HC24-C Series User Manual

Manual version: V1.05
Subject to change without notice

| Product model	Product instructions
SR-HC2410-C	Charging current 10A, load current 10A, with RS485 communication
SR-HC2420-C	Charging current 20A, load current 20A, with RS485 communication
SR-HC2430-C	Charging current 30A, load current 30A, with RS485 communication
SR-HC2440-C	Charging current 40A, load current 40A, with RS485 communication
SR-HC2460-C	Charging current 60A, load current 60A, with RS485 communication
SR-HC4840-C	Charging current 40A, load current 40A, with RS485 communication

I. Product Introduction

◆ Products adopt 32-bit high-speed main control chip and large-screen LCD, with adjustable charging and discharging parameters.
◆ It supports such five battery types as custom, sealed lead-acid (factory default), gel lead-acid, flooded (open cell) lead-acid, lithium battery (default lithium iron phosphate).
◆ It supports the RS485 communication interface, and the baud rate is adjustable which can support maximum 115200kps.
◆ Automatic identification of lead-acid battery system voltage.
◆ The complete multi-stage PWM charging management can be set to off-load charging for better support of voltage-sensitive loads.
◆ Temperature compensation is adopted to automatically adjust charging parameters.
◆ Rich load working modes are easy to use in various DC loads.
◆ Protective functions including built-in reverse polarity protection, open circuit protection, high temperature protection, and overcurrent/short circuit protection (can be set) are self-recovery type without damage to the controller.
◆ Dual MOS anti-backflow circuit is equipped with ultra-low heat generation.
◆ Lithium battery activation function is provided.
◆ The user-friendly browsing design and dynamic interface are convenient and intuitive for operation.

II. Panel Diagram

LCD

Key

Location hole

+ − Solar energy
+ − Battery
+ − Load
RS485
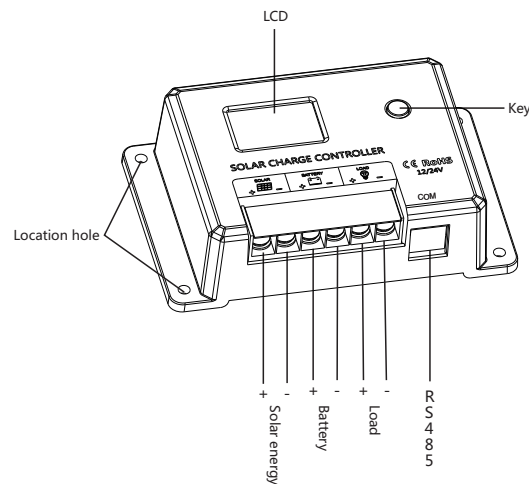
III. Installation Instructions and Precautions

1.The controller should be installed firmly, and the dimensions are as follows:
HC2410-C   Overall dimension: 120*75*34mm   Mounting dimension: 108.5*57.5mm
HC2420-C   Overall dimension: 134*85*36mm   Mounting dimension: 121*70mm
HC2430/40-C Overall dimension: 159*100*39mm   Mounting dimension: 147*80mm
HC2460/4840-C Overall dimension: 193*131*55.2mm Mounting dimension:178.4*108.4mm
2. Mounting hole diameter: 3.5 mm

