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Lovsun HC24 Series Solar Charge Controller User Manual

**Series Solar Charge Controller
User Manual**

Contents

Recommendations for Safe Use

1. The controller is a 12V/24V controller. When installing it for the first time, please make sure the battery has enough voltage so that the controller can recognize it as the correct type of battery.
2. Install the controller as close to the battery as possible to avoid voltage drop caused by too long wire, which may affect the normal determination of voltage.
3. The controller is suitable for 12/24V lead-acid batteries, ternary lithium batteries and lithium iron phosphate batteries. Please select the appropriate battery type in the menu.
4. The controller can only use PV panel as a charge source. Do not use DC power supply as a charge source.
5. The controller will generate heat when running. Please install the controller on a flat, well-ventilated surface.

Features

1. 32-bit high-speed master control chip.
2. Large-screen LCD for display, charge and discharge parameters adjustable, Allow selection of multiple battery types, with a flexibility to set the load to work during the day or night.
3. Complete multi-stage PWM charge management.
4. Built-in reverse connection protection, open-circuit protection, high temperature protection, over-current/short-circuit protection (optional), which are all self -recovery type, with no damage to the controller.
5. Double MOS anti-backflow circuit, ultra-low heat generation.
6. Lithium battery activation available.
7. Dual USB output, maximum current up to 2A, supporting high current charging of Iphone, Ipad and Android mobile phones and other devices.

System Wiring
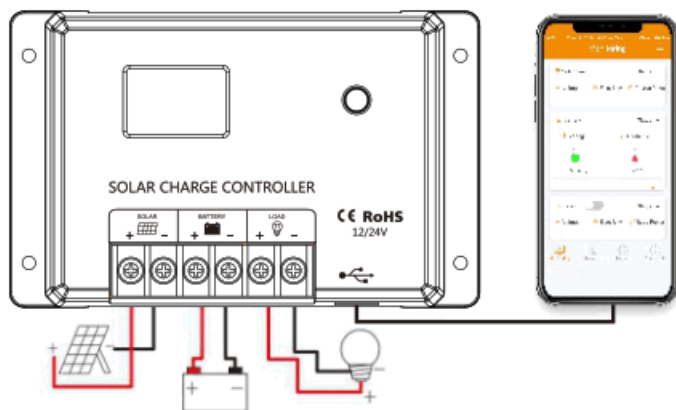
1. Connect the anode and cathode of the battery to the controller according to the diagram, and take care to avoid reverse connection.
2. Connect the anode and cathode of the load to the controller according to the diagram, and take care to avoid reverse connection.
3. Connect the solar panel to the controller according to the diagram, and take care to avoid reverse connection.

Note: Please strictly follow the above sequence for connection, otherwise the controller may be damaged. Disassembly sequence is opposite to the wiring one.

Button Functions

Function 1: When the battery voltage is normal, press the button to turn on or o the load.
Function 2: Press and hold the button for 2s to enter the menu. On the menu wher you need to change the settings, press and hold the button for 2s to make the number blinking, and then click to adjust the set value. Then, press and hold the button for 2s to make the number stop blinking to complete the setting.
Function 3: Press and hold the button for more than 10s until the screen shows F01. At this point, you can restart the controller.
Function 4: Press and hold the button for more than 20s until the screen shows F02. At this point, you can restore the controller to default settings.

Display Interface/Parameter Settings

Main display interface:
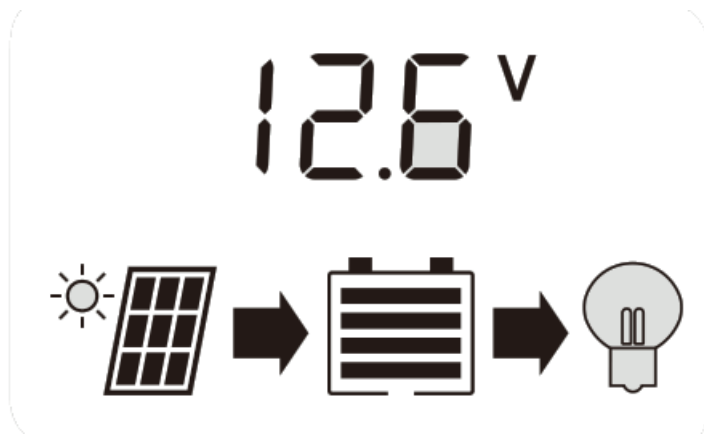
System voltage type selection interface. The default battery voltage is 12V, i.e. the interface shows U12V. If 24V is required, it should be set to U24V.

