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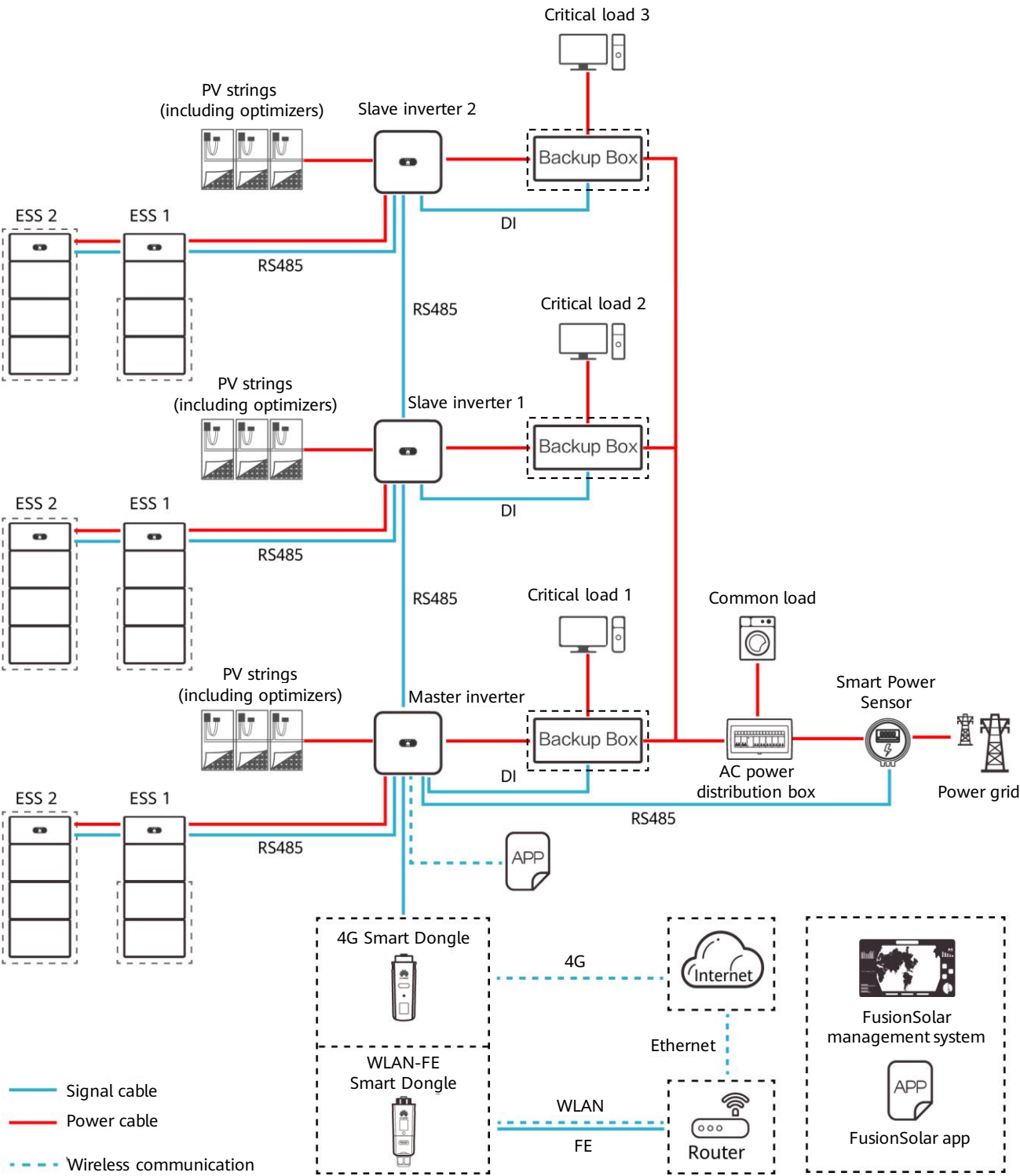## (Single-Phase PV+ESS Scenario + Smart Dongle Networking)

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1 Networking

- Critical load 3
- PV strings (including optimizers)
- Slave inverter 2
- Backup Box
- ESS 2 / ESS 1
- RS485
- DI
- Critical load 2
- Slave inverter 1
- Backup Box
- PV strings (including optimizers)
- RS485
- Critical load 1
- Common load
- PV strings (including optimizers)
- Master inverter
- Backup Box
- DI
- AC power distribution box
- Smart Power Sensor
- Power grid
- RS485
- APP
- 4G Smart Dongle
- 4G
- Internet
- FusionSolar management system
- WLAN-FE Smart Dongle
- Ethernet
- WLAN
- FE
- Router
- FusionSolar app

Legend:
- Signal cable
- Power cable
- Wireless communication
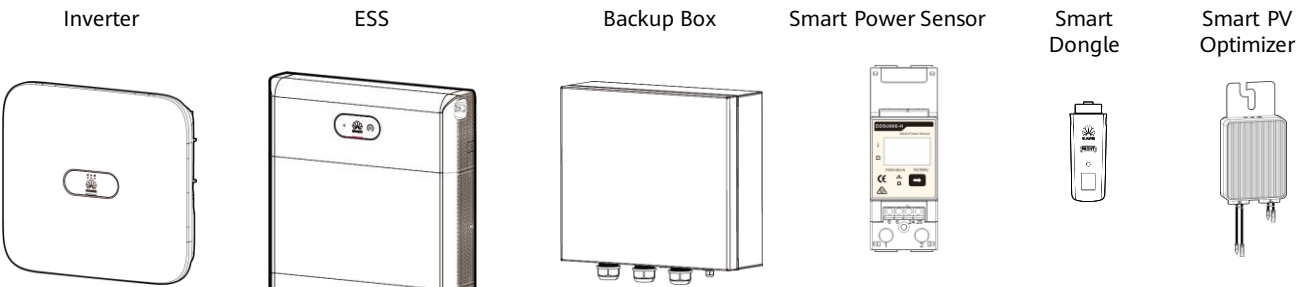
NOTE
1. The information in this document is subject to change without notice. Every effort has been made in the preparation of this document to ensure accuracy of the contents, but all statements, information, and recommendations in this document do not constitute a warranty of any kind, express or implied.
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.

2 Product Overview

Inverter | ESS | Backup Box | Smart Power Sensor | Smart Dongle | Smart PV Optimizer

