GATEWAY ECC-PLC

User Manual

Version 3.0

www.solaxpower.com

eManual in the QR code or at
http://kb.solaxpower.com/

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About This Manual

Scope of Validity

This manual is an integral part of Gateway ECC. It describes the installation, electrical connection, commissioning, maintenance and troubleshooting of the product. Please read it carefully before operating.

Note:

"ECC" refers to the communication gateway energy control center-WiFi.

Target Group

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

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

Explanation of Symbols

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

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

Change History

Version 03 (2024-10-30)

Updated "Contact Information" (Modified the email address of Australian branch)

Version 02 (2024-06-13)

Updated "1.2 Safety" (Modified Safety Regulations)

Version 01 (2024-06-13)

Updated "1.2 Safety" (Modified Safety Regulations)

Version 00 (2024-03-28)

Initial release

Table of Contents

1 Preface

1.1 Read this First

Gateway ECC-PLC is well designed and tested to meet all applicable states and international safety standards. However, like all electrical and electronic equipment, safety precautions must be observed and followed during the installation of the ECC-PLC to reduce the risk of personal injury and to ensure a safe installation.

Before installing the device, the installer must carefully read, fully understand and strictly follow the detailed instruction of the user manual and other related regulations. And the safety instructions in this document are only supplements to local laws and regulations.

SolaX shall not be liable for any consequences caused by the violation of the storage, transportation, installation, and operation regulations specified in this document, including, but not limited to:

- ECC-PLC damage due to force majeure, such as earthquake, flooding, thunderstorm, lighting, fire hazard, volcanic eruption, etc.
- ECC-PLC damage due to man-made cause.
- ECC-PLC used or operated against any items in local policy.
- Failure to follow the operation instructions and safety precautions on the product and in this document.
- Installation and use under improper environment or electrical condition.
- Unauthorized modifications to the product or software.
- ECC-PLC damage caused during transportation by the customer.
- Storage conditions that do not meet the requirements specified in this document.
- Installation and commissioning operated by unauthorized personnel who are not licensed and /or satisfy state and local jurisdiction regulations.

1.2 Safety

Save these important safety instructions. Failure to do so may result in damage to the ECC-PLC and injury.

CAUTION!

- Before installation, ensure all power of the device has been cut off.
- Do not dismantle or scrap by force.
- Strictly follow the installation guide to connect cables and the enclosure must be well locked before the device is electrified.
- Unauthorized opening and cable connection will void the warranty and cause lethal danger or serious injury due to electric shock.
- Refer to the corresponding installation guide for related safety requirements when it is connected to other devices.
- Anti-static measures should be taken to decrease the damage of static electricity to electronic components.
- Keep away from flammable, explosive materials.
- All the product labels and nameplate on the device shall be maintained clearly visible.

FCC RULES

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body. This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.
Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note:This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

NOTICE!

- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- Users mustn't replace detachable MAINS supply cords by inadequately RATED cords.

2 ECC-PLC System

2.1 ECC-PLC System Description

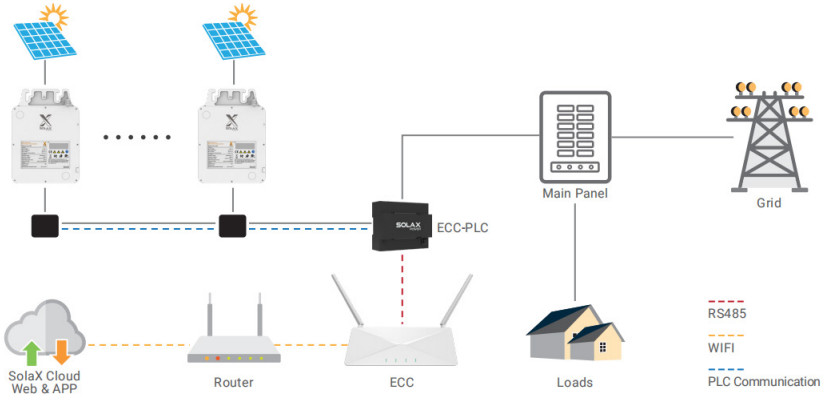


Figure 2-1 System overview diagram

ECC-PLC

SolaX gateway ECC-PLC is used to collect PV production data and energy consumption data and delivers it to the ECC via RS485. Besides, it support bidirectional communications for remote maintenance.
With integrated optional production metering and consumption monitoring, the ECC-PLC is the platform for smart energy management.

A1-Micro 1 in 1

Currently, we developed A1-Micro 1 in 1, X1-Micro 2 in 1 and X1-Micro 4 in 1 series. 2 in 1 and 4 in 1 are applicable to WiFi version, and 1 in 1 is applicable to PLC version. For 2 in 1 and 4 in 1, ECC-PLC only needs to be connected to meter. For 1 in 1, ECC-PLC connects to ECC and matches to the whole system for use.

PV module

PV Module is an assembly of photovoltaic cells, also known as solar cells. To achieve a required voltage and current, a group of PV modules are wired into large array that called PV array. A PV module is the essential component of any PV system that converts sunlight directly into direct current electricity.

Grid

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

SolaXCloud

SolaXCloud is an intelligent, multifunctional monitoring platform that can be accessed either remotely or through a hard wired connection. With the SolaX Cloud, the operators and installers can always view key and up-to-date data and set it remotely. You can log in to your user account at any time through a personal computer, IOS or Android device to view real-time monitoring data or historical data, and perform remote settings as needed.

2.2 Highlights

- Real-time load and PV production monitoring
- Web-based monitoring and control
- Bidirectional communication for remote upgrades
- Built-in industrial-grade PLC module
- Support for remote operation and maintenance

2.3 Appearance

2.3.1 Overview

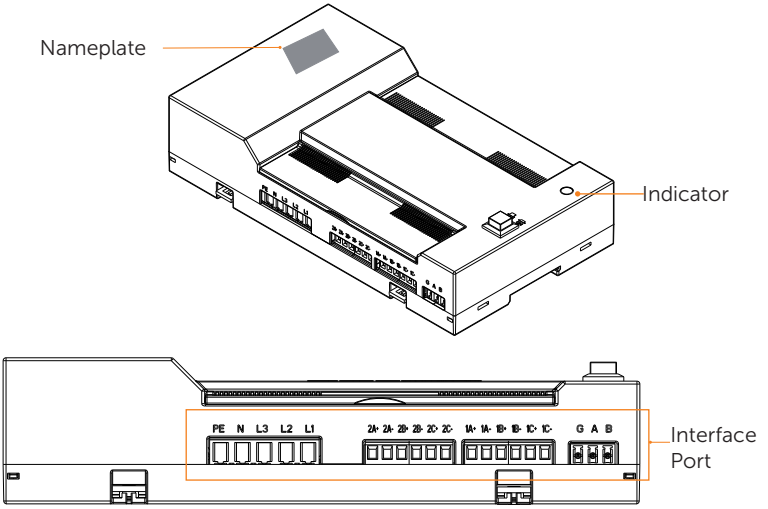


Figure 2-2 Appearance

Table 2-1 Desciption of appearance

Item	Description
Nameplate	Nameplate clearly identifies the device type, serial number, specific DC / AC parameters, certification, etc.
Indicator	Shows the running status of device
Interface port	Including Power, Current sampling port*2, RS485 port

2.3.2 Dimensions

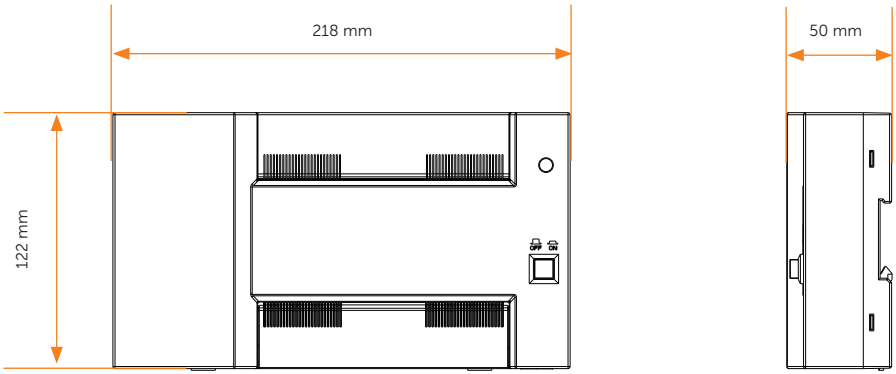


Figure 2-3 Dimensions

2.3.3 Interface Layout

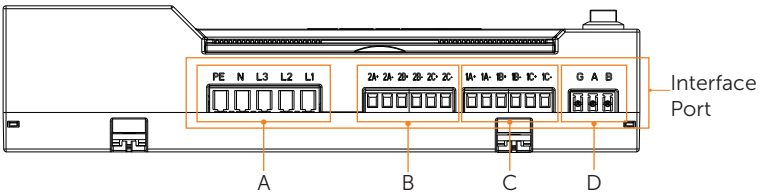


Table 2-2 Interface description

No.	Item	Description
A	Power	For power supply connection
B	Current sampling port	For production CT connection
C	Current sampling port	For consumption CT connection
D	RS485 port	For RS485 connection

2.3.4 Symbols on the Label and ECC-PLC

Table 2-3 Description of symbols

	FCC mark of conformity
	Caution, risk of electric shock
	Caution, risk of danger
	Danger of high voltage. Do not touch live parts for 5 minutes after disconnection from the power sources.
	Read the enclosed documentations
	Do not dispose of the inverter together with household waste.
	CSA mark of conformity

NOTICE!

