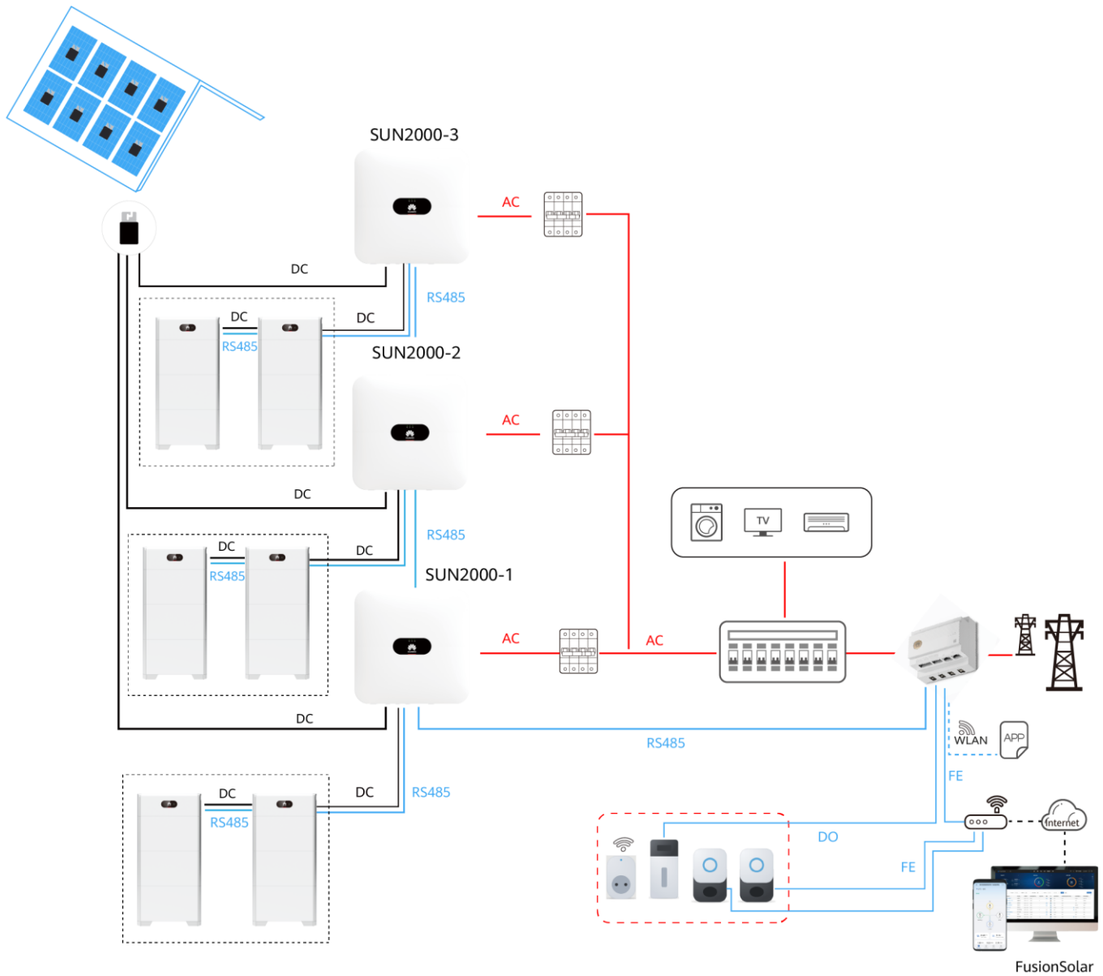
Residential Smart PV Solution Quick Guide
(Three-Phase PV+ESS Scenario + EMMA Networking)

Issue: 02
Date: 2023-11-13

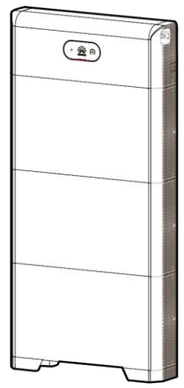
1 Networking



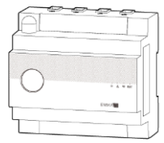
2 Product Overview

Inverter

Energy storage system (ESS)



EMMA



Smart PV Optimizer

Component	Model	Description
Inverter	SUN2000-(12KTL-25KTL)-MB0 SUN2000-(15KTL-25KTL)-MB0-ZH SUN2000-(3KTL-12KTL)-M1	A maximum of three inverters can be cascaded.
ESS	LUNA2000-(5-30)-S0	The capacity of a battery module is 5 kWh. A maximum of two ESSs can be cascaded and the maximum capacity is 30 kWh.
EMMA	EMMA-A01 EMMA-A02	• A01: Only PV and ESS features are supported. • A02: Features of PV, ESSs, smart chargers, and smart loads are supported.
Smart PV Optimizer	SUN2000-450W-P SUN2000-450W-P2 SUN2000-600W-P	SUN2000-600W-P: Long and short input cables are available to connect to PV modules with different cable lengths.

