

User Manual

Hybrid Inverter

SH110CX/SH125CX



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About This Manual

This manual gives an introduction to the inverter product as well as instructions on the installation, operation, and maintenance of the inverter, yet not all-encompassing regarding the information about the PV system. You may visit www.sungrowpower.com or the website of the device manufacturer for more information.

Scope of Application

This manual applies to the following devices:

- SH110CX
- SH125CX

It will be referred to as "inverter" hereinafter unless otherwise specified.

Target Group

This manual is intended for professional technicians who are responsible for installation, operation, and maintenance of inverters, and users who need to check inverter parameters.

Installation can only be done by qualified technical persons, Qualified personnel must:

- Have certain electrical wiring, electronic, and mechanical expertise, and be familiar with electrical and mechanical schematics;
- Have received professional training in the installation and commissioning of electrical equipment;
- Be able to respond quickly to dangers or emergencies that may occur during the process of installation and commissioning;
- Be familiar with applicable local standards and relevant safety regulations on electrical systems;
- Read through this manual carefully and have a good understanding of the relevant safety instructions.

How to Use This Manual

Read through this manual carefully before using the product, and keep it properly in an easy-to-reach place.

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 have purchased should take precedence. You can find the latest version of the manual at support.sungrowpower.com or reach your sales for it.

Security Disclaimer

To learn more about the product cybersecurity vulnerability disclosure and handling process, visit <https://en.sungrowpower.com/security-vulnerability-management>.

For more cybersecurity details, please refer to the user manual of the corresponding communication module/data logger provided with the product.

Symbol Explanations

To ensure the safety of life and property for users when using the product and to improve the efficiency of product use, the manual provides relevant information, which are highlighted by 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, may lead to device malfunctions or financial losses.



Indicates additional information, emphasized contents, or tips that may be helpful, e.g. to help you solve problems or save time.

Contents

All Rights Reserved.....	I
About This Manual.....	II
1 Safety Instructions.....	1
1.1 Unpacking and Inspection.....	2
1.2 Installation Safety.....	3
1.3 Electrical Connection Safety.....	3
1.4 Operation Safety.....	6
1.5 Maintenance Safety.....	6
1.6 Disposal Safety.....	7
2 Product Description.....	8
2.1 Product Overview.....	8
2.2 Symbols on the Product.....	9
2.3 LED Indicators.....	10
2.4 DC Switch.....	13
2.5 Circuit Diagram.....	13
3 System Application Introduction.....	15
3.1 System Application Overview.....	15
3.2 PV Energy Storage System (PV ESS).....	15
3.2.1 PV ESS Introduction.....	15
3.2.2 Backup Function Statement.....	16
3.2.3 Energy Management.....	16
3.3 System Application Scenarios.....	19
3.3.1 Pure Grid-connected System Scenario.....	19
3.3.1.1 System Overview.....	19
3.3.1.2 Single-inverter System.....	19
3.3.1.3 Multi-inverter System.....	22
3.3.2 On/off-grid System Scenario.....	23
3.3.2.1 System Overview.....	23
3.3.2.2 Single-inverter System.....	25
3.3.2.3 Multi-inverter System.....	34
3.3.3 Pure Off-grid System Scenario.....	45
3.3.3.1 System Overview.....	45
3.3.3.2 Single-inverter System.....	45
3.3.3.3 Multi-inverter System.....	47

3.3.4 Third-party Dispatching.....	48
4 Function Description.....	49
4.1 Safety Function.....	49
4.1.1 Protection.....	49
4.1.2 Grounding Fault Alarm.....	49
4.2 Energy Conversion and Management.....	49
4.2.1 Power Derating.....	49
4.2.2 Normal Operating Voltage Range.....	49
4.2.3 Normal Operating Frequency Range.....	50
4.2.4 Reactive Power Regulation.....	50
4.2.5 Load Control.....	50
4.2.6 Battery Management.....	50
4.2.7 Meter Management.....	50
4.3 Communication and Configuration.....	51
5 Unpacking and Storage.....	52
5.1 Unpacking and Inspection.....	52
5.2 Scope of Delivery.....	53
5.3 Inverter Storage.....	54
6 Mechanical Mounting.....	55
6.1 Installation Precautions.....	55
6.2 Installation Site Selection.....	55
6.2.1 Installation Environment Requirements.....	56
6.2.2 Installation Support Requirements.....	58
6.2.3 Installation Angle.....	59
6.2.4 Installation Space Requirements.....	60
6.3 Installation Tools.....	62
6.4 Move Inverter.....	64
6.5 Install Mounting Bracket.....	65
6.5.1 Mounted on PV Bracket.....	66
6.5.2 Mounted on Wall.....	68
6.5.3 Mounted on Pole.....	70
6.6 Mount the Inverter.....	72
7 Electrical Connection.....	74
7.1 Installation Precautions.....	74
7.2 Terminal Description.....	76
7.3 Electrical Connection Overview.....	77
7.4 Crimp OT/DT terminal.....	86
7.5 External Protective Grounding Connection.....	87
7.5.1 Requirements for External Protective Grounding.....	88

7.5.2 Wiring Steps.....	88
7.6 AC Cable Connection.....	89
7.6.1 AC side Requirements.....	89
7.6.2 OT/DT Terminal Requirements.....	91
7.6.3 AC Cable Connection.....	91
7.6.3.1 Wiring Steps (for 8-hole terminal block/ multi-core cable).....	91
7.6.3.2 Wiring Steps (for 16-hole terminal block/ single-core cable).....	98
7.7 DC Cable Connection.....	106
7.7.1 PV Input Configuration.....	108
7.7.2 Assemble DC Connector (MC4).....	110
7.7.3 Installing PV Connector.....	111
7.8 Battery Connection.....	112
7.8.1 Electrical Connection Requirements.....	112
7.8.2 Assemble Battery Connector.....	113
7.9 Communication Connection.....	115
7.9.1 Communication Terminal Cover.....	115
7.9.2 Communication Wiring Area.....	116
7.9.3 RS485 Communication Connection.....	117
7.9.3.1 Interface Description.....	118
7.9.3.2 RS485 Communication Wiring.....	118
7.9.3.3 Wiring Steps (Terminal Block).....	120
7.9.4 Dry Contact Function.....	123
7.9.4.1 Wiring Steps.....	125
7.9.5 DRM Connection.....	125
7.9.6 DSP Communication Connection.....	129
7.9.7 Battery Communication Connection.....	129
7.10 Install Protective Cover (Optional for SH110CX).....	131
8 iSolarCloud App.....	135
8.1 About iSolarCloud.....	135
8.2 Install iSolarCloud.....	136
8.3 User Roles.....	137
8.4 Device Commissioning.....	137
9 Commissioning.....	138
9.1 Inspection Before Commissioning.....	138
9.2 Commissioning Steps	138
10 Inverter Decommissioning.....	140
10.1 Shut Down the Inverter.....	140
10.2 Dismantle the Inverter.....	140
10.3 Dispose of Inverter.....	141

11 Troubleshooting and Maintenance	142
11.1 Troubleshooting.....	142
11.2 Maintenance.....	149
11.2.1 Maintenance Precautions.....	149
11.2.2 Routine Maintenance.....	150
11.2.3 Fan Maintenance.....	151
11.2.4 Clean Air Outlet.....	153
11.2.5 DC Switch Maintenance.....	153
12 Appendix	154
12.1 Technical Data.....	154
12.2 Wring Distance of DI Dry Contact.....	158
12.3 Quality Assurance.....	160
12.4 Contact Information.....	161

1 Safety Instructions

Follow strictly the relevant safety instructions during the process of product installation, commissioning, operation, and maintenance. Improper use or incorrect operation may result in:

- Injury to or death of the operator or other people.
- Damage to the product, or to the property that belongs to the operator or a third party.

Strictly follow the safety instructions stated in the manual to avoid the hazards mentioned above.

WARNING

Do not perform any operation on the product (including but not limited to, handling, installing, powering on, and maintaining the product, performing electrical connection, and working at heights) in harsh weather conditions, such as thunder and lightning, rain, snow, and Level 6 or stronger winds. SUNGROW shall not be held liable for any damage to the product due to force majeure, such as earthquakes, floods, volcanic eruptions, mudslides, lightning strikes, fires, wars, armed conflicts, typhoons, hurricanes, tornadoes, and other extreme weathers. In case of fire, evacuate the building or product area and call the fire department. Do not go back to the fire area.

Tighten the screws at the specified torques using proper tools when fastening the product and terminals. Otherwise, the product may be damaged. The damage caused therefrom will not be covered by the warranty.

Understand how to use the tools properly first before starting using them, to avoid causing personal injury or product damage.

NOTICE

Perform operations on the product only if you have a good understanding of this manual and appropriate tools in hand.



- Safety instructions in this manual should only serve as a supplement and are not all-encompassing regarding all the norms that need to be followed. All work should be carried out considering the actual situation on the site.
- SUNGROW shall not be held liable for any damage caused by violation of general safe operation requirements, safety standards, and the safety instructions specified in this manual.
- Product installation, operation, and maintenance should be conducted in compliance with applicable local laws, regulations, and specifications. Safety instructions in this manual should only be a supplement to the local laws, regulations, and specifications.
- During the product transport, installation, wiring, and maintenance, etc., the materials and tools prepared by users must meet the requirements of applicable local laws and regulations, safety standards, and other relevant specifications. SUNGROW 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.
- Operations on the product, including but not limited to, handling, installing, wiring, powering-on, maintenance, and use of the product, must not be performed by unqualified personnel. SUNGROW shall not be held liable for any damage to the product resulting from operations done by unqualified personnel.
- Where the transport of the product is arranged by users, SUNGROW shall not be held liable for any damage to the product that is caused by users themselves or the third-party transport service providers designated by the users.
- SUNGROW shall not be held liable for any damage to the product caused by the negligence, intent, fault, improper operation, and other behaviors of users or third-party organizations.
- SUNGROW shall not be held liable for any damage to the product arising from reasons unrelated to SUNGROW.

1.1 Unpacking and Inspection

WARNING

- **Check all safety signs, warning labels, and nameplates on products.**
- **Ensure that the safety signs, warning labels and nameplates must be clearly visible and cannot be removed or covered before the product is decommissioned.**

NOTICE

After receiving the product, check whether the appearance and structural parts of the device are damaged, and check whether the packing list is consistent with the actual ordered product. If there are problems with the above inspection items, do not install the device and contact SUNGROW in time.

1.2 Installation Safety

** DANGER**

Make sure there is no electrical connection before installation.
Where hole drilling is required during installation, avoid the internal water pipes and electrical wires when drilling.

** CAUTION**

Improper installation may cause personal injury!

- If the product supports hoisting transport and is hoisted by hoisting tools, ensure no personnel pass or stay beneath the product during the process.
- When handling the product, get prepared for carrying its weight and keep the balance to prevent it from tilting or falling.

NOTICE

Before operating the product, check and ensure that the tools to be used have undergone regular maintenance.

1.3 Electrical Connection Safety

** DANGER**

Before electrical connections, make sure that the product is not damaged; otherwise, it may lead to danger!
Before electrical connections, please make sure that the inverter switch and all switches connected to the inverter are set to "OFF", otherwise electric shock may occur!

** DANGER**

Hazardous voltages on the PV string when it is exposed to sunlight!

- Operators must wear proper personal protective equipment during electrical connections.
- Check and confirm that the DC cables are voltage-free using a measuring instrument before touching them.
- Observe all the safety instructions listed in the documents for the PV string and other relevant documents.
- The inverter must not be connected to a PV string that requires positive or negative grounding.

** DANGER**

Battery short circuits can cause excessively high instantaneous current and release significant heat, potentially leading to fires and personal injury.

Before performing electrical work on batteries, disconnect them from all power sources.

Battery terminals and the cables connecting to the inverter carry fatal voltages. Stay away from the cables or terminals inside the inverter to avoid serious injury or death.

Strictly follow all safety instructions provided by the battery manufacturer.

** DANGER**

Danger to life due to high voltages inside the product!

- Be sure to use specialized insulated tools during wiring.
- Note and observe the warning labels on the product, and perform operations strictly following the safety instructions.
- Observe all the safety instructions listed in this manual and other relevant documents for the product.

** WARNING**

Damage to the product caused by incorrect wiring is not covered by the warranty.

- Electrical connections must be performed by qualified personnel.
- The specification of cables used in the PV power system should meet the relevant requirements. The cables should be properly insulated and firmly connected.

 WARNING

- Before connecting the PV connectors to the product, check the positive and negative ends of PV module cables first. Connect the PV connectors to the corresponding terminals on the product only after confirming that the polarity is correct.
- During the installation and operation of the inverter, please ensure that the positive or negative polarities of PV strings do not short-circuit to the ground. Otherwise, an AC or DC short-circuit may occur, resulting in equipment damage. The damage caused by this is not covered by the warranty.
- Do not connect any load between the inverter and the AC circuit breaker, so as to prevent the switch from tripping by mistake.
- Determine the specifications of AC circuit breakers to be used strictly in compliance with the applicable local laws and regulations and safety standards or the recommendation by SUNGROW. Otherwise, the circuit breaker may not open in time in the event of something abnormal, which may then lead to safety incidents.
- The battery interface must be compatible with the inverter. The full voltage range of the battery must fall within the allowable range of the inverter, and the battery voltage must not exceed the maximum allowable DC input voltage of the inverter.

NOTICE

- Wiring must be done in compliance with the applicable local grid regulations and relevant safety instructions specified for the PV string.
- Install the external protective grounding cable first when performing the electrical connection and remove the external protective grounding cable last when removing the inverter.

1.4 Operation Safety

DANGER

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.

When the product is operating:

- Do not touch the product enclosure;
- Do not plug and unplug any connector on the product;
- Do not touch any wiring terminal of the product. Otherwise, it may lead to electric shocks;
- Do not disassemble or remove any part of the product. Otherwise, it may lead to electric shocks;
- Do not touch any hot part of the device (e.g. heat sink); otherwise, it may cause burns.
- Do not connect or disconnect any individual battery; otherwise, it may lead to burn hazards.
- Do not connect or remove any PV string or any PV module in a string. Otherwise, an electric shock may occur.
- If the inverter is equipped with a DC switch, do not operate it. Otherwise, it may cause device damage or personal injury.

Do not take other actions, such as setting parameters, during the process of firmware update, to avoid update failure.

1.5 Maintenance Safety

DANGER

Risk of product damage or personal injury due to improper servicing!

- Before maintenance, disconnect the AC circuit breaker on the grid side and then the DC switch. Verify that the connected battery is de-energized. If a fault that may cause personal injury or device damage is found before maintenance, disconnect the AC circuit breaker and wait until the night before operating the DC switch. Otherwise, a fire inside the product or an explosion may occur, causing personal injuries.
- After the product is powered off for 15 minutes, measure the voltage and current using proper instruments. Perform operation and maintenance of the product wearing proper protective equipment after confirming that there is no voltage or current present.
- Even if the inverter has stopped running, it may still be hot and cause burns. Perform operations on the inverter wearing protective gloves after it cools down.

** DANGER**

Touching the power grid or the contacts and terminals inside the inverter connected to the power grid may lead to electric shocks!

- Voltage may be present on the grid side. Use a standard voltmeter to check and confirm that it is voltage-free before touching.

** CAUTION**

To prevent irrelevant personnel from operating the product by mistake or other accidents, please set up highly visible warning signs around the inverter or fence off a warning zone.

NOTICE

- If the paint on the inverter enclosure peels off or the enclosure rusts, repair it in time. Otherwise, the product performance may be affected.
- Do not use cleaning agents to clean the inverter. Otherwise, the inverter may be damaged, and the loss caused therefrom will not be covered by the warranty.
- No part inside the product requires maintenance. Therefore, do not open the inverter enclosure (except for the wiring box) or replace any of its internal components without authorization. Otherwise, the damage caused therefrom will not be covered by the warranty.
- To minimize the risk of electric shocks, do not perform maintenance operations that are not specified in this manual. If necessary, contact SUNGROW for maintenance. Losses arising from failure to observe this instruction will not be covered by warranty.
- Do not open the maintenance door in rainy or snowy weather. If it is inevitable, take proper protective measures to avoid the ingress of rainwater and snow into the maintenance compartment; otherwise, the operation of the inverter may be affected.
- Before closing the maintenance door, check whether there is any object left inside the maintenance compartment, such as screws, tools, etc.
- It is recommended for users to use cable sheathing to protect the AC cable. If the cable sheathing is used, make sure it is positioned inside the maintenance compartment.

1.6 Disposal Safety

** WARNING**

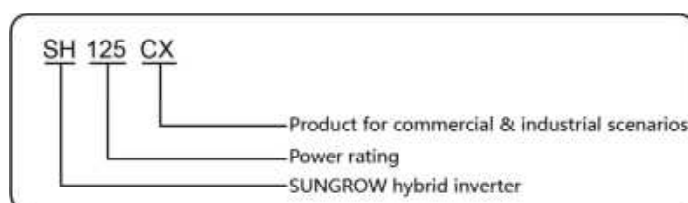
Please scrap the product in accordance with relevant local regulations and standards to avoid property damages or personal injuries.

2 Product Description

2.1 Product Overview

Product Model

The model description is as follows (Taking SH125CX as an example) :



Inverter External Design

The external design of the inverter is shown below.

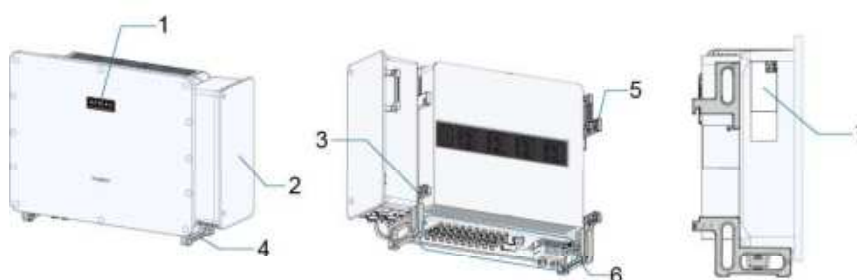


Figure 2-1 Inverter External Design

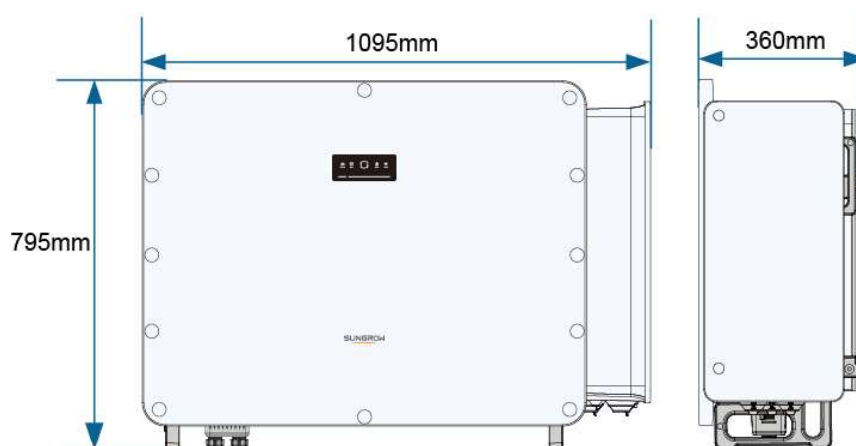
*The figure here is for reference only and the real product may differ.