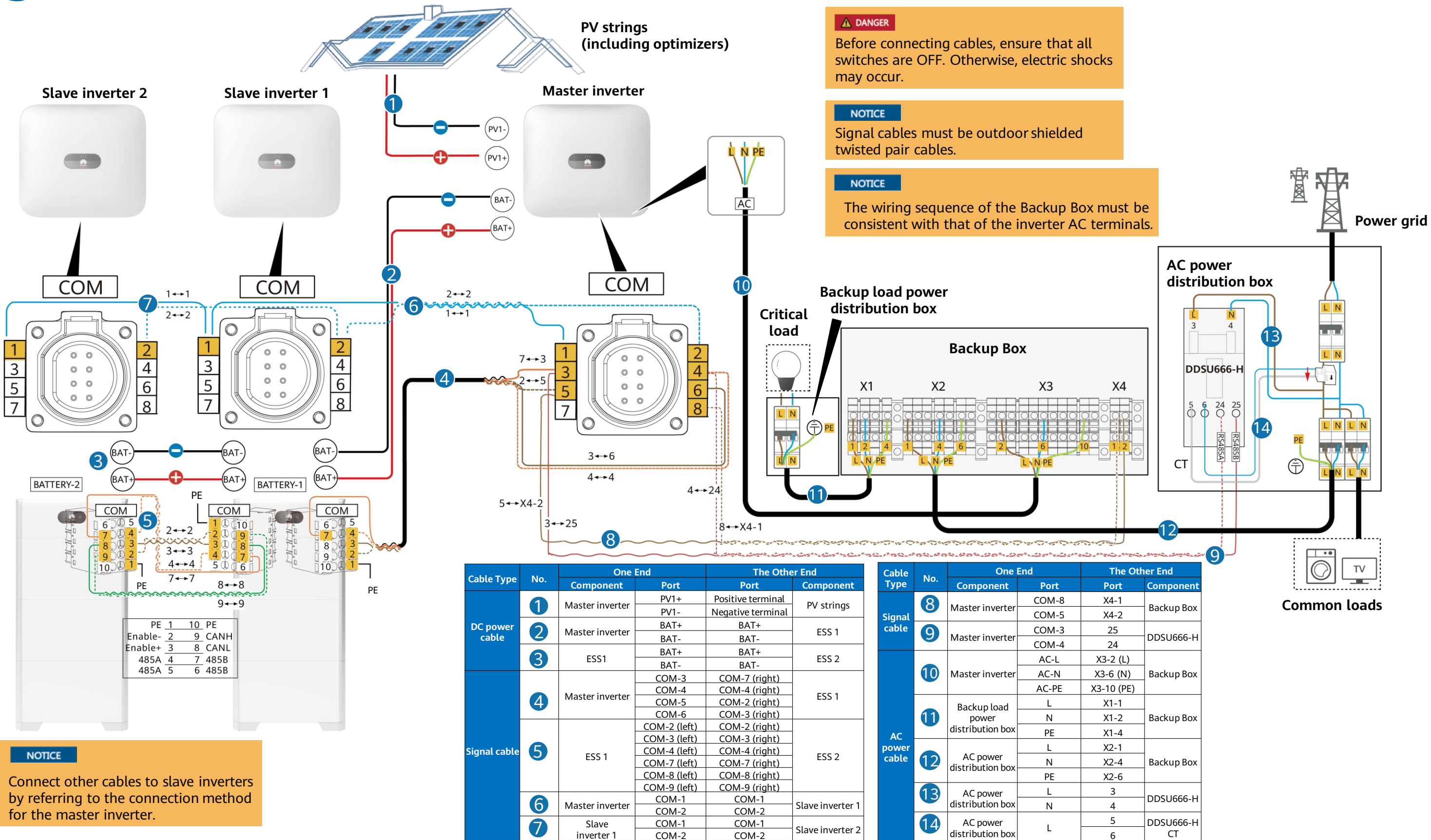| Component	Model		Description
Inverter (master and slave)	SUN2000-(2KTL-6KTL) -L1 SUN2000-(8K, 10K)-LC0 SUN2000-(8K, 10K)-LC0-ZH		• A maximum of three inverters can be cascaded. • L1/LC0 inverters can be cascaded.
Energy storage system (ESS)	LUNA2000-(5-30)-S0 LUNA2000-(7, 14, 21)-S1		• If there is only one ESS, it must be connected to the master inverter. • Each inverter can connect to a maximum of two ESSs, each L1 can connect to a maximum of one ESS. • The LUNA2000-(5-30)-S0 and LUNA2000-(7, 14, 21)-S1 cannot connect to the same inverter in a parallel system. • If inverters are cascaded, the LUNA2000-(5-30)-S0 and LUNA2000-(7, 14, 21)-S1 cannot connect to different inverters.
Backup Box	Backup Box-B0		• AC input voltage range: 198–253 V • If there is only one Backup Box, it must be connected to the master inverter. • The SUN2000-(8K, 10K)-LC0, SUN2000-(8K, 10K)-LC0-ZH cannot be connected to the Backup Box.
Smart Power Sensor	**Single-Phase:** DDSU666-H YDS70-C16 DDSU71 DDSU1079-CT	**Three-Phase:** DTSU666-H DTSU666-HW YDS60-80 DTSU71 DHSU1079-CT	• The Smart Power Sensor must be connected to the master inverter. • It connects to the inverter over RS485 for output power management and power limiting. • Only L1 supports the three-phase smart power sensor.
Smart Dongle	SDongleA-03(4G) SDongleB-06(4G) SDongleA-05(WLAN-FE)		• The Smart Dongle must be connected to the master inverter. • It connects to the management system and performs power scheduling. • The SDongleA-03 (4G) is compatible only with the SUN2000-(2KTL-6KTL)-L1.
Optimizer	SUN2000-450W-P2 SUN2000-600W-P		For details about the optimizer supported by the inverter, see SUN2000 Smart PV Optimizer User Manual

NOTE
In the Smart Dongle networking scenario, a maximum of three inverters and six ESSs can be connected.

3 Cable Connections (Single-Phase Inverter L1 + ESS S0 + Backup Box B0)

PV strings (including optimizers)

Slave inverter 2   Slave inverter 1   Master inverter

⚠ DANGER

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

NOTICE

Signal cables must be outdoor shielded twisted pair cables.

NOTICE

The wiring sequence of the Backup Box must be consistent with that of the inverter AC terminals.

Power grid

AC power distribution box

Critical load

Backup load power distribution box

Backup Box

DDSU666-H

Common loads

NOTICE

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

PE	1	10	PE
Enable-	2	9	CANH
Enable+	3	8	CANL
485A	4	7	485B
485A	5	6	485B

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
DC power cable	①	Master inverter	PV1+	Positive terminal	PV strings
			PV1-	Negative terminal	
	②	Master inverter	BAT+	BAT+	ESS 1
			BAT-	BAT-	
	③	ESS1	BAT+	BAT+	ESS 2
			BAT-	BAT-	
Signal cable	④	Master inverter	COM-3	COM-7 (right)	ESS 1
			COM-4	COM-4 (right)	
			COM-5	COM-2 (right)	
			COM-6	COM-3 (right)	
	⑤	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)	
	⑥	Master inverter	COM-1	COM-1	Slave inverter 1
			COM-2	COM-2	
	⑦	Slave inverter 1	COM-1	COM-1	Slave inverter 2
			COM-2	COM-2	

