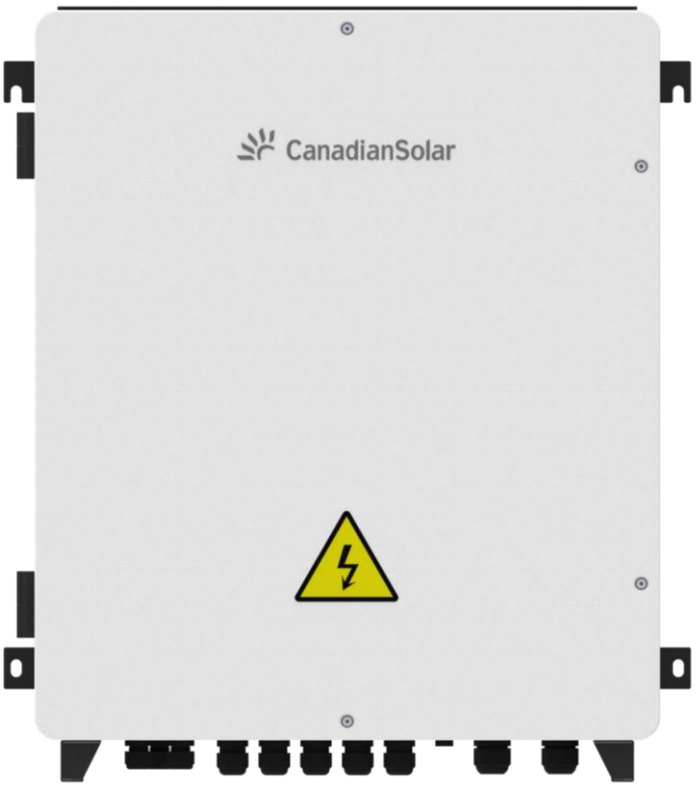
CanadianSolar

CSCU-ICB-CCO01



Smart Sub-array Controller User Manual

(Part No: 91000507; Release Date: January, 2024)

Contents

All Rights Reserve

This manual provides important safety instructions for the installation, electrical connection, commissioning, and maintenance of the outdoor application cabinet CSCU-ICB-CCO01 smart sub-array controller (hereinafter referred to as the smart sub-array controller) produced by the CSI Solar Co., Ltd. (hereinafter referred to as CSI). Both users and professional installers must read these guidelines carefully and strictly follow these instructions. Failure to follow these instructions may result in death, serious injury or property damage. Installation and operation of the smart sub-array controller require professional skills, and only professionals can engage in this work (please refer to NB/T32004). The installer must inform the end customer (or consumer) of the above matters.
This manual is only valid for the smart sub-array controller type: CSCU-ICB-CCO01.

About this Manual

Due to product version upgrades or other reasons, the content of this manual will be updated regularly. Unless otherwise agreed, this manual is for guidance only. CSI gives no warranty of any kind whatsoever, either explicitly or implicitly, with respect to the information contained herein.
In the event of any inconsistency among different language versions of this document, the English version shall prevail. Please refer to our product lists and documents published on our website at: http://www.csisolar.com as these lists are updated on a regular basis.

Limitation of Liability

CSI is not responsible for any form of damage or injury, including but not limited to operation of the sub-array controller, system installation, physical harm or injury, and property damage resulting from failure to follow the instructions in this manual.

Target Group

This manual is intended for PV power station operators and electrical technicians with appropriate qualifications.

Symbol Conventions

To ensure the personal and property safety of users when using the product and to optimize its use, this manual provides relevant information and emphasizes it using the following symbols. The following lists the symbols that may be used in this manual. Please read them carefully to better use this manual.

Symbol	Description
 DANGER	Indicates a high potential danger that if not avoided will result in death or serious injury to personnel.
 WARNING	Indicates a moderate potential danger that if not avoided could result in death or serious injury to personnel.
 CAUTION	Indicates a low potential danger that if not avoided could result in moderate or minor injury to personnel.
 NOTICE	Indicates a potential risk that if not avoided could result in equipment failure or property damage.
 INFORMATION	Indicates additional information, emphasized contents or tips that may optimize product use, helping you solve a problem or save time.

1. Safety precautions

1.1 General safety

(1) Declaration

When installing, operating, and maintaining equipment, please read this manual first and follow all safety precautions and warnings on the equipment as well as those in this manual.

The "Notices," "Cautions," "Warnings," and "Dangers" in this manual do not represent all safety precautions that should be followed. They are only supplementary to all safety precautions. CSI Solar Co., Ltd. assumes no responsibility for any damage caused by violating general safety operation requirements or violating design, production, and equipment safety standards.

This equipment should be used in an environment that meets design specifications, otherwise it may cause equipment failure. Any resulting equipment function abnormalities or component damage, personal safety accidents, property damage, etc., are not covered by equipment quality warranty.

When installing, operating, and maintaining equipment, you should comply with local laws, regulations, and norms. The safety precautions in this manual are only supplementary to local laws, regulations, and norms.

Note: The safety instructions in this manual cannot cover all the precautions that should be followed. Please operate according to the actual situation on site. CSI Solar Co., Ltd. assumes no responsibility for any damage caused by violating the safety instructions in this manual.

The following situations are not covered by CSI Solar Co., Ltd.'s responsibility:

- Operating the equipment outside the conditions specified in this manual.
- Installing and using the equipment in an environment that exceeds the relevant international or national standards.
- Unauthorized disassembly, modification of the product, or modification of software code.
- Not follow the instructions and safety warnings in the product documentation.
- Equipment damage caused by abnormal natural environments (force majeure such as earthquakes, fires, storms, etc.).
- Transport damage caused by customers themselves.
- Equipment damage caused by storage conditions that do not meet product documentation requirements.

(2) General requirements

- Do not install, use, or operate outdoor equipment and cables (including but not limited to handling equipment and cables, connecting or disconnecting signal interfaces connected to the outdoors, working at heights, outdoor installation, etc.) during thunderstorms, rain, snow, or wind speeds of greater than 6 Beaufort.
- After installing equipment, remove empty packaging materials in the equipment area, such as cardboard boxes, foam, plastic wrap, zip ties, etc.
- If a fire occurs, evacuate the building or equipment area and press the fire alarm button or call the fire department. Under no circumstances should you reenter a burning building.
- Do not falsify, damage, or cover up any labels or nameplates on the equipment.
- When installing equipment, use tools to tighten screws.
- Familiarize yourself with the entire photovoltaic grid-connected power generation system's composition, operation principles, and relevant national/regional standards.
- If paint is scratched during equipment transportation or installation, it must be repaired promptly to prevent exposed parts from being exposed to outdoor environments for long periods of time.

（3）Personal safety

● If any faults are found during equipment operation that may cause personal injury or equipment damage, you should immediately terminate the operation, report to the responsible person, and take effective protective measures.

● Before using tools, familiarize yourself with their correct usage to avoid injury to people or damage to the equipment.

● When the equipment is operating and the outer casing temperature is high, there is a risk of burns. Do not touch it.

1.2 Personnel requirements

Personnel responsible for installing and maintaining the equipment must undergo strict training to understand various safety precautions and master correct operation methods.

Only qualified professionals or trained personnel are allowed to install, operate, and maintain the equipment.

Only qualified professionals are allowed to disassemble safety facilities and inspect equipment.

Personnel who operate the equipment, including operators, trained personnel, and professionals, should have the special operation qualifications required by local national standards, such as high-voltage operation qualifications, climbing qualifications, and special equipment operation qualifications.

Replacing equipment or components (including software) must be completed by professionals or authorized personnel.

1.3 Electrical safety

（1）Grounding requirements

● Equipment that requires grounding must be installed with the grounding wire first and removed with the grounding wire last.

● It is prohibited to damage the grounding conductor.

● It is prohibited to operate the equipment without installing the grounding conductor.

● The equipment must be connected to the grounding wire permanently. Before operating the equipment, check the electrical connection to ensure that the equipment is properly grounded.

（2）General requirements

Before making electrical connections, ensure that the equipment is not damaged, otherwise it may cause electric shock or fire.

● All electrical connections must meet the electrical standards of the country/region where they are used.

● User-provided cables must comply with local laws and regulations.

● When operating at high voltage, use dedicated insulated tools please.

（3）AC/DC operation

It is prohibited to install or remove power lines while the equipment is live. The power wire core generates an arc or spark at the instant of contact with the conductor, which can cause fire or personal injury.

● Before making electrical connections, if there is a possibility of touching live parts, disconnect the

corresponding fuse devices on the equipment's front panel.

● Before connecting power lines, confirm that the power line labels are correctly identified and then proceed with the connection.

● If the equipment has multiple inputs, all inputs should be disconnected and the equipment should be completely powered off before it can be operated.

(4) Wiring requirements

● Using cables in high-temperature environments may cause insulation aging and damage. The minimum distance between the cable and heat-generating components or heat sources is 30mm.

● The same type of cables should be tied together, and cables of different types should be placed at least 30mm apart, and it is prohibited to entangle or cross each other.

● The cables used in PV grid-connected power generation systems must be connected securely and have good insulation, and they must be of the correct specification.

1.4 Installation environment requirements

● Do not install the smart sub-array controller on buildings or carriers made of flammable, explosive, or heat-resistant materials.

● Ensure that the installation location is inaccessible to children.

● The ambient temperature of the smart sub-array controller should be between -30°C and 60°C.

● The relative humidity of the installation environment should be between 0 and 100°C (without condensation).

● It is prohibited to install this product in an environment containing salt, sulfur, or other corrosive substances.

The smart sub-array controller installed in salt-affected areas (marine environments) may corrode, which can cause fire. Salt-affected areas refer to those within 500m of the coast or affected by sea winds. Sea winds may affect product warranty when using the smart sub-array controller under special climatic conditions (such as salt, sulfur, ammonia, etc.). Please consult with CSI technical support for more information.

● Avoid direct sunlight, direct rainfall, and snow accumulation on this product.

● The installation location should have good ventilation. It is prohibited to install this product in a small enclosed space with poor air circulation.

● The installation height should be appropriate for easy viewing and operation.

1.5 Mechanical safety

(1) Ladder safety

● When ladder climbing may involve electricity, use wooden ladders or fiberglass ladders.

● When using a stepladder, ensure that the pull rope is secure and that someone is holding the ladder while it is being used.

● Before using a ladder, confirm that it is in good condition, that it can support the weight required, and that it is not overloaded.

● When using a ladder, place its widest part on the ground or take other measures to prevent slipping.

● The ladder should be placed on a stable surface. The angle of the ladder should be 75°, which can be checked using a protractor.

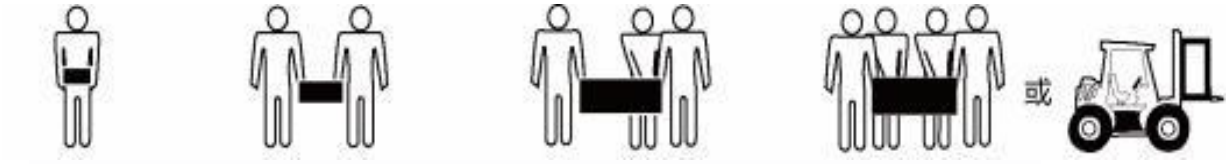
● When climbing a ladder, please follow these guidelines to reduce risk and ensure safety.

(2) Drilling safety

When drilling on the wall or floor, the following safety precautions need to be considered:

- Wear safety goggles and protective gloves when drilling.
- Cover the equipment during the drilling process to prevent debris from falling into the equipment. After drilling, clean up the debris promptly.

(3) Safe lifting of heavy loads



< 18 Kg	18 Kg~32 Kg	32 Kg~55 Kg	> 55 Kg
(< 40 Pounds)	(40 Pounds~70 Pounds)	(70 Pounds~121 Pounds)	(> 121 Pounds)

- When lifting heavy loads, be prepared for the weight to avoid being injured by the weight or by twisting.
- When lifting equipment by hand, wear protective gloves to avoid injury.

1.6 Commissioning

When the equipment is first powered on, it needs to be correctly set up by professional personnel. Incorrect settings may cause the equipment to be incompatible with the certifications of the country/region where it is located, affecting the normal operation of the equipment.

1.7 Maintenance and replacement

During operation, equipment may have high voltage and could produce electric shocks, leading to death, serious personal injury, or serious property damage. Therefore, before performing any maintenance work, the equipment must be powered off and operated strictly according to the safety precautions listed in this manual and other relevant documents.

- Please maintain the equipment under conditions where you are familiar with and understand this manual content, and have appropriate tools and testing equipment.
- Before performing maintenance work, please power off the equipment first before operating on it.
- During the maintenance process, please try to avoid irrelevant personnel entering the maintenance site and isolate it by erecting temporary warning signs or fences.
- If the equipment fails, please contact your dealer for handling.
- The equipment cannot be powered on again until the fault is completely repaired, otherwise it may cause the fault to expand or damage the equipment.