No.	Item	Description
1	LED indicator	Indicates the current status of the inverter.
2	AC junction box	Used for AC wiring.
3	External grounding terminals	Two grounding terminals are provided. Use at least one of them for grounding.
4	Bottom handles	Two handles, used for inverter handling.
5	Mounting ears	Two, used to hang the inverter onto the mounting-bracket.

No.	Item	Description
6	Wiring area	Includes the DC switch, DC terminals, battery terminals, and communication terminals. For details, please refer to 7.2 Terminal Description .
7	Labels	Includes the nameplate, warning labels, and QR code.

Product Dimensions

The dimensions of the inverter are shown below.



Weight

Model	Weight
SH50CX	≤ 115 kg
SH110/125CX	≤ 128 kg

2.2 Symbols on the Product

Symbol	Description
	Disconnect the inverter from all external power sources before inverter maintenance.
	Burn hazard due to the hot surface that may exceed 60°C.
	Danger to life due to high voltages! After the inverter is disconnected from the external power source, wait at least 15 minutes before touching any of its internal conductive parts.

Symbol	Description
	Installation and operation must only be performed by qualified personnel.
	High voltage hazard. Ensure proper grounding before powering on!
	Comply with RCM certification.
	Read the manual before performing any operation on the inverter.
	Transformerless inverter.
	Do not dispose of the inverter as household waste.
	Read the manual before performing any operation on the inverter.
	CE Declaration of Conformity.

2.3 LED Indicators

As a human-machine interface, the LED indicators on the inverter's front panel display the current operating status of the inverter.

The LED panel is located on the front of the inverter and includes a display and indicator lights.



Figure 2-2 LED Panel

Table 2-1 LED Indicator Status Description

Indicator	Color	Status	Meaning
		Steady on	PV fault
		Steady on	PV outputting power
		Off	PV not outputting power
		Steady on	Battery fault
		Steady on	Battery connected
		Off	Battery not connected
		Steady on	Inverter fault
		Steady on	Inverter operating normally
		Off	The AC and DC power are disconnected.
		Steady on	Inverter operating in grid-connected mode
		Off	Grid connection abnormal
		Steady on	External data communication normal

Indicator	Color	Status	Meaning
		Blink	Communicating via Bluetooth
		Off	No communication
Battery Status Indicator	Refer to "Battery Status Indicator".		
			

Battery Status Indicator

The battery status indicator section comprises two indicators: the operation status indicator and the SOC status indicator.



1: Operation status indicator

2: SOC status indicator

Table 2-2 Operation Status Indicator Description

Color	Status	Meaning
Blue 	Steady on	Battery connection
Grey 	Off	No battery
Red 	Steady on	Battery fault

Table 2-3 SOC Status Indicator Description

Color	Status	Meaning
Blue		Battery SOC: 0
		$0 < \text{Battery SOC} \leq 20\%$
		$20\% < \text{Battery SOC} \leq 40\%$
		$40\% < \text{Battery SOC} \leq 60\%$
		$60\% < \text{Battery SOC} \leq 80\%$
		Battery SOC > 80%

Color	Status	Meaning
Grey		Battery not connected or fully discharged

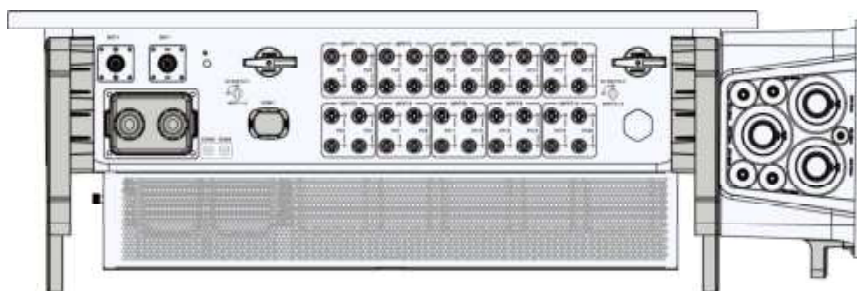


The figures shown are for reference only. The actual product may differ.

2.4 DC Switch

The DC switch can safely disconnect the inverter from the PV strings. The inverter is equipped with two DC switches. The two DC switches control two different groups of PV terminals respectively. If the inverter detects a major internal fault (e.g., overvoltage, overcurrent, overtemperature), the DC switch automatically trips to interrupt the DC inputs.

Refer to [11.2.5 DC Switch Maintenance](#) for proper handling when the DC switch trips automatically.



*The figure shown here is for reference only and the real product may differ.

Product Model	DC Switch	PV Terminals Controlled by the Switch
SH110/125CX	DC SWITCH 1	PV1–PV10
	DC SWITCH 2	PV11–PV20

2.5 Circuit Diagram

The following figure shows the main circuit of the inverter.

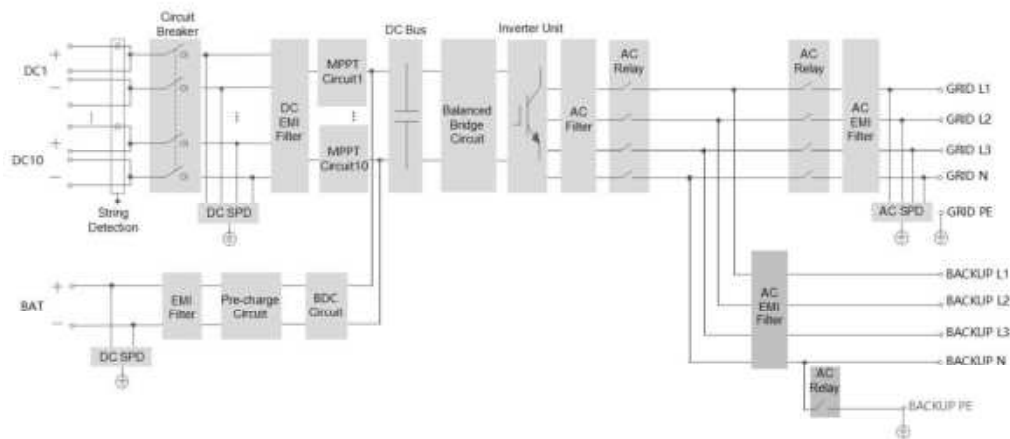


Figure 2-3 Circuit Diagram

- DC switches can safely disconnect the PV input when necessary to ensure the safe operation of the inverter and the safety of personnel
- EMI filters can filter out the electromagnetic interference inside the inverter to ensure that the inverter meets the requirements of electromagnetic compatibility standards.
- The inverter converts DC into grid-compatible AC current and feeds AC into the grid.
- The AC filter removes high-frequency components from the inverter output current, ensuring the output current meets grid requirements.
- The output relay isolates the inverter's AC output from the grid, allowing the inverter to safely disconnect from the grid during inverter faults or grid faults.
- The AC SPD provides a discharge path for AC side overvoltage, preventing damage to internal inverter circuits caused by overvoltage impact.



The PE wire of Backup terminal is not required for Australia and New Zealand.

⚠ DANGER

If the lightning level exceeds the protection level of the product, surge protection and overvoltage protection may fail, resulting in electric shock and fatal injury!

3 System Application Introduction

3.1 System Application Overview

SH110/ 125CX are three-phase non-isolated hybrid inverters applicable to both on-grid and off-grid PV systems. After the integration of Energy Management System (EMS), they can control and optimize the energy flow so as to increase the self-consumption of the system.



- The inverter must only be operated with PV strings with class II protection in accordance with IEC 61730, application class A. It is not allowed for the positive pole or the negative pole of the PV strings to be grounded.
- Do not connect any local load between the inverter and the AC circuit breaker.

3.2 PV Energy Storage System (PV ESS)

WARNING

When designing the system, ensure that the operating ranges of the devices connected to the inverter all satisfy the inverter's requirements for operation.

3.2.1 PV ESS Introduction

By directly connecting a battery module to the inverter, the conventional PV system can be upgraded to be an Energy Storage System (ESS).

The system is capable of operating off-grid to ensure an emergency power supply for protected loads in the event of a grid interruption or blackout, which may be caused by:

- islanding;
- under-voltage;
- under-frequency or over-frequency.

NOTICE

- Under any connection, either grid-connection or off-grid application, please be sure that the potential voltage between N and PE line is not higher than 12V, otherwise, inverter will stop generating power.
- The system is not suitable for supplying life-sustaining medical devices. It cannot guarantee backup power in all circumstances.

3.2.2 Backup Function Statement

DANGER

This product is not intended to power life-support medical equipment. Power loss may cause life-threatening consequences.

This disclaimer pertains to general Sungrow policy for inverters described in this document.

1. For hybrid inverters, the electrical setup typically includes connection to both PV arrays and battery modules. If neither PV arrays nor battery modules supply usable power in backup mode, the backup source will automatically shut down. SUNGROW is not liable for any consequences resulting from failure to comply with this guidance.
2. When operating in backup mode, the inverter supports a 6 kW single-phase half-wave load. For details regarding the inverter's load carrying capacity, please contact SUNGROW.
3. In general, backup switchover time of single inverter is less than 10 ms. However, external factors or local grid codes may prevent backup mode from being enabled. Therefore, users must be aware of the following conditions and comply with the relevant operating instructions:
 - Do not connect loads requiring continuous and stable power supply.
 - Do not connect loads with total capacity exceeding the maximum backup capacity.
 - Due to the limitations of the battery's own state, the battery current may be restricted by various factors, including but not limited to temperature and weather conditions.

Backup Overload Protection Statement

When overload protection is triggered, the inverter fault needs to be cleared manually. Try to minimize the backup load power or remove loads that may cause high inrush current.



- During commissioning before the inverter operates with load, confirm that the load does not exceed the rated load. Exceeding the rated load will cause damage to the inverter.
- After a bypass overload fault is reported, manually disconnect the external load circuit breaker, modify the load circuit and power, confirm the load does not exceed the rated load, manually clear the fault, and then restart.

3.2.3 Energy Management

The battery discharges to power the loads. If battery power is insufficient, the grid supplies both backup and general loads.

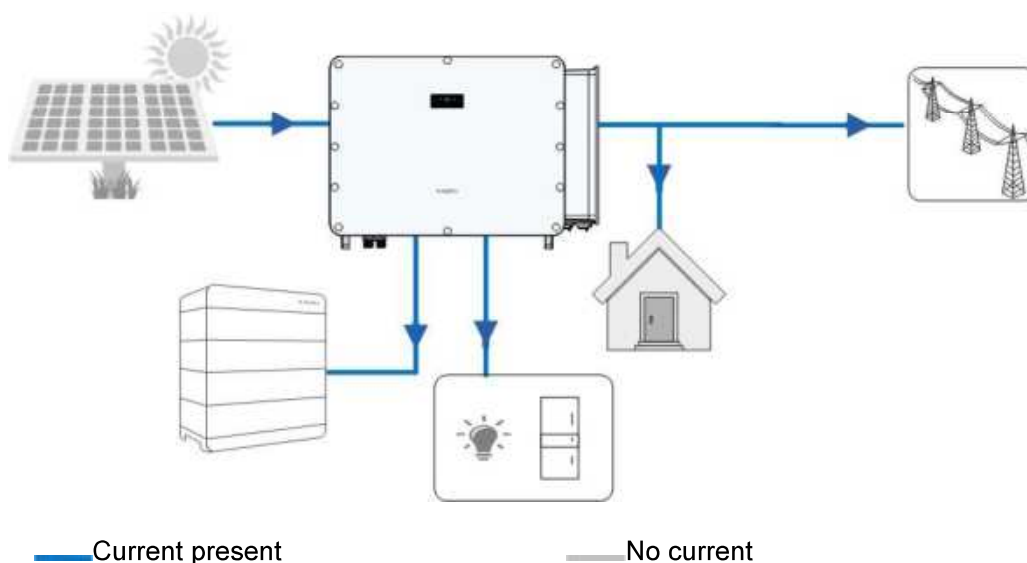
When the grid is present, the inverter activates the bypass function, and backup loads are connected directly to the grid through the inverter's internal bypass switch.

If the smart meter is malfunctioning or not installed while the inverter operates normally, the battery can not charge or discharge. Under these circumstances, feed-in power settings will be invalid, and the DO function in optimized mode will also be disabled.

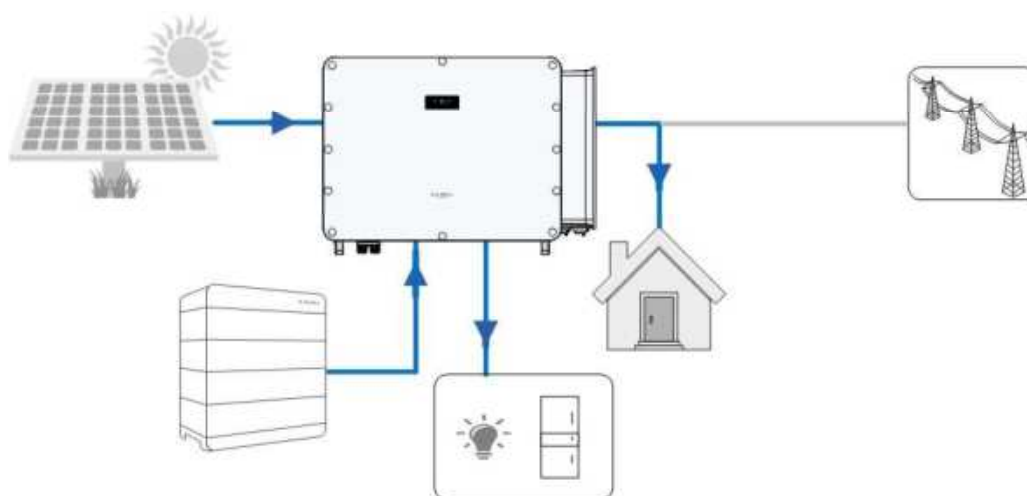
Daytime Energy Management

The energy management system (EMS) operates in self-consumption mode by default.

- Scenario 1: PV generation $\geq$ Load consumption
 - PV power is first used for loads, with the surplus used to charge the battery
 - If the battery is fully charged, excess power is fed into the grid. Feed-in power will not exceed the limit set in the initial configuration.



- Scenario 2: PV generation $<$ Load consumption
 - The battery discharges to cover the power deficit during the permitted discharge period.
 - If the combined PV and battery power still cannot meet the load demand, the inverter will draw power from the grid.

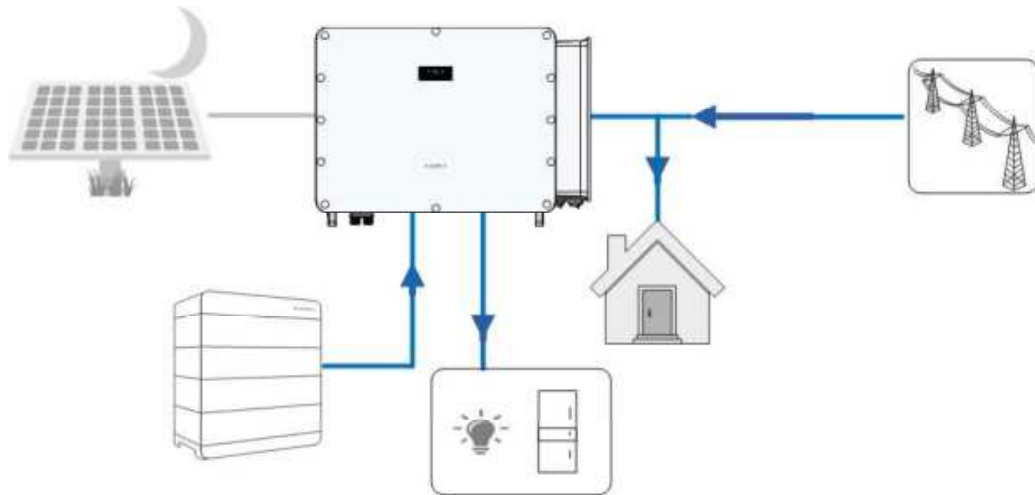


— Current present

— No current

Nighttime Energy Management

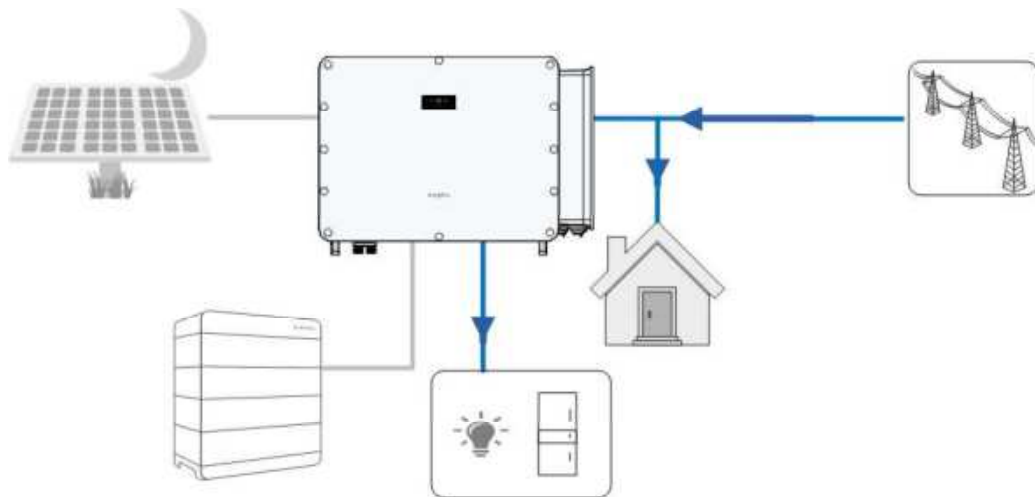
At night, the battery discharges to power the loads. If battery power is insufficient, the grid also supplies power to the loads.



— Current present

— No current

At night, when the battery is depleted, the system enters standby mode with all power supplied by the grid.



— Current present

— No current

3.3 System Application Scenarios



Scenarios not mentioned here are considered unsupported by default. For additional application requirements, please contact Sungrow technical support for confirmation.

3.3.1 Pure Grid-connected System Scenario

3.3.1.1 System Overview

The pure on-grid system scenario is applicable to regions with a stable utility grid, where feed power to the grid may be restricted. Additional loads can be connected to the **grid port** to increase the self-consumption rate of PV generation. In this scenario, up to 24 hybrid inverters can be configured. No loads are connected to the **backup port**. In the event of a grid outage, the system will not supply power to the loads. When PV is connected, batteries are optional.

Pure grid-connected system: All loads are connected to the **GRID** port, and the system operates in grid-connected mode.

