

# Residential Smart PV Solution Quick Guide

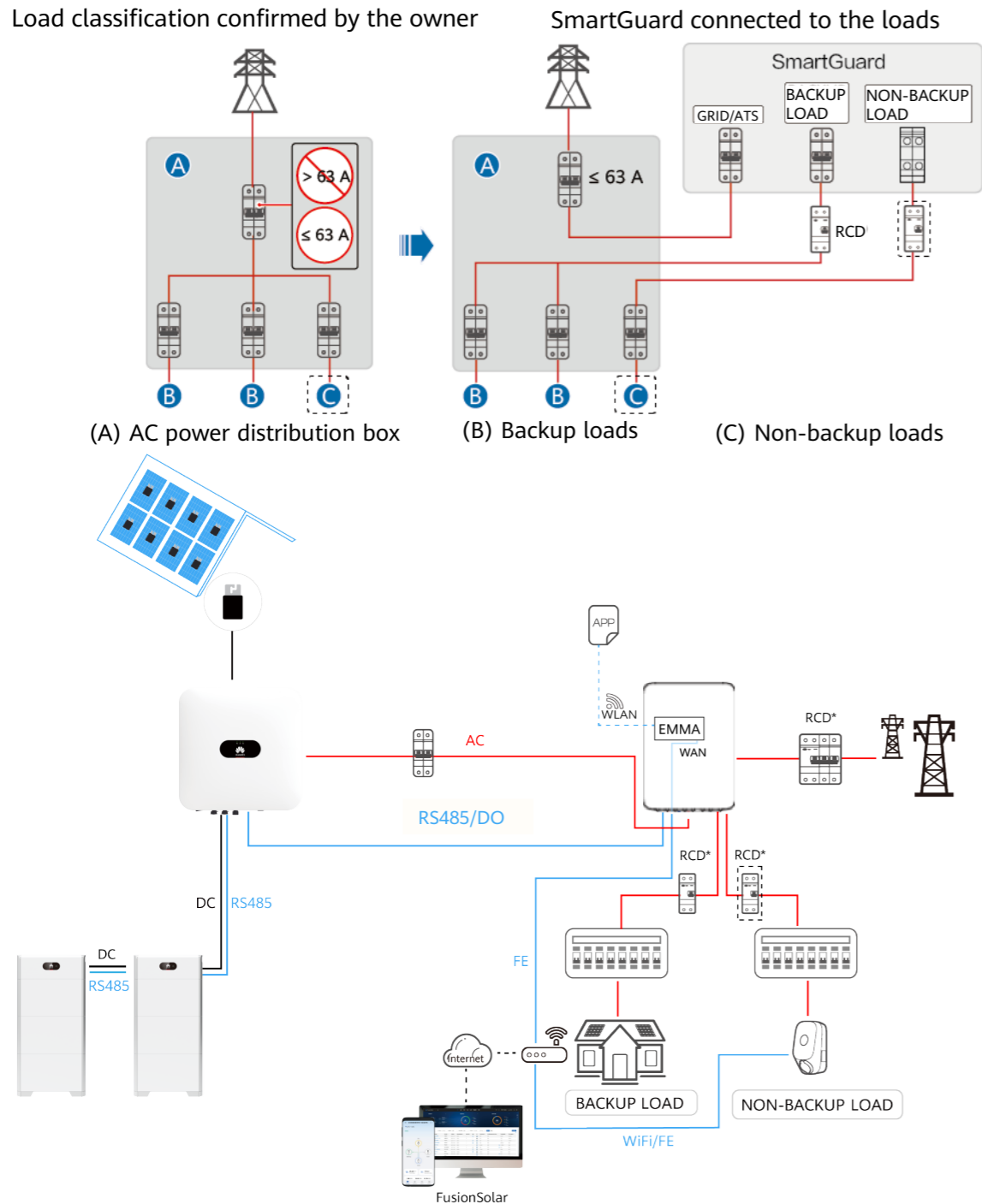
## (Single-Phase PV+ESS Scenario + SmartGuard Networking)

