

**CSI-40K-T4001A-E**

**CSI-50K-T4001A-E**

**CSI-60K-T4001A-E**

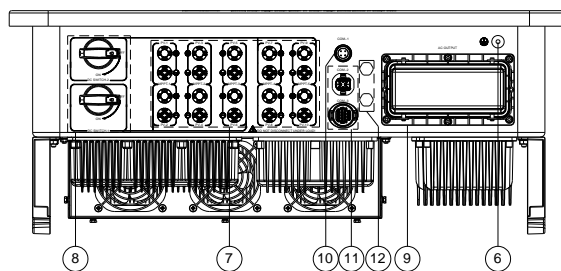


# **PV Inverter Quick Installation Guide**

(Part No: 91000469; Release Date: December, 2023)



CSI-60K-T4001A-E



- |                                   |   |
|-----------------------------------|---|
| 1. LED indicator panel            | 7. PV input connectors                      |
| 2. Side handles and mounting ears | 8. DC disconnect switch                     |
| 3. M12 holes for lifting eyes     | 9. AC terminal block and protection cover   |
| 4. Rating label                   | 10. Connector for wireless communication    |
| 5. Warning label                  | 11. Connectors for RS485 and export limited |
| 6. Additional grounding point     | 12. Breather valve                          |

FIG 2-1 Product introduction (The picture is for reference only)

### 3.1 Installation Environment Requirements

- 1) Do not install the inverter on structures constructed of flammable, thermolabile, or explosive materials.
- 2) Ensure the inverter is out of children's reach.
- 3) The ambient temperature should be between  $-30^{\circ}\text{C}$ ~  $60^{\circ}\text{C}$ .
- 4) The humidity of the installation location should be below 100% without condensation.
- 5) Do not install the inverter outdoors in salt, sulfur, or other corrosive areas.
- 6) Prevent the inverter from direct exposure to sun, rain and snow.
- 7) The inverter should be well-ventilated. Ensure air circulation.
- 8) Never install the inverter in living areas. The inverter will generate noise during operation, affecting daily life.
- 9) Install at an appropriate height for ease of viewing LED indicators and operating switches.

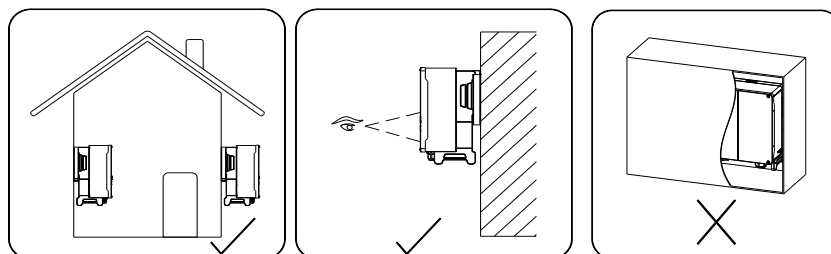


FIG 3-1 Installation site

### 3.2 Structural Requirements

The inverter(s) must be installed on a structure with a load-bearing capacity of  $>4$  times the inverter weight.

### 3.3 Installation Angle Requirements

Install the inverter vertically or at a minimum back tilt of  $10^{\circ}$ . Forward installation or upside-down installation is prohibited.

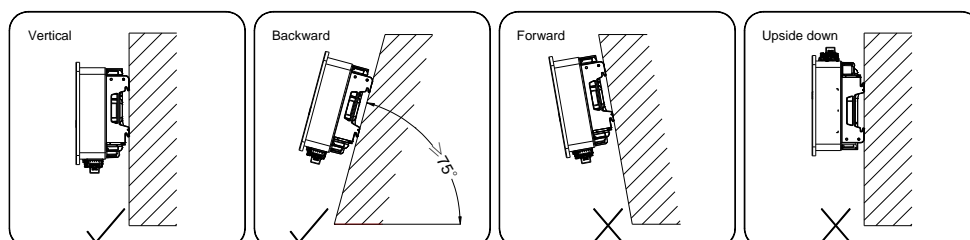


FIG 3-2 Installation angle

### 3.4 Installation Clearance Requirements

- 1) Reserve enough clearance around the inverter to ensure sufficient space for heat dissipation, as shown in FIG 3-3.  
( Under the premise of ensuring installability, the clearance on both sides of the inverter can be reduced to 200mm, but it is recommended to be  $\geq 500\text{mm}$ .)
- 2) In case of multiple inverters, reserve specific clearance between the inverters (FIG. 3-4).

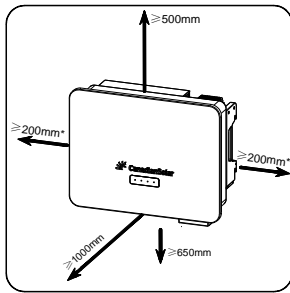


FIG 3-3 Single inverter installation clearance

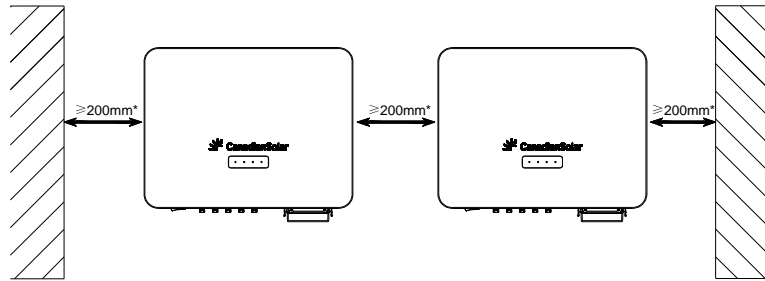


FIG 3-4 Multiple inverters installation clearance

- 3) In the case of back-to-back installation, reserve specific clearance between the two inverters.

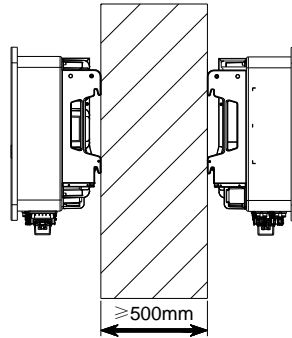


FIG 3-5 Back-to-back installation

### 3.5 Assembling the mounting bracket

The assembly of the mounting bracket and its dimensions are shown in FIG 3-6.