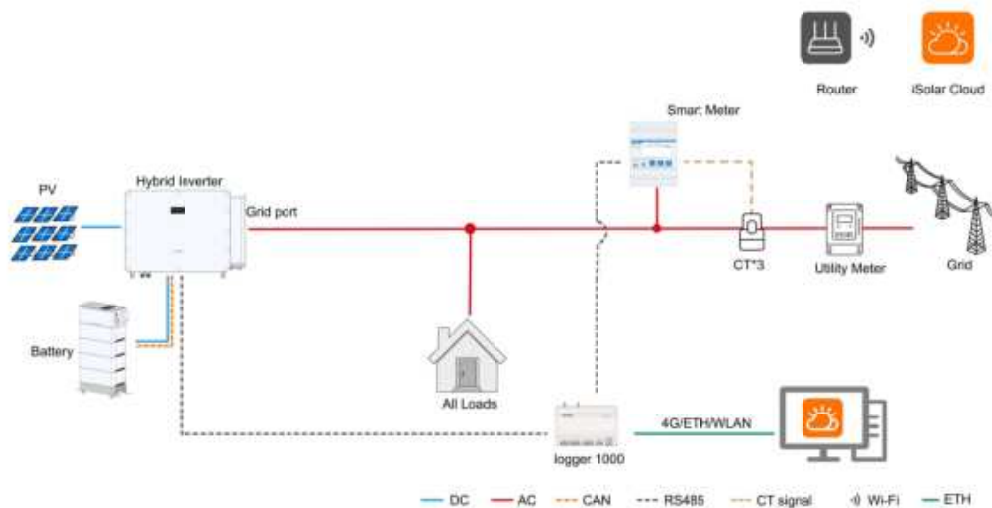
Scenario	Single-inverter/Multi-inverter system configuration					
	PV module s ⁽¹⁾	Battery ⁽¹⁾	Smart meter	Logger 1000	Manual change over switch	Grid
Pure grid-connected system (no backup)	○	○	●	●	✗	●

● Required, ○ Optional, ✗ Not required

(1) In this scenario, either only PV or only the battery may be connected, but not both disconnected.

3.3.1.2 Single-inverter System

3.3.1.2.1 System Configuration



Component	Model/Type	Quantity	Remarks
Hybrid inverter	SH110/125CX	1	Key component of the energy storage system
Smart meter	Refer to 4.2.7 Meter Management	1	Refer to 4.2.7 Meter Management .
Current transformer (CT)	Determined based on grid connection point current.	3	- CT compatible with Smart meter is required. - CT specifications shall be determined based on grid connection point current.
Communication device	Logger1000 (COM100)	1	/
Terminal resistor	120 Ω	2	- When the smart meter communication cable exceeds 10m, a 120Ω resistor must be connected in parallel at the meter terminals. - When communication between the battery and the inverter, it is recommended to connect a 120Ω resistor in parallel at the CAN communication port of the battery farthest from the inverter.

Component	Model/Type	Quantity	Remarks
AC miniature circuit breaker (MCB): Grid port	200A/400V Type A (I_{max} : 200A)	1	- To be purchased by the customer. Select MCB with appropriate specifications based on actual needs, including wiring plan, number of loads, and inverter capacity. - The circuit breaker must be installed on the grid port of each hybrid inverter.
PV	/	/	Optional; batteries are not required when PV is connected.
Battery	Refer to 4.2.6 Battery Management	/	- Optional, to be purchased by the customer. - Required if PV is not configured.

3.3.1.2.2 System Settings



It is recommended to use the local access of Logger1000 for system commissioning. For Logger1000 login, network configuration, plant creation, device addition, etc., please refer to [Logger1000 User Manual](#).

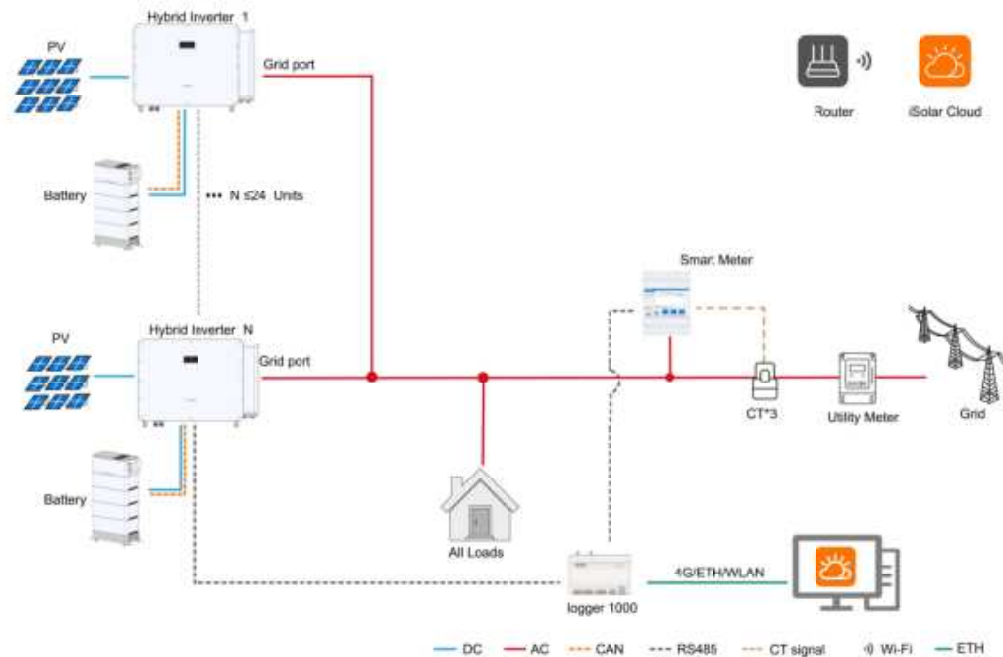
The corresponding sections in [Logger1000 User Manual](#) for parameter setting operations are listed in the table below:

No.	Parameter setting	Reference section title
1	Set energy management mode	Select Energy Management Operating Mode
2	Enable Feed-in power limit: Total active power control or Per-phase active power control	Grid-Connected Power Control
3	Set Feed-in power limit parameters	
4	Set Purchase energy with limited power	
5	Set CT transformation ratio	- Add meter: Adding a Meter - Setting CT transformation ratio:

No.	Parameter setting	Reference section title
		Configuring Parameters for Meter

3.3.1.3 Multi-inverter System

3.3.1.3.1 System Configuration



Component	Model/Type	Quantity	Remarks
Hybrid inverter	SH110/125CX	≤24	- Key component of the energy storage system. - Different inverter models can be operated in parallel.
Smart meter	Refer to 4.2.7 Meter Management	1	Refer to 4.2.7 Meter Management .
Current transformer (CT) or Rogowski coil	Determined based on grid connection point current.	3	- CT compatible or Rogowski coil with Smart meter is required. - CT specifications shall be determined based on grid connection point current.
Communication device	Logger1000 (COM100)	1	/

Component	Model/Type	Quantity	Remarks
Terminal resistor	120 Ω	2	- When the smart meter communication cable exceeds 10m, a 120Ω resistor must be connected in parallel at the meter terminals. - When communication between the battery and the inverter, it is recommended to connect a 120Ω resistor in parallel at the CAN communication port of the battery farthest from the inverter.
AC miniature circuit breaker (MCB): Grid port	200A/400V Type A (I_{max} : 200A)	1 pcs for per inverter	- To be purchased by the customer. Select MCB with appropriate specifications based on actual needs, including wiring plan, number of loads, and inverter capacity. - The circuit breaker must be installed on the grid port of each hybrid inverter.
PV	/	/	Optional; batteries are not required when PV is connected.
Battery	Refer to 4.2.6 Battery Management	/	- Optional, to be purchased by the customer. - Required if PV is not configured.

3.3.1.3.2 System Settings

The parameter settings for the multi-inverter system are the same as those for the single-inverter system in a pure grid-connected scenario. Refer to [3.3.1.2.2 System Settings](#).

3.3.2 On/off-grid System Scenario

3.3.2.1 System Overview

The on/off-grid system must be connected to the utility grid through the **GRID** port of the inverter. When the grid is normal, the system operates in on-grid mode. When a grid fault occurs, the system automatically switches to off-grid mode. During off-grid operation, loads connected to the **GRID** port will lose power, while loads connected to the **BACKUP** port can continue operating normally.

On-/off-grid system: Loads can be connected to both the **GRID** port and the **BACKUP** port. The system supports both on-grid and off-grid operation, with automatic grid/off-grid switching performed by the inverter.



For details regarding the inverter's load carrying capacity, please contact SUNGROW.

Scenario	Single-inverter system configuration					
	PV module s	Battery	Smart meter	Logger 1000	Manual change over switch	Grid
Partial backup	○	●	●	●	✕	●
Plant-level backup	○	●	●	●	● ⁽¹⁾	●
Grid port retrofit / AC- coupled system	○	●	●	●	✕	●

Scenario	Multi-inverter system configuration					
	PV module s	Battery	Smart meter	Logger 1000	Manual change over switch	Grid
Partial backup – one backup port one load (≤24 units)	○	●	●	●	✕	●
Partial backup – all backup ports one	○	●	●	●	✕	●

Scenario	Multi-inverter system configuration					
	PV module s	Battery	Smart meter	Logger 1000	Manual change over switch	Grid
load (2 units)						
Plant-level backup (2 units)	○	●	●	●	● ⁽¹⁾	●
Grid port retrofit / AC- coupled system (2 units)	○	●	●	●	✕	●

● Required, ○ Optional, ✕ Not required

(1) The manual changeover switch shall be provided by the customer.

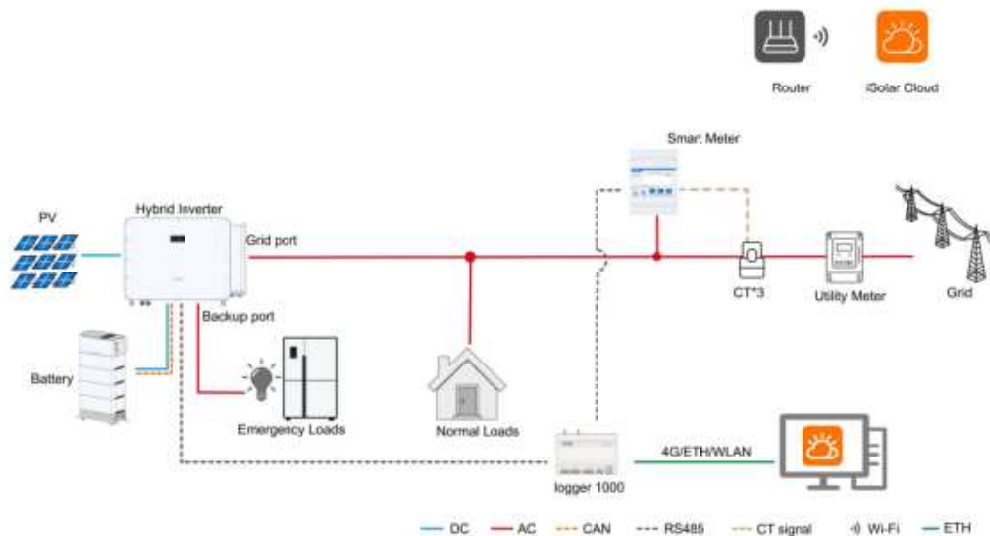
3.3.2.2 Single-inverter System

3.3.2.2.1 Partial backup

3.3.2.2.1.1 System configuration

The partial backup scenario is applicable to areas where the grid is unstable. In the event of a grid failure, the loads connected to the grid are no longer supplied with energy. A long-period grid outage may cause serious consequences to some key loads, such as emergency light, refrigerator, etc. A possible solution for bridging this supply gap is to connect the emergency loads to the **BACKUP** port on the hybrid inverter.

If a grid failure happens, the hybrid system will be disconnected from the utility grid. A backup grid then is created and the PV system can thus continue to supply power to the emergency loads connected to the **BACKUP** port.



Component	Model/Type	Quantity	Remarks
Hybrid inverter	SH110/125CX	1	Key component of the energy storage system.
Smart meter	Refer to 4.2.7 Meter Management	1	Refer to 4.2.7 Meter Management .
Current transformer (CT)	Determined based on grid connection point current.	3	- CT compatible with Smart meter is required. - CT specifications shall be determined based on grid connection point current.
Communication device	Logger1000 (COM100)	1	/
Terminal resistor	120 Ω	2	- When the smart meter communication cable exceeds 10m, a 120Ω resistor must be connected in parallel at the meter terminals. - When communication between the battery and the inverter, it is recommended to connect a 120Ω resistor in parallel at the CAN communication port of the battery farthest from the inverter.

Component	Model/Type	Quantity	Remarks
AC miniature circuit breaker (MCB): Grid port	320-400A/400V Type A ($I_{\max}$: 400A)	1 pcs for per hybrid inverter	- To be purchased by the customer. Select MCB with appropriate rated current based on actual needs, including wiring plan, number of loads, and inverter capacity. - The circuit breaker must be installed on both the grid port and the backup port of the hybrid inverter.
AC miniature circuit breaker (MCB): Backup port	250A/400V Type A ($I_{\max}$: 250A)	1 pcs for per hybrid inverter	
PV	/	/	Optional configuration; the hybrid inverter may operate without PV.
Battery	Refer to 4.2.6 Battery Management	/	Battery connection is strongly recommended; to be purchased separately.

3.3.2.2.1.2 System settings



It is recommended to use the local access of Logger1000 for system commissioning. For Logger1000 login, network configuration, plant creation, device addition, etc., please refer to [Logger1000 User Manual](#).

The corresponding sections in [Logger1000 User Manual](#) for parameter setting operations are listed in the table below:

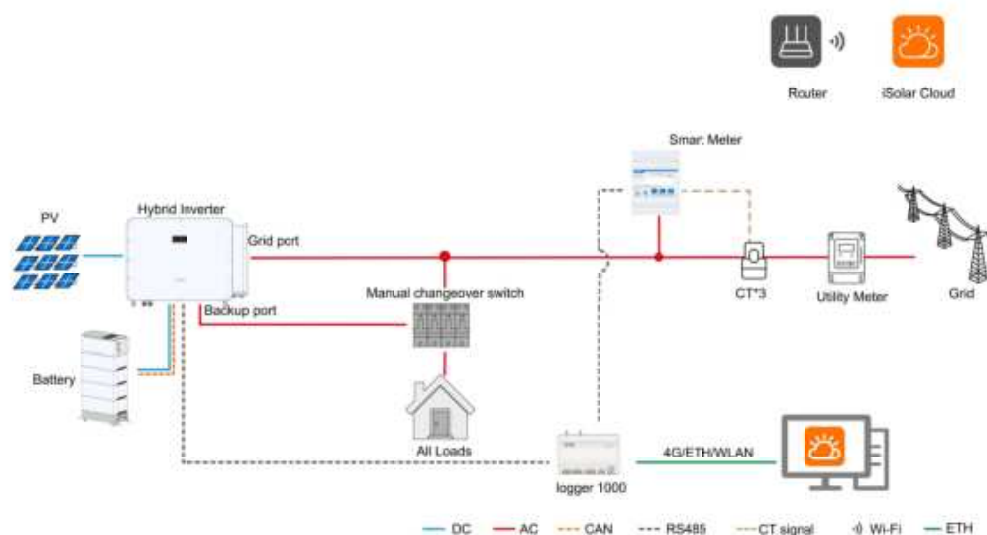
No.	Parameter setting	Reference section title
1	Set energy management mode	Select Energy Management Operating Mode
2	Enable Feed-in power limit: Total active power control or Per-phase active power control	Grid-Connected Power Control
3	Set Feed-in power limit parameters	
4	Set Purchase energy with limited power	
5	Enable Off-grid mode	System Power Backup
6	Set Backup SOC for off-grid operation	

No.	Parameter setting	Reference section title
7	Set CT transformation ratio	- Add meter: Adding a Meter - Setting CT transformation ratio: Configuring Parameters for Meter

3.3.2.2.2 Plant-level backup

3.3.2.2.2.1 System configuration

In this scenario, all plant loads are connected to the hybrid inverter's **BACKUP** port via a manual changeover switch. When the inverter requires maintenance, the power supply can be switched from the backup port to the grid through the manual changeover switch, ensuring uninterrupted power supply to the plant-level loads.



Component	Model/Type	Quantity	Remarks
Hybrid inverter	SH/110/125CX	1	Key component of the energy storage system.
Smart meter	Refer to 4.2.7 Meter Management	1	Refer to 4.2.7 Meter Management .
Current transformer (CT)	Determined based on grid connection point current.	3	- CT compatible with Smart meter is required. - CT specifications shall be determined based on grid connection point current.

Component	Model/Type	Quantity	Remarks
Communication device	Logger1000 (COM100)	1	/
Terminal resistor	120 Ω	2	- When the smart meter communication cable exceeds 10m, a 120Ω resistor must be connected in parallel at the meter terminals. - When communication between the battery and the inverter, it is recommended to connect a 120Ω resistor in parallel at the CAN communication port of the battery farthest from the inverter.
Manual changeover switch ⁽¹⁾	320~400A/400V	1	- To be purchased by the customer. Used for plant-level backup. - Switch the power supply for all loads from the inverter to the grid when the inverter requires maintenance.
AC miniature circuit breaker (MCB): Grid port	320-400A/400V Type A (I_{max} : 400A)	1 pcs for per hybrid inverter	To be purchased by the customer. Select MCB with appropriate rated current based on actual needs, including wiring plan, number of loads, and inverter capacity.
AC miniature circuit breaker (MCB): Backup port	250A/400V Type A (I_{max} : 250A)	1 pcs for per hybrid inverter	The circuit breaker must be installed on both the grid port and the backup port of the hybrid inverter.
PV	/	/	Optional configuration; the hybrid inverter may operate without PV.
Battery	Refer to 4.2.6 Battery Management	/	Battery connection is strongly recommended; to be purchased separately.

(1) The manual changeover switch should be 4-pole single-pole double-throw type, to be purchased by the customer

3.3.2.2.2 System settings

The parameter settings for the single-inverter system in a plant-level backup scenario are the same as those for the single-inverter system in a Partial backup scenario. Refer to [3.3.2.2.1.2 System settings](#).

3.3.2.2.3 Grid Port Retrofit/AC Coupling

3.3.2.2.3.1 System configuration

If a three-phase PV inverter has already been installed in the existing system, the system can be upgraded to a PV & storage system by adding hybrid inverters and batteries. The energy storage system maximizes the utilization of PV generation, increases the self-consumption rate, and reduces electricity costs.

Grid port retrofit refers to paralleling the AC terminals of the existing PV inverter with the **GRID** port of the hybrid inverter, as shown in the figures below.

