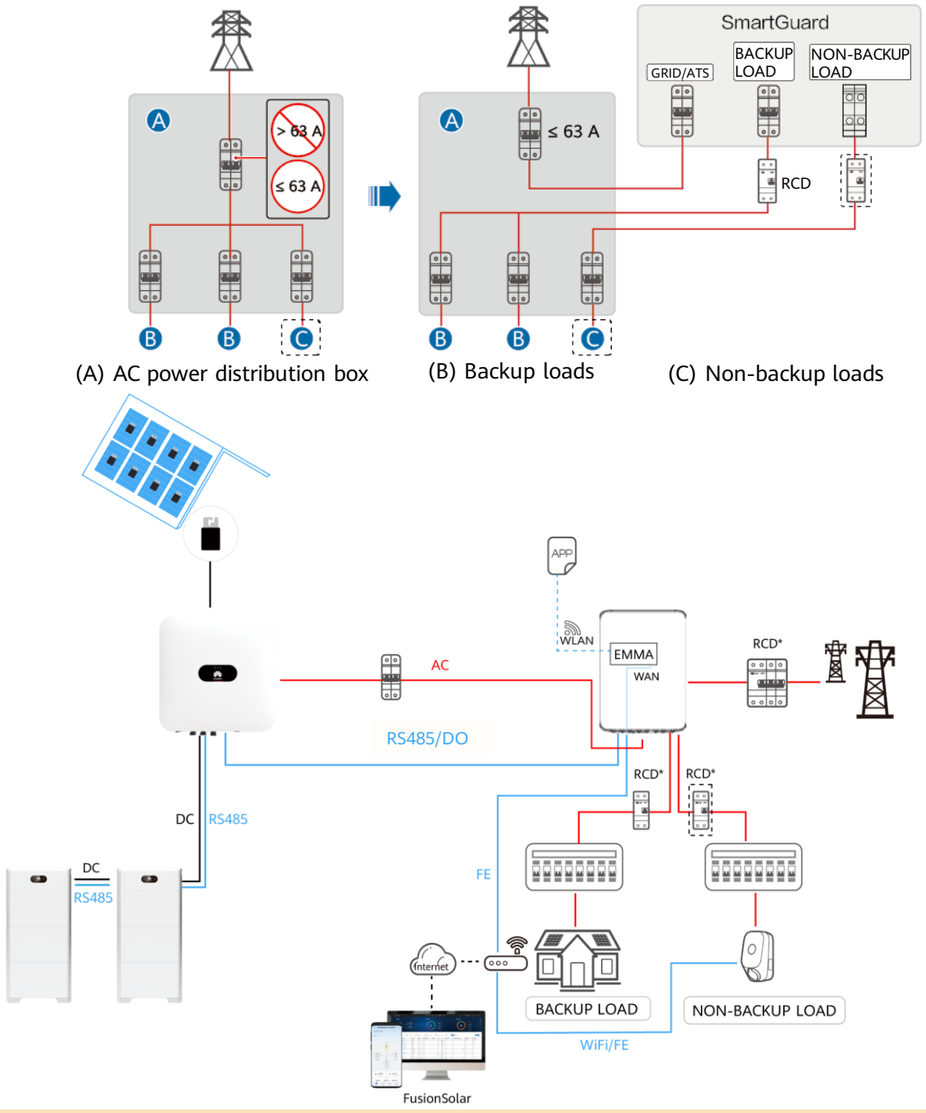
Residential Smart PV Solution Quick Guide
(Single-Phase PV+ESS Scenario + SmartGuard Networking)

Issue: 03
Date: 2024-07-15

1 Networking

Load classification confirmed by the owner

SmartGuard connected to the loads



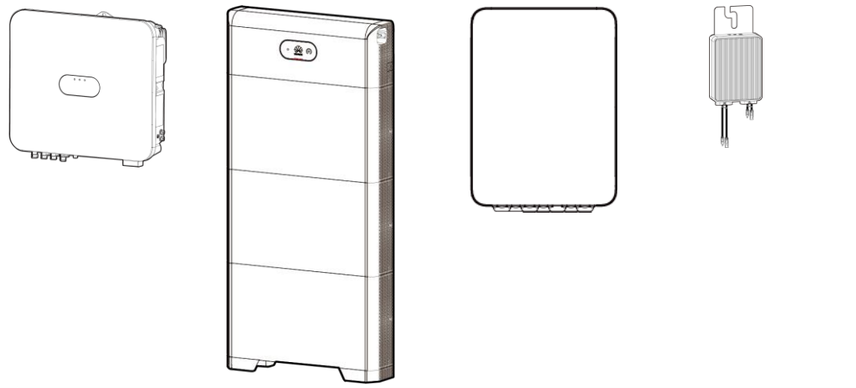
DANGER

Note*: A residual current device (RCD) must be installed before the backup load. During off-grid operation, the main circuit breaker does not provide protection. Electric leakage on the load may result in electric shocks. An RCD is optional for the non-backup load. However, the main circuit breaker with the leakage protection function must be installed. The rated residual operating current must be greater than or equal to the number of inverters multiplied by 100 mA.

NOTE

- Both the EMMA in the SmartGuard and the Smart Dongle provide communication capabilities. Only either of them can be installed in a power plant for networking. Otherwise, communication between devices will be abnormal.
- If a charger is configured, the charger must be installed on the non-backup load port.

2 Product Overview



Component	Model	Description
Inverter	SUN2000-(8K, 10K)-LC0 SUN2000-(8K, 10K)-LC0-ZH SUN2000-(2KTL-6KTL)-L1	Only one inverter is supported.
Energy storage system (ESS)	LUNA2000-(5-30)-S0 LUNA2000-(7, 14, 21)-S1	• Two ESSs can be cascaded. • The LUNA2000-(5-30)-S0 and LUNA2000-(7, 14, 21)-S1 cannot connect to the same inverter in a parallel system.
SmartGuard	SmartGuard-63A-S0 SmartGuard-63A-AUS0	Works with the inverter, ESS, grid, and home appliances to achieve smart management on home power consumption, grid detection, and on/off-grid switchover.
Optimizer	SUN2000-450W-P2 SUN2000-600W-P	For details about the optimizer supported by the inverter, see SUN2000 Smart PV Optimizer User Manual

