SUNGROW
Clean power for all

Operation & Maintenance Guide

PowerKeeper Series

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About This Manual

Purpose of Manual

This manual primarily introduces the daily O&M standards, operating procedures, fault troubleshooting methods, and safety regulations for Commercial & Industrial (C&I) Flexible ESS (including C&I Flexible BESS, hybrid inverters, and Logger1000). It provides standardized guidance to ensure long-term, safe, stable, and efficient system operation, reduce O&M costs, and extend the system's service life.

Applicable Device Models

This manual applies to the following product models:

C&I Flexible BESS

- ST050CF
- ST062CF
- ST075CF
- ST087CF
- ST100CF
- ST112CF
- ST125CF
- ST137CF
- ST150CF
- ST162CF
- ST175CF
- ST187CF
- ST200CF
- ST212CF
- ST225CF
- ST237CF
- ST250CF

Hybrid Inverter

- SH110CX
- SH125CX

Logger1000

- Logger1000A
- Logger1000A-EU
- Logger1000B

Unless otherwise specified, all are referred to as "Logger1000" in this document.

Intended Audience

This manual is applicable to on-site O&M personnel of energy storage plants, after-sales engineers, plant managers, and trained and qualified integrator O&M personnel.

All O&M operations must be performed only by professional technicians. Professional technicians must meet the following requirements:

- Have received specialized training.
- Have thoroughly read this manual and understood the safety precautions related to operations.
- Be familiar with local standards and safety regulations related to electrical systems.

How to Use This Manual

Read through this manual carefully before using the product, and keep it in an accessible location.

To increase customer satisfaction, the product and its manual will be updated and improved constantly. If the manual you have received is slightly inconsistent with the real product, it is probably owed to a product update. In such a case, the real product shall take precedence.

The manual may be updated and revised from time to time, however, there still might be slight deviations from the real product or errors. In such cases, the actual product you purchased shall prevail. You may also download or obtain the latest manual from **support.sungrowpower.com** or through your sales channels.

The figures in this manual are for reference only. The actual product received may differ.

Symbols in Manual

To ensure the personal and property safety of users when using the product and to use it more efficiently and optimally, the manual provides relevant information and highlights it with the following symbols.

Symbols used in this manual are listed below. Please review carefully for better use of this manual.

⚠ DANGER

Indicates high-risk potential hazards that, if not avoided, may lead to death or serious injury.

⚠ WARNING

Indicates moderate-risk potential hazards that, if not avoided, may lead to death or serious injury.

⚠ CAUTION

Indicates low-risk potential hazards that, if not avoided, may lead to minor or moderate injury.

NOTICE

Indicates potential risks that, if not avoided, can lead to device malfunctions or financial losses.

"Note" is supplementary information in the manual that emphasizes and complements the content. It may also provide tips or tricks for optimizing product use, which can help you solve a problem or save time.

Safety Statement

Electrical Safety

⚠ DANGER

- **Ensure the system has stopped operating before powering off!**
- **Do not install or remove any components while the power is on. Power off the system before installing or removing components.**

⚠ DANGER

- **Touching the power grid, internal parts of the device, or contacts and terminals connected between devices poses an electric shock hazard!**
- **Voltage may be generated on the battery or grid side. Verify that no voltage is present using a standard voltmeter before touching.**

⚠ DANGER

Hazardous high voltage inside the product!

- **Observe the warning signs on the product.**
- **Observe all the safety instructions listed in this manual and other documents for this equipment.**
- **Comply with the battery-related protection requirements and precautions.**

⚠ WARNING

Only qualified personnel can replace internal components.

⚠ WARNING

- **To prevent the risk of electric shock, do not perform any O&M operations beyond those described in this manual.**
- **If necessary, contact SUNGROW O&M personnel for assistance.**

Battery Safety

⚠ WARNING

- **No user-maintainable parts are inside the battery unit.**
- **Only personnel authorized by SUNGROW may remove, replace, or dispose of batteries. Users are prohibited from performing any battery maintenance.**

⚠ DANGER

Dismantling or incinerating the battery may result in fire.

Mechanical and Environmental Safety

⚠ WARNING

- **When using tools to fasten the product or terminals, please tighten according to the specified torque; otherwise, the product may be damaged, and such damage will not be covered by the warranty.**
- **Understand how to use the tools correctly before starting using them to avoid personal injury or damage to the device.**
- **During product O&M, user-supplied materials and tools must comply with local laws, regulations, safety standards, and related specifications. Sungrow Power Supply Co., Ltd. shall not be held liable for any damage to the product caused by the adoption of materials and tools that fail to meet the above-mentioned requirements.**

⚠ WARNING

- **Perform O&M on the equipment under favorable weather conditions whenever possible. If severe weather conditions occur, such as heavy rain, dense fog, or strong winds, O&M work must be suspended.**
- **Do not perform O&M on the system in rainy, humid, or windy weather. SUNGROW shall not be held liable for any possible damage arising from failure to observe this instruction.**
- **Special inspection work shall be carried out during special seasons and under abnormal weather conditions (such as the rainy season, extreme cold, extreme heat, and typhoons).**
- **When laying cables, keep the cables at least 30 mm away from the outer edge of the heat-generating components or areas, so as to protect the insulation layer of cables from aging or getting damaged due to high temperature.**
- **Even after the product is powered off, it may still be hot and cause burns. Wear protective gloves when operating the product after it has cooled down.**

NOTICE

Observe the following precautions to prevent misoperation or accidents caused by irrelevant personnel:

- **Put up highly visible warning signs around the equipment to prevent accidents caused by inadvertent switching-on.**
- **Set up warning signs or fence off a warning zone near the equipment.**
- **Prepare appropriate first-aid and rescue facilities near the equipment, and ensure escape and rescue routes are unobstructed.**

Emergency Response

Fire

Although the battery is carefully designed, a fire risk remains. Similarly, nearby fires or abnormally high temperatures can also cause the battery to catch fire.

Protective Equipment

Respirators are not required during normal operation.

When a fire occurs, harmful smoke may be emitted, including carbon monoxide, carbon dioxide, and various hydrocarbons. To comply with the Personal Protective Equipment Directive (89/686/EEC), use a full-face self-contained breathing apparatus (SCBA) with a full set of PPE during firefighting.

Fire Suppression System

NOTICE

In the event of a fire, only qualified firefighters wearing appropriate PPE are permitted to enter the room where the batteries are located.
Completely extinguishing a large fire may take a long time. Smoke indicates that the batteries are still burning. Be aware of the risk of re-ignition.

Fire extinguishing steps are as follows:

1. Turn off any connected power systems or electronic devices, such as batteries, battery isolators, PV DC isolators, AC isolators, the solar power main switch, and the normal power main switch.
2. Extinguish the fire fully before entering the incident hot zone.
3. Use fire sand, a carbon dioxide extinguisher, or other emergency firefighting equipment approved by firefighters to extinguish the fire if the battery is on fire.
4. Use an ABC fire extinguisher to extinguish the fire if it is not from batteries and has not yet spread to batteries. Remove batteries and any other sources of ignition from the fire scene.

Flood

The battery has limited water resistance (submersion in water up to 50 cm deep for a short period), but the actual depth and duration of submersion are uncontrollable. Operation of a wet battery is not recommended. If the battery has been submerged in water, please contact the installer or customer service promptly.

Battery Leakage

Battery abuse, misuse, or damage may cause an increase in internal battery pressure. This may cause electrolyte leakage. In the event of battery electrolyte release:

- Do not enter the room under any circumstances.
- Avoid contact with leaked liquid or gas.
- Call the local emergency number or contact the fire department if necessary.

In case of contact with leaked substances, follow these guidelines to minimize injury to the maximum extent:

- Inhalation: Evacuate the contaminated area and seek medical assistance.
- Eye contact: Rinse the eyes with plenty of water for at least 15 minutes and seek medical attention immediately.
- Skin contact: Rinse the affected area thoroughly with plenty of water for at least 15 minutes. Remove contaminated clothing or soak it with water if possible. If the patient feels pain, seek medical assistance immediately.
- Accidental ingestion: Induce vomiting and seek medical attention immediately.

Wipe the contact area with a sponge or cloth soaked in water until medical help is obtained. These substances can damage skin and eyes, and in severe cases can cause blindness.

Contents

1 System Overview

1.1 System Typology

This configuration is designed specifically for a new PV ESS, where the PV array and ESS are integrated on the DC side of the hybrid inverter. PV power can be used directly to charge the BESS without additional AC conversion, thereby improving overall system efficiency and reducing conversion losses. Logger1000 can manage the energy flow among the hybrid inverter, the BESS, and the loads, enabling a higher self-consumption rate and providing backup power during grid faults.

The overall system topology is shown below:

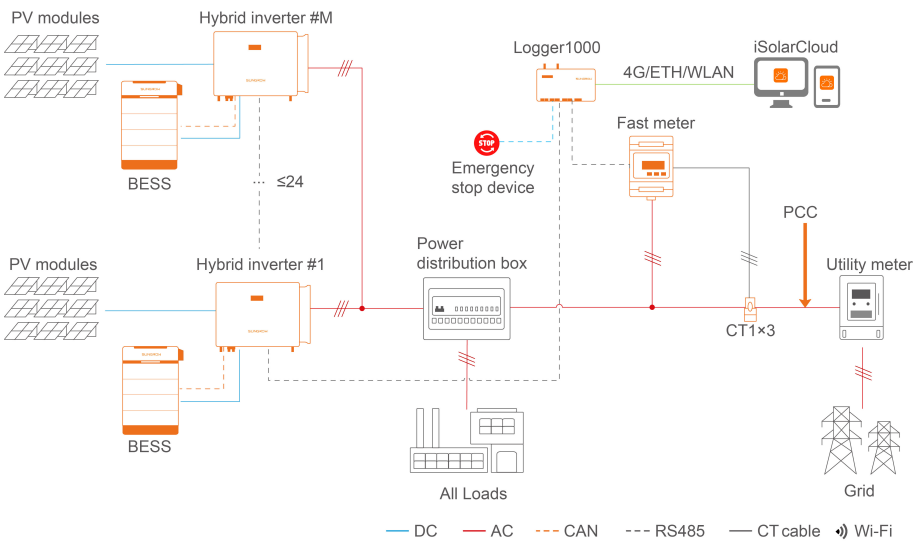


Figure 1-1 System Typology

The system topology diagrams in this section apply to a new DC-coupled PV ESS. For detailed designs of system topology diagrams for other scenarios, please refer to *System Application Plan*.