**Issue: 04**  
**Date: 2025-07-01**



## 1 Networking

Load classification confirmed by the owner



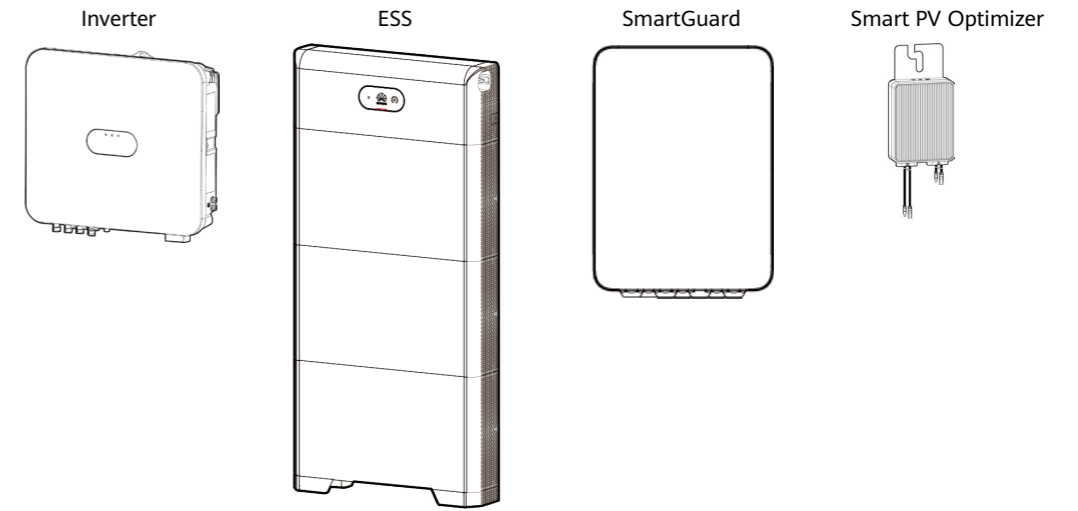
 **DANGER**

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 SUN2000-(3K-6K)-LB0 SUN5000-(3K, 6K)-LB0	<ul style="list-style-type: none"> <li>Only one inverter is supported.</li> <li>Optimizers must be configured for all PV modules connected to a SUN5000 inverter. Otherwise, the inverter cannot be started.</li> </ul>
Energy storage system (ESS)	LUNA2000-(5-30)-S0 LUNA2000-S1	<ul style="list-style-type: none"> <li>Two ESSs can be cascaded.</li> <li>The LUNA2000-(5-30)-S0 and LUNA2000-S1 cannot connect to the same inverter in a parallel system.</li> </ul>
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	For details about the optimizer supported by the inverter, see: <ul style="list-style-type: none"> <li><a href="#">SUN2000 Smart PV Optimizer User Manual</a></li> <li><a href="#">MERC-600W-PA0 Smart PV Optimizer User Manual</a></li> </ul>	