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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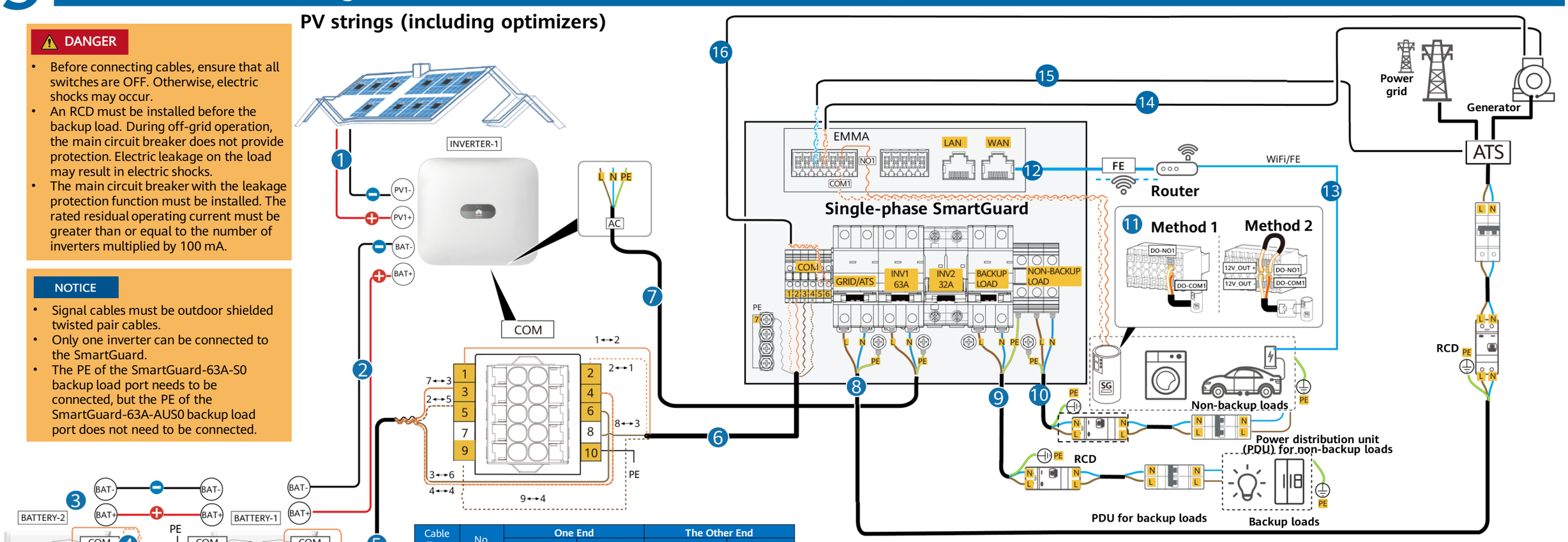
3 Cable Connections (Single-Phase Inverter LC0 + ESS S0 + SmartGuard)

DANGER

- Before connecting cables, ensure that all switches are OFF. Otherwise, electric shocks may occur.
- An RCD must be installed before the backup load. During off-grid operation, the main circuit breaker does not provide protection. Electric leakage on the load may result in electric shocks.
- The main circuit breaker with the leakage protection function must be installed. The rated residual operating current must be greater than or equal to the number of inverters multiplied by 100 mA.

NOTICE

- Signal cables must be outdoor shielded twisted pair cables.
- Only one inverter can be connected to the SmartGuard.
- The PE of the SmartGuard-63A-S0 backup load port needs to be connected, but the PE of the SmartGuard-63A-AUS0 backup load port does not need to be connected.



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

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
AC power cable	7	Inverter	AC-L	INV1-L	SmartGuard
			AC-N	INV1-N	
			AC-PE	INV1-PE	
	8	Grid	L	GRID/ATS-L	SmartGuard
			N	GRID/ATS-N	
	9	PDU for backup loads	L	BACKUP LOAD-L	SmartGuard
			N	BACKUP LOAD-N	
	10	PDU for non-backup loads	L	NON-BACKUP LOAD-L	SmartGuard
			N	NON-BACKUP LOAD-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 max. 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.

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
Signal cable	12	EMMA	WAN	LAN	Router
	13	Charger	FE	LAN	Router
	14	SmartGuard	DI2+	Generator alarm signal port	Generator
			DI2-		
	15	SmartGuard	DI1+	Position feedback signal upon grid connection	ATS
			DI1-		
	16	SmartGuard	COM-5	Generator control signal port	Generator
			COM-6		

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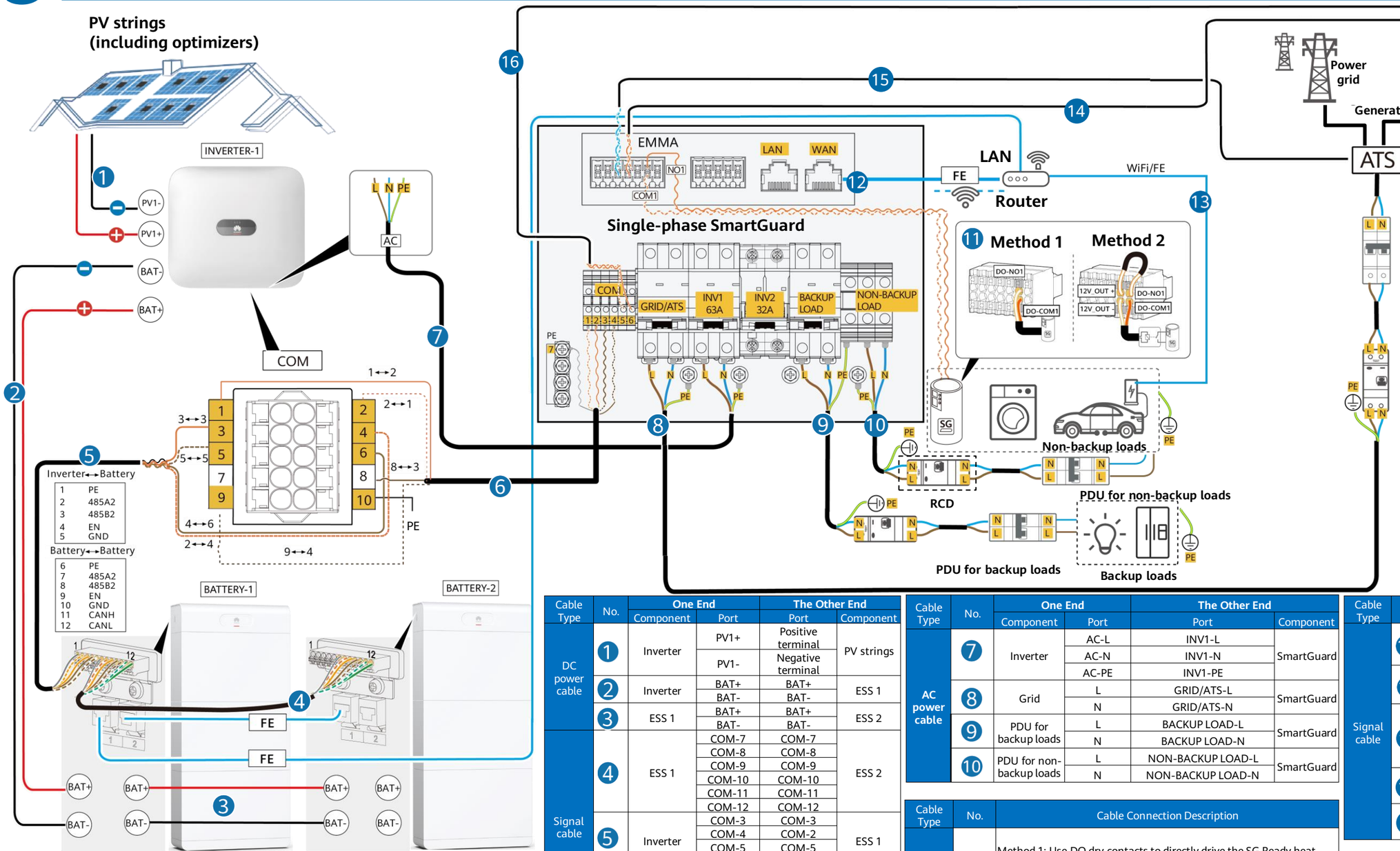
3 Cable Connections (Single-Phase Inverter LC0 + ESS S1 + SmartGuard)



