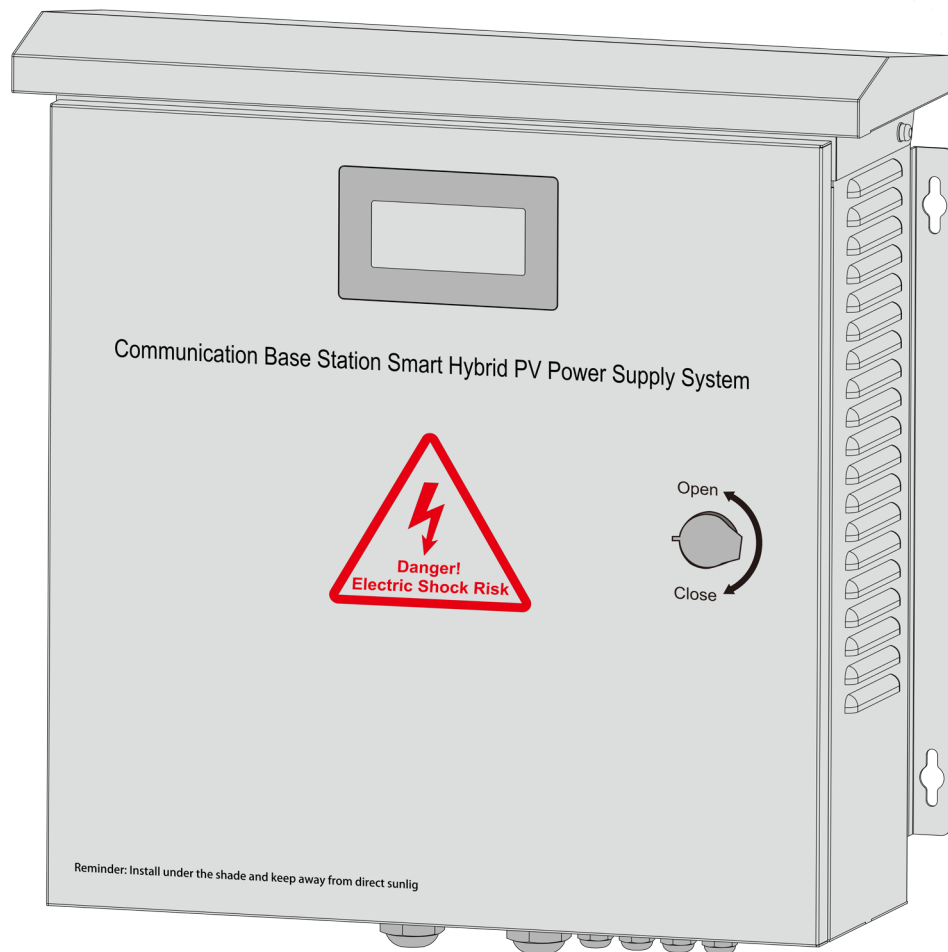


User Manual



Telecom Base Station Smart Hybrid PV and Hybrid Energy Storage Power Supply System

- Please read this user manual carefully before use and keep it properly.
- The product is subject to the actual item, pictures are for reference only.

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1.0 Important Safety Notices

1.1 Acknowledgement

Thank you for trusting and supporting us with your purchase. We truly appreciate your business.

In this user manual, we aim to provide you with clear, accurate instructions and helpful information to ensure you can easily understand and use our products.

1.2 Notice before Use

Before using this product, please read the user manual carefully to ensure you understand the correct and safe operating procedures. By using this product, you acknowledge that you have read and fully understood all the contents of this manual. Do not use the product until you have thoroughly reviewed the instructions and understood its functionality. Our company shall not be held liable for any financial losses or personal injuries arising from improper use or failure to adhere to the instructions provided in this manual.

To continuously improve our products, we reserve the right to update content in the manual. We also retain all intellectual property rights, including copyrights, patents, trademarks, and designs. The manual may be updated periodically without prior notice.

If you notice any discrepancies between the product and the manual, or if you have any questions, please contact us for clarification and any necessary updates. Our company reserves the final right of interpretation of this manual.

1.3 Safety Warnings

We attach great importance to safety and recommend that individuals who are involved in the installation, operation, maintenance, or servicing of our products exercise caution and adhere to common safety practices. It is crucial to follow the safety instructions outlined in this manual and adhere to the safety labels ensure the safety of both people and property, while minimizing potential risks.

The following information is marked on the instruction manual or product label sticker: A danger or warning symbol indicates a higher level of potential risk. If not avoided, it may result in death or serious personal injury. Special attention should be paid to these warnings, as they directly concern your safety or the safety of the product.



Note: Here are suggestions and tips for the operator.



Attention: This operation is destructive.



Warning: This operation is dangerous, be sure to do a good job of safety preparation before operation.

2.0 Product Introduction

2.1 Product Overview

This product can detect the power generation of solar panels in real time, and track the highest voltage current value (VI), so that the system can output to the system battery bus with maximum power. It is used in off-grid photovoltaic systems to coordinate the work of solar panels, batteries and loads, and is the core control equipment of the stacking light system.

The device has a comprehensive electronic fault self-test function and powerful electronic protection function, which can avoid the damage of product components caused by installation errors and system faults to the greatest extent.