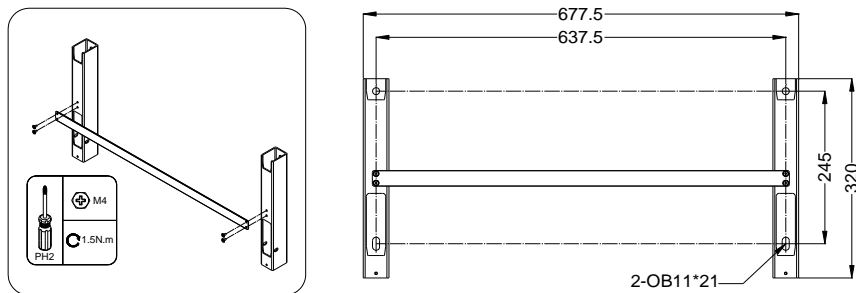


FIG 3-6 Assembly mounting bracket

#### 3.5.1 Standard C or U Steel Installation

Mounting Steps:

- Step 1: Localize the hole positions in C or U-section steel to install the mounting bracket.
- Step 2: Secure the mounting bracket with M8 bolts and nuts.

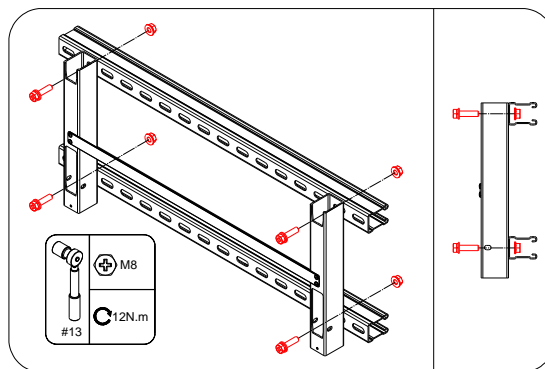


FIG 3-7 Locate the mounting hole

### 3.5.2 Steel Frame Installation

Mounting Steps:

Step 1: Level the assembled mounting bracket by using a level, and mark the positions for drilling holes on the steel frame.

Drill the holes. Recommended aperture 10mm.

Step 2: Secure the mounting bracket with M8 bolts and nuts.

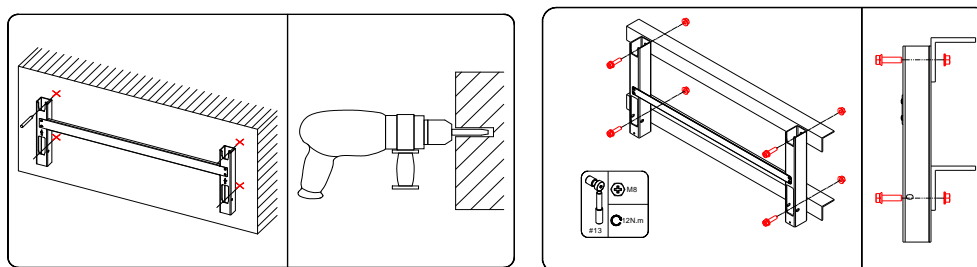


FIG 3-8 Install the wall bracket

### 3.5.3 Wall-Mounted Installation

M8 or M10 expansion bolts can be used to fix the mounting bracket on the wall. (Note: No expansion bolt is supplied)

Mounting Steps

Step 1: Level the assembled mounting bracket by using a level, and mark the positions for drilling holes on the wall.

Step 2: Insert the expansion bolts into the holes and secure them with a rubber hammer. Fasten the nut with a wrench to expand the bolt. Remove the nut, spring washer, and flat washer, and store them properly.

Step 3: Fix the mounting bracket using spring washers, flat washers and the nuts of the expansion bolts (FIG 3-9).

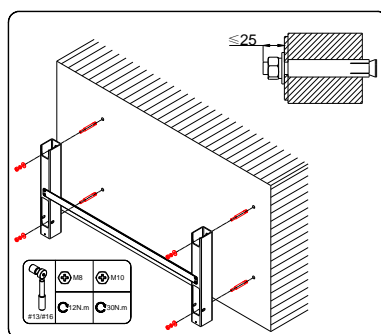


FIG 3-9 Wall-mounted installation

### 3.6 Inverter Installation

Step 1: Take out the inverter from the packing carton.

Step 2: If the inverter is installed in a high position, hoisting the inverter is recommended (refer to manual "4.3.2 Hoisting Transport"). If not, skip performing this step.

Step 3: Hang the inverter to the mounting bracket and ensure that the mounting ears perfectly engage with the mounting bracket.

Step 4: Fix the inverter with screws M6x30.

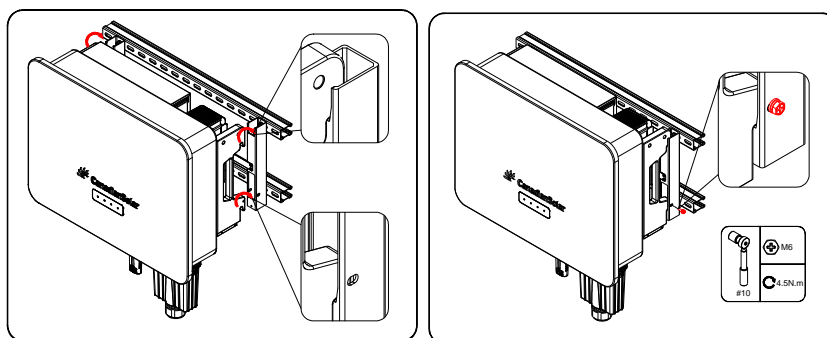


FIG 3-10 Install the inverter

## 4 Electrical Connection

### 4.1 Electrical Connection Overview

A) PV string; B) Inverter; C) AC distribution box/cabinet; D) Utility grid; E) Monitoring device