1.2 System Composition and Roles of Each Device

The C&I PowerKeeper series BESS consists of hybrid inverters SH110/125CX, stacked BESS ST050CF–ST250CF, and Logger1000. Each device has a clear role and operates in coordination. The specific components and their roles are as follows:

BESS

The C&I Flexible BESS is the system's core energy storage unit, responsible for storing and releasing electrical energy. It internally integrates an intelligent BMS that manages its operating parameters in real time, receives inverter control commands, switches between charging and discharging states, and ensures the safe operation of both itself and the overall system.

The BESS is primarily composed of the decorative upper cover, S/G for the main battery stack, upper cover for the auxiliary battery stack (if any), Pack, main battery stack base, auxiliary battery stack base, and other modules. The main equipment components inside the BESS are shown in the diagram below:

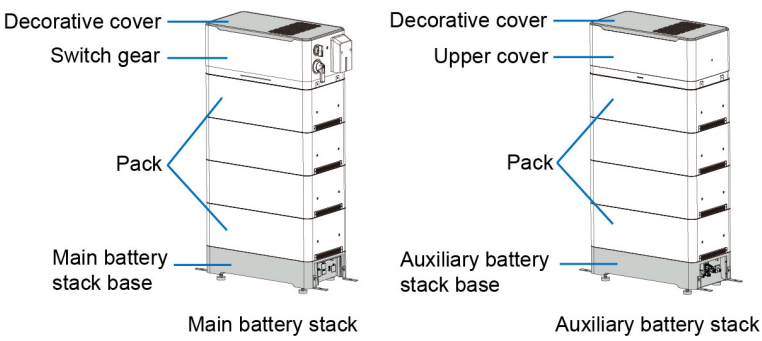


Figure 1-2 Equipment Components

*The above images are for reference only. The actual product shall prevail.

The external view of the BESS is shown below.

*The above images are for reference only. The actual product shall prevail.

Hybrid Inverter

SH110/125CX is the system's core of power conversion and control, connecting the BESS to the C&I power grid or load, responsible for AC/DC power conversion (battery discharge → AC supply or grid connection; power grid charging → DC storage), executing the system charge or discharge control strategy, coordinating the charging or discharging cycles of the battery cabinets, and serving as the central hub for system energy conversion.

- The inverter must be used only with PV strings that comply with IEC 61730, Application Class A, and Class II protection. Do not connect the inverter to PV strings that require the positive or negative grounding, as this may damage the inverter.
- Do not connect any local loads between the inverter and the AC circuit breaker.

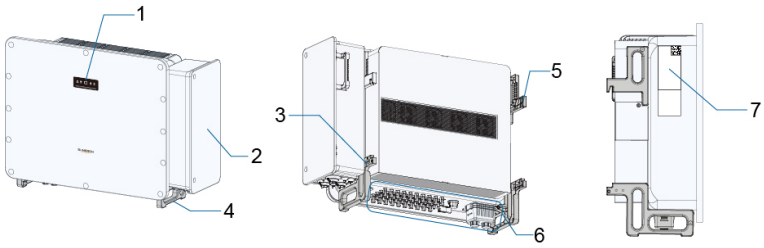


Figure 1-3 Product Appearance

*The above images are for reference only. The actual product shall prevail.

No.	Name	Description
1	LED indicator	Indicates the current working status of the inverter.
2	AC junction box	Connect the AC cable.
3	External grounding terminals	Two grounding terminals are provided. Use at least one of them for grounding.
4	Base handles	Two handles, used for inverter handling.
5	Mounting hangers	Four hangers, used to hang the inverter onto the mounting-bracket.
6	Wiring area	Includes the DC switch, DC terminals, battery terminals, and communication terminals (refer to SH110/125CX User Manual).
7	Label	Includes the nameplate, warning labels, and QR code.

Logger1000

Logger1000 is a device used for PV plant data acquisition, power control, and protocol conversion. This device integrates a communication gateway and plant O&M functions, featuring flexible networking, assisted O&M, and simple operation.

(1) Front view; (2) Bottom view; (3) Rear view; (4) Side view

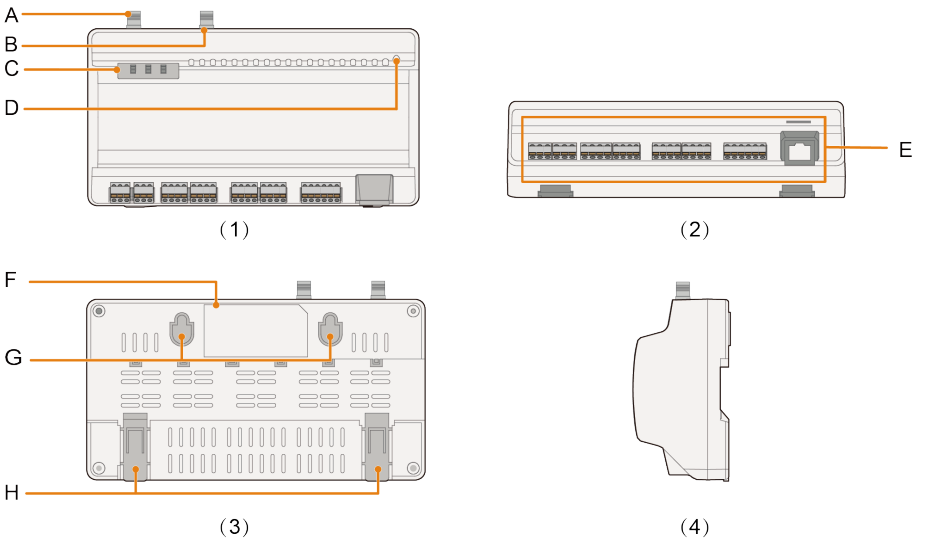


Figure 1-4 Product Appearance

*The illustration uses Logger1000A as an example and is for reference only; the actual product shall prevail.

Item	Name	Description
A	WLAN antenna mounting hole	-
B	4G antenna mounting hole	-
C	LED indicator	Displays the Logger1000 running status.
D	RST key	Press and hold for more than three seconds to restart. Press and hold for more than 60 seconds to restore factory settings.
E	Wiring area	-
F	Nameplate	-
G	Wall mounting holes	Suitable for wall-mounted installation.
H	Rail clips	Suitable for rail mounting

1.3 System-Level Function

The new DC-coupled PV ESS has the functions shown in the table below:

Table 1-1 System-Level Function

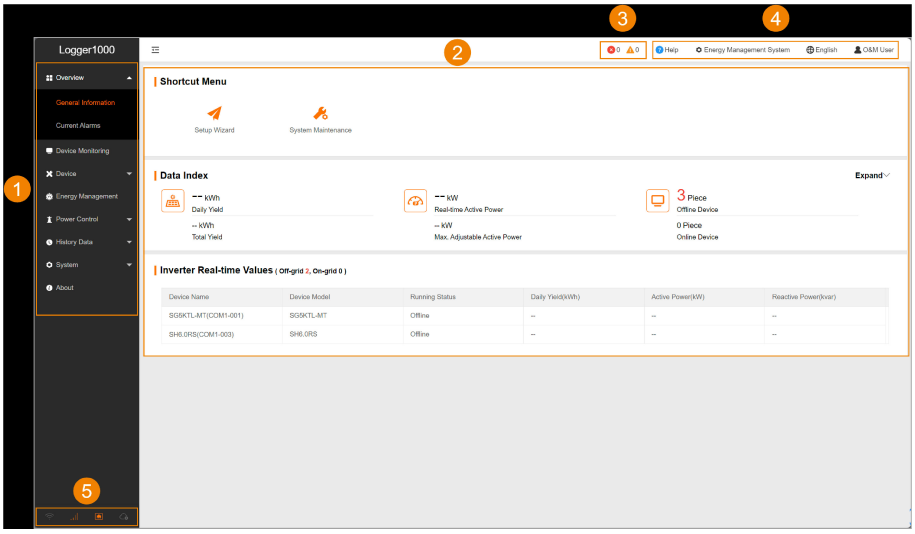
Function	Description
Energy management mode	Self-consumption (default), time scheduling, forced mode, VPP dispatch, etc.
Power regulation	Power limiting, DRM regulation, DI emergency stop, and RCR regulation
Feed-in limitation	Power regulation time: ≤ 2 seconds (when used with meter DTSU666-20) Power control accuracy: 1.5% of rated power Power control response time: 0.8 seconds Supports phase-by-phase feed-in control (single unit) and total feed-in control.
Unbalanced output	Supports 100% unbalanced loading in grid connection mode.
Online update	When the system is in grid-connected operation, firmware updates for the hybrid inverter, BESS, and Logger1000 can be performed.
Energy purchase power limit	Supported ≥ Total connected load power of the system

1.4 Interface and Management

Logger1000 is based on cloud-edge collaboration. With an open and modular design, the system enables refined energy dispatch management and O&M for PV-ESS plants, enhancing overall power generation efficiency.

Users can access device configuration and management interfaces via the iSolarCloud App on a mobile phone or via a portable PC workstation, enabling convenient daily O&M and real-time visibility and control of device operating status and operating strategies. Based on cloud or local identity authentication, accounts are assigned different user permissions to ensure system security and user data security.

Interface Introduction



Location	Name	Description
1	Navigation Bar	• **Overview**: View basic device information and real-time fault information. • **Device monitoring**: View the real-time status of the device, among others. • **Device maintenance**: Manage connected devices. • **Energy management**: Set the battery usage strategy. • **Power regulation**: Adjust the power output of the SUNGROW inverter. • **Historical data**: View historical operation logs. • **System**: View system information. • **About**: View device firmware information.
2	Functional Zone	Display current page.
3	Alarm Column	Display the number of faults and alarms for connected devices. • /: View the number of inverter faults and alarms.
4	Toolbar	View help information, switch application scenarios, switch the user interface language, or update personal information.
5	Status Bar	Display device communication status: • WLAN connection status • Mobile network connection status

Location	Name	Description
		•  Ethernet connection status •  iSolarCloud connection status

Local Functions

- **Data Management:** Logger1000 provides a Web interface accessible via computer browsers. It supports commissioning and configuration of hybrid inverters, batteries, meters, and other devices, offers real-time data management, and displays faults or alarms in real time.
- **Control Strategies:** Energy management includes self-consumption, time scheduling, forced mode, and VPP dispatch. Power regulation includes power limiting, DRM regulation, DI emergency stop, and RCR regulation.