NOTE

1. The information in this document is subject to change without notice. Every effort has been made in the preparation of this document to ensure accuracy of the contents, but all statements, information, and recommendations in this document do not constitute a warranty of any kind, express or implied.
2. For details about the solution components, installation, and cable connections, see the corresponding user manuals and quick guides.
3. The cable colors involved in this document are for reference only. Select cables in accordance with local cable specifications.

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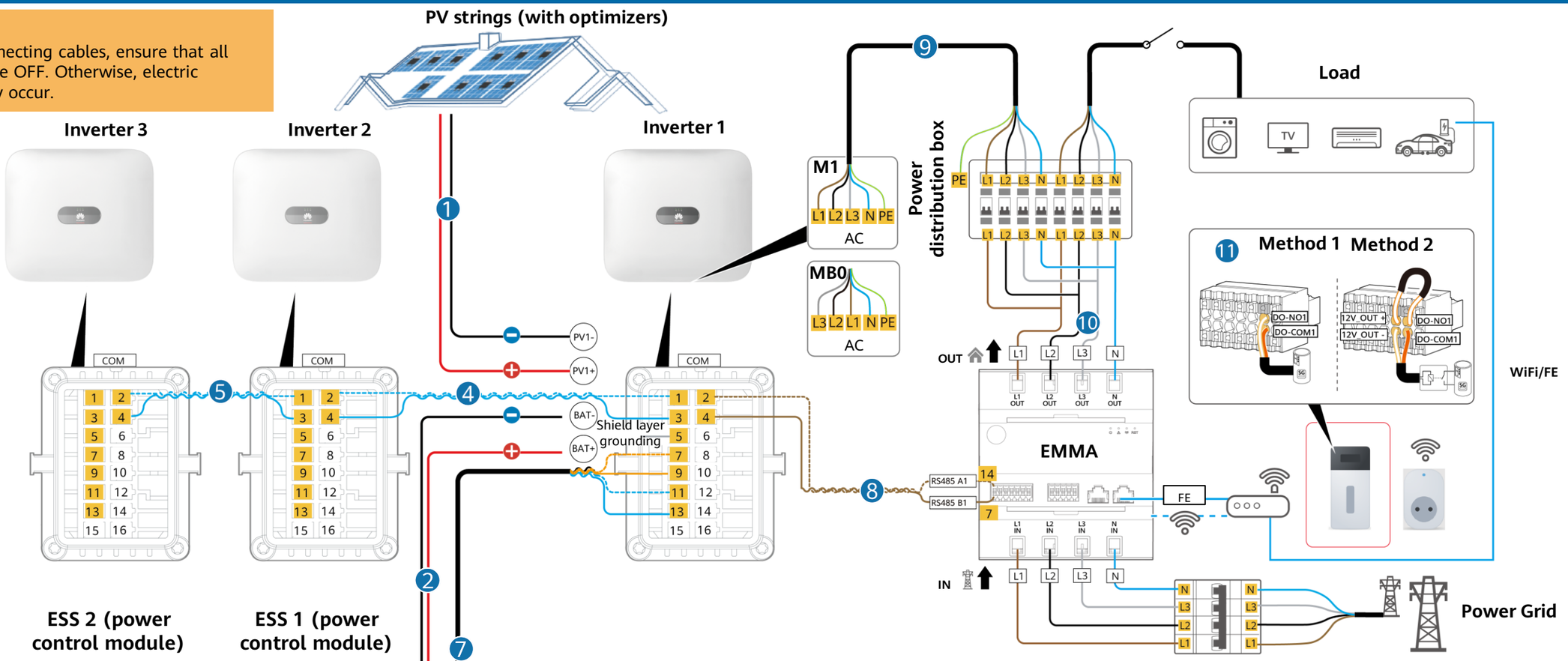
3 Cable Connections (Three-Phase Inverter + ESS S0 + EMMA with an Internal CT)

DANGER

Before connecting cables, ensure that all switches are OFF. Otherwise, electric shocks may occur.



NOTICE

Connect other cables to inverters by referring to the connection method for the inverter 1.

NOTICE

Signal cables must be outdoor shielded twisted pair cables.