DANGER

- Before connecting cables, ensure that all switches are OFF. Otherwise, electric shocks may occur.
- An RCD must be installed before the backup load. During off-grid operation, the main circuit breaker does not provide protection. Electric leakage on the load may result in electric shocks.
- The main circuit breaker with the leakage protection function must be installed. The rated residual operating current must be greater than or equal to the number of inverters multiplied by 100 mA.

NOTICE

- Signal cables must be outdoor shielded twisted pair cables.
- Only one inverter can be connected to the SmartGuard.
- The PE of the SmartGuard-63A-S0 backup load port needs to be connected, but the PE of the SmartGuard-63A-AUS0 backup load port does not need to be connected.

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
DC power cable	1	Inverter	PV1+	Positive terminal	PV strings
			PV1-	Negative terminal	
	2	Inverter	BAT+	BAT+	ESS 1
			BAT-	BAT-	
	3	ESS 1	BAT+	BAT+	ESS 2
			BAT-	BAT-	
Signal cable	4	ESS 1	COM-7	COM-7	ESS 2
			COM-8	COM-8	
			COM-9	COM-9	
			COM-10	COM-10	
			COM-11	COM-11	
			COM-12	COM-12	
	5	Inverter	COM-3	COM-3	ESS 1
			COM-4	COM-2	
			COM-5	COM-5	
			COM-6	COM-4	
	6	Inverter	COM-1	COM-2	SmartGuard
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			AC-PE	INV1-PE	
	8	Grid	L	GRID/ATS-L	SmartGuard
			N	GRID/ATS-N	
	9	PDU for backup loads	L	BACKUP LOAD-L	SmartGuard
			N	BACKUP LOAD-N	
	10	PDU for non-backup loads	L	NON-BACKUP LOAD-L	SmartGuard
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3 Cable Connections (Single-Phase Inverter L1 + ESS S0 + SmartGuard)

⚠ DANGER

- Before connecting cables, ensure that all switches are OFF. Otherwise, electric shocks may occur.
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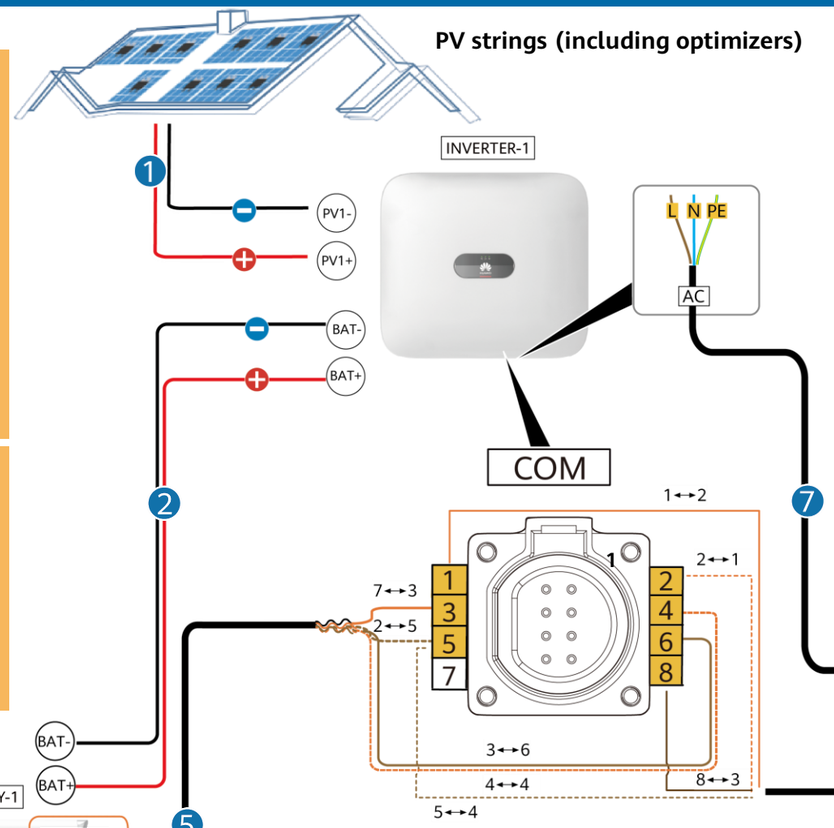
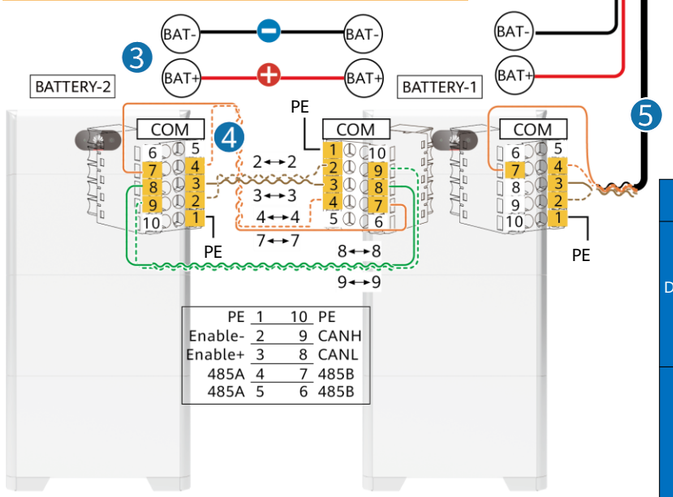
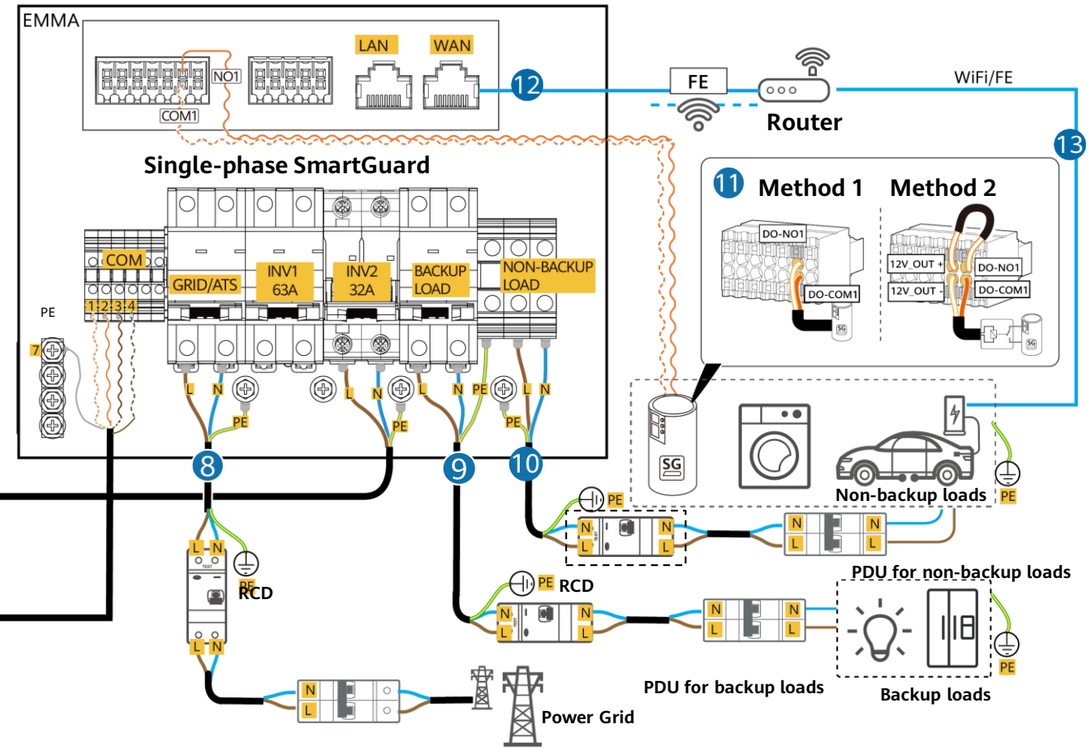
- Signal cables must be outdoor shielded twisted pair cables.
- Only one inverter can be connected to the SmartGuard.
- The PE of the SmartGuard-63A-S0 backup load port needs to be connected, but the PE of the SmartGuard-63A-AUS0 backup load port does not need to be connected.