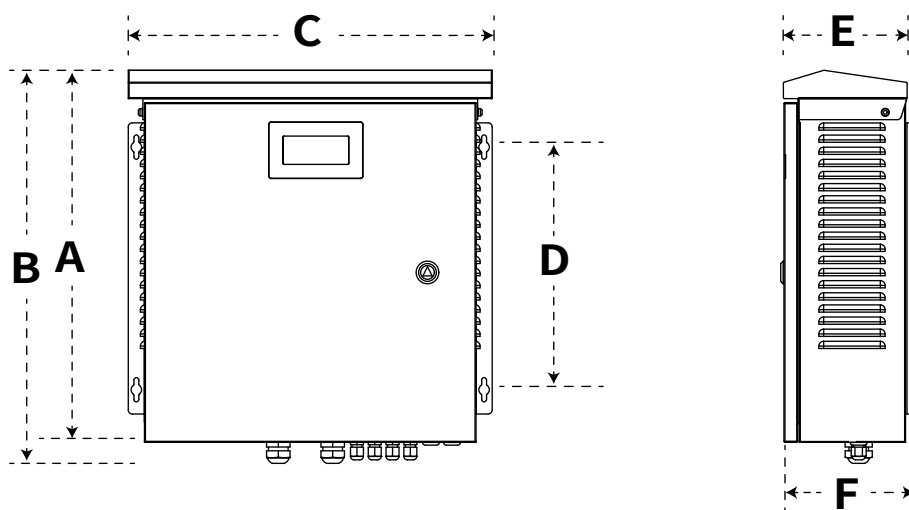
2.2 Product Features

- ◆ MPPT tracking efficiency can reach up to 99.9%;
- ◆ It has a limited output mode. When the power of the panel is too large and the output current is greater than the rated current, the device automatically reduces the output power to work at the rated output current;
- ◆ Built-in overtemperature protection mechanism. When the temperature exceeds the set value of the equipment, the charging current decreases linearly with the temperature to avoid high temperature damage of the equipment;
- ◆ Compatible with remote sampling compensation for battery voltage, eliminating the phenomenon of voltage difference caused by large current line loss, so that the system output is stable and efficient.

2.3 Product List

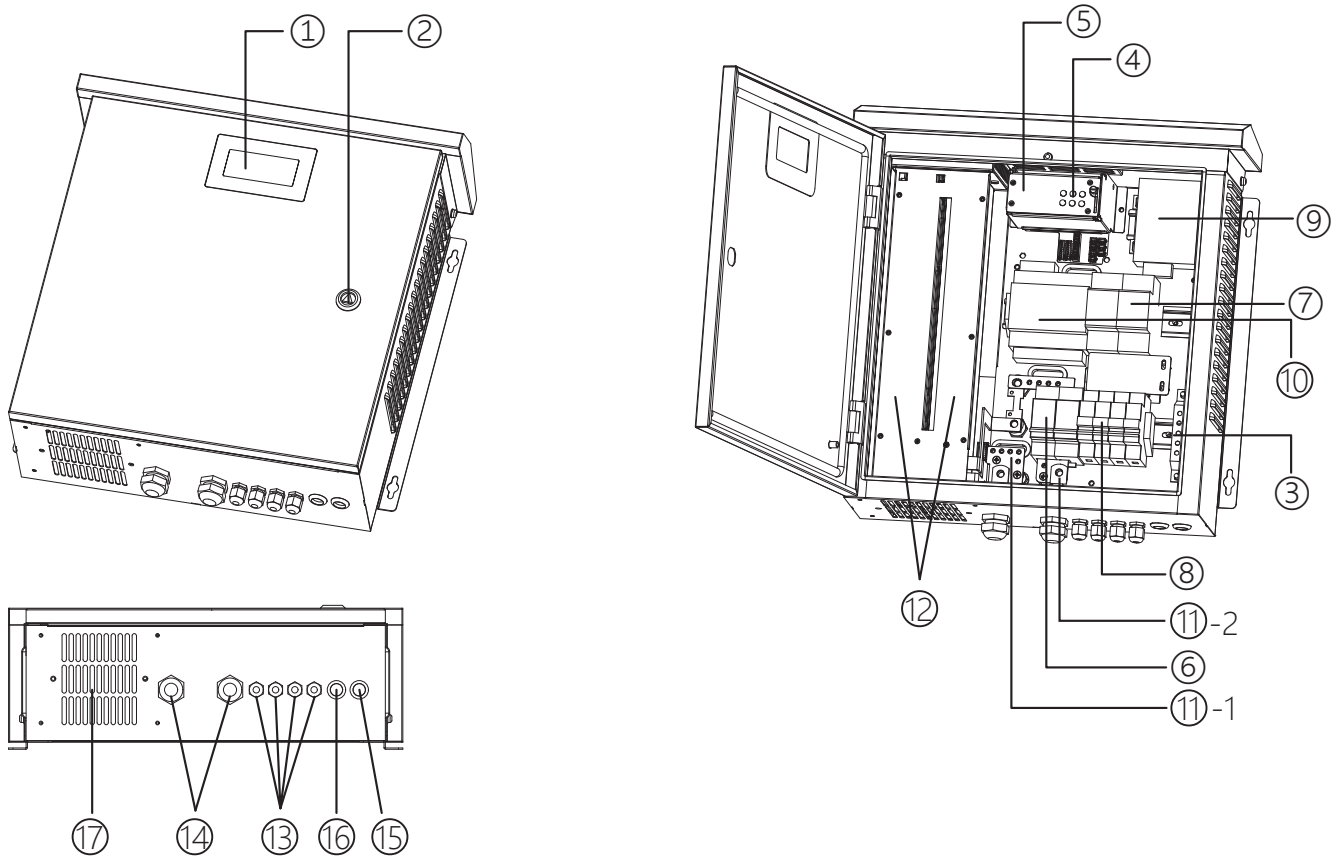
1	Equipment *1	4	Installation kit (SC terminal, plastic expansion plugs, screws, etc.) *1
2	Triangle key *1	5	User Manual *1
3	Signal antenna *1		

2.4 Product Dimensions



Model / Dimensions	A	B	C	D	E	F
CCG01DJ CCG02DJ	460mm	485mm	450mm	300mm	150mm	160mm

2.5 Structure description



1	Display interface	10	Meter
2	Waterproof triangular lock	11-1	Output terminal block (positive)
3	Ground busbar	11-2	Output terminal block (negative)
4	Control button	12	Photovoltaic power module
5	LCD screen	13	PV wiring inlet hole
6	Battery circuit breaker	14	Output hub holes
7	Surge protector	15	Antenna port
8	PV input circuit breaker (1D) 1 Set (+/-)	16	Grounding port
	PV input circuit breaker (2D) 2 Sets (+/- +/-)	17	Cooling vents (outlets)
9	DTU module		

