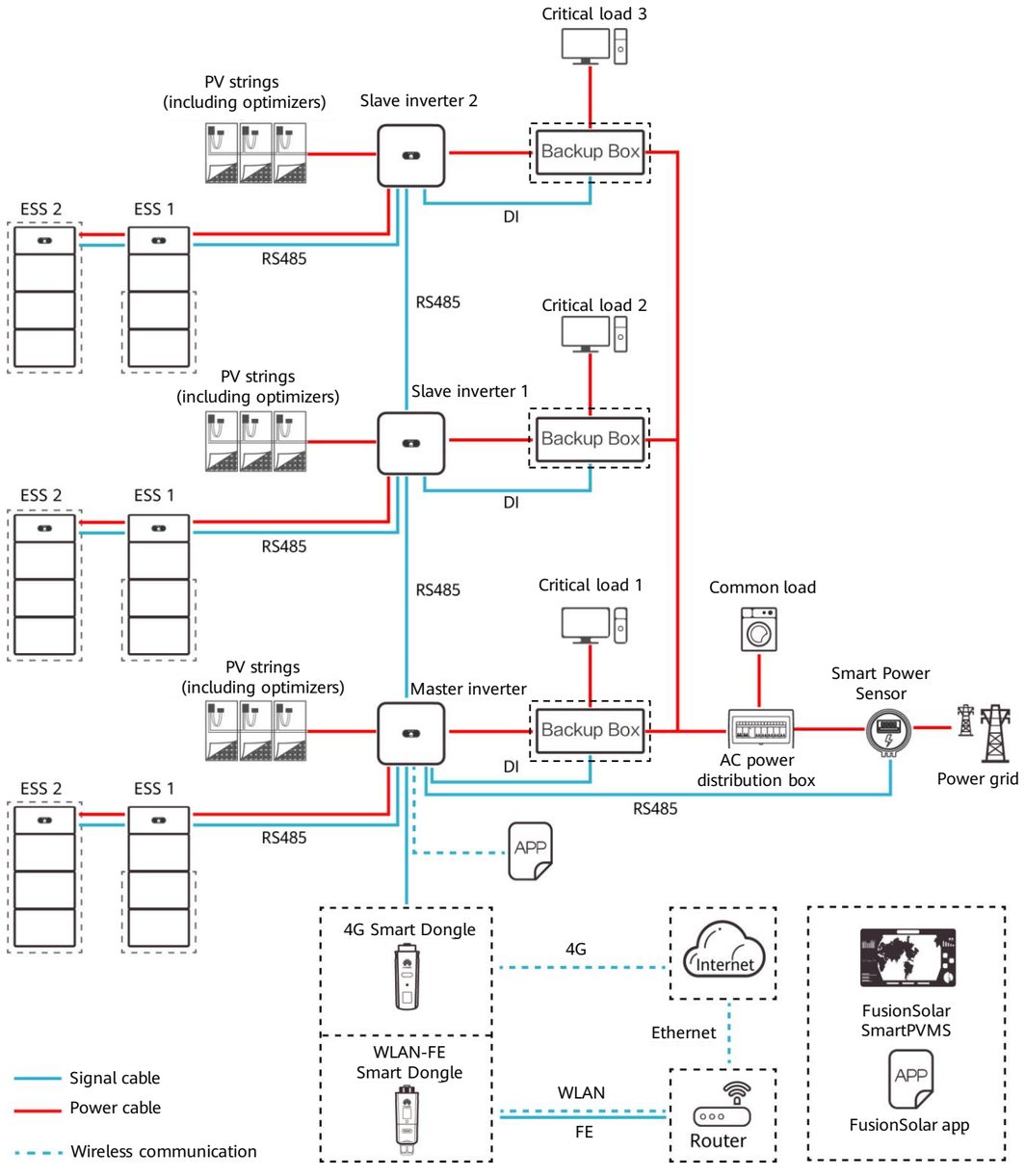
Residential Smart PV Solution Quick Guide
(Three-Phase PV+ESS Scenario + Smart Dongle Networking)

Issue: 07
Date: 2024-07-15

HUAWEI

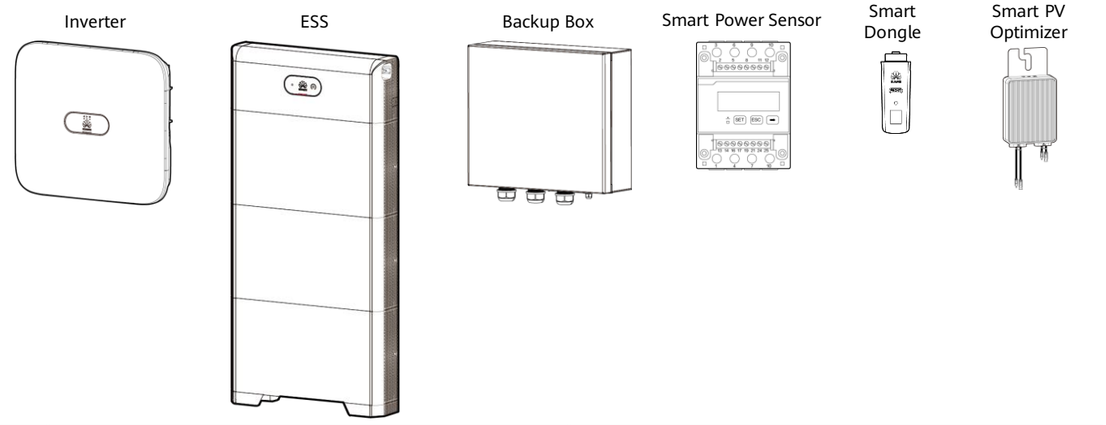
1 Networking



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



Component	Model		Description
Inverter (master and slave)	SUN2000-(5KTL-12KTL)-M1 SUN2000-(12K-25K)-MB0 series SUN2000-(8KTL-20KTL)-M2 SUN2000-(12KTL-25KTL)-M5 series SUN2000-(5K-12K)-MAP0 series	SUN5000-(8KTL, 12KTL)-MAP0 series SUN5000-(17K, 25K)-MB0 series	• A maximum of three inverters can be cascaded. • M1/M2/M5/MB0 inverters can be cascaded. • The SUN2000-(5K-12K)-MAP0 cannot be cascaded with other inverters. • SUN5000 inverters cannot be cascaded with SUN2000 inverters. • Optimizers must be configured for all PV modules connected to a SUN5000 inverter. Otherwise, the inverter cannot be started. • In the Smart Dongle networking scenario, a maximum of three inverters and six ESSs can be connected.
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 M1/MAP0 can connect to a maximum of two ESSs, and each MB0 can connect to a maximum of four ESSs(each battery terminal can connect to a maximum of two batteries). • 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-B1		• AC input voltage range: grid-tied (three-phase) 342–440 V; off-grid (single-phase) 220/230 V • If there is only one Backup Box, it must be connected to the master inverter. • Only M1 can be connected to the Backup Box-B1.
Smart Power Sensor	DTSU666-H DTSU666-HW YDS60-80 YDS60-C24 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.
Smart Dongle	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.
Smart PV Optimizer	SUN2000-450W-P2 SUN2000-600W-P MERC-600W-PA0 MERC-(1300W, 1100W)-P		For details about the optimizer supported by the inverter, see: • SUN2000 Smart PV Optimizer User Manual • MERC-600W-PA0 Smart PV Optimizer User Manual • MERC-(1300W, 1100W)-P Smart PV Optimizer User Manual

NOTICE

When MB0 functions as the master inverter and needs to connect to both a power meter and ESS, if more than two ESSs are connected, select one of the following meter models: DTSU666-HW, YDS60-80, YDS60-C24, DTSU71, and DHSU1079-CT. The DTSU666-H is not supported. Ensure that the baud rate for RS485-2 is negotiated to 115200 bit/s. For details about baud rate negotiation, see Baud Rate Negotiation.