HC2410-C

HC2420-C

HC2430/40-C

HC2460/4840-C
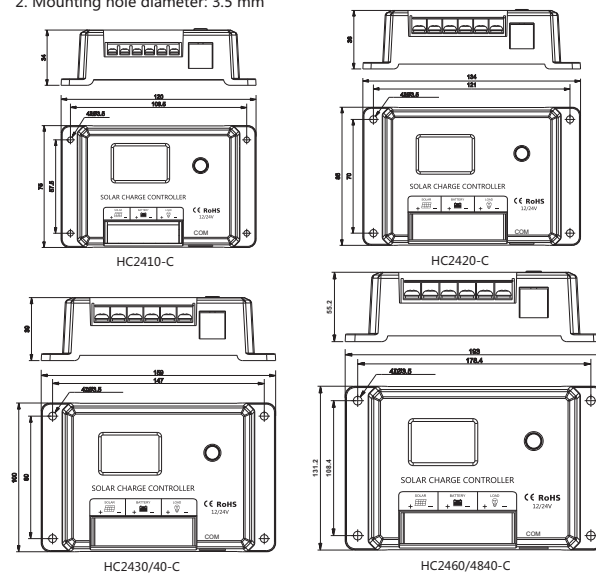
3. Operation instructions:
1). The first step is to connect the battery: if the connection is correct, the controller screen will light up,otherwise, please check whether the connection is correct.
2). The second step is to connect the solar panel: if there is strong enough sunlight (the voltage of the panel is higher than the voltage of the battery), the sun icon on the LCD screen will light up, otherwise, please check whether the connection is correct.
3). The third step is to connect the load: connect the load cable to the load output terminal of the controller, and the current should not exceed the rated current of the controller.
4. The controller will generate heat during operation, and it is recommended to install it in a ventilated and heat-dissipating environment.
5. Select cables with sufficient capacity to avoid excessive loss on the line and misjudgment by the controller.
6. A common positive electrode design is applied in the controller. If grounding is required, please ground the positive electrode.
7. It is important to fully charge the battery frequently. The interval should be at least once a month, otherwise, it will suffer permanent damage. The battery can only be fully charged when more energy enters the battery than used by the load.
Users should keep this in mind when configuring the system.

8. Please check whether each wiring terminal of the controller is locked, otherwise, the terminal will be vulnerable when the current is excessive.
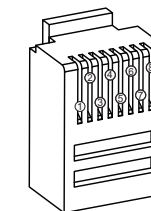
IV. State icon

LCD icon	Content	State
	Day or charging	Normal on
	Night identification	OFF
	No load	Arrow off
	On load	Normal on
	Normal battery	Full on
	Over-voltage	
	Over-discharge	Full on

V. LCD Schematic Diagram

Parameter display

Unit display

Day icon Charging icon Battery icon Discharge icon Load icon
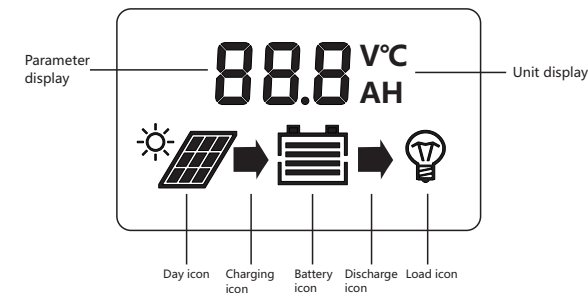
VI. RS485 Communication Interface

1. Definition of communication interface

S/N	Definition
①	CAN_L
②	CAN_H
③	NC
④	NC
⑤	Power ground/signal ground
⑥	D-
⑦	D+
⑧	Positive terminal

VII. LCD Screen Browsing Menu

The LCD interface is in automatic cycle mode with an interval of 3s.
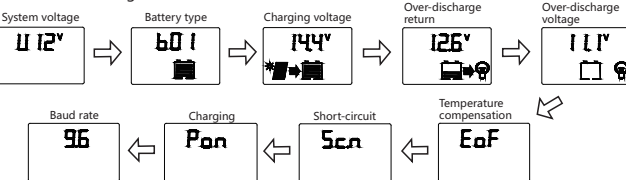
1. Real-time data menu

| Main page | PV voltage | Battery voltage | Charging current | Load current |

| Error code | Load mode | Device |
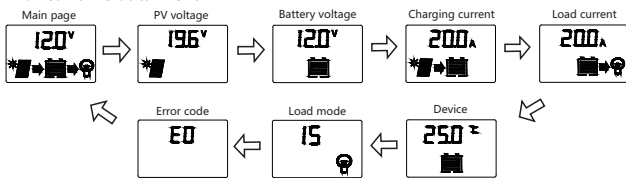
2. Setting menu

2.1 Setting menu of load mode

| Load mode | Load mode |

2.2 Other setting menu

| System voltage | Battery type | Charging voltage | Over-discharge return | Over-discharge voltage |

| Baud rate | Charging | Short-circuit | Temperature compensation |

VIII. Battery Type Setting

On the interface of real-time data in no-load mode, hold down the key for 2s to enter the parameter setting menu. Short press to switch to the "Battery Type" setting menu, hold down the key for 2s to enter the setting interface, and the parameters will flash. Short press to adjust the parameters, hold down the key for 2s or keep 10s without key operation to confirm the parameters and exit the adjustment mode. See "Table E" for controller battery types.