Cloud Functions

- **Data Management:** Data is transmitted from the local end to iSolarCloud, enabling telecontrol management via the iSolarCloud Web or App. It offers a visualized display on a large screen and a convenient human-machine interface. It supports commissioning and configuration of devices such as hybrid inverters, batteries, and meters across a single plant or multiple plants, as well as real-time data management and fault or alarm display. Various types of reports are available for historical data statistics, with customizable report templates such as energy storage reports, PV reports, plant reports, and revenue reports.
- **Control Strategies:** The cloud supports intelligent dispatch and planned outage (South Africa only) functions. In addition, the local control strategy data and execution status will be displayed on the cloud synchronously, while the local control strategy can be configured on the cloud.

2 Power On and Off

2.1 Inspection Before Powering On

Personnel Requirements

- Personnel engaged in on-site commissioning must not have significant physical or sensory impairments. After receiving training, passing the relevant examinations and assessments by the appropriate departments, and obtaining a certificate recognized by the national labor safety inspection authority, they may perform electrical operations.
- Personnel engaged in on-site commissioning must be proficient in first aid for electric shock.
- Personnel engaged in on-site commissioning must remain focused on the task at hand. Do not touch any cables unless they have been confirmed to be voltage-free using a multimeter.
- Before starting the commissioning process, personnel must carefully check that the tools are safe and reliable, and wear necessary PPE to prevent accidents during work.

Inspection Before Powering On

Before powering on the equipment, check the following items carefully to ensure that all the inspection items meet the power-on standards:

- Check that the BESS, hybrid inverter, Logger1000, and other devices have all been fully installed.
- Check that the exterior of the BESS, hybrid inverter, Logger1000, and other devices is intact.
- Refer to the electrical drawings and check that all cables, including those between BESSs, between the BESS and the inverter, and between the inverter and Logger1000, are correctly connected to avoid misconnections or reversed connections.
- Check that the AC and DC connections between BESSs, between the BESS and the inverter, and between the inverter and Logger1000 are not loose.
- Check that the communication cables between BESSs, between the BESS and the inverter, and between the inverter and Logger1000 are reliably connected.
- The BESS, hybrid inverter, Logger1000, and other devices are reliably grounded.
- The load switch on the BESS must be in the open state, and the DC switch of the inverter and the AC circuit breaker must both be in the "OFF" position.
- No tools or other items are left on the top of the device, or inside its wiring box (if any).
- The AC circuit breaker is selected in compliance with the relevant requirements specified in this manual and applicable local standards.
- All safety signs and warning labels are firmly attached and clearly visible.

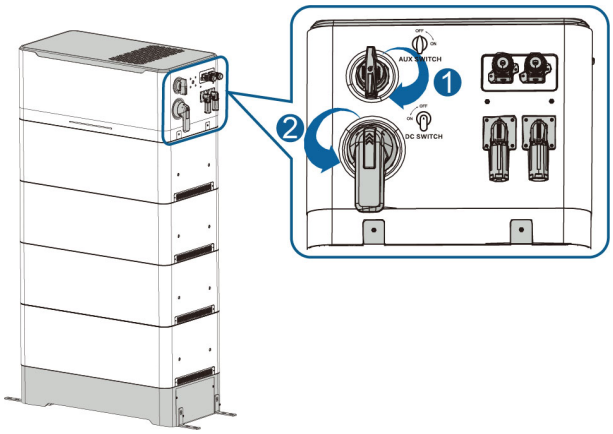
If the equipment has been installed but has not been in operation for more than three months, it must be inspected by a qualified professional before being put back into operation.

2.2 Power-On Procedure

Inspect the equipment thoroughly before powering it on. The equipment can only be powered on after all the inspection items are confirmed to meet the requirements.

Step 1 Power on the BESS.

a. First, rotate the auxiliary power switch on the right side of the S/G to “ON”. If no fault is reported, rotate the main circuit load switch to “ON”. The BESS will enter self-check mode, and the status indicator will flash blue. When the indicator is steady blue, it indicates that the BESS has been powered on and is working normally.



WARNING

If a short circuit occurs in the BESS during power-on commissioning, immediately disconnect the power cable between the S/G and the inverter, inspect the BESS wiring, and eliminate the short-circuit fault. Then perform step 1 to confirm whether the BESS has a fault (indicator is red). Use iSolarCloud to obtain fault information in order to contact SUNGROW for BESS repair.

Step 2 Power on the hybrid inverter.

NOTICE

- **Please follow the steps below strictly in order, and ensure that the time between consecutive steps is at least five minutes; otherwise, the product may be damaged, and any resulting damage will not be covered by the warranty.**
- **Before closing the AC circuit breaker between the inverter and the power grid, measure the AC voltage with a multimeter set to AC voltage, ensure that it is within the allowable range. Otherwise, the inverter may be damaged.**

a. Verify that the BESS has been powered on successfully.

b. Rotate the DC switch to the "ON" position.

c. Close the AC circuit breaker between the inverter and the power grid.

d. Check the LED indicator lights on the inverter to ensure it is operating normally.

If light and power grid conditions are met, the inverter will operate normally. Inverter grid connection may take several minutes or longer, depending on the country code selected in the initial settings and the actual on-site power grid conditions.

e. For a first-time grid connection, use the iSolarCloud App to set the initial protection parameters (refer to the iSolarCloud App User Manual).

f. When the lighting is normal, and the power grid conditions meet the requirements for grid connection, a solid blue inverter indicator indicates that the grid-connected operation is normal.

When the inverter is grid-connected, it is strictly prohibited to close the DC switch. Failure to comply may skip the insulation resistance monitoring, leading to inverter damage. Any resulting losses will not be covered under warranty.

Step 3 Log in to Logger1000. For detailed operations, refer to 3 Data Management.

--End

WARNING

If a circuit breaker trips during the power-on process, do not close any other circuit breakers. Immediately check for a short circuit in the downstream loads of the tripped circuit breaker.

2.3 System Commissioning

2.3.1 Communication Commissioning

Step 1 Use the logger to automatically search for and add inverters, batteries, meters, or other devices.

After inverters, batteries, meters, or other devices are replaced, Logger1000 can automatically search for, identify, and add the new devices.

Step 2 If you use the backend management system to read the data from batteries, inverters, meters, and other devices, the data must be readable.

Step 3 If you use the backend management system to send system shutdown and startup commands and charging or discharging power commands, the corresponding functionality must be enabled.

Step 4 If you use the backend management system to change the control parameter settings, the corresponding functionality must be enabled.

--End

2.3.2 Startup/Shutdown Commissioning

Step 1 Use the backend management system to start the inverter. When the hybrid inverter startup command is sent, the hybrid inverter must start normally. When the hybrid inverter shutdown command is sent, the hybrid inverter must stop normally.

Step 2 Use the backend management system to increase the hybrid inverter power in 10 kW steps up to the actual maximum discharging power, and let it run for 10 minutes. Check that the voltage, current, temperature, and other parameters of the Rack remain within normal ranges. Check that the voltage, current, and device-temperature-rise parameters for all hybrid inverters remain within normal ranges. Then, set the hybrid inverter power to 0 kW.

Step 3 If the communication between the control backend and the hybrid inverter is disconnected, the hybrid inverter shall be able to shut down.

--End

2.3.3 Charge-Discharge Cycle Commissioning

Step 1 The backend management system performs a full charge-discharge cycle based on the actual charging and discharging capability of the Rack to calibrate the Rack SOC and ensure SOC accuracy.

Step 2 During the charging-discharging process, check that the voltages, currents, and temperatures of the Rack and individual cells remain within normal ranges.

Step 3 Check that the voltages, currents, and temperatures of the hybrid inverter remain within normal ranges.

Step 4 Check whether the cell voltage difference and temperature difference show significant deviations.

--End

2.4 Planned Shutdown

Planned shutdown refers to a scheduled interruption of equipment operation for overhaul, testing, or maintenance.

⚠ WARNING

- **If the equipment needs to be powered off and shut down, please ensure the BESS is in a non-charging and non-discharging state.**
- **A burn hazard remains even after the inverter is shut down. Wait for the inverter to cool down. Then, perform operations on the inverter wearing protective gloves.**

Step 1 Power off the hybrid inverter.

a. Disconnect the external AC circuit breaker and ensure it cannot be reconnected accidentally.

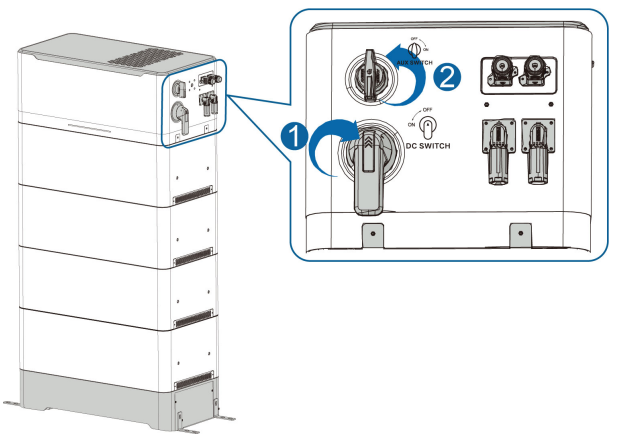
b. Rotate the DC switch of the inverter to the “OFF” position.

c. Wait at least 15 minutes for the internal capacitors to fully discharge.

d. Test the DC cables using a current clamp and ensure they are current-free.

Step 2 Power off the BESS.

a. Rotate the main circuit load switch on the right side of the S/G to “OFF”, and rotate the auxiliary power switch to “OFF” to shut down the equipment.



--End

If the equipment must be powered off for maintenance, ensure lockout-tagout (LOTO) is performed on the load switch and the auxiliary power switch to prevent safety accidents caused by inadvertent switching-on.

