1 Networking

Connecting All Loads to the SmartGuard

Connecting Some of Loads to the SmartGuard
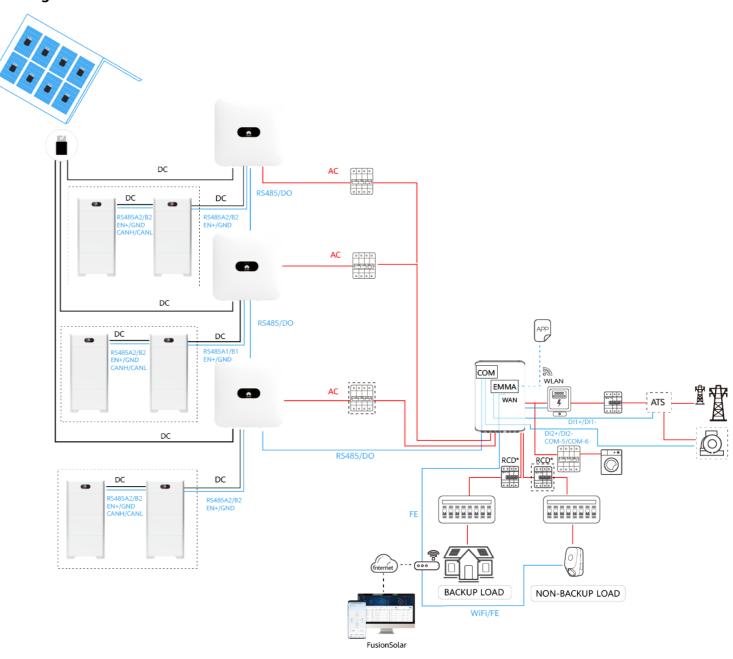

* The figure uses the LUNA2000-(5-30)-S0 as an example.

⚠ **DANGER**

- An RCD must be installed for the backup load. During off-grid operation, the main circuit breaker does not provide protection. Electric leakage on the loads may result in electric shocks.
- A main circuit breaker with the leakage protection function must be installed. Its rated residual operating current must be ≥ Number of M1 or MAP0 inverters x 100 mA or ≥ Number of MB0 inverters x 300 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.

📖 **NOTE**

The three-phase SmartGuard supports a maximum load current of 63 A. If the load current exceeds 63 A, only some of loads can be connected to it. In addition, a power meter needs to be connected between the three-phase SmartGuard and the main circuit breaker.
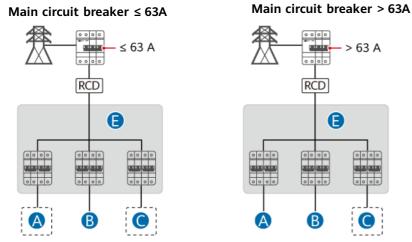
Residential Smart PV Solution Quick Guide
(Three-Phase PV+ESS Scenario + SmartGuard Networking)

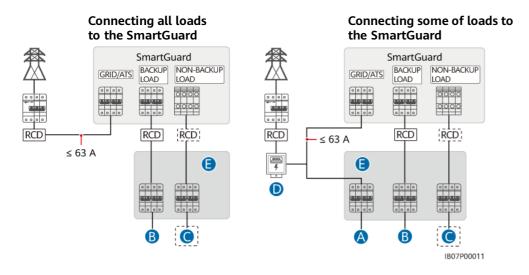# 1 Networking

If the main circuit breaker's rating is 63 A or less, you can connect all or some of the loads to the SmartGuard. However, if the rating is greater than 63 A, you can connect only some of the loads to the SmartGuard. (Dashed boxes indicate optional components.)

Main circuit breaker ≤ 63A

Main circuit breaker > 63A

Loads connected to the SmartGuard (dashed boxes indicate optional components)

Connecting all loads to the SmartGuard

Connecting some of loads to the SmartGuard

IB07P00011

(A) Load not connected to the SmartGuard   (B) Backup load   (C) Non-backup load
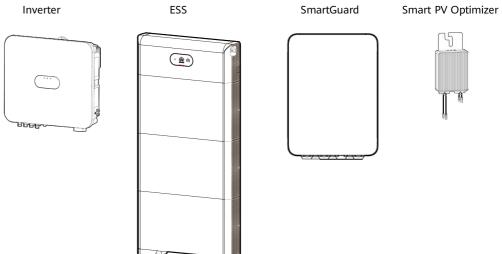
(D) Power meter   (E) AC power distribution box