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3 Cable Connections (Single-Phase Inverter L1 + ESS S1 + SmartGuard)

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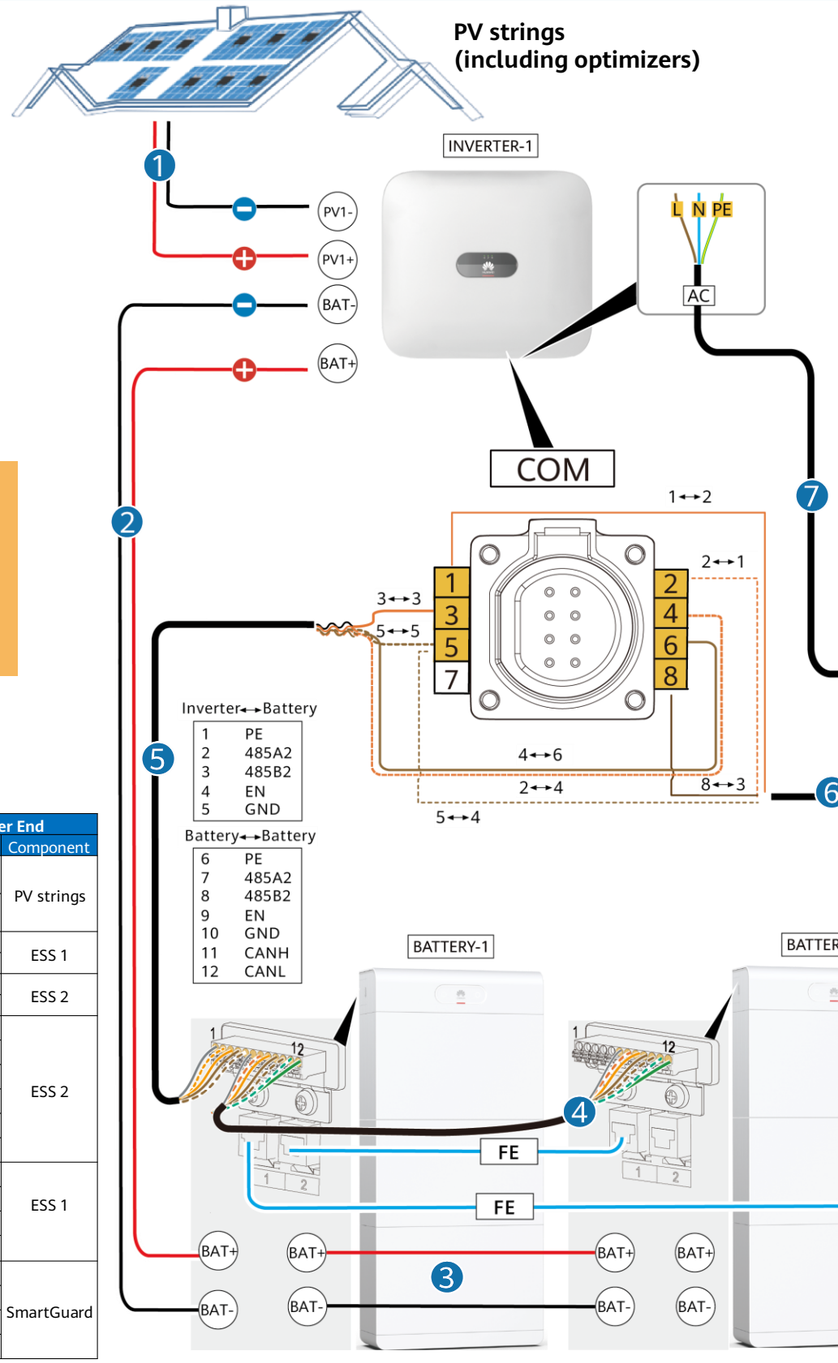

