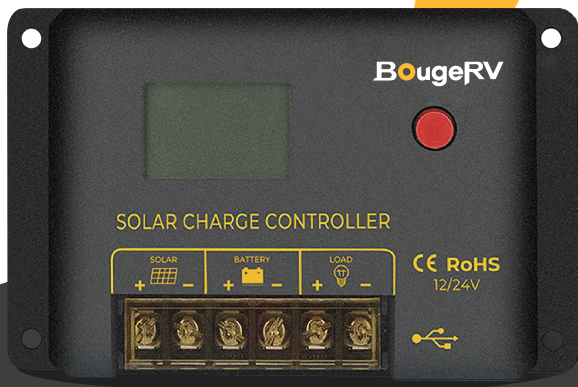


User Manual

30A PWM NEGATIVE
GROUND SOLAR
CHARGE CONTROLLER



Features

1. Activation available for dormant Lithium battery, auto-voltage identification available for lead-acid battery.
2. Large-screen backlighting display, charge and discharge parameters adjustable by the button.
3. Built-in reverse connection protection, open-circuit protection, high-temperature protection, over-current/short-circuit protection (adjustable), which are all self-recovery types, with no damage to the controller.
4. Double MOS anti-backflow circuit, ultra-low heat generation, equipped with the heat sink. With temperature compensation function.
5. Dual USB output, maximum current up to 2A, supporting high current charging of iPhone, iPad, and Android mobile phones and other devices.
6. Complete multi-stage PWM charge management.
7. 32-bit high-speed master control chips.

Limited Warranty

BougeRV Solar Panel comes with an **18-month warranty** that commences from the date of purchase.

If you have any questions during use, please feel free to contact us:

 service@bougeRV.com

 1-669-232-7427

 www.bougeRV.com

If you have some problems in the process of using the controller, please send the following information to the email: **service@bougeRV.com**



- 1** Specifications of the solar panels (series / parallel, quantity, voltage, power).
- 2** The voltage and battery type of the battery.
- 3** The pictures or videos of the controller: battery voltage, battery charging current, the output voltage of the solar panel.

Charge Controller Safety

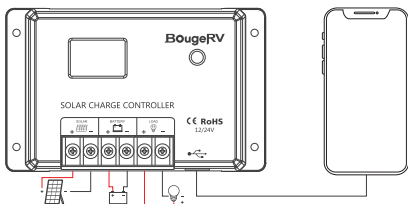
Charge Controller Safety

1. NEVER connect the solar panel array to the controller without a battery. The battery must be connected first. This may cause a dangerous occurrence where the controller would experience a high open-circuit voltage at the terminals. Ensure input voltage does not exceed 50 VDC to prevent permanent damage.
2. Use the Open Circuit (V_{oc}) to make sure the voltage does not exceed this value when connecting panels together in series.
3. The charge controller should be installed indoors in a well-ventilated, cool, and dry environment.
4. Do NOT allow water to enter the controller.

Battery Safety

1. Do NOT let the positive (+) and negative (-) terminals of the battery touch each other.
 2. Explosive battery gases may be present while charging. Be certain there is enough ventilation to release the gases.
 3. Be careful when working with large lead-acid batteries. Wear eye protection and have fresh water available in case there is contact with the battery acid.
 4. Over-charging and excessive gas precipitation may damage the battery plates and activate material shedding on them. Too high of an equalizing charge or too long of one may cause damage. Please carefully review the specific requirements of the battery used in the system.
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System Wiring



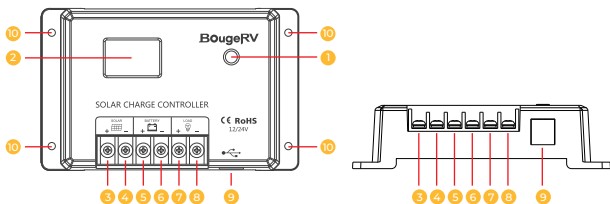
1. Connect the battery to the solar charge controller FIRST, ensuring polarity correct.
2. Then connect the positive and negative poles of the load to the load terminals of the controller.
3. Finally, connect the positive and negative poles of the solar panel to the PV terminals of the controller.

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

Caution

1. First make sure your battery system is 12V or 24V. Ensure that the maximum open-circuit voltage of the solar system does not exceed 50V.
2. Ensure that the maximum output current of the solar panel does not exceed 30A.
3. Ensure that the voltage of the solar panel is higher than the battery voltage.