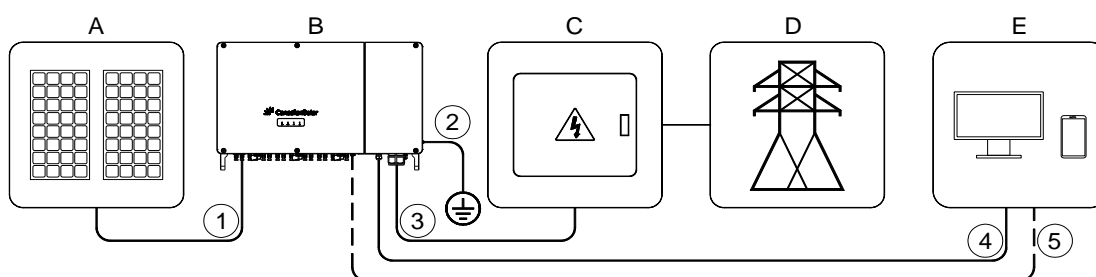


FIG 4-1 General electrical connection diagram

Table 4-1 Recommended Cables


No.	Cable Name	Cable Type	Conductor Cross-Sectional Area	Outer Diameter
1	DC cable	PV cable, complying with 1500V standard	4~6mm <sup>2</sup>	6~9mm
2	Additional Grounding cable	Outdoor single core copper conductor cable	The same as that of the PE wire in the AC cable	N/A
3	AC cable	Four/Five-core outdoor copper or aluminum cables* 【1】	L1/L2/L3/N (40kW) : 16~35 mm <sup>2</sup> L1/L2/L3/N (50-60kW) : 25~50 mm <sup>2</sup> PE wire: refer to "table 4-2 PE wire requirements"	22~38mm
4	Communication cable	Shielded twisted pair	0.25~1.0 mm <sup>2</sup> (24-18 AWG)	4.0~5.5mm
5	Wireless communication	N/A	N/A	N/A

\* 【1】 A copper to aluminum adapter terminal is required when an aluminum cable is used.

Table 4-2 PE wire requirements

Phase wire cross section S	PE wire cross-section	Note
$16 < S \leq 35 \text{ mm}^2$	$16 \text{ mm}^2$	The specifications are valid only when the phase wire and PE wire use the same material. If otherwise, ensure that the cross section of PE wire produces a conductance equivalent to that of the wire specified in the table.
$S > 35 \text{ mm}^2$	$S/2$	

## 4.2 Connecting the PE Cable

 <b>WARNING</b>	<p>Since the inverter is a transformerless inverter, neither the negative pole nor the positive pole of the PV string can be grounded. Otherwise, the inverter will not operate normally.</p> <p>Connect the additional grounding terminal to the protective grounding point before AC, PV, and communication cable connections.</p> <p>The ground connection of this additional grounding terminal cannot replace the connection of the PE terminal of the AC cable. Make sure those terminals are both grounded reliably.</p>
---	---

### 4.2.1 Additional Grounding Requirements

All non-current carrying metal parts and device enclosures in the PV power system should be grounded, for example, brackets of PV modules and inverter enclosure. When there is only one inverter in the PV system, connect the additional grounding cable to a nearby grounding point.

When there are multiple inverters in the PV system, connect grounding points of all inverters and the PV array frames to the equipotential cable (according to the onsite conditions) to implement an equipotential connection.

### 4.2.2 Connection Procedure

- Step 1: Prepare an external ground cable according to the following figure: strip the cable -> crimp the terminal -> cover the heat shrinkable sleeve. Recommended terminal type: DT/OT.
- Step 2: Remove the screw on the grounding terminal and fasten the cable with a wrench.
- Step 3: Apply paint to the grounding terminal to ensure corrosion resistance.

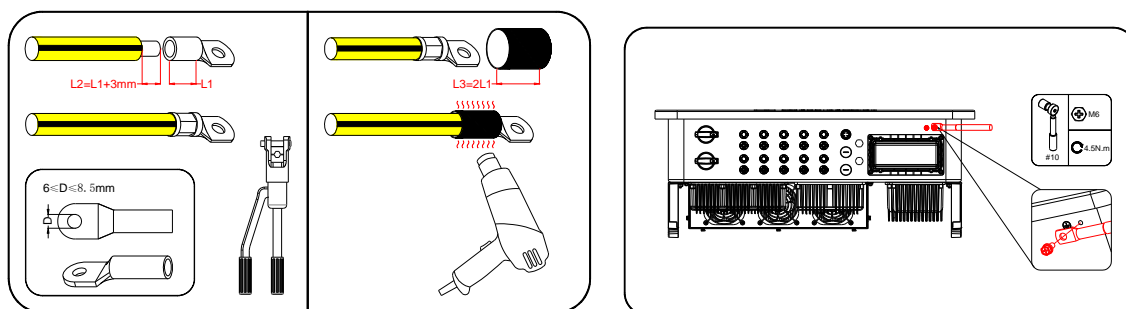


FIG 4-2 Install ground cables

## 4.3 Communication Cable Connection

This inverter series provides a standard wireless communication function and an optional wired communication function.

### 4.3.1 Multifunctional communication plug wiring and installation

Wiring signal connector:

- Step 1: Prepare the signal cable by removing the signal cable's jacket about 23mm, and then strip the wire insulation layer about 7mm, as per FIG.4-3.

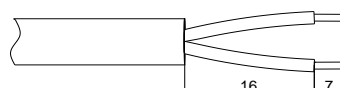


FIG 4-3 Strip Signal Cable

- Step 2: Insert the conductors into the corresponding pins of the plug(see table in FIG 4-4), and then fix the conductors by screws firmly, as per FIG.5-4. Tool: Phillips screwdriver #1. Torque: 0.6~0.8N.m.
- Step 3: Tighten the pressure nut, and then push the threaded sleeve into the plug, as per FIG 4-4.
- Step 4: Finally, insert the assembled connector into the Multifunctional communication receptacle (COM.-3) on the inverter, as per FIG 4-5.