2.6 Electrical parameters

CCG Series	CCG01DJ		CCG02DJ		
Product Information					
Type	CCG Series-Communication Base Station Smart Hybrid PV Power Supply System (Isolated Type)				
Mppt Efficiency	≥99%				
Peak Conversion Efficiency	≥95%				
Standby Power Consumption	≤3.0W		≤6.0W		
Photovoltaic Input Parameters					
Max. Input Power	2400W	3300W	4800W	5900W	6600W
Max. Input Current	18A×1 Input (MPPT)		18A×2 Input (MPPT)		
Working Voltage Range	120Vdc~420Vdc				
MPPT Voltage Range	120Vdc~340Vdc				
Max. Cmponent Access Voltage	420Vdc				
Minimum Start Charging Voltage	160Vdc				
Protection Voltage (Over/Under)	420Vdc/115Vdc				
Recovery Voltage (Over/Under Recovery)	415Vdc/120Vdc				
Output Parameters					
Rating Output Power	2160W	3000W	4320W	5400W	6000W
Max. Output Current	40A	60A	80A	100A	120A
Rated Output Voltage	57VDC				
Battery Management Parameters					
Battery System	48V: Lead-Acid Battery/Lithium-Ion Battery/Rectifier				
Charging And Protection Parameter Setting (Adjustable)	Default: 57VDC (40VDC ~ 60VDC Adjustable)				
	Default: Overvoltage Protection 60V Overvoltage Recovery 57V (40VDC ~ 60VDC Adjustable)				
	Default: Under-Voltage Protection 40V Under-Voltage Recovery 42V (40VDC ~ 60VDC Adjustable)				
Display & Communication					
Display	LCD+LED				
Communication	RS485 Bus / Standard Modbus Protocol				
Monitoring	PC Monitoring, 4G Remote Monitoring, etc				
Protection					
Photovoltaic Input Protection	Input Overvoltage and Undervoltage Protection				
Output Protection	Stable Voltage Protection, Battery Reverse Connection Protection, Battery Disconnection Protection and Overcharge Protection				
General Protection	Over Temperature Protection, Fan Fault Protection, Over Current Protection, Surge and Lightning Protection				
Safety Standards					
Safety Stamdards/ Dielectric Withstand Voltage Test	Input-output 1400vdc, 60 seconds (leakage current less than 20mA no arc and no breakdown)				
	Input-ground 1400vdc, 60 seconds (leakage current less than 20mA no arc no breakdown)				
	Output-ground 700vdc, 60 seconds (leakage current less than 20mA no arc and no breakdown)				
	Communication port-ground 500vdc, 60 seconds (leakage current less than 20mA no arc and no breakdown)				
Surge Protection	Rated 20kA, Max 40kA				
Insulation Impedance	≥2MΩ				
Earthing Resistance	≤0.1Ω				
Other Parameters					
Heat Dissipation Method	Fan Cooling				
Installation	Wall Mounting				
Product Dimension	485*450*160mm				
Product Weight (Kg)	14.5		16.5		
Operating Ambient Temperature	-20℃ ~+50℃				
Storage Temperature and Relative Humidity	-40℃ ~ +70℃ 5 ~ 95%, No Condensation				
IP Rating	IP54				
Operating Altitude	0 ~ 4000m (When 3000 ~ 4000m, the ambient temperature decreases by 1 degree for every 100m increase in height)				

*The voltage of the photovoltaic array shall not exceed this limit.

**These power limits refer to the maximum power that the controller can handle. High-power arrays can be used without damaging the controller.

3.0 Installation

3.1 Pre-installation precautions

➤ Installation Location

- ◆ Install the equipment in a dry, well-ventilated area that is easily accessible for maintenance and disassembly.
- ◆ Avoid installation on flammable or highly combustible materials. Do not install in hazardous areas with explosion risks.
- ◆ Keep the equipment away from moisture, flammable substances, or areas prone to dust accumulation.
- ◆ Do not install the equipment in enclosures containing open or sealed batteries.
- ◆ The equipment may exceed 40°C during operation. Ensure it is installed in a location that is not accessible to unauthorized personnel.
- ◆ Avoid direct sunlight. Prolonged exposure may raise the temperature of the device, negatively impacting heat dissipation and operational performance.

➤ Security Information

- ◆ Wear insulated tools during installation to ensure safety.
- ◆ Disconnect all switches and circuit breakers of the equipment before installation or adjustment.
- ◆ It is recommended that more than two people be involved in the installation. In the event of an accident, request assistance from nearby personnel immediately.
- ◆ Installation must be carried out by qualified technicians or individuals trained in safe installation practices, in accordance with the local electrical regulations.

➤ Proper Use

- ◆ This equipment is designed for solar power use only. Connecting it to any other power source (such as wind turbines or generators) may void the warranty.
- ◆ The equipment contains no user-serviceable parts. Do not attempt to disassemble or repair the equipment.
- ◆ Before performing any maintenance, disconnect the internal circuit breaker to ensure safety during operations.

3.2 Installation and Power-On Procedure

➤ Step 1: Unpack and check

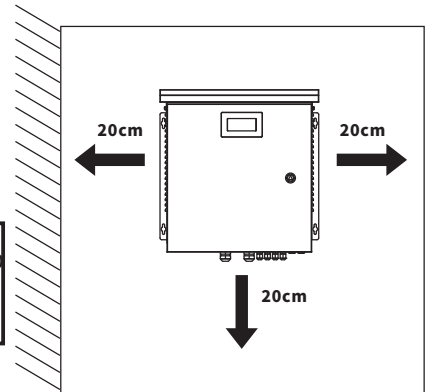
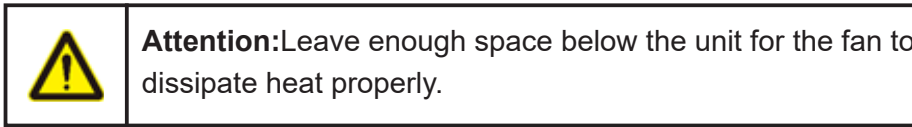
Inspect the equipment for any damage or impact sustained during transportation, and verify that specifications and parameters align with the details provided in the order.

➤ Step 2: Check the parameter limits

Ensure that the open-circuit voltage (Voc) of the solar panel array, under minimum temperature compensation conditions, does not exceed the rated voltage of the device. Multiple devices can be connected in parallel to the same battery pack to increase the output current. Each device connected in parallel must be linked to a separate solar panel.

