inverter

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

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

Precautions

- If the ambient temperature for storage is between 30°C and 50°C (86°F to 122°F), please recharge the battery modules at least once every 6 months.
 - If the ambient temperature for storage is between -20°C and 30°C (-4°F to 86°F), please recharge the battery modules at least once every 12 months.
 - For the first installation, the interval among manufacture dates of battery modules shall not be exceed 3 months.
 - If a battery module is replaced or added for capacity expansion, each battery's SoC should be consistent. The max. SoC difference should be $\pm 5\%$.
 - If users want to increase their battery system capacity, please ensure that the SoC of the existing system capacity is about 40%. The manufacture date of the new battery module shall not exceed 6 months. If the manufacture date of the new one exceeds 6 months, please charge it to around 40%.
-

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, please ensure that the battery SoC is greater than 20% or the battery input voltage is greater than 90V. Otherwise, it may cause serious failure during the upgrade process!

CAUTION!

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

CAUTION!

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

Upgrade preparation

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

NOTICE!

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

Upgrade steps

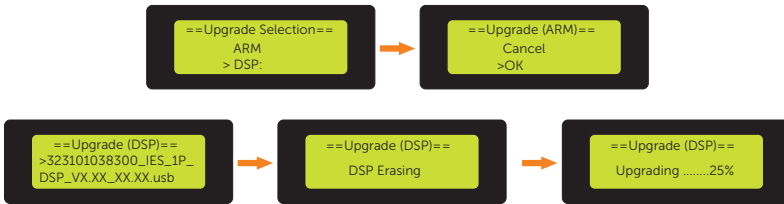
- a. Please save the Upgrade firmware in your U disk first, and press the **Enter** button on the inverter screen for 5 seconds to enter the OFF mode.
- b. Find the **Upgrade** port of the inverter, unplug the monitoring module (WiFi Dongle / LAN Dongle / 4G Dongle) by hand, and insert the USB flash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



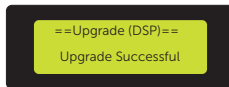
- d. Please confirm the new firmware version again and select the firmware to upgrade. The upgrade takes about 20 seconds. When it is completed, the LCD screen returns to the **Update** page.



- 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.



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



NOTICE!

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

12 Decommissioning

12.1 Disassembling the X1-IES-A system



- When disassembling the X1-IES-A system, strictly follow the steps as below.

Disassembling the inverter

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

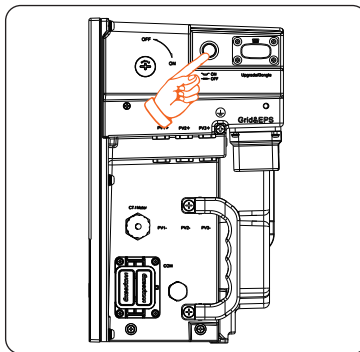


Figure 12-1 Pressing the button

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

Step 3: Press the BMS Button to shut down the battery, then turn off the BAT switch.

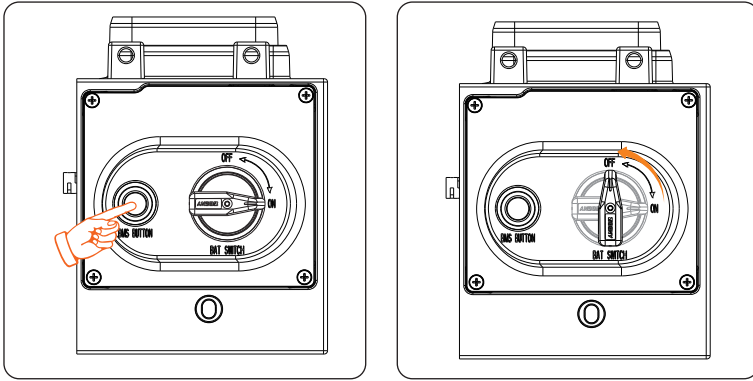


Figure 12-2 Pressing the button and turning off the switch

WARNING!

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

Step 4: Use a flat-head screwdriver to prise open the position indicated by the arrow to remove the Grid cable.