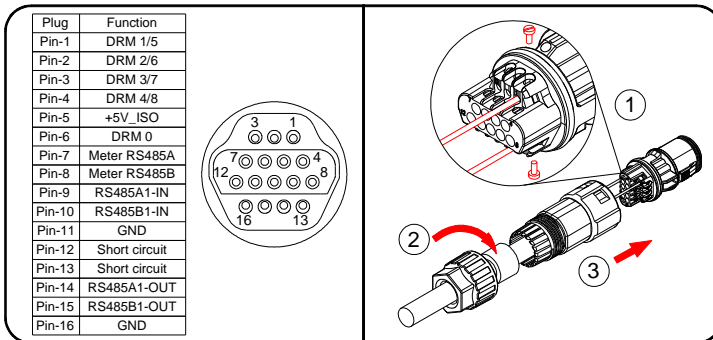


FIG 4-4 Assembling the Connector

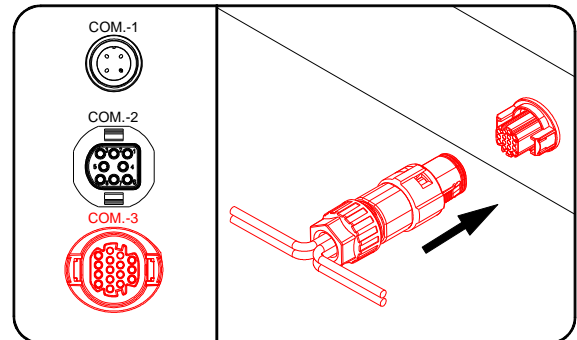


FIG 4-5 Insert the connector into the receptacle

#### 4.3.2 Multi-inverter RS485 communication system

In case of multiple inverters, select COM-3 port to achieve communication connection in daisy chain (FIG 4-6).

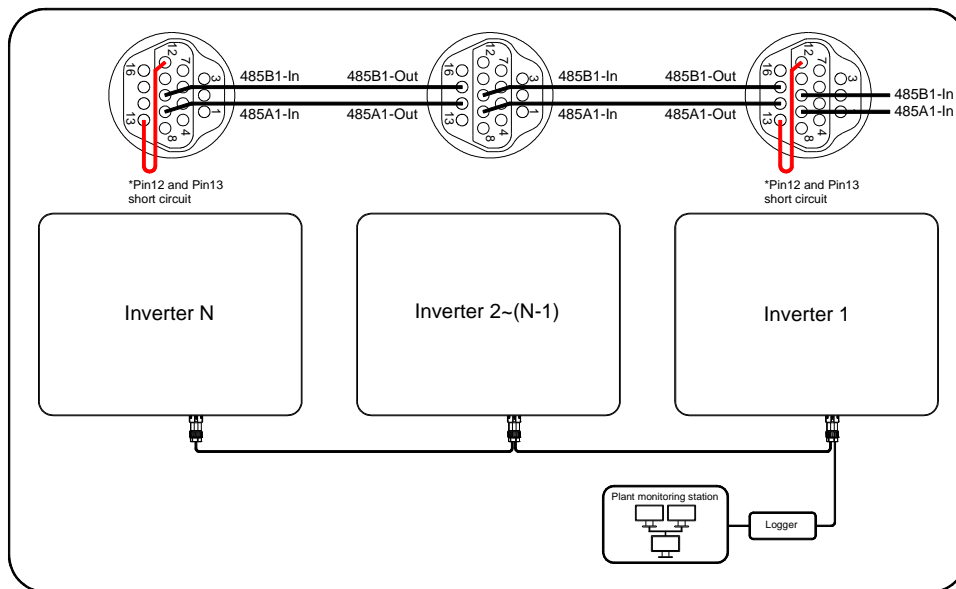


FIG 4-6 Multiple Inverter Communication Network



NOTE: When more than 15 inverters are connected on the same daisy chain, the two inverters at both ends of the daisy chain, Pin12 and Pin13 of the terminals must be short circuited to ensure communication quality, and the shielding layer of the communication cable should be grounded at a single point.

#### 4.4 Dongle Connection

This product supports Dongle Connection. For more information about the data logger, please refer to the Smart Data Logger (WIFI) Quick Installation Guide.

#### 4.5 Smart Meter Connection (Optional)

The inverter has integrated export limitation functionality. To use this function, a smart meter must be installed. For installation and operation methods, please refer to the instructions in the smart meter package.

## 4.6 AC Cable Connection

### 4.6.1 AC Side Requirements

Before connecting the inverter to the grid, ensure the grid voltage and frequency comply with inverter(s) technical specification. Otherwise, contact the electric power company for help.



Connect the inverter to the grid only after getting an approval from the local electric power company.

### 4.6.2 Connection Procedure

Step 1: Disconnect the AC-side circuit breaker and prevent it from inadvertent reconnection.

Step 2: Open the wiring compartment, loosen the swivel nut of the AC waterproof connector, take out the multi-layer sealing ring and select a seal rings according to the cable outer diameter. Lead the cable through the swivel nut, seal rings, and wiring compartment successively.

Step 3: Strip the protection layer and insulation layer by specific length, as described in the figure below.

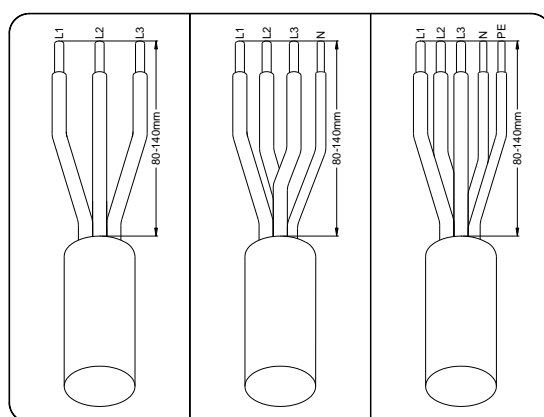


FIG 4-7 AC cable stripping requirements

Step 4: Make the cable and crimp OT/DT terminal.