Setting method: Press and hold for more than 2s until the number flashes. Then, press to adjust. After adjustment, press and hold for 2s again until the number no longer flashes. At this point, the setting is complete.
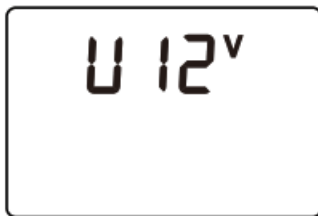
Menu 1

Battery type settings:
b01=Sealed lead acid battery (default)
b02=Gel battery
b03=Flooded lead acid battery
b04=Ternary lithium battery
b07=Lithium iron phosphate battery
b01 – b03 are multi-stage charging method
b04/b07 are two-stage charging method
Setting method: same as above.

Menu 2

Load operating mode adjustment interface [24H] – continuously power the load for 24.

[00H] – light control mode. The load is turned on or off by thelight control signal.

[1~23H] – time control mode. The load is turned on by the light control signal and then turned off after a delay.

[C2A] – the load will work for 2 hours a day, stop for 15 minutes, and keep cycling.

[C2d] – the load will work for 2 hours during the day, stop for 15 minutes, and keep cycling.

[C2n] – the load will work for 2 hours at night, stop for 15 minutes, and keep cycling. Setting method: same as
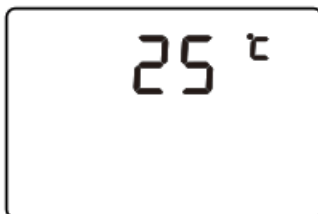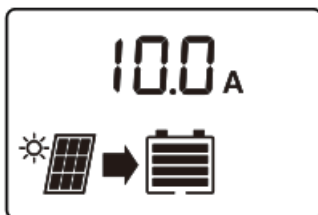
above.

Menu 3

Note:

1. No matter what kind of load operating mode is set, when the battery is discharged to as low as the cut-off voltage, the controller will force to shut down the load.
2. hen the controller is in an activated condition, the load will remain off.

Display the charge current.

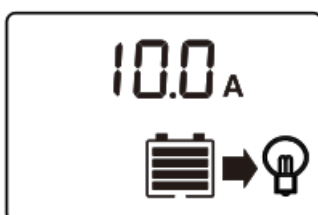**Menu 4**

Display current controller temperature.

Menu 5

Display the load current.

Menu 6

Boost charge voltage – regulation interface (only valid for b04, b07)
When the battery voltage rises to this set voltage, PWM charging is enabled.

During normal charging, the arrow indicator is always on, and after entering float charging, the arrow indicator is slowly flashing. Setting recommendation: It is recommended to keep the default value. Setting method: same as above.
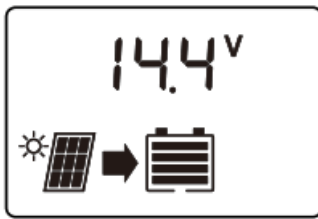

Menu 7

Over discharge recovery voltage – regulation interface (LVR) When the controller turns off the load due to low voltage, the load will not be turned on until the battery voltage rises to the set voltage again. Setting recommendation: It is recommended to keep the default value. Setting method: same as above.
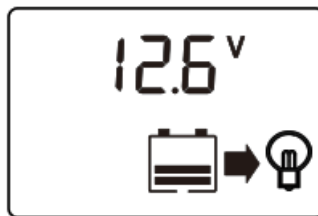
Menu 8

Over discharge voltage – regulation interface (LVD) The controller will automatically cut off the load output when the battery voltage drops below this voltage.
Setting ecommendation: It is recommended to keep the default value. Setting method: same as above.
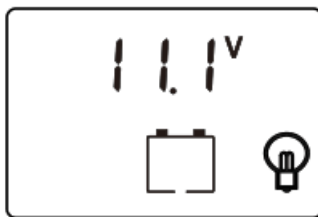
Menu 9

Light control ON/OFF threshold (PV panel voltage) In light control or time control mode, when the controller detects that the voltage of the PV panel is less than this set value, it will turn on the load after a delay and otherwise turn off the load. At night, if the ambient light around the solar panel is too bright, the solar panel output voltage will become higher, which will cause the controller to automatically turn off the load. At this point, it can be adjusted somewhat by this value.
Setting recommendation: It is recommended to keep the default value. Setting method: same as above.
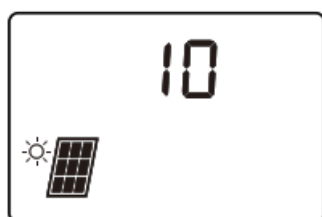
Menu 10

