

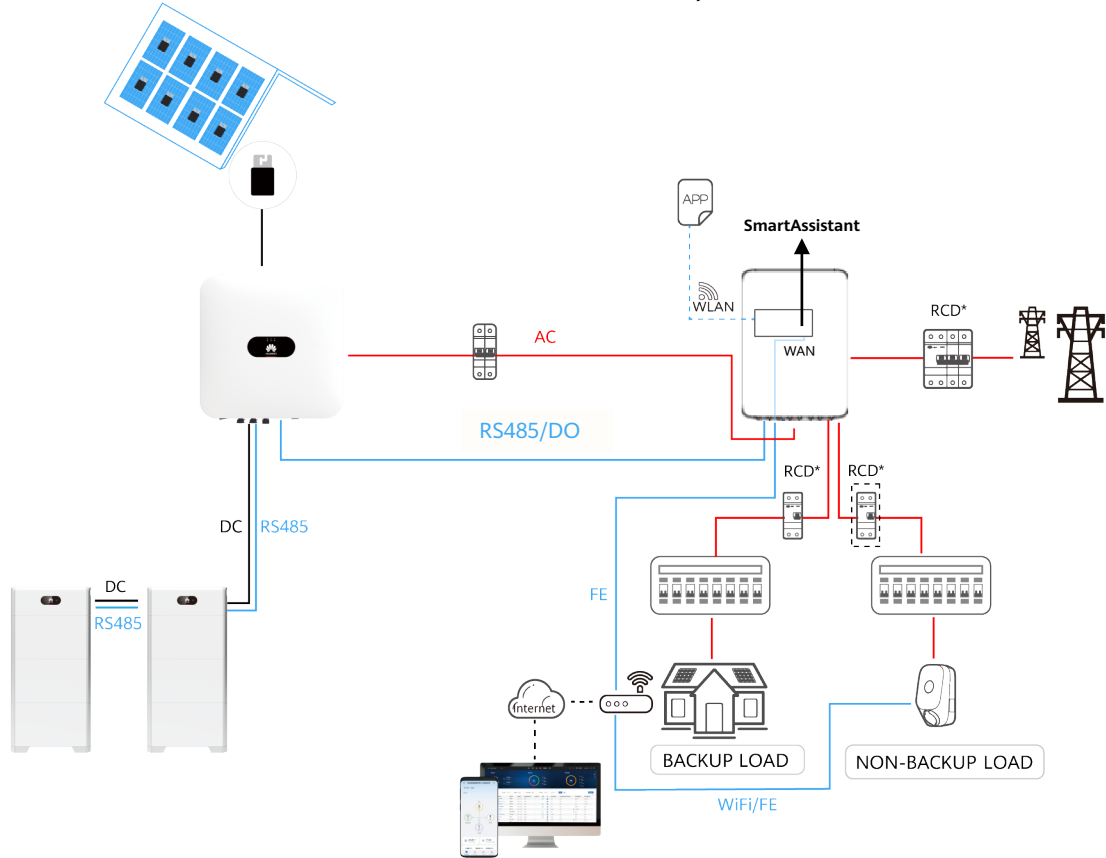
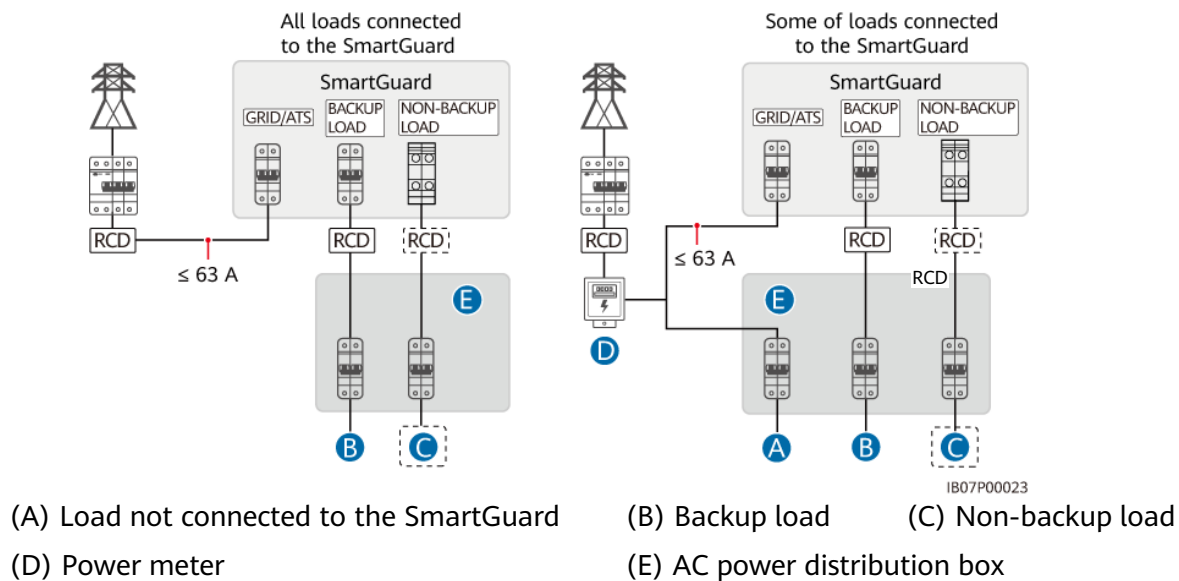
# Residential Smart PV Solution Quick Guide