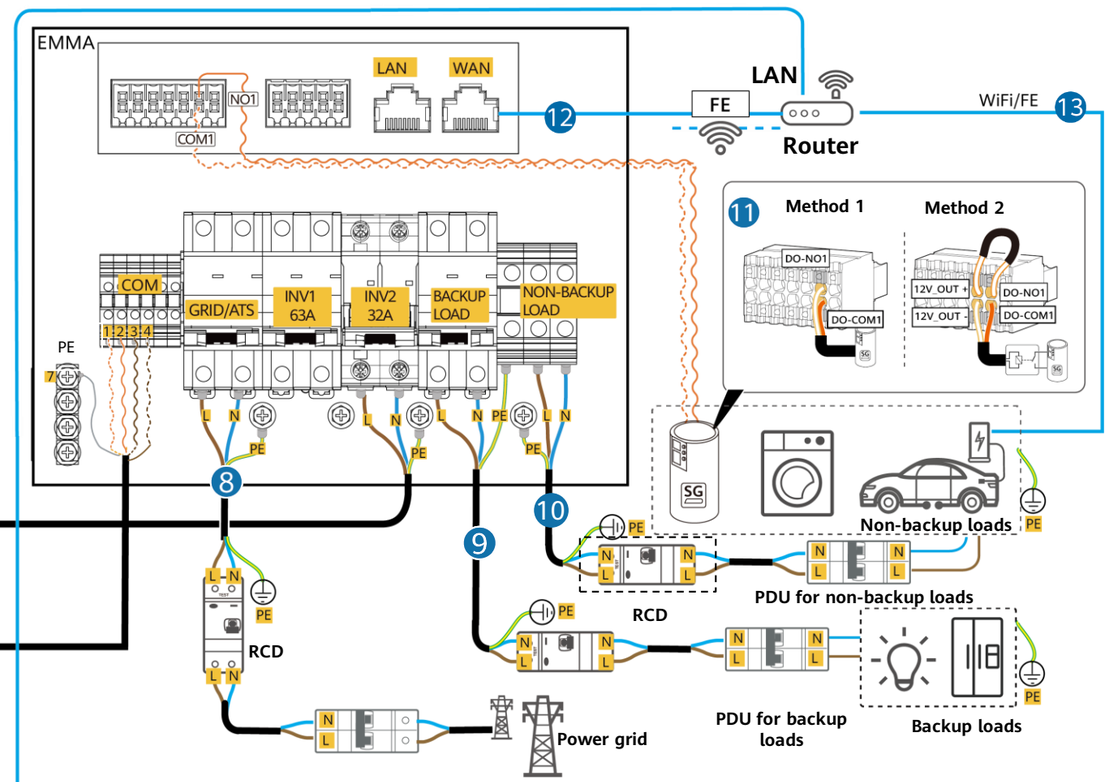

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			COM-12	COM-12	
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	13	Charger	FE	LAN	Router

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HUAWEI

4 System Commissioning

App-based Deployment Procedure

Download and install the FusionSolar app

↓

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

↓

Enter the setup wizard

↓

Check the device status

Downloading and Installing the FusionSolar App

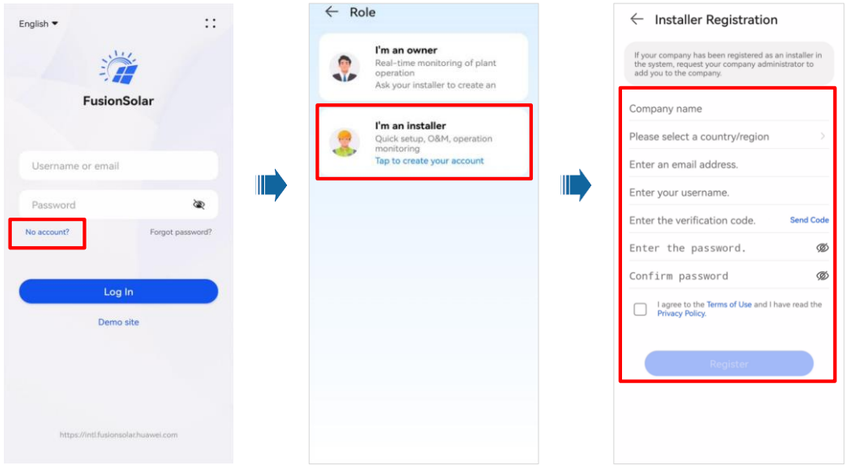
- Search for FusionSolar in the app store to download the app.
- Scan the QR code below to download the app.

FusionSolar

Installer Registration

Initial registration

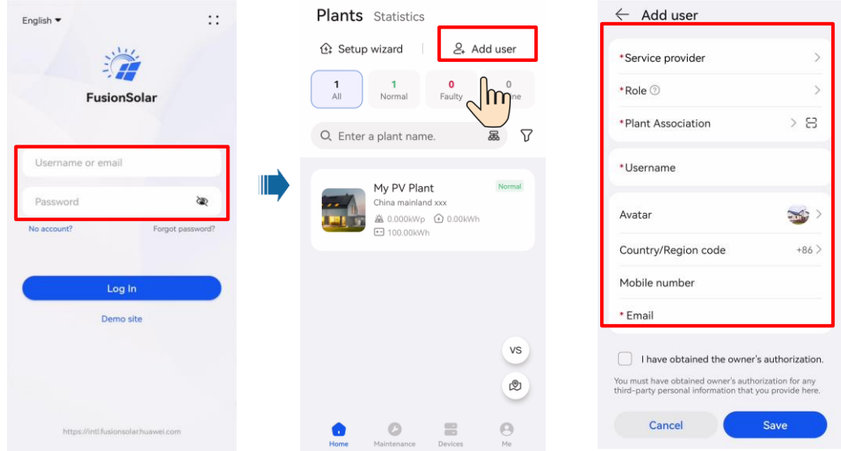
Create the first installer account, and generate a domain named after the company.



Or

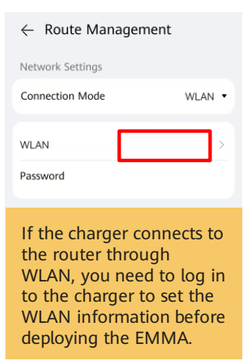
Non-initial registration

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

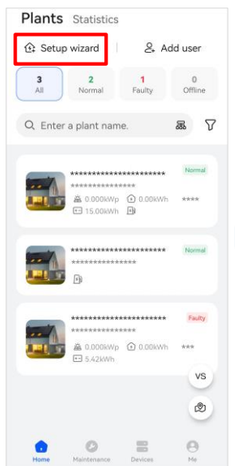


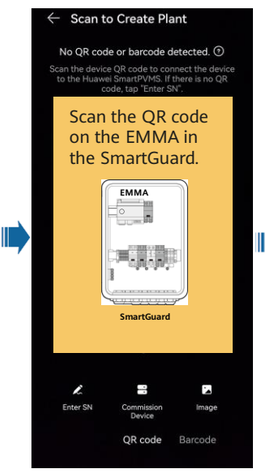
Setup Wizard (Connecting to the EMMA WLAN for Commissioning)

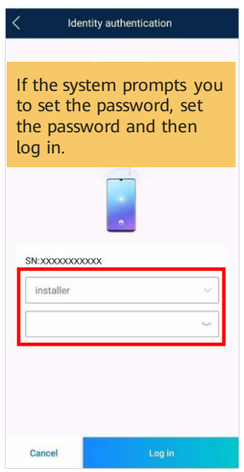
Set the WLAN information of the charger.