2 Product Overview

Inverter   ESS   SmartGuard   Smart PV Optimizer

Component	Model	Description
Inverter	SUN2000-(3KTL-10KTL)-M1 SUN2000-(12K-25K)-MB0 series SUN5000-(17K, 25K)-MB0 series SUN2000-(5K-12K)-MAP0 series SUN5000-(8K, 12K)-MAP0 series	• M1/MB0: Only one inverter is supported. • MAP0: A maximum of three inverters are supported. • The SUN2000-(5K-12K)-MAP0 inverter 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-(7, 14, 21)-S1	• 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.
SmartGuard	SmartGuard-63A-T0 SmartGuard-63A-AUT0	Works with the inverter, ESS, grid, and home appliances to achieve smart management on home power consumption, grid detection, and on/off-grid switchover.
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

📖 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.

3 Cable Connections (Three-Phase Inverter M1/MB0 + 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.
- A main circuit breaker with the leakage protection function must be installed. Its rated residual operating current must be ≥ Number of M1 inverters x 100 mA or ≥ Number of MB0 inverters x 300 mA..

NOTICE

- Signal cables must be outdoor shielded twisted pair cables.
- Only one inverter can be connected to the SmartGuard.
- The PEN of the SmartGuard-63A-T0 backup power port must be connected, but the PEN of the SmartGuard-63A-AUT0 backup power port does not need to be connected.

PV strings (with optimizers)

Inverter

Three-phase SmartGuard

EMMA — LAN — WAN — FE — WiFi/FE

INV1 63A | INV2 32A | GRID/ATS | BACKUP LOAD | NON-BACKUP LOAD

Method 1 | **Method 2**

Power grid

RCD

PDU for non-backup loads

Non-backup loads

PDU for backup loads

Backup loads

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
DC power cable	❶	Inverter	PV1+	Positive terminal	PV strings
			PV1-	Negative terminal	
	❷	Inverter	BAT+	BAT+	ESS 1
			BAT-	BAT-	
	❸	ESS 1	BAT+	BAT+	ESS 2
			BAT-	BAT-	
Signal cable	❹	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)	
	❺	Inverter	COM-13	COM-2 (right)	ESS 1
			COM-11	COM-3 (right)	
			COM-7	COM-4 (right)	
			COM-9	COM-7 (right)	
			COM-5 (shield layer)	COM-1 (right) (shield layer)	
	❻	Inverter	COM-2	COM-1	SmartGuard
			COM-4	COM-2	
			COM-8	COM-3	
			COM-16	COM-4	

Cable Type	No.	One End		One End	
		Component	Port	Port	Component
AC power cable	❼	Inverter	AC-L1	INV1-L1	SmartGuard
			AC-L2	INV1-L2	
			AC-L3	INV1-L3	
			AC-N	INV1-N	
			AC-PE	INV1-PE	
	❽	Grid	L1	GRID/ATS-L1	SmartGuard
			L2	GRID/ATS-L2	
			L3	GRID/ATS-L3	
			N	GRID/ATS-N	
			PE	GRID/ATS-PE	
	❾	PDU for backup loads	L1	BACKUP LOAD-L1	SmartGuard
			L2	BACKUP LOAD-L2	
			L3	BACKUP LOAD-L3	
			N	BACKUP LOAD-N	
			PE	BACKUP LOAD-PE	
	❿	PDU for non-backup loads	L1	NON-BACKUP LOAD-L1	SmartGuard
			L2	NON-BACKUP LOAD-L2	
			L3	NON-BACKUP LOAD-L3	
			N	NON-BACKUP LOAD-N	
			PE	NON-BACKUP LOAD-PE	

Battery connections:

BATTERY-2 | BATTERY-1

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

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

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

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3 Cable Connections (Three-Phase Inverter M1/MB0 + ESS S1 + SmartGuard)

PV strings (with optimizers)