 **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)

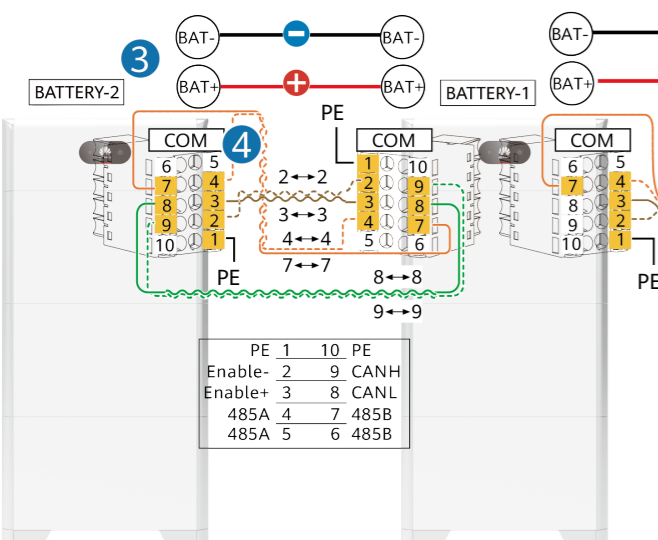
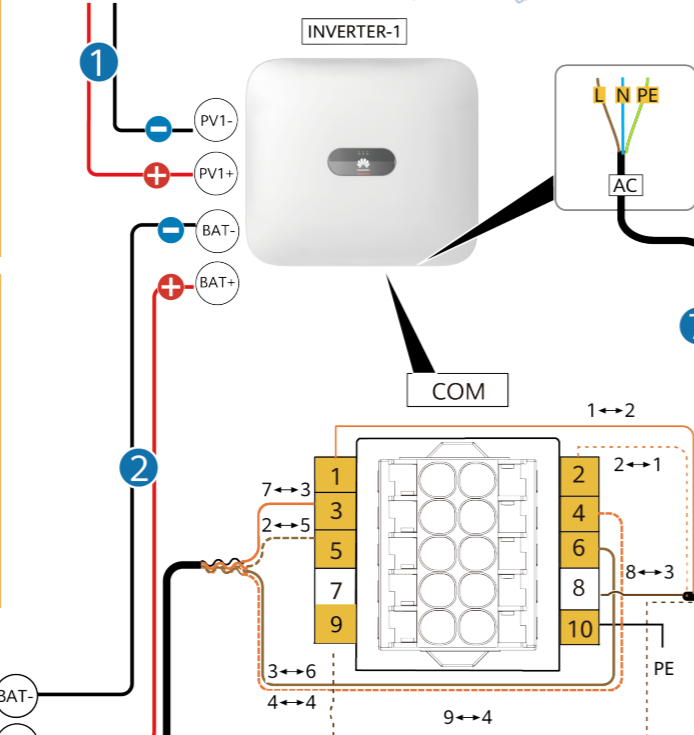
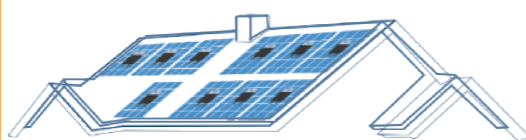
### ⚠ DANGER

- 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.

### PV strings (including optimizers)



Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
DC power cable	1	Inverter	PV1+	Positive terminal	PV strings
	2	Inverter	PV1-	Negative terminal	PV strings
	3	ESS 1	BAT+	BAT+	ESS 1
Signal cable	4	ESS 1	BAT-	BAT-	ESS 2
	5	ESS 1	BAT+	BAT+	ESS 2
	6	ESS 1	BAT-	BAT-	ESS 2
	7	ESS 1	COM-2 (left)	COM-2 (right)	ESS 2
	8	ESS 1	COM-3 (left)	COM-3 (right)	ESS 2
	9	ESS 1	COM-4 (left)	COM-4 (right)	ESS 2
	10	ESS 1	COM-7 (left)	COM-7 (right)	ESS 2
	11	ESS 1	COM-8 (left)	COM-8 (right)	ESS 2
	12	ESS 1	COM-9 (left)	COM-9 (right)	ESS 2
	13	ESS 1	COM-3	COM-7 (right)	ESS 1
AC power cable	14	Inverter	COM-4	COM-4 (right)	ESS 1
	15	Inverter	COM-5	COM-2 (right)	ESS 1
	16	Inverter	COM-6	COM-3 (right)	ESS 1
	17	Inverter	COM-1	COM-2	SmartGuard
Signal cable	18	Inverter	COM-2	COM-1	SmartGuard
	19	Inverter	COM-8	COM-3	SmartGuard
	20	Inverter	COM-9	COM-4	SmartGuard

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
AC power cable	7	Inverter	AC-L	INV1-L	SmartGuard
	8	Inverter	AC-N	INV1-N	SmartGuard
	9	Inverter	AC-PE	INV1-PE	SmartGuard
	10	Inverter	AC-L	INV1-L	SmartGuard
Signal cable	11	Grid	L	GRID/ATS-L	SmartGuard
	12	Grid	N	GRID/ATS-N	SmartGuard
	13	PDU for backup loads	L	BACKUP LOAD-L	SmartGuard
	14	PDU for backup loads	N	BACKUP LOAD-N	SmartGuard
Signal cable	15	PDU for non-backup loads	L	NON-BACKUP LOAD-L	SmartGuard
	16	PDU for non-backup loads	N	NON-BACKUP LOAD-N	SmartGuard
	17	PDU for non-backup loads	L	NON-BACKUP LOAD-L	SmartGuard
	18	PDU for non-backup loads	N	NON-BACKUP LOAD-N	SmartGuard