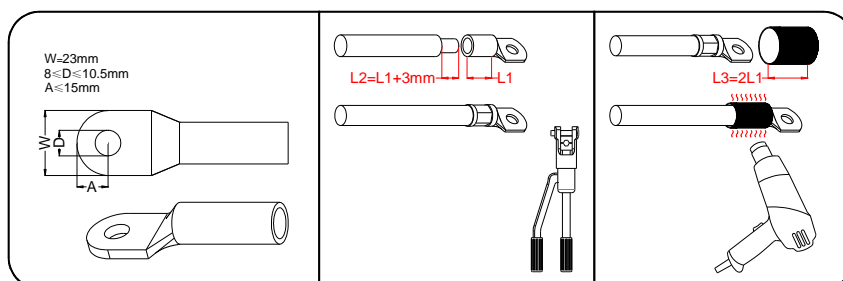


FIG 4-8 Make the cable

Step 5: Remove the protective box by pushing the clasp in the left and right directions. Take out the inter-pole insulation shield of the terminal block delivered with the machine and install it on the terminal block.

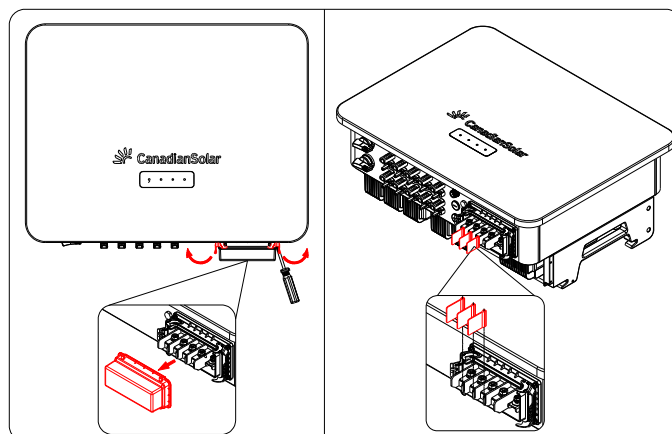


FIG 4-9 Remove the protective box and install the insulation shield between terminals

Step 6: Connect the AC cable with crimped terminals to the inverter AC terminal block.

Recommended locking torque: 8-10N.m

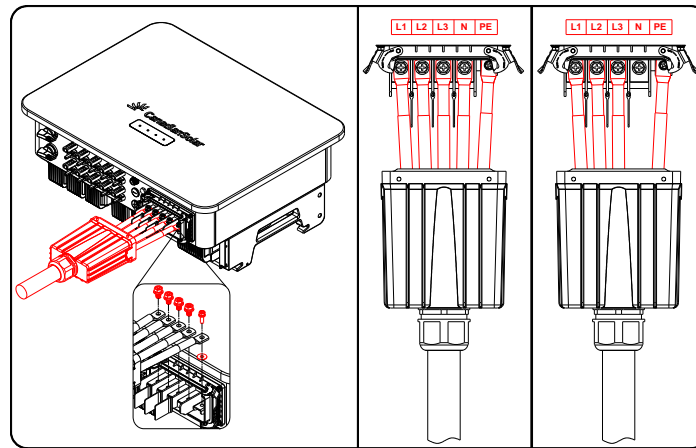


FIG 4-10 Connect AC cable

Step 7: Pull back the buckle to secure the wiring compartment.

Step 8: Gently pull the cable backwards to ensure firm connection, and fasten the swivel nut clockwise.

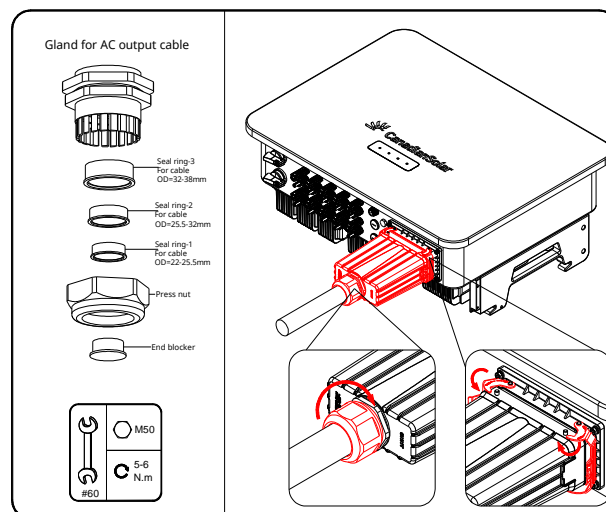






FIG 4-11 Recommended AC cable connection position.

## 4.7 DC Cable Connection

 <b>DANGER</b>	<p><b>Electric shock!</b></p> <p>The PV array will generate lethal high voltage once exposed to sunlight. Before performing electrical operations, ensure that all cables are uncharged. Do not turn on the AC circuit breaker before the inverter is electrically connected.</p>
 <b>CAUTION</b>	<p>Make sure the PV array is well insulated to the ground before connecting it to the inverter. During the installation of PV strings and the solar inverter, the positive or negative terminals of PV strings may be short-circuited to ground if the power cable is not properly installed or routed. In this case, an AC or DC short circuit may occur and damage the solar inverter. The caused device is not covered under any warranty.</p>

 <b>NOTICE</b>	<p>There is a risk of inverter damage! The following requirements should be met.  Failure to do so will void guarantee and warranty claims.</p> <ul style="list-style-type: none"> <li>• Make sure the maximum voltage of each string is always less than 1100 V.</li> <li>• The inverter enters the standby state when the input voltage ranges between 1,000V and 1,100V. The inverter returns to the running state once the voltage returns to the MPPT operating voltage range (200 to 1,000V).</li> </ul> <p>Make sure the maximum short circuit current on the DC side is within the permissible range.</p> <ul style="list-style-type: none"> <li>• The polarities of electric connections are correct on the DC input side. The positive and negative terminals of a PV module connect to corresponding positive and negative DC input terminals of the solar inverter.</li> </ul>
 <b>CAUTION</b>	<p>Use the connectors delivered with the solar inverter. If the PV connectors are lost or damaged, purchase the connectors of the same model. The device damage caused by incompatible PV connectors is beyond the warranty scope.</p>

#### 4.7.1 Connection Procedure

Step 1: Strip the insulation from each DC cable by 7mm.