Light control ON/OFF delay threshold (in seconds).
When the controller detects that the PV panel voltage is lowerthan the set threshold, it will delay to turn on the load. Such time value can be used to prevent turning off the amp due to erroneous judgment caused by the interference of car lights or lightning at night.
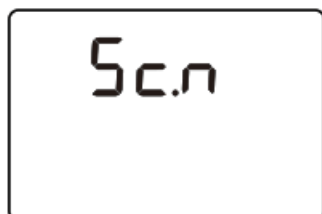**Setting recommendation:** It is recommended to keep the default value.
Setting ethod: same as above

Menu 11

Short-circuit protection setting. Some inductive or capacitive loads may draw a large current at the moment of start-up, which may trigger the short circuit protection of the controller and cause the output to shut down. In this case, the user can turn off the short-circuit protection. SC.F is Off, SC.n is On, and the default is On. Setting method: same as above.

Menu 12

PWM charge settings (only valid for b04, b07) PWM is likely to cause the system to produce noise and interference. Especially when a lithium battery with BMS is used, PWM charging may trigger BMS protection and cause system failure. Therefore, the customer has the option to turn PWM off. In this mode, once the battery is charged to the preset voltage (interface 7), the controller will stop charging immediately, and restart charging after the battery voltage returns. PoF is Off, Pon is On, and the default is On.
**Setting recommendation:** It is recommended to keep the default value. Setting method: same as above.

```
┌─────────────┐
│             │
│   Pon       │
│             │
│             │
└─────────────┘
   Menu 13
```

Load light control mode settings. Lc1 indicates that the load is working at night, Lc2 indicates that the load is working during the day, and the light control has priority over the time control to turn off the load. Lc3 indicates that the load is working at night, Lc4 indicates that the load is working during the day, and the time control has priority over the light control to turn off the load. Example: If it is set to 16H, since the night/day length is only 12 hours, Lc1/2 will run for 12 hours only, and Lc3/4 will run for 16 hours. The default is Lc1.
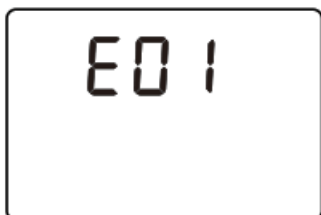**Setting method:** same as above.
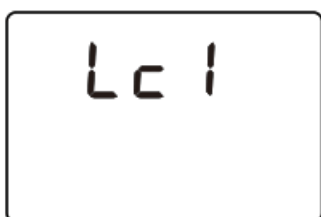
```
┌─────────────┐
│             │
│   Lc 1      │
│             │
│             │
└─────────────┘
   Menu 14
```

Error Code

Battery low voltage state. When the battery voltage is lower than LVD, the controller will cut off the load, and when the battery voltage returns to LVR, the controller will automatically turn on the load. Press the button to forcibly recover.

```
┌─────────────┐
│             │
│   E01       │
│             │
│             │
└─────────────┘
```

Battery high voltage state. When the battery voltage exceeds HVD for some reasons, the controller will cut off the load output, and after the battery voltage is returns to VR, he controller ill automatically turn on the load. Press the button to forcibly recover.

```
┌─────────────┐
│             │
│   E02       │
│             │
│             │
└─────────────┘
```

oad over current state. When the load current exceeds the rated value, if the current does not recover to the safe value within 60s, the load will turn into short circuit rotection state. Press the button to forcibly recover.

```
EO5
```

Load short circuit state. If short-circuit protection is triggered at the load side, the load will be turned off immediately. After 10s, the controller will automatically turn the load on again.

```
EO4
```

High temperature exception interface. When the controller temperature exceeds 80 ℃, it will shut down. At this point, neither charge nor discharge works. It will recover as the temperature falls back to 70 ℃.

```
EO6
```

Solar panel over-voltage protection. When the solar panel voltage exceeds 50V, the controller will stop charging to protect the internal circuitry. When the voltage is below 45V, charging resumes.