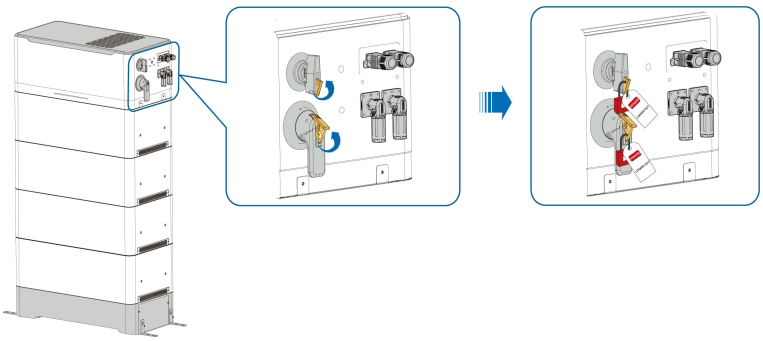


Figure 2-1 LOTO

3 Data Management

System Connection

Users can log in to the Logger1000 embedded Web UI via a hotspot or an Ethernet connection to manage data.

- **Hotspot connection**
  1. On the PC, open the wireless network settings, then connect to the Logger1000's wireless network to establish a wireless connection.

     The wireless network name is SG-[device S/N] (e.g., SG-A1234567890). You can find the device S/N on the front label of Logger1000.

  2. Enter the IP address https://11.11.11.1 in the browser address bar; you will be redirected to the Logger1000 Web UI.
- **Ethernet connection**
  1. Configure the PC's network card to ensure its IP address is on the same subnet as the Logger1000's IP address.

     Make sure the first three octets of the IP address are the same. The last octet must be within the range of 0 to 255 (excluding 12). For example, the IP address of the PC can be set as 12.12.12.125, and the subnet mask as 255.255.255.0.

- Enter the IP address https://12.12.12.12 in the browser address bar; you will be redirected to the Logger1000 Web UI.

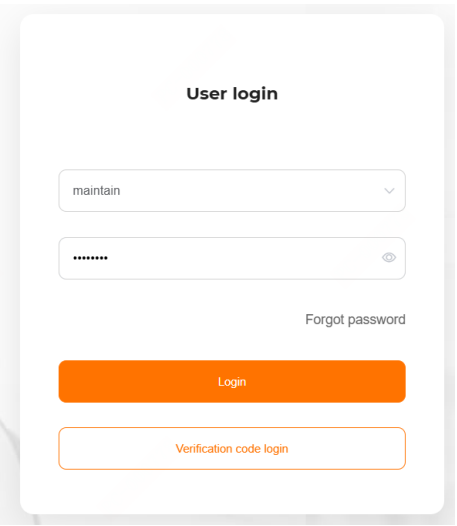
Login

Table 3-1 Initial Account and Password

Username	User Role	Login Password
maintain	O&M user	pw1111
administrator	Administrator	pw@111111
develop	Developer account	Dynamically generated

3.1 Local Management

Log in to the Logger1000 embedded Web UI; you will be redirected to the login page.

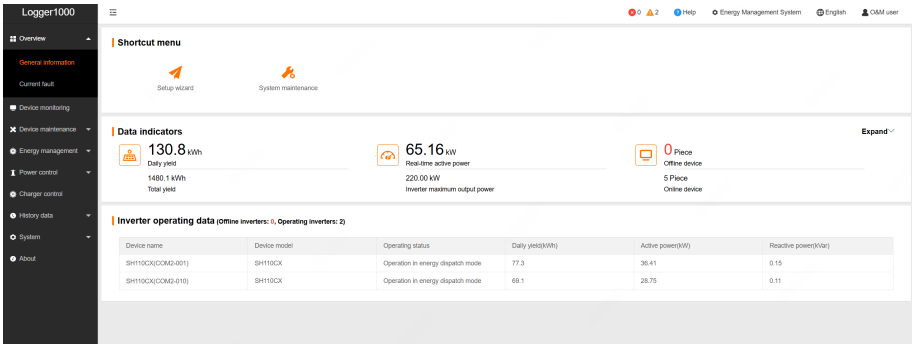


Two login methods are available for O&M users:

- **Account and Password**
  1. Enter the O&M user account name: maintain
  2. Enter the default password: pw1111
  3. Click **Login**.
- **Verification Code**
  1. Enter the O&M user account name: maintain
  2. Click **Verification code login**.
  3. In the pop-up **Back to account + password login** window, select "Send to owner" or "Send to installer/retailer", click **Get verification code**, and enter the received verification code.
  4. Click **Login**.

- LOGGERSV300.001.00.P050 and later versions support verification code login.
- Please ensure Logger1000 is connected to iSolarCloud, and that the SN of Logger1000 added when the plant is created uniquely corresponds to the email address and phone number of the plant owner or installer or retailer.
- Verification codes are sent via SMS for the Chinese server and via email for the International, European, and Australian servers.
- Each verification code is valid for five minutes. No more than five verification code requests are allowed within one hour. If the verification code is entered incorrectly six consecutive times, the account will be locked for 10 minutes. During the lockout period, the user can still log in using the account name and password.

After successful login, the Web UI will display the **O&M user** operation interface.



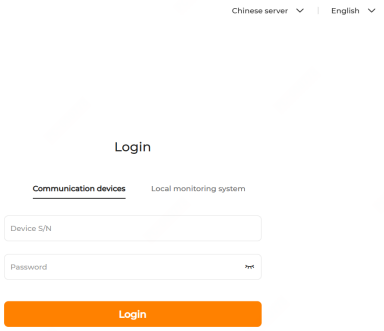
3.2 Telecontrol Management

Prerequisite

- The current Logger1000 has enabled the telecontrol maintenance function.
- Telecontrol maintenance information has been obtained.

For example, log in as the O&M user "maintain":

Step 1 Enter the telecontrol maintenance address https://rm.isolarcloud.com in the browser address bar; you will be redirected to the corresponding page.



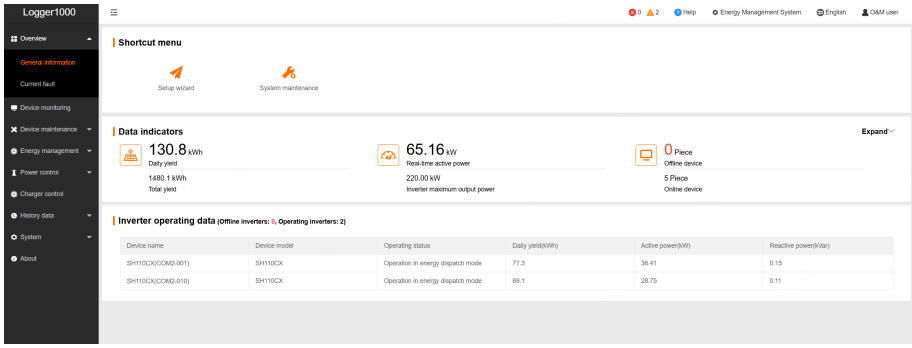
Step 2 Select the server site and product category.

- Server site: Select based on telecontrol maintenance information.
- Product category: Communication device products.

Step 3 Enter the account and password, and click **Login**; you will be redirected to the Logger1000 login page.

Step 4 Enter the O&M user account name: maintain, and enter the initial password: pw1111.

Step 5 Click **Login**. After successful login, the Web UI will display the **O&M user** operation interface.



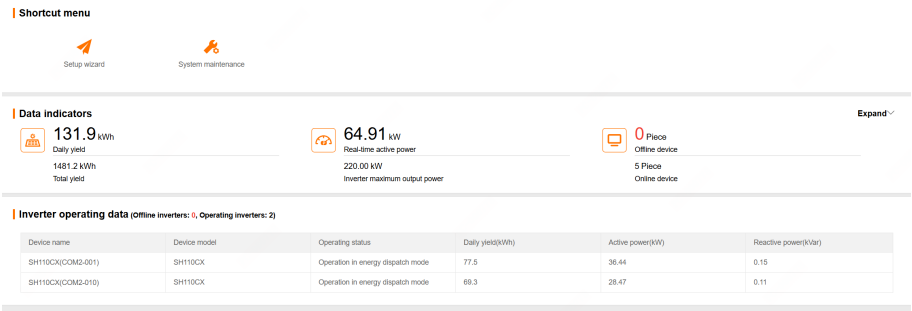
--End

3.3 Data Recording and Export

3.3.1 View Plant and Device Operation Information

View Plant Operation Information

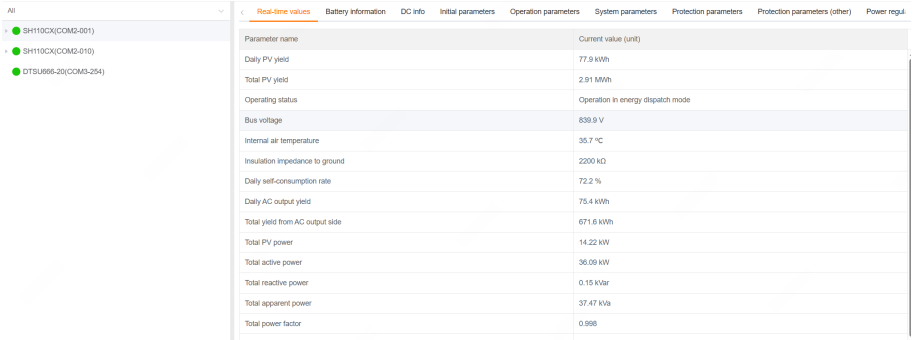
Go to **Overview > General Information** to view the basic information of the plant.



- **Data indicators**: View key operating indicators of the plant, such as today's yield, cumulative yield, and real-time active power.
- **Inverter operating data**: View the operating status and performance indicators of inverters.

View Device Basic Information

On the **Device monitoring** page, view the basic information of devices.



Depending on the type of connected device, you can view real-time information, DC information, device information, battery information, and more.

On the **Device monitoring** page or the **Device maintenance > Device list** page, you can view the communication status of devices.