Cable Type	No.	One End		The Other End	
		Componen	Port	Port	Component
DC power cable	1	Inverter 1	PV1+	Positive termina	PV string
			PV1-	Negative terminal	
	2	Inverter 1	BAT+	BAT+	ESS 1
			BAT-	BAT-	
	3	ESS 1	BAT+	BAT+	ESS 2
			BAT-	BAT-	
Signal cable	4	Inverter 1	COM-1	COM-2	Inverter 2
			COM-3	COM-4	
	5	Inverter 2	COM-1	COM-2	Inverter 3
			COM-3	COM-4	
	6	ESS 1	COM-2 (left)	COM-2 (right)	ESS 2
			COM-3 (left)	COM-3 (right)	
			COM-4 (left)	COM-4 (right)	
			COM-7 (left)	COM-7 (right)	
			COM-8 (left)	COM-8 (right)	
			COM-9 (left)	COM-9 (right)	
	7	Inverter 1	COM-13	COM-2 (right)	ESS 1
			COM-11	COM-3 (right)	
			COM-7	COM-4 (right)	
			COM-9	COM-7 (right)	
			COM-5 (PE)	COM-1 (right) (PE)	

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Componen
Signal cable	8	Inverter 1	COM-2	COM-14	EMMA
			COM-4	COM-7	
AC power cable	9	Inverter 1	AC-L1	L1	Power distribution box
			AC-L2	L2	
			AC-L3	L3	
			AC-N	N	
			AC-PE	PE	
	10	EMMA	L1 OUT	L1	Power distribution box
			L2 OUT	L2	
			L3 OUT	L3	
			N OUT	N	

Cable Type	No.	Cable Connection Description
Signal cable	11	Method 1: Use DO dry contacts to directly drive the SG Ready heat pump. The capability of the DO dry contacts is 12 V DC@1 A. Method 2: Use a 12 V@30 mA power supply to drive the external relay. Choose the proper contact capability of the external relay according to the SG Ready heat pump port.

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3 Cable Connections (Three-Phase Inverter + ESS S0 + EMMA with an External CT)

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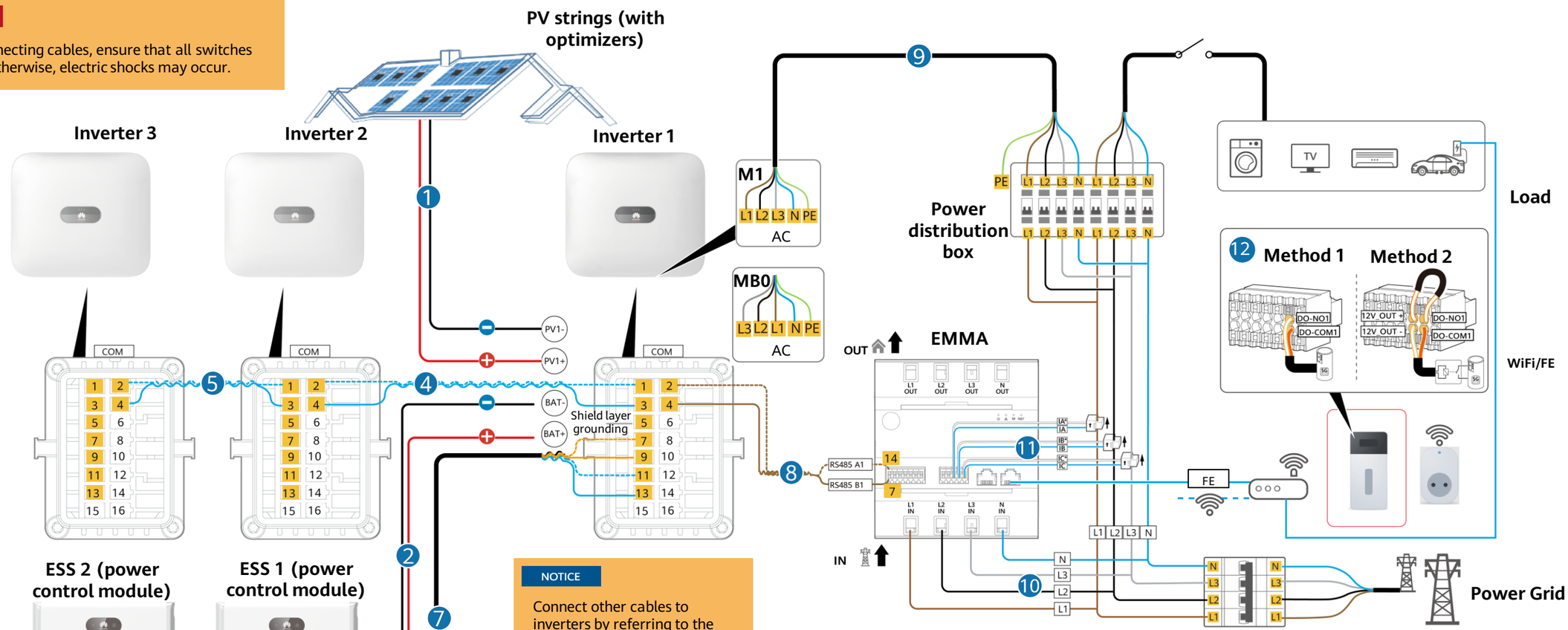

