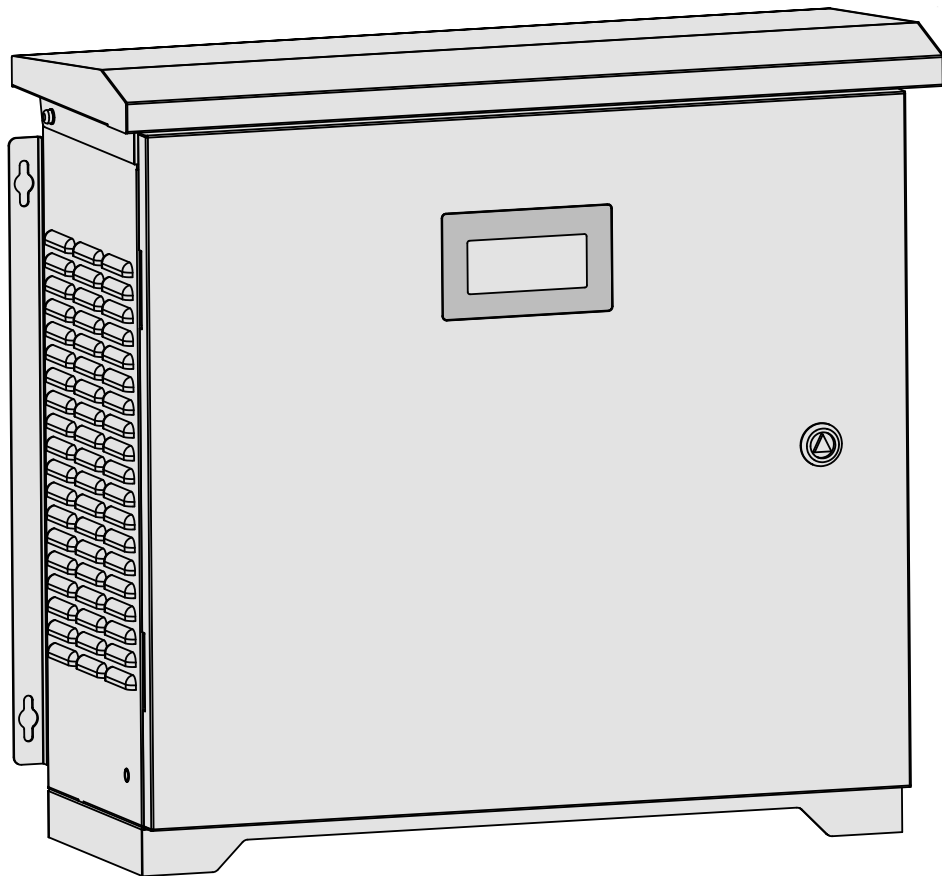


IPANDEE



CDG Series Ultra-Simplified Hybrid Power System

- Please read this user manual carefully before use and keep it for future reference.
- The actual product shall prevail; images are for reference only.

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1.0 Important Safety Instructions

1.1 Acknowledgments

We sincerely thank you for purchasing our product and for your trust and support.

In this product manual, we are committed to providing you with accurate and clear operating guidelines and relevant information to help you better understand and utilize our product.

1.2 Instructions for Use

Before using this product, please read this manual thoroughly to understand the correct and safe operating procedures. Using this product indicates that you have agreed to and fully read and understood all contents of this manual. Please do not use the product before carefully reading the instructions and understanding its performance; the Company shall not be liable for any economic loss or personal injury caused by operations that do not comply with this manual. To continuously optimize our products, the Company reserves the right to adjust the manual's content. Meanwhile, all relevant intellectual property and industrial property rights, including copyrights, patents, trademarks, and designs, are reserved. This manual will be updated periodically without further notice. If you find any conflict between your product and this manual, or if you have any doubts regarding the product or this manual, please contact us for consultation and revision. The Company reserves the right of final interpretation of this manual.

1.3 Safety Warning Descriptions

We attach great importance to safety. It is recommended that anyone in close contact with our products, such as those involved in installation, operation, maintenance, or service, exercise caution, follow common sense, and adhere to the safety information in this manual and on the machine's installation labels to ensure the safety of personnel and property and to reduce safety risks.

The following are relevant information symbols used in the manual or on product labels: When a Danger or Warning symbol appears, it indicates a potentially hazardous situation or high-risk scenario. If not avoided, it will result in death or serious personal injury. Special attention and emphasis must be given to these as they involve your safety or the safety of the product.



Reminder: Indicates suggestions and tips for the operator.



Caution: Indicates that the operation carries potential destructive risks.



Warning: Indicates that the operation carries potential destructive risks.

2.0 Product Introduction

2.1 Product Overview

This document provides operational instructions for the simplified hybrid power system. The system features a fully configured rated capacity of 200A and is composed of a 1U high-voltage isolated MPPT solar module, a 1U rectifier module, a 1U bidirectional DCDC energy storage module, and an MCX01CG monitoring module. It supports multiple-stage load shedding, secondary load shedding, primary load shedding, and non-load shedding functions. This power system is suitable for the following scenarios: Pure grid base stations, pure solar base stations, and diesel-solar hybrid base stations. The manual covers product introduction, component description, installation, commissioning, and system maintenance. If the configuration of the DC power distribution for this product series differs from the description in this manual, the actual product shall prevail.

The product consists of a solar power distribution unit, a rectifier power distribution unit, a -48V DC output power distribution unit, a monitoring unit, and a surge protection unit. It provides a stable -48V DC power supply for telecommunications equipment. (An optional 4G wireless module can be configured as needed for remote monitoring and operational control).



Warnings: Even when the input power and external batteries are disconnected, some circuits may still be energized. This product contains large-capacity capacitors; hazardous voltage may remain after disconnecting external power. Please let the unit sit for a period of time before opening the enclosure.



Caution: The product's DC working ground (positive pole grounded) is disconnected from the protective ground (PE) at the factory. Before use, please connect the working ground and protective ground according to local design specifications. If performing insulation tests, disconnect the yellow-green ground wire between the DC working ground and PE to avoid test failure. If an external DC working ground wire is required, prioritize removing the internal yellowgreen wire between the grounds to avoid redundant grounding.

2.2 System Features

Safe and Reliable

Safety is the foundation of stable base station operation. The power control system builds a full lifecycle safety defense line across system architecture, products, operation and maintenance, and networking.

- ♦ The system uses a fully modular isolated design to ensure single-point failures do not propagate.
- ♦ Stringent management across selection, design/development, testing, and production.
- ♦ Moves beyond the traditional "expert experience" model through intelligent management and professional O&M, integrating AI predictive maintenance to transition from reactive to proactive.

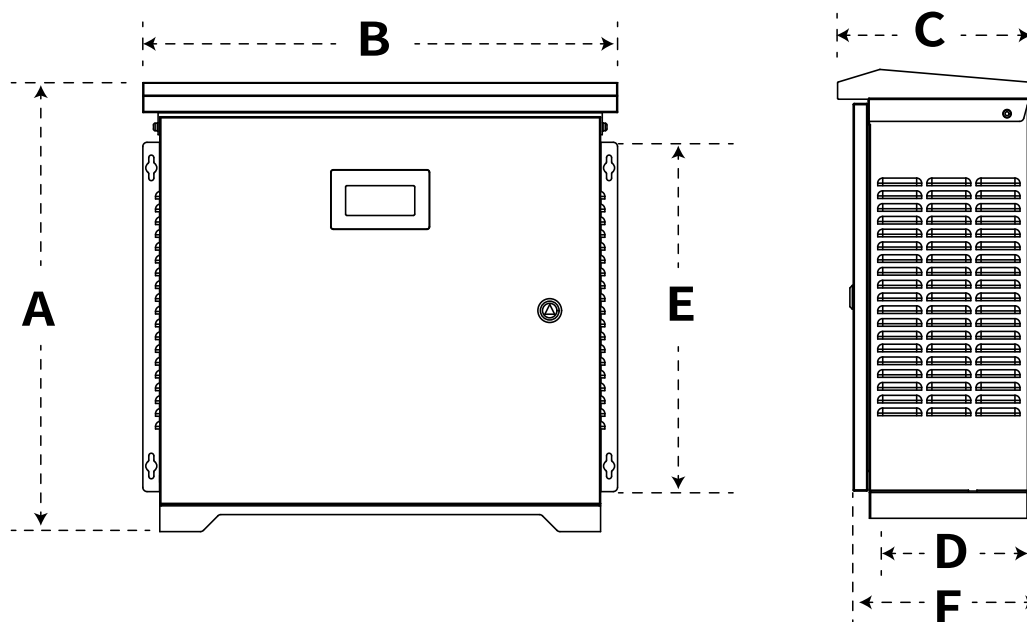
Efficient and Intelligent

- ♦ Enables easy scalability and simplified maintenance through functional modularity and prefabrication, perfectly empowering AI-powered intelligent data centers, accelerating fast deployment, and seamlessly evolving to meet future IT requirements.

Green and Low-Carbon

- ♦ Supports the efficient integration of various clean energy sources to assist in carbon reduction. It reconstructs the power supply architecture to achieve high-density integration, energy saving, and emission reduction.

2.3 Product Dimensions



Model / Dimensions	A	B	C	D	E	F
CDG48R200	527mm	560mm	235mm	188mm	410mm	217mm

2.4 Product Configuration Table

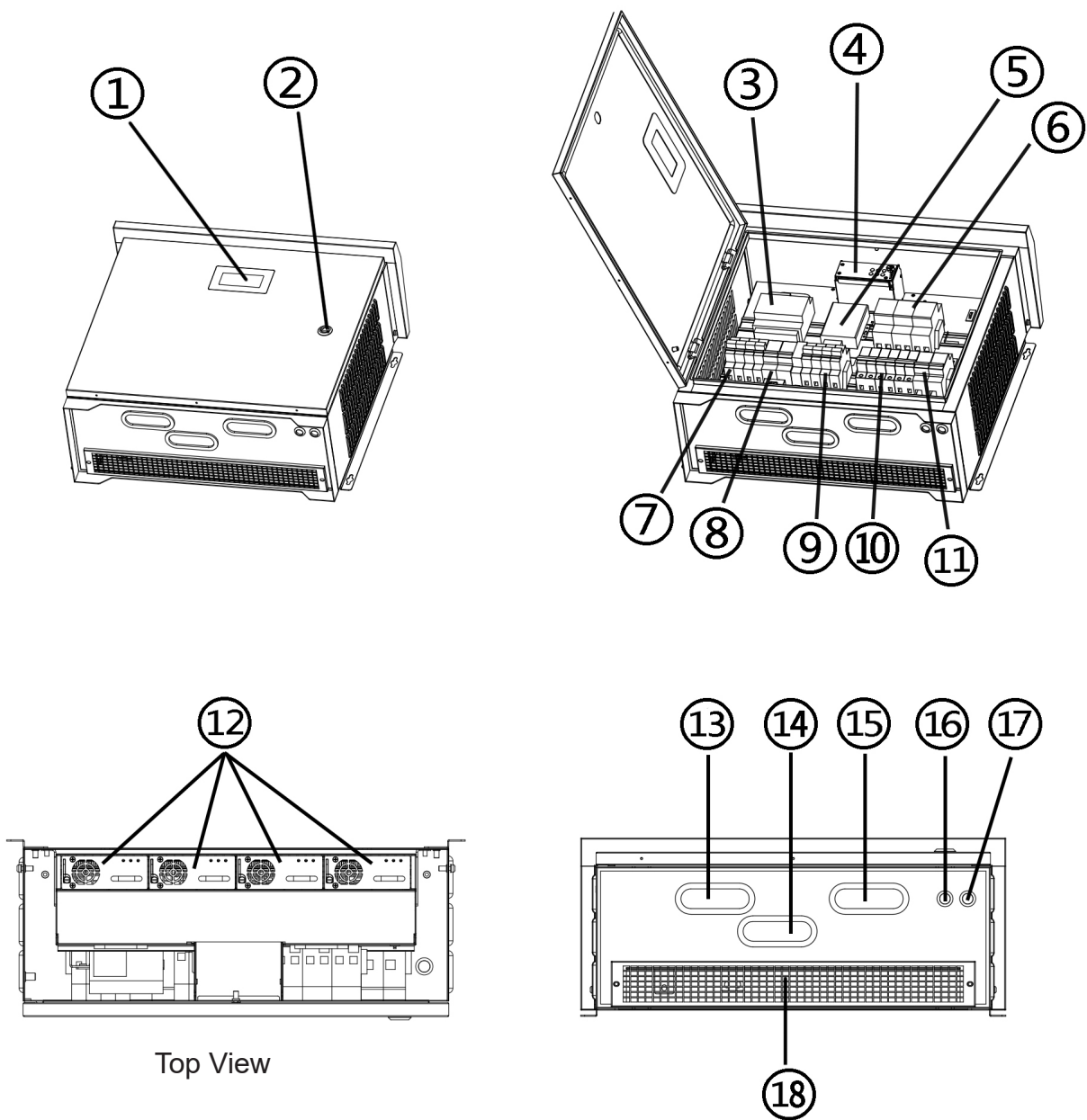
Product Name	Model	Configuration Parameters
Hybrid Power System	CDG48R200	Wall-mounted ultra-simplified hybrid power system; supports up to 4 functional modules (50A*4).
Modules	Monitoring Modes	Built-in 1 pc, RS485 communication, centralized system monitoring and management
	Solar Module Specs	50A 1U, Standard: 2 pcs (Max: 4 pcs, factory-configured)
	Bidirectional DCDC Module	50A 1U, Standard: 1 pc (Max: 4 pcs, factory-configured)
	Rectifier Module Specs	50A 1U, Standard: 1 pc (Max: 4 pcs, factory-configured)
Solar Power Distribution Unit	PV Input	Circuit Breaker 32A/2P*2PCS (Standard)
	PV Surge Protection	TTC40-220D/2P*2PCS (Standard)
AC Power Distribution Unit	AC Input	Circuit Breaker 63A/2P*1PCS (Grid, Generator)
	AC Surge Protection	TC40-275/2P *1PCS
DC Power Distribution Unit	Energy Storage Output	Circuit Breaker 125A/2P*1PCS
	Output Surge Protection	TC40-110VDC/1P*1PCS
	Load Shedding DC Output	Features primary and secondary load shedding functions: Primary shedding distribution: 4 channels 32A 1P*2PCS, 16A 1P*2PCS Secondary shedding distribution: 4 channels 32A 1P*2PCS, 16A 1P*2PCS (Circuit breaker specifications and quantities can be customized)



Note: The actual configuration is subject to the final physical product.

