## FusionSolar Smart PV Management System Connection (Inverters + SDongle)

# **User Manual**

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HUAWEI DIGITAL POWER TECHNOLOGIES CO., LTD.

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## Huawei Digital Power Technologies Co., Ltd.

Address: Huawei Digital Power Antuoshan Headquarters

Futian, Shenzhen 518043

People's Republic of China

Website: https://digitalpower.huawei.com

# **About This Document**

## Purpose

This document describes how to connect inverters to the FusionSolar Smart PV Management System through the Smart Dongle (SDongleA and SDongleB, also referred to as Dongle). For details about the installation of each device, see the corresponding user manual or quick guide. This document describes only cable connections between devices, power-on commissioning, and maintenance.

# **Intended Audience**

This document is intended for photovoltaic (PV) plant operators and qualified electricians.

# **Symbol Conventions**

The symbols that may be found in this document are defined as follows.

| Symbol | Description  |
|--------|--|
|        | Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.  |
|        | Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.   |
|        | Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.   |
| NOTICE | Indicates a potentially hazardous situation which, if not<br>avoided, could result in equipment damage, data loss,<br>performance deterioration, or unanticipated results.<br>NOTICE is used to address practices not related to<br>personal injury. |
| D NOTE | Supplements the important information in the main text.<br>NOTE is used to address information not related to<br>personal injury, equipment damage, and environment<br>deterioration.  |

# **Change History**

Changes between document issues are cumulative. The latest document issue contains all the changes made in earlier issues.

#### Issue 08 (2025-04-17)

- Updated 2.3 Communication Networking of the SDongleB-06 (4G).
- Updated 2.4 Communication Networking of the SDongleA-05 (WLAN-FE, 02312QMV).
- Updated 2.5 Communication Networking of the SDongleA-05 (WLAN-FE, 02312QMV-004).
- Updated 6.3 Upgrading the Inverter and Smart Dongle Software.

#### Issue 07 (2024-09-05)

- Updated 2.3 Communication Networking of the SDongleB-06 (4G).
- Updated 2.5 Communication Networking of the SDongleA-05 (WLAN-FE, 02312QMV-004).

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- Add 5.3 Connecting to the Smart Dongle and Setting Feed-in at Limited Current.
- Updated 5.4 Third-Party Management System Settings (Connecting to Two Management Systems).

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- Updated 2.2 Communication Networking of the SDongleA-03 (4G).
- Updated 2.3 Communication Networking of the SDongleB-06 (4G).

#### Issue 04 (2023-08-14)

Updated 5.2 Setting Grid-tied Control Parameters.

#### Issue 04 (2023-04-14)

- Updated 2 Introduction to the Solution.
- Updated 2.2 Communication Networking of the SDongleA-03 (4G).
- Add 2.3 Communication Networking of the SDongleB-06 (4G).
- Updated 2.4 Communication Networking of the SDongleA-05 (WLAN-FE, 02312QMV).
- Add 3.3 Installing the 4G (06) Smart Dongle.
- Updated 5.2.1 Setting Parameters over the App.
- Add 5.4 Third-Party Management System Settings (Connecting to Two Management Systems).

- Add 5.5 Setting Parameters and Exporting Logs Through the WLAN of the Smart Dongle.
- Updated 6.1 Modifying Inverter Communications Parameters.

#### Issue 03 (2022-03-15)

- Updated 2.2 Communication Networking of the SDongleA-03 (4G).
- Updated 2.4 Communication Networking of the SDongleA-05 (WLAN-FE, 02312QMV).
- Updated 3.1 Connecting Cables for Cascaded Inverters.

#### Issue 02 (2021-11-25)

- Updated 2.2 Communication Networking of the SDongleA-03 (4G).
- Updated 2.4 Communication Networking of the SDongleA-05 (WLAN-FE, 02312QMV).
- Updated 3.2 Installing the 4G/WLAN Smart Dongle.
- Updated 5.2 Setting Grid-tied Control Parameters.

#### Issue 01 (2020-12-10)

This issue is the first official release.

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# Safety Information

#### Statement

Before transporting, storing, installing, operating, using, and/or maintaining the equipment, read this document, strictly follow the instructions provided herein, and follow all the safety instructions on the equipment and in this document. In this document, "equipment" refers to the products, software, components, spare parts, and/or services related to this document; "the Company" refers to the manufacturer (producer), seller, and/or service provider of the equipment; "you" refers to the entity that transports, stores, installs, operates, uses, and/or maintains the equipment.

The Danger, Warning, Caution, and Notice statements described in this document do not cover all the safety precautions. You also need to comply with relevant international, national, or regional standards and industry practices. The Company shall not be liable for any consequences that may arise due to violations of safety requirements or safety standards concerning the design, production, and usage of the equipment.

The equipment shall be used in an environment that meets the design specifications. Otherwise, the equipment may be faulty, malfunctioning, or damaged, which is not covered under the warranty. The Company shall not be liable for any property loss, personal injury, or even death caused thereby.

Comply with applicable laws, regulations, standards, and specifications during transportation, storage, installation, operation, use, and maintenance.

Do not perform reverse engineering, decompilation, disassembly, adaptation, implantation, or other derivative operations on the equipment software. Do not study the internal implementation logic of the equipment, obtain the source code of the equipment software, violate intellectual property rights, or disclose any of the performance test results of the equipment software.

# The Company shall not be liable for any of the following circumstances or their consequences:

- The equipment is damaged due to force majeure such as earthquakes, floods, volcanic eruptions, debris flows, lightning strikes, fires, wars, armed conflicts, typhoons, hurricanes, tornadoes, and other extreme weather conditions.
- The equipment is operated beyond the conditions specified in this document.

- The equipment is installed or used in environments that do not comply with international, national, or regional standards.
- The equipment is installed or used by unqualified personnel.
- You fail to follow the operation instructions and safety precautions on the product and in the document.
- You remove or modify the product or modify the software code without authorization.
- You or a third party authorized by you cause the equipment damage during transportation.
- The equipment is damaged due to storage conditions that do not meet the requirements specified in the product document.
- You fail to prepare materials and tools that comply with local laws, regulations, and related standards.
- The equipment is damaged due to your or a third party's negligence, intentional breach, gross negligence, or improper operations, or other reasons not related to the Company.

## 1.1 Personal Safety

#### ▲ DANGER

Ensure that power is off during installation. Do not install or remove a cable with power on. Transient contact between the core of the cable and the conductor will generate electric arcs or sparks, which may cause a fire or personal injury.

#### A DANGER

Non-standard and improper operations on the energized equipment may cause fire, electric shocks, or explosion, resulting in property damage, personal injury, or even death.

#### **DANGER**

Before operations, remove conductive objects such as watches, bracelets, bangles, rings, and necklaces to prevent electric shocks.

#### **DANGER**

During operations, use dedicated insulated tools to prevent electric shocks or short circuits. The dielectric withstanding voltage level must comply with local laws, regulations, standards, and specifications.

#### Figure 1-1 Personal protective equipment



#### **General Requirements**

- Do not stop protective devices. Pay attention to the warnings, cautions, and related precautionary measures in this document and on the equipment.
- If there is a likelihood of personal injury or equipment damage during operations, immediately stop, report the case to the supervisor, and take feasible protective measures.
- Do not power on the equipment before it is installed or confirmed by professionals.
- In the case of a fire, immediately leave the building or the equipment area and activate the fire alarm or call emergency services. Do not enter the affected building or equipment area under any circumstances.

#### **Personnel Requirements**

- Only professionals and trained personnel are allowed to operate the equipment.
  - Professionals: personnel who are familiar with the working principles and structure of the equipment, trained or experienced in equipment operations and are clear of the sources and degree of various potential hazards in equipment installation, operation, maintenance
  - Trained personnel: personnel who are trained in technology and safety, have required experience, are aware of possible hazards on themselves in certain operations, and are able to take protective measures to minimize the hazards on themselves and other people
- Personnel who plan to install or maintain the equipment must receive adequate training, be able to correctly perform all operations, and understand all necessary safety precautions and local relevant standards.
- Only qualified professionals or trained personnel are allowed to install, operate, and maintain the equipment.
- Only qualified professionals are allowed to remove safety facilities and inspect the equipment.
- Personnel who will perform special tasks such as electrical operations, working at heights, and operations of special equipment must possess the required local qualifications.

- Only authorized professionals are allowed to replace the equipment or components (including software).
- Only personnel who need to work on the equipment are allowed to access the equipment.

# **1.2 Electrical Safety**

#### 

Non-standard and improper operations may result in fire or electric shocks.

#### **DANGER**

Prevent foreign matter from entering the equipment during operations. Otherwise, equipment short-circuits or damage, load power derating, power failure, or personal injury may occur.

#### MARNING

For the equipment that needs to be grounded, install the ground cable first when installing the equipment and remove the ground cable last when removing the equipment.

#### **General Requirements**

- Follow the procedures described in the document for installation, operation, and maintenance. Do not reconstruct or alter the equipment, add components, or change the installation sequence without permission.
- Obtain approval from the national or local electric utility company before connecting the equipment to the grid.
- Before installing or removing power cables, turn off the switches of the equipment and its upstream and downstream switches.
- If any liquid is detected inside the equipment, disconnect the power supply immediately and do not use the equipment.
- Before performing operations on the equipment, check that all tools meet the requirements and record the tools. After the operations are complete, collect all of the tools to prevent them from being left inside the equipment.
- Before installing power cables, check that cable labels are correct and cable terminals are insulated.
- When installing the equipment, use a torque tool of a proper measurement range to tighten the screws. When using a wrench to tighten the screws, ensure that the wrench does not tilt and the torque error does not exceed 10% of the specified value.

- If the equipment has multiple inputs, disconnect all the inputs and wait until the equipment is completely powered off before performing operations on the equipment.
- Check equipment connections periodically, ensuring that all screws are securely tightened.
- Only qualified professionals can replace a damaged cable.
- Do not scrawl, damage, or block any labels or nameplates on the equipment. Promptly replace labels that have worn out.
- Do not use solvents such as water, alcohol, or oil to clean electrical components inside or outside of the equipment.

#### Grounding

- Ensure that the grounding impedance of the equipment complies with local electrical standards.
- Ensure that the equipment is connected permanently to the protective ground. Before operating the equipment, check its electrical connection to ensure that it is reliably grounded.
- Do not work on the equipment in the absence of a properly installed ground conductor.
- Do not damage the ground conductor.
- For the equipment that uses a three-pin socket, ensure that the ground terminal in the socket is connected to the protective ground point.
- If high touch current may occur on the equipment, ground the protective ground terminal on the equipment enclosure before connecting the power supply; otherwise, electric shock as a result of touch current may occur.

#### **Cabling Requirements**

- When selecting, installing, and routing cables, follow local safety regulations and rules.
- When routing power cables, ensure that there is no coiling or twisting. Do not join or weld power cables. If necessary, use a longer cable.
- Ensure that all cables are properly connected and insulated, and meet specifications.
- Ensure that the slots and holes for routing cables are free from sharp edges, and that the positions where cables are routed through pipes or cable holes are equipped with cushion materials to prevent the cables from being damaged by sharp edges or burrs.
- Ensure that cables of the same type are bound together neatly and straight and that the cable sheath is intact. When routing cables of different types, ensure that they are away from each other without entanglement and overlapping.

# **1.3 Environment Requirements**

#### ▲ DANGER

Do not expose the equipment to flammable or explosive gas or smoke. Do not perform any operation on the equipment in such environments.

#### ▲ DANGER

Do not place the equipment near heat sources or fire sources, such as smoke, candles, heaters, or other heating devices. Overheat may damage the equipment or cause a fire.

#### 

Install the equipment in an area far away from liquids. Do not install it under areas prone to condensation, such as under water pipes and air exhaust vents, or areas prone to water leakage, such as air conditioner vents, ventilation vents, or feeder windows of the equipment room. Ensure that no liquid enters the equipment to prevent faults or short circuits.

#### **General Requirements**

- Ensure that the equipment is stored in a clean, dry, and well ventilated area with proper temperature and humidity and is protected from dust and condensation.
- Keep the installation and operating environments of the equipment within the allowed ranges. Otherwise, its performance and safety will be compromised.
- Do not install, use, or operate outdoor equipment and cables (including but not limited to moving equipment, operating equipment and cables, inserting connectors to or removing connectors from signal ports connected to outdoor facilities, working at heights, performing outdoor installation, and opening doors) in harsh weather conditions such as lightning, rain, snow, and level 6 or stronger wind.
- Do not install the equipment in an environment with direct sunlight, dust, smoke, volatile or corrosive gases, infrared and other radiations, organic solvents, or salty air.
- Do not install the equipment in an environment with conductive metal or magnetic dust.
- Do not install the equipment in an area conducive to the growth of microorganisms such as fungus or mildew.
- Do not install the equipment in an area with strong vibration, noise, or electromagnetic interference.

• After installing the equipment, remove the packing materials such as cartons, foam, plastics, and cable ties from the equipment area.

# **1.4 Mechanical Safety**

#### 

When working at heights, wear a safety helmet and safety harness or waist belt and fasten it to a solid structure. Do not mount it on an insecure moveable object or metal object with sharp edges. Make sure that the hooks will not slide off.

#### 

Ensure that all necessary tools are ready and inspected by a professional organization. Do not use tools that have signs of scratches or fail to pass the inspection or whose inspection validity period has expired. Ensure that the tools are secure and not overloaded.

#### 

Do not drill holes into the equipment. Doing so may affect the sealing performance and electromagnetic containment of the equipment and damage components or cables inside. Metal shavings from drilling may short-circuit boards inside the equipment.

#### **General Requirements**

- Do not perform operations such as arc welding and cutting on the equipment without evaluation by the Company.
- Do not install other devices on the top of the equipment without evaluation by the Company.
- Use correct tools and operate them in the correct way.

#### **Moving Heavy Objects**

• Be cautious to prevent injury when moving heavy objects.



• If multiple persons need to move a heavy object together, determine the manpower and work division with consideration of height and other conditions to ensure that the weight is equally distributed.

- If two persons or more move a heavy object together, ensure that the object is lifted and landed simultaneously and moved at a uniform pace under the supervision of one person.
- Wear personal protective gears such as protective gloves and shoes when manually moving the equipment.
- To move an object by hand, approach to the object, squat down, and then lift the object gently and stably by the force of the legs instead of your back. Do not lift it suddenly or turn your body around.
- Move or lift the equipment by holding its handles or lower edges. Do not hold the handles of modules that are installed in the equipment.
- Do not quickly lift a heavy object above your waist. Place the object on a workbench that is half-waist high or any other appropriate place, adjust the positions of your palms, and then lift it.
- Move a heavy object stably with balanced force at an even and low speed. Put down the object stably and slowly to prevent any collision or drop from scratching the surface of the equipment or damaging the components and cables.
- When moving a heavy object, be aware of the workbench, slope, staircase, and slippery places. When moving a heavy object through a door, ensure that the door is wide enough to move the object and avoid bumping or injury.
- When transferring a heavy object, move your feet instead of turning your waist around. When lifting and transferring a heavy object, ensure that your feet point to the target direction of movement.

# **2** Introduction to the Solution

This solution mainly applies to residential or small-scale ground-mounted PV plants, in which the inverter and power meter are connected to the FusionSolar Smart PV Management System through the Smart Dongle.

| Model  | Communications<br>Mode | Description   |  |
|--|------------------------|---|--|
| SDongleA-01  | WLAN                   | Connects to a router over a WLAN. The router connects to the FusionSolar Smart PV Management System over an IP network.     |  |
| SDongleA-03-CN <sup>a</sup><br>SDongleA-03-EU<br>SDongleA-03-AU<br>SDongleA-03-JP<br>SDongleA-03-KR<br>SDongleB-06-CN <sup>a</sup><br>SDongleB-06-EU<br>SDongleB-06-AU<br>SDongleB-06-NH | 4G                     | Connects to the FusionSolar Smart PV Management<br>System through the 4G network by using a SIM<br>card.                    |  |
| SDongleA-05  | WLAN and FE            | Connects to a router over WLAN or FE. The router connects to the FusionSolar Smart PV Management System over an IP network. |  |
| Note a: The SDongleA-03-CN and SDongleB-06-CN Smart Dongles are applicable only to the Chinese mainland. For other countries or regions, Huawei does not provide quality assurance.      |                        |   |  |

 Table 2-1
 Smart Dongle models

#### Table 2-2 WLAN parameters

| Technical Specification | Value Range         |
|-------------------------|---------------------|
| Frequency               | 2400 MHz-2483.5 MHz |
| Protocol standard       | 802.11b/g/n         |
| Bandwidth               | 20M                 |
| Maximum transmit power  | ≤ 20 dBm E.I.R.P.   |

# 2.1 Communication Networking of the SDongleA-01 (WLAN)

- The inverter connects to the router through the WLAN Smart Dongle, and then connects to the FusionSolar Smart PV Management System through the router.
- The inverter connects to the FusionSolar app through its WLAN. You can use the FusionSolar app to view the running information and settings of the inverter.
- You can remotely log in to the FusionSolar Smart PV Management System over the WebUI or FusionSolar app.



#### Figure 2-1 Networking description

#### D NOTE

- The components in the dotted box are optional.
- The inverter model is subject to change. The model information and device appearance in this document are for reference only.
- When multiple inverters are cascaded, only one Smart Dongle or SmartLogger can be connected to the RS485 communications link.
- When the Smart Dongle is used in China, it can be used for device cascading using RS485 communication (inverters cascading with inverters or other non-inverter devices). A maximum of 10 devices can be cascaded. In site communication scenarios, the number of inverters that can be cascaded also depends on the inverter features. When this Smart Dongle is used in other areas, device cascading using RS485 communication is not supported.

#### Table 2-3 Number of cascaded inverters

| Limit   | Actual Connection            |   |  |
|---|------------------------------|---|--|
| Maximum Number of Devices That Can Be<br>Connected to the Smart Dongle <sup>ab</sup>          | Number of Slave<br>Inverters | Number of Other Devices<br>(Such as Power Meters) |  |
| 10  | n ≤ 9                        | ≤ 9 – n   |  |
| Note a: You can view the number of devices that can be connected to the Smart Dongle from the |                              |   |  |

Note a: You can view the number of devices that can be connected to the Smart Dongle from the label on the external package.

Note b: If the number of inverters exceeds the limit, configure multiple Smart Dongles. The installation and commissioning for each Smart Dongle are the same.