- It must be consulted in all cases where symbol of Table 2-3 is marked, in order to find out the nature of the potential HAZARDS and any actions which have to be taken to avoid them.

3 Installation Preparation

3.1 Unpacking

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

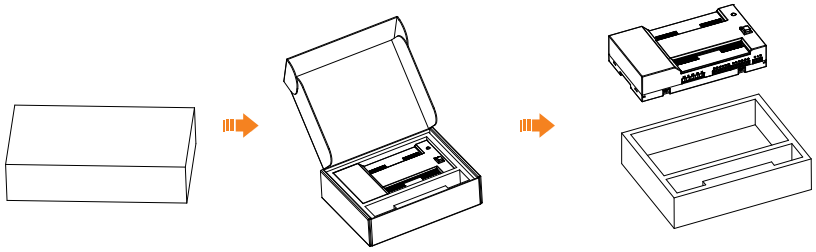


Figure 3-1 Unpacking the ECC-PLC

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

3.2 Packing List

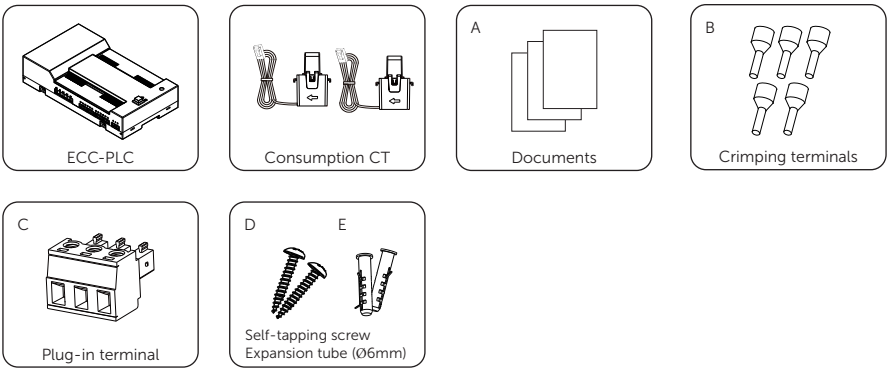


Table 3-4 Packing list

Item No.	Items	Quantity	Description
/	ECC-PLC	1 pc	
/	Consumption CT	2 pcs	Current: 100 A/33.33 mA
A	Documents	/	
B	Crimping terminals	5 pcs	
C	Plug-in terminal	1 pc	Rated voltage/current: 300 V/20 A
D	Self-tapping screw	2 pcs	
E	Expansion tube	2 pcs	

* Note: Refer to the actual delivery for the optional accessories.

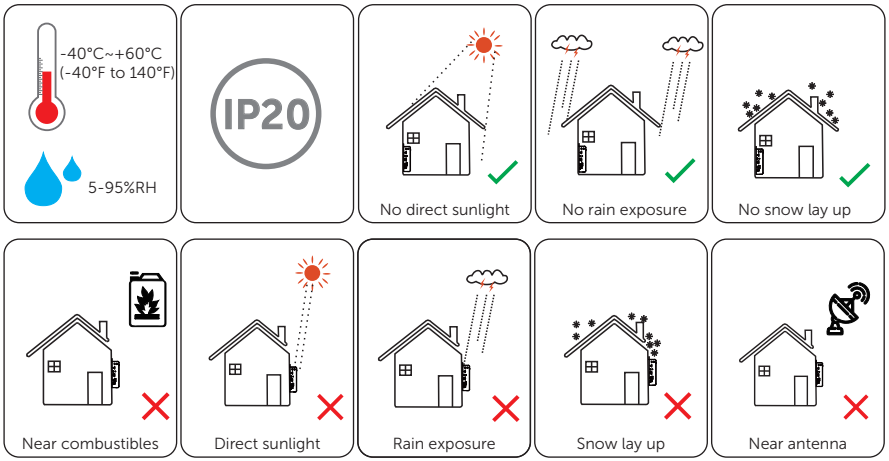
3.3 Selection of Installation Location

The installation location selected for the ECC-PLC is quite critical in the aspect of the guarantee of machine safety, service life and performance.

- It has the IP20 ingress protection, which allows it to be installed outdoor;
- The installation position shall be convenient for wiring connection, operation and maintenance.
- Avoid installing the device in a place where it is difficult to operate and disconnect device;

3.3.1 Environment Requirement

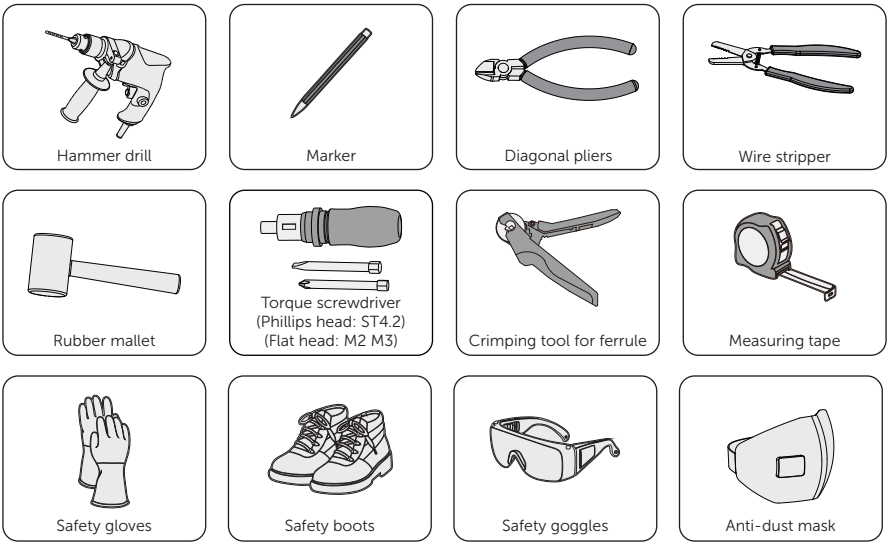
- The ambient temperature: -40°C~+60°C (-40°F to 140°F);
- The humidity shall be between 5%-95%;
- Do not install the ECC-PLC in the areas where the altitude exceeds 2000 m;
- Install the ECC-PLC in a well-ventilated environment for heat dissipation;
- Do not install the ECC-PLC in areas with flammable, explosive and corrosive materials;
- Do not install the ECC-PLC in areas near combustibles and antenna;
- Install all ECCs and DC connectors under the PV modules.
- Avoid direct exposure to UV, rain and other harmful weather events.
- Avoid electromagnetic inlterference in case of the malfunction of electronic equipment.



3.4 Tools Requirement

3.4.1 Recommended Equipment

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

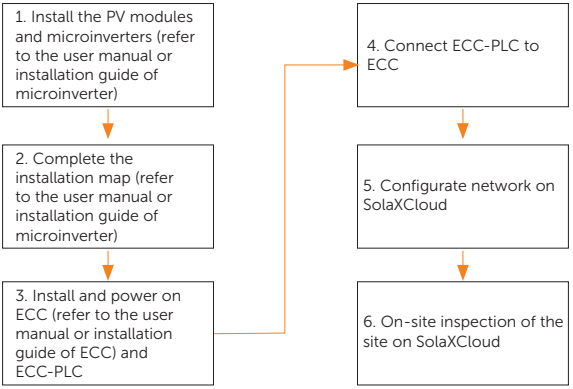


3.4.2 Additionally Required Items

Table 3-5 Additionally required wires

No.	Required Material	Requirement	Note
1	RS485 communication cable	Wire diameter: 28-16 AWG 0.5-1.5 mm^2	For RS485 connection
2	Water-proof cover	We recommended local well-known brand	For outdoor installation
3	Guide rail	Matching to ECC-PLC	For rail mounting of ECC-PLC installation (if you choose wall mounting, this material is not required)
4	Power cable	Wire diameter: 15-18 AWG (American-standard) or 1.5 mm^2 (European standard)	For power supply of ECC-PLC
5	Production CT	Current: 100 A/33.33 mA	Please purchase from SolaX if needed.