2.5 Structural Description

Example: CDG48R200

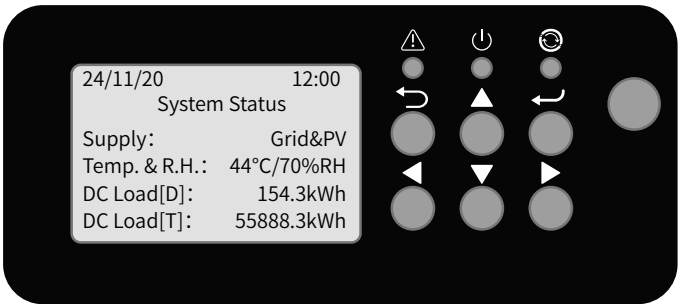


1	Display Window	10	Input Circuit Breaker
2	Waterproof Triangle Lock	11	DCDC Circuit Breaker
3	Meter	12	Functional Module Slots
4	Monitoring Display Screen	13	Battery Negative (-) Wiring Hole
5	DTU Module	14	Battery Positive (+) Wiring Hole
6	Surge Protective Device (SPD)	15	Input Wiring Hole
7	Primary Load Shedding Breaker	16	Grounding Hole
8	Battery Circuit Breaker	17	Signal Antenna Hole
9	Secondary Load Shedding Breaker	18	Heat Dissipation Vent (Air Outlet)

2.5.1 Monitoring Module

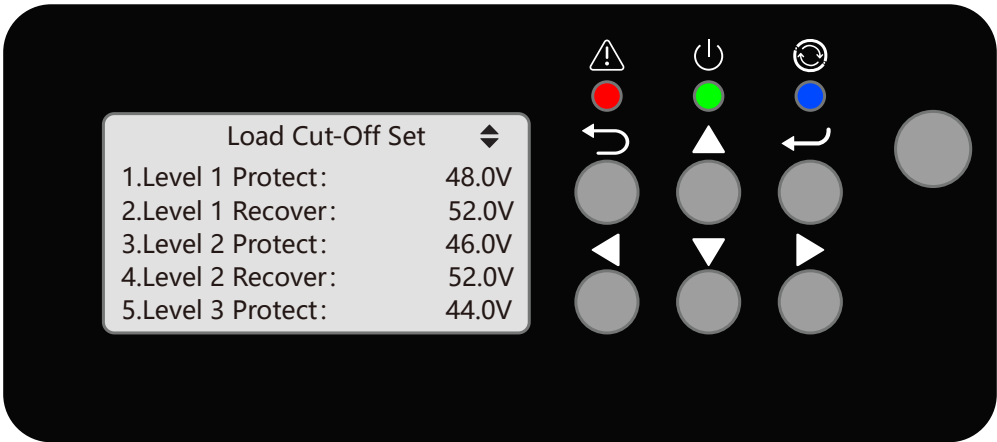


Main Interface:



Indicators: “Alarm” “Power” “Run”
Keys: “Back” “Enter” “UP” “Down” “Left” “Right”

Load Shedding Control Interface:



2.5.2 Solar Module



1	Alarm Indicator
2	Power Indicator
3	Run Indicator
4	Module Handle
5	Air Inlet
6	Securing Handle
7	Handle Securing Screw
8	Physical Address DIP Switch (Comm. Address)

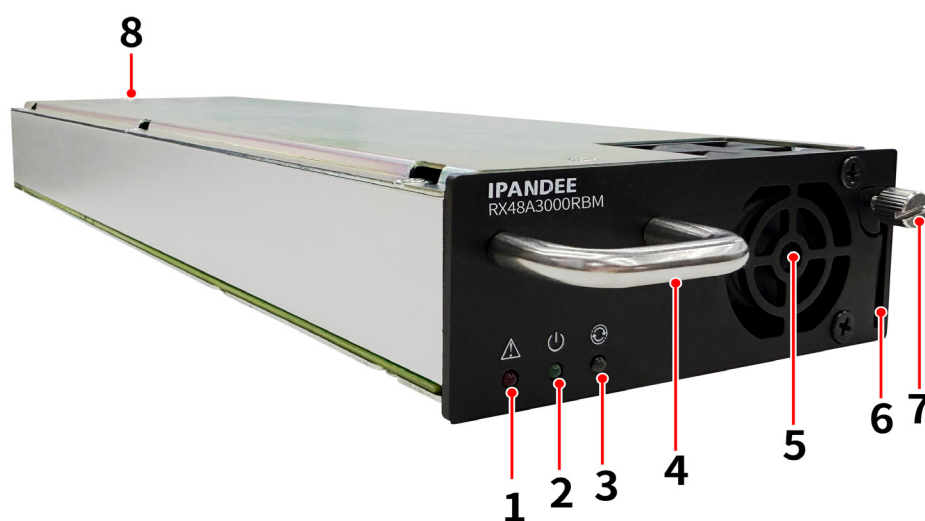
Solar Module Status Indicators

- ♦ Green Power Indicator: The module is powered on normally, or the internal residual power is sufficient for the auxiliary power supply to function. The indicator will flash once every 10 seconds.
- ♦ Red Fault Alarm Indicator: The indicator remains Off during normal operation or when only an input under-voltage alarm exists. It stays Steady On in the event of a fan fault, and flashes at 1-second intervals when other alarms or faults occur.
- ♦ Blue Run Status Indicator : The indicator remains Off when the module is in standby mode. It stays Steady On during operation if the module is in a regulated voltage output state, and flashes at 1-second intervals under other output states.

Solar Module Specifications

BX48D3000RBM Base Station Isolated 3000W Solar Module for Hybrid Solar & Storage Systems	
Product Category	
Controller Type	Controller with Maximum Power Point Tracking (MPPT) function
MPPT Efficiency	≥99%
Peak Conversion Efficiency	≥95%
Standby Power Consumption	Output powered on: ≤ 2.0W; Input powered on: ≤ 4.0W
Cooling Method	Air Cooling
Input Parameters	
Input Protection Voltage(OVP / UVP)	420Vdc/115Vdc
Input Protection Recovery Voltage (OVP / UVP recovery)	415Vdc/120Vdc
Input Voltage Range	120Vdc~420Vdc
MPPT Voltage Range	120Vdc~340Vdc
Start-up Charging Voltage $V_{start-pv}$	160±2V
Low Voltage Protection V_{low-pv}	115±2V
Max. Input Current	18A
Max. Input Power	3300W
Charging Parameters	
Output DC Voltage Range	40V ~ 60VDC(Factory default: 57 Vdc), (adjustable)
Applicable Battery Type	Lead-acid battery / Lithium-ion battery
Battery Management	Output charging parameters and protection parameters are configurable
Output DC Current	Rated: 50A, Max: 60A
Display & Communication	
Status Indication	LED indicators : Red (fault/alarm); Blue (standby/run); Green (power)
Communication Method	RS485 Bus / Standard Modbus Protocol / CAN2.0B
Protection Functions	
PV Input Protection	PV input over voltage and under voltage protection
Output Protection	Voltage regulation protection, battery reverse polarity protection, battery disconnection protection, and overcharge protection
General Protection	Over-temperature protection, fan fault protection, over-current protection, and surge protection
Safety & Dielectric Strength	Input/Output to Ground: 1.0KV/20mA/60S
	Communication Port to Ground: 0.7KV/20mA/60S
Insulation Resistance	≥10MΩ
Grounding Resistance	≤0.1 Ω
Other Parameters	
Installation Method	Embedded inside a combiner box or cabinet system chassis
Product Dimensions	333*105*41mm
Product Weight (kg)	2.025
Operating Ambient Temperature	-20°C ~ +50°C(Derating occurs above 40°C)
IP Rating	IP20
Altitude	≤ 4000m(Derates by 1°C for every 100m increase above 3000m)

2.5.3 Rectifier Module



1	Alarm Indicator
2	Power Indicator
3	Run Indicator
4	Module Handle
5	Air Inlet
6	Securing Handle
7	Handle Securing Screw
8	Physical Address DIP Switch (Comm. Address)

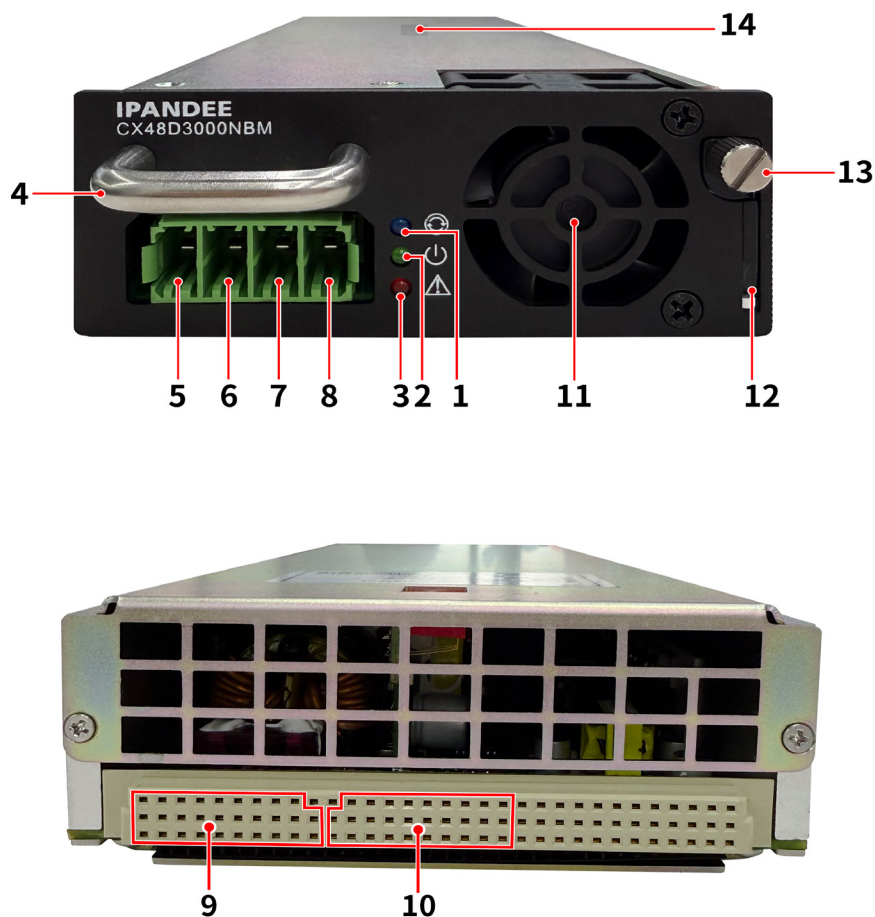
Rectifier Module Status Indicators

- ♦ Green Power Indicator: When the module is powered on normally or the internal residual power is sufficient for the auxiliary power supply to function, the indicator will remain Steady On but flash once every 10 seconds. During maintenance or replacement, ensure the green light is completely Off before touching the input/output ports or internal components.
- ♦ Red Fault Alarm Indicator: The indicator stays Steady On in the event of a fan fault, and flashes at 1-second intervals when other alarms or faults occur.
- ♦ Blue Run Status Indicator: The indicator remains Off when the module is in standby mode. It stays Steady On during operation if the module is in a stable output state, and flashes at 1-second intervals when in a soft-start state.

Rectifier Module Specifications

RX48A3000RBM Base Station Isolated 3000W Rectifier Module for Hybrid Solar & Storage Systems		
Product Category		
Model	RX48A3000RBM-H	RX48A3000RBM-L
Peak Conversion Efficiency	≥95%	
Standby Power Consumption	Output powered on: ≤ 2.0W; Input powered on: ≤ 4.0W	
Cooling Method	Air cooling	
Input Parameters		
Input Protection Voltage (OVP / UVP)	285Vac/170Vac	145Vac/85Vac
Input Protection Recovery Voltage (OVP / UVP recovery)	280Vac/175Vac	140Vac/90Vac
Input Voltage Range	170Vac~285Vac	85Vac~140Vac
Input Frequency Range	45Hz~55Hz	55Hz~65Hz
Max. Input Current	18A	36A
Max. Input Power	3000W	
Charging Parameters		
Output DC Voltage Range	40V ~ 60VDC (Factory default: 54VDC), (adjustable)	
Applicable Battery Type	Lead-acid battery / Lithium-ion battery	
Battery Management	Output charging parameters and protection parameters are configurable	
Output DC Current	Rated: 50A	
Display & Communication		
Status Indication	LED indicators: Red (fault & alarm); Blue (standby & run); Green (power)	
Communication Method	RS485 Bus / Standard Modbus Protocol /CAN2.0B	
Protection Functions		
PV Input Protection	PV input over voltage and under voltage protection	
Output Protection	Voltage regulation protection, battery reverse polarity protection, battery disconnection protection, and overcharge protection	
General Protection	Over-temperature protection, fan fault protection, over-current protection, and surge protection	
Safety / Dielectric Withstand	Input / output to ground: 1.0KV/20mA/60S	
	Communication Port to Ground: 0.7KV/20mA/60S	
Insulation Resistance	≥10MΩ	
Grounding Resistance	≤0.1Ω	
Other Parameters		
Installation Method	Embedded inside a combiner box or cabinet system chassis	
Product Dimensions	333*105*41mm	
Product Weight (kg)	2.025	
Operating Ambient Temperature	-20℃ ~ +50℃ (Derating occurs above 40℃)	
IP Rating	IP20	
Altitude	≤ 4000m(Derates by 1℃ for every 100m increase above 3000m)	

2.5.4 Bidirectional DCDC Module



1	Run Indicator	8	Port A Battery Negative (-)
2	Power Indicator	9	Port B Battery Negative (Busbar)
3	Alarm Indicator	10	Port B Battery Positive (Busbar)
4	Module Handle	11	Air Inlet
5	Port A Battery Positive (+)	12	Securing Handle
6	Port A Battery Negative (-)	13	Handle Securing Screw
7	Port A Battery Positive (+)	14	Physical Address DIP Switch (Comm.Address)

Bidirectional DC/DC Module Status Indicator

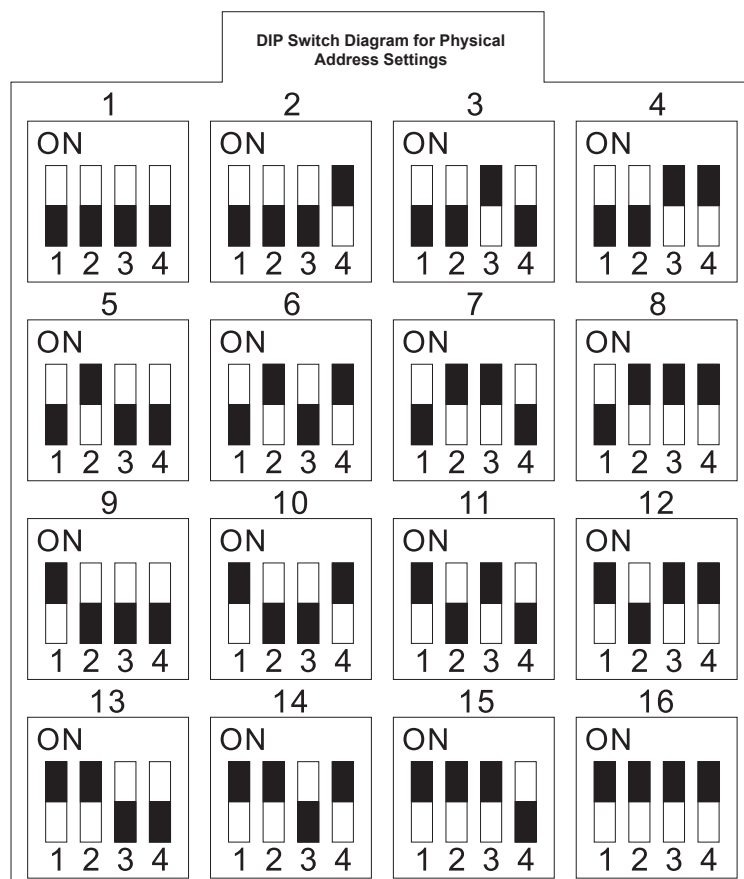
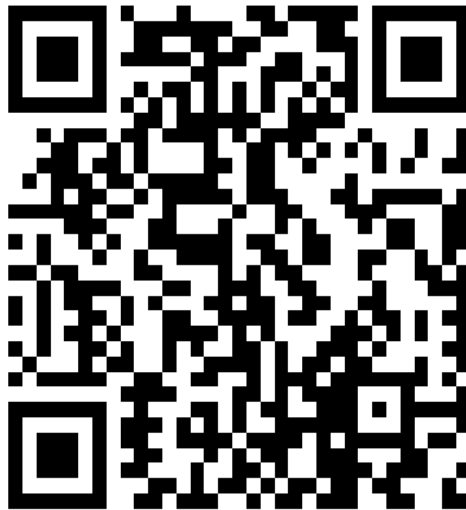
- ♦ Green Power Indicator: When the module is powered on normally or the internal residual power is sufficient for the auxiliary power supply to function, the indicator will flash once every 10 seconds.
- ♦ Red Fault Alarm Indicator: The indicator remains Off during normal operation or when only a Terminal A battery disconnected alarm exists. It stays Steady On in the event of a fan fault, and flashes at 1-second intervals when other alarms or faults occur.
- ♦ Blue Run Status Indicator: The indicator remains Off during the module's initial power-on self-test (POST) and under fault conditions. It stays Steady On when the module is in standby mode, and flashes at 1-second intervals when in an active operational state.