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

Issue: 05  
Date: 2025-09-30



## 1 Networking



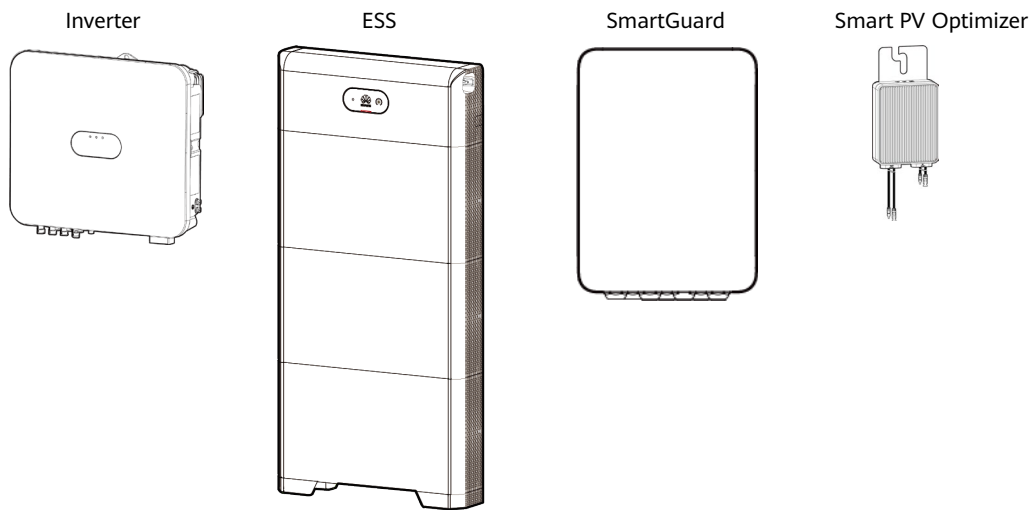
### ⚠ DANGER

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 SmartAssistant 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<br>SUN2000-(8K, 10K)-LC0-ZH<br>SUN2000-(2KTL-6KTL)-L1<br>SUN2000-(3K-6K)-LB0<br>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 the SUN5000 inverter. Otherwise, the inverter cannot be started.</li></ul> |
| Energy storage system (ESS) | LUNA2000-(5-30)-S0<br>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<br>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

- 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.