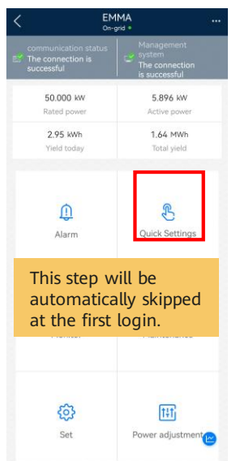


If the charger connects to the router through WLAN, you need to log in to the charger to set the WLAN information before deploying the EMMA.

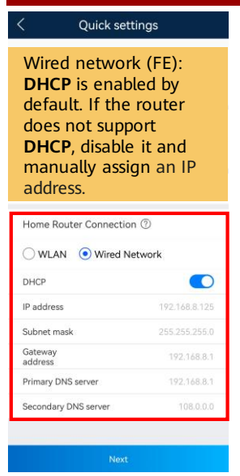


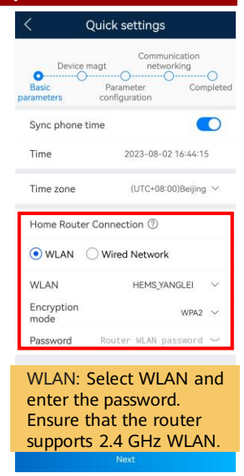






Set the router parameters.





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

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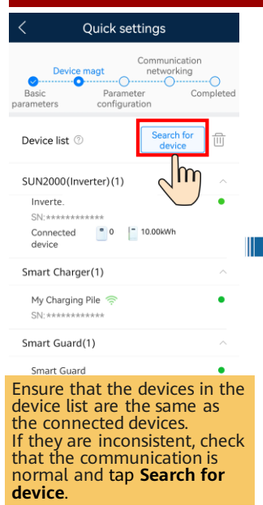
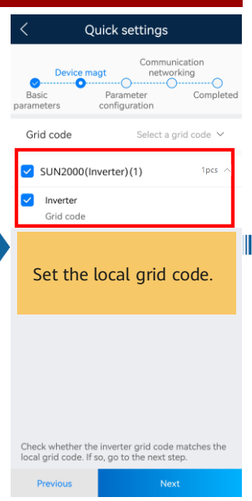
Device management

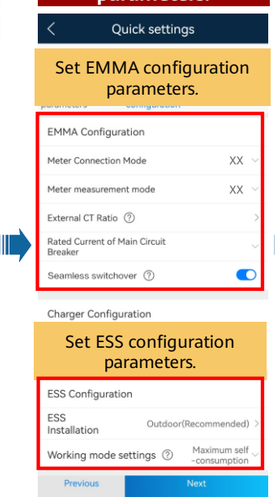


Ensure that the devices in the device list are the same as the connected devices.
If they are inconsistent, check that the communication is normal and tap **Search for device**.



Set the local grid code.

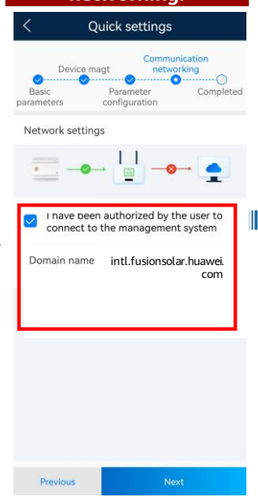
Set the key parameters.



Set EMMA configuration parameters.

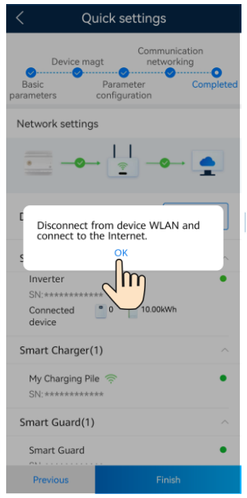
Set ESS configuration parameters.

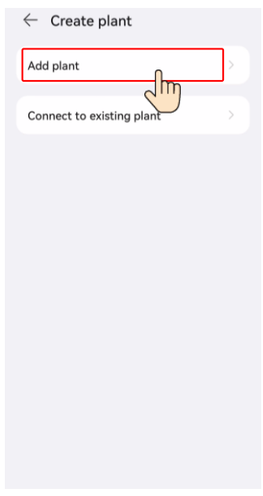
Set the communication networking.



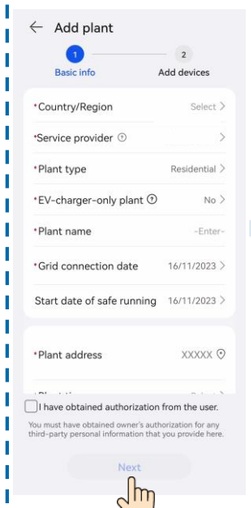
Connection test

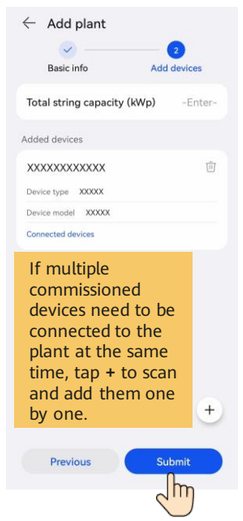
Create a plant.





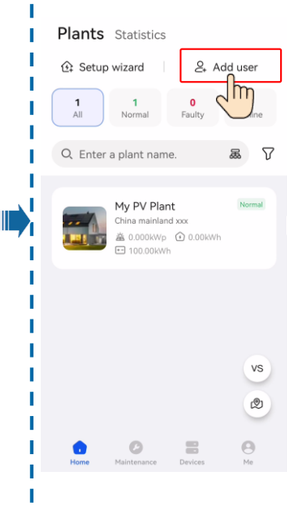
Add a plant.

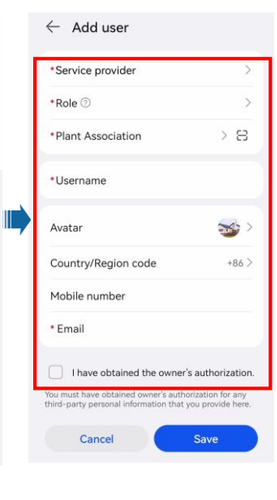




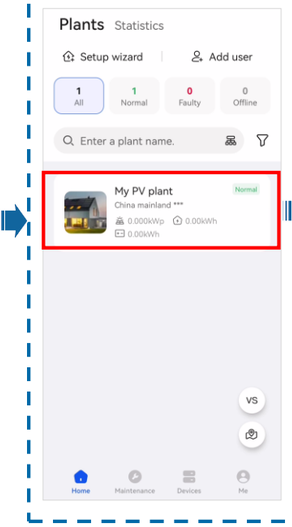
If multiple commissioned devices need to be connected to the plant at the same time, tap + to scan and add them one by one.