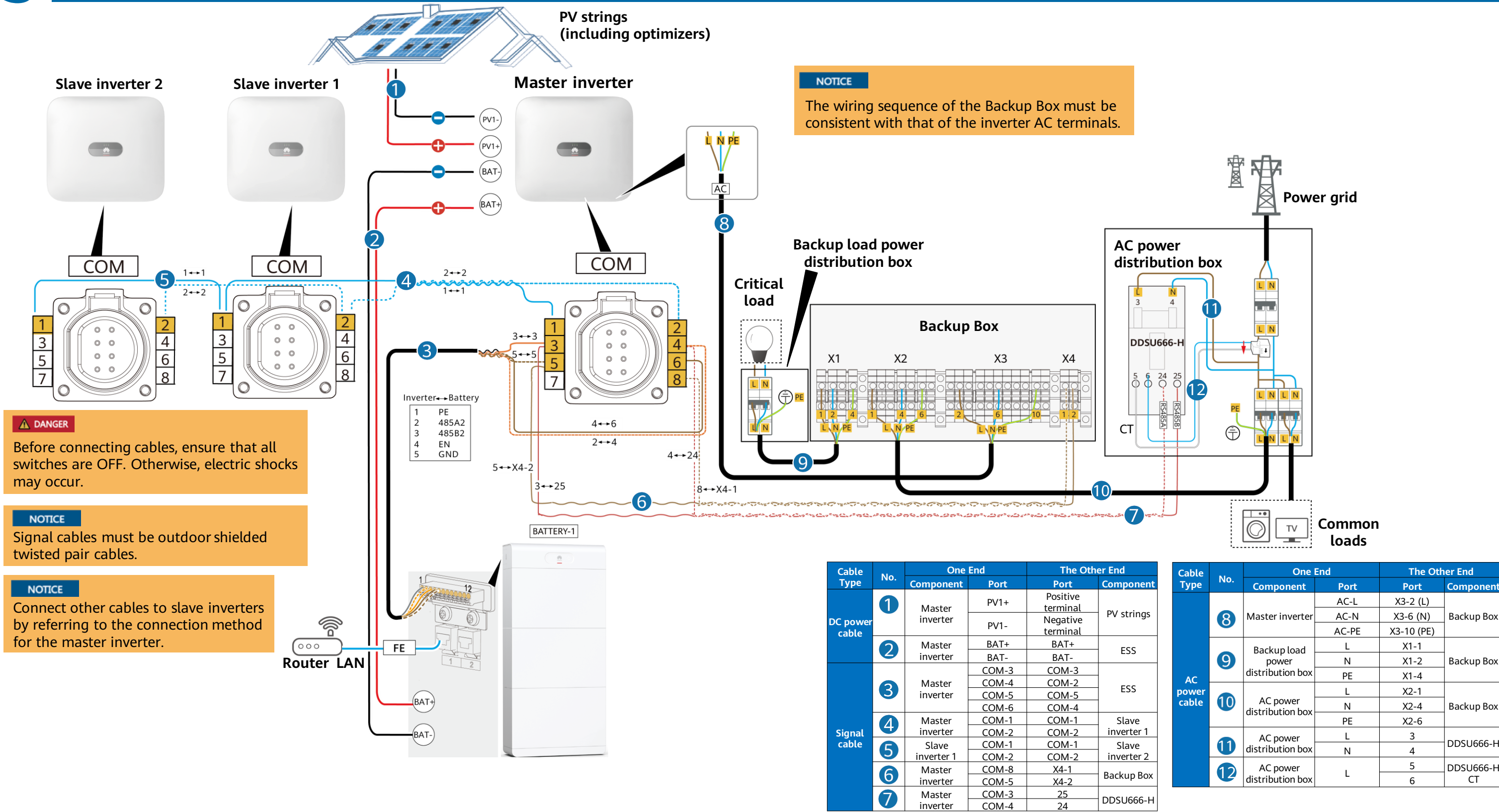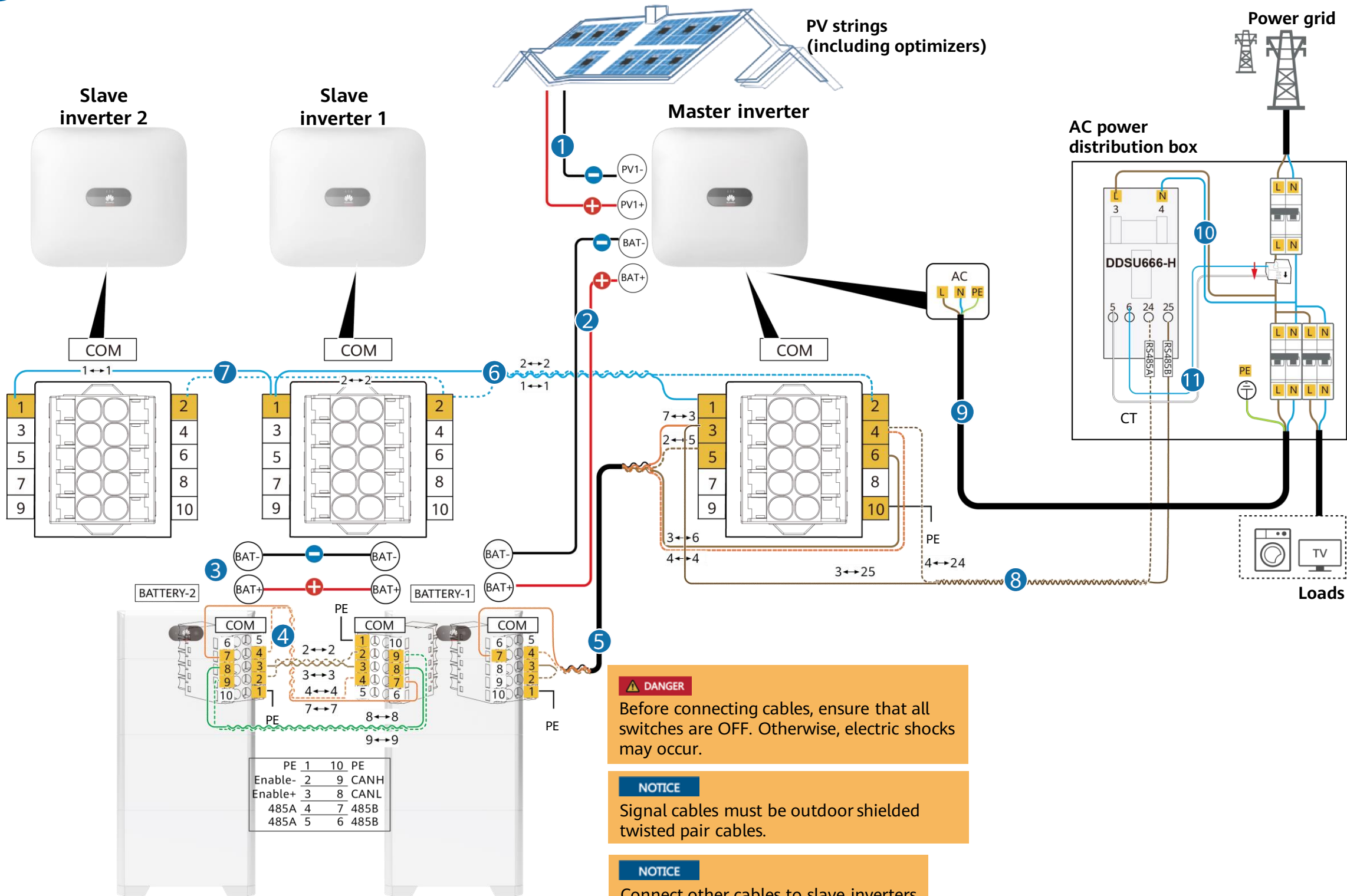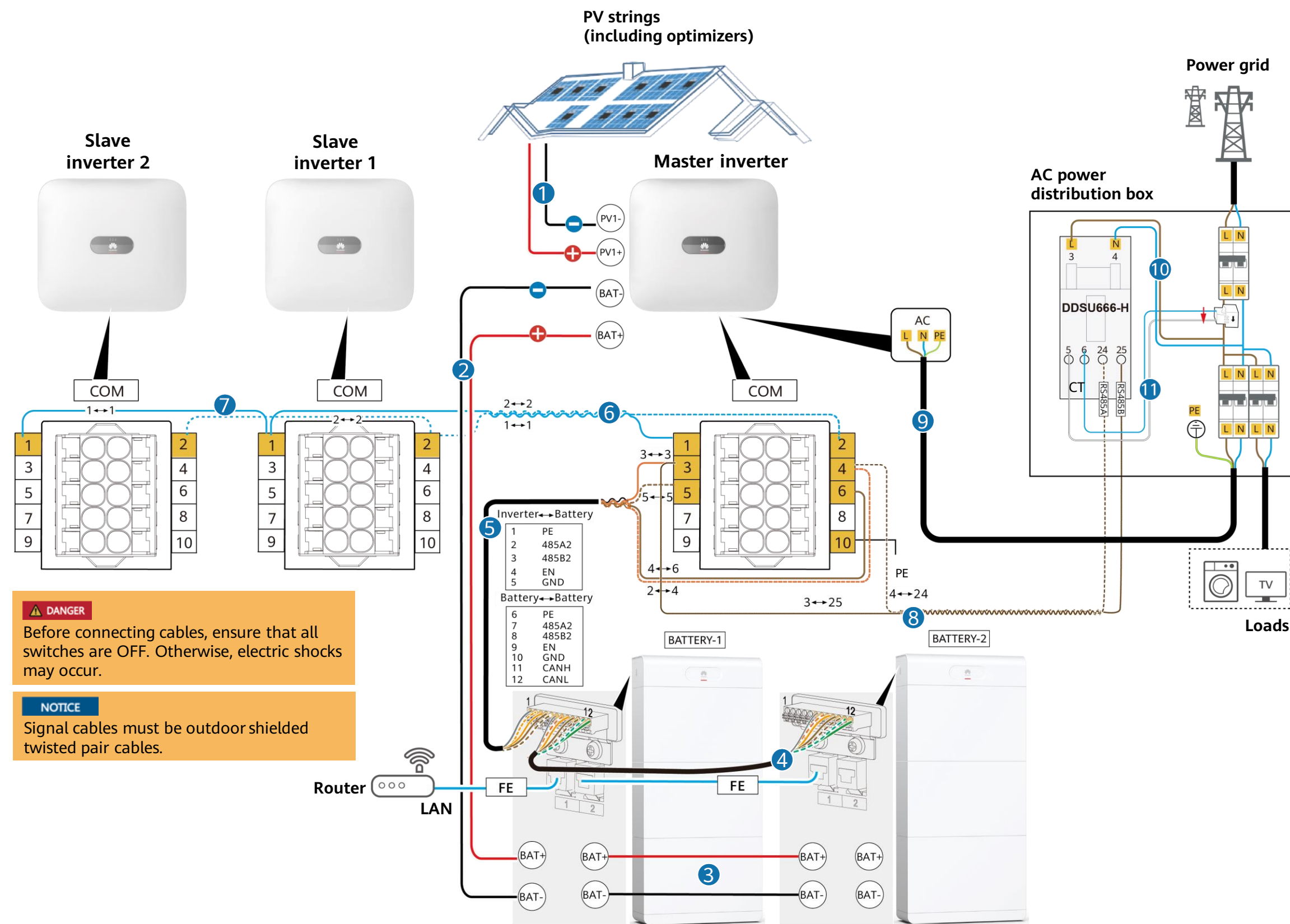| Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
Signal cable	⑧	Master inverter	COM-8	X4-1	Backup Box
			COM-5	X4-2	
	⑨	Master inverter	COM-3	25	DDSU666-H
			COM-4	24	
AC power cable	⑩	Master inverter	AC-L	X3-2 (L)	Backup Box
			AC-N	X3-6 (N)	
			AC-PE	X3-10 (PE)	
	⑪	Backup load power distribution box	L	X1-1	Backup Box
			N	X1-2	
			PE	X1-4	
	⑫	AC power distribution box	L	X2-1	Backup Box
			N	X2-4	
			PE	X2-6	
	⑬	AC power distribution box	L	3	DDSU666-H
			N	4	
	⑭	AC power distribution box	L	5	DDSU666-H
				6	CT