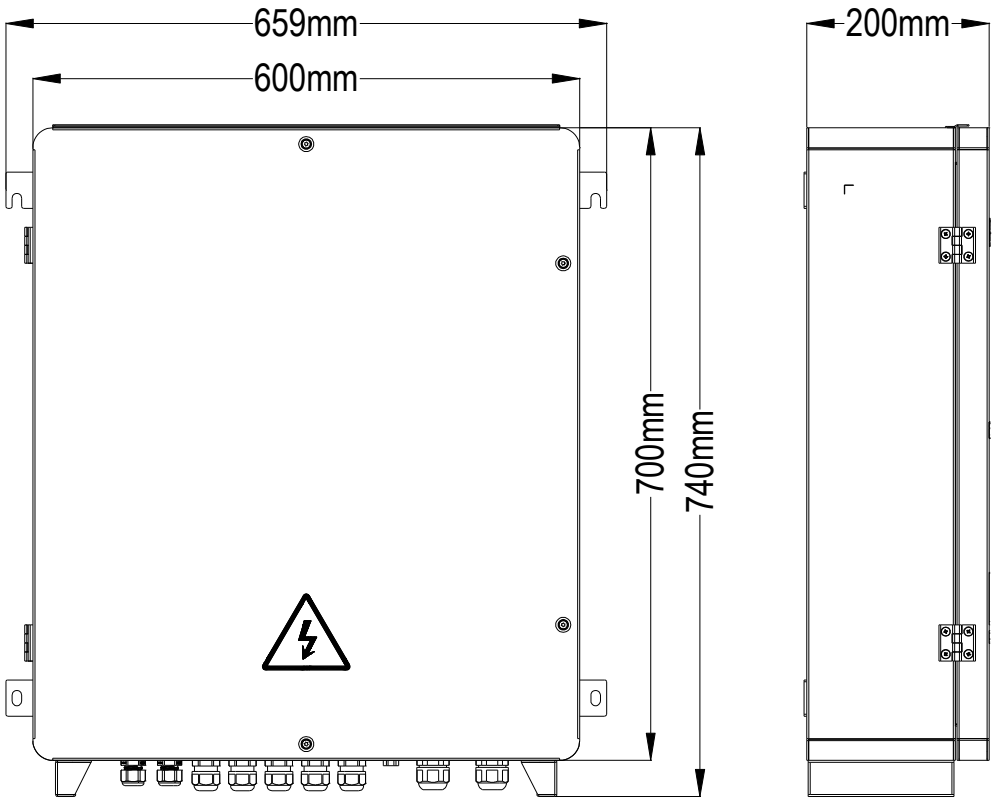
2. Product introduction

This chapter mainly introduces the product model, appearance, component location and application occasion of the smart sub-array controller.

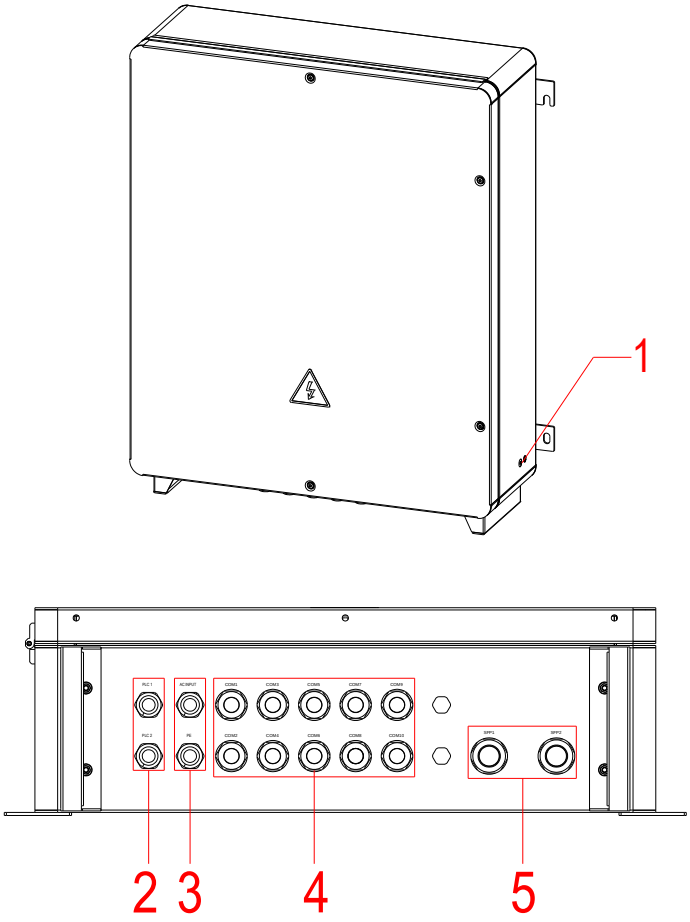
2.1 Product model

Name	Model	Configuration
Smart Sub-array Controller	CSCU-ICB-CCO01	1. PLC communication (1 channel/2 channels optional) 2. Optical fiber ring network (optional) 3. Vertical encryption and authentication device (optional)

2.2 Product size



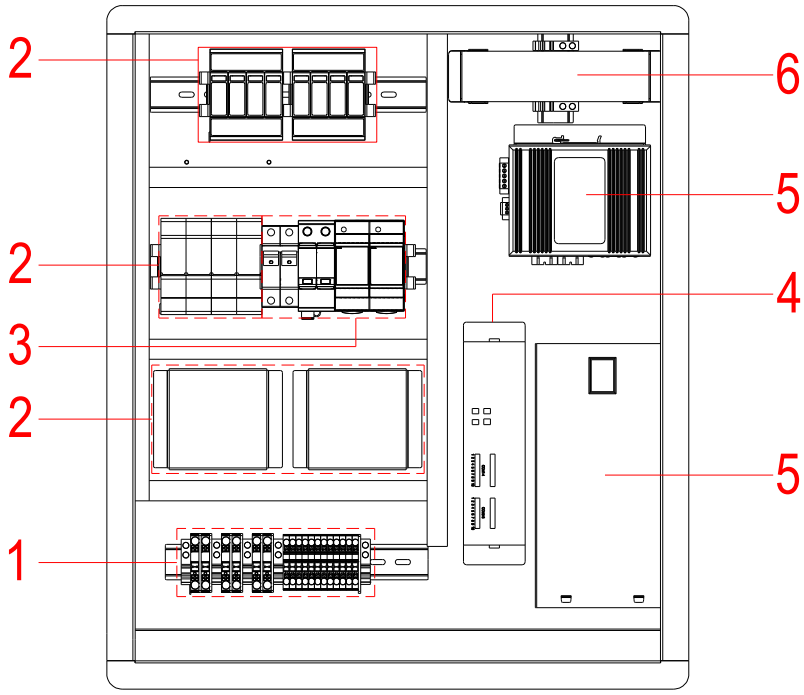
2.3 Product appearance



1. External grounding point of the cabinet
2. PLC wiring interface (PLC1/PLC2)
3. Single-phase AC power interface (AC INPUT)
4. Communication cable interface (COM1~10)
5. Optical fiber incoming line interface (SFP1/SFP2)

2.4 Component location

Note: To facilitate user operation and use, the figure only lists the components and reserved installation positions that users need to operate.

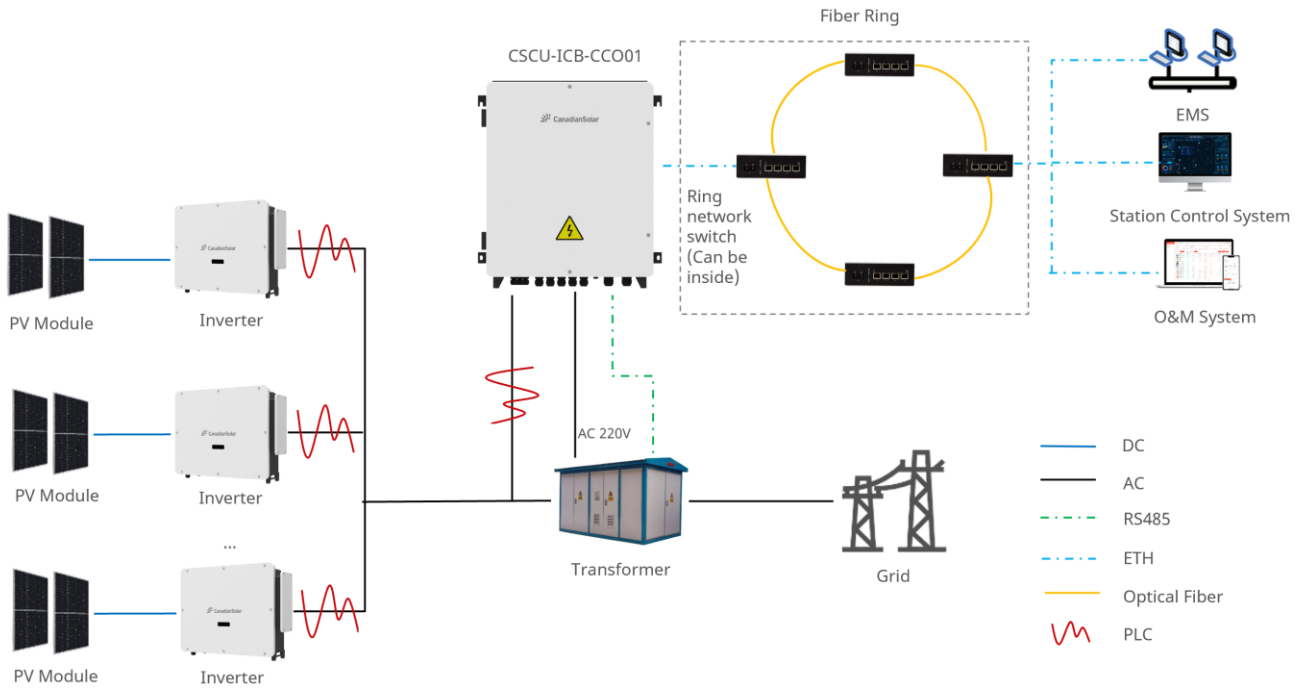


The smart sub-array controller components are shown in the following table:

Serial Number	Description and Remark
1	Terminal block
2	PLC module and electrical protective devices (fuse and lightning arrester) (Standard: 1 channel; optional 2 channels)
3	Power supply module and electrical protective devices (air switch and lightning arrester) (Dual power redundancy)
4	Communication management machine
5	Ethernet switch and optical fiber terminal box (optional)
6	Vertical encryption gateway (optional)

2.5 Typical application occasion

This occasion is the standard networking solution for the smart sub-array controller. The inverter side adopts PLC communication, and multiple optical ring networks can be converged and connected to the management system through the ring network switch.



3. Product specifications

This chapter mainly introduces the external interfaces and specifications of the smart sub-array controller.

3.1 Power supply mode

Product Model	Power Supply Mode	Power Consumption
CSCU-ICB-CCO01	Rated 220VAC, input range 100VAC~240VAC, frequency 50/60Hz	<30W

3.2 External interfaces

Interface	Function Description	Performance	Remark

RS485	RS485 communication port	1. Supports up to 6 channels; 2. Electrical isolation, all SELV circuits; 3. The number of RS485 access devices per channel is recommended not to exceed 30, and the total number of access devices does not exceed 80; 4. Communication baud rate supports 9600-115200; 5. Supports Modbus RTU protocol (as a host machine).	
100M electric port (optional)	Ethernet electric port	1. 2ports; 2. 10/100M self-adaptive; 3. With switching function.	Used for data ring networking. The port is provided through the ring network switch, and the optical port provides fiber splicing interfaces externally through the pigtail box.
100M optical port (optional)	Ethernet optical port	1. 2 pairs; 2. Fiber transmission distance > 20km.	
PLC	PLC interface	1. Supports ≤ 800V AC input; 2. Requires R phase and T phase access, consistent with inverter end.	Default 1 channel and 2 channels need optional selection.

4. Storage requirements

If the smart sub-array controller is not immediately put into use, the following requirements must be met when storing the controller:

● Do not remove the outer packaging, and inspect it regularly. If there is any damage due to insect or rodent bites, please replace the packaging in a timely manner.

● The storage environment should have appropriate temperature and humidity levels, and prevent dust and moisture from corroding the equipment.

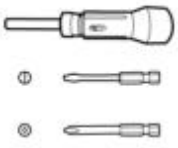
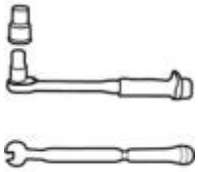
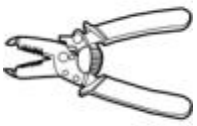
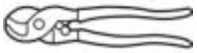
● When stacking, please place the equipment neatly to avoid equipment tipping over and causing personal injury or equipment damage.

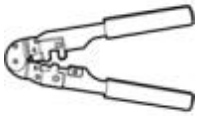
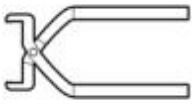
● After long-term storage, the smart sub-array controller needs to be inspected and tested by professional personnel before it can be put into use.

● Damage to the equipment due to non-compliance with the storage requirements is not covered under warranty.

5. System installation

5.1 Tool preparation

Category	Tool			
Installation	 Impact drill	 Adjustable spanner	 Screwdriver	 Torque screwdriver
	 Complete set of socket wrenches	 Torque wrench	 Stripper pliers	 Oblique cutting pliers
	 Rubber hammer	 Cable crimping pliers	 Wire cutters	 Tool knives

	 Crystal head cable crimping pliers	 Cable tester	 Multimeter	 Surge arrester module extraction tool
	 Heat shrinking tube	 Hot air gun	 Vacuum cleaner	 Marker pen
	 Steel tape measure	 Leveling ruler	 Zip ties	-
Personal protective equipment	 Safety gloves	 Safety goggles	 Dust mask	 Safety shoes

5.2 Check before installation

The box contains products and fittings. Please check the products and fittings based on the packing list or contract and record them after removing the packaging.