Note: After changing the battery type and system voltage, the controller needs to be powered on again, otherwise it will operate according to the battery type and system voltage before setting.

Table E Battery type and display code table

Character display code	Battery type	Remarks
b00	Custom mode	In the non-automatic identification mode, when the temperature compensation is set to EoF, it is judged as a lithium battery, and the rest are lead-acid batteries
b01	Sealed lead-acid battery	
b02	Gel lead-acid battery	Factory default
b03	Flooded lead-acid battery	
b04	Ternary lithium battery	
b07	Lithium iron phosphate battery	

IX. Key Function

1. In the real-time data menu:
   If the load mode is manual mode, short press to switch the load; if the load mode is non-manual mode, short press to switch down the real-time menu, and return to automatic cycle mode without any key operation for 10s.
2. In the real-time data interface of no-load mode, hold down the key for 2s to enter the setting menu
   Short press to switch the parameter menu; hold down for 2s to enter the parameter setting interface and the parameter will flash; short press to adjust the parameter, hold down for 2s to confirm the parameter and exit the adjustment mode.
   Note: It will automatically exit the setting mode after 10s without key operation and enter the real-time data interface. At the same time, complete the last parameter setting, and short press to return to the automatic cycle mode.
3. In the load mode interface:
   Hold down the key to enter the "load mode" adjustment, short press to adjust the parameters, hold down for 2s or 10s without key operation to confirm the parameters, and exit the adjustment mode as well as return to the automatic cycle mode.

X. Controller Reboot and Factory Data Reset

1. Hold down the key for more than 10s until F01 is displayed on the screen to restart the controller;
2. Hold down the key for more than 20 seconds until the screen displays F02 to restore the factory default parameters.

XI. Six Load Operating Modes

1. Light control (00): when there is no sunlight and the light intensity drops to the starting point (light control off), and after the controller confirms the start signal with a delay of 1 minute, the load will be turned on according to the set parameters and start to operate; when there is sunlight and the light intensity rises to the starting point, the controller will delay for 1 minute to confirm the shutdown signal and then close the output, thereby the load will stop operating.
2. Light control+time control (01H-14H): the start-up process is the same as that of light control. When the load reaches the set time, it will automatically turn off, and the setting time is 1-14 hours.
3. Manual mode (15): in this mode, you can control the load on or off by pressing the button, regardless of whether it is day or night.
4. Commissioning mode (16): when there is a light signal, the load will be turned off, otherwise, the load will be turned on. It is convenient to quickly check the correctness of the system installation during installation and commissioning.
5. Normal on mode 1 (17): the load keeps the output state when it is powered on.
6. Normal on mode 2 (18): The load works for 24 hours and disconnects for one minute (shifted from charging to non-charging).

Display	Mode
00	Light control mode
01-14	Light control+time control 1h-14h
15	Manual mode
16	Debugging mode
Normal on mode 1 (17)	On load for 24 hours (factory default)
Normal on mode 2 (18)	On load for 24 hours and off for one minute

XII. Manual Switch Load

When the load mode is 15 (manual mode), short press the button on any interface (non-setting mode) to switch the load on and off.
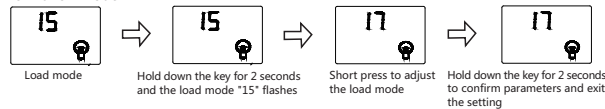

Note: Since the load start is a soft start, the LCD load icon will be displayed with a delay after the load is turned on.