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(Single-Phase PV+ESS Scenario + Smart Dongle Networking)

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3 Cable Connections (Single-Phase Inverter L1 + ESS S1 + Backup Box B0)

PV strings
(including optimizers)

Slave inverter 2

Slave inverter 1

Master inverter

NOTICE

The wiring sequence of the Backup Box must be consistent with that of the inverter AC terminals.

PV1-
PV1+
BAT-
BAT+

L N PE
AC

Power grid

COM

COM

COM

1↔1
2↔2

2↔2
1↔1

Backup load power distribution box

Critical load

AC power distribution box

DDSU666-H

Backup Box

X1   X2   X3   X4

L N   L N PE   L N PE

CT

5 6 24 25
RS485A RS485B

3↔3
5↔5

Inverter↔Battery
1	PE
2	485A2
3	485B2
4	EN
5	GND

4↔6

2↔4

DANGER

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

NOTICE

Signal cables must be outdoor shielded twisted pair cables.

NOTICE

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

5↔X4-2

3↔25

4↔24

8↔X4-1

BATTERY-1

Router LAN

FE

BAT+

BAT-

Common loads

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
DC power cable	①	Master inverter	PV1+	Positive terminal	PV strings
			PV1-	Negative terminal	
	②	Master inverter	BAT+	BAT+	ESS
			BAT-	BAT-	
Signal cable	③	Master inverter	COM-3	COM-3	ESS
			COM-4	COM-2	
			COM-5	COM-5	
			COM-6	COM-4	
	④	Master inverter	COM-1	COM-1	Slave inverter 1
			COM-2	COM-2	
	⑤	Slave inverter 1	COM-1	COM-1	Slave inverter 2
			COM-2	COM-2	
	⑥	Master inverter	COM-8	X4-1	Backup Box
				X4-2	
	⑦	Master inverter	COM-3	25	DDSU666-H
			COM-4	24	

| Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
AC power cable	⑧	Master inverter	AC-L	X3-2 (L)	Backup Box
			AC-N	X3-6 (N)	
			AC-PE	X3-10 (PE)	
	⑨	Backup load power distribution box	L	X1-1	Backup Box
			N	X1-2	
			PE	X1-4	
	⑩	AC power distribution box	L	X2-1	Backup Box
			N	X2-4	
			PE	X2-6	
	⑪	AC power distribution box	L	3	DDSU666-H
			N	4	
	⑫	AC power distribution box	L	5	DDSU666-H CT
				6	

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

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

PV strings (including optimizers)

Power grid

Slave inverter 2

Slave inverter 1

Master inverter

AC power distribution box

DDSU666-H

CT

Loads

BATTERY-2

BATTERY-1

PE	1		10	PE
Enable-	2		9	CANH
Enable+	3		8	CANL
485A	4		7	485B
485A	5		6	485B

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

NOTICE
Signal cables must be outdoor shielded twisted pair cables.

NOTICE
Connect other cables to slave inverters by referring to the connection method for the master inverter.

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

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
Signal cable	⑥	Slave inverter 1	COM-1	COM-1	Slave inverter 2
			COM-2	COM-2	
	⑦	Master inverter	COM-1	COM-1	Slave inverter 1
			COM-2	COM-2	
	⑧	Master inverter	COM-3	25	DDSU666-H
			COM-4	24	

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
AC power cable	⑨	Master inverter	AC-L	L	AC power Power distribution box
			AC-N	N	
			AC-PE	PE	
	⑩	AC power distribution box	L	3	DDSU666-H
			N	4	
	⑪	AC power distribution box	L	5	DDSU666-H CT
				6	

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

PV strings
(including optimizers)

Power grid

Slave inverter 2

Slave inverter 1

Master inverter

AC power distribution box

DDSU666-H

CT

Router

LAN

Loads

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

NOTICE
Signal cables must be outdoor shielded twisted pair cables.

Inverter↔Battery
1 PE
2 485A2
3 485B2
4 EN
5 GND

Battery↔Battery
6 PE
7 485A2
8 485B2
9 EN
10 GND
11 CANH
12 CANL

BATTERY-1

BATTERY-2

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
DC power cable	1	Master inverter	PV1+	Positive terminal	PV strings
			PV1-	Negative terminal	
	2	Master 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	Master inverter	COM-3	COM-3	ESS 1
			COM-4	COM-2	
			COM-5	COM-5	
			COM-6	COM-4	

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
Signal cable	6	Slave inverter 1	COM-1	COM-1	Slave inverter 2
			COM-2	COM-2	
	7	Master inverter	COM-1	COM-1	Slave inverter 1
			COM-2	COM-2	
	8	Master inverter	COM-3	25	DDSU666-H
			COM-4	24	

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
AC power cable	9	Master inverter	AC-L	L	AC power Power distribution box
			AC-N	N	
			AC-PE	PE	
	10	AC power distribution box	L	3	DDSU666-H
			N	4	
	11	AC power distribution box	L	5	DDSU666-H
				6	CT