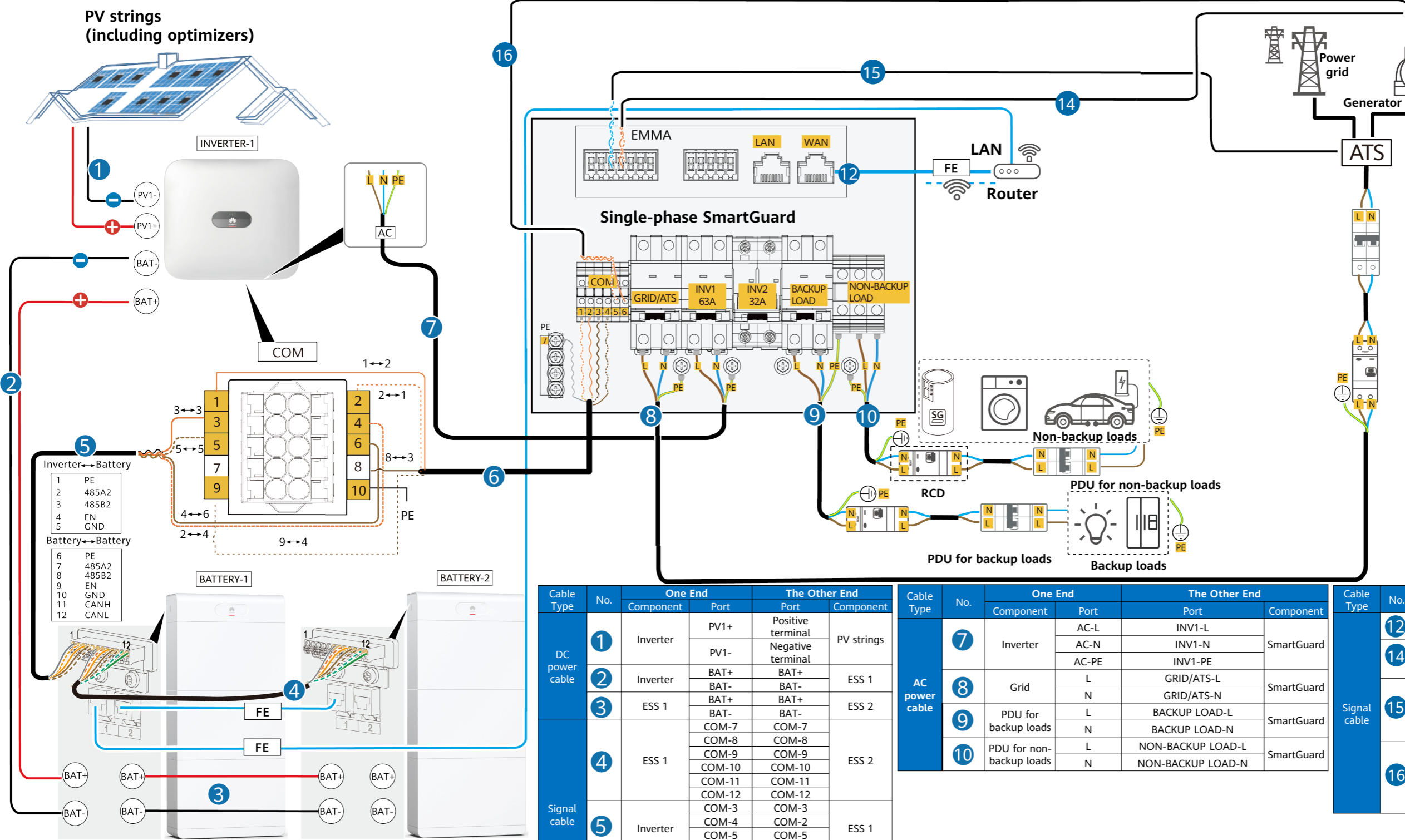
Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
Signal cable	12	EMMA	WAN	LAN	Router
	13	SmartGuard	DI2+	Generator alarm signal port	Generator
	14	SmartGuard	DI2-	Generator alarm signal port	Generator
	15	SmartGuard	DI1+	Position feedback signal upon grid connection	ATS
Signal cable	16	SmartGuard	DI1-	Position feedback signal upon grid connection	ATS
	17	SmartGuard	COM-5	Generator control signal port	Generator
Signal cable	18	SmartGuard	COM-6	Generator control signal port	Generator
	19	SmartGuard	COM-6	Generator control signal port	Generator