Inverter

Three-phase SmartGuard

EMMA — NO1, COM1, LAN, WAN, FE, WiFi/FE

INV1 63A · **INV2 32A** · **GRID/ATS** · **BACKUP LOAD** · **NON-BACKUP LOAD**

COM

	PE
1	PE
2	485A2
3	485B2
4	EN
5	GND

Inverter◄►Battery

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

BATTERY-1 · **BATTERY-2**

Power grid

RCD

PDU for non-backup loads

PDU for backup loads

Non-backup loads

Backup loads

Method 1 — DO-NO1, DO-COM1
Method 2 — 12V_OUT+, 12V_OUT-, DO-NO1, DO-COM1
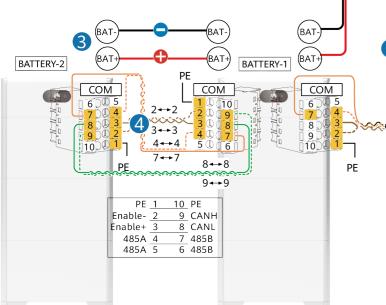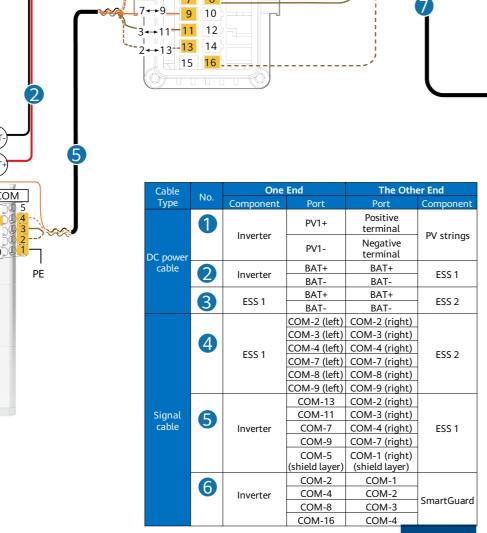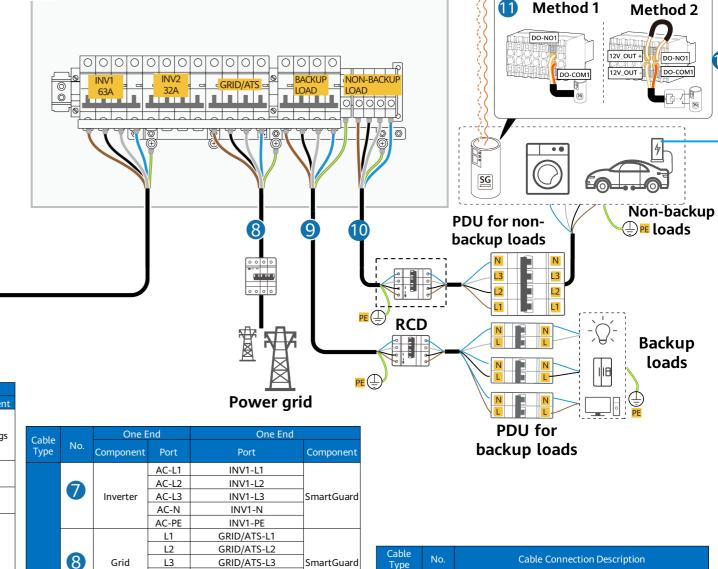
⚠ DANGER
- Before connecting cables, ensure that all switches are OFF. Otherwise, electric shocks may occur.
- An RCD must be installed before the backup load. During off-grid operation, the main circuit breaker does not provide protection. Electric leakage on the load may result in electric shocks.
- A main circuit breaker with the leakage protection function must be installed. Its rated residual operating current must be ≥ Number of M1 inverters x 100 mA or ≥ Number of MB0 inverters x 300 mA..

NOTICE
- Signal cables must be outdoor shielded twisted pair cables.
- Only one inverter can be connected to the SmartGuard.
- The PEN of the SmartGuard-63A-T0 backup power port must be connected, but the PEN of the SmartGuard-63A-AUT0 backup power port does not need to be connected.

Cable Type	No.	Component	Port	Port	Component
AC 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-	

Cable Type	No.	Component	Port	Port	Component
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-13	COM-5	ESS 1
			COM-11	COM-4	
			COM-7	COM-2	
			COM-3	COM-3	
			COM-5 (shield layer)	COM-1 (shield layer)	
	6	Inverter	COM-2	COM-1	SmartGuard
			COM-4	COM-2	
			COM-8	COM-3	
			COM-16	COM-4	

Cable Type	No.	Component	Port	Port	Component
AC power cable	7	Inverter	AC-L1	INV1-L1	SmartGuard
			AC-L2	INV1-L2	
			AC-L3	INV1-L3	
			AC-N	INV1-N	
			AC-PE	INV1-PE	
	8	Grid	L1	GRID/ATS-L1	SmartGuard
			L2	GRID/ATS-L2	
			L3	GRID/ATS-L3	
			N	GRID/ATS-N	
	9	PDU for backup loads	L1	BACKUP LOAD-L1	SmartGuard
			L2	BACKUP LOAD-L2	
			L3	BACKUP LOAD-L3	
			N	BACKUP LOAD-N	
	10	PDU for non-backup loads	L1	NON-BACKUP LOAD-L1	SmartGuard
			L2	NON-BACKUP LOAD-L2	
			L3	NON-BACKUP LOAD-L3	
			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.	Component	Port	Port	Component
Signal cable	12	EMMA	WAN	LAN	Router
	13	Charger	FE	LAN	Router