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			PV1-	Negative terminal	
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			BAT-	BAT-	
	3	ESS 1	BAT+	BAT+	ESS 2
			BAT-	BAT-	
Signal cable	4	Inverter 1	COM-1	COM-2	Inverter 2
			COM-3	COM-4	
	5	Inverter 2	COM-1	COM-2	Inverter 3
			COM-3	COM-4	
	6	ESS 1	COM-2 (left)	COM-2 (right)	ESS 2
			COM-3 (left)	COM-3 (right)	
			COM-4 (left)	COM-4 (right)	
			COM-7 (left)	COM-7 (right)	
			COM-8 (left)	COM-8 (right)	
			COM-9 (left)	COM-9 (right)	
	7	Inverter 1	COM-13	COM-2 (right)	ESS 1
			COM-11	COM-3 (right)	
			COM-7	COM-4 (right)	
			COM-9	COM-7 (right)	
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			AC-PE	PE	
	10	EMMA	L1 IN	L1	Power distribution box
			L2 IN	L2	
			L3 IN	L3	
			N IN	N	
	11	EMMA	IA*&IA	L1	Power distribution box
			IB*&IB	L2	
			IC*&IC	L3	

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4 System Commissioning

App-based Deployment Procedure

Download and install the FusionSolar app

↓

Sign up as an installer (optional, required for initial registration)

↓

Enter setup wizard

↓

Check the device status

Downloading and Installing the FusionSolar App

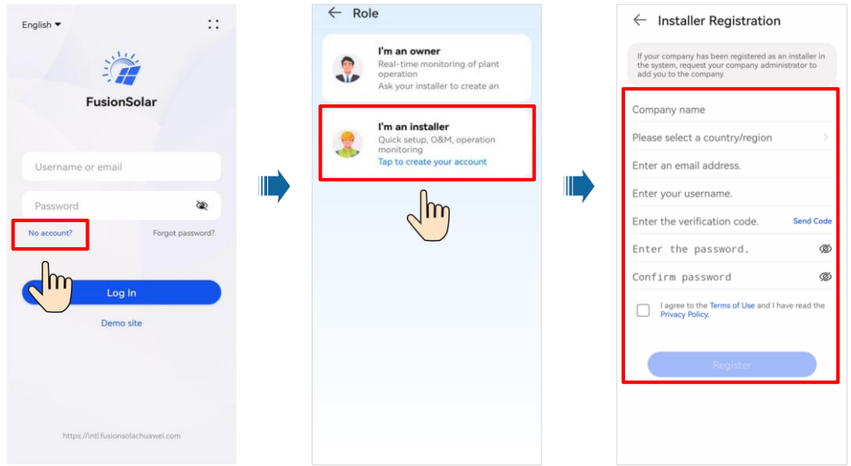
- Search for **FusionSolar** in the app store to download the app.
- Scan the QR code below to download the app.

FusionSolar

Installer Registration

Initial registration

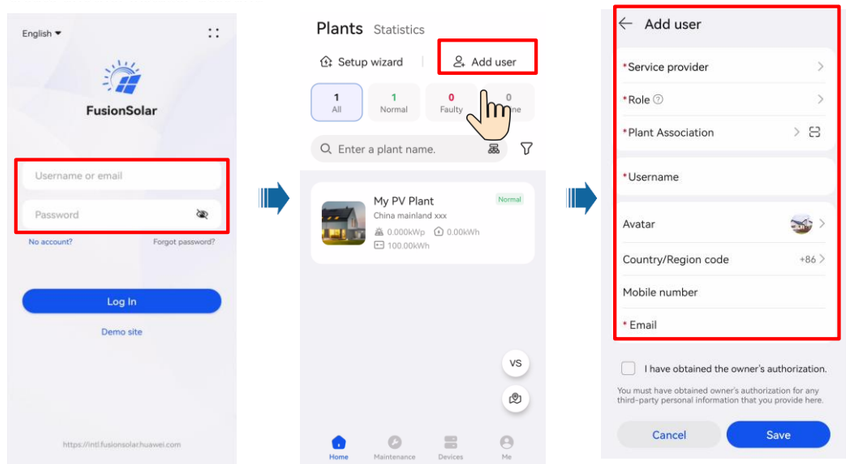
Create the first installer account, and generate a domain named after the company.



Or

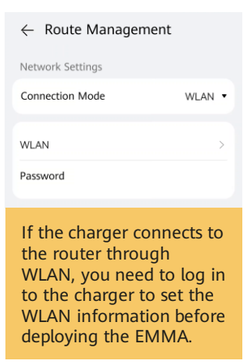
Non-initial registration

If the company requires multiple installer accounts, log in to the FusionSolar app and tap **Add User** to create another installer account.