# Residential Smart PV Solution Quick Guide

(Single-Phase PV+ESS Scenario + SmartGuard Networking)



## 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.

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## (Single-Phase PV+ESS Scenario + SmartGuard Networking)



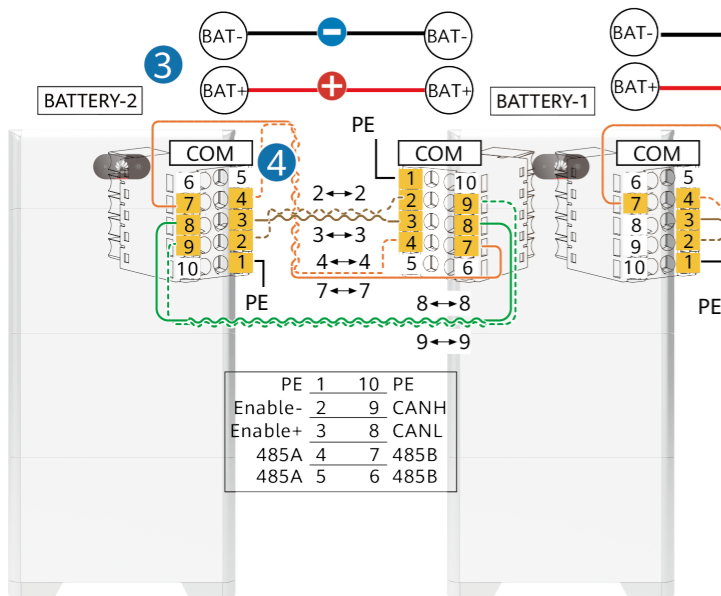
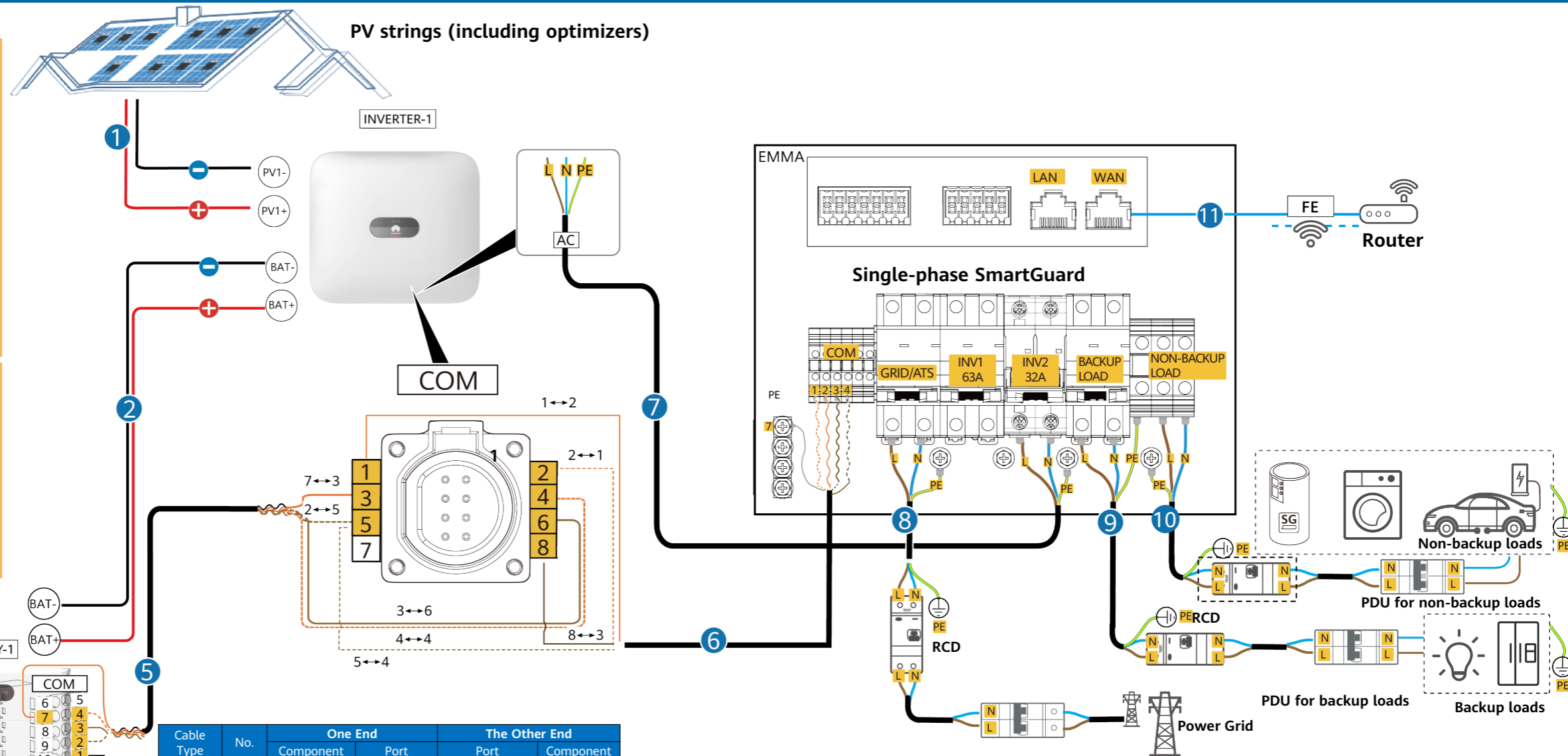
### 3 Cable Connections (Single-Phase Inverter L1 + ESS S0 + SmartGuard)