XIII. Load Mode Setting

Hold down the key for 2 seconds in the load mode interface to enter the load mode setting interface (mode code + load icon), and the parameters will flash. Short press to adjust the load mode. After the adjustment is completed, the load mode will save automatically and exist the mode setting through holding down the key for 2 seconds or with no operation for 10 seconds.
As shown in the figure, change the current load mode from manual mode "15" to load normal on mode 1 "17"

| Load mode | Hold down the key for 2 seconds and the load mode "15" flashes | Short press to adjust the load mode | Hold down the key for 2 seconds to confirm parameters and exit the setting |

XIV. Special Function Settings

1. Temperature compensation: Eon means temperature compensation is on; EoF means temperature compensation is off. If the controller and the battery are not in the same temperature environment, it is recommended to turn off the temperature compensation function.
2. Load short-circuit protection setting: Son means short-circuit protection on; SoF means short-circuit protection off; please turn off the short-circuit protection function for equipment with an excessive starting current.
3. Charging mode: Pon means PWM charging mode; PoF means disconnected charging mode; it is recommended to use disconnected charging mode for voltage-sensitive loads.
4. Baud rate setting: The baud rate can be set to 2400-115200bps and its factory default is 9600bps.

XV. Error Code Table

Display code	Related problem
E0	No error
E1	Battery over-discharge
E2	Battery over-voltage
E4	Load short-circuit
E5	Load overload
E6	Controller internal overtemperature
E10	Solar panel overvoltage

XVI. Common Problems and Solutions

Phenomenon	Common problems and solutions
LCD screen does not light up	Please check whether the connection of battery is correct
LCD screen does not display completely or not update	Please check whether the connection of battery is correct
The battery panel icon does not light up with sunlight	Please check whether the connection of the photovoltaic cell is correct and the contact is reliable; whether the voltage of the battery board is less than the battery voltage
Others	Check whether the wiring is reliable and whether the system voltage identification is correct

XVII. Technical Parameter Table

Model		HC2410-C	HC2420-C	HC2430-C	HC2440-C	HC2460-C	HC4840-C
Rated current	Charge	10A	20A	30A	40A	60A	40A
	Load	10A	20A	30A	40A	60A	40A
Current display function		Charging and discharging current display					
System voltage		12V/24V/U--(automatic identification)					12/24/36/48V/U--(automatic identification)
Rated power		12V/150W 24V/300W	12V/300W 24V/600W	12V/450W 24V/900W	12V/600W 24V/1200W	12V/900W 24V/1800W	12V/600W 24V/1200W 36V/1800W 48V/2400W
No-load loss		<7mA/12V ; <10mA/24V					
Maximum PV input voltage		Start the protection and stop charging when the voltage is above 55V. Continue to charge when the voltage is below 50V.					100V protection, stop charging. Recovery below 95V.
Maximum allowable voltage at the battery end		<32V					<64V
Battery type ①		b00(USER)	b01(SLD)	b02(GEL)	b03(FLD)	b04(Ternary lithium)	b07 LiFePO4
Over-voltage protection		16.0V	16.0V	16.0V	16.0V	Boost voltage +2V	Boost voltage +2V
Equalizing charging voltage		14.6V	14.6V	-	14.8V	-	-
Boost charging voltage		14.4V	14.4V	14.2V	14.6V	12.5V	14.4V
Float charge voltage		13.8V	13.8V	13.8V	13.8V	12.5V	14.4V
Charging reconnect voltage		13.2V	13.2V	13.2V	13.2V	12.0V	13.2V
Over-discharge reconnect voltage		12.6V	12.6V	12.6V	12.6V	10.5V	12.6V
Over-discharge voltage		11.1V	11.1V	11.1V	11.1V	9.5V	11.1V
Equalizing charging time		2H	2H	-	2H	-	-
Boost charging time		2H					
Temperature compensation		-3.0mV/℃/2V					
Light control voltage		Light control on 5V, ×2/24V; light control off 6V, ×2/24V;					
Turn-on delay of light control		1 minute					
Communication method		RS485					
Baud rate		2400~115200bps					
Communication protocol		ModBus					
Operating temperature		-35℃ to 60℃ ;					
Altitude		≤3000m					
Protection grade		IP32					
Net weight		130g	180g	290g	322g	660g	
Protection function		Battery panel short-circuit protection; battery panel and battery reverse connection protection					
		Over-temperature protection, load overload protection, and short-circuit protection					
Product dimensions		120*75*34	134*85*36	159*100*39	193*131*55.2		

① Parameters when the battery type is 12V; 24V system, the relevant voltage points are automatically multiplied by 2; 48V system, the relevant voltage points are automatically multiplied by 4.