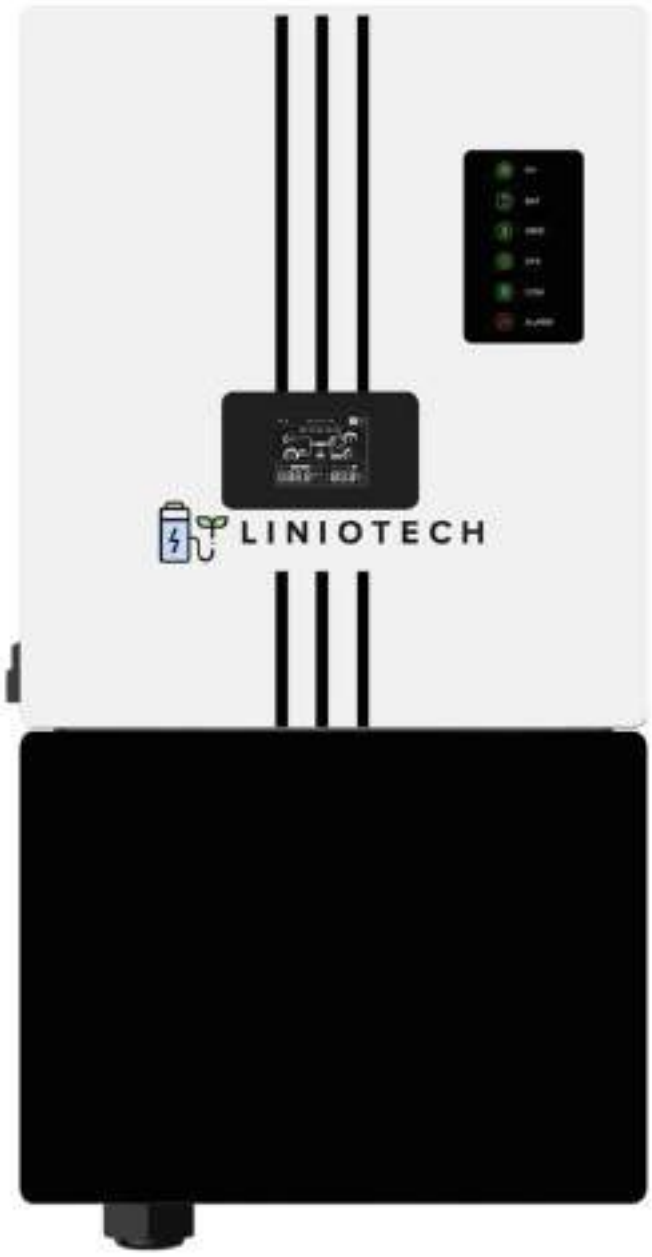


USER MANUAL

Energy Storage System

READ THE INSTRUCTIONS COMPLETELY BEFORE OPERATING THE EQUIPMENT

Check the utility voltage before turning ON the unit if connected.

Verify the inverter's programmed grid type before connecting to the utility.

The inverter will be programmed in 120/240V Split-Phase at 60Hz by default.

Disregarding these instructions could result in permanent damages to the inverter

DISCLAIMER

UNLESS SPECIFICALLY AGREED TO IN WRITING, THE MANUFACTURER:
(A) DOES NOT WARRANT THE ACCURACY, SUFFICIENCY OR SUITABILITY OF ANY TECHNICAL OR OTHER INFORMATION PROVIDED IN ITS MANUALS OR OTHER DOCUMENTATION.
(B) ASSUMES NO RESPONSIBILITY OR LIABILITY FOR ANY LOSS OR DAMAGES, WHETHER DIRECT, INDIRECT, CONSEQUENTIAL, OR INCIDENTAL, ARISING OUT OF THE USE OF SUCH INFORMATION. USE OF SUCH INFORMATION SHALL BE ENTIRELY AT THE USER'S RISK.
The manufacturer is not responsible for system failure, damage or injury resulting from improper installation of its products.
Information in this manual is subject to change without notice.
This manual is only focused on the inverter labeled as: **11K4HB-T2/LV-ULP**.

Table of Contents

IMPORTANT SAFETY INSTRUCTIONS

SYMBOLS THAT APPEAR IN THIS DOCUMENT

WARNING: This symbol indicates information that, if ignored, could cause serious injury, equipment damage, or death.

CAUTION: This symbol indicates information that, if ignored, could result in minor injury or equipment damage.

NOTE: This symbol indicates relevant information that is not related to hazardous situations.

WARNINGS

Read this entire document before installing or using the inverter. Failure to follow any of the instructions or warnings in this document can result in electrical shock, serious injury, or death. Damage to the inverter is also possible, potentially rendering it inoperable.

High Risk due to fire or electrocution – Installation, maintenance and connection of inverters must be performed by qualified personnel, in compliance with local electrical standards, wiring rules and requirements of local power authorities and/or companies.

The temperature of some parts of the inverter may exceed 60 ℃ during operation. DO NOT touch the inverter during operation to avoid being burnt.

Ensure children are kept away from inverters.

DO NOT open the front cover of the inverter. Apart from performing work at the wiring terminal (as instructed in this manual), touching or changing components without authorization may cause injury to people, damage to inverters and annulment of the warranty.

Static electricity may damage electronic components. Appropriate methods must be adopted to prevent such damage to the inverter; otherwise the inverter may be damaged and the warranty annulled.

Ensure the output voltage of the proposed PV array is lower than the maximum rated input voltage of the inverter; otherwise the inverter may be damaged and the warranty annulled.

When exposed to sunlight, the PV array generates dangerous high DC voltage. Please operate according to our instructions, or it will result in danger to life.

PV modules should have an IEC61730 class A rating.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

The system must have Ground connections and Neutral connections.

Solar PV+/PV- are UNGROUNDED. Note, you may ground PV Racking/Mounts, but doing so directly to the inverter will likely result in damage in the case of a direct lightning strike to the PV array. Ground the PV racking directly to earth ground.

DO NOT connect the grid to the “AC OUT” output terminal.

DO NOT reverse the polarity of batteries. **Damage WILL occur**.

DO NOT exceed **600 V DC** on any MPPT on the inverter.

DO NOT turn off the battery breaker if there is current flowing in or out of the battery in any amount.

DO NOT use impact drivers to tighten any fasteners on the inverter.

Use conduit for AC and DC wires entering/exiting the wiring compartment to meet NEC and CSA code

ALL terminals/breakers, including battery, MPPT, and AC Terminal Blocks should have only one conductor connected to each terminal. Pig tailing is an acceptable method to legally connect two wires to one circuit.

SYMBOLS USED

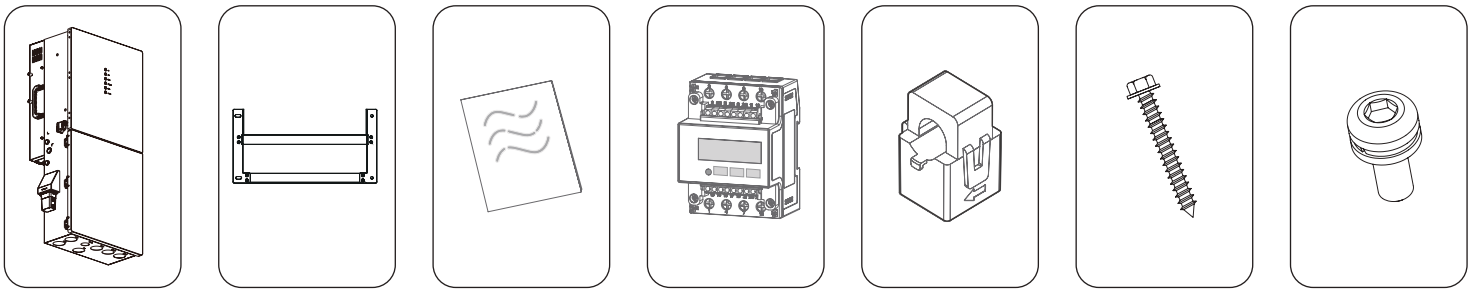
Labels	Description
	Danger of high voltage and electric shock! Only qualified personnel may perform work on the inverter.
	Residual voltage exists after the inverter is powered off. It takes 5 minutes for system to discharge to a safe voltage.
	Danger of hot surface
	Environmental Protection Use Period
	Refer to the operating instructions
	Product should not be disposed as household waste.
	Grounding terminal

1. Get to Start

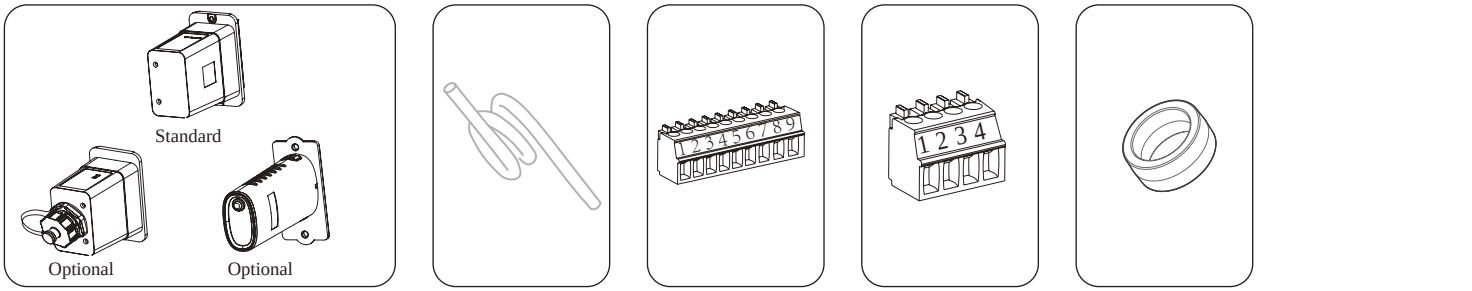
1.1 Component Guide

The box should include all items shown below. If there is any damage or missing parts, please contact your dealer immediately.

A B C D E F G

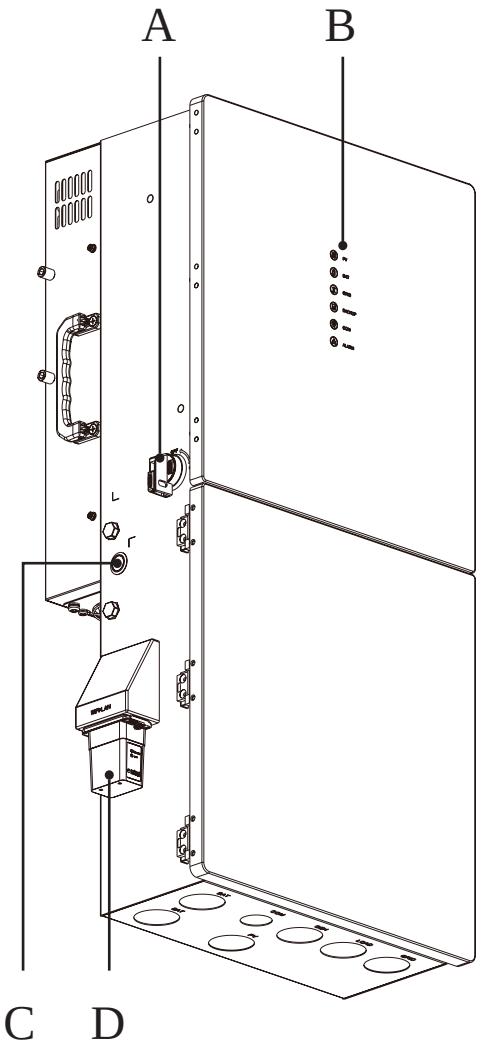


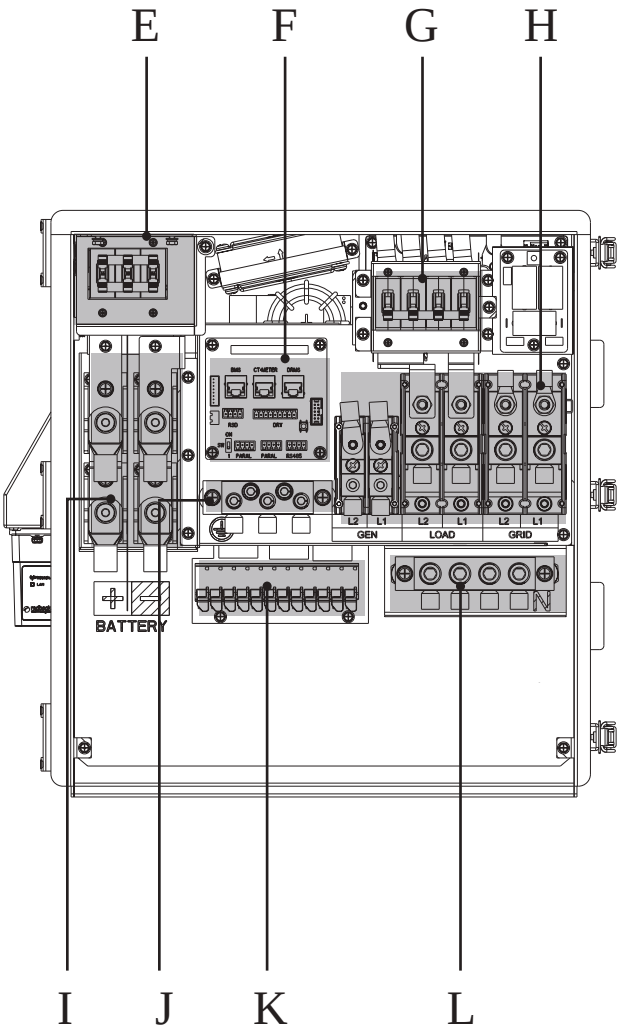
H I J K L



Component	Description	Quantity
A	Inverter	1
B	Mounting Bracket	1
C	File Package	1
D	Meter (Optional)	1
E	300 A CT	2
F	M6 Expansion Screw	4
G	M6 Security Screw	1
H	Wi-Fi / LAN Module (Optional)	1
I	Parallel Cable (Optional)	1
J	9-Pin Terminal	1
K	4-Pin Terminal	4
L	Toroid	2

1.2 General Description

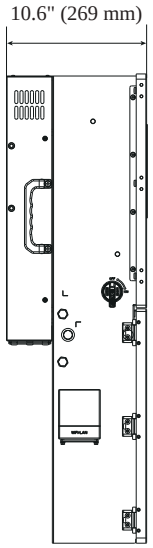


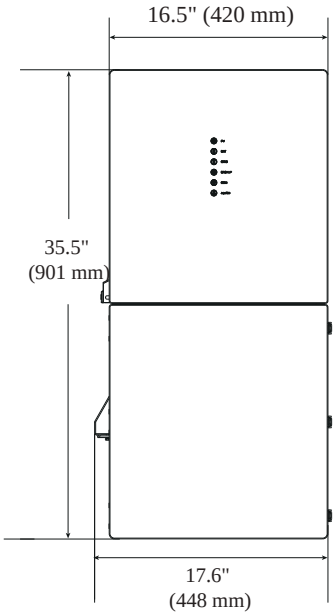


Component	Description
A	PV switch
B	LED screen
C	ON/OFF Button
D	Wi-Fi / LAN Module
E	Battery breaker
F	Communication connection ports (RS485, BMS, DRM, CT, DRY, RSD, PARA)
G	LOAD breaker
H	GEN/LOAD/GRID terminals
I	Battery terminals

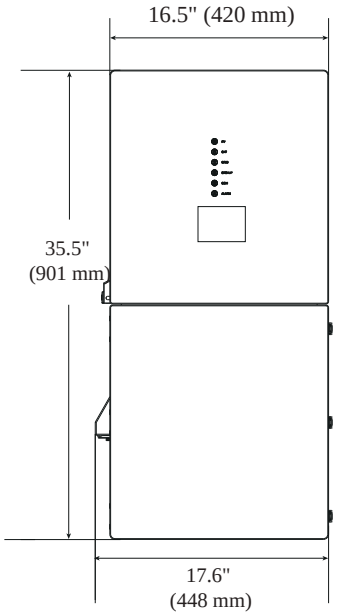
Component	Description
J	Ground Busbar
K	PV connection terminal block
L	Neutral Busbar

1.3 Specifications

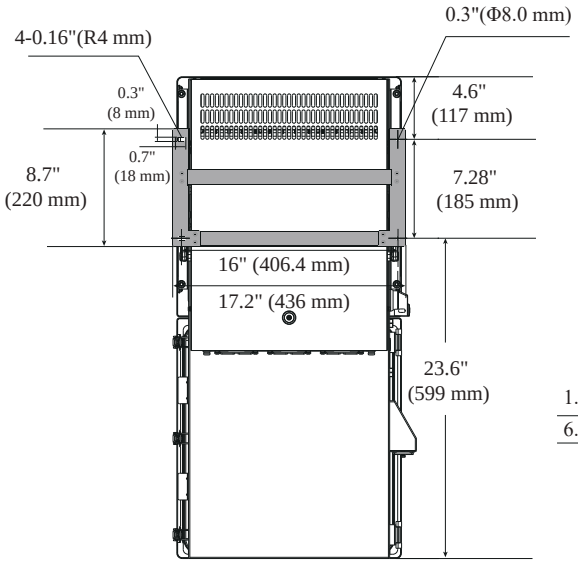


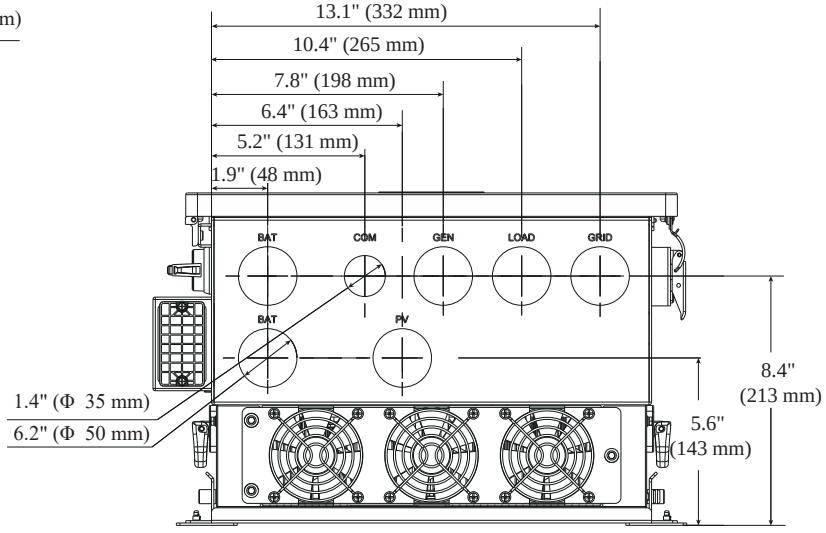


(LED screen**)**



(LED + LCD screen**)**





Torque value application note

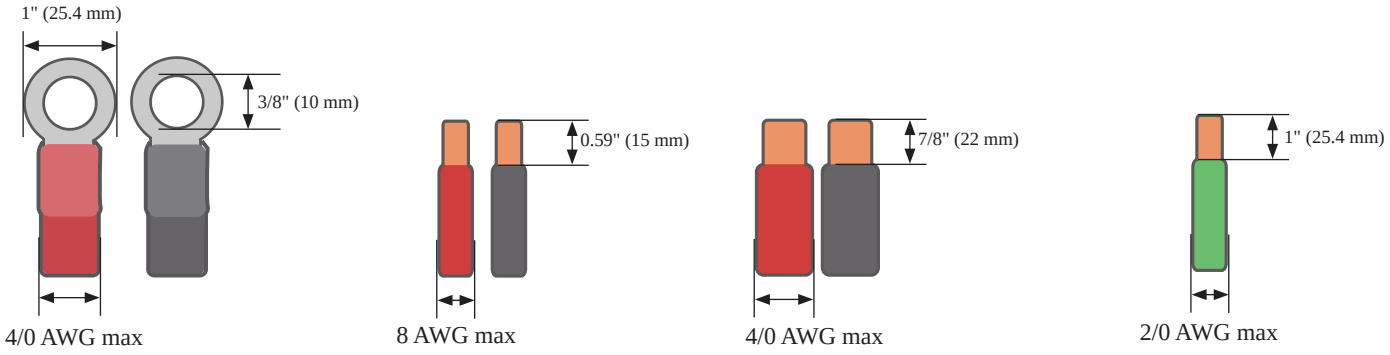
Terminal	Torque [lb-in]	Torque [N·m]
BAT +/ -	106 lb-in	12 N.m
GEN	110 lb-in	12.4 N·m
LOAD	165 lb-in	18.6 N·m
GRID	165 lb-in	18.6 N·m
Neutral busbar	94 lb-in	10.6 N·m
Ground busbar	94 lb-in	10.6 N·m

AC/DC connection requirements

Prepare cables recommended below as needed.

Port/Terminal	Recommended cable size range	Recommended strip length
BAT+/-	2 AWG (2pcs) or 4/0 AWG	/
GEN	1 AWG to 1/0 AWG	5/8 (16 mm)
LOAD	2/0 AWG to 4/0 AWG	7/8 in (22 mm)
GRID	2/0 AWG to 4/0 AWG	7/8 in (22 mm)
Neutral busbar	2/0 AWG to 4/0 AWG 1 AWG to 1/0 AWG (GEN)	1 in (25.4 mm)
Ground busbar	1/0 AWG to 2/0 AWG 1 AWG to 1/0 AWG (GEN)	1 in (25.4 mm)
MPPT	10 AWG to 8 AWG	0.59 in (15 mm)

Batteries | **PV Conductors** | **AC Conductors** | **Ground**



1.4 Basic System Architecture

Typically, an ESS (Energy Storage System) consists of PV array, inverter, battery, loads and sensors.
The inverter is a high-quality device which can convert solar energy into AC energy. The energy generated by inverter can be preferentially supplied to its self consumption, stored in the battery for future use, or fed into public grid.
For whole-home load consumption, connect the utility grid diretly to the "Grid" terminal.

- An external breaker must be installed between the grid and the inverter. Size the breaker according to code.
- Connect the "LOAD" output to the Main panel. Follow electric code to select proper wire gauge.

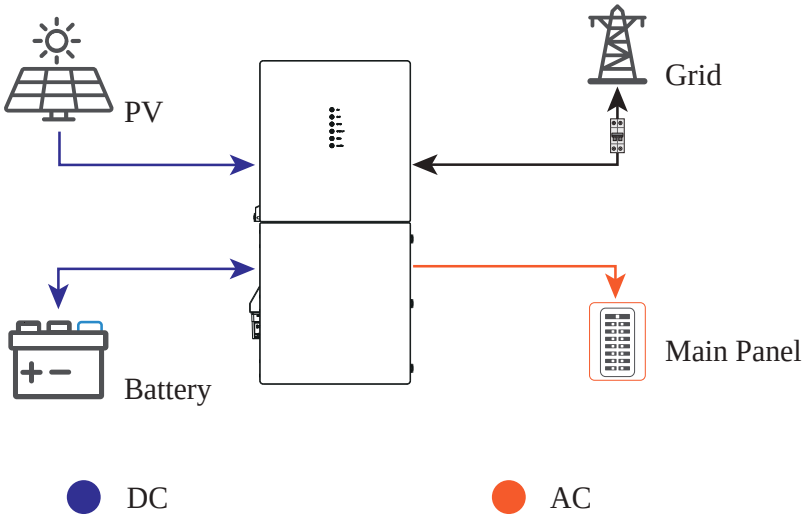


Figure 1–1 Whole-Home Load

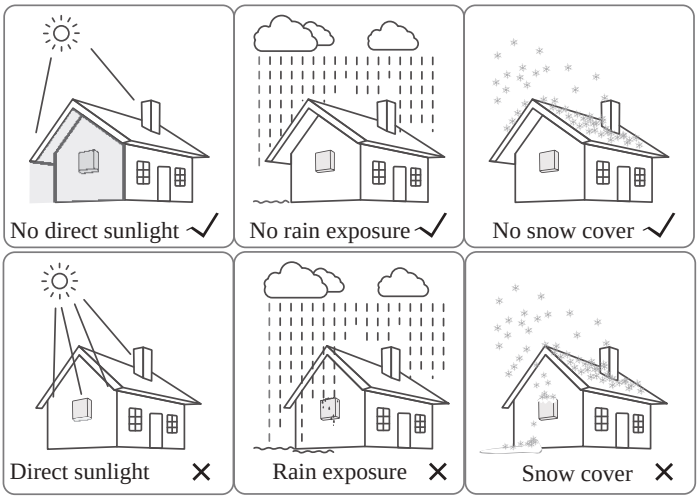
2. Mounting

2.1 Mounting the Inverter

2.1.1 Mounting Requirements

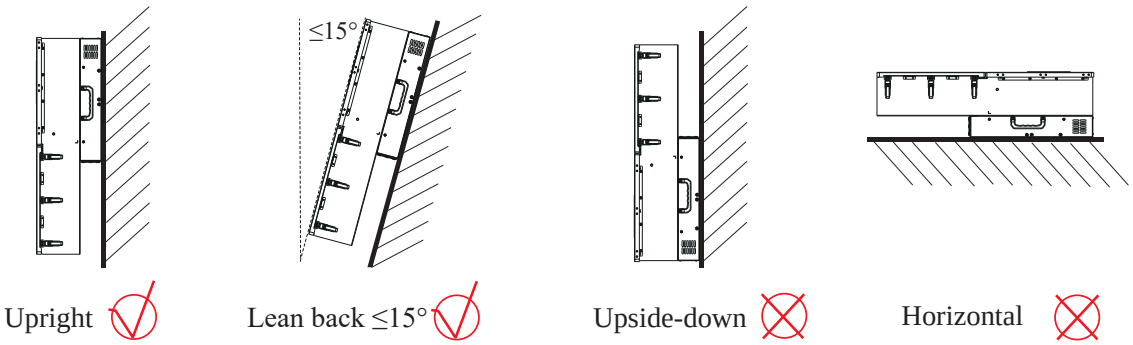
Environment Requirements

- With a NEMA 3R protection rating, the inverter can be mounted indoors or outdoors.
- The inverter is suitable for use in residential non-habitable spaces.
- The mounting location must be inaccessible to unrelated personnel since the enclosure and heat sinks are extremely hot during operation.
- Do not install the inverter in areas containing highly flammable materials or gases.
- To ensure optimum operation and long service life, the ambient temperature must be below 50°C.
- The inverter must be mounted in a well-ventilated environment to ensure good heat dissipation.
- Identify the inverter location on a stub frame, a brick wall or a concrete wall. Ensure the carrier, where the inverter is mounted, can support the weight of the inverter.
- Do not install the inverter in a rest area since it will cause noise during operation.
- The installation height should be reasonable, and please make sure it is easy to operate and view the display.
- Product label and warning symbols shall be clear to read after installation.
- To ensure long service life, the inverter must not be exposed to direct solar irradiation, rain, or snow. It is recommended that the inverter be mounted in a sheltered place.



Angle Requirements

Mount the inverter vertically or at a maximum back tilt of 15°. Do not install the inverter in a wrong direction. Always keep the connection area downward.



Clearance Requirements

Considering the diamensions of the inverter, find a suitable location for the system. There must be at least:

- 39.37 in (1000 mm) of clearance from inverter/battery to doors/windows
- 19.69 in (500 mm) of vertical clearance
- 13.78 in (350 mm) of side clearance .

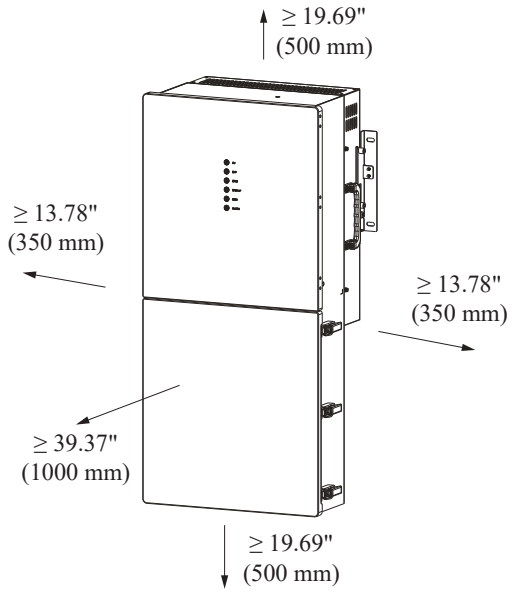


Figure 2–1 Clearance requirement for single installation

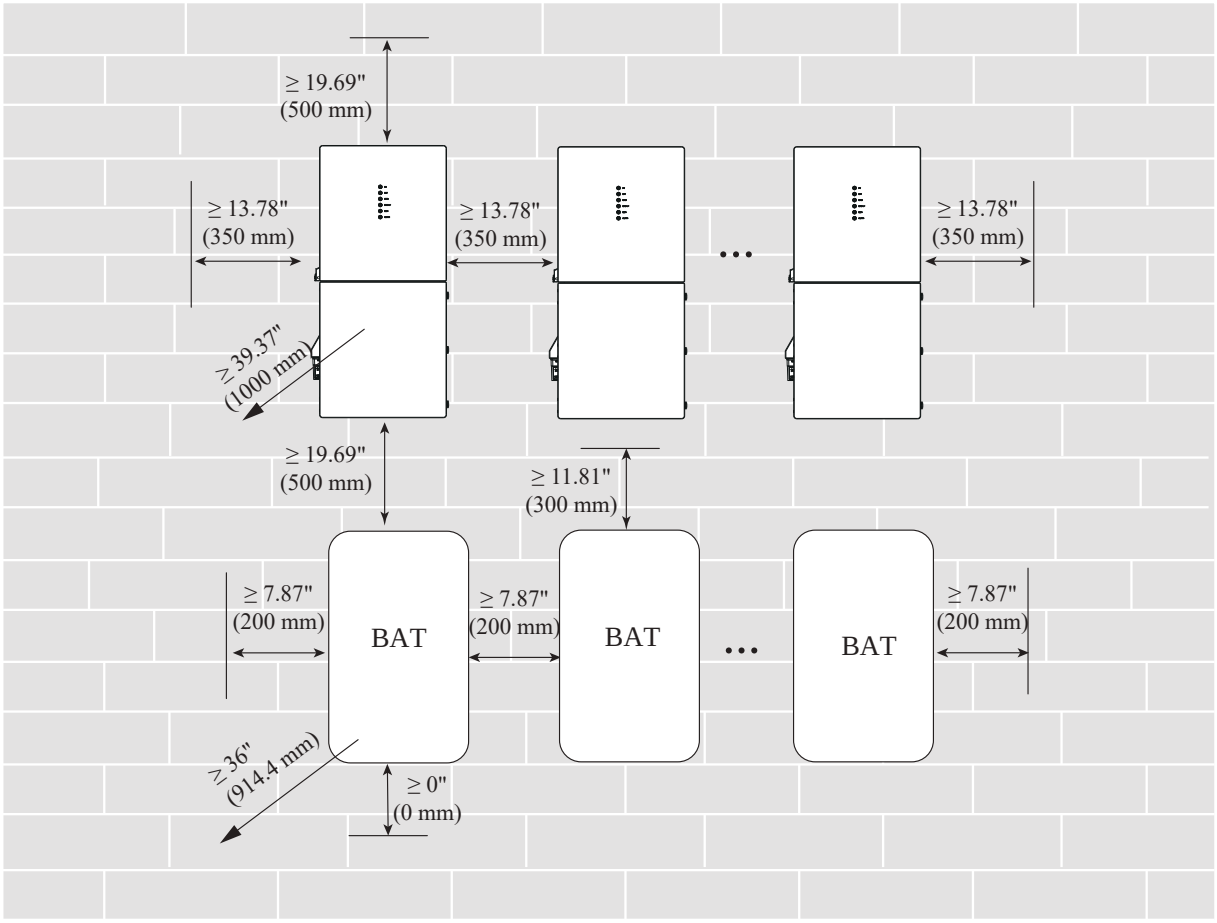


Figure 2–2 Clearance requirement for ESS

2.2 Mounting Instructions

Before drilling the hole on the wall, ensure no damage on the electric wire and/or water pipe inside the wall.

The inverter is heavy! Two or three persons are recommended to install the inverter.
To prevent potential damages and injuries from inverter falling down, please ensure that the inverter is well-mounted.

Please prepare an electric screwdriver and a marker. You may need expansion plugs or anchors for concrete.

Procedures

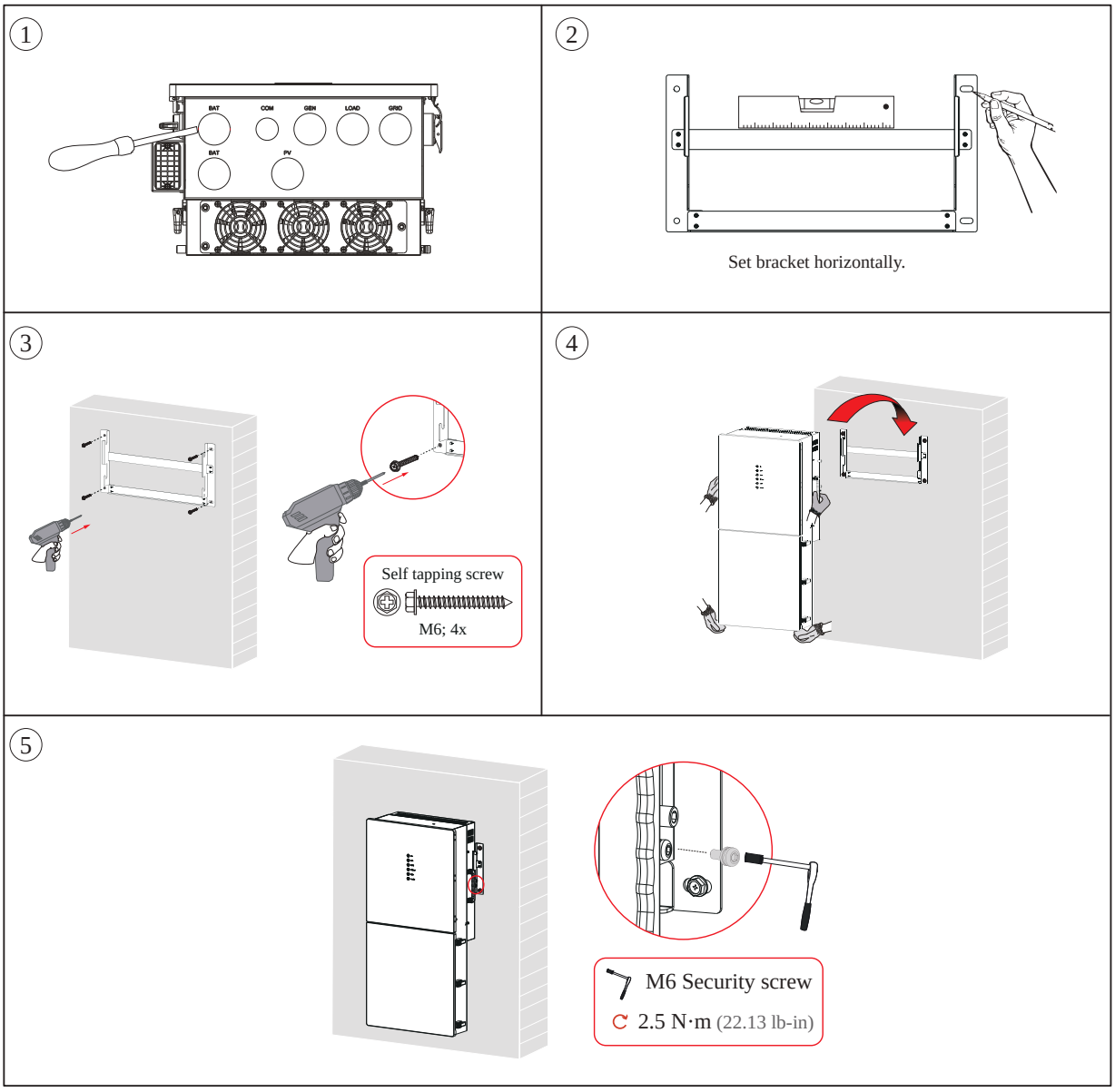
Step 1 Use a flat-head screwdriver to knock the wiring holes on the bottom of the inverter as needed.

Step 2 Level the mounting bracket against the mounting surface and mark the hole positions with a marker.

Step 3 Drive the screws through the mounting bracket into the mounting surface. Ensure the bracket is firmly attached.

Step 4 Mount the inverter.

Step 5 Secure the inverter with the security screw.



3. Electrical Connection

3.1 Removing Insulation Cover

A shielding cover has been installed over the wiring box of the ESS inverter to protect users from potential electrical injuries. Before electrical connections, remove the insulation cover from the wiring area temporarily, as shown in figure below.

Before removing the cover, please ensure that the inverter and all cables to be installed have been completely powered off during the whole process of installation and connection.

After the electrical connections are complete, if no other connections are made in the wiring area, replace the insulation cover and ensure the grounding cable is well-connected again.

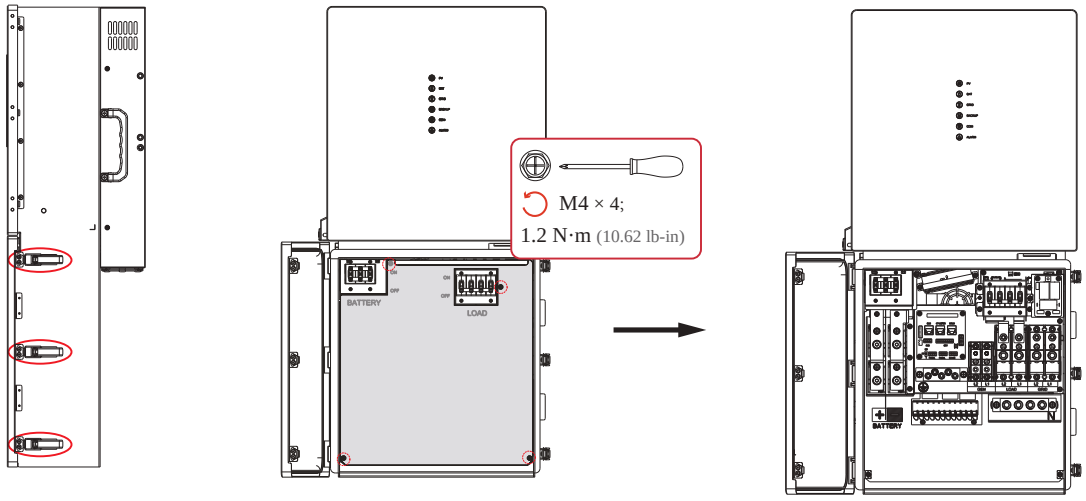


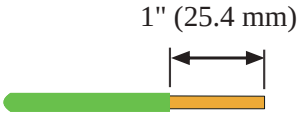
Figure 3–1 Removing insulation cover

3.2 PE Connection

The inverter must be grounded; otherwise, there will be an electric shock risk.

If the positive pole or negative pole of the PV array is required to be grounded, the inverter output (to AC grid) must be isolated by transformer in accordance with IEC62109-1, -2 standards.

A protective earth (PE) busbar is intergated in the inverter. Please be sure to connect the PE cable to the PE busbar for reliable grounding. A minimum gauge size of 1/0 AWG green or green-yellow wire is recommended.



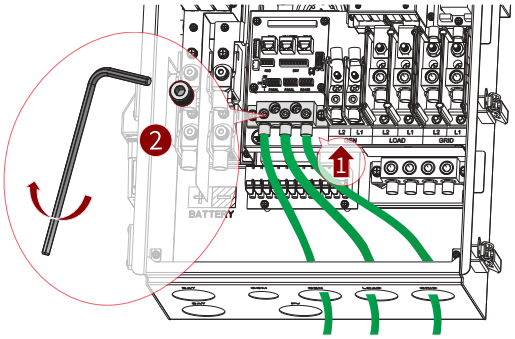
Terminal	Cable specification	Torque (Ib-in)	Torque (N·m)
PE	1/0 AWG to 2/0 AWG	94	10.6
PE (GEN)	1 AWG to 1/0 AWG	94	10.6

Procedures

Step 1 Thread the PE cables into wiring box through GEN/ LAOD /GRID connection ports.

Step 2 Insert the PE cable into the busbar accordingly, and tighten terminal screws.

Step 3 Make sure that all cables are securely in place.



3.3 GEN/LOAD/GRID Connection

1. Before connecting the GEN/LOAD/GRID terminal, ensure that both the AC terminal and the DC terminal are powered off and the PV switch is OFF. Otherwise there is a risk of high voltage shock.
2. To reduce the risk of fire, please add an overcurrent protection device (OCPD or 'circuit breaker') in accordance with the National Electrical Code ANSI / NFPA 70.
3. An external AC breaker, usually located in a load panel or solar dedicated AC sub-panel, is needed for an on-grid / AC connection to isolate the inverter from the utility grid when necessary.

Procedures

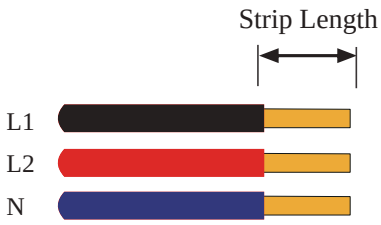
Step 1 Prepare the proper cable, and strip an appropriate length of the cable insulation. It is recommended to use outdoor dedicated cables.

Step 2 Thread the cables into the wiring box through GEN/ LOAD /GRID connection ports accordingly.

Step 3 Insert the wire into the terminal according to the label on the terminal block, and then tighten the terminal screws with a proper torque. Finally, ensure that all cables are securely in place.

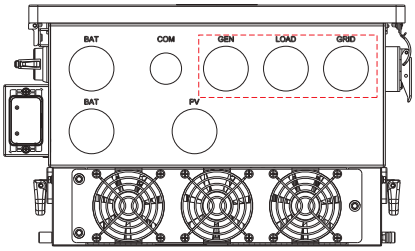
- AC cable connection ports in the illustrations are for reference only. Select appropriate ports as needed.

①



Terminal	Cable specification	Torque (lb-in)	Torque (N·m)	Strip Length
GEN	1 AWG to 1/0 AWG	110	12.4	5/8 in (16 mm)
LOAD	2/0 AWG to 4/0 AWG	165	18.6	7/8 in (22 mm)
GRID	2/0 AWG to 4/0 AWG	165	18.6	7/8 in (22 mm)
N	2/0 AWG to 4/0 AWG	94	10.6	1 in (25.4 mm)
N (GEN)	1 AWG to 1/0 AWG	94	10.6	1 in (25.4 mm)

②



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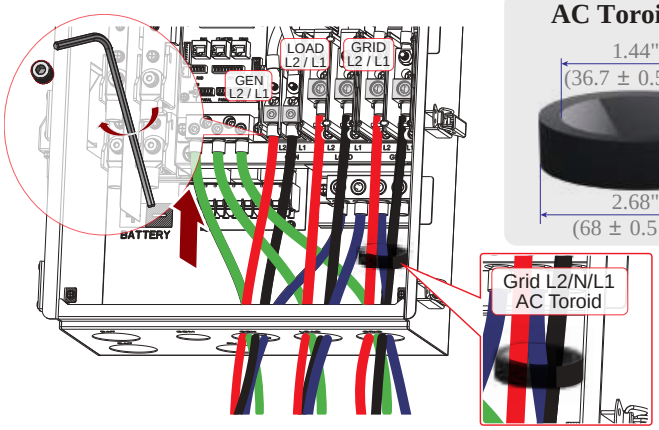
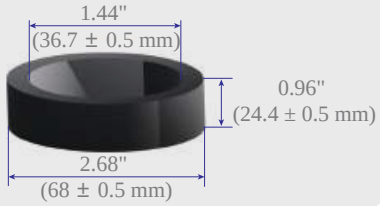


AC Toroid Dimension:



3.4 PV Connection

> ⚠ Photovoltaic arrays exposed to sunlight will generate dangerous voltages!
> Before connecting the PV terminal, ensure that both the AC terminal and the DC terminal are powered off and the PV switch is OFF. Otherwise there is a risk of high voltage shock.

Procedures

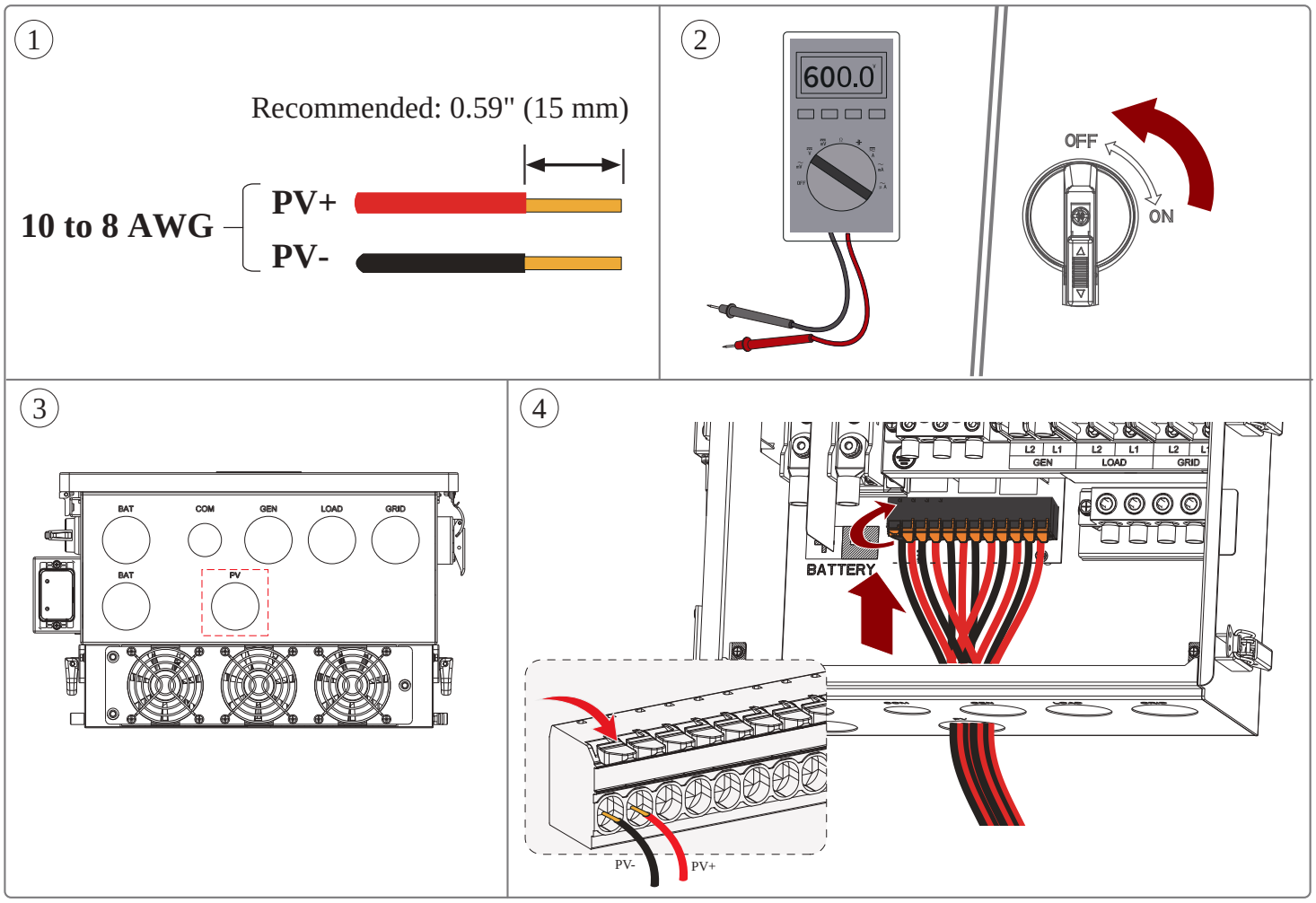
Step 1 Prepare the proper cable we recommended as shown below, and strip an appropriate length of the cable insulation. It is recommended to use outdoor dedicated PV cables.

Step 2 Inspection before connection.

- Check correct polarity of wire connection from PV modules and PV input connectors.
- The test voltage cannot exceed 600 VDC.
- Ensure that the PV switch is OFF.

Step 3 Thread the cables into wiring box through PV connection ports.

Step 4 Open the switches of PV input connector. Insert the stripped cable into the PV input connector. When doing so, ensure that the stripped cable and the PV input connector are of the same polarity. Finally, close switches and ensure the wires are tightly fixed.



3.5 Battery Connection

> ⚠ Before connecting the battery terminal, ensure that both the AC terminal and the DC terminal are powered off and the PV switch is OFF. Otherwise there is a risk of high voltage shock.

Procedures

Step 1 Prepare the proper cable and OT terminal we recommended as shown below, and strip an oppropriate length of the cable insulation. It is recommended that the battery cable be less than or equal to 3 m.

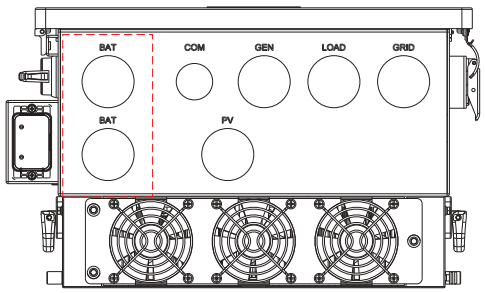
Step 2 Thread the cables into wiring box through BAT connection ports.

Step 3 Insert and tighten the cables into the battery terminals.

①

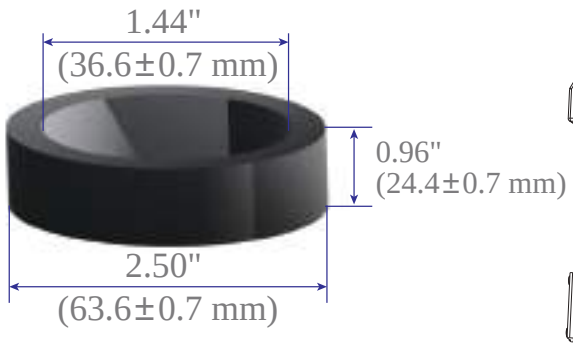
Battery	Cable Specification	Torque (Ib-in)	Torque (N·m)
Single	4/0 AWG	106	12
Two paralleled	2 AWG	106	12

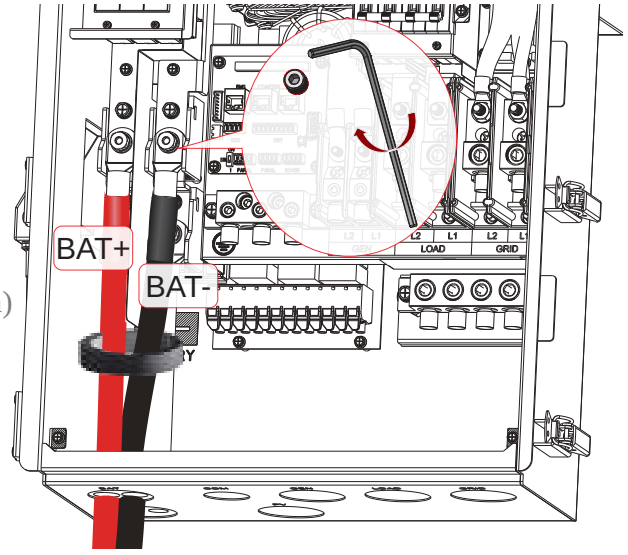
②



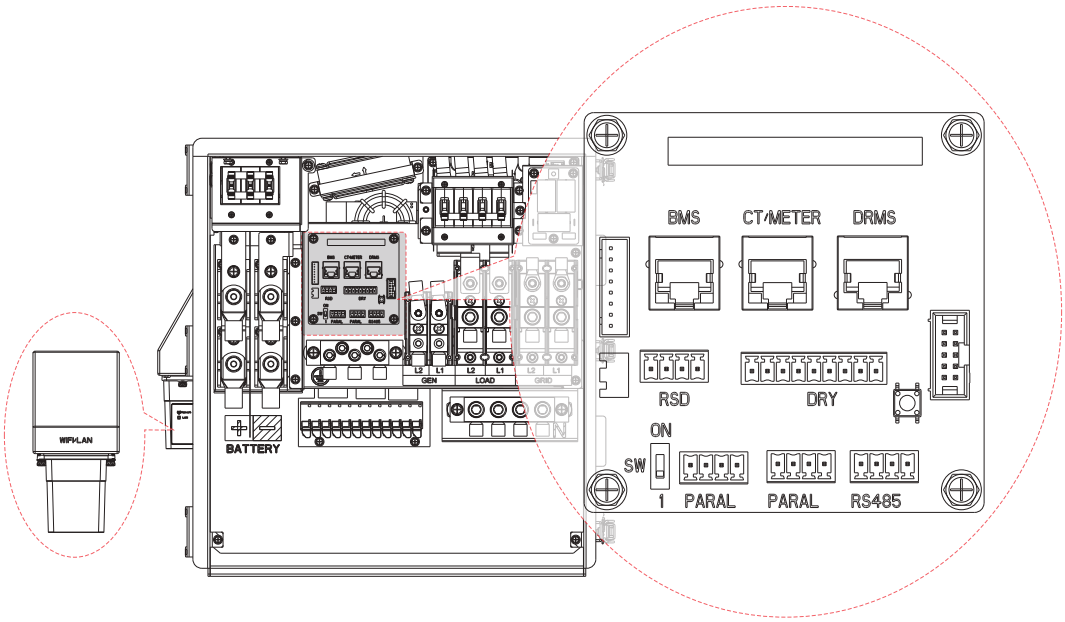
③

DC Toroid Dimension:





3.6 Communication Connection

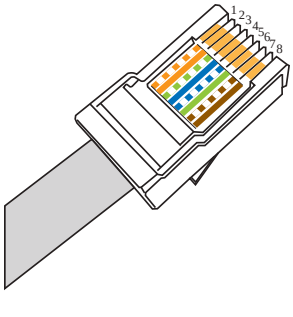


Interface		Description
BMS		Lithium battery communication interface
CT/METER		For CT/Meter communication or Grid current sense
DRMS		Demand response mode for Australia application
RSD (rapid shutdown device)		RSD control interface
9-Pin	GEN	Generator control
	NTC	Temperature sensor terminal of lead-acid battery
	RMO	Remote off control
	DRY	DI/DO control
PARA		4-Pin interface for parallel communication
		A matched resistance switch for parallel communication
RS485		4-Pin interface for RS485 communication
Wi-Fi		For Wi-Fi/LAN communication

3.7 BMS Connection (Only for Lithium Battery)

This manual ONLY illustrates the pinout sequence of BMS at INVERTER SIDE. For details about the pinout sequence at battery side, see the user manual of the battery you use, and the following pinout diagram of battery side is only for illustration.

Standard RJ45 Pinout



RJ45 Pin Configuration	
Pin	**Color**
1	White-Orange
2	Orange
3	White-Green
4	Blue
5	White-Blue
6	Green
7	White-Brown
8	Brown

Always face the flat side of the terminal, and count the pin slots from left to right from 1 to 8. Read the pin definitions of both the battery and inverter carefully.

Pin definition of terminal

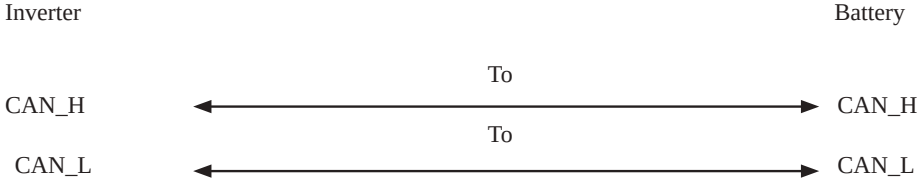
Inverter

Inverter	
Pin	**Definition**
1	/
2	/
3	/
4	CAN_H
5	CAN_L
6	/
7	/
8	/

Battery

Battery	
Pin	**Definition**
1	/
2	/
3	/
4	CAN_H
5	CAN_L
6	GND
7	/
8	/

CAN BUS connection principle



BMS Communication Cable Preparation

Procedures

Step 1 Prepare RJ45 terminals and strip appropriate length of COM cables.

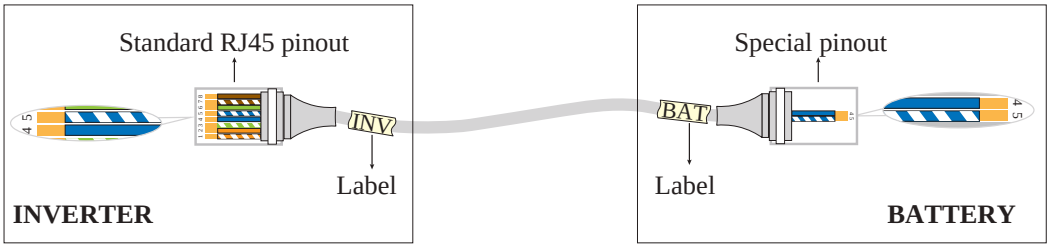
Step 2 According to pin definitions and cable order, assemble the RJ45 terminals and crimp communication wires. There are two methods to assemble the RJ45 terminals.

Step 3 Then label the RJ45 terminals (BAT or INV) to avoid confusion.

Step 4 After finishing wire-making, use a multimeter or other specific tool to check if your cable is good, bad, or wired incorrectly.

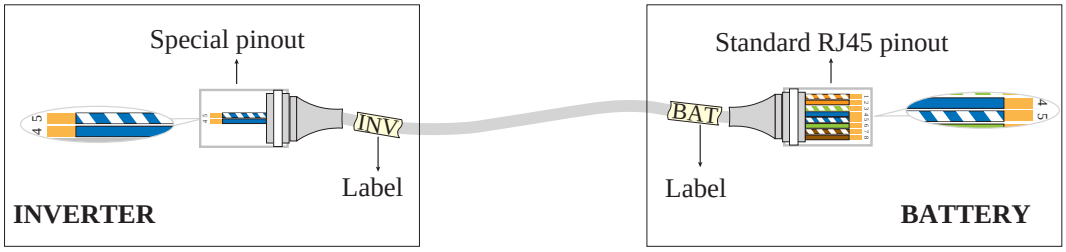
Method 1:

Use the INVERTER RJ45 pinout as the standard pinout to crimp wires, then the battery side will be a non-standard one (special pinout). Cut off the other no-used wires (1/2/3/6/7/8) for the battery RJ45 terminal.



Method 2:

Use the BATTERY RJ45 pinout as the standard pinout to crimp wires, then the inverter side will be a non-standard one (special pinout). Cut off the other no-used wires (1/2/3/6/7/8) for the inverter RJ45 terminal.

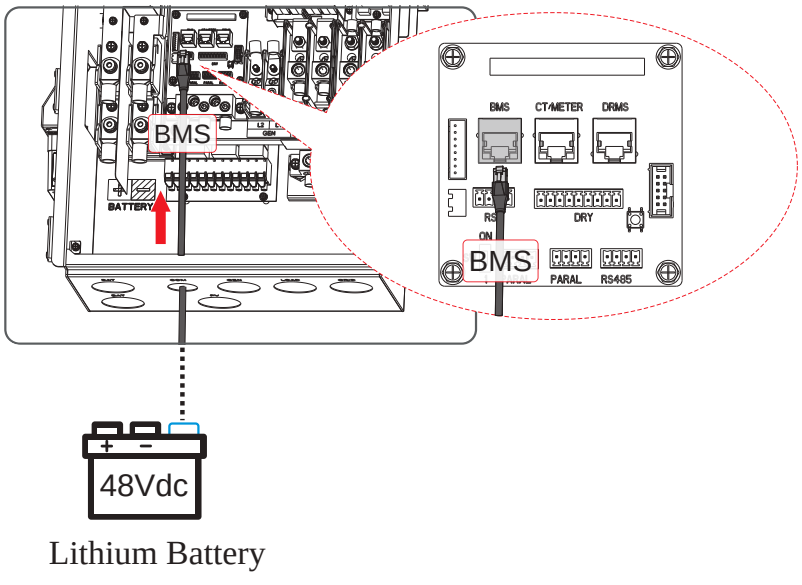


BMS Communication Cable Connection

Procedures

Step 1 Lead the BMS cable through the COM port.

Step 2 Insert the RJ45 terminal into BMS port.



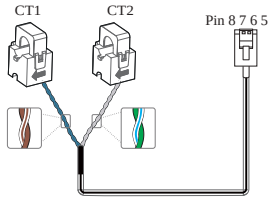
Lithium Battery

3.8 CT/Meter Connection

A CT/Meter is applied to monitor electricity usage of all loads.
RJ45 Terminal Configuration for CT and Meter Communication

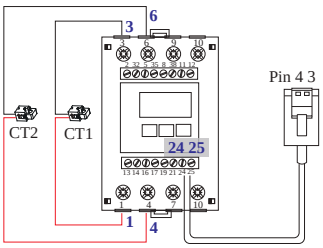
Pin	Function Description
1	--
2	--
3	RS485_A
4	RS485_B
5	CT2-
6	CT2+
7	CT1+
8	CT1-

CT Connection



RJ45	RJ45 Pin-out Color	CT Cable Label
Pin5(CT2-)	White-Blue	CT2-L2
Pin6(CT2+)	Green	
Pin7(CT1+)	White-Brown	CT1-L1
Pin8(CT1-)	Brown	

Meter + CT connection



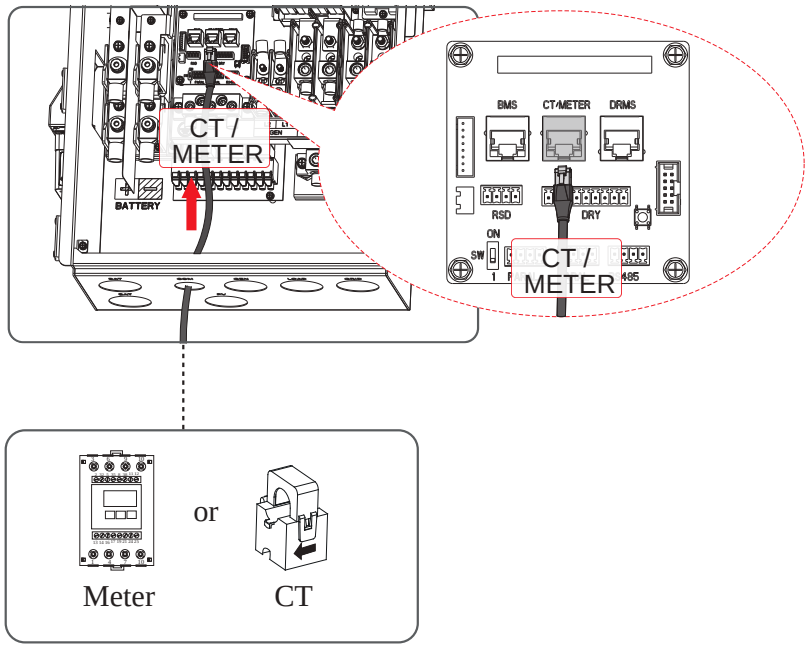
RJ45	Meter
Pin3(RS485_A)	Pin24
Pin4(RS485_B)	Pin25

CT/Meter Communication Cable Connection

Procedures

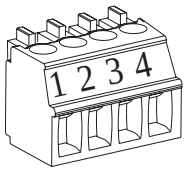
Step 1 Make the RJ45 terminal according to above function description of each Pin definition.

Step 2 Lead the CT/Meter cable through the COM port. And insert the RJ45 terminal into CT/METER port.



3.9 RS485 Connection

4-Pin interface for RS485 communication:



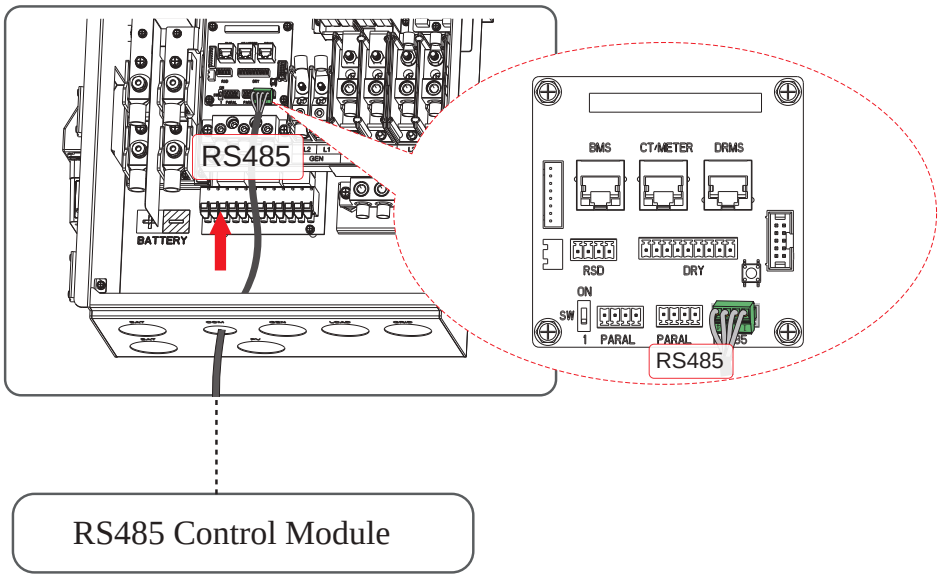
Pin	Function Description
1	RS485_A
2	RS485_B
3	RS485_A
4	RS485_B

RS485 Communication Cable Connection

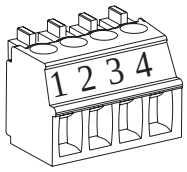
Procedures

Step 1 Make the 4-Pin terminal according to above function description of each Pin definition.

Step 2 Lead the RS485 cable through one COM port. And insert the 4-Pin terminal into RS485 port on inverter panel.



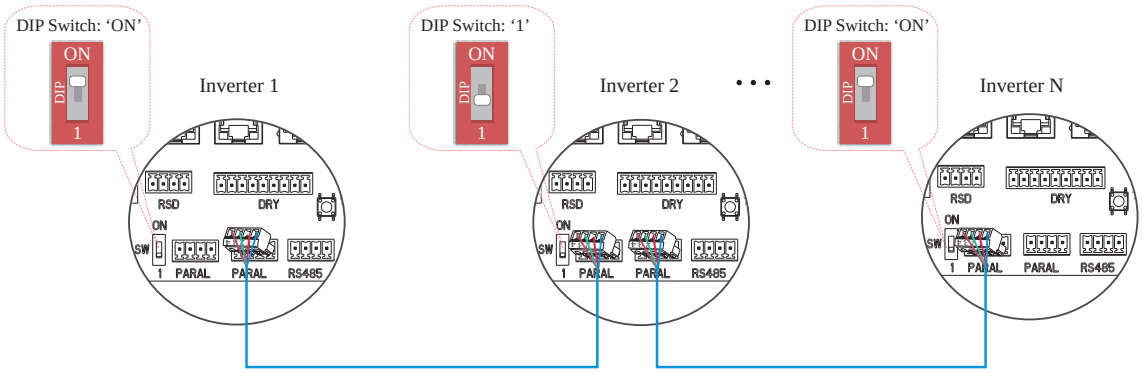
3.10 Parallel Communication Connection



Pin	Function Description
1	GND_S
2	PARA_SYNC
3	CAN_L
4	CAN_H

Parallel Communication Cable Connection

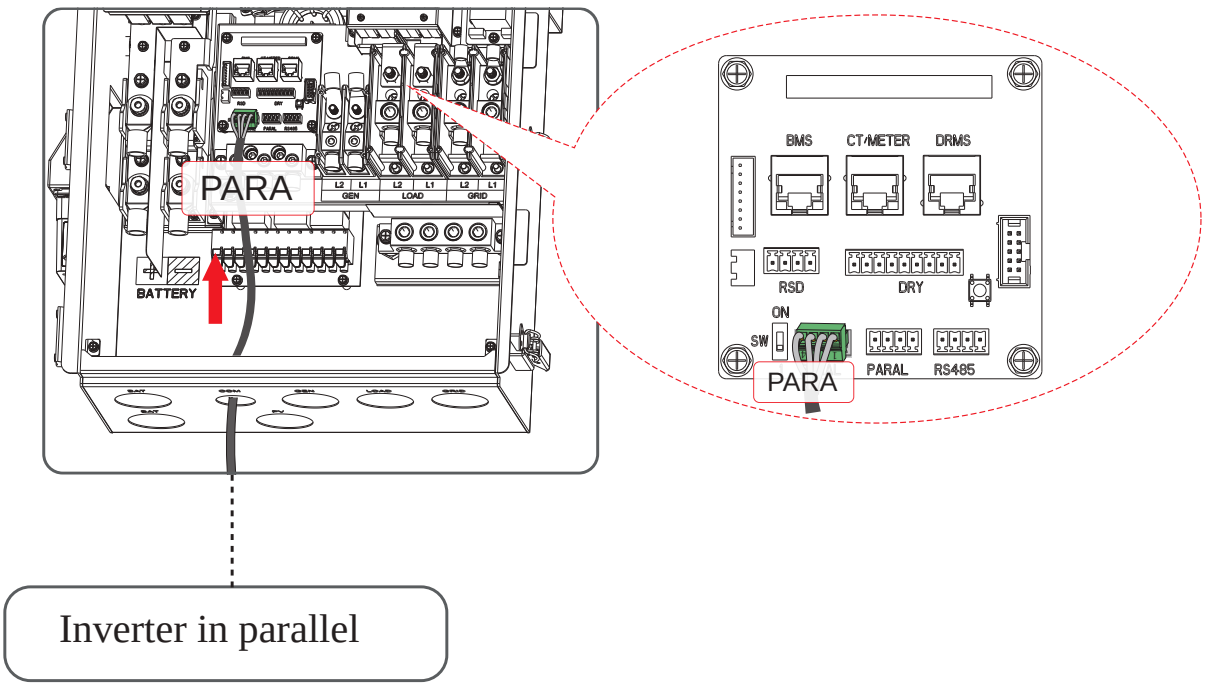
It is necessary to turn the matched resistance switch of inverter 1 and inverter N to “ON” in parallel connection mode.



Procedures

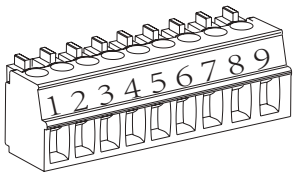
Step 1 Make the 4-Pin terminal according to above function description of each Pin definition.

Step 2 Lead the Parallel communication cable through one COM port. And insert the 4-Pin terminal into PARA port.



3.11 NTC/RMO/DRY Connection(s)

Pin 123456789

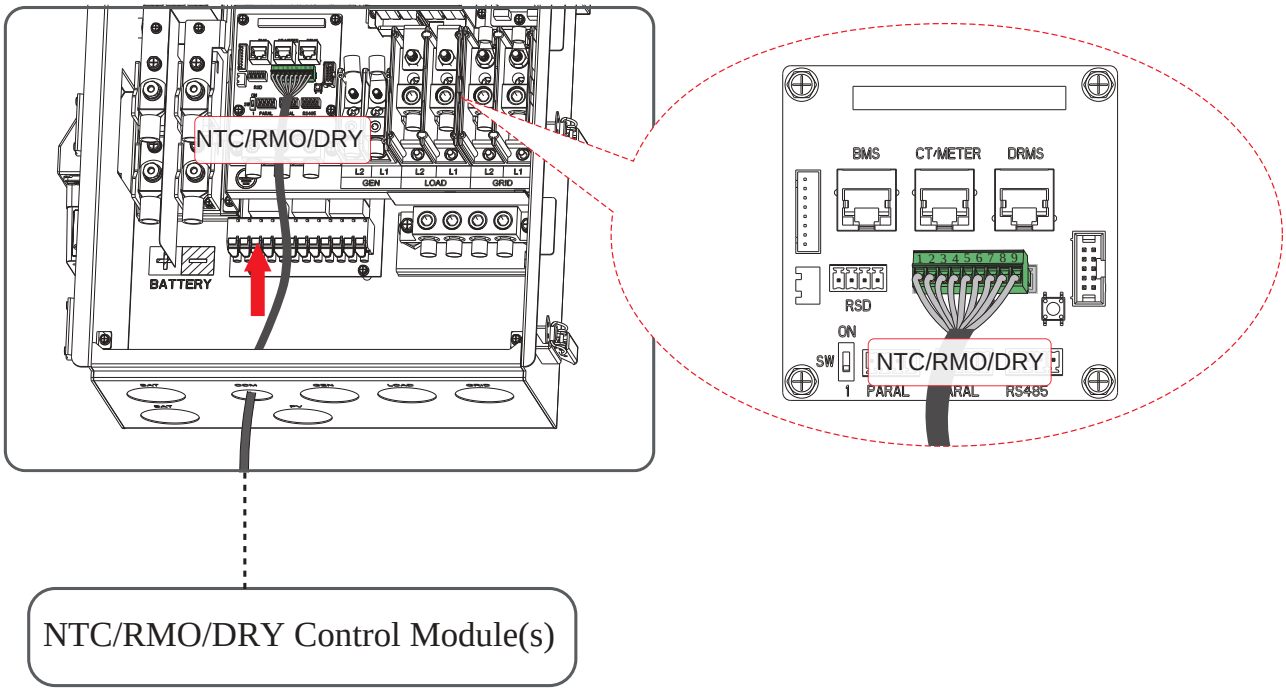


Pin	Function Description
1	GEN Control
2	GEN Control
3	NC1 (Normal Close)
4	NO2 (Normal Open)
5	N2
6	NC2 (Normal Close)
7	Remote Off
8	GND S (Lead-acid Battery NTC BAT)
9	Lead-acid Battery NTC BAT+

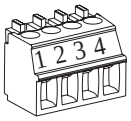
Procedures

Step 1 Make the 9-Pin terminal according to above function description of each Pin definition for the auxiliary port you want to use.

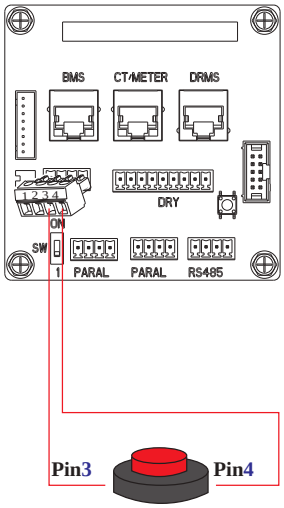
Step 2 Lead the NTC/RMO/DRY cable(s) through one COM port. And insert the 9-Pin terminal into DRY port.



3.12 RSD Connection



Pin	3	4
Description	Emergency Stop Signal Button	

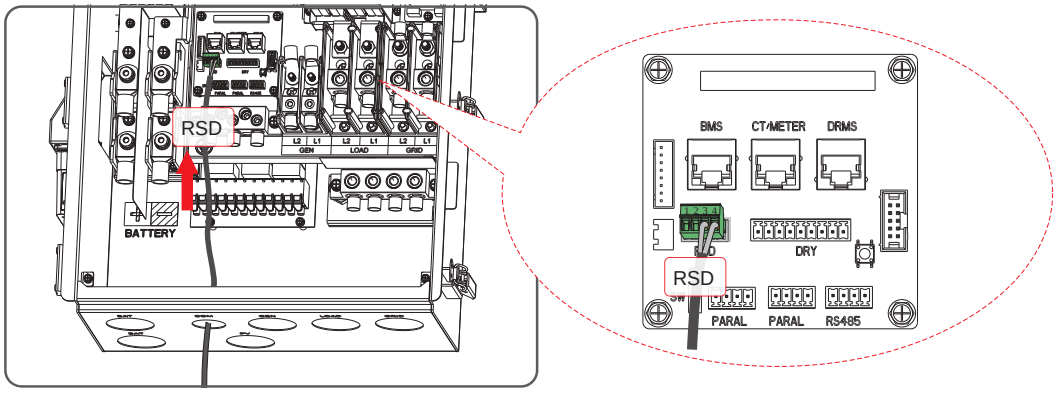


Normally Open Rapid Shutdown Signal Button

Procedures

Step 1 Make the 4-Pin terminal according to above function description of each Pin definition.

Step 2 Lead the RSD Communication cable through the COM port. And insert the 4-Pin terminal into RSD port.



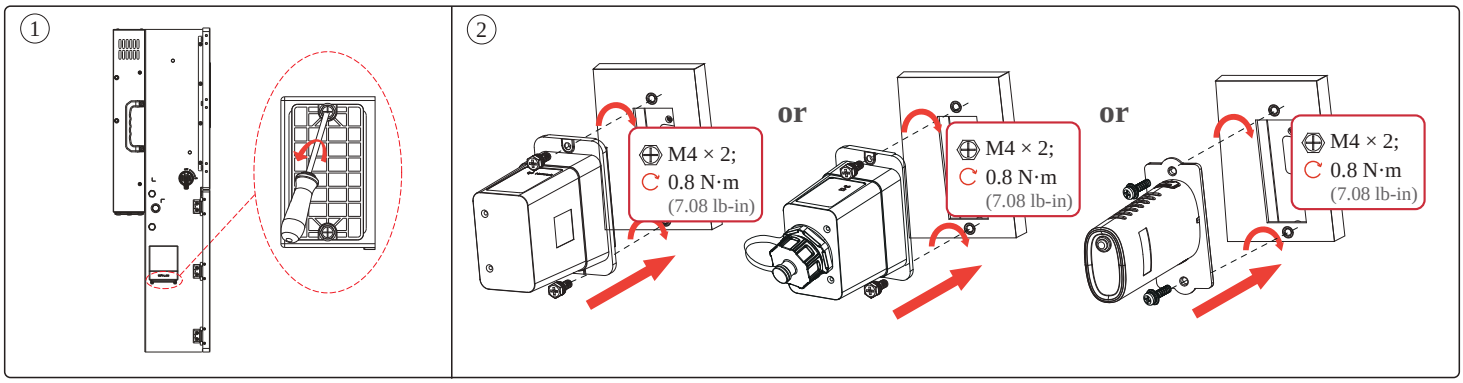
3.13 WiFi/LAN Module Connection

For details, please refer to the corresponding Module Installation Guide in the packing.
The appearance of module may be slightly different. The figure shown here is only for illustration.

Procedures

Step 1 Unscrew and remove the cover.

Step 2 Install and secure the module.



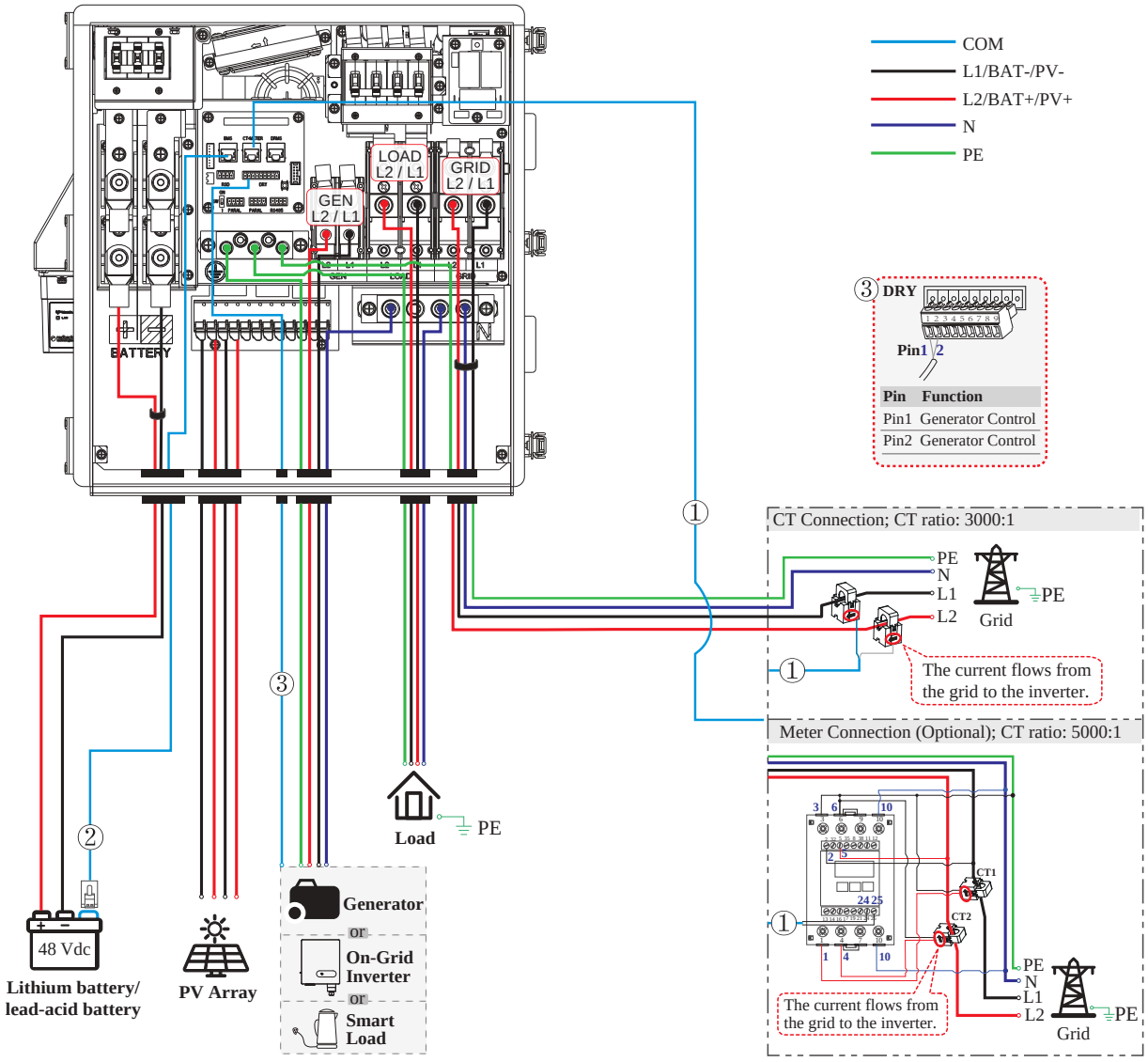
4. Wiring Diagrams

This Chapter illustrates wiring diagram of general use cases. While these diagrams offer general guidance, they may not encompass all variations and specifics required by load codes. Consult with relevant authorities and ensure compliance before proceeding wiring. The diagram presented herein are not exhaustive and should not be relied upon solely for permitting or warranty verification. Installers are encouraged to exercise caution, seek professional advice when necessary, and undertake installations in accordance with established electrical standards and regulations.

> ⚠ Ensure that the inverter and all cables to be installed have been completely powered off during the whole process of installation and connection. Otherwise, high voltage may result in fatal injury.

Standard Non-parallel Wiring Diagram

120/240Vac Split Phase
120/208Vac 2/3 Phase



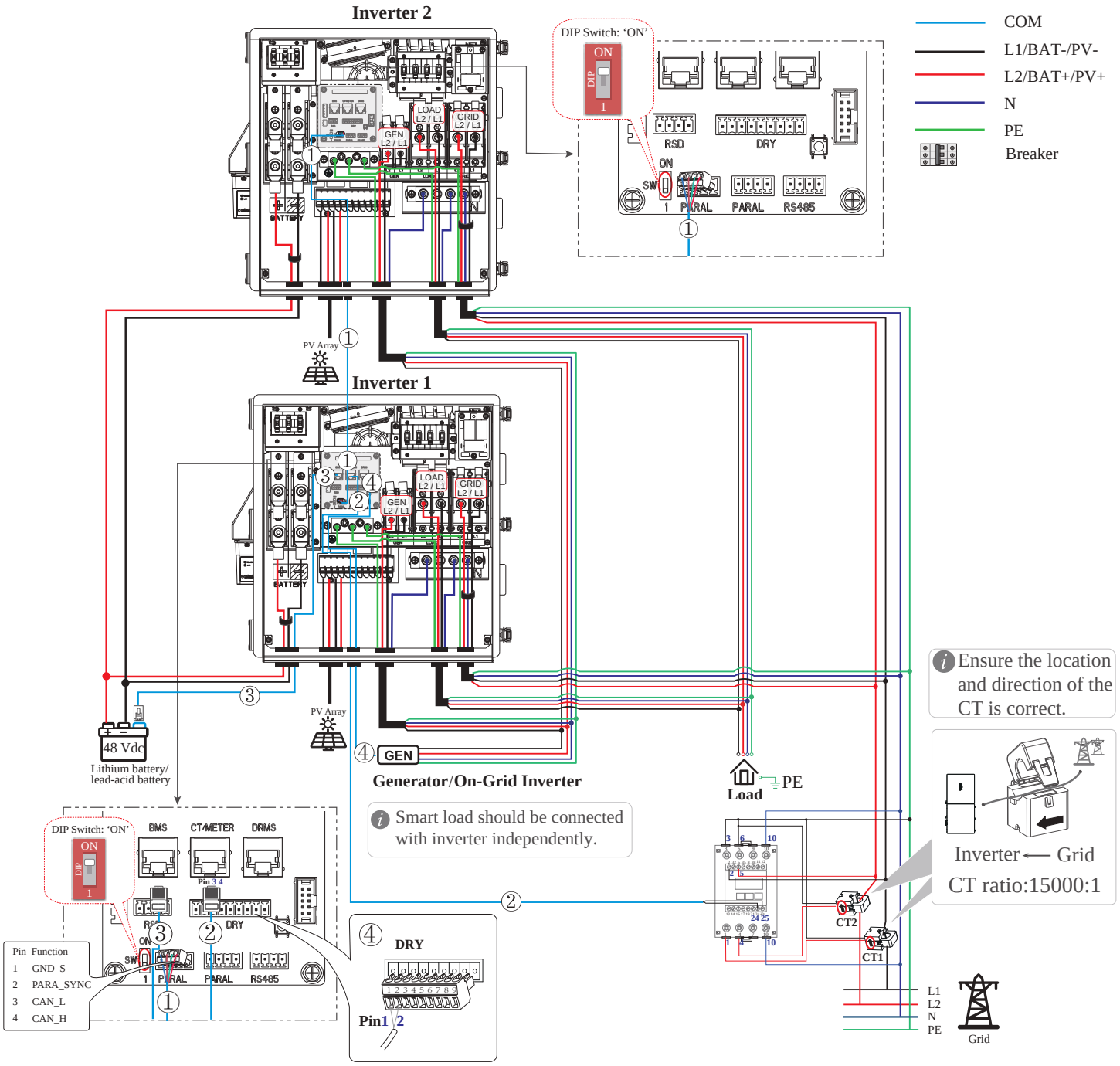
① CT/Meter communication connection (meter is optional)

② BMS communication connection (only for lithium battery)

③ DRY communication connection (only for GEN)

Split Phase Parallel Connection Mode-Scheme A (N=2)

120/240Vac Split Phase
120/208Vac 2/3 Phase



① Parallel communication connection

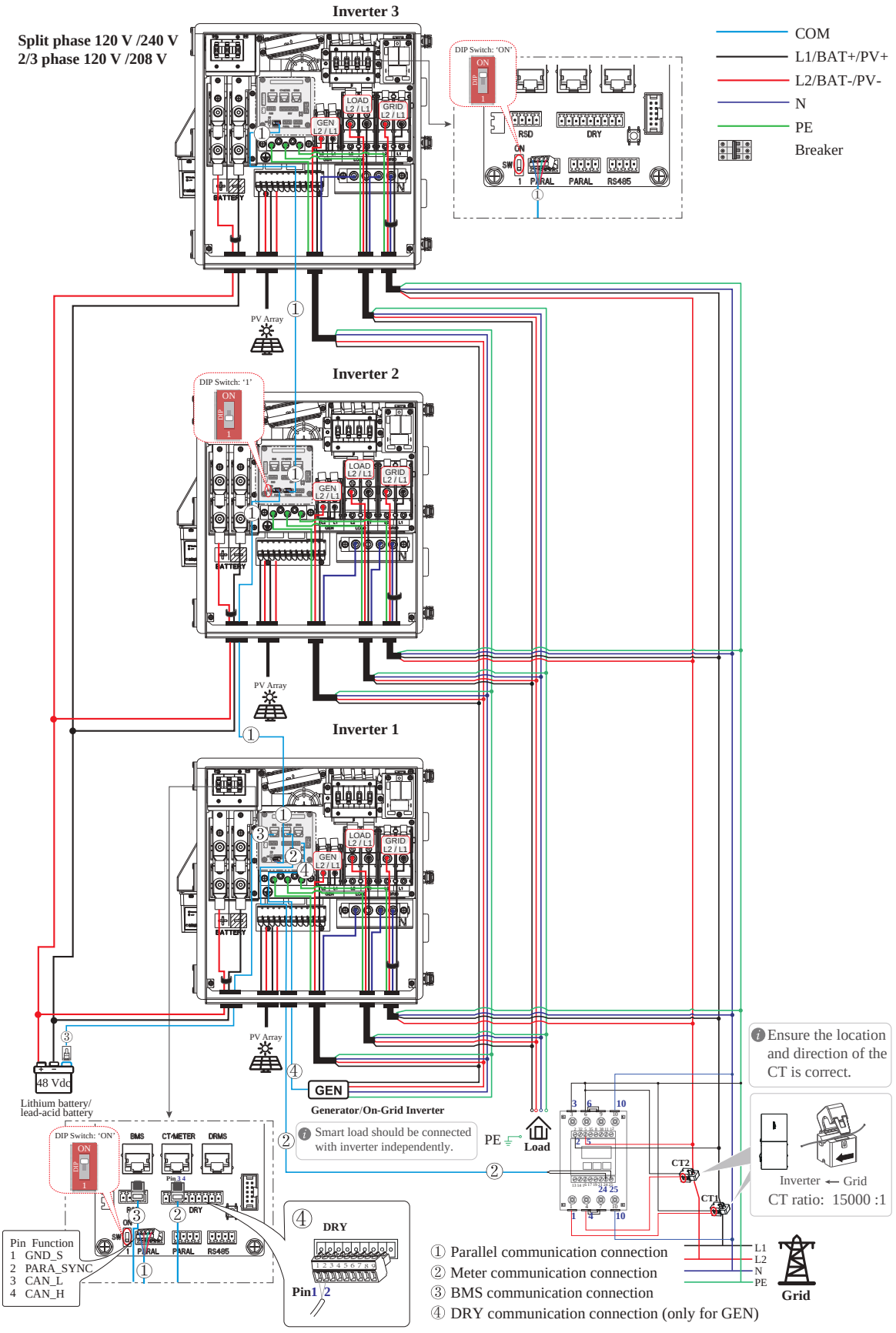
② Meter communication connection (meter is optional)

③ BMS communication connection (only for lithium battery)

④ DRY communication connection (only for GEN)

* Meter and BMS communication cables can be connected to any inverter of the parallel system, but they must be inserted into the same inverter and this inverter will be inverter 1.
* Please refer to **Note for parallel wiring diagrams** to learn more information about this parallel diagram.

Split Phase Parallel Connection Mode-Scheme B (N=3)



* Meter and BMS communication cables can be connected to any inverter of the parallel system, but they must be inserted into the same inverter and this inverter will be inverter 1.

* Please refer to **Note for parallel wiring diagrams** to learn more information about this parallel diagram.

Note for parallel wiring diagrams

1. BMS communication connection is only for lithium battery.
2. It is necessary to turn the matched resistance switch (or DIP switch) of inverter 1 and inverter N to “ON” and others to “1” in parallel connection mode.
3. It is necessary to additionally purchase suitable CT and energy meter according to the specific requirements in parallel connection mode-Scheme B in which the CT ratio is 15000:1.
4. Under parallel connection mode, it is required to connect APP to one of the inverters in the system, and then go to ***Console > Hybrid Setting> Other >Parallel mode*** to enable parallel mode on APP.
5. In one parallel system, the smart load is only allowed to be connected to GEN port in a non-parallel way.
6. The external DC/AC breakers are not supplied with the inverter and must be purchased separately. Prepare the external parallel breakers with a nominal current $\geq 2 * N * I_{max}$. (N refers to the parallel inverter quantity; I_{max} refers to the maximum output current of the inverter.)

5. Operation

5.1 Inverter Working Mode

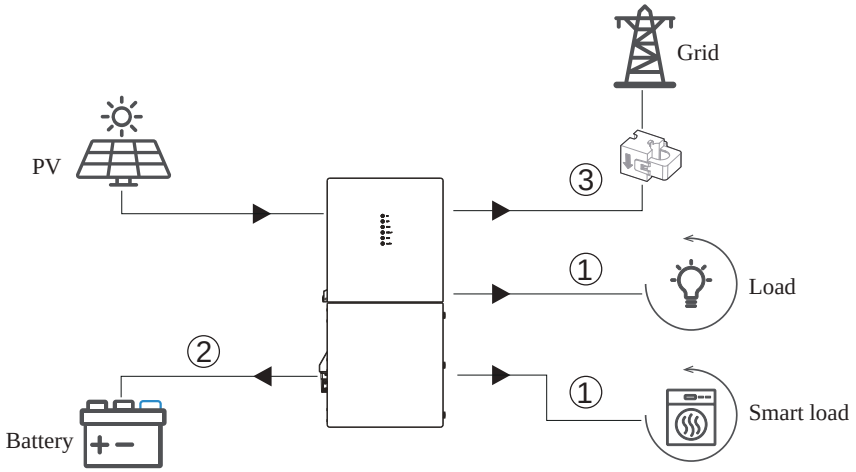
The inverter supports several different working modes.

5.1.1 Self-consumption Mode

Go to the "Hybrid Setting" menu, and select the "Self-consumption mode".
In Self-consumption mode, the priority of PV energy consumption will be Load > Battery > Grid, that means the energy produced by PV gives priority to loads, the excess energy is used to charge the battery and the remaining energy is fed into the grid.
This is the default mode to increase energy effeciency. There are several situations of self-consumption working mode based on PV energy.

Abundant PV Energy

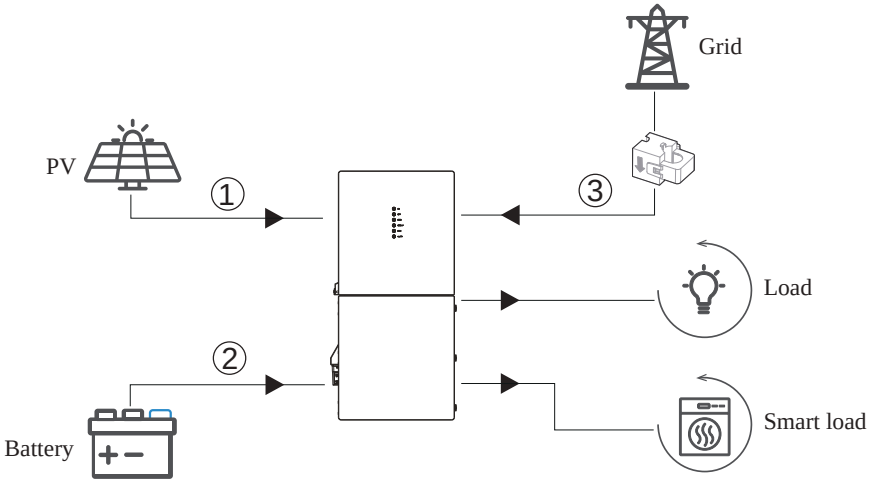
When PV energy is abundant, the inverter delivers PV energy to the load, the battery, and then the grid in sequence.



① ② ③ is the sequence of PV energy transmission.

Limited PV Energy

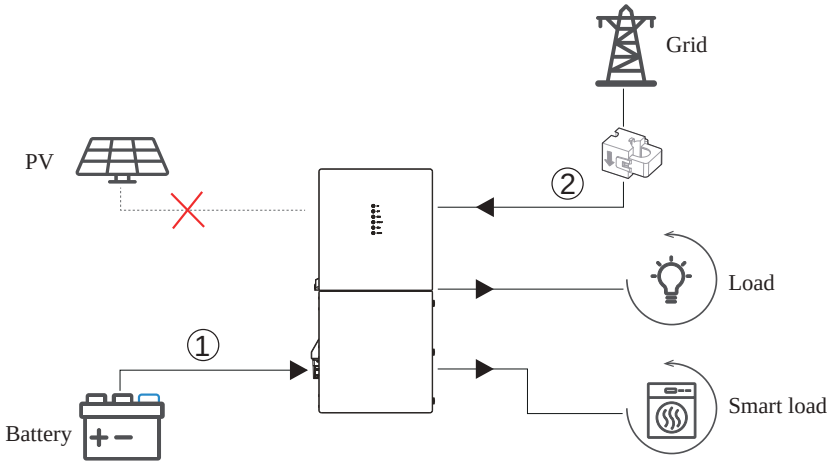
When the PV energy is not enough to cover all consumption, the PV energy will be entirely used by loads, and the insufficient part will be supplied by battery. Then still insufficient parts will be supplied by grid.



① ② ③ is the sequence of loads consumption.

No PV Input

When there is no PV input, such as in the evening or some cloudy or rainy days, the inverter will first discharge the battery energy for load consuming. If the load demand is not met, the loads will consume grid energy.



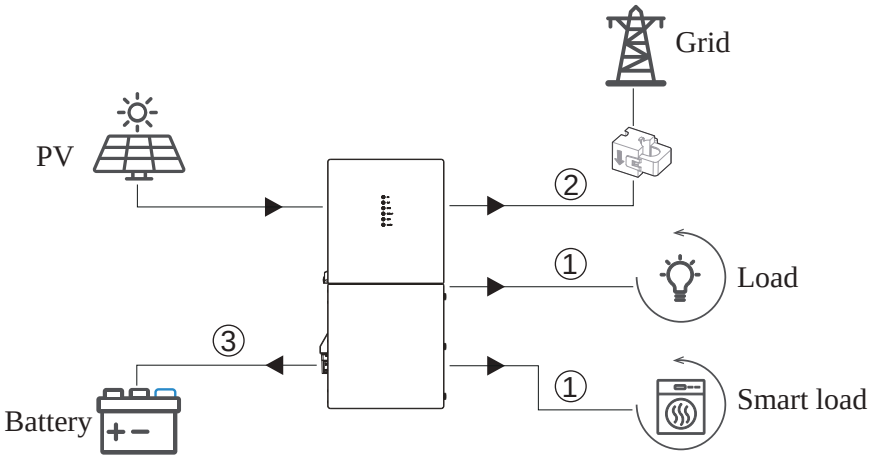
① ② is the sequence of loads consumption.

5.1.2 Feed-in Priority Mode

Go to the "Hybrid Setting" menu, and select the "Feed-in priority mode".
Under this mode, the priority of PV energy consumption will be Load > Grid > Battery, that means the energy produced by PV gives priority to powering local loads, the excess energy is fed into the grid, and the remaining energy is used to charge the battery.

Abundant PV Energy

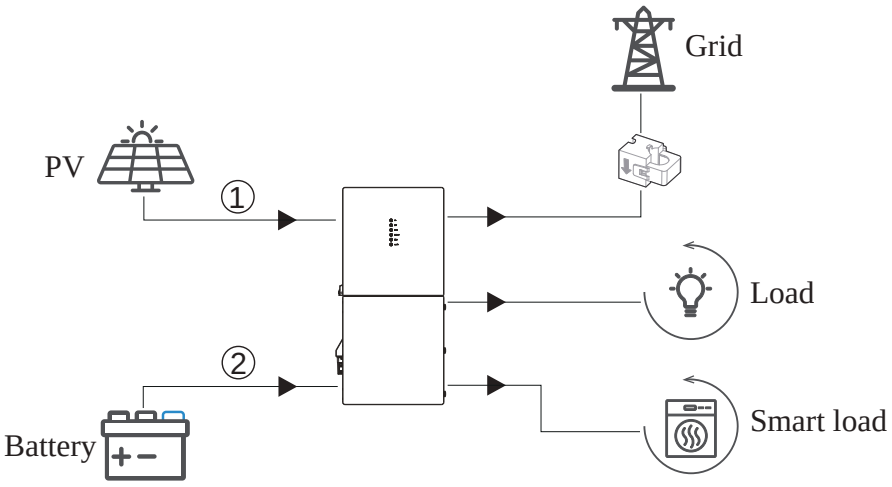
When PV energy is abundant, the PV energy will be first consumed by loads. If there is excess PV power, the power will be fed into grid. If there is still PV energy left after load consuming and grid feeding, then the remaining PV power will be used to charge the battery.



① ② ③ is the sequence of PV energy transmission.

Limited PV Energy

When PV energy is limited and can not meet the feed-in grid power, the battery will discharge to meet it.

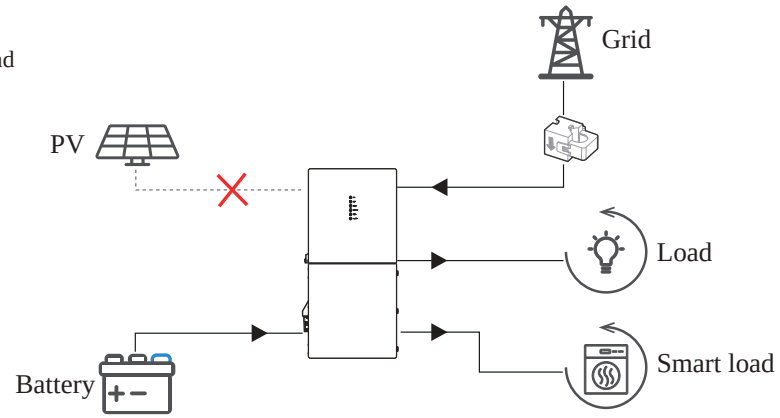


① ② is the sequence of grid feed-in energy

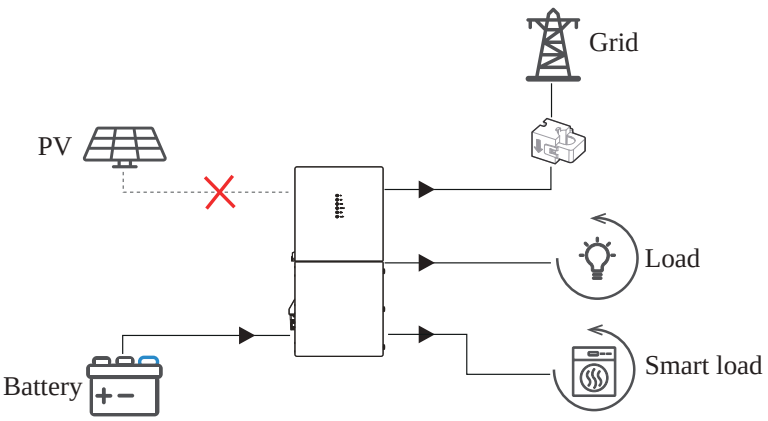
No PV Input

The inverter will first discharge the battery energy for home load consuming when no PV input, such as in the evening or some cloudy or rainy days. If the demand is not met, the loads will consume the grid energy.

$P_{BAT} < P_{Load}$



$P_{BAT} \geq P_{Load}$



5.1.3 Back-up Mode

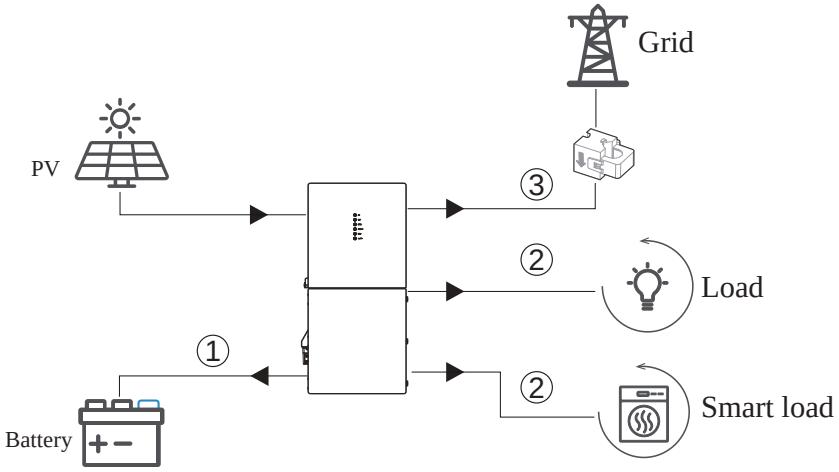
Go to the "Hybrid Setting" menu, and select the "Back-up Mode". In this mode, the priority of PV energy consumption will be Battery > Load > Grid.
This mode aims to charge the battery quickly, and at the same time, you can choose whether to allow AC to charge the battery.

Forbid AC Charging

In this mode, the battery can be charged only with PV power, and the charging power varies with PV power.

Abundant PV Energ

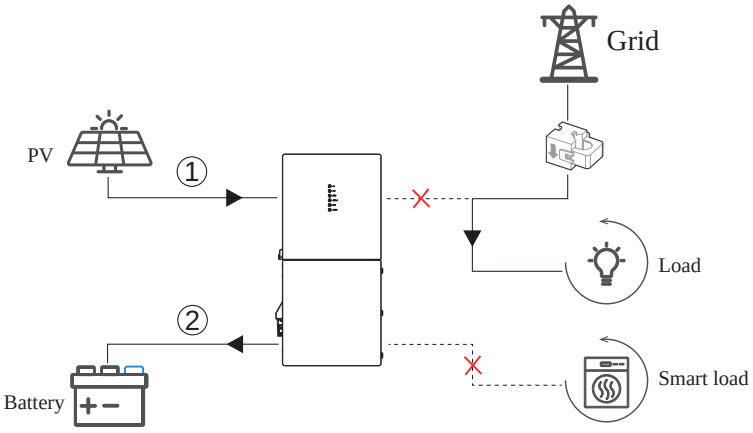
When PV energy is abundant, PV charges the battery first, then meets the load, and the rest is fed into the grid.



① ② ③ is the sequence of PV energy transmission.

Limited PV Energy

When PV energy is limited, PV gives priority to charging the battery, and the grid directly meets the load demand.



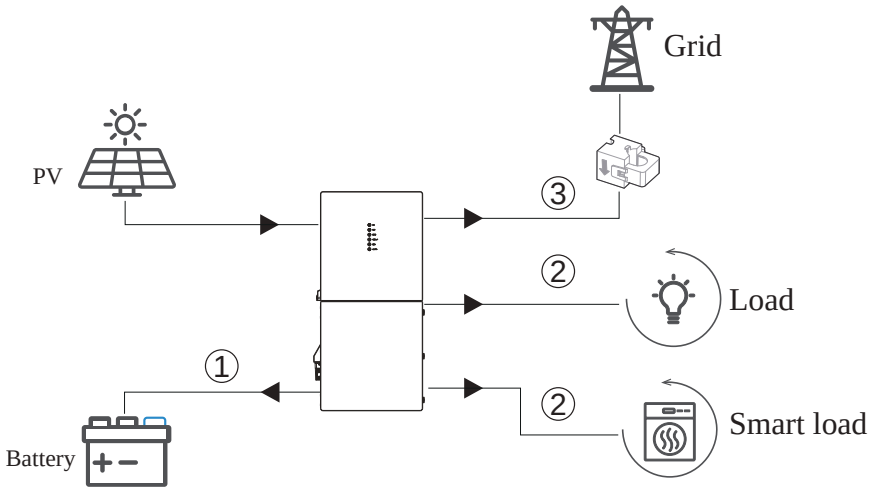
① ② is the sequence of PV energy transmission.

Allow AC Charging

In this situation, the battery can be charged by PV and AC.

Abundant PV energy

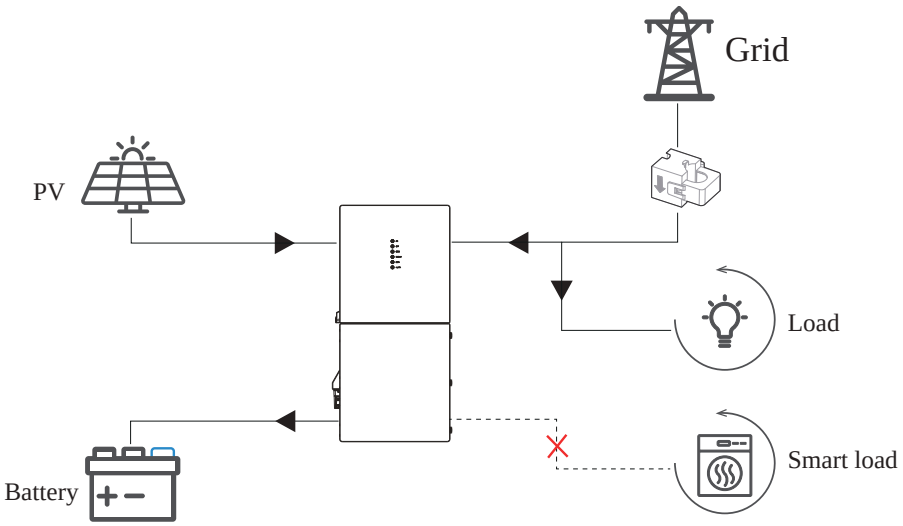
When PV energy is abundant, PV charges the battery first, then meets the loads, and the rest is fed into the grid.



① ② ③ is the sequence of PV energy transmission.

Limited PV Energy

When the PV energy is not enough to charge the battery, the grid energy will charge the battery as supplement. Meanwhile, the grid energy is consumed by loads.

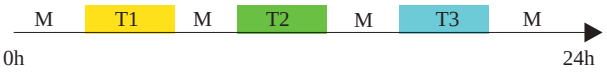


5.1.4 Forced Charge/Discharge Function

According to the demands of application, the user can set the inverter to work on forced charge/discharge the battery in any working mode.

There are three time periods in which you can set this function. Outside of the set periods, the inverter returns to its original working mode. The forced charge/discharge function has the highest priority.

The relationship between the forced charge/discharge function and working mode shown as below.



M : Self-consumption Mode/Feed-in Priority Mode/Back-up Mode
T1: Time period 1 for forced charge/discharge parameter setting
T2: Time period 2 for forced charge/discharge parameter setting
T3: Time period 3 for forced charge/discharge parameter setting
T1, T2, and T3 priority to M.
For the detail settings, please go to ***Console > Hybrid Setting*** to enable ***Time-based Control*** on App.

5.1.5 Off Grid Mode

When the power grid is lost, the system automatically switches to Off-grid mode.
In this mode, inverter can't work without battery.

Declaration for Off-grid Function

- For hybrid inverters, the electrical installation typically includes connection of the inverter to both PV modules and batteries. If there is no available power from batteries or PV modules in off-grid mode, the load port power supply will be automatically terminated. The manufacture shall hold no liability for any consequences arising from failure to follow this instruction.
- Normally, the off-grid mode switchover time is less than 10 ms. However, the system may fail to enter off-grid mode due to some external factors. Therefore, the users must be aware of the conditions and comply the following instructions:
  - Do not connect loads that require a stable power supply for reliable operation.
  - Do not connect the loads whose total capacity is greater than the maximum load port capacity.
  - Do not connect the loads that may cause very high start-up current surges, such as airconditioner, high-power pump, vacuum cleaner, and hair drier.
  - Due to the condition of the battery itself, battery current might be limited by some factors, including but not limited to the temperature and weather.

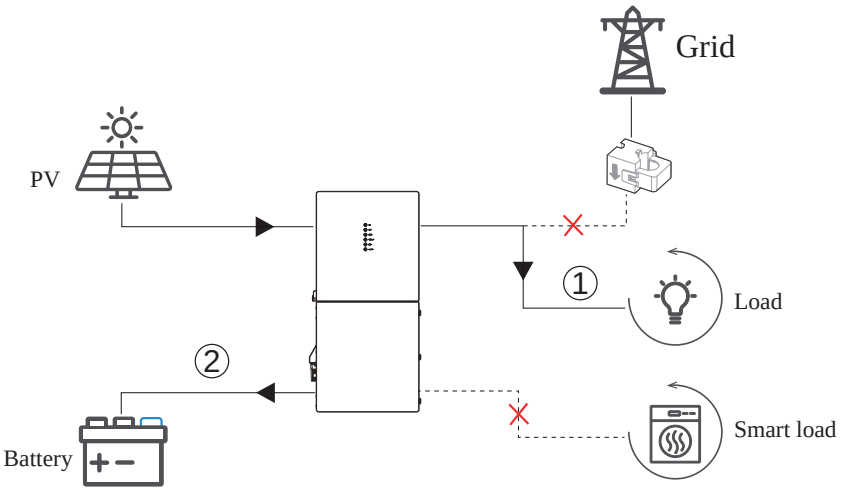
Declaration for Off-grid Overload Protection

- Since the inverter is connceted to the grid via Grid terminal directly and provide 200 A power to the load, once the grid is lost, inverter is unable to supply 200 A power to the load. An over load alarm will occur and the load power will be cut off.
- The inverter will restart in case of overload protection. The restarting time will be 3 minutes if overload protection repeats. After the cumulative overload times up to three, the inverter will be locked. You can unlock the inverter by pressing the power button for 1s to clear the overload alarm. Try to reduce load port power within the maximum limit or remove the loads that may cause very high start-up current surges.

1. In this mode, please complete the output voltage and frequency settings.
2. It is better to choose the battery capacity greater than 100 Ah to ensure load port function works normally.
3. If output loads are inductive or capacitive loads, to make sure the stability and reliability of system, it is recommended to configure the power of these loads to be within 50% of load port output power range.

Abundant PV energy

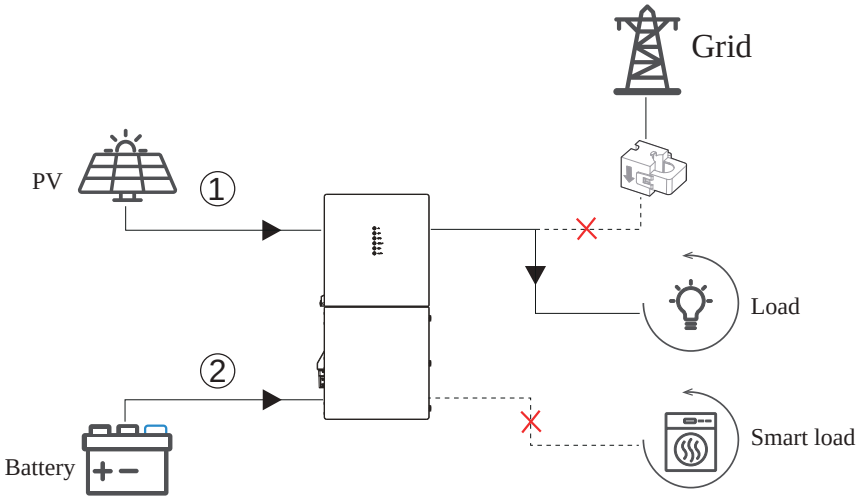
When PV energy is abundant, the PV power will be first consumed by the load, then charge the battery.



① ② ③ is the sequence of PV energy transmission.

Limited PV Energy

When PV energy is limited, loads are first powered by PV and then supplemented by battery.



① ② is the sequence of load consumption.

5.2 Startup/Shutdown Procedure

5.2.1 Startup

Before starting up, check whether the installation is secure and strong enough, and whether the system has been well grounded. Then make sure the connections of AC, battery, PV etc. are correct, and confirm the parameters and configurations conform to relevant requirements.

AC Frequency	50/60 Hz	PV Voltage	70 V to 540 V
Battery Voltage	40 V to 64 V	Grid AC Voltage	120/240 V (Split phase) / 208 V (2/3 phase)

Procedures

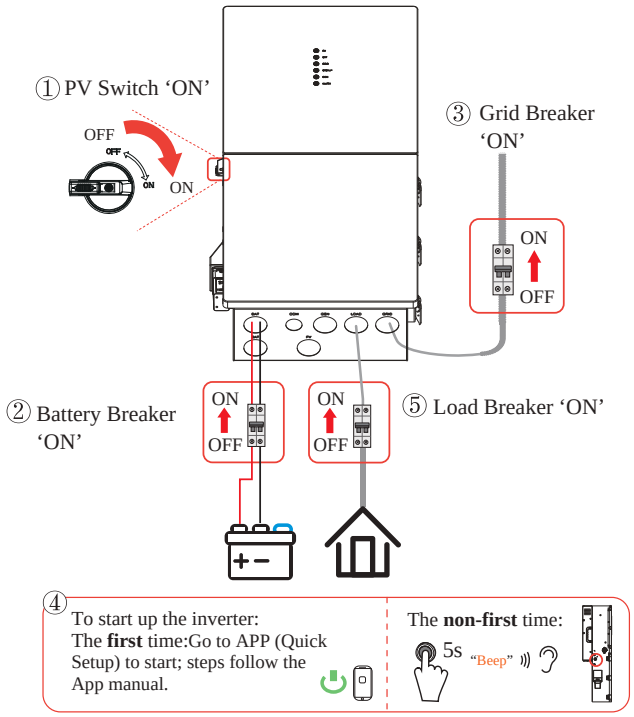
Step 1 Power on the PV Switch.

Step 2 Power on the DC breaker at BATTERY side.

Step 3 Power on the AC breaker at GRID side.

Step 4 Connect the cell phone App via Bluetooth. And click the Power ON in the App for the first time. Refer to App manual for details. Or you can hold the ON/OFF button on the side of the inverter for 5 s in this step when performing subsequent startup.

Step 5 Power on the AC breaker at LOAD side.



5.2.2 Commissioning

It is necessary to fully commission the inverter system for it is essential to protect the system from fire, electric shock, other damages, and personal injury.

Inspection

Before commissioning, the operator or installer (qualified personnel) must inspect the system carefully and ensure that:

1. The system is properly installed according to the contents and instructions in this manual, and there is sufficient space for operation, maintenance, and ventilation.
2. All terminals and cables are in good conditions.
3. No objects are left in/on the inverter or within the required clearance.
4. The PV and the battery pack are working normally, and the grid is normal.

5.2.3 Start Commissioning

When all items have been checked and the system is ready for use, start the commissioning procedure.

Procedures

Step 1 Power on the system by following the Startup Procedure in section 5.2.1.

Step 2 Set the parameters on the App according to user's needs.

Step 3 Complete commissioning.

5.2.4 Shutdown

Procedures

Step 1 Connect the cell phone App via Bluetooth. And click the Power OFF on the App. Refer to App manual for details. Or you can hold the ON/OFF button on the side of the inverter for 5 seconds in this step when performing subsequent shutdown.

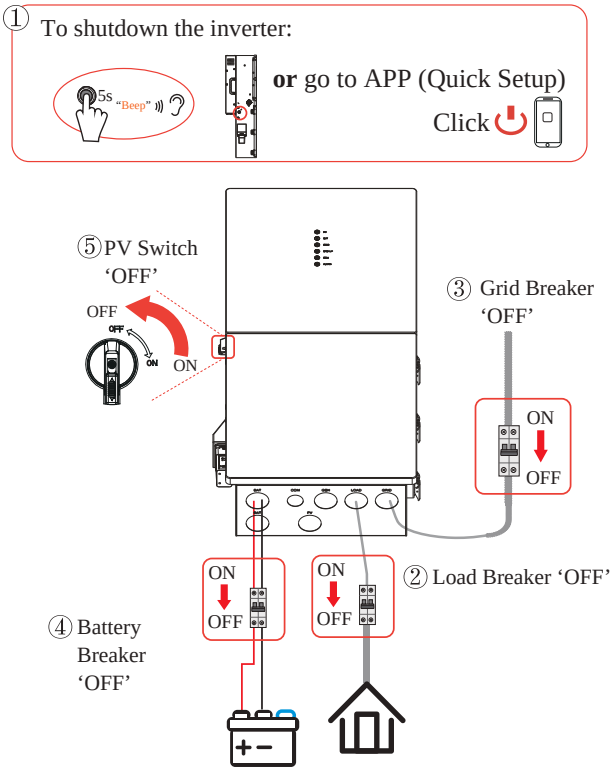
Step 2 Power off the AC breaker at BACKUP side.

Step 3 Power off the AC breaker at GRID side.

Step 4 Power off the DC breaker at BATTERY side.

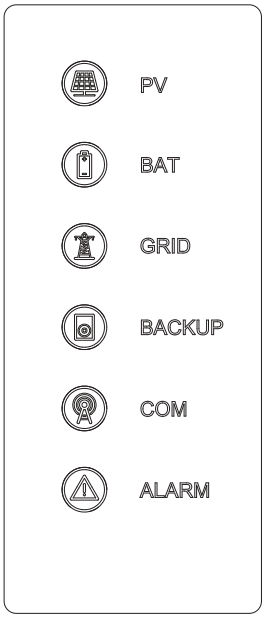
Step 5 Power off the PV Switch.

Step 6 To disconnect the inverter cables, please wait at least 5 minutes before touching them.



6. User Interface

6.1 LED Indicators



LED Indicator	Status	Description
PV	On	PV input is normal.
	Blink	PV input is abnormal.
	Off	PV is unavailable.
BAT	On	Battery is charging.
	Blink	Battery is discharging.
		Battery is abnormal.
	Off	Battery is unavailable.
GRID	On	GRID is available and normal.
	Blink	GRID is available and abnormal.
	Off	GRID is unavailable.
COM	Blink	Data are communicating.
	Off	No data transmission.
BACKUP	On	BACKUP power is available.
	Blink	BACKUP output is abnormal.
	Off	BACKUP power is unavailable.
ALARM	On	Fault has occurred and inverter shuts down.
	Blink	Alarms have occurred but inverter doesn't shut down.
	Off	No fault.

6.2 LED Indicating Code

The below table details common status of the LED indicators and its indicating code.

Description	Code	PV LED	Grid LED	BAT LED	BACKUP LED	COM LED	ALARM LED
PV normal		●	◎	◎	◎	◎	○
No PV		○	◎	◎	◎	◎	○
PV over voltage	B0	★	◎	◎	◎	◎	○
PV under voltage	B4						
PV irradiation weak	B5						
PV string reverse	B7						
PV string abnormal	B3						
On grid		◎	●	◎	◎	◎	○
Bypass output							

Description	Code	PV LED	Grid LED	BAT LED	BACKUP LED	COM LED	ALARM LED
Grid absent	A2	◎	○	◎	◎	◎	○
Grid over voltage	A0	◎	★	◎	◎	◎	○
Grid under voltage	A1						
Grid over frequency	A3						
Grid under frequency	A4						
Grid abnormal	A6						
Grid over mean voltage	A7						
Neutral live wire reversed	A8						
Battery in charge		◎	◎	●	◎	◎	○
Battery unavailable		◎	◎	○	◎	◎	○
Battery absent	D1						
Battery in discharge		◎	◎	★★	◎	◎	○
Battery under voltage	D3	◎	◎	★	◎	◎	○
Battery over voltage	D2						
Battery discharge over current	D4						
Battery over temperature	D5						
Battery under temperature	D6						
Communication loss (Inverter - BMS)	D8						
BACKUP output active		◎	◎	◎	●	◎	◎
BACKUP output inactive		◎	◎	◎	○	◎	◎
BACKUP short circuit	DB	◎	◎	◎	★	◎	○
BACKUP over load	DC						
BACKUP output voltage abnormal	D7						
BACKUP over dc-bias volt-age	CP						
RS485/DB9/BLE/USB		◎	◎	◎	◎	★	◎
Inverter over temperature	C5	◎	◎	◎	◎	◎	★
Fan abnormal	C8						
Inverter in power limit state	CL						
Data logger lost	CH						
Meter lost	CJ						
Remote off	CN						

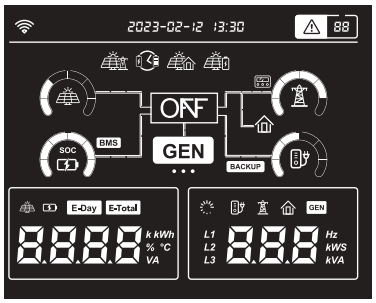
Description	Code	PV LED	Grid LED	BAT LED	BACKUP LED	COM LED	ALARM LED
PV insulation abnormal	B1	◎	◎	◎	◎	◎	●
Leakage current abnormal	B2						
Internal power supply abnormal	C0						
Inverter over dc-bias current	C2						
Inverter relay abnormal	C3						
GFCI abnormal	C6						
System type error	C7						
Unbalance Dc-link voltage	C9						
Dc-link over voltage	CA						
Internal communication error	CB						
Internal communication loss(E-M)	D9						
Internal communication loss(M-D)	DA						
Software incompatibility	CC						
Internal storage error	CD						
Data inconsistency	CE						
Inverter abnormal	CF						
Boost abnormal	CG						
Dc-dc abnormal	CU						

6.3 LCD Screen (Optional)

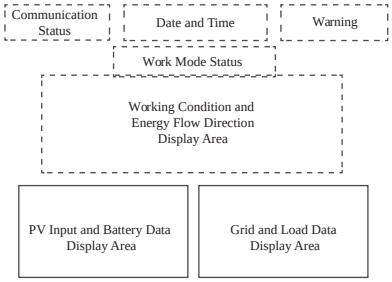
LCD screen is optional for this series of inverters. If you choose a LCD screen, the following introduction will help you understand the function of each icon displayed.

> LCD screen will be automatically turned off if there is no operation within 10 mins (which cannot be changed by default). You can press the ON/OFF button on the side of inverter to wake up the LCD screen.

Menu Structure Overview

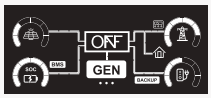
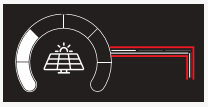


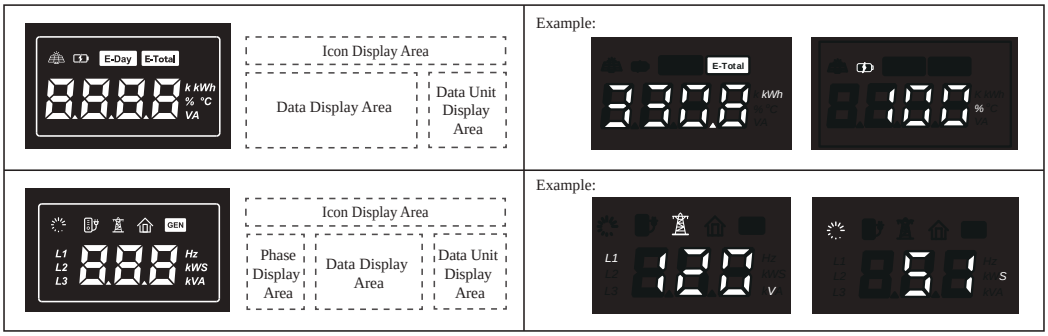
Actual LCD Screen



Function Overview

Icon Introduction-1

	This icon indicates **WIFI** connection status.
	The **date and time** display information about year, month, day, and hour. The ':' between hour and minute flashes once a second.
	The **Warning icon** only displays when an error occurs. For the specific warning code explanation, please refer to the chapter Inverter Troubleshooting.
	These four icons show **different operating statuses**. Please refer to Chapter Inverter Working Mode for a detailed introduction.  **Feed-in Priority Mode**  **Self-used Mode**  **Time-based Control Function**  **Back-up Charging Mode**
	This area shows the **working conditions and energy flow directions**. Please refer to Table Icon Status Description for a detailed introduction to each icon displayed.
	The **Energy Bars** indicate the direction of energy flow. Each bar lights up one by one, then turns off when all bars light and repeats this cycle again.
	The **Energy Ring** indicates the battery SOC or the current power percentage. Each Energy Ring definition is as follows.  PV Input Power  ***On-Grid Mode***: Grid Output Power ***Non On-Grid Mode:*** Bypass load consumption power + Backup consumption power  Battery SOC  Backup
	 Grid undervoltage  Grid overvoltage



Icon Introduction-2

	The **PV icon** represents the power of PV.
	The **Battery icon** represents the current battery charge percentage or the voltage of battery.
E-Day	The **E-Today icon** represents the electricity energy generated today.
E-Total	The **E-Total icon** represents the electricity energy generated in total.
	When the **Loading icon** is on, it indicates that the device is starting, and the start timer countdown is displayed. The icon lights up a cluster of lights every second until all lights are on, and then it repeats the whole process again.
	The **Back-Up icon** represents the relevant power, frequency or voltage of backup.
	The **Grid icon** represents the relevant power, frequency or voltage of the Grid.
	The **Load icon** represents the power consumption.
GEN	The **GEN icon** represents the voltage or power of generator.
L1 L2 L3	The **L1 icon** represents L1 phase of Grid/Backup/Generator. The **L2 icon** represents L2 phase of Grid/Backup/Generator. The **L3 icon** represents L3 phase of Grid/Backup/Generator.
	These two areas will display corresponding data of each lit icon mentioned above.

Icon Status Description

Icon Status Description			
Icon	**Name**	**Light**	**Description**
	PV	ON	Any PV voltage exists (it should be higher than the Min. PV Startup Voltage) .
		OFF	PV Voltage is lower than the Min. PV Startup Voltage.
	Grid	ON	Grid Voltage and frequency are normal.
		OFF	Grid overvoltage / undervoltage / overfrequency / underfrequency occurs.
	Battery	ON	Bat. Voltage is higher than the Rated Min. Bat Voltage.
		OFF	Bat. Voltage is lower than the Rated Min. Bat Voltage.
	Back-Up Load	ON	Backup relay is on.
		OFF	Backup relay is off.
	BMS	ON	Battery is set to BMS Type and its communication is normal.
		Blink	BMS communication is abnormal.(The icon indicator on for one second, off for one second)
		OFF	1. Battery is not set to BMS Type.
			2. Battery voltage is lower than Rated Min. Voltage
	BACKUP	ON/OFF	Lights up with Back-Up Load icon simultaneously
	Meter/CT	ON	Power Limit is set to CT or Meter in APP, and the CT/Meter communication is normal, the Grid side is running well.
		Blink	When Meter/CT communication is lost, Meter/CT icon on for one second, off for one second)
		OFF	1. Power Limit is not set to CT or Meter.
			2. The voltage or frequency of grid side is abnormal.
	Load	ON/OFF	Lights up with Grid icon simultaneously.
	ON	ON	1. Backup relay is on.
			2. The inverter works under On-Grid mode.
			3. The inverter works under Off-Grid mode.
	OFF	OFF	Non-on working mode.
	Generator / Smart Load / Inverter	From left to right, when the three dots light up, each represents a different meaning.	
		When GEN communication is lost, GEN icon will go off.	
	GEN	ON	Generator relay is on.
		OFF	Generator replay is off.
	Generator dot	ON	In APP, the "Gen port" parameters are set to "Generator Input" and the generator relay is powered on.
		OFF	APP parameter is set to Non 'Generator Input'.
	Smart Load dot	ON	In APP, the "Gen port" parameters are set to "Smart Load Output" and the generator relay is powered on.
		OFF	APP parameter is set to Non 'Smart Load Output'.
	Inverter dot	ON	In APP, the "Gen port" parameters are set to "Inverter Input" and the generator relay is powered on.
		OFF	APP parameter is set to Non 'Inverter Input'.

7. APP Setting

This chapter only illustrator the basic setting of APP. For more details, please refer to the APP manual.

7.1 Download App

- Scan the QR code on the inverter to download the APP.
- Download APP from the App Store or Google Play.

> Before using the local setting, the App should access some permissions. (You can allow them when you install the App or grant permissions in your own phone setting.) When the App asks for permission, please click Allow.

7.2 Local Login

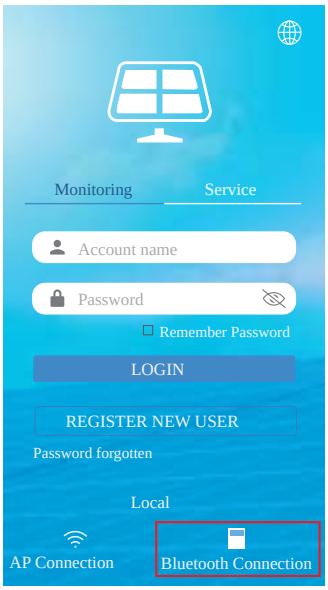
Procedures

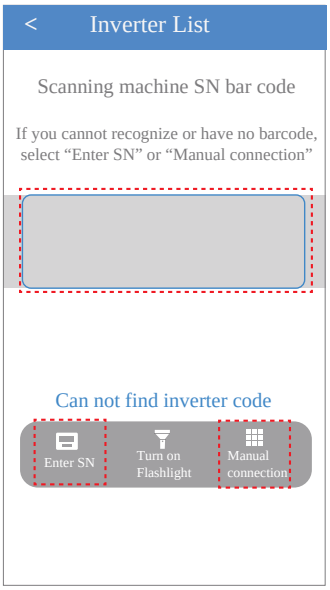
Step 1 Enable the Bluetooth on your own phone and open the APP, then click the Bluetooth Connection.

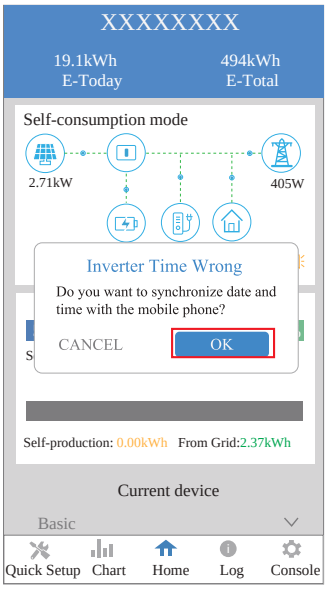
Step 2 To connect the inverter, please choose one of the following three ways:

- Scan machine SN barcode
- Enter SN
- Manual connection

Step 3 Click OK.







7.3 Quick Setup

The quick setup is required for the first local login. Please perform the following steps.

Procedures

Step 1 Click ***Quick Setup.***

Step 2 Firstly please read tips on the screen carefully. Secondly choose the WiFi SSID and enter the WiFi password. Then click the ***START THE CONFIGURATION*** button and wait for WiFi router loading successfully. Finally click the ***Next.***

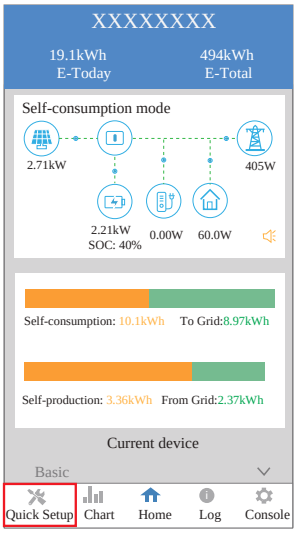
> Please use the 2.4G network frequency band for configuration.

Step 3 Set Standard Code and Date and Time parameters. Then click the ***Next***.

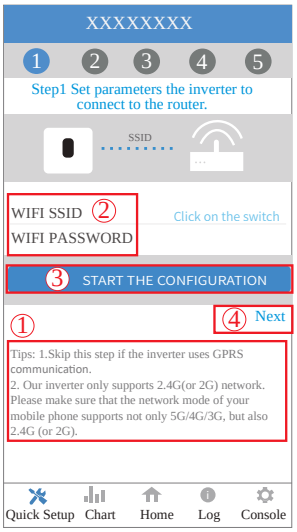
Step 4 Set parameters for the inverter to connect to the power limit. ***Power control*** and ***Meter type*** can be set in this step or later according to the Grid monitoring device (CT is selected by default) . Then click the ***Next***.

Step 5 Set parameters for the inverter to connect to the work mode and battery type. Then click the ***Next***.

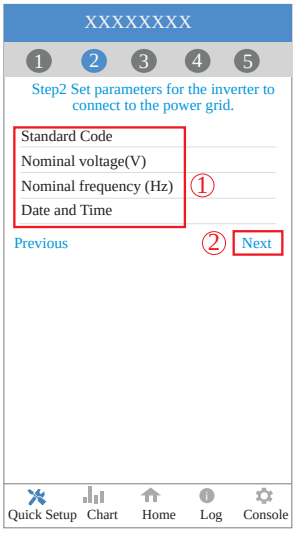
Step 6 Click the power button to turn on the inverter.



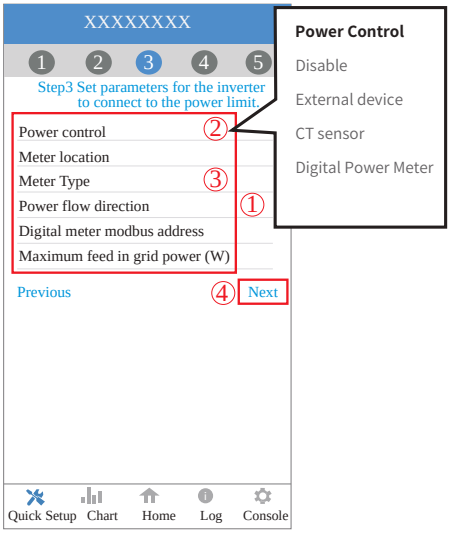
Step 1



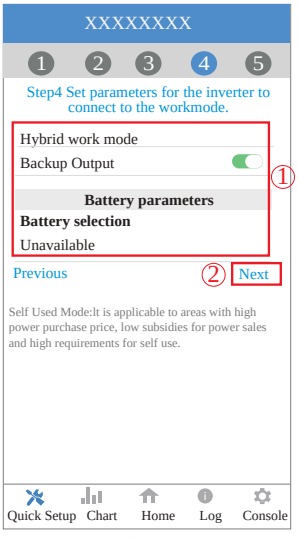
Step 2



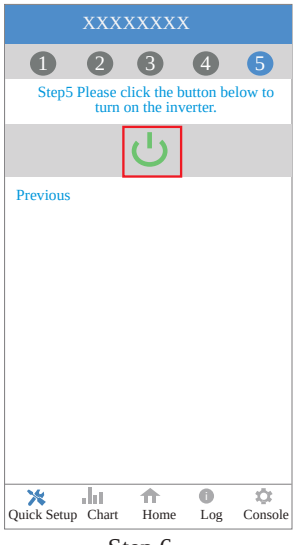
Step 3



Step 4



Step 5



Step 6

8. Maintenance

⚠ Before maintaining and commissioning inverter and its peripheral distribution unit, switch off all the charged terminals of the inverter and wait at least 10 minutes after the inverter is powered off.

8.1 Routine Maintenance

Items	Check content	Maintain Content	Maintenance Interval
Inverter output status	Statistically maintain the status of electrical yield, and remotely monitor its abnormal status.	N/A	Weekly
Inverter running status	• Check that the inverter is not damaged or deformed. • Check for normal sound emitted during inverter operation. • Check and ensure that all inverter communications are running well.	If there is any abnormal phenomenon, replace the relevant parts.	Monthly
Inverter electrical connections	• Check that all AC, DC and communication cables are securely connected; • Check that PGND cables are securely connected; • Check that all cables are intact and free from aging.	If there is any abnormal phenomenon,replace the cable or re-connect it.	Semiannually
Inverter cleaning	Check periodically that the heat sink is free from dust and blockage.	Clean periodically the heat sink.	Yearly

8.2 Troubleshooting

When a fault occurs, please perform troubleshooting according to the following solutions. Contact your dealer if these solutions do not work.

Code	Fault	Solution
A0	Grid over voltage	1. If the alarm occurs occasionally, possibly the power grid voltage is abnormal temporarily, and no action is required. 2. If the alarm occurs repeatedly, contact the local power station. After receiving approval of the local power bureau,revise the electrical protection parameter settings on the inverter through the App. 3. If the alarm persists for along time, check whether the AC circuit breaker /AC terminals is disconnected, or if the grid has a power outage.
A1	Grid under voltage	
A3	Grid over frequency	
A4	Grid under frequency	
A2	Grid absent	Wait till power is restored.
B0	PV over voltage	Check whether the maximum input voltage of a single PV string exceeds the MPPT working voltage. If yes, modify the number of PV module connection strings.
B1	PV insulation abnormal	1. Check the insulation resistance against the ground for the PV strings. If a short circuit has occurred, rectify the fault. 2. If the insulation resistance against the ground is less than the default value in a rainy environment, set insulation resistance protection on the App.
B2	Leakage current abnormal	1. If the alarm occurs occasionally, the inverter can be automatically recovered to the normal operating status after the fault is rectified. 2. If the alarm occurs repeatedly, contact your dealer for technical support.
B4	PV under voltage	1. If the alarm occurs occasionally, possibly the external circuits are abnormal accidentally. The inverter automatically recovers to the normal operating status after the fault is rectified. 2. If the alarm occurs repeatedly or last a long time, check whether the insulation resistance against the ground of PV strings is too low.
C0	Internal power supply abnormal	1. If the alarm occurs occasionally, the inverter can be automatically restored, and no action is required. 2. If the alarm occurs repeatedly, please contact the customer service.
C2	Inverter over dc-bias current	1. If the alarm occurs occasionally, possibly the power grid voltage is abnormal temporarily, and no action is required. 2. If the alarm occurs repeatedly, and the inverter fails to generate power, contact the customer service.

Code	Fault	Solution
C3	Inverter relay abnormal	1. If the alarm occurs occasionally, possibly the power grid voltage is abnormal temporarily, and no action is required. 2. If the alarm occurs repeatedly, please refer to the suggestions or measures of Grid over voltage. 3. If the inverter fails to generate power, contact the customer service center. If there is no abnormality on the grid side, the machine fault can be determined. (If you open the cover and find traces of damage to the relay, it can be concluded that the machine is faulty.) And please contact the customer service.
CN	Remote off	1. Local manual shutdown is performed in APP. 2. The monitor executed the remote shutdown instruction. 3. Remove the communication module and confirm whether the alarm disappears. If yes, replace the communication module. Otherwise, please contact the customer service.
C5	Inverter over temperature	1. If the alarm occurs occasionally, the inverter can be automatically recovered. No action is required. 2. If the alarm occurs repeatedly, please check whether the installation site has direct sunlight, bad ventilation, or high ambient temperature (such as installed on the parapet). Yet, if the ambient temperature is lower than 45° C and the heat dissipation and ventilation is good, please contact customer service.
C6	GFCI abnormal	1. If the alarm occurs occasionally, it could have been an occasional exception to the external wiring. The inverter can be automatically recovered. No action is required. 2. If it occurs repeatedly or cannot be recovered for a long time, please contact customer service.
B7	PV string reverse	Check and modify the positive and negative polarity of the input string.
C8	Fan abnormal	1. If the alarm occurs occasionally, please restart the inverter. 2. If it occurs repeatedly or cannot be recovered for a long time, check whether the external fan is blocked by other objects. Otherwise, Please contact customer service.
C9	Unbalance Dc-link voltage	1. If the alarm occurs occasionally, the inverter can be automatically recovered. No action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Please contact customer service.
CA	Dc-link over voltage	
CB	Internal communication error	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls.contact the customer service center.
CC	Software incompatibility	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls. contact the customer service center.

Code	Fault	Solution
CD	Internal storage error	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls.contact the customer service center.
CE	Data inconsistency	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls. contact the customer service center.
CF	Inverter abnormal	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls.contact the customer service center.
CG	Boost abnormal	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls.contact the customer service center.
CJ	Meter lost	1. Check the meter parameter Settings 2. Local APP checks that the communication address of the inverter is consistent with that of the electricity meter 3. The communication line is connected incorrectly or in bad contact 4. Electricity meter failure. 5. Exclude the above, if the alarm continues to occur, please contact the customer service center.
P1	Parallel ID warning	It is Parallel ID Alarm. Please. check the parallel communication cable, and check whether any inverter joins or exits online. All inverters are powered off completely, check the line, and then power on the inverters again to ensure that the alarm is cleared.
P2	Parallel SYN signal warning	Parallel synchronization signal is abnormal. Check whether the parallel communication cable is properly connected.
P3	Parallel BAT abnormal	The parallel battery is abnormal. Whether the battery of the inverter is reported low voltage or the battery is not connected.
P4	Parallel GRID abnormal	The parallel grid is abnormal. Whether the grid of the inverter is abnormal.
P5	Phase Sequence abnormal	Ensure that Set phase position on APP is consistent with the power grid phase. There are two ways to clear this alarm: 1. Power off each inverter, change the phase sequence for each inverter and then power on inverter. 2. Standby each inverter, change the phase sequence for each inverter on APP, power off inverter, and then power on inverter. If exclude the above, the alarm continues to occur, please contact the customer service center.

Code	Fault	Solution
D2	Battery over voltage	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. Check that the battery overvoltage protection value is improperly set. 3. The battery is abnormal. 4. If exclude the above, the alarm continues to occur, please contact the customer service center.
D3	Battery under voltage	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. Check the communication line connection between BMS and inverter (lithium battery). 3. The battery is empty or the battery voltage is lower than the SOC cut-off voltage. 4. The battery undervoltage protection value is improperly set. 5. The battery is abnormal. 6. If exclude the above, the alarm continues to occur, please contact the customer service center.
D4	Battery discharger over current	1. Check whether the battery parameters are correctly set. 2. Battery undervoltage. 3. Check whether a separate battery is loaded and the discharge current exceeds the battery specifications. 4. The battery is abnormal. 5. If exclude the above, the alarm continues to occur, please contact the customer service center.
D5	Battery over temperature	1. If the alarm occurs repeatedly, please check whether the installation site is in direct sunlight and whether the ambient temperature is too high (such as in a closed room). 2. If the battery is abnormal, replace it with a new one. 3. If exclude the above, the alarm continues to occur, please contact the customer service center.
D6	Battery under temperature	
D7	BACKUP output voltage abnormal	1. Check whether the BACKUP voltage and frequency Settings are within the specified range. 2. Check whether the BACKUP port is overloaded. 3. When not connected to the power grid, check whether BACKUP output is normal. 4. If exclude the above, the alarm continues to occur, please contact the customer service center.
D8	Communication error (Inverter-BMS)	1. Check whether the battery is disconnected. 2. Check whether the battery is well connected with the inverter. 3. Confirm that the battery is compatible with the inverter.It is recommended to use CAN communication. 4. Check whether the communication cable or port between the battery and the inverter is faulty. 5. If exclude the above, the alarm continues to occur, please contact the customer service center.

Code	Fault	Solution
D9	Internal communication loss(E-M)	1. Check whether the communication cables between BACKUP, electricity meter and inverter are well connected and whether the wiring is correct. 2. Check whether the communication distance is within the specification range. 3. Disconnect the external communication and restart the electricity meter and inverter.. 4. If exclude the above, the alarm continues to occur, please contact the customer service center.
DA	Internal communication loss(M-D)	
CU	Dcdc abnormal	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, please check: • Check whether the MC4 terminal on the PV side is securely connected • Check whether the voltage at the PV side is open circuit, ground to ground, etc. 3. If exclude the above, the alarm continues to occur, please contact the customer service center.
CP	BACKUP over dc-bias voltage	1. If the alarm occurs occasionally, the inverter can be automatically recovered and no action is required. 2. If the alarm occurs repeatedly, the inverter cannot work properly. Pls. contact the customer service center.
DB	BACKUP short circuit	1. Check whether the live line and null line of BACKUP output are short-circuited. 2. If it is confirmed that the output is not short-circuited or an alarm, please contact customer service to report for repair. (After the troubleshooting of alarm problems, BACKUP switch needs to be manually turned on during normal use.)
DC	BACKUP over load	1. Disconnect the BACKUP load and check whether the alarm is cleared. 2. If the load is disconnected and the alarm is generated, please contact the customer service. (After the alarm is cleared, the BACKUP switch needs to be manually turned on for normal use.)

9. Technical Specification

Model	11K4HB-T2/LV-ULP
Efficiency	
CEC. Efficiency	96.50 %
Input (PV)	
Max. PV Input Power	15,000 W
Max. PV Voltage	600 V
Start-up Voltage	90 V
MPPT Operating Voltage Range	70 V to 540 V
Max. Input Current per MPPT	30 A / 22 A / 22 A
Max Short Current per MPPT	40 A / 30 A / 30 A
No. of PV Strings per MPPT	2 / 2 / 2
No. of MPPT	3
Input / Output (BAT)	
Battery Type	Lithium-ion/Lead-acid
Nominal Battery Voltage	51.2 V
Battery voltage range	40 V to 64 V
Max. charge/discharge current	210 A / 210 A
Max. charge/discharge power	10,000 W / 10,000 W
Output / Input (Grid)	
Nominal AC Output Power	11,400 W
Max. AC Output Apparent power	11,400 VA
Max. AC Output Current	47.5 A
Max. Grid Passthrough Current	200 A
Nominal Grid Voltage	120 V / 240 V (Split phase) ,120 V / 208 V (2/3 phase)
Nominal Grid Frequency	50 Hz /60 Hz
Grid Frequency Range	45 Hz to 55 Hz / 55 Hz to 65 Hz (Adjustable)
Power Factor	> 0.99 @rated power (Adjustable 0.8 LG to 0.8 LD)
THDI	< 3 % (Rated Power)
Output (Load)	
Nominal Output Power	11,400 W
Max. AC Output Power (PF=1)	11,400 W
Nominal Output Current	47.5 A
Peak Output Apparent Power	150 %,10 s
Nominal Output Voltage	120 V / 240 V (Split phase) ,120 V / 208 V (2/3 phase)
Nominal Output Frequency	50 Hz / 60 Hz
Transfer Time	10 ms (typical)
THDV	< 3 % @100% R Load
Output/Input (GEN Port)	Max. 100 A / 24,000 W
Protection	
Protection Category	Class I
DC Switch	Yes
Anti-islanding Protection	Yes
AC Overcurrent Protection	Yes
DC/AC Overvoltage Protection	Yes
AC Short Circuit Protection	Yes

Model	**11K4HB-T2/LV-ULP**
PV Reverse Connection	Yes
Surge Arrester	DC Type II, AC Type II
Insulation Resistance Detection	Yes
Leakage Current Protection	Yes
Battery Breaker	Integrated (300 A)
Load Breaker	Integrated (2*200 A)
AFCI/RSD Monitoring	Yes
General	
Max. Operation Altitude	2000 m
Ingress Protection Degree	NEMA 3R
Operating Temperature Range	-25 ℃ to ~60℃ (> 45 ℃ derating)
Relative Humidity	0 % to 100 %
Cooling Method	Smart Cooling
Mounting	Wall bracket
Dimensions (W*H*D)	17.6*35.5*10.6 inch (448*901*270 mm)
Weight	47 Kg / 103.6 lb
HMI & COM	
Display	LED , LCD (optional)
Communication	CAN (for BMS), RS485 (for meter), RS485, CAN (for parallel), Optional: WiFi /LAN
Certification	
Safety	UL 1741/CSA C22.2/UL 1699B
EMC	FCC Part 15 Class B
Grid	UL1741SA, UL1741SB, UL 1741 PCS CRD, IEEE1547, HECO SRD 2.0, CSIP
Warranty	5 Years/10Years

NOTE