Bidirectional DCDC Module Specifications

CX48D3000NBM Base Station DCDC Module for Hybrid Solar & Storage Systems	
Product Category	
Controller Type	Non-isolated DCDC bidirectional power conversion module for base station power systems.
Conversion Efficiency	≥96%
Standby Power	≤2.5W
Output Control	Bidirectional output, direction controlled via communication commands.
Cooling Method	Air cooling
Input Parameters	
Input Protection Voltage (OVP/UVF)	60Vdc/42Vdc
Input Protection Recovery Voltage (OVP / UVP recovery)	57Vdc/45Vdc
Input Voltage Range	40Vdc~60Vdc
Max. Input Current	60A
Max. Input Power	3300W
Output Parameters	
Output DC Voltage Range	40V ~ 60VDC (Factory default: 56VDC)
Max. Output Current	60A
Default Settings	Output voltage: 54V Over voltage: 60V Over voltage recovery: 57V (adjustable)
Display & Communication	
Communication Method	Standard Modbus Protocol
Monitoring Method	Local PC monitoring, 4G remote monitoring, etc.
Protection Functions	
Input Protection	Over-voltage and Under-voltage protection
Output Protection	Output over-voltage and under-voltage protection, reverse polarity protection, and battery disconnection protection
General Protection	Over-temperature protection, fan fault protection, over-current protection, and surge protection
Safety / Dielectric Withstand	Input/Output to Ground: 1.0KV/20mA/60S
	Communication Port to Ground: 0.7KV/20mA/60S
Insulation Resistance	≥10MΩ
Other Parameters	
Installation Method	Subrack installation
Product Dimensions	333*105*41mm
Product Weight (kg)	1.575
Operating Ambient Temperature	-20°C ~ +50°C
IP Rating	IP20
Altitude	≤ 4000m (Derates by 1°C for every 100m increase above 3000m)

2.5.5 Module Physical Address Configuration

Users can scan the QR code below with a mobile phone to view and configure the settings.
Alternatively, the settings can be configured according to the physical address DIP switch diagram.



2.5.6 Slot-to-Address Mapping

Example: CDG48R200



2.5.7 Functional Module Slot Definitions

Example: CDG48R200 (Solar Module: 2 Pieces; Rectifier Module: 1 Piece; Bidirectional DCDC Module: 1 Piece)



Note: Ensure that the functional module addresses strictly map to their corresponding slot positions during operation. This prevents address duplication among functional modules, which will cause identification failure in the monitoring module.

3.0 Installation

3.1 Safety Regulations

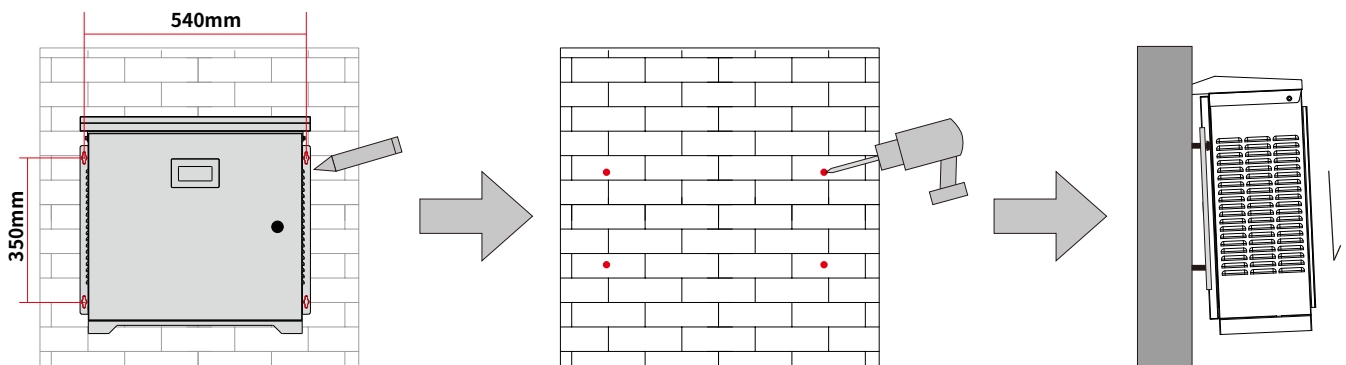
- ◆ Only qualified technical personnel are permitted to perform installation and maintenance.
- ◆ Provide a power supply that meets the equipment requirements.
- ◆ Provide grounding that meets the equipment requirements.
- ◆ Keep the equipment environment clean and dry.
- ◆ Avoid contact with exposed parts of the electrical circuit.

3.2 Installation Preparation

- ◆ Upon arrival at the site, inspect materials against the packing list for completeness.
- ◆ Arrange a safe and tidy installation site.
- ◆ Prepare required tools; ensure they are insulated and anti-static before use.
- ◆ Prepare auxiliary materials: cable ties, insulation tape, expansion bolts, various cables, etc.

3.3 Product Installation

Install the mounting ears onto the controller. Hold the controller against the desired installation position, and use a marker to mark the 4 mounting hole locations through the ears. Drill 4 holes with a diameter of 6 mm and a depth of approximately 6 cm at the marked positions. Insert plastic wall plugs into the 4 drilled holes until they are completely flush with the wall. Drive self-tapping screws into the plastic wall plugs, leaving a proper distance protruding from the wall. Then, align the mounting holes of the controller with the protruding screws, and hang the controller securely onto the wall.



3.4 Module Installation

Prerequisites

- ◆ Inspect the modules upon arrival to ensure they are complete and intact.
- ◆ Remove the filler panels from the designated module slots.



Note: If a module is damaged, please contact customer service via the phone number on the after-sales label. The rear air exhaust area is hot during operation. Do NOT touch or cover it with cables or debris.

Operating Steps

- ◆ Step 1: Insert the module horizontally into the corresponding slot.
- ◆ Step 2: Push the module forward along the guide rails until it is fully seated. Tighten the securing screws on the front panel.

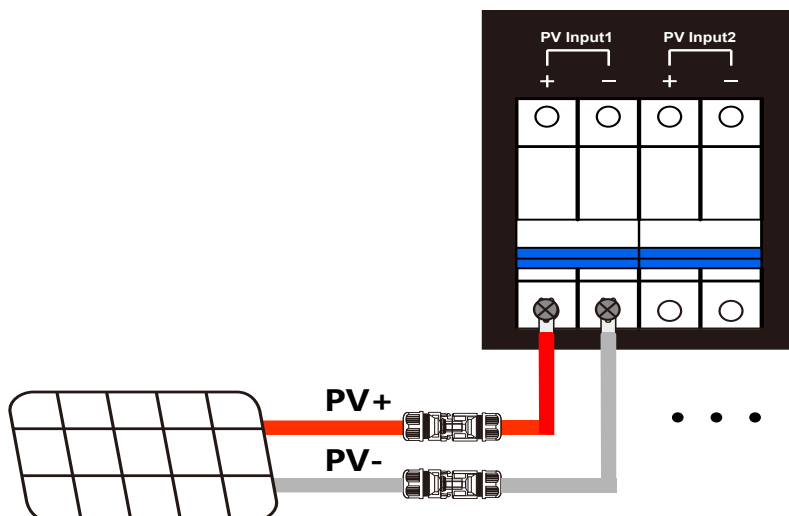


Note: Some product modules have been pre-installed inside the power system at the factory and do not require additional installation. Please check to ensure they are securely in place.