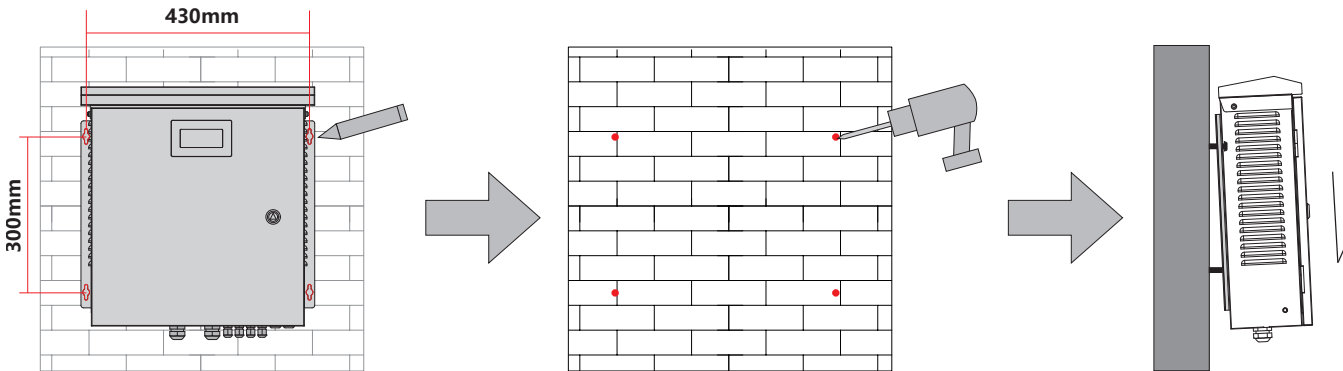
➤ Step 3: Determine the installation space

To ensure proper air circulation, a minimum space of 20 cm (7.9 inches) should be left beneath the device, and 20 cm (7.9 inches) should be left on the sides. The device should not be installed in an enclosed box. See the diagram on the right:



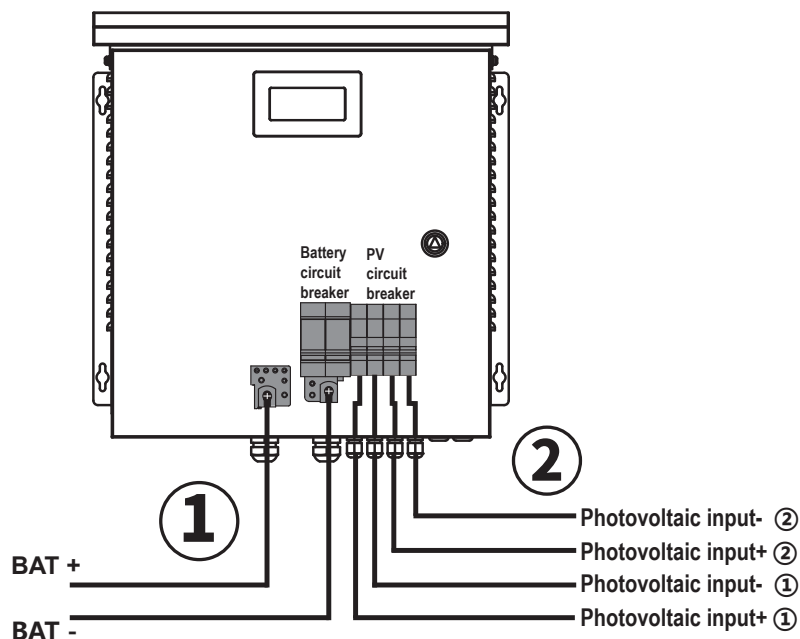
➤ Step 4: Secure the equipment

Attach the mounting ears to the device. Hold the device with both hands and position it at the installation location. Use a marker to mark the four mounting holes on the mounting ears. Based on the marks, drill four holes with a diameter of 8mm and a depth of approximately 6cm. Fill the four holes with plastic expansion plugs. Then, insert self-tapping screws into the expansion plugs, leaving a portion of the screw exposed. Finally, align the mounting holes of the device with the screws and hang the device onto them.



➤ Step 5: Wiring sequence

After properly attaching the cable terminals, connect the corresponding positive and negative terminals on the device according to the numbered sequence. Before making any connections, ensure the circuit breaker is in the off position. See the diagram below:



➤ Step 6: Power on

Check to ensure that all cables and terminals are securely connected before power on;

1. First, close the circuit breaker ① connected to the battery. Ensure that the equipment is properly connected to the battery (the equipment's LCD screen will turn on and display information). Check the communication status of each module. The corresponding icon for the photovoltaic module will appear as a sun, indicating normal communication. At this point, you can proceed to set the output working parameters.

2. Next, open circuit breaker ② for the solar panel PV input. If the voltage of the PV input is within the equipment's charging working range, the equipment will enter charging mode.



Note: After circuit breaker ① is closed, if the equipment fails to start, it may be due to battery undervoltage or reverse polarity of the battery..



Note: This device prevents reverse current leakage at night, so diodes are not required to be connected in series with the photovoltaic modules during installation.



Attention: Before closing the circuit breaker, measure the open-circuit voltage of the battery to confirm that the positive and negative poles are correctly connected. The voltage must exceed 40V for the equipment to operate.



Attention: When wiring, avoid incorrect reverse connections between the photovoltaic input and the equipment's output, as this may damage the internal circuit and void the warranty.



Attention: Installation must comply with electrical code requirements. This equipment has a built-in circuit breaker. If external circuit breakers and fuses are required, please select the appropriate specifications based on the actual application needs.



Warning: Please ensure that the connection is reliable and stable. Use cable clamps to secure the cables and prevent them from shaking due to external forces, which could lead to overheating and pose a safety risk.



Warning: There is a risk of electric shock. Before making contact, test the impedance between all terminals and ground.

3.3 Power off

Please disconnect circuit breaker ② first, followed by disconnecting circuit breaker ①. Ensure the equipment is powered off before performing maintenance or other operations.

4.0 Settings and Operations

4.1 Rules for Series Connection of Photovoltaic Modules

Due to the variety of photovoltaic modules available on the market, this device functions as the central controller of the hybrid solar system. It is designed to be compatible with different types of photovoltaic modules, optimizing the conversion of solar energy into electricity. Users can determine the appropriate number of modules to connect in series based on the open-circuit voltage (Voc) and maximum power point voltage (Vmpp) of the specific module model. If you are unsure, please contact our technical support team for assistance.

When setting up the series configuration, ensure that the total open-circuit voltage (Voc) of the connected modules does not exceed the maximum input voltage of 420V as specified by the equipment.

4.2 Total Input Power of Photovoltaic Modules

This series of equipment features input and output current limiting functions, meaning the device can limit the input current to within the 18A range. The equipment can operate at its maximum power output without exceeding its rated output current. Therefore, even if the PV input power exceeds the equipment's rated charging power, the equipment will still output at its rated output current to the battery busbar. For example, if the equipment has a maximum output current of 60A and is used in a 48V system, the output current will not exceed 60A, regardless of how much power the solar array provides.