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

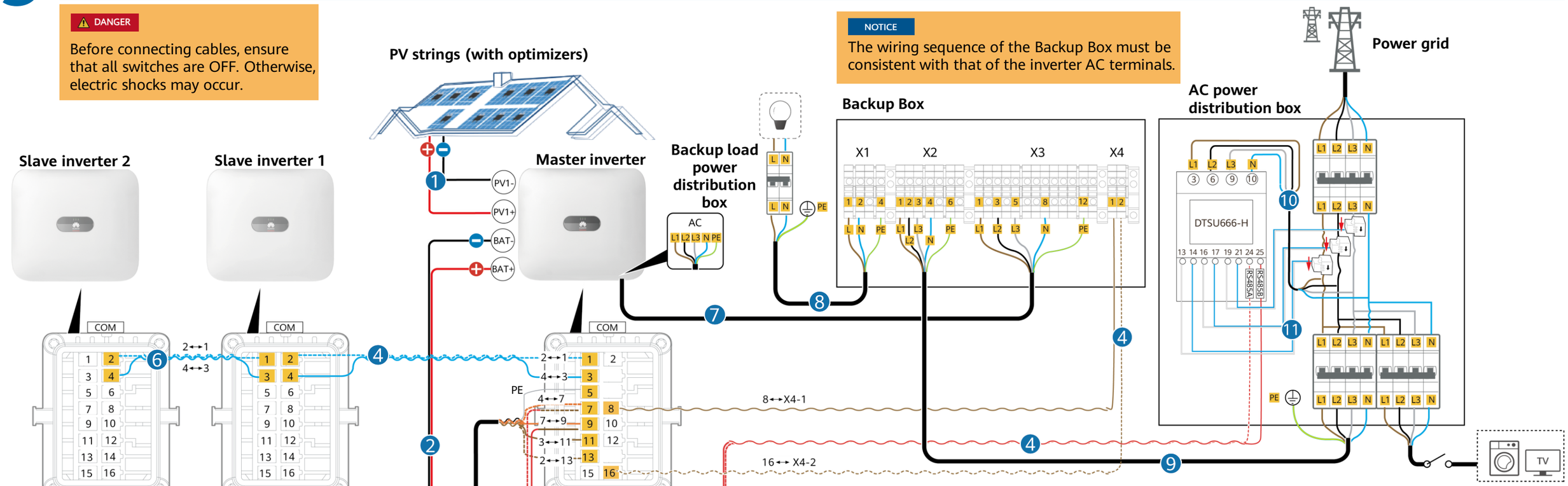
3 Cable Connections (Three-Phase Inverter M1 + ESS S0 + Backup Box B1 + Smart Dongle)

DANGER

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

NOTICE

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



NOTICE

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

NOTICE

Signal cables must be outdoor shielded twisted pair cables.

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	Master inverter	COM-13	COM-2(right)	ESS 1
			COM-11	COM-3(right)	
			COM-7	COM-4(right)	
			COM-9	COM-7(right)	
			COM-1	COM-2	Slave inverter 1
			COM-3	COM-4	
			COM-8	X4-1	Backup Box
			COM-16	X4-2	
			COM-9	25	DTSU666-H
			COM-7	24	
	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	Slave inverter 1	COM-1	COM-2	Slave inverter 2
			COM-3	COM-4	

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
AC power cable	7	Master inverter	AC-L1	X3-1 (L1)	Backup Box
			AC-L2	X3-3 (L2)	
			AC-L3	X3-5 (L3)	
			AC-N	X3-8 (N)	
			AC-PE	X3-12 (PE)	
	8	Backup load power distribution box	L	X1-1	Backup Box
			N	X1-2	
			PE	X1-4	
	9	AC power distribution box	L1	X2-1	Backup Box
			L2	X2-2	
			L3	X2-3	
			N	X2-4	
			PE	X2-6	
	10	AC power distribution box	L1	3	DTSU666-H
			L2	6	
			L3	9	
			N	10	
	11	AC power distribution box	L1	13	DTSU666-H CT
				14	
			L2	16	
				17	
			L3	19	
				21	

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

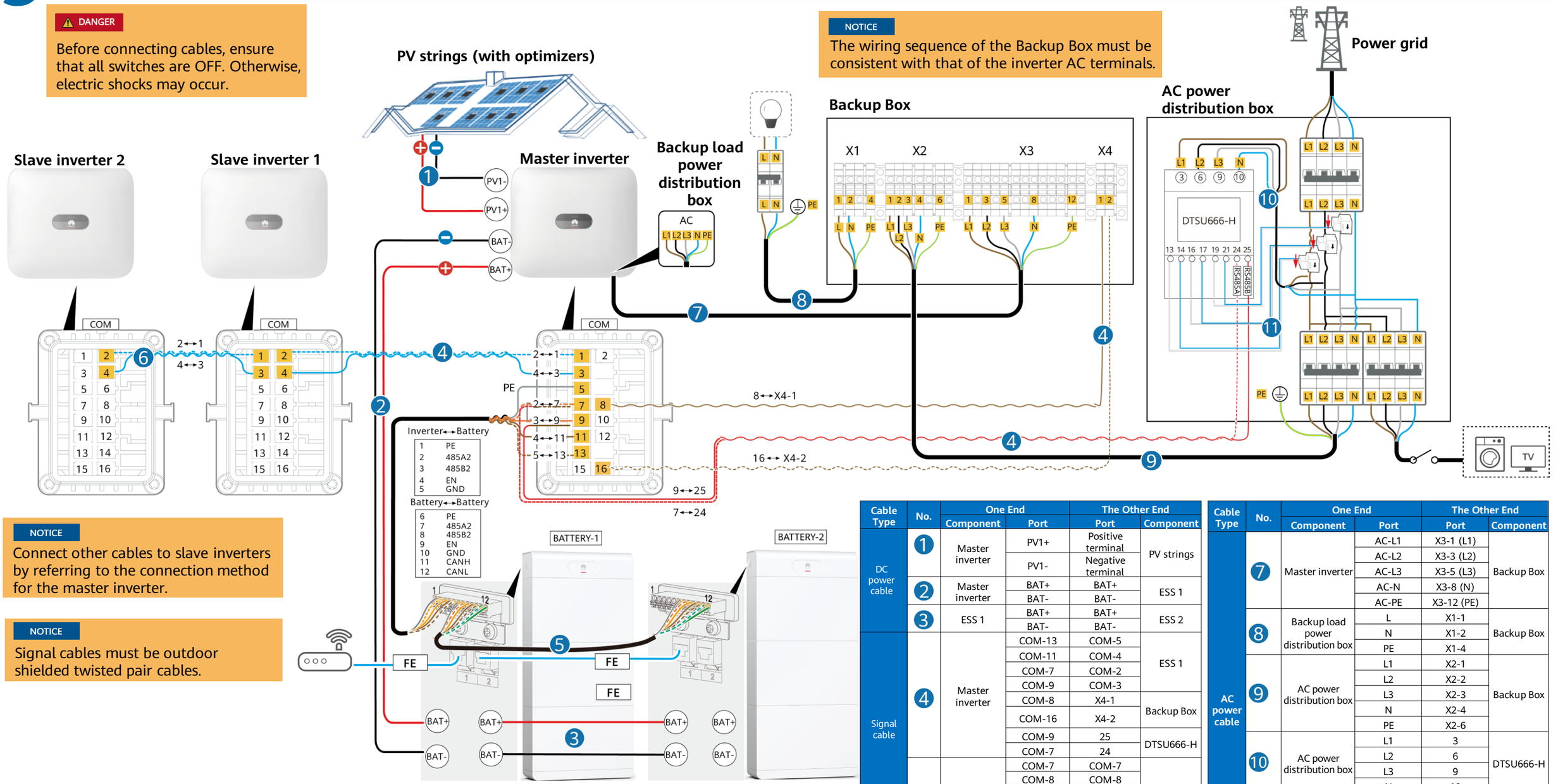
3 Cable Connections (Three-Phase Inverter M1 + ESS S1 + Backup Box B1 + Smart Dongle)

DANGER

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

NOTICE

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



NOTICE

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

NOTICE

Signal cables must be outdoor shielded twisted pair cables.