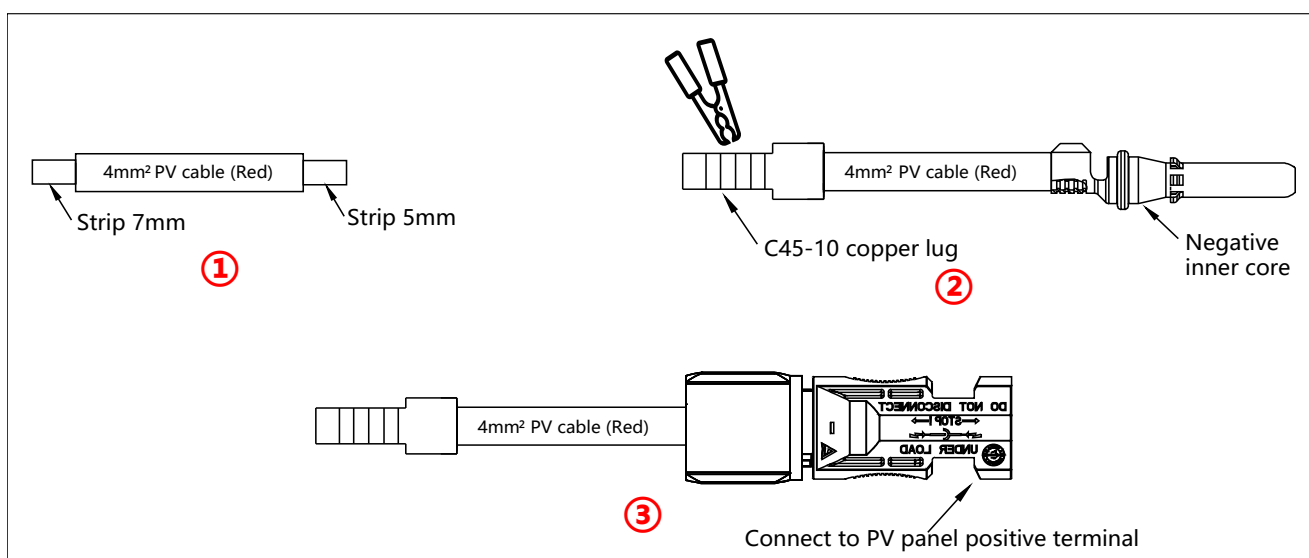
3.5 Cable Installation

3.5.1 Installing PV Input Cables

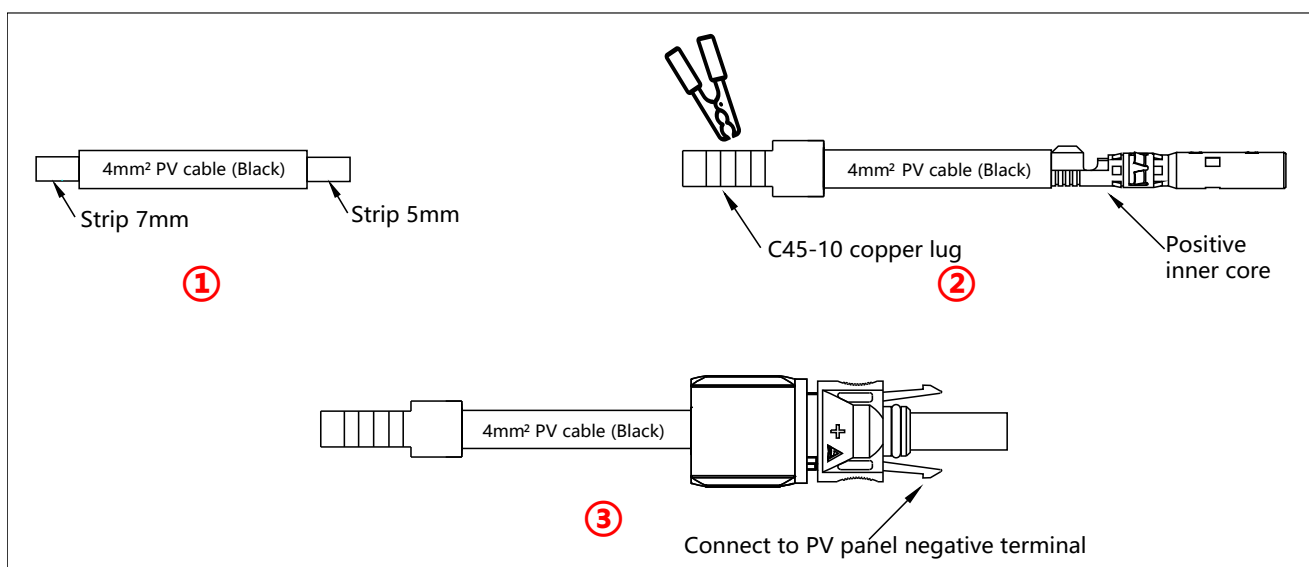
Wiring Diagram



◆ PV+ (Positive) Cable Assembly Diagram

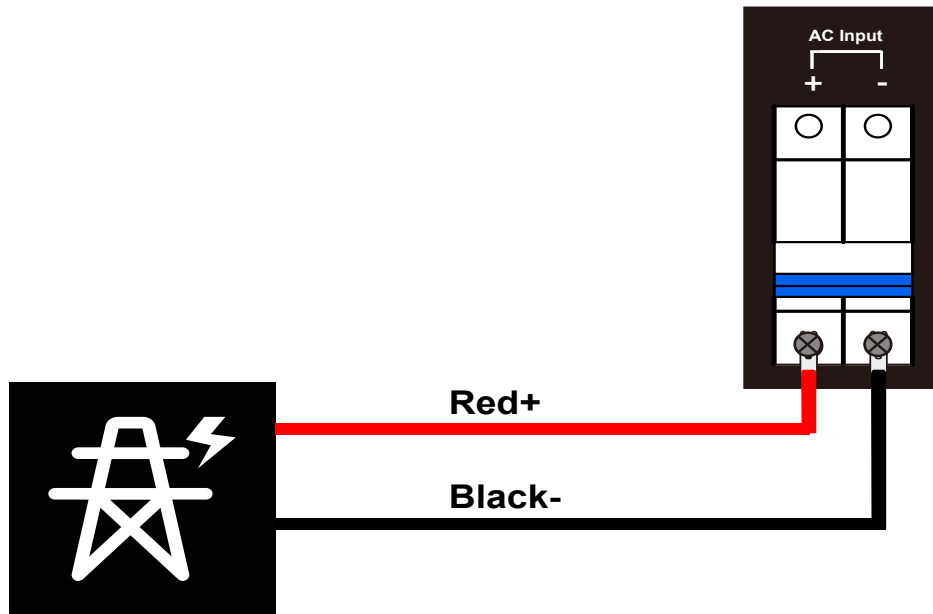


◆ PV- (Negative) Cable Assembly Diagram

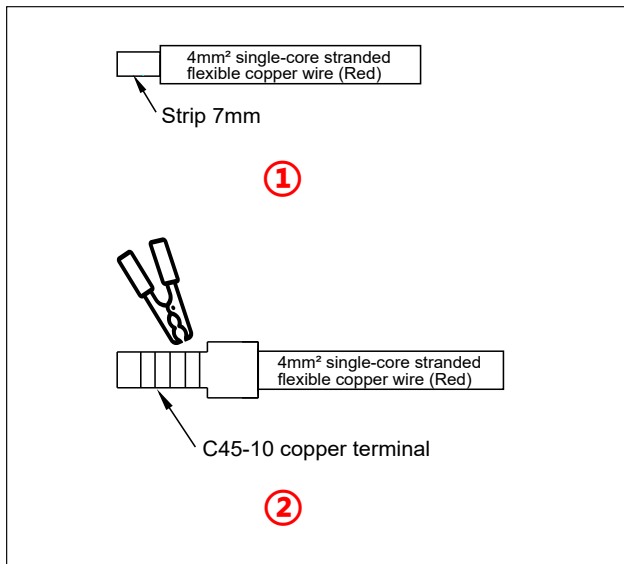


3.5.2 Installing the Grid Input Cable

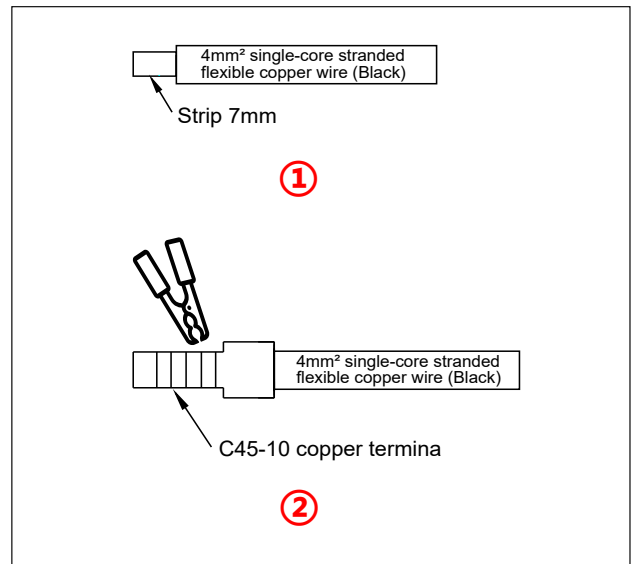
Wiring Diagram



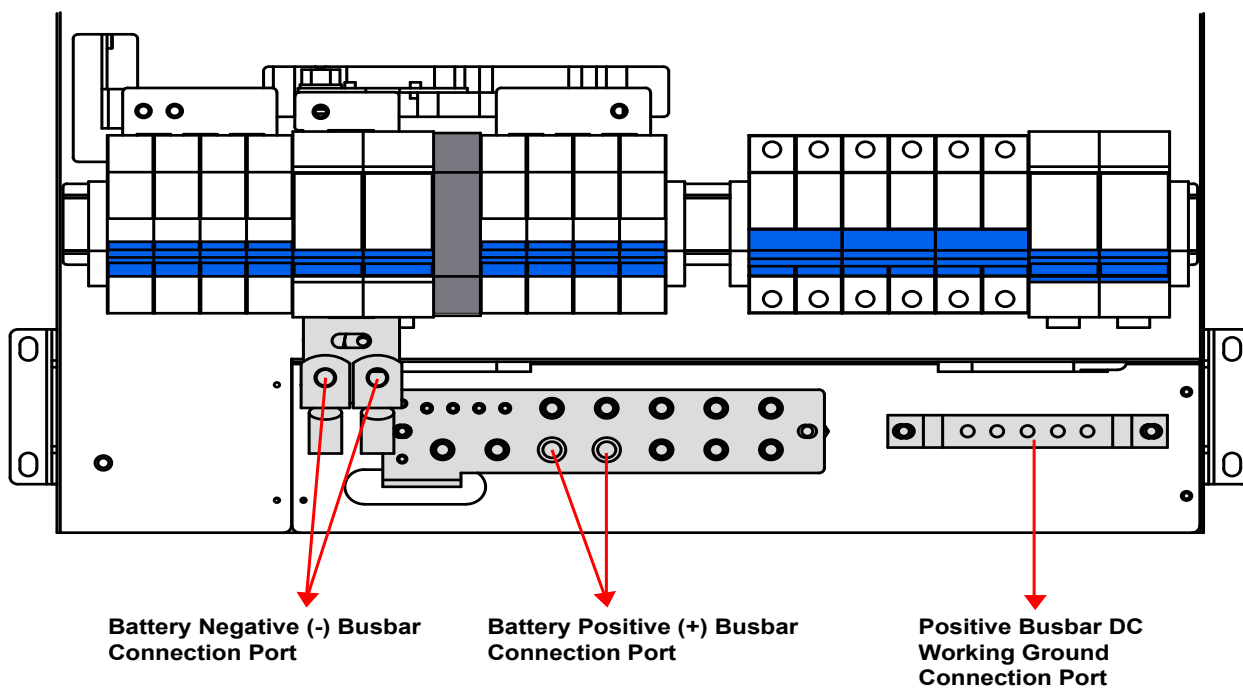
- ♦ Diagram for Assembling the AC Input (Red) Cable



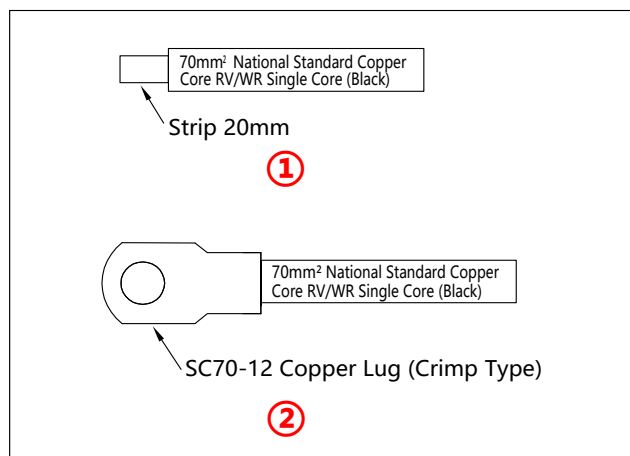
- ♦ Diagram for Assembling the AC Input (Black) Cable



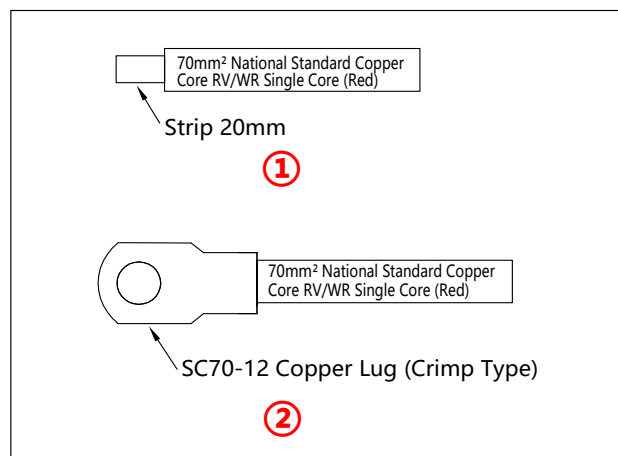
3.5.3 Installing Backup Battery Cables



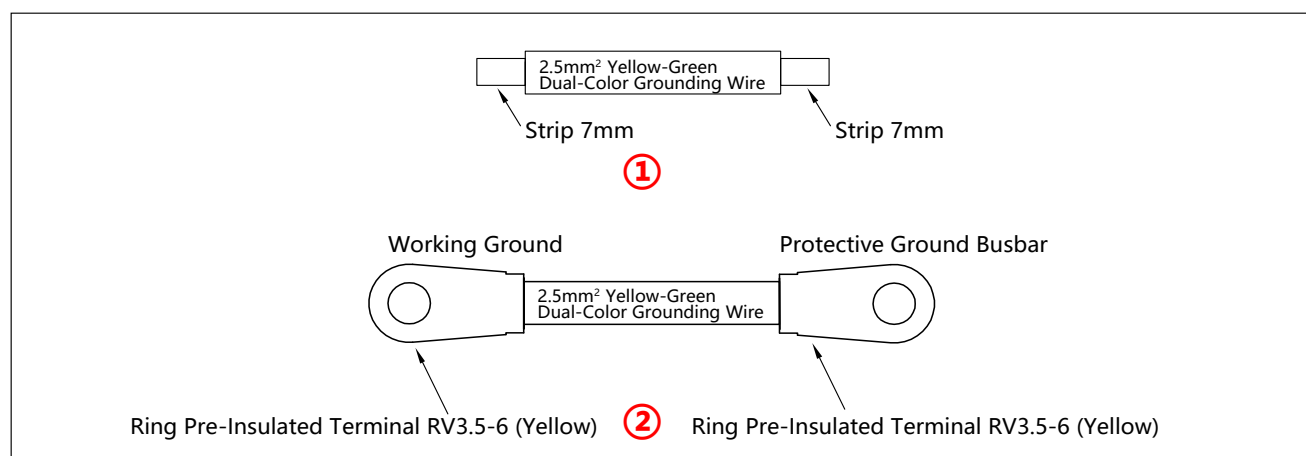
◆ Battery Negative (-) Cable



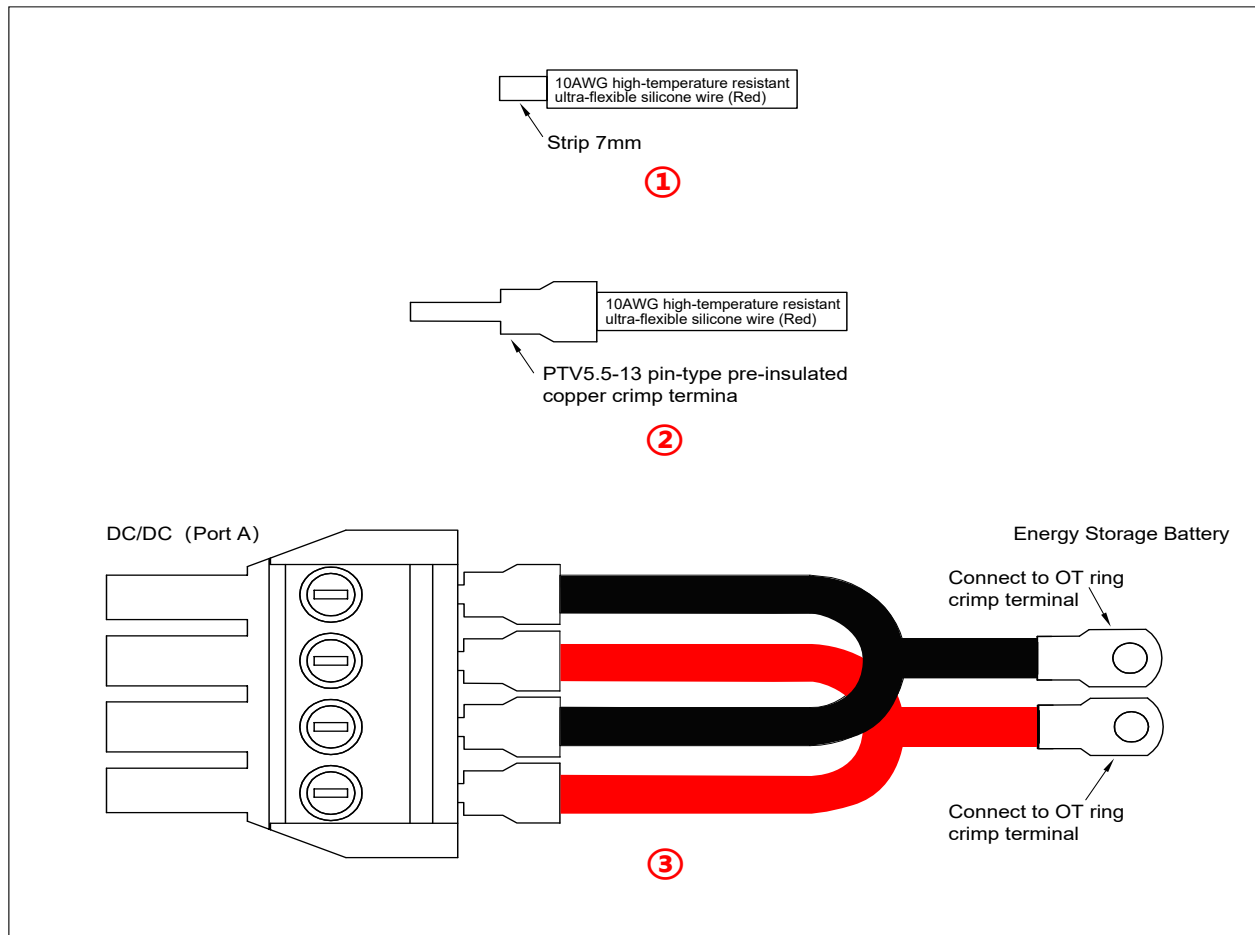
◆ Battery Positive (+) Busbar Cable



◆ Positive Busbar Working Ground Cable Assembly Diagram



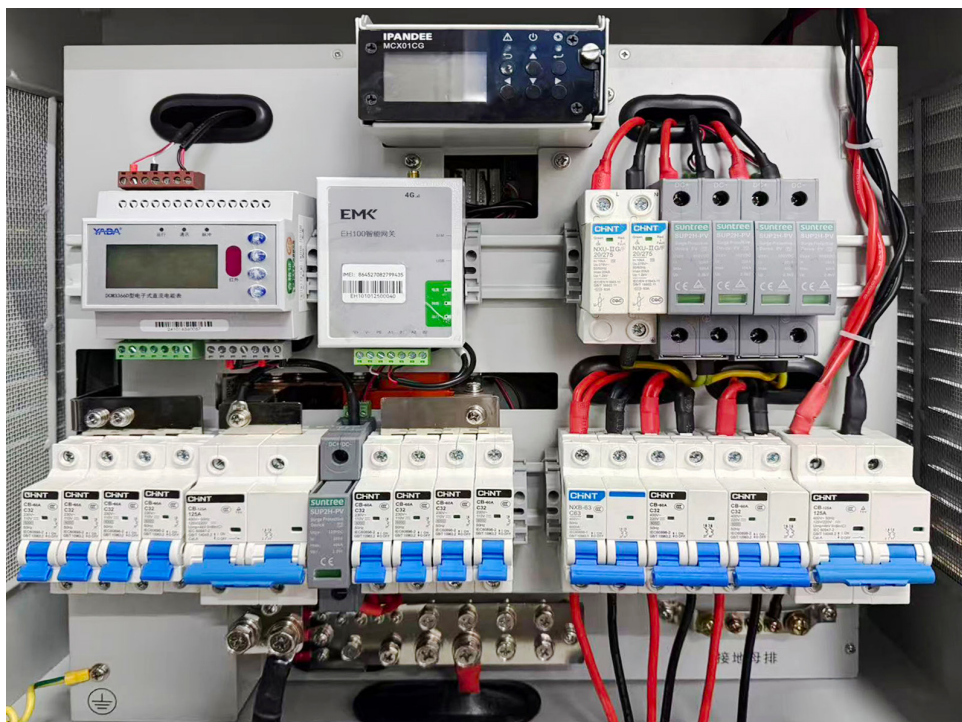
◆ Assembling the DCDC Energy Storage Battery Module Wiring Terminals



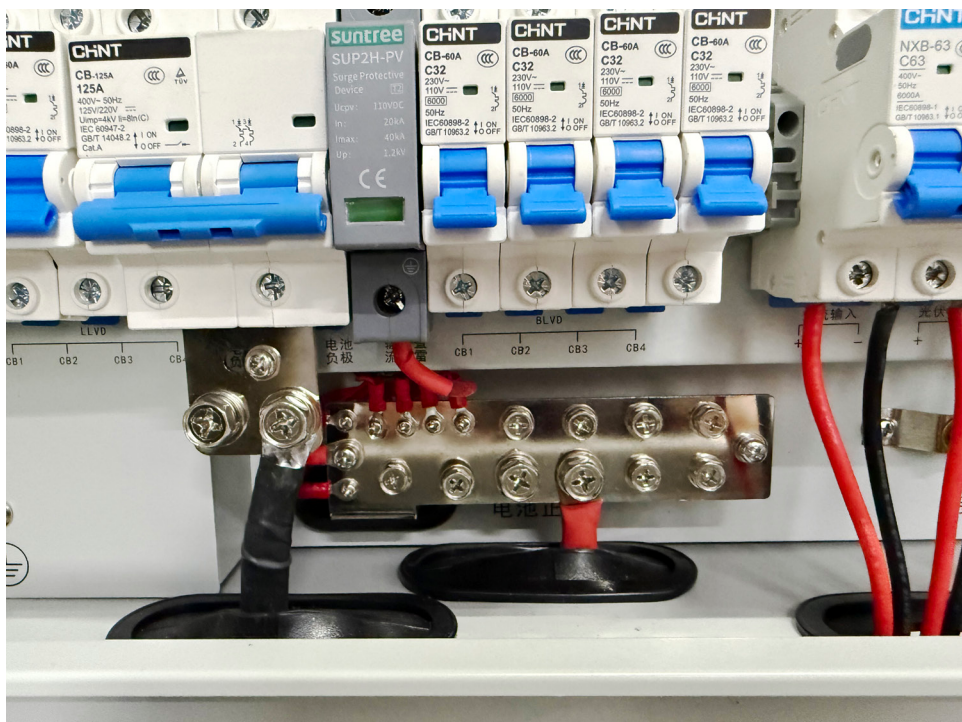
3.6 Power-on Commissioning

3.6.1 Battery Busbar Port Power-on Commissioning

① Before connecting the battery busbar ports, please ensure the circuitbreaker at the battery end is turned OFF.