# Residential Smart PV Solution Quick Guide

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



## 3 Cable Connections (Single-Phase Inverter LC0/LB0 + ESS S0 + SmartGuard)

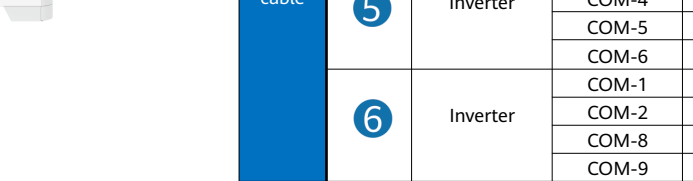
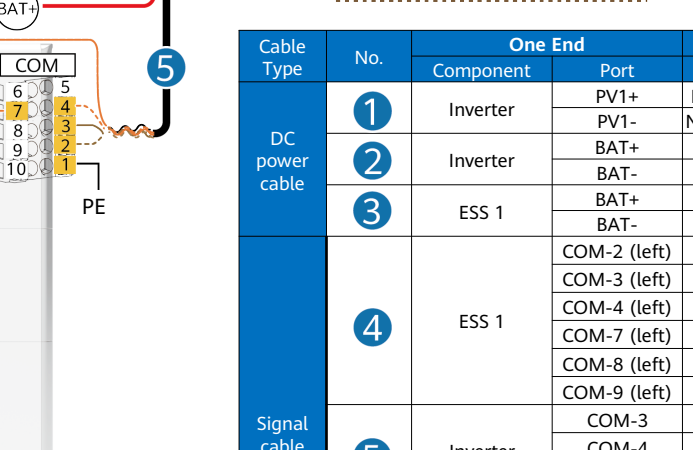
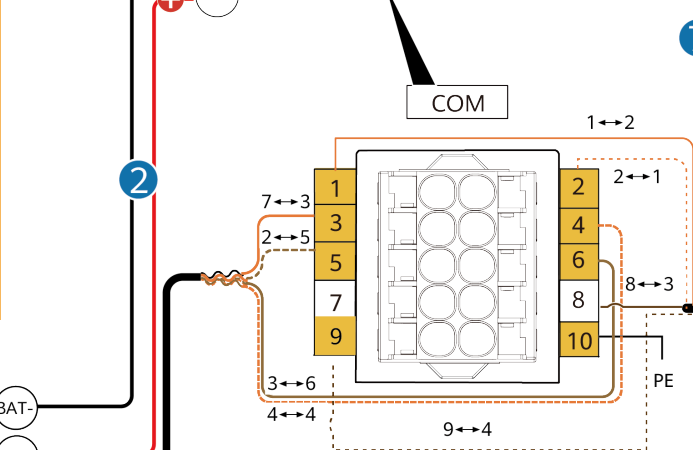
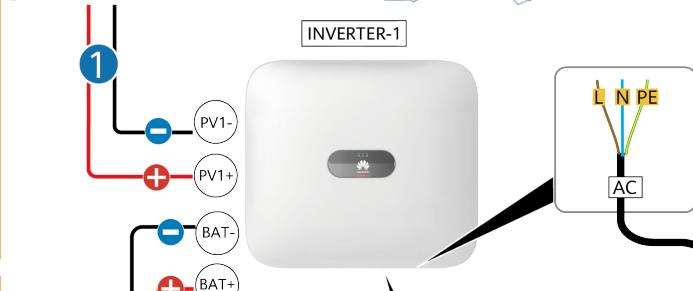
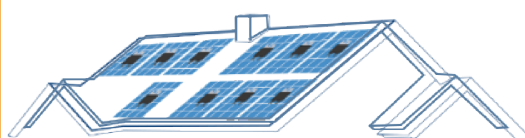
### ⚠ DANGER

- 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 (left) | COM-3 (right)     | ESS 2      |
|                | 14  | ESS 1     | COM-4 (left) | COM-4 (right)     | ESS 2      |
|                | 15  | ESS 1     | COM-5 (left) | COM-5 (right)     | ESS 2      |
| Signal cable   | 16  | Inverter  | COM-1        | COM-2             | SmartGuard |
|                | 17  | Inverter  | COM-2        | COM-1             | SmartGuard |
|                | 18  | Inverter  | COM-8        | COM-3             | SmartGuard |
|                | 19  | 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  | LC0: INV1-L<br>LB0: INV2-L   | SmartGuard |
|                | 8   |                          | AC-N  | LC0: INV1-N<br>LB0: INV2-N   |            |
|                | 9   |                          | AC-PE | LC0: INV1-PE<br>LB0: INV2-PE |            |
|                | 10  | Grid                     | L     | GRID/ATS-L                   | SmartGuard |
|                | 11  |                          | N     | GRID/ATS-N                   |            |
|                | 12  | PDU for backup loads     | L     | BACKUP LOAD-L                | SmartGuard |
|                | 13  |                          | N     | BACKUP LOAD-N                |            |
|                | 14  | PDU for non-backup loads | L     | NON-BACKUP LOAD-L            | SmartGuard |
|                | 15  |                          | N     | NON-BACKUP LOAD-N            |            |
|                | 16  | PDU for non-backup loads | L     | NON-BACKUP LOAD-L            | SmartGuard |
|                | 17  |                          | N     | NON-BACKUP LOAD-N            |            |
|                | 18  | PDU for non-backup loads | L     | NON-BACKUP LOAD-L            | SmartGuard |