3.5 System Installation Steps



4 Installation

4.1 Install ECC-PLC

NOTICE!
• The safety of any system incorporating the equipment is the responsibility of the assembler of the system.

4.1.1 Installation method 1 (on the wall):

Step 1: Check the box for the items as follows:

i) ECC-PLC

ii) Bracket

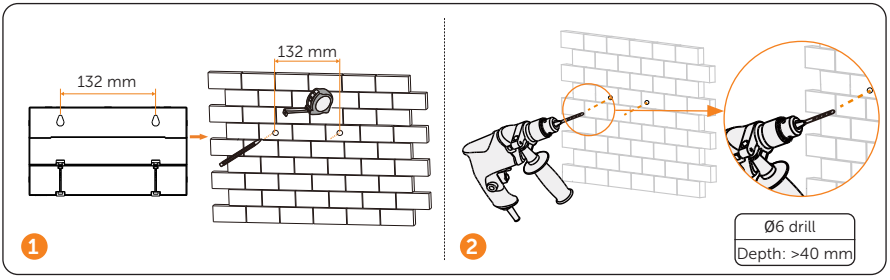
iii) CT

iv) Ferrules

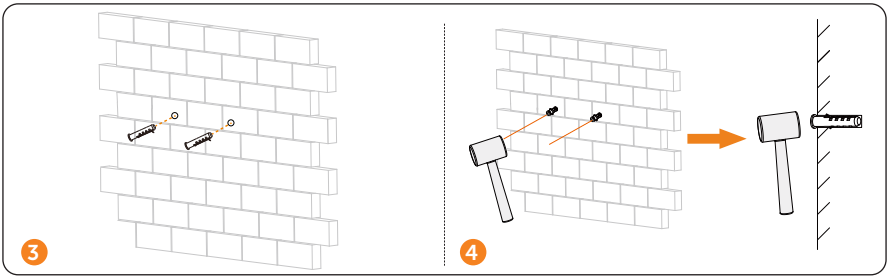
v) Plug-in terminal

Step 2: User the bracket as a template to mark the position of the 2 holes on the wall using a marker and measuring tape.

Step 3: Drill holes with a drill (drill bit: ø6 mm), make sure the holes are deep enough (at least 60 mm) for installation.



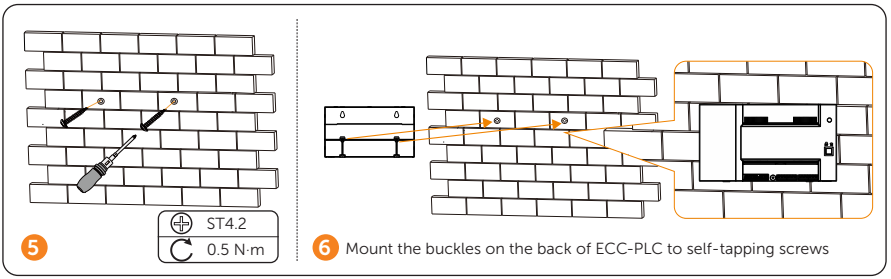
Step 4: Insert the expansion tubes in the holes.



NOTICE!

- For wooden wall mounting, please skip step 3 and 4.

Step 5: Place the wall bracket and use self-tapping screws to tighten the bracket. Attach ECC-PLC to the bracket. Make sure the back side of ECC-PLC is fixed well with buckles on the bracket.



NOTICE

- Prior to step 6, please complete wiring process.

NOTICE!

- After step 6, please use a cover to cover the device in case of touch by mistake.

NOTICE!

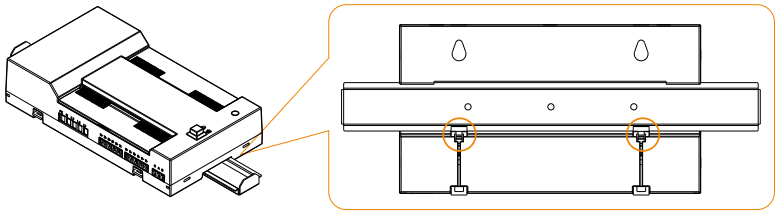
- The device shall be used in door.

4.1.2 Installation method 2 (on the rail):

NOTICE!

- The rail refers to rail in the distribution box (with lock) to be wired or rail in the space that only professional personnel can open.

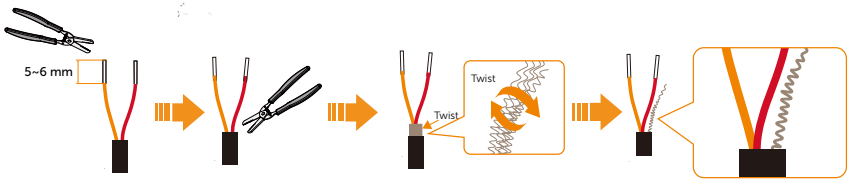
Step 1: Fix the bracket of ECC-PLC on the rail in the distribution box or in the space that only professional personnel can open.



1 Mounting the buckles on the back of ECC-PLC to the guide rail

4.1.3 RS485 connection

Step 1: Strip 5-6 mm of the RS485 communication cable. We recommend using the shielded twisted pairs.



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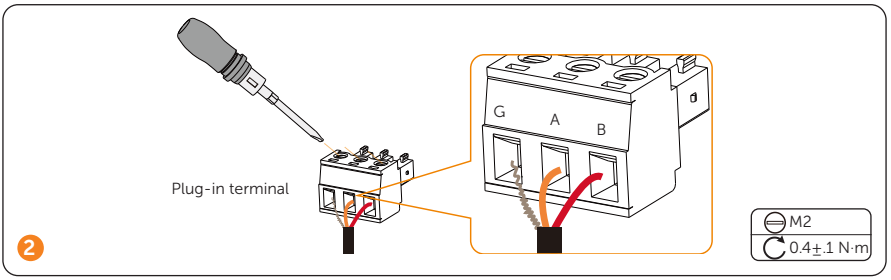
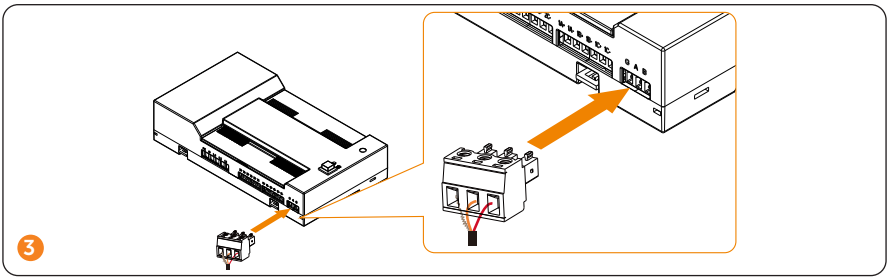
Step 2: Insert the striped cables into the corresponding port of the plug-in terminal, and lock the cables with a screw.



Step 3: Insert the plug-in terminal into the corresponding port of ECC-PLC.

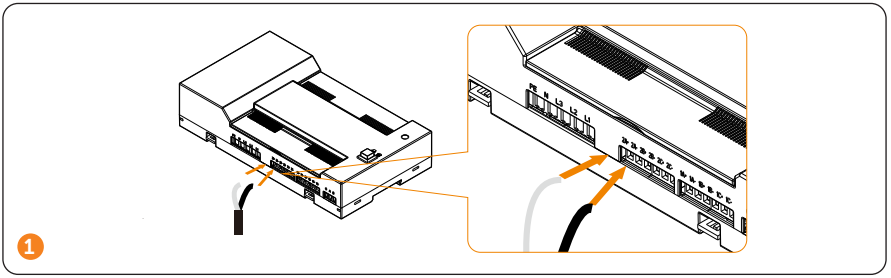


NOTICE!

- After step 3, please refer to **ECC User Manual or Installation Guide** to connect ECC-PLC to the RS485-1 port of ECC.

4.1.4 CT connection

Step 1: Thread the CT cables into the corresponding port of ECC-PLC and lock the terminals.