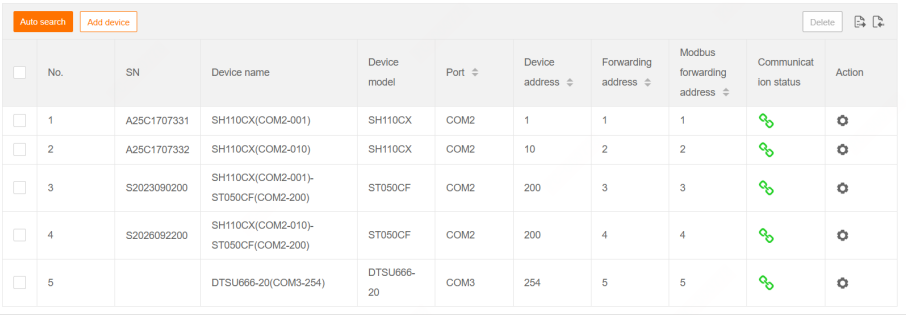
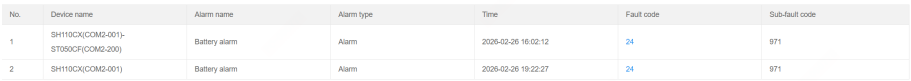


Table 3-2 Device Communication Status

Icon	Instructions
/	Device communication normal
/	Device communication abnormal

3.3.2 View Device Faults

- Go to **Overview > Current fault**.



View the current device faults.

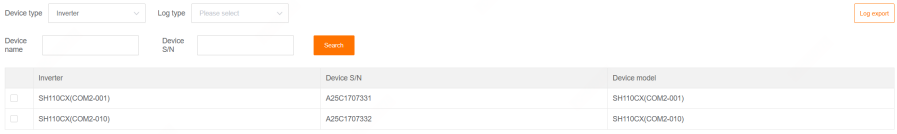
3.3.3 Export Device Logs

The web interface supports exporting device logs for inverters, batteries, and other devices.

Prerequisite

- The device must be online.

Step 1 Go to **Device maintenance > Device log**.



Step 2 Select the device type and log type from the drop-down lists in the upper left corner.

Log types include fault records, event records, and operation records.

Step 3 Select the device(s) and click **Log export**.

When selecting the battery, you must also set the start and end times, and the time interval must not exceed four hours.

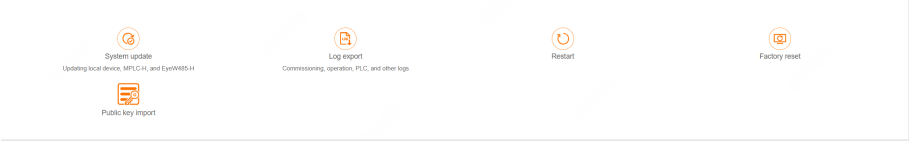
A progress dialog displays the export progress.

Step 4 When the export progress reaches "100%", click **Export** to export the device log information to your local system.

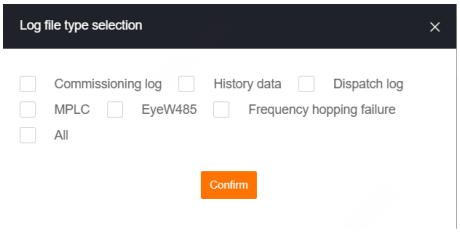
--End

3.3.4 Export Logger1000 Logs

Step 1 Go to **System > System maintenance**.



Step 2 Click **Log export** to open the **Log file type selection** dialog.



Step 3 Select the desired log types.

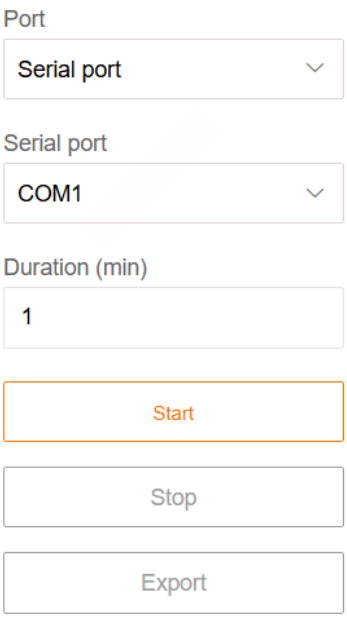
Step 4 Click **Confirm** to export the log information to your local system.

--End

3.3.5 Export Message

Logger1000 supports capturing and exporting port messages to facilitate troubleshooting connected devices or the Logger1000 itself.

Step 1 Go to **System > Message export**.



Step 2 In the **Port** drop-down list, select the port type.

- **Serial port**: Receive or record message data from the RS-485 port.
- **Network**: Receive or record message data from the network.

Step 3 If you select **Serial port**, select the COM port for data capture from the **Serial port** drop-down list.

Step 4 If you select **Network**, select the network connection type from the **Network** drop-down list.

Network connection types include ETH, Wi-Fi, and mobile network.

Step 5 In the **Duration** text box, set the message recording duration.

Step 6 Click **Start** to start message recording.
After the preset time expires, message recording stops automatically.

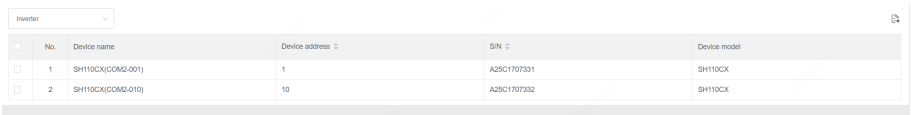
Step 7 (Optional) Click **Stop** to manually interrupt message recording.

Step 8 Click **Export** to export the messages.

--End

3.3.6 Export Fault Recording Data

Step 1 Go to **Device maintenance > Fault recording**.



Step 2 Select the device type from the drop-down list in the upper left corner.

Step 3 Select the device and click to export data to your local system.

When selecting the battery, you must also set the start and end times, and the time interval must not exceed four hours.

Step 4 Unzip the ZIP file locally.

Step 5 Use iConfig to open the .txt file in the ZIP file to view the fault recording information of the device.

Please contact Sungrow Customer Service for the installation package and instructions for iConfig.

--End

4 Troubleshooting

4.1 Introduction

When the C&I Flexible ESS experiences abnormal changes, it is recommended to carry out preliminary checks using the fault and troubleshooting methods described in this manual.

If the problem persists after following this manual, contact SUNGROW for further assistance. It would be helpful if you could provide the below information:

- Models and serial numbers of the C&I Flexible ESS and internal devices
- Fault information and a brief description of the fault
- A photo of the fault, if possible

4.2 Fault Quick Reference Table

When the BESS, inverter, or Logger1000 experiences a fault, you can view the fault information on the iSolarCloud App interface. If the inverter is equipped with an LCD screen, you may check the fault information on the screen. The table below lists the fault codes for the BESS and inverters, the common faults of Logger1000, and the corresponding troubleshooting methods.

BESS

Fault Type	Fault Code	Solution
Battery fault	703, 711, 712, 715, 717	1. Generally, this fault will be resolved within 20 minutes. 2. If this fault occurs frequently and repeatedly, switch off the BESS and contact the installer or manufacturer to check whether the inverter is damaged. 3. If it does not recover after a long time, contact the installer or manufacturer. When the battery SOC falls below 3%, immediately switch off the BESS to prevent damage from overdischarge.
	707, 733	1. Check whether a heat source exists near the BESS, and measure the ambient temperature. The operating temperature range of the BESS is 0°C to 55°C for charging, and -20°C to 55°C for discharging.

Fault Type	Fault Code	Solution
		Please check whether the ambient temperature or the battery temperature goes beyond this range. In case the battery is placed near a heat source or in an unventilated environment, or the ambient temperature is too high, please improve the installation environment for the BESS. 2. If it does not recover after a long time, contact the installer or manufacturer. When the battery SOC falls below 3%, immediately switch off the BESS to prevent damage from overdischarge.
	708, 734	1. The operating temperature range of the BESS is 0°C to 55°C for charging, and -20°C to 55°C for discharging. Please check whether the ambient temperature or the battery temperature falls below this range. In case the ambient temperature is too low, please improve the installation environment for the BESS. 2. If it does not recover after a long time, contact the installer or manufacturer. When the battery SOC falls below 3%, immediately switch off the BESS to prevent damage from overdischarge.
	714	1. Check whether the communication cable between the inverter and the battery is connected incorrectly or is loose. 2. Replace the communication cable if the problem is not resolved. 3. If it does not recover after a long time, contact the installer or manufacturer. When the battery SOC falls below 3%, immediately switch off the BESS to prevent damage from overdischarge.
	732	1. Please contact the installer or manufacturer to upgrade the hybrid inverter, logger, and battery software to the latest version. 2. If it does not recover after a long time, contact the installer or manufacturer.

Fault Type	Fault Code	Solution
	735, 736, 737	1. Generally, the battery can recover automatically. 2. If the problem is not resolved, switch off the BESS, and restart it after five minutes. 3. If it does not recover after a long time, contact the installer or manufacturer. When the battery SOC falls below 3%, immediately switch off the BESS to prevent damage from overdischarge.
	739	1. Switch off the BESS, and restart it after five minutes. 2. If it does not recover after a long time, contact the installer or manufacturer. When the battery SOC falls below 3%, immediately switch off the BESS to prevent damage from overdischarge.
	740	1. Check whether the slave battery wiring is incorrect or loose. 2. Switch off the BESS, and restart it after five minutes. 3. If it does not recover after a long time, contact the installer or manufacturer. When the battery SOC falls below 3%, immediately switch off the BESS to prevent damage from overdischarge.
	741	1. Please contact the installer or manufacturer to upgrade the hybrid inverter, logger, and battery software to the latest version. 2. If the problem is not resolved, check whether the system configuration is correct (SUNGROW single-phase hybrid inverter used with the BESS consisting of 2–6 Packs; SUNGROW three-phase hybrid inverter used with the BESS consisting of 3–8 Packs). 3. If it does not recover after a long time, contact the installer or manufacturer. When the battery SOC falls below 3%, immediately switch off the BESS to prevent damage from overdischarge.

Fault Type	Fault Code	Solution
	742	1. Please check whether the battery power cables are connected in reverse or have poor contact. 2. If it does not recover after a long time, contact the installer or manufacturer. When the battery SOC falls below 3%, immediately switch off the BESS to prevent damage from overdischarge.
	743, 744, 745	1. Generally, the battery can recover automatically. 2. If the problem is not resolved, please upgrade the battery software. 3. If it does not recover after a long time, contact the installer or manufacturer. When the battery SOC falls below 3%, immediately switch off the BESS to prevent damage from overdischarge.
	746	1. Please contact the installer or manufacturer to upgrade the hybrid inverter, logger, and battery software to the latest version. 2. If the problem is not resolved, please contact the installer to change the order of Packs and re-install the BESS. 3. If it does not recover after a long time, contact the installer or manufacturer. When the battery SOC falls below 3%, immediately switch off the BESS to prevent damage from overdischarge.
	747	1. Switch off the BESS, and restart it after five minutes. 2. If the problem is not resolved, please upgrade the battery software. 3. If it does not recover after a long time, contact the installer or manufacturer. When the battery SOC falls below 3%, immediately switch off the BESS to prevent damage from overdischarge.
	750, 751	Please contact the installer or the manufacturer.