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



**PV strings (including optimizers)**

**INVERTER-1**

**BATTERY-1**

**BATTERY-2**

**SmartAssistant**

**Single-phase SmartGuard**

**Router**

**Power grid**

**Generator**

**ATS**

**Non-backup loads**

**PDU for non-backup loads**

**PDU for backup loads**

**Backup loads**

**DC power cable**

**AC power cable**

**Signal cable**

| Cable Type     | No. | One End                  | The Other End |
|----------------|-----|--------------------------|---------------|
|                |     | Component                | Port          |
| DC power cable | 1   | Inverter                 | PV1+          |
|                | 2   | Inverter                 | PV1-          |
| AC power cable | 7   | Inverter                 | AC-L          |
|                | 8   | Grid                     | L             |
|                | 9   | PDU for backup loads     | L             |
|                | 10  | PDU for non-backup loads | L             |
|                | 11  | Inverter                 | AC-N          |
|                | 12  | Inverter                 | AC-PE         |
|                | 13  | Grid                     | N             |
|                | 14  | PDU for backup loads     | N             |
|                | 15  | PDU for non-backup loads | N             |
|                | 16  | Inverter                 | PE            |

| Cable Type   | No. | One End   | The Other End |
|--------------|-----|-----------|---------------|
|              |     | Component | Port          |
| Signal cable | 1   | Inverter  | COM-1         |
|              | 2   | Inverter  | COM-2         |
|              | 3   | ESS 1     | COM-3         |
|              | 4   | ESS 1     | COM-4         |
|              | 5   | ESS 1     | COM-5         |
|              | 6   | ESS 1     | COM-6         |
|              | 7   | ESS 1     | COM-7         |
|              | 8   | ESS 1     | COM-8         |
|              | 9   | ESS 1     | COM-9         |
|              | 10  | ESS 1     | COM-10        |

| Cable Type   | No. | One End   | The Other End |
|--------------|-----|-----------|---------------|
|              |     | Component | Port          |
| Signal cable | 11  | ESS 1     | COM-11        |
|              | 12  | ESS 1     | COM-12        |
|              | 13  | ESS 1     | COM-13        |
|              | 14  | ESS 1     | COM-14        |
|              | 15  | ESS 1     | COM-15        |
|              | 16  | ESS 1     | COM-16        |
|              | 17  | ESS 1     | COM-17        |
|              | 18  | ESS 1     | COM-18        |
|              | 19  | ESS 1     | COM-19        |
|              | 20  | ESS 1     | COM-20        |

- 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 |            |
|                | 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-3  | COM-3             | ESS 1      |
|                |     |           | COM-4  | COM-2             |            |
|                |     |           | COM-5  | COM-5             |            |
|                |     |           | COM-6  | COM-4             |            |
|                | ⑥   | Inverter  | COM-1  | COM-2             | SmartGuard |
|                |     |           | COM-2  | COM-1             |            |
| COM-8          |     |           | COM-3  |                   |            |
| COM-9          |     |           | COM-4  |                   |            |

| Cable Type     | No. | One End                  |                   | The Other End                |            |
|----------------|-----|--------------------------|-------------------|------------------------------|------------|
|                |     | Component                | Port              | Port                         | Component  |
| AC power cable | ⑦   | Inverter                 | AC-L              | LC0: INV1-L<br>LB0: INV2-L   | SmartGuard |
|                |     |                          | AC-N              | LC0: INV1-N<br>LB0: INV2-N   |            |
|                |     |                          | AC-PE             | LC0: INV1-PE<br>LB0: INV2-PE |            |
|                | ⑧   | Grid                     | L                 | GRID/ATS-L                   | SmartGuard |
|                |     |                          | N                 | GRID/ATS-N                   |            |
|                | ⑨   | PDU for backup loads     | L                 | BACKUP LOAD-L                | SmartGuard |
|                |     |                          | N                 | BACKUP LOAD-N                |            |
|                | ⑩   | PDU for non-backup loads | L                 | NON-BACKUP LOAD-L            | SmartGuard |
| N              |     |                          | NON-BACKUP LOAD-N |                              |            |