#### DANGER

- Before connecting cables, ensure that all switches are OFF. Otherwise, electric shocks may occur.
- 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
	2	Inverter	PV1-	Negative terminal	PV strings
	3	ESS 1	BAT+	BAT+	ESS 2
Signal cable	4	ESS 1	BAT-	BAT-	ESS 2
	5	Inverter	BAT+	BAT+	ESS 1
	6	Inverter	BAT-	BAT-	SmartGuard
	7	ESS 1	COM-2 (left)	COM-2 (right)	ESS 2
	8	ESS 1	COM-3 (left)	COM-3 (right)	ESS 2
	9	ESS 1	COM-4 (left)	COM-4 (right)	ESS 2
	10	ESS 1	COM-7 (left)	COM-7 (right)	ESS 2
	11	ESS 1	COM-8 (left)	COM-8 (right)	ESS 2
	12	ESS 1	COM-9 (left)	COM-9 (right)	ESS 2
	13	Inverter	COM-3	COM-7 (right)	ESS 1
	14	Inverter	COM-4	COM-4 (right)	ESS 1
	15	Inverter	COM-5	COM-2 (right)	ESS 1

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
AC power cable	7	Inverter	AC-L	INV1-L	SmartGuard
	8	Inverter	AC-N	INV1-N	SmartGuard
	9	Inverter	AC-PE	INV1-PE	SmartGuard
	10	Grid	L	GRID/ATS-L	SmartGuard
Signal cable	11	Grid	N	GRID/ATS-N	SmartGuard
	12	PDU for backup loads	L	BACKUP LOAD-L	SmartGuard
	13	PDU for backup loads	N	BACKUP LOAD-N	SmartGuard
	14	PDU for non-backup loads	L	NON-BACKUP LOAD-L	SmartGuard
	15	PDU for non-backup loads	N	NON-BACKUP LOAD-N	SmartGuard

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
Signal cable	11	EMMA	WAN	LAN	Router