4

3 Cable Connections (Three-Phase Inverter MAP0 + ESS S0 + SmartGuard Connected to All Loads)

PV strings (with optimizers)

Inverter

Three-phase SmartGuard

EMMA

LAN WAN

Power grid

Generator

ATS

RCD

⚠ 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.
- A main circuit breaker with the leakage protection function must be installed. Its rated residual operating current must be ≥ Number of MAP0 inverters x 100 mA.

NOTICE

- Signal cables must be outdoor shielded twisted pair cables.
- The PEN of the SmartGuard-63A-T0 backup power port must be connected, but the PEN of the SmartGuard-63A-AUT0 backup power port does not need to be connected.

PV1-
PV1+
BAT-
BAT+

AC
PE N
L1 L2 L3
AC

COM

485A
485B
EN/Enable+
GND/Enable-

PE

BAT-
BAT+

BATTERY-2   BATTERY-1

COM
PE

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

INV1 63A   INV2 32A   GRID/ATS   BACKUP LOAD   NON-BACKUP LOAD

Method 1   Method 2
DO-NO1   12V_OUT DO-NO1
DO-COM1   12V_OUT DO-COM1

SG

Non-backup loads

PDU for non-backup loads

PDU for backup loads   Backup loads

RCD

N L3 L2 L1   N L3 L2 L1
PE

FE   WiFi/FE

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: RJ45 network port	COM-7 (right)	ESS 1
				COM-4 (right)	
				COM-2 (right)	
				COM-3 (right)	
	6	Inverter	COM-1	COM-1	SmartGuard
			COM-3	COM-2	
			COM-7	COM-3	
			COM-9	COM-4	
	16	SmartGuard	COM-5	Generator control signal port	Generator
			COM-6		

Cable Type	No.	One End		One End	
		Component	Port	Port	Component
AC power cable	7	Inverter	AC-L1	INV1-L1	SmartGuard
			AC-L2	INV1-L2	
			AC-L3	INV1-L3	
			AC-N	INV1-N	
			AC-PE	INV1-PE	
	8	Grid	L1	GRID/ATS-L1	SmartGuard
			L2	GRID/ATS-L2	
			L3	GRID/ATS-L3	
			N	GRID/ATS-N	
	9	PDU for backup loads	L1	BACKUP LOAD-L1	SmartGuard
			L2	BACKUP LOAD-L2	
			L3	BACKUP LOAD-L3	
			N	BACKUP LOAD-N	
	10	PDU for non-backup loads	L1	NON-BACKUP LOAD-L1	SmartGuard
			L2	NON-BACKUP LOAD-L2	
			L3	NON-BACKUP LOAD-L3	
			N	NON-BACKUP LOAD-N	

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
Signal cable	14	SmartGuard	DI2+	Generator alarm signal port	Generator
			DI2-		
	15	SmartGuard	DI1+	Position feedback signal upon grid connection	ATS
			DI1-		

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

3 Cable Connections (Three-Phase Inverter MAP0 + ESS S0 + SmartGuard Connected to Some of Loads)

PV strings (with optimizers)

Inverter

Three-phase SmartGuard

EMMA LAN WAN

Power grid **Generator**

ATS

AC power distribution box

DTSU666-H

⚠ **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.
- A main circuit breaker with the leakage protection function must be installed. Its rated residual operating current must be ≥ Number of MAP0 inverters x 100 mA.

Method 1 **Method 2**

DO-NO1 / DO-COM1 / 12V_OUT+ / 12V_OUT−

PDU for non-backup loads

Non-backup loads

INV1 63A / INV2 32A / GRID/ATS / BACKUP LOAD / NON-BACKUP LOAD

RCD

PDU for backup loads **Backup loads**

485A / 485B / EN/Enable+ / GND/Enable−

BATTERY-2 BATTERY-1

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

NOTICE
- Signal cables must be outdoor shielded twisted pair cables.
- The PEN of the SmartGuard-63A-T0 backup power port must be connected, but the PEN of the SmartGuard-63A-AUT0 backup power port does not need to be connected.