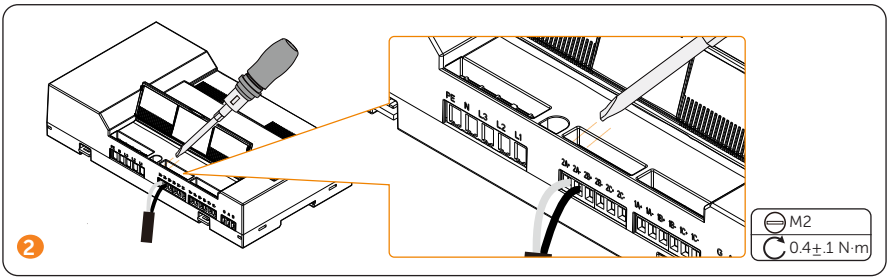
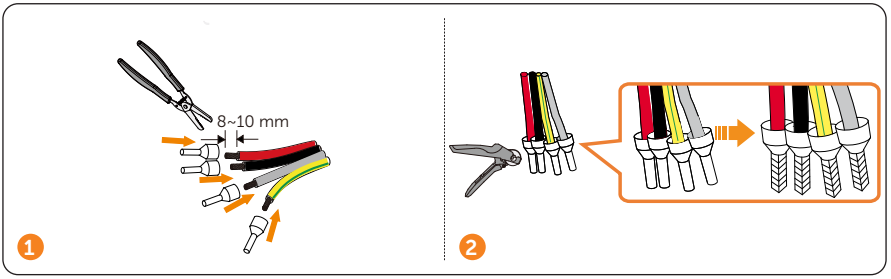


Table 4-6 Different grids and CT wiring

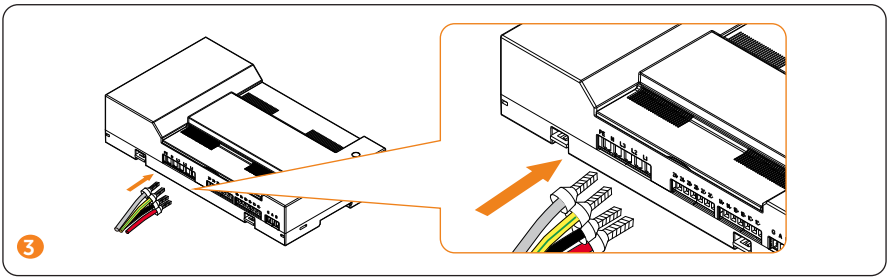
Grid	CT number	Port
Split-phase	Production CT × 2 (optional)	White line: 2A+/2B+ Black line: 2A-/2B-
	Consumption CT × 2	White line: 1A+/1B+ Black line: 1A-/1B-
Three-phase	Production CT × 3 (optional)	White line: 2A+/2B+/2C+ Black line: 2A-/2B-/2C-
	Consumption CT × 3	White line: 1A+/1B+/1C+ Black line: 1A-/1B-/1C-

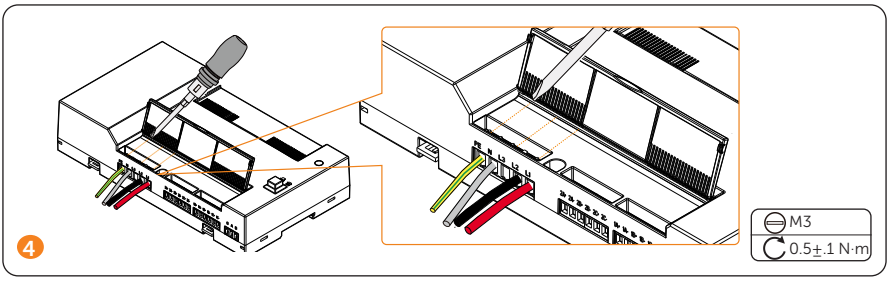
4.1.5 PV connection

Step 1: Strip 8-10 mm of the L, N and PE cables of the PV line and install the crimping terminals.



Step 2: Thread the crimping terminals into the ECC-PLC port according to cable variation.





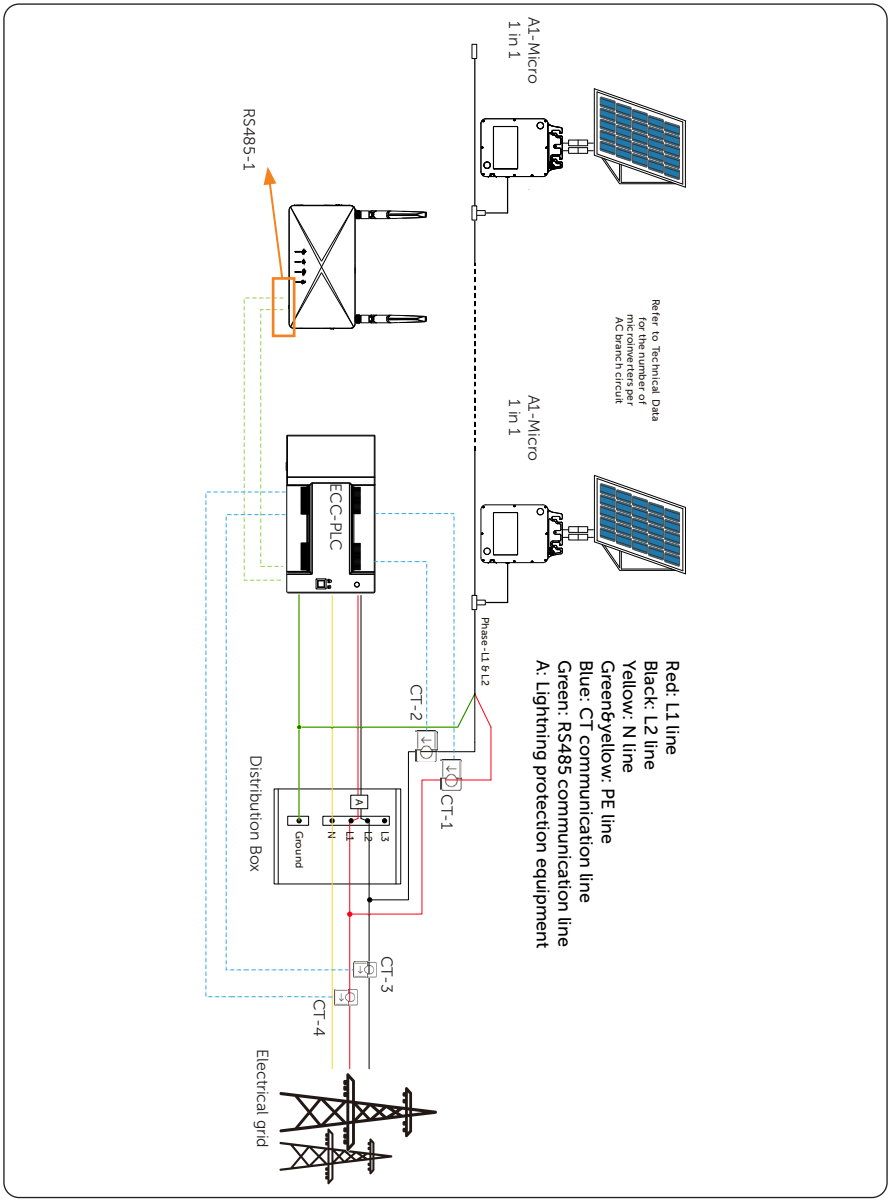
The graphics above shows the wiring steps of power cables in the split-phase. If you need to wire for the three-phase, please connect the corresponding cable to ECC-PLC according to the grid:

Grid	Cable				
	PE	N	L3	L2	L1
Split-phase	√	√	×	√	√
Three-phase	√	√	√	√	√

NOTICE!

- We recommend using 1.5 mm^2 (European standard) or 15-18 AWG (American standard) power cable.