#### Table 2-4 Device description

| Device    | Description  | Service<br>Owner   |
|-----------|--|--------------------|
| PV module | Prepared by the customer.  | Device<br>supplier |
| Inverter  | SUN2000-(3KTL-20KTL)-M0. Software version:<br>SUN2000MA V100R001C00SPC100 or later. Only one<br>inverter can be connected. | Huawei             |
| Dongle    | Purchased by the customer. The model should be SDongleA-01.  | Huawei             |

| Device                           | Description  | Service<br>Owner   |
|----------------------------------|--|--------------------|
| Router                           | <ul> <li>The router supports WLAN (IEEE 802.11 b/g/n, 2.4 GHz), and the inverters are within the WLAN signal coverage.</li> <li>The WPA, WPA2, or WPA/WPA2 encryption mode is</li> </ul> | Device<br>supplier |
|                                  | recommended.   |                    |
|                                  | • The Enterprise mode is not supported (such as airport WLAN and other public hotspots that require authentication).   |                    |
|                                  | • WEP and WPA TKIP encryption modes are not recommended because they have serious security vulnerabilities.  |                    |
|                                  | • If the access fails in WEP or WPA TKIP mode, log in to the router and change the encryption mode of the router to WPA2 or WPA/WPA2.  |                    |
| Intelligent<br>management system | FusionSolar Smart PV Management System. Software version: SmartPVMS V500R007C00SPC110 or later.  | Huawei             |
| Арр                              | FusionSolar app of 5.7.001 or a later version. The app can<br>be locally connected to the inverter and remotely<br>connected to the FusionSolar Smart PV Management<br>System.           | Huawei             |
| Power distribution unit          | Prepared by the customer   | Device<br>supplier |
| Smart Power Sensor               | Recommended model: DTSU666-H   | Huawei             |
| Power meter                      | Prepared by the customer   | Device<br>supplier |

# 2.2 Communication Networking of the SDongleA-03 (4G)

- The inverter connects to the FusionSolar Smart PV Management System through the 4G Smart Dongle.
- The master inverter connects to the FusionSolar app. You can use the FusionSolar app to view the running information and settings of the inverter.
- You can remotely log in to the FusionSolar Smart PV Management System over the WebUI or FusionSolar app.

#### **RS485 Networking**



#### **NOTE**

- The components in the dotted box are optional.
- The inverter model is subject to change. The model information and device appearance in this document are for reference only.
- In the networking, the inverter where the Dongle is installed is the master inverter, and other inverters are slave inverters. Slave inverters can communicate with the Dongle through cascading.
- If multiple inverters are cascaded, use either a Dongle or a SmartLogger for networking. You cannot use two networking methods at the same time.
- The Smart Power Sensor connects to the RS485-2 and RS485\_2 ports, or 485B2 and 485A2 ports on the master inverter. The RS485-1 and RS485\_1 ports, or 485B1 and 485A1 ports are used for inverter cascading.

Table 2-5 Device description

| Device    | Description              | Service<br>Owner   |
|-----------|--------------------------|--------------------|
| PV module | Prepared by the customer | Device<br>supplier |

| Device   |                    | Description   | Service<br>Owner |
|----------|--------------------|---|------------------|
| Inverter | Master<br>inverter | <ul> <li>SUN2000-(2KTL-5KTL)-CN or SUN2000-(2KTL-5KTL)-L0.<br/>Software version: SUN2000L V100R001C00SPC333 or<br/>later.</li> <li>SUN2000-(2KTL-6KTL)-L1. Software version: SUN2000L<br/>V200R001C00 or later.</li> <li>SUN2000-(3KTL-20KTL)-M0</li> <li>SUN2000-(3KTL-20KTL)-M1</li> <li>SUN2000-(3KTL-20KTL)-M2</li> <li>SUN2000-(20KTL, 29.9KTL, 30KTL, 36KTL, 40KTL)-M3<br/>Series</li> <li>SUN2000-(50KTL-ZHM3, 50KTL-M3, 50KTL-BRM3)</li> <li>SUN2000-(50KTL-NHM3</li> <li>SUN2000-50KTL-NHM3</li> <li>SUN2000-(12KTL-25KTL)-M5 Series</li> <li>SUN2000-70KTL/75KTL-C1 (optional), SUN2000-70KTL-<br/>INM0, SUN2000-50KTL/60KTL/65KTL-M0,<br/>SUN2000-50KTL/SUN2000-63KTL-JPM0, or<br/>SUN2000-50KTL/SUN2000-63KTL-JPM0, or<br/>SUN2000-50KTL/JPM1. Software version: SUN2000<br/>V300R001C00SPC112 or later.</li> <li>SUN2000-100KTL/110KTL/125KTL-M0, SUN2000-75KTL/<br/>100KTL-M1, or SUN2000-100KTL-INM0.</li> <li>SUN2000-(75KTL-M1, 100KTL-M2, 110KTL-M2, 115KTL-<br/>M2)</li> </ul> | Huawei           |
|          | Slave<br>inverter  | <ul> <li>A master inverter can be used as a slave inverter. A master inverter that does not support cascading, such as SUN2000-(2KTL-5KTL)-CN or SUN2000-(2KTL-5KTL)-L0, cannot be used as a slave inverter.</li> <li>SUN2000-29.9KTL/36KTL/42KTL/50KTL</li> <li>SUN2000-33KTL-A</li> <li>SUN2000-33KTL/40KTL-JP</li> <li>SUN2000-43KTL-IN-C1</li> <li>SUN2000-50KTL-C1</li> </ul>  | Huawei           |
| Dongle   |                    | Purchased by the customer. The model should be<br>SDongleA-03-XX. For details, see the Smart Dongle models.   | Huawei           |
| SIM card |                    | If the Smart Dongle is not configured with a SIM card,<br>prepare a standard SIM card of the local carriers (size: 25<br>mm x 15 mm).   | Customer         |

| Device                              | Description  | Service<br>Owner   |
|-------------------------------------|--|--------------------|
| Intelligent<br>management<br>system | • Huawei management system: FusionSolar Smart PV<br>Management System with the software version of<br>SmartPVMS V500R007C00SPC110 or later. You are<br>advised to use the latest version.  | Huawei             |
|                                     | • Third-party management system: A third-party management system is supported. For details, see the third-party management system documentation.   |                    |
| Арр                                 | <ul> <li>FusionSolar app of 5.7.001 or a later version. The app can be locally connected to the inverter and remotely connected to the FusionSolar Smart PV Management System.</li> <li>SUN2000 app of 3.2.00.005 or a later version for Android. The app can be locally connected to the inverter.</li> </ul> | Huawei             |
| Power distribution<br>unit          | Prepared by the customer   | Device<br>supplier |
| Battery                             | Can connect to LUNA2000 batteries.   | Huawei             |
| Smart Power<br>Sensor               | <ul> <li>Recommended models for three-phase inverters:<br/>DTSU666-H, YDS60-80, YDS60-C24, DTSU666-HW</li> <li>Recommended models for single-phase inverters:</li> </ul>   | Huawei             |
| Power meter                         | DDSU666-H<br>Prepared by the customer  | Device<br>supplier |

#### **MBUS Communication Networking**

- The inverter connects to the FusionSolar Smart PV Management System through the 4G Smart Dongle.
- The master inverter connects to the FusionSolar app. You can use the FusionSolar app to view the running information and settings of the inverter.
- You can remotely log in to the FusionSolar Smart PV Management System over the WebUI or FusionSolar app.

#### NOTICE

The MBUS communication is applicable to medium-voltage grid connection scenarios and non-low-voltage public grid connection scenarios (industrial environment).



#### Figure 2-3 Networking description

#### **NOTE**

- The components in the dotted box are optional.
- The inverter model is subject to change. The model information and device appearance in this document are for reference only.
- In the networking, the inverter where the Dongle is installed is the master inverter, and other inverters are slave inverters. Slave inverters can communicate with the Dongle through cascading.
- If multiple inverters are cascaded, use either a Dongle or a SmartLogger for networking. You cannot use two networking methods at the same time.

| Table 2-6 Device or software description | Table 2-6 | Device | or software | description |
|--|-----------|--------|-------------|-------------|
|--|-----------|--------|-------------|-------------|

| Device                      |                   | Description  | Service Owner |
|-----------------------------|-------------------|--|---------------|
| PV module                   |                   | Prepared by the customer   | Customer      |
| Inverter Master<br>inverter |                   | SUN2000-100KTL/110KTL/125KTL-M0. Software version: SUN2000 V500R001C00SPC100 or later. | Huawei        |
|                             | Slave<br>inverter | SUN2000-36KTL<br>SUN2000-50KTL/60KTL-M0<br>SUN2000-100KTL/110KTL/125KTL-M0             | Huawei        |

| Device                           | Description   | Service Owner  |
|----------------------------------|---|--|
| Dongle                           | Purchased by the customer. The model should be SDongleA-03-XX. For details, see the Smart Dongle models.  | Huawei   |
| SIM card                         | If the Smart Dongle is not configured with a SIM card, prepare a standard SIM card (size: 25 mm x 15 mm) of a local carrier.  | Customer   |
| Intelligent<br>management system | • Huawei management system: FusionSolar Smart<br>PV Management System with the software version<br>of SmartPVMS V500R007C00SPC110 or later. You<br>are advised to use the latest version. | <ul><li>Huawei</li><li>Device<br/>supplier</li></ul> |
|                                  | • Third-party management system: A third-party management system is supported. For details, see the third-party management system documentation.  |  |
| Арр                              | • FusionSolar app of 5.7.001 or a later version. The app can be locally connected to the inverter and remotely connected to the FusionSolar Smart PV Management System.                   | Huawei   |
|                                  | • SUN2000 app of 3.2.00.005 or a later version for Android. The app is locally connected to the inverter.   |  |
| AC combiner box                  | Prepared by the customer  | Customer   |
| Transformer station              | Prepared by the customer  | Customer   |
| Power meter                      | Prepared by the customer  | Device supplier                                      |

### Smart Dongle Parameters

 Table 2-7 Number of cascaded inverters

| Limit  |                                 | Actual Connection            |  |
|--|---------------------------------|------------------------------|--|
| Maximum Number of Devices That Can Be<br>Connected to the Smart Dongle <sup>abcd</sup> |                                 | Number of<br>Slave Inverters | Number of Other<br>Devices (Such as Power<br>Meters) |
| 10   | 10                              | n ≤ 9                        | ≤ 9 – n  |
|  | 3 (with energy storage)         | n ≤ 2                        | ≤ 2 – n  |
|  | 3 (with single-phase inverters) | n ≤ 2                        | ≤ 2 – n  |
| 2  | 2                               | n ≤ 1                        | ≤ 1 – n  |

| Limit Actual Connection  |                              | n  |
|--|------------------------------|--|
| Maximum Number of Devices That Can Be<br>Connected to the Smart Dongle <sup>abcd</sup> | Number of<br>Slave Inverters | Number of Other<br>Devices (Such as Power<br>Meters) |

Note a: You can view the number of devices that can be connected to the Smart Dongle from the label on the external package.

Note b: If the number of inverters exceeds the limit, configure multiple Smart Dongles. The installation and commissioning for each Smart Dongle are the same.

Note c: A maximum of three SUN2000-(2KTL-6KTL)-L1 inverters can be cascaded.

Note d: If RS485 communication is used and the device is connected to the RS485-2 and RS485\_2 ports, or 485B2 and 485A2 ports on the master inverter, the device is not counted as a cascaded device.

| Model                                      | Supported<br>Frequency<br>Bands and<br>Systems   | Protocol<br>standard   | Bandwidth   | Maximum<br>transmit power  |
|--|--|--|---|--|
| SDongl<br>eA-03-<br>CN<br>SDongl<br>eA-03- | LTE FDD: B1,<br>B3, B8<br>LTE TDD: B38,<br>B39, B40, B41<br>DC-HSPA+/<br>HSPA+/HSPA/<br>UMTS: B1, B5,<br>B8, B9<br>TD-SCDMA:<br>B34, B39<br>GSM/GPRS/<br>EDGE: 900<br>MHz, 1800<br>MHz<br>LTE FDD: B1,<br>B3, B7, B8,<br>P20 | <ul> <li>Supports LTE-<br/>FDD (with<br/>receive<br/>diversity):<br/>B1/B3/B7/B8/B<br/>20/B28.</li> <li>Supports LTE-<br/>FDD (with<br/>receive<br/>diversity):<br/>B38/B40/B41.</li> <li>Supports<br/>WCDMA:<br/>B1/B8.</li> <li>Supports GSM:<br/>900 MHz/1800<br/>MHz.</li> </ul> | <ul> <li>LTE features:</li> <li>Supports a maximum of<br/>3GPP R8 non-CA Cat 4 FDD<br/>and TDD.</li> <li>Supports 1.4 MHz/3 MHz/5<br/>MHz/10 MHz/15 MHz/20<br/>MHz RF bandwidth.</li> <li>Supports MIMO in the<br/>downlink.</li> <li>LTE-FDD: maximum<br/>downlink rate of 150 Mbit/s<br/>and maximum uplink rate<br/>of 50 Mbit/s</li> <li>LTE-TDD: maximum<br/>downlink rate of 130 Mbit/s<br/>and maximum uplink rate<br/>of 30 Mbit/s</li> </ul> | <ul> <li>Class 4 (33<br/>dBm±2 dB),<br/>EGSM900<br/>frequency<br/>band</li> <li>Class 1 (30<br/>dBm±2 dB),<br/>DCS1800<br/>frequency<br/>band</li> <li>Class E2 (27<br/>dBm±3 dB),<br/>EGSM900 8-<br/>PSK</li> <li>Class E2 (26<br/>dBm±3 dB),<br/>DCS1800 8-<br/>DCS1800 8-<br/>DCS1800 8-</li> </ul> |
| EU   | B20<br>LTE TDD: B38,<br>B40<br>WCDMA/<br>HSDPA/<br>HSUPA/HSPA<br>+: B1, B8<br>GSM/GPRS/<br>EDGE: 900<br>MHz, 1800<br>MHz   | • Supports digital audio.  | <ul> <li>UMTS features:</li> <li>Supports 3GPP R7 HSDPA+,<br/>HSDPA, HSUPA, and<br/>WCDMA.</li> <li>Supports QPSK and 16QAM<br/>modulation.</li> <li>HSDPA+: maximum<br/>downlink rate of 21 Mbit/s</li> <li>HSUPA: maximum uplink<br/>rate of 5.76 Mbit/s</li> </ul>   | <ul> <li>PSK</li> <li>Class 3 (24<br/>dBm+1/-3<br/>dB), WCDMA<br/>frequency<br/>band</li> <li>Class 3 (23<br/>dBm±2 dB),<br/>LTE-FDD<br/>frequency<br/>band</li> </ul>   |
| SDongl<br>eA-03-<br>AU                     | LTE FDD: B1,<br>B2, B3, B4,<br>B5, B7, B8,<br>B28<br>LTE TDD: B40<br>WCDMA: B1,<br>B2, B5, B8<br>GSM: 850<br>MHz, 900<br>MHz, 1800<br>MHz, 1900<br>MHz   |  | <ul> <li>WCDMA: maximum<br/>downlink rate of 384 kbit/s<br/>and maximum uplink rate<br/>of 384 kbit/s</li> <li>GSM features:</li> <li>GPRS:</li> <li>Supports GPRS multislot<br/>class 12.</li> <li>Coding schemes: CS-1, CS-2,<br/>CS-3, and CS-4</li> <li>Maximum downlink rate:<br/>85.6 kbit/s; maximum uplink<br/>rate: 85.6 kbit/s</li> <li>EDGE:</li> </ul>  | <ul> <li>Class 3 (23<br/>dBm±2 dB),<br/>LTE-TDD<br/>frequency<br/>band</li> </ul>  |

**Table 2-8** Frequency bands and systems of the Smart Dongle

| Model                  | Supported<br>Frequency<br>Bands and<br>Systems                         | Protocol<br>standard | Bandwidth  | Maximum<br>transmit power |
|------------------------|--|----------------------|--|---------------------------|
| SDongl<br>eA-03-<br>JP | LTE FDD: B1,<br>B3, B8, B18,<br>B19, B26<br>LTE TDD: B41<br>WCDMA: B1, |                      | <ul> <li>Supports EDGE multislot<br/>class 12.</li> <li>Supports GMSK and 8-PSK<br/>modulation and coding<br/>schemes.</li> </ul>  |                           |
| SDongl<br>eA-03-<br>KR | B6, B8, B19<br>LTE FDD: B1,<br>B3, B5, B7<br>WCDMA: B1                 |                      | <ul> <li>Downlink coding format:<br/>MCS 1–9</li> <li>Uplink coding format: MCS 1–9</li> <li>Maximum downlink rate:<br/>236.8 kbit/s; maximum<br/>uplink rate: 236.8 kbit/s</li> </ul> |                           |

Table 2-9 Traffic requirements for the SIM card

| Access<br>Managemen<br>t System<br>Type         | Monthly Traffic Requirement for the SIM Card |   | Traffic Capability   |   |
|---|--|---|--|---|
| FusionSolar<br>Smart PV<br>Management<br>System | Inverter                                     | Without a<br>power sensor<br>or energy<br>storage | 10 MB + 4 MB x<br>Number of inverters  | <ul> <li>Device performance<br/>data can be updated<br/>every 5 minutes.</li> <li>The Smart Dongle logs,</li> </ul> |
|   |  | With a power sensor                               | 10 MB + 7 MB x<br>Number of inverters  | inverter logs, and I-V<br>diagnosis data can be<br>exported monthly. The  |
|   |  | With energy<br>storage                            | 13 MB + 7 MB x<br>Number of inverters +<br>5 MB x Number of DC-<br>DC converters | Smart Dongle and<br>inverters can be<br>upgraded monthly.   |
|   |  | With a power<br>sensor and<br>energy storage      | 13 MB + 7 MB x<br>Number of inverters +<br>5 MB x Number of DC-<br>DC converters |   |
|   | With Smart PV Optim                          | PV Optimizers                                     | Inverter data usage + 2<br>MB + 0.2 MB x<br>Number of Smart PV<br>Optimizers     |   |

# 2.3 Communication Networking of the SDongleB-06 (4G)

- The inverter connects to the FusionSolar Smart PV Management System through the 4G Smart Dongle.
- The master inverter connects to the FusionSolar app. You can use the FusionSolar app to view the running information and settings of the inverter.
- The Smart Dongle can connect to a third-party management system.
- The Smart Dongle supports WLAN hotspots.
- You can remotely log in to the FusionSolar Smart PV Management System over the WebUI or FusionSolar app.

#### **RS485 Networking**



Figure 2-4 Networking description

#### **NOTE**

- The components in the dotted box are optional.
- The inverter model is subject to change. The model information and device appearance in this document are for reference only.
- In the networking, the inverter where the Dongle is installed is the master inverter, and other inverters are slave inverters. Slave inverters can communicate with the Dongle through cascading.
- If multiple inverters are cascaded, use either a Dongle or a SmartLogger for networking. You cannot use two networking methods at the same time.
- The Smart Power Sensor connects to the RS485-2 and RS485\_2 ports, or 485B2 and 485A2 ports on the master inverter. The RS485-1 and RS485\_1 ports, or 485B1 and 485A1 ports are used for inverter cascading.