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
DC power Cable	❶	Inverter	PV1+	Positive terminal	PV strings
			PV1-	Negative terminal	
	❷	Inverter	BAT+	BAT+	ESS 1
			BAT-	BAT-	
	❸	ESS 1	BAT+	BAT+	ESS 2
			BAT-	BAT-	
Signal Cable	❹	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)	
	❺	Inverter	COM: RJ45 network port	COM-7 (right)	ESS 1
				COM-4 (right)	
				COM-2 (right)	
				COM-3 (right)	
	❻	Inverter	COM-1	COM-1	SmartGuard
			COM-3	COM-2	
			COM-7	COM-3	
			COM-9	COM-4	
	⑯	SmartGuard	COM-5	Generator control signal port	Generator
			COM-6		

Cable Type	No.	One End		One End	
		Component	Port	Port	Component
AC power cable	❼	Inverter	AC-L1	INV1-L1	SmartGuard
			AC-L2	INV1-L2	
			AC-L3	INV1-L3	
			AC-N	INV1-N	
			AC-PE	INV1-PE	
	❽	Grid	L1	GRID/ATS-L1	SmartGuard
			L2	GRID/ATS-L2	
			L3	GRID/ATS-L3	
			N	GRID/ATS-N	
	❾	PDU for backup loads	L1	BACKUP LOAD-L1	SmartGuard
			L2	BACKUP LOAD-L2	
			L3	BACKUP LOAD-L3	
			N	BACKUP LOAD-N	
	❿	PDU for non-backup loads	L1	NON-BACKUP LOAD-L1	SmartGuard
			L2	NON-BACKUP LOAD-L2	
			L3	NON-BACKUP LOAD-L3	
			N	NON-BACKUP LOAD-N	

Cable Type	No.	One End		The Other End	
		Component	Port	Port	Component
Signal cable	⑭	SmartGuard	DI2+	Generator alarm signal port	Generator
			DI2-		
	⑮	SmartGuard	DI1+	Position feedback signal upon grid connection	ATS
			DI1-		
	⑰	SmartGuard	485A2	24	DTSU666-H
			485B2	25	

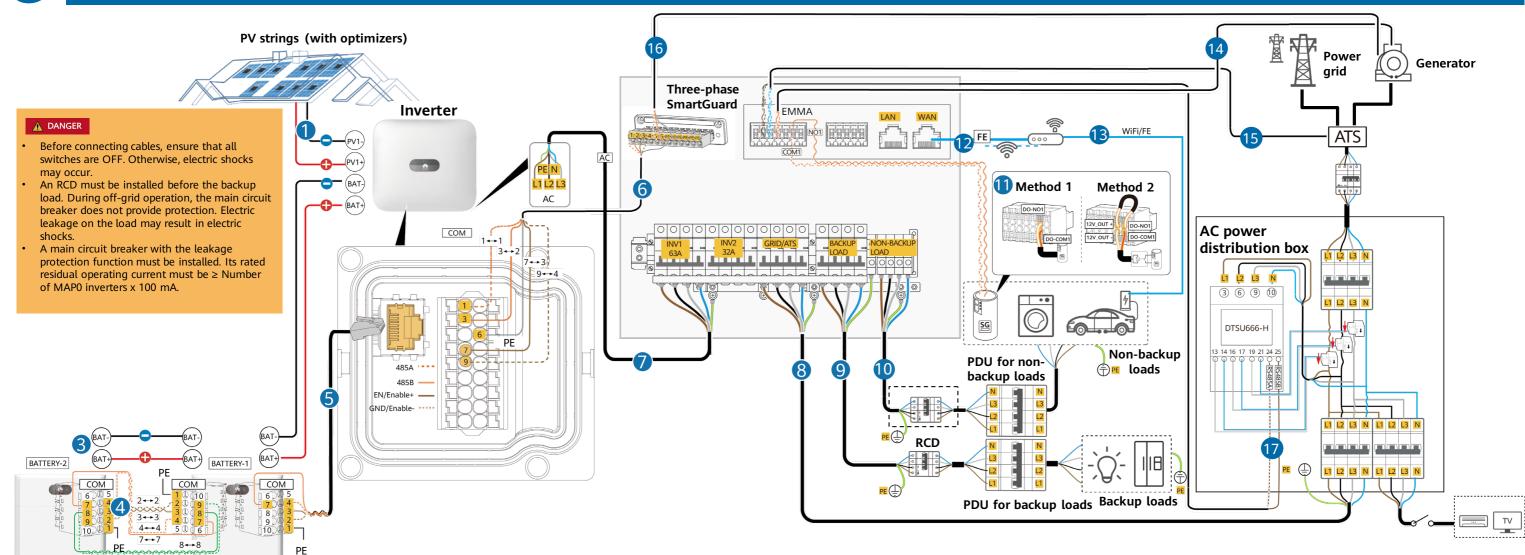| Cable Type	No.	Cable Connection Description
Signal cable	⑪	Method 1: Use DO dry contacts to directly drive the SG Ready heat pump. The max. capability of the DO dry contacts is 12 V DC@1 A.
		Method 2: Use a 12 V@30 mA power supply to drive the external relay. Choose the proper contact capability of 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