3 Cable Connections (Single-Phase Inverter LC0/L1 Cascading)

📖 **NOTE**

The following figure shows the signal cable cascading of LC0/L1 single-phase inverters. For the complete networking wiring diagram, refer to the preceding cable connection diagrams.
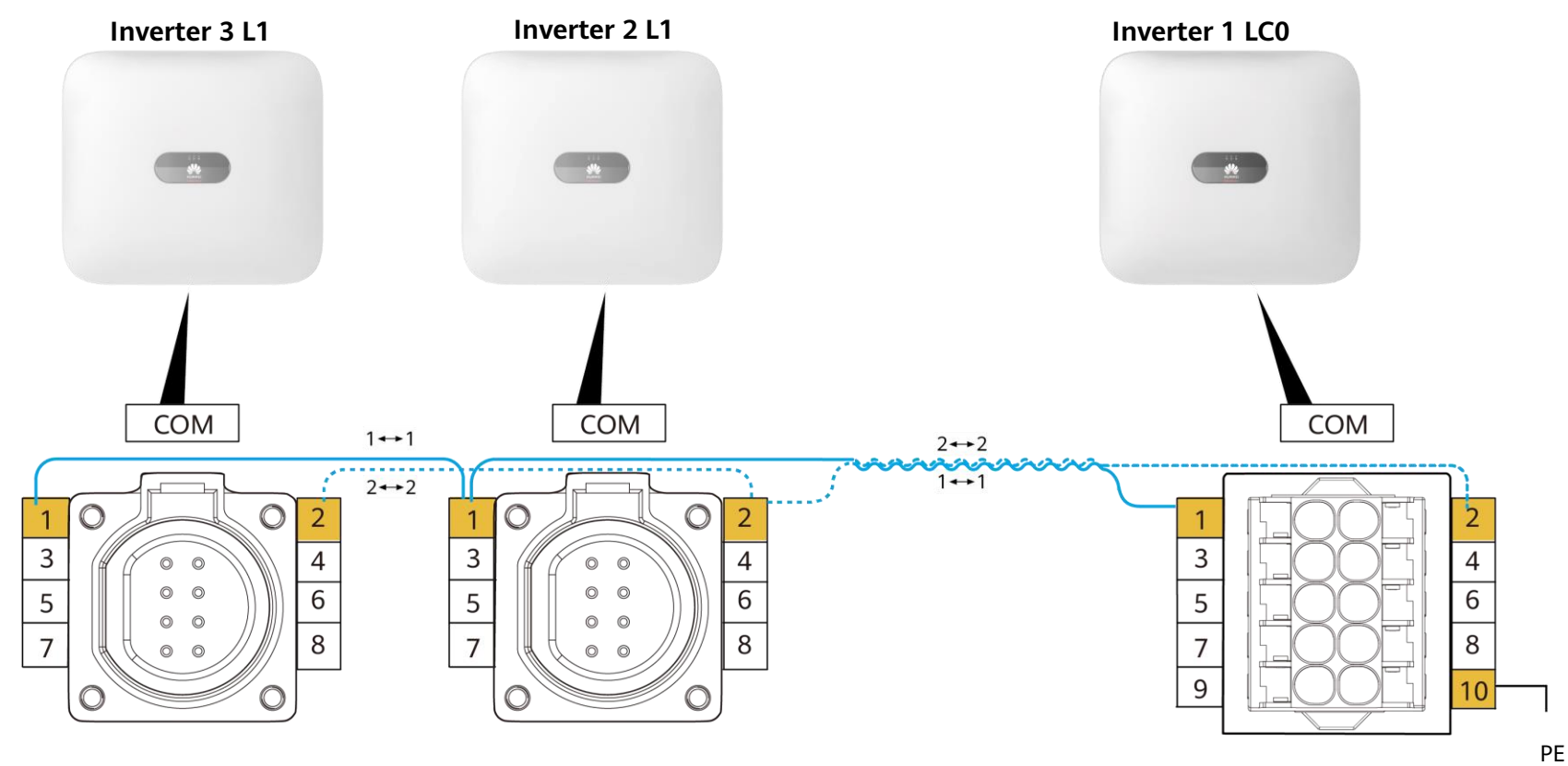
Residential Smart PV Solution Quick Guide
(Single-Phase PV+ESS Scenario + Smart Dongle Networking)

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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 THE setup wizard
- Check the device status

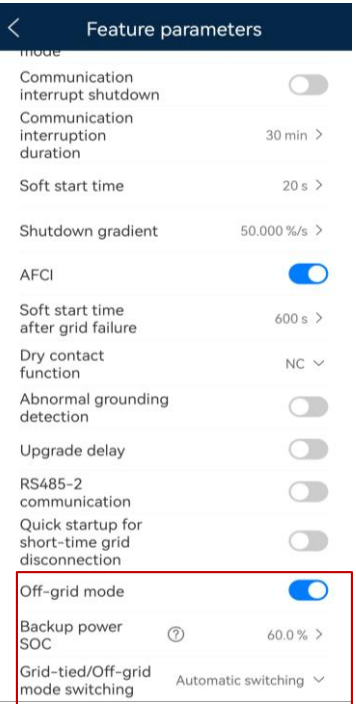#### Downloading and Installing the FusionSolar App

- 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.
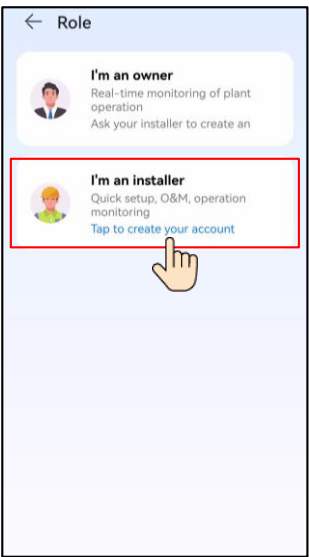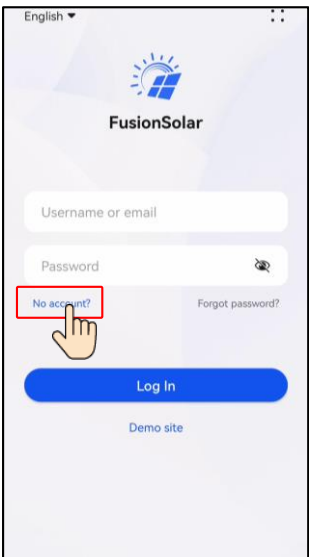
Or

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.
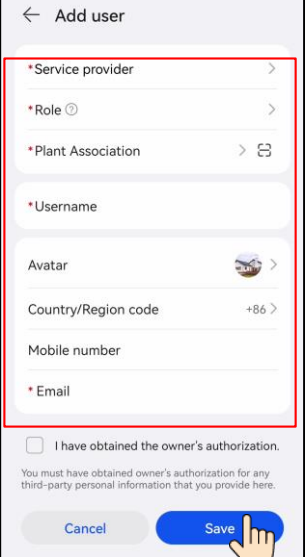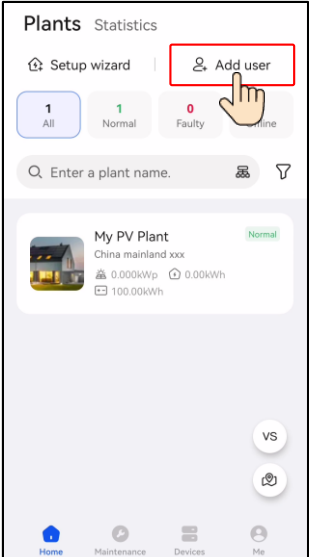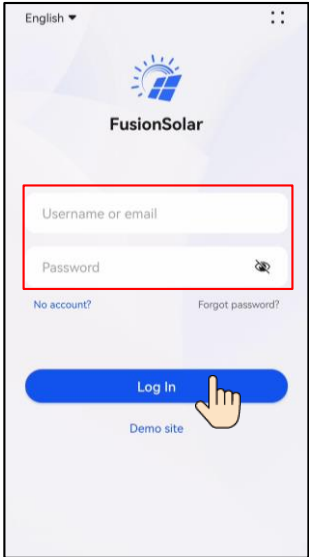
Setup Wizard (Connecting to the Inverter WLAN for Commissioning)

Scan the QR code of the master inverter.

Log in as an **installer**. The initial password is **00000a**. If the system prompts you to set the password, set the password and then log in.

Set the local grid code.

At the first login, the **Quick settings** screen is displayed by default.

If you enable **Sync phone time**, the time and time zone of the inverter are synchronized with those of the mobile phone.