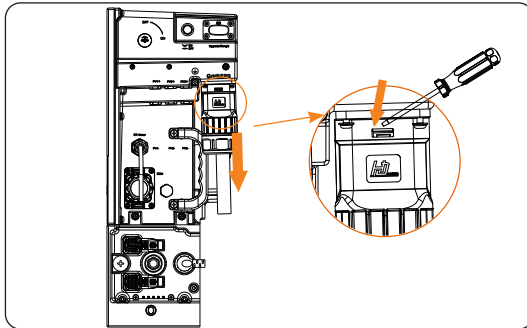


Figure 12-3 Removing the Grid cable

Step 5: Remove the Communication cable.

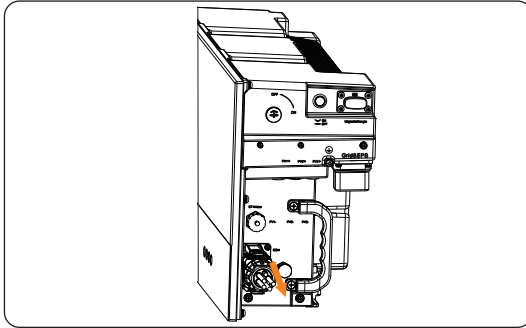


Figure 12-4 Removing the communication cable

Step 6: Remove the Meter/CT cable.

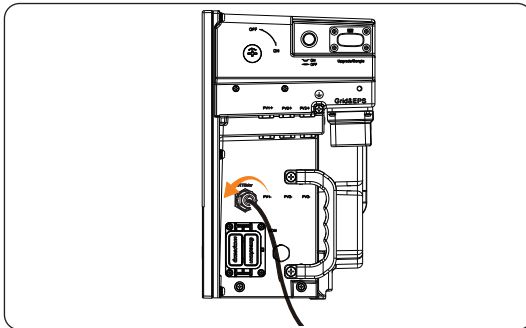


Figure 12-5 Removing the Meter/CT cable

Step 7: Remove the PE cable.

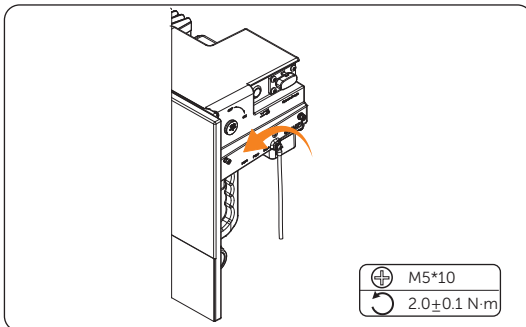


Figure 12-6 Removing the PE cable

Step 8: Remove the Dongle.

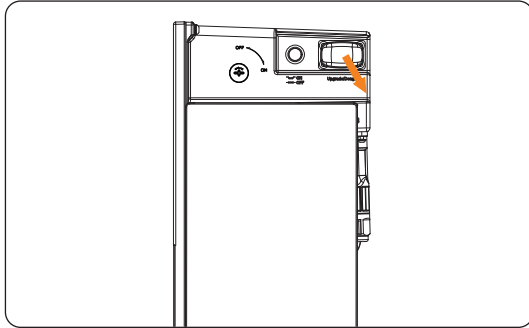


Figure 12-7 Removing the Dongle

Step 9: Put the original protective caps on the terminals.

Step 10: Unscrew the screws of fastening the wall mounting bracket and remove the wall mounting bracket.

Step 11: Remove the inverter.

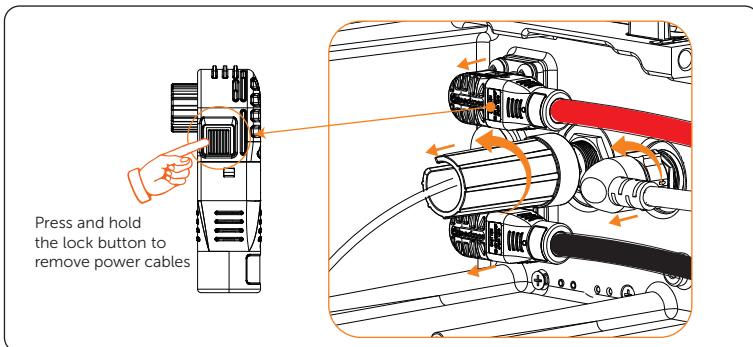
Disassembling the Battery (T-BAT-SYS)

Step 12: 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 13: Rotate the ring anti-clockwise to unplug the heater cable after two arrows are aligned in the case of two towers.

Step 14: Use and rotate anti-clockwise a rotation wrench to unplug the communication cable in the case of two towers.



Press and hold the lock button to remove power cables

Figure 12-8 Unplugging cables

Step 15: Unscrew the screws to remove the grounding cable.

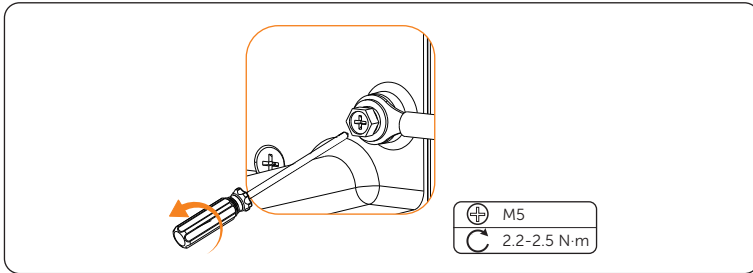


Figure 12-9 Removing grounding cable

NOTICE!

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

12.2 Packing the X1-IES-A system

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

12.3 Disposing of the X1-IES-A system

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

13 Technical Data

- Inverter

AC output/ input

Model	X1-IES-3.7K-A	X1-IES-5K-A	X1-IES-6K-A	X1-IES-8K-A
AC output				
Rated output apparent power [VA]	3680	5000	6000	8000
Max. output apparent power [VA]	3680	5000 (4600 for VDE4105, 4999 for AS4777, 5000 for C10/11)	6600	8000
Nominal AC voltage [a.c. V]	220/230/240			
Frequency [Hz]	50/60			
Rated output current [a.c. A]	16	21.8	26.1	34.8
Max. output continuous current [a.c. A]	16	21.8	28.7	34.8
Current (inrush) (at 50µs) [a.c. A]	53			
Maximum output fault current (at 1ms) [a.c. A]	55	75	100	100
Maximum output overcurrent protection [a.c. A]	65	100	125	125
Power factor range	0.8 leading - 0.8 lagging			
Total harmonic distortion (THDi)	< 3 %			
AC input				
Max. apparent power [VA]	3680	5000	6000	8000
Rated AC power [W]	3680	5000	6000	8000
Nominal AC voltage [a.c. V]	220/230/240			
Frequency [Hz]	50/60			
Max. AC input current [a.c. A]	16	21.8	28.7	34.8
Power factor range	0.8 leading - 0.8 lagging			

Battery

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

Efficiency, Safety and Protection

Model	X1-IES-3.7K-A	X1-IES-5K-A	X1-IES-6K-A	X1-IES-8K-A
Efficiency				
Rated battery charge efficiency			97%	
Rated battery discharge efficiency			97%	
Safety and Protection				
Safety	IEC62477 / IEC62109-1 / IEC62109-2			
Grid monitoring	VDE0126-1-1 A1:2012/VDE-AR-N 4105/G98/G99/AS4777/EN50549/CEI 0-21			
AC SPD protection	Integrated			
Over/ under voltage protection	Yes			
Grid protection	Yes			
DC injection monitoring	Yes			
Back feed current monitoring	Yes			
Residual current detection	Yes			
Active anti-islanding method	Frequency Shift			
Over heat protection	Yes			
Array insulation resistance detection	Yes			

Generic data

Model	X1-IES-3.7K-A	X1-IES-5K-A	X1-IES-6K-A	X1-IES-8K-A
Dimensions (W/H/D) [mm]	717*350*210			
Dimensions of packing (W/H/D) [mm]	790*590*350			
Net weight [kg]	22.75			
Gross weight * [kg]	27.9			
Heat dissipation treatment	Natural cooling			
Noise emission (typical) [dB(A)]	< 35			
Storage temperature range [°C]	-40 to +65			
Operating ambient temperature range [°C]	-35 to +60 (derating at 45)			
Humidity [%]	0% to 100% (condensing)			
Altitude [m]	≤ 3000			
Ingress protection	IP66			
Protective class	I			
Cold standby consumption	< 5 W			
Idle mode	Yes			
Overvoltage category	III(electric supply side)			
Pollution degree	III			
Installation mode	Wall mounted			
Inverter topology	Non-isolated			
Communication interface	RS485 (Meter), Pocket-X, USB, RS485 (Modbus, EV Charger, Datahub), Parallel (CAN+RS485), DO (SG ready), DI			

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

Technical Data

- Battery (T-BAT-SYS)

Configuration List

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

Performance Parameter

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

NOTICE!

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

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