#### Table 2-10 Device description

| Device                      | Description   | Service<br>Owner   |
|-----------------------------|---|--------------------|
| PV module                   | Prepared by the customer  | Device<br>supplier |
| Inverter Master<br>inverter | <ul> <li>SUN2000-(2KTL-5KTL)-CN or SUN2000-(2KTL-5KTL)-<br/>L0. Software version: SUN2000L V100R001C00SPC333<br/>or later.</li> <li>SUN2000-(2KTL-6KTL)-L1</li> <li>SUN2000-(3KTL-20KTL)-M0</li> <li>SUN2000-(3KTL-20KTL)-M1</li> <li>SUN2000-(3KTL-12KTL)-M1</li> <li>SUN2000-(3KTL-12KTL)-M1</li> <li>SUN2000-(8K, 12K)-MAP0 Series</li> <li>SUN2000-(8K, 12K)-MAP0 Series</li> <li>SUN2000-(12K-25K)-MB0 Series</li> <li>SUN2000-(12K-25K)-MB0 Series</li> <li>SUN2000-(20KTL, 29.9KTL, 30KTL, 36KTL, 40KTL)-M3<br/>Series</li> <li>SUN2000-(12KTL-25KTL)-M5 Series</li> <li>SUN2000-(12KTL-25KTL)-M5 Series</li> <li>SUN2000-(50KTL-7HM3, 50KTL-M3, 50KTL-BRM3)</li> <li>SUN2000-50KTL/NHM3</li> <li>SUN2000-70KTL/75KTL-C1 (optional),<br/>SUN2000-50KTL/SUN2000-63KTL-JPM0, or<br/>SUN2000-50KTL/SUN2000-63KTL-JPM0, or<br/>SUN2000-50KTL/JPM1. Software version: SUN2000<br/>V300R001C00SPC112 or later.</li> <li>SUN2000-100KTL/110KTL/125KTL-M0,<br/>SUN2000-75KTL/100KTL-M1, or SUN2000-100KTL-<br/>INM0.<br/>SUN2000-(75KTL-M1, 100KTL-M2, 110KTL-M2,<br/>115KTL-M2)</li> <li>SUN2000-(50K, 75K, 80K, 150K)-MG Series</li> <li>SUN2000-(150K-MG0-ZH,150K-MG0)</li> </ul> | Huawei             |

| Device                           |                   | Description  | Service<br>Owner   |  |
|----------------------------------|-------------------|--|--------------------|--|
|                                  | Slave<br>inverter | <ul> <li>A master inverter can be used as a slave inverter. A master inverter that does not support cascading, such as SUN2000-(2KTL-5KTL)-CN or SUN2000-(2KTL-5KTL)-L0, cannot be used as a slave inverter.</li> <li>SUN2000-29.9KTL/36KTL/42KTL/50KTL</li> <li>SUN2000-33KTL-A</li> <li>SUN2000-33KTL/40KTL-JP</li> <li>SUN2000-43KTL-IN-C1</li> <li>SUN2000-50KTL-C1</li> </ul> | Huawei             |  |
| Dongle                           |                   | Purchased by the customer. The model should be SDongleB-06-XX. For details, see the Smart Dongle models.   | Huawei             |  |
| SIM card                         |                   | If the Smart Dongle is not configured with a SIM card, prepare a standard SIM card of the local carriers (size: 25 mm x 15 mm).  | Customer           |  |
| Intelligent<br>management system |                   | <ul> <li>Huawei management system: FusionSolar Smart PV<br/>Management System with the software version of<br/>SmartPVMS V500R007C00SPC110 or later. You are<br/>advised to use the latest version.</li> <li>Third-party management system: A third-party<br/>management system is supported. For details, see the<br/>third-party management system documentation.</li> </ul>     | Huawei             |  |
| Арр                              |                   | <ul> <li>FusionSolar app of 5.7.001 or a later version. The app can be locally connected to the inverter and remotely connected to the FusionSolar Smart PV Management System.</li> <li>SUN2000 app of 3.2.00.005 or a later version for Android. The app can be locally connected to the inverter.</li> </ul>   | Huawei             |  |
| Power distribution<br>unit       |                   | er distribution Prepared by the customer   |                    |  |
| Battery                          |                   | The LUNA2000 energy storage device is supported.   |                    |  |
| Smart Power Sensor               |                   | <ul> <li>Recommended models for three-phase inverters:<br/>DTSU666-H, YDS60-80, YDS60-C24, DTSU666-HW</li> <li>Recommended models for single-phase inverters:<br/>DDSU666-H</li> </ul>   |                    |  |
| Power meter                      |                   | Prepared by the customer   | Device<br>supplier |  |

#### **MBUS Communication Networking**

- The inverter connects to the FusionSolar Smart PV Management System through the 4G Smart Dongle.
- The master inverter connects to the FusionSolar app. You can use the FusionSolar app to view the running information and settings of the inverter.
- You can remotely log in to the FusionSolar Smart PV Management System over the WebUI or FusionSolar app.
- Procedure:
  - a. Open the FusionSolar app, log in using an installer account, and choose Services > Device commissioning. Then, scan the QR code on the Smart Dongle or manually connect to the WLAN of the Smart Dongle to access the device commissioning screen.
  - b. Enterthe login password.
  - c. Tap Log in and go to the solar inverter screen. Choose Settings > Communication configuration > Parallel system communication parameter settings > MBUS. Insert the Dongle into the inverter whose parallel communication parameter is MBUS. Ensure that the parallel communication parameter of other inverters in the parallel system is NA.
  - d. When using the Dongle to perform quick settings, set **Networking mode** to **MBUS**.

#### NOTICE

- The MBUS communication is applicable to medium-voltage grid connection scenarios and non-low-voltage public grid connection scenarios (industrial environment).
- To enable the anti-crosstalk function, you need to load a whitelist. Ensure that the PLC CCO version is SmartMBUS V100R001C00SPC220B220 or later.



#### Figure 2-5 Networking description

#### D NOTE

- The components in the dotted box are optional.
- The inverter model is subject to change. The model information and device appearance in this document are for reference only.
- In the networking, the inverter where the Dongle is installed is the master inverter, and other inverters are slave inverters. Slave inverters can communicate with the Dongle through cascading.
- If multiple inverters are cascaded, use either a Dongle or a SmartLogger for networking. You cannot use two networking methods at the same time.

Table 2-11 Device or software description

| Device                           |                   | Description   | Service Owner   |  |
|----------------------------------|-------------------|---|---|--|
| PV module                        |                   | Prepared by the customer  | Customer  |  |
| Inverter                         |                   |   | Huawei  |  |
|                                  | Slave<br>inverter | A master inverter can be used as a slave inverter.  | Huawei  |  |
| Dongle                           |                   | Purchased by the customer. The model should be<br>SDongleB-06-XX. For details, see the Smart Dongle<br>models. Software version: SDongle<br>V200R022C10SPC103B016 or later.   | Huawei  |  |
| SIM card                         |                   | If the Smart Dongle is not configured with a SIM<br>card, prepare a standard SIM card (size: 25 mm x<br>15 mm) of a local carrier.  | Customer  |  |
| Intelligent management<br>system |                   | <ul> <li>Huawei management system: FusionSolar Smart<br/>PV Management System.</li> <li>Third-party management system: A third-party<br/>management system is supported. For details,<br/>see the third-party management system<br/>documentation.</li> </ul> | <ul> <li>Huawei</li> <li>Device<br/>supplier</li> </ul> |  |

| Device                                       | Device Description  |                 |
|--|---|-----------------|
| Арр  | <ul> <li>FusionSolar app of 6.23.00.162 or a later version. The app can be locally connected to the inverter and remotely connected to the FusionSolar Smart PV Management System.</li> <li>SUN2000 app of 6.23.00.153 or a later version for Android. The app is locally connected to the inverter.</li> </ul> | Huawei          |
| AC combiner box                              | combiner box Prepared by the customer   |                 |
| Transformer station Prepared by the customer |   | Customer        |
| Power meter                                  | Prepared by the customer  | Device supplier |

#### **Smart Dongle Parameters**

| Table 2-12 | Number | of cascaded | inverters |
|------------|--------|-------------|-----------|
|------------|--------|-------------|-----------|

| Limit  |                                 | Actual Connection            |   |
|--|---------------------------------|------------------------------|---|
| Maximum Number of Devices That Can Be<br>Connected to the Smart Dongle <sup>abcd</sup> |                                 | Number of Slave<br>Inverters | Number of Other Devices<br>(Such as Power Meters) |
| 10   | 10                              | n ≤ 9                        | ≤ 9 – n   |
|  | 3 (with energy storage)         | n ≤ 2                        | ≤ 2 – n   |
|  | 3 (with single-phase inverters) | n ≤ 2                        | ≤ 2 – n   |
| 2  | 2                               | n ≤ 1                        | ≤ 1 – n   |

Note a: You can view the number of devices that can be connected to the Smart Dongle from the label on the external package.

Note b: If the number of inverters exceeds the limit, configure multiple Smart Dongles. The installation and commissioning for each Smart Dongle are the same.

Note c: A maximum of three SUN2000-(2KTL-6KTL)-L1 inverters can be cascaded.

Note d: If RS485 communication is used and the device is connected to the RS485-2 and RS485\_2 ports, or 485B2 and 485A2 ports on the master inverter, the device is not counted as a cascaded device.

| Table 2-13 | Basic | specifications |
|------------|-------|----------------|
|------------|-------|----------------|

| Parameter Name | Description                       |  |
|----------------|-----------------------------------|--|
| SIM card type  | Standard SIM card (25 mm x 15 mm) |  |
| Indicator      | LED                               |  |

| Parameter Name                 | Description                          |  |
|--------------------------------|--------------------------------------|--|
| Typical power consumption      | 3.5 W                                |  |
| Dimensions (W x H x D)         | 48 mm x 28 mm x 162 mm               |  |
| Net weight                     | <ul><li>87 g</li><li>120 g</li></ul> |  |
| Ingress protection (IP) rating | IP65                                 |  |
| Operating temperature          | -30°C to +65°C                       |  |
| Relative humidity              | 5%–95% RH                            |  |
| Storage temperature            | -40°C to +70°C                       |  |
| Maximum altitude               | 4000 m                               |  |

| Table 2-14 Frequency bands ar | d systems of the Smart Dongle |
|-------------------------------|-------------------------------|
|-------------------------------|-------------------------------|

| Model                  | Supported<br>Frequency<br>Bands and<br>Systems   | Protocol<br>standard   | Bandwidth  | Maximum<br>transmit power  |
|------------------------|--|--|--|--|
| SDongl<br>eB-06-<br>CN | LTE FDD: B1,<br>B3, B5, B8<br>LTE TDD:<br>B34, B39,<br>B40, B41<br>GSM/GPRS/<br>EDGE: 900<br>MHz, 1800<br>MHz  | <ul> <li>Supports<br/>LTE FDD<br/>(with<br/>receive<br/>diversity):<br/>B1/B3/B5/B<br/>8.</li> <li>Supports<br/>LTE-TDD<br/>(with</li> </ul> | <ul> <li>LTE features:</li> <li>Supports a maximum of 3GPP<br/>R8 non-CA Cat 4 FDD and TDD.</li> <li>Supports 1.4 MHz/3 MHz/5<br/>MHz/10 MHz/15 MHz/20 MHz<br/>RF bandwidth.</li> <li>Supports MIMO in the<br/>downlink.</li> <li>LTE-FDD: maximum downlink</li> </ul>   | <ul> <li>Class 4 (33<br/>dBm±2 dB),<br/>EGSM900<br/>frequency<br/>band</li> <li>Class 1 (30<br/>dBm±2 dB),<br/>DCS1800<br/>frequency<br/>band</li> </ul>   |
| SDongl<br>eB-06-<br>EU | LTE FDD: B1,<br>B3, B7, B8,<br>B20, B28,<br>B31<br>LTE TDD:<br>B38, B40,<br>B41<br>GSM/GPRS/<br>EDGE: 850<br>MHz, 900<br>MHz, 1800<br>MHz, 1900<br>MHz | receive<br>diversity):<br>B7/B20/B28<br>/B38/B40/<br>B41.<br>• Supports<br>GSM: 900<br>MHz/1800<br>MHz.<br>• Supports<br>digital<br>audio.   | <ul> <li>rate of 150 Mbit/s and<br/>maximum uplink rate of 50<br/>Mbit/s</li> <li>LTE-TDD: maximum downlink<br/>rate of 130 Mbit/s and<br/>maximum uplink rate of 30<br/>Mbit/s</li> <li>UMTS features:</li> <li>Supports 3GPP R7 HSDPA+,<br/>HSDPA, HSUPA, and WCDMA.</li> <li>Supports QPSK and 16QAM<br/>modulation.</li> <li>HSDPA+: maximum downlink</li> </ul> | <ul> <li>Class E2 (27<br/>dBm±3 dB),<br/>EGSM900 8-<br/>PSK</li> <li>Class E2 (26<br/>dBm±3 dB),<br/>DCS1800 8-<br/>PSK</li> <li>Class 3 (24<br/>dBm+1/-3<br/>dB), WCDMA<br/>frequency<br/>band</li> </ul> |
| SDongl<br>eB-06-<br>AU | LTE FDD: B2,<br>B4, B12<br>WCDMA: B1,<br>B2, B5, B8<br>GSM: 850<br>MHz, 900<br>MHz, 1800<br>MHz, 1900<br>MHz   | ,<br>,   | <ul> <li>rate of 21 Mbit/s</li> <li>HSUPA: maximum uplink rate of 5.76 Mbit/s</li> <li>WCDMA: maximum downlink rate of 384 kbit/s and maximum uplink rate of 384 kbit/s</li> <li>GSM features:</li> <li>GPRS:</li> </ul>   | <ul> <li>Class 3 (23<br/>dBm±2 dB),<br/>LTE-FDD<br/>frequency<br/>band</li> <li>Class 3 (23<br/>dBm±2 dB),<br/>LTE-TDD<br/>frequency<br/>band</li> </ul>   |
| SDongl<br>eB-06-<br>NH | LTE FDD: B1,<br>B3, B8, B18,<br>B19, B26<br>LTE TDD:<br>B41<br>WCDMA: B1,<br>B6, B8, B19   |  | <ul> <li>Supports GPRS multislot class 12.</li> <li>Coding schemes: CS-1, CS-2, CS-3, and CS-4</li> <li>Maximum downlink rate: 85.6 kbit/s; maximum uplink rate: 85.6 kbit/s</li> <li>EDGE:</li> <li>Supports EDGE multislot class 12.</li> </ul>  | SDongleB-06<br>(WiFi): ≤ 20 dBm<br>E.I.R.P.  |

| Model | Supported<br>Frequency<br>Bands and<br>Systems | Protocol<br>standard | Bandwidth  | Maximum<br>transmit power |
|-------|--|----------------------|--|---------------------------|
|       |  |                      | <ul> <li>Supports GMSK and 8-PSK<br/>modulation and coding<br/>schemes.</li> </ul>                 |                           |
|       |  |                      | <ul> <li>Downlink coding format: MCS<br/>1–9</li> </ul>  |                           |
|       |  |                      | • Uplink coding format: MCS 1–9  |                           |
|       |  |                      | <ul> <li>Maximum downlink rate: 236.8<br/>kbit/s; maximum uplink rate:<br/>236.8 kbit/s</li> </ul> |                           |
|       |  |                      | SDongleB-06 (WiFi): 20 MHz/40<br>MHz (optional)  |                           |

| Access<br>Managemen<br>t System<br>Type                        | Monthly Traffic Requirement for the SIM Card |   |  | Traffic Capability   |
|--|--|---|--|--|
| FusionSolar<br>Smart PV<br>Management<br>System <sup>[1]</sup> | Inverter                                     | Without a<br>power sensor<br>or energy<br>storage | 15 MB + 4 MB x<br>Number of inverters  | <ul> <li>Device performance<br/>data can be updated<br/>every 5 minutes.</li> <li>The Smart Dongle logs,<br/>inverter logs, and I-V<br/>diagnosis data can be<br/>exported monthly. The</li> </ul> |
|  |  | With a power sensor                               | 15 MB + 7 MB x<br>Number of inverters  |  |
|  | 2  | With energy<br>storage                            | 18 MB + 7 MB x<br>Number of inerters + 5<br>MB x Number of DC-<br>DC converters  | Smart Dongle and<br>inverters can be<br>upgraded monthly.  |
|  |  | With a power<br>sensor and<br>energy storage      | 18 MB + 7 MB x<br>Number of inverters +<br>5 MB x Number of DC-<br>DC converters |  |
|  | With Smart PV Optimizers                     |   | Inverter data usage + 2<br>MB + 0.2 MB x<br>Number of Smart PV<br>Optimizers     |  |

Note 1: The SDongleB-06 communicates with the management system in single-port or doubleport mode. To ensure security in data transmission, use the single-port mode for encrypted transmission. For details about how to switch the mode, see the *FusionSolar App and SUN2000 App Device Commissioning Guide*.
#### Smart Dongle WLAN

Commission the inverter locally via the Smart Dongle WLAN. If the Smart Dongle WLAN is disabled, log in to the FusionSolar app and tap the plant name on the **Home** screen to access the plant screen. Tap **Devices** and then tap **SDongleB-06**. Choose **O&M Authorization** > **WLAN wakeup** > **Confirm** to enable the Smart Dongle WLAN.

**NOTE** 

If the inverter has a built-in WLAN module, the Smart Dongle WLAN is disabled by default. If the inverter does not have a WLAN module, the Smart Dongle WLAN is enabled by default.



Figure 2-6 Enabling the Smart Dongle WLAN

# 2.4 Communication Networking of the SDongleA-05 (WLAN-FE, 02312QMV)

#### Smart Dongle (BOM Number: 02312QMV)

- The inverter connects to the router through the WLAN-FE Smart Dongle, and then connects to the FusionSolar Smart PV Management System through the router.
- The master inverter connects to the FusionSolar app through its WLAN. You can use the FusionSolar app to view the running information and settings of the inverter.
- You can remotely log in to the FusionSolar Smart PV Management System over the WebUI or FusionSolar app.



Figure 2-7 Networking description (WLAN-FE)

#### **NOTE**

- The components in the dotted box are optional.
- The inverter model is subject to change. The model information and device appearance in this document are for reference only.
- In the networking, the inverter where the Dongle is installed is the master inverter, and other inverters are slave inverters. Slave inverters can communicate with the Dongle through cascading.
- If multiple inverters are cascaded, use either a Dongle or a SmartLogger for networking. You cannot use two networking methods at the same time.
- The Smart Power Sensor connects to the RS485-2 and RS485\_2 ports, or 485B2 and 485A2 ports on the master inverter. The RS485-1 and RS485\_1 ports, or 485B1 and 485A1 ports are used for inverter cascading.

| Table 2-16 Number of | of cascaded inverters |
|----------------------|-----------------------|
|----------------------|-----------------------|

| Limit  |                                 | Actual Connection            |   |
|--|---------------------------------|------------------------------|---|
| Maximum Number of Devices That Can Be<br>Connected to the Smart Dongle <sup>abcd</sup> |                                 | Number of Slave<br>Inverters | Number of Other Devices<br>(Such as Power Meters) |
| 10   | 10                              | n ≤ 9                        | ≤ 9 – n   |
|  | 3 (with energy storage)         | n ≤ 2                        | ≤ 2 – n   |
|  | 3 (with single-phase inverters) | n ≤ 2                        | ≤ 2 – n   |

| Limit   | Actual Connection |                         |
|---|-------------------|-------------------------|
| Maximum Number of Devices That Can Be         | Number of Slave   | Number of Other Devices |
| Connected to the Smart Dongle <sup>abcd</sup> | Inverters         | (Such as Power Meters)  |

Note a: You can view the number of devices that can be connected to the Smart Dongle from the label on the external package.