4.1.6 Wiring diagram-split phase



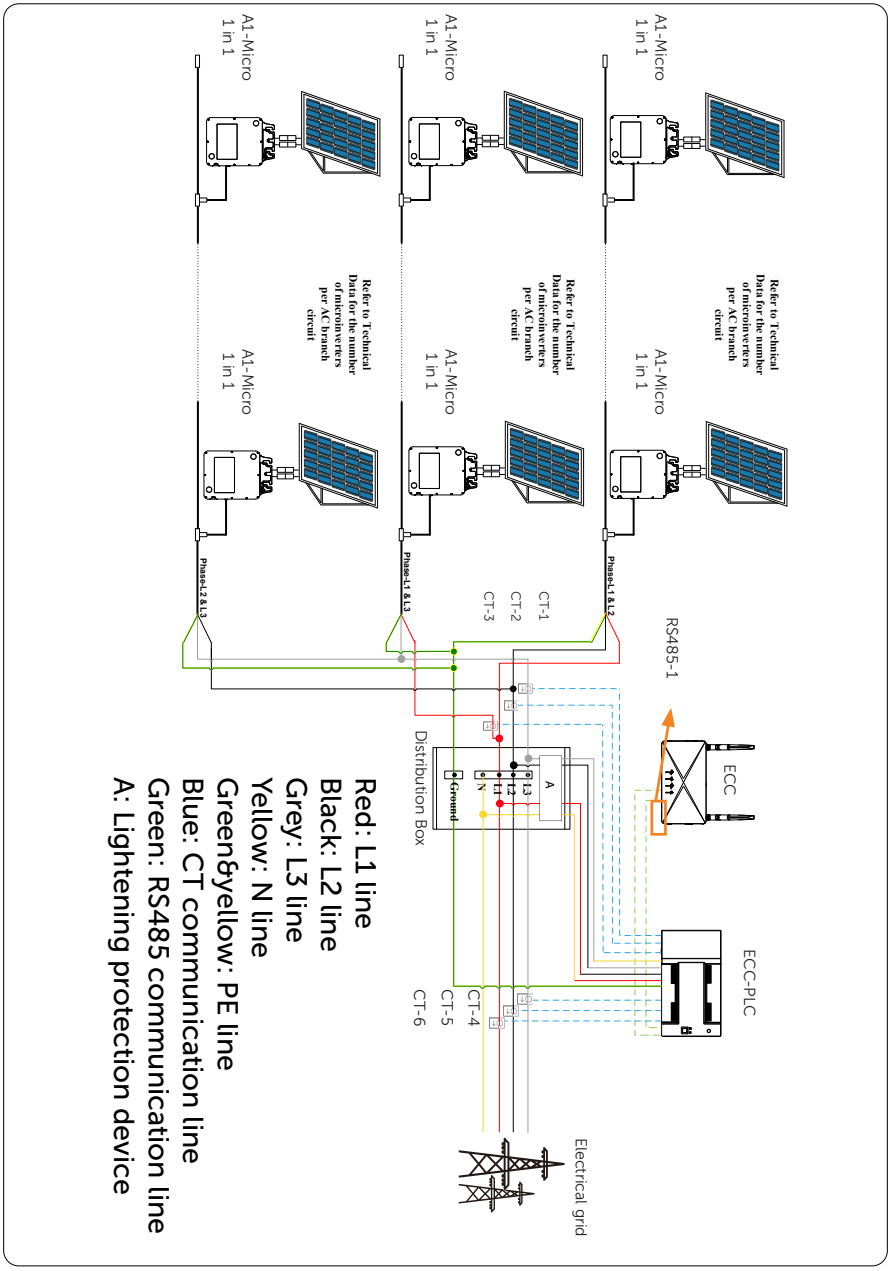
Please connect the corresponding line to the correct port of ECC-PLC as shown in the following table:

Connected port/line	ECC-PLC port
CT-1 (production CT; optional): White line	2A+
CT-1 (production CT; optional): Black line	2A-
CT-2 (production CT; optional): White line	2B+
CT-2 (production CT; optional): Black line	2B-
L1 line	L1
L2 line	L2
N line	N
PE line	PE
CT-3 (consumption CT): White line	1A+
CT-3 (consumption CT): Black line	1A-
CT-4 (consumption CT): White line	1B+
CT-4 (consumption CT): Black line	1B-
ECC: A	A
ECC: B	B
ECC: GND	G

NOTICE!

- ECC-PLC is connected under a separate circuit breaker in the distribution box.
- Add a 5 A fuse to the power port of the ECC-PLC

4.1.7 Wiring diagram-three phase



Please connect the corresponding line to the correct port of ECC-PLC as shown in the following table:

Connected port/line	ECC-PLC port
CT-1 (production CT; optional): White line	2A+
CT-1 (production CT; optional): Black line	2A-
CT-2 (production CT; optional): White line	2B+
CT-2 (production CT; optional): Black line	2B-
CT-3 (production CT; optional): White line	2C+
CT-3 (production CT; optional): Black line	2C-
L1 line	L1
L2 line	L2
L3 line	L3
N line	N
PE line	PE
CT-4 (consumption CT): White line	1A+
CT-4 (consumption CT): Black line	1A-
CT-5 (consumption CT): White line	1B+
CT-5 (consumption CT): Black line	1B-
CT-6 (consumption CT): White line	1C+
CT-6 (consumption CT): Black line	1C-
ECC: A	A
ECC: B	B
ECC: GND	G

NOTICE!

- ECC-PLC is connected under a separate circuit breaker in the distribution box.
- Add a 5 A fuse to the power port of the ECC-PLC

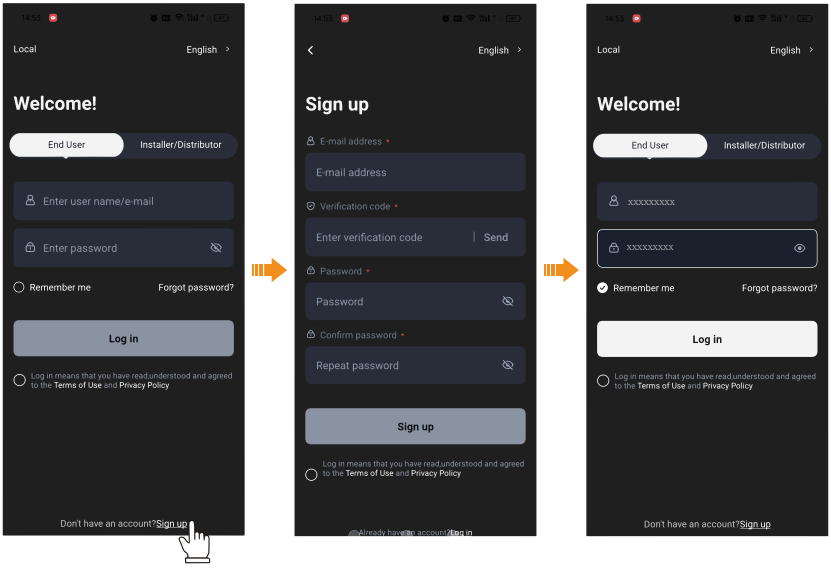
4.2 APP Operation

4.2.1 Download APP

Scan the QR code to download SolaXCloud App.

SolaXCloud

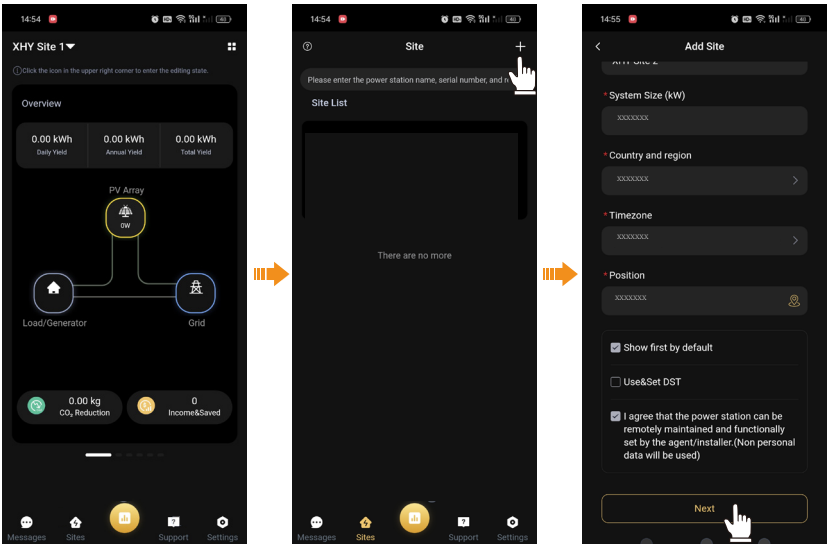
4.2.2 Register an account and log in



NOTICE!

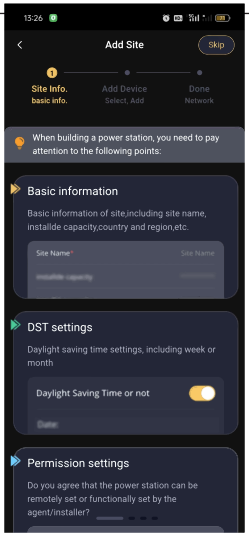
- Before configurating network, please make sure that A1-Micro 1 in 1, ECC and ECC-PLC have been connected as a system.