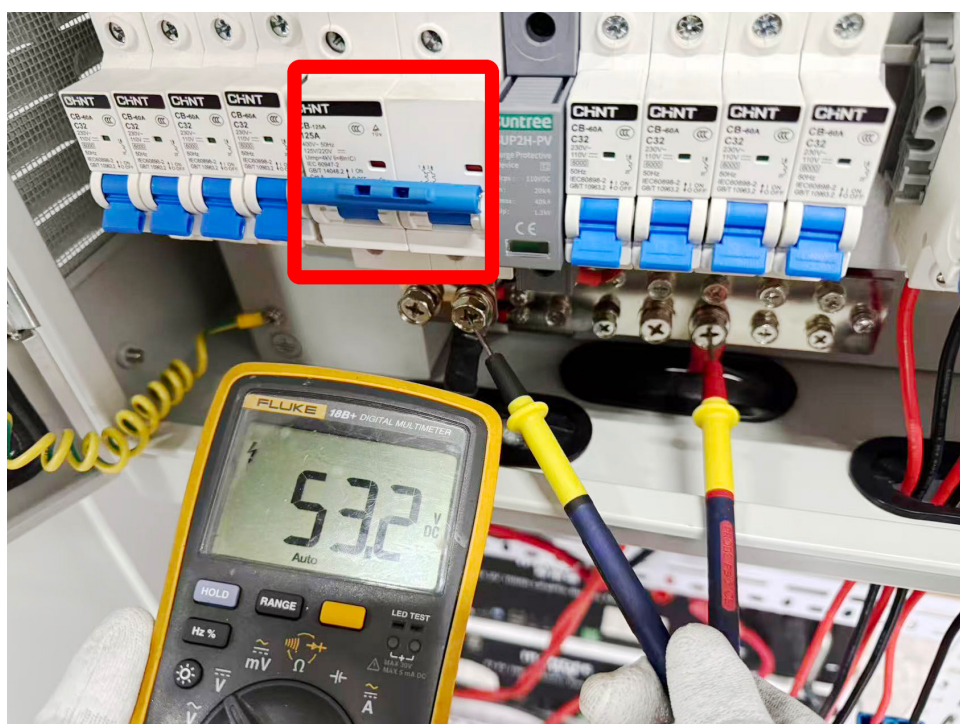
② Busbar Ports: Please ensure the positive and negative cables at the battery busbar ports are connected securely.



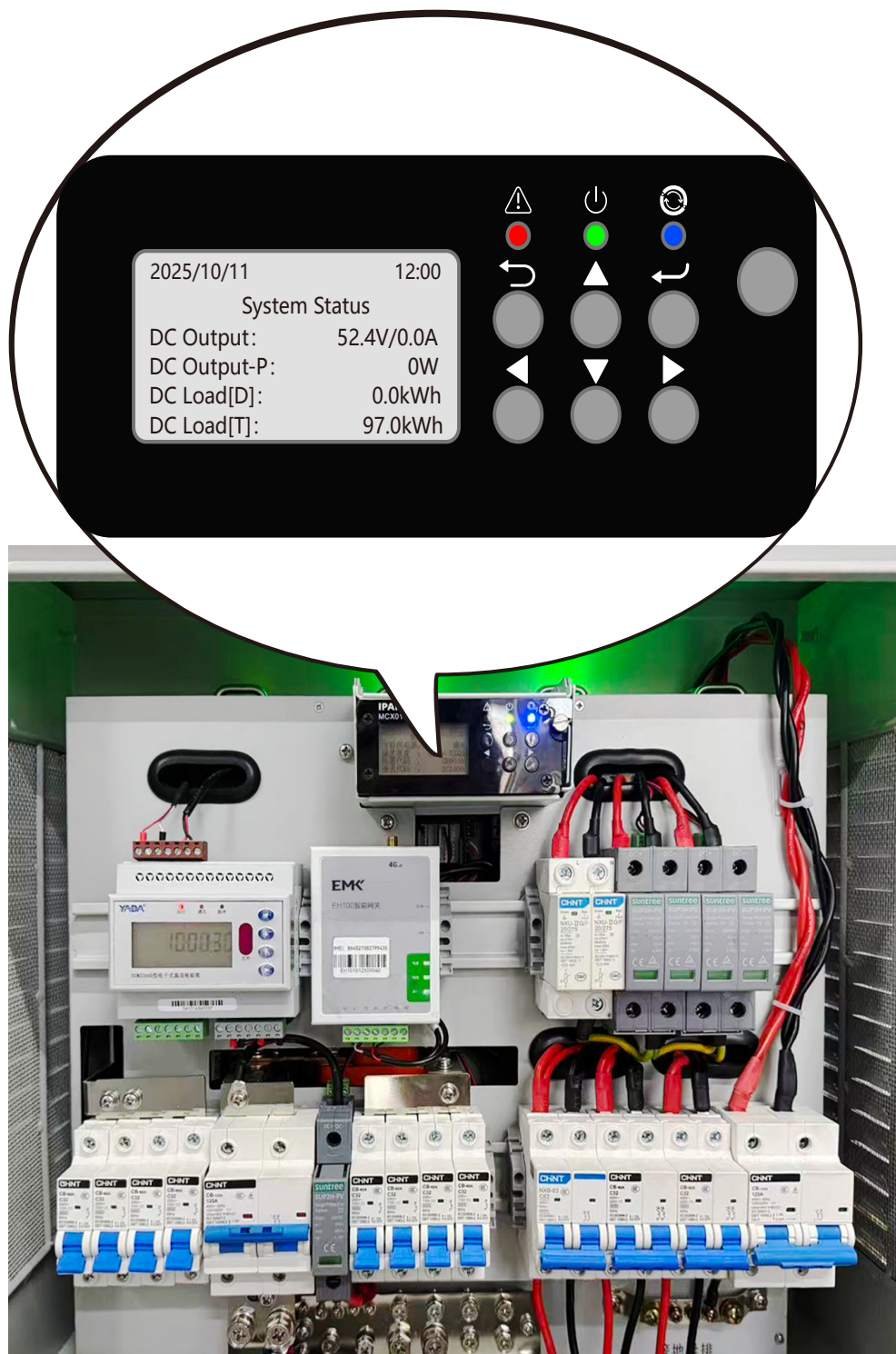
③ Use a multimeter set to the DC voltage range to check whether the wiring polarity of the positive and negative battery terminals is correct, and ensure that the busbar voltage is within the normal operating range (40 V–60 V).



④ After confirming the battery busbar inspection is correct, close the circuit breaker at the battery end.

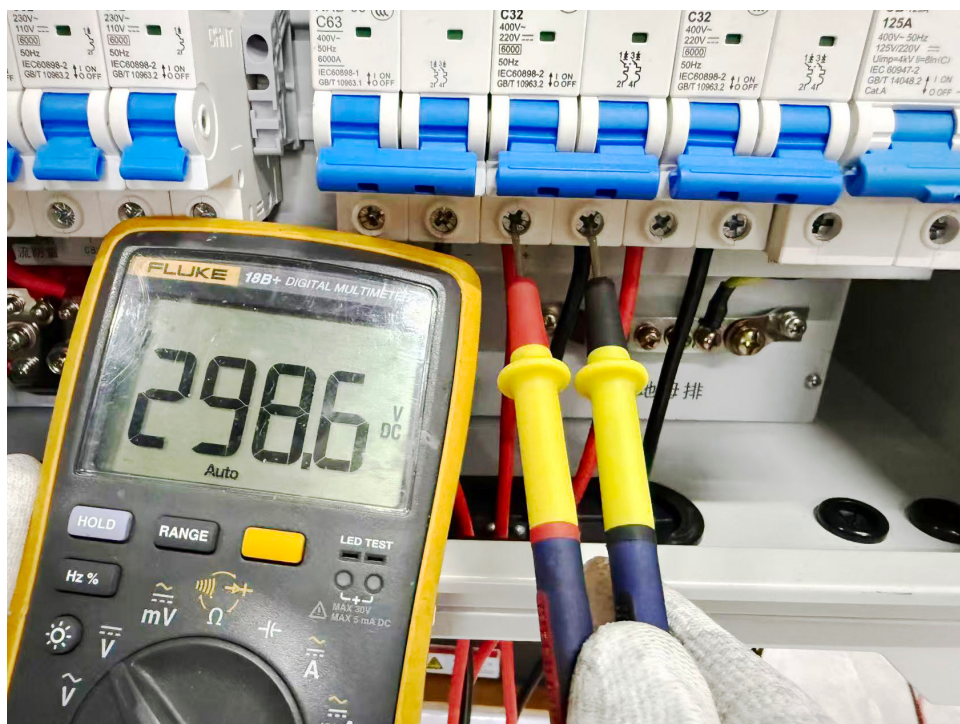


⑤ Observe whether the monitoring display screen lights up. Once active, verify if the displayed battery voltage at the busbar port is consistent with the busbar voltage measured during the pre-power-on inspection.

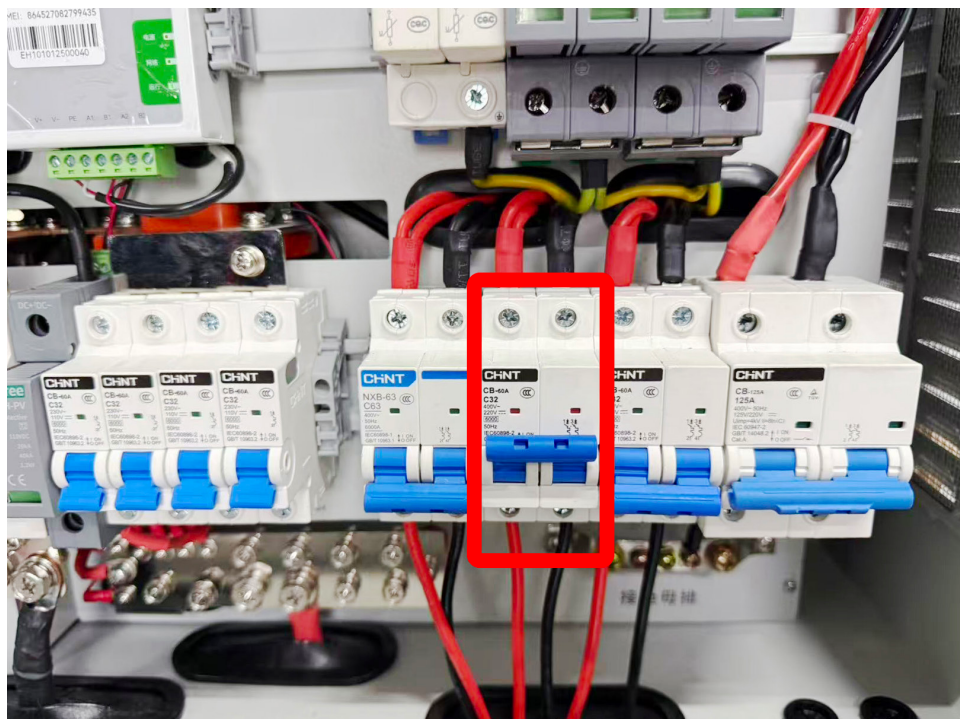


3.6.2 PV Input Port Power-on Commissioning

① Use a multimeter set to the DC voltage range to check whether the wiring polarity of the PV input port is correct, and ensure that the PV input port voltage is within the normal operating range (120 V–420 V).



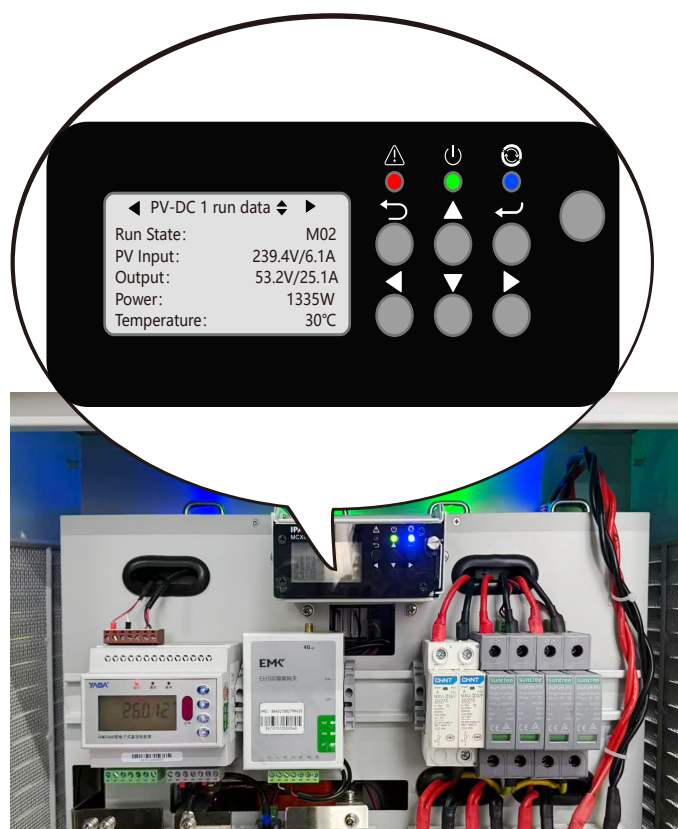
② After confirming that the PV input port polarity and voltage checks are correct, close the corresponding PV input air circuit breaker.



- ③ Check the solar operational data on the monitoring display (for the corresponding channel) to verify if the displayed data matches the measured voltage at the PV input port.