After unpacking, please inspect:

- The box surface is free of dents, cracks, scratches, rust or stains.
- The cable clamping head and the terminal block are not missing or damaged.

After opening the cabinet door of the smart sub-array controller, please check:

- The internal components are not detached or deformed.
- The cables inside the cabinet are not loose, detached, or broken.

After checking the above items, installation can proceed.

5.3 Installation of the cabinet

5.3.1 Installation space

The installation space requirements for the smart sub-array controller are as follows:

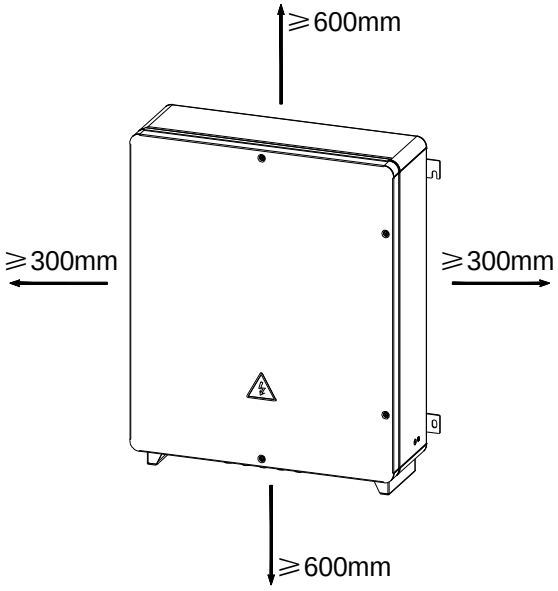


Figure 1 Spatial Distance Schematic Diagram (unit: mm)

CAUTION	Please ensure that the installation site has reserved space that meets the minimum space requirements for the sub-array, otherwise it may affect the installation and operation of the sub-array controller.

5.3.2 Installation of the cabinet

The smart sub-array controller can be installed using two installation methods: wall hanging and PV bracket. The following describes the installation method of the smart sub-array controller in detail.

CAUTION	To ensure reliable fixation of the sub-array controller, the fixing screws must be tightened according to the torque requirements.

- When using wall hanging installation, please bring your own stainless steel expansion bolt.
- When using PV bracket installation, please use the combined bolts provided in the box.

Wall hanging installation

The following figure shows wall hanging installation:

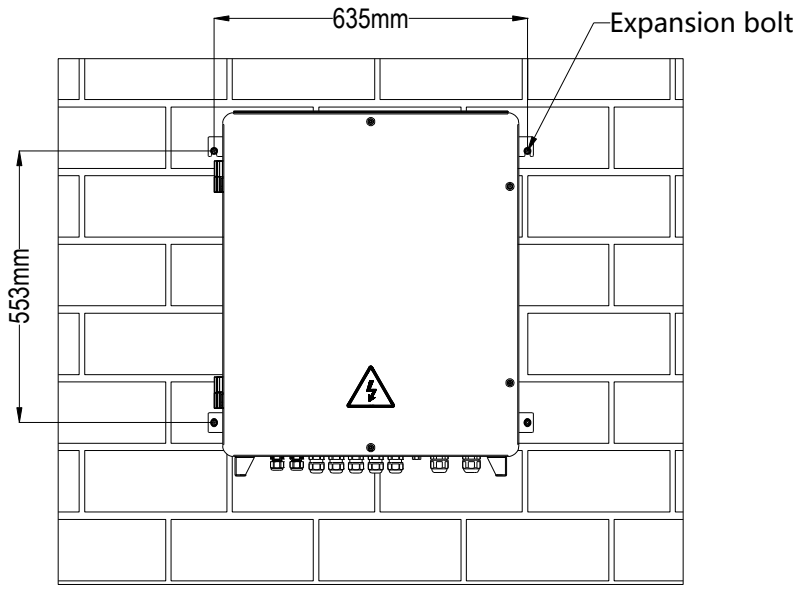


Figure 2 Wall Hanging Installation Schematic Diagram (unit: mm)

Step 1 Mark the hole positions on the wall based on the installation hole distance.
Step 2 Install the self-provided expansion bolts (with a diameter of 6-8 mm).
Step 3 Install the carrier of the smart sub-array controller on the expansion bolts and tighten the bolts.

CAUTION	Before drilling, please ensure that the pre-embedded water and electricity lines in the wall are avoided to prevent danger.

Pole installation/PV bracket installation

The following figure shows pole installation/PV bracket installation:

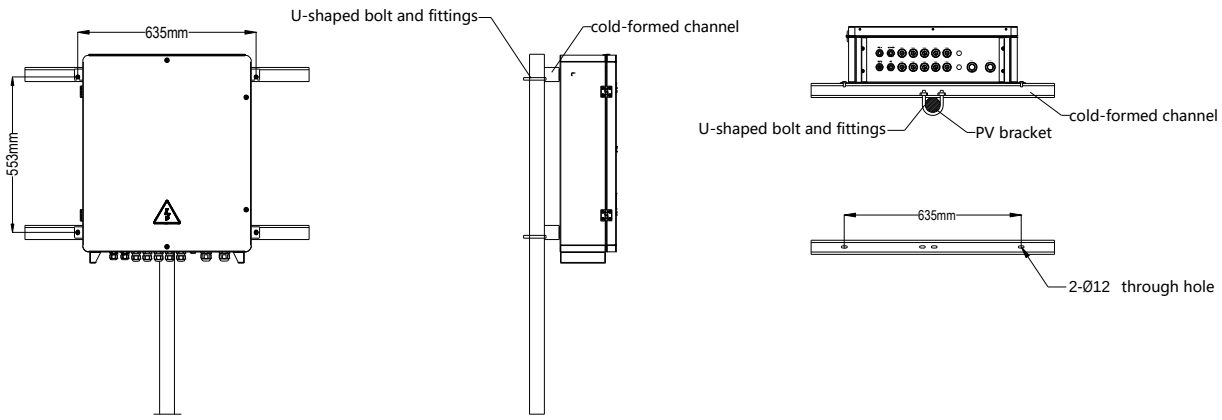


Figure 3 Pole Installation / PV Bracket Installation Schematic Diagram (unit: mm)

Step 1 Use U-shaped bolts and fittings to install cold-formed channels on the pillars. (Note: Do not perform this step when installing a PV bracket.)
Step 2 Use the randomly shipped bolts and nuts to fix the smart sub-array controller to the cold-formed channels.

5.4 Open the cabinet door

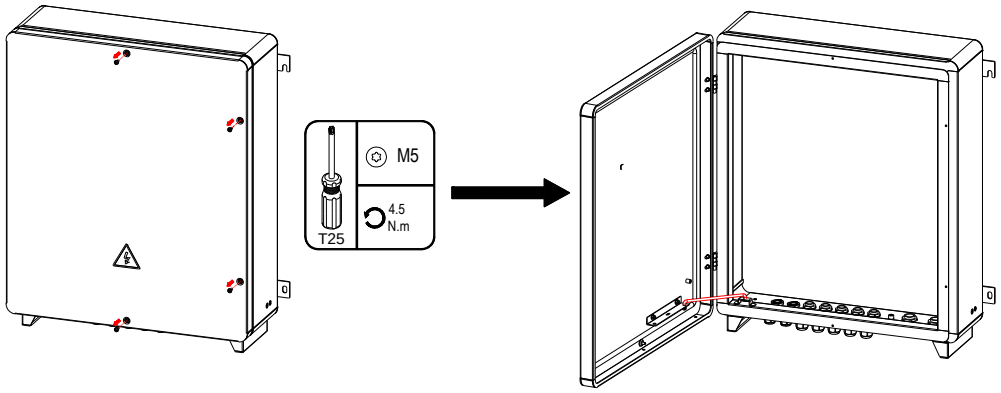


Figure 4 Door Opening Schematic Diagram

Step 1 Use a screwdriver to remove the fixing screws of the cabinet door.
Step 2 Open the cabinet door to a certain angle and install supporting rods.

WARNING	Before opening the cabinet door, the smart sub-array controller should be powered off, and all its upstream switches should be disconnected. If live operation of the equipment is required, please wear insulated gloves and take protective measures.

CAUTION	If the cabinet door needs to be opened in case of rain or snow, please take protective measures to prevent rain or snow from entering the cabinet. If it is impossible to prevent rain or snow from entering the cabinet, please do not open the cabinet door during rain or snow.

5.5 Cable connection

The electrical connection of the smart sub-array controller should comply with the wiring regulations of the country/region where the project is located and should be connected according to this instruction. The cable connections of the sub-array controller should ensure that the three-phase AC lines, single-phase AC lines, and communication lines are separately routed in an orderly manner. It is recommended to use shielded measures for communication signal cables to avoid interference from other signals.

Please be sure to pay attention to the following warnings to ensure personal safety of cable operators.

WARNING	The AC input terminal of the cabinet is high voltage. Before installing or removing equipment, be sure to disconnect the upstream power supply switch, and use a multimeter to test the input port to confirm that the AC voltage is zero.

WARNING	Before connecting the cables (including power lines and communication lines), it must be confirmed that the cable labels are correctly identified.

As shown in the following figure, the external cables of the smart sub-array controller are three-phase AC line (PLC line), single-phase AC line and RS485 line, respectively.

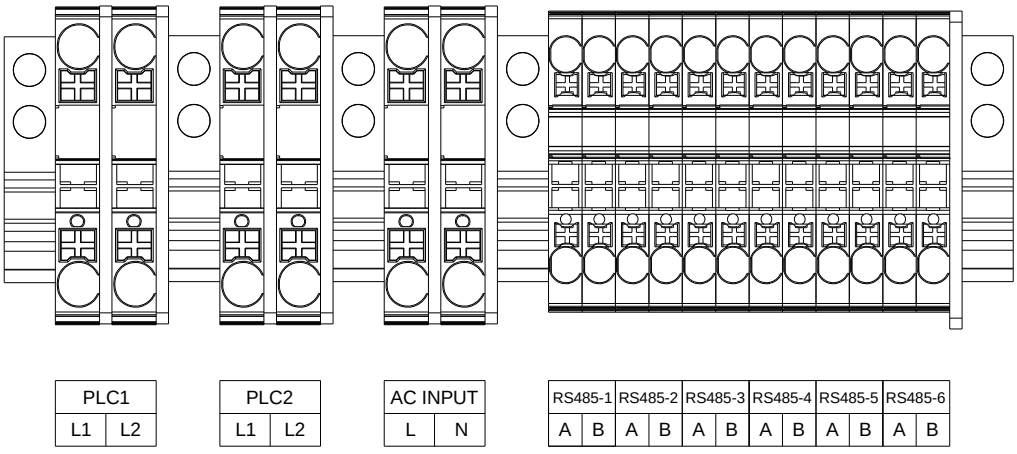


Figure 5 Wiring Port Schematic Diagram

5.5.1 Cable specification

The cable connection specifications for the smart sub-array controller is as follows:

Table 1 Detailed List of Cable Terminals

Serial Number	Cable	Specification	Cross-sectional Area	Cable Outer Diameter [Note]
1	PLC connection wire (connected to R phase and T phase)	Outdoor copper core cable (0.6/1KV)	2x1.0~2.5mm^2	4-15mm
2	Single-phase AC line	Outdoor copper core cable (300/500V)	2x1.0~2.5mm^2	4-15mm
3	RS485 line	Shielded twisted pair communication cable	2x0.25~1.0mm^2	4-15mm
4	Internal ground wire	Outdoor copper core cable (0.6/1KV)	6~10mm^2	4-15mm
5	Optical fiber	Armored optical fiber	/	9-18mm
[Note] To ensure the sealing effect after wiring, the cable outer diameter must be within the range specified in the table above, and the cable fasteners must be tightened. If the wire specifications do not meet the requirements specified in the table above, fireproof putty must be used to seal the gap between the cable and the fastener.				

5.5.2 Cable connection

When connecting cables, users should prepare corresponding cables in advance.

⚠ CAUTION	To prevent excessive pressure on the cables and poor cable connections due to ground settlement, it is recommended to bend the outgoing cables inside the cabinet, leaving 20~30mm of slack, before connecting them to the corresponding ports, and ensure that the armor of the cables is stripped inside the cabinet.

Three-phase AC line wiring (PLC)

For smart sub-array controllers with PLC communication, the R phase and T phase of the three-phase AC line are connected to the terminal block, and then pass through three-phase fuses to reach the PLC.

PLC networking is suitable for medium voltage grid-connected occasions. If it is applied in low voltage grid-connected occasions, the following two conditions must be met:

(1) The PLC slave nodes in data collectors and inverters cannot have any loads connected to them.

(2) The distance between the data collector and any loads, including air conditioning, machine tools, motors, etc., must be greater than 20m, i.e., the nearest load distribution line to the low voltage grid connection point must be greater than 20m.

Note: Connecting the three-phase AC line incorrectly may cause communication errors on the PLC.

As shown in the figure below, the three-phase AC line is connected to L1 (R phase) and L2 (T phase) in PLC1 respectively.