4.2.3 Add a site

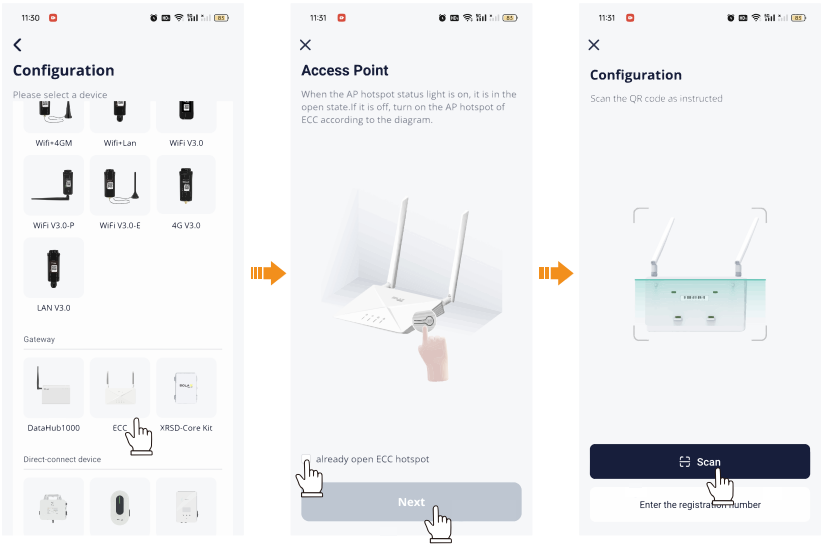


NOTICE

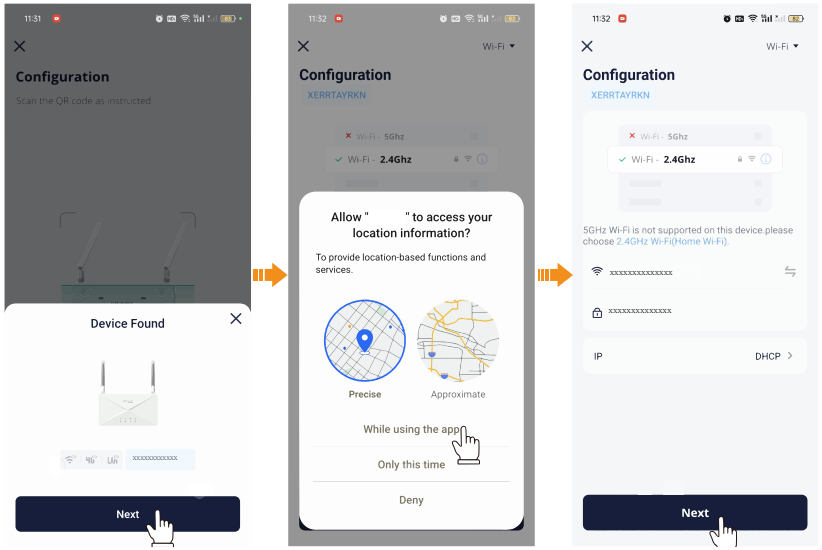
- Click the corresponding notice to know more details about how to **Add Site**. If you don't need reading these notices, click **Skip**.

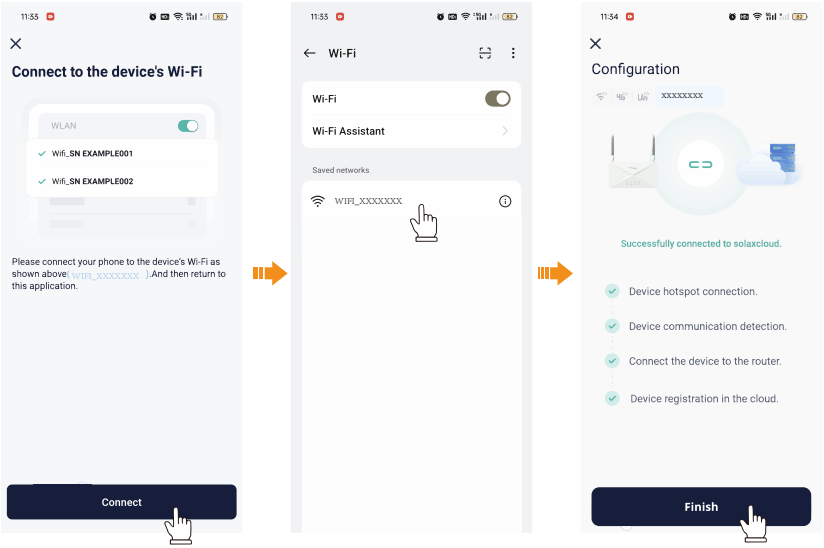


4.2.4 Bind ECC in the added site



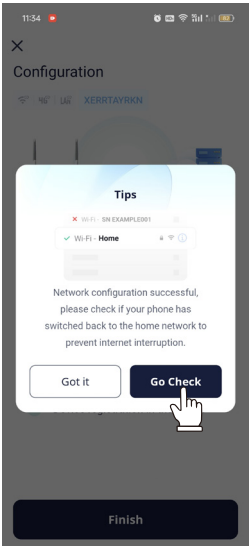
4.2.5 Cofigurate network for ECC





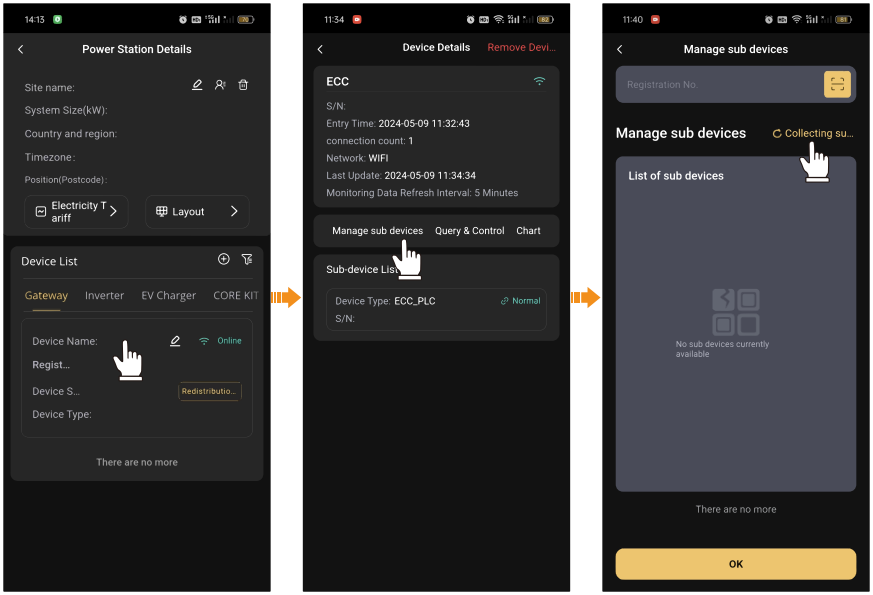
NOTICE

- After ECC configuration succeeds, the connected ECC-PLC will show on the Gateway list.
- Remember to switch to your home WiFi for the subsequent operation.



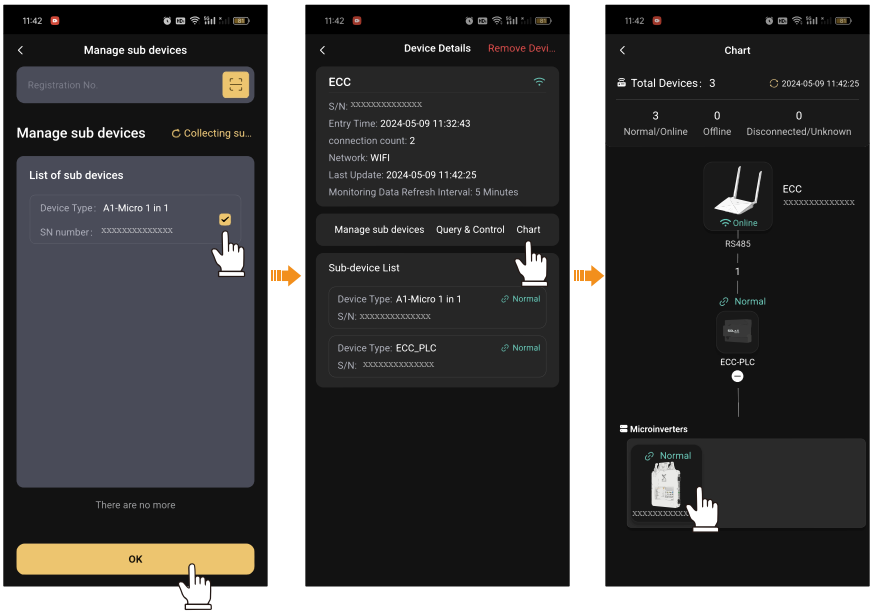
4.2.6 Bind A1-Micro 1 in 1

Step 1: Enter the **Device Detail** interface, click **Manage sub devices** and **collecting sub devices** to bind A1-Micro 1 in 1.