The actual working power of the photovoltaic array operates under the following conditions:

- 1) When the actual power of photovoltaic array $\leq$ the rated output power of the equipment, the maximum output power of the equipment is the actual PV power.
- 2) When the actual power of photovoltaic array $>$ the rated output power of the equipment, the equipment works at its the rated power.



Note: Please refer to the parameter table for the rated power of different models of products!

4.3 LED Indicator Light Status Description

- 1) Green LED Indicator: Stays solid on after the system is powered on.
- 2) Blue LED Indicator: Stays solid on when the photovoltaic power module is generating power (i.e., in M01 state); otherwise, it stays off.
- 3) Red LED Indicator: Stays solid on when there is a system warning; otherwise, it stays off.

4.4 Buzzer Status Description

- 1) When there is a system alarm, the buzzer will sound for 2 seconds every 5 seconds;
- 2) There will be a brief sound each time the button is pressed.



Note: 1. The addresses of the photovoltaic power modules integrated in the system should be defined in order from 1 to 2.
2. If a photovoltaic power module fails and needs to be replaced, once installation is complete, the working parameters should be reset and saved in the control center to ensure that the new power module's parameters are consistent with the system.

4.5 Operating Status Table of CCG Series System

Code	Meaning	Criteria
M00	Standby	The power generation conditions are not met (all 0x2005 data from the PV modules is 0), and all communications are normal.
M01	Power Generating	The photovoltaic module is in the state of power generation.
M02	Waiting for Module Connection/ Module Missing	There is an abnormal communication with photovoltaic module.
M03	Shutdown via Remote Communications	Remote Control Command to Disable Power Generation.

4.6 Fault Code Table of CCG Series System Surge Protector Device

SPD Fault Code	Abnormal 4 th Input	Abnormal 3 rd Input	Abnormal 2 nd Input	Abnormal 1 st Input
SPD0001				●
SPD0002			●	
SPD0003			●	●
SPD0004		●		
SPD0005		●		●
SPD0006		●	●	
SPD0007		●	●	●
SPD0008	●			
SPD0009	●			●
SPD000A	●		●	
SPD000B	●		●	●
SPD000C	●	●		
SPD000D	●	●		●
SPD000E	●	●	●	
SPD000F	●	●	●	●
● Indicates the presence of a fault.				

4.7 Fault Code Table of CCG Series System Alarms

System Alarm Fault Code	The Output of The PV Module	Internal Overheating	Voltage Compensation Sampling Is Abnormal	Output Busbar Under-Voltage	Output Bus Over-Voltage	SPD Fault
E0001						●
E0002					●	
E0003					●	●
E0004				●		
E0005				●		●
E0008			●			
E0009			●			●
E000A			●		●	
E000B			●		●	●
E000C			●	●		
E000D			●	●		●
E0010		●				
E0011		●				●
E0012		●			●	
E0013		●			●	●
E0014		●		●		
E0015		●		●		●
E0018		●	●			
E0019		●	●			●
E001A		●	●		●	
E001B		●	●		●	●
E001C		●	●	●		
E001D		●	●	●		●
E0020	●					
E0021	●					●
E0022	●				●	
E0023	●				●	●
E0024	●			●		
E0025	●			●		●
E0028	●		●			
E0029	●		●			●
E002A	●		●		●	
E002B	●		●		●	●
E002C	●		●	●		
E002D	●		●	●		●
E0030	●	●				
E0031	●	●				●
E0032	●	●			●	
E0033	●	●			●	●
E0034	●	●		●		
E0035	●	●		●		●
E0038	●	●	●			
E0039	●	●	●			●
E003A	●	●	●		●	
E003B	●	●	●		●	●
E003C	●	●	●	●		
E003D	●	●	●	●		●

● Indicates the presence of a fault.

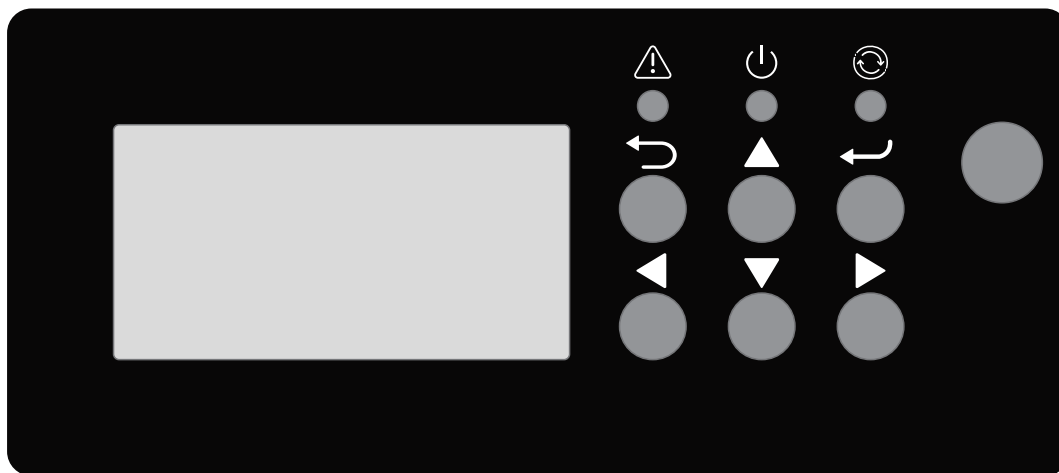
4.8 Operation Settings

System operation data browsing:

The first row on the left indicates the year, month and day, the right indicates the time, and the middle indicates the number of photovoltaic power modules set and access status,

Several solid circles indicate that the system has set several PV modules. The small dots around the solid circles (i.e., the shape of the sun) indicate that the modules at this location are connected normally, and the left numbers start to represent address 1, 2, 3, 4 respectively.