Identification Of Parts



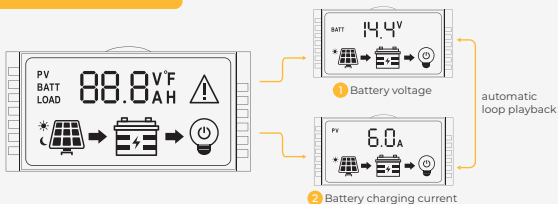
- 1 Set Button
- 2 LCD Backlighting Display
- 3 PV Positive Terminal
- 4 PV Negative Terminal
- 5 Battery Positive Terminal
- 6 Battery Negative Terminal
- 7 Load Positive Terminal
- 8 Load Negative Terminal
- 9 USB Output Port
- 10 Mounting Holes

Button Functions

1. When you see the main menu interface on the screen, click the button to turn on or off the load.
2. Long press the button for 2s to enter the menu selection interface, then click the button to select the menu that needs to be changed.
3. In terms of the menu that needs to change the setting, long press the button for 2s until the parameter is flashing, and click the button to change the setting. After the setting is completed, long press the button for 2s to confirm.
4. After confirming the parameters, no need to press the button, and the main menu will be returned after 5s (click the button within 5s if you want to enter the next menu).
5. Long press and hold the button for more than 10s until the screen displays F01, the controller can be restarted.
6. Long press and hold the button for more than the 20s until F02 is displayed on the screen, and the factory settings can be restored.

Display Interface

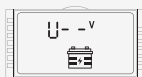
Main menu interface



Menu 1: System voltage setting interface



Setting method: long press for more than 2s until the parameter flashes, short press to adjust the parameter, after the adjustment is completed, long press for more than 2s until the parameter no longer flashes, the setting is complete.



1 Automatically identify voltage
(only applicable to the lead-acid battery)



2 12V battery



3 24V battery

Menu 2: Battery type setting



Setting method: Same as above.

- 1 b01=Sealed Lead Acid battery (SLA)
- 2 b02=Absorbed Glass Mat battery (AGM)
- 3 b03=GEL battery (GEL)
- 4 b04=Flooded Lead Acid battery (FLA)
- 5 b05=Ternary lithium battery
- 6 b06=LiFePO4
- 7 b07=LTO

Menu 3: Display the current controller temperature



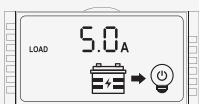
Note: This interface can only view the temperature value, and cannot adjust the parameters.

Menu 4: Display solar panel output voltage



Note: This voltage is the voltage from the solar panel to the controller. Only the voltage can be viewed, and the parameters cannot be adjusted.

Menu 5: Display load output current



Note: This interface can only view the current, and cannot adjust the parameters.

Menu 6: Over-discharge voltage adjustment interface



When the battery voltage is lower than this voltage, the controller will automatically cut off the load output.

Setting parameter range: U12V system: 9.0-12.0V; U24V system: 18-24.0V.

Setting method: Same as above.

Menu 7: Over-discharge recovery voltage adjustment interface



When the controller cuts off the load due to low voltage, the load will not be switched on until the battery voltage rises to the set voltage again.

Setting parameter range: U12V system, 10.5-13.5V; U24V system: 21-27.0V.

Setting method: Same as above.

Menu 8: Load working mode adjustment interface



- 1 **000H:** Pure light control mode, the controller turns on the load when there is no sunlight and turns off the load when there is sunlight.
- 2 **01.0H-23.0H:** Time control mode, the controller turns on the load when there is no sunlight, and the set time controls the load of time.
- 3 **24.0H:** 24-hour working mode with load.

Menu 9: Boost charging voltage-adjust interface



Adjust the boost charge voltage.

Setting parameter range: U12V system, 12.0~14.8V; U24V system: 24~29.6V.

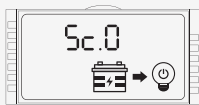
Setting method: Same as above.

Note: Only when the controller sets the battery type to b05, b06, b07, the parameters can be adjusted; When the controller sets the battery type as b01-b04, the parameters cannot be adjusted; Only lithium batteries can be adjusted the boost charge voltage, it is recommended to keep the default value.

Menu 10: Short circuit protection setting



- 1 Turn off short circuit protection



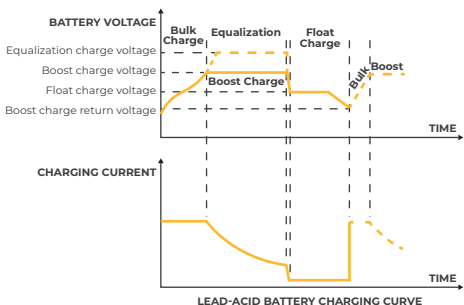
- 2 Turn on short circuit protection

Some inductive or capacitive loads will have a large current at the moment of starting, which may trigger the short-circuit protection of the controller and cause the output to shut down. At this time, the user can turn off the short-circuit protection function.

Setting method: Same as above.

Working Stage

Lead-acid Battery Working Stage