Fault Type	Fault Code	Solution
	833	1. Please contact the installer or manufacturer to upgrade the hybrid inverter, logger, and battery software to the latest version. 2. If the problem is not resolved, check whether the system configuration is correct (SUNGROW single-phase hybrid inverter used with the BESS consisting of 2–6 Packs; SUNGROW three-phase hybrid inverter used with the BESS consisting of 3–8 Packs). 3. If the problem is not resolved, please contact the installer to change the order of Packs and re-install the BESS. 4. If it does not recover after a long time, contact the installer or manufacturer. When the battery SOC falls below 3%, immediately switch off the BESS to prevent damage from overdischarge.
	908	Please contact the installer or the manufacturer.
Battery alarm	932, 939, 964	1. Generally, the battery can recover automatically. 2. If it does not recover after a long time, contact the installer or manufacturer. When the battery SOC falls below 3%, immediately switch off the BESS to prevent damage from overdischarge.
	937, 941, 942	1. Generally, the battery can recover automatically. 2. If the problem is not resolved, please upgrade the battery software. 3. If it does not recover after a long time, contact the installer or manufacturer. When the battery SOC falls below 3%, immediately switch off the BESS to prevent damage from overdischarge.
	933	1. Check whether a heat source exists near the BESS, and measure the ambient temperature. The operating temperature

Fault Type	Fault Code	Solution
		range of the BESS is 0°C to 55°C for charging, and -20°C to 55°C for discharging. Please check whether the ambient temperature or the battery temperature goes beyond this range. In case the battery is placed near a heat source or in an unventilated environment, or the ambient temperature is too high, please improve the installation environment for the BESS. 2. If it does not recover after a long time, contact the installer or manufacturer. When the battery SOC falls below 3%, immediately switch off the BESS to prevent damage from overdischarge.
	934	1. The operating temperature range of the BESS is 0°C to 55°C for charging, and -20°C to 55°C for discharging. Please check whether the ambient temperature or the battery temperature falls below this range. In case the ambient temperature is too low, please improve the installation environment for the BESS. 2. If it does not recover after a long time, contact the installer or manufacturer. When the battery SOC falls below 3%, immediately switch off the BESS to prevent damage from overdischarge.
	935	1. Generally, the battery can recover automatically. 2. If the problem is not resolved, switch off the BESS, and restart it after five minutes. 3. If it does not recover after a long time, contact the installer or manufacturer. When the battery SOC falls below 3%, immediately switch off the BESS to prevent damage from overdischarge.
	968, 969, 970, 971, 972, 973	1. Generally, the battery can recover automatically. 2. If it does not recover after a long time, contact the installer or manufacturer. When the battery SOC falls below 3%, immediately

Fault Type	Fault Code	Solution
		switch off the BESS to prevent damage from overdischarge.

Hybrid Inverter

Fault Code	Fault Name	Troubleshooting Method
002, 003, 014, 015	Grid overvoltage	Generally, the inverter will reconnect to the grid once the grid returns to normal. If this fault occurs repeatedly: 1. Measure the actual grid voltage. Contact your local power company for help if the grid voltage is higher than the set value. 2. Check protection parameters via the App or LCD. Obtain consent from the local grid operator before modifying the overvoltage protection threshold. 3. If none of the above reasons apply and the fault persists, please contact Sungrow Customer Service Center.
004, 005	Grid undervoltage	Generally, the inverter will reconnect to the grid once the grid returns to normal. If this fault occurs repeatedly: 1. Measure the actual grid voltage. Contact your local power company for help if the grid voltage is lower than the set value. 2. Check whether the protection parameters are appropriately set via the App or the LCD. 3. Check whether the AC cable connection is secure. 4. If none of the above reasons apply and the fault persists, please contact Sungrow Customer Service Center.
008	Grid overfrequency	Generally, the inverter will reconnect to the grid once the grid returns to normal. If this fault occurs repeatedly: 1. Measure the actual grid frequency. Contact your local power company for help if the grid frequency is outside the set range. 2. Check whether the protection parameters are appropriately set via the App or the LCD. 3. If none of the above reasons apply and the fault persists, please contact Sungrow Customer Service Center.
009	Grid underfrequency	

Fault Code	Fault Name	Troubleshooting Method
010	Grid outage	Generally, the inverter will reconnect to the grid once the grid returns to normal. If this fault occurs repeatedly: 1. Check whether the grid supplies power reliably. 2. Check whether the AC cable connection is secure. 3. Check whether the AC cable is connected to the correct terminal (whether the live wire and the N wire are reversed). 4. Check whether the AC circuit breaker is closed. 5. If none of the above reasons apply and the fault persists, please contact Sungrow Customer Service Center.
012	Excess leakage current	1. The fault can be caused by damp PV panels or poor lighting conditions. Generally, the inverter will reconnect to the grid automatically once the environmental conditions improve. 2. If the environment is normal, check whether the AC and DC cables are well insulated. 3. If none of the above reasons apply and the fault persists, please contact Sungrow Customer Service Center.
013	Grid abnormal	Generally, the inverter will reconnect to the grid once the grid returns to normal. If this fault occurs repeatedly: 1. Measure the actual grid frequency and grid voltage. Contact your local power company for help if the grid parameter exceeds the set range. 2. If none of the above reasons apply and the fault persists, please contact Sungrow Customer Service Center.
017	Grid voltage unbalance	Generally, the inverter will reconnect to the grid once the grid returns to normal. If this fault occurs repeatedly: 1. Measure the actual grid voltage. Contact your local power company for help if the grid-phase voltages differ significantly. 2. If the voltage difference between phases is within the permissible range of the local power company, modify the grid voltage imbalance parameter through the App or the LCD.

Fault Code	Fault Name	Troubleshooting Method
		3. If none of the above reasons apply and the fault persists, please contact Sungrow Customer Service Center.
037	Ambient temperatur e too high	Generally, the device will resume operation after the internal temperature or module temperature returns to normal. If the fault occurs repeatedly: 1. Check whether the ambient temperature of the device is too high. 2. Check whether the device is in a well-ventilated place. 3. Check whether the device is exposed to direct sunlight. Shield it if it is under direct sunlight. 4. Check whether the fan is running properly. Replace the fan if it is not working normally. 5. If none of the above reasons apply and the fault persists, please contact Sungrow Customer Service Center.
039	Low system insulation impedance	Wait for the inverter to return to normal. If the fault occurs repeatedly: 1. Check whether the ISO impedance protection value is excessively high via the App or the LCD, and ensure that it complies with local regulations. 2. Check the strings and DC cable impedance to ground. Take corrective measures in case of short circuit or damaged insulation layer. 3. If the cable is normal and the fault occurs on rainy days, check it again when the weather turns fine. 4. If the system contains batteries, check whether the battery cables are damaged and whether the terminal connections are loose or have poor contact. If so, replace damaged cables and tighten the wiring terminals to ensure a reliable connection. 5. If none of the above reasons apply and the fault persists, please contact Sungrow Customer Service Center.
106	Ground fault	1. Check whether the AC cable is correctly connected. 2. Check whether the insulation between the ground cable and the live wire is normal.

Fault Code	Fault Name	Troubleshooting Method
		3. If none of the above reasons apply and the fault persists, please contact Sungrow Customer Service Center.
051	Off-grid load overpower fault	1. Reduce the load power connected to the off-grid port, or remove some loads. 2. If the fault persists, contact Sungrow Customer Service Center.
714	BMS communication fault	1. Check the communication cable and terminals for abnormalities. If any, correct them to ensure a reliable connection. 2. Reconnect the communication cable of the gauge. 3. If the fault persists, contact Sungrow Customer Service Center.
932–935, 937, 939	Battery alarm	Generally, the battery can recover automatically. If the alarm persists for a long time: 1. If the alarm is caused by ambient temperature, such as overtemperature alarm or low temperature alarm, adjust the ambient temperature (such as improve cooling conditions). 2. If the fault persists, please contact the battery manufacturer.
703, 711, 712, 715, 732–736, 739, 832–833, 835–837	Battery fault alarm	1. If the battery voltage is abnormal, check whether the battery power cable is improperly connected. If so, reconnect it correctly. 2. If the battery power cable is correctly connected, check whether the real-time battery voltage is abnormal. If abnormal, contact the battery manufacturer. If normal, contact Sungrow Customer Service Center. 3. If the battery temperature is abnormal, adjust the ambient temperature (such as improve cooling conditions). 4. If the fault persists, please contact the battery manufacturer.
502–504, 507, 508, 510, 513, 516–518, 994, 996	System alarm	1. The inverter can continue running. 2. Check the alarm-related wiring and terminals for any abnormality. Inspect the environment for foreign objects, and rectify any issues found.

Fault Code	Fault Name	Troubleshooting Method
		3. If the alarm occurs repeatedly, please contact Sungrow Customer Service Center.
514	Meter communication abnormal alarm	1. Check whether the communication cable and the terminals are abnormal. If so, correct them to ensure reliable connection. 2. Reconnect the communication cable of the meter. 3. If none of the above reasons apply and the alarm persists, please contact Sungrow Customer Service Center.
006, 007, 011, 019, 021, 025, 038, 040–042, 048-050, 052–054, 056, 064–067, 100–102, 105, 107, 113, 117, 200–205, 300, 303–305, 308–316, 320, 600, 601, 605, 608, 612, 616, 620, 624, 995	System fault	1. Wait for the system to return to normal. 2. Disconnect the AC switch and the DC switch. If a battery is present, disconnect the battery switch. Wait 15 minutes, then close the AC and DC switches in sequence to restart the system. If the fault still exists, contact Sungrow Customer Service Center. 3. If the alarm occurs repeatedly, please contact Sungrow Customer Service Center.
75	Parallel communication alarm	1. Wait for the fault to clear automatically. 2. Check whether the parallel parameters are correctly set. 3. Check whether the communication cables between the master and slave devices are disconnected, loose, or damaged. 4. If none of the above reasons apply and the alarm persists, please contact Sungrow Customer Service Center.