(Optional) Cascade inverters.
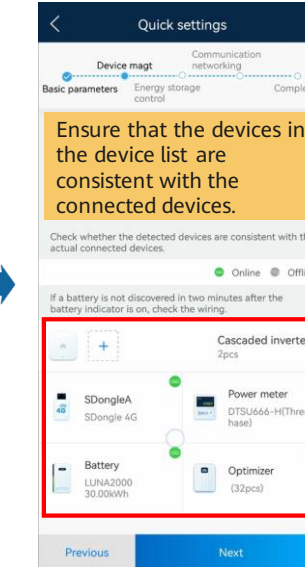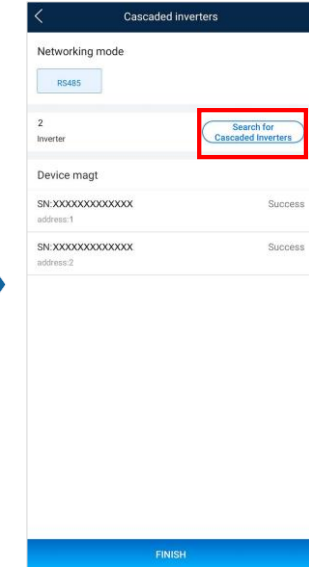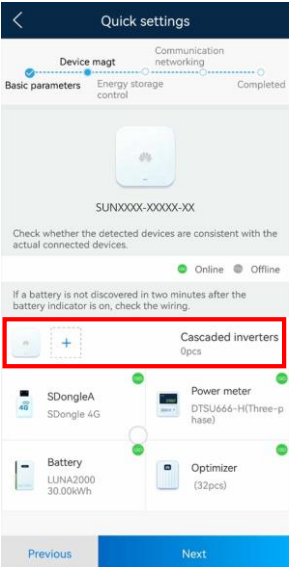
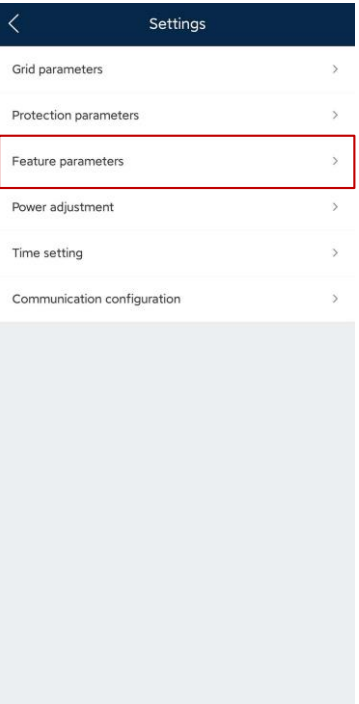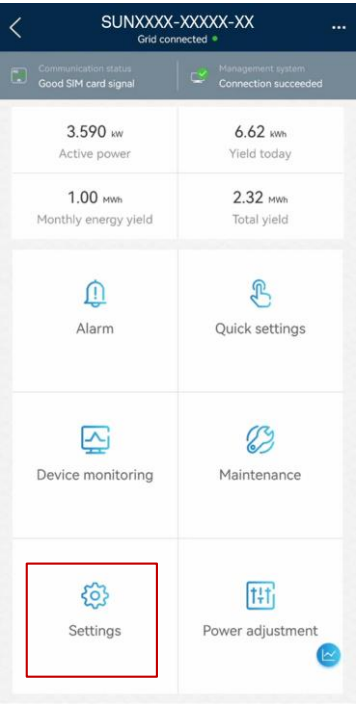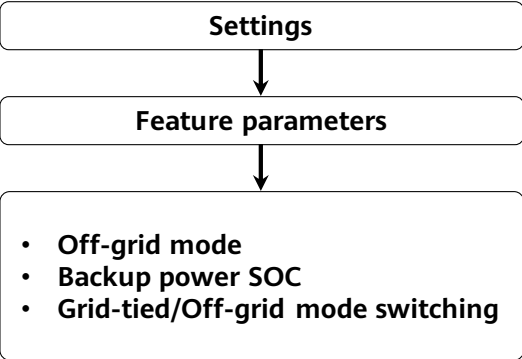Ensure that the devices in the device list are consistent with the connected devices.

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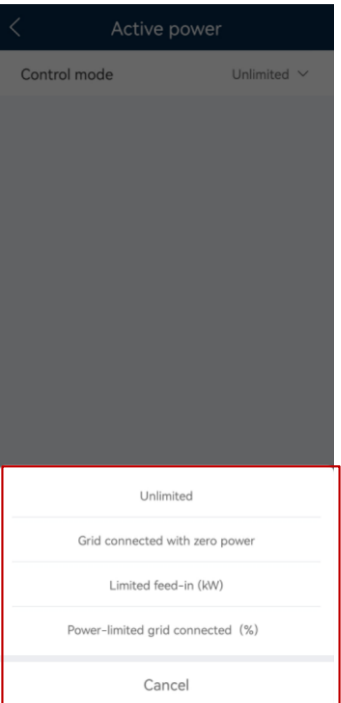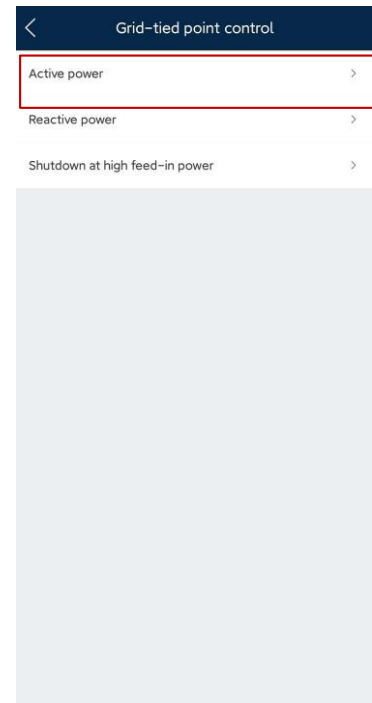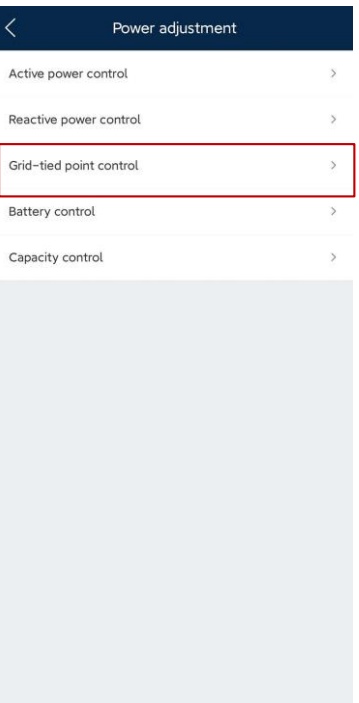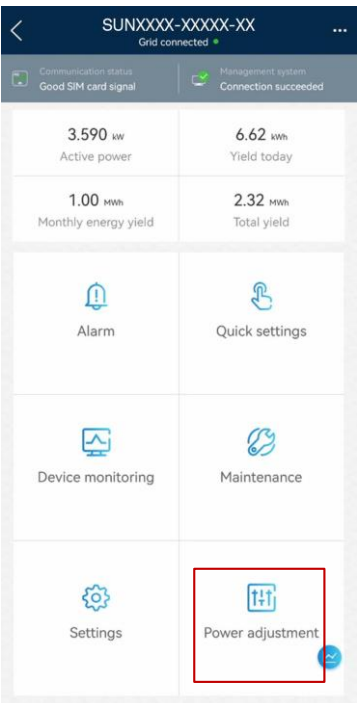## (Single-Phase PV+ESS Scenario + Smart Dongle Networking)

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Set the ESS parameters.
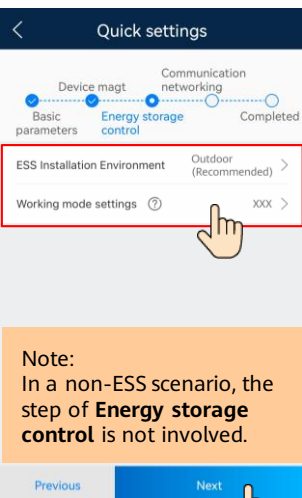
Set the ESS installation environment and working mode.

You can tap ⊘ to obtain the detailed working mode information.

Note:
In a non-ESS scenario, the step of **Energy storage control** is not involved.

Set the communication networking.

WLAN communication

Or
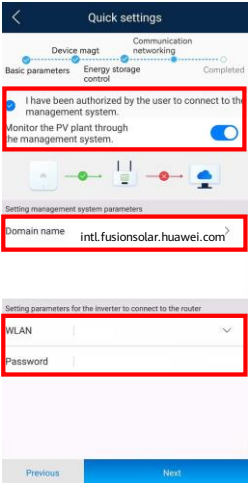
Select the desired router and enter the router password.