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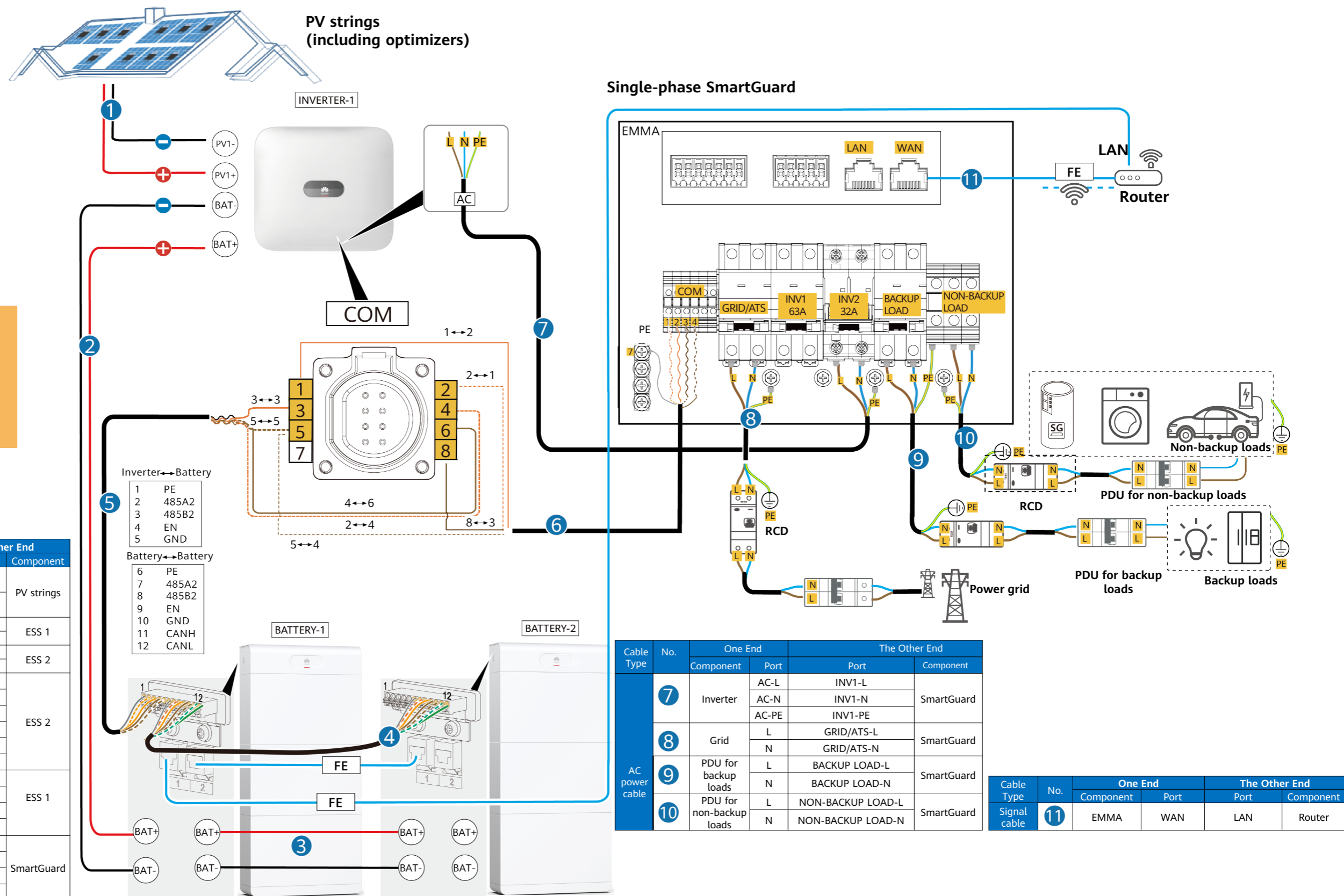
### 3 Cable Connections (Single-Phase Inverter L1 + ESS S1 + SmartGuard)

#### ⚠ 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	
DC power cable	2	Inverter	BAT+	BAT+	ESS 1
			BAT-	BAT-	
DC power cable	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	
Signal cable	5	Inverter	COM-3	COM-3	ESS 1
			COM-4	COM-2	
			COM-5	COM-5	
			COM-6	COM-4	
Signal cable	6	Inverter	COM-1	COM-2	SmartGuard
			COM-2	COM-1	
			COM-8	COM-3	
			COM-5	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
AC power cable	9	PDU for backup loads	N	BACKUP LOAD-N	SmartGuard
			L	BACKUP LOAD-L	
	10	PDU for non-backup loads	N	NON-BACKUP LOAD-N	SmartGuard

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
Signal cable	11	EMMA	WAN	LAN	Router