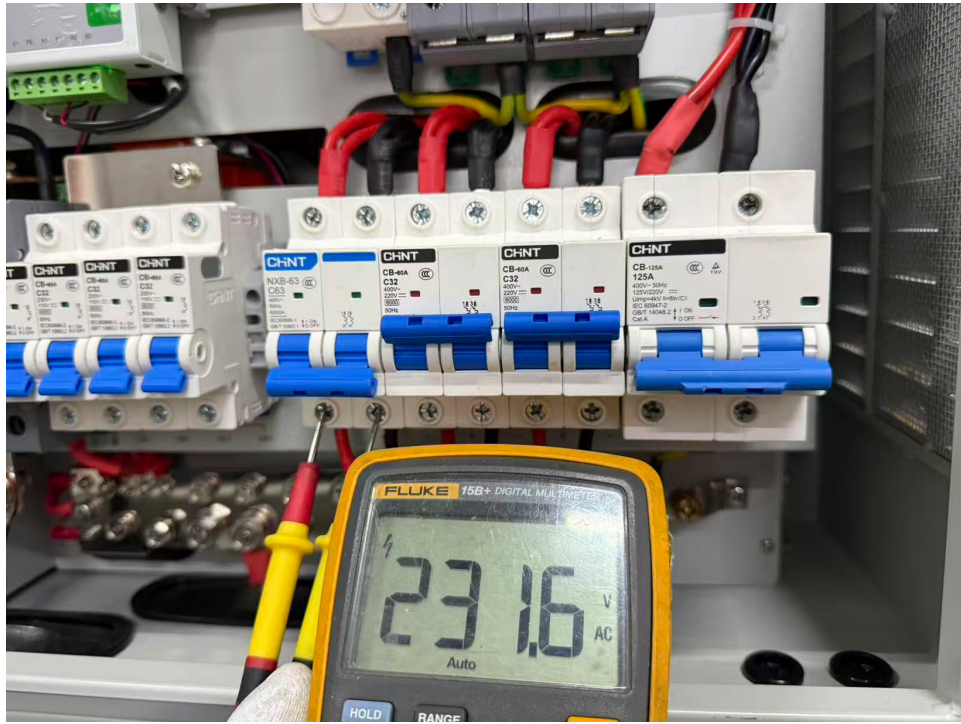
- ④ Upon a successful check, the solar module will enter normal charging mode after 30 seconds, indicated by a flashing green light. The monitoring display will then show the operational data of the solar module.



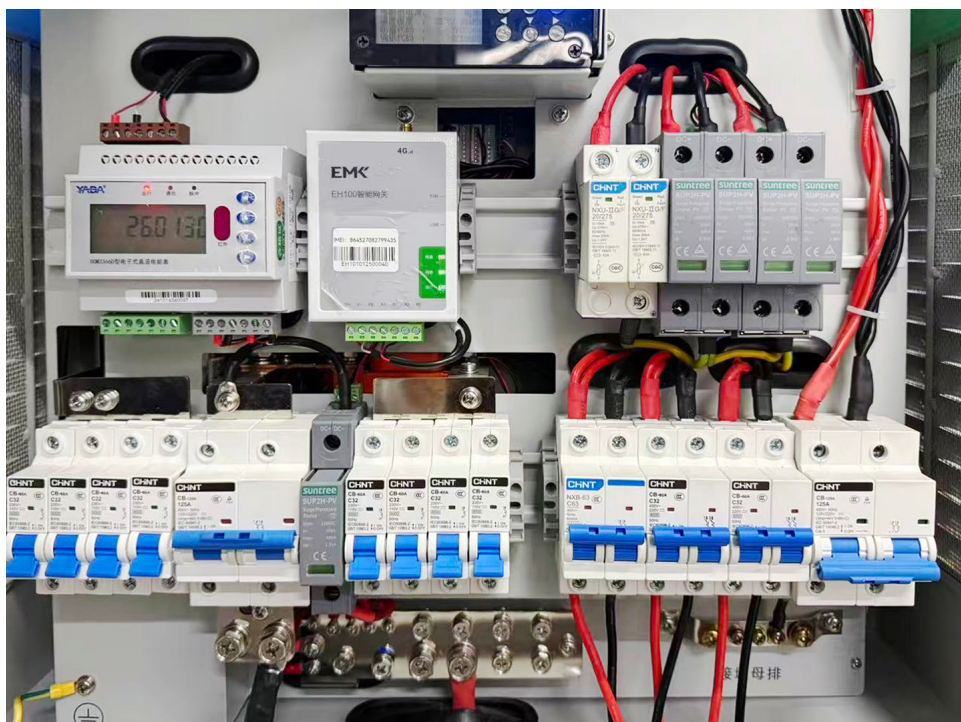
3.6.3 Rectifier Input Port Power-on Commissioning

- ① Use a multimeter set to the AC voltage range to check whether the input port wiring is normal, and ensure that the rectifier input port voltage is within the normal operating range (170 V–285 V).

Example: Single-phase wiring method



- ② After confirming that the AC input port voltage is correct, close the AC input circuit breaker.



③ Check the rectifier operational data on the monitoring display (for the corresponding channel) to verify if the displayed data matches the measured voltage at the rectifier input port.

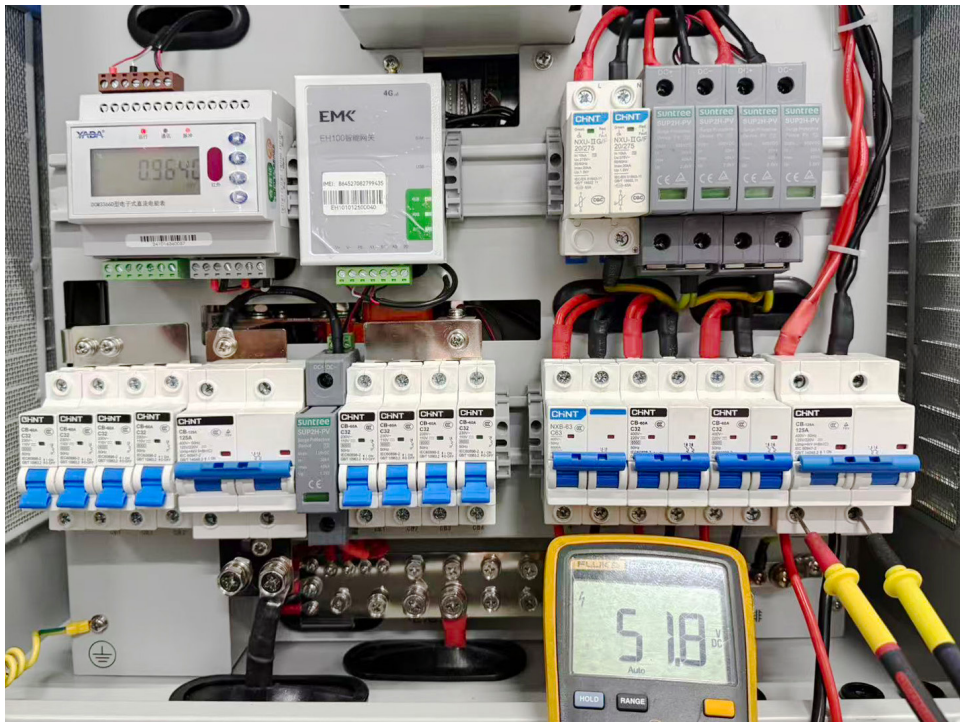


④ If the detection result is normal, the rectifier functional module will enter the normal operating mode after 30 s, with the green indicator blinking, and the monitoring display screen will show the rectifier functional module operating data.

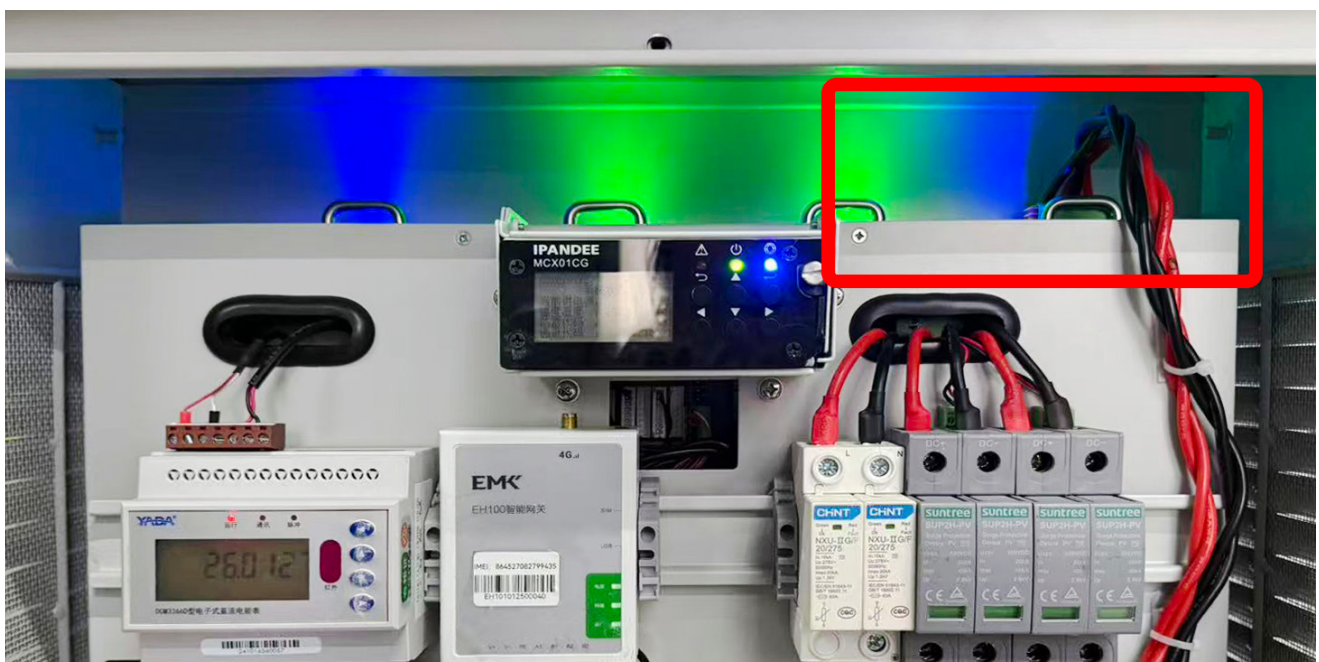


3.6.4 Bidirectional DC/DC Input Port Power-on Commissioning

① Use a multimeter set to the DC voltage range to check whether the wiring polarity of DCDC input port A is correct, and ensure that the voltage of input port A is within the normal operating range (40V–60V).



② After confirming the inspection of the bidirectional DCDC input port is correct, insert the energy storage battery terminal into Port A of the module.



③ Check the DCDC operational data on the monitoring display (for the corresponding channel) to verify if the displayed data matches the measured voltage at the DCDC input port.

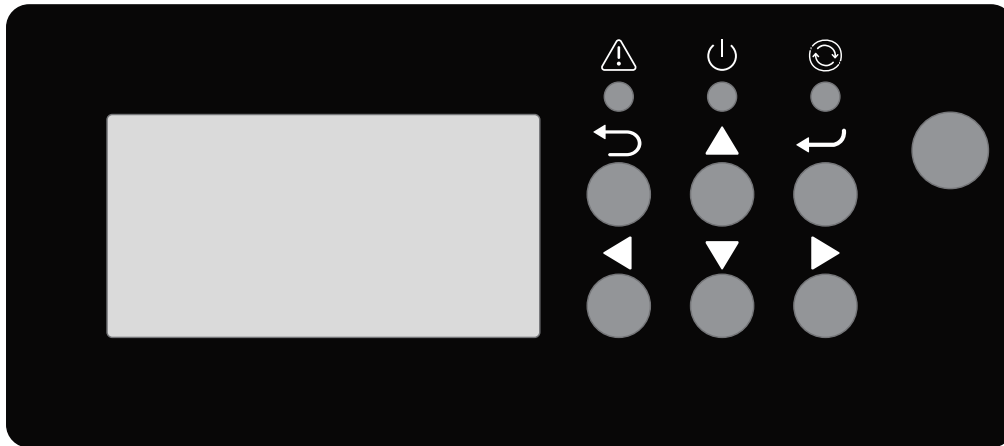


④ If the detection result is normal, the operating logic and sequence of the bidirectional DCDC (B→A operation, A→B operation) will function based on the sequence configured by the monitoring module. (Note: Before the bidirectional DCDC module operates, please configure the required operating logic and sequence on the monitoring display screen first.)



4.0 Settings

4.1 Operation Interface Overview



Indicators: ⚠ "Alarm" ⏻ "Power" 🔄 "Run"

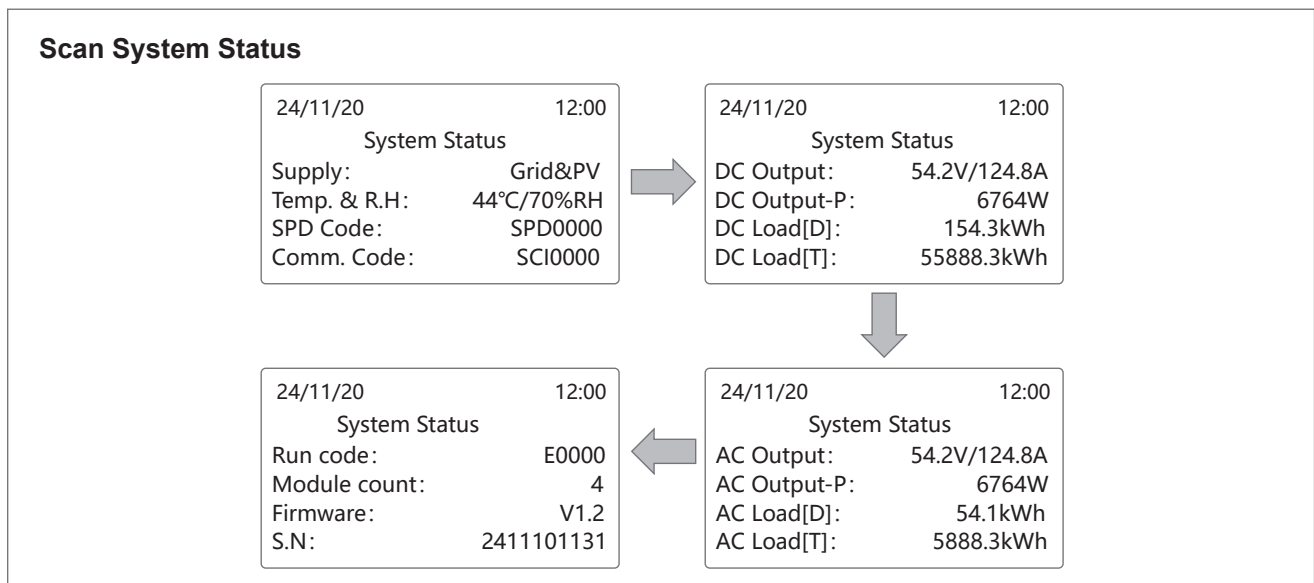
Keys: ↶ "Return" ↵ "Enter" ▲ "Up" ▼ "Down" ◀ "Left" ▶ "Right"

★ Pressing any key to wakes up the screen. The backlight turns off after 30 seconds of inactivity.
In any non-setting interface, press and hold the Return key for 3 seconds to restart the LCD display.

★ The monitoring module supports Chinese/English. Hold ↶ "Return" for 3 seconds to change languages.

4.2 Operation Settings

4.2.1 Operation Diagram

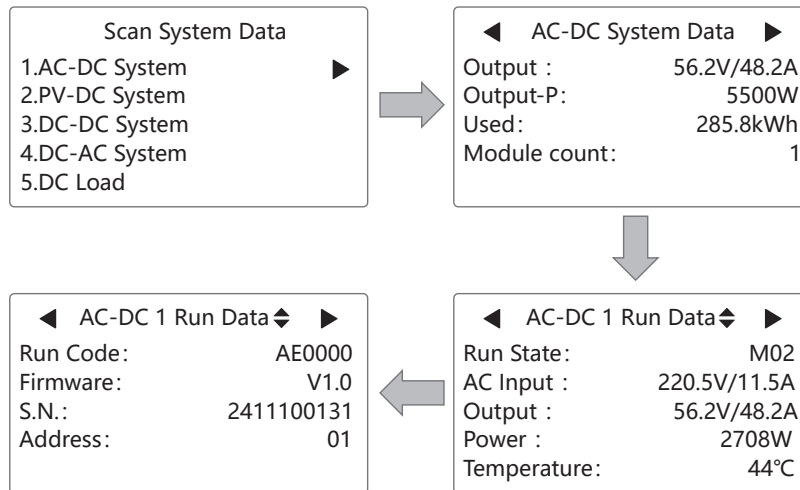


Key Descriptions:

“▲” “▼” Scroll through the pages in a loop. “◀” Enter the System Basic Settings page.