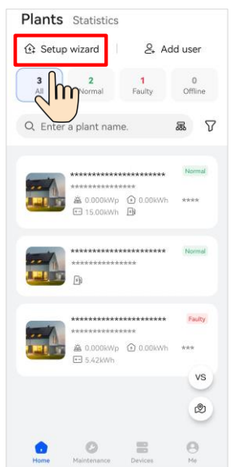


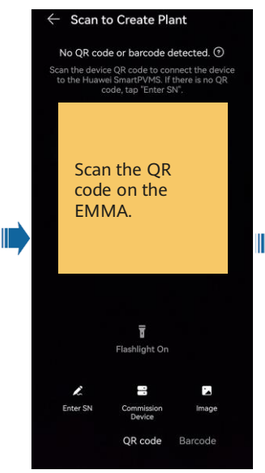
Setup Wizard (Connecting to the Inverter WLAN for Commissioning)

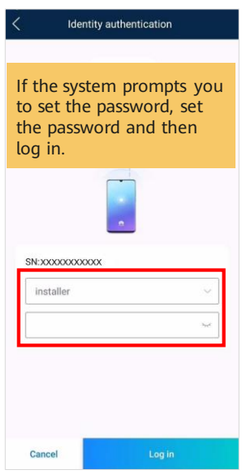
Set the WLAN information of the charger.

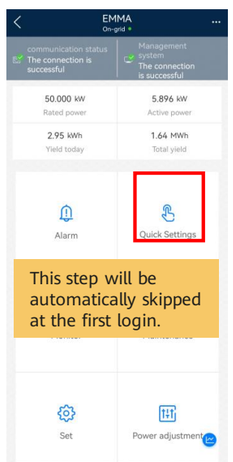


If the charger connects to the router through WLAN, you need to log in to the charger to set the WLAN information before deploying the EMMA.



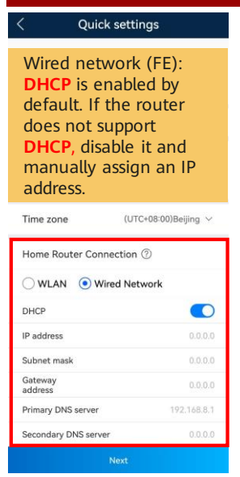




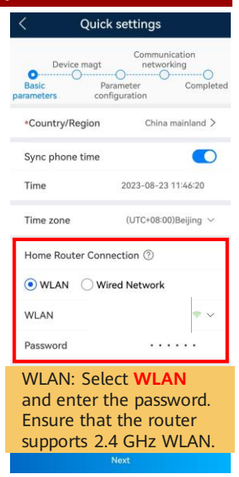


This step will be automatically skipped at the first login.

Set the route parameters.



Wired network (FE): **DHCP** is enabled by default. If the router does not support **DHCP**, disable it and manually assign an IP address.



WLAN: Select **WLAN** and enter the password. Ensure that the router supports 2.4 GHz WLAN.

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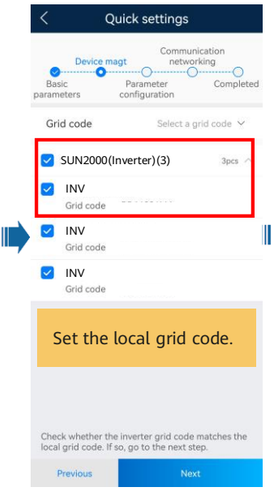
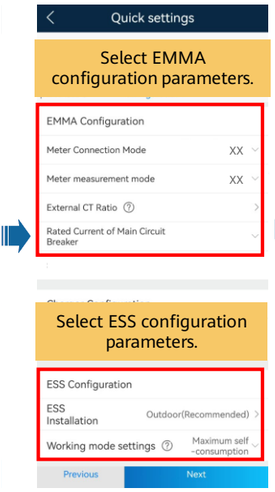
Device magt.

Ensure that the devices in the device list are the same as the connected devices.
If they are inconsistent, check that the communication is normal and tap **Search for device**.



Set the local grid code.

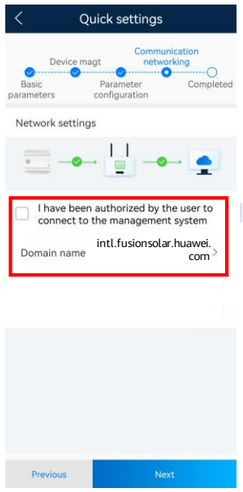
Set the key parameters.



Select EMMA configuration parameters.

Select ESS configuration parameters.

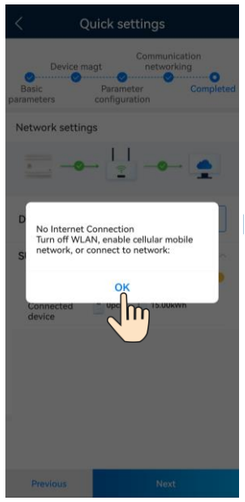
Set the communication networking.