operation panel

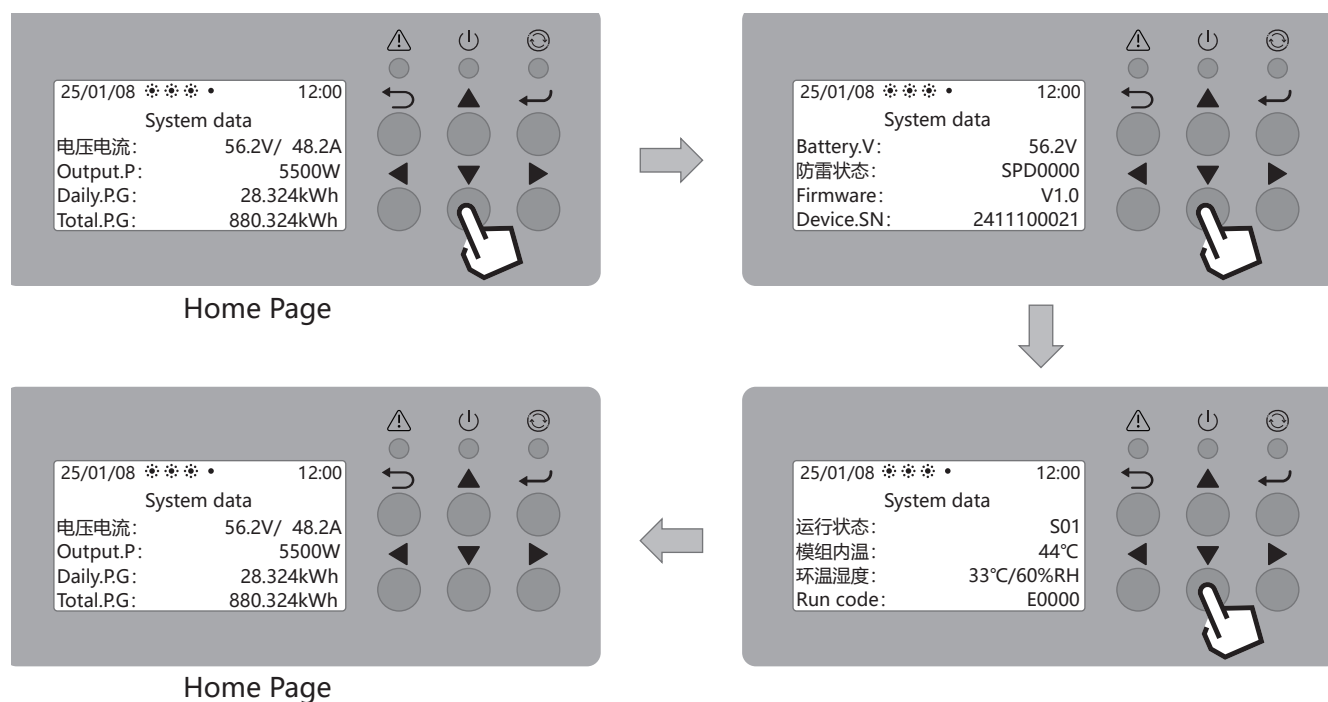


指示灯: ⚠ "告警" ⏻ "电源" ↻ "运行"

按键定义: ↩ "返回" ⬅ "功能" ▲ "上键" ▼ "下键" ◀ "左键" ▶ "右键"

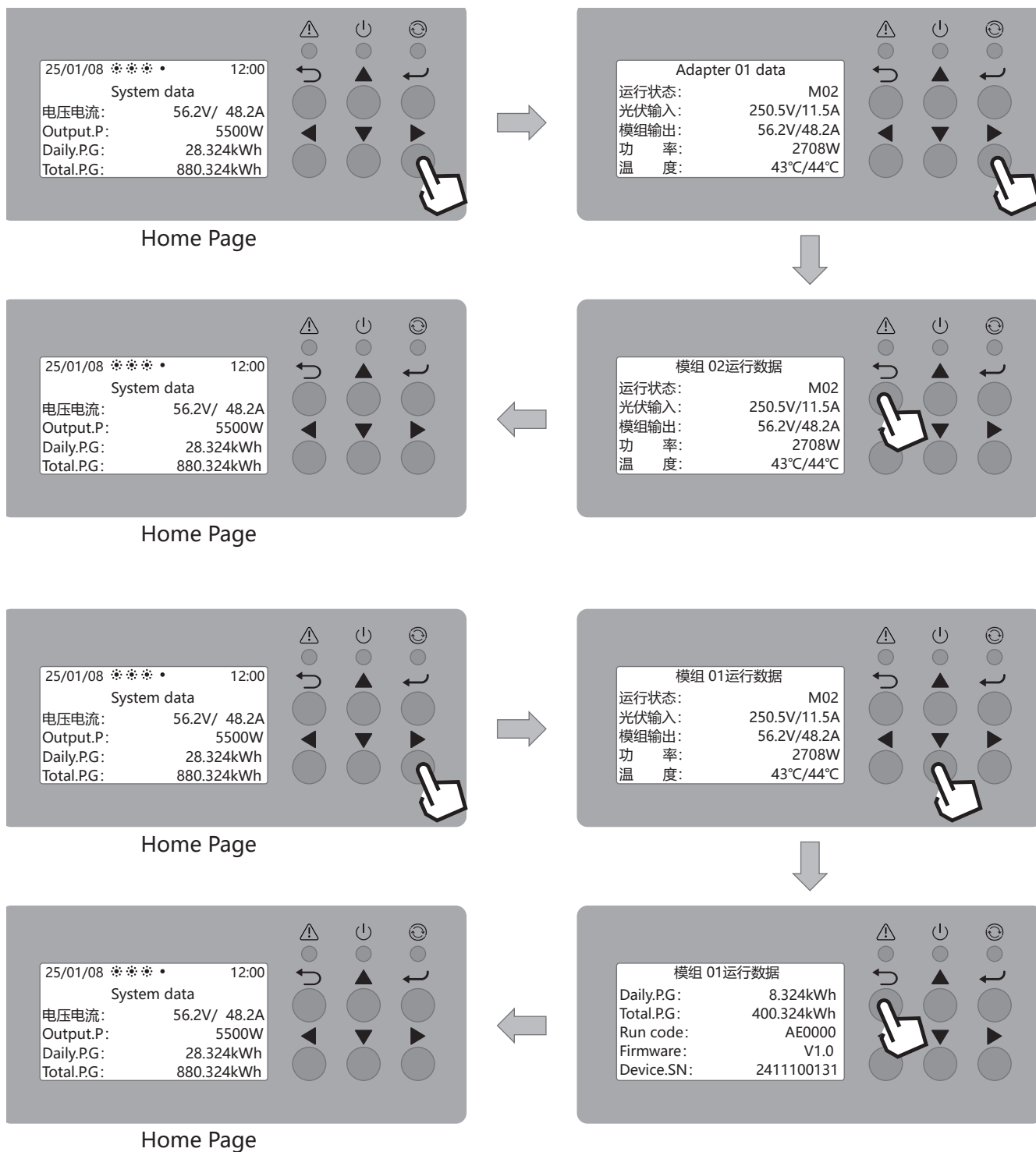
★ 任意按键操作可唤醒点亮屏幕, 30秒无操作背光熄灭。任意非设置界面长按返回键3秒, LCD显示重启。