“▶” Enter the Scan System Data page and module run data pages.

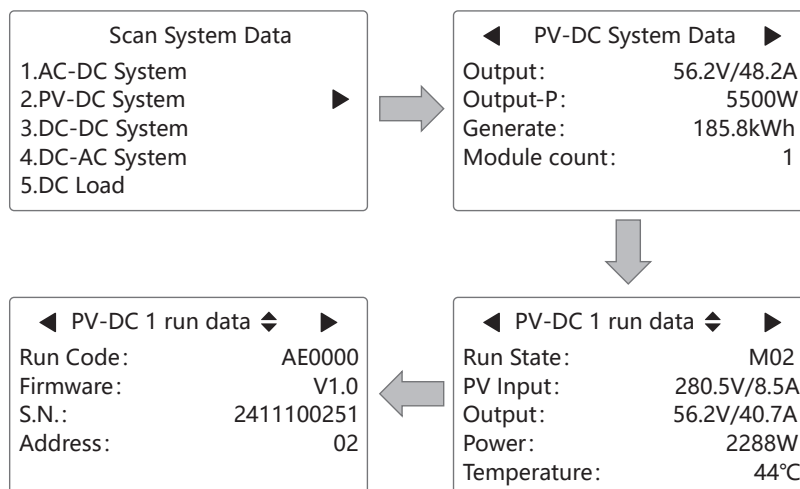
Scan AC-DC System Data



Key Descriptions:

In the Scan System Data page, select AC-DC System Data, press "▶" or "↶" to enter and view the relevant data. The data is divided into system data and run data for each module. Press the "▲" and "▼" keys to scan the run data of the module. Press the "◀" and "▶" keys to switch between modules. Press the "↵" to return to the previous pages.

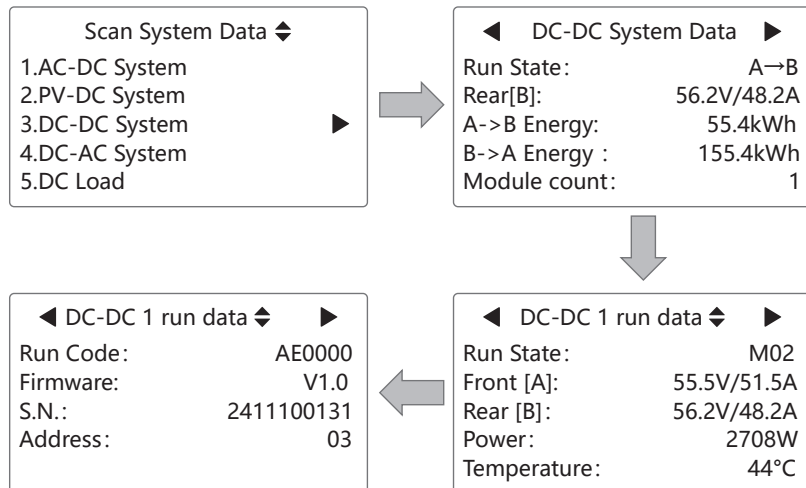
Scan PV-DC System Data



Key Descriptions:

In the Scan System Data page, select PV-DC System Data, press "▶" or "↶" to enter and view the relevant data. The data is divided into system data and run data for each module. Press the "▲" and "▼" keys to scan the run data of the module. Press the "◀" and "▶" keys to switch between modules. Press the "↵" to return to the previous page.

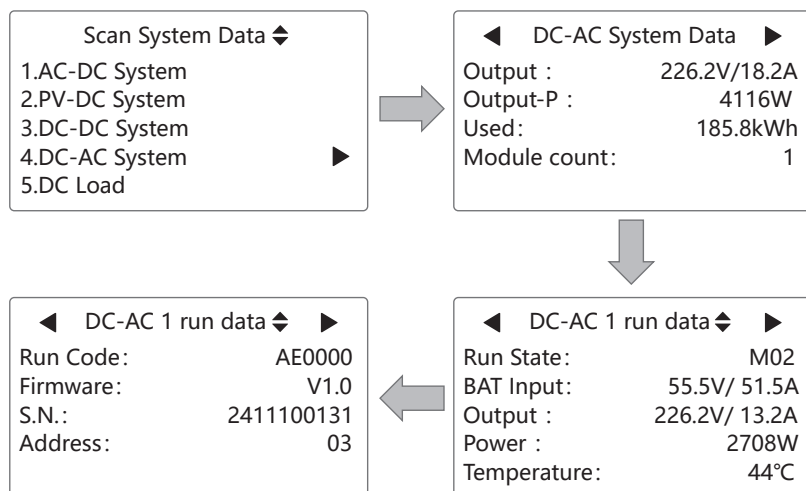
Scan DC-DC System Data



Key Descriptions:

In the Scan System Data page, select DC-DC System Data, press "►" or "↶" to enter and view the relevant data. The data is divided into system data and run data for each module. Press the "▲" and "▼" keys to scan the run data of the module. Press the "◀" and "▶" keys to switch between modules. Press the "↵" to return to the previous pages.

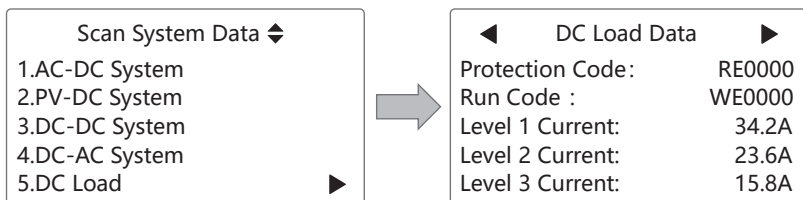
Scan DC-AC System Data



Key Descriptions:

In the Scan System Data page, select DC-AC System Data, press "►" or "↶" to enter and view the relevant data. The data is divided into system data and run data for each module. Press the "▲" and "▼" keys to scan the run data of the module. Press the "◀" and "▶" keys to switch between modules. Press the "↵" to return to the previous pages.

Scan DC Load Low Voltage Disconnect Protection Data



Key Descriptions:

In the Scan System Data page, select DC Load Data, press "►" or "↵" to enter and view the relevant data. Press "↶" to return to the previous pages.



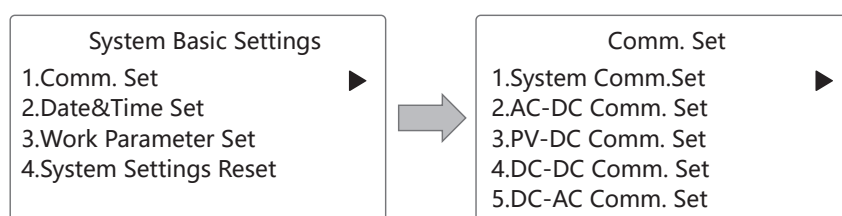
Caution: The number of each type of functional modules available for scanning depends on the module quantity setting in the Communication Setting page. If the quantity for a particular functional module type is set to 0, a prompt will appear advising you to add the required number of modules in the settings page.

4.2.2 System Basic Settings

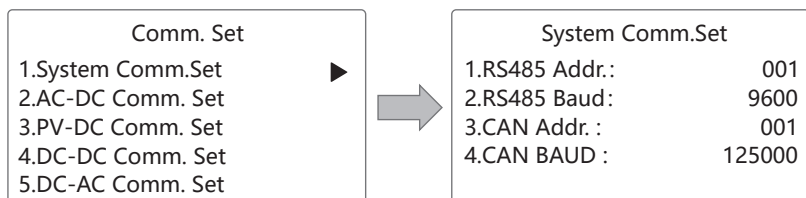
System settings includes: Communication Settings, Date&Time Settings, Work Parameter Settings, and System Settings Reset. Use the "▲" and "▼" keys to select, and press the "►" key to enter the content page of the selected option.

Communication Settings

In the System Basic Settings menu, select Communication Settings and enter the Communication Settings menu.



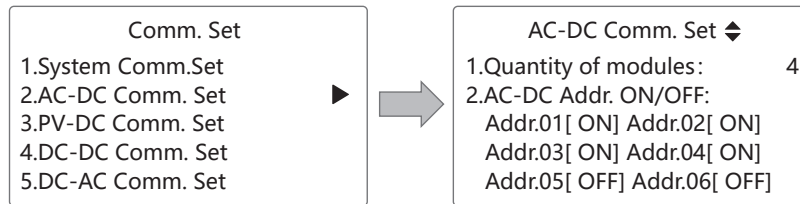
System Communication Settings (Monitoring Module)



Key Descriptions:

In the Communication Settings menu, select System Communication settings and press "►" or "↵" to enter the external communication address and baud rate settings. Press and hold the "↵" key for 3 seconds until the cursor appears, then use the "▲" and "▼" keys to adjust the data value, and use the "◀" and "▶" keys to select the data item to be modified. After adjustment, press and hold the "↵" key for 3 seconds to save the modified parameters. Press the "↶" key to return to the previous page level by level.

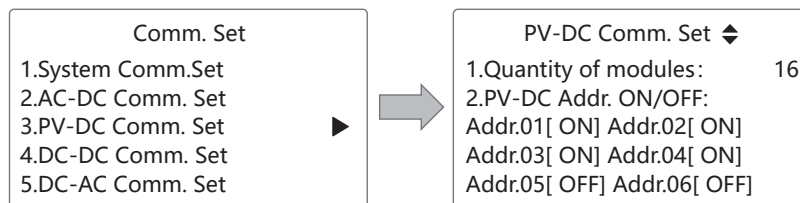
AC-DC Communication Settings



Key Descriptions:

In the Communication Settings menu, select AC-DC Communication Settings and press "►" or "↵" to enter the module quantity and address on/off settings. Press and hold the "↵" key for 3 seconds until the cursor appears, then use the "▲" and "▼" keys to adjust the data value, and use the "◀" and "▶" keys to select the data item to be modified. After adjustment, press and hold the "↵" key for 3 seconds to save the modified parameters. Press the "↶" key to return to the previous page level by level.

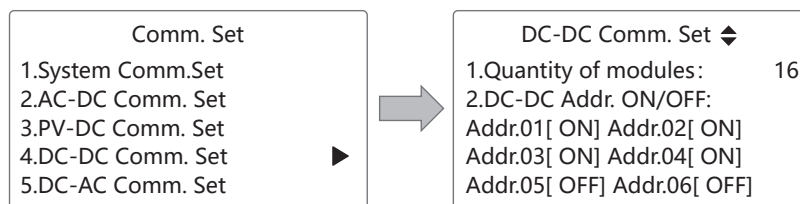
PV-DC Communication Settings



Key Descriptions:

In the Communication Settings menu, select PV-DC Communication Settings and press "►" or "↵" to enter the module quantity and address on/off settings. Press and hold the "↵" key for 3 seconds until the cursor appears, then use the "▲" and "▼" keys to adjust the data value, and use the "◀" and "▶" keys to select the data item to be modified. After adjustment, press and hold the "↵" key for 3 seconds to save the modified parameters. Press the "↶" key to return to the previous page level by level.

DC-DC Communication Settings



Key Descriptions:

In the Communication Settings menu, select DC-DC Communication Settings and press "►" or "↵" to enter the module quantity and address on/off settings. Press and hold the "↵" key for 3 seconds until the cursor appears, then use the "▲" and "▼" keys to adjust the data value, and use the "◀" and "▶" keys to select the data item to be modified. After adjustment, press and hold the "↵" key for 3 seconds to save the modified parameters. Press the "↶" key to return to the previous page level by level.

DC-AC Communication Settings



Key Descriptions:

In the Communication Settings menu, select DC-AC Communication Settings and press "►" or "↶" to enter the module quantity and address on/off settings. Press and hold the "↶" key for 3 seconds until the cursor appears, then use the "▲" and "▼" keys to adjust the data value, and use the "◀" and "▶" keys to select the data item to be modified. After adjustment, press and hold the "↶" key for 3 seconds to save the modified parameters. Press the "↷" key to return to the previous page level by level.

NOTE: Special Instructions on the Number and Address Settings of Functional Modules

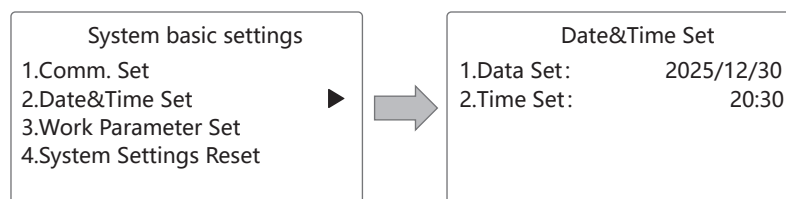
"ON" indicates that the functional module enables this address; "OFF" indicates that the function module disables this address. The number of modules must equal the number of enabled addresses, and the enabled addresses must correspond one-to-one with the slot addresses of the inserted function modules.

The total number of modules among the four types—rectifier(AC-DC), solar charge controller (PV-DC), DC-DC, and inverter(DC-AC)—must not exceed 16. When setting addresses, if a later setting conflicts with a previously saved address function, the later setting will overwrite the previous one.

Example: If address 04 is first saved as the address for a rectifier module, and later, when configuring a solar charge controller module, address 04 is also enabled, then address 04 will be used as the address for the solar charge controller module.

Date&Time Settings

In the System Basic Settings menu, select Date&Time Settings to enter and set the date and time.

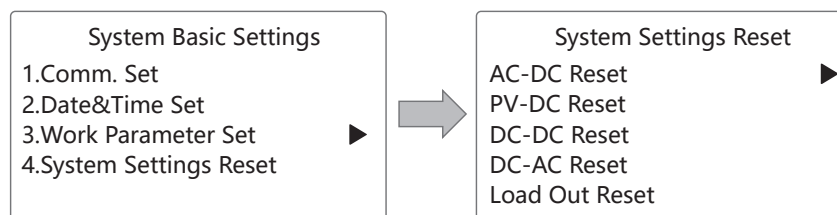


Key Descriptions:

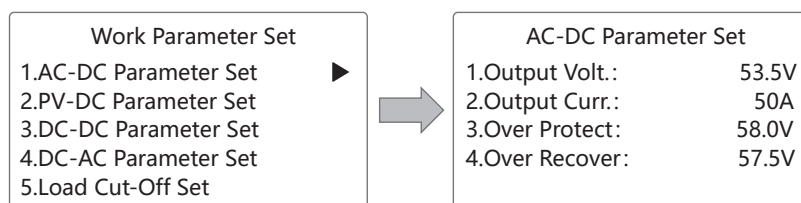
Press and hold the "↶" key for 3 seconds until the cursor appears, then use the "▲" and "▼" keys to adjust the data value, and use the "◀" and "▶" keys to select the data item to be modified. After adjustment, press and hold the "↶" key for 3 seconds to save the modified time. Press the "↷" key to return to the previous page level by level.

Work Parameter Settings

In the System Basic Settings menu, select Work Parameter Settings to enter.