Create an owner account.





Viewing the Plant Status



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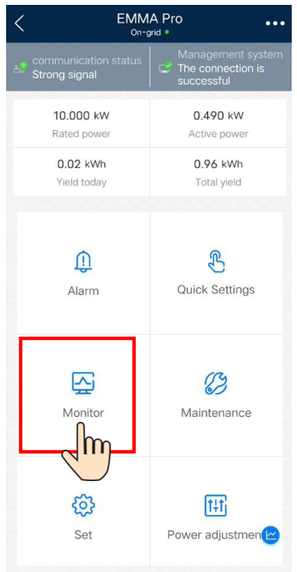
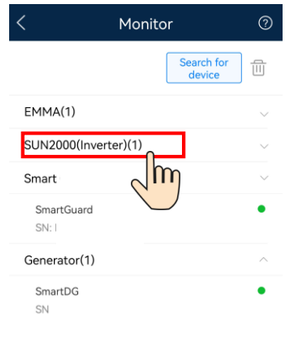
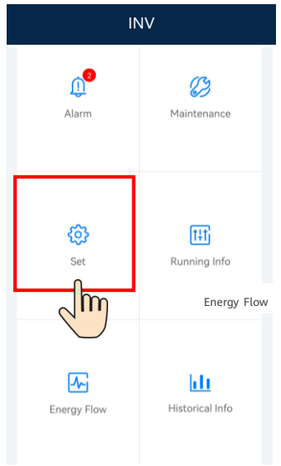
5 On/Off-Grid Control Parameters

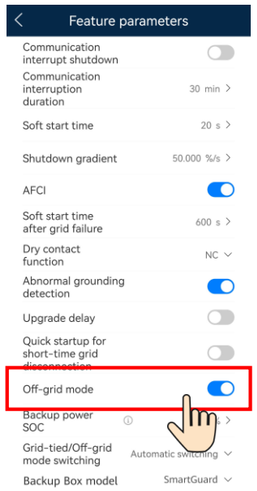
Enabling Off-Grid Mode

Monitor
↓
SUN2000 inverter
↓
Set
↓
Off-grid mode; Backup power SOC; Grid-tied/Off-grid mode switching



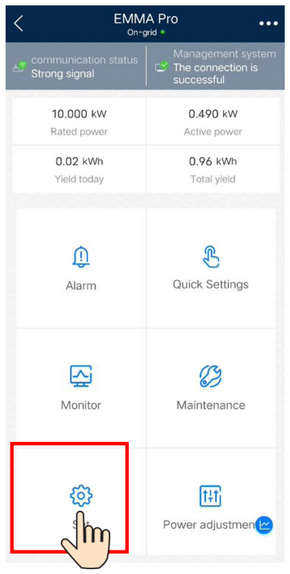


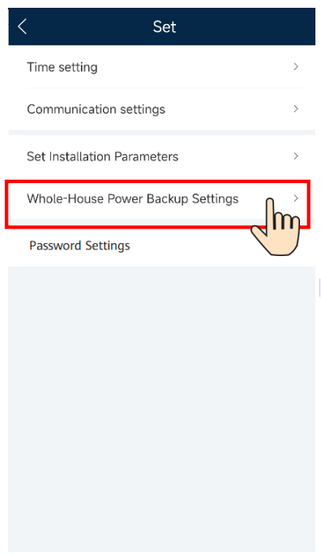




Setting Seamless Switchover

Set
↓
Whole-House Power Backup Settings
↓
Seamless switchover





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6 Grid-tied Point Parameters

Setting Grid-tied Point Control

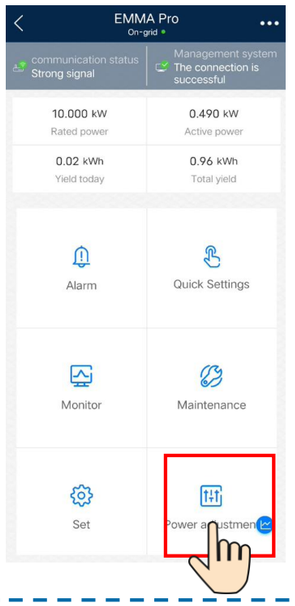
Power adjustment

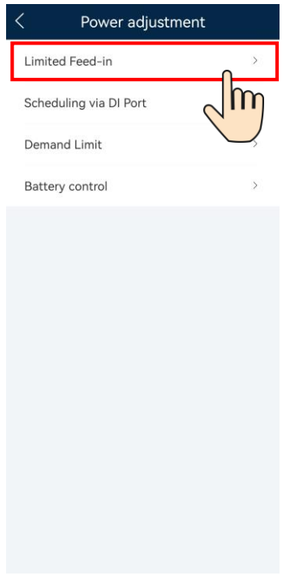
↓

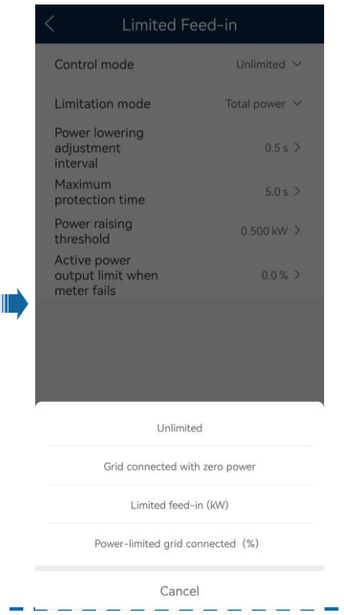
Limited Feed-in

↓

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







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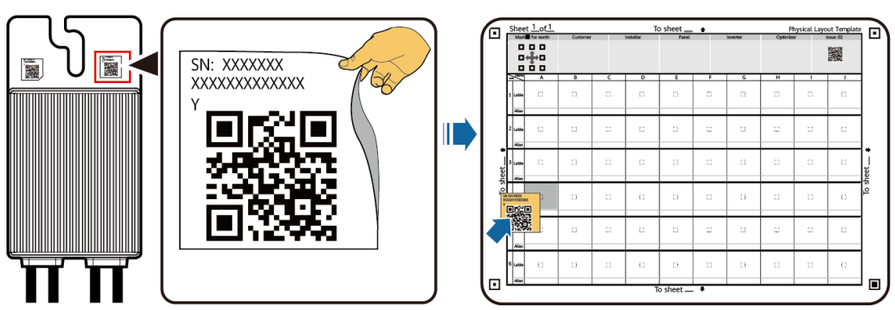
7 Physical Layout of Smart PV Optimizers

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.