Note b: If the number of inverters exceeds the limit, configure multiple Smart Dongles. The installation and commissioning for each Smart Dongle are the same.

Note c: A maximum of three SUN2000-(2KTL-6KTL)-L1 inverters can be cascaded.

Note d: If RS485 communication is used and the device is connected to the RS485-2 and RS485\_2 ports, or 485B2 and 485A2 ports on the master inverter, the device is not counted as a cascaded device.

| Device    |                    | Description   | Service Owner   |
|-----------|--------------------|---|-----------------|
| PV module |                    | Purchased by the customer   | Device supplier |
| Inverter  | Master<br>inverter | <ul> <li>SUN2000-(2KTL-6KTL)-L1</li> <li>SUN2000-(8K,10K)-LC0 Series</li> <li>SUN2000-(3KTL-20KTL)-M0</li> <li>SUN2000-(3KTL-12KTL)-M1</li> <li>SUN2000-(8KTL-20KTL)-M2</li> <li>SUN2000-(12K-25K)-MB0 Series</li> <li>SUN5000-(17K, 25K)-MB0 Series</li> <li>SUN2000-(20KTL, 29.9KTL, 30KTL, 36KTL, 40KTL)-M3 Series</li> <li>SUN2000-(50KTL-ZHM3, 50KTL-M3, 50KTL-BRM3)</li> <li>SUN2000-(12KTL-25KTL)-M5 Series</li> </ul> | Huawei          |
|           | Slave<br>inverter  | <ul> <li>A master inverter can be used as a slave inverter.</li> <li>SUN2000-33KTL</li> <li>SUN2000-29.9KTL/33KTL-A/36KTL</li> <li>SUN2000-50KTL/60KTL-M0</li> <li>SUN2000-100KTL/110KTL-M0</li> </ul>  | Huawei          |
| Dongle    |                    | Purchased by the customer. The model should be SDongleA-05.   | Huawei          |

#### Table 2-17 Device description

| Device                              | Description  | Service Owner   |
|-------------------------------------|--|-----------------|
| Router                              | • The router supports WLAN (IEEE 802.11 b/g/n, 2.4 GHz), and the inverters are within the WLAN signal coverage.  | Device supplier |
|                                     | • The WPA, WPA2, or WPA/WPA2 encryption mode is recommended.   |                 |
|                                     | • The Enterprise mode is not supported (such as airport WLAN and other public hotspots that require authentication).   |                 |
|                                     | • WEP and WPA TKIP encryption modes are not recommended because they have serious security vulnerabilities.  |                 |
|                                     | • If the access fails in WEP or WPA TKIP mode, log in to the router and change the encryption mode of the router to WPA2 or WPA/WPA2.                                    |                 |
| Intelligent<br>management<br>system | FusionSolar Smart PV Management System. Software version: SmartPVMS V500R007C00SPC110 or later.  | Huawei          |
| Арр                                 | FusionSolar app of 5.7.001 or a later version. The app can be locally connected to the inverter and remotely connected to the FusionSolar Smart PV Management System.    | Huawei          |
| Power distribution unit             | Prepared by the customer   | Device supplier |
| Battery                             | The LUNA2000 energy storage device is supported.   | Huawei          |
| Smart Power<br>Sensor               | <ul> <li>Recommended models for three-phase inverters:<br/>DTSU666-H, YDS60-80, YDS60-C24, DTSU666-HW</li> <li>Recommended models for single-phase inverters:</li> </ul> | Huawei          |
|                                     | DDSU666-H  |                 |
| Power meter                         | Prepared by the customer   | Device supplier |

# 2.5 Communication Networking of the SDongleA-05 (WLAN-FE, 02312QMV-004)

#### Smart Dongle (BOM Number: 02312QMV-004)

- The inverter connects to the router through the WLAN-FE Smart Dongle, and then connects to the FusionSolar Smart PV Management System through the router.
- The Smart Dongle can connect to a third-party management system.
- The Smart Dongle supports WLAN hotspots.

- The master inverter connects to the FusionSolar app through its WLAN. You can use the FusionSolar app to view the running information and settings of the inverter.
- You can remotely log in to the FusionSolar Smart PV Management System over the WebUI or FusionSolar app.

#### **RS485 Networking**



#### Figure 2-8 Networking description (WLAN-FE)

#### 

- The components in the dotted box are optional.
- The inverter model is subject to change. The model information and device appearance in this document are for reference only.
- In the networking, the inverter where the Dongle is installed is the master inverter, and other inverters are slave inverters. Slave inverters can communicate with the Dongle through cascading.
- If multiple inverters are cascaded, use either a Dongle or a SmartLogger for networking. You cannot use two networking methods at the same time.
- The Smart Power Sensor connects to the RS485-2 and RS485\_2 ports, or 485B2 and 485A2 ports on the master inverter. The RS485-1 and RS485\_1 ports, or 485B1 and 485A1 ports are used for inverter cascading.

| Table 2-18 Number | r of cascaded inverters | 5 |
|-------------------|-------------------------|---|
|-------------------|-------------------------|---|

| Limit  |                                 | Actual Connection            |   |
|--|---------------------------------|------------------------------|---|
| Maximum Number of Devices That Can Be<br>Connected to the Smart Dongle <sup>abcd</sup> |                                 | Number of Slave<br>Inverters | Number of Other Devices<br>(Such as Power Meters) |
| 10   | 10                              | n ≤ 9                        | ≤ 9 – n   |
|  | 3 (with energy storage)         | n ≤ 2                        | ≤ 2 – n   |
|  | 3 (with single-phase inverters) | n ≤ 2                        | ≤ 2 – n   |

Note a: You can view the number of devices that can be connected to the Smart Dongle from the label on the external package.

Note b: If the number of inverters exceeds the limit, configure multiple Smart Dongles. The installation and commissioning for each Smart Dongle are the same.

Note c: A maximum of three SUN2000-(2KTL-6KTL)-L1 inverters can be cascaded.

Note d: If RS485 communication is used and the device is connected to the RS485-2 and RS485\_2 ports, or 485B2 and 485A2 ports on the master inverter, the device is not counted as a cascaded device.

 Table 2-19 Device description

| Device                      |  | Description  | Service Owner   |
|-----------------------------|--|--|-----------------|
| PV module                   |  | Purchased by the customer  | Device supplier |
| Inverter Master<br>inverter |  | • SUN2000-(2KTL-5KTL)-L0, SUN2000-(2KTL-6KTL)-<br>L1. Software version: SUN2000L V200R001C00 or<br>later. (all software versions of this inverter model<br>are supported.) | Huawei          |
|                             |  | <ul> <li>SUN2000-(8K,10K)-LC0 Series</li> </ul>  |                 |
|                             |  | <ul> <li>SUN2000-(3KTL-20KTL)-M0</li> </ul>  |                 |
|                             |  | <ul> <li>SUN2000-(3KTL-12KTL)-M1</li> </ul>  |                 |
|                             |  | SUN2000-(5K-12K)-MAP0 Series   |                 |
|                             |  | <ul> <li>SUN5000-(8K, 12K)-MAP0 Series</li> </ul>  |                 |
|                             |  | <ul> <li>SUN2000-(8KTL-20KTL)-M2</li> </ul>  |                 |
|                             |  | • SUN2000-(12K-25K)-MB0 Series   |                 |
|                             |  | • SUN5000-(17K, 25K)-MB0 Series  |                 |
|                             |  | <ul> <li>SUN2000-(20KTL, 29.9KTL, 30KTL, 36KTL, 40KTL)-<br/>M3 Series</li> </ul>   |                 |
|                             |  | • SUN2000-(50KTL-ZHM3, 50KTL-M3, 50KTL-BRM3)   |                 |
|                             |  | • SUN2000-(12KTL-25KTL)-M5 Series  |                 |
|                             |  | <ul> <li>SUN2000-(75KTL-M1, 100KTL-M2, 110KTL-M2,<br/>115KTL-M2)</li> </ul>  |                 |
|                             |  | • SUN2000-(50K, 75K, 80K, 150K)-MG Series  |                 |
|                             |  | <ul> <li>SUN5000-(150K-MG0-ZH,150K-MG0)</li> </ul>   |                 |

| Device                              | Description   | Service Owner   |  |
|-------------------------------------|---|-----------------|--|
| Slave<br>inverter                   | <ul> <li>A master inverter can be used as a slave inverter.</li> <li>SUN2000-33KTL</li> <li>SUN2000-29.9KTL/33KTL-A/36KTL</li> <li>SUN2000-50KTL/60KTL-M0</li> <li>SUN2000-100KTL/110KTL-M0</li> </ul>  | Huawei          |  |
| Dongle                              | Purchased by the customer. The model should be SDongleA-05.   | Huawei          |  |
| Router                              | <ul> <li>The router supports WLAN (IEEE 802.11 b/g/n, 2.4 GHz), and the inverters are within the WLAN signal coverage.</li> <li>The WPA, WPA2, or WPA/WPA2 encryption mode is recommended.</li> <li>The Enterprise mode is not supported (such as airport WLAN and other public hotspots that require authentication).</li> <li>WEP and WPA TKIP encryption modes are not recommended because they have serious security vulnerabilities.</li> <li>If the access fails in WEP or WPA TKIP mode, log in to the router and change the encryption mode of the router to WPA2 or WPA/WPA2.</li> </ul> | Device supplier |  |
| Intelligent<br>management<br>system | FusionSolar Smart PV Management System. Software version: SmartPVMS V500R007C00SPC110 or later.   | Huawei          |  |
| Арр                                 | FusionSolar app of 5.7.001 or a later version. The app can be locally connected to the inverter and remotely connected to the FusionSolar Smart PV Management System.   | Huawei          |  |
| Power distribution<br>unit          | Prepared by the customer  | Device supplier |  |
| Battery                             | The LUNA2000 energy storage device is supported.  | Huawei          |  |
| Smart Power<br>Sensor               | <ul> <li>Recommended models for three-phase inverters:<br/>DTSU666-H, YDS60-80, YDS60-C24, DTSU666-HW</li> <li>Recommended models for single-phase inverters:<br/>DDSU666-H</li> </ul>  | Huawei          |  |
| Power meter                         | Prepared by the customer  | Device supplier |  |

#### **MBUS Communication Networking**

• The inverter connects to the router through the WLAN-FE Smart Dongle, and then connects to the FusionSolar Smart PV Management System through the router.

- The master inverter connects to the FusionSolar app. You can use the FusionSolar app to view the running information and settings of the inverter.
- You can remotely log in to the FusionSolar Smart PV Management System over the WebUI or FusionSolar app.
- Procedure:
  - Open the FusionSolar app, log in using an installer account, and choose а. **Services > Device commissioning**. Then, scan the QR code on the Smart Dongle or manually connect to the WLAN of the Smart Dongle to access the device commissioning screen.
  - Enterthe login password. b.
  - c. Tap Log in and go to the solar inverter screen. Choose Settings > **Communication configuration > Parallel system communication parameter settings > MBUS**. Insert the Dongle into the inverter whose parallel communication parameter is **MBUS**. Ensure that the parallel communication parameter of other inverters in the parallel system is NA.
  - When using the Dongle to perform guick settings, set **Networking mode** d. to MBUS.

#### NOTICE

- The MBUS communication is applicable to medium-voltage grid connection scenarios and non-low-voltage public grid connection scenarios (industrial environment).
- To enable the anti-crosstalk function, you need to load a whitelist. Ensure that the PLC CCO version is SmartMBUS V100R001C00SPC220B220 or later.



Figure 2-9 Networking description (WLAN-FE)

#### D NOTE

- The components in the dotted box are optional.
- The inverter model is subject to change. The model information and device appearance in this document are for reference only.
- In the networking, the inverter where the Dongle is installed is the master inverter, and other inverters are slave inverters. Slave inverters can communicate with the Dongle through cascading.
- If multiple inverters are cascaded, use either a Dongle or a SmartLogger for networking. You cannot use two networking methods at the same time.

| Table 2-20 Device or software description |                   |   |  |  |
|---|-------------------|---|--|--|
| Device                                    |                   | Description   | Service Owner  |  |
| PV module                                 |                   | Prepared by the customer  | Customer   |  |
| Inverter Master<br>inverter               |                   | <ul> <li>SUN2000-(65KTL, 70KTL, 75KTL)-C1,<br/>SUN2000-(50KTL, 60KTL, 63KTL, 65KTL, 70KTL,<br/>75KTL)-M0 and SUN2000-(50KTL, 65KTL,<br/>70KTL)-M1. Software version: SUN2000<br/>V300R001C00SPC128B115 or later.</li> </ul> | Huawei   |  |
|   |                   | <ul> <li>SUN2000-100KTL/110KTL/125KTL-M0 and<br/>SUN2000-75KTL/110KTL-M1. Software version:<br/>SUN2000 V500R001C00SPC129B092 or later.</li> </ul>  |  |  |
|   |                   | <ul> <li>SUN2000-(100KTL, 110KTL, 115KTL)-M2.</li> <li>Software version: SUN2000ME</li> <li>V500R023C00SPC030B128 or later.</li> </ul>  |  |  |
|   |                   | • SUN2000-(50K, 75K, 80K, 150K)-MG Series   |  |  |
|   |                   | <ul> <li>SUN5000-(150K-MG0-ZH,150K-MG0)</li> </ul>  |  |  |
|   | Slave<br>inverter | A master inverter can be used as a slave inverter.  | Huawei   |  |
| Dongle                                    |                   | Purchased by the customer. The model should be<br>SDongleA-05. For details, see the Smart Dongle<br>models. Software version: SDongle<br>V200R022C10SPC103B016 or later.  | Huawei   |  |
| Intelligent management<br>system          |                   | <ul> <li>Huawei management system: FusionSolar Smart<br/>PV Management System.</li> <li>Third-party management system: A third-party</li> </ul>   | <ul><li>Huawei</li><li>Device<br/>supplier</li></ul> |  |

#### Table 2-20 Device or software description

|                                  | V200R022C10SPC103B016 or later.   |   |
|----------------------------------|---|---|
| Intelligent management<br>system | <ul> <li>Huawei management system: FusionSolar Smart<br/>PV Management System.</li> <li>Third-party management system: A third-party<br/>management system is supported. For details,<br/>see the third-party management system<br/>documentation.</li> </ul>   | <ul> <li>Huawei</li> <li>Device<br/>supplier</li> </ul> |
| Арр                              | <ul> <li>FusionSolar app of 6.23.00.162 or a later version. The app can be locally connected to the inverter and remotely connected to the FusionSolar Smart PV Management System.</li> <li>SUN2000 app of 6.23.00.153 or a later version for Android. The app is locally connected to the inverter.</li> </ul> | Huawei  |

| Device              | Description              | Service Owner   |
|---------------------|--------------------------|-----------------|
| AC combiner box     | Prepared by the customer | Customer        |
| Transformer station | Prepared by the customer | Customer        |
| Power meter         | Prepared by the customer | Device supplier |

#### Smart Dongle WLAN

Commission the inverter locally via the Smart Dongle WLAN. If the Smart Dongle WLAN is disabled, log in to the FusionSolar app and tap the plant name on the **Home** screen to access the plant screen. Tap **Devices** and then tap **SDongleA-05**. Choose **O&M Authorization** > **WLAN wakeup** > **Confirm** to enable the Smart Dongle WLAN.

#### **NOTE**

If the inverter has a built-in WLAN module, the Smart Dongle WLAN is disabled by default. If the inverter does not have a WLAN module, the Smart Dongle WLAN is enabled by default.



Figure 2-10 Enabling the Smart Dongle WLAN

# **3** Cable Connections

# **3.1 Connecting Cables for Cascaded Inverters**

This document provides only the schematic diagram of inverter cascading. For details about communications port definitions and cable connections, see the user manual of each inverter.



#### Figure 3-1 Cable connections for cascaded inverters

#### NOTICE

- Ensure that the sshield layer is grounded when connecting the RS485 cable.
- When laying out communications cables, separate them from power cables and keep them away from strong interference sources to prevent communication interruption.



Figure 3-2 Connecting cables to the DTSU666-H (three-phase three-wire)







**Figure 3-4** Connecting cables between the inverter and DTSU666-HW or YDS60-80 (three-phase three-wire direct connection)

**Figure 3-5** Connecting cables between the inverter and DTSU666-HW or YDS60-80 (three-phase three-wire CT connection)





**Figure 3-6** Connecting cables between the inverter and DTSU666-HW or YDS60-80 (three-phase four-wire direct connection)



**Figure 3-7** Connecting cables between the inverter and DTSU666-HW or YDS60-80 (three-phase four-wire CT connection)

# 3.2 Installing the 4G/WLAN Smart Dongle

**Step 1** Install a SIM card. (Skip this step for the WLAN Smart Dongle or the Smart Dongle that is configured with a SIM card.)

Figure 3-8 Installing a SIM card





#### Figure 3-9 Installing a Smart Dongle



----End

# 3.3 Installing the 4G (06) Smart Dongle

**Step 1** Install a SIM card. (Skip this step for the Smart Dongle configured with a SIM card.)

Figure 3-10 Installing a SIM card



**Step 2** Install the Smart Dongle onto the USB port on the master inverter.

Figure 3-11 Installing a Smart Dongle



----End

# 3.4 Installing the WLAN-FE Smart Dongle

#### WLAN communication

Install the Smart Dongle onto the USB port on the master inverter.

#### Figure 3-12 Installing a Smart Dongle



#### **FE** Communication

After connecting the FE cable, install the Smart Dongle onto the USB port on the master inverter.

You are advised to use a Cat 5e outdoor shielded network cable (outer diameter < 9 mm; internal resistance  $\leq$  1.5 ohms/10 m) and shielded RJ45 connectors.

Figure 3-13 Installing a Smart Dongle



# **4** System Power-On and Commissioning

#### ▲ DANGER

- Wear personal protective equipment and use dedicated insulated tools to avoid electric shocks or short circuits.
- Do not use wet cloth to clean exposed copper bars or other conductive parts.

#### 

 Before performing maintenance, power off the equipment, follow the instructions on the delayed discharge label, and wait for a period of time as specified to ensure that the equipment is not energized.

#### NOTICE

Before the equipment is put into operation for the first time, ensure that the parameters are set correctly by professional personnel. Incorrect parameter settings may result in noncompliance with local grid connection requirements and affect the normal operations of the equipment.

# 4.1 Checking Before Power-On

- 1. Ensure that the ground cable of the inverter is securely connected.
- 2. Ensure that the inverter is properly installed and all cables are correctly and reliably connected.
- 3. Ensure that the Smart Dongle is properly installed.

### 4.2 Powering On the Inverter

Power on the inverter after cable connections are completed.

#### Procedure

- **Step 1** Turn on the AC circuit breaker between the inverter and the power grid.
- **Step 2** Turn on the DC switch at the bottom of the inverter.