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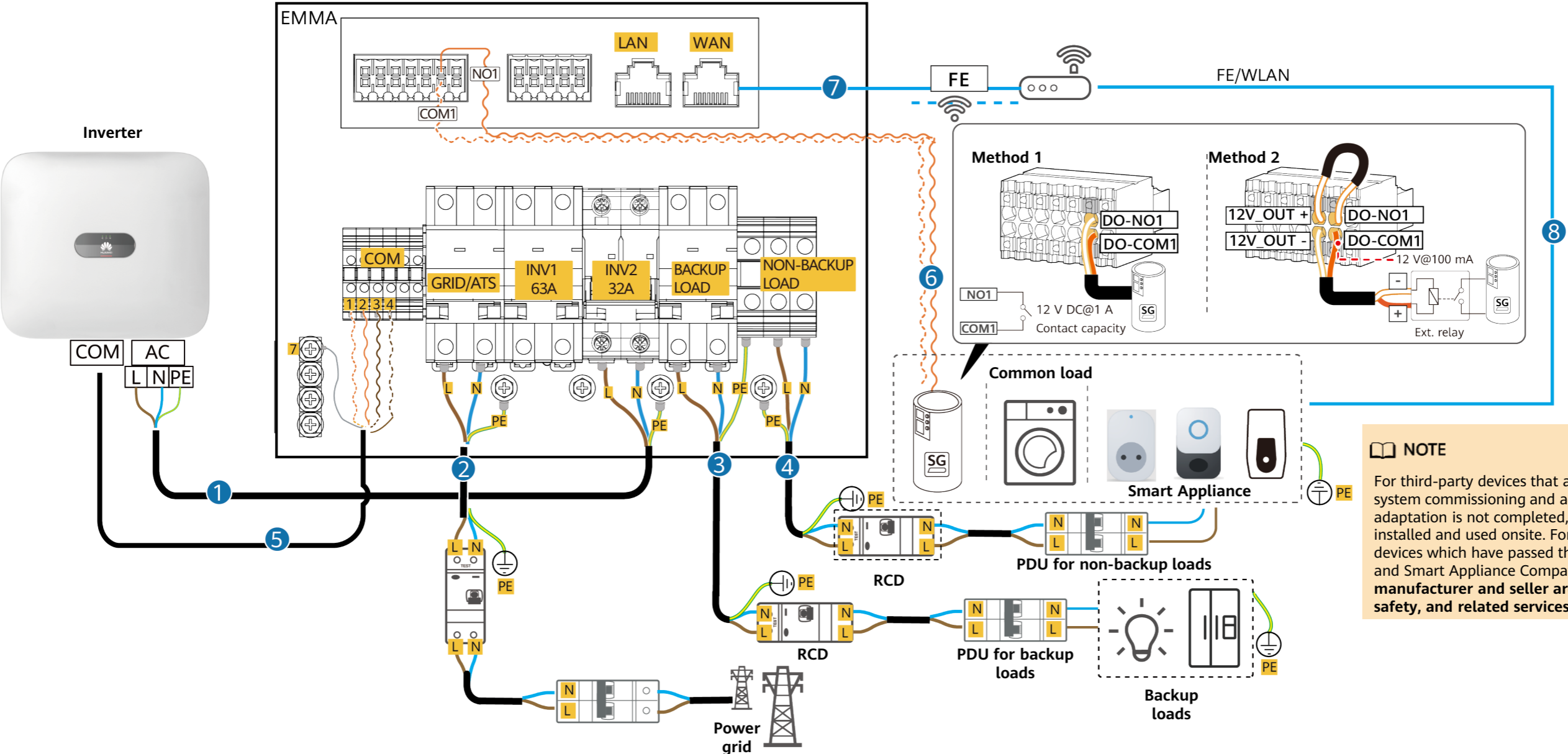


## 3 Cable Connections (Smart Appliance Networking)

Cable Type	No.	One End	The Other End
Component	Port	Port	Component
AC power cable	1	AC-L	INV1/2-L
		AC-N	INV1/2-N
		AC-PE	INV1/2-PE
	2	L	GRID/ATS-L1
		N	GRID/ATS-N
	3	L	BACKUP LOAD-L1
		N	BACKUP LOAD-N
	4	L	NON-BACKUP LOAD-L1
		N	NON-BACKUP LOAD-N

Cable Type	No.	One End	The Other End
Component	Port	Port	Component
Signal cable	5	Inverter	COM-1
			COM-2
			COM-3
			COM-4
	6	SmartGuard	NO1/12V_OUT-*
	7	EMMA	COM1
	8	Router	SG Ready heat pump
			Router

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.



**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.**

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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

### Commissioning Instructions

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



Scan for instructions