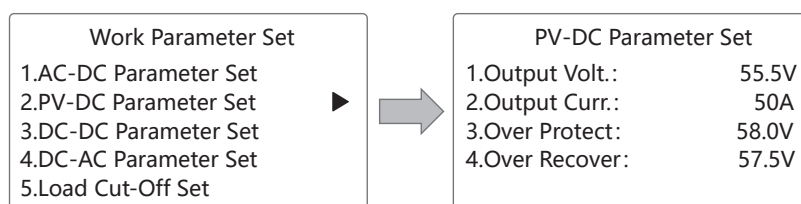
AC-DC Parameter Settings



Key Descriptions:

In the Work Parameter Settings menu, select AC-DC Parameter Settings and press "►" or "↵" to enter. Press and hold the "↵" key for 3 seconds until the cursor appears, then use the "▲" and "▼" keys to adjust the data value, and use the "◀" and "▶" keys to select the data item to be modified. After adjustment, press and hold the "↵" key for 3 seconds to save the modified parameters. Press the "↶" key to return to the previous page level by level.

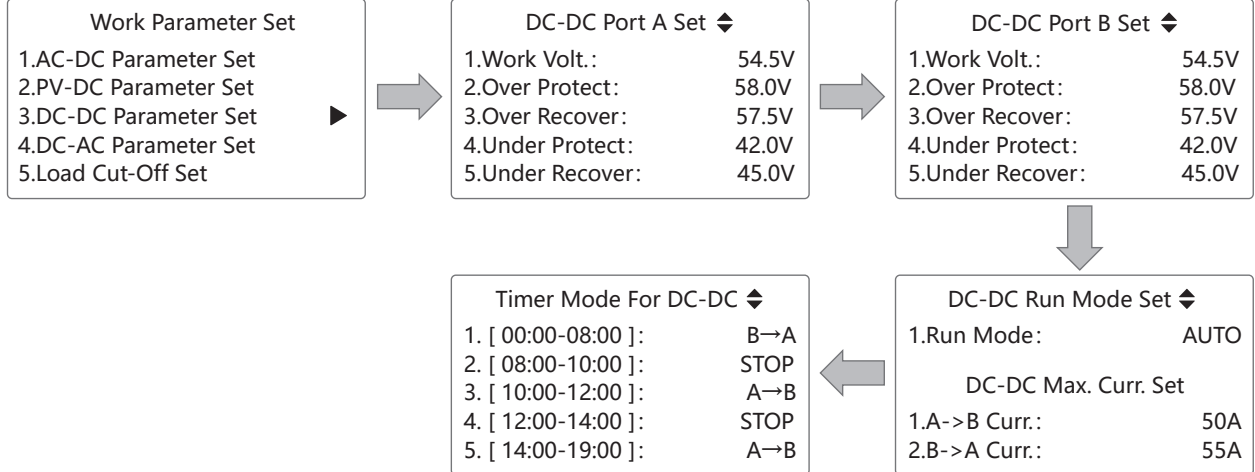
PV-DC Parameter Settings



Key Descriptions:

In the Work Parameter Settings menu, select PV-DC Parameter Settings and press "►" or "↵" to enter. Press and hold the "↵" key for 3 seconds until the cursor appears, then use the "▲" and "▼" keys to adjust the data value, and use the "◀" and "▶" keys to select the data item to be modified. After adjustment, press and hold the "↵" key for 3 seconds to save the modified parameters. Press the "↶" key to return to the previous page level by level.

DC-DC Parameter Settings

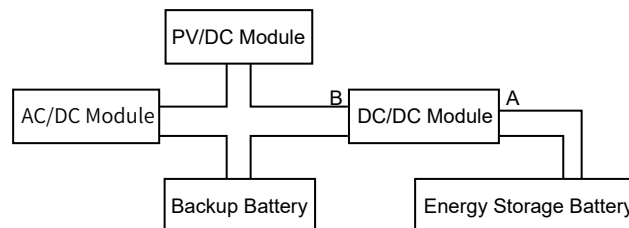


Key Descriptions:

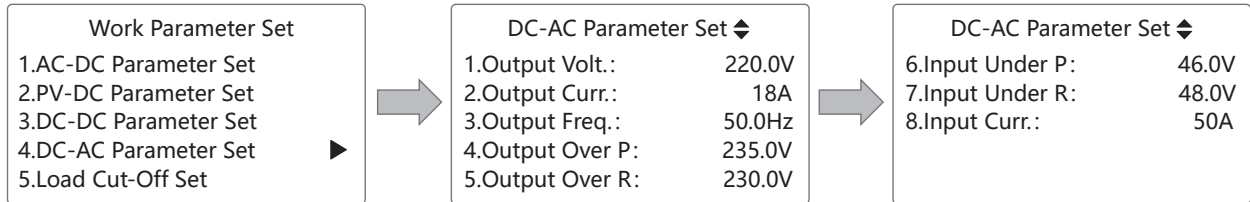
In the Work Parameter Settings menu, select DC-DC Parameter Settings and press "►" or "↶" to enter. Press and hold the "↶" key for 3 seconds until the cursor appears, then use the "▲" and "▼" keys to adjust the data value, and use the "◀" and "▶" keys to select the data item to be modified. After adjustment, press and hold the "↶" key for 3 seconds to save the modified parameters. Press the "↷" key to return to the previous page level by level.



Caution: Run Mode: AUTO Voltage Mode and TIMER Mode. STOP Mode: Not in operation. AUTO Voltage Mode: During the day, excess energy from the solar-storage system is stored in the battery. At night, the energy stored during the day is used first. During daytime operation, when the monitoring module detects that the battery bus voltage exceeds the output voltage set on the PV/DC module (the logic is defined as 0.5V below the set value), the DC/DC module operates in B→A mode, charging the energy storage battery. During nighttime operation, based on the monitoring module's clock, between 9:00 PM and 6:00 AM (21:00–6:00), the system operates in A→B mode, discharging the energy storage battery to the battery bus until the energy storage battery undervoltage protection is over. TIMER Timer Mode: 5 timer periods are reserved to define the operating direction (STOP, A→B, B→A).



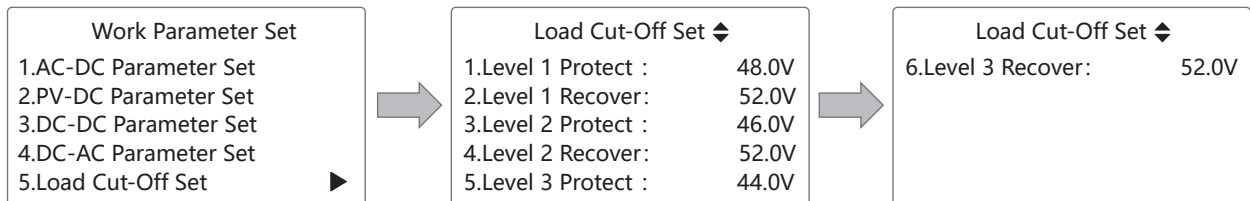
DC-AC Parameter Settings



Key Descriptions:

In the Work Parameter Settings menu, select DC-AC Parameter Settings and press "►" or "↶" to enter. Press and hold the "↶" key for 3 seconds until the cursor appears, then use the "▲" and "▼" keys to adjust the data value, and use the "◀" and "▶" keys to select the data item to be modified. After adjustment, press and hold the "↶" key for 3 seconds to save the modified parameters. Press the "↵" key to return to the previous page level by level.

Load Cut-Off Settings

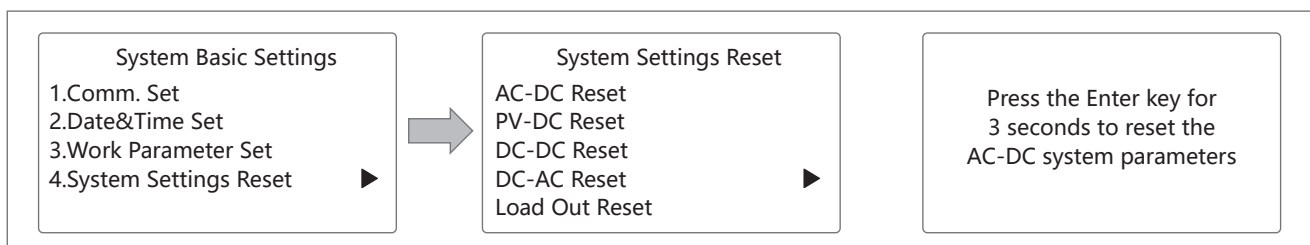


Key Descriptions:

In the Work Parameter Settings menu, select Load Cut-off Settings and press "►" or "↶" to enter. Press and hold the "↶" key for 3 seconds until the cursor appears, then use the "▲" and "▼" keys to adjust the data value, and use the "◀" and "▶" keys to select the data item to be modified. After adjustment, press and hold the "↶" key for 3 seconds to save the modified parameters. Press the "↵" key to return to the previous page level by level.

System Settings Reset

In the System Basic Settings menu, select System Settings Reset and enter.



Key Descriptions:

In the System Settings Reset menu, move the cursor to select the functional module whose parameters need to be reset, then press the "►" key or "↶" key to enter the prompt page. Follow the instructions on the prompt page and press the "↶" key for 3 seconds to start the parameter reset. Press the "↵" key to return to the previous page level by level.

5.0 Maintenance and Service

5.1 Routine Maintenance

Maintenance personnel shall determine the maintenance interval based on local conditions. A recommended interval is once every 6 months.

Routine Maintenance Checklist

Maintenance Item	Inspection Item	Inspection Method	Abnormal Condition	Solution
Electrical	If output voltage is normal	Multimeter	Input voltage is out of the normal range	Please refer to 5.2 Alarm & Fault Troubleshooting
			Battery branch or load branch voltage exceeds the set range (-40VDC ~ -60VDC)	
Fault Inspection	If indicators are normal	Visual inspection	Fault alarm present	
Grounding	Whether the power supply grounding point is properly connected to the grounding busbar inside the cabinet	Multimeter	Resistance between the power supply grounding point and the grounding busbar is $> 0.1\Omega$	Tighten the grounding point or replace the grounding cable

5.2 Alarm & Fault Troubleshooting

5.2.1 DC Overvoltage

Possible Causes

- ◆ Improper DC overvoltage alarm value setting;
- ◆ System float/equalize voltage is set too high;
- ◆ Module failure.

Troubleshooting

- ◆ Check the DC overvoltage alarm value (default 60VDC) — adjust if needed.
- ◆ Check if the float/equalize charge voltage is set too high — verify cause and restore to normal.
- ◆ Remove modules one by one: if alarm persists, reinsert the module; if alarm clears, replace the module.

5.2.2 DC Undervoltage

Possible Causes

- ◆ Improper DC undervoltage alarm value setting;
- ◆ The system float charge voltage is set too low;
- ◆ Module failure.

Troubleshooting

- ◆ Check whether there is a power outage. If so, restore the power supply.
- ◆ Check DC undervoltage alarm values (level 1 Low Voltage Disconnect: 48V, level 2 Low Voltage Disconnect: 46V, level 3 Voltage Disconnect: 44V; recovery: 52V) — adjust if needed.
- ◆ Check if float/equalize voltage is set too low — verify cause and restore to normal.
- ◆ Check if load current of the power system exceeds the current system capacity. If so, either increase the system capacity configuration or reduce the system load.
- ◆ Check if a faulty module has reduced system capacity — replace if needed.

5.2.3 Load Circuit Disconnection

Possible Causes

- ◆ Load CB/fuse tripped/open
- ◆ Load CB/fuse detection wire loose

Troubleshooting

- ◆ Check whether the load circuit breaker or fuse is open. If so, clear the fault on the downstream circuit, then close the circuit breaker or replace the fuse.
- ◆ Check whether the load circuit breaker or fuse detection wire is loose. If so, secure the detection wire firmly.

5.2.4 Battery Circuit Disconnection

Possible Causes

- ◆ Battery circuit breaker or fuse is open/tripped;
- ◆ Battery circuit breaker or fuse detection wire is loose;
- ◆ Contactor failure.

Troubleshooting

- ◆ Check whether the battery circuit breaker or fuse is open. If so, clear the fault on the downstream circuit, then close the circuit breaker or replace the fuse.
- ◆ Check whether the battery circuit breaker or fuse detection wire is loose. If so, secure the detection wire firmly.
- ◆ Manually control the battery contactor to close or open, and check whether the battery current changes accordingly. If not, replace the contactor.

5.2.5 Battery Disconnection

Possible Causes

- ◆ AC power failure;
- ◆ The battery low-voltage disconnect (BLVD) setting on the monitoring module is too high;
- ◆ Module fault;
- ◆ Improper system configuration.

Troubleshooting

- ◆ Check whether the input power is out. If so, restore the power supply.
- ◆ Check whether the battery low-voltage disconnect (BLVD) setting on the monitoring module (see functional module settings) is too high. If so, adjust it according to the actual conditions.
- ◆ Check whether a module failure has caused the power system capacity to fall short of the load demand. If so, replace the faulty module.
- ◆ Check whether the power system load current exceeds the current system capacity. If so, either increase the system capacity configuration or reduce the system load.

5.2.6 Module Failure

Possible Causes

- ◆ Poor module contact;
- ◆ Module damaged;
- ◆ Module operation abnormal.

Troubleshooting

- ◆ Check whether the alarm indicator on the module panel is steadily on (red). If so, remove the module, wait for the indicator to turn off, then reinsert the module.
- ◆ If the alarm persists, replace the module.

5.2.7 Module Protection

Possible Causes

- ◆ Module input voltage is too high;
- ◆ Module input voltage is too low;
- ◆ Ambient temperature is too high.

Troubleshooting

- ◆ Check whether the input voltage exceeds the module's maximum operating voltage. If so, clear the power supply fault, then restore power.
- ◆ Check whether the input voltage is below the module's minimum operating voltage. If so, clear the power supply fault, then restore power.
- ◆ Check whether the ambient temperature exceeds the module's normal operating temperature. If so, inspect and resolve the temperature control system fault.

6.2.8 Communication Failure Between Module and Monitoring Module

Possible Causes

- ◆ The module has been removed;
- ◆ Poor contact of the communication cables at the rear of the module, or poor contact of the communication cables between the monitoring module and the module adapter;
- ◆ Module failure;
- ◆ Duplicate address settings of functional modules.

Troubleshooting

- ◆ Check whether the module has been removed. If so, reinsert the module.
- ◆ Check whether the the connections between the functional module and the monitoring module are secure.
- ◆ If the alarm persists, replace the module.
- ◆ Ensure that the functional module addresses correspond one-to-one with their respective slot positions (this prevents address conflicts between functional modules during operation, which would cause the monitoring module to fail to identify them).

6.0 Packing List

1、Ultra-Simplified Hybrid Power System	1 set
2、User Manual	1 set
3、Factory Inspection Report	1 copy
4、Installation Accessories	1 copy
5、Certificate of Conformity	1 piece
6、Functional Modules	Several (as per configuration)

7.0 Warranty and After-Sales Service

This product is warranted for one year from the date of purchase (subject to the contract terms). During the warranty period, product failures under normal use will be repaired or replaced free of charge by our company. After the warranty period expires, repair services remain available, and a repair fee will be charged.

- ◆ This warranty is provided solely to the original purchaser and is non-transferable.
- ◆ Our company reserves the right to make product changes without prior notice.

Free service will not be provided under any of the following circumstances during the warranty period:

- ◆ Equipment damage caused by failure to follow the user manual.
- ◆ Equipment damage caused by force majeure or natural disasters.
- ◆ Equipment modification or alteration by the customer.
- ◆ Equipment damage caused by transportation after the customer has signed for receipt.