----End

#### Viewing the LED Indicator Status of the Smart Dongle

| Operation   | Indicator<br>Color  | Indicator Status   | Remark<br>s  | Description  |
|---|---|--|--------------|--|
| Installing<br>the Smart                               | N/A   | Off  | Normal       | The Smart Dongle is not secured or is not powered on.  |
| Dongle  | Yellow<br>(blinking<br>green and red<br>simultaneousl<br>y) | Steady on  |              | The Smart Dongle is secured and powered on.  |
|   | Red   | Blinking fast (on<br>for 0.2s and then<br>off for 0.2s)    |              | The parameters for connecting to the router are to be set.   |
|   | Red   | Steady on  | Abnorm<br>al | Replace the Smart Dongle because it has an internal fault.   |
|   | Blinking red<br>and green<br>alternatively                  | Blinking slowly<br>(red for 1s and<br>then green for       |              | No communication with the inverter <ul> <li>Remove and insert the Smart</li> </ul>   |
|   |   | 1s)  |              | <ul><li>Dongle.</li><li>Check that the inverter matches the Smart Dongle.</li></ul>  |
|   |   |  |              | • Connect the Smart Dongle to<br>another inverter. Check whether<br>the Smart Dongle or the USB<br>port of the inverter is faulty. |
| Upgrading<br>the Smart<br>Dongle                      | Blinking red<br>and green<br>alternatively                  | Blinking fast (red<br>for 0.2s and then<br>green for 0.2s) | Normal       | The Smart Dongle is being upgraded locally.  |
| Setting an<br>inverter's<br>connection<br>to a router | Green   | Blinking slowly<br>(on for 0.5s and<br>then off for 0.5s)  | Normal       | Connecting to the router   |

| Operation                       | Indicator<br>Color | Indicator Status  | Remark<br>s  | Description  |
|---------------------------------|--------------------|---|--------------|--|
|                                 | Red                | Blinking fast (on<br>for 0.2s and then<br>off for 0.2s) | Abnorm<br>al | Failed to connect to the router.<br>Check whether the parameters for<br>connecting the Smart Dongle to<br>the router are properly set. If not,<br>set the parameters correctly.                      |
| Setting<br>parameters           | Green              | Steady on   | Normal       | Successfully connected to the management system.   |
| in the<br>manageme<br>nt system | Red                | Blinking slowly<br>(on for 1s and<br>then off for 1s)   | Abnorm<br>al | Failed to connect to the<br>management system. Check<br>whether the parameters for<br>connecting inverters to the<br>management system are properly<br>set. If not, set the parameters<br>correctly. |
|                                 | Green              | Blinking fast (on<br>for 0.2s and then<br>off for 0.2s) | Normal       | The inverter is communicating with the management system through the Smart Dongle.   |

#### Table 4-2 LED indicator status (4G Smart Dongle)

| Indicator  |  | Remarks  | Description  |
|--|--|----------|--|
| N/A  | Off  | Normal   | The Smart Dongle is not secured or is not powered on.  |
| Yellow (blinking<br>green and red<br>simultaneously) | Steady on  |          | The Smart Dongle is secured and powered on.  |
| Green  | The indicator  | Normal   | Dialing (duration < 1 min)   |
|  | blinks at intervals<br>of 2s, on for 0.1s<br>and then off for<br>1.9s. | Abnormal | If the duration is longer than 1 min, the 4G parameter settings are incorrect. Reset the parameters.                               |
|  | Blinking slowly<br>(on for 1s and                                      | Normal   | The dial-up connection is set up successfully (duration < 30s).  |
|  | then off for 1s)   | Abnormal | If the duration is longer than 30s, the<br>settings of the management system<br>parameters are incorrect. Reset the<br>parameters. |
|  | Steady on  | Normal   | Successfully connected to the management system.   |

| Indicator                                  |  | Remarks  | Description  |
|--|--|----------|--|
|  | Blinking fast (on<br>for 0.2s and then<br>off for 0.2s)    |          | The inverter is communicating with the management system through the Smart Dongle.   |
| Red  | Steady on  | Abnormal | Replace the Smart Dongle because it has an internal fault.   |
|  | Blinking fast (on<br>for 0.2s and then<br>off for 0.2s)    |          | The Smart Dongle has no SIM card or the<br>SIM card is in poor contact. Check whether<br>the SIM card has been installed or is in good<br>contact. If not, install the SIM card or<br>remove and insert the SIM card.  |
|  | Blinking slowly<br>(on for 1s and<br>then off for 1s)      |          | The Smart Dongle fails to connect to the<br>management system because the SIM card<br>has no traffic or the signal strength is poor.<br>If the Smart Dongle is reliably connected,<br>check the SIM card signal through the app.<br>If no signal is received or the signal strength<br>is weak, contact the carrier. Check whether<br>the tariff and traffic of the SIM card are<br>normal. If not, recharge the SIM card or<br>purchase a data package. |
| Blinking red and<br>green<br>alternatively | Blinking slowly<br>(red for 1s and<br>then green for 1s)   |          | <ul> <li>No communication with the inverter</li> <li>Remove and insert the Smart Dongle.</li> <li>Check that the inverter matches the<br/>Smart Dongle.</li> <li>Connect the Smart Dongle to another<br/>inverter. Check whether the Smart Dongle<br/>or the USB port of the inverter is faulty.</li> </ul>  |
|  | Blinking fast (red<br>for 0.2s and then<br>green for 0.2s) | Normal   | The Smart Dongle is being upgraded locally.  |

# **5** Plant Creation and Commissioning

# 5.1 Creating a PV Plant

# 5.1.1 Creating a PV Plant over the App

#### Prerequisites

• You have downloaded and installed the FusionSolar app which can be obtained by searching for **FusionSolar** in Huawei AppGallery or scanning the QR code.



FusionSolar App

- The inverter is properly powered on and the Smart Dongle communicates with the management system properly.
- You have obtained the login account and password from the installation contractor or Huawei service engineer. If no account or password is available, create an account.

**NOTE** 

- The latest app version is required for device commissioning. You can search for **FusionSolar** in App Store or scanning the QR code to install the app for iOS.
- This section contains a large number of screenshots, which are only used to illustrate the operation method. The PV plant, device model, and parameters in the figures are for reference only.
- The version of the FusionSolar app is 5.7.001. The actual screens may vary.

#### Procedure

**Step 1** Register an installer account using a mobile number (only in China) or email address. If an installer account exists, skip this step.

| English 🖛                           | ::        | $\leftarrow$ Role                       | $\leftarrow$ Installer Registration  |
|-------------------------------------|-----------|---|--|
|                                     |           | Peal-time monitoring of plant operation | If your company has been registered as an installer in<br>the system, request your company administrator to<br>add you to the company. |
| FusionSolar                         |           | Ask your installer to create an         | Company name   |
|                                     |           | I'm an installer                        | Please select a country/region   |
| Username or email                   |           | Quick setup, O&M, operation monitoring  | Enter an email address.  |
| Password                            |           | Tap to create your account              | Enter your username.   |
|                                     | password? |   | Enter the verification code. Send Code   |
|                                     | passion   |   | Enter the password. 🚿  |
| Log In                              |           |   | Confirm password 🚿   |
| Demo site                           |           |   | I agree to the Terms of Use and I have read the<br>Privacy Policy.   |
| https://intl.fusionsolar.huawei.com | n         |   | Register   |

#### Figure 5-1 Registering an account

**Step 2** Log in to the app using the installer account, and tap **Setup Wizard** to create a PV plant. For details, see the *FusionSolar APP Quick Guide* by scanning the QR code.

#### **NOTE**

- To ensure account security, change the password periodically and keep the newpassword in mind. A password left unchanged for a long period of time may bestolen or cracked. If a password is lost, devices cannot be accessed. In thesecases, the user is liable for any loss caused to the PV plant.
- To create multiple installer accounts for a company, log in to the app and create an installer account by choosing **New User**.

#### Figure 5-2 Creating a PV plant



Figure 5-3 FusionSolar APP Quick Guide



----End

### 5.1.2 Creating a PV Plant over the WebUI

#### Prerequisites

- You have matched the devices with the PV plant with the PV plant with the help of the installation contractor.
- The inverter and Smart Dongle have been powered on and communicates properly with the management system.
- You have obtained the login account and password from the installation contractor or Huawei service engineer. If no account or password is available, create an account.



#### Figure 5-4 Procedure for creating a PV plant

#### Procedure

**Step 1** Enter the management system address in the address box of a browser: https:// intl.fusionsolar.huawei.com.

#### **NOTE**

- Browser: Chrome 67, Safari 9.0, Internet Explorer 11, or a later version is recommended.
- The software version corresponding to the user interface (UI) snapshots is SmartPVMS V500R007C00CP2101. The UIs may vary with software versions and are for reference only.
- Step 2 If you have obtained the login account and password from the installation contractor or Huawei service engineer, enter the account and password, and click Log In to go to the home page. If you have not created an account, click Installer Registration, fill in the registration information, and activate the account with the email verification code sent to you.

#### Figure 5-5 Login page



#### Figure 5-6 Registering an account

| Instal  | ler Registration  |
|---|---|
| Note:<br>If your company has registered an ac<br>Ask your administrator to add you to | count in the system, you do not need to register again.<br>the user list. |
| Company name:   |   |
| Mobile number:  | +86   |
| Username:   |   |
| Password:   |   |
| Confirm password:   |   |
| SMS verification code:  | Send Code   |
| I agree to  | o Terms of Use and I have read Privacy Policy.                            |
|   | Submit  |

#### Step 3 Add Plant.

• Method 1: On the home page, click **Add Plant**.

#### Figure 5-7 Creating a PV plant (method 1)

| 🎢 FusionSolar 🛛 🎧               | Home Monito   | ring Reports Plants Maintena                               | nce Value-Added Services                   | System 🗹                        | Q 🕜 English 🖉   | ≗≀ '` ⊘             |
|---------------------------------|---|--|--|---------------------------------|---|---------------------|
| Plant KPIs                      |   | Plant Status   |  | Real-Time Alarms                |   |                     |
| Current power                   | 85.90 con<br>Ved today<br>128.85 con<br>Todal yield | 9<br>Total planes  | S<br>Normal<br>0<br>Faulty<br>2<br>Cfiline | 4<br>Total alarms               | O     Critical     O     Critical     O     Anjor     U     I     Minor     O     Warning | 6                   |
|                                 | Region: Region                                      | Device type: All   | V Total string capacity: All               | v.                              | Search Reset  | Add Plant           |
| Status c Plant Image Plant Name | End date     Region     Address                     | © Grid<br>Connection © Total String<br>Date Capacity (KWp) | c Optimizer c Batter                       | y Weather Current<br>Power (kW) | Ic Energy<br>(KWp) C Today<br>(KWh)   | 0 Total Yield (kWh) |

• Method 2: On the home page, click **Plants**, choose **Plant Management** under **Plant**, and click **Add Plant**.

Figure 5-8 Creating a PV plant (method 2)

| 🎁 FusionSolar                     | ⊢ ŵ        | Home     | Monitoring | Reports | Plants                      | Maintenance | Value-Adde | ed Services    | System | Q       | 🕜 English | 8  | (i) (i  | ?  |
|-----------------------------------|------------|----------|------------|---------|-----------------------------|-------------|------------|----------------|--------|---------|-----------|----|---------|----|
| Plants           Plant Management | Enter a ke | eyword 4 | Plant r    | name:   |                             | Search      | Reset      |                |        |         |           |    |         |    |
| Plant Migration                   | En Ro      |          | î.         |         |                             |             | Delete     | Cancel St      | hare   | Share   | Share EMI | /  | dd Plan | nt |
| Plant License                     | • Et:      | XXX      | 🗌 Plar     |         | Total Plant String<br>(kWp) | Capacity Ad | ldress d   | Contact Person |        | Contact | Method    | Op | ration  |    |



| •            | 0                       |                             | 0                                    | 0                    |
|--------------|-------------------------|-----------------------------|--------------------------------------|----------------------|
| t Basic Info | Add Devices             | Set String Capacity         | Set Electricity Prices               | Set Other In         |
|              | • Company:              |                             |                                      | ×                    |
|              | * Plant name:           |                             |                                      |                      |
| * Grid       | connection date: Select | t date 📋                    |                                      |                      |
|              | Contact person:         |                             |                                      |                      |
|              | Contact method: Enter   | a phone number or an email  | address.                             | 0                    |
|              | • 🗌 Us                  | er's authorization obtained |                                      |                      |
|              | If the co<br>advance    |                             | hird-party personal information, obt | ain authorization in |
|              | duvanu                  | w.r.                        |                                      |                      |

Figure 5-9 Basic information of the PV plant

**Table 5-1** Description of basic information (\* means mandatory fields)

| Parameter             | Description  |
|-----------------------|--|
| Company*              | Company to which the new PV plant belongs.   |
| Plant name*           | Name of the new PV plant.  |
| Grid connection time* | Start date of the safe operation of the PV plant.  |
| Contact Person        | PV plant contact who facilitates problem handling.<br>You are advised to set this parameter.   |
| Contact method        | Contact information which facilitates problem handling. You are advised to set this parameter. |

**Step 5** On the **Add Devices** tab page, set the connected devices for the PV plant.

 Manually enter the SN of the Smart Dongle and click the blank area of Device type. The system automatically displays the device name and model. The affiliated inverters and power meter are automatically added. Click + on the left of the SN to expand the device information. (The + icon becomes the – icon after the information is expanded.) Then, check whether the connected devices are correct.

Figure 5-10 Entering the device SN

| Set Basic Info Add Devices Set String Capacity Set Electricity Prices Set Oth | 0        |
|---|----------|
| Defends   | ther Inf |
| Refresh   | Add      |



1. Fill **Total plant string capacity (kWp)** (Total rated active power of the plant generator set) as required. In the device list, select one or more devices to be configured and click **Set String Capacity**. The **Set String Capacity** dialog box is displayed.

Figure 5-11 Setting string capacity

| Add Plant           |                    |                     |                          | х                     |
|---------------------|--------------------|---------------------|--------------------------|-----------------------|
| •<br>Set Basic Info | Add Devices        | Set String Capacity | © Set Electricity Prices | Set Other Info        |
| Total plant string  | capacity (kWp): 30 |                     |                          | Set String Capacity   |
| Device Nan          | ne Device Type     | Device Model        | SN                       | String Capacity (kWp) |
| ✓ HV2080055         | 916 Inverter       | SUN2000-10KTL-M1    | XXXXXXXXXXX              | 3.334                 |

2. Verify the number of PV strings and the string capacity, and click **OK**.

Figure 5-12 Verifying the number of PV strings and the string capacity

| Set String Ca | pacity |       |             |     |       | ×  |
|---------------|--------|-------|-------------|-----|-------|----|
| 🔽 Batch app   | ly     | Strin | g quantity: | 2   |       |    |
| PV1 capacity: | 3000   | Wp    | PV2 capacit | ty: | 3000  | Wp |
|               |        |       |             |     | Cance | ОК |

#### D NOTE

If **Batch apply** is selected, the capacity of other PV strings to be configured is automatically set to the same value as PV1 after PV1 capacity is configured.

**Step 7** Click **Next**. On the displayed **Set Electricity Prices** tab page, set the date range, time period, and electricity price.

Figure 5-13 Adding time-based prices

| Add Plant      |                |                     |                             | ×              |
|----------------|----------------|---------------------|-----------------------------|----------------|
| •              | Add Devices    | Set String Capacity | Set Electricity Prices      | Set Other Info |
| Feed-in Tariff | Purchase Price |                     | Use Default Electricity Pri | ces Add        |
| Date range:    | 01-01 📋 -      | 12-31 📋             |                             | ⊕ Ū            |
| Start time:    | 00:00:00 V End | d time: 24:00:00 V  | Price: 1 CNY/               | kWh Delete     |

#### D NOTE

- Click **Add** to add a date range. Multiple date ranges cannot overlap and must cover a full year.
- Click 🕀 to add a time period and price. Multiple time periods cannot overlap and must cover a full year.
- Click **Delete** to delete a time-based price.
- Click <sup>1</sup> to delete a date range.
- Step 8 Click Next to go to the Set Other Info tab page. Set other information about the PV plant, including Plant image, Address, Start time of safe running, Plant overview, and Plant time zone of the PV plant. Start time of safe running refers to the day when the PV plant starts to generate electricity normally. It is mainly used to calculate the safe running days of the PV plant.

| Add Plant |                       |                            |                      |           | ×              |
|-----------|-----------------------|----------------------------|----------------------|-----------|----------------|
| •         | Add Devices           | Set String Capacity        | Set Electricity      | Prices    | Set Other Info |
|           | Plant image:          | +<br>Click to Upload       |                      |           |                |
|           | N                     | Max. size: 5 MB; supported | formats: jpg, png, j | peg, bmp. |                |
|           | * Region:             |                            |                      |           | $\sim$         |
|           | * Address:            | Plant address              | م                    |           |                |
| * Lon     | gitude and latitude:  |                            |                      |           | R              |
| Start o   | late of safe running: | 2020-10-19 📋               |                      |           |                |
|           | Plant overview:       |                            |                      |           |                |
|           | Plant time zone:      | (UTC+08:00) Beijing, Chor  | ngqing, Hong Kong    | , Urumqi  | $\sim$         |
|           |                       |                            | Cancel               | Previous  | Save           |

#### Figure 5-14 Other information

**Step 9** Click **Save**. In the displayed dialog box, click **OK**. The PV plant is created successfully.

----End

#### **Follow-up Procedure**

- Modifying PV plant information: In the PV plant list, click **Modify** for the PV plant to be modified.
- Deleting a PV plant: In the PV plant list, select one or more PV plants to be deleted and click **Delete**.

# 5.2 Setting Grid-tied Control Parameters

### 5.2.1 Setting Parameters over the App

#### Prerequisites

- The FusionSolar app is recommended when the inverter is connected to the FusionSolar Smart PV Management System. The SUN2000 app is recommended when the inverter is connected to other management systems.
- You have downloaded and installed the FusionSolar app which can be obtained by searching for **FusionSolar** in Huawei AppGallery or scanning the QR code.



FusionSolar App

 SUN2000 APP: Search for "SUN2000" in Huawei AppGallery, download the latest installation package, and install the SUN2000 app by following the instructions.

#### **NOTE**

- In areas (such as the UK) where the FusionSolar app is not available, or when a thirdparty management system is used, only the SUN2000 app can be used for commissioning. This document uses the FusionSolar app as an example to describe the commissioning method. For the SUN2000 app, perform operations as required.
- The SUN2000 app version should be 3.2.00.005 (Android) or later.

#### Procedure

**Step 1** Run the FusionSolar app and go to the **Device commissioning** screen. (Perform this step only for the FusionSolar app.)



#### Figure 5-15 Device commissioning

Step 2 Connect to the inverter

| Identity authentication   | < SUN2000<br>Standty:suri       | -XXX-XX                                   |
|---|---------------------------------|---|
|   | Good WLAN signal                | Management system<br>Connection succeeded |
|   | Active power<br>0.0000mm        | Energy yield of current day               |
|   | Monthly Energy Yield<br>0.030we | Total<br>4.640m                           |
| SN: XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX                            | Ú<br>Alarm                      | Ruick settings                            |
| installer        Enter your password.                               | Device Monitoring               | Maintenance                               |
| Initial password: 00000a or set<br>the password at the first login. | <b>کې</b><br>Settings           | t+1<br>Power adjustment                   |
| Cancel  |                                 |   |

#### Figure 5-16 Connecting to the inverter

#### **NOTE**

- Code scanning: Tap **Connect** to access the scanning screen, place the QR code or bar code of the solar inverter in the scan frame. The device will be automatically connected after the code is identified.
- During the login, if five consecutive invalid password entries are made (theinterval between two consecutive entries is less than 2 minutes), the accountwill be locked for 10 minutes. The password should consist of six characters.
- To ensure account security, change the password periodically and keep the newpassword in mind. A password left unchanged for a long period of time may bestolen or cracked. If a password is lost, devices cannot be accessed. In thesecases, the user is liable for any loss caused to the PV plant.