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

# Residential Smart PV Solution Quick Guide

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



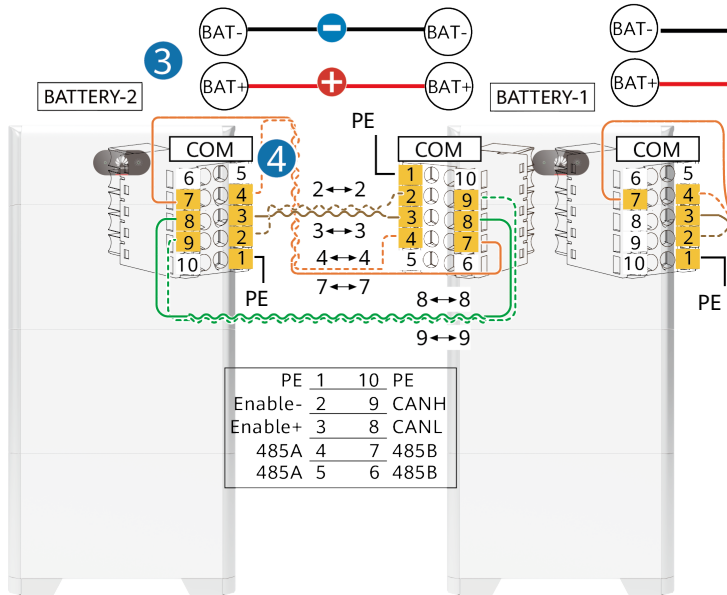
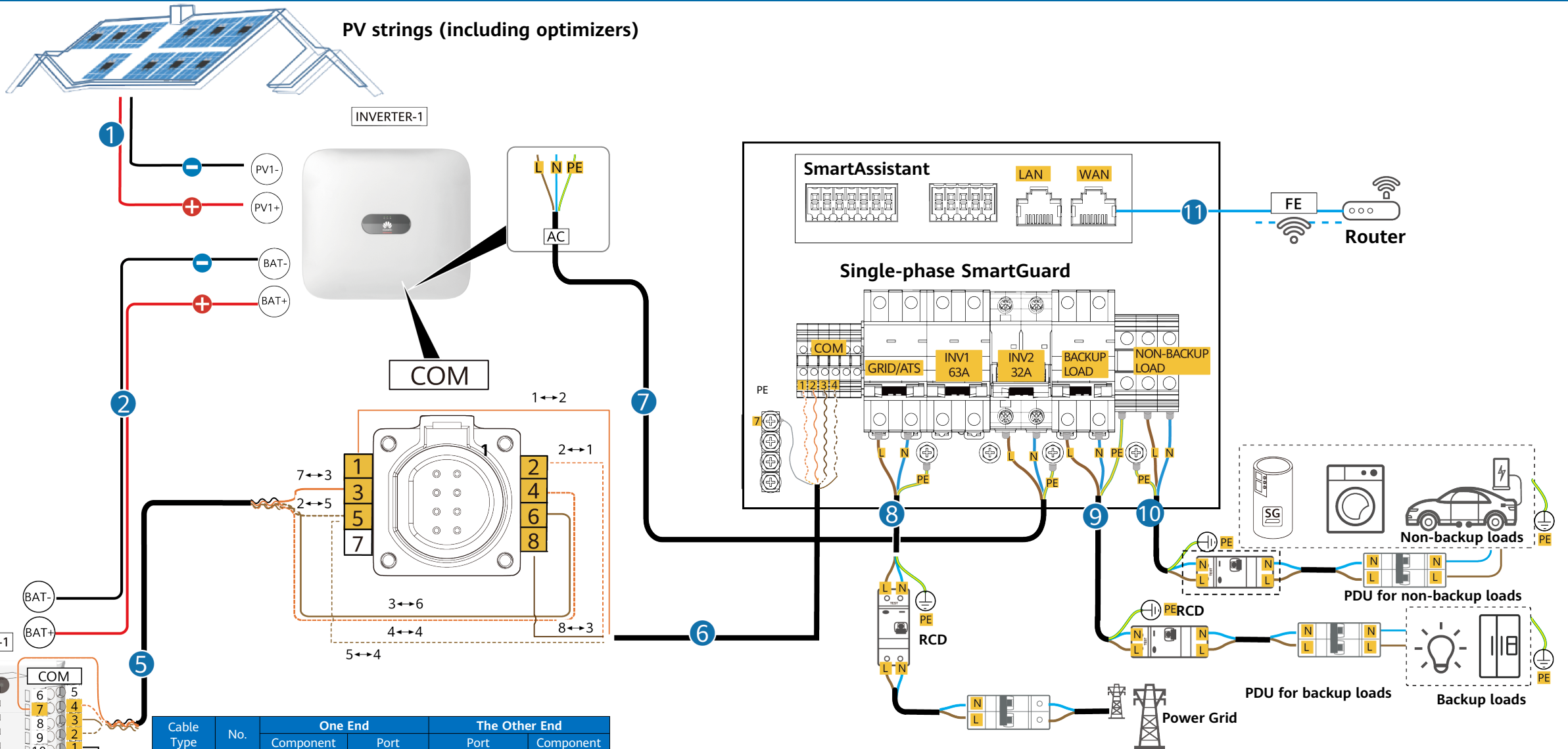
### 3 Cable Connections (Single-Phase Inverter L1 + ESS S0 + SmartGuard)