Step 2: Assemble the cable ends with the crimping pliers

Step 3: Lead the cable through cable gland, and insert into the insulator until it snaps into place.

Gently pull the cable backward to ensure firm connection. Tighten the cable gland and the insulator (torque 2.5 N.m to 3 N.m).

Step 4: Check for polarity correctness.

The inverter will not function properly if any PV polarity is reversed.

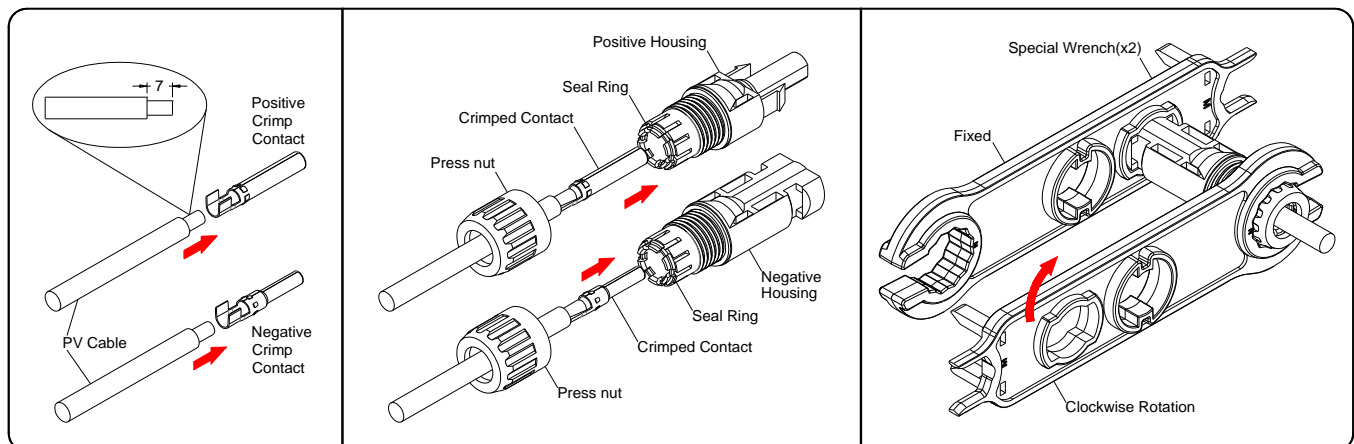


FIG 4-12 DC cable connection

#### 4.7.2 Installing the PV Connectors.

Step 1: Rotate all the DC switches to "OFF" position.

Step 2: Check the cable connection of the PV string for polarity correctness and ensure that the open circuit voltage in any case does not exceed the inverter input limit of 1,100V.

Step 3: Connect the PV connectors to corresponding terminals until there is an audible click.

Step 4: Follow the foregoing steps to connect PV connectors of other PV strings.

Step 5: Seal the unused PV terminals with the terminal caps.

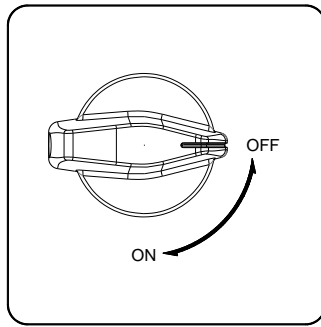


FIG 4-12 DC switch

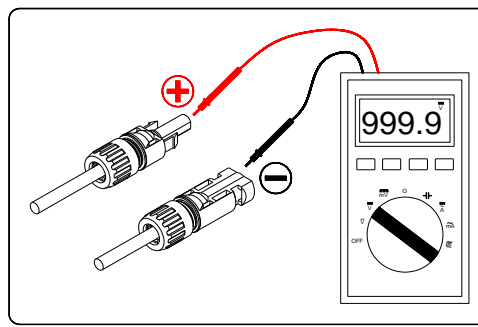


FIG 4-13 Check the polarity of PV string

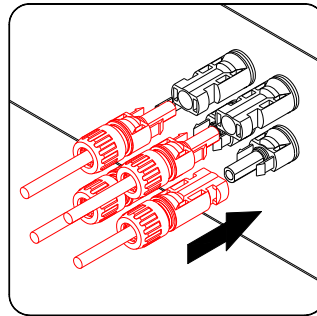


FIG 4-14 Connect the PV connectors to the inverter



**NOTICE**

If the DC input power cable is reversely connected and DC switches are set to ON, do not immediately turn off the DC switches or reconnect the positive and negative connectors. Otherwise, the device may be damaged. The caused device damage is not covered under any warranty. Wait until the solar irradiance declines at night and the PV string current reduces to below 0.5 A. Then, turn off the three DC switches, remove the positive and negative connectors, and rectify the connection of the DC input power cable.

## 5 Commissioning Inverter

### 5.1 Electrical Inspection

- 1) The inverter DC switch and external circuit breaker are disconnected
- 2) The inverter should be accessible for operation, maintenance and service.
- 3) Nothing is left on the top of the inverter.
- 4) The inverter is correctly connected to the external devices, and the cables are routed in a safe place or protected against mechanical damage.
- 5) The selection of the AC circuit breaker is in accordance with the user manual and all applicable local standards.
- 6) All unused terminals at the bottom of the inverter are properly sealed.
- 7) Warning signs & labels are suitably affixed and durable.

### 5.2 Commissioning Procedure

If all of the items mentioned above meet the requirements, proceed as follows to start up the inverter for the first time.


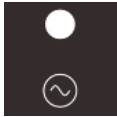


Step 1: Rotate the DC switch of the inverter to "ON" position.

Step 2: Connect the AC switch (if applicable) between the inverter and the grid.

Step 3: Connect the DC switch (if applicable) between the inverter and the PV string.

Step 4: Set initial protection parameters via the CSI Cloud App. If the irradiation and grid conditions meet requirements, the inverter will normally operate.

Step 5: Observe the LED indicator to ensure that the inverter operates normally.