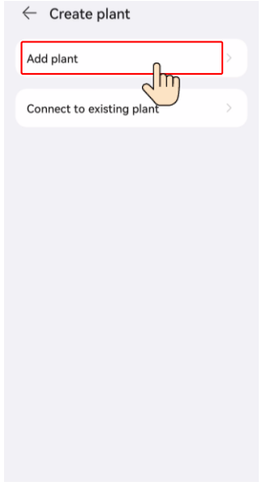


Connection Test.

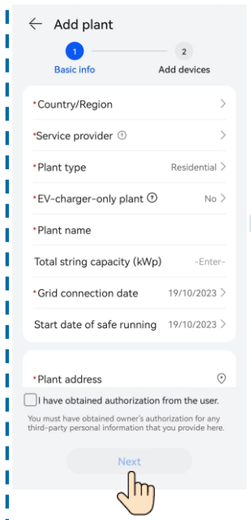
In an inverter cascading scenario, the parameter synchronization result is displayed.

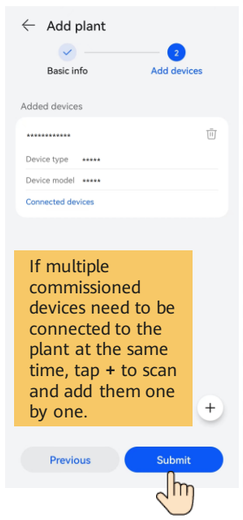
Create plant.





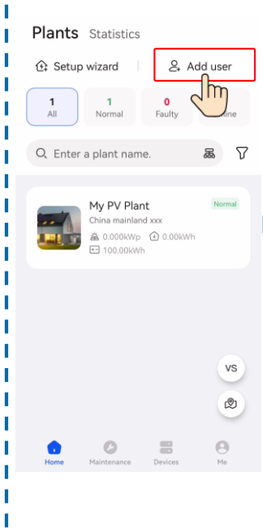
Add a plant.

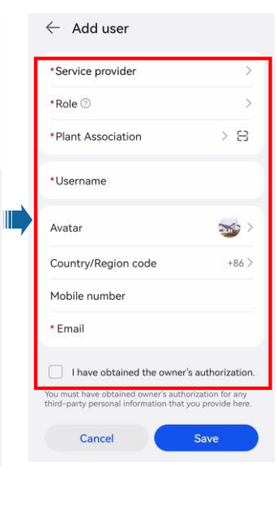




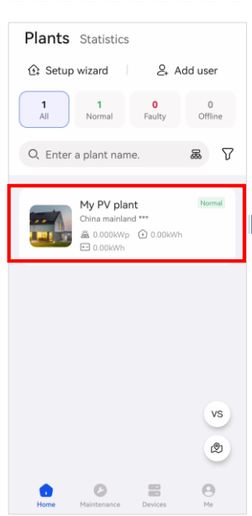
If multiple commissioned devices need to be connected to the plant at the same time, tap + to scan and add them one by one.

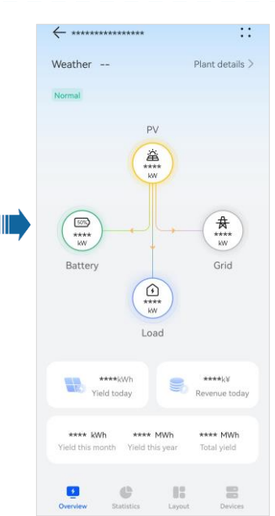
Create an owner account.





Viewing the Plant Status





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5 Off-Grid/Grid-tied Control Parameters