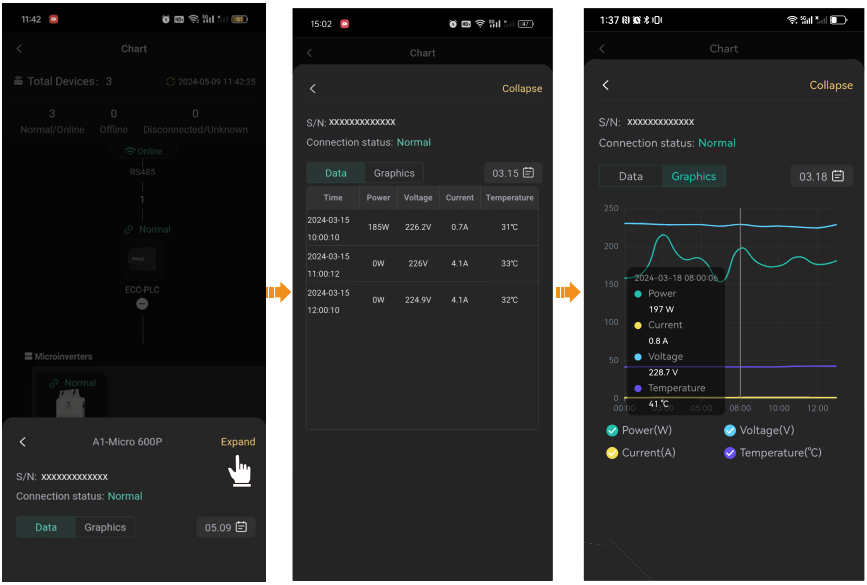


4.2.7 On-site inspection

Step 1: After binding A1-Micro 1 in 1, click **Chart** to see more detail information.

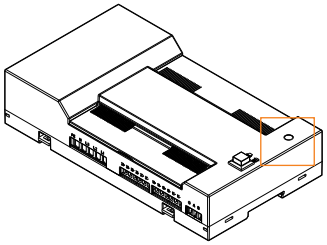


Step 2: Click **Expand** to check the data and graphics.



5 Troubleshooting and Maintenance

5.1 LED Indicator



Indicator	Status	Description
RUN	Green light steady on	The connection between ECC-PLC and ECC is normal
	Red light steady on	The connection between ECC-PLC and ECC is abnormal
	Green/red light flashes alternately	The ECC-PLC is upgrading (200 ms)

5.2 Maintenance

Regular maintenance is required for the ECC. The table of "Proposal of Maintenance" below lists the operational maintenance for expressing the optimum device performance. More frequent maintenance service is needed in the worse work environment. Please make records of the maintenance.

WARNING!

- Only qualified person can perform the maintenance for the ECC-PLC.
- Only use the spare parts and accessories approved by SolaX for maintenance.
- Use insulation tools before maintenance.

5.2.1 Maintenance routines

Item	Check Notes	Maintenance Inverval
Safety check	• Check the items mentioned in section 1 “Safety” • The safety check shall be performed by manufacturer’s qualified person who has adequate training, knowledge, and practical experience.	Every 12 months

5.2.2 Replacement of consumable materials (CT)

Step 1: Power off the current on the circuit of CT.

Step 2: Take down the CT.

Step 3: Wiring a new CT.

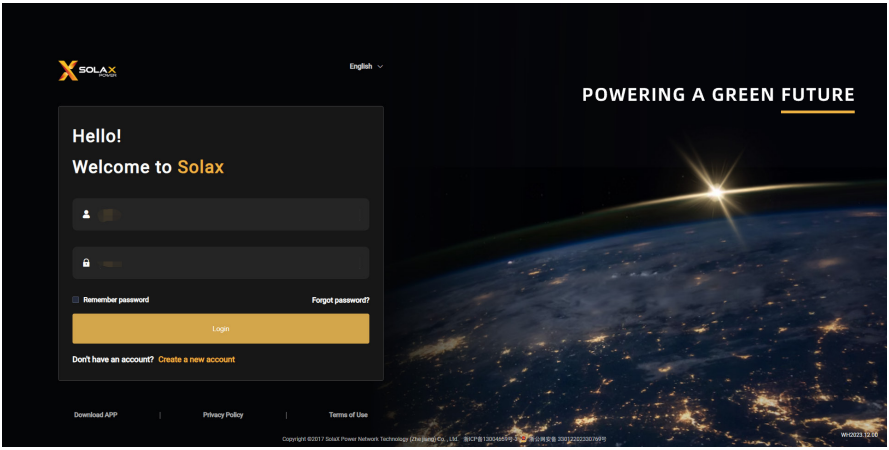
Step 4: Clip CT on the original line.

Step 5: Restore the power supply.

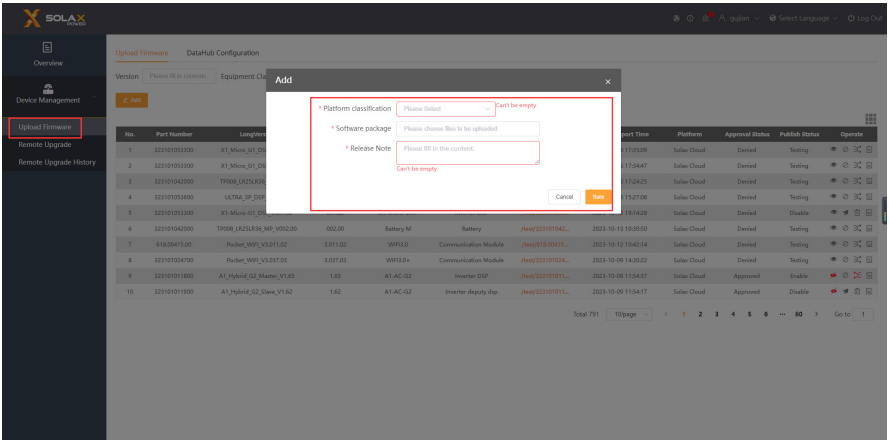
5.2.3 Upgrading Steps

Upgrade steps

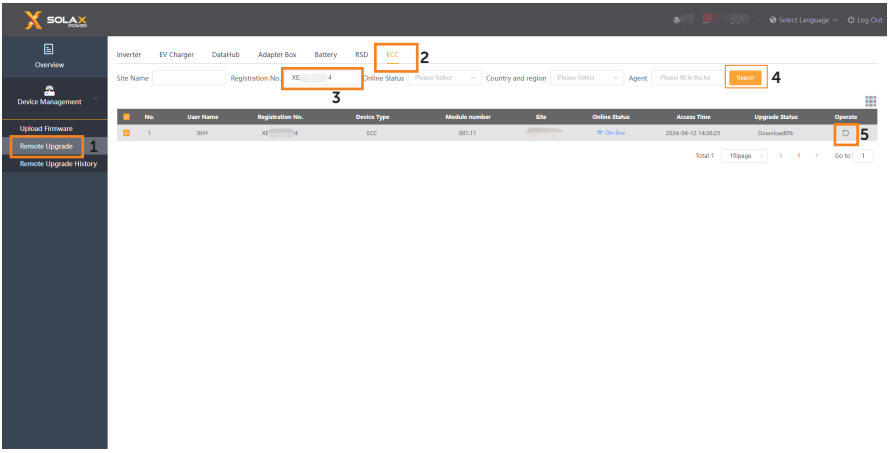
a. Log in https://www.solaxcloud.com/ to upgrade the microinverter.