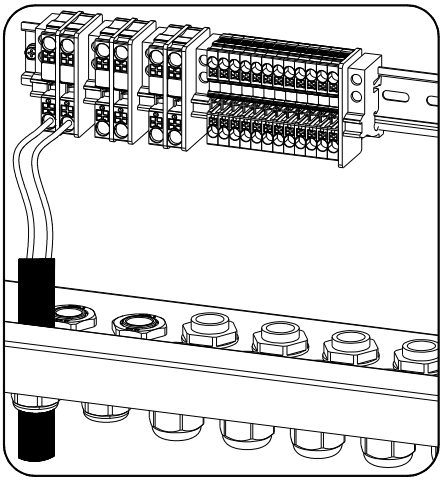


Figure 6 Three-phase AC Line Wiring Diagram

Single-phase AC line wiring (power supply)

● The single-phase AC line 220Vac flows into the power supply module through the switch after being connected to the terminal.

● As shown in Figure 7, the single-phase AC line is connected to the terminal.

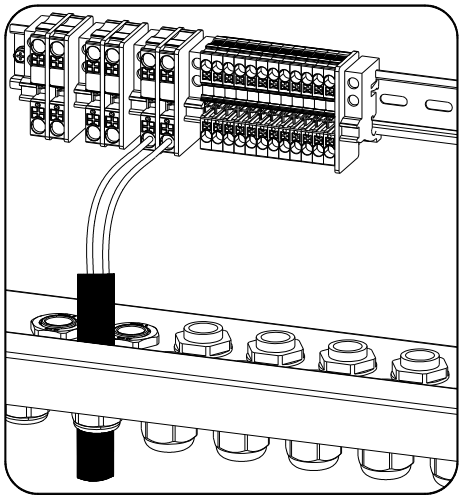


Figure 7 Single-phase AC Line Wiring Diagram

Cabinet external ground wire connection

- The ground wire is connected to the grounding busbar nearby.
- The ground wire is fixed on the cabinet.

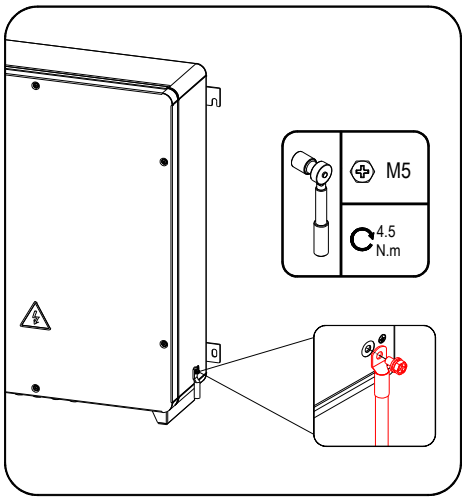


Figure 8 External Ground Wire Connection Schematic Diagram

After the wiring is completed, in order to improve the corrosion resistance of the ground terminal, it is recommended to apply silicone sealant or paint to the outer part of the ground terminal after installation.

RS485 communication line connection

Table 2 RS485 Port Function Introduction

Serial Number	RS485 Port	Function	Remark
1	RS485_1~6	Reserved RS485 port	Without using PLC, the wiring method of RS485 can also be used, and it can also be used for third-party equipment access.

Line connection schematic diagram is as follows:

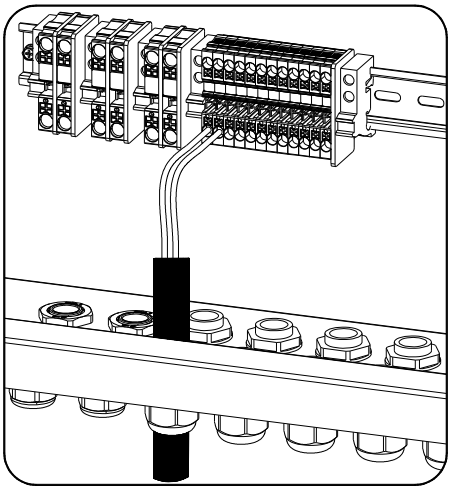


Figure 9 RS485 Line Connection Schematic Diagram

Optical fiber fusion (optional)

If the sub-array optical fiber is used for networking, the optical fiber fusion ring network is implemented on the sub-array side.

The following figure shows the optical fiber fusion access port:

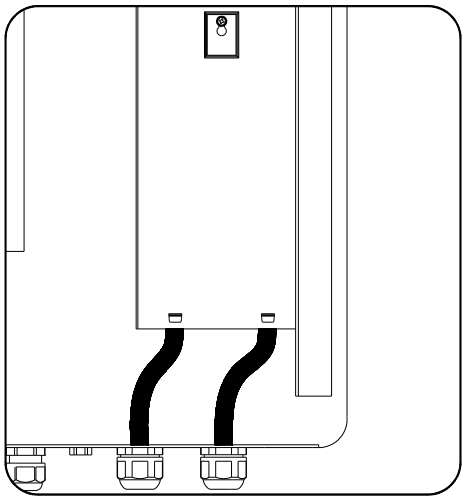


Figure 10 Optical Fiber Fusion Connection Schematic Diagram

5.6 Post-installation inspection

After installation, the following inspection items are performed:

● Confirm that the wiring is solid and reliable, and that the power lines and signal lines meet the requirements for strong and weak current routing, and that the cables are neatly bound.

● Ensure that there is no debris left in the cabinet.

● Use fire-resistant putty to seal the bottom gland, tighten the gland, and ensure that the cabinet is waterproof and moisture-proof inside.

● All upstream switches of the cabinet and cabinet switches are in the off state.

6. Engineering configuration

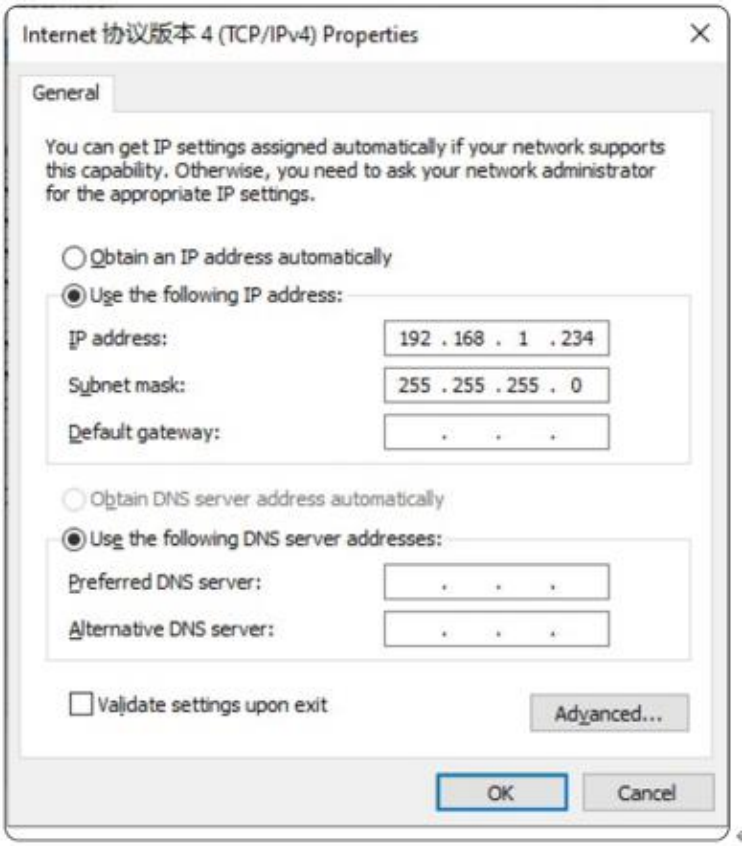
6.1 Configuration software download

Please go to https://smartenergy.csisolar.com/attach/ConfigTool_EN.7z, and download ConfigTool configuration software.

6.2 Connecting the data collector

6.2.1 Network cable connection to the data collector

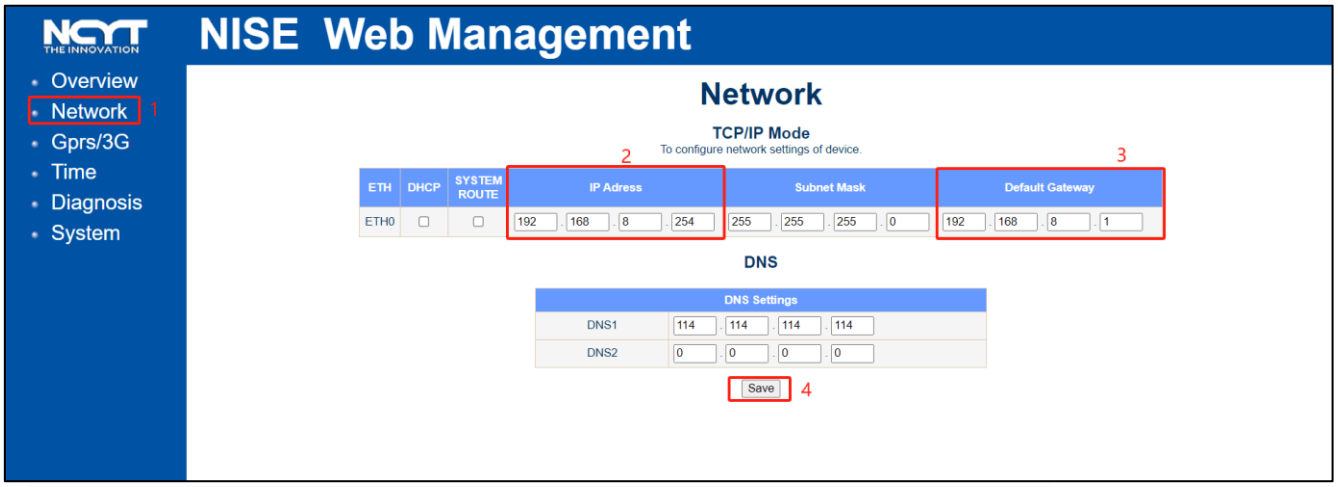
The default IP address of the data collector is 192.168.1.254. Modify the IP address of the computer to ensure that it is on the same network segment as the data collector, such as 192.168.1.234, and connect the computer and data collector using a network cable.



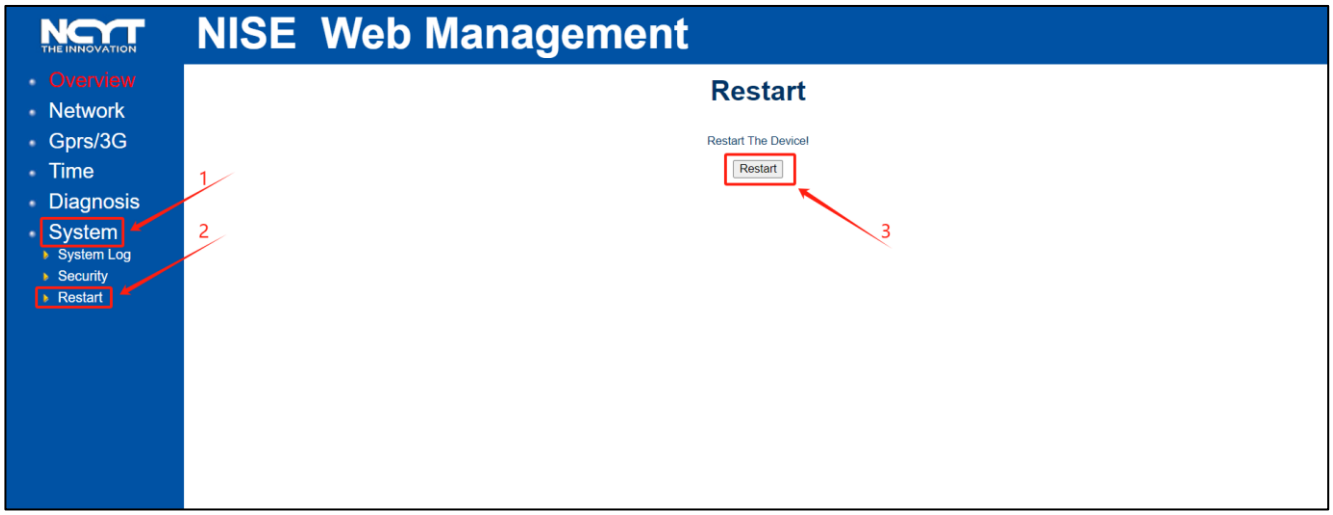
6.2.2 Configure network information

(1) Connect the network cable to the data collector, open a web browser on the computer, enter 192.168.1.254, enter the user name "admin" and password "admin", and click Log in.

(2) Modify the "Network" page to configure the IP address and gateway address of the management machine according to the router's network segment information. For example, if the router's network segment is located in the 8th segment, modify the IP address of the management machine to 192.168.8.254, and set the default gateway to 192.168.8.1. Click Save.



(3) After completing and saving the modification, restart the management machine.