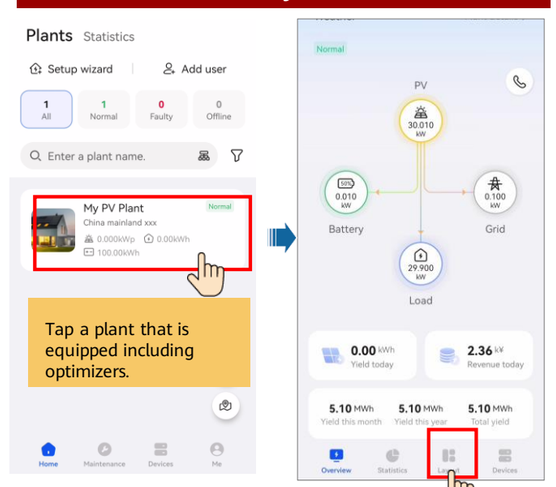


Taking a Photo of the Physical Layout Template

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

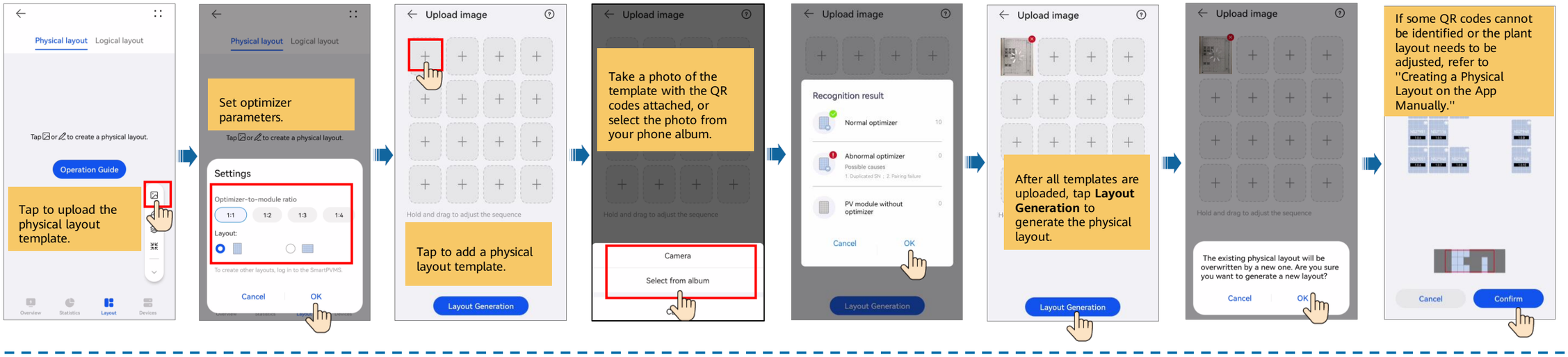
Generating a Physical Layout on the App

Enter the Layout screen.



Generating a Physical Layout on the App Automatically

Upload the template and generate a layout.



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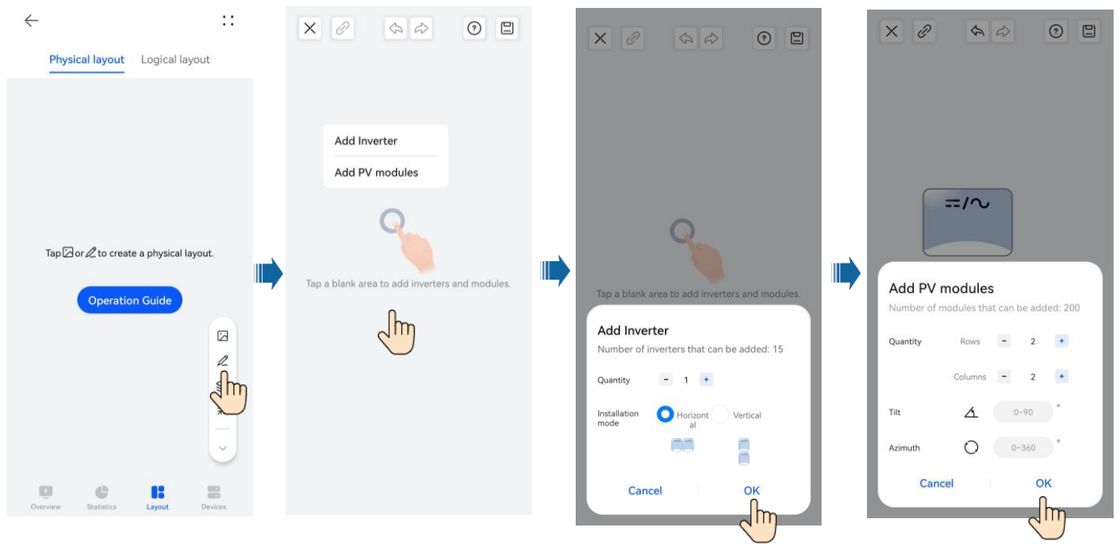
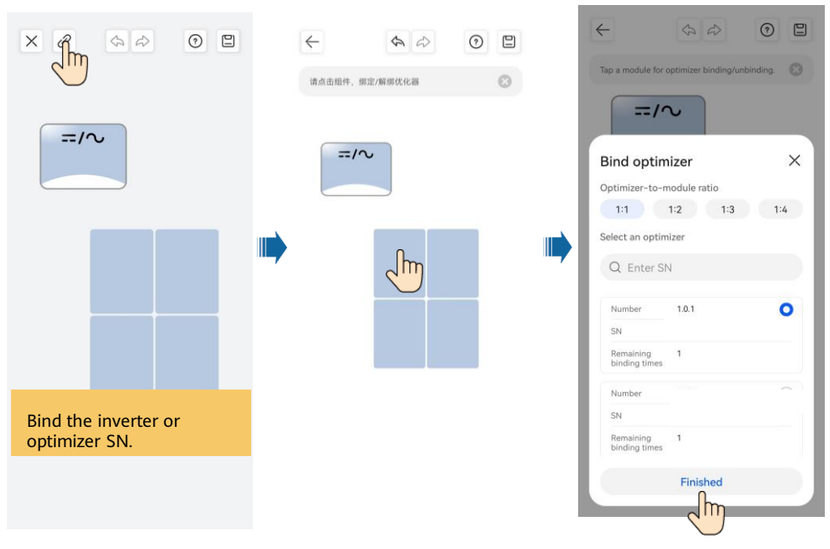
Creating a Physical Layout on the App Manually

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.