#### 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  | COM-2 (left)  | COM-2 (right)     | ESS 1      |
|                | 6   | Inverter  | COM-3 (left)  | COM-3 (right)     | ESS 1      |
|                | 7   | Inverter  | COM-4 (left)  | COM-4 (right)     | ESS 1      |
|                | 8   | Inverter  | COM-7 (left)  | COM-7 (right)     | ESS 1      |
|                | 9   | Inverter  | COM-8 (left)  | COM-8 (right)     | ESS 1      |
|                | 10  | Inverter  | COM-9 (left)  | COM-9 (right)     | ESS 1      |
|                | 11  | Inverter  | COM-10 (left) | COM-10 (right)    | ESS 1      |
|                | 12  | Inverter  | COM-11 (left) | COM-11 (right)    | ESS 1      |
|                | 13  | Inverter  | COM-12 (left) | COM-12 (right)    | ESS 1      |

| Cable Type     | No. | One End        |       | The Other End |            |
|----------------|-----|----------------|-------|---------------|------------|
|                |     | Component      | Port  | Port          | Component  |
| AC power cable | 7   | Inverter       | AC-L  | INV2-L        | SmartGuard |
|                | 8   | Inverter       | AC-N  | INV2-N        | SmartGuard |
|                | 9   | Inverter       | AC-PE | INV2-PE       | SmartGuard |
|                | 10  | Inverter       | AC-PE | INV2-PE       | SmartGuard |
| Signal cable   | 11  | SmartAssistant | WAN   | LAN           | Router     |