Setting Grid-tied Point Control

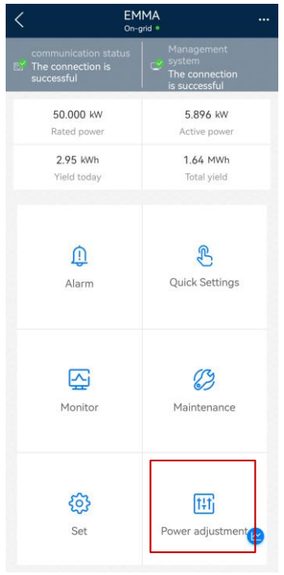
Power adjustment

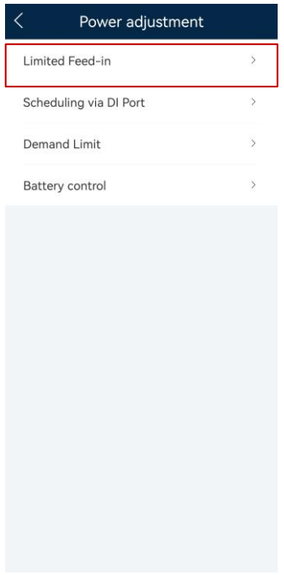
↓

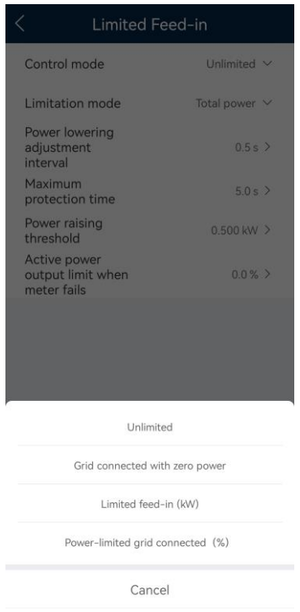
Limited Feed-in

↓

Control mode
- **Unlimited**
- **Grid connected with zero power**
- **Limited feed-in (kW)**
- **Power-limited grid connected (%)**







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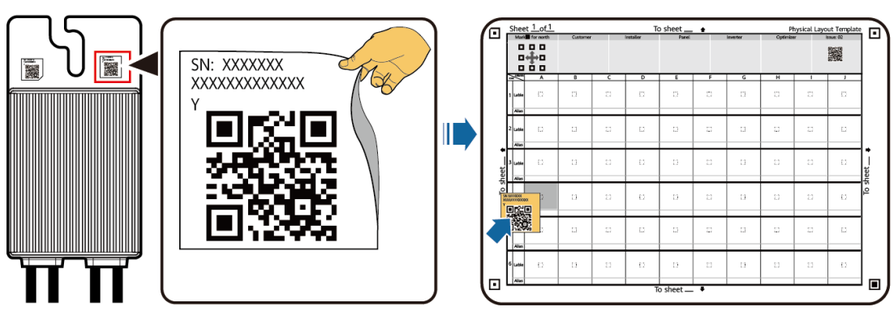
6 Physical Layout of Smart PV Optimizers

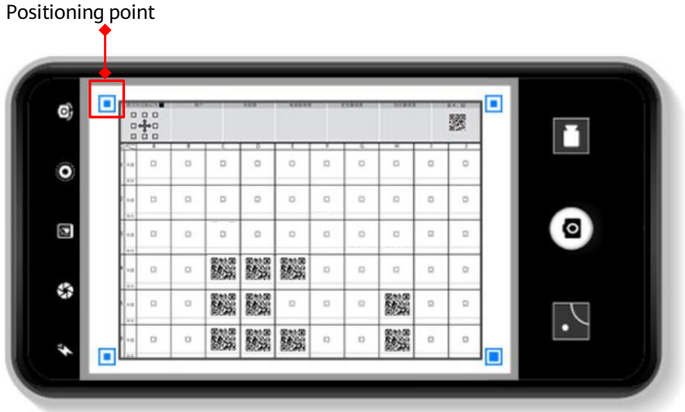
Attaching SN Labels

Remove the SN labels from optimizers and attach them to the physical layout template based on the actual positions of the optimizers in the plant.



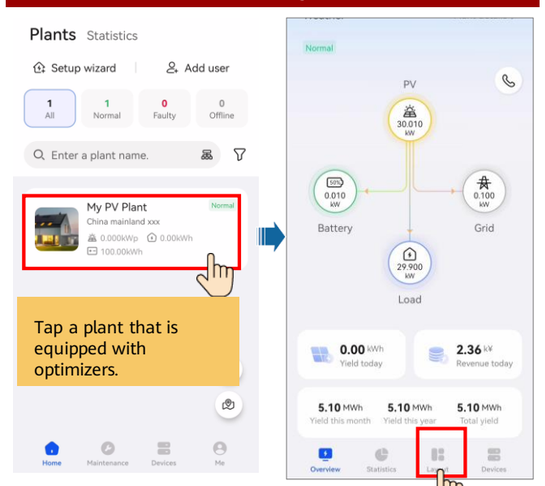
Taking a Photo of the Physical Layout Template

Ensure that the four positioning points on the template are within the frame.