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	Master inverter	COM-13	COM-5	ESS 1
			COM-11	COM-4	
			COM-7	COM-2	
			COM-9	COM-3	
			COM-8	X4-1	Backup Box
			COM-16	X4-2	
			COM-9	25	DTSU666-H
			COM-7	24	
	5	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	
	6	Slave inverter 1	COM-1	COM-2	Slave inverter 2
			COM-3	COM-4	

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
AC power cable	7	Master inverter	AC-L1	X3-1 (L1)	Backup Box
			AC-L2	X3-3 (L2)	
			AC-L3	X3-5 (L3)	
			AC-N	X3-8 (N)	
			AC-PE	X3-12 (PE)	
	8	Backup load power distribution box	L	X1-1	Backup Box
			N	X1-2	
			PE	X1-4	
	9	AC power distribution box	L1	X2-1	Backup Box
			L2	X2-2	
			L3	X2-3	
			N	X2-4	
			PE	X2-6	
	10	AC power distribution box	L1	3	DTSU666-H
			L2	6	
			L3	9	
			N	10	
	11	AC power distribution box	L1	13	DTSU666-H CT
				14	
			L2	16	
				17	
			L3	19	
				21	

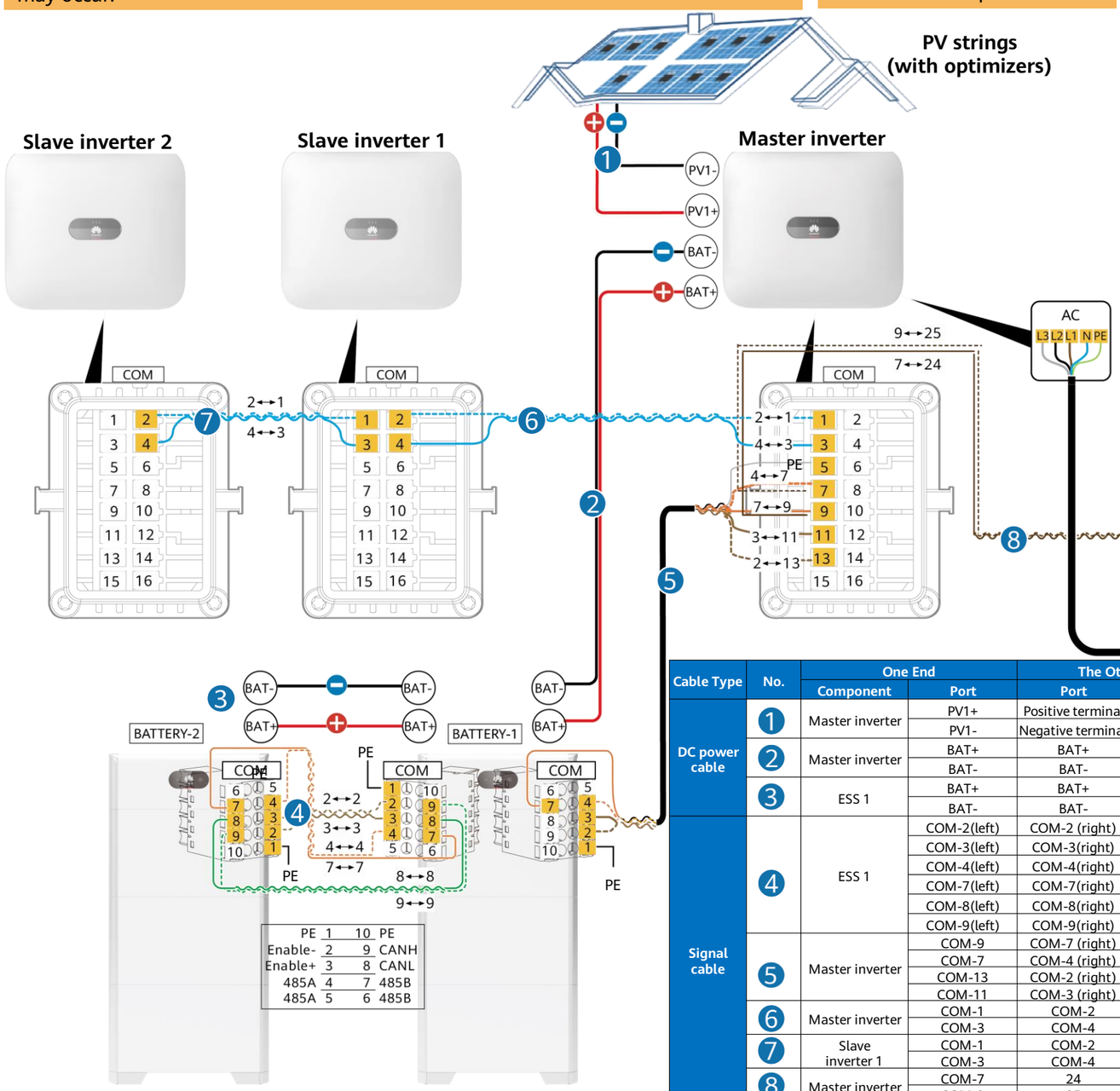
Residential Smart PV Solution Quick Guide
(Three-Phase PV+ESS Scenario + Smart Dongle Networking)

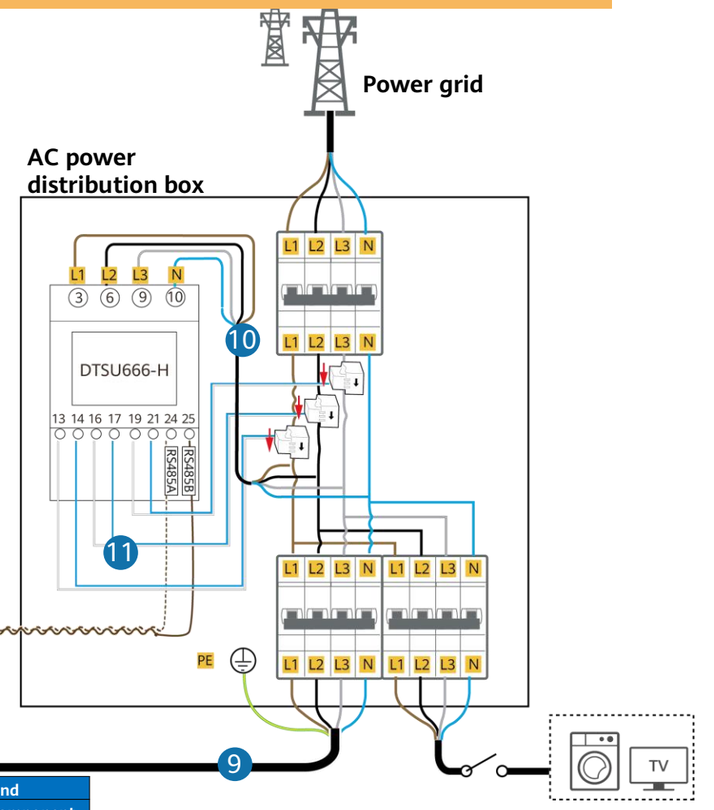
3 Cable Connections (Three-Phase Inverter MB0 + ESS S0 + Smart Dongle)

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-9	COM-7 (right)	ESS 1
			COM-7	COM-4 (right)	
			COM-13	COM-2 (right)	
			COM-11	COM-3 (right)	
	6	Master inverter	COM-1	COM-2	Slave inverter 1
			COM-3	COM-4	
	7	Slave inverter 1	COM-1	COM-2	Slave inverter 2
			COM-3	COM-4	
	8	Master inverter	COM-7	24	DTSU666-H
			COM-9	25	

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
AC power cable	9	Master inverter	L1	L1	AC power distribution box
			L2	L2	
			L3	L3	
			N	N	
			PE	PE	
	10	AC power distribution box	L1	3	DTSU666-H
			L2	6	
			L3	9	
			N	10	
	11	AC power distribution box	L1	13	DTSU666-H CT
				14	
			L2	16	
				17	
			L3	19	
				21	

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

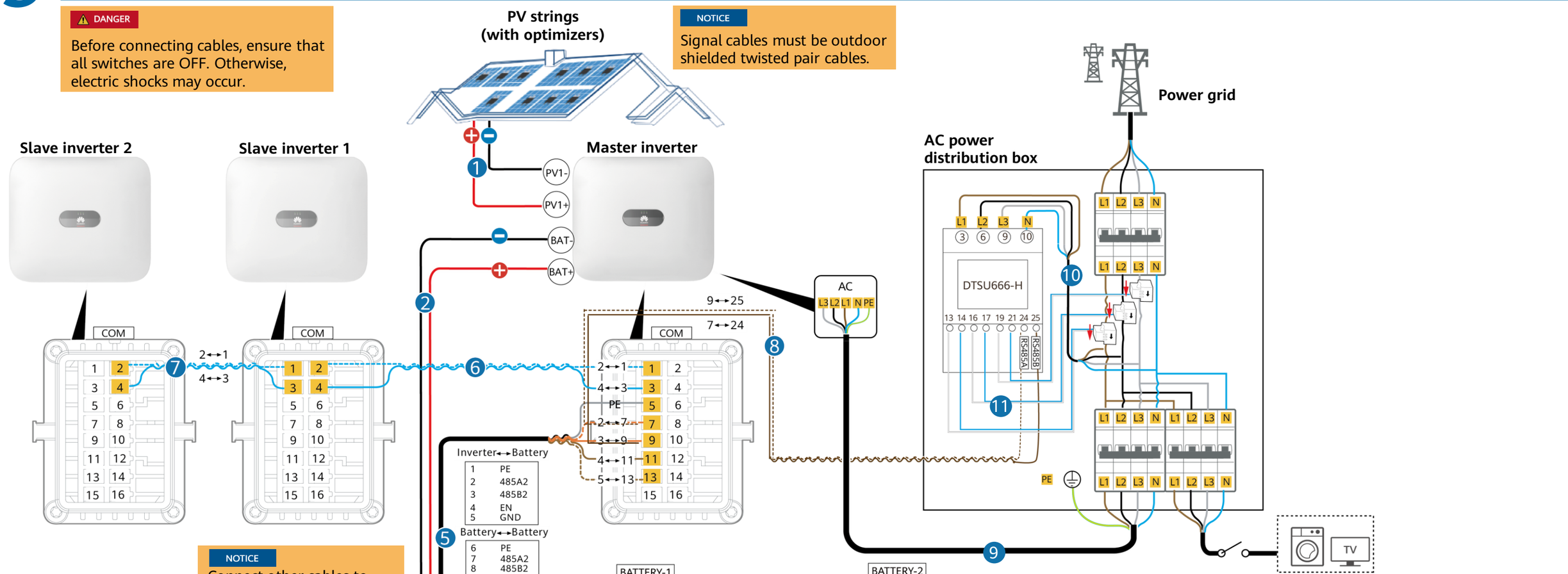
3 Cable Connections (Three-Phase Inverter MB0 + ESS S1 + Smart Dongle)

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

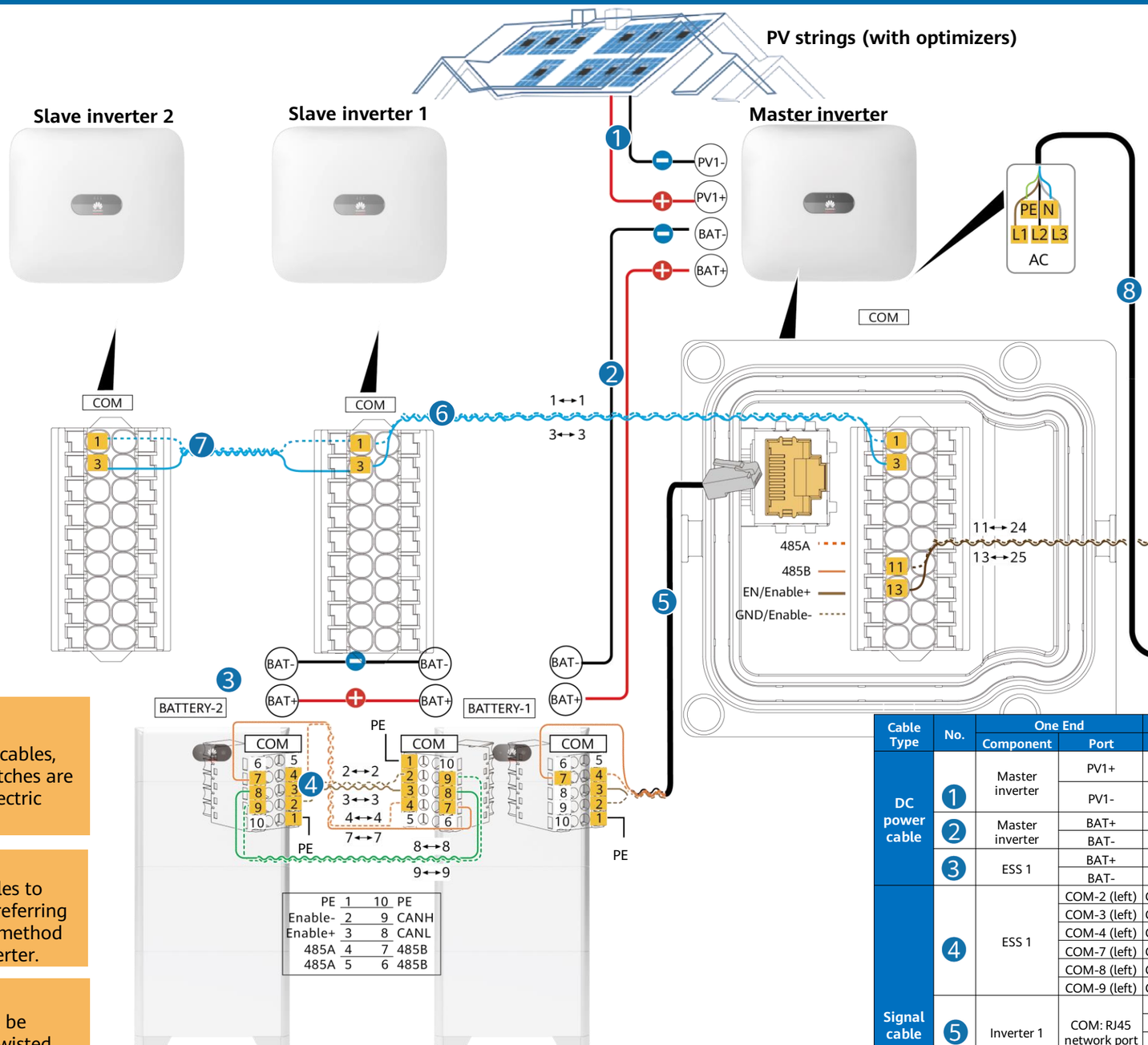
Connect other cables to slave inverters by referring to the connection method for the master inverter.

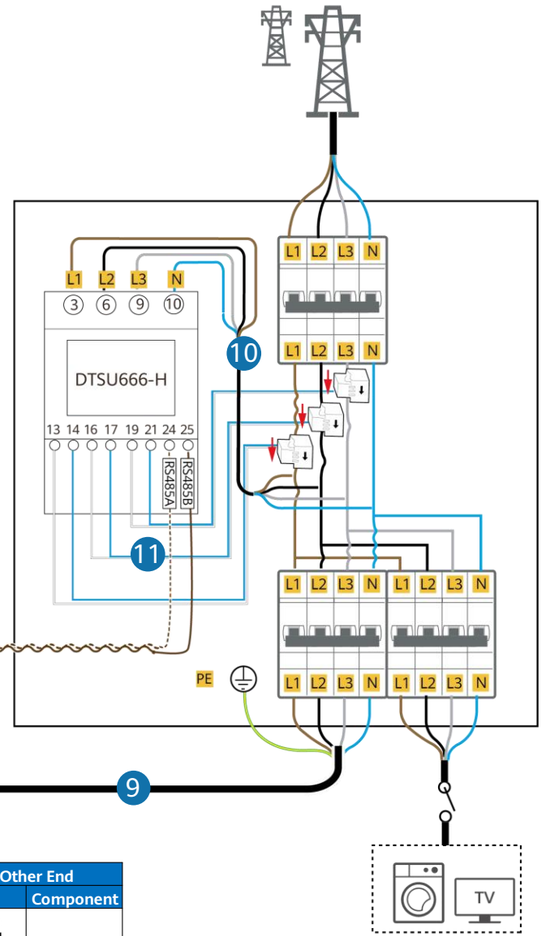
Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
DC power cable	1	Master inverter	PV1+	Positive terminal	PV strings
			PV1-	Negative terminal	
	2	Master inverter	BAT+	BAT+	ESS 1
			BAT-	BAT-	
	3	ESS 1	BAT+	BAT+	ESS 2
			BAT-	BAT-	
Signal cable	4	ESS 1	COM-7	COM-7	ESS 2
			COM-8	COM-8	
			COM-9	COM-9	
			COM-10	COM-10	
			COM-11	COM-11	
			COM-12	COM-12	
	5	Master inverter	COM-9	COM-3	ESS 1
			COM-7	COM-2	
			COM-13	COM-5	
			COM-11	COM-4	
	6	Master inverter	COM-1	COM-2	Slave inverter 1
			COM-3	COM-4	
	7	Slave inverter 1	COM-1	COM-2	Slave inverter 2
			COM-3	COM-4	
	8	Master inverter	COM-7	24	DTSU666-H
			COM-9	25	

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
AC power cable	9	Master inverter	L1	L1	AC power distribution box
			L2	L2	
			L3	L3	
			N	N	
			PE	PE	
	10	AC power distribution box	L1	3	DTSU666-H
			L2	6	
			L3	9	
			N	10	
	11	AC power distribution box	L1	13	DTSU666-H CT
				14	
			L2	16	
				17	
			L3	19	
				21	

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

3 Cable Connections (Three-Phase Inverter MAP0 + ESS S0 + Smart Dongle)





DANGER

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

NOTICE

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

NOTICE

Signal cables must be outdoor shielded twisted pair cables.

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	Inverter 1	COM: RJ45 network port	COM-2	ESS 1
				COM-3	
				COM-4	
				COM-7	
	6	Master inverter	COM-1	COM-1	Slave inverter 1
			COM-3	COM-3	
	7	Slave inverter 1	COM-1	COM-1	Slave inverter 2
			COM-3	COM-3	
	8	Master inverter	COM-7	24	DTSU666-H
			COM-9	25	

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
AC power cable	9	Master inverter	L1	L1	AC power distribution box
			L2	L2	
			L3	L3	
			N	N	
			PE	PE	
	10	AC power distribution box	L1	3	DTSU666-H
			L2	6	
			L3	9	
			N	10	
	11	AC power distribution box	L1	13	DTSU666-H CT
				14	
			L2	16	
				17	
			L3	19	
				21	

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

3 Cable Connections (Three-Phase Inverter MAP0 + ESS S1 + Smart Dongle)

DANGER

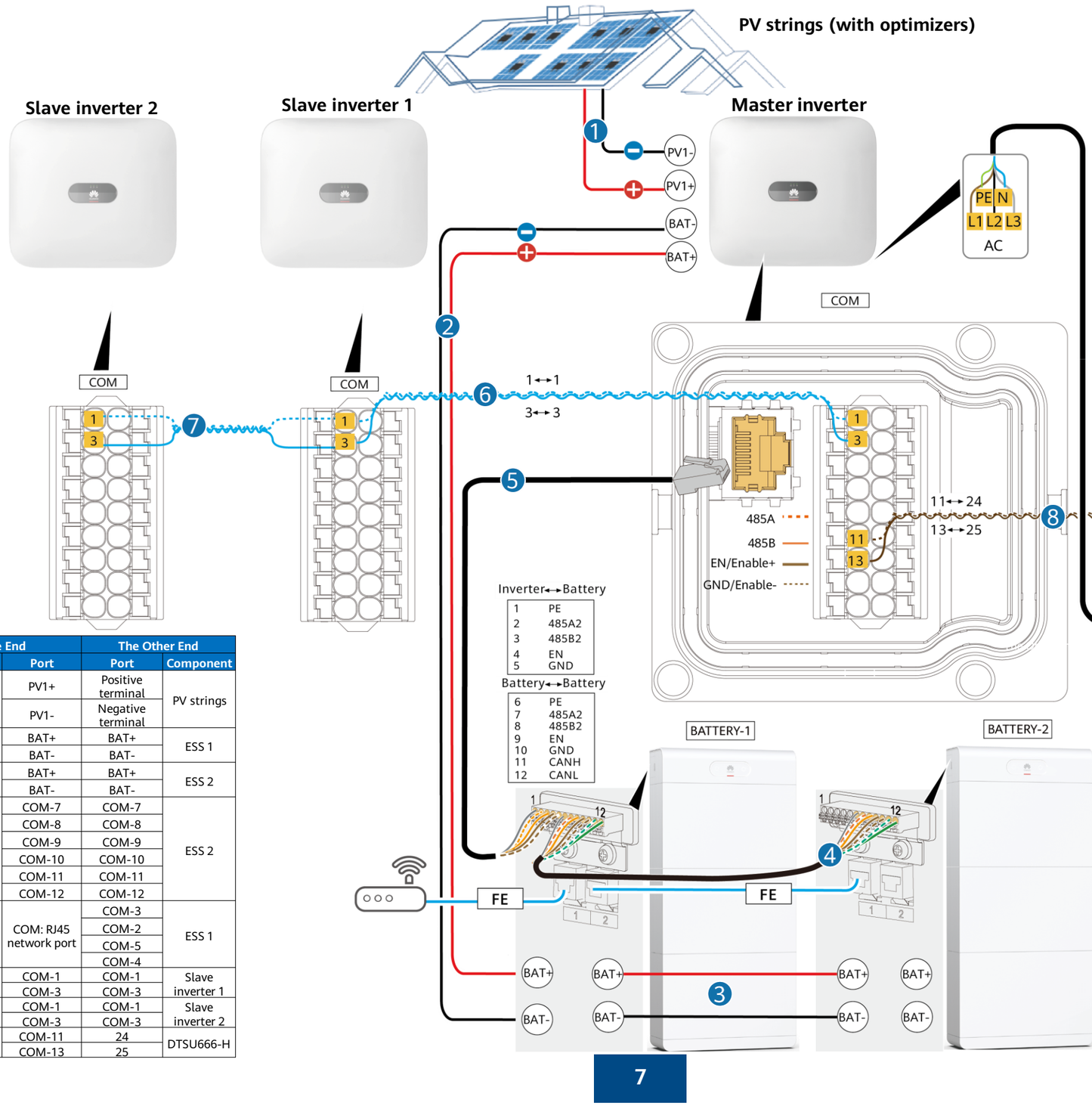
Before connecting cables, ensure that all switches are OFF. Otherwise, electric shocks may occur.

NOTICE

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

NOTICE

Signal cables must be outdoor shielded twisted pair cables.



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	Inverter 1	COM: RJ45 network port	COM-3	ESS 1
				COM-2	
				COM-5	
				COM-4	
	6	Master inverter	COM-1	COM-1	Slave inverter 1
			COM-3	COM-3	
	7	Slave inverter 1	COM-1	COM-1	Slave inverter 2
			COM-3	COM-3	
	8	Master inverter	COM-11	24	DTSU666-H
			COM-13	25	

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
AC power cable	9	Master inverter	L1	L1	AC power distribution box
			L2	L2	
			L3	L3	
			N	N	
			PE	PE	
	10	AC power distribution box	L1	3	DTSU666-H
			L2	6	
			L3	9	
			N	10	
	11	AC power distribution box	L1	13	DTSU666-H CT
				14	
			L2	16	
				17	
			L3	19	
				21	

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

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

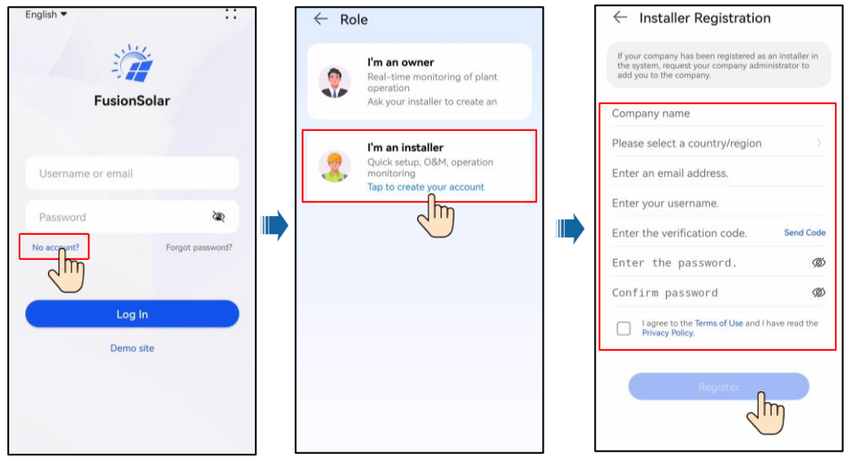
- Search for FusionSolar in the app store to download the app.
- Scan the QR code below to download the app.

FusionSolar

Installer Registration

Initial registration

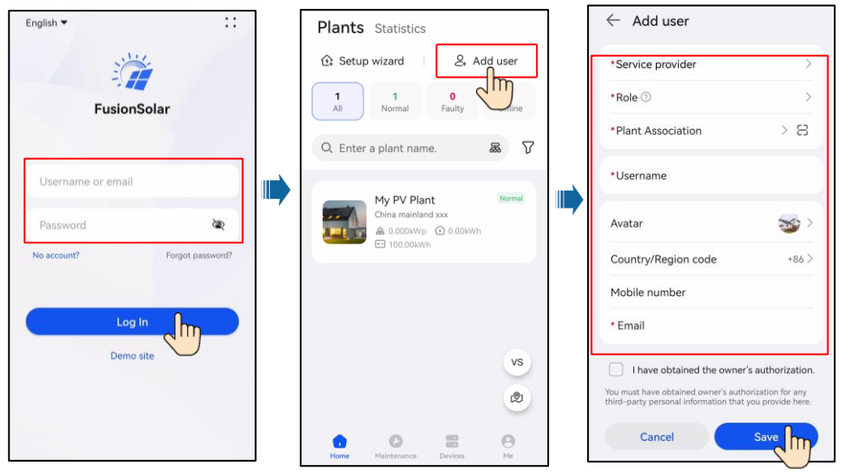
Create the first installer account, and generate a domain named after the company.



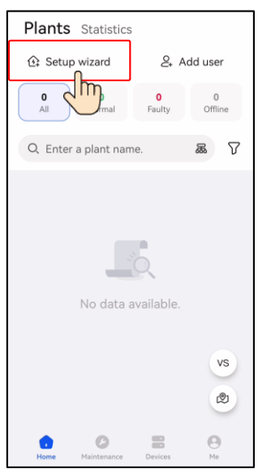
Or

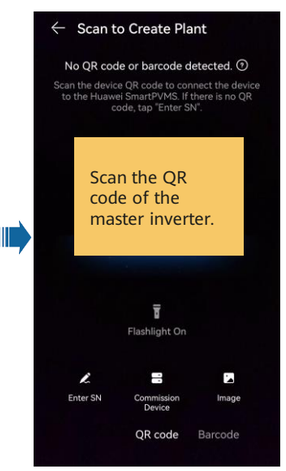
Non-initial registration

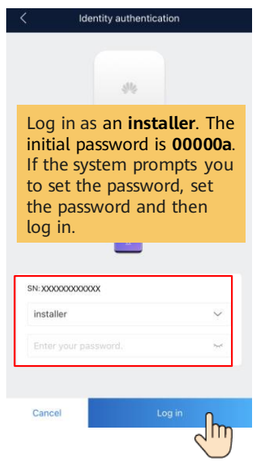
If the company requires multiple installer accounts, log in to the FusionSolar app and tap **Add user** to create another installer account.

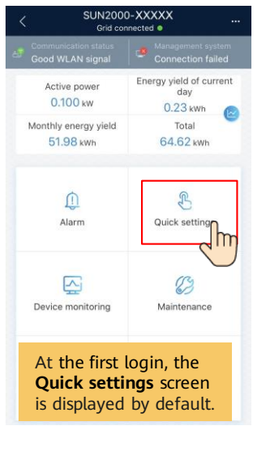


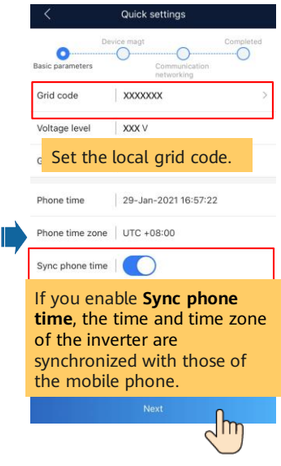
Setup Wizard (Connecting to the Inverter WLAN for Commissioning)



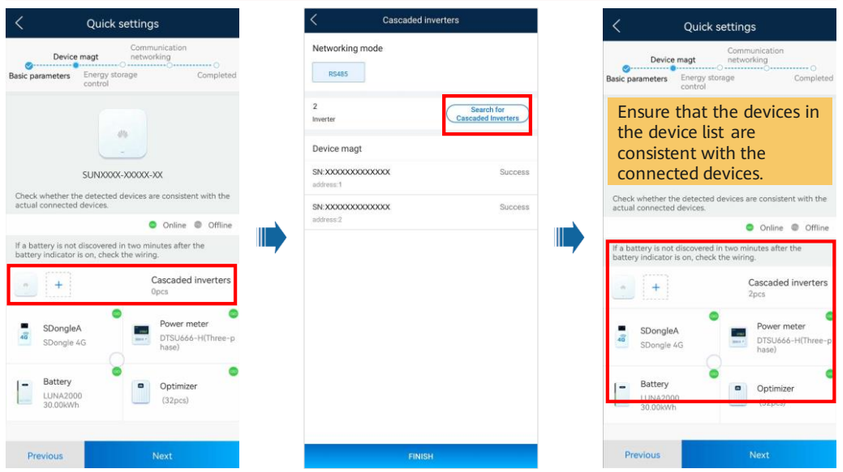






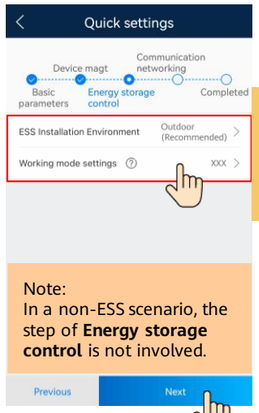


(Optional) Cascade inverters.



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

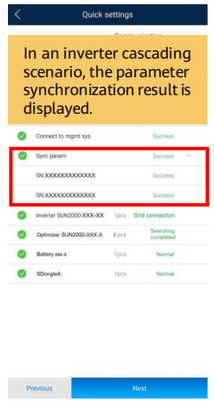
Set the ESS parameters.



Set the ESS installation environment and working mode.

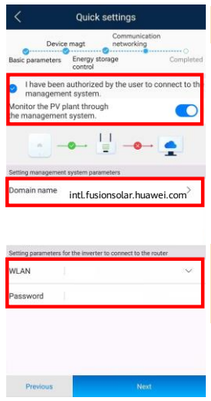
You can tap ⓘ to obtain the detailed working mode information.

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



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

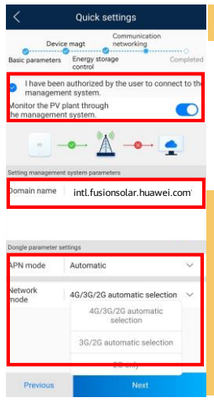
Set the communication networking.



WLAN communication

Select the desired router and enter the router password.

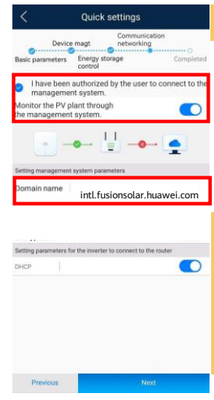
Or



4G communication

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.

Or

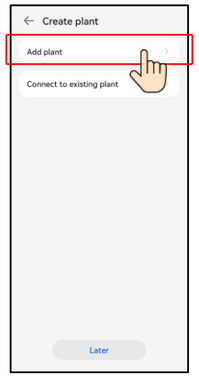


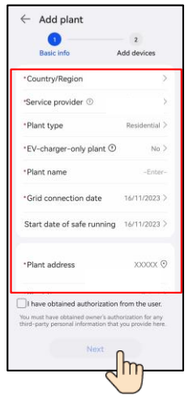
FE communication

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

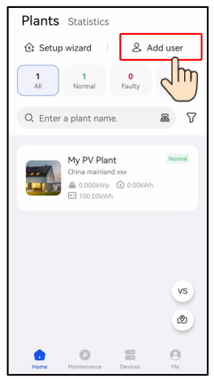
Ethernet

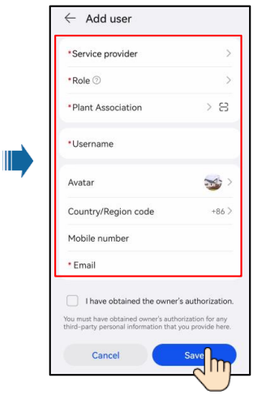
Add a plant.



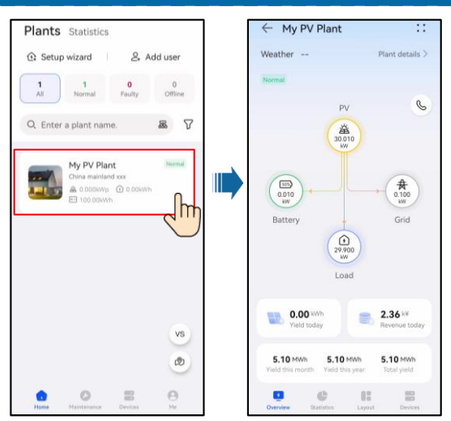


Create an owner account.





Checking the Plant Status



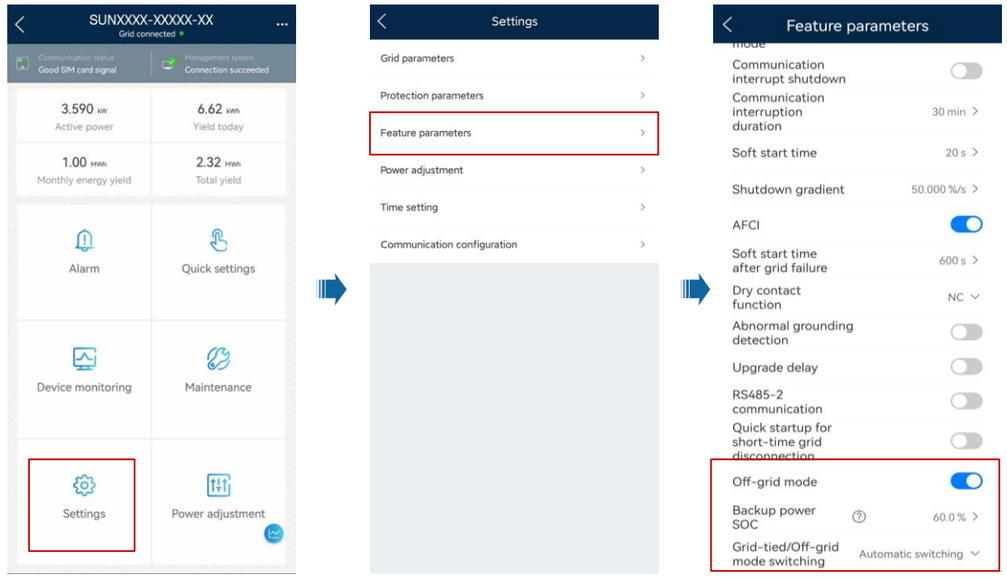
Residential Smart PV Solution Quick Guide
(Three-Phase PV+ESS Scenario + Smart Dongle Networking)

HUAWEI

5 Off-Grid/Grid-tied Control Parameters

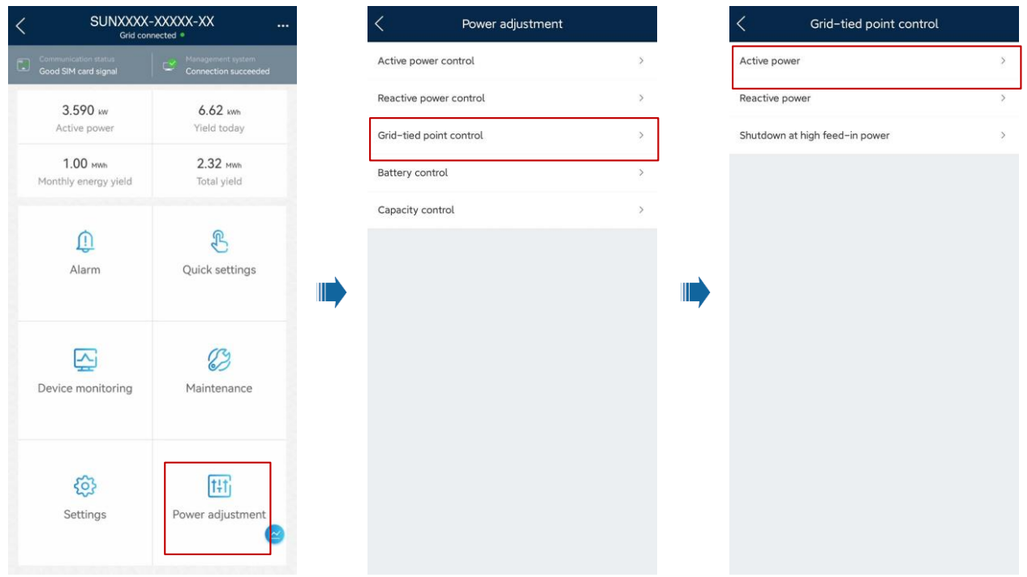
Enabling Off-Grid Mode

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**



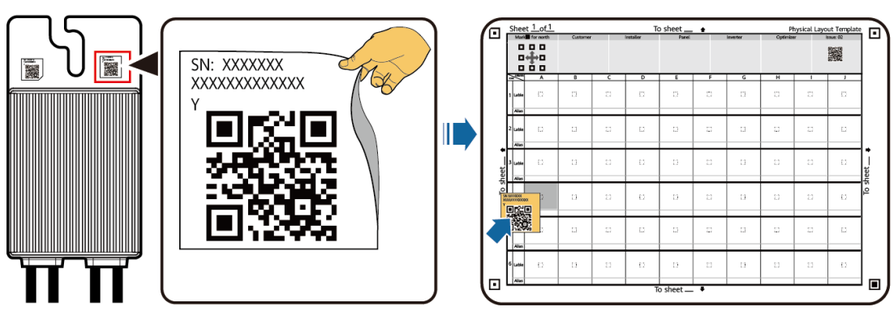
Residential Smart PV Solution Quick Guide
(Three-Phase PV+ESS Scenario + Smart Dongle Networking)

HUAWEI

6 Physical Layout of Smart PV Optimizers

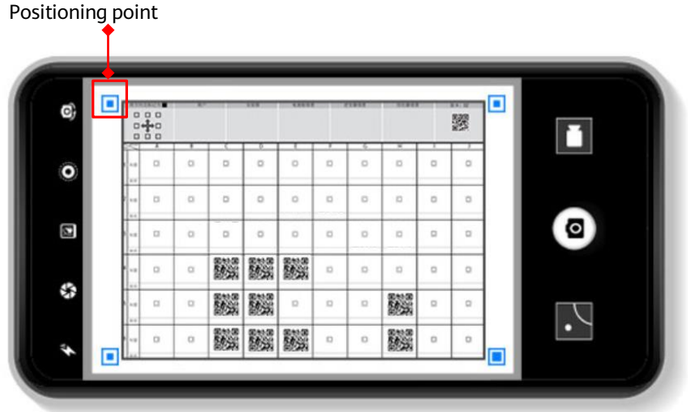
Attaching SN Labels

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.



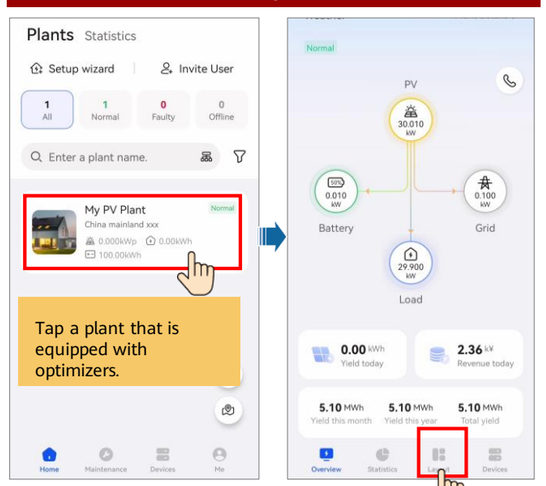
Taking a Photo of the Physical Layout Template

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



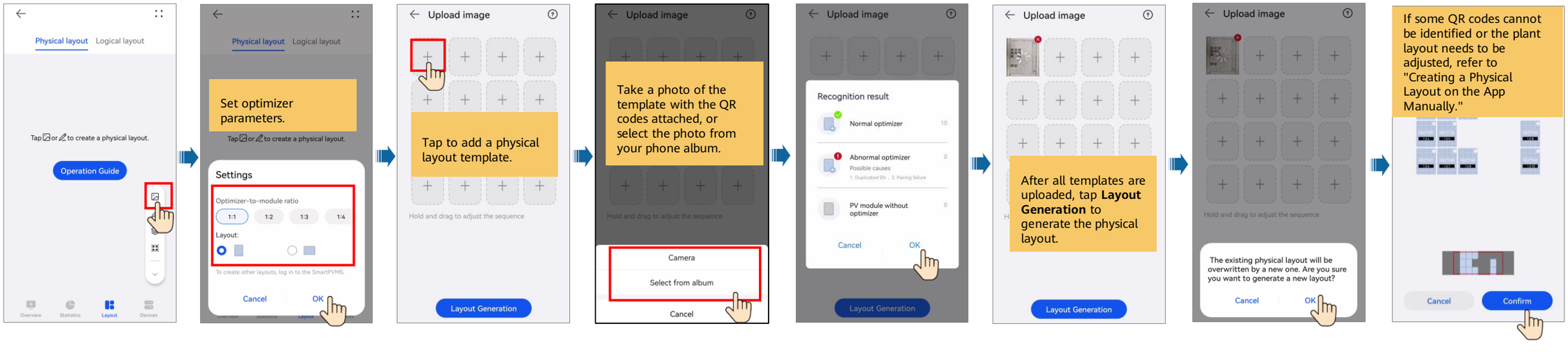
Generating a Physical Layout on the App

Enter the Layout screen.



Generating a Physical Layout on the App Automatically

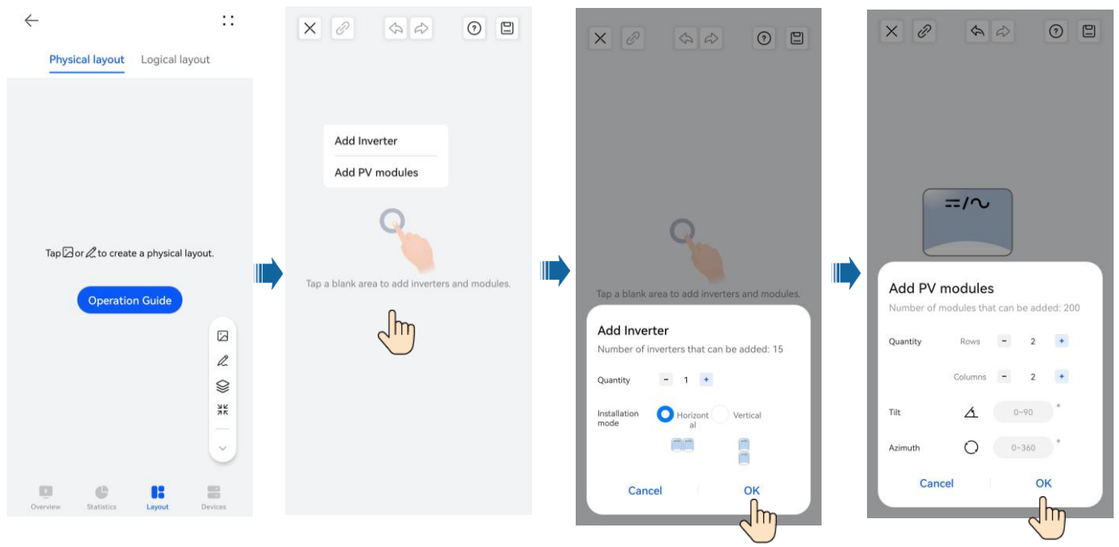
Upload the template and generate a layout.



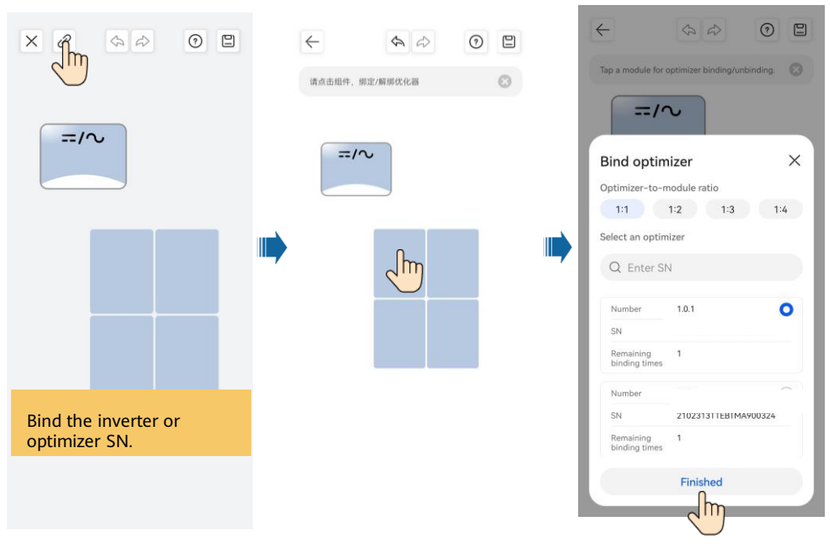
Residential Smart PV Solution Quick Guide
(Three-Phase PV+ESS Scenario + Smart Dongle Networking)

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.



Adjust the physical layout.