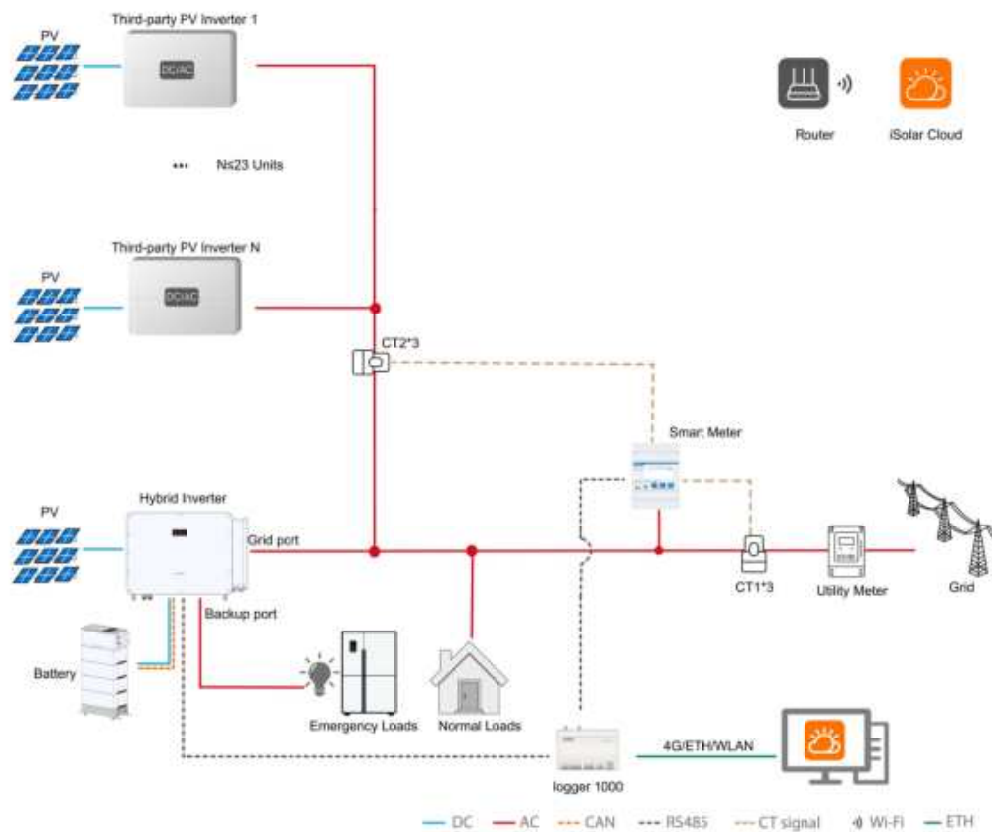


Figure 3-1 Grid Port Retrofit (Third-Party PV Inverter)

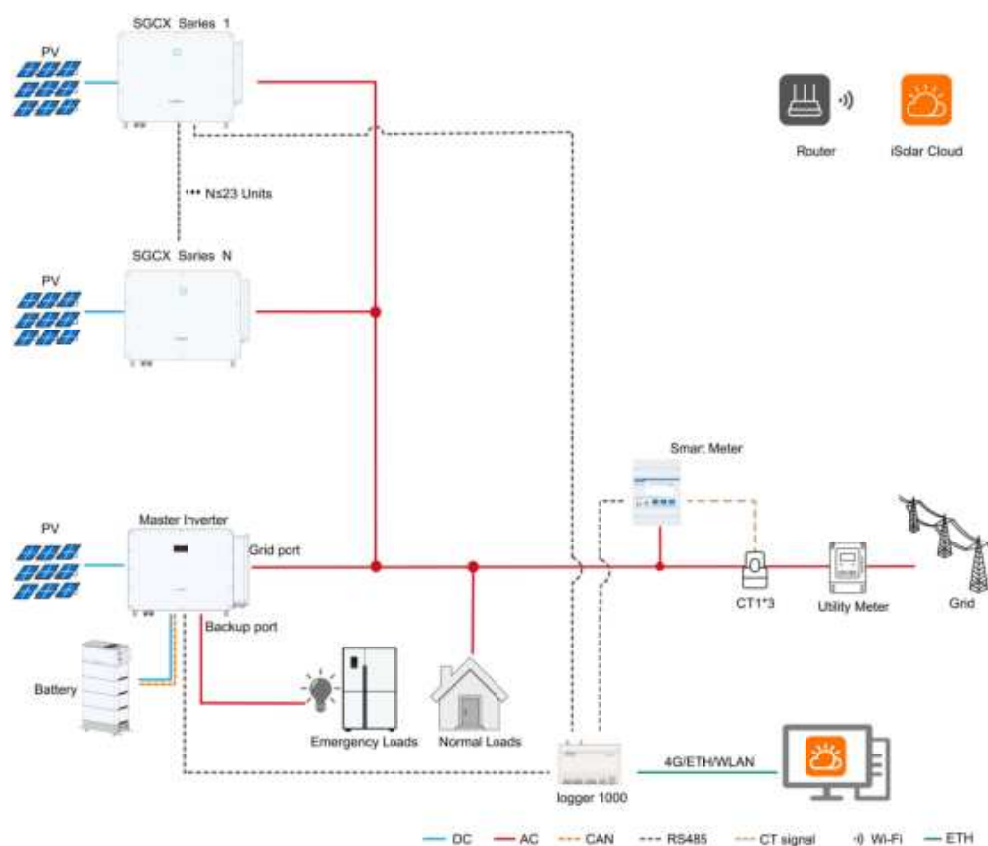


Figure 3-2 Grid Port Retrofit (Sungrow PV Inverter)

Component	Model/Type	Quantity	Remarks
Hybrid inverter	SH110/125C X	1	Key component of the energy storage system.
PV inverter	- Sungrow: SG50CX/ SG110X/ SG50CX-P2/ SG110CX-P2/ SG125CX-P2 - Third-party PV inverter	≤23	Sungrow PV inverters and third-party PV inverters must not be mixed in the same system
Smart meter ⁽¹⁾	Refer to 4.2.7 Meter Management	1	Refer to 4.2.7 Meter Management .
Current transformer (CT)	Determined by grid	Sungrow PV	CT compatible with Smart meter is required.

Component	Model/Type	Quantity	Remarks
	connection point current	inverter (SGCX):3 • Third-party PV inverter :6 ⁽²⁾	- For third-party PV inverter system, the specifications of CT2 should be determined by current at PV inverter parallel point. - For third-party PV inverter system, the specifications of CT1 and CT2 shall be consistent.
Communication device	Logger1000 (COM100)	1	/
Terminal resistor	120 Ω	2	- When the smart meter communication cable exceeds 10m, a 120Ω resistor must be connected in parallel at the meter terminals. - When communication between the battery and the inverter, it is recommended to connect a 120Ω resistor in parallel at the CAN communication port of the battery farthest from the inverter.
AC miniature circuit breaker (MCB): Grid port	320-400A/ 400V Type A (I _{max} : 400A)	1 pcs for per hybrid inverter	- To be purchased by the customer. Select MCB with appropriate rated current based on actual needs, including wiring plan, number of loads, and inverter capacity. - The circuit breaker must be installed on both the grid port and the backup port of the hybrid inverter.
AC miniature circuit breaker (MCB): Backup port	250A/ 400V Type A (I _{max} : 250A)	1 pcs for per hybrid inverter	
PV	/	/	Optional configuration; the hybrid inverter may operate without PV.

Component	Model/Type	Quantity	Remarks
Battery	Refer to 4.2.6 Battery Management	/	Battery connection is strongly recommended; to be purchased separately.

(1) When using third-party PV inverter, the dual-channel smart meter DTSU666-20 is required.

(2) For third-party PV inverter system, 6 CTs are required, with CT2 connected to the parallel point of the PV inverters.

3.3.2.2.3.2 System settings



It is recommended to use the local access of Logger1000 for system commissioning. For Logger1000 login, network configuration, plant creation, device addition, etc., please refer to [Logger1000 User Manual](#).

The corresponding sections in [Logger1000 User Manual](#) for parameter setting operations are listed in the table below:

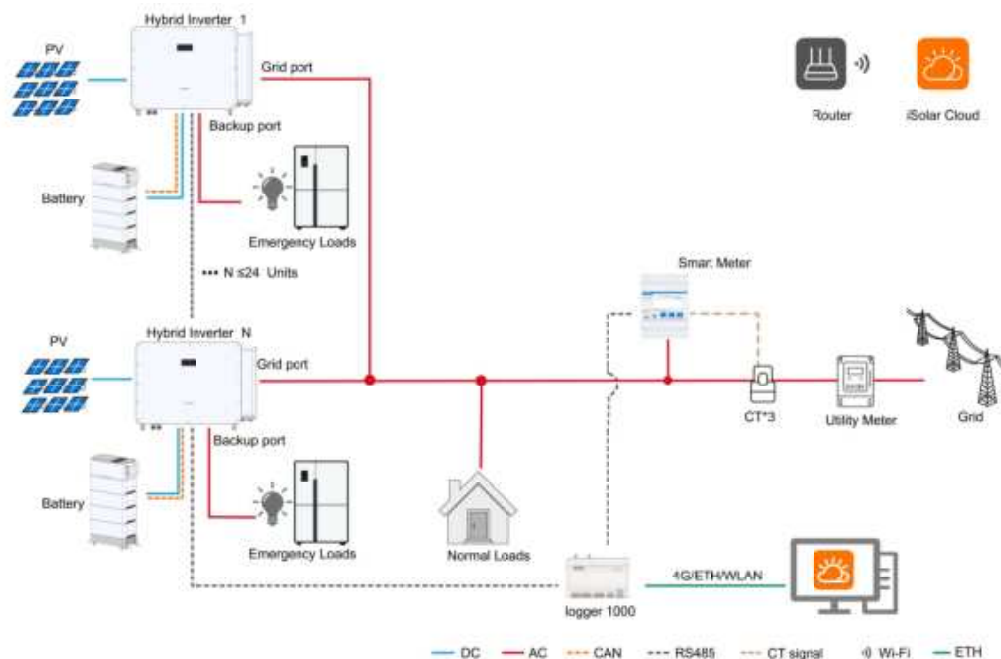
No.	Parameter setting	Reference section title
1	Set energy management mode	Select Energy Management Operating Mode
2	Enable Feed-in power limit: Total active power control or Per-phase active power control	Grid-Connected Power Control
3	Set Feed-in power limit parameters	
4	For third-party retrofit systems, set Third-party power generation system	
5	Set Purchase energy with limited power	
6	Enable Off-grid mode	System Power Backup
7	Set Backup SOC for off-grid operation	
8	Set CT transformation ratio	- Add meter: Adding a Meter - Setting CT transformation ratio: Configuring Parameters for Meter

3.3.2.3 Multi-inverter System

3.3.2.3.1 Partial backup(one backup port one load ≤24 units)

3.3.2.3.1.1 System configuration

One backup port one load refers to a configuration in which the **GRID** ports of the hybrid inverters are connected in parallel to the utility grid, while the **BACKUP** ports are independently connected to emergency loads.



Component	Model/Type	Quantity	Remarks
Hybrid inverter	SH110/125CX	≤24	- Key component of the energy storage system. - Different inverter models can be connected in parallel.
Smart meter	Refer to 4.2.7 Meter Management	1	Refer to 4.2.7 Meter Management .
Current transformer (CT) or Rogowski coil	Determined based on grid connection point current.	3	- CT compatible or Rogowski coil with Smart meter is required. - CT specifications shall be determined based on grid connection point current.
Communication device	Logger1000 (COM100)	1	/

Component	Model/Type	Quantity	Remarks
Terminal resistor	120 Ω	2	- When the smart meter communication cable exceeds 10m, a 120Ω resistor must be connected in parallel at the meter terminals. - When communication between the battery and the inverter, it is recommended to connect a 120Ω resistor in parallel at the CAN communication port of the battery farthest from the inverter.
AC miniature circuit breaker (MCB): Grid port	320-400A/400V Type A (I_{max} : 400A)	1 pcs for per hybrid inverter	To be purchased by the customer. Select MCB with appropriate rated current based on actual needs, including wiring plan, number of loads, and inverter capacity.
AC miniature circuit breaker (MCB): Backup port	250A/400V Type A (I_{max} : 250A)	1 pcs for per hybrid inverter	The circuit breaker must be installed on both the grid port and the backup port of the hybrid inverter.
PV	/	/	Optional configuration; the hybrid inverter may operate without PV.
Battery	Refer to 4.2.6 Battery Management	/	Battery connection is strongly recommended; to be purchased separately.

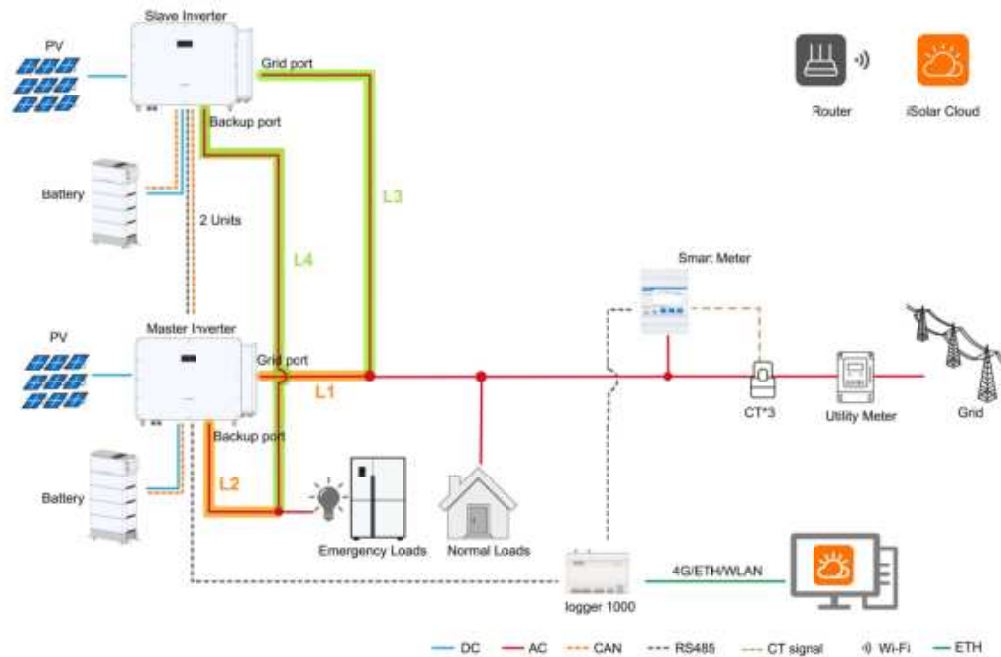
3.3.2.3.1.2 System settings

The parameter settings for the multi-inverter system in a Partial backup scenario are the same as those for the single-inverter system in a Partial backup scenario. Refer to [3.3.2.2.1.2 System settings](#).

3.3.2.3.2 Partial backup (all backup ports one load, 2 units)

3.3.2.3.2.1 System configuration

All backup ports one load refers to a configuration in which the **grid** ports of the hybrid inverter are connected in parallel to the utility grid, while the **backup** ports are paralleled and connected to critical emergency loads. By paralleling the backup ports, more emergency loads can be connected, improving the system's self-consumption rate.



The total length of AC cable from the inverter's grid/backup port to the busbar for each inverter is recommended to be the same ($L1+L2=L3+L4$).

Component	Model/Type	Quantity	Remarks
Hybrid inverter	SH110/125CX	2	- Key component of the energy storage system. - Paralleled hybrid inverters must be of the same model.
Smart meter	Refer to 4.2.7 Meter Management	1	Refer to 4.2.7 Meter Management .
Current transformer (CT)	Determined based on grid connection point current.	3	- CT compatible with Smart meter is required. - CT specifications shall be determined based on grid connection point current.
Communication device	Logger1000 (COM100)	1	/
Terminal resistor	120 Ω	2	When the smart meter communication cable exceeds 10m, a 120Ω resistor must be connected in parallel at the meter terminals.

Component	Model/Type	Quantity	Remarks
			When communication between the battery and the inverter, it is recommended to connect a 120Ω resistor in parallel at the CAN communication port of the battery farthest from the inverter.
AC miniature circuit breaker (MCB): Grid port	320-400A/400V Type A (I _{max} : 400A)	1 pcs for per hybrid inverter	- To be purchased by the customer. Select MCB with appropriate rated current based on actual needs, including wiring plan, number of loads, and inverter capacity. - The circuit breaker must be installed on both the grid port and the backup port of the hybrid inverter.
AC miniature circuit breaker (MCB): Backup port	250A/400V Type A (I _{max} : 250A)	1 pcs for per hybrid inverter	
PV	/	/	Optional configuration; the hybrid inverter may operate without PV.
Battery ⁽¹⁾	Refer to 4.2.6 Battery Management	/	Battery connection is strongly recommended; to be purchased separately.

(1) In this scenario, the battery capacity configured for each inverter must be consistent.

3.3.2.3.2.2 System settings



It is recommended to use the local access of Logger1000 for system commissioning. For Logger1000 login, network configuration, plant creation, device addition, etc., please refer to [Logger1000 User Manual](#).

The corresponding sections in [Logger1000 User Manual](#) for parameter setting operations are listed in the table below:

No.	Parameter setting	Reference section title
1	Enable Master-slave operating mode and set master-slave parameters	Configuring Parameters for Inverters
2	Set energy management mode	Select Energy Management Operating Mode

No.	Parameter setting	Reference section title
3	Enable Feed-in power limit: Total active power control or Per-phase active power control	Grid-Connected Power Control
4	Set Feed-in power limit parameters	
5	Set Purchase energy with limited power	
6	Enable Off-grid mode	System Power Backup
7	Set Backup SOC for off-grid operation	
8	Set CT transformation ratio	• Add meter: Adding a Meter • Setting CT transformation ratio: Configuring Parameters for Meter

3.3.2.3.3 Plant-level backup (all backup ports one load, 2 units)

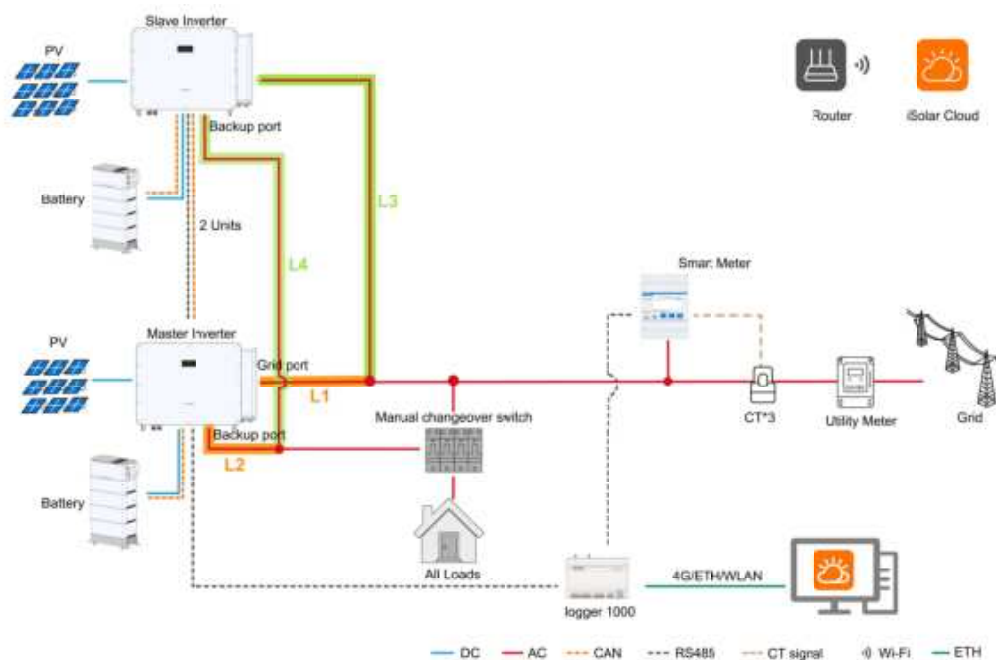
3.3.2.3.3.1 System configuration

In this scenario, all plant loads are connected to the hybrid inverter's **BACKUP** port via a manual changeover switch. When the inverter requires maintenance, the power supply can be switched from the backup port to the grid through the manual changeover switch, ensuring uninterrupted power supply to the plant-level loads.