operation chart



运行数据" 页面单按 "▲" "▼" 键查阅实时数据, 按 "▼" 键回到主界面。

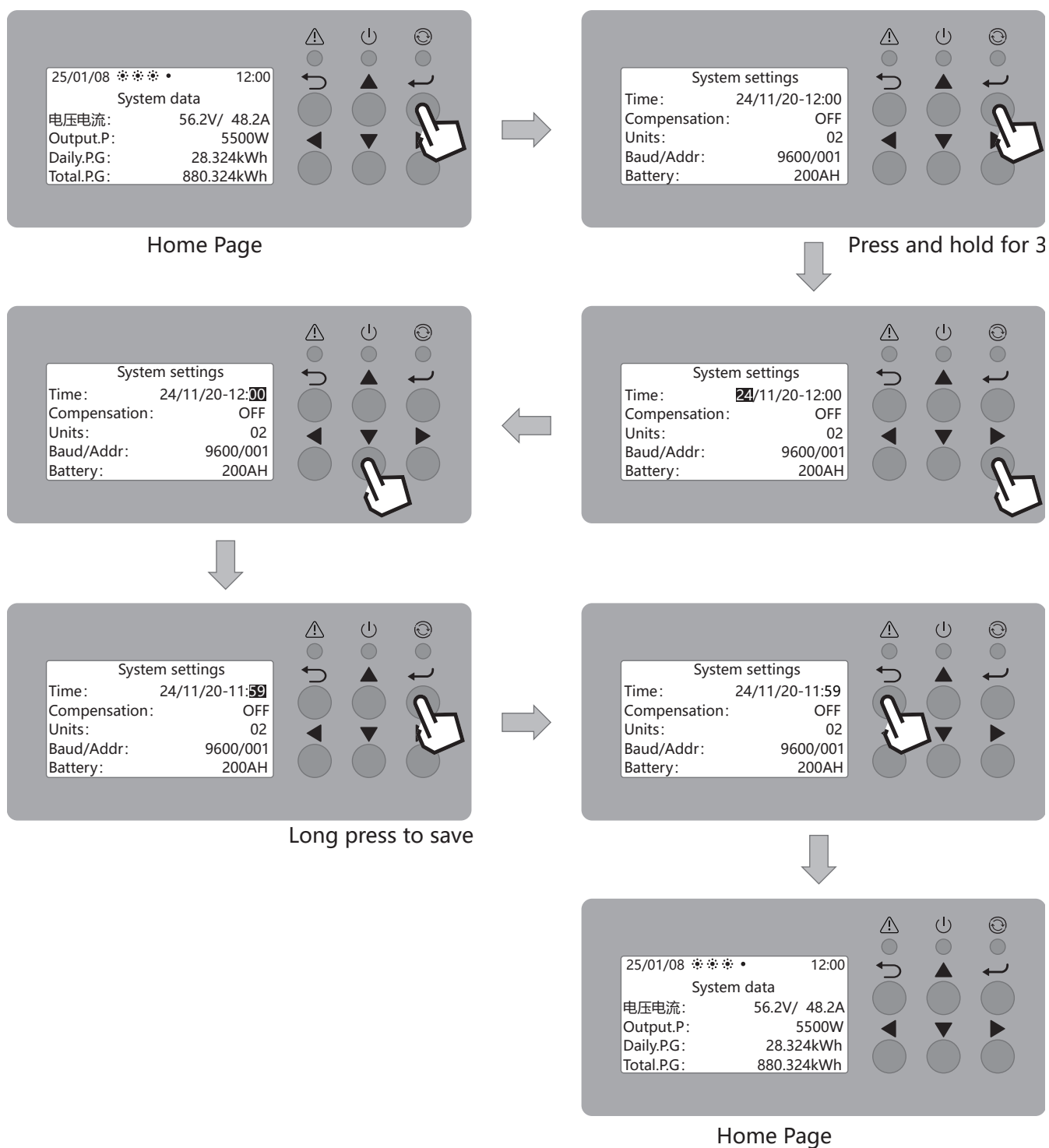
Browse the data of each photovoltaic power module