E 10
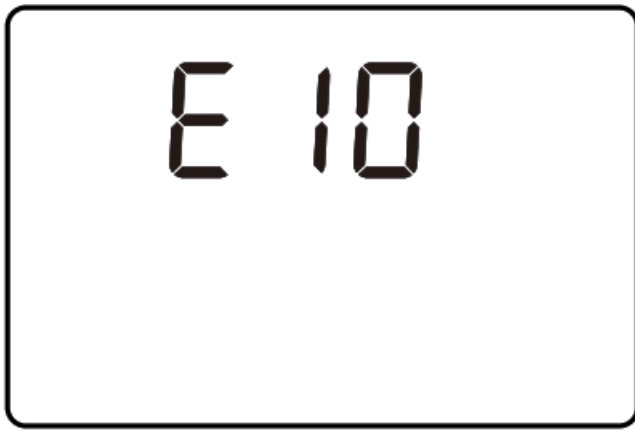
FAQ

Q: Why isn't charging displayed after my PV panel is connected?

– A: Check if the PV panel wiring is correct, and if the connection is reversed or false; check if the PV panel voltage is too high; check if the PV panel is blocked and the voltage drops consequently.

Q: Why is the charge current so small?

– A: The higher the PV panel power, and the stronger the sunlight, the larger the charge current, and conversely, incorrect PV panel voltage, and blocking by foreign object, hadow, etc. will cause the current to decrease. In addition, when the battery voltage is high, it will enter a floating charge state, at which point the charge current will also ecome smaller and smaller.

Q: Why won't my load light up?

– A: The causes that the load is not turned on may include, the load operating mode is not set correctly. For example, the light control is set up but the load is not turned on   uring the day. In this case, battery is low, resulting in the controller to cut off the load, or the load is not properly connected, disconnected, burned out or the like.

Q: What if I don't need to use electricity for an appropriately long period of time?

– A: If the daily power generation of the PV panels is less than the amount of electricity used by the load, it will result in a situation where the generation does not cover the   onsumption. In this case, it is recommended to increase the number of PV panels in order to cope with extreme rainy weather. In addition, you can increase the battery apacity, as well as reduce the wattage of the load or working hours to balance the whole system.

Q: Why does a fully charged battery run out of power after a short use?

– A: The battery is close to the end of life. You can do a simple test. For example, after discharge, charge the battery by PV panel or mains. The voltage will rise very soon. hen,   top charging and turn on the load. The voltage drops very soon. This indicates that the battery performance has degraded. You should replace a battery.

Specifications

	HC2410	HC2420	HC2430	
System voltage	12V/24V			
Battery operating voltage range	8-32V			
Rated current	Charge	10A	20A	30A
Load	10A	20A	30A	
Maximum PV input voltage	50V, enable protection and stop charging. Below 45V, charge resumes.			
Charging mode	The default is PWM charging,b04/b07 can be set to intermittent charging.			
USB output	5V/2A			
Static power consumption	≤10mA			
Operating temperature	-35~+60℃			
Altitude	≤3000m			
IP rating	IP32			
Product size	120*75*34mm	134*85*36mm	159*100*39mm	
Installation size	108.5*58.5mm	121*70mm	147*80mm	
Weight	130g	180g	290g	

Charge and Discharge Parameters

Battery type	b01(SLD)	b02(GEL)	b03(FLD)	b04 (Ternary lithium)	b07 (Lithium iron hosphate)
High voltage protection HVD	16V	16V	16V	16V	16V
High voltage recovery HVR	15V	15V	15V	15V	15V
Boost charge voltage	14.4V	14.2V	14.6V	12.5V	14.4V
Equalizing charge voltage	14.6V	–	14.8V	–	–
Floating charge voltage	13.8V	13.8V	13.8V	12.5V	14.4V
Boost charge return	13.2V	13.2V	13.2V	12.0V	13.2V
voltage Over discharge recovery oltage Over	12.6V	12.6V	12.6V	10.5V	12.6V
discharge oltage	11.1V	11.1V	11.1V	9.5V	11.1V
Boost charge time	2hrs				
Equalizing charge time	2hrs	–	2hrs	–	–

1. The above voltage corresponds to 12V system only. If a 24V system is used, please*2.
2. b01-b03 will go into equalizing charge when and only when LVD occurs. After equalizing charge, it goes directly into floating charge.
3. The corresponding parameters in green font in the table can be modified by the buttons, and the other parameters cannot be modified.

LOVSUNS

*Product specifications are subject to change without notice.

Documents / Resources

Lovsun HC24 Series Solar Charge Controller [pdf] User Manual
HC24 Series, HC24, HC24 Series Solar Charge Controller, Solar Charge Controller, Controller, Charge Controller