Fault Code	Fault Name	Troubleshooting Method
90	Inverter parallel synchronous signal abnormal	1. Check the master and slave settings. Ensure that one inverter is set as the master inverter and the remaining inverters are set as slave inverters. The number of master and slave devices must match the actual configuration, and slave device IDs must be set sequentially. 2. Check whether the parallel communication cables are correctly connected, including the CAN2H/CAN2L connections on the COM1 port between different devices. 3. Check whether the last inverter is connected to the termination resistor. A 120 Ω resistor (included with the delivery accessories) must be correctly connected between CAN2H and CAN2L.
213	Parallel inverter grid-side wiring fault	Check whether the phase sequence of the grid-side wiring is consistent between the system's master and slave inverters.
214	Parallel inverter load-side wiring fault	Check whether the phase sequence of the load-side wiring is consistent between the system's master and slave inverters.
329	AC port wiring or terminal abnormal	1. Check the AC port wiring. 2. Turn off the power and restart the inverter. 3. If none of the above reasons apply and the alarm persists, please contact Sungrow Customer Service Center.
514	Meter communication abnormal alarm	1. Check whether the communication cable and the terminals are abnormal. If so, correct them to ensure reliable connection. 2. Reconnect the communication cable of the meter. 3. If none of the above reasons apply and the alarm persists, please contact Sungrow Customer Service Center.
714	BMS communication fault	Check whether the communication cable is correctly connected. If the fault persists, please contact Sungrow Customer Service Center.

Fault Code	Fault Name	Troubleshooting Method
995	Power backup port short circuit	1. Turn off the inverter. 2. Use a multimeter to measure the resistance between each pair of phase wires and verify that it matches the actual household load. 3. Check the AC cable connection to the load port.
69, 635–636	DC switch trip alarm	1. When only DC switch 1 or DC switch 2 trips, the device can continue to operate. 2. Check the alarm-related wiring and terminals for any abnormality. Inspect the environment for foreign objects, and rectify any issues found. 3. If none of the above reasons apply and the alarm persists, please contact Sungrow Customer Service Center. 635 and 636 indicate that DC switch 1 and DC switch 2 have tripped, respectively.
304	EPS relay fault	1. Try turning off the inverter power and restarting it. 2. If none of the above reasons apply and the alarm persists, please contact Sungrow Customer Service Center.
71, 72	System alarm	If the surge protection fails, it is recommended to manually shut down the equipment and contact SUNGROW after-sales service professionals for inspection and repair.
99	Balanced bridge overtemperature	1. Turn off the inverter power and restart it. 2. Check whether the equipment's internal temperature sensor wiring is loose or damaged.
414	Grid connection port overload	Reduce the load power of the backup port or the multifunction port, turn off some loads, then click "Clear port overload fault".
415	Off-grid port overload	Reduce the load power of the backup port, turn off some loads, then click "Clear port overload fault".

Logger1000

Fault Symptom	Cause and Troubleshooting Method
Power-on failure	**The power supply port of Logger1000 is not connected to a power source.** Correctly connect the power cable to the power supply port of Logger1000.
	Power supply fault Check the power supply status. Measure the input voltage of the master and slave nodes with a multimeter.
	Logger1000 fault Replace the power supply.
No devices found	**No device is connected to the RS-485 port, or the cable connection is loose, detached, or reversed.** Check the RS-485 communication cable connection. If it is loose, detached, or reversed, reconnect and tighten it.
	The RS-485 communication parameters are set incorrectly. Check the RS-485 communication parameter settings and ensure that the baud rate and communication address are set correctly.
	Devices that do not support automatic identification have not been manually added. Manually add meteo stations, meters, and other devices.
	The address of the manually added device does not match the actual device address. Check whether the device address is set correctly.
	The device is operating abnormally. Check the device operating status.
Logger1000 displays device status as "Disconnected".	**The communication cable between the device and Logger1000 is loose, disconnected, or detached.** Check the cable connection between the device and Logger1000. If it is loose or detached, reconnect and tighten it.
	The device is operating abnormally.

Fault Symptom	Cause and Troubleshooting Method
	After verifying that the device is correctly connected, power on the device.
	The device has been removed or the configuration has been changed. • Check whether any device has been replaced. If so, search again or manually add the device. • If the device has been physically removed from the site, be sure to delete the corresponding device from the Web UI.
Failed communication with the backend	**Logger1000 cannot communicate normally with the backend.** Check whether the Ethernet port of Logger1000 is correctly connected to the PC or router.
	The network parameters are set incorrectly. Check whether the network parameters are set correctly.
	The forwarding protocol is configured incorrectly. Check whether the forwarding protocol is configured correctly.

If the above troubleshooting methods still fail to resolve the fault or alarm, please contact SUNGROW.

5 Component Replacement

5.1 Precautions for Component Replacement

NOTICE

- **Operators must have certain electronic, electrical wiring, and mechanical expertise, and be familiar with electrical and mechanical schematics. Operators must be familiar with the composition and working principles of the ESS and its upstream and downstream equipment.**
- **Operators must have received professional training in the installation and commissioning of electrical equipment.**
- **Operators must be able to respond quickly to dangers or emergencies that may occur during the process of component replacement.**
- **Operators must be familiar with applicable local standards and specifications of the country/region where the project is located.**

⚠ DANGER

- **Do not install or remove power cables while the power is on. Turn off the power switch before installing or removing the power cable.**
- **Proceed with maintenance only after the power is off. Do not restore power during operation.**
- **Voltage may be generated on the battery or grid side. Verify that no voltage is present using a standard voltmeter before touching.**
- **If necessary, contact SUNGROW on-site service personnel for maintenance and overhaul.**

⚠ WARNING

- **Wear PPE when performing equipment maintenance or servicing. Maintenance personnel must wear PPE properly, including goggles, helmets, insulated shoes, and gloves.**
- **The core components of the ESS (such as Pack, BMS, inverters, and contactors) are sensitive to electrostatic discharge (ESD). ESD can damage the internal electronic components of these parts and affect normal system operation; therefore, ESD protection must be implemented throughout all operations.**
- **Test using a multimeter and ensure the parts to be maintained inside the cabinet are completely voltage-free.**
- **Make necessary grounding and short-circuit connections.**
- **For the potentially live parts near the area of operation, cover them with insulated cloth for shielding.**
- **Put up highly visible warning signs around the equipment to prevent accidents caused by inadvertent switching-on. Set up warning signs or fence off a warning zone near the equipment.**

NOTICE

- **Replacement parts must be completely identical to the original parts in model, specifications, and parameters. It is strictly prohibited to use parts of different models or specifications as substitutes, to avoid system malfunctions, component burnout, or even safety incidents caused by parameter mismatches.**
- **Replacement parts must be genuine parts from the original manufacturer or qualified products certified by the original manufacturer. The use of counterfeit, substandard, refurbished, or damaged parts is strictly prohibited. Ensure the quality and compatibility of the parts.**
- **If any abnormal condition occurs during replacement (such as stuck components, broken wiring, smoke, or unusual odors), immediately stop work, cut off the power, evacuate to a safe area, and contact SUNGROW on-site service personnel for technical support. Do not attempt any unauthorized or forceful operation.**
- **All replacement operations must be recorded, including the replacement date, part name, model, reason for replacement, operator, and other information, to facilitate subsequent O&M traceability.**

5.2 Common Module Replacement Procedures

⚠ DANGER

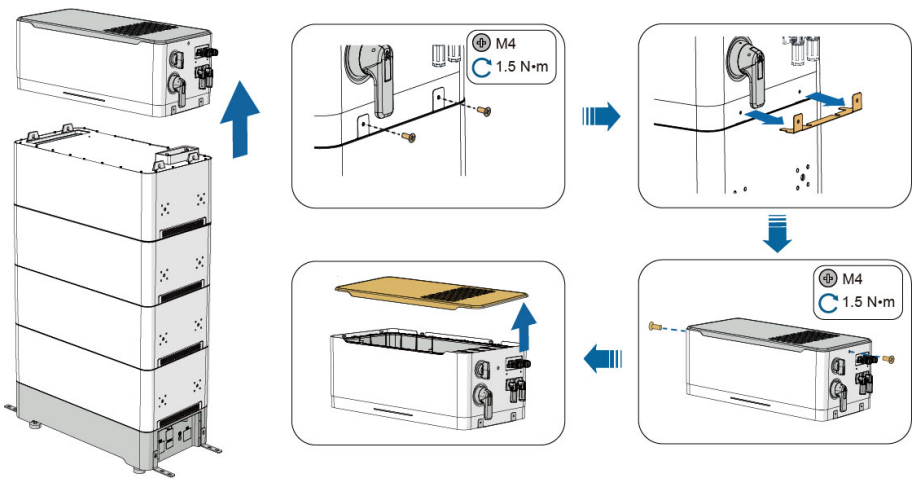
- **Before starting fan maintenance, be sure to power off the corresponding device and disconnect all power inputs from the device.**
- **After the device is powered off, the voltage and current shall be tested using specialized measurement instruments. Maintenance and operation must only be performed by qualified personnel who wear protective equipment after confirming that no voltage or current is present.**
- **Fan maintenance must be performed by qualified personnel.**

5.2.1 BESS Fan Replacement

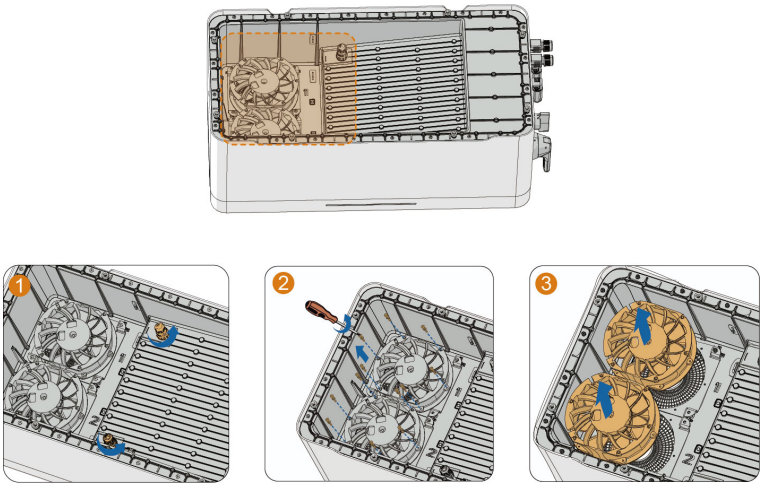
The BESS is equipped with built-in fans for heat dissipation during operation. If the fans do not operate properly, the battery cannot be effectively cooled, which will affect the efficiency of the BESS or cause derated operation. Therefore, it is necessary to clean dirty fans and replace the broken fans in a timely manner. Clean and replace the fans as follows:

Step 1 Shutdown the system. For details, see 2.4 Planned Shutdown.