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

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3 Cable Connections (Three-Phase Inverter MAP0 + ESS S1 + SmartGuard Connected to All Loads)

PV strings (with optimizers)

Inverter

Three-phase SmartGuard

EMMA   LAN   WAN

NO1   COM1

FE   WiFi/FE

Power grid   Generator

ATS   RCD

Method 1   Method 2

DO-NO1   12V_OUT+   DO-NO1
DO-COM1   12V_OUT-   DO-COM1

Non-backup loads

PDU for non-backup loads   PE

PDU for backup loads   Backup loads

INV1 63A   INV2 32A   GRID/ATS   BACKUP LOAD   NON-BACKUP LOAD

PE N L1 L2 L3   AC

COM

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

485A
485B
EN/Enable+
GND/Enable-

BATTERY-1   BATTERY-2

BAT+ BAT+   BAT+ BAT+
BAT- BAT-   BAT- BAT-

FE   FE

⚠ 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.
- A main circuit breaker with the leakage protection function must be installed. Its rated residual operating current must be ≥ Number of MAP0 inverters x 100 mA.

NOTICE

- Signal cables must be outdoor shielded twisted pair cables.
- The PEN of the SmartGuard-63A-T0 backup power port must be connected, but the PEN of the SmartGuard-63A-AUT0 backup power 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: RJ45 network port	COM-3	ESS 1
				COM-2	
				COM-5	
				COM-4	
	6	Inverter	COM-1	COM-1	SmartGuard
			COM-3	COM-2	
			COM-7	COM-3	
			COM-9	COM-4	
	16	SmartGuard	COM-5	Generator control signal port	Generator
			COM-6		

Cable Type	No.	One End		One End	
		Component	Port	Port	Component
AC power cable	7	Inverter	AC-L1	INV1-L1	SmartGuard
			AC-L2	INV1-L2	
			AC-L3	INV1-L3	
			AC-N	INV1-N	
			AC-PE	INV1-PE	
	8	Grid	L1	GRID/ATS-L1	SmartGuard
			L2	GRID/ATS-L2	
			L3	GRID/ATS-L3	
			N	GRID/ATS-N	
	9	PDU for backup loads	L1	BACKUP LOAD-L1	SmartGuard
			L2	BACKUP LOAD-L2	
			L3	BACKUP LOAD-L3	
			N	BACKUP LOAD-N	
	10	PDU for non-backup loads	L1	NON-BACKUP LOAD-L1	SmartGuard
			L2	NON-BACKUP LOAD-L2	
			L3	NON-BACKUP LOAD-L3	
			N	NON-BACKUP LOAD-N	