运行数据”页面单按“◀”“▶”键查阅模组运行数据，单按“▲”“▼”键查看组件运行状态，按“↶”键回到界面。

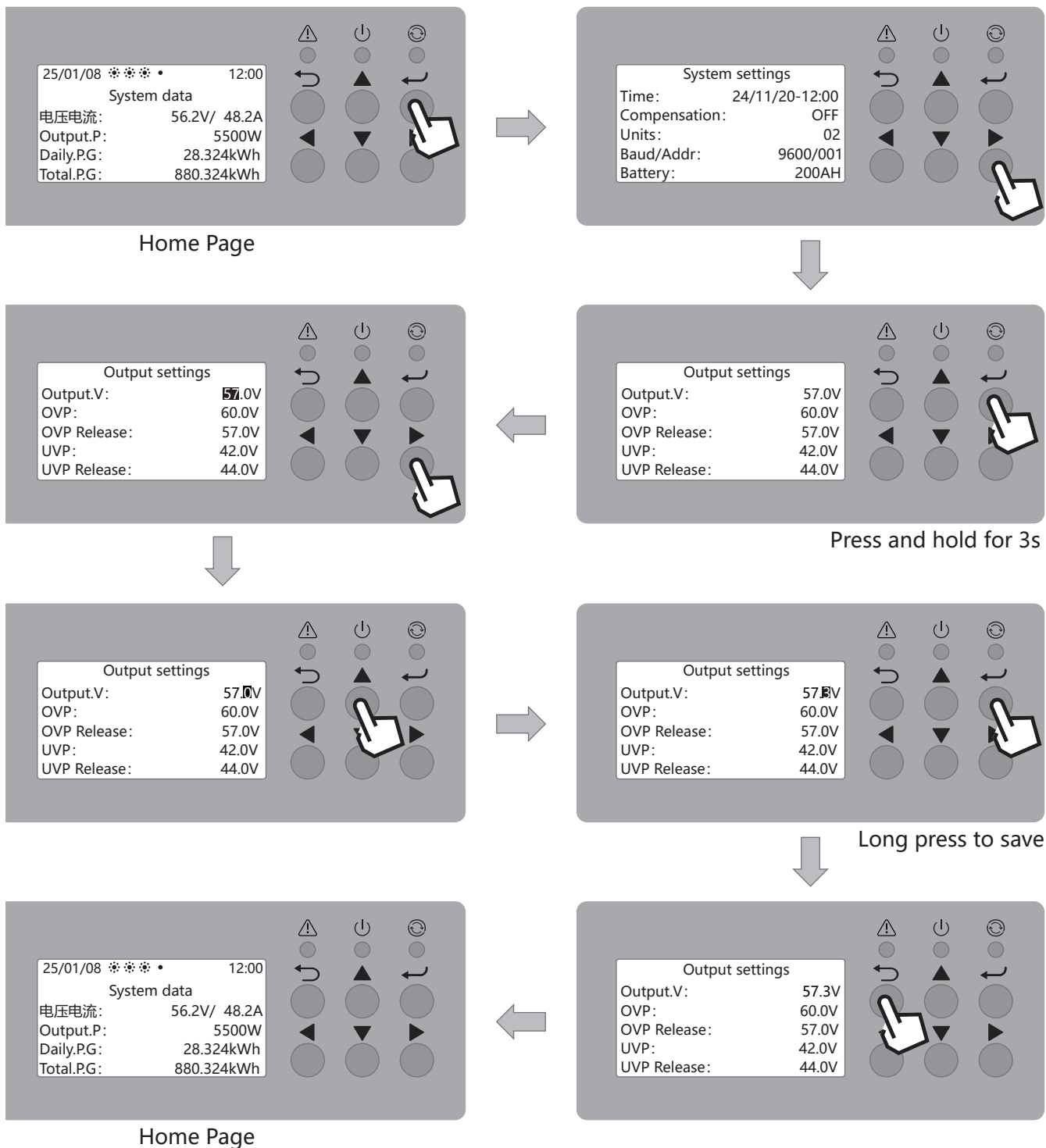
Set page content

System Settings



“运行数据” 页面单按 “↔” 键查阅系统设置项，长按 “↔” 键进入系统设置页面，“◀” “▶” 键调整位置，“▲” “▼” 键调整数值，调整完长按 “↔” 键保存，按 “↶” 键回到主界面。

Output Settings



运行数据”页面单按“←”键查阅系统设置项，继续按“▶”键查看输出设置项，长按“←”键进入系统设置页面，◀“▶”键调整位置，“▲”“▼”键调整数值，调整完长按“←”键保存，按“↶”键回到主界面。

4.9 Default parameters of CCG series

- 1) Device address: default 1, which can be modified on the panel.
- 2) Communication baud rate: default 9600bps/s, which can be modified on the panel.
- 3) Number of modules: Default 2 groups, which can be modified by panel and command (according to the actual number of photovoltaic power modules integrated and assembled).
- 4) Battery capacity: default 200AH, which can be modified by panel and command.
- 5) Output working voltage: default 57.00V, which can be modified by panel and command.
- 6) Output overvoltage protection voltage: default 60.00V, can be modified on the panel, can be modified by command.
- 7) Output overvoltage recovery voltage: default 57.00V, can be modified on the panel, can be modified by command.
- 8) Output undervoltage protection voltage: default 40.00V, can be modified on the panel, can be modified by command.
- 9) Output undervoltage recovery voltage: default 42.00V, which can be modified on the panel and by command.

5.0 Common Faults and Treatment

5.1 Common Faults

Solutions to the problem of no charge:

- Check that the solar panels are in good contact and that the array is not blocked or damaged;
- Check whether the input voltage of the equipment is normal and ensure that the wiring of the equipment is correct;
- Check the status of the circuit breaker;
- Check the battery status and replace it if necessary.

Display fault resolution:

- Long press the back button for 3 seconds to restart the screen;
- Try to restart the device and see if it returns to normal;
- If the display screen is damaged, contact the manufacturer for replacement or repair;
- If the internal circuit of the equipment is damaged, contact the manufacturer for replacement or maintenance.

Communication fault resolution:

- Check whether the data line is damaged, contact the manufacturer for replacement or repair;
- Ensure that the communication interface is correctly connected without loosening or damage;
- Check communication protocol Settings to ensure compatibility with other devices.



Warning: There are no user-repairable parts in the equipment. If necessary, please contact the manufacturer's technical support. Do not disassemble or attempt to repair the controller by yourself.

6.0 Product Protection Function and System Maintenance

6.1 Introduction of Protection Function

➤ **Waterproof and dustproof protection: IP54**

Dustproof grade: 5, waterproof grade: 4.

➤ **Battery reverse protection**

The system does not work after the positive and negative terminals of the battery are reversed, and the controller will not be burned.

➤ **Photovoltaic input short circuit protection**

The device disconnects from charging after a short circuit at the pv array input. When the short circuit condition is cleared, charging will resume automatically.

➤ **PV input reverse protection (customizable)**

Do not use DC power supply equipment for input reverse protection.

➤ **Internal overheating protection**

When the internal temperature of the device reaches the limit threshold, the power is automatically reduced.

➤ **Heater temperature limit**

When the radiator temperature exceeds the maximum tolerance threshold, the equipment automatically shuts down and stops running.

➤ **Battery drop protection**

When the output battery is detected to be detached, the device will stop power output.

➤ **Fan fault protection**

When the fan is blocked or faulty, the device automatically stops charging.



Note: There is no GFDI (ground fault detection device) inside the equipment.

6.2 System Maintenance

- ◆ To maintain optimal performance, it is recommended to perform project inspections more than twice a year.
- ◆ Confirm that the airflow around the equipment is not blocked, and remove dust and blockage from the ventilation holes of the chassis.
- ◆ Check whether all exposed wires are damaged by sun exposure, friction with other objects around, dry decay, insect or rodent damage, etc. Necessary repairs or replacement of wires are required.
- ◆ Verify that the indicator light is consistent with the operation of the equipment. Please note any faults or error displays and take corrective action if necessary.
- ◆ Check all terminals for signs of corrosion, insulation damage, high temperature or burning / discoloration, and tighten terminal screws.
- ◆ Check for dirt, nest insects and corrosion, and clean as required.



Warning: Electric shock danger! Make sure all power is disconnected before performing the above operations, and then perform the corresponding checks or operations!