#### **Step 3** Set grid-tied control parameters.

#### **NOTE**

To set **Grid-tied point control**, you need to enter the inverter login password. For details about the inverter login password, see the section about connecting to the inverter.



Figure 5-17 Parameter settings

#### Table 5-2 Control mode

| Paramet         | er Name                                      |  | Description   |
|-----------------|--|--|---|
| Active<br>power | Unlimited                                    | N/A  | If this parameter is set to <b>Unlimited</b> , the inverter output power is not limited and the inverter can feed its rated power to the power grid.  |
|                 | Grid<br>connectio<br>n with<br>zero<br>power | Closed-loop<br>controller                        | <ul> <li>For a single inverter: When the Smart Dongle is connected, set Closed-loop controller to Inverter. When the inverter is directly connected, Closed-loop controller to Inverter.</li> <li>For multiple inverters, Closed-loop controller can only be set to Controller.</li> </ul>  |
|                 |  | Limitation mode                                  | • <b>Total power</b> indicates export limitation of the total power at the grid-connection point. (When a single-phase meter is connected, only the <b>Total power</b> limitation mode can be selected.)  |
|                 |  |  | • <b>Single-phase power</b> indicates export limitation of the power in each phase at the grid-connection point.  |
|                 |  | Power adjustment period                          | Specifies the shortest interval for a single export limitation adjustment.  |
|                 |  | Power raising<br>threshold                       | Specifies the dead zone for adjusting the inverter<br>output power. If the power fluctuates within the<br>power control hysteresis, the power is not adjusted.  |
|                 |  | Communication<br>disconnection fail-<br>safe     | In the inverter export limitation scenario, if this<br>parameter is set to <b>Enable</b> , the inverter will derate<br>according to the active power derating percentage<br>when the communication between the inverter and<br>the Smart Dongle is disconnected for a period longer<br>than <b>Communication disconnection detection</b><br><b>time</b> . |
|                 |  | Communication<br>disconnection<br>detection time | Specifies the time for determining the communication disconnection between the inverter and the Smart Dongle. This parameter is displayed when <b>Communication disconnection fail-safe</b> is set to <b>Enable</b> .   |
|                 |  | Active power<br>output limit for<br>fail-safe    | Specifies the derating value of the inverter active<br>power by percentage. If the Smart Dongle does not<br>detect any power meter data or the communication<br>between the Smart Dongle and the inverter is<br>disconnected, the Smart Dongle delivers the derating<br>value of the inverter active power by percentage.                                 |

| Paramete | r Name  |  | Description   |
|----------|---|--|---|
|          | Grid<br>connectio<br>n with<br>limited<br>power<br>(kW) | Closed-loop<br>controller                        | <ul> <li>For a single inverter: When the Smart Dongle is connected, set Closed-loop controller to Inverter. When the inverter is directly connected, Closed-loop controller to Inverter.</li> <li>For multiple inverters, Closed-loop controller can only be set to Controller.</li> </ul>  |
|          |   | Limitation mode                                  | <ul> <li>Total power indicates export limitation of the total power at the grid-connection point. (When a single-phase meter is connected, only the Total power limitation mode can be selected.)</li> <li>Single-phase power indicates export limitation of the power in each phase at the grid-connection point.</li> </ul>                             |
|          |   | Maximum grid<br>feed-in power<br>(kW)            | Specifies the maximum active power transmitted from the grid-tied point to the power grid.  |
|          |   | Power adjustment period                          | Specifies the shortest interval for a single export limitation adjustment.  |
|          |   | Maximum<br>protection time                       | <ul> <li>Specifies the time for detecting power meter data.<br/>If the Smart Dongle does not detect any power<br/>meter data within the preset time, the Smart<br/>Dongle delivers the preset value of the Fail-safe<br/>power threshold to the inverter for protection.</li> <li>The recommended value is 5s or greater.</li> </ul>                      |
|          |   | Power raising<br>threshold                       | Specifies the dead zone for adjusting the inverter<br>output power. If the power fluctuates within the<br>power control hysteresis, the power is not adjusted.  |
|          |   | Communication<br>disconnection fail-<br>safe     | In the inverter export limitation scenario, if this<br>parameter is set to <b>Enable</b> , the inverter will derate<br>according to the active power derating percentage<br>when the communication between the inverter and<br>the Smart Dongle is disconnected for a period longer<br>than <b>Communication disconnection detection</b><br><b>time</b> . |
|          |   | Communication<br>disconnection<br>detection time | Specifies the time for determining the<br>communication disconnection between the inverter<br>and the Smart Dongle. This parameter is displayed<br>when <b>Communication disconnection fail-safe</b> is set<br>to <b>Enable</b> .   |

| Paramete | r Name  |   | Description   |
|----------|---|---|---|
|          |   | Active power<br>output limit for<br>fail-safe | Specifies the derating value of the inverter active<br>power by percentage. If the Smart Dongle does not<br>detect any power meter data or the communication<br>between the Smart Dongle and the inverter is<br>disconnected, the Smart Dongle delivers the derating<br>value of the inverter active power by percentage.                                 |
|          | Grid<br>connectio<br>n with<br>limited<br>power | Closed-loop<br>controller                     | <ul> <li>For a single inverter: When the Smart Dongle is connected, set Closed-loop controller to Inverter. When the inverter is directly connected, Closed-loop controller to Inverter.</li> <li>For multiple inverters, Closed-loop controller can</li> </ul>   |
|          | (%)   |   | only be set to <b>Controller</b> .  |
|          |   | Limitation mode                               | • <b>Total power</b> indicates export limitation of the total power at the grid-connection point. (When a single-phase meter is connected, only the <b>Total power</b> limitation mode can be selected.)  |
|          |   |   | • <b>Single-phase power</b> indicates export limitation of the power in each phase at the grid-connection point.  |
|          |   | PV plant capacity                             | Specifies the total maximum active power in the inverter cascading scenario.  |
|          |   | Maximum grid<br>feed-in power (%)             | Specifies the percentage of the maximum active power of the grid-tied point to the PV plant capacity.   |
|          |   | Power adjustment period                       | Specifies the shortest interval for a single export limitation adjustment.  |
|          |   | Maximum<br>protection time                    | • Specifies the time for detecting power meter data.<br>If the Smart Dongle does not detect any power<br>meter data within the preset time, the Smart<br>Dongle delivers the preset value of the <b>Fail-safe</b><br><b>power threshold</b> to the inverter for protection.   |
|          |   |   | The recommended value is 5s or greater.   |
|          |   | Power raising<br>threshold                    | Specifies the dead zone for adjusting the inverter<br>output power. If the power fluctuates within the<br>power control hysteresis, the power is not adjusted.  |
|          |   | Communication<br>disconnection fail-<br>safe  | In the inverter export limitation scenario, if this<br>parameter is set to <b>Enable</b> , the inverter will derate<br>according to the active power derating percentage<br>when the communication between the inverter and<br>the Smart Dongle is disconnected for a period longer<br>than <b>Communication disconnection detection</b><br><b>time</b> . |

| r Name              |  | Description   |
|---------------------|--|---|
|                     | Communication<br>disconnection<br>detection time   | Specifies the time for determining the communication disconnection between the inverter and the Smart Dongle. This parameter is displayed when <b>Communication disconnection fail-safe</b> is set to <b>Enable</b> .   |
|                     | Active power<br>output limit for<br>fail-safe  | Specifies the derating value of the inverter active<br>power by percentage. If the Smart Dongle does not<br>detect any power meter data or the communication<br>between the Smart Dongle and the inverter is<br>disconnected, the Smart Dongle delivers the derating<br>value of the inverter active power by percentage. |
| Shutdown a<br>power | at high feed-in  | <ul> <li>The default value is <b>Disable</b>.</li> <li>If this parameter is set to <b>Enable</b>, the inverter shuts down for protection when the grid-connection point power exceeds the threshold and remains in this condition for the specified time threshold.</li> </ul>  |
|                     |  | • The default value is <b>0</b> . This parameter specifies the power threshold of the grid-connection point for triggering inverter shutdown.   |
| threshold fo        | or triggering  | The default value is <b>20</b> . This parameter specifies the duration threshold of high feed-in power for triggering inverter shutdown.  |
|                     |  | <ul> <li>When High feed-in power duration threshold<br/>for triggering inverter shutdown is set to 5,<br/>Shutdown at high feed-in power takes<br/>precedence.</li> </ul>   |
|                     |  | • When High feed-in power duration threshold<br>for triggering inverter shutdown is set to 20,<br>Grid connection with limited power takes<br>precedence (when Active power control is set to<br>Grid connection with limited power).   |
|                     | Shutdown a<br>power<br>Upper feed-<br>for inverter<br>High feed-it<br>threshold fo<br>inverter shu | Communication         disconnection         detection time         Active power         output limit for         fail-safe         Shutdown at high feed-in   |

Note a: This parameter is supported only for the AS4777 grid code.

----End

# 5.2.2 Setting Parameters over the WebUI

#### Prerequisites

- You have matched the devices with the PV plant with the PV plant with the help of the installation contractor.
- The inverter and Smart Dongle have been powered on and communicates properly with the management system.

• You have obtained the login account and password from the installation contractor or Huawei service engineer. If no account or password is available, create an account.

#### Procedure

**Step 1** Enter the management system address in the address box of a browser: https:// intl.fusionsolar.huawei.com.

#### **NOTE**

- Browser: Chrome 67, Safari 9.0, Internet Explorer 11, or a later version is recommended.
- The software version corresponding to the user interface (UI) snapshots is SmartPVMS V500R007C00CP2101. The UIs may vary with software versions and are for reference only.
- Step 2 If you have obtained the login account and password from the installation contractor or Huawei service engineer, enter the account and password, and click Log In to go to the home page. If you have not created an account, click Installer Registration, fill in the registration information, and activate the account with the email verification code sent to you.

#### Figure 5-18 Login page

| Fus                    | sionSolar   |                  |
|------------------------|-------------|------------------|
| A Username/Email       | O- Password | <b>ි?</b> Log In |
| Installer Registration | Demo Site   | _                |

#### Figure 5-19 Registering an account

#### Installer Registration

| Note:<br>If your company has registered an ac<br>Ask your administrator to add you to | count in the system, you do not need to register again.<br>the user list. |
|---|---|
| * Company name:   |   |
| * Mobile number:  | +86   |
| * Username:   |   |
| * Password :  |   |
| * Confirm password:   |   |
| * SMS verification code:  | Send Code   |
| I agree to  | o Terms of Use and I have read Privacy Policy.                            |
|   | Submit  |

**Step 3** On the **Home** page, click the plant name to access the plant page. Choose **Device Management**, select Dongle, and click **Set Parameters**.



Figure 5-20 Setting export limitation 1



| Device Information         | Active Power Control Mode: |    |
|----------------------------|----------------------------|----|
| Management System Settings | No limit                   | 18 |
| Active Power Control       |                            |    |
| Reactive Power Control     |                            |    |
| EMS Control                |                            |    |
| Time Setting               |                            |    |
| Feed protection            |                            |    |

#### Figure 5-21 Setting export limitation 2

| Parameter                                |                           | Description   |
|--|---------------------------|---|
| Unlimited                                | N/A                       | If this parameter is set to <b>Unlimited</b> , the inverter output power is not limited and the inverter can feed its rated power to the power grid.  |
| Grid<br>connection<br>with zero<br>power | Closed-loop<br>controller | • For a single inverter: When the Smart Dongle is connected, set <b>Closed-loop controller</b> to <b>Inverter</b> . When the inverter is directly connected, <b>Closed-loop controller</b> to <b>Inverter</b> . |
|  |                           | • For multiple inverters, <b>Closed-loop controller</b> can only be set to <b>SDongle</b> .   |
|  | Limitation mode           | • <b>Total power</b> indicates export limitation of the total power at the grid-connection point. (When a single-phase meter is connected, only the <b>Total power</b> limitation mode can be selected.)        |
|  |                           | • <b>Single-phase power</b> indicates export limitation of the power in each phase at the grid-connection point.  |
|  | Power adjustment period   | Specifies the shortest interval for a single export limitation adjustment.  |
| Parameter  |                                     | Description   |
|--|-------------------------------------|---|
|  | Maximum protection<br>time          | • Specifies the time for detecting power meter data. If<br>the Smart Dongle does not detect any power meter<br>data within the preset time, the Smart Dongle delivers<br>the preset value of the <b>Fail-safe power threshold</b> to<br>the inverter for protection.  |
|  |                                     | The recommended value is 5s or greater.   |
|  | Power raising<br>threshold          | Specifies the dead zone for adjusting the inverter output<br>power. If the power fluctuates within the power control<br>hysteresis, the power is not adjusted.  |
|  | Fail-safe power<br>threshold        | Specifies the derating value of the inverter active power<br>by percentage. If the Smart Dongle does not detect any<br>power meter data or the communication between the<br>Smart Dongle and the inverter is disconnected, the Smart<br>Dongle delivers the derating value of the inverter active<br>power by percentage. |
| Grid<br>connection<br>with limited<br>power (kW) | Closed-loop<br>controller           | • For a single inverter: When the Smart Dongle is connected, set <b>Closed-loop controller</b> to <b>Inverter</b> . When the inverter is directly connected, <b>Closed-loop controller</b> to <b>Inverter</b> .   |
|  |                                     | • For multiple inverters, <b>Closed-loop controller</b> can only be set to <b>SDongle</b> .   |
|  | Limitation mode                     | • <b>Total power</b> indicates export limitation of the total power at the grid-connection point. (When a single-phase meter is connected, only the <b>Total power</b> limitation mode can be selected.)  |
|  |                                     | • <b>Single-phase power</b> indicates export limitation of the power in each phase at the grid-connection point.  |
|  | PV plant capacity                   | Specifies the total maximum active power in the inverter cascading scenario.  |
|  | Maximum grid feed-<br>in power (kW) | Specifies the maximum active power transmitted from the grid-tied point to the power grid.  |
|  | Power adjustment period             | Specifies the shortest interval for a single export limitation adjustment.  |
|  | Maximum protection<br>time          | • Specifies the time for detecting power meter data. If<br>the Smart Dongle does not detect any power meter<br>data within the preset time, the Smart Dongle delivers<br>the preset value of the <b>Fail-safe power threshold</b> to<br>the inverter for protection.  |
|  |                                     | The recommended value is 5s or greater.   |
|  | Power raising<br>threshold          | Specifies the dead zone for adjusting the inverter output<br>power. If the power fluctuates within the power control<br>hysteresis, the power is not adjusted.  |

| Parameter                                       |                                    | Description   |  |
|---|------------------------------------|---|--|
|   | Fail-safe power<br>threshold       | Specifies the derating value of the inverter active power<br>by percentage. If the Smart Dongle does not detect any<br>power meter data or the communication between the<br>Smart Dongle and the inverter is disconnected, the Smart<br>Dongle delivers the derating value of the inverter active<br>power by percentage.     |  |
| Grid<br>connection<br>with limited<br>power (%) | Closed-loop<br>controller          | <ul> <li>For a single inverter: When the Smart Dongle is connected, set Closed-loop controller to Inverter. When the inverter is directly connected, Closed-loop controller to Inverter.</li> <li>For multiple inverters, Closed-loop controller can only be set to SDongle.</li> </ul>                                       |  |
|   | Limitation mode                    | <ul> <li>Total power indicates export limitation of the total power at the grid-connection point. (When a single-phase meter is connected, only the Total power limitation mode can be selected.)</li> <li>Single-phase power indicates export limitation of the power in each phase at the grid-connection point.</li> </ul> |  |
|   | PV plant capacity                  | Specifies the total maximum active power in the inverted cascading scenario.  |  |
|   | Maximum grid feed-<br>in power (%) | Specifies the percentage of the maximum active power of the grid-tied point to the PV plant capacity.   |  |
|   | Power adjustment period            | Specifies the shortest interval for a single export limitation adjustment.  |  |
|   | Maximum protection<br>time         | <ul> <li>Specifies the time for detecting power meter data. If the Smart Dongle does not detect any power meter data within the preset time, the Smart Dongle delivers the preset value of the Fail-safe power threshold to the inverter for protection.</li> <li>The recommended value is 5s or greater.</li> </ul>          |  |
|   | Power raising<br>threshold         | Specifies the dead zone for adjusting the inverter output<br>power. If the power fluctuates within the power control<br>hysteresis, the power is not adjusted.  |  |
|   | Fail-safe power<br>threshold       | Specifies the derating value of the inverter active power<br>by percentage. If the Smart Dongle does not detect any<br>power meter data or the communication between the<br>Smart Dongle and the inverter is disconnected, the Smart<br>Dongle delivers the derating value of the inverter active<br>power by percentage.     |  |

----End

## 5.3 Connecting to the Smart Dongle and Setting Feedin at Limited Current

#### **Prerequisites**

FusionSolar app: Go to Huawei AppGallery and search for FusionSolar or scan the QR code to download and install the app.



FusionSolar App

- SUN2000 app: Go to Huawei AppGallery, search for SUN2000, and download the installation package of the latest version.
- Feed-in at limited current can be set by connecting to the WLAN of the Smart Dongle only in the following scenarios where only one inverter is deployed.

| Table 5-4 Supported scenarios           |   |                        |                                  |  |  |
|---|---|------------------------|----------------------------------|--|--|
| Inverter                                | Smart Dongle                            | Networking<br>Scenario | Feed-in at<br>Limited<br>Current | Grid Code  |  |
| SUN2000-(30K<br>TL, 36KTL,<br>40KTL)-M3 | SDongleB-06-EU                          | Single device          | Yes                              | • G99-TYPEA-   |  |
|   | SDongleA-05 (BOM<br>code: 02312QMV-004) |                        |                                  | LV<br>• G99-TYPEB-<br>LV                             |  |
| SUN2000-(110                            | SDongleB-06-EU                          | Single device          | Yes                              | • G99-TYPEB-   |  |
| KTL, 115KTL)-<br>M2                     | SDongleA-05 (BOM<br>code: 02312QMV-004) |                        |                                  | HV<br>• G99-TYPEB-<br>HV-MV480<br>• G99-TYPEA-<br>HV |  |

#### Ta

#### **NOTE**

- In areas where the FusionSolar app is unavailable (for example, in the UK) or a thirdparty management system is used, only the SUN2000 app can be used for commissioning. This document uses the FusionSolar app as an example to describe the commissioning method. For the SUN2000 app, perform operations based on the actual situation.
- The SUN2000 app version must be 24.5.100.B001 (Android) or later.

#### Procedure

**Step 1** Run the FusionSolar app and start **Commission Device**. (Perform this step only for the FusionSolar app.)



Figure 5-22 Commission Device







**Step 3** Set parameters for feed-in at limited current.

#### Figure 5-24 Parameter settings



#### Table 5-5 Parameter settings

| Parameter                            | Value              | Description   |
|--------------------------------------|--------------------|---|
| Feed-in at limited                   | Disabled (default) | Disable the function of feed-in at limited current.   |
| current <sup>a</sup>                 | Enabled            | Enable the function of feed-in at limited current.  |
| Max. feed-in<br>current <sup>b</sup> | [0, 30000 A]       | • Due to external disturbances, the feed-in current may exceed the specified value by 2%. In this case, the inverter will adjust the current to a value within the range limit.                                     |
|                                      |                    | • After the user changes the maximum feed-in current, the inverter will adjust the current to a value within the range limit.   |
| Max. grid supply<br>current          | [0, 30000 A]       | If the grid supply current exceeds the specified value by 2%, the inverter will adjust the current to a value within the range limit.   |
| Current<br>adjustment<br>interval    | [1, 5s]            | The default value 2s is recommended. When the current at the grid connection point exceeds the allowed range, the inverter adjusts the current every 2s. A larger value indicates a lower current adjustment speed. |

Note a:

- If the SUN2000-(30KTL, 36KTL, 40KTL)-M3 inverter shuts down because the feed-in current adjustment is not complete within the specified time, the user needs to manually start the inverter. By default, the number of manual startups cannot exceed three within 30 days. If this limit is reached, it is not allowed to manually start the inverter again.
- If the SUN2000-(110KTL, 115KTL)-M2 inverter shuts down because the feed-in current adjustment is not complete within the specified time, the user needs to manually start the inverter. By default, the user needs to wait for at least 4 hours before starting the inverter.

Note b: If the maximum feed-in current is not adjusted to a value within the range limit within 15s, the inverter will shut down and report a **Power Control Abnormal at Grid Connection Point** alarm.

----End

# 5.4 Third-Party Management System Settings (Connecting to Two Management Systems)

#### Prerequisites

- The inverter connects to a third-party management system and the Huawei management system.
- You have downloaded and installed the FusionSolar app which can be obtained by searching for **FusionSolar** in Huawei AppGallery or scanning the QR code.



FusionSolar App

 SUN2000 APP: Search for "SUN2000" in Huawei AppGallery, download the latest installation package, and install the SUN2000 app by following the instructions.

#### D NOTE

- Only SDongleB-06 and SDongleA-05 (BOM number: 02312QMV-004) can connect to a third-party management system.
- The app version must be 6.24.00.006 or later.

#### Method 1: Connecting to the Inverter Built-in WLAN to Set Third-Party Management System Parameters

#### **NOTE**

Only the SUN2000-(12KTL-25KTL)-M5, SUN2000-(12K-25K)-MB0, SUN5000-(17K, 25K)-MB0, SUN2000-(5K-12K)-MAP0, SUN5000-(8K, 12K)-MAP0, and SUN600-(15KTL-25KTL)-ZHM0 series inverters can be set on the FusionSolar app. For other models of inverters, log in to the FusionSolar SmartPVMS to set the parameters.

# **Step 1** Run the FusionSolar app and go to the **Device commissioning** screen. (Perform this step only for the FusionSolar app.)



#### Figure 5-25 Device commissioning

**Step 2** Connect to the inverter.

| Identity authentication  | < SUN2000<br>Standby:suri                | -XXX-XX                     |
|--|--|-----------------------------|
|  | Communication status<br>Good WLAN signal | Management system           |
|  | Active power<br>0.000(rm)                | Energy yield of current day |
|  | Monthly Energy Yield<br>0.030ms          | Total<br>4.640mm            |
|  | <b>L</b><br>Alarm                        | Ruick settings              |
| Enter your password  | Device Monitoring                        | Maintenance                 |
| Initial password: 00000a or set the password at the first login. | <mark>کی</mark><br>Settings              | t+t<br>Power adjustment     |
| Cancel Log in  |  |                             |

#### Figure 5-26 Connecting to the inverter

#### **NOTE**

- Code scanning: Tap **Connect** to access the scanning screen, place the QR code or bar code of the solar inverter in the scan frame. The device will be automatically connected after the code is identified.
- During the login, if five consecutive invalid password entries are made (theinterval between two consecutive entries is less than 2 minutes), the accountwill be locked for 10 minutes. The password should consist of six characters.
- To ensure account security, change the password periodically and keep the newpassword in mind. A password left unchanged for a long period of time may bestolen or cracked. If a password is lost, devices cannot be accessed. In thesecases, the user is liable for any loss caused to the PV plant.

#### Step 3 Setting the third-party management parameters

| Settings              |             | < Communication<br>configuration                    |   | < |                        | ent system-1<br>meters | Ð      |
|-----------------------|-------------|---|---|---|------------------------|------------------------|--------|
| Grid parameters       | >           | Inverter WLAN settings                              | > |   | Connect                |                        | D      |
| Protection parameters | >           | Router connection settings                          | > |   | Server                 | XXX.XXXXXXXXX          | : >    |
| eature parameters     | >           | RS485_1   | > |   | Port                   | 20000                  | ( >    |
| ower adjustment       | , <b></b> , |   |   |   | TLS                    |                        | D      |
| Time setting          | >           | Management system                                   | > |   | TLS version            | XXXXX or later         | $\sim$ |
|                       | >           | Mobile network                                      | > |   | Network<br>Management  | Trina                  | ~      |
|                       |             | Dongle parameter settings                           | > |   | Protocol<br>Management |                        |        |
|                       |             | Parallel system communication<br>parameter settings | > |   | system status          | XXXXX                  |        |
|                       |             | Manageme Stem-1 parameters                          | > |   |                        |                        |        |

#### Figure 5-27 Parameter settings

#### Table 5-6 Parameter settings

| Parameter                         | Description   | Value Range   |
|-----------------------------------|---|---|
| Connect                           | <ul> <li>The default value is Disable, meaning that a third-party management system is not connected.</li> <li>When this parameter is set to Enable, a third-party management system can be connected.</li> </ul>   | <ul><li>Disable</li><li>Enable</li></ul>  |
| Server                            | Domain name or IP address.  | -   |
| Port                              | Server port.  | [0, 65535]  |
| TLS                               | <ul> <li>If the third-party management system uses the TLS encryption protocol, set this parameter to Enable and select a most secure version supported by the third-party management system.</li> <li>If the third-party management system does not use the TLS encryption protocol, set this parameter to Disable.</li> </ul> | <ul><li>Disable</li><li>Enable</li></ul>  |
| TLS version                       | Select a version based on the TLS version of the third-<br>party management system.   | <ul> <li>TLS 1.0 or later</li> <li>TLS 1.1 or later</li> <li>TLS 1.2 or later</li> <li>TLS 1.3</li> </ul> |
| Network<br>Management<br>Protocol | The default value is standard Modbus.   | Modbus  |

#### ----End

#### Method 2: Logging In to the FusionSolar Smart PV Management System to Set Third-Party Management System Parameters

• Log in to the FusionSolar app and tap the plant name on the **Home** screen to access the plant screen. Choose **Devices**, select the target SDongle, and choose **Parameter settings**. Set the parameters as prompted.

| -   | · · ·  |   |  |
|---|--|---|--|
| Plants Statistics   | XXXXXXXXXX ::<br><u>All</u> Inverter 1 Dongle 1 Optimizer 60 |   | C XXXXXXXXXX :::<br>Active Alarms H<br>O&M Authorization |
| 0     0     0       All     Normal     Faulty       Q. Enter a plant name.  | SH<br>Device<br>Expration<br>Date                            |   | Parameter settings<br>Modify device                      |
|   | Running XXXXX SN         | • | No data available.                                       |
| Company and the second se | Overview Statistics Layout                                   | ) | Alarminto  |
|   | ← Parameter settings   |   | ← Parameter settings                                     |
|   | Basic Settings Working mode                                  |   |  |
|   | Management system-1 parameters                               |   | Basic Settings Working mode 5                            |
|   | Connect Enable >   |   | Connect Enable >   |
|   | Server   |   |  |
|   | Port 0   |   |  |
|   | TLS encryption Enable >                                      |   |  |
|   |  |   | Connect  |
|   |  |   | Disable 6  |
|   |  |   | Enable   |
|   | Cancel OK  |   | Cancel   |

#### Figure 5-28 Setting the third-party management parameters

Log in to https://intl.fusionsolar.huawei.com to access the WebUI of the • FusionSolar Smart PV Management System. On the Home page, click the plant name to access the plant page. Choose Device Management, select the target SDongle, click Set Parameter. Set the parameters as prompted.



Figure 5-29 Setting the third-party management parameters

Status

Anlagenbild Anlagenname

xxxxxx

#### Table 5-7 Parameter settings

| Parameter                   | Description   | Value Range   |
|-----------------------------|---|---|
| Connect                     | <ul> <li>The default value is Disable, meaning that a third-party management system is not connected.</li> <li>When this parameter is set to Enable, a third-party management system can be connected.</li> </ul>   | <ul><li>Disable</li><li>Enable</li></ul>  |
| Server                      | Domain name or IP address.  | -   |
| Port                        | Server port.  | [0, 65535]  |
| TLS encryption              | <ul> <li>If the third-party management system uses the TLS encryption protocol, set this parameter to Enable and select a most secure version supported by the third-party management system.</li> <li>If the third-party management system does not use the TLS encryption protocol, set this parameter to Disable.</li> </ul> | <ul><li>Disable</li><li>Enable</li></ul>  |
| Management<br>system status | Connection status of the third-party management system.   | <ul> <li>Not connected</li> <li>Internal error.<br/>Resources are<br/>insufficient.</li> <li>Connection<br/>Successful</li> <li>Connection<br/>deadlock</li> <li>The peer end is<br/>disabled</li> <li>Connection<br/>abnormal</li> <li>Failed to connect<br/>to the port</li> <li>Failed to verify<br/>the peer<br/>certificate</li> <li>The local<br/>certificate is<br/>abnormal</li> <li>Domain name<br/>resolution failed</li> <li>Failed to connect<br/>to the server</li> <li>Connecting</li> <li>Second challenge<br/>authentication</li> </ul> |

| Parameter                    | Description  | Value Range |
|------------------------------|--|-------------|
| Server IP<br>address         | IP address.  | -           |
| Deliver Trust<br>Certificate | Import the CA certificate of the third-party management<br>system to Huawei's device to ensure encrypted<br>connection. Before import, ensure that the third-party<br>management system is successfully connected. | -           |

# 5.5 Setting Parameters and Exporting Logs Through the WLAN of the Smart Dongle

#### Procedure

**Step 1** Run the FusionSolar app and go to the **Device commissioning** screen. (Perform this step only for the FusionSolar app.)

Figure 5-30 Device commissioning



**Step 2** Connect to the Smart Dongle to set parameters and export logs. For details, see the Smart Dongle section in the *FusionSolar App, SUN2000 App Device Commissioning Manual*. You can scan the following QR code to obtain the document.



#### Figure 5-31 Connecting to the Smart Dongle

Figure 5-32 FusionSolar App, SUN2000 App Device Commissioning Manual



#### **NOTE**

- Code scanning: Tap **Connect** to access the scanning screen, place the QR code or bar code of the solar inverter in the scan frame. The device will be automatically connected after the code is identified.
- If you enter wrong login passwords for **installer** for five consecutive times and the interval between two attempts is within 2 minutes, your account will be locked. Log in to the app again after 5 minutes.
- Use the initial password upon the first Log-in and change it immediately after login. To ensure account security, change the password periodically and keep the new password in mind. Not changing the initial password may cause password disclosure. A password left unchanged for a long period of time may be stolen or cracked. If a password is lost, devices cannot be accessed. In these cases, the user is liable for any loss caused to the PV plant.
- Only SDongleA-05 or SDongleB-06supports this upgrade mode.
- The screenshots are for reference only. The actual screens may vary.

#### ----End

# **6** Maintenance

# 6.1 Modifying Inverter Communications Parameters

#### Prerequisites

- The FusionSolar app is recommended when the inverter is connected to the FusionSolar Smart PV Management System. The SUN2000 app is recommended when the inverter is connected to other management systems.
- You have downloaded and installed the FusionSolar app which can be obtained by searching for **FusionSolar** in Huawei AppGallery or scanning the QR code.



FusionSolar App

 SUN2000 APP: Search for "SUN2000" in Huawei AppGallery, download the latest installation package, and install the SUN2000 app by following the instructions.

#### **NOTE**

- In areas (such as the UK) where the FusionSolar app is not available, or when a thirdparty management system is used, only the SUN2000 app can be used for commissioning. This document uses the FusionSolar app as an example to describe the commissioning method. For the SUN2000 app, perform operations as required.
- The SUN2000 app version should be 3.2.00.005 (Android) or later.

### 6.1.1 WLAN Communication Networking

**Step 1** Run the FusionSolar app and go to the **Device commissioning** screen. (Perform this step only for the FusionSolar app.)



#### Figure 6-1 Device commissioning



Figure 6-2 Connecting to the inverter



#### **NOTE**

- Code scanning: Tap **Connect** to access the scanning screen, place the QR code or bar code of the solar inverter in the scan frame. The device will be automatically connected after the code is identified.
- During the login, if five consecutive invalid password entries are made (theinterval between two consecutive entries is less than 2 minutes), the accountwill be locked for 10 minutes. The password should consist of six characters.
- To ensure account security, change the password periodically and keep the newpassword in mind. A password left unchanged for a long period of time may bestolen or cracked. If a password is lost, devices cannot be accessed. In thesecases, the user is liable for any loss caused to the PV plant.

# **Step 3** Tap **Settings > Communication configuration** and set the parameters for **Router connection settings**.



#### Figure 6-3 Inverter communication settings

#### Table 6-1 Parameter description

| Туре                      | Parameter               | Setting Description  |
|---------------------------|-------------------------|--|
| Inverter's                | WLAN list               | Specifies the name of the wireless network.  |
| connection to<br>a router | Password                | Specifies the password for logging in to the wireless network.   |
|                           | DHCP                    | • Enable this parameter if you use the IP address<br>automatically allocated by the router. In this case, the<br>values of <b>IP address</b> , <b>Subnet mask</b> , <b>Gateway</b> , <b>Primary</b><br><b>DNS server</b> , and <b>Secondary DNS server</b> are<br>automatically allocated. |
|                           |                         | <ul> <li>Disable this parameter if you do not use the IP address<br/>automatically allocated by the router. In this case, you<br/>need to set the values of IP address, Subnet mask,<br/>Gateway, Primary DNS server, and Secondary DNS<br/>server.</li> </ul>                             |
|                           | IP address              | Specifies the IP address for the router to which the<br>inverter WLAN network connects. The IP address must be<br>in the same network segment as the router IP address.  |
|                           | Subnet mask             | Specifies the router subnet mask.  |
|                           | Gateway                 | Specifies the router gateway address.  |
|                           | Primary DNS server      | Specifies the address for the primary domain name service (DNS) server.  |
|                           | Secondary DNS<br>server | Specifies the address for the secondary DNS server.  |

#### Table 6-2 Description of icons

| lcon | Router | Router |  |  | ystem |
|------|--------|--------|--|--|-------|
|      |        |        |  |  |       |

| Mean<br>ing | Disconnec<br>ted | Incorrect<br>password | Connected; signal strength | Connection<br>failed. | Connecti<br>on is<br>successf<br>ul. |
|-------------|------------------|-----------------------|----------------------------|-----------------------|--------------------------------------|
|-------------|------------------|-----------------------|----------------------------|-----------------------|--------------------------------------|

----End

# 6.1.2 4G Communication Networking

#### Procedure

**Step 1** Run the FusionSolar app and go to the **Device commissioning** screen. (Perform this step only for the FusionSolar app.)

Figure 6-4 Device commissioning



**Step 2** Connect to the inverter.

#### Figure 6-5 Connecting to the inverter



#### D NOTE

- Code scanning: Tap **Connect** to access the scanning screen, place the QR code or bar code of the solar inverter in the scan frame. The device will be automatically connected after the code is identified.
- During the login, if five consecutive invalid password entries are made (theinterval between two consecutive entries is less than 2 minutes), the accountwill be locked for 10 minutes. The password should consist of six characters.
- To ensure account security, change the password periodically and keep the newpassword in mind. A password left unchanged for a long period of time may bestolen or cracked. If a password is lost, devices cannot be accessed. In thesecases, the user is liable for any loss caused to the PV plant.

# **Step 3** Tap **Settings > Communication configuration** and set **Mobile network** parameters.

| < Settings            |   |   | < Communication configuration       |   | < Mobile network                 | Connect                 |
|-----------------------|---|---|-------------------------------------|---|----------------------------------|-------------------------|
| Grid parameters       | > |   | Inverter WLAN settings              | > |                                  |                         |
| Protection parameters | > |   | RS485_1                             | > | <u> </u>                         | A                       |
| Feature parameters    | > |   | Management system<br>settings       | > | Monthly traffic package          | $_{\rm M}\sim$          |
| Power adjustment      | > | - | Mobile network                      | > | Monthly used traffic calibration | $_{\rm M}\sim$          |
| Time setting          | > |   | Dongle parameter<br>settings        | > | APN mode                         | Manual $\smallsetminus$ |
| Communication config  | > |   | Parallel system                     |   | Identification type              | None $\sim$             |
|                       |   |   | communication parameter<br>settings | > | APN                              | cmnet                   |
|                       |   |   |                                     |   | APN dialup number                |                         |
|                       |   |   |                                     |   | APN user name                    |                         |
|                       |   |   |                                     |   | APN user password                | het                     |
|                       |   |   |                                     |   | Network mode 4G/3                | IG/2G automatic         |

#### Figure 6-6 Inverter communication settings

| Table 6-3 | Parameter | description |
|-----------|-----------|-------------|
|-----------|-----------|-------------|

| Туре     | Parameter                    | Setting Description  |  |  |  |  |
|----------|------------------------------|--|--|--|--|--|
| 4G AF AF | APN mode                     | • Set the parameters related to the SIM card based on  |  |  |  |  |
|          | APN                          | <ul> <li>the information provided by the SIM card carrier.</li> <li>When APN mode is set to Manual, APN, APN dialup</li> </ul> |  |  |  |  |
|          | APN dialup number num<br>are | number, APN user name, and APN user password   |  |  |  |  |
|          | APN user name                | are all displayed and configurable. When <b>APN mode</b> is set to <b>Automatic</b> , these parameters are not displayed.      |  |  |  |  |
|          | APN user password            |  |  |  |  |  |
| -        | Network mode                 |  |  |  |  |  |
|          | PIN                          |  |  |  |  |  |

#### Table 6-4 Description of icons

| Icon SIM card Management system |
|---------------------------------|
|---------------------------------|

|             |                   | <b>.</b>   |                                |                    |                                 |
|-------------|-------------------|--|--------------------------------|--------------------|---------------------------------|
| Meani<br>ng | Enter the<br>PIN. | No SIM<br>card   | Not connected; signal strength | Connection failed. | Connection<br>is<br>successful. |
| lcon        | PUK:              | <b>.</b>   |                                | N/A                | N/A                             |
| Meani<br>ng | Enter the<br>PUK. | Failed to<br>read the<br>card. The<br>signal is<br>poor or<br>the<br>subscriber<br>is in<br>arrears. | Connected; signal strength     | N/A                | N/A                             |

----End

# 6.1.3 FE Communication Networking

**Step 1** Run the FusionSolar app and go to the **Device commissioning** screen. (Perform this step only for the FusionSolar app.)

Figure 6-7 Device commissioning



**Step 2** Connect to the inverter.

| Identity authentication   | SUN2000                          | -XXX-XX                                   |
|---|----------------------------------|---|
|   | Good WLAN signal                 | Management system<br>Connection succeeded |
|   | Active power<br>0.000(sw)        | Energy yield of current day               |
|   | Monthly Energy Yield<br>0.030wea | Total<br>4.64tuwe                         |
|   | <b>D</b><br>Alarm                | <b>Q</b> uick settings                    |
| Installer  Chter your password.                                 | Device Monitoring                | (2)<br>Maintenance                        |
| itial password: 00000a or set<br>e password at the first login. | <b>Coo</b> s                     | <b>1</b><br>Power adjustment              |
| Cancel Log in   |                                  |   |

#### Figure 6-8 Connecting to the inverter

#### **NOTE**

- Code scanning: Tap **Connect** to access the scanning screen, place the QR code or bar code of the solar inverter in the scan frame. The device will be automatically connected after the code is identified.
- During the login, if five consecutive invalid password entries are made (theinterval between two consecutive entries is less than 2 minutes), the accountwill be locked for 10 minutes. The password should consist of six characters.
- To ensure account security, change the password periodically and keep the newpassword in mind. A password left unchanged for a long period of time may bestolen or cracked. If a password is lost, devices cannot be accessed. In thesecases, the user is liable for any loss caused to the PV plant.

# **Step 3** Tap **Settings > Communication configuration** and set the parameters for **Router connection settings**.

| < Settings                  |   | < Communication configuration |             |   | < Router connection settings Connect |  |  |  |
|-----------------------------|---|-------------------------------|-------------|---|--------------------------------------|--|--|--|
| Grid parameters >           |   | Inverter WLAN settings        | >           | - |                                      |  |  |  |
| Protection parameters >     |   | Router connection             | >           |   |                                      |  |  |  |
| Feature parameters >        |   | R\$485_1                      | >           |   | WLANConnect FEConnect                |  |  |  |
| Power adjustment            | <b></b>   | Management system             | \<br>\      |   | рнср                                 |  |  |  |
| Time setting >              |   | settings                      |             |   |                                      |  |  |  |
| Communication configuration |   | Dongle parameter<br>settings  | >           |   | IP address                           |  |  |  |
| m                           | >     Inverter WLAN settings     >       ers     >     Router connection     >       s     >     RS485_1     >       >     >     Management system     >       >     Dongle parameter     > |                               | Subnet mask |   |                                      |  |  |  |
|                             |   | communication parameter       | >           |   | Gateway                              |  |  |  |
|                             |   |                               |             |   | Primary DNS server                   |  |  |  |
|                             |   |                               |             |   | Secondary DNS server                 |  |  |  |

#### Figure 6-9 Inverter communication settings

 Table 6-5 Parameter description

| Туре                                    | Parameter               | Setting Description  |
|---|-------------------------|--|
| Inverter's<br>connection to<br>a router | DHCP                    | • Enable this parameter if you use the IP address<br>automatically allocated by the router. In this case, the<br>values of <b>IP address</b> , <b>Subnet mask</b> , <b>Gateway</b> , <b>Primary</b><br><b>DNS server</b> , and <b>Secondary DNS server</b> are<br>automatically allocated. |
|   |                         | <ul> <li>Disable this parameter if you do not use the IP address<br/>automatically allocated by the router. In this case, you<br/>need to set the values of IP address, Subnet mask,<br/>Gateway, Primary DNS server, and Secondary DNS<br/>server.</li> </ul>                             |
|   | IP address              | Specifies the IP address for the router to which the<br>inverter WLAN network connects. The IP address must be<br>in the same network segment as the router IP address.  |
|   | Subnet mask             | Specifies the router subnet mask.  |
|   | Gateway                 | Specifies the router gateway address.  |
|   | Primary DNS server      | Specifies the address for the primary domain name service (DNS) server.  |
|   | Secondary DNS<br>server | Specifies the address for the secondary DNS server.  |

 Table 6-6 Description of icons

| lcon        | Router             |                |                           | Management system     |                           |  |  |
|-------------|--------------------|----------------|---------------------------|-----------------------|---------------------------|--|--|
|             |                    |                |                           |                       |                           |  |  |
| Meani<br>ng | Connection failed. | Connecting<br> | Connection is successful. | Connection<br>failed. | Connection is successful. |  |  |

----End

# 6.2 Exporting Inverter and Smart Dongle Logs

#### Procedure

Step 1 Log in to the management system, click Plants, and choose Log Export under Device.





Step 2 Select devices and click Start Export to create an export task. When the export status is Succeeded, select the corresponding logs and click Save Log to save the logs locally.

Figure 6-11 Exporting and saving logs

| 📸 FusionSolar 丨 🏠  | Home Monite | oring Reports | Plants      | Maintenance | Value-Adde  | d Services   | System | Q    | 🕐 Englist  | , å         | ()       | ?      |
|--------------------|-------------|---------------|-------------|-------------|-------------|--------------|--------|------|------------|-------------|----------|--------|
| Device             | Log Export  | Optimizer L   | a Evport    | Battery Lo  | a Evport    |              |        |      |            |             |          |        |
| Adapter Management | LOG Export  | Optimizer Li  | by Export   | Dattery LC  | y Export    |              |        |      |            |             |          |        |
| Device Access      | Plant name  |               | Device type | All         | Device Name | e:           | SN     |      | E          | ort Status  | All      |        |
| Update Management  | Search      | Reset         |             |             |             |              |        |      |            |             |          |        |
| Log Export         |             |               |             |             |             |              |        | Rtad | Export     | Stop Export | 0.74     | e Log  |
| License Management |             |               |             |             |             |              |        | otan | Export     | stop Export | Sav      | e Log  |
| Inspection         | Plan        | t Name Devic  | e Type De   | vice Name   | SN E        | xport Status |        | Task | Start Time |             | Task End | t Time |
|                    | UDL         | 1 Invert      | er Inv      | erter-7     |             |              |        |      |            |             |          |        |
|                    |             |               |             |             |             |              |        |      |            |             |          |        |

#### ----End

# 6.3 Upgrading the Inverter and Smart Dongle Software

#### Prerequisites

- You have contacted Huawei technical support engineers to upload the upgrade package of the software.
- The FusionSolar app is recommended when the inverter is connected to the FusionSolar Smart PV Management System. The SUN2000 app is recommended when the inverter is connected to other management systems.
- You have downloaded and installed the FusionSolar app which can be obtained by searching for **FusionSolar** in Huawei AppGallery or scanning the QR code.



FusionSolar App

• SUN2000 APP: Search for "SUN2000" in Huawei AppGallery, download the latest installation package, and install the SUN2000 app by following the instructions.

# Connecting to the Inverter over the App (Not Applicable to Inverters with the Built-in WLAN Function)

**Step 1** Ensure that the Smart Dongle to be upgraded is inserted into a running inverter. Wait for more than 2 minutes, remove the Smart Dongle, and connect the USB data cable to the inverter.

**NOTE** 

Perform this step if communication with the inverter over a USB data cable is required.

**Step 2** Run the FusionSolar app and go to the **Device commissioning** screen. (Perform this step only for the FusionSolar app.)



Figure 6-12 Device commissioning

**Step 3** Connect to the inverter.

Figure 6-13 Connecting to the inverter



#### D NOTE

- Code scanning: Tap **Connect** to access the scanning screen, place the QR code or bar code of the solar inverter in the scan frame. The device will be automatically connected after the code is identified.
- During the login, if five consecutive invalid password entries are made (theinterval between two consecutive entries is less than 2 minutes), the accountwill be locked for 10 minutes. The password should consist of six characters.
- To ensure account security, change the password periodically and keep the newpassword in mind. A password left unchanged for a long period of time may bestolen or cracked. If a password is lost, devices cannot be accessed. In thesecases, the user is liable for any loss caused to the PV plant.

#### **Step 4** Upgrade a device as prompted.

#### **NOTE**

- Prepare the upgrade package before upgrading the device.
- Delivering an upgrade command to an inverter may cause power grid connection failure of the inverter and affect the energy yield.

#### Figure 6-14 Upgrading a device

| < |  | 0-XXX-XX                    | K Maintenance                      |                  | <        | Upgrade device           |     |
|---|--|-----------------------------|------------------------------------|------------------|----------|--------------------------|-----|
| 8 | Communication status<br>Good WLAN signal | Connection succeeded        | Subdevice management               | >                | Inverter | upgrade                  |     |
|   | Active power                             | Energy yield of current day | (1) Upgrade device                 | >                | Current  | version: XXXXXXXXXXXXXXX | Upg |
|   | 1.501 kw<br>Monthly energy yield         | Total                       | Log management                     | >                | Dongle   | upgrade                  |     |
|   | 82.63 kuh                                | 394.44 svn                  | (1) Performance data               | >                | Current  | ersion: XXXXXXXXXXXXXXX  | Upç |
|   | Alarm                                    | Quick settings              | (2) Alarm beacon                   | >                |          |                          |     |
|   | Alaini                                   | Quick settings              | ③ AFCI self-check                  |                  |          |                          |     |
|   | <b>S</b>                                 |                             | Inverter ON/OFF     Grid connected | • •              |          |                          |     |
|   | Device monitoring                        | Maintenance                 | Restore defaults                   | Restore defaults |          |                          |     |
|   | ¢  | 1HT                         | Clear alarms                       |                  |          |                          |     |
|   | Settings                                 | Power adjustment            | Ø Clear historical energy yield    |                  |          |                          |     |

----End

#### Connecting to the Smart Dongle over the App

#### **NOTE**

- Only SDongleA-05 or SDongleB-06supports this upgrade mode.
- The screenshots are for reference only. The actual screens may vary.
- **Step 1** Run the FusionSolar app and go to the **Device commissioning** screen. (Perform this step only for the FusionSolar app.)







Figure 6-16 Connecting the Smart Dongle



**Step 3** Upgrade a device as prompted.

#### **NOTE**

Prepare the upgrade package before upgrading the device.





#### **Over the WebUI**

**Step 1** Log in to the management system, click **Plants** in the upper-right corner to go to the **Device** page, and choose **Update Management**. On the **Device Upgrade** tab page, click **Create**, and create an upgrade task.

Figure 6-18 Creating an upgrade task

| 🎁 FusionSolar              | । 🎧 Home Monitoring Reports Parts Maintenance WaterAdded Services SystemSmartDesign 💬 🕼 Q. @English & (  | 0                     |
|----------------------------|--|-----------------------|
| Device                     | Device lipiden   |                       |
| Device Management          | Update by Device Type Update by Plant Type           Convr the Link name         Update type         SN         Convr the Link name         Convr the Link | elect a device update |
| Update Management          | Search Reset   |                       |
| Log Export                 | Citate Epot * Retrying Cita  | ck After Update Refre |
| License Management         | 🗌 Task Name 🛛 Update Tas   Device Type 🖗   Target Version   Progress 🗇   Creator   Update Mode   Creation Time O   Description   | Operation             |
| Inspection                 | Successful   | 5 Q B                 |
| Configure Strings          | C Total records: 1 C   | 1 > 207 page          |
| Module Library Management  |  |                       |
| Device Certificate Managem |  |                       |

**Step 2** Set **Upgrade**, **Device type**, **Target version**, and **Device selection**, and click **OK** to upgrade the devices.

#### **NOTE**

If the update after confirmation mode is selected, the device can be updated only after the user's consent is obtained.

Figure 6-19 Device upgrade

| vice Update                    |  |              |          |  |
|--------------------------------|--|--------------|----------|--|
| Update by Device Type Update b | vy Plant Type  |              |          |  |
| V Basic Information            |  |              |          |  |
| Task name                      | Enter a task name  |              |          |  |
| Description                    | Enter a task description                                     |              |          |  |
| Update mode                    | After authorization  | ~            |          |  |
| > Select Device The device lis | I does not contain devices that are disconnected or being up | graded.      |          |  |
| ✓ Match Target Version         |  |              |          |  |
| Device model                   | • Ta   | rget version | -Select- |  |
| Owner's authorization obtained | 1 🔾 Yes 🔘 No   |              | Cancel   |  |
|                                |  |              |          |  |

----End

# 6.4 Updating the Device List

When a device connected to the Device List is deleted or replaced, you need to update the plant device information on the **Device Management** page.

#### Prerequisites

The PV plant to be updated communicates properly with the FusionSolar Smart PV Management System.

#### Procedure

- **Step 1** On the home page of the management system, select the plant to be modified from the plant list.
- **Step 2** On the **Device Management** page, select the target device, and then delete or replace the device.

Figure 6-20 Device management

| •                                    |                |                |        |             |                      |             |           |            |               |     |
|--------------------------------------|----------------|----------------|--------|-------------|----------------------|-------------|-----------|------------|---------------|-----|
| 🎢 FusionSolar 🛛 🕻                    | Home Monit     | oring Reports  | Plants | Maintenance | Value-Added Services | System      | Q         | 🛞 English  | ۵ (           | ?   |
| Home > XXXXXXXX<br>Overview   Layout | Reports De     | evice Manage   | ment   | Alarms Pla  | ant Profile          |             |           |            |               |     |
| Device type: All v                   | Device name:   | SN:            |        | Model:      | Communication        | Status: All |           | √ @s       | earch         |     |
|                                      | Release Device | Set Parameters | Rep    | lace Device | Batch Rename         | Export      | Basic Inf | o Export P | erformance Da | ata |

#### **NOTE**

Replacing inverters does not affect the total energy yield of the PV plant.

----End

# 6.5 Replacing the Smart Dongle and the Master Inverter

### 6.5.1 Replacing the Smart Dongle

#### Replacing a Faulty Smart Dongle with a Smart Dongle of the Same Model

#### D NOTE

If SDongleA-01, SDongleB-06, SDongleA-03, or SDongleA-05 is faulty, it must be replaced with a Smart Dongle of the same model.

- Step 1 Remove the faulty Smart Dongle.
- **Step 2** Replace the SIM card. (Perform this step when the 4G communication mode is used.)
  - If the purchased Smart Dongle has a built-in SIM card, replace the Smart Dongle without replacing the SIM card.
  - If the purchased Smart Dongle does not have a built-in SIM card, use the SIM card in the faulty Smart Dongle.
- **Step 3** Install a new Smart Dongle onto the inverter where the faulty Smart Dongle was installed.
- **Step 4** Set the password for logging in to the WLAN. (Perform this step when the WLAN communication mode is used.)
- Step 5 Log in to the FusionSolar app and tap the plant name on the Home screen to access the plant screen. Tap Devices, select the faulty Smart Dongle, tap Device Replacement, and replace the Smart Dongle as prompted.



Figure 6-21 Device Replacement

#### Replacing a Faulty Smart Mobile-4G with an SDongleA-03

**NOTE** 

- Replacing a Faulty Smart Mobile-4G-CN with an SDongleA-03-CN.
- Replacing a Faulty Smart Mobile-4G-EU with an SDongleA-03-EU.
- Step 1 Check that the software version of the master inverter supports the SDongleA-03. If the software version is not compatible, update the software version or replace the inverter.
- Step 2 Remove the faulty Smart Dongle.
- **Step 3** Replace the SIM card. (Perform this step when the 4G communication mode is used.)
  - If the purchased Smart Dongle has a built-in SIM card, replace the Smart Dongle without replacing the SIM card.
  - If the purchased Smart Dongle does not have a built-in SIM card, use the SIM card in the faulty Smart Dongle.
- **Step 4** Log in to the FusionSolar app and tap the plant name on the **Home** screen to access the plant screen. Tap **Devices** and add a new Smart Dongle.

#### Figure 6-22 Add device



----End

#### 6.5.2 Replacing the Master Inverter

**Step 1** When the MBUS is used for networking, use the app to change the cascading mode of the original master inverter to RS485 through **Quick settings**.

#### 

Tap Search for cascaded inverters and exit after 5s.

#### Figure 6-23 Setting inverter cascading

| etworking n | node |                        |
|-------------|------|------------------------|
| RS485       | MBUS |                        |
| erter       | (    | Search for<br>cascaded |

- **Step 2** Remove the Smart Dongle and install it on the new master inverter.
- **Step 3** Set up a site and commission the new master inverter.

----End

# 6.6 Troubleshooting Common Issues

| Fault  | Cause  | Troubleshooting  |
|--|--|--|
| Huawei FusionSolar<br>Smart PV<br>Management<br>System shows that<br>the communication<br>with the inverter is<br>interrupted. | <ol> <li>The RS485 cables among inverters<br/>are loose or disconnected.</li> <li>The PV string is not properly<br/>connected, and the inverter has<br/>no DC input.</li> <li>The baud rate or RS485 address<br/>of the inverter is changed.</li> <li>The Smart Dongle is faulty.</li> </ol> | <ol> <li>Check that the RS485 cables<br/>among inverters are properly<br/>connected and tightened.</li> <li>Check that the inverter is<br/>correctly connected and power<br/>on the inverter.</li> <li>Check that the baud rate and<br/>RS485 address of the inverter<br/>are set correctly.</li> <li>Replace the Smart Dongle.</li> </ol> |
| The SN of the Smart<br>Dongle cannot be<br>identified by the<br>FusionSolar app.   | The bar code is damaged and cannot be scanned.   | Manually enter the SN on the <b>Add</b><br><b>Device</b> screen on the FusionSolar<br>app.   |

| Fault  | Cause   | Troubleshooting   |
|--|---|---|
| The devices<br>connected to the<br>Smart Dongle are<br>not connected to the<br>Huawei FusionSolar<br>Smart PV<br>Management      | <ol> <li>Check whether the inverter<br/>software version meets the<br/>requirements. If not, upgrade the<br/>inverter to a specified version or<br/>later.</li> <li>Check that the RS485<br/>communications cables are</li> </ol> | If the inverters cannot be detected<br>after troubleshooting, the Smart<br>Dongle is faulty. Contact Huawei<br>technical support. |
| System properly.   | <ul><li>connected properly.</li><li>3. Check that the RS485<br/>communications parameters of<br/>the inverter are set correctly.</li></ul>  |   |
|  | <ol> <li>Check that the inverter<br/>communications parameters are<br/>correctly set.</li> </ol>  |   |
| After the Smart<br>Dongle is replaced,<br>the connection to<br>the management<br>system using the<br>original SIM card<br>fails. | The SIM card is bound to the original<br>Smart Dongle.  | Contact the carrier of the SIM card<br>to unbind the SIM card from the<br>Smart Dongle.   |

# Acronyms and Abbreviations

| A   |                        |
|-----|------------------------|
| арр | Application            |
| L   |                        |
| LCD | liquid crystal display |
| S   |                        |
| SN  | Serial Number          |
| U   |                        |
| USB | Universal Serial Bus   |