Step 2 Remove the S/G (main battery stack) or the upper cover box (auxiliary battery stack) from the BESS, and open the decorative cover.



Step 3 Unplug the fan connector that needs to be replaced, remove the fan mounting screws, and remove the fan.



Step 4 Use a soft brush or a vacuum cleaner to clean the fans, or replace any damaged ones. Install the fan mounting screws at the specified torque and connect the fan connectors.

Step 5 Install the decorative cover, then reinstall the S/G or upper cover box above the BESS by reversing the steps in step 2.

Step 6 Power on the BESS and perform a self-test. If no faults or alarms are detected, the replacement is complete.

--End

⚠ WARNING

If a circuit breaker trips during the power-on process, do not close any other circuit breakers. Immediately check for a short circuit in the downstream loads of the tripped circuit breaker.

5.2.2 Hybrid Inverter Fan Replacement

⚠ DANGER

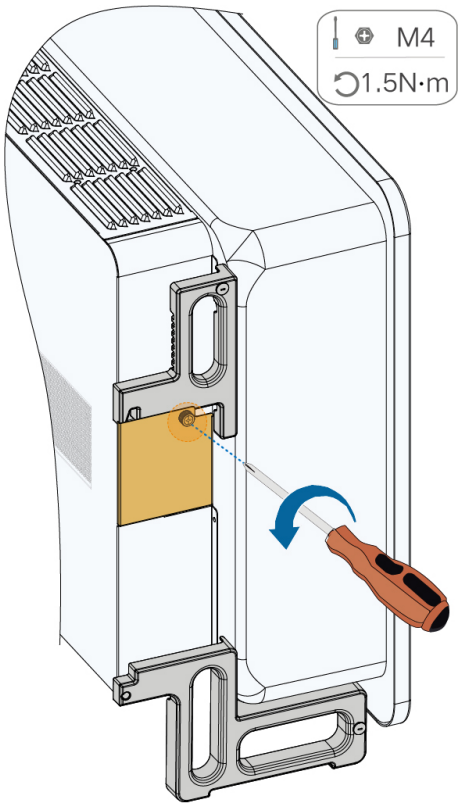
- **Before starting fan maintenance, be sure to power off the inverter and disconnect all power inputs from the inverter.**
- **Wait 15 minutes after the inverter is powered off, then test the voltage and current using specialized measurement instruments. Maintenance and operation must only be performed by qualified personnel who wear protective equipment after confirming that no voltage or current is present.**
- **Fan maintenance must be performed by qualified personnel.**

The inverter is equipped with built-in fans for heat dissipation during operation. If the fans malfunction, the inverter cannot cool down effectively, which may reduce efficiency or trigger derating. Therefore, it is necessary to clean dirty fans and replace the broken fans in a timely manner.

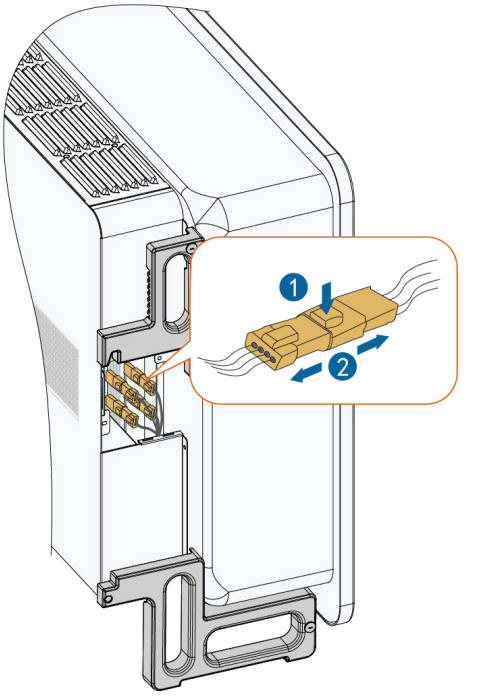
Clean and replace the fans as follows:

Step 1 Shutdown the system. For details, see 2.4 Planned Shutdown.

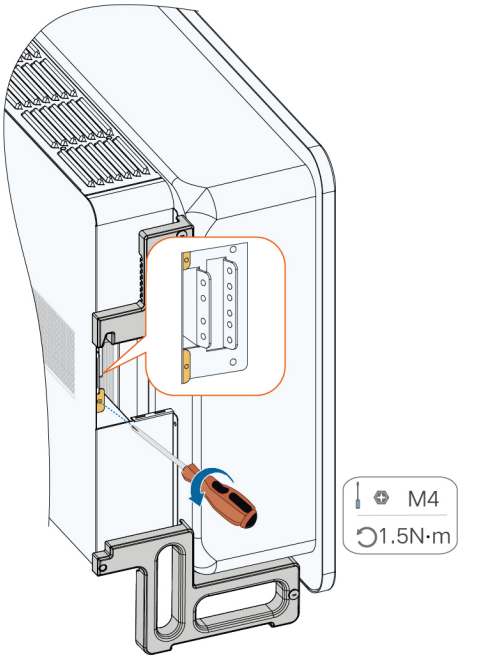
Step 2 Remove the screws on the fan cover of the equipment.



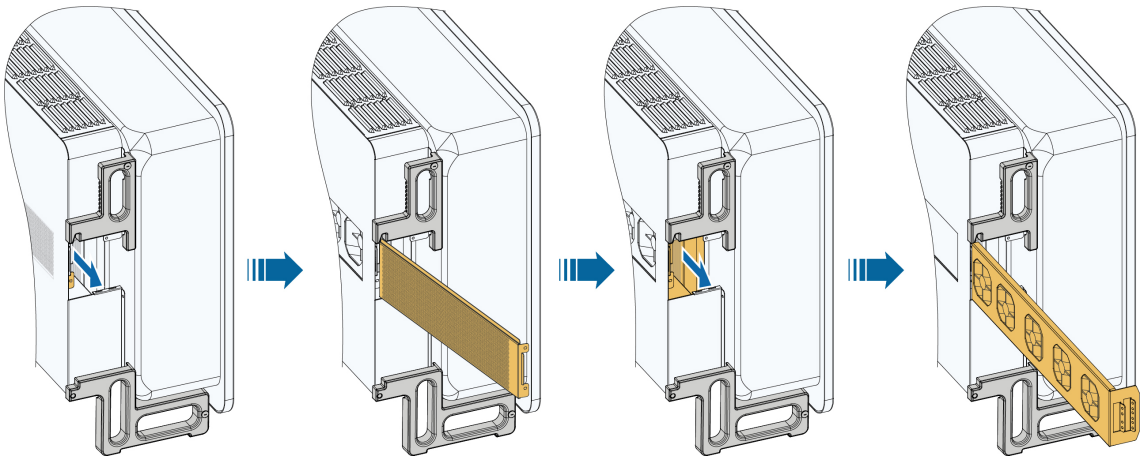
Step 3 Press the key on the connector to release its locking element, and pull the connector out. Then, loosen the screws on the fan holder.



Step 4 Loosen the screws on the side of the fans.



Step 5 Pull out the fan holder and clean the fans using a soft brush or a vacuum cleaner. Replace the fan if it is damaged.



Step 6 Reverse the previous steps and secure the fans after cleaning or replacement is completed.

Step 7 Power on the inverter, perform a self-test, and if no faults or alarms are detected, the replacement is complete.

--End

6 Appendix

6.1 Terminology

Abbreviations	English
B	
BC	Battery Cluster (Rack)
BESS	Battery Energy Storage System
BMU	Battery Management Unit
BMS	Battery Management System
BSC	Battery System Controller
C	
CAN	Controller Area Network
E	
EMS	Energy Management System
L	
Logger	Data Logger
LFP	Lithium iron phosphate
P	
Pack	Battery module
PC	Personal Computer
S	
S/G	Switch Gear
SOC	State of Charge
SOH	State of Health

6.2 Quality Assurance

When product faults occur during the warranty period, SUNGROW will provide free service or replace the product with a new one.

The software security update period for this product aligns with the warranty period. During the warranty, security patches or updates will be provided if any vulnerabilities or compatibility issues are identified.

Evidence

During the warranty period, the customer shall provide the product purchase invoice and date. In addition, the trademark on the product shall be undamaged and legible. Otherwise, SUNGROW has the right to refuse to honor the quality guarantee.

Conditions

- After replacement, unqualified products shall be processed by SUNGROW.
- The customer shall give SUNGROW a reasonable period to repair the faulty device.

Exclusion of Liability

In the following circumstances, SUNGROW has the right to refuse to honor the quality guarantee:

- The free warranty period for the whole machine/components has expired.
- The device is damaged during transport.
- The device is incorrectly installed, refitted, or used.
- The device operates in harsh conditions beyond those described in this manual.
- The fault or damage is caused by installation, repairs, modification, or disassembly performed by a service provider or personnel not from SUNGROW.
- The fault or damage is caused by the use of non-standard or non-SUNGROW components or software.
- The installation and use range are beyond stipulations of relevant international standards.
- The damage is caused by unexpected natural factors.

For faulty products in any of above cases, if the customer requests maintenance, paid maintenance service may be provided based on the judgment of SUNGROW.

Product data such as product dimensions are subject to change without prior notice. The latest documentation from SUNGROW should take precedence in case of any deviation.

6.3 Contact Information

In case of questions about this product, please contact us. We need the following information to provide you the best assistance:

- Model of the device
- Serial number of the device
- Fault code/name
- Brief description of the problem

For detailed contact information, please visit: **https://www.sungrowpower.com/en/about-us/contact-us**

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