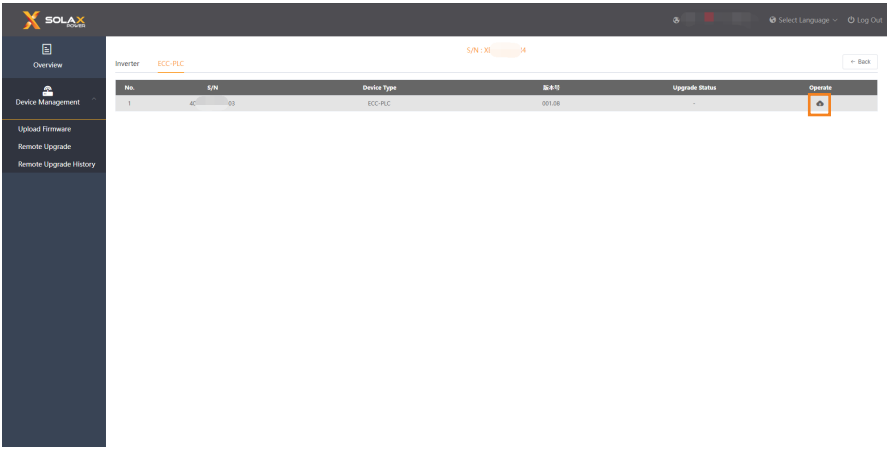
b. Click **Upgrade Firmware, Add,** and fill in the information and upload firmware. Click **Sure** to finish firmware upgrade.



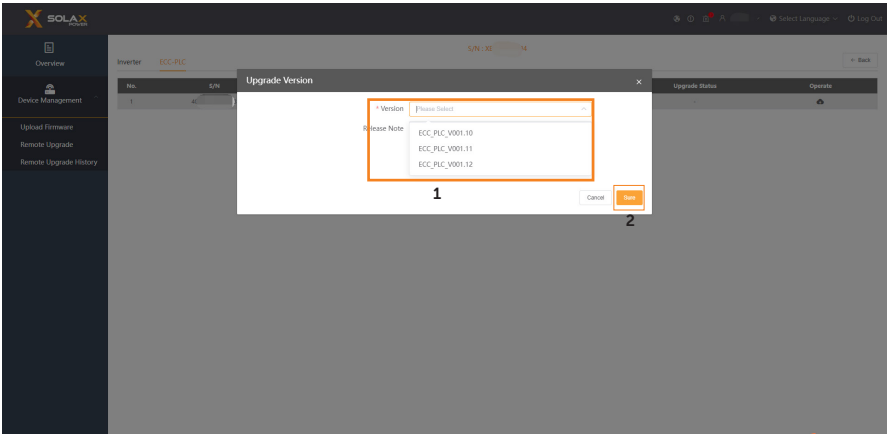
c. Select **Remore Upgrade**, choose the upper-level ECC of the ECC PLC to be upgraded and click the **subset** icon.



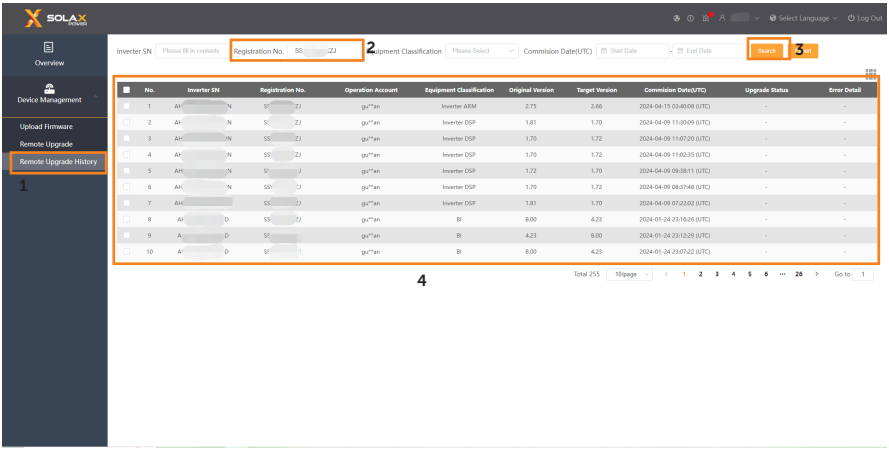
d. Select the ECC-PLC you want to upgrade and click the **upgrade** icon.



e. Select the corresponding version and click **sure** to upgrade ECC-PLC.



f. If you need to check upgrade history, please select **Remote Upgrade History**.



5.2.4 Device Replacement

a. To disassembling the ECC-PLC

» Pull the power adapter.

» Unbind the original ECC-PLC on the APP and bind a new one in the previous site.

6 Decommissioning

6.1 Disassembling the Gateway

Refer to a. To disassembling the ECC-PLC for disassembling the ECC.

6.2 Packing the Gateway

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

6.3 Transportation and Storage

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

Transportation

- Observe the caution signs on the packaging of ECC-PLC before transportation.
- Pay attenting to the weight of ECC. Handle with care.
- Wear protective gloves when carrying the equipment by hand to prevent injuries.
- When lifting up the ECC, hold the bottom position of the ECC. Keep ECC-PLC horizontal in case of falling down due to tilt.

Storage

- The ECC-PLC must be stored indoors.
- Do not remove the original packaging material and check the outer packaging material regularly.
- The storage temperature should be between -40°C and +60°C. The humidity should be between 5% and 95%.
- Stack the ECC-PLC in accordance with the caution signs on the ECC-PLC carton to prevent their falling down and device damage. Do not place it upside down.

- If the ECC-PLC has been stored for more than 10 years, it must be checked and tested by professionals prior to use.

6.4 Disposal of the Gateway

Please dispose of the ECCs or accessories in accordance with the disposal regulations for electronic waste applied at the installation site.

7 Technical Data

Power adapter	100~250 Vac 50/60 Hz 1 A input
Voltage acquisition range	100~250Vac
Current acquisition range	0.1 ~ 100 A
Carrier power frequency	5 ~ 12 MHz
Carrier communication rate	115200 bps
Rated power	20W
Measurement category	III
Phase	single phase/three phase
Voltage category	Split Phase: Rated voltage (L-L): 240 V~ Three Phase: Rated voltage (L-N): 240V~
Altitude	2000 m
MAINS supply voltage fluctuations	±10%
Pollution degree	II
Protection degree	IP20 (indoor)
Operating temperature range	-40°C ~ 60°C (-40°F to 140°F)
Humidity	5%~95%
Dimensions	218 * 122 * 50 mm
Weight	480 g
Standard	CSA C22.2 No. 61010-1-12; UL 61010-1, CSA-C22.2 No. 61010-2-030; UL 61010-2-030; FCC CFR Title 47, Part 15
Compliance	UL1741, FCC

8 Appendix

8.1 INSTALLATION MAP

Microinverter Installation Map

Make sure N for North

Panel type:
Azimuth:
Tilt:
Sheet_of_

Customer information:

Gateway series number:

ROW \ COLUMN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A																
B																
C																
D																

Contact Information

UNITED KINGDOM

Unit C-D Riversdale House, Riversdale Road, Atherstone, CV9 1FA
+44 (0) 2476 586 998
service.uk@solaxpower.com

AUSTRALIA

21 Nicholas Dr, Dandenong South VIC 3175
+61 1300 476 529
service@solaxpower.com.au

TURKEY

Fevzi Çakmak mah. aslım cd. no 88 A Karatay / Konya / Türkiye
service.tr@solaxpower.com

GERMANY

Am Tullnaupark 8, 90402 Nürnberg, Germany
+49 (0) 6142 4091 664
service.eu@solaxpower.com
service.dach@solaxpower.com

USA

3780 Kilroy Airport Way, Suite 200, Long Beach, CA, US 90806
+1 (408) 690 9464
info@solaxpower.com

NETHERLANDS

Twekkeler-Es 15 7547 ST Enschede
+31 (0) 8527 37932
service.eu@solaxpower.com
service.bnl@solaxpower.com

POLAND

WARSAW AL. JANA P. II 27. POST
+48 662 430 292
service.pl@solaxpower.com

SPAIN

+34 9373 79607
tecnico@solaxpower.com

ITALY

+39 011 19800998
support@solaxpower.it

BRAZIL

+55 (34) 9667 0319
info@solaxpower.com

PAKISTAN

service.pk@solaxpower.com

SOUTH AFRICA

service.za@solaxpower.com

CE Statement

SolaX Power Network Technology (Zhejiang) Co., Ltd. declares that this ECC-PLC is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU. In accordance with Article 10(2) and Article 10(10), this product allowed to be used in all EU member states.

Safe distance warning

Use the ECC-PLC in the environment with the temperature between -40°C ~ 60°C (-40°F to 140°F).

Operation Frequency:

Frequency: 5.6-12 MHz

Output Power: -40 dBm/Hz

SolaX Power Network Technology (Zhejiang) Co., Ltd.

ADD.: No. 278, Shizhu Road, Chengnan Sub-district, Tonglu County,
Hangzhou, Zhejiang, China
E-mail: info@solaxpower.com

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