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

# Residential Smart PV Solution Quick Guide

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



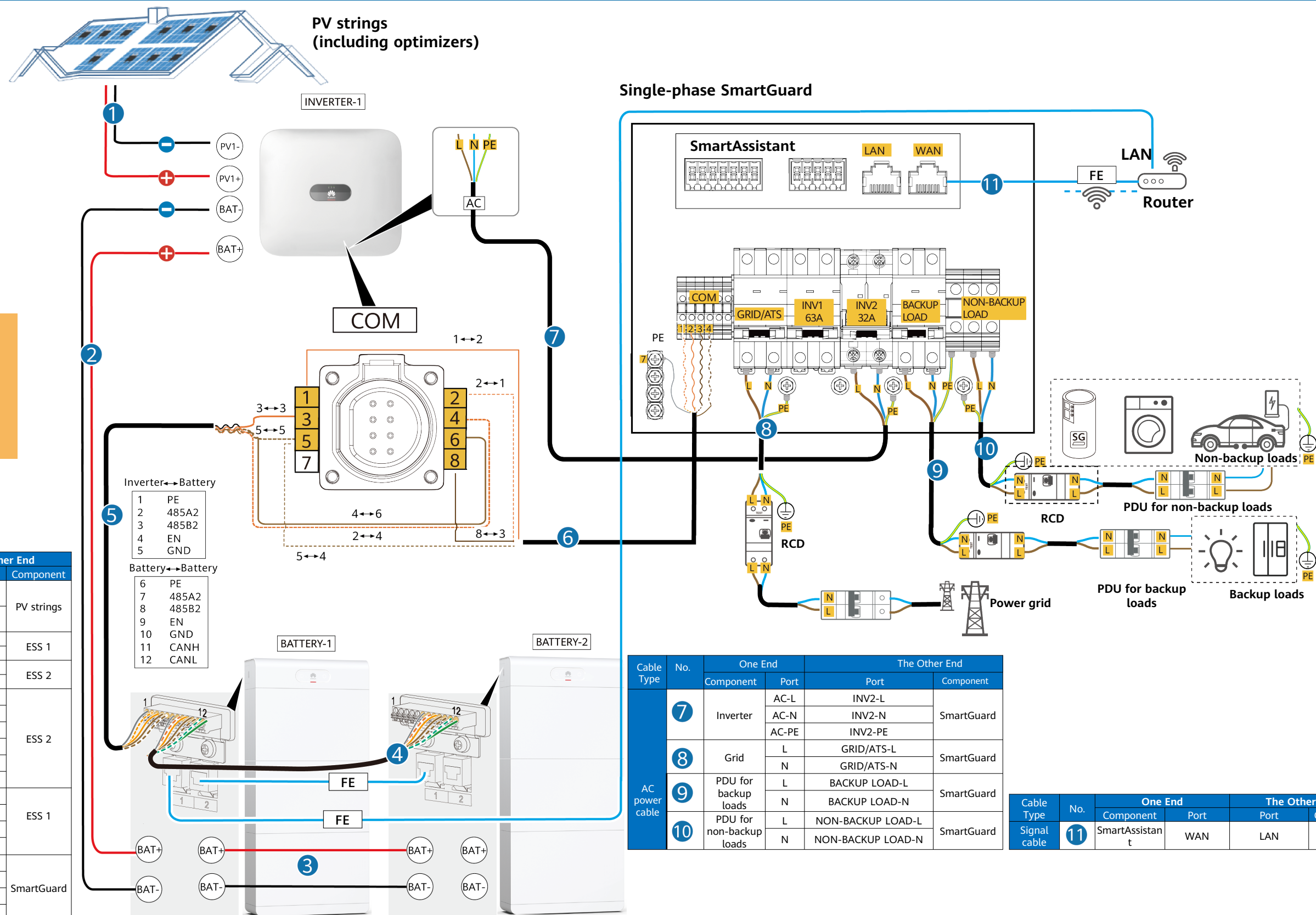
### 3 Cable Connections (Single-Phase Inverter L1 + ESS S1 + SmartGuard)

#### ⚠ 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             |            |
|                | 5   | Inverter  | COM-10 | COM-10            | ESS 1      |
|                |     |           | COM-11 | COM-11            |            |
|                |     |           | COM-12 | COM-12            |            |
| Signal cable   | 6   | Inverter  | COM-3  | COM-3             | SmartGuard |
|                |     |           | COM-4  | COM-2             |            |
|                |     |           | COM-5  | COM-5             |            |
|                |     |           | COM-6  | COM-4             |            |

| Cable Type     | No. | One End                  |       | The Other End |            |
|----------------|-----|--------------------------|-------|---------------|------------|
|                |     | Component                | Port  | Port          | Component  |
| AC power cable | 7   | Inverter                 | AC-L  | INV2-L        | SmartGuard |
|                |     |                          | AC-N  | INV2-N        |            |
|                |     |                          | AC-PE | INV2-PE       |            |
|                | 8   | Grid                     | L     | GRID/ATS-L    | SmartGuard |
| AC power cable | 9   | PDU for backup loads     | N     | GRID/ATS-N    | SmartGuard |
|                |     |                          |       |               |            |
| AC power cable | 10  | PDU for non-backup loads | L     | BACKUP LOAD-L | SmartGuard |
|                |     |                          | N     | BACKUP LOAD-N |            |