In this scenario, the **BACKUP** ports of 2 hybrid inverters of the same model can be connected in parallel.



- The total power of connected loads must not exceed the inverter's maximum backup output capacity.
- For details regarding the inverter's load carrying capacity, please contact SUNGROW.



The total length of AC cable from the inverter's grid/backup port to the busbar for each inverter is recommended to be the same ($L1+L2=L3+L4$).

Component	Model/Type	Quantity	Remarks
Hybrid inverter	SH110/125C X	2	- Key component of the energy storage system. - Paralleled hybrid inverters must be of the same model.
Smart meter	Refer to 4.2.7 Meter Management	1	Refer to 4.2.7 Meter Management .
Current transformer (CT)	Determined based on grid connection point current.	3	- CT compatible with Smart meter is required. - CT specifications shall be determined based on grid connection point current.
Communication device	Logger1000 (COM100)	1	/
Terminal resistor	120 Ω	2	When the smart meter communication cable exceeds 10m, a 120Ω resistor must be connected in parallel at the meter terminals.

Component	Model/Type	Quantity	Remarks
			When communication between the battery and the inverter, it is recommended to connect a 120Ω resistor in parallel at the CAN communication port of the battery farthest from the inverter.
Manual changeover switch	640~800A/ 400V	1	- To be purchased by the customer. Used for plant-level backup. - Switch the power supply for all loads from the inverter to the grid when the inverter requires maintenance.
AC miniature circuit breaker (MCB): Grid port	320~400A/ 400V Type A (I _{max} : 400A)	1 pcs for per hybrid inverter	- To be purchased by the customer. Select MCB with appropriate rated current based on actual needs, including wiring plan, number of loads, and inverter capacity. - The circuit breaker must be installed on both the grid port and the backup port of the hybrid inverter.
AC miniature circuit breaker (MCB): Backup port	250A/ 400V Type A (I _{max} : 250A)	1 pcs for per hybrid inverter	
PV	/	/	Optional configuration; the hybrid inverter may operate without PV.
Battery ⁽¹⁾	Refer to 4.2.6 Battery Management	/	Battery connection is strongly recommended; to be purchased separately.

(1) In this scenario, the battery capacity configured for each inverter must be consistent.

3.3.2.3.3.2 System settings

The parameter settings for the multi-inverter system in a Plant-level backup scenario are the same as those for the multi-inverter system in a Partial backup (all backup ports one load, 2 units) scenario. Refer to [3.3.2.3.2.2 System settings](#).

3.3.2.3.4 Grid Port Retrofit/AC Coupling

3.3.2.3.4.1 System configuration

If a three-phase PV inverter has already been installed in the existing system, the system can be upgraded to a PV & storage system by adding hybrid inverters and batteries. The energy storage system maximizes the utilization of PV generation, increases the self-consumption rate, and reduces electricity costs.

Grid port retrofit refers to paralleling the AC terminals of the existing PV inverter with the **GRID** port of the hybrid inverter, while the backup ports of two hybrid inverters of the same model are connected in parallel, as shown in the figures below.

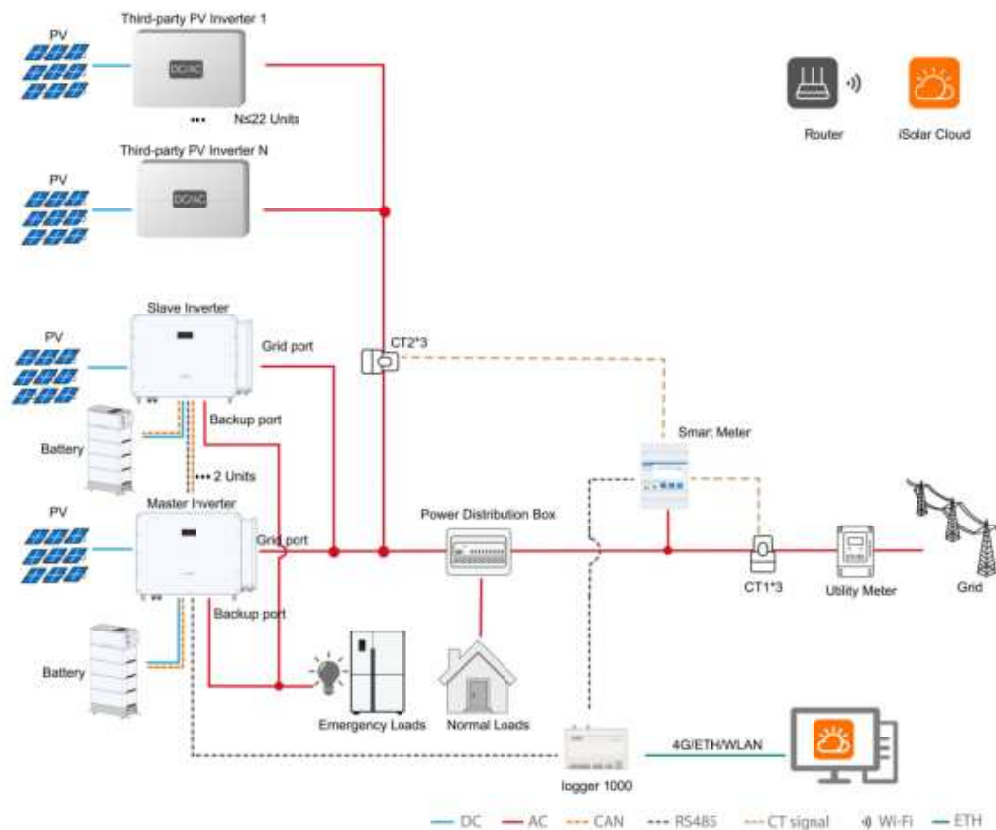


Figure 3-3 Grid Port Retrofit (Third-Party PV Inverter)

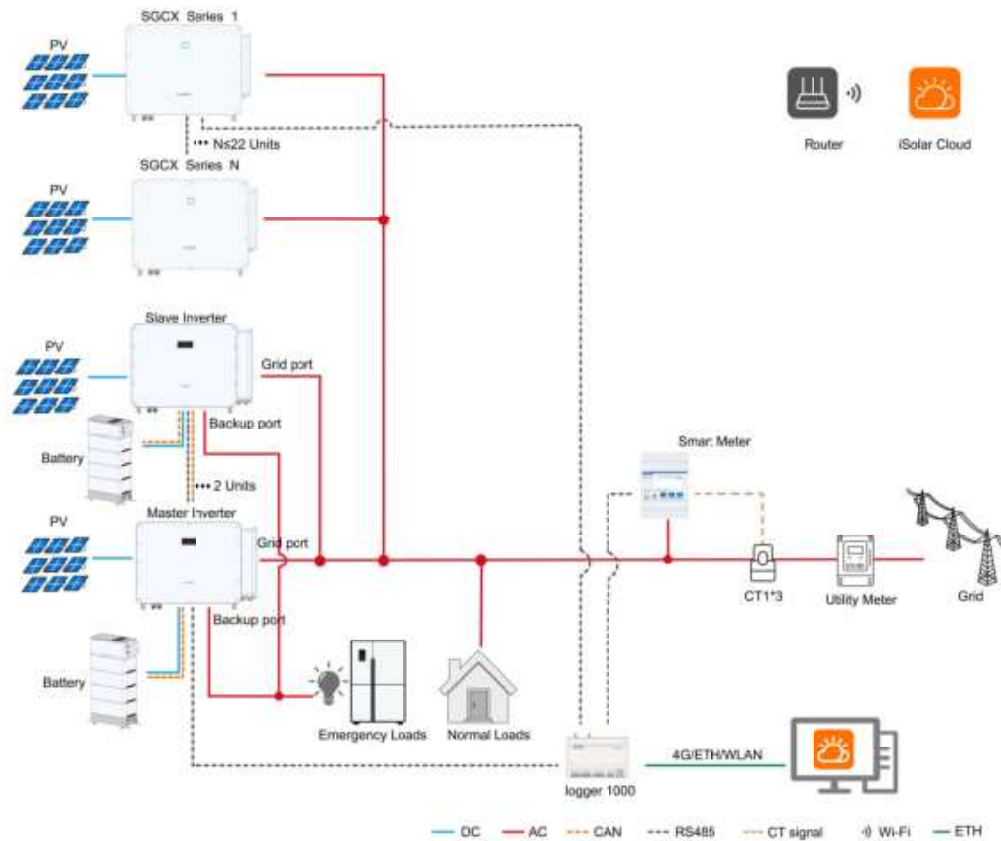


Figure 3-4 Grid Port Retrofit (Sungrow PV Inverter)

Component	Model/Type	Quantity	Remarks
Hybrid inverter	SH/110/125CX	2	- Key component of the energy storage system. - Paralleled hybrid inverters must be of the same model.
PV inverter	- Sungrow: SG50CX/ SG110X/ SG50CX-P2/ SG110CX-P2/ SG125CX-P2 - Third-party PV inverter	≤22	Sungrow PV inverters and third-party PV inverters must not be mixed in the same system
Smart meter ⁽¹⁾	Refer to 4.2.7 Meter Management	1	Refer to 4.2.7 Meter Management .

Component	Model/Type	Quantity	Remarks
Current transformer (CT1)	Determined by grid connection point current	3	- CT compatible with Smart meter is required. - CT specifications shall be determined based on grid connection point current.
Current transformer (CT2)	Determined by grid connection point current	3	- Required only when connecting third-party PV inverters, the specifications of CT1 and CT2 shall be consistent and selected based on the grid connection point current. - CT compatible with Smart meter is required.
Communication device	Logger1000 (COM100)	1	/
Terminal resistor	120 Ω	2	- When the smart meter communication cable exceeds 10m, a 120Ω resistor must be connected in parallel at the meter terminals. - When communication between the battery and the inverter, it is recommended to connect a 120Ω resistor in parallel at the CAN communication port of the battery farthest from the inverter.
AC miniature circuit breaker (MCB): Grid port	320-400A/400V Type A (I_{max} : 400A)	1 pcs for per hybrid inverter	- To be purchased by the customer. Select MCB with appropriate rated current based on actual needs, including wiring plan, number of loads, and inverter capacity. - The circuit breaker must be installed on both the grid port and the backup port of the hybrid inverter.
AC miniature circuit breaker (MCB): Backup port	250A/400V Type A (I_{max} : 250A)	1 pcs for per hybrid inverter	
PV	/	/	Optional configuration; the hybrid inverter may operate without PV.

Component	Model/Type	Quantity	Remarks
Battery	Refer to 4.2.6 Battery Management	/	Battery connection is strongly recommended; to be purchased separately.

(1) When using third-party PV inverter, the dual-channel smart meter DTSU666-20 is required.

3.3.2.3.4.2 System settings



It is recommended to use the local access of Logger1000 for system commissioning. For Logger1000 login, network configuration, plant creation, device addition, etc., please refer to [Logger1000 User Manual](#).

The corresponding sections in [Logger1000 User Manual](#) for parameter setting operations are listed in the table below:

No.	Parameter setting	Reference section title
1	Enable Master-slave operating mode and set master-slave parameters	Configuring Parameters for Inverters
2	Set energy management mode	Select Energy Management Operating Mode
3	Enable Feed-in power limit: Total active power control or Per-phase active power control	Grid-Connected Power Control
4	Set Feed-in power limit parameters	
5	For third-party retrofit systems, set Third-party power generation system	
6	Set Purchase energy with limited power	System Power Backup
7	Enable Off-grid mode	
8	Set Backup SOC for off-grid operation	
9	Set CT transformation ratio	- Add meter: Adding a Meter - Setting CT transformation ratio: Configuring Parameters for Meter

3.3.3 Pure Off-grid System Scenario

3.3.3.1 System Overview

A pure off-grid system is not connected to the utility grid and does not connect to a generator. All loads must be connected to the **BACKUP** port of the hybrid inverter. This configuration is mainly used for all backup ports one load scenarios.

Pure off-grid system: All loads are connected to the **BACKUP** port. The system is not connected to the utility grid and operates only in off-grid mode.

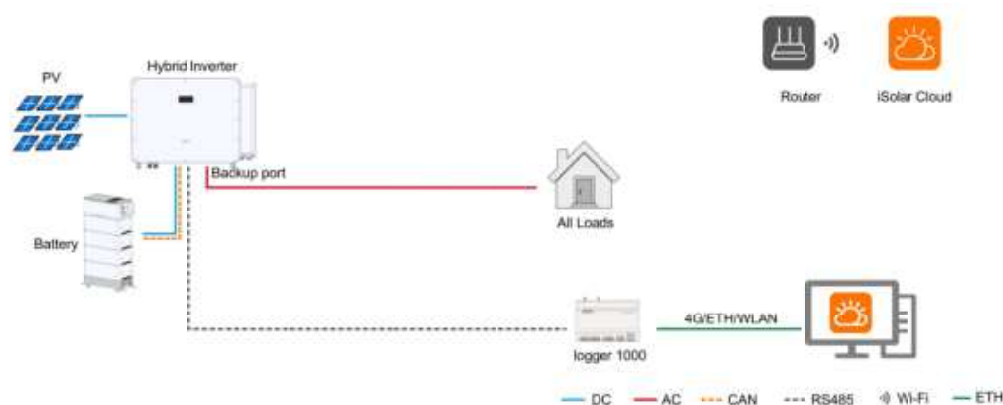
For details regarding the inverter's load carrying capacity, please contact **SUNGROW**.

Scenario	Single-inverter/Multi-inverter System configuration					
	PV module s	Battery	Smart meter	Logger 1000	Manual change over switch	Grid
Pure off-grid system	●	●	✕	●	✕	✕

● Required, ✕ Not required

3.3.3.2 Single-inverter System

3.3.3.2.1 System Configuration



Component	Model/Type	Quantity	Remarks
Hybrid inverter	SH110/125CX	1	Key component of the energy storage system.

Component	Model/Type	Quantity	Remarks
Communication device	Logger1000 (COM100)	1	/
Terminal resistor	120 Ω	1	When communication distance between the battery and the inverter, it is recommended to connect a 120 Ω resistor in parallel at the CAN communication port of the battery farthest from the inverter.
AC miniature circuit breaker (MCB): Backup port	250A/ 400V, Type A (I_{max} : 250A)	1 pcs for per inverter	- To be purchased by the customer. Select MCB with appropriate specifications based on actual needs, including wiring plan, number of loads, and inverter capacity. - The circuit breaker must be installed on the grid port of each hybrid inverter.
PV	/	/	Must be configured and prepared by the customer
Battery	Refer to 4.2.6 Battery Management	/	The battery must be connected and purchased separately.

3.3.3.2.2 System Settings



It is recommended to use the local access of Logger1000 for system commissioning. For Logger1000 login, network configuration, plant creation, device addition, etc., please refer to [Logger1000 User Manual](#).

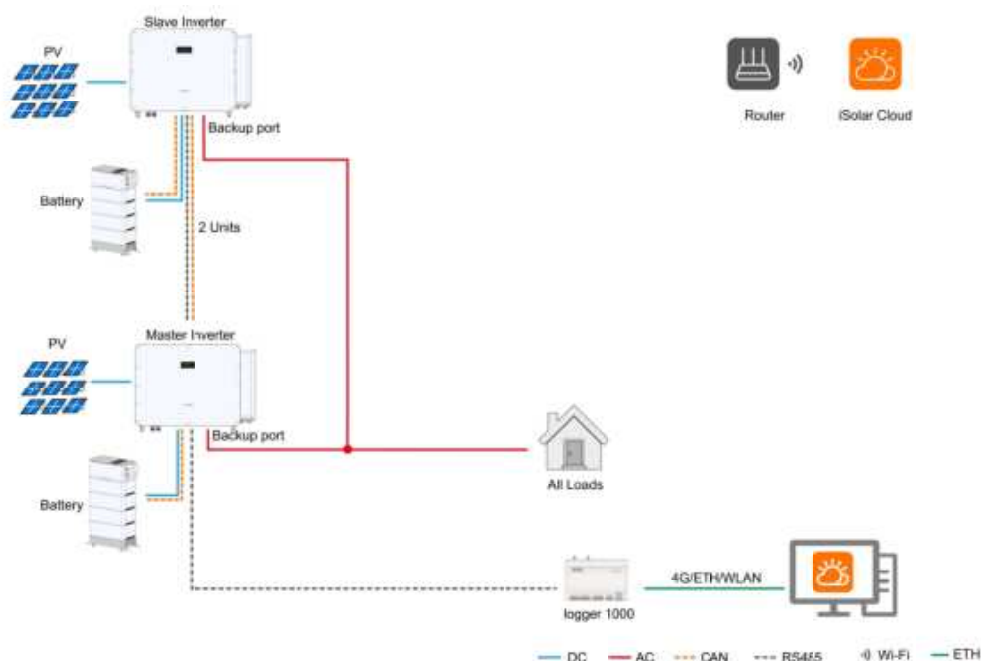
The corresponding sections in [Logger1000 User Manual](#) for parameter setting operations are listed in the table below:

No.	Parameter setting	Reference section title
1	Enable Off-grid mode	System Power Backup
2	Enable Off-grid emergency charging and set Target SOC of off-grid emergency charging	Configuring Parameters for Inverters

3.3.3.3 Multi-inverter System

3.3.3.3.1 System Configuration

The backup ports of two hybrid inverters of the same model can be connected in parallel.



Component	Model/Type	Quantity	Remarks
Hybrid inverter	SH110/125CX	2	- Key component of the energy storage system. - Paralleled hybrid inverters must be of the same model.
Communication device	Logger1000 (COM100)	1	/
Terminal resistor	120 Ω	1	When communication distance between the battery and the inverter, it is recommended to connect a 120Ω resistor in parallel at the CAN communication port of the battery farthest from the inverter.
AC miniature circuit breaker (MCB): Backup port	250A/ 400V, Type A (I _{max} : 250A)	1 pcs for per inverter	To be purchased by the customer. Select MCB with appropriate specifications based on actual needs, including wiring plan, number of loads, and inverter capacity.

Component	Model/Type	Quantity	Remarks
			The circuit breaker must be installed on the grid port of each hybrid inverter.
PV	/	/	Must be configured and prepared by the customer
Battery	Refer to 4.2.6 Battery Management	/	The battery must be connected and purchased separately.

3.3.3.3.2 System Settings



It is recommended to use the local access of Logger1000 for system commissioning. For Logger1000 login, network configuration, plant creation, device addition, etc., please refer to [Logger1000 User Manual](#).

The corresponding sections in [Logger1000 User Manual](#) for parameter setting operations are listed in the table below:

No.	Parameter setting	Reference section title
1	Enable Master-slave operating mode and set master-slave parameters	Configuring Parameters for Inverters
2	Enable Off-grid mode	System Power Backup
3	Enable Off-grid emergency charging and set Target SOC of off-grid emergency charging	Configuring Parameters for Inverters

3.3.4 Third-party Dispatching

In some countries, grid companies need to manage available energy to meet continuously changing supply and demand requirements and to maintain grid stability. Therefore, they need to communicate with hybrid inverters for external dispatch, such as frequency control or charge/discharge control.