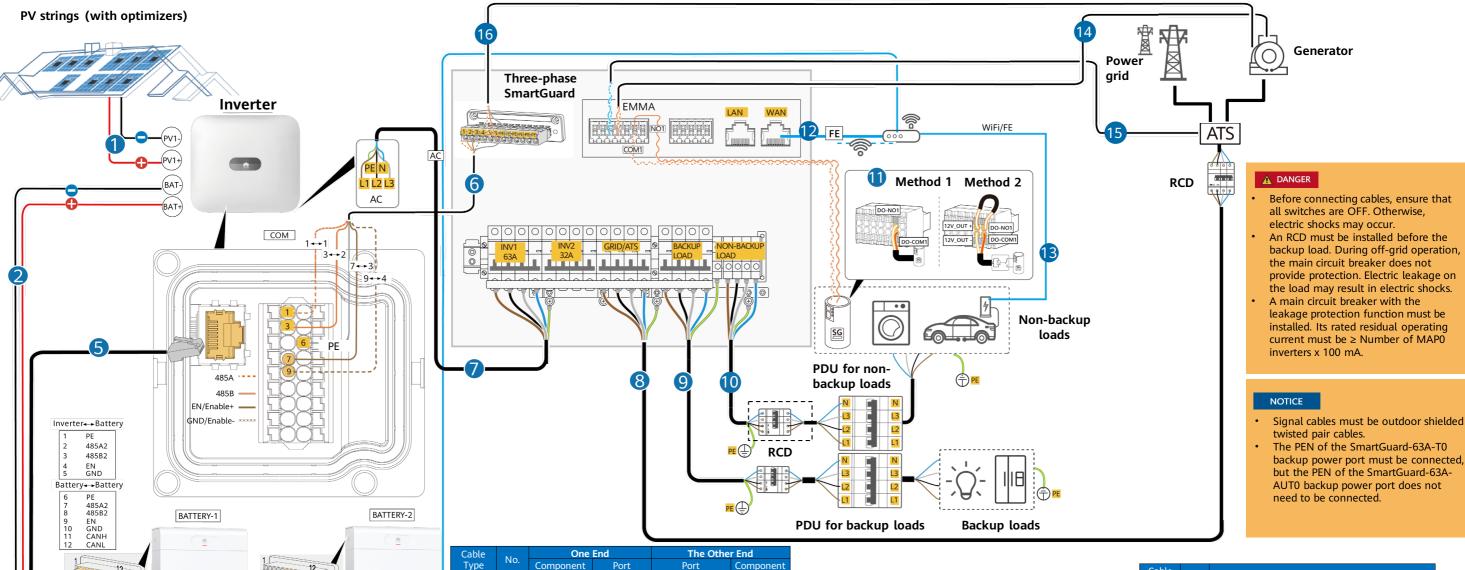| Cable Type	No.	Cable Connection Description
Signal cable	11	Method 1: Use DO dry contacts to directly drive the SG Ready heat pump. The max. capability of the DO dry contacts is 12 V DC@1 A. Method 2: Use a 12 V@30 mA power supply to drive the external relay. Choose the proper contact capability of 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-		

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.

Huawei FusionSolar

Installer Registration

Initial registration

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

or

Non-initial registration

To create multiple installer accounts for a company, log in to the FusionSolar app and tap **Invite 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.

Scan the QR code on the EMMA in the SmartGuard.

If the system prompts you to set the password, set the password and then log in.

This step will be automatically skipped at the first login.

Set the router parameters.

Wired network (FE): DHCP is enabled by default. If the router does not support **DHCP**, disable it and manually assign an IP address.

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

Residential Smart PV Solution Quick Guide
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Device management

Quick settings

Device magt — Communication networking
Basic parameters — Parameter configuration — Completed

Device list **Search for device**

SUN2000(Inverter)(1)
Inverter.
SN:************
Connected device 0 10.00kWh

Smart Charger(1)
My Charging Pile
SN:************

Smart Guard(1)
Smart Guard

> 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**.

Quick settings

Device magt — Communication networking
Basic parameters — Parameter configuration — Completed

Grid code Select a grid code

☑ SUN2000(Inverter)(1) 1pcs
☑ Inverter
Grid code

Set the local grid code.

Check whether the inverter grid code matches the local grid code. If so, go to the next step.

Previous | Next

Set the key parameters.

Quick settings

Set EMMA configuration parameters.

EMMA Configuration
Meter Connection Mode XX
Meter measurement mode XX
External CT Ratio
Rated Current of Main Circuit Breaker
Seamless switchover

Charger Configuration

Set ESS configuration parameters.

ESS Configuration
ESS Installation Outdoor(Recommended)
Working mode settings Maximum self -consumption

Previous | Next

Set the communication networking.

Quick settings

Device magt — Communication networking
Basic parameters — Parameter configuration — Completed

Network settings

☑ I have been authorized by the user to connect to the management system
Domain name intl.fusionsolar.huawei.com

Previous | Next

Connection test

Quick settings

Device magt — Communication networking
Basic parameters — Parameter configuration — Completed

Network settings

Device list **Connection**

SUN2000(Inverter)(1)
Inverter
SN:************
Connected 0 10.00kWh

Smart Charger(1)
My Charging Pile
SN:************

Smart Guard(1)
Smart Guard

Previous | Finish

Create a plant.