LED indicator	LED state	Definition
 PV connection indicator	Steady green	At least one PV string is properly connected, and the DC input voltage of the corresponding MPPT circuit is at least 200V.
	Off	The solar inverter disconnects from all PV strings, or the DC input voltage of all MPPT circuits is less than 200V.
 Grid connection indicator	Steady green	The solar inverter is in grid-tied mode.
	Blinking green	The solar inverter is in self-test mode or wait mode.
	Off	The solar inverter is not in grid-tied mode.
 Communications/Maintenance indicator	Blinking green	The solar inverter receives communication data normally
	Off	The solar inverter has not receives communication data for 10 seconds.
	Steady green	The solar inverter is in maintenance status
 Alarm indicator	Steady red	A major alarm is generated.
	Blinking red	A minor or warning alarm is generated.
	Off	No alarm

## 6 CSI Smart Energy App - Local Mode

### 6.1 APP Introduction

The CSI SmartEnergy APP can establish a communication connection to the dongle via the Bluetooth, thereby achieving local access to the inverter. Users can use the App to view basic information, alarms , set parameters, etc.

### 6.2 Download and Install the App

Method 1: Scan the following QR Code to download and install the App according to the prompt information.



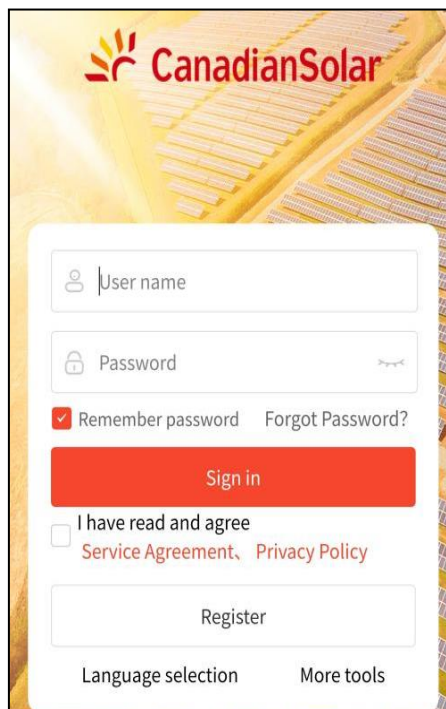
Method 2: For the monitoring and local APP information, please refer to documents published on our website at:  
<https://smartenergy.csisolar.com>

### 6.3 Use the Local Mode to Login the App

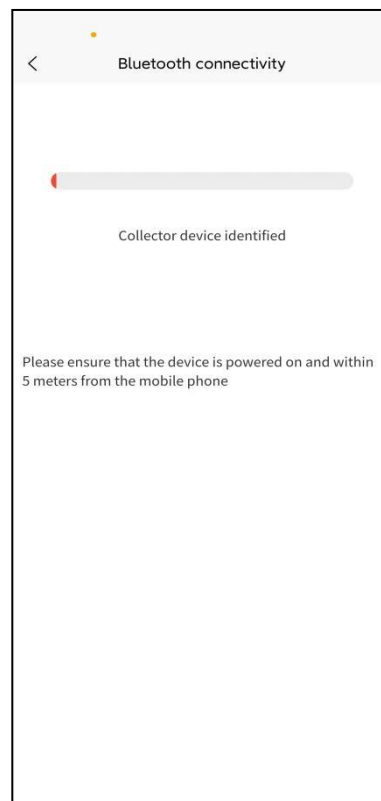
Notice: To use the local mode, the following conditions should be met:

- (1) The dongle is connected to the inverter and powered on.
- (2) The distance between the mobile phone and the dongle should be within 5m and there is no shelter.
- (3) Make sure the Bluetooth of your phone is opened.

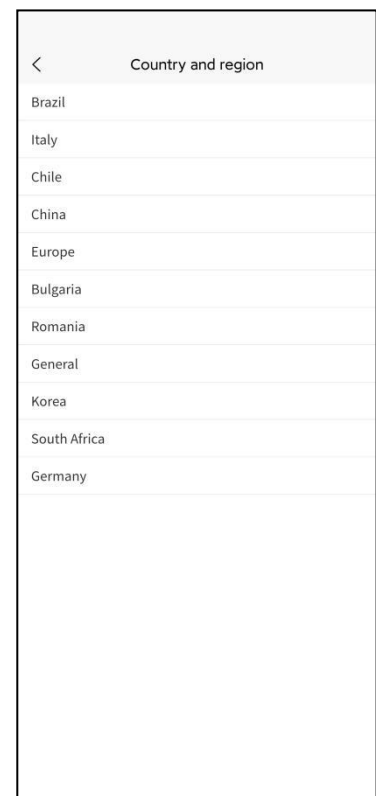
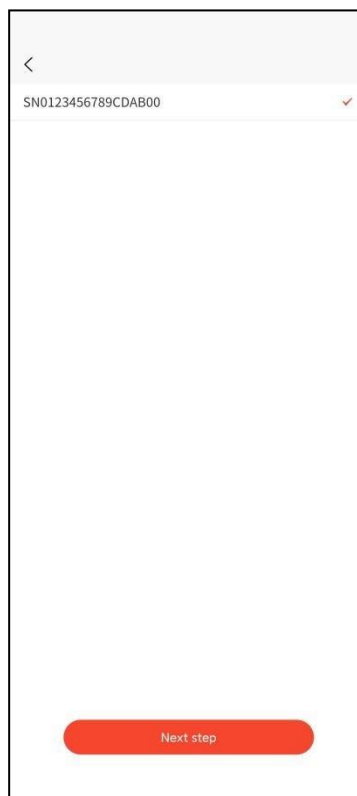
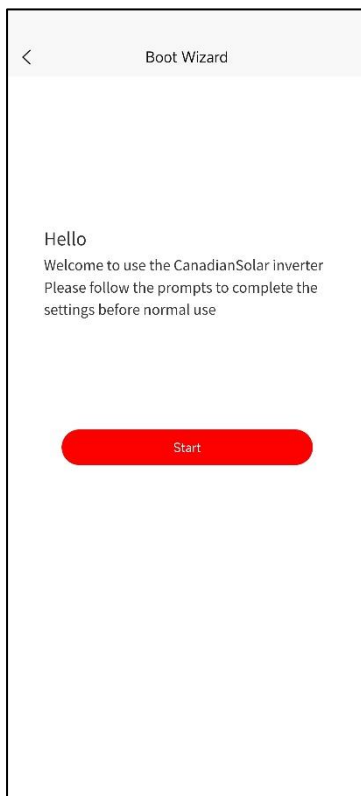
Step 1: Open the CSI SmartEnergy APP.

