

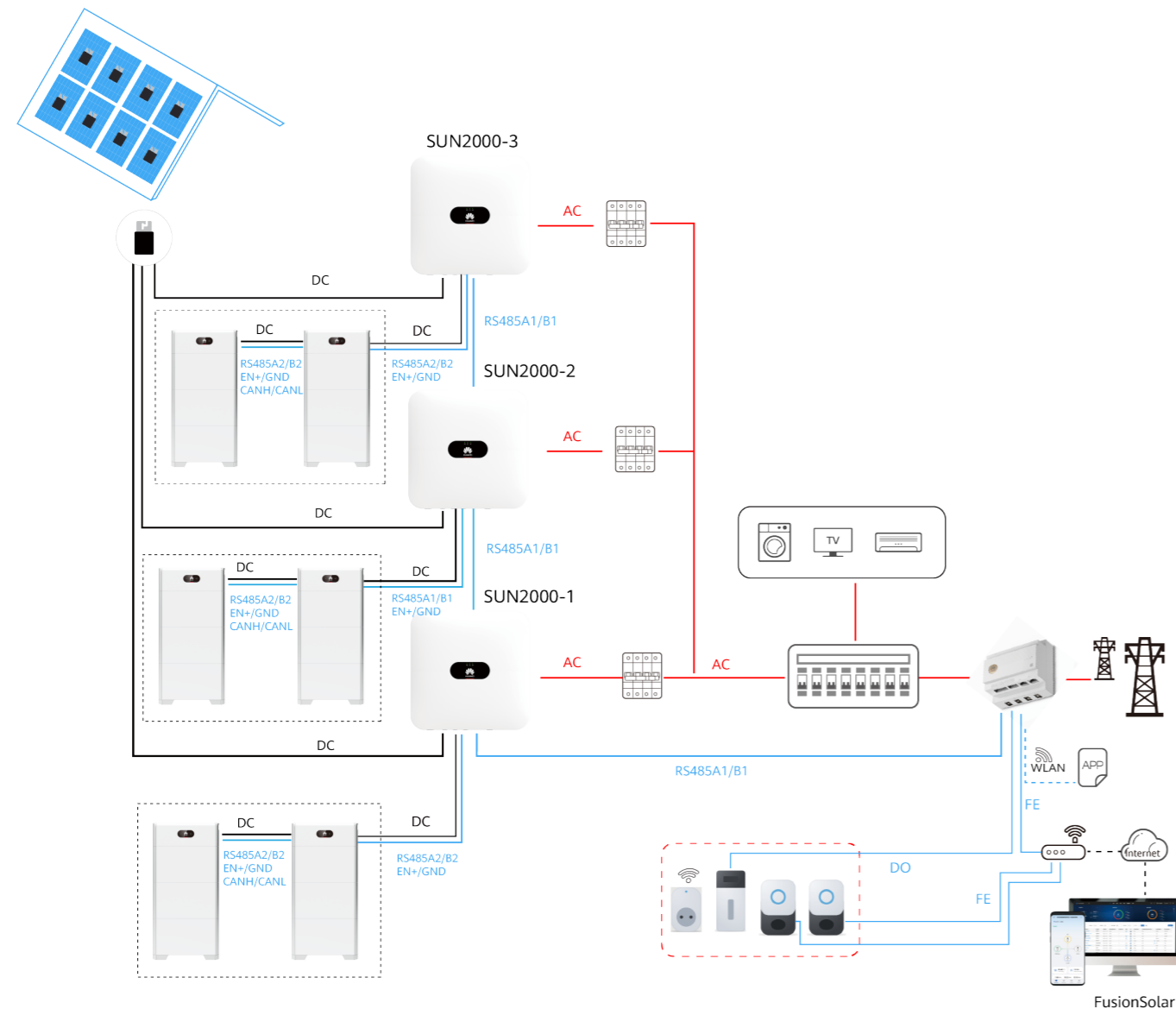
Residential Smart PV Solution Quick Guide

(Three-Phase PV+ESS Scenario + EMMA Networking)

Issue: 07
Date: 2025-07-01



1 Networking



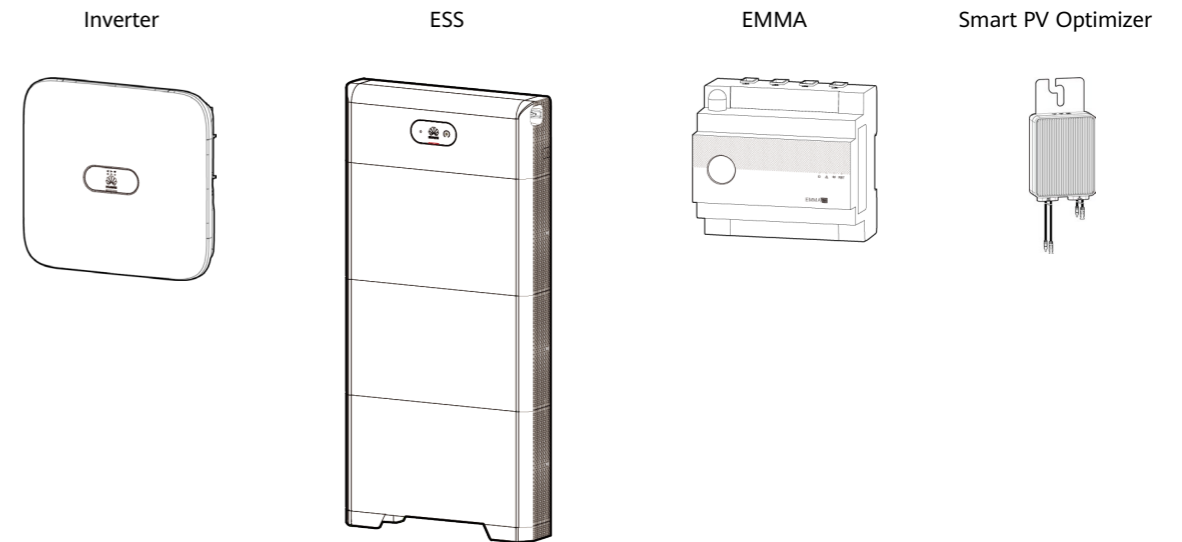
NOTE

- 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.
- For details about the solution components, installation, and cable connections, see the corresponding user manuals and quick guides.
- The cable colors involved in this document are for reference only. Select cables in accordance with local cable specifications.

NOTE

Both the EMMA and 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.

2 Product Overview



Component	Model	Description
Inverter	SUN2000-(12KTL-25KTL)-MB0 series SUN2000-(3KTL-12KTL)-M1 SUN2000-(8KTL-20KTL)-M2 SUN2000-(12KTL-25KTL)-M5 series SUN2000-(5K-12K)-MAP0 series SUN5000-(8KTL, 12KTL)-MAP0 series SUN5000-(17K, 25K)-MB0 series	<ul style="list-style-type: none"> 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.
Energy storage system (ESS)	LUNA2000-(5-30)-S0 LUNA2000-S1	<ul style="list-style-type: none"> 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-S1 cannot connect to the same inverter in a parallel system. If inverters are cascaded, the LUNA2000-(5-30)-S0 and LUNA2000-S1 cannot connect to different inverters.
EMMA	EMMA-A01 EMMA-A02	<ul style="list-style-type: none"> A01: Only PV and ESS features are supported. A02: Features of PV, ESSs, smart chargers, and smart loads are supported.
Smart PV Optimizer		<p>For details about the optimizer supported by the inverter, see:</p> <ul style="list-style-type: none"> SUN2000 Smart PV Optimizer User Manual MERC-600W-PA0 Smart PV Optimizer User Manual MERC-(1300W, 1100W)-P Smart PV Optimizer User Manual

NOTE

In the EMMA networking scenario, a maximum of three inverters and 12 ESSs can be connected.

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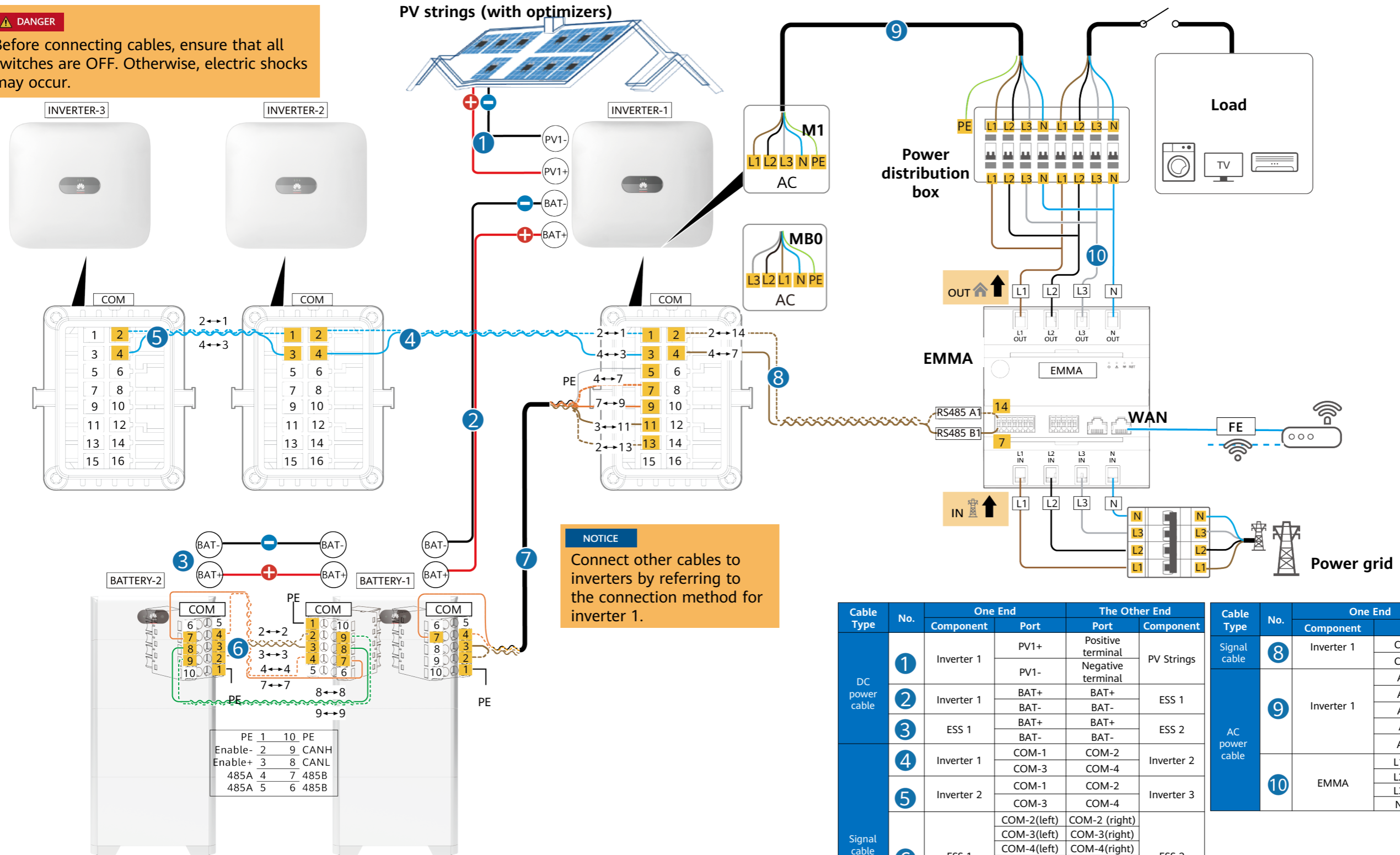


3

Cable Connections (Three-Phase Inverter M1/MB0 + 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 inverter 1.

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	Inverter 1	PV1+	Positive terminal	PV Strings
			PV1-	Negative terminal	
	2	Inverter 1	BAT+ BAT-	BAT+ BAT-	ESS 1
Signal cable	4	Inverter 1	COM-1	COM-2	Inverter 2
			COM-3	COM-4	
	5	Inverter 2	COM-1	COM-2	Inverter 3
Signal cable	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)	
Signal cable	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)	
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	
	10	EMMA	L1 OUT	L1	Power distribution box
L2 OUT	L2				
L3 OUT	L3				
AC power cable	10	EMMA	N OUT	N	Power distribution box

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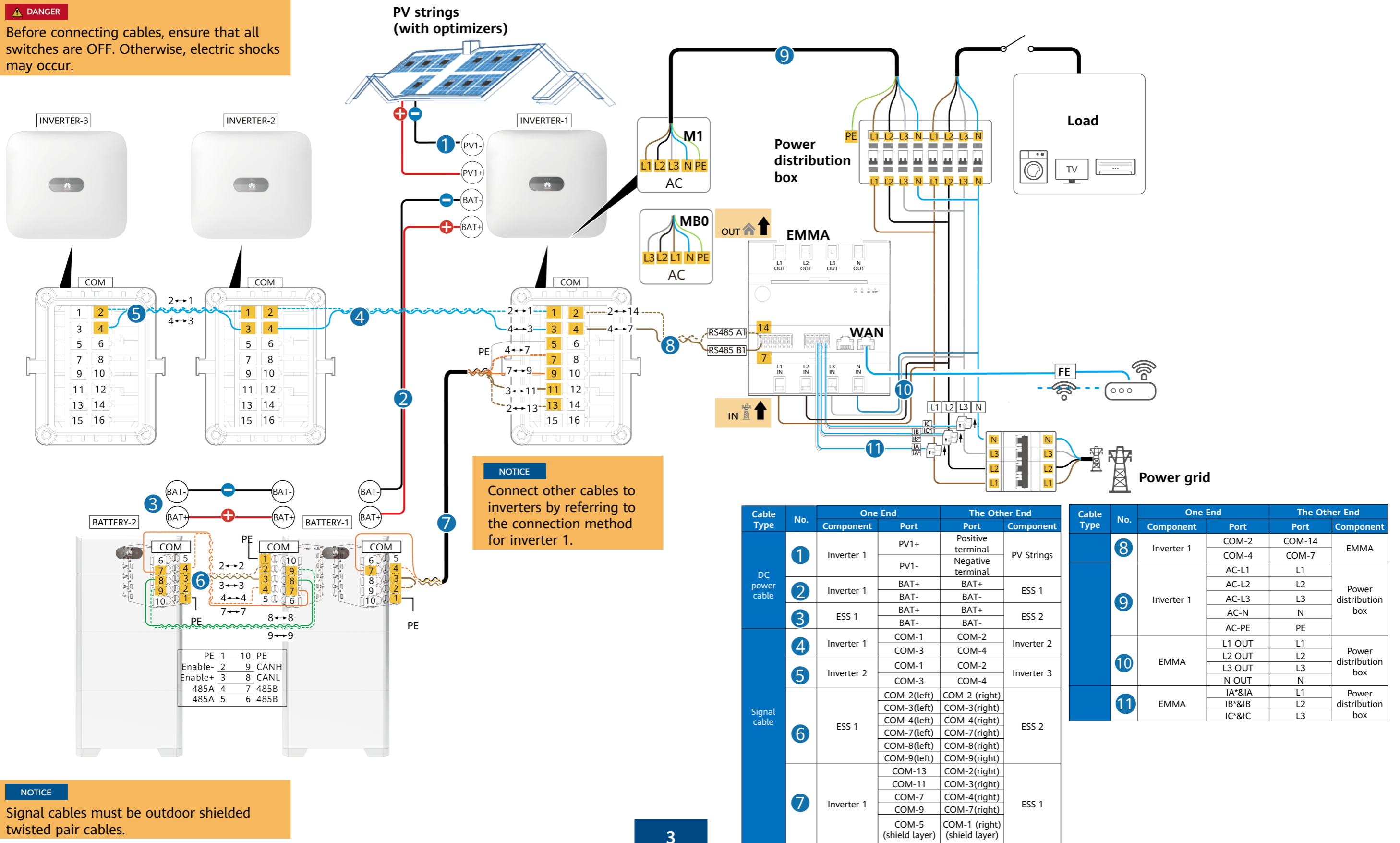


3

Cable Connections (Three-Phase Inverter M1/MB0 + ESS S0 + EMMA with an External CT)

DANGER

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



Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
DC power cable	1	Inverter 1	PV1+	Positive terminal	PV Strings
			PV1-	Negative terminal	
	2	Inverter 1	BAT+	BAT+	ESS 1
	3	ESS 1	BAT+	BAT+	ESS 2
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)	
	7	Inverter 1	COM-9(left)	COM-9(right)	ESS 1
			COM-13	COM-2(right)	
COM-11			COM-3(right)		
COM-7			COM-4(right)		
COM-9			COM-7(right)		
		COM-5 (shield layer)	COM-1 (right) (shield layer)		

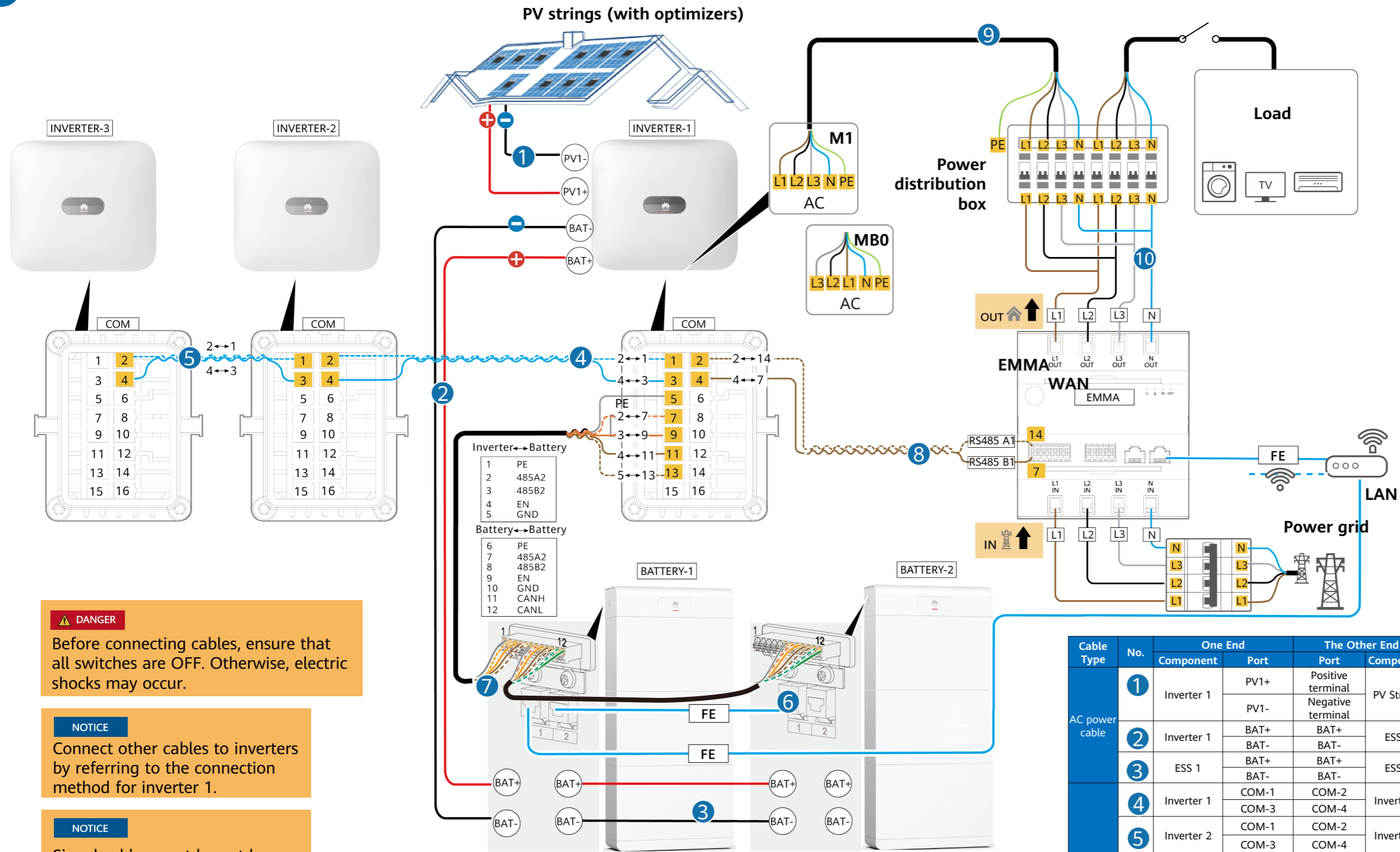
Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
8	Inverter 1	COM-2	COM-14	COM-7	EMMA
		COM-4	COM-7		
9	Inverter 1	AC-L1	L1		Power distribution box
		AC-L2	L2		
		AC-L3	L3		
		AC-N	N		
10	EMMA	L1 OUT	L1		Power distribution box
		L2 OUT	L2		
		L3 OUT	L3		
		N OUT	N		
11	EMMA	IA*&IA	L1		Power distribution box
		IB*&IB	L2		
		IC*&IC	L3		

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3 Cable Connections (Three-Phase Inverter M1/MB0 + ESS S1 + 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 inverter 1.

NOTICE
Signal cables must be outdoor shielded twisted pair cables.

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
AC power cable	1	Inverter 1	PV1+	Positive terminal	PV Strings
			PV1-	Negative terminal	
	2	Inverter 1	BAT+ BAT-	BAT+ BAT-	ESS 1
	3	ESS 1	BAT+ BAT-	BAT+ BAT-	ESS 2
Signal cable	4	Inverter 1	COM-1 COM-3	COM-2 COM-4	Inverter 2
	5	Inverter 2	COM-1 COM-3	COM-2 COM-4	
	6	ESS 1	COM-7 COM-8 COM-9	COM-7 COM-8 COM-9	ESS 2
			COM-10 COM-11 COM-12	COM-10 COM-11 COM-12	
	7		Inverter 1	COM-11 COM-7 COM-9 COM-5 (shield layer)	

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

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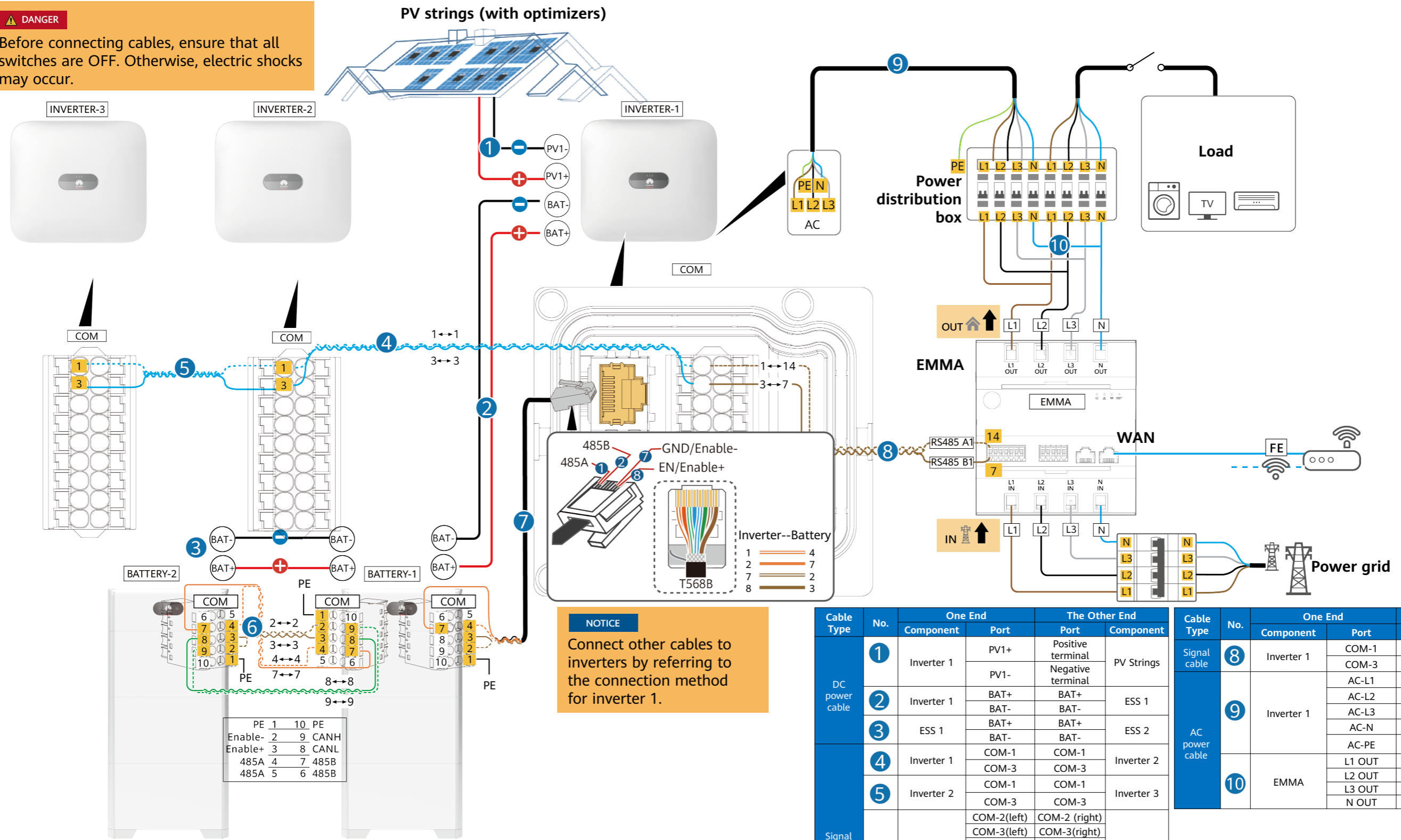


3

Cable Connections (Three-Phase Inverter MAP0 + 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 inverter 1.

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	Inverter 1	PV1+	Positive terminal	PV Strings				
			PV1-	Negative terminal					
	2	Inverter 1	BAT+ BAT-	BAT+ BAT-	ESS 1				
Signal cable	4	Inverter 1	COM-1	COM-1	Inverter 2				
			COM-3	COM-3					
Signal cable	5	Inverter 2	COM-1	COM-1	Inverter 3				
			COM-3	COM-3					
Signal cable	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)					
Signal cable	7	Inverter 1	COM: RJ45 network port	COM-2(right) COM-3(right) COM-4(right) COM-7(right)	ESS 1				
			Signal cable	8		Inverter 1	COM-1	COM-14	EMMA
							COM-3	COM-7	
AC power cable	9	Inverter 1	AC-L1	L1	Power distribution box				
			AC-L2	L2					
			AC-L3	L3					
	10	EMMA	L1 OUT	L1	Power distribution box				
L2 OUT	L2								
L3 OUT	L3								

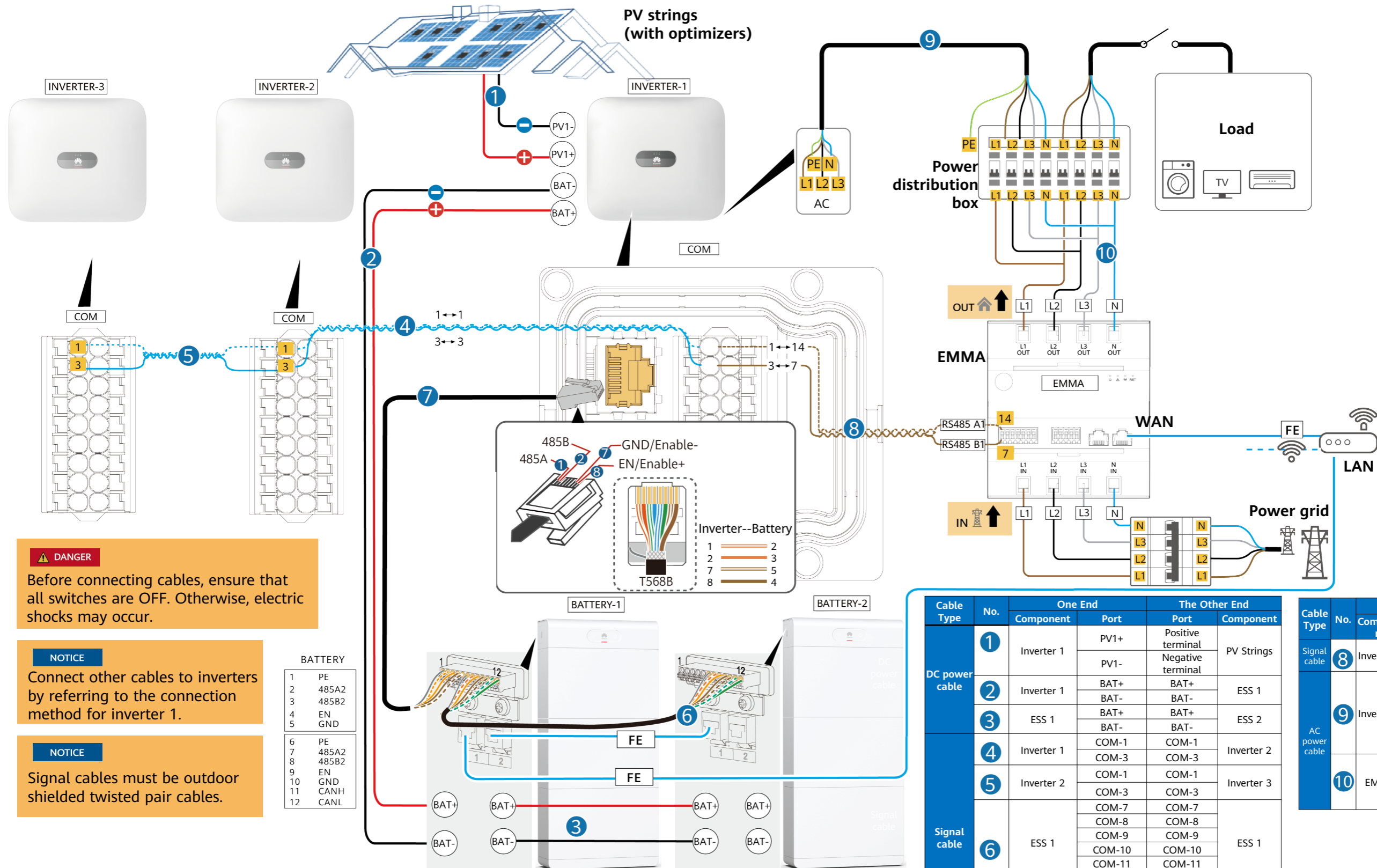
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(Three-Phase PV+ESS Scenario + EMMA Networking)



3

Cable Connections (Three-Phase Inverter MAP0 + ESS S1 + 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 inverter 1.

NOTICE
Signal cables must be outdoor shielded twisted pair cables.

BATTERY	
1	PE
2	485A2
3	485B2
4	EN
5	GND
6	PE
7	485A2
8	485B2
9	EN
10	GND
11	CANH
12	CANL

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
DC power cable	1	Inverter 1	PV1+	Positive terminal	PV Strings
			PV1-	Negative terminal	
	2	Inverter 1	BAT+	BAT+	ESS 1
DC power cable	3	ESS 1	BAT-	BAT-	ESS 2
			BAT+	BAT+	
Signal cable	4	Inverter 1	COM-1	COM-1	Inverter 2
			COM-3	COM-3	
	5	Inverter 2	COM-1	COM-1	Inverter 3
			COM-3	COM-3	
	6	ESS 1	COM-7	COM-7	ESS 1
		COM-8	COM-8		
		COM-9	COM-9		
		COM-10	COM-10		
Signal cable	7	Inverter 1	COM: RJ45 network port	COM-2	ESS 1
				COM-5	
				COM-4	
				COM-3	

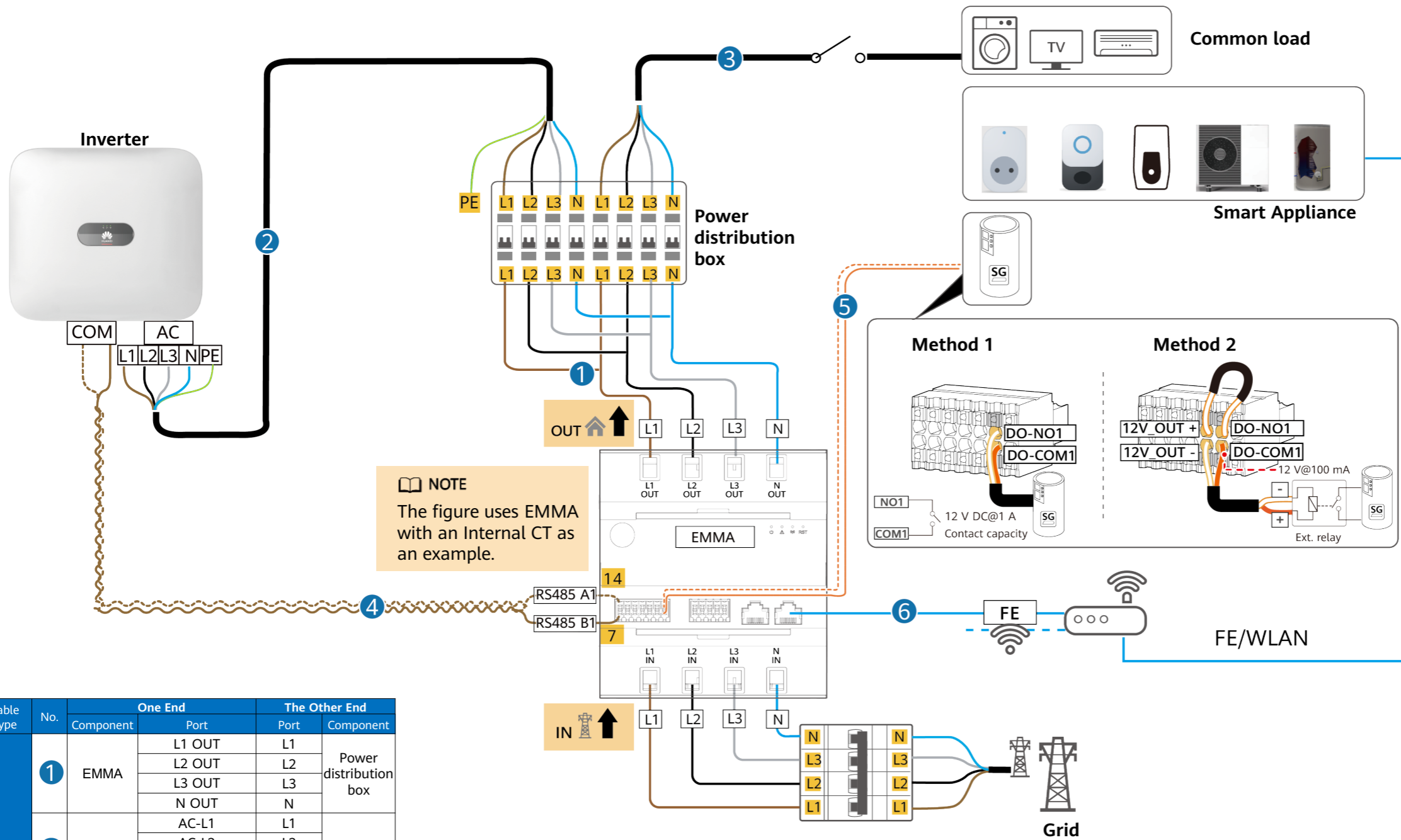
Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
Signal cable	8	Inverter 1	COM-1	COM-14	EMMA
AC power cable	9	Inverter 1	AC-L1	L1	Power distribution box
			AC-L2	L2	
			AC-L3	L3	
			AC-N	N	
AC power cable	10	EMMA	L1 OUT	L1	Power distribution box
			L2 OUT	L2	
			L3 OUT	L3	
			N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

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3 Cable Connections (Smart Appliance Networking)



NOTE

For third-party devices that are not adapted to the system, system commissioning and adaptation are required. If the adaptation is not completed, the devices may fail to be installed and used onsite. For details about the third-party devices which have passed the interconnection test, see EMMA and Smart Appliance Compatibility Test List. **Note: The manufacturer and seller are responsible for the quality, safety, and related services of the third-party devices.**

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
AC power cable	1	EMMA	L1 OUT	L1	Power distribution box
			L2 OUT	L2	
			L3 OUT	L3	
AC power cable	2	Inverter	AC-L1	L1	Power distribution box
			AC-L2	L2	
			AC-L3	L3	
			AC-N	N	
			AC-PE	PE	
AC power cable	3	Common load/Smart Appliance/Charger	L1	Power distribution box	
			L2		
			L3		
Signal cable	4	Inverter	COM-7	EMMA	
			COM-14		
Signal cable	5	EMMA	NO1/12V_OUT-*	SG Ready heat pump	
			COM1		
Signal cable	6	EMMA	WAN	Router	
Signal cable	7	Router		Smart Appliance/Charger	

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(Three-Phase PV+ESS Scenario + EMMA Networking)



3 Cable Connections (Three-Phase Inverter + Third-party Inverter + EMMA)

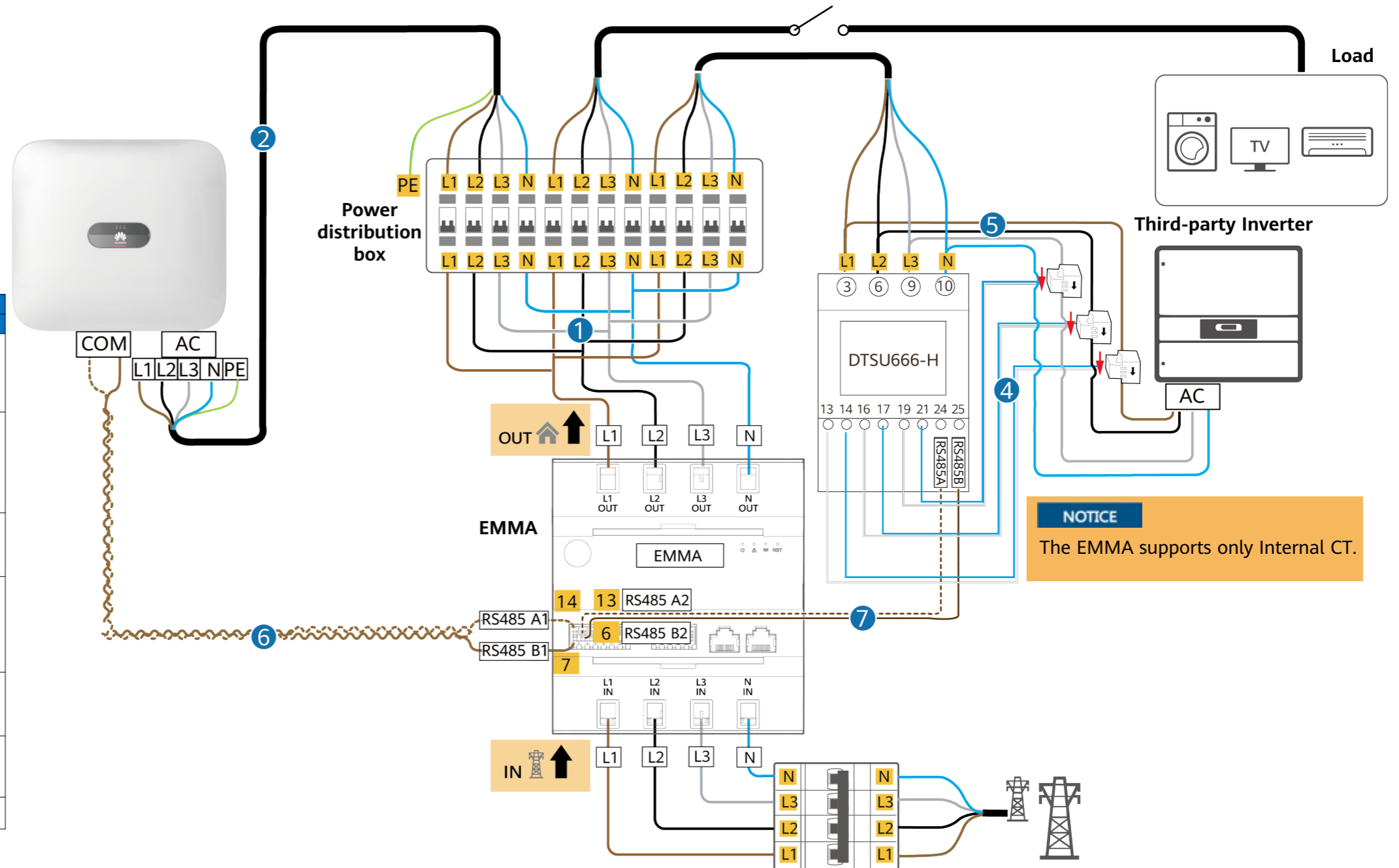
⚠ DANGER

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

NOTICE

- Signal cables must be outdoor shielded twisted pair cables.
- This section describes the cable connections for third-party inverters. For the complete networking wiring diagram, refer to the preceding cable connection diagrams.

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
AC power cable	①	EMMA	L1 OUT	L1	Power distribution box
			L2 OUT	L2	
			L3 OUT	L3	
			N OUT	N	
	②	Huawei inverter	AC-L1	L1	Power distribution box
AC-L2			L2		
AC-L3			L3		
AC-N			N		
AC-PE			PE		
③	Power meter	3	L1	Power distribution box	
		6	L2		
		9	L3		
		11	N		
		13	L1		Third-party Inverter
④	Power meter CT	14	L1		
		16	L2		
		17	L3		
		19	L3		
		21	L3		
⑤	Third-party Inverter	AC-L1	L1	Power distribution box	
		AC-L2	L2		
		AC-L3	L3		
		AC-N	N		
		⑥	Huawei inverter		COM-4(M1/MB0)
COM-3(MAP0)	COM-14				
COM-2(M1/MB0)	COM-13				
⑦	Power meter	24	COM-13	EMMA	
		25	COM-6		



NOTICE
The EMMA supports only Internal CT.

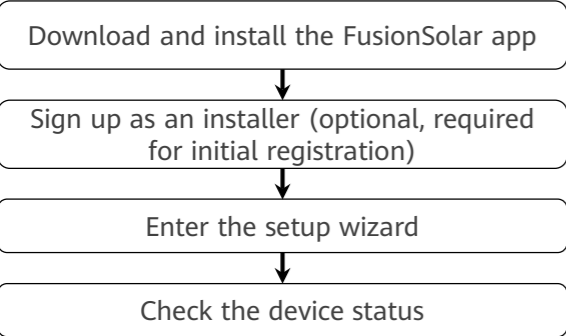
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4 System Commissioning

App-based Deployment Procedure



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

Commissioning Instructions

For details about installer registration, setup wizard, and common parameter settings, see the [FusionSolar App Quick Guide \(EMMA\)](#).



Scan for instructions