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

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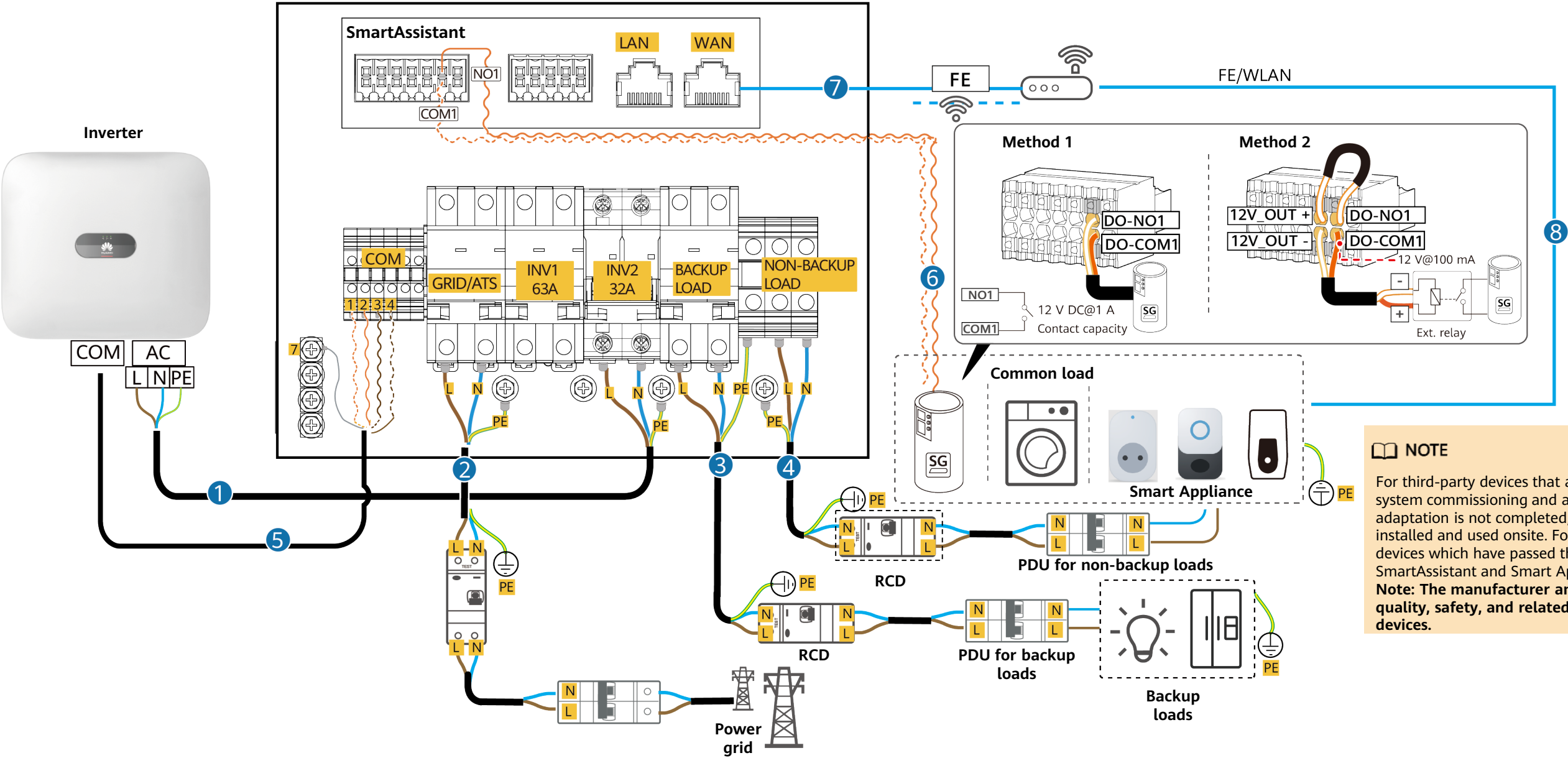
(Single-Phase PV+ESS Scenario + SmartGuard Networking)



## 3 Cable Connections (Smart Appliance Networking)

| Cable Type     | No. | One End                  |       | The Other End      |            |
|----------------|-----|--------------------------|-------|--------------------|------------|
|                |     | Component                | Port  | Port               | Component  |
| AC power cable | 1   | Inverter                 | AC-L  | INV1/2-L           | SmartGuard |
|                |     |                          | AC-N  | INV1/2-N           |            |
|                |     |                          | AC-PE | INV1/2-PE          |            |
|                | 2   | Grid                     | L     | GRID/ATS-L1        | SmartGuard |
|                |     |                          | N     | GRID/ATS-N         |            |
|                | 3   | PDU for backup loads     | L     | BACKUP LOAD-L1     | SmartGuard |
|                |     |                          | N     | BACKUP LOAD-N      |            |
|                |     |                          | L     | NON-BACKUP LOAD-L1 |            |
|                | 4   | PDU for non-backup loads | L     | NON-BACKUP LOAD-L1 | SmartGuard |
|                |     |                          | N     | NON-BACKUP LOAD-N  |            |

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



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@100 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 SmartAssistant 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.

# Residential Smart PV Solution Quick Guide

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



## 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 \(SmartAssistant\)](#).



Scan for instructions