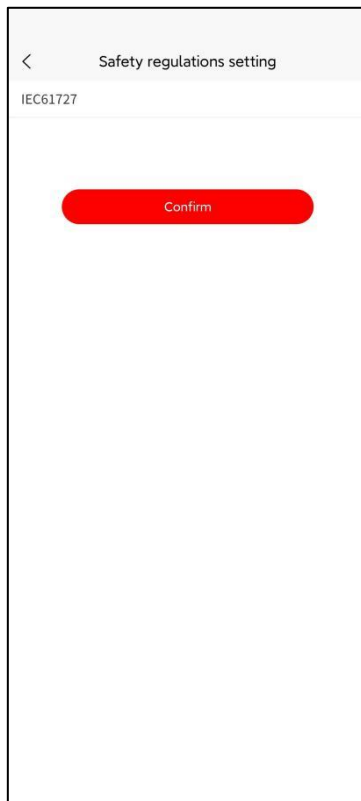


Step 2: Select "More tools"->"Local Access". Scan the QR code of the dongle, and the mobile phone will connect the dongle automatically.



Step 3: If it is the first time to boot the inverter, you need to set the Grid Code as required on the boot page



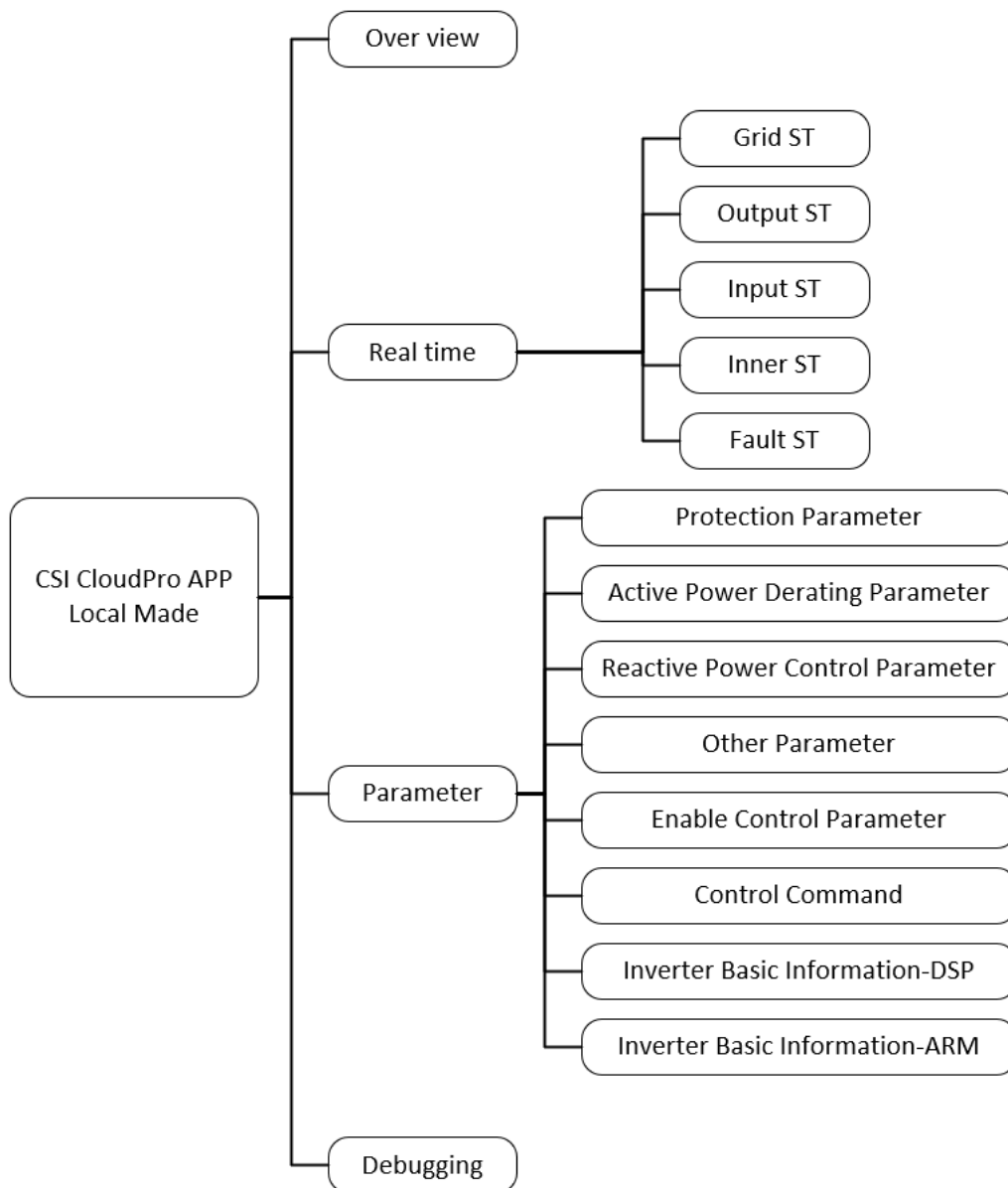


#### Notice

Must select the correct grid code where the inverter is installed. If the grid code is not suitable, it may cause the inverter to report a fault error.

You can also set the grid code on the "Parameter" -> "Inverter Basic Information-DSP" -> "Grid Code" after setting on this page.

## 6.4 Function List



## 7 Obtaining User Manual

Please scan the QR code for more detailed information in the user manual.