4G communication

Or
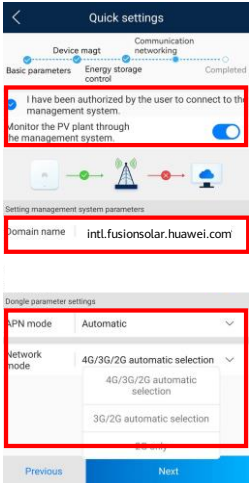
By default, **APN mode** is set to **Automatic**. If you cannot access the Internet in **Automatic** mode, set it to **Manual**. In this case, set the parameters related to the SIM card with the information obtained from the carrier.

FE communication
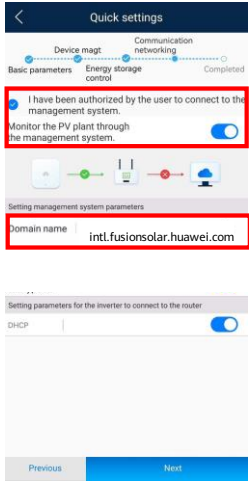
If the Ethernet parameter is displayed, the network cable is not connected. Reconnect the network cable.

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

Add a plant.
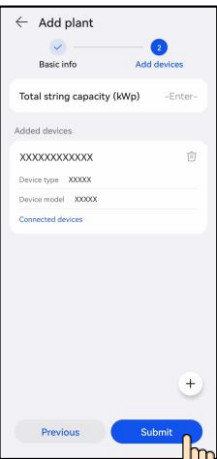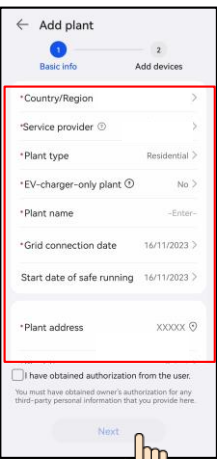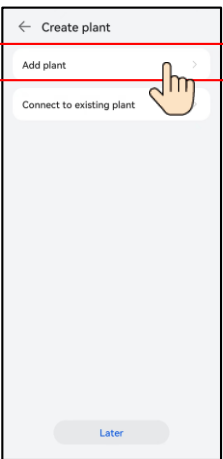
Create an owner account.
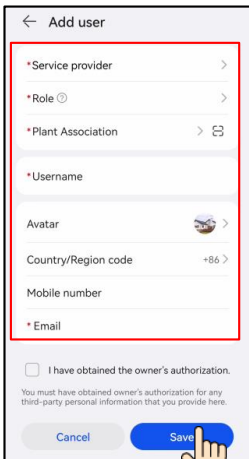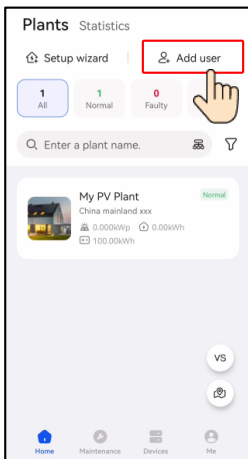
Checking the Plant Status
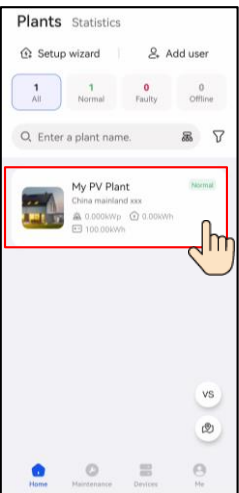
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5 Off-Grid/Grid-tied Control Parameters

Enabling Off-Grid Mode

Settings

↓

Feature parameters

↓

• Off-grid mode • Backup power SOC • Grid-tied/Off-grid mode switching

Setting Grid-tied Point Control
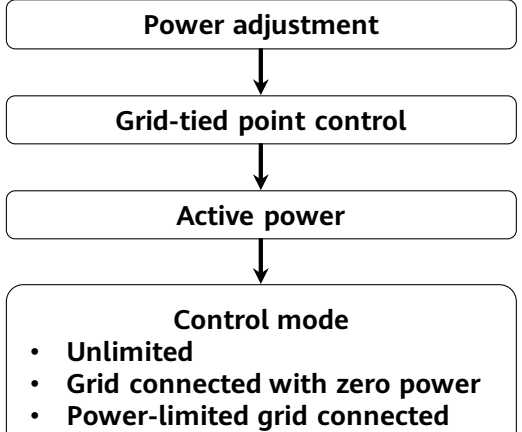
Power adjustment

↓

Grid-tied point control

↓

Active power

↓

| Control mode
• Unlimited
• Grid connected with zero power
• Power-limited grid connected |
| --- |

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.
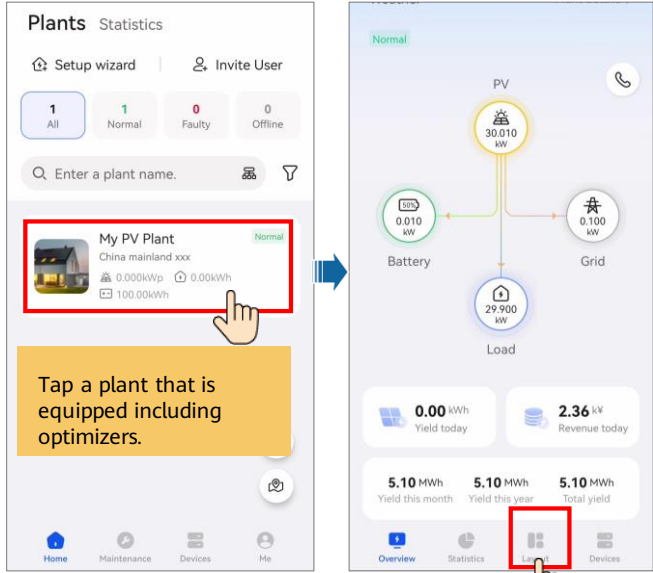

SN: XXXXXXX
XXXXXXXXXXXX
Y
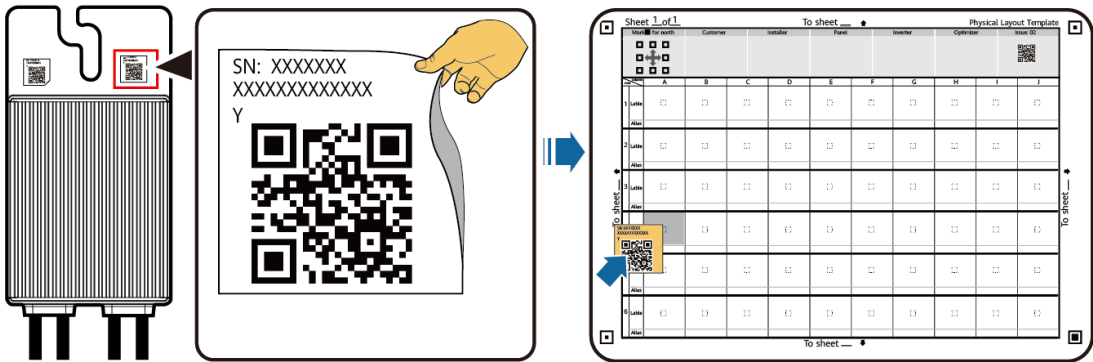
Taking a Photo of the Physical Layout Template

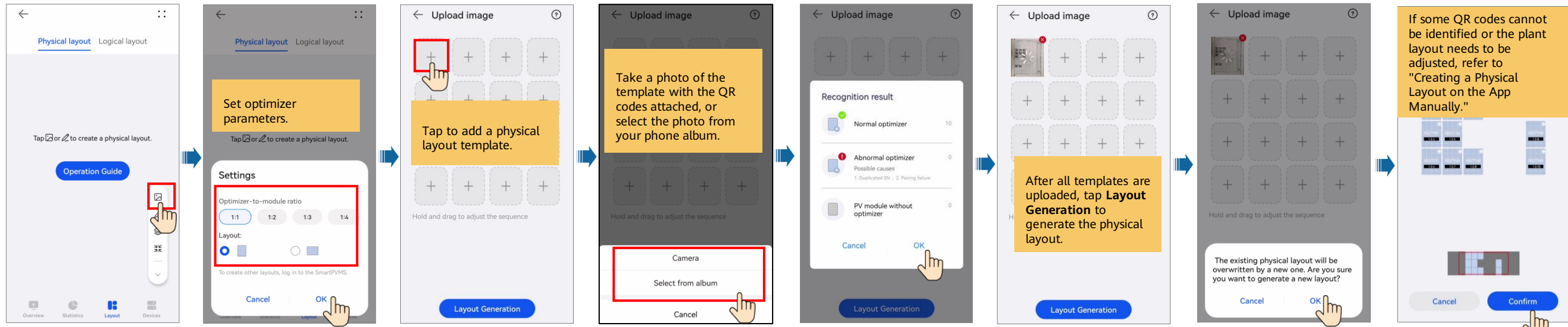Ensure that the four positioning points on the template are within the frame.