Quick settings

Device magt — Communication networking
Basic parameters — Parameter configuration — Completed

Network settings

> Disconnect from device WLAN and connect to the Internet.
> **OK**

Inverter
SN:************ 0 10.00kWh
Connected device

Smart Charger(1)
My Charging Pile
SN:************

Smart Guard(1)
Smart Guard

Previous | Finish

Create plant

Add plant

Connect to existing plant

Add a plant.

Add plant
1 Basic info — 2 Add devices

*Country/Region Select
*Service provider
*Plant type Residential
*EV-charger-only plant No
*Plant name -Enter-
*Grid connection date 16/11/2023
Start date of safe running 16/11/2023
*Plant address XXXXX

☐ I have obtained authorization from the user.
You must have obtained owner's authorization for any third-party personal information that you provide here.

Next

Add plant
1 Basic info — 2 Add devices

Total string capacity (kWp) -Enter-

Added devices
XXXXXXXXXX
Device type XXXXX
Device model XXXXX
Connected devices

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

Previous | Submit

Create an owner account.

Plants Statistics
⚙ Setup wizard **Add user**

1 All | 1 Normal | 0 Faulty | Offline

Search Enter a plant name.

My PV Plant
China mainland xxx
0.000kWp 0.00kWh
100.00kWh

Normal

VS

Home | Maintenance | Devices | Me

Add user

*Service provider
*Role
*Plant Association
*Username
Avatar
Country/Region code +86
Mobile number
*Email

☐ I have obtained the owner's authorization.
You must have obtained owner's authorization for any third-party personal information that you provide here.

Cancel | Save

Viewing the Plant Status

Plants Statistics
⚙ Setup wizard ☺ Add user

1 All | 1 Normal | 0 Faulty | 0 Offline

Search Enter a plant name.

My PV plant
China mainland ***
0.000kWp 0.00kWh
0.00kWh

Normal

VS

Home | Maintenance | Devices | Me

****

Weather -- Plant details
Normal

PV
**** kW

Battery ****kW | Grid ****kW
Load ****kW

****kWh Yield today | ****¥ Revenue today

**** kWh Yield this month | **** MWh Yield this year | **** MWh Total yield

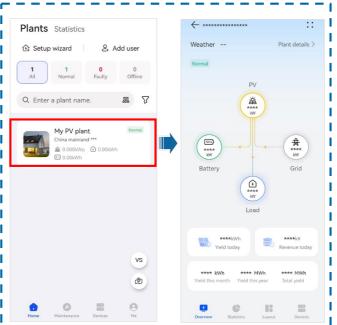Overview | Statistics | Layout | Devices

Residential Smart PV Solution Quick Guide
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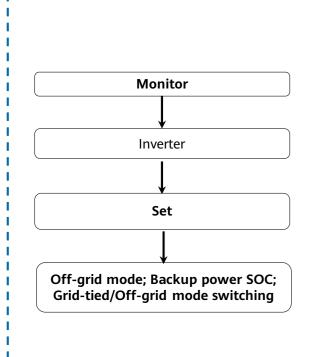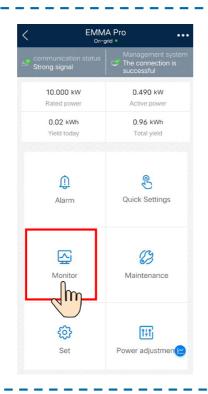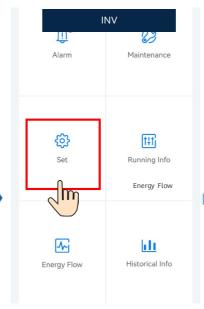
5 On/Off-Grid Control Parameters

Enabling Off-Grid Mode

```
Monitor
   ↓
Inverter
   ↓
Set
   ↓
Off-grid mode; Backup power SOC;
Grid-tied/Off-grid mode switching
```
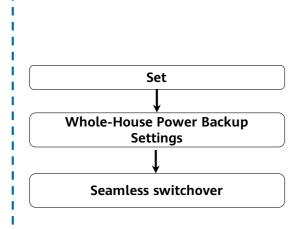
Setting Seamless Switchover

```
Set
   ↓
Whole-House Power Backup
Settings
   ↓
Seamless switchover
```

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 (%)

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

HUAWEI

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.

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.

Plants Statistics

Tap a plant that is equipped with optimizers.

Generating a Physical Layout on the App Automatically

Upload the template and generate a layout.

Tap to upload the physical layout template.

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.

Camera / Select from album

Recognition result

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

The existing physical layout will be overwritten by a new one. Are you sure you want to generate a new 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."

12

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