- Third-party dispatching can be implemented when the system is operating in on-grid mode. Please contact Sungrow to obtain the API interface and access authorization, and complete interface debugging with the local company to ensure that performance and functions meet requirements. Control commands can then be transmitted via the iSolarCloud API service.
- If third-party IoT devices are used, Modbus protocol debugging shall be completed first.

4 Function Description

4.1 Safety Function

4.1.1 Protection

The inverter integrates a variety of protection features, including short circuit protection, ground insulation resistance monitoring, residual current protection, anti-islanding protection, DC overvoltage, DC overcurrent protection, etc.

4.1.2 Grounding Fault Alarm

The inverter has integrated a multiple-function dry-contact (DO relay), which can be used for the external alarm for earth fault. The external alarm needs to be powered by the grid. The additional equipment required is a light indicator. If an earth fault occurs:

- The DO dry contact will automatically activate and send a grounding fault alarm signal.
- The grounding fault alarm signal will be uploaded.

4.2 Energy Conversion and Management

The inverter converts DC power from PV arrays or batteries to AC power per grid requirements, and transfers DC power from PV panels to batteries.

With its integrated bidirectional converter, the inverter can charge/discharge batteries.

Multiple MPPT trackers maximize power output from PV strings with different orientations, tilt angles or module configurations.

4.2.1 Power Derating

Power derating protects the inverter from overload or potential faults. Power derating is activated based on grid requirements.

4.2.2 Normal Operating Voltage Range

The inverter can operate within the permitted voltage range for at least the specified observation time. Settings depend on the type of grid connection, such as normal startup or automatic reconnection after going off-grid.

If the voltage exceeds the operating or protection threshold, the inverter will disconnect from the grid within the specified time. If the disturbance duration exceeds the protective trip time, the inverter will automatically reconnect when voltage returns to normal.

4.2.3 Normal Operating Frequency Range

The inverter can operate continuously within its frequency range for at least the specified observation time. Settings depend on the type of grid connection, such as normal startup or automatic reconnection after going off-grid.

When frequency exceeds operating and protection thresholds, the inverter will disconnect from the grid. If the disturbance duration exceeds the protective trip time, the inverter will automatically reconnect after the frequency returns to a normal level.

4.2.4 Reactive Power Regulation

The inverter is capable of operating in reactive power regulation mode to support the grid. The reactive power regulation mode can be configured via the iSolarCloud App.

4.2.5 Load Control

The inverter integrates a multifunctional dry contact (DO relay) for load control via contactors. Control modes are user-configurable:

4.2.6 Battery Management

The currently supported battery brands and models are shown in the following table.

Inverter Model	Battery	
	Brand	Model
SH110/125C X	SUNGROW	ST050CF / ST100CF / ST150CF / ST200CF / ST250CF
		ST050CF / ST062CF / ST075CF / ST087CF / ST100CF / ST112CF / ST125CF / ST137CF / ST150CF / ST162CF / ST175CF / ST187CF / ST200CF / ST212CF / ST225CF / ST237CF / ST250CF



- The table is continually updated. If the battery model is not in the table, consult SUNGROW if it is supported.
- When the connected battery capacity is less than 100 kWh, the system must be configured with PV.

4.2.7 Meter Management

The currently supported meter brands and models are shown in the following table.

Inverter Model	Meter	
	Brand	Model
SH110/125CX	SUNGROW	DTSU666-20
	Weidmuller	EM610
	Acrel	DTSD1352
	Janitza	UMG604
	SUNGROW	DTSU666
	Jiangsu SFERE	PD194E/Z
	Acrel	PZ96-E3
	Schneider	IEM3255
	Janitza	UMG104



- The table is continually updated. If the meter model is not in the table, consult SUNGROW if it is supported.
- For details on using the meter, refer to section "Connecting to the Energy Meter" in the [Logger1000 User Manual](#).

4.3 Communication and Configuration

The inverter has various ports for device and system monitoring, including RS485, Bluetooth and CAN. Configure parameters for optimal performance. Inverter information can be accessed via the iSolarCloud App.

5 Unpacking and Storage

5.1 Unpacking and Inspection

The product has undergone strict tests and inspections before delivery. However, as it may still get damaged during transportation, please carry out a thorough inspection before signing the delivery receipt.

- Inspect the packaging for any damages.
- Check the delivered items for quantity and see if the delivery matches the order placed according to the packing list.
- Unpack and inspect the items inside for any damages.

Contact the transport company or SUNGROW in case of any damages or missing items, and provide relevant photos or the name/quantity of the missing items for better services.

Do not throw away the original packaging box. It is recommended to store the device in its original packaging after it is decommissioned.

NOTICE

- **Inspect the product for any external damages or damages to the structural parts, and check if the packing list matches the order placed. In case of any problem with the above-mentioned inspection items, do not install the device and contact SUNGROW in time.**
- **If any tool is used for unpacking, be careful not to damage the product.**

5.2 Scope of Delivery



No.	Item	Quantity
A	Inverter	1
B	Mounting bracket	1
C	Bracket connecting plate	1
D	M4 × 10 screw	4
E	M10 screw	4
F	M6×65 screw	2
G	PV connector	20
H	PV terminal assembly/ disassembly tool	1
I	L-shaped wrench	1
J	M6×20 screw	1
K	4-hole waterproof seal	2
L	Battery Connector	1
M	Carrying handle	3

No.	Item	Quantity
N	Cable entry plate	1
O	Magnetic ring	2
P	Document	1



The figure shown here is for illustration only and the real product may differ.

5.3 Inverter Storage

Proper storage is required if the inverter is not installed immediately.

- Store the inverter in the original packing case with the desiccant inside.
- The storage temperature must be always between -40°C and $+70^{\circ}\text{C}$, and the storage relative humidity must be always between 0 and 95 %, non-condensing.
- In case of stacking storage, the number of stacking layers should never exceed the limit marked on the outer side of the packing case.
- The packing case should be upright.
- If the inverter needs to be transported again, pack it strictly before loading and transporting it.
- Do not store the inverter in places susceptible to direct sunlight, rain, and strong electric field.
- Do not place the inverter in places with items that may affect or damage the inverter.
- Store the inverter in a clean and dry place to prevent dust and water vapor from eroding.
- Do not store the inverter in places with corrosive substances or susceptible to rodents and insects.
- Carry out periodic inspections. Inspection shall be conducted at least once every six months. If any insect or rodent bites are found, replace the packaging materials in time.
- If the inverter has been stored for one year or longer, or has been mounted but remains non-operational for more than three months, it must be inspected and tested by qualified personnel before being put into operation.

NOTICE

Please store the inverter according to the storage requirements. Product damage caused by failure to meet the storage requirements is not covered by the warranty.

6 Mechanical Mounting

WARNING

Respect all local standards and requirements during mechanical installation.

6.1 Installation Precautions

DANGER

Make sure there is no electrical connection before installation.

WARNING

Poor installation environment will affect system performance. Refer to [6.2.1 Installation Environment Requirements](#) for detailed environmental requirements. SUNGROW shall not be held liable for any property damage caused by non-compliant installation environments.

CAUTION

Improper installation may cause personal injury!

- When moving the inverter, be aware of its weight and keep the balance to prevent it from tilting or falling.
- Wear proper protective equipment before performing operations on the inverter.
- The bottom terminals and interfaces of the inverter cannot directly contact the ground or other supports. The inverter cannot be directly placed on the ground.

NOTICE

Ensure that no device in the system causes it hard to disconnect the DC switch and the AC circuit breaker during the installation.

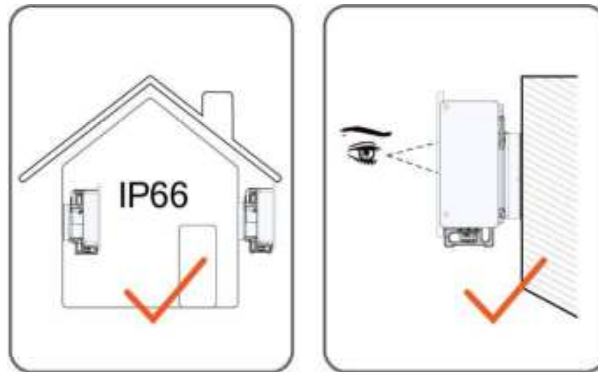
If drilling is required during installation:

- Wear goggles and safety gloves.
- Avoid the water pipes and electrical wires inside the wall when drilling.
- Cover the product to protect it from ingress of debris and dust.

6.2 Installation Site Selection

A good location is critical to the safe operation, long service life, and good performance of the inverter

- The inverter has an IP66 protection rating and can be installed indoors or outdoors.
- The installation height of the inverter should allow for clear visibility of the LED indicator panel and facilitate electrical connections, operation, and maintenance.



6.2.1 Installation Environment Requirements

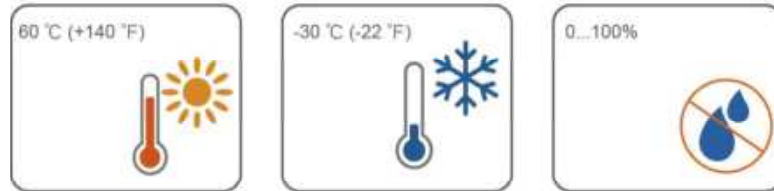


- The inverter produces noise during operation, thus it is not recommended to install it in places for residential purposes. If this cannot be avoided, it is recommended to install the inverter in a place over 25 meters away from the residential area, or take noise mitigation measures.
- If the inverter is installed in a place with lush vegetation, weed on a regular basis. In addition, the ground beneath the inverter needs to undergo certain treatment, such as laying cement or gravel, etc. (an area of 3 m × 2.5 m is recommended).
- Do not install the inverter in an environment with flammables, explosives, or smoke.

- Do not install the inverter in places prone to water leak, e.g., under the air-conditioner vent, the air vent, or the cable outlet window of the machine room, so as to prevent device damage or short circuit caused by intrusion of water.
- Do not install the inverter in a place with corrosives such as corrosive gas and organic solvent, etc.
- When the inverter is running, its surface may carry high voltages or get very hot. Do not touch it; otherwise, it may lead to burns or electric shocks.
- Do not install the inverter in a place that can be easily reached.
- The installation site must have solid ground, free of rubber-like soils (which cannot be effectively compacted) or weak soils, and should not be prone to subsidence. Also, avoid low-lying areas where water or snow may accumulate. Ensure the site is located above the highest recorded water level in the area.
- Do not install the inverter in a position that could be flooded.
- To prevent vegetation or water on the ground from impacting inverter operation, if the space above meets the designated requirements, elevate the inverter to an appropriate height.
- Install the inverter in a place with shelter, so as to prevent it from getting impacted by direct sunlight and severe weather (e.g., snow, rain, and lightning). The inverter will derate in high temperatures for self-protection. If installed in a place directly exposed to sunlight, as the temperature rises, the inverter may experience power reduction.
- Good heat dissipation is very important to the inverter. Please install the inverter in a ventilated environment.
- If the inverter needs to be installed in a closed or semi-closed environment, please install additional heat dissipation or ventilation devices. Furthermore, while the inverter is operating, ensure the indoor ambient temperature does not exceed the outdoor ambient temperature. A semi-closed environment refers to a special space where natural ventilation is limited and gas or heat may easily accumulate, although it is not fully enclosed on all six sides.
- Please consult SUNGROW before installing inverters outdoors in areas prone to salt damage, which are mainly coastal areas within 500 meters of the coast. The sedimentation amount of salt spray is correlated to the characteristics of the seawater, sea winds, precipitation, air humidity, topography, and forest coverage in the adjacent sea areas, and there are substantial differences between different coastal areas.
- To ensure device safety and service life, avoid using this product in highly polluted environments containing substances such as sulfur or halogens.
- The inverter is strictly prohibited from being installed in environments with vibration or strong electromagnetic fields (including strong common-mode interference). A strong magnetic field environment refers to one where the magnetic field strength exceeds 30 A/m. The aforementioned environments may cause the product to malfunction.
- In dusty environments such as places full of dust, smoke, dense intake/exhaust grilles or floc, particles may cling to the device's air outlet or heat sink, thus impacting its heat dissipation performance or even getting it damaged. Therefore, do not install the inverter in dusty environments. If the inverter has to be installed in such environments,

please clean its fans and heat sink on a regular basis to ensure a good heat dissipation performance.

- The average temperature approximately 1 m around the inverter should be taken as its ambient operating temperature. The temperature and humidity should meet the requirements below:



- For installed inverters that remain non-operational for an extended period, follow these requirements:
 - Seal all unused DC terminals with the plugs supplied with the inverter.
 - If the inverter is installed in a dusty or sandy environment, add protective covers at the air inlet and outlet to prevent dust accumulation that could obstruct airflow and affect fan operation. Remove the protective covers before putting the inverter into service.

NOTICE

- **If the inverter is installed indoors or if there are significant obstructions in the air outlet pathway, add ventilation equipment to enhance heat dissipation. The temperature at the air inlet of the inverter must not exceed the nominal ambient temperature specified for operation at rated power under the current working conditions to ensure long-term stable system operation.**
- **Ensure a ventilation rate of $\geq 1000 \text{ m}^3/\text{h}$ and a cooling capacity of $\geq 5 \text{ kW}$ at the rear air outlet of each inverter.**

6.2.2 Installation Support Requirements

The installation surface must have a load-bearing capacity of at least 4 times the inverter's weight and match the inverter dimensions.

Do not install the inverter on surfaces prone to resonance, as this may cause excessive noise.

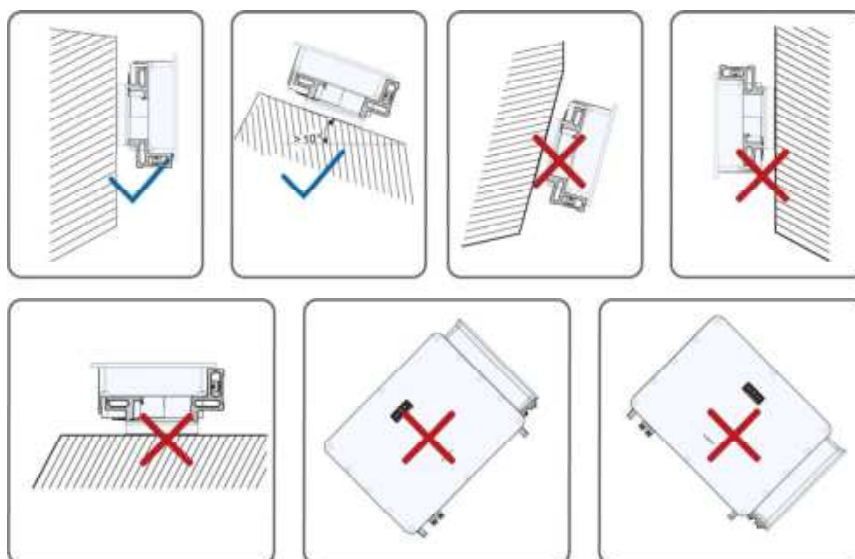
Installation on combustible building materials is strictly prohibited. Suitable mounting surfaces include: Non-combustible wall surfaces: Concrete, fire-resistant gypsum board, brick wall, etc. Non-combustible roof structures: Color-Coated corrugated steel roofing sheets, precast concrete slabs, fiber-reinforced cement boards, etc.



6.2.3 Installation Angle

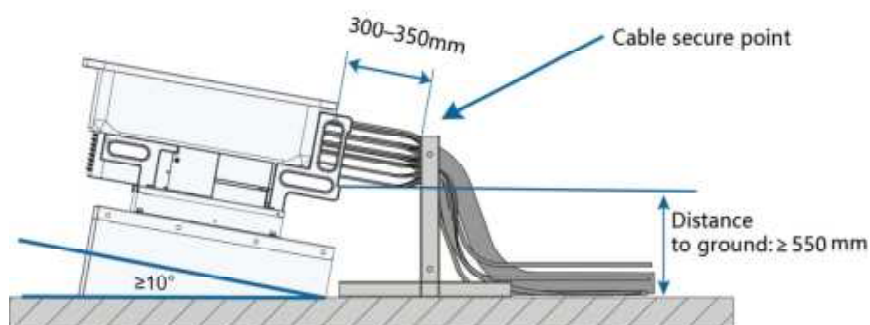
It is recommended that the inverter be installed vertically or tilted backward. Forward or upside-down installation and installation at a left tilt, right tilt, or excessive back tilt are not allowed.

Backward installation does not apply to floating power plants.



Backward Installation Requirements

To install the inverter on level ground, add a rack under it to ensure the installation angle meets the specified requirements. The figure below presents an inverter mounted on a rack.



Take into account the below requirements when designing a racking system for the inverter:

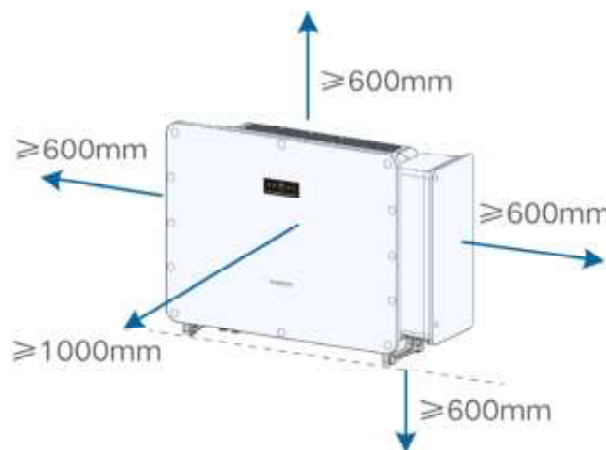
- Consider the climatic conditions at the site. Take protective measures against rain and snow if necessary.
- The waterproof connectors should be ≥ 550 mm off the ground.
- Secure the cables with cable ties at a distance of 300–350 mm from the DC connectors and the waterproof connectors for communication terminals. This prevents the connectors from loosening due to stress caused by cable hanging down or swaying, hence avoiding impairing the ingress protection performance of the inverter.
- Tighten the waterproof connectors at the torques specified in this manual. Ensure the connectors are secure and well-sealed.

In case of any questions, please contact SUNGROW.

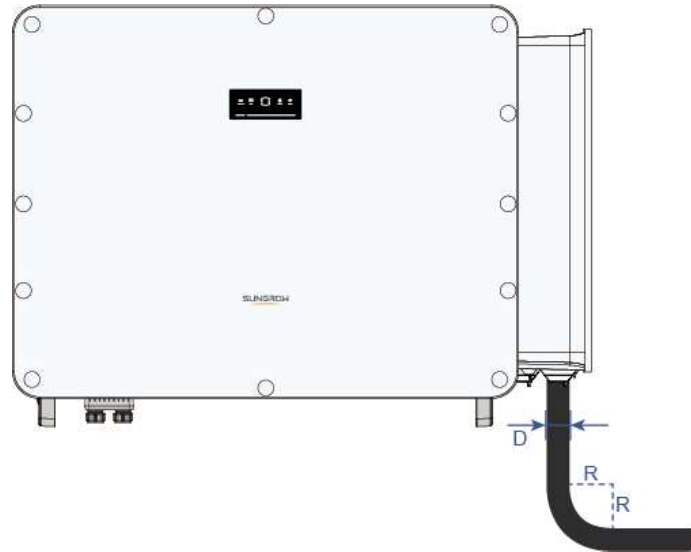
6.2.4 Installation Space Requirements

Space Required for Installing One Single Inverter

Make sure there is sufficient space around the inverter for good ventilation. The space requirements for installing one inverter are shown in the figure below.