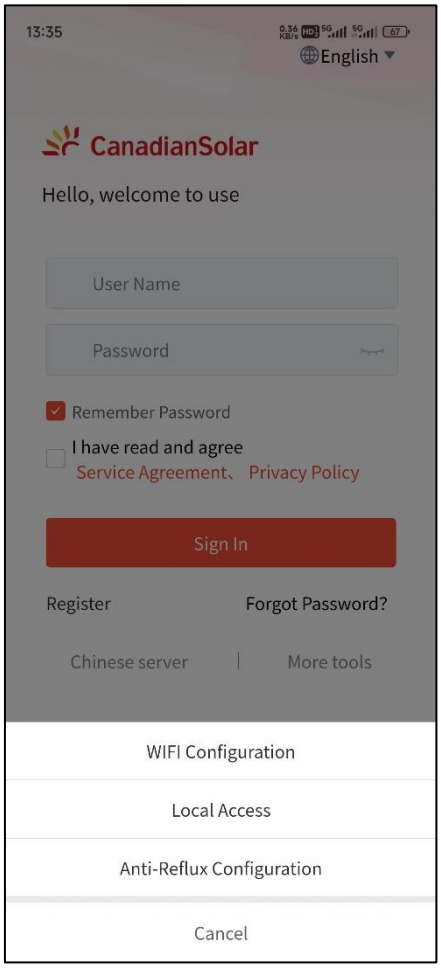


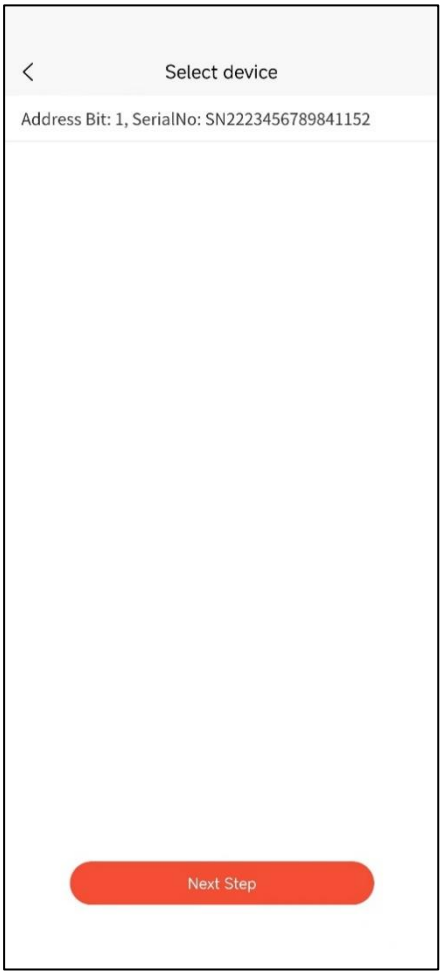
6.3 Software configuration

6.3.1 Changing the Modbus address

NOTICE	Before using the data collector, it is necessary to modify and record the Modbus addresses of each inverter, to ensure that the Modbus addresses on the same RS485 bus are not duplicated.
INFORMATION	The operation method is as follows using the smart data stick provided by CSI.

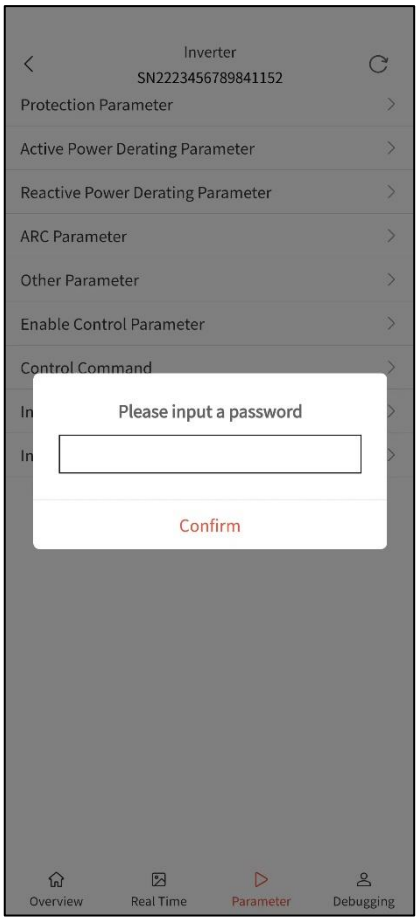
(1) Insert the data stick into the inverter, wait for the green light to blink, open the APP "More Tools" -> "Local Access" -> scan the code to connect the inverter, select the inverter and click "Next".

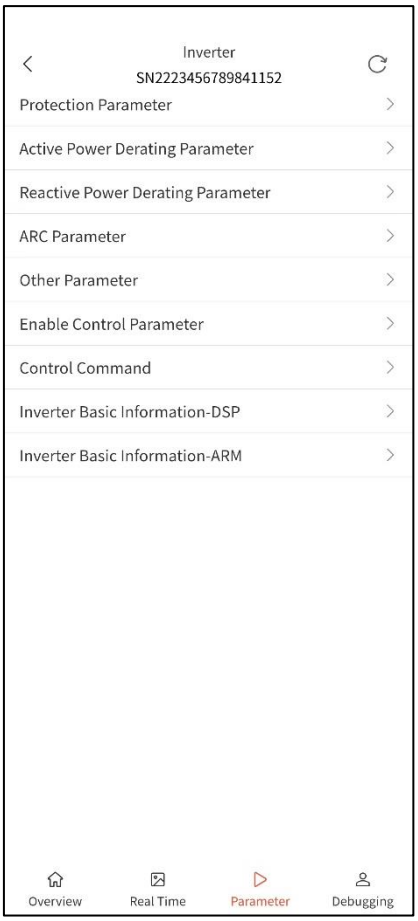


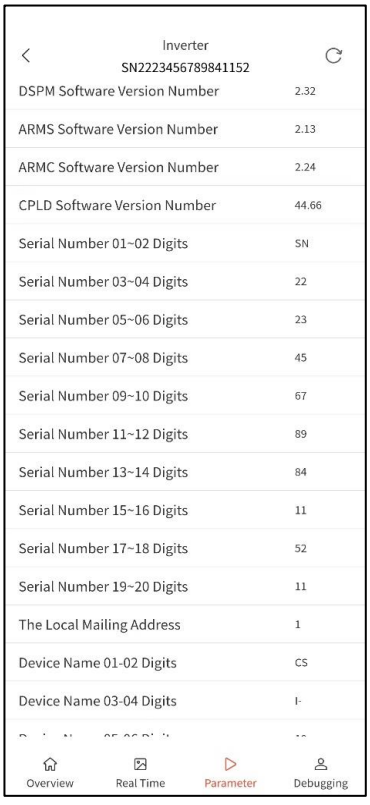


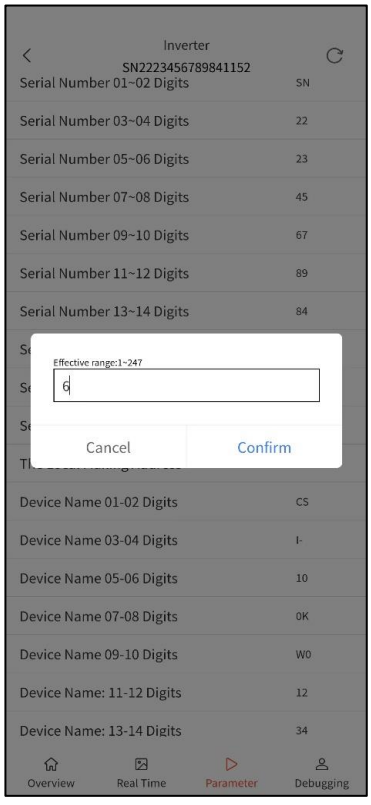
(2) Click the "Parameters" page below -> enter password 8888 in the pop-up box -> click "Inverter Basic Information-ARM".

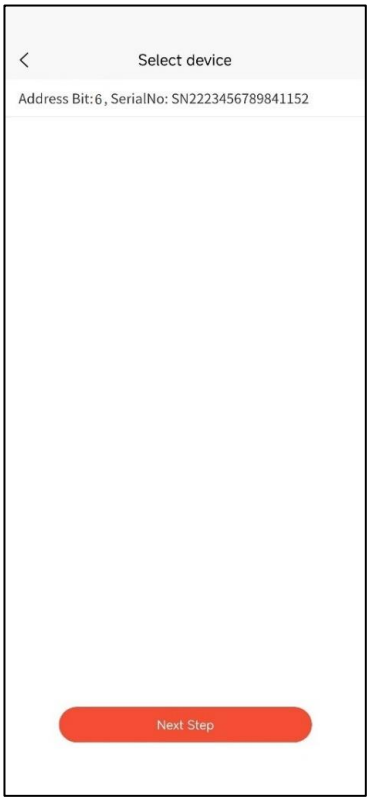
(3) Click "The Local Mailing Address" -> modify the address to the desired one -> click "Confirm" -> re-scan and connect to confirm the successful modification.


Inverter
SN2223456789841152
Protection Parameter
Active Power Derating Parameter
Reactive Power Derating Parameter
ARC Parameter
Other Parameter
Enable Control Parameter
Control Command
Please input a password
Confirm
Overview
Real Time
Parameter
Debugging


Inverter
SN2223456789841152
Protection Parameter
Active Power Derating Parameter
Reactive Power Derating Parameter
ARC Parameter
Other Parameter
Enable Control Parameter
Control Command
Inverter Basic Information-DSP
Inverter Basic Information-ARM
Overview
Real Time
Parameter
Debugging

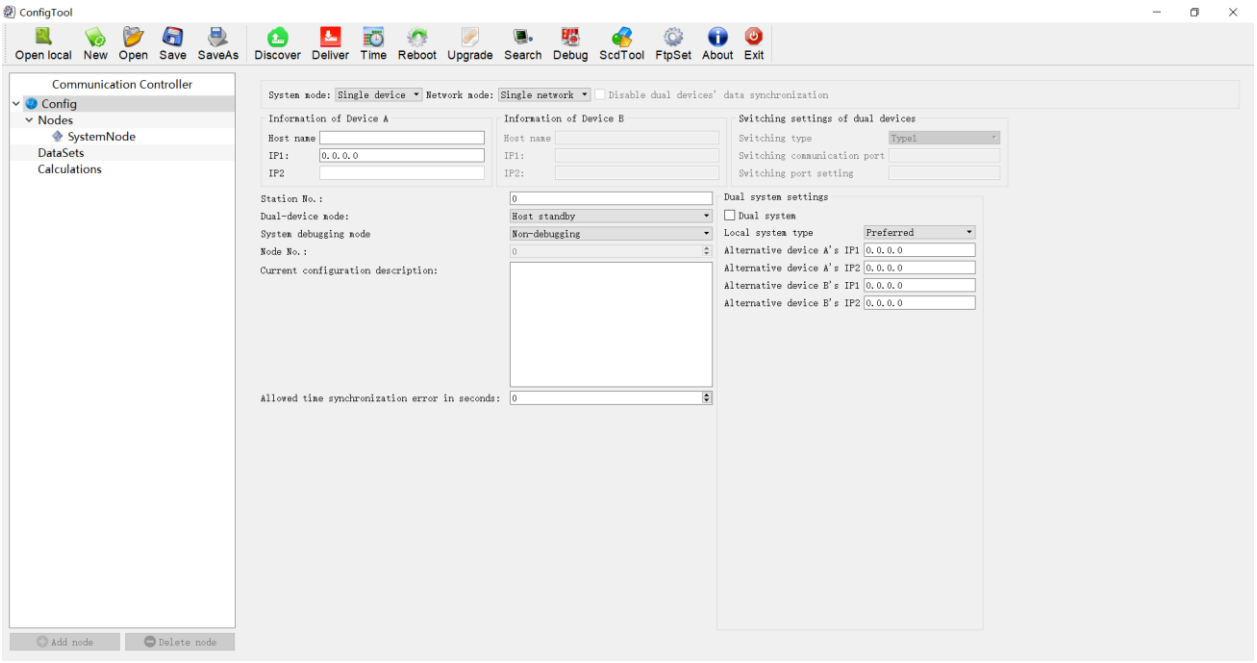

Inverter
SN2223456789841152
DSPM Software Version Number 2.32
ARMS Software Version Number 2.13
ARMC Software Version Number 2.24
CPLD Software Version Number 44.66
Serial Number 01~02 Digits SN
Serial Number 03~04 Digits 22
Serial Number 05~06 Digits 23
Serial Number 07~08 Digits 45
Serial Number 09~10 Digits 67
Serial Number 11~12 Digits 89
Serial Number 13~14 Digits 84
Serial Number 15~16 Digits 11
Serial Number 17~18 Digits 52
Serial Number 19~20 Digits 11
The Local Mailing Address 1
Device Name 01-02 Digits CS
Device Name 03-04 Digits I-
Overview
Real Time
Parameter
Debugging


Inverter
SN2223456789841152
Serial Number 01~02 Digits SN
Serial Number 03~04 Digits 22
Serial Number 05~06 Digits 23
Serial Number 07~08 Digits 45
Serial Number 09~10 Digits 67
Serial Number 11~12 Digits 89
Serial Number 13~14 Digits 84
Effective range:1~247
6
Cancel
Confirm
Device Name 01-02 Digits CS
Device Name 03-04 Digits I-
Device Name 05-06 Digits 10
Device Name 07-08 Digits 0K
Device Name 09-10 Digits W0
Device Name: 11-12 Digits 12
Device Name: 13-14 Digits 34
Overview
Real Time
Parameter
Debugging