Positioning point
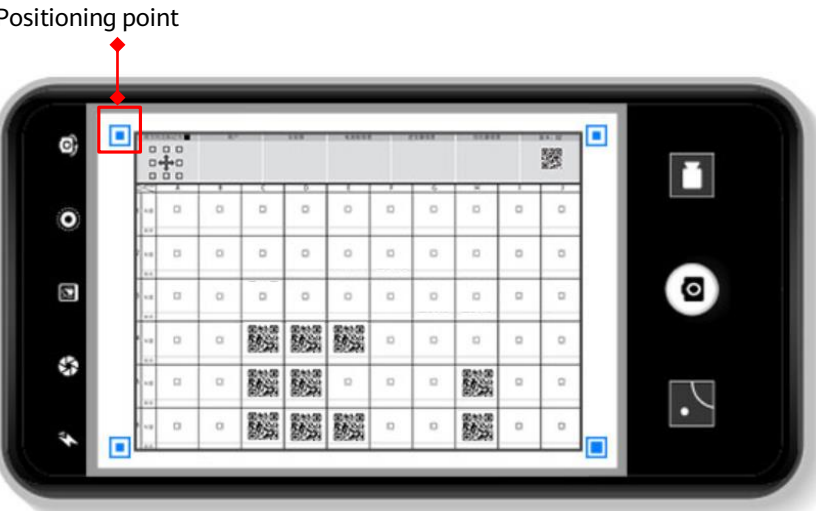
Generating a Physical Layout on the App

Enter the Layout screen.

Tap a plant that is equipped including optimizers.

Generating a Physical Layout on the App Automatically

Upload the template and generate a layout.

Set optimizer parameters.

Tap to add a physical layout template.

Take a photo of the template with the QR codes attached, or select the photo from your phone album.

After all templates are uploaded, tap **Layout Generation** to generate the physical layout.

If some QR codes cannot be identified or the plant layout needs to be adjusted, refer to "Creating a Physical Layout on the App Manually."
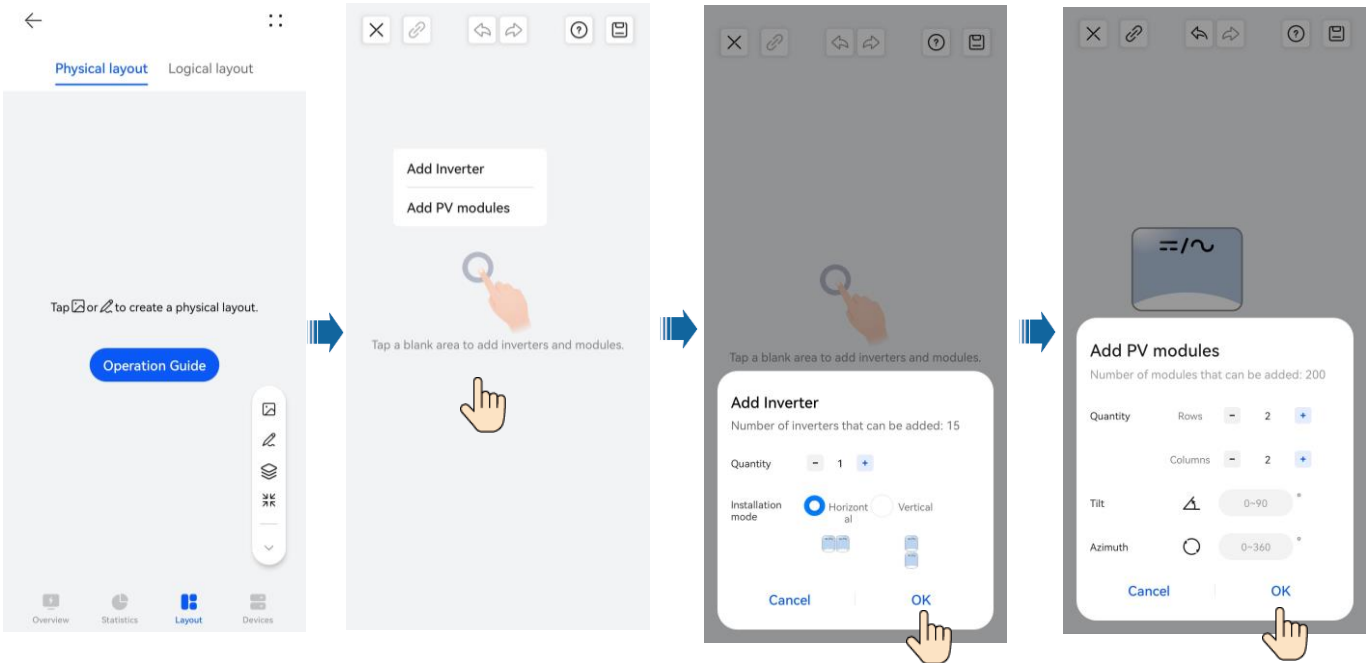
Residential Smart PV Solution Quick Guide
(Single-Phase PV+ESS Scenario + Smart Dongle Networking)
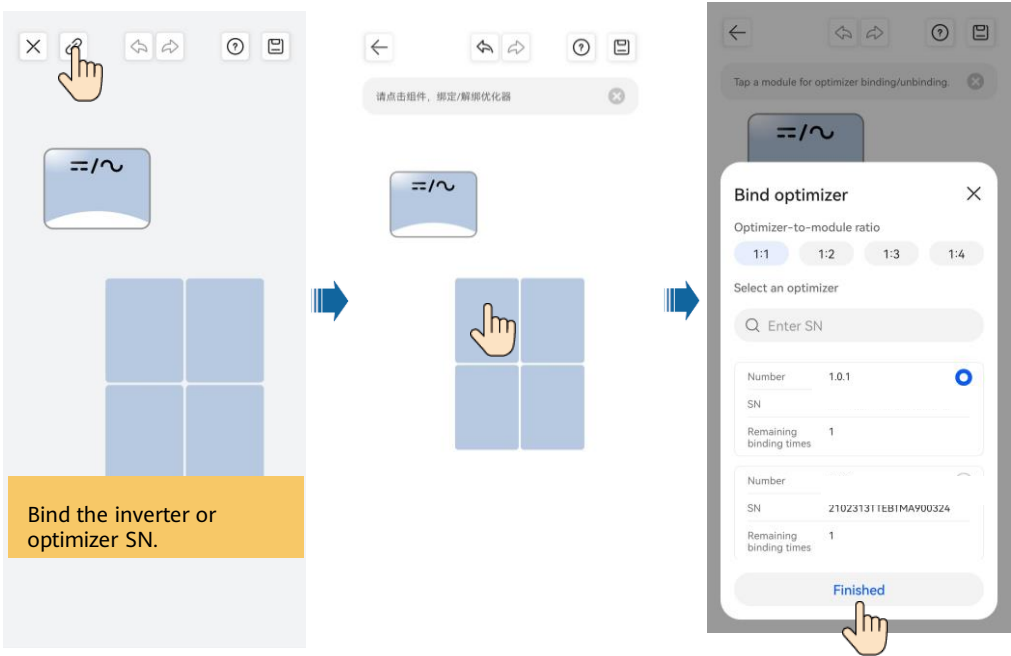
Creating a Physical Layout on the App Manually

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

Bind the inverter or optimizer SN.

Bind the inverter or optimizer SN.

Adjust the physical layout.

Select the PV modules that need to have the azimuth adjusted.