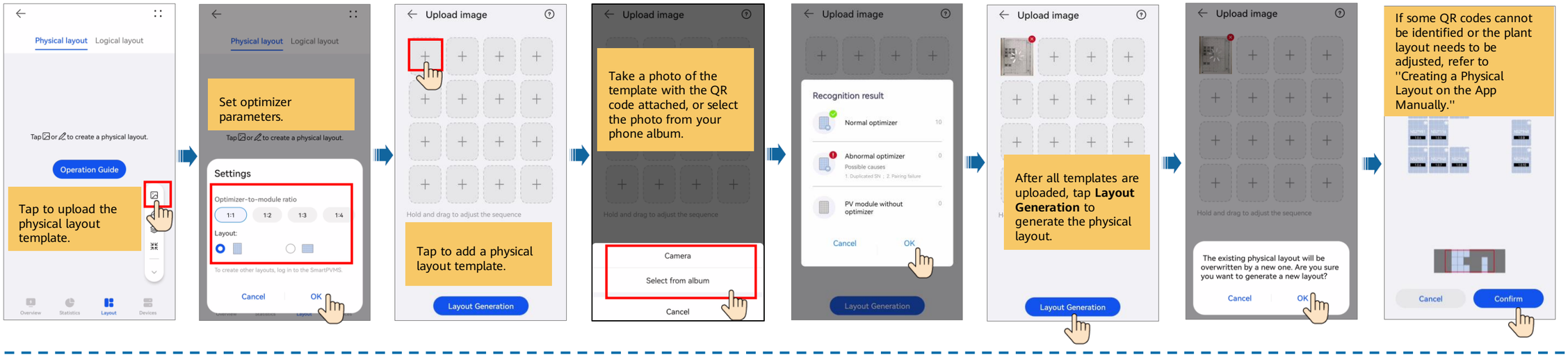
Generating a Physical Layout on the App

Enter the Plant Layout screen.



Generating a Physical Layout on the App

Upload the template and generate a layout.



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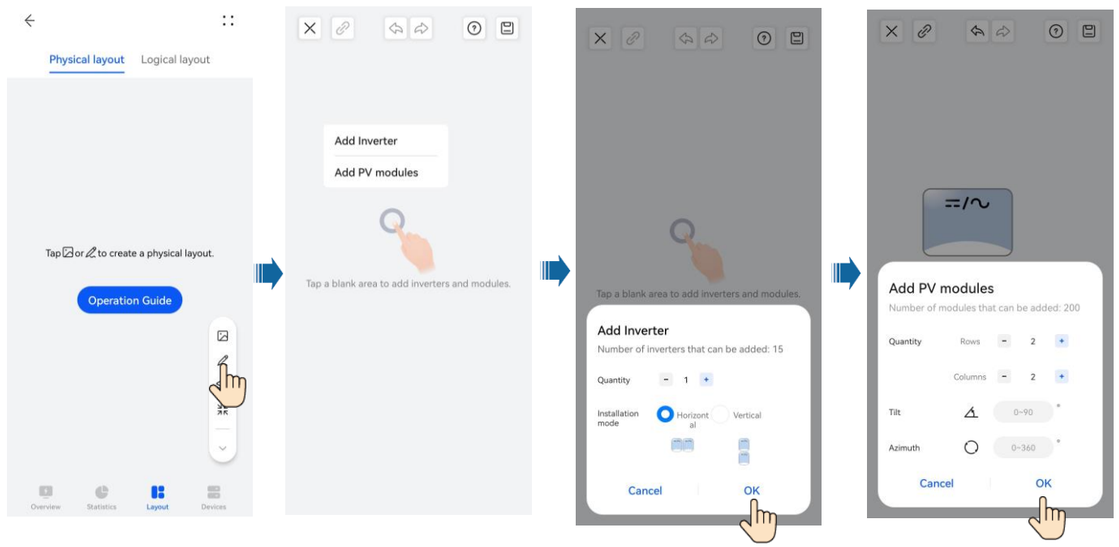
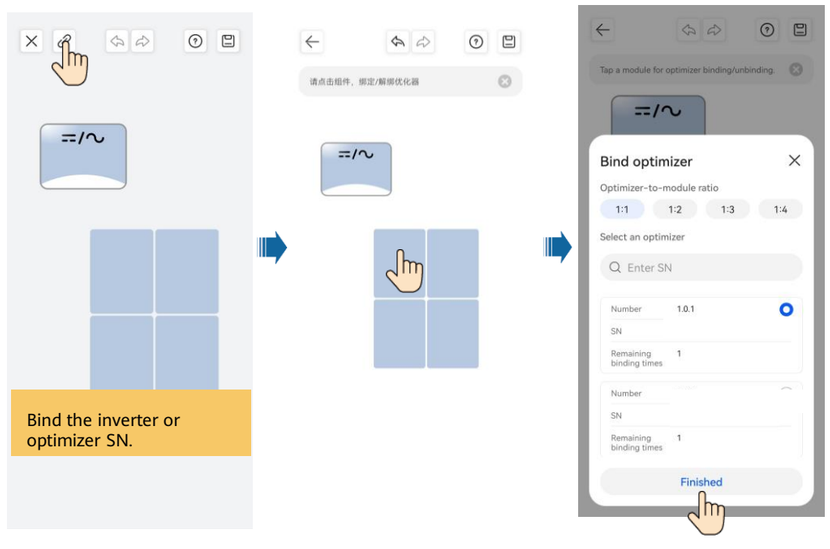
Creating a Physical Layout on the App Manually

Edit the physical layout and specify the quantity of inverters and PV modules as required.



Bind the inverter or optimizer SN.



Adjust the physical layout.