Select device
Address Bit:6, SerialNo: SN2223456789841152
Next Step

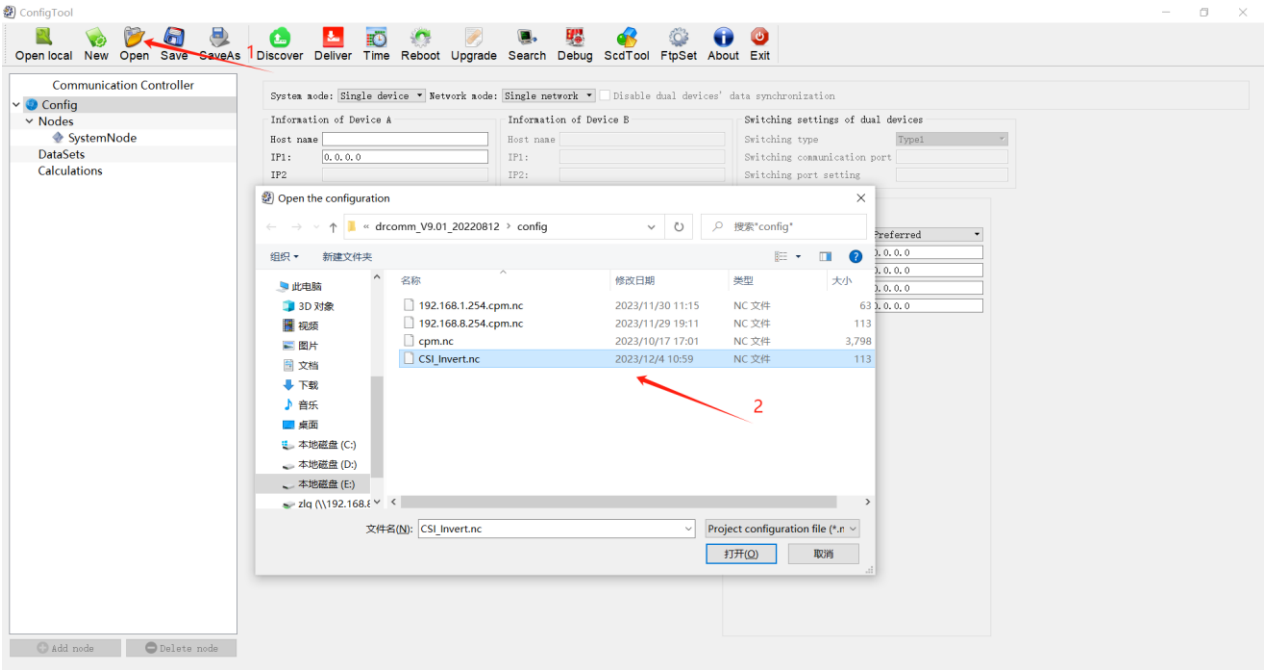
6.3.2 Open configuration software

Go to the /bin directory and open the configuration application ConfigTool.EXE.



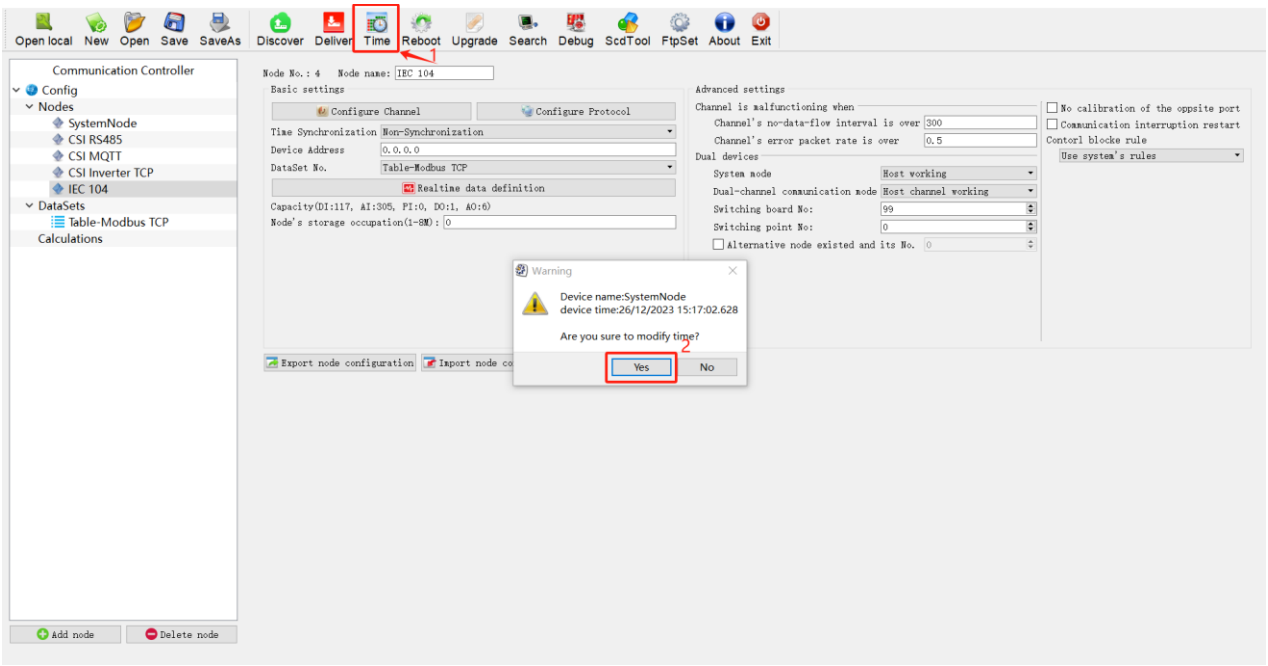
6.3.3 Select configuration file

Click on "Open" and select "CSI_Invert.NC" profile to see several configurations displayed by default in the node list.



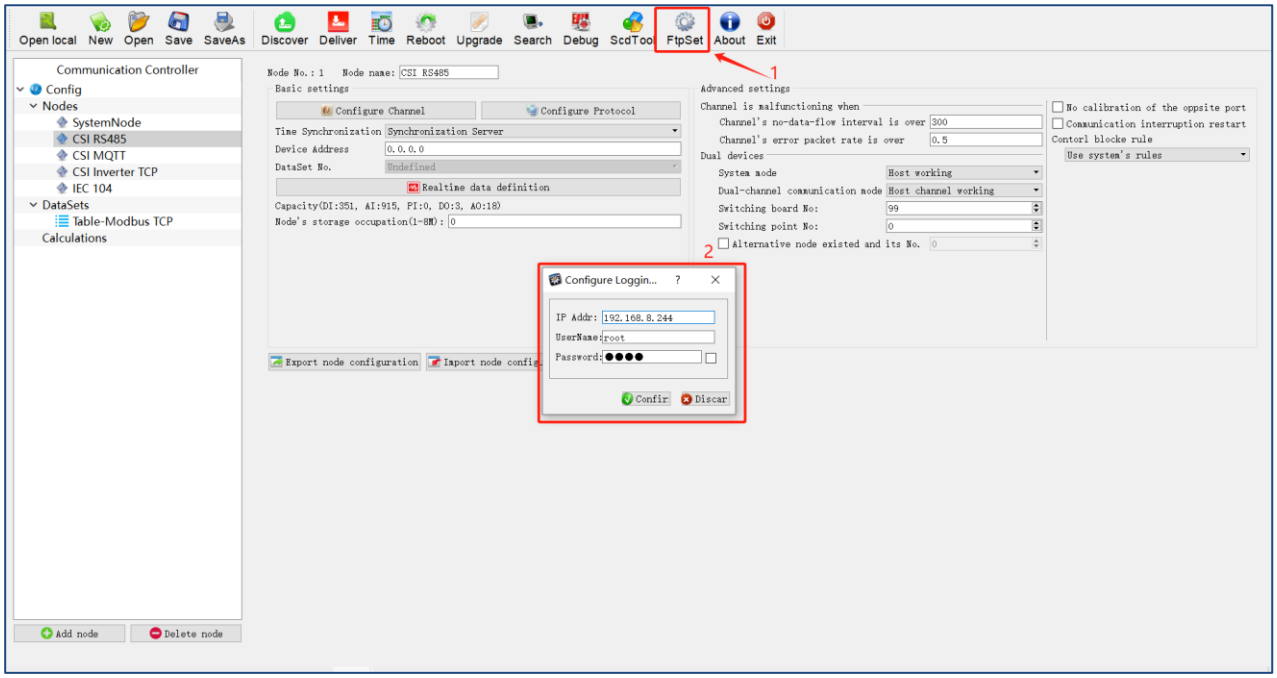
6.3.4 Time configuration

After opening the configuration, in order to calibrate the inverter time, you need to calibrate the time of the management machine first.



6.3.5 Network configuration

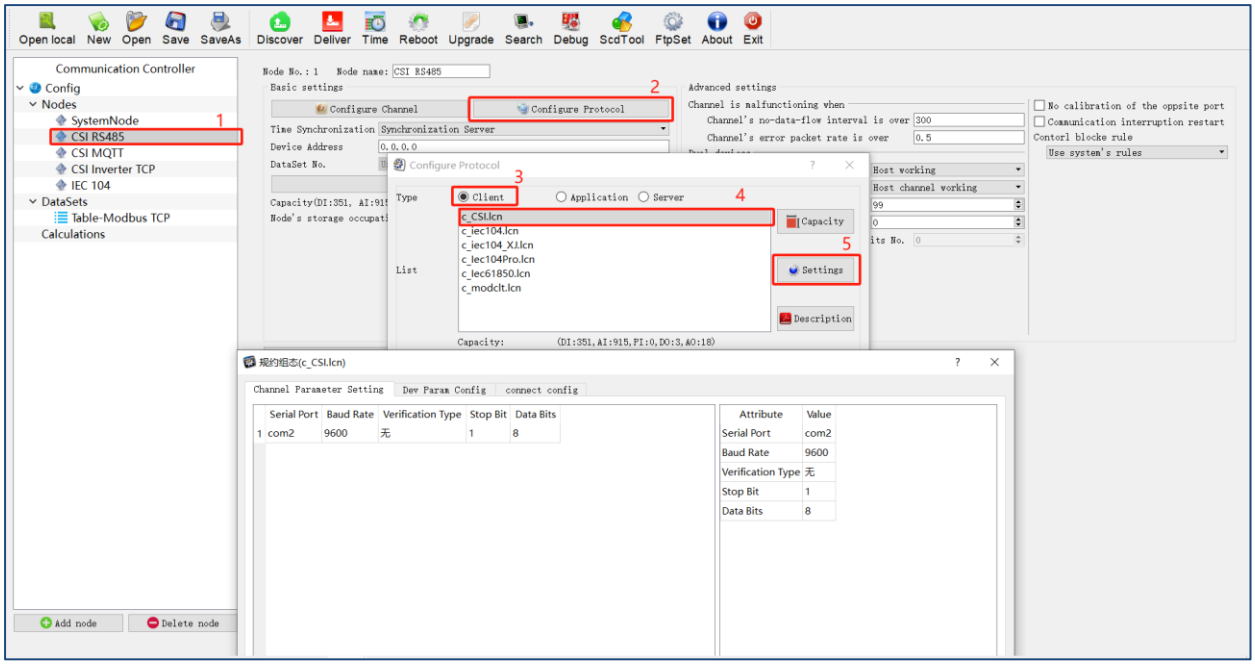
In "FtpSet", set the parameters according to the previously modified management machine IP address.



6.3.6 Serial port configuration

(1) Select protocol node

Select the node "CSI RS485" in the node list, select "Configure Protocol", select "c_CSI.lcn" in the client protocol, click "Settings", and the configure protocol dialog box appears.



(2) Set serial port parameters

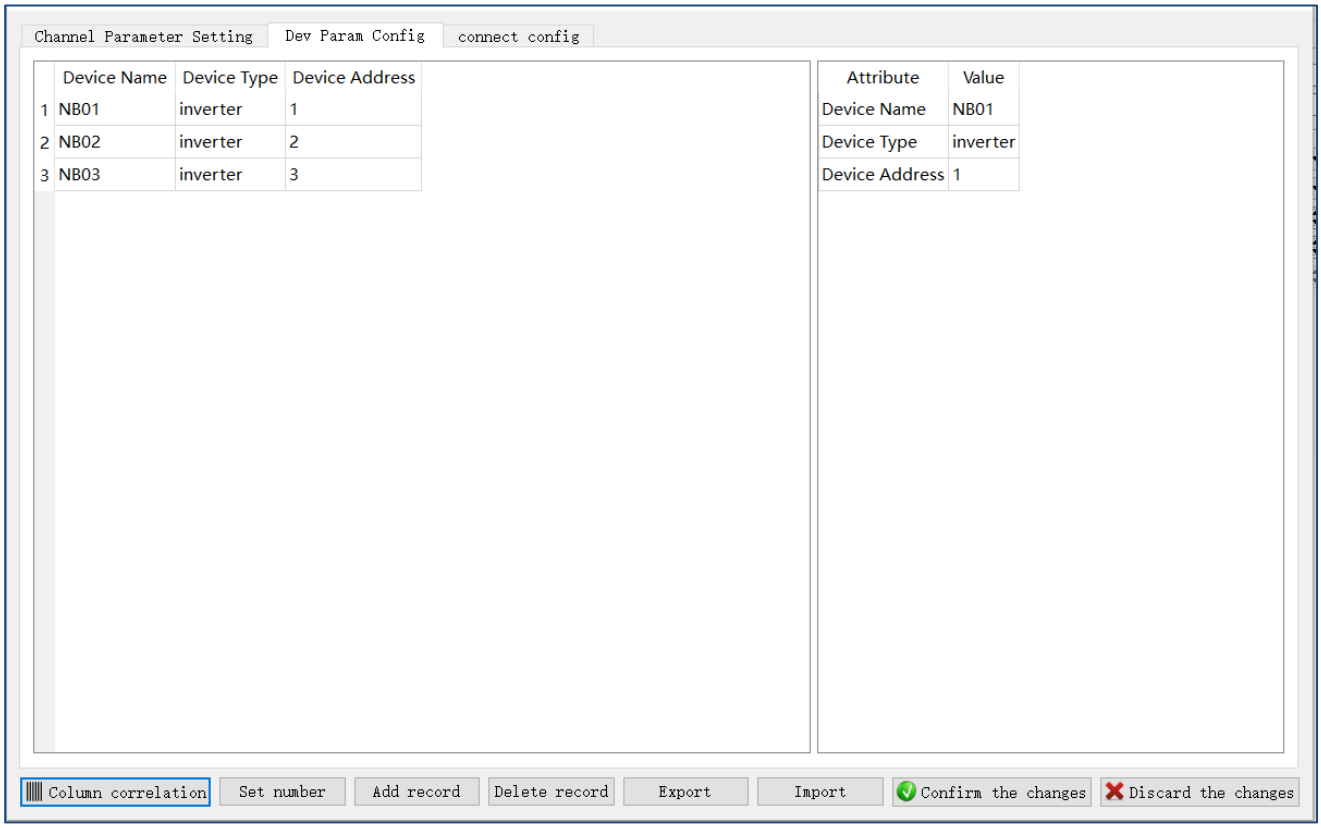
Configure the serial port number, baud rate, check type, stop bit, and data bit in the "Channel Parameter Setting".

NOTICE	The com number configured in the software should be one more than the actual interface number. For example, if the actual interface connected is com1, the software configuration should choose com2.

(3) Set inverter parameters

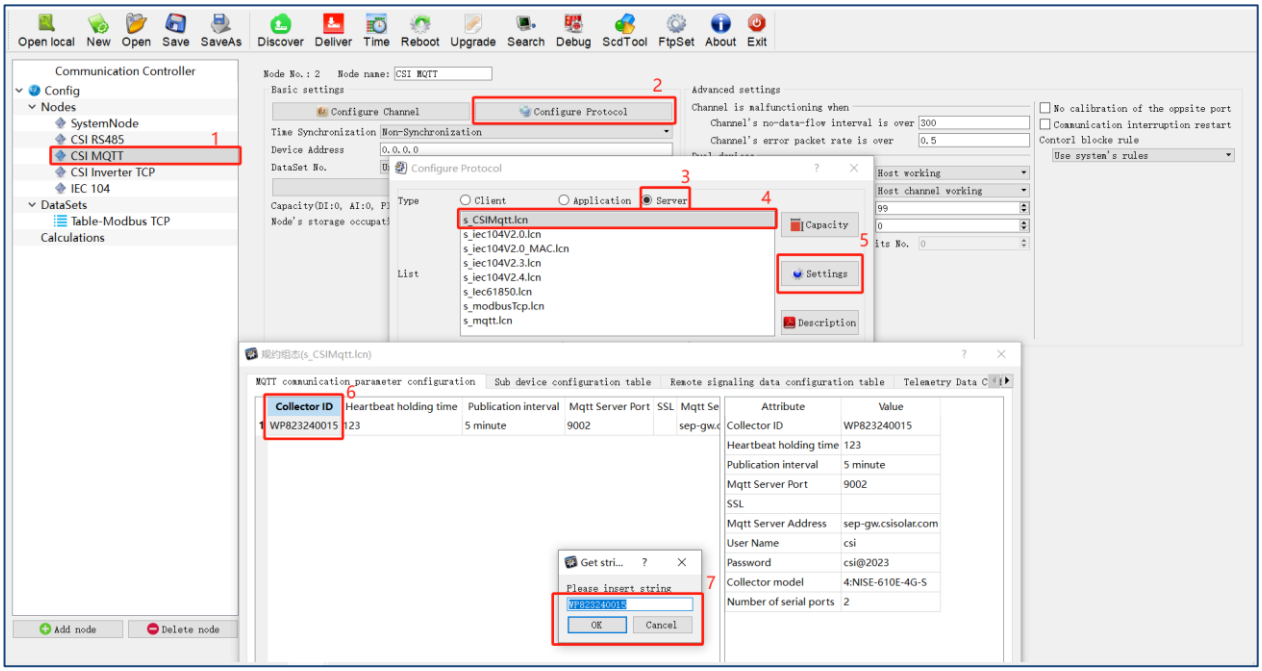
In the "Device Parameter Configuration", configure the number of inverters and their communication addresses according to the previously modified communication addresses. Inverters can be added by "Adding Records". If there are actually 3 inverters on site, you need to add 3 records, and the communication addresses are 1, 2, and 3 respectively. Then click "OK" -> "Confirm Modification" to complete the configuration of the serial port part.

NOTICE	Before this, it is necessary to modify the Modbus address of the inverter and set it to the same address as the configuration.



6.3.7 MQTT forwarding configuration

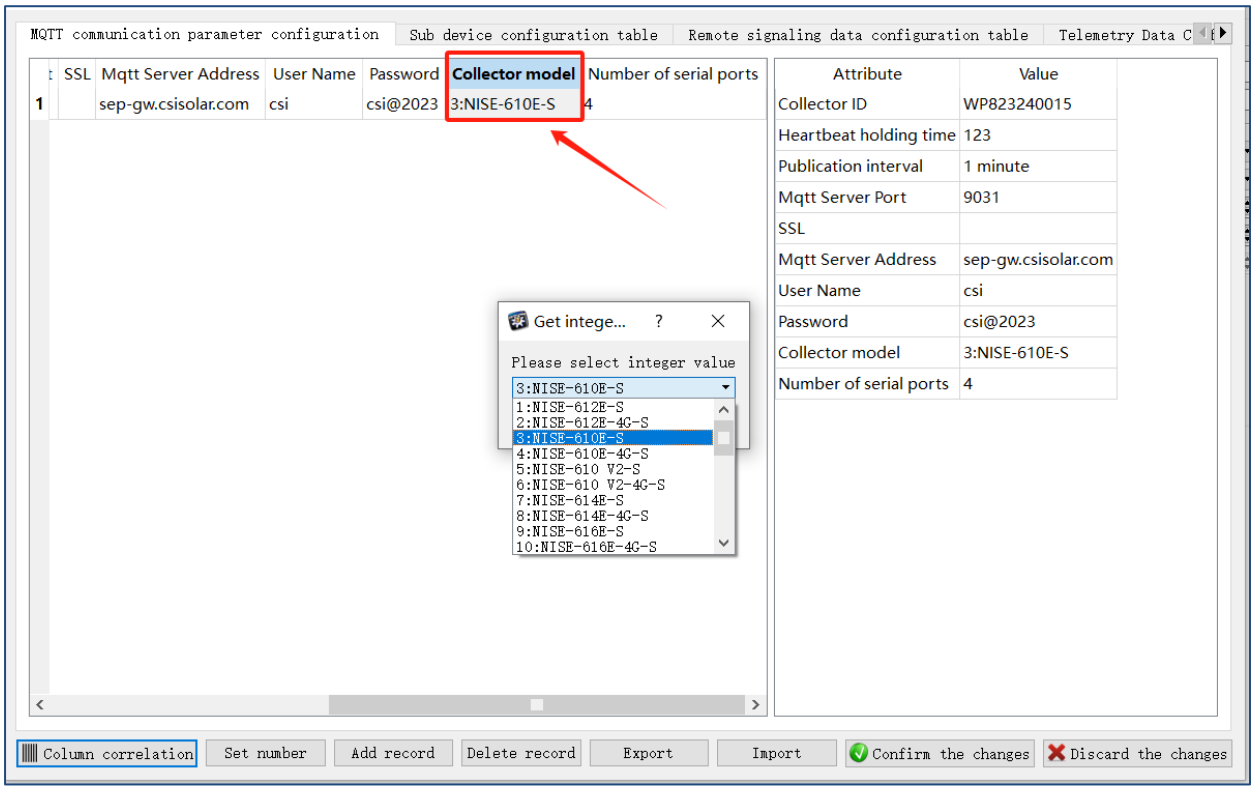
NISE-610E enables data forwarding to the Canadian Intelligent Energy Platform by default. You can delete the CSI MQTT node if it is not needed. Select "CSI MQTT" in "Nodes"-> click "Configure Protocol"-> select "s_CSIMqtt.lcn" in "Server" -> click "Settings" -> under "MQTT Communication Parameter Configuration" -> double-click "Collector ID", and enter the correct collector ID in the pop-up dialog box. The collector ID can be found on the outer casing of the data collector.



The location of the collector ID on the outer casing can be referenced to the following diagram. The serial number is the collector ID.

NOTICE	The input of the collector ID is very important. If the input is incorrect, the device may not be found on the platform.

Additionally, choose a product that matches the model you are using, and the collector model can also be found on the label above.



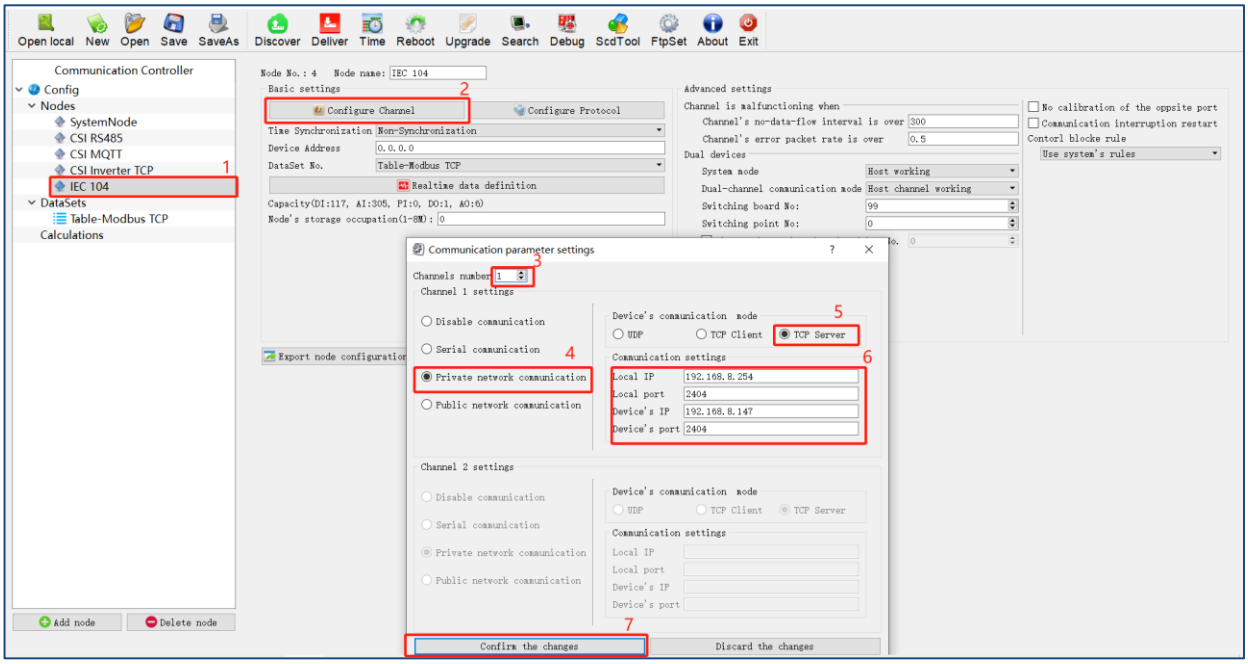
NOTICE	Do not modify other parameters of MQTT at will, otherwise it may cause data to fail to upload to the platform.

6.3.8 Modbus TCP forwarding

The configuration file of CSI_Invert.nc has opened the Modbus TCP forwarding function by default. If it is not needed, the CSI Inverter Modbus TCP node can be deleted.

6.3.9 IEC 104 forwarding

The configuration file of CSI_Invert.nc has opened the IEC 104 forwarding function by default. If it is not needed, the IEC 104 node can be deleted. When using the IEC 104 node, the IP address and port of the management machine and IEC host need to be filled in:

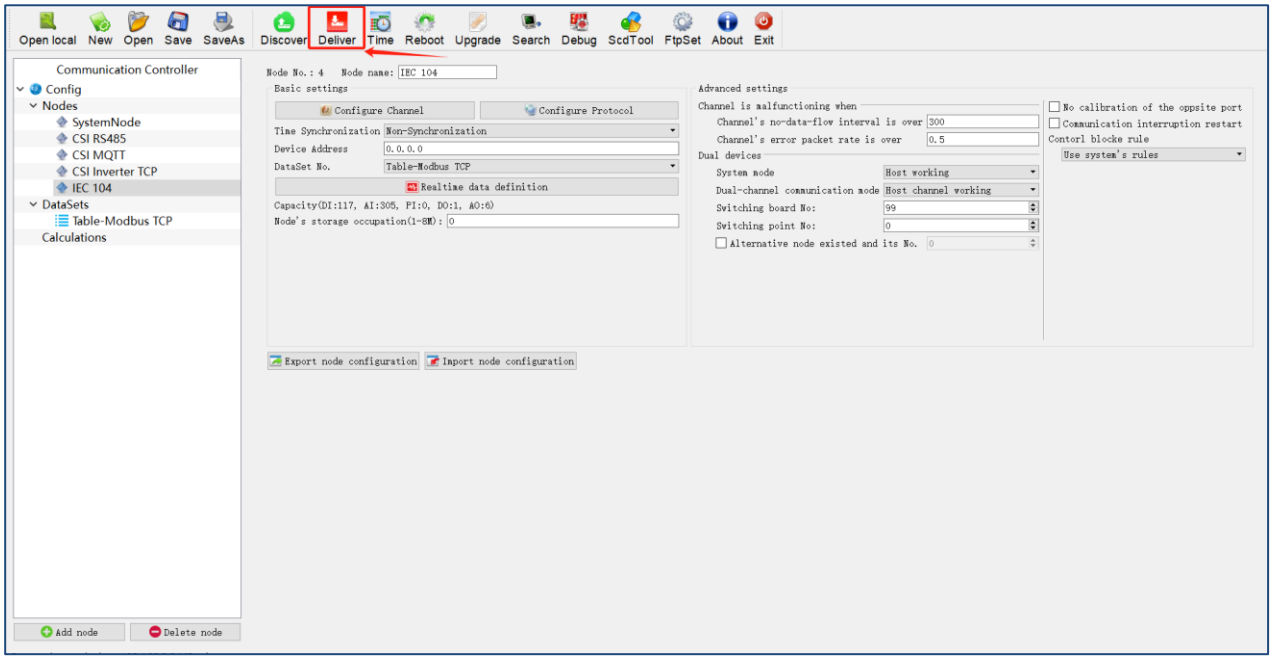


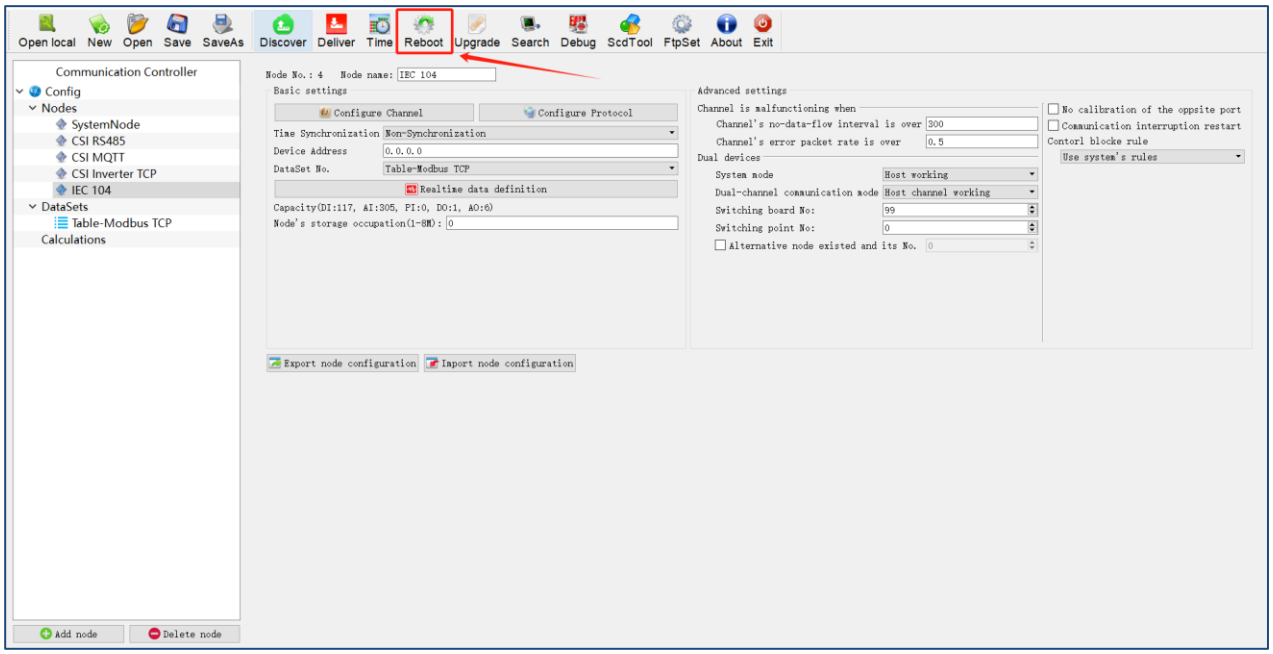
6.3.10 Other protocol forwarding and third-party device access

The data collector supports the forwarding of other protocols and the access of third-party devices. Contact local technical support for remote configuration.

6.3.11 Configuration download and device restart

After completing all the configurations, click "Deliver". When prompted, click "Reboot" to complete all the configurations.





7. System commissioning

7.1 Pre-power-up check

Serial Number	Acceptance Criteria
1	The cabinet and all components have been installed securely.
2	Upstream switches of the cabinet and cabinet switches are in the off state.
3	Cables are connected correctly and firmly, with no exposed metal.

4	Cables are tidy and well-organized, with even spacing between ties, appropriate tightness, and consistent orientation.
5	The power lines and signal lines meet the requirements for strong and weak current routing, in accordance with the system cabling plan.
6	The used waterproof connectors have been tightened with lock nuts and sealed. Unused waterproof connectors have been fitted with plugs and tightened with lock nuts.
7	The cabinet is clean and tidy, without dust, dirt, or construction debris inside.
8	The paint finish on the cabinet exterior is intact. If paint is chipped, it should be immediately touched up to prevent corrosion.

7.2 Powering on the system

- The pre-power-up check has been completed.
- The operator has donned personal protective equipment.
- The power supply voltage for the smart sub-array controller is within its operating voltage range, and the three-phase input voltage is within the operating voltage range.

Operating steps:

Step 1 Close the single-phase power supply switch for the smart sub-array controller.

Step 2 After the smart sub-array controller system powers on, observe whether the indicator lights on the single board and various devices are normal.

7.3 Close the cabinet door

Adjust the support rods, close the main cabinet door, and secure the screws.

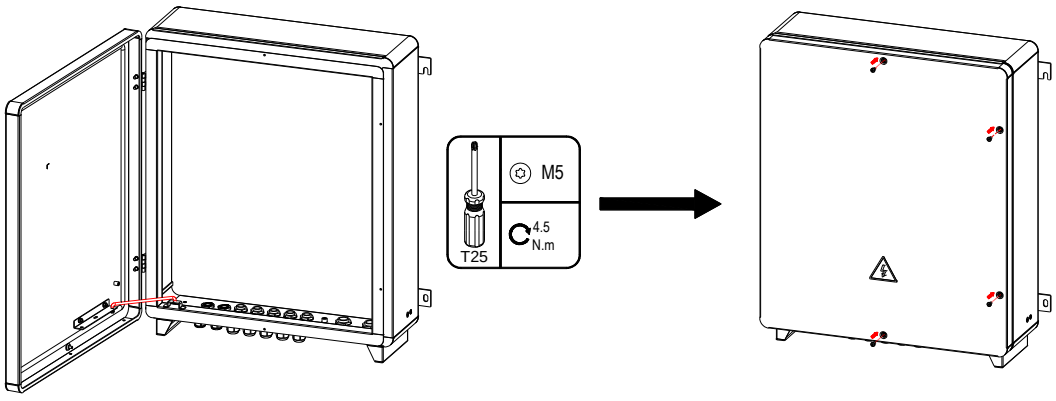


Figure 11 Door Closing Schematic Diagram

7.4 Powering off the system

Disconnect the single-phase power supply switch for the smart sub-array controller.

8. System maintenance

8.1 Routine maintenance

Prior to system cleaning, electrical connections, grounding reliability, etc., perform a power-off operation to ensure that the smart sub-array controller is powered off to ensure personal safety. If it is impossible to prevent rain or snow from entering the cabinet, please do not open the cabinet door during rain or snow.

Maintenance checklist

Check Item	Check Method	Maintenance Frequency
Cabinet inspection	1. Check for any physical damage or deformation on the smart sub-array controller's exterior. 2. Check for any dust or dirt inside the smart sub-array controller.	Once a year
System operation status	1. Check that all equipment inside the smart sub-array controller is operating normally. 2. Check if the lightning arrester is operating normally.	Every six months
Electrical connections	1. Check for loose or disconnected cables. 2. Check for damaged cables, focusing on whether there are any cuts on the surface of the cables that are in contact with metal. 3. Check that unused waterproof connectors have their plugs inserted and their lock nuts tightened.	Once a year
Grounding reliability	Check that all ground wires are securely grounded.	Once a year

8.2 Troubleshooting

Hardware faults

Fault Symptom	Cause Analysis	Troubleshooting Advice
The single-phase input switch of the smart sub-array controller is not powered on.	1. The power supply of the upstream terminal of the single-phase input switch is abnormal. 2. The single-phase input switch is faulty.	1. Use a multimeter to check if the power supply of the upstream terminal of the single-phase input switch is normal. 2. Replace the single-phase input switch.
The power adapter or 24V DC power supply is not supplying power.	1. The connection between the 24V DC input/output cables is loose or disconnected. 2. The power adapter or 24V DC power supply is faulty.	1. Check if the cable connections are correct. If they are loose or disconnected, reconnect and tighten them securely. 2. Replace the power adapter or 24V DC power supply module.
The communication management machine is not powered on.	1. The communication management machine is not functioning properly. 2. The power adapter or 24V DC power supply is faulty.	1. Use a multimeter to check if the communication management machine is receiving proper power supply. 2. Check if there is output at the 24V power supply inlet. 3. Please contact the distributor or CSI Customer Service Center for assistance.

Communication faults

Fault Symptom	Cause Analysis	Troubleshooting Advice

There is no communication between the communication management machine and Ethernet switch (optional).	1. The communication between the communication management machine and the Ethernet switch is abnormal. 2. The IP of the communication management machine is not configured or the IP configuration is not within the local area network.	1. Check whether the network port indicator lights on the communication management machine and Ethernet switch are blinking normally. If not, install the network cable on other FE ports of the Ethernet switch or replace the network cable and try again. 2. Check whether the IP parameter configuration of the communication management machine is correct. If not, reconfigure it. 3. Connect a PC to the Ethernet switch, and use IP to check whether the communication is normal. If not, replace the network cable and try again. 4. Please contact the distributor or CSI Customer Service Center for assistance.
RS485 communication failure	Communication between the communication management machine and inverter is abnormal.	1. Check whether the indicator lights on the communication management machine are blinking normally. If not, install the communication line on other ports or replace the communication line and try again. 2. Please contact the distributor or CSI Customer Service Center for assistance.

8.3 Component replacement

- High voltage exists during equipment operation, so please do not operate with power on.
- Before replacing components, please confirm that there are matching and functional spare parts.
- When replacing components, power off the smart sub-array controller first, wait at least 3 minutes after powering off to ensure that the smart sub-array controller is powered off.

● Check and power on the smart subarray controller after replacing components to confirm that the replaced components work normally. After replacing the component, please complete the pre-power-up check of the smart sub-array controller first before powering it on to confirm that the replaced component can work normally.

● Faulty components should be disposed of according to applicable electrical waste disposal laws in the installation location.

8.3.1 Replacing three-phase surge arresters

● The surge arrester consists of a surge protection module and a base.

● If the surge arrester is damaged or the display window is red, it means that the surge arrester has failed and needs to be replaced.

● The replacement method for single-phase and three-phase surge arresters is the same. This section uses a single-phase surge arrester as an example to explain how to replace a surge arrester.

Step 1 Remove the surge protection module on the surge arrester.
Step 2 Install the surge protection module.

8.3.2 Replacing knife fuse switches

Step 1 Remove the cables connected to the knife fuse switch and label them well.
Step 2 Remove the faulty knife fuse switch.
Step 3 Install a new knife fuse switch.
Step 4 Connect the cables according to the cable labels.

8.3.3 Replacing fuses of knife fuse switches

Step 1 Open the knife fuse switch box and remove the faulty fuse.
Step 2 Install a new fuse, and close the knife fuse switch box.

8.3.4 Replacing single-phase input switches

Step 1 Remove the cables connected to the single-phase input switch and label them well.
Step 2 Remove the faulty single-phase input switch.
Step 3 Install a new single-phase input switch.
Step 4 Connect the cables according to the cable labels.

9 Technical Data

	Product Model	CSCU-ICB-CCO01
Communication	Number of supported devices	≤80
	RS485 interface	6
	PLC communication interface	1 channel / 2 channels (optional)
	Optical fiber switch (optional)	2×100Mbps optical ports, 6×10Base-T/100Base-TX network ports
	Optical fiber terminal box (optional)	2 inputs and 4 outputs SC single mode
	Vertical encryption gateway (optional)	ten megabyte type
PLC communication	Maximum communication distance	≤1000m
	Maximum voltage resistance	920V (line voltage) / 532V (phase voltage)
Power Supply	AC input	100-240V，50/60Hz
	Power consumption	<30W
Environmental Parameters	Operating temperature	-30℃~+60℃
	Storage temperature	-40℃~+70℃
	Operating humidity	≤95% (no condensation)
	Operating altitude	≤4000m
	Protection grade	IP65
Mechanical Parameters	Size (width×height×depth)	600X740X200mm
	Weight	18kg
	Installation method	wall hanging, bracket

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