The minimum ground clearance for the inverter is 600 mm. The actual installation height may vary depending on cable specifications.

**Single-core wire****Multi-core wire**

Unarmored cable

Armored cable

Unarmored cable

Armored cable

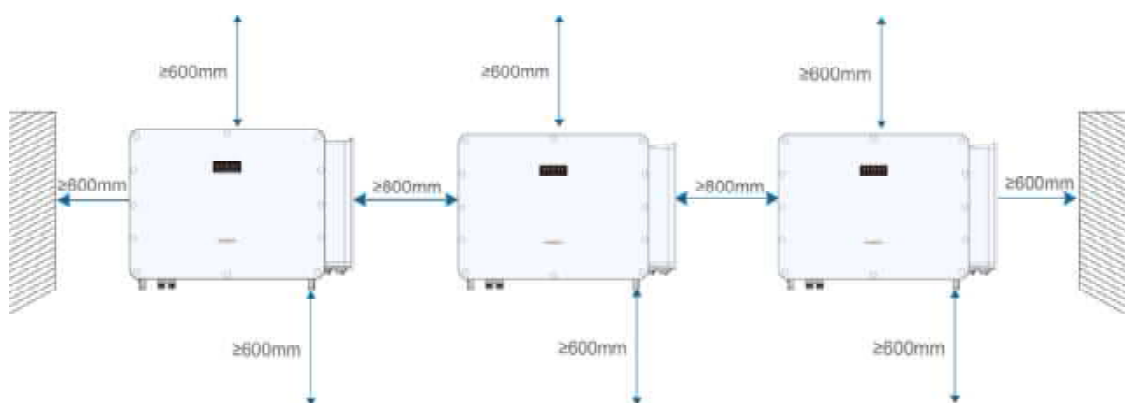
 $R \geq 20D$ $R \geq 15D$ $R \geq 15D$ $R \geq 12D$ 

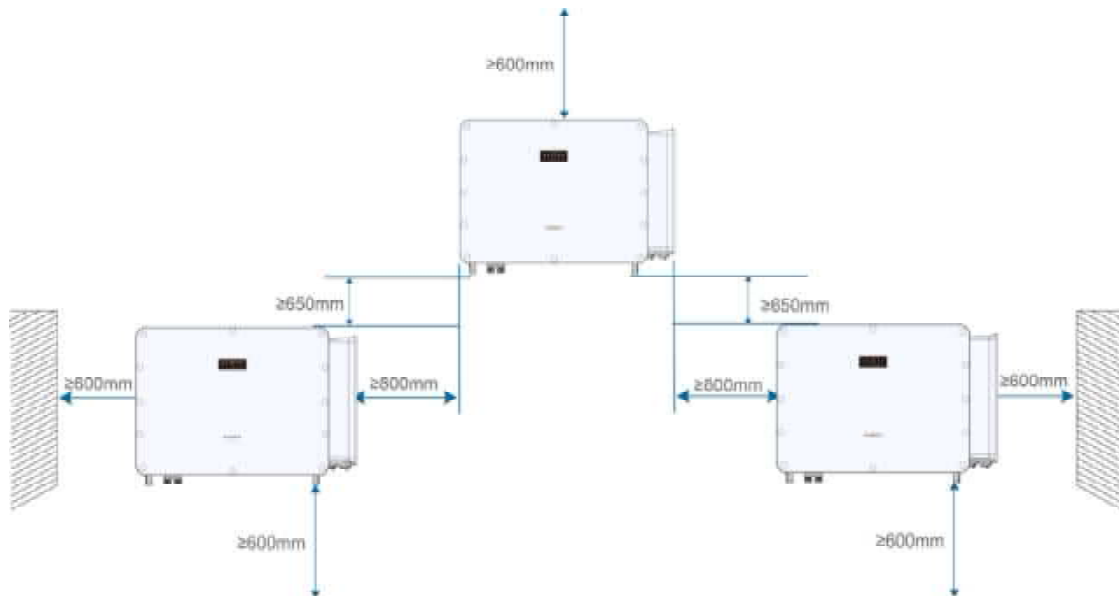
R is the bending radius, and D is the outer diameter of the thickest connected cable.

AC cables must enter the maintenance chamber vertically.



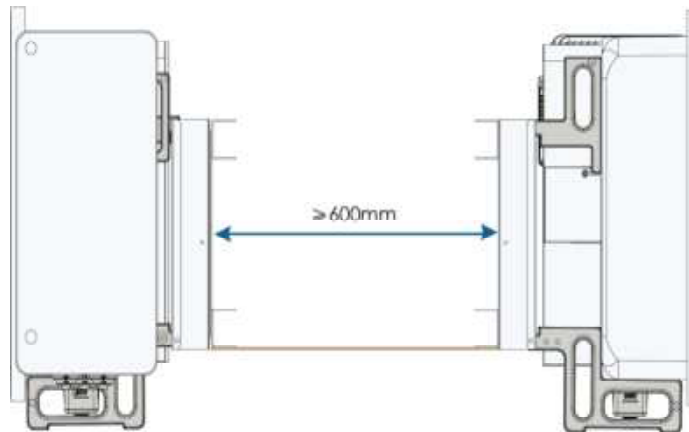
If the actual space reserved for the inverter is smaller than that required in the figure, before maintaining its fans, lift the inverter away from the bracket or wall.

Inverters Installed in One Row**Inverters Installed in an Inverted-T Pattern**



Inverters Installed Back-to-back

For inverters installed back to back, the distance between them should be at least 600mm. In this scenario, a baffle should be added between the two inverters to make a channel for heat dissipation. The baffle should be placed horizontally between the two inverters, without blocking their air outlets.



- In case the inverters need to be arranged in tiers with one above another, please refer to the "Installation Instructions for Commercial & Industrial Application Scenarios".
- To learn about the heat dissipation requirements for inverters installed indoors, please contact SUNGROW.

6.3 Installation Tools

Installation tools to be used include but are not limited to those listed below. If necessary, use other auxiliary tools at the site.



Goggles



Earplugs



Dust mask



Safety gloves



Safety shoes



Utility knife



Anti-static wrist strap



Marker



Level

Hammer drill
($\phi 12$)

Rubber mallet

Phillips
screwdriver (M4,
M6, M8)Open-end wrench
(16mm, 33mm)Socket wrench
set (M4, M8, M12)

Wire cutter



Wire strippers



Hydraulic pliers



Heat gun

Slotted
screwdriver (M2,
M3, M6)

Connector wrench



Multimeter (≥ 1100
V DC)



Vacuum cleaner



Scissors



Electric drill ($\phi 12$)



Crimping tool (4–
6 mm²)



Allen wrench



Socket (16mm)

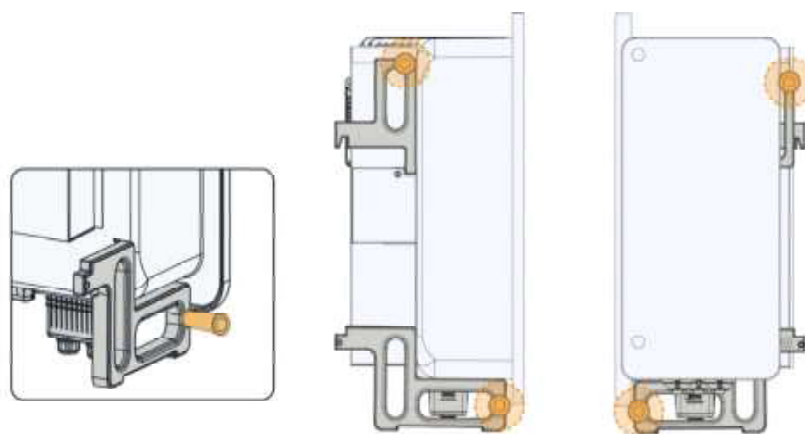


Li-ion hydraulic
plier

6.4 Move Inverter

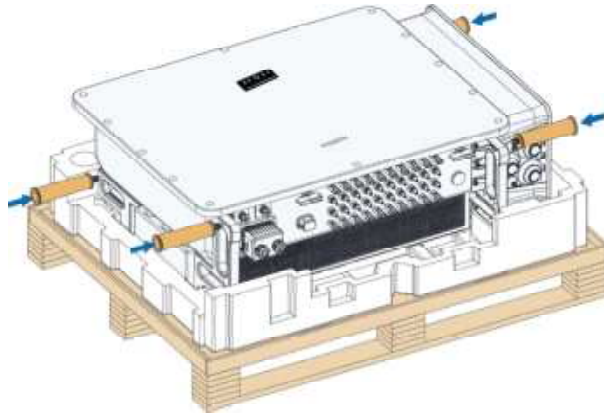
Before installation, take the inverter out of the packing crate and move it to the target position.

It is recommended to move the inverter using its top and bottom handles and the add-on handles. Grip the handles, lift the inverter, and move it to the target position.



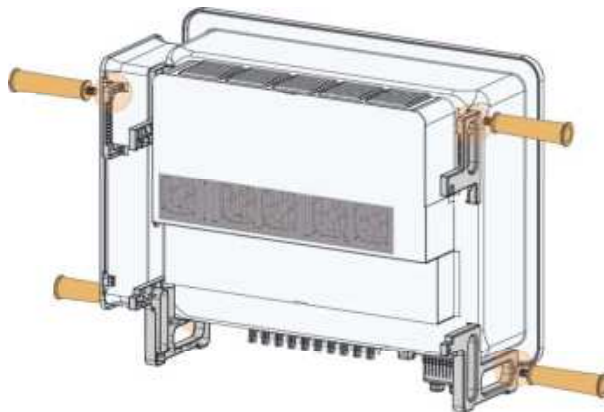
Move an Inverter that Lays Flat

To take the inverter out of the crate, use mainly the vertical handles at the top and bottom of the inverter (as indicated in the figure below).



Hang the Inverter to the Mounting bracket

To hang the inverter to the mounting bracket, use mainly the top vertical handles, the bottom-left horizontal handle, and the bottom-right add-on handle.



⚠ CAUTION

Improper handling may lead to personal injury!

- Properly decide the number of installation personnel to handle the inverter based on the inverter's weight. Installation personnel should wear protective equipment such as anti-impact shoes and safety gloves.
- Always pay attention to inverter's center of gravity during handling and prevent it from getting tilted.
- Putting the inverter directly on a hard ground may cause damage to its metal enclosure. Therefore, protective material such as foam or a sponge mat should be placed underneath the inverter.
- Move the inverter by holding its handles. Do not move it by gripping its connectors.

6.5 Install Mounting Bracket

Use a mounting bracket to mount the inverter on a wall or a PV bracket (PV module holder).

The dimensions of a mounting bracket assembly are shown below.



Figure 6-1 Dimensions of Mounting Bracket

Reserve sufficient space when installing the mounting bracket. Make sure the space requirements for inverter installation are met.

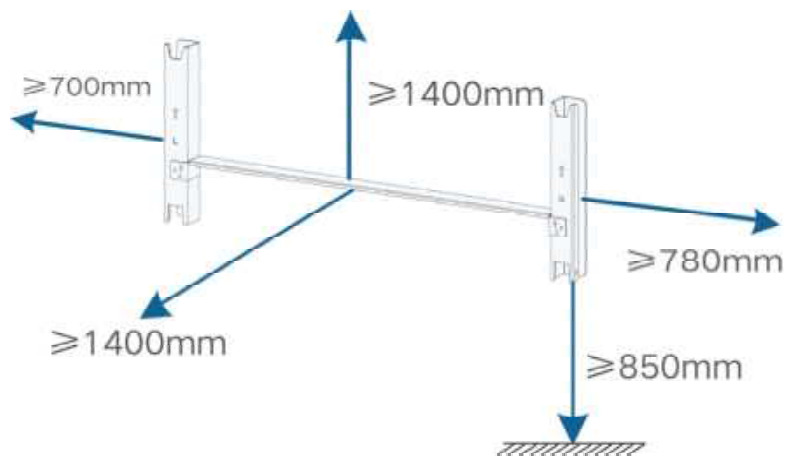


Figure 6-2 Requirements of Space Reserved for Inverter Installation

6.5.1 Mounted on PV Bracket

Prerequisite

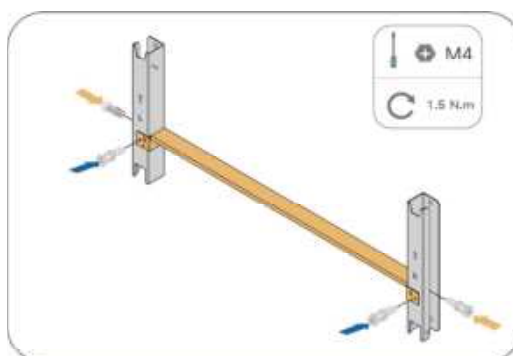
Tools

Item	Specification
Phillips screwdriver	M4
Marker	-
Level	-
Electric drill	Drill bit: $\phi 12$
Socket	16 mm

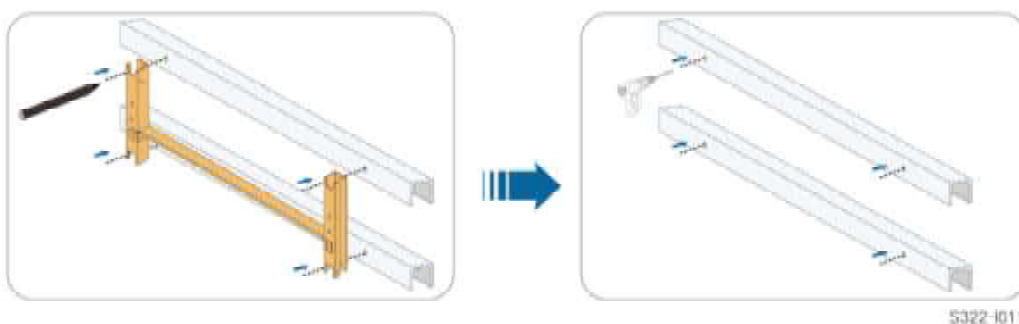
Required Materials

Item	Quantity	Specifications	Source
Phillips screwdriver	4	M4×10	Packing list
Bolt assembly	4	M10	Packing list

Step 1 Assemble the mounting bracket together by fixing the two sub-brackets to the two sides of the connecting plate.

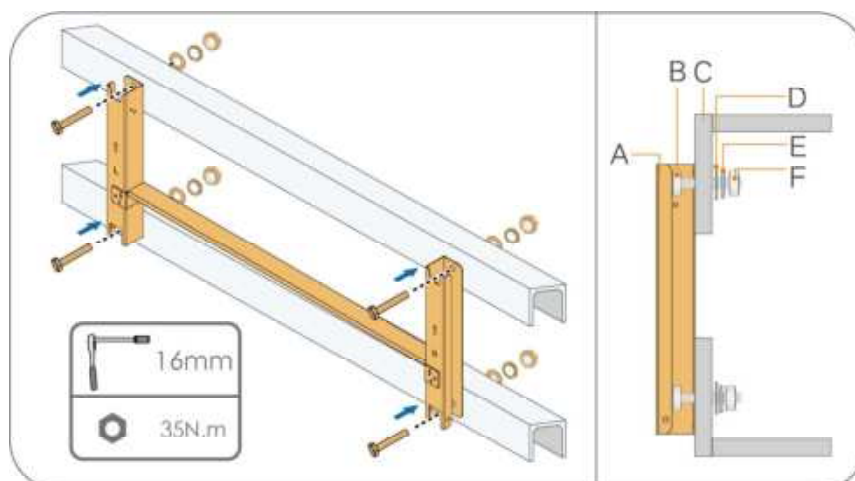


Step 2 Put the mounting bracket assembly on the PV bracket, adjust its angle with the assistance of the level, and mark the hole positions for drilling. Then, drill holes at the corresponding positions using an electric drill.



5322-1011

Step 3 Secure the mounting bracket with bolts.



(A) Mounting bracket	(B) Fully- threaded bolt	(C) Metal bracket	(D) Flat washer	(E) Spring washer	(F) Hexagon nut
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--End

6.5.2 Mounted on Wall

Prerequisite

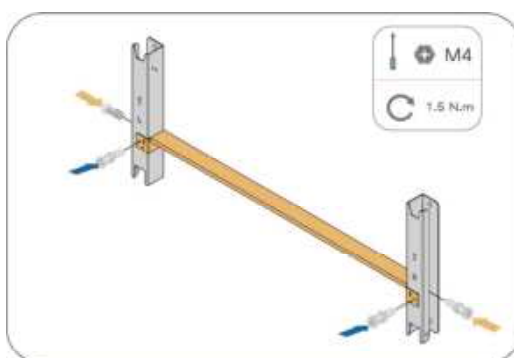
Tools

Item	Specification
Phillips screwdriver	M4
Marker	-
Level	-
Hammer drill	Drill bit: $\phi 12$
Socket	16 mm

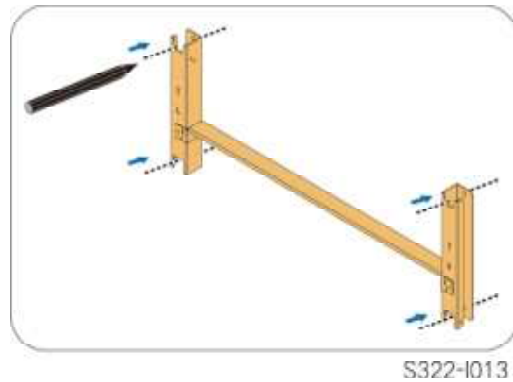
Required Materials

Item	Quantity	Specifications	Source
Phillips screwdriver	4	M4×10	Packing list
Expansion bolt	4	M10×95 (recommended)	Prepared by the user

Step 1 Assemble the mounting bracket together by fixing the two sub-brackets to the two sides of the connecting plate.



Step 2 Put the mounting bracket assembly at the target position. Adjust its angle with the assistance of the level, and mark the hole positions for drilling.



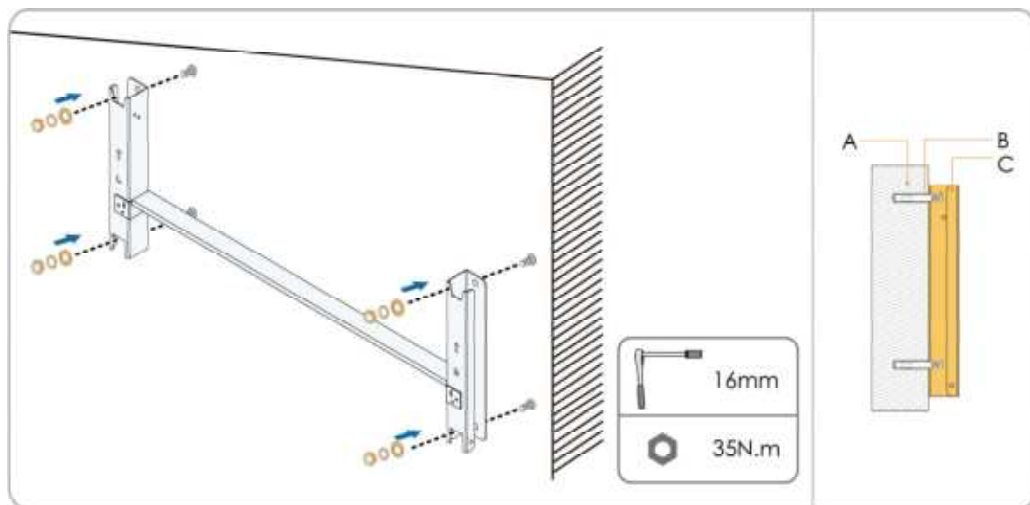
For SH110CX, the hole-drilling template included in the delivery scope can be used to mark the hole positions for drilling. For details, please refer to [7.10 Install Protective Cover \(Optional for SH110CX\)](#).

Step 3 Drill holes using a hammer drill, and clean the holes. Then, insert the expansion bolts into the holes, and tap the bolts using a rubber mallet to secure them in place. Next, tighten the nuts at the end of the bolts using a wrench to make the bolt sleeves expand. After that, remove the nuts, spring washers, and flat washers, and keep them properly for later use.



After removing the nuts, spring washers, and flat washers, make sure the ends of expansion bolt sleeves are flush with the wall surface. Otherwise, the mounting bracket will not stay stable on the wall.

Step 4 Hang the mounting bracket to the expansion bolts, and fit the washers and nuts to fix it.



(A) Wall

(B) Bolt assembly

(C) Mounting bracket

--End

6.5.3 Mounted on Pole

Prerequisite

Tools

Item	Specification
Phillips screwdriver	M4
Marker	-
Level	-
Electric drill*	Drill bit: $\phi 12$
Socket	16 mm

*Determine if tools with different specifications are required based on the size of the bolts used for the matching clamp.

Required Materials

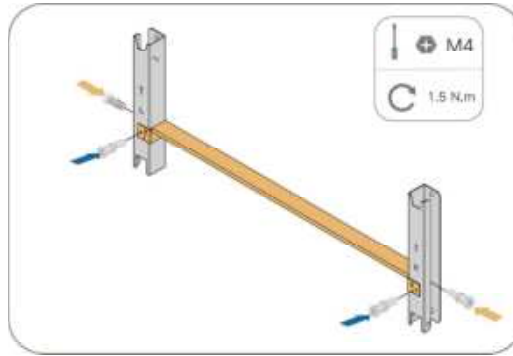
Item	Quantity	Specifications	Source
Phillips screwdriver	4	M4×10	Packing list
Bolt assembly	4	M10	Packing list
Nut assembly	4	M10	Prepared by the user
Steel U-channel	2	-	Prepared by the user
Clamp	2	Decide according to the size of the pole.	Prepared by the user

Step 1 Bury the pole to an appropriate depth in the ground at the installation site.

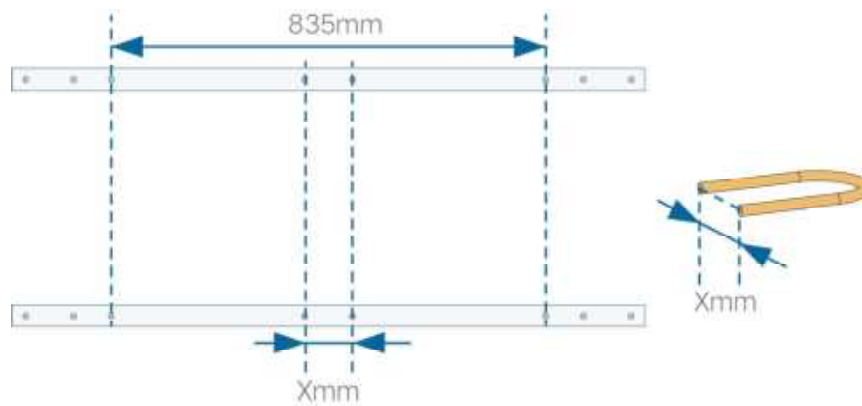


Skip this step if the inverter is pole-mounted on a cement pillar or PV bracket.

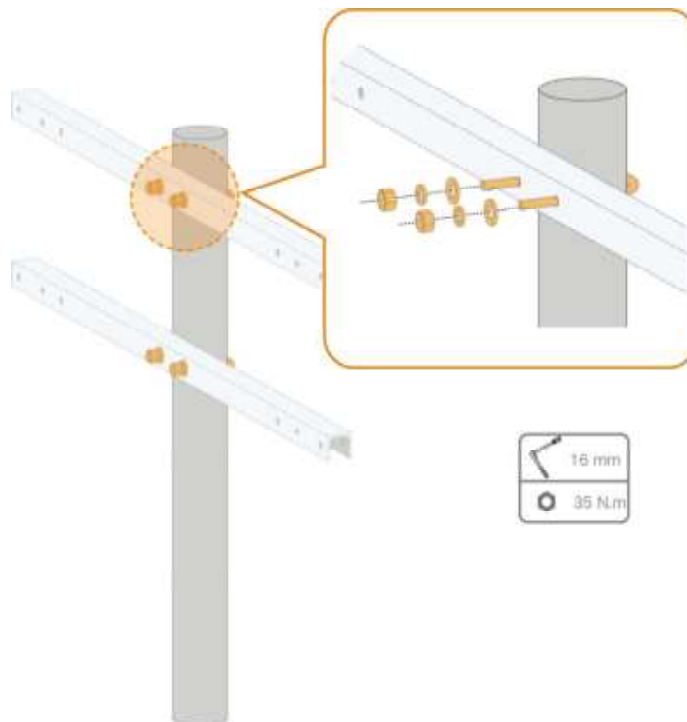
Step 2 Assemble the mounting bracket together by fixing the two sub-brackets to the two sides of the connecting plate.



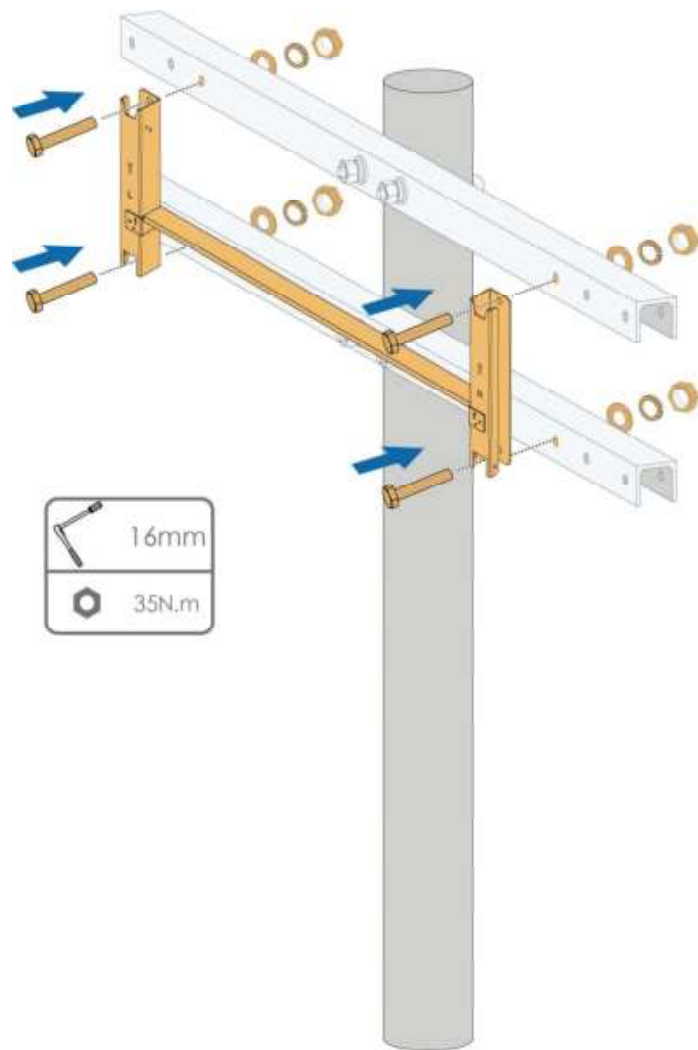
Step 3 Mark the hole positions on the U-channels by referring to the instructions in the figure below, and drill holes.



Step 4 Fix the U-channels to the pole with bolts and clamps.



Step 5 Fix the mounting bracket to the U-channels with bolts.



--End

6.6 Mount the Inverter

Prerequisite

Tools

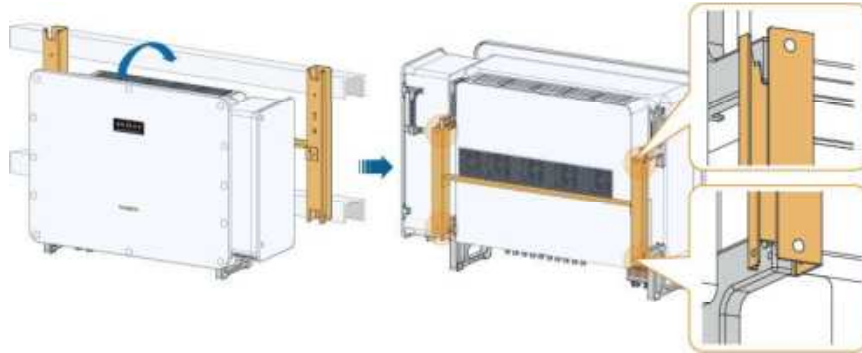
Item	Specification
Phillips screwdriver	M6

Required Materials

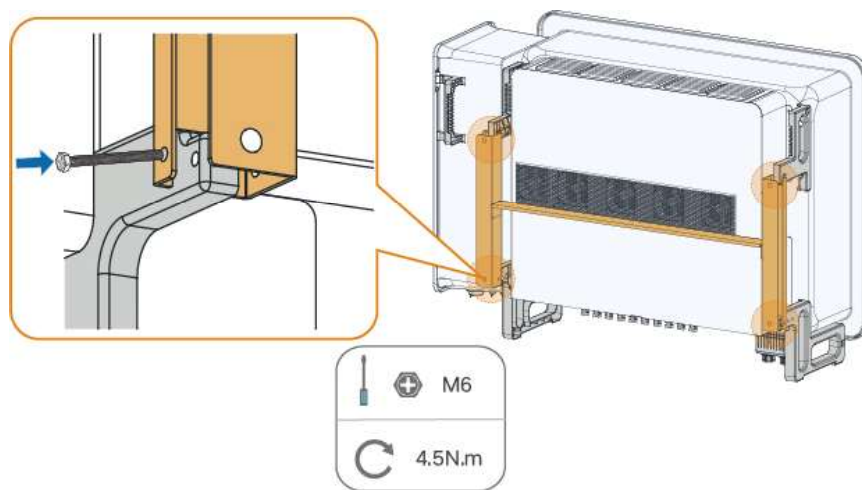
Item	Quantity	Specifications	Source
Phillips screwdriver	2	M6×65	Packing list

Step 1 Take the inverter out of the packing crate.

Step 2 Hang the inverter on the mounting bracket. Ensure the inverter's mounting ears fit perfectly into the mounting bracket.



Step 3 Fix the inverter with screws.



NOTICE

The inverter's left and right sides must be fixed to the mounting bracket with screws, otherwise, the inverter may not be secure.

--End

7 Electrical Connection

7.1 Installation Precautions

DANGER

Hazardous voltages on the PV string when it is exposed to sunlight!

- Operators must wear proper personal protective equipment during electrical connections.
- Check and confirm that the DC cables are voltage-free using a measuring instrument before touching them.
- Observe all the safety instructions listed in the documents for the PV string and other relevant documents.

DANGER

- Before electrical connections, please make sure that the inverter switch and all switches connected to the inverter are set to "OFF", otherwise electric shock may occur!
- Ensure that the inverter is undamaged and all cables are voltage free before performing electrical work.
- Do not close the AC circuit breaker until the electrical connection is complete.

WARNING

- Do not damage the ground conductor. Do not operate the product in the absence of a properly installed ground conductor. Otherwise, it may cause personal injury or product damage.
- Please use measuring devices with an appropriate range. Overvoltage can damage the measuring device and cause personal injury.

WARNING

Damage to the product caused by incorrect wiring is not covered by the warranty.

- Electrical connections must be performed by qualified personnel.
- Operators must wear proper personal protective equipment during electrical connections.
- All cables used in the PV generation system must be firmly attached, properly insulated, and adequately dimensioned.
- The factors that affect cable selection include rated current, cable type, routing mode, ambient temperature, and maximum expected line loss.

NOTICE

All electrical connections must be done in compliance with the applicable local and national/regional electrical standards.

- **Cables used shall comply with the requirements of local laws and regulations.**
- **Only with the permission of the national/regional grid department, the inverter can be connected to the grid.**

NOTICE

- **Install the external protective grounding cable first when performing the electrical connection and remove the external protective grounding cable last when removing the inverter.**
- **Keep the AC output cable and the DC input cable close to each other during the electrical connection.**
- **Wiring must be done in compliance with the applicable local grid regulations and relevant safety instructions specified for the PV string.**

NOTICE

- **After being crimped, the OT terminal must wrap the wires completely, and the wires must contact the OT terminal closely.**
- **When using a heat gun, protect the device from being scorched.**
- **Keep the PV+ cable and PV– cable close to each other when connecting DC input cables.**
- **Before connecting a power cable (such as the AC cable, the DC cable, etc.), confirm that the label and identifier on the power cable are correct.**
- **When laying out communication cables, separate them from power cables and keep them away from strong interference sources to prevent communication interruption.**
- **All vacant terminals must be covered with waterproof covers to prevent affecting the protection rating.**
- **Ensure that AC output cables are firmly connected. Failing to do so may cause inverter malfunction or damage to its AC connectors.**
- **When the wiring is completed, seal the gap of cable inlet and outlet holes with fireproof / waterproof materials such as fireproof mud to prevent foreign matter or moisture from entering and affecting the long-term normal operation of the inverter.**



Incorrect cable connections may lead to inaccuracies in the power flow diagram. In such cases, it is necessary to verify the correctness of the wiring.



The wire colors in the figures in this manual are for reference only. Please select wires according to local cable codes.

7.2 Terminal Description

Terminals are located at its side and bottom, as shown in the figure below:

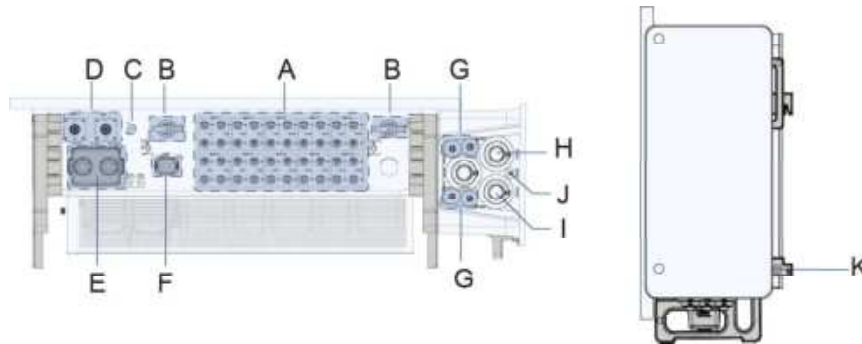


Figure 7-1 Terminal Description

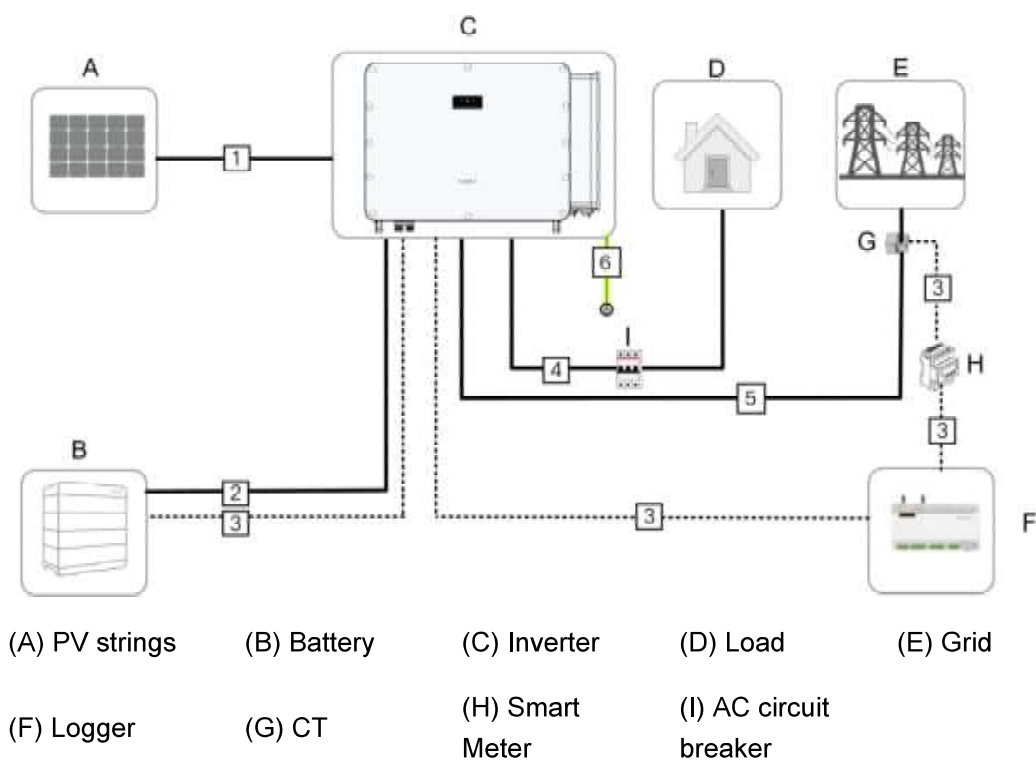
*The figure is for reference only and the real product may differ.

No.	Item	Label	Remarks
A	DC input terminals	+ / -	20 pairs, PV connector.
B	DC switch	DC SWITCH	Used to control the connection and disconnection of DC inputs.
C	Battery grounding terminals		Used for battery grounding.
D	Battery terminals	BAT+/BAT-	Used for battery connection.
E	Communication terminals	COM2/COM3	Used for communication with meter, battery, logger, DRM, DO, RSD.
F	Communication terminals	COM1	Used for connecting a communication module.
G	Grounding terminal	PE	Used for internal grounding.
H	Load AC terminals	BACKUP	Used for load AC connection.
I	Grid AC terminals	GRID	Used for grid AC connection.

No.	Item	Label	Remarks
J	Battery auxiliary power terminals	BAT aux power	Used for auxiliary power output from the battery
K	External grounding terminals		Used for the reliable grounding of the inverter. Two grounding terminals are provided. Use at least one of them for grounding.

7.3 Electrical Connection Overview

To connect the inverter to the PV system, these electrical connections should be completed: external grounding, and connections of the grid and the PV strings.



- For Australia, a DC circuit breaker must be installed between the battery and the inverter.
- The actual wiring between the battery and the logger is determined by the battery model. For detailed instructions, please consult the manual provided by the battery manufacturer.