



X1-Lite-LV

8 kW / 10 kW / 12 kW

User Manual

Version 0.0

www.solaxpower.com



eManual in the QR code or
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About This Manual

Scope of Validity

This manual is an integral part of X1-Lite-LV series inverter. It describes the transportation, storage, installation, electrical connection, commissioning, maintenance and troubleshooting of the product. Please read it carefully before operating.

This manual is valid for the following inverter models:

- X1-Lite-8K-LV
- X1-Lite-10K-LV
- X1-Lite-12K-LV

Model description

X1-Lite-8K-LV

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Item	Meaning	Description
1	Product family name	"X1-Lite": energy storage series inverter that supports grid connection of photovoltaic system;
2	Power	"8K": rated output power of 8 kW.
3	Low voltage battery	"LV" means the inverter should pair with low voltage battery.

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 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 0.0 (2024-06-20)

Initial release

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1 Safety

1.1 General Safety

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

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

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

- Inverter damage caused by force majeure events, such as earthquakes, floods, thunderstorms, lightning, fire hazards, volcanic eruptions, and similar events.
- Inverter damage due to human causes.
- Usage or operation of the inverter 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.
- Inverter 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 regulations.

1.2 Safety Instructions of PV, Inverter, Grid and Battery

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

1.2.1 Safety Instructions of PV

DANGER!

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

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

WARNING!

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

WARNING!

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

WARNING!

- A photovoltaic module used on the inverter must have an IEC61730A rating, and the total open circuit voltage of the photovoltaic string / array is lower than the maximum rated DC input voltage of the inverter. Any damage caused by photovoltaic overvoltage is not covered by warranty.

1.2.2 Safety Instructions of Inverter

DANGER!

Potential risk of lethal electric shock associated with the inverter

- Only operate the inverter if it is in a technically faultless condition. Operating a faulty inverter may lead to electric shock or fire.
- Unauthorized opening of the upper cover will void the warranty and can result in lethal danger or serious injury due to electric shock.
- Make sure that the inverter is reliably grounded before any operation to prevent the risk of electric shock causing lethal danger or serious injury.
- Only qualified personnel can perform the installation, wiring, maintenance of the inverter by following this document and the related regulations.

WARNING!

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

WARNING!

- The inverter can not be operated when it is running. Radiation may be harmful to health! Do not stay for a long time and keep at least 20 cm away from the inverter.
- After the inverter and power grid cut off the PV power supply, there will be a certain amount of residual voltage in a short time, be cautious or it may lead to serious personal injury and even high risk of death. Use a multimeter (impedance at least 1 M Ω) to measure the voltage between the UDC and the UDC to ensure that the inverter port is discharged below the safe voltage before starting operation (35 VDC).

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!

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

CAUTION!

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

NOTICE!

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

1.2.3 Safety Instructions of Utility Grid

NOTICE!

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

1.2.4 Safety Instructions of Battery

WARNING!

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

NOTICE!

- This inverter should pair with low voltage battery, for the specific parameters such as battery type, nominal voltage and nominal capacity etc., please refer to Battery Data. Refer to the matching battery specification for details.

2 Product Overview

2.1 Product Introduction

The X1-Lite-LV series inverter is an energy storage PV grid-connected inverter. It supports various intelligent solutions to achieve efficient and economical energy utilization.

2.2 Appearance

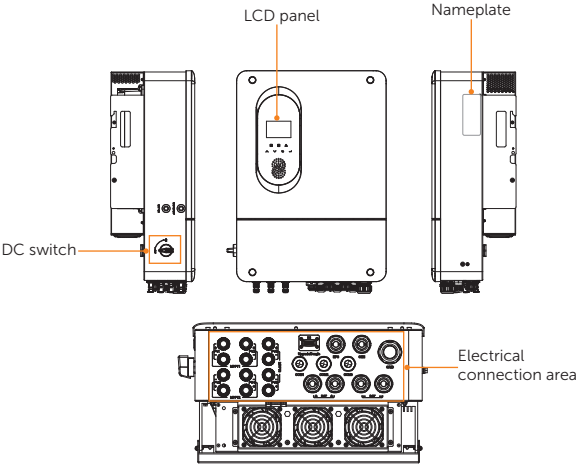


Figure 2-1 Appearance

Table 2-1 Description of appearance

Item	Description
Nameplate	Nameplate clearly identifies the device type, serial number, specific DC / AC parameters, certification, etc.
LCD panel	Including screen, indicators and keys. Screen displays the information; indicators indicate the status of inverter. Keys are used to perform the parameter setting.
DC switch	Connect or disconnect the PV input.
Electrical connection area	Including PV terminals, battery terminals, GEN, GRID and EPS terminals, communication terminals, etc.

2.3 Supported Power Grid

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

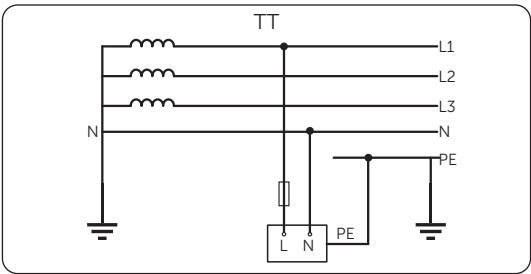


Figure 2-2 Supported power grid-TT

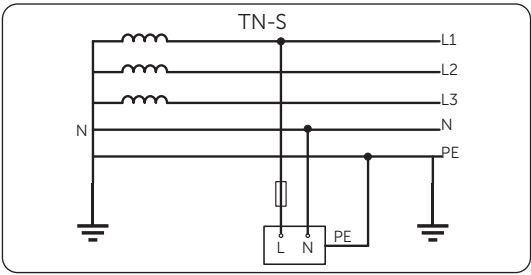


Figure 2-3 Supported power grid-TN-S

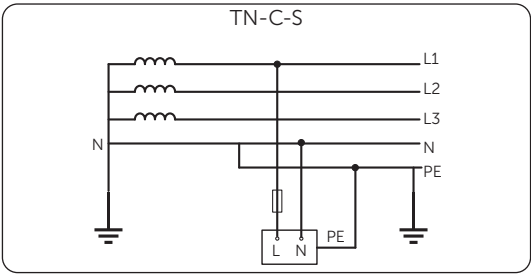


Figure 2-4 Supported power grid-TN-C-S

2.4 Symbols on the Label and Inverter

Table 2-2 Description of symbols

Symbol	Description
	CE mark. The inverter complies with the requirements of the applicable CE guidelines.
	TUV certified.
	RCM mark. The inverter complies with the requirements of the applicable RCM guidelines.
	Additional grounding point.
	Beware of hot surface. Do not touch a running inverter, as the inverter becomes hot during operation!
	Risk of electric shock. High voltage exists after the inverter is powered on!
	Risk of danger. Potential hazards exist after the inverter is powered on!
	Read the enclosed documentations.
	Do not dispose of the inverter together with household waste.
	Do not operate this inverter until it is isolated from battery, mains and on-site PV generation source.
	Danger of high voltage. Do not touch live parts for 5 minutes after disconnection from the power sources.

2.5 Working Principle

2.5.1 Circuit Diagram

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

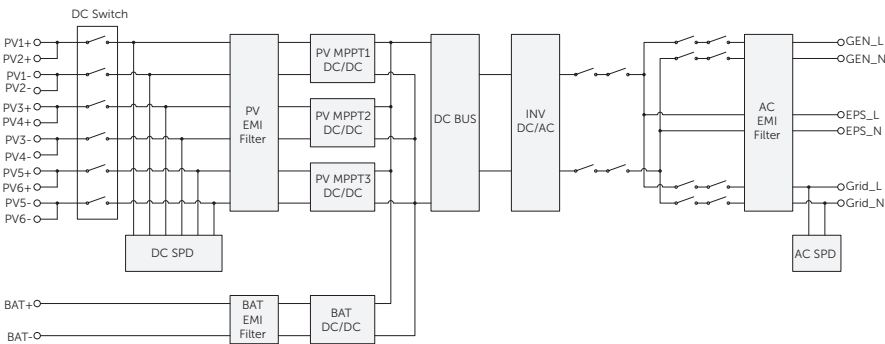


Figure 2-5 Circuit Diagram for X1-Lite-LV series inverter

NOTICE!

- MPPT 3 is available for 12 kW inverter.

2.5.2 Application Schemes

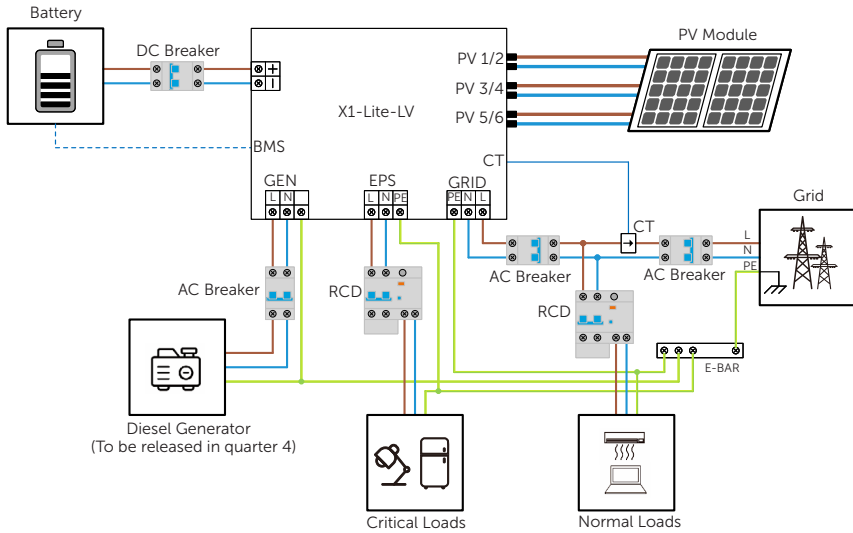


Figure 2-6 Partial home backup for most countries

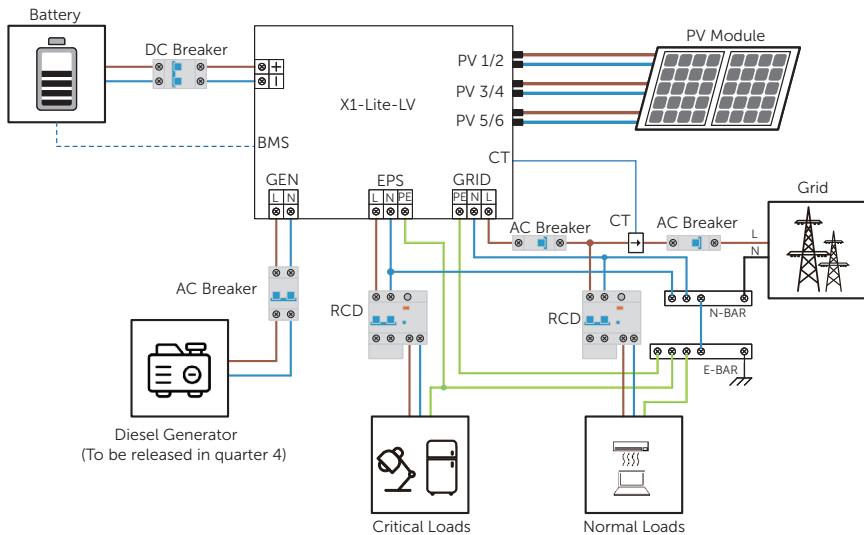


Figure 2-7 Partial home backup for Australia

2.6 Working State

The series inverter has INIT, IDLE, START, RUN and STOP state.

Table 2-3 Description of working state

State	Description
INIT	The inverter is checking for the initialization information such as the model and country, the conditions to be met in order to enter IDLE state.
IDLE	The inverter is doing some preparations to enter START state, such as checking relays.
START	The inverter is being started and ready for on-grid or off-grid operation.
RUN	The inverter is working in on-grid or off-grid state.
STOP	Users power off the inverter or fault occurs to the inverter.

2.7 Working mode

There are different work modes of the inverter based on different needs.

Applicable areas	Work modes
Countries other than Pakistan (including India, Vietnam, South Africa, Uzbekistan)	Self consumption mode, backup mode and Force time use mode
Pakistan	SUB mode, SBU mode, MKS mode and Force time use mode

For how to set the working mode, please refer to ["10.3 Work Mode"](#).

2.7.1 Self consumption mode

This mode is applicable to countries other than Pakistan.

Application Scenarios:

This mode is suitable for applications where electricity prices are high and solar power generation is not allowed to feed into the grid. Solar power takes priority in supplying the load, with any excess power being stored in the battery for later use.

The load is primarily powered by solar energy, with the battery taking over if solar power is insufficient, and grid power being the final option.

If the PV power exceeds the load power, the excess power will be used to charge the battery.

This mode defaults to zero feed-in control, preventing any power from being fed back into the grid.

Note:

In this mode, when the battery voltage is lower than the settable battery voltage of load-to-grid power supply, the battery will start charging, and the load will be powered by grid, and the battery will be charged in the following modes according to the priority setting of battery charging power supply:

Only Solar charging: Solar charges the battery, and the load is completely powered by the power grid;

Solar then Utility charging: If there is Solar energy, only Solar energy will charge the battery; if there is no solar energy, the power grid will charge the battery;

Solar+Utility: Same as 2 (Only Utility charging);

When the battery is charged to the battery voltage supplied by the load to the battery, it will return to the normal operation mode.

2.7.2 Backup Mode

This mode is applicable to countries other than Pakistan.

Application Scenarios:

This mode uses the energy storage system as a backup power source and is suitable for applications where power outages are frequent. When the grid is normal, the load is powered by solar and the grid, and the battery is only charged without discharging. When there is a power outage, the energy storage system works in off-grid mode to supply power to important loads.

The load is prioritized to be powered by solar. If the solar power is insufficient, the load is powered by the grid. If the grid is unavailable, the load is powered by the battery + solar in off-grid mode.

If the PV power is greater than the load power, the excess power charges the battery.

After the battery is fully charged, the excess PV power can be either fed back to the grid or limited based on the zero-export setting.

(In terms of program control, it is consistent with the Self Consumption mode, where the battery charging/discharging power is controlled to be zero or the allowed power for grid feeding. However, the battery only charges and does not discharge.)

Note:

In this mode, if the priority setting for the battery charging source is:

Only Solar charging: No response, and the normal operating mode mentioned above is followed.

Solar then Utility charging: If solar power is available, only solar charges the battery. In the absence of solar power, the grid charges the battery.

Solar + Utility: Same as mode 2 (Only Utility charging).

2.7.3 Force time use mode

This mode is applicable to all countries including Pakistan.

Application Scenarios:

This mode is more suitable for applications with peak and off-peak electricity price differences. When the electricity price is high, the battery discharges to power the load. When the electricity price is low, the battery is charged from solar or the grid to reach full capacity.

It provides three battery discharge time slots, corresponding to peak periods with higher electricity prices. During these periods, the battery discharges to power the load, providing economic value to the customer. The operation during these periods is consistent with the normal operation mode of the Self Consumption mode. The difference lies in the fact that when the battery voltage drops below the voltage at which the load is switched to grid power in the Time of Use mode, the battery only charges without discharging.

Note:

In this mode, it also provides three battery charging time slots, corresponding to off-peak periods with lower electricity prices. During these periods, the battery is charged from PV or the grid, and the load is powered by the grid, providing economic value to the customer. Different priority settings for the battery charging source can be selected for each of the three battery charging time slots, and it is possible for the battery to reach full capacity and enter the float charging stage during these time slots.

Outside the peak and off-peak time slots set, the battery follows the priority setting mode for the battery charging source.

2.7.4 SUB Mode

This mode is applicable under Pakistan's safety, corresponding to backup mode for other countries.

Application Scenarios:

This mode uses the energy storage system as a backup power source and is suitable for applications with frequent power outages. When the grid is operational, the load is powered by solar and the grid, and the battery only charges without discharging. With the grid available, the battery is generally kept at full charge. It only operates in off-grid mode to supply power to critical loads when the grid power is cut off.

The load is primarily powered by solar, and if solar power is insufficient, the grid supplies power. In the absence of grid power, the system switches to off-grid mode, using the battery and solar to power the load.

If the power generated by solar exceeds the load demand, the excess electricity is used to charge the battery.

After the battery is fully charged, whether the surplus PV power is fed back into the grid or limited depends on the setting for zero-export at the grid interface.

Note:

In this mode, if the priority setting for the battery charging source is as follows:

Only Solar Charging: No response, and the normal operation mode described above is followed.

Solar then Utility Charging: If solar power is available, the battery is exclusively charged by solar. In the absence of solar power, the grid charges the battery based on the maximum allowable grid charging current set at the grid interface.

Solar + Utility Charging: The battery is charged using the power from solar plus the maximum allowable grid charging current set at the grid interface.

2.7.5 SBU Mode

This mode is applicable under Pakistan's safety, corresponding to self consumption mode for other countries.

Application Scenarios:

This mode is suitable for applications where electricity prices are high and solar power cannot be fed into the grid. Solar power is prioritized for loads, and excess power is stored in the battery for later use. This mode is ideal for customers with low daytime electricity consumption and higher nighttime electricity consumption.

Loads are primarily powered by solar energy. If the solar power is insufficient, the battery will provide power. If the battery voltage drops below the voltage threshold for switching to grid supply in SBU mode, the loads will be powered by the grid. Once the battery voltage reaches the voltage threshold for switching back to solar and battery supply, the loads will be powered by solar power and the battery again.

If the solar power generated exceeds the load demand, the excess power will be used to charge the battery.

In this mode, zero export is enabled by default, meaning power cannot be fed back to the grid.

Note:

In this mode, if the battery voltage drops below the adjustable voltage threshold for switching to grid supply, the battery starts charging and the loads are powered by the grid. The battery charging mode depends on the priority settings:

Only solar charging: The battery is charged with solar power, and the loads are fully powered by the grid.

Solar then utility charging: If solar power is available, the battery is charged only with solar power. If there is no solar power, the battery is charged within the maximum current limit set for grid charging.

Solar + utility charging: The power generated by solar plus the maximum current limit set for grid charging on the interface will charge the battery simultaneously.

2.7.6 MKS Mode

This mode is applicable under Pakistan's safety.

Application Scenarios:

This mode is suitable for customers who have higher electricity consumption during certain periods of the day and lower consumption at night. When solar power is available, this mode is basically the same as the SBU mode, and the discharge range of the battery is wider than that of the SBU mode. The difference lies in the fact that the battery only starts charging and the load switches to grid power when the battery voltage falls below the minimum discharge voltage. Normal operation is resumed only when the battery is charged to a voltage higher than the maximum charging voltage.

At night when solar power is unavailable, this mode is basically the same as the SUB mode, with the battery only charging and not discharging, which prevents the battery from being depleted.

3 System Overview

System Overview

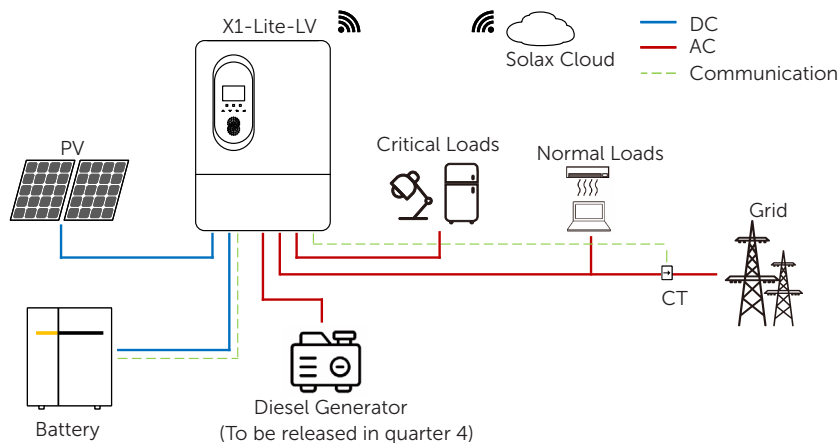


Figure 3-1 System diagram

Table 3-1 System item description

Item	Description
X1-Lite-LV series inverter (the device covered in this manual)	The X1-Lite-LV series inverter is an energy storage inverter that supports grid connection of photovoltaic system.
PV modules	PV modules work in MPPT mode. The maximum number of PV string per MPPT tracker is two for 8 kW and 10 kW inverter and three for 12 kW inverter.
Battery	The series inverter should be coupled low voltage battery (Lithium or Lead-Acid). The battery with the same capacity and the same model can be installed simultaneously. It communicates with the inverter via BMS and must comply with the specifications of the regulations.
Meter/CT	The meter/CT is used by the inverter for import / export or consumption readings, and manages the battery charge / discharge accordingly for smart energy management applications.

Item	Description
Generator (To be released in quarter 4)	SolaX PV-Genset solution ensures optimum interaction between the photovoltaics and diesel generator, which saves fuel, lowers energy costs and ensures a stable and reliable power supply.
Grid	220 V / 230 V and 240 V grid are supported.
SolaX Cloud	SolaX Cloud is an intelligent, multifunctional monitoring platform that can be accessed either remotely or through a hard wired connection. With the SolaX Cloud, the operators and installers can always view key and up to date.

4 Transportation and Storage

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

Transportation

- Observe the caution signs on the packaging of inverter before transportation.
- Pay attention to the weight of the inverter. Carry the inverters by the required number of personnel as specified by local regulations.(gross/net weight of X1-Lite-LV: 42/37 kg)
- Wear protective gloves when carrying the equipment by hand to prevent injuries.
- When lifting up the inverter, hold the bottom position of the carton. Keep the inverter horizontal in case of falling down.

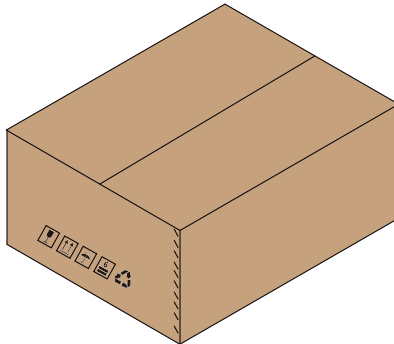


Figure 4-1 Caution signs on the packaging

Storage

- The inverter must be stored indoors.
- Do not remove the original packaging material and check the outer packaging material regularly.
- The storage temperature should be between -40°C and $+70^{\circ}\text{C}$. The relative humidity should be between 0%RH and 100%RH.
- Stack the inverter in accordance with the caution signs on the inverter carton to prevent their falling down and device damage. Do not place it upside down.

5 Preparation before Installation

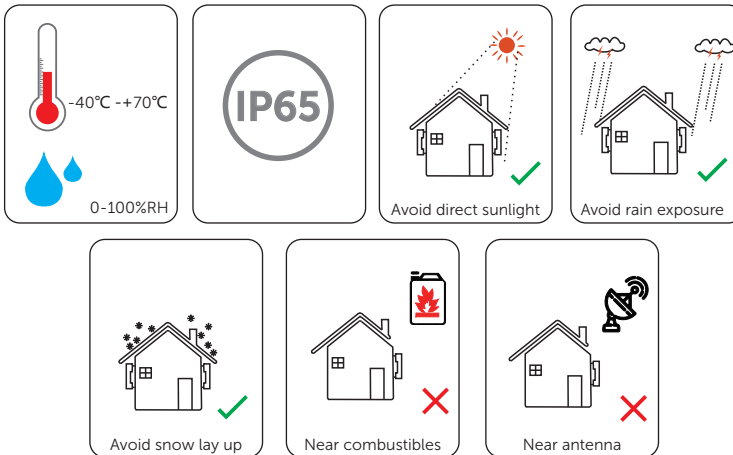
5.1 Selection of Installation Location

The installation location selected for the inverter is quite critical in the aspect of the guarantee of machine safety, service life and performance. It has the IP65 ingress protection, which allows it to be installed outdoor. The installation position shall be convenient for wiring connection, operation and maintenance.

5.1.1 Environment Requirement

Make sure the installation environment meets the following conditions:

- The ambient temperature: -40°C to $+70^{\circ}\text{C}$.
- The relative humidity shall be between 0-100%RH.
- Do not install the inverter in the areas where the altitude exceeds 3000 m.
- Install the inverter in a well-ventilated environment for heat dissipation. You are recommended to install an awning over the inverter if it is installed on a support outdoor.
- Do not install the inverter in areas with flammable, explosive and corrosive materials or near antenna.
- Avoid direct sunlight, rain exposure and snow laying up.



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 inverter at least 500 meters away from the coast and avoid sea breeze directly hit.

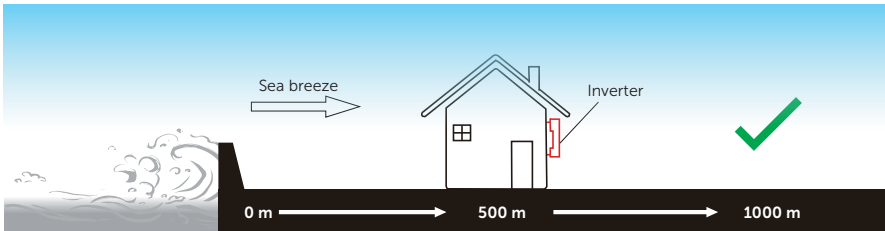


Figure 5-1 Recommended installation position

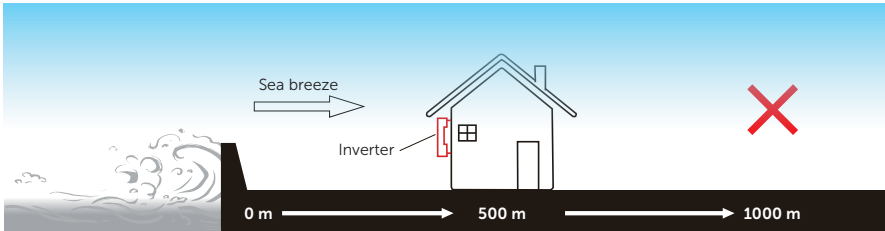


Figure 5-2 Incorrect installation position

NOTICE!

- For the installation of the whole system, please refer to the specific environment requirement of each unit.

5.1.2 Installation Carrier Requirement

The installation carrier must be made of a non-flammable material, such as solid brick, concrete, etc. and be capable of supporting the weight of the inverter and suitable of the dimensions of the inverter. If the wall strength is not enough (such as wooden wall, the wall covered by thick layer of decoration), it must be strengthened additionally.

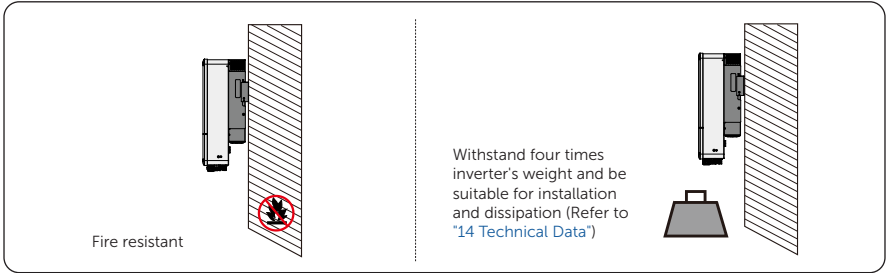


Figure 5-3 Installation carrier requirement

5.1.3 Clearance Requirement

The minimum clearance reserved for the connected terminal at the bottom of inverter should be 14 cm. When planning installation space, it is important to consider the bending radius of the wires.

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

For installations with multiple inverters, make sure to leave a minimum space of 60 cm between each inverter. In areas with high ambient temperatures, increase the clearances between the inverters and provide adequate fresh air ventilation if feasible.

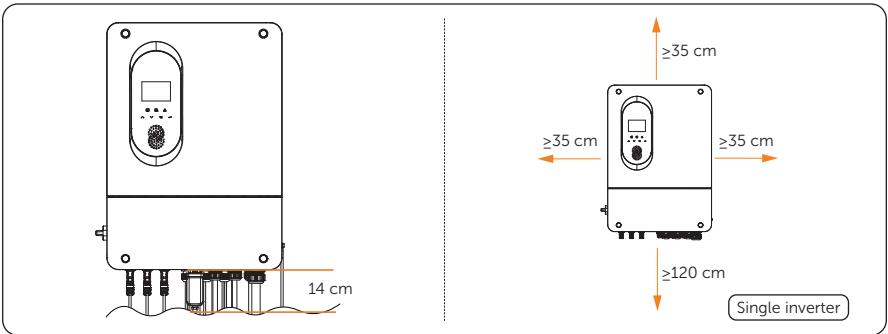


Figure 5-4 Clearance requirement for single inverter

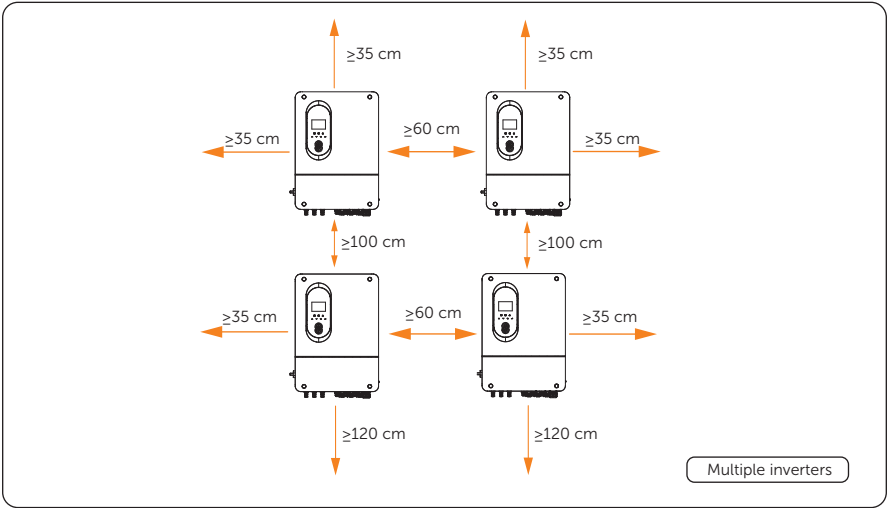
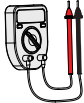
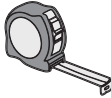
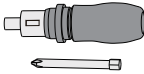
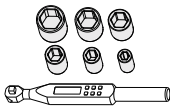
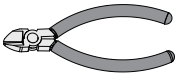
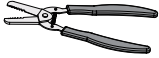
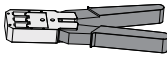
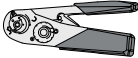
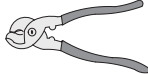
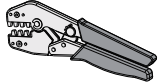
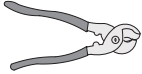
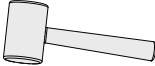
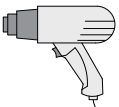
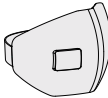


Figure 5-5 Clearance requirement for multiple inverters

5.2 Tools Requirement

Installation tools include but are not limited to the following recommended ones. If necessary, use other auxiliary tools on site. Please note that the tools used must comply with local regulations.

 Hammer drill (drill bit: Ø10 mm)	 Multimeter (≥ 600 V DC)	 Measuring tape	 Utility knife
 Marker	 Torque screwdriver (Phillips head: M4 / M6 / M8)	 Torque wrench (10 mm)	 Diagonal plier
 Wire stripper	 Crimping tool for RJ45	 Crimping tool for Battery	 Wire cutter
 Crimping tool	 Crimping tool for PV terminal	 Rubber mallet	 Spirit level
 Heat gun	 Ø6 mm Heat shrink tubing	 Safety goggles	 Anti-dust mask
 Safety gloves	 Safety boots		

5.3 Additionally Required Materials

Table 5-1 Additionally required wires

No.	Required Material		Type	Conductor Cross-section
1	PV wire		Dedicated PV wire with a voltage rating of 600 V	4-6 mm ²
2	Communication wire		Network cable CAT5E	0.2 mm ²
3	Battery power cable		Conventional copper wire	35~50 mm ²
4	Additional PE wire		Conventional yellow and green wire	10~16 mm ²

Table 5-2 Wire and breaker recommended for Grid connection

Model	8 kW	10 kW	12 kW
Wire (copper) 	10 mm ²	16 mm ²	16 mm ²
Circuit breaker 	60 A	80 A	100 A

Table 5-3 Wire and breaker recommended for EPS connection

Model	8 kW	10 kW	12 kW
Wire (copper) 	8 mm ²	10 mm ²	16 mm ²
Circuit breaker 	50 A	60 A	80 A

Table 5-4 Wire and breaker recommended for GEN connection

Model	15 kW	20 kW	25 kW
Wire (copper) 	10 mm ²	16 mm ²	16 mm ²
Circuit breaker 	60 A	80 A	100 A

6 Unpacking and Inspection

6.1 Unpacking

- The inverter undergoes 100% testing and inspection before delivery. However, damages may still occur during transportation. Before unpacking, please carefully check the external packaging for any signs of damage, such as punctures or cracks.
- Unpacking the inverter according to the following figure.

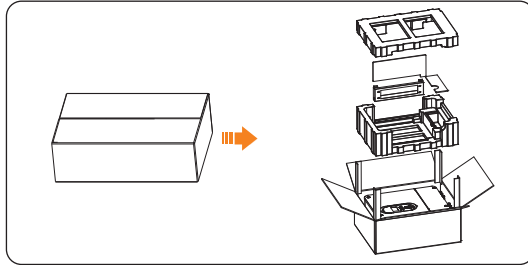


Figure 6-1 Unpacking the inverter

- Properly handle all the packaging materials in case they may be reused for storage and transportation of the inverter in the future.
- Upon opening the package, check whether the inverter is intact and whether all accessories are included. If any damage is found or any parts are missing, contact your dealer immediately.

6.2 Scope of Delivery

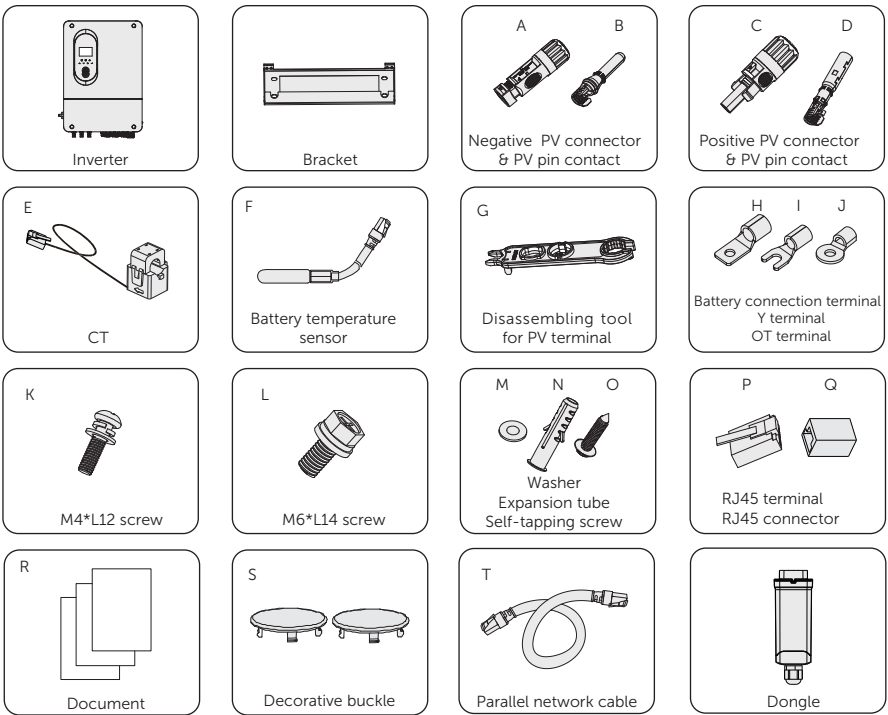


Table 6-1 Packing list

Item	Description	Quantity	Remark
/	Inverter	1 pc	
/	Bracket	1 pc	
A	Negative PV connector	4 pairs for 8kW~10kW inverters 6 pairs for 12kW inverter	
B	Negative PV pin contact	4 pairs for 8kW~10kW inverters 6 pairs for 12kW inverter	
C	Positive PV connector	4 pairs for 8kW~10kW inverters 6 pairs for 12kW inverter	
D	Positive PV pin contact	4 pairs for 8kW~10kW inverters 6 pairs for 12kW inverter	
E	CT	1 pc	

Unpacking and Inspection

Item	Description	Quantity	Remark
F	Battery temperature sensor	1 pc	For measuring the temperature of battery
G	Disassembling tool for PV terminal	1 pc	
H	Battery connection terminal	4 pcs	
I	Y terminal	9 pcs	For Grid, EPS, GEN connection
J	OT terminal	1 pc	For grounding
k	M4*L12 screw	2 pcs	For fixing the inverter
L	M6*L14 screw	1 pc	For grounding
M	Washer	4 pcs	For fixing the bracket
N	Expansion tube	4 pcs	For fixing the bracket
O	Self-tapping screw	4 pcs	For fixing the bracket
P	RJ45 terminal	4 pcs	
Q	RJ45 connector	2 pcs	
R	Document	/	
S	Decorative buckle	2 pcs	For decorating the lower cover
T	Parallel network cable	1 pc	For parallel connection
/	Dongle	1 pc	

NOTICE!

- Refer to the actual delivery for the optional accessories.

7 Mechanical Installation

⚠ WARNING!

- Only qualified personnel are allowed to perform the mechanical installation following local laws and regulations.
- Check the existing power cables or other piping in the wall to prevent electric shock or other damage.
- Use insulated tools and wear personal protective equipment throughout the installation and maintenance process.

⚠ CAUTION!

- During installation, always be cautious about the weight of the inverter. Improper lifting or dropping of the inverter may result in personal injury.

NOTICE!

- Install the inverter at a maximum back tilt of 15 degrees and avoid forward tilted, side tilted, or upside down.

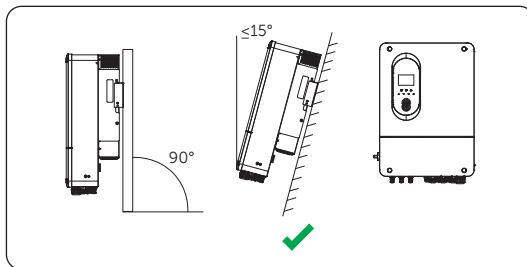


Figure 7-1 Correct installation

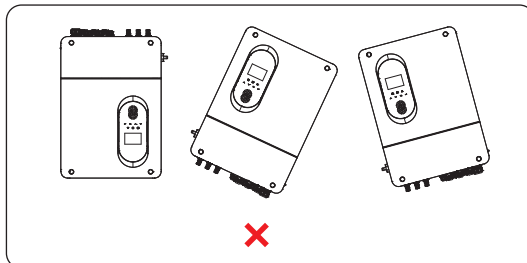


Figure 7-2 Incorrect installation

7.1 Dimensions for mounting

Before installation, check the dimensions of the wall mounting bracket and ensure that enough space is reserved for the installation and heat dissipation of the entire system.

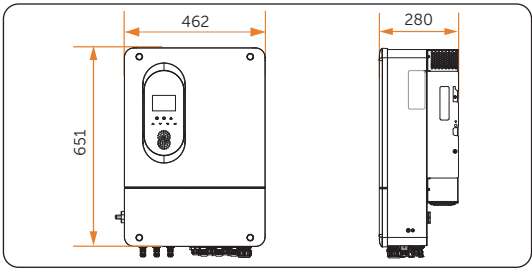


Figure 7-3 Dimensions 1 (Unit: mm)

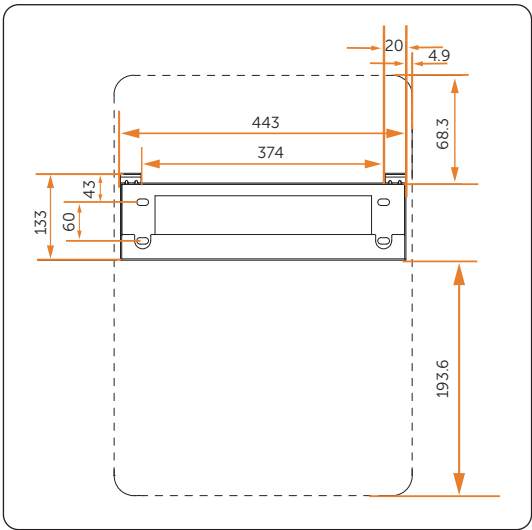


Figure 7-4 Dimensions 2 (Unit: mm)

7.2 Installation procedures

Step 1: Horizontally align the wall mounting bracket with the wall, adjust the position of the bracket with a spirit level until the bubble stays in the middle, and then mark holes. The minimum distance between the ground and the inverter is 1200 mm.

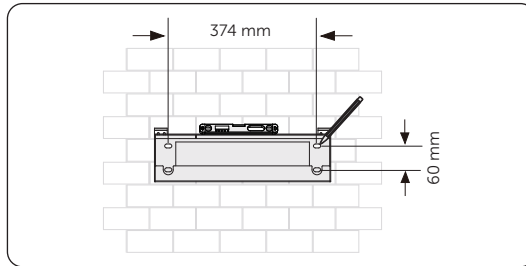


Figure 7-5 Marking the holes

Step 2: Set the wall mounting bracket aside and drill holes with $\varnothing 10$ drill bit. The depth of the holes should be over 80 mm.

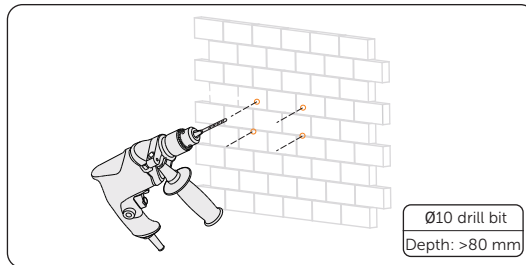


Figure 7-6 Drilling holes

Step 3: Knock the expansion tubes into the holes. Attach the wall mounting bracket on the wall again. Insert the self-tapping screws into the holes and secure it to the wall by torque wrench.

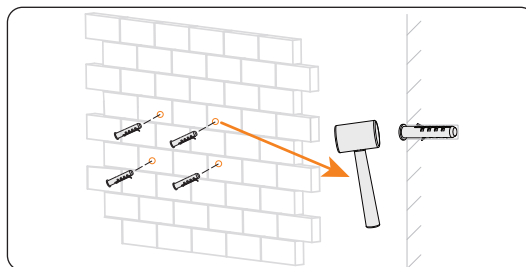


Figure 7-7 Knocking the expansion tubes

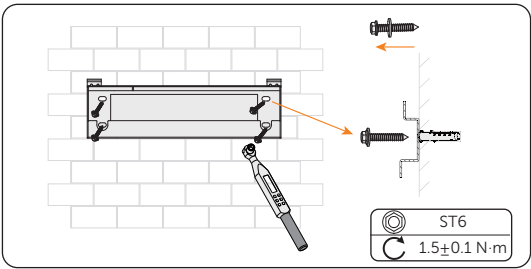


Figure 7-8 Securing the wall mounting bracket

Step 4: If the inverter needs to be temporarily placed on the ground, use foam or other protective materials to protect it against potential damages. Lift up the inverter collaboratively by the required number of personnel in accordance with the local regulation and hang it onto the wall mounting bracket. Make sure that the hanging holes of the inverter are properly inserted into the lugs of the bracket.

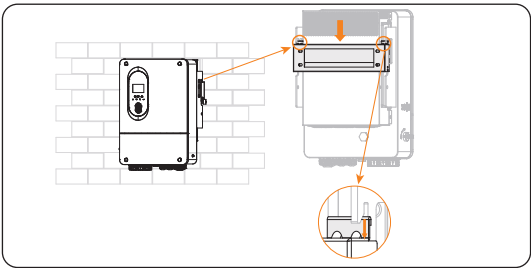


Figure 7-9 Hanging the inverter

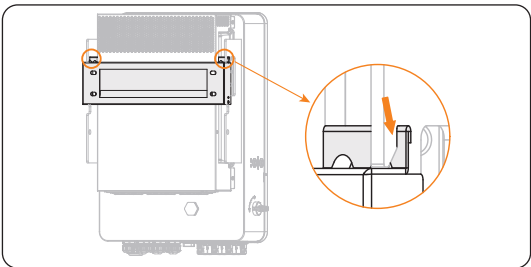


Figure 7-10 Hanging the inverter

Step 5: Use M4*12 screws to secure the inverter on both sides.

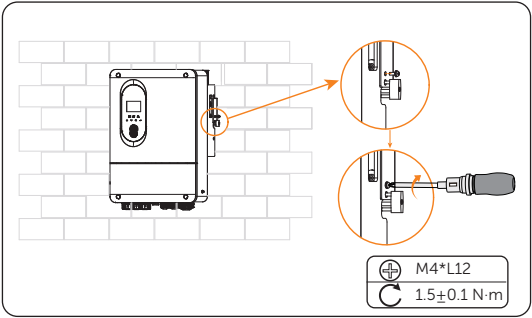


Figure 7-11 Securing the inverter

8 Electrical Connection

DANGER!

- Before electrical connection, make sure the DC switch and AC breaker are disconnected. Otherwise, the high voltage may cause electric shock, resulting in severe personal injuries or even death.

WARNING!

- Only qualified personnel are allowed to perform the electrical connection following local laws and regulations.
- Strictly follow the instructions of this manual or other related documentation for electrical connection. Inverter damages caused by incorrect wiring is not covered by the warranty.
- Use insulated tools and wear personal protective equipment throughout the electrical connection process.

8.1 Terminals of Inverter

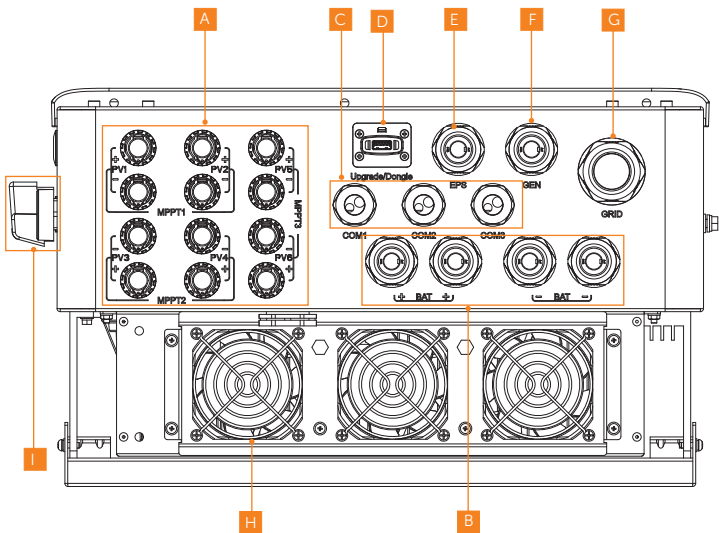


Figure 8-1 Terminals of Inverter

Table 8-1 Description of terminals

Item	Description	Remarks
A	PV connection terminal	PV1 ~ PV4 terminals for 8 and 10 kW inverter; PV1~ PV6 terminals for 12 kW inverter
B	Battery connection terminal	
C	COM communication terminal	Including DI/COM, DO, BMS, DRM, METER/CT_1, METER/CT_2, Parallel_1, Parallel_2
D	Dongle terminal	
E	EPS connection terminal	
F	GEN connection terminal	
G	GRID connection terminal	
H	Fan	
I	DC switch	

8.2 PE Connection

The inverter must be reliably grounded. The PE connection point has been marked with

 It is recommended to connect the inverter to a nearby grounding point.

PE connection procedures

Step 1: Strip the insulation of the PE cable to an appropriate length.

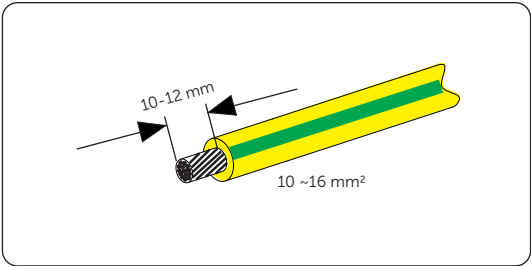


Figure 8-2 Stripping the PE cable

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

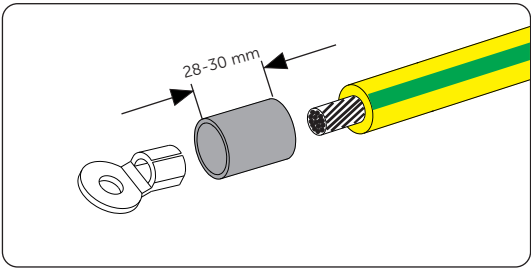


Figure 8-3 Installing the tubing and OT terminal

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

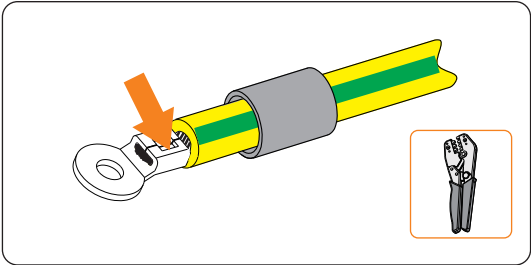


Figure 8-4 Crimping the cable

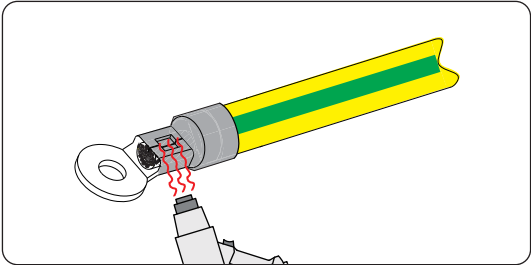


Figure 8-5 Shrinking the tubing

Step 4: Connect the assembled PE cable to the grounding point of the inverter, and secure it with the M6*14 screw in the packing list. (Torque: 3 ± 0.3 N·m)

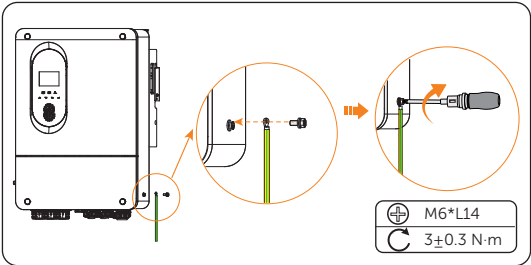


Figure 8-6 Securing the PE cable

8.3 EPS, GEN and GRID Connection

NOTICE!

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

The inverter supports the EPS mode. When connected to the grid, the inverter outputs go through the Grid terminal, and when disconnected from the grid, the inverter outputs go through the EPS terminal.

Requirements for EPS, GEN and GRID connection

- Grid voltage requirement
 - » The grid voltage and frequency must be within the allowable range (220 V / 230 V / 240V, 50 / 60 Hz) and comply with the requirements of the local power grid.
- Residual Current Device (RCD)
 - » The inverter does not require an external RCD when operating. If an external RCD is required by local regulations, a 300 mA Type-A RCD is recommended. If required by local regulations, a Type-B RCD is also permitted.
- AC breaker
 - » An AC breaker that matches the power of the inverter must be used between the inverter output and the power grid. Each inverter must be equipped with an independent breaker or other load disconnection unit to ensure the safe disconnection from the grid. For specific information on the AC breaker for Grid, EPS and GEN, see ["5.3 Additionally Required Materials"](#).
- EPS load
 - » Make sure that the rated power of the EPS load is within the rated output power range of the inverter. Otherwise, the inverter will report an **Overload Fault** alarm. In this case, turn off some loads to suit the rated EPS output power range of the inverter, and then press the **ESC** key on the LCD screen to clear the fault.
 - » When connecting to the EPS terminal, pay attention to the following points:

Medical equipment	Connection prohibited
Precision instrument	Connection prohibited
Appliances susceptible to malfunctions in the event of power outages during use.	Connection prohibited
 - » For inductive loads such as refrigerators, air conditioner, washing machine, etc., ensure that their start power does not exceed the EPS peak power of the inverter.

Table 8-2 EPS load information

Type of load	Equipment	Start power
Resistive load	Lamp	Rated power
	Fan	Rated power
	Hair dryer	Rated power
Inductive load	Refrigerator	3-5 times rated power
	Air conditioner	3-6 times rated power
	Washing machine	3-5 times rated power
	Microwave oven	3-5 times rated power

* Refer to the nominal start power of the equipment for the actual start power.

Wiring procedures

NOTICE!

- Please refer to the table in Additionally Required Materials to view the recommended wire sizes for GRID, EPS, and GEN.
- For 8kW inverter, the size of Y terminal is 10 mm². For 10kW and 12kW inverters, the size of Y terminal is 16 mm².

Step 1: Prepare three-core cables as the EPS, GEN and GRID cables and strip the insulation of L, N and the grounding conductor to an appropriate length. Insert the conductors L, N, and grounding conductor into the Y terminals.

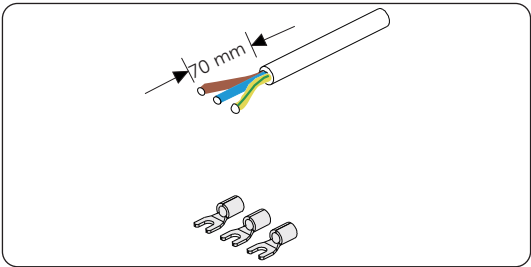


Figure 8-7 Stripping cables

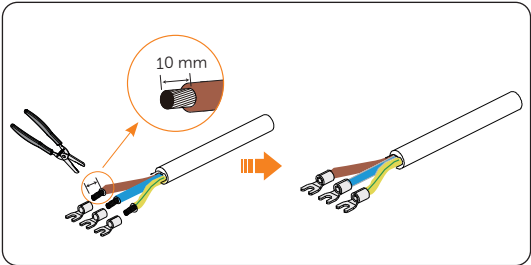


Figure 8-8 Stripping cables

Step 2: Use crimping tool to crimp it. Make sure the conductors are correctly assigned and firmly seated in the Y terminals.

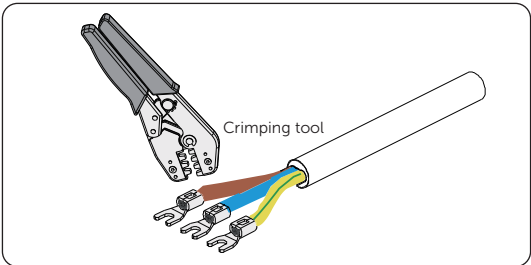


Figure 8-9 Crimping the conductors

Step 3: Use a cross screwdriver to loosen the M6 screws on both sides of the inverter. Then remove the lower cover of the inverter. (Torque: 3 ± 0.3 N·m)

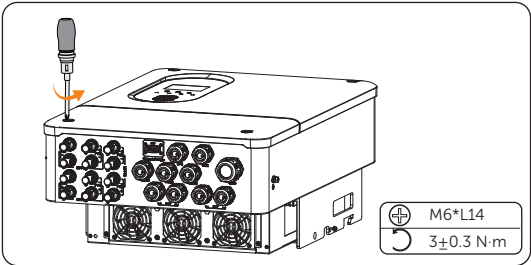


Figure 8-10 Loosening the screws

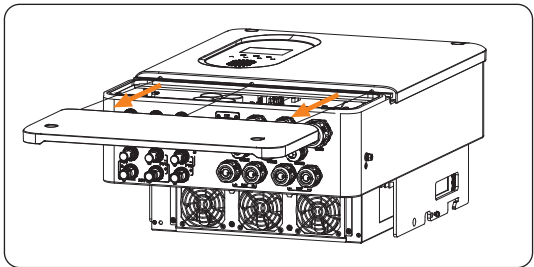


Figure 8-11 Removing the lower cover

Step 4: Disassemble EPS, GEN and GRID ports. And remove the plugs and sealing cover as shown below. It is recommended to seal unused plugs with fireproof putty.

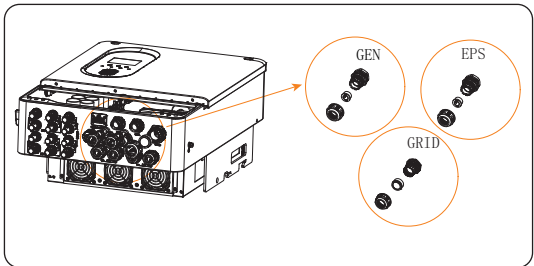


Figure 8-12 Removing the plugs

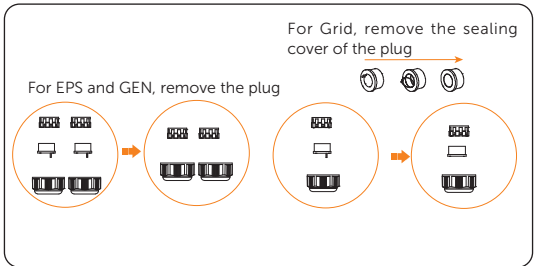


Figure 8-13 Removing the plugs

NOTICE!

- For EPS and GEN, remove the plug. For Grid, remove the sealing cover of the plug. keep the plugs in a safe place, seal the unused terminals with them.

Step 5: Find the location of EPS, GEN and GRID connection port.

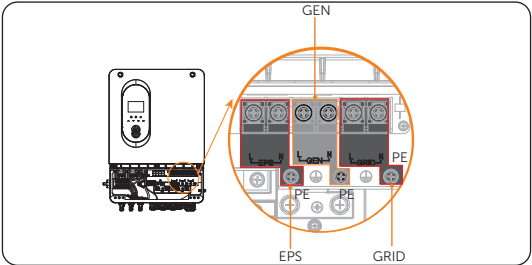


Figure 8-14 Finding the location

Step 6: Thread EPS, GEN and Grid cables through the corresponding EPS, GEN and Grid ports.

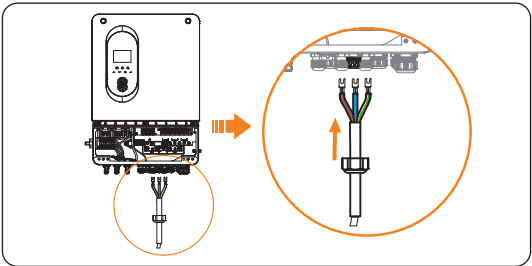


Figure 8-15 Threading the EPS cable

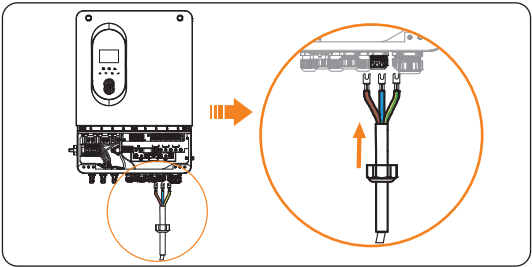


Figure 8-16 Threading the GEN cable

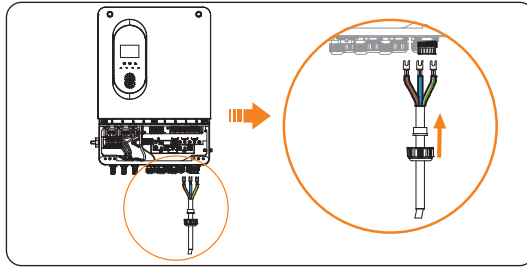


Figure 8-17 Threading the GRID cable

Step 7: Loosen the M6 screws to insert the crimped conductors. (Torque: 3 ± 0.3 N·m)

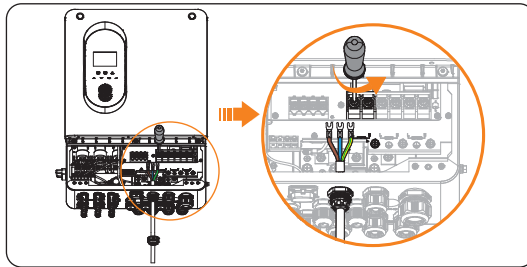


Figure 8-18 Loosening the EPS screws

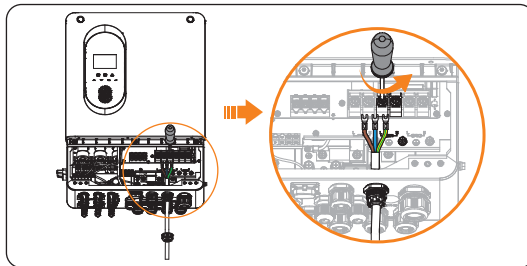


Figure 8-19 Loosening the GEN screws

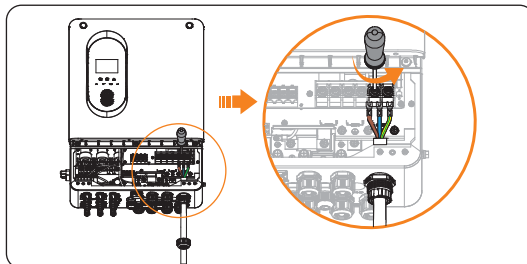


Figure 8-20 Loosening the GRID screws

Step 8: Insert the crimped conductors L, N, and grounding conductor into the terminals according to the wire sequence and tighten the screws with a cross screwdriver (Torque: $3\pm0.3\text{N}\cdot\text{m}$). Then tighten the swivel nut.

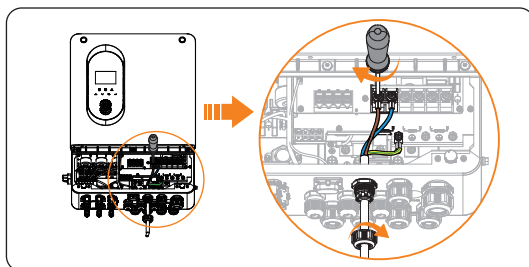


Figure 8-21 Connecting the EPS cable

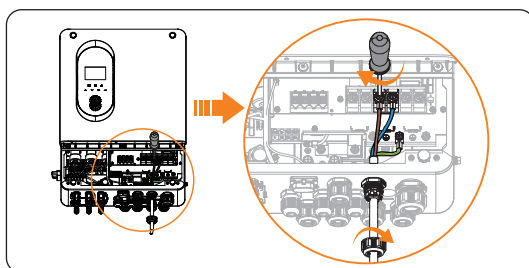


Figure 8-22 Connecting the GEN cable

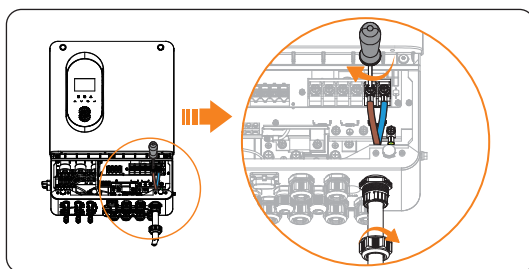


Figure 8-23 Connecting the GRID cable



- Before powering on the inverter, seal the unused terminals of EPS, GRID and GEN with the plugs. Otherwise, electrical shock may be caused by high voltage, resulting in serious personal injury or death.

8.4 PV Connection

DANGER!

- When exposed to the sunlight, PV modules will generate lethal high voltage. Please take precautions.
- Before connecting the PV modules, make sure that both DC switch and AC breaker are disconnected, and that the PV module output is securely isolated from the ground.

WARNING!

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

CAUTION!

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

Requirements for PV connection

- Open circuit voltage and operating voltage
 - » The open circuit voltage of each module array cannot exceed the maximum PV input voltage (600 V) of the inverter. Otherwise, the inverter may be damaged.
 - » The operating voltage of PV modules must be within the MPPT voltage range (50-550 V) of the inverter. Consider the impact of low temperature on the voltage of the photovoltaic panels, as lower temperatures tend to result in higher voltages.
- PV module
 - » The PV modules within the same MPPT channel are of the same brand. Additionally, the strings within the same channel should have identical quantities, and be aligned and tilted identically.
 - » The positive or negative pole of the PV modules is not grounded.
 - » The positive cables of the PV modules must be connected with positive DC connectors.
 - » The negative cables of the PV modules must be connected with negative DC connectors.

Wiring procedures

Step 1: Strip the insulation of the PV cables to an appropriate length.

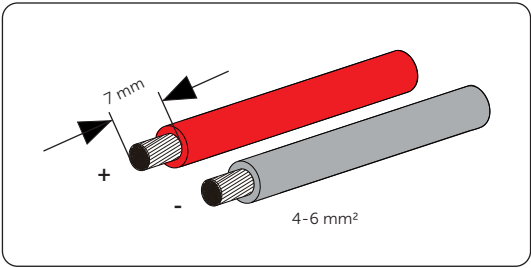


Figure 8-24 Stripping the PV cable

Step 2: Insert the stripped cable into the PV pin contact.

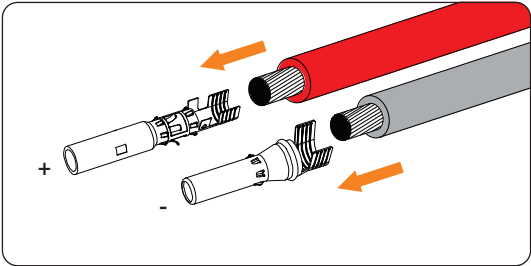


Figure 8-25 Inserting the PV pin contact

Step 3: Make sure the the PV cable and PV pin contact are of the same polarity. Crimp it with crimping tool for PV terminal. Pay attention to the crimping position.

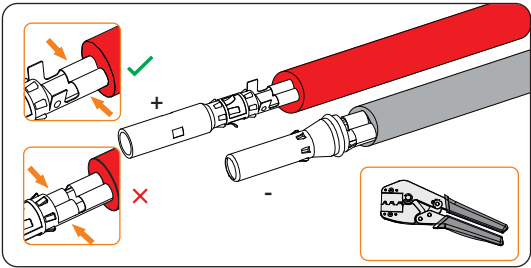


Figure 8-26 Crimping the terminal

Step 4: Thread the PV cable through swivel nut and insert the cable into the PV connector.

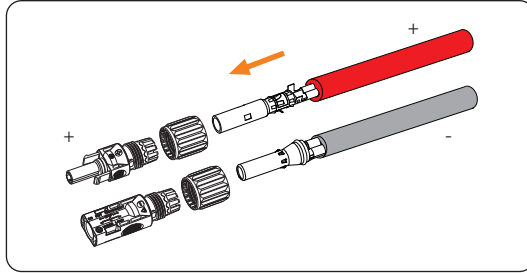


Figure 8-27 Threading the PV cable

Step 5: A "Click" will be heard if it is connected correctly. Gently pull the cable backward to ensure firm connection. Tighten the swivel nut. Verify that the PV connectors have the correct polarity before connection.

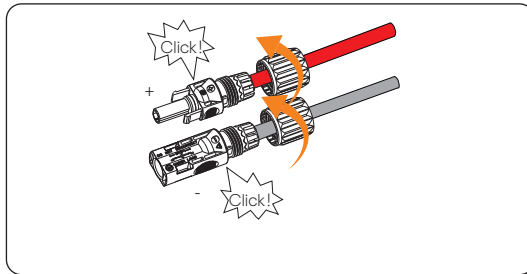


Figure 8-28 Securing the PV cable

Step 6: Use a voltage measuring device which complies with the local regulation to measure the positive and negative voltage of the assembled PV connectors. Make sure the open circuit voltage does not exceed the input limit of 600 V.

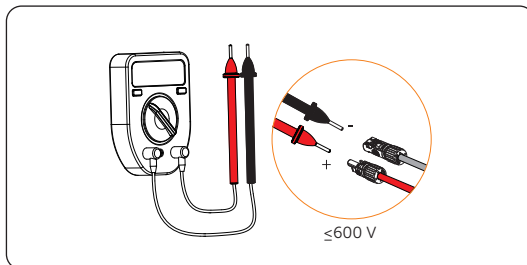


Figure 8-29 Measuring the voltage of PV connectors

NOTICE!

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

Step 7: Remove the PV terminal caps and connect the assembled PV connectors to corresponding terminals until there is an audible "Click". The PV+ on the string side must be connected to the PV+ on the inverter side, and the PV- on the string side must be connected to the PV- on the inverter side.

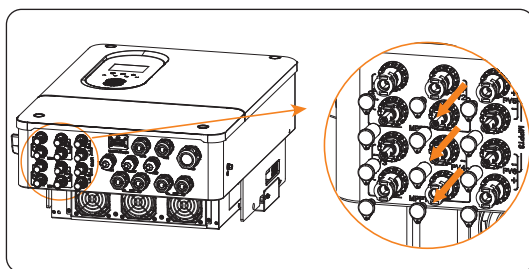


Figure 8-30 Removing the PV terminal caps

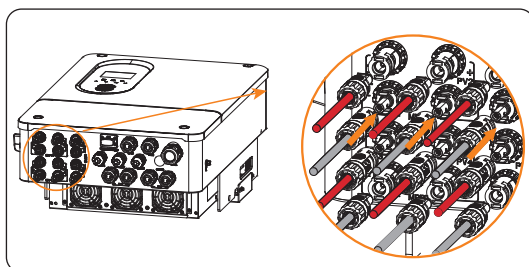


Figure 8-31 Connecting the PV cable

NOTICE!

- For 8kW~10kW inverters, remove PV terminal caps of MPPT1 and MPPT2.

⚠ WARNING!

- Seal the unused PV terminals with original terminal caps. If all PV terminals are connected, keep the waterproof caps in a safe place. Reinstall it immediately after removing the connectors from terminals.

8.5 Battery Power Cable Connection



- Before connecting the cables, make sure the breaker, power button (if any) and DC switch (if any) of battery is OFF.
- Always ensure correct polarity. Never reverse the polarity of the battery cables as this will result in inverter damage.

NOTICE!

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

Requirments for battery connection

- Battery
 - » Lithium and Lead-acid battery
 - » The inverter is equipped with two independent battery terminals, allowing for connection to two separate battery strings.
 - » Make sure the input voltage of each BAT terminal is higher than minimum voltage 40 V and lower than maximum input voltage 60 V.
- Micro circuit breaker (MCB)
 - » If the battery is integrated with a readily accessible internal DC breaker, no additional DC breaker is required. If local regulations mandate the use of a DC MCB between the battery and the inverter, install a non-polar DC MCB.
 - » The nominal voltage of DC MCB should be larger than maximum voltage of battery.

Model	X1-Lite-8K-LV	X1-Lite-10K-LV	X1-Lite-12K-LV
Voltage	Nominal voltage of DC breaker should be larger than maximum voltage of battery.		
Current (A)	250	250	300

- Battery configuration information
 - » X1-Lite-LV series inverter matches with SolaX low voltage battery TP-LD53, TP-LD150. A single inverter can match with maximum 16 batteries.

Battery connection diagram

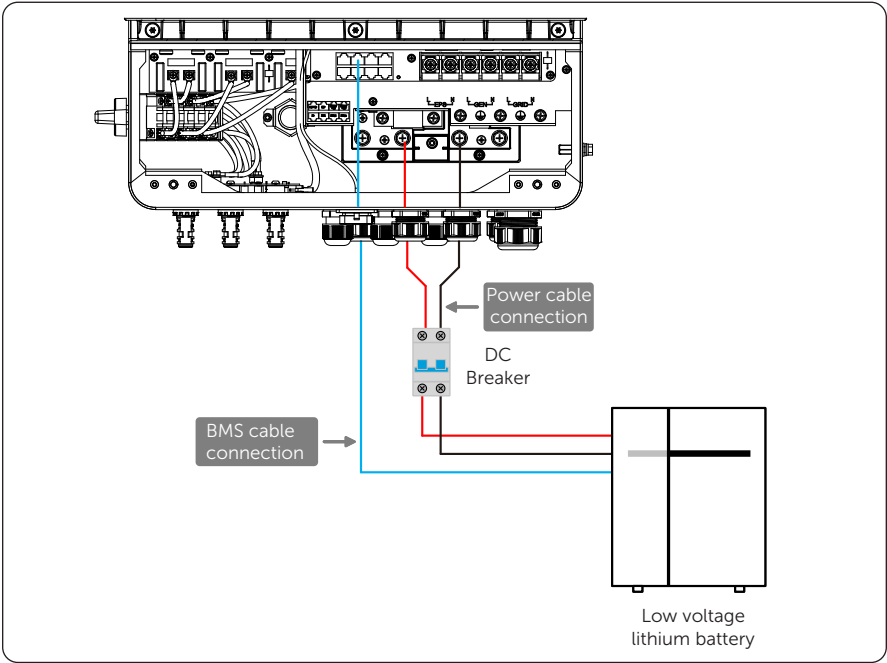


Figure 8-32 Lithium battery connection diagram

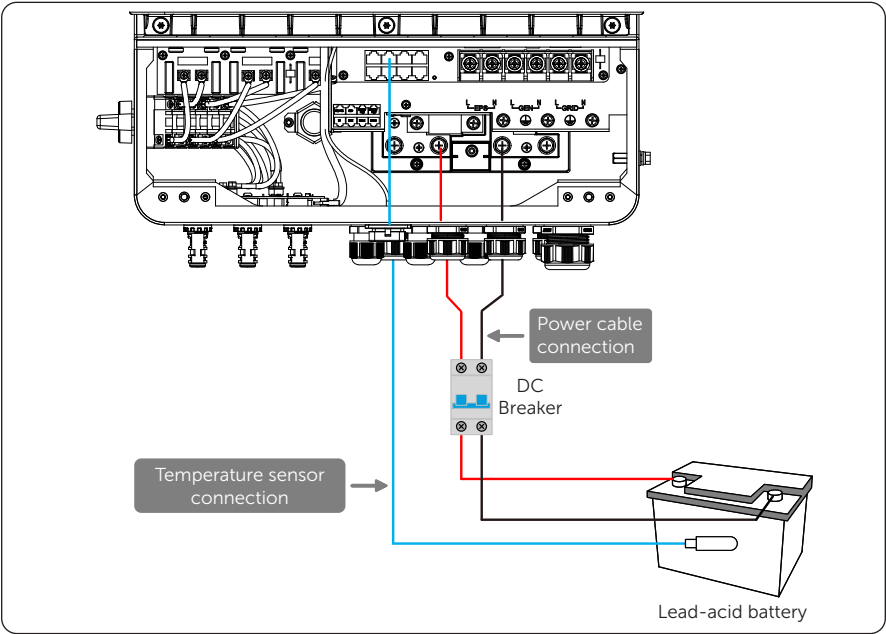


Figure 8-33 Lead-acid battery connection diagram

Wiring procedures

Step 1: Strip the insulation of the battery power cable to an appropriate length.

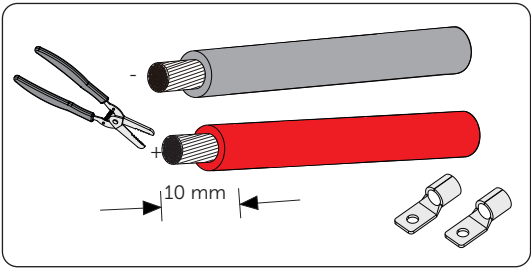


Figure 8-34 Stripping the battery cable

Step 2: Insert the stripped cable into the battery connection terminal. Use crimping tool for battery to crimp it.

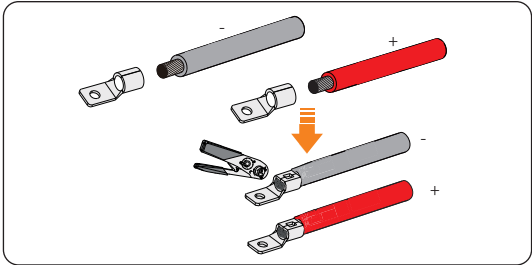


Figure 8-35 Inserting the battery connection terminal

Step 3: Disassemble the BAT+ and BAT- ports. Then remove the plug.

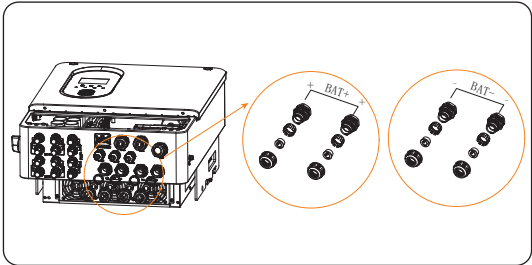


Figure 8-36 Disassembling the terminal

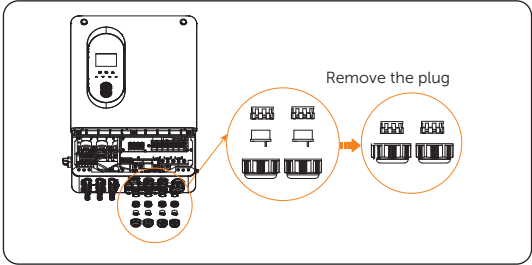


Figure 8-37 Removing the plug

Step 4: Thread the battery cable through swivel nut and the battery terminal.

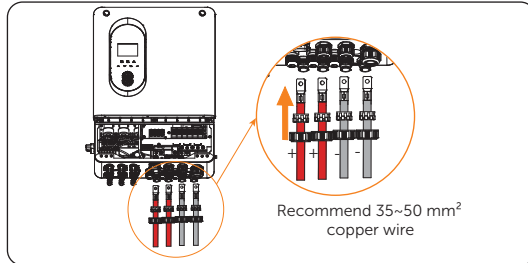


Figure 8-38 Removing the plug

Step 5: Remove the M8 screws to connect the battery cable. (Torque: $5 \pm 0.5 \text{ N}\cdot\text{m}$)

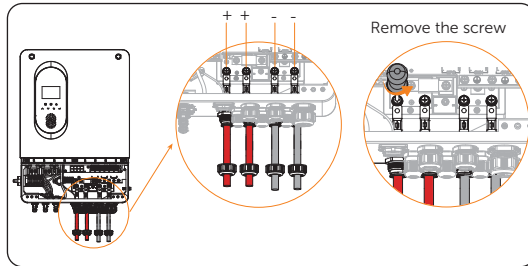


Figure 8-39 Removing the screws

Step 6: Insert the positive cable into BAT+ port and the negative cable to BAT-port. Use cross screwdriver to tighten the screws (Torque: $5 \pm 0.5 \text{ N}\cdot\text{m}$). Then tighten the swivel nut. Verify that the battery connectors have the correct polarity before connection.

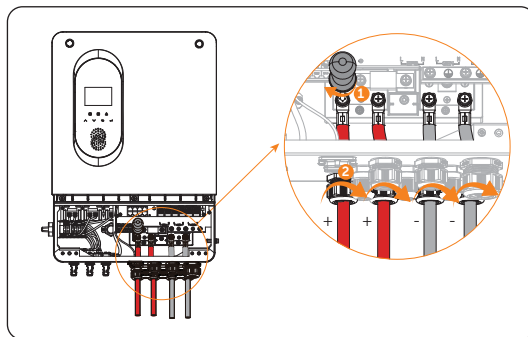


Figure 8-40 Connecting the battery connector

Battery temperature sensor wiring procedures

- Step 1:** Find the battery temperature sensor in the accessory bag.
- Step 2:** Disassemble the COM1/2/3 terminal. You can select any port from COM1/2/3. Pass the battery temperature sensor through the COM port and insert the RJ45 terminal of the battery temperature sensor into the BMS port located inside the inverter. Then attach the terminal of the other end to the lead-acid battery in order to measure the battery temperature.

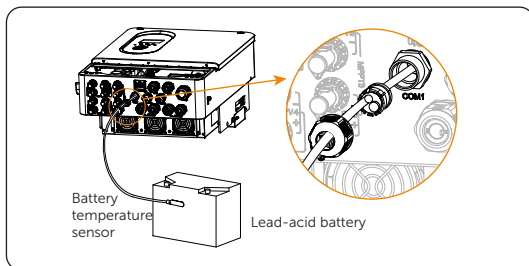


Figure 8-41 Disassemble the swivel nut and attaching the terminal

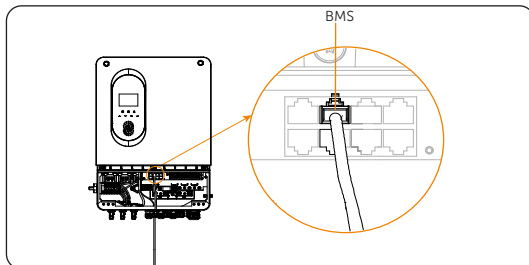
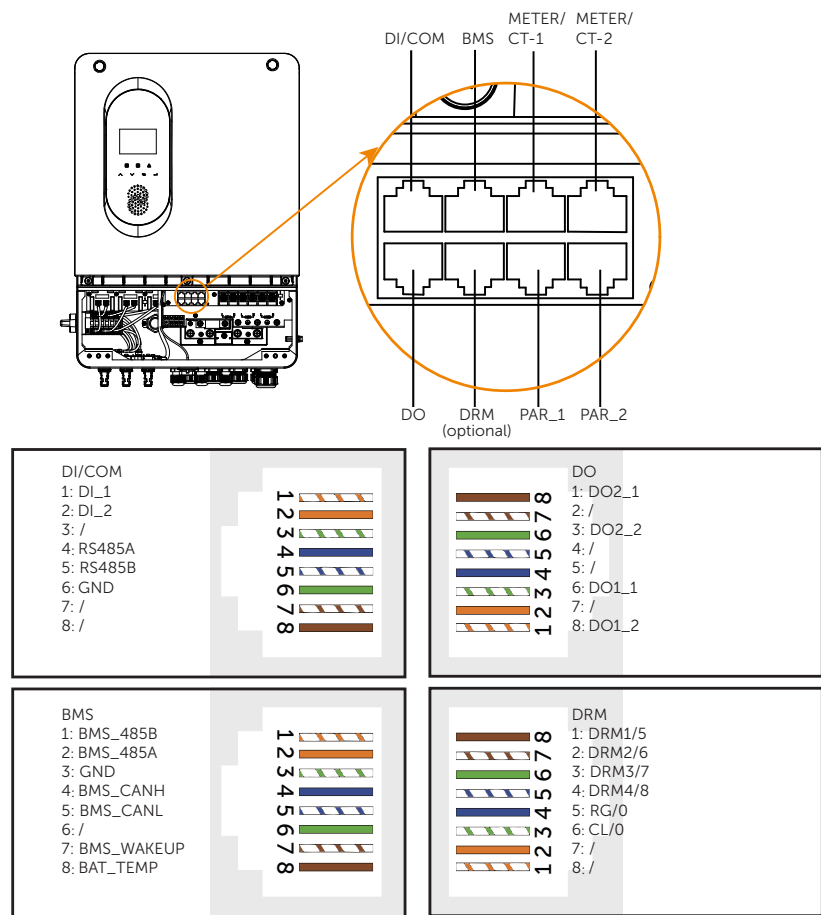


Figure 8-42 Inserting the cable into BMS port

8.6 COM Communication Connection

8.6.1 Pin Assignment of COM Terminal

The COM terminal is used for generator state detection, rapid shutdown and remote monitoring via DI/COM terminal, generator start-up via DO terminal, battery communication via BMS terminal, controlling the device response via DRM terminal, Meter and CT connection via METER/CT_1 and METER/CT_2 terminal, parallel connection via PAR_1 and PAR_2 terminal.



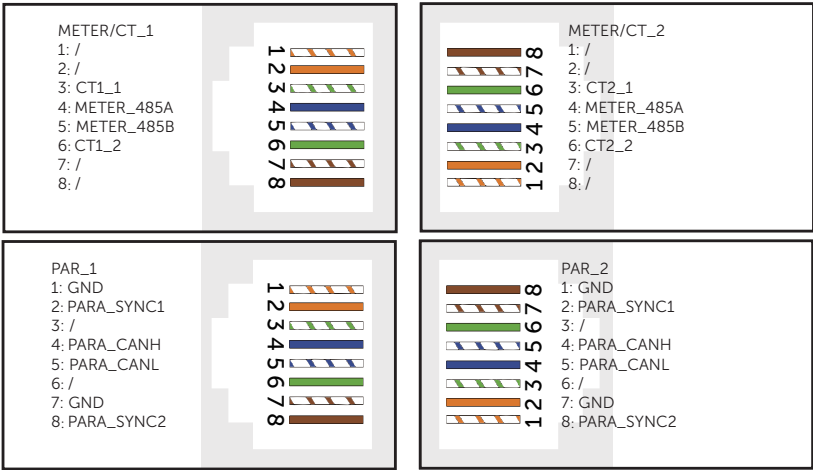


Figure 8-43 Pin assignment of COM terminal

8.6.2 DI/COM Connection

DI/COM terminal is designed to support generator state detection, rapid shutdown and remote monitoring through dry contact input.

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

DI/COM pin assignment

Table 8-3 DI/COM pin assignment

	Pin	Pin assignment
For generator state detection or rapid shutdown (dry contact input)	1	DI_1
	2	DI_2
	3	/
For remote mointoring (dry contact input)	4	RS485A
	5	RS485B
	6	GND
	7	/

8	/
---	---

8.6.3 DO Connection

DO terminal is designed to support generator start-up through dry contact output.

DO pin assignment

Table 8-4 DO pin assignment

	Pin	Pin assignment
For generator start-up (dry contact output)	1	DO2_1
	2	/
For generator start-up (dry contact output)	3	DO2_2
	4	/
	5	/
For generator start-up (dry contact output)	6	DO1_1
	7	/
For generator start-up (dry contact output)	8	DO1_2

8.6.4 BMS Communication Connection

Through BMS communication terminal, the inverter can communicate with the battery.

8.6.5 DRM Connection (Applicable to AS/NZS 4777.2)

According to AS/NZS 4777.2, the inverter needs to support the function of demand response mode (DRM). 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.

DRM 0, DRM 1 and DRM 5 are available now.

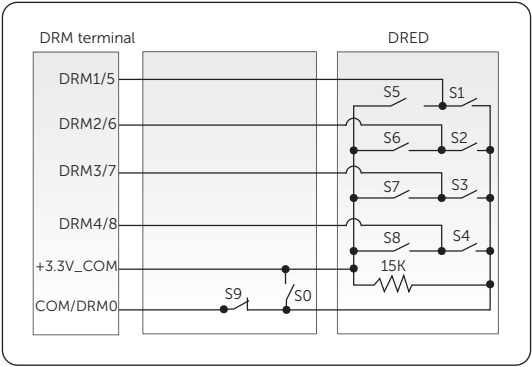


Figure 8-44 DRED connection diagram

Table 8-5 Descriptions of DRM

Mode	Pin	Requirement
DRM 0	Pin 6	• When S0 is turned on, the inverters shut down. • When S0 is turned off, the inverters restore grid connection.
DRM 1	Pin 1	• When S1 is turned on, the inverters do not input active power.
DRM 5	Pin 1	• When S5 is turned on, the inverters do not output active power.

8.6.6 Meter/CT Connection

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

 CAUTION!

- Smart meters must be authorized by our company. Unauthorized meter may be incompatible with the inverter, thereby resulting in inverter damage and working mode malfunction. 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 wire and L wire 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.
- It is recommended to wrap the CT clip around in circles with insulating tape.

Meter/CT connection diagram

NOTICE!

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

- Meter connection diagram

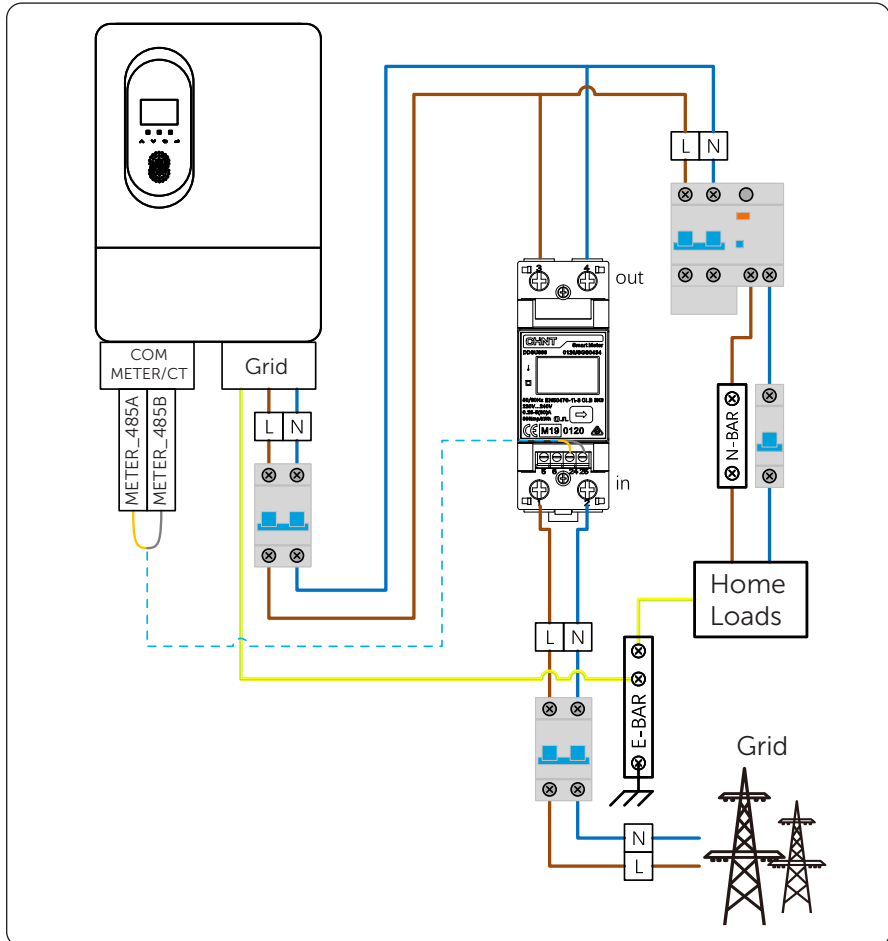


Figure 8-45 Meter connection diagram

- CT connection diagram

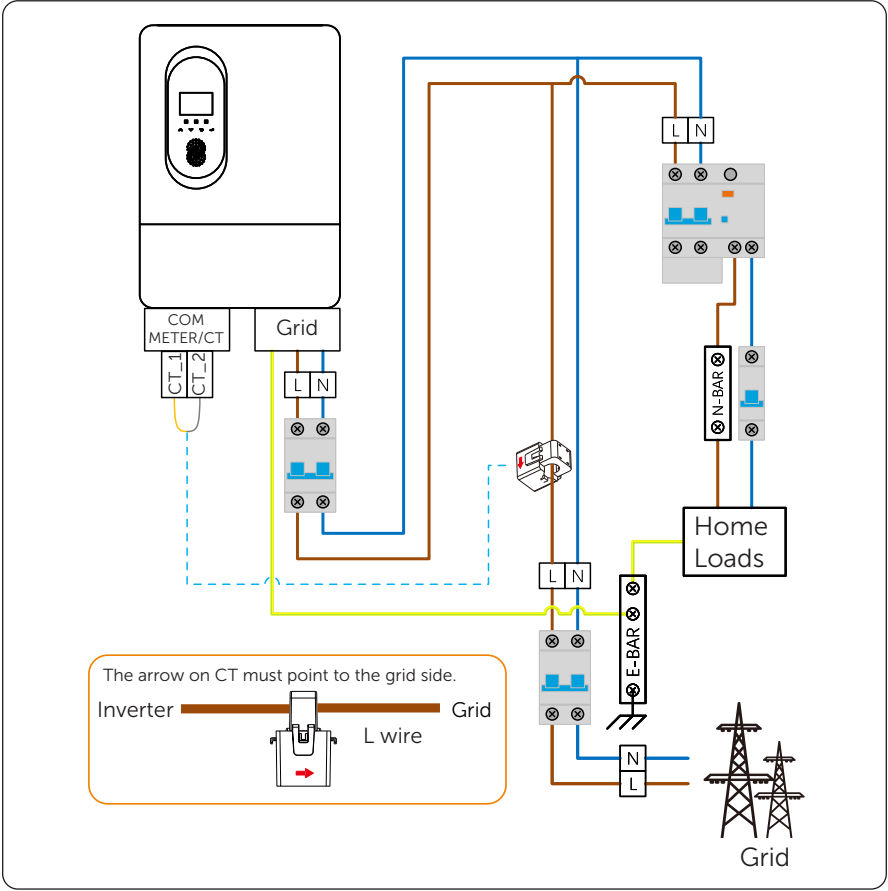


Figure 8-46 CT connection diagram

Meter/CT_1 pin assignment

Pin	Pin assignment
1	/
2	/

For CT connection	3	CT1_1
For Meter connection	4	METER_485A
	5	METER_485B
For CT connection	6	CT1_2
	7	/
	8	/

Meter/CT_2 pin assignment

	Pin	Pin assignment
	1	/
	2	/
For CT connection	3	CT2_1
For Meter connection	4	METER_485A
	5	METER_485B
For CT connection	6	CT2_2
	7	/
	8	/

8.6.7 Parallel Connection

The inverter provides the parallel connection function. One inverter will be set as the **Master** inverter to control other **Slave** inverters in the system. (To be released in quarter 3)

8.6.8 Wiring procedure of COM Communication Connection

Meter/CT wiring procedure

Step 1: Disassemble the COM port, then remove the plug. For communication connection, you can select any port from COM1/2/3. For unused terminals, keep the plug to protect the terminal.

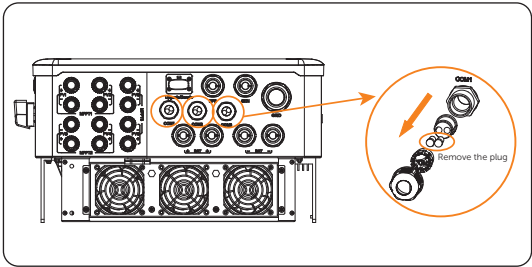


Figure 8-47 Removing the plug

Step 2: Crimp RJ45 terminal. It is recommended to use CAT5 network cable.
For CT connection without RJ45 connector, there is no need to crimp RJ45 terminal.
For Meter connection, crimp only one RJ45 terminal. (Step a, b)
For CT connection with RJ45 connector, crimp two RJ45 terminals. (Step a, b,c)

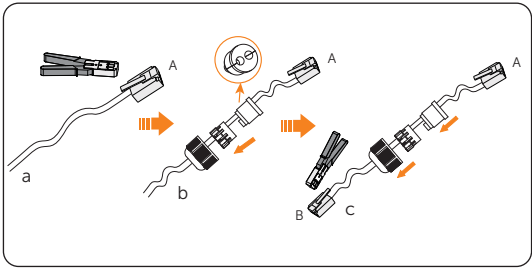


Figure 8-48 Crimping RJ45 terminal

Step 3: For Meter connection. Insert one side of the cable (with RJ45 terminal) into the Meter/CT port of the inverter, and the other side into the Meter. Then tighten the swivel nut.

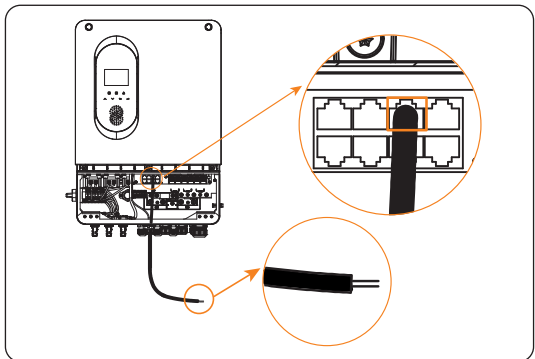


Figure 8-49 Inserting the cable into the Meter/CT port

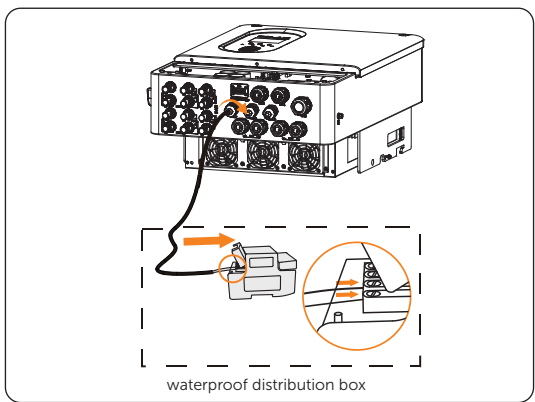


Figure 8-50 Inserting the cable into the Meter

Step 4: For CT connection without RJ45 connector. Insert the cable with RJ45 terminal side into the Meter/CT port of the inverter. Then tighten the swivel nut.

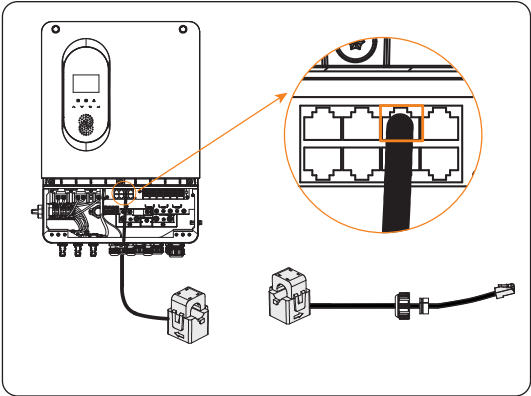


Figure 8-51 Inserting the cable into the Meter/CT port

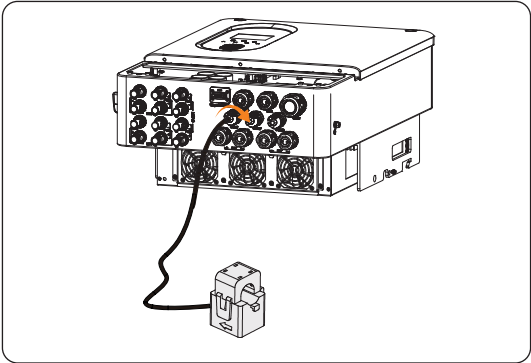


Figure 8-52 Tightening the swivel nut

Step 5: For CT connection with RJ45 connector. Insert one side of the cable into the Meter/CT port of the inverter, and the other side into the RJ45 connector. Then insert the RJ45 terminal of the CT into the RJ45 connector. Then tighten the swivel nut.

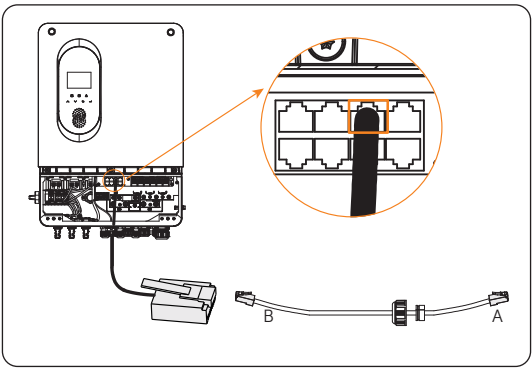


Figure 8-53 Inserting the cable into the Meter/CT port

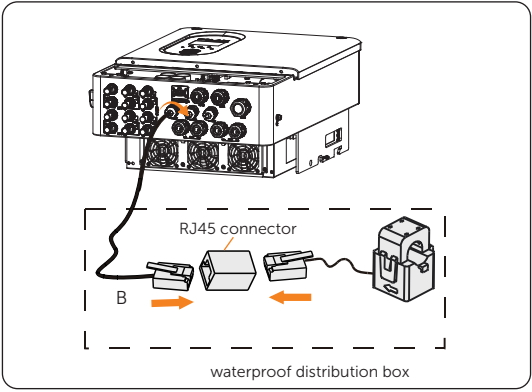


Figure 8-54 Inserting the RJ45 terminals into the RJ45 connector

DI/COM, BMS, DO, DRM wiring procedure

Step 1: Thread the cable into the swivel nut, clamping jaw and cable support sleeve. Strip the insulation layer (length: 15mm) at one end of the cable. Crimp RJ45 terminal at the same end of the cable. Pay attention to the pin order of RJ45 terminal. Use a network cable tester to check if the cable has been correctly and properly crimped before connecting to inverter.

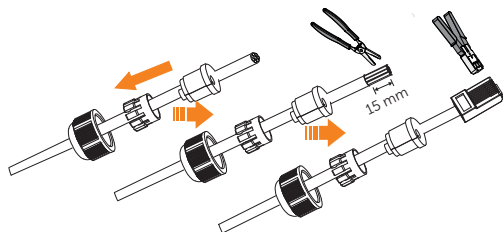


Figure 8-55 Cable making procedure

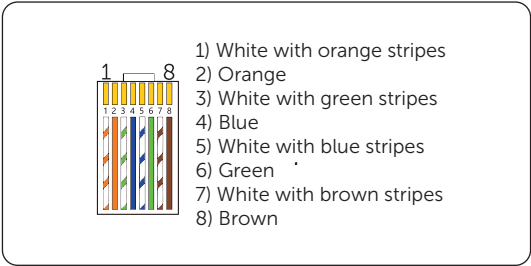


Figure 8-56 Pin order of RJ45 terminal

Step 2: For communication connection, you can select any port from COM1/2/3. Find the location of DI/COM, BMS, DO, DRM port inside the inverter.

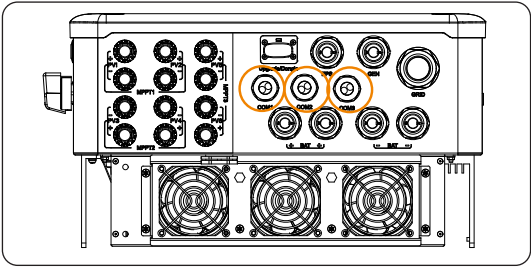


Figure 8-57 Finding the COM terminal

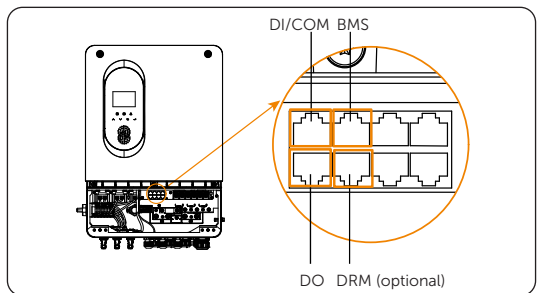


Figure 8-58 Finding the DI/COM, BMS, DO, DRM port

Step 3: Insert the assembled cable into the corresponding ports, then tighten the swivel nut.

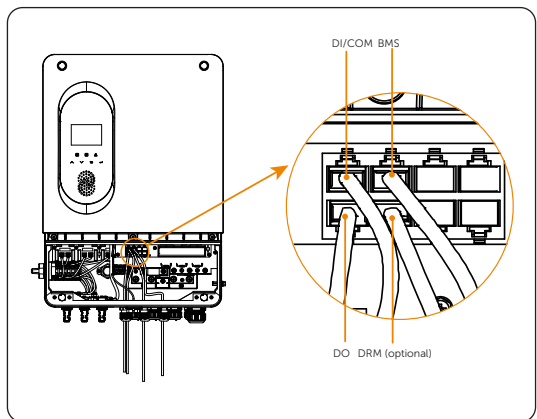


Figure 8-59 Connecting the DI/COM, BMS, DO, DRM port

Parallel wiring procedure

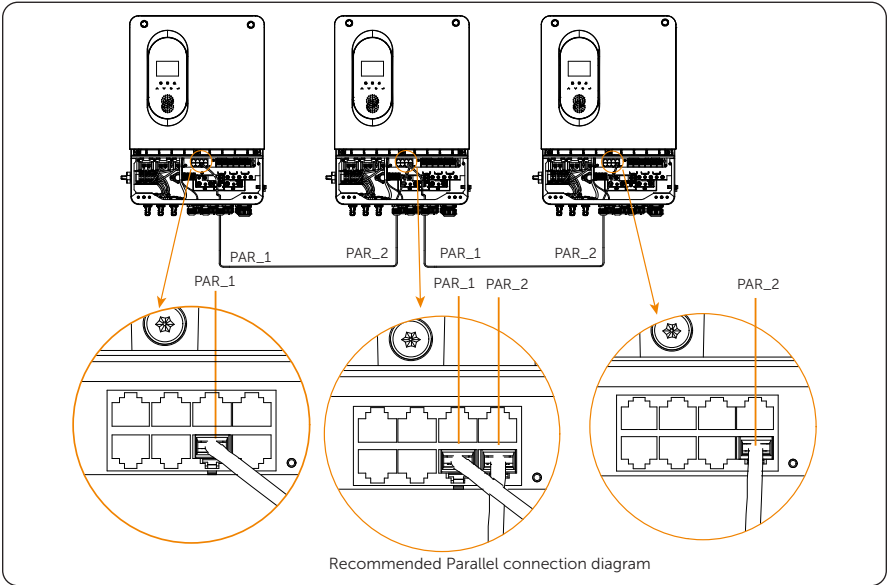


Figure 8-60 Parallel connection diagram

NOTICE!

- Parallel network cable is in the accessory bag.

Close the lower cover

Step 1: Put the lower cover back to the inverter. Use cross screwdriver to tighten the screws on both sides. (Torque: 3 ± 0.3 N·m)

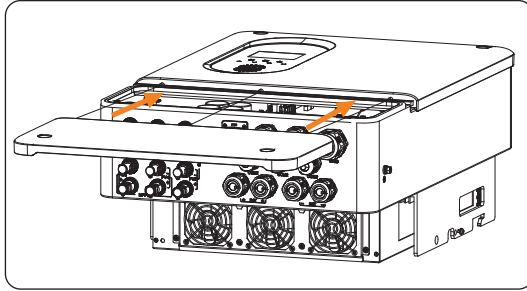


Figure 8-61

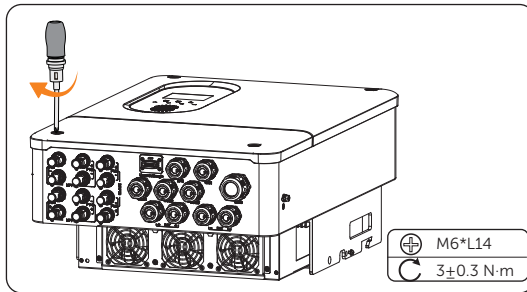


Figure 8-62 Tighten the screws

Step 2: Install the two decorative buckles to the two screws from the accessory bag.

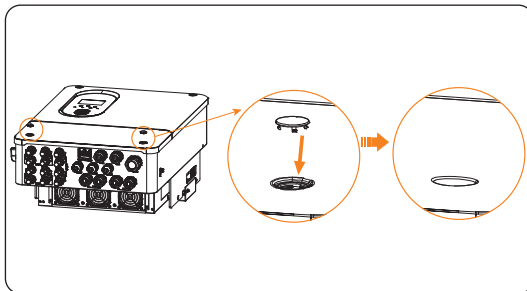


Figure 8-63 Installing the decorative buckles

8.7 Monitoring Connection

The inverter provides a Dongle terminal, which can transmit data of the inverter to the monitoring website via WiFi+LAN dongle. The WiFi+LAN dongle is equipped with two kinds of communication modes (Wi-Fi mode or LAN mode). Users can choose based on actual needs.

Monitoring connection diagram

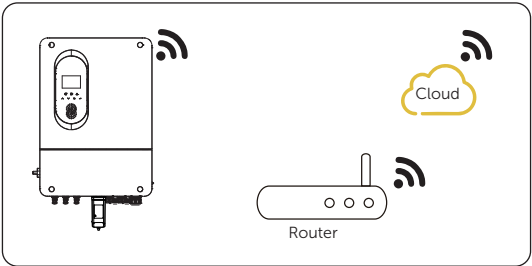


Figure 8-64 Wi-Fi mode connection diagram

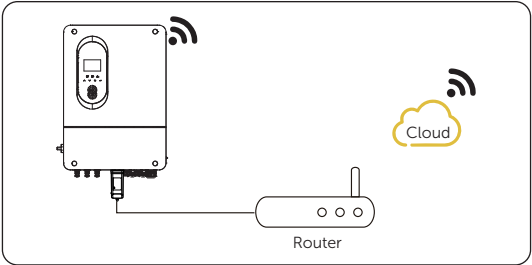


Figure 8-65 LAN mode connection diagram

Monitoring wiring procedure

Wi-Fi mode:

- a. Assemble the dongle.

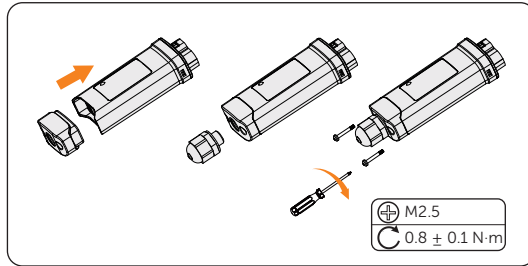


Figure 8-66 Assembling the dongle

- b. Plug the dongle to the inverter.

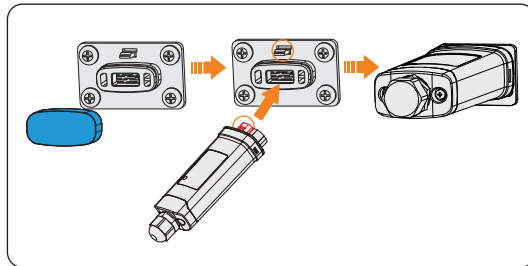


Figure 8-67 Dongle connection procedure

! CAUTION!

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

NOTICE!

- The distance between the router and the inverter must be no more than 100 meters. If there are walls in between, the distance must be no more than 20 meters.
- For locations where Wi-Fi signals are weak, install a Wi-Fi signal booster.

NOTICE!

- For details on Wi-Fi configuration, see *Pocket WiFi + LAN Installation Manual*. You can configure Wi-Fi only after the inverter is powered on.

LAN mode:

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

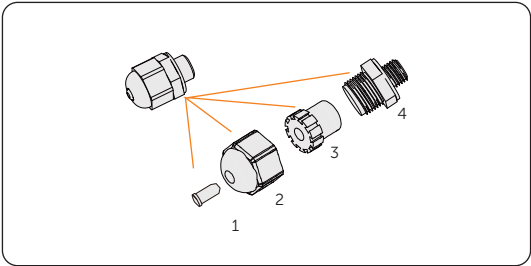


Figure 8-68 Disassembling the waterproof connector

- b. Assemble the dongle.

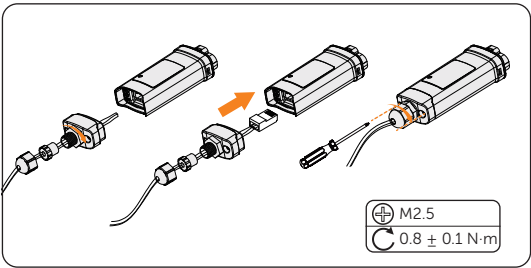


Figure 8-69 Assembling the dongle

- c. Plug the dongle to the inverter.

9 System Commissioning

9.1 Checking before Power-on

No.	Item	Checking details
1	Installation	The inverter is installed correctly and securely. The battery is installed correctly and securely. Other device (if any) is installed correctly and securely.
2	Wiring	All DC, AC cables and communication cables are connected correctly and securely; The meter/CT is connected correctly and securely. The ground cable is connected correctly and securely;
3	Breaker	All the DC breakers and AC breakers are OFF;
4	Connector	The AC and DC connectors are connected; The connectors on the Grid and EPS terminal are connected correctly and securely.
5	Unused terminal	Unused terminals and ports are locked by waterproof caps.
6	Screw	All the screws are tightened.

9.2 Powering on the System

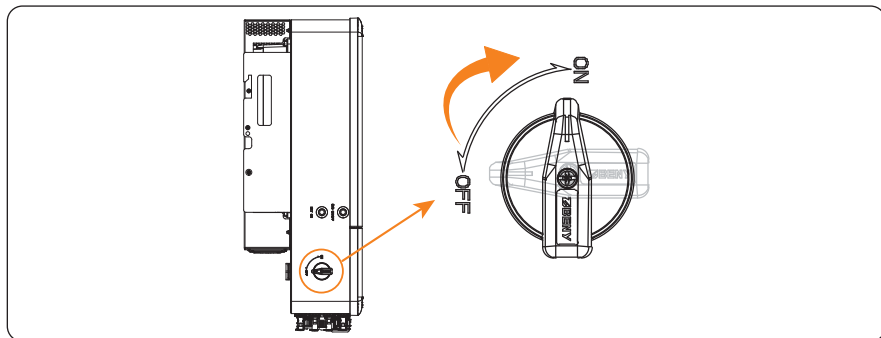
Step 3: Turn on the AC breaker between the inverter and the public grid.

Step 4: Turn on the AC breaker between the inverter and the EPS loads.

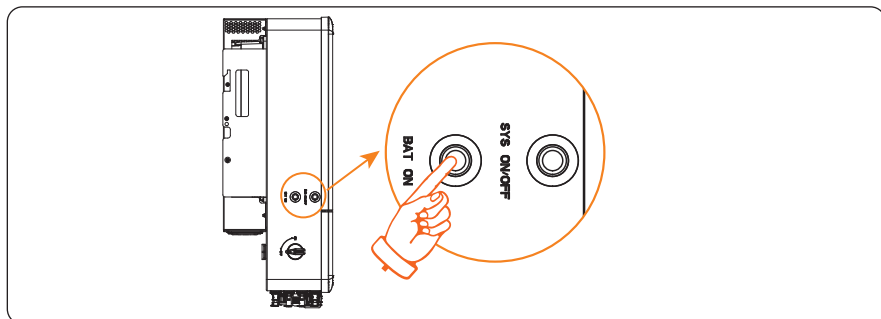
Step 5: Turn on the DC switch between the PV string and the inverter. (if any)

Step 6: Turn on the DC switch between the battery and the inverter.

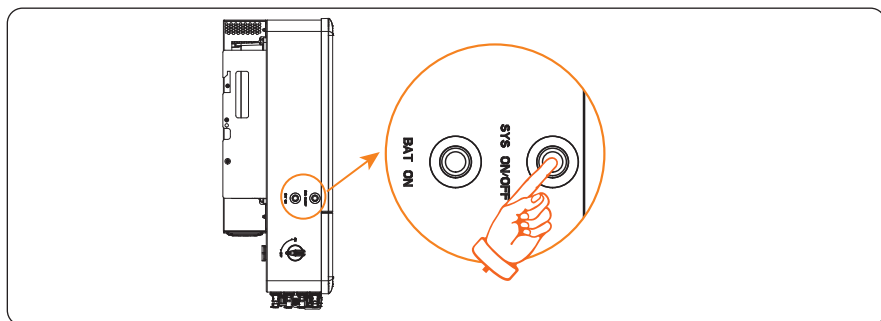
Step 7: Turn on the DC switch at the left side of the inverter.



Step 8: If the battery is connected, but PV and Grid are not connected. Press and hold the battery button until the screen is on. If PV or Grid is connected, skip this step.



Step 9: Turn on the system button at the left side of the inverter, the light on the system button will light up. Then the inverter will start automatically.



10 Operation on LCD

10.1 Introduction of Control Panel

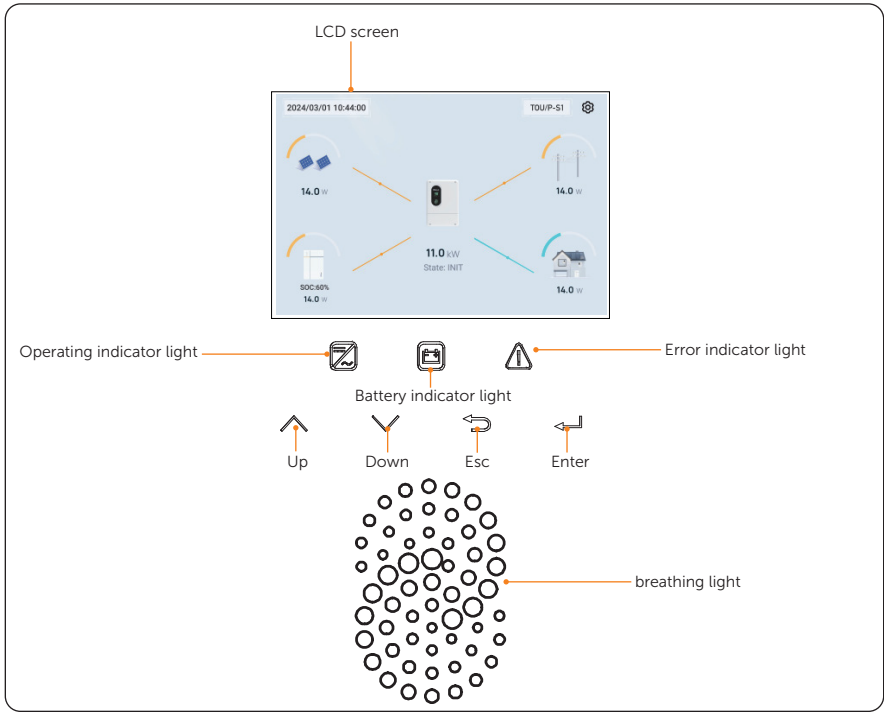


Figure 10-1 Control Panel

- While upgrading, the green, blue and red indicator lights will flash in turns and the breathing light also flashes the three color in turns, indicating that the upgrade is in progress.
- In error state, the fault message and error code will be displayed at the LCD screen, please refer to corresponding solutions in the troubleshooting.

Item	Definition
LCD screen	Display the information of the inverter.

Table 10-1 Definition of indicators

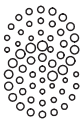
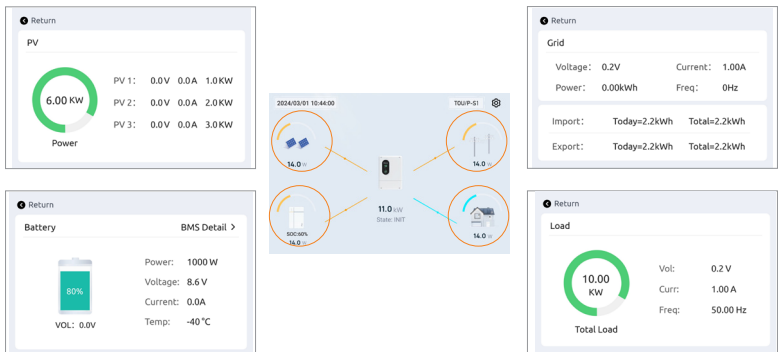
LED indicator	Status	Definition
 Operating	 Solid green	The inverter is in grid-connected operation state or off-grid operation state.
	 Green blinking	The inverter is in the process of powering on.
	 Light off	The inverter is in a fault or manual shutdown state.
 Error	 Solid red	The inverter is in a fault state.
	 Red blinking	The inverter has alarm information.
	 Light off	There are no faults and alarms in the inverter.
 Battery	 Solid blue	The battery is online and the voltage is normal.
	 Light off	Low battery voltage or no battery.
Breathing light	Status	Definition
 Breathing light	 Green blinking	Both inverter and battery are in normal status.
	 Red blinking	The inverter has alarm information.
	 Blue blinking	The battery is in normal status, but the battery SOC is lower than the setted min SOC.
	Green, blue and red lights flash in turns	The upgrade is in progress. After successfully upgraded, the light turns green and the buzzer sounds for one second.

Table 10-2 Definition of keys

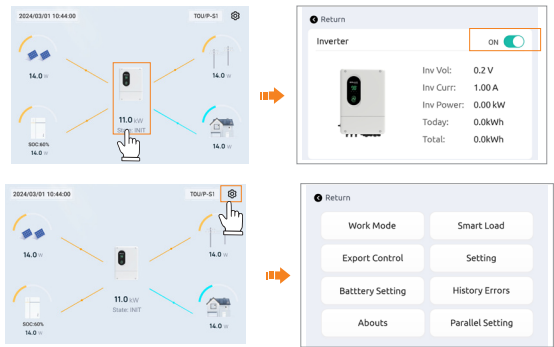
Key	Definition
ESC key	Return to the superior menu or cancel setting value.
Up key	Turn to the previous page.
Down key	Turn to the next page.
Enter key	Confirm the selection

10.2 Introduction of Menu Interface

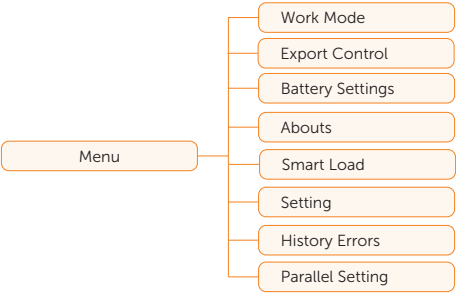
The default menu is shown as below. In this interface, you can tap on the four icons of PV, battery, grid and load to check the basic information of each part.



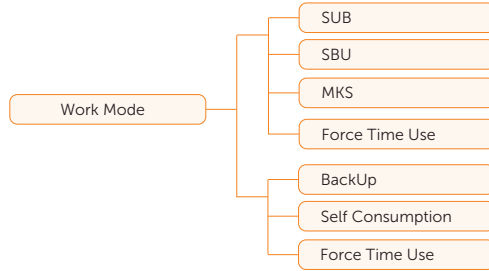
You can **Power On/Off** the inverter after tapping the icon of the inverter. After powering on the inverter, you can set the following settings: Work Mode, Smart Load, Export Control, Setting, Battery Setting, History Errors, Abouts and Parallel Setting. (Only when the inverter is in parallel, will the "Parallel Setting" display on the screen.)



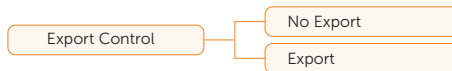
There are eight submenus in the menu that can be selected for relevant setting operations.



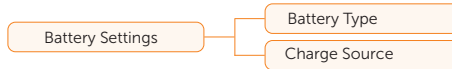
- **Work Mode:** Select the working mode of the inverter, including Work mode for Pakistan : **SUB, SBU, MKS** and **Force Time Use** and Work mode for other countries: **BackUp, Self Consumption** and **Force Time Use**.



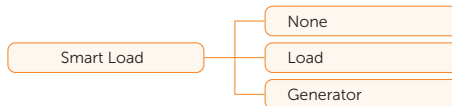
- **Export Control:** Set whether or not feeding power to the grid. Including **No Export** and **Export**.



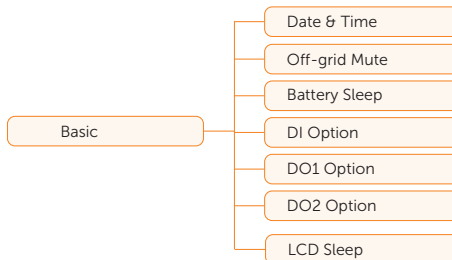
- **Battery Settings:** Select **Battery Type** and set **Charge Source**.

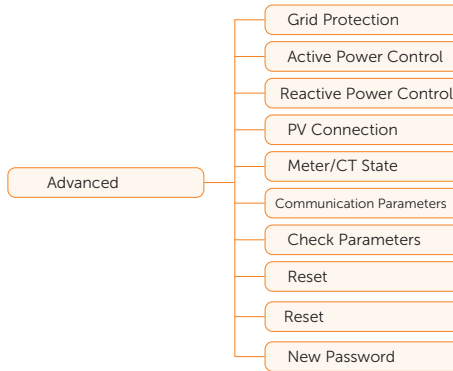


- **Abouts:** Here you can see some basic information of the inverter.
- **Smart Load:** Set the generator port connections including: **None, Load** and **Generator**.



- **Setting:** Set the parameters of the inverter, including **Basic** and **Advanced**.



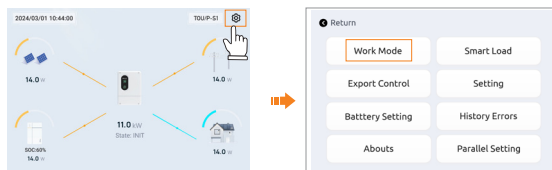


- **History Errors:** Display the history data of errors.
- **Parallel Setting:** Set the information of parallel.

10.3 Work Mode

Setting path: **Menu> Work Mode**

After entering into the default menu, select the **Setting icon**, then you can set work mode for Pakistan and work mode for other countries as follows:



- Work Mode for Pakistan. To select the Pakistan work modes, please tap "Country" on the **Basic** interface (**Inverter**> **Setting** > **Basic**) and select "Pakistan" first. You can refer to "Country" section for details. There are four work modes for Pakistan: **SUB**, **SBU**, **MKS** and **Force Time Use**.

There are two types of Battery: Lead acid (Voltage type) and Lithium (SOC type).

- » **Return To Utility Voltage/SOC:** When the voltage/SOC is lower than the setted value, the battery starts to charge. (For lead acid battery) Default: 46V, range:42~47V; (For Lithium battery) Default: 20%, range:10~40%.
- » **Return To Battery Voltage/SOC:** When the voltage/SOC is higher than the setted value, the battery starts to discharge. (For lead acid battery) Default: 54V, range:48~59V; (For Lithium battery) Default: 80%, range:50~90%.
- » **Low DC Cut-off Voltage/SOC:** When the voltage/SOC is lower than the setted value, the battery stops to discharge. (For lead acid battery) Default: 42V, range:40~47V; (For Lithium battery) Default: 58%, range:49~59%.

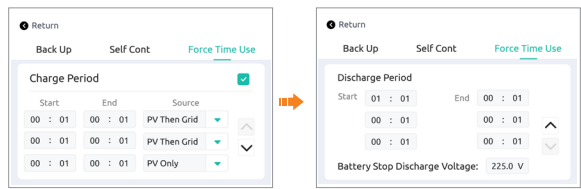
When "**Force Time Use**" mode is selected, there will be two interface pages for setting the charging period and discharging period. you can switch between the two pages tapping up and down:



- Work Mode for other countries. There are three work modes for other countries: **BackUp**, **Self consumption** and **Force Time Use**.



When "Force Time Use" mode is selected, there will be two interface pages for setting the charging period and discharging period. you can switch between the two pages tapping up and down:

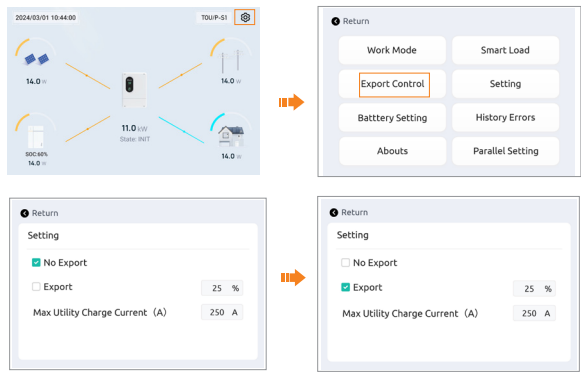


10.4 Export Control

Setting path: **Menu>Export Control**

Here users can choose between feeding excess PV power into the grid or limiting it.

- **No Export:** disallows feeding power into the grid.
- **Export:** allows feeding power into the grid and enables to set the percentage of power to be fed in as needed. Range:0~100%
- » **Max Utility Charge Current:** setting the current that can be taken from the power grid when the battery is charged. Default: 250A; Range: 0~250A.



10.5 Battery Setting

Setting path: **Menu>Battery Setting**

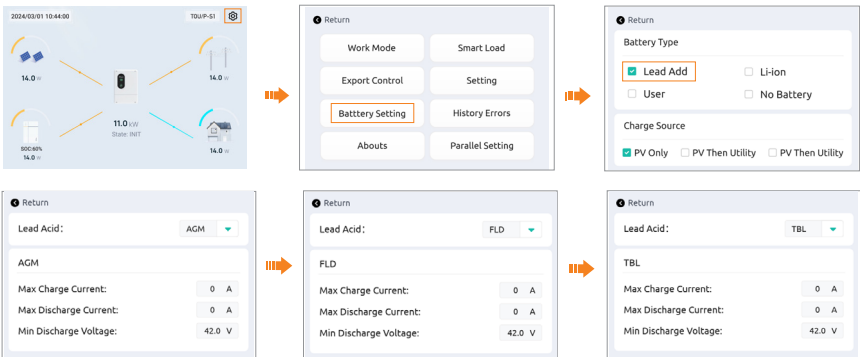
- **Battery Type:** For Pakistan, you can select the following battery types: (Lead acid Type) AGM, FLD, TBL; (Lithium Type) SolaX-LV, PylonTech, Volta, Lemoen; (User defined) User and No Battery. For other countries, you can select the following battery types: Lead acid; (Lithium Type) SolaX-LV, GSL, JLS; (User defined) User and No Battery.

» Lead acid battery: (For Pakistan) After tapping Lead Acid, you can choose AGM, FLD or TBL , the specific lead acid battery here. (For other countries) Here you can tap Lead Acid to choose Lead acid battery.

Max Charge Current: Default: 250A, range:0~250A

Max Discharge Current: Default: 250A, range:0~250A

Min Discharge Voltage: Default: 42V, range:40~47V



» Lithium battery: Here you can choose the specific lithium battery from Solax-LV, PylonTech, Volta and Lemoen.

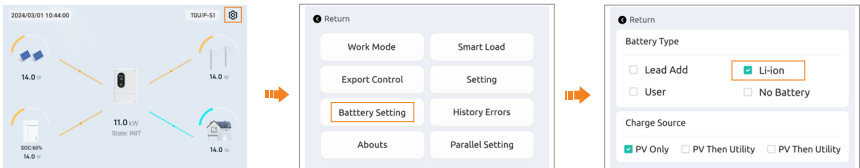
Max Charge Current: Default: 250A, range:0~250A

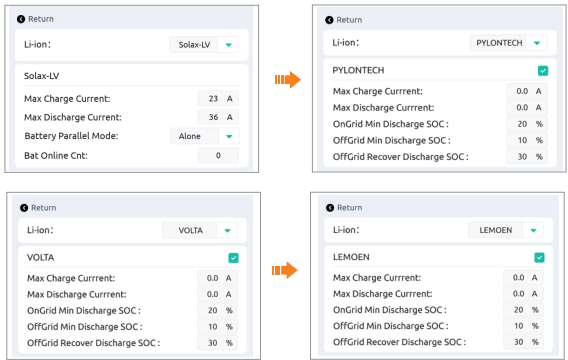
Max Discharge Current: Default: 250A, range:0~250A

OnGrid Min Discharge SOC: Default: 20A, range:10~70A

OffGrid Min Discharge SOC: Default: 10A, range:5~30A

OffGrid Recover Discharge SOC: Default: 30A, range:0~100A





» User: Here you can choose other batteries according to your actual needs.

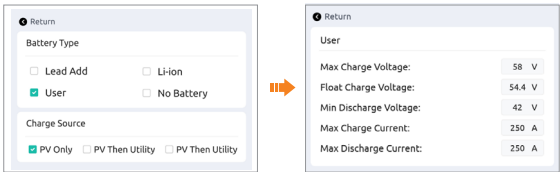
Max Charge Voltage: Default: 58V, range:49~59V

Float Charge Voltage: Default: 54.4V, range:49~59V

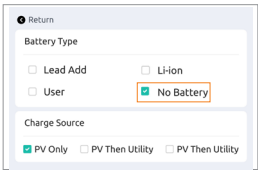
Min Discharge Voltage: Default: 42V, range:40~47V

Max Charge Current: Default: 250A, range:0~250A

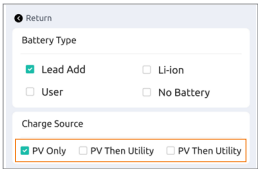
Max Discharge Current: Default: 250A, range:0~250A



» No battery: No battery is connected.



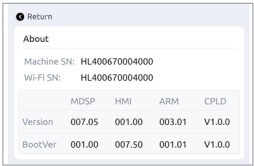
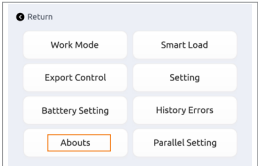
- **Charge Source:** For charging the battery, there are three options to choose from: PV Only, PV Then Utility and PV+Utility.
 - » PV Only: allows only PV charging.
 - » PV Then Utility: prioritizes PV charging and supplements with grid charging when needed.
 - » PV+Utility: allows for both PV and grid charging.



10.6 Abouts

Setting path: **Menu>Smart Load**

Here you can check the basic information of the inverter.



10.7 Smart Load

Setting path: **Menu>Smart Load**

The generator port has three options:

- **None:** No device is connected to the generator port;



- **Load:** The generator port is connected to a load;

There are two types of Battery: Lead acid (Voltage type) and Lithium (SOC type).

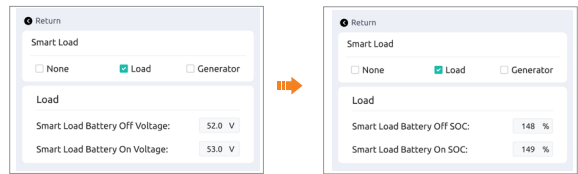
- » **Smart Load Battery Off Voltage/SOC:** When the voltage/SOC is lower than the setted value, the battery will no longer supply power to the smart load;
- » **Smart Load Battery On Voltage/SOC:** When the voltage/SOC is higher than the setted value, the battery will supply power to the smart load again.

Smart Load Battery Off Voltage: Default:48V, range:42-52V

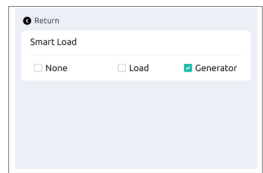
Smart Load Battery On Voltage: Default:52V, range:48-53V

Smart Load Battery Off SOC: Default:30%, range:15-30%

Smart Load Battery On SOC: Default:50%, range:30-60%



- **Generator:** The generator port is connected to the generator.

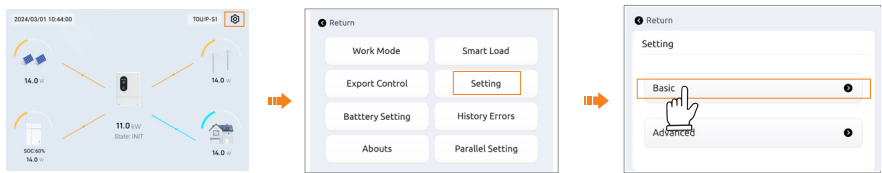


10.8 Setting

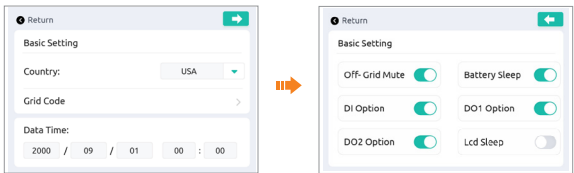
Settings includes Basic setting and Advanced setting.

10.8.1 Basic Setting

Setting path: **Menu>Setting>Basic**



You can set Date&Time, Country, Safety, Off-Grid mute, Battery sleep, DI Option, DO1 Option, DO2 option and LCD Sleep in **Basic** interface.



Setting Date & Time

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

Setting Country

This inverter provides multiple countries for customers to choose.

Setting Safety

NOTICE!

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

Here you can set safety code according to different countries and grid-tied standards. There are several standards to choose from, please refer to the LCD screen on the inverter. (May be changed or added without notice)

Setting Off-Grid Mute

When the inverter is running in off-grid (EPS) Mode, you can choose whether the buzzer is turned on or not.

- Turn ON, the buzzer mutes.
- Turn off, the buzzer will sound every 4 seconds when the battery SOC is > EPS min. SOC. When the battery SOC is equal to EPS min. SOC, the buzzer will sound with higher frequency at every 400 ms.

Setting Battery Sleep

You can set whether the battery sleep is turned on or not.

Battery Sleep state means the battery is in standby state. At this time, it will neither charge nor discharge.

Setting DI Option

You can set whether the DI Option is turned on or not.

Setting DO1 Option

You can set whether the DO1 Option is turned on or not.

Setting DO2 Option

You can set whether the DO2 Option is turned on or not.

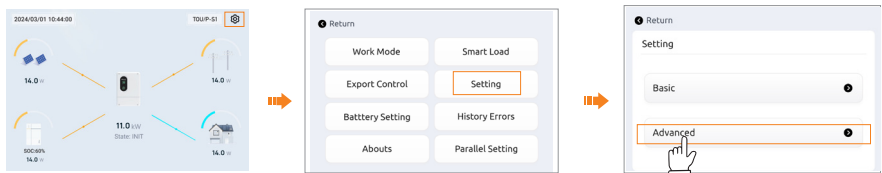
Setting LCD Sleep

You can set whether the LCD Sleep is turned on or not.

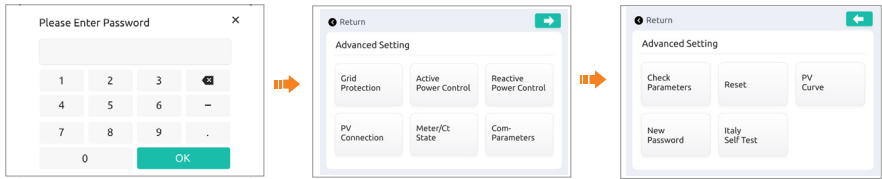
LCD Sleep state means if you do not operate the screen for a period of time , the screen will stay off.

10.8.2 Advanced Setting

Setting path: **Menu>Setting>Advanced**



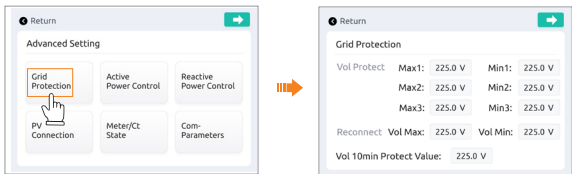
After tapping the **Advanced** interface, you need to enter the password , the default password is "2 0 1 4". After entering into the **Advanced** interface, you can set Grid protection, Active power control, Reactive power control, PV connection, Meter/CT state, Com-parameters, Check parameters, Reset, Parallel setting and New password here.



Setting Grid Protection

When the Safety is selected, the parameters of Grid Protection corresponding to the selected safety code will be automatically matched. 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.

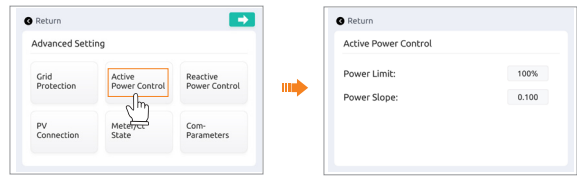
You can also set the parameters according to your actual needs within the range of the specific Safety.



Setting Active Power Control

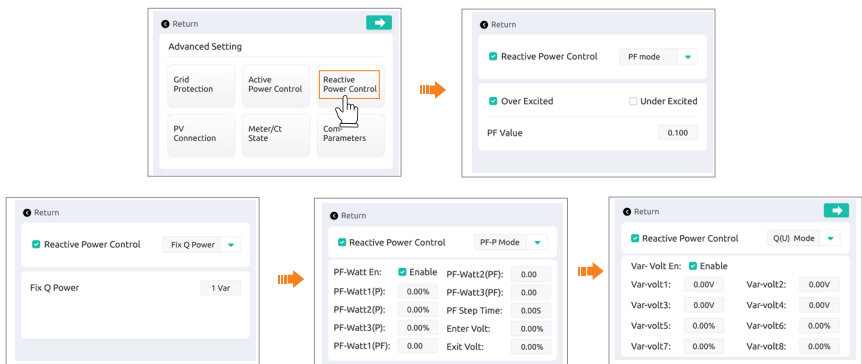
Here you can set the Power limit and Power slope of the active power.

- » **Power Limit:** Range:0~110.
- » **Power Slope:** Range:-1.0~1.0



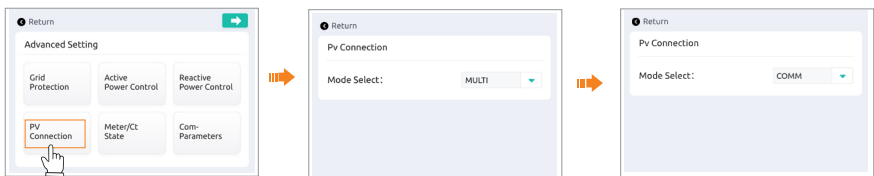
Setting Reactive Power Control

There are four modes can be selected: PF Mode, Fix Q Power, PF_P Mode and QU Mode.



Setting PV Connection

Here you can set PV connection mode. There are two modes can be selected: MULTI and COMM.



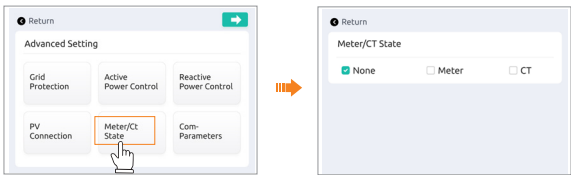
Setting Meter/CT State

NOTICE!

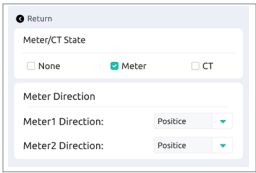
- If the user has other power generation equipment (such as inverter) at home and wants to monitor both, the inverter provides Meter/CT_2 communication function to monitor the power generation equipment.

Here you can set Meter/CT port from the three options:

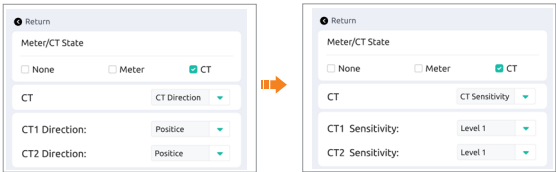
- None:** No device is connected to the Meter/CT port;



- Meter:** The Meter/CT port is connected to Meter;
 - » **Meter1/2 Direction:** Here you can set the direction of Meter1/2 to Positive or Negative connection according to the actual situation.



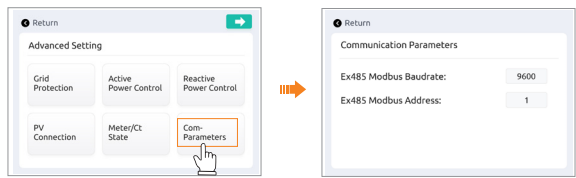
- CT:** The Meter/CT port is connected to CT ;
 - » **CT1/2 Direction:**Here you can set the direction of CT1/2 to Positive or Negative connection according to the actual situation.
 - » **CT1/2 Sensitivity:** Here you can set the sensitivity level of CT1/2. There are three levels to choose from: level1/2/3. The larger the number, the higher the sensitivity.



Setting COM-parameters

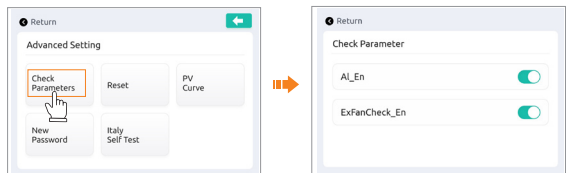
You can select the baud rate and set the address of the external communication protocol for communicating with external equipment.

- » **Ex485 Modbus Baudrate:** Default: 9600. Range: 4800, 9600, 19200.
- » **Ex485 Modbus Address:** Default: 1.



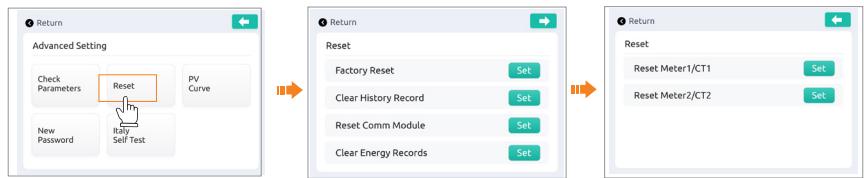
Setting Check Parameters

Here you can set whether enabling or disabling the following check parameters: AI_En and ExFanCheck_En.



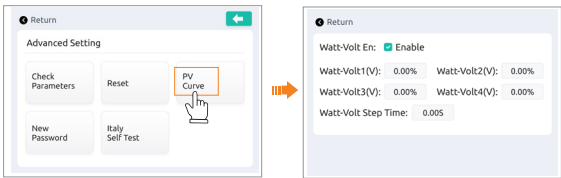
Setting Reset

Here you can reset value of Comm Module and Meter1/CT1, Meter2/CT2; Clear history record and energy records ; and restore to the factory set.



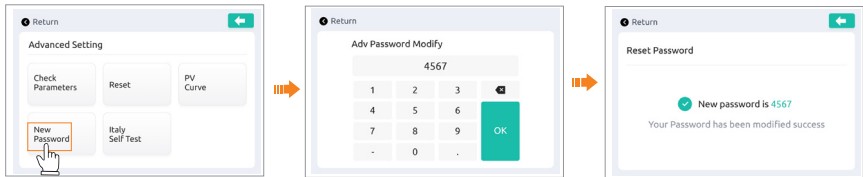
Setting PV Curve

Here you can set whether enabling or disabling the PV Curve.



Setting New password

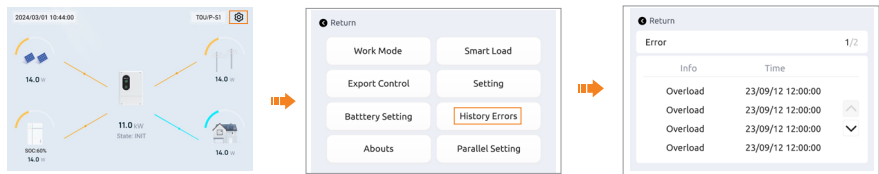
Here you can reset the advanced password.



10.9 History Errors

Displaying path: **Menu>History Error**

After entering the **History Error** interface, the data of history errors will be displayed on the LCD.

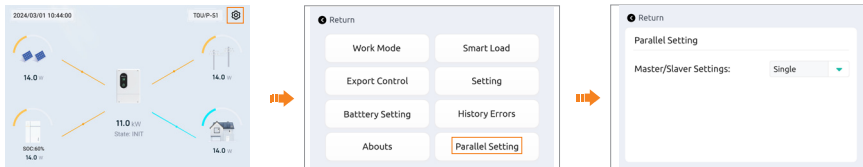


10.10 Parallel Setting

Setting path: **Menu>Parallel Setting**

The series inverters support up to 10 units in the parallel system.

- **Master/Slaver Settings:** Here you can set the state of inverter to **Single** or **Parallel**. When parallel, the state of inverter can be set to Master/Slaver1~9/Phase one~three.
- **Parallel Numbers:** Here you can set parallel numbers to 1~10, the series inverters support up to 10 units in the parallel system.



11 Operation on SolaX App and Web

11.1 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.

11.2 Operation Guide on SolaXCloud App

11.2.1 Downloading and installing App

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

The QR codes are also available on the upper-left corner of the login page of our official website (www.solaxcloud.com), and the user manual of the dongle.



App Store

Google play

Figure 11-1 QR code

Method 2: Search for **SolaXCloud** in Apple Store APP or Google Play Store, and then download the app.

11.2.2 Operation on the App

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

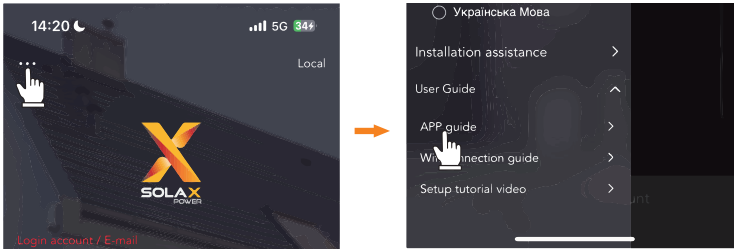


Figure 11-2 App guide on SolaXCloud

NOTICE!

- The screenshots in this chapter correspond to the SolaX Cloud App V4.2.8.

11.3 Operations on SolaXCloud Webpage

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

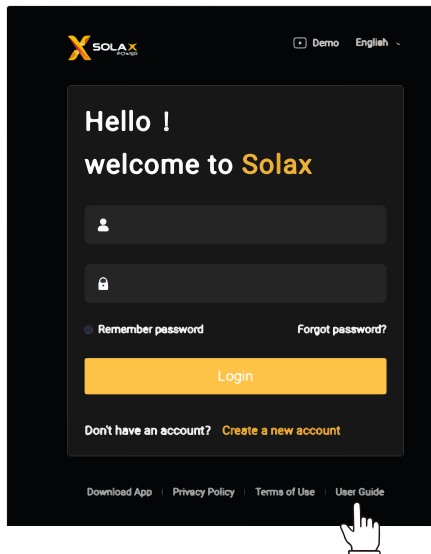


Figure 11-3 User guide on Web

12 Troubleshooting and Maintenance

12.1 Power off

- a. Turn off the system button at the left side of the inverter.
- b. Turn off the DC switch at the left side of the inverter.
- c. Turn off the DC switch between the battery and the inverter and turn off the battery.
- d. Turn off the DC switch between the PV string and the inverter. (If there is any).
- e. Turn off the AC breaker between the inverter and the EPS loads.
- f. Turn off the AC breaker between the inverter and the public grid.



WARNING!

- After the inverter is powered off, there may still be residual electricity and heat which may cause electric shocks and body burns. Please wear personal protective equipment (PPE) and start maintaining the inverter at least five minutes after power off.

12.2 Troubleshooting

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

Table 12-1 Troubleshooting list

Error Type	Error Code	Fault	Descriptions and Diagnosis
INSTALL	1	ISO_FAIL	Insulation impedance detection failed. • Check whether the wire insulation is intact.
INSTALL	2	NO_PWR_METER	Electricity meter has no power. • Check the status of the meter.
INSTALL	3	REMOTE_TURN_OFF	Remote shutdown • Restart the inverter.
INSTALL	4	FREQ_CFG_UNMATCH	Frequency configuration mismatch • Check whether the frequency is within the correct range.
INSTALL	6	ARC_FAIL	Arc fault • Wait for a while to see if it returns to normal.

Error Type	Error Code	Fault	Descriptions and Diagnosis
INSTALL	7	EPS_OVER- LOAD_105PER	1.05 times overload • Turn off high-power load.
INSTALL	8	EPS_OVER- LOAD_125PER	1.25 times overload • Turn off high-power load.
INSTALL	9	EPS_OVER- LOAD_150PER	1.5 times overload • Turn off high-power load.
INSTALL	10	EPS_OVERLOAD_ LOCK	Overload self-locking • Turn off high-power load, PV, battery and power grid, and restart inverter.
INSTALL	11	PV_CONN_CFG_ ERROR	PV connection configuration error. • Turn off PV, battery and power grid, restart inverter, and confirm whether PV connection is correct.
INSTALL	12	STARTUP_CON- DITION_FAIL	Startup state failed. • If only grid is connected, when starting the inverter, this fault will prompt in the LCD. • Wait for a while to see if it returns to normal.
INSTALL	14	CPLD_BLOCK_ DSP_PWM	CPLD chip shuts down all drivers due to hardware over-current or overvoltage. • Contact SolaX for help.
PV	20	PV_01_REVERSE	PV1 reverse connection • Turn off PV, battery and power grid, restart inverter, and check the connection status of positive and negative poles of PV1.
PV	21	PV_02_REVERSE	PV2 reverse connection • Turn off PV, battery and power grid, restart inverter, and check the connection status of positive and negative poles of PV2.
PV	22	PV_03_REVERSE	PV3 reverse connection • Turn off PV, battery and power grid, restart inverter, and check the connection status of positive and negative poles of PV3.
PV	23	PV_01_VOLT_ HIGH	PV1 Voltage is too high • Check the output voltage of PV1.
PV	24	PV_02_VOLT_ HIGH	PV2 Voltage is too high • Check the output voltage of PV2
PV	25	PV_03_VOLT_ HIGH	PV3 Voltage is too high • Check the output voltage of PV3
BAT	40	BAT_TYPR_CFG_ ERR	Battery type configuration error • Turn off PV, battery and power grid, restart inverter, and confirm whether the battery type is correct.
BAT	41	BATT_VOLT_ HIGH	Battery voltage is too high • Check whether the battery output voltage is within the normal range.
BAT	42	BAT_BMS_CELL_ FAULT	BMS battery failure • Please contact the battery supplier.
BAT	43	BAT_BMS_ COMM_FAULT	BMS communication failure • Check whether the communication between battery and inverter is normal.
BAT	44	BAT_SOC_LOW	Low battery SOC • Please charge the battery in time.

Error Type	Error Code	Fault	Descriptions and Diagnosis
GRID	50	GRID_LOSS	Power grid loss • Check whether the battery input voltage is within the normal working range.
GRID	51	GRID_OVP1	The grid voltage exceeds the allowable value 1 • Check whether the grid voltage is within the normal working range.
GRID	52	GRID_OVP2	The grid voltage exceeds the allowable value 2 • Check whether the grid voltage is within the normal working range.
GRID	53	GRID_UVP1	The grid voltage is lower than the allowable value 1. • Check whether the grid voltage is within the normal working range.
GRID	54	GRID_UVP2	The grid voltage is lower than the allowable value 2. • Check whether the grid voltage is within the normal working range.
GRID	57	GRID_OF1	Power grid frequency exceeds the allowable value 1. • Check whether the grid frequency is within the normal working range.
GRID	58	GRID_OF2	Power grid frequency exceeds the allowable value 2 • Check whether the grid frequency is within the normal working range.
GRID	59	GRID_UF1	The power grid frequency is lower than the allowable value 1. • Check whether the grid frequency is within the normal working range.
GRID	60	GRID_UF2	The power grid frequency is lower than the allowable value 2. • Check whether the grid frequency is within the normal working range.
GRID	61	GRID_OVP3	The grid voltage exceeds the allowable value 3 • Check whether the grid voltage is within the normal working range.
GRID	62	GRID_UVP3	The grid voltage is lower than the allowable value 3. • Check whether the grid voltage is within the normal working range.
GRID	63	GRID_OF3	Power grid frequency exceeds the allowable value 3 • Check whether the grid frequency is within the normal working range.

Error Type	Error Code	Fault	Descriptions and Diagnosis
GRID	64	GRID_UFP3	The power grid frequency is lower than the allowable value 3. Check whether the grid frequency is within the normal working range.
INV	70	BST01_SW_OCP	BST1 software overcurrent Please contact the after-sales personnel.
INV	71	BST02_SW_OCP	BST2 software overcurrent Please contact the after-sales personnel.
INV	72	BST03_SW_OCP	BST3 software overcurrent Please contact the after-sales personnel.
INV	73	BST01_HW_OCP	BST1 hardware overcurrent Please contact the after-sales personnel.
INV	74	BST02_HW_OCP	BST2 hardware overcurrent Please contact the after-sales personnel.
INV	75	BST03_HW_OCP	BST3 hardware overcurrent Please contact the after-sales personnel.
INV	76	BST_OVER_PWR	BST overpower - When only PV is connected to supply loads, the power of one mppt exceeds the maximum power of the Mppt. - Turn off high-power load and wait for a while to see if it returns to normal.
INV	77	BUCKBST_HW_OCP	BuckBst hardware overcurrent Wait for a while to see if it returns to normal.
INV	78	BUCKBST_SW_OCP	BuckBst software overcurrent Please contact the after-sales personnel.
INV	79	BUCKBST_SW_OVP	BuckBst software overvoltage Please contact the after-sales personnel.
INV	80	BUCKBST_SW_UVP	BuckBst software undervoltage Please contact the after-sales personnel.
INV	81	LLC_HW_OCP	Llc hardware overcurrent - The battery may be short-circuited. Use a multimeter to check whether the battery port is short-circuited. - Wait for a while to see if it returns to normal.
INV	82	LLC_START_FAIL	Llc startup failed. Please contact the after-sales personnel.
INV	83	BUCKBST_START_FAIL	BuckBst startup failed. Please contact the after-sales personnel.

Error Type	Error Code	Fault	Descriptions and Diagnosis
INV	85	DCBUS_INIT_CHK_FAIL	DCBUS initialization detection failed. Turn off PV, battery and power grid, and restart inverter.
INV	86	DCBUS_HW_OVP	DCBUS hardware overvoltage Please contact the after-sales personnel.
INV	87	DCBUS_SW_OVP	DCBUS software overvoltage Please contact the after-sales personnel.
INV	88	DCBUS_SW_UVP	DCBUS software overvoltage Please contact the after-sales personnel.
INV	89	DCBUS_SHORT	DCBUS short circuit Turn off PV, battery and power grid, and restart inverter.
INV	90	DCBUS_INV_SS_FAIL	DCBUS inverter soft start failed. Please contact the after-sales personnel.
INV	91	DCBUS_BST_SS_FAIL	DCBUS BST soft start failed. - Check whether the battery SOC is too low. - Please contact the after-sales personnel.
INV	92	DCBUS_BUCKBST_SS_FAIL	DCBUS BUCKBST soft start failed. Please contact the after-sales personnel.
INV	100	INV_PLL_FAIL	Inverter phase-locked failure Please contact the after-sales personnel.
INV	101	INV_RLY_FLT	Inverter relay fault Please contact the after-sales personnel.
INV	102	INV_RLY_ON_FAIL	Pull-in fault of inverter relay Please contact the after-sales personnel.
INV	103	INV_EPS_RLY_FAULT	EPS end relay failure Please contact the after-sales personnel.
INV	104	INV_SS_ACVOLT_FAIL	Soft start AC voltage failed. Please contact the after-sales personnel.
INV	105	INV_SW_OCP	Inverter software overcurrent Please contact the after-sales personnel.
INV	106	INV_HW_WAVE_OCP	Inverter hardware half-wave overcurrent Please contact the after-sales personnel.
INV	107	INV_HW_OCP	Inverter hardware overcurrent Please contact the after-sales personnel.

Error Type	Error Code	Fault	Descriptions and Diagnosis
INV	108	INV_DCI_PROT	During on-grid operation, DC component of the inverter exceeds the permissible value. • Contact SolaX for help.
INV	109	INV_DCV_PROT	During off-grid operation, DC component of the inverter exceeds the permissible value. • Contact SolaX for help.
INV	111	INV_GFCI_CT_FAIL	CT fault • Wait for a while to see if it returns to normal. Check whether CT works properly.
INV	112	INV_GFCI_PROT	GFCI fault • Wait for a while to see if it returns to normal.
INV	113	INV_FREQT_OCP	Inverter frequent overcurrent alarm • Wait for a while to see if it returns to normal. Check whether the inverter current works in the normal range.
INV	115	INV_SW_OVP	Inverter software overvoltage • Please shut down and restart.
VER	140	TYPE_MODEL_ERR	Model configuration error • Turn off PV, battery and power grid, and restart inverter. Check whether the inverter model is configured correctly.
BMS	150	BMS_CELL_OVER_FAULT	Overvoltage fault of cell. • Wait for fault recovery, restart the battery and contact after-sales personnel.
BMS	151	BMS_CELL_LOW_FAULT	Undervoltage fault of cell. • Recharge the battery..
BMS	152	BMS_CELL_DIFF_FAULT	Excessive voltage difference fault of cell. • Ensure that the battery works in the normal voltage range.
BMS	153	BMS_HVB_OVER_FAULT	Overvoltage fault of total voltage. • Wait for fault recovery, restart the battery and contact after-sales personnel.
BMS	154	BMS_HVB_LOW_FAULT	Undervoltage fault of total voltage. • Recharge the battery.
BMS	155	BMS_TEMP_OVER_FAULT	High temperature fault. • Stop using the battery and wait for the temperature to recover.

Error Type	Error Code	Fault	Descriptions and Diagnosis
BMS	156	BMS_SELF_CHECK_FAULT	Self-test fault. • Check the battery failure and contact the after-sales personnel.
BMS	157	BMS_POS_RLY_ADH_FAULT	Main positive relay sticking fault. • Please contact the after-sales personnel.
BMS	158	BMS_POS_RLY_OPEN_FAULT	Main positive relay open circuit fault. • Please contact the after-sales personnel.
BMS	159	BMS_NEG_RLY_ADH_FAULT	Main negative relay sticking fault. • Please contact the after-sales personnel.
BMS	160	BMS_NEG_RLY_OPEN_FAULT	Main negative relay open circuit fault. • Please contact the after-sales personnel.
BMS	161	BMS_PRECHG_FAIL_FAULT	Pre-charge failure fault. • Reset the battery. If this fault is reported many times, please contact after-sales personnel.
BMS	162	BMS_CELL_SAMPL_FAULT	Cell sampling fault. • Please contact the after-sales personnel.
BMS	163	BMS_TEMP_SAMPLE_FAULT	Temperature sampling fault. • Please contact the after-sales personnel.
BMS	164	BMS_SYS_FAULT	System fault. • Please contact the after-sales personnel.
BMS	165	BMS_DSG_OVER_FAULT	Over-discharge current fault. • Stop using the battery and wait for it to recover or restart the battery. If this fault is reported many times, please contact the after-sales personnel.
BMS	166	BMS_CHG_OVER_FAULT	Over-charge current fault. • Ensure that the battery works in the normal voltage range.
BMS	167	BMS_AFE_COM_FAULT	AFE communication fault. • Please contact the after-sales personnel.
BMS	168	BMS_INV_COM_FAULT	External network communication fault. • Check the communication line between the battery and the inverter. If this fault still occurs after reinserting the line, please contact the after-sales personnel.
BMS	169	BMS_MID_COM_FAULT	Intermediate network communication fault. • Check the communication line between the batteries. If this fault still occurs after reinserting the line, please contact the after-sales personnel.

Error Type	Error Code	Fault	Descriptions and Diagnosis
BMS	170	BMS_VOLT_SENSOR_FAULT	Voltage sensor fault. • Please contact the after-sales personnel.
BMS	171	BMS_ID_REPET_FAULT	ID duplication fault. • Check if the system connections are correct and follow the initial installation steps to perform the startup operation again.
BMS	172	BMS_TEMP_LOW_FAULT	Low temperature fault. • Wait for fault recovery, restart the battery and contact after-sales personnel.
BMS	173	BMS_CURR_SENSOR_FAULT	Current sensor fault. • Please contact the after-sales personnel.
BMS	174	BMS_LINE_FAULT	Power line open circuit fault. • Check whether the power line is connected properly and restart the battery.
BMS	175	BMS_FLASH_FAULT	Flash fault. • Please contact the after-sales personnel.
BMS	176	BMS_AFE_PROTECT_FAULT	AFE self-protection fault. • Please contact the after-sales personnel.
BMS	177	BMS_CHG_REQ_FAULT	Charging request fault. • Check if the inverter is correctly supplying power to the battery.
BMS	178	BMS_INS_FAULT	Insulation fault. • Please contact the after-sales personnel.
INV	200	BAT_VOLT_OUT_RANGE	Battery voltage overrun • Ensure that the battery works in the normal voltage range.
INV	201	PV_VOLT_OUT_RANGE	Battery voltage overrun • Ensure that PV works in the normal voltage range.
INV	202	BAT_SOC_LOW_ON_GRID	Low soc of grid-connected battery • Stop discharging and start charging.
INV	203	BAT_SOC_LOW_OFF_GRID	Low soc of off-grid battery • Stop discharging and start charging.
INV	204	INV_PWR_DRT	Inverter power derating • Ensure that the inverter power is within the normal range.
INV	205	BAT_CHRG_PWR_DRT	Battery charging power derating • Ensure that the battery charging power is within the normal range.

Error Type	Error Code	Fault	Descriptions and Diagnosis
INV	206	BAT_DISCHRG_PWR_DRT	Battery discharge power derating Ensure that the battery discharge power is within the normal range.
INV	207	BAT_FLOATING_CHRG	Battery floating charge Check battery voltage.
INV	208	BAT_REPLENISH_CHRG	Battery recharge Check the battery voltage and replenish the power in time.
INV	209	BAT_PWR_IN_CFG_MODE	Battery power configuration mode Make sure that the battery works correctly.
INV	210	BST_IN_CVS_MODE	BST constant voltage source mode. BST operates in constant voltage source mode.
INV	211	PV_PWR_DRT_INV_PWR_LMT	Inverter power limit Ensure that the inverter output power is within the normal range.
INV	212	PV_PWR_DRT_ZERO_EXPORT	Anti-reflux. Ensure that it is in an anti-reflux state.
INV	213	PV_PWR_DRT_CHRG_PWR_LMT	Charging power limit. Ensure that the charging power is within the normal range.
INV	214	PV_PWR_DRT_CURR_LMT	Current limiting Ensure that the current works within the normal range.
COM	215	INTER_FAN_FAIL	Internal fan failed. Check whether there is any foreign matter inside the fan.
INSTALL	240	EXTERN_FAN1_FAIL	External fan1 failure Please check if the external fan is damaged or blocked..
INSTALL	241	EXTERN_FAN2_FAIL	External fan2 failure Please check if the external fan is damaged or blocked..
INSTALL	242	EXTERN_FAN3_FAIL	External fan3 failure Please check if the external fan is damaged or blocked..
INSTALL	243	DSP_UPDATE_FAIL	DSP upgrade failure Please contact after-sales for assistance with software up grade.
INSTALL	244	ARM_UPDATE_FAIL	ARM upgrade failure Please contact after-sales for assistance with software upgrade.

Error Type	Error Code	Fault	Descriptions and Diagnosis
INSTALL	245	SMCU_UPDATE_FAIL	SMCU upgrade failure Please contact after-sales for assistance with software upgrade.
INSTALL	246	NO_METER	Meter loss Please check if the meter is connected or if the meter communication line works normally.
INSTALL	247	NO_CT	CT loss Please check if the CT is connected.
INSTALL	248	NO_NTC	NTC loss Please check if the NTC is connected correctly.
INSTALL	249	BMS_LOST	Communication loss between inverter and battery management system equipment. Please check the connection status between the BMS device and the inverter.

Error Code	Fault	Diagnosis and Solutions
/	Screen not on	- Check if the inverter correctly and normally connected to PV, battery or grid. - Contact SolaX for help if the inverter is connected correctly.
	Abnormal sound on fan	- Check if there is foreign objects stuck in the fan. - Contact SolaX for help.
/	Screen on but no content display	Contact SolaX for help.
/	No readings after CT connection	- Check if CT is correctly clipped on the L wire - Check if the arrow on the CT points at Grid. - Contact SolaX for help if it can not return to normal.
/	No readings on Load (on App or Web)	- Check if the load is connected correctly. - Check if the power of load on the LCD screen displays normally. - Check if the monitoring module works normally. - Contact SolaX for help if it can not return to normal.
/	No readings on Grid (on App or Web)	- Check if the grid connection is normal. - Check if the grid parameter on the LCD screen displays normally. - Check if the monitoring module works normally. - Contact SolaX for help if it can not return to normal.

Error Code	Fault	Diagnosis and Solutions
/	No readings on battery (on App or Web)	• Check if the battery is connected correctly. • Check if the battery parameter on the LCD screen displays normally. • Check if the monitoring module works normally. • Contact SolaX for help if it can not return to normal.
/	No Feedin data (on App or Web)w	• Check if the meter/CT is connected correctly. • Check if the meter/CT parameter on the LCD screen displays normally. • Check if the monitoring module works normally. • Contact SolaX for help if it can not return to normal.
/	No data on App or Web	• Check if the monitoring module works normally. • Contact SolaX for help.
/	No display on meter after power on	• If the meter connection is abnormal, reconnect them according to the wiring diagrams. • Wait for the grid voltage to restore. • Contact SolaX for help if it can not return to normal.
/	Abnormal electrical data on meter	• If the wiring is incorrect, reconnect them based on the wiring diagrams. • Set the voltage and current ratio according to the setting steps of meter user manual. • Contact SolaX for help if it can not return to normal.

12.3 Maintenance

Regular maintenance is required for the inverter. Please check and maintain the following items based on the instructions below to ensure the optimal performance of the inverter. For inverters working in inferior conditions, more frequent maintenance is required. Please keep maintenance records.



WARNING!

- Only qualified person can perform the maintenance for the inverter.
- Only spare parts and accessories authorized by SolaX can be used for maintenance.

12.3.1 Maintenance routines

Table 12-2 Proposal of Maintenance

Item	Check notes	Maintenance interval
Fans	• Check if the fan makes noise or is covered by dust. • Clean the fan with a soft and dry cloth or brush, or replace the fan if necessary.	Every 12 months
Electrical connection	• Ensure that all cables are firmly connected. • Check the integrity of the cables, ensuring that there are no scratches on the parts touching the metallic surface. • Verify that the sealing caps on idle terminals are not falling off.	Every 12 months
Grounding reliability	• Check if the grounding cables are firmly connected to the grounding terminals. Use a ground resistance tester to test the grounding resistance from the inverter enclosure to the PE bar in the power distribution box.	Every 12 months
Heat sink	• Check if there are foreign objects in the heat sink.	Every 12 months
Dongle	• Check whether the dongle is securely connected.	From time to time
Indicators	• Check if the indicators of the inverter are in normal state. • Check if the display of the inverter is normal.	From time to time

Item	Check notes	Maintenance interval
General status of inverter	• Check if there is any damage on the inverter. • Check if there is any abnormal sound when the inverter is running.	Every 6 months

12.3.2 Upgrading Firmware

WARNING!

- Make sure that the type and format of the firmware file are correct. Do not modify the file name. Otherwise, the inverter may not work properly.
- Do not modify the folder name and file path where the firmware files are located, as this may cause the upgrade to fail.

WARNING!

- Before upgrading, ensure that the PV input voltage is higher than 180 V (preferably on sunny day), or that the battery SOC is higher than 20%, or the battery input voltage is higher than 180 V. Failure to meet one of these conditions may result in upgrade process failure.

Upgrade preparation

- Prepare a USB drive (USB 2.0/3.0, ≤ 32 GB, FAT 16/32).
- Check for the current firmware version of the inverter.
- Contact our service support for the update firmware file, and save it to the USB drive.
 - » For ARM file: X1LiteLV_8_12kW_V001.00.bin
 - » For DSP file: X1LiteLV_8_12kW_lap.txt
- Check the folder name and file path:

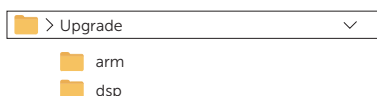


Figure 12-4 Folder name and path

Upgrade steps

- a. Plug the U disk into the upgrading port below: If the Dongle is connected to the port, please remove the dongle first.
- b. After the U disk is plugged in, the system will start upgrading, and the three indicator lights and the breathing light will flash in turns. (Operating indicator: green; battery indicator: blue; Error indicator: Red). Wait approximately 4-5 minutes.
- c. After successfully upgraded, the breathing light turns green and the buzzer sounds for one second, and the three indicator lights on the LCD will be a constant state. If the breathing light turns red, it means that the upgrade has failed. If the upgrade fails, please contact our after-sales support.

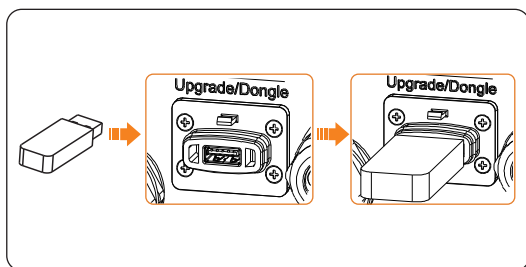


Figure 12-5 Plug in the U disk

NOTICE!

- The USB disk can be plugged in when the inverter is in normal status.

13 Decommissioning

13.1 Disassembling the Inverter

**WARNING!**

- Strictly follow the steps below to disassemble the inverter.
- Only use the dedicated removal tool delivered with the inverter to disassemble the AC connector, PV connector, battery connector and communication connector.

- Step 1:** Turn off the system by **ON/OFF** on LCD screen.
- Step 2:** Disconnect the external breakers of the inverter.
- Step 3:** Turn off the system button and the DC switch at the left side of the inverter.
- Step 4:** Turn off the battery switch / button / breaker (if any). (See documents of battery)
- Step 5:** Disconnect the PV connector: Insert the disassemble tool for PV terminal into the notch of PV connector and slightly pull out the connector.

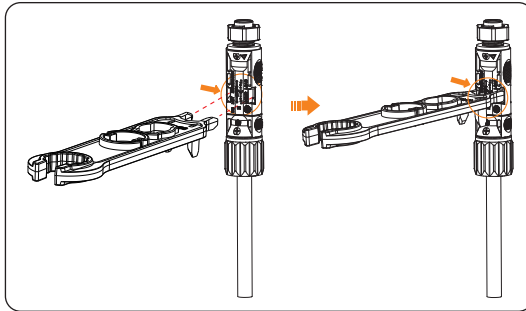


Figure 13-6 Disassembling the PV connector

Step 6: Slightly pull out the dongle module.

Step 7: Disconnect the battery connectors: remove the M8 screws and loosen the swivel nuts, and slightly pull the connectors. (Torque: 15 ± 1 N·m)

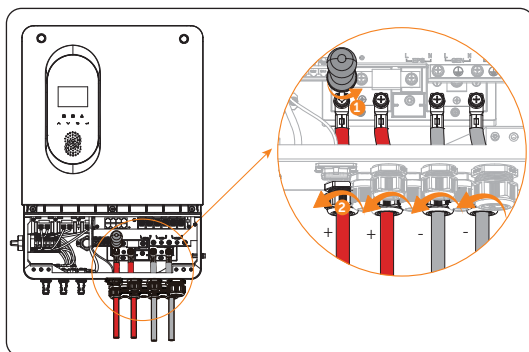


Figure 13-7 Removing the battery connector

Step 8: Disconnect EPS, GEN and GRID connector: remove the M6 screws and loosen the swivel nuts, and slightly pull the connectors.

Step 9: Disconnect the COM connector: loosen the swivel nut of the COM connector and remove the RJ45 terminals of Meter/CT_1, Meter/CT_2, D1/COM, DO, BMS, DRM, PAR_1 and PAR_2.

Step 10: Put the original terminal caps on the terminals.

Step 11: Unscrew the grounding screw and remove the grounding cable.

Step 12: Unscrew the M4 screw on the sides of inverter and vertically lift up the inverter to dismantle the inverter. (Torque: 1.5 ± 0.1 N·m)

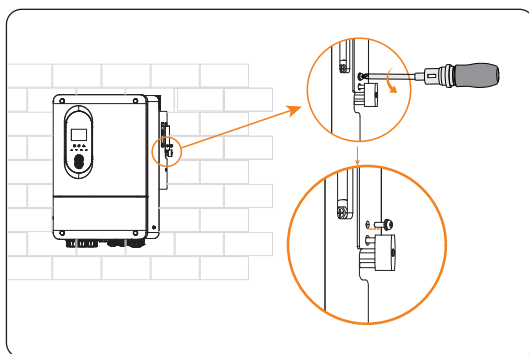


Figure 13-8 Unscrewing the M4 screws

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

13.2 Packing the Inverter

- Use the original packaging materials if available.

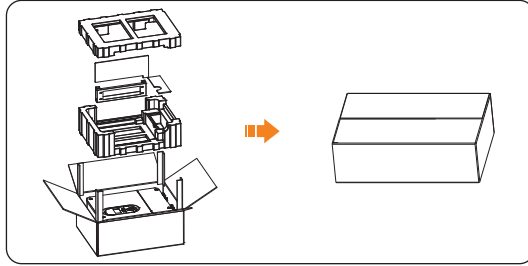


Figure 13-9 Packing the inverter

- If the original packing material is not available, use the packing material which meets the following requirements:
 - » Suitable for the weight and dimension of product
 - » Convenient for transportation
 - » Can be sealed with adhesive tape

13.3 Disposing of the Inverter

Properly dispose of the inverter and accessories in accordance with local regulations on the disposal of electronic waste.

14 Technical Data

DC input

Model	X1-Lite-8K-LV	X1-Lite-10K-LV	X1-Lite-12K-LV
Max. recommended PV power [W]	16000	20000	24000
Max PV voltage [d.c. V]	600		
Nominal DC operating voltage [d.c. V]	360		
MPPT voltage range [d.c. V]	50-550		
MPPT full power voltage range [d.c. V]	180-500	200-500	180-500
Max. PV current [d.c. A] ¹	32/32	32/32	32/32/32
Isc PV array short circuit [d.c. A]	40/40	40/40	40/40/40
Start output voltage [d.c. V]	110	110	110
Max. inverter backfeed current to the array [d.c. V]	0		
No. of MPP trackers	2	2	3
Strings per MPP trackers	A:1/B:1	A:1/B:1	A:1/B:1/C:1

* ¹" When 1 MPPT has 2 string input, if both strings are connected to PV, the maximum string current of a single string does not exceed 16A. If only one string of PV is connected, the maximum single string current does not exceed 32A.

AC output/ input

Model	X1-Lite-8K-LV	X1-Lite-10K-LV	X1-Lite-12K-LV
AC output			
Rated output apparent power [VA]	8000	10000	12000
Max. output apparent power [VA]	8800	11000	13200
Nominal AC voltage [a.c. V]	220/230/240		
Frequency [Hz]	50/60		
Rated output current [a.c. A]	34.8	43.5	52.2
Max. output continuous current [a.c. A]	40	50	60
Maximum output fault current (at 1ms) [a.c. A]	95	135	
Maximum output overcurrent protection [a.c. A]	110	165	
Power factor range	0.8 leading - 0.8 lagging		
Total harmonic distortion (THDi) (rated power)	< 3 %		
AC input			
Max. apparent power [VA]	12650	14950	18400
Rated AC power [W]	12650	14950	18400
Nominal AC voltage [a.c. V]	220/230/240		
Frequency [Hz]	50/60		
Max. AC input current [a.c. A]	55	65	80
Power factor range	0.8 leading - 0.8 lagging		

Model	X1-Lite-8K-LV	X1-Lite-10K-LV	X1-Lite-12K-LV
Max. GEN input / output current [a.c. A]	55	65	80
AC connection	L / N / PE		
DC disconnection switch	Yes		

Battery

Model	X1-Lite-8K-LV	X1-Lite-10K-LV	X1-Lite-12K-LV
Battery type	Lithium / Lead-Acid		
Battery voltage range [d.c. V]	40-60		
Nominal battery voltage [d.c. V]	48		
Max. charging voltage [d.c. V]	≤60 (Adjustable)		
Max. continuous charge/ discharge current [d.c. A]	190	220	250
Charging strategy for Lithium battery	Self-adaption to BMS		
Charging strategy for Lead-Acid battery	3 stages curve		
Temperature sensor	Optional		

Efficiency, Safety and Protection

Model	X1-Lite-8K-LV	X1-Lite-10K-LV	X1-Lite-12K-LV
Efficiency			
MPPT efficiency	>99.9%	>99.9%	>99.9%
European efficiency	97.0%	97.0%	97.0%
Maximum efficiency	97.6%	97.6%	97.6%
Battery charge efficiency ²	95.0%	95.0%	95.0%
Battery discharge efficiency ²	94.0%	94.0%	94.0%
Safety and Protection			
Safety	IEC 62109-1/-2		
Grid monitoring	NRS 097-2-1, IEC61727, IEC62116, INMETRO, PEA, MEA, BIS		
DC SPD protection	Integrated		
AC SPD protection	Integrated		
Anti-islanding protection	Yes		
PV string input reverse polarity protection	Yes		
Insulation resistor detection	Yes		
Residual current monitoring unit	Yes		
Output over current protection	Yes		
Output short protection	Yes		
Output over voltage protection	Yes		
Battery terminal temp protection	Yes		
Surge protection	AC Type II / DC Type II		

* ² PV to BAT Max. efficiency 96.0%, BAT to AC Max. efficiency 95.0%.

EPS (Off-grid) output

Model	X1-Lite-8K-LV	X1-Lite-10K-LV	X1-Lite-12K-LV
Rated EPS apparent power [VA]	8000	10000	12000
Nominal EPS voltage [a.c. V]		230	
Frequency		50/60	
Rated EPS current [a.c. A]	34.8	43.5	52.2
Peak apparent power [VA] ³		2 times of rated, 10s	
Switching time (typical value) [ms]		< 10	
Total harmonic distortion (THDv) (linear load)		< 2 %	

* ³ Depend on PV and battery capacity.

Generic data

Model	X1-Lite-8K-LV	X1-Lite-10K-LV	X1-Lite-12K-LV
Dimensions (W/H/D) [mm]		651*462*280	
Dimensions of packing (W/H/D) [mm]		790*595*340	
Net weight [kg]		37	
Gross weight * [kg]		42	
Cooling concept	Natural cooling		Smart cooling
Noise emission (typical) [dB(A)]		< 45	
Storage temperature range [°C]		-40 to +70	
Operating ambient temperature range [°C]		-25 to +60 (derating above +45)	
Humidity [%]		0% to 100% (condensing)	
Altitude [m]		< 3000	
Ingress protection		IP65	
Self consumption (night) [W]		< 10	
Installation mode		Wall bracket	
Inverter topology		Transformerless for PV Side / HF for Battery Side	
Human machine interfaces		LED+LCD (capacitive touch)	
Communication interfaces		CAN, RS485, CT, Meter, WiFi, LAN, 4G (optional)	
Standard warranty		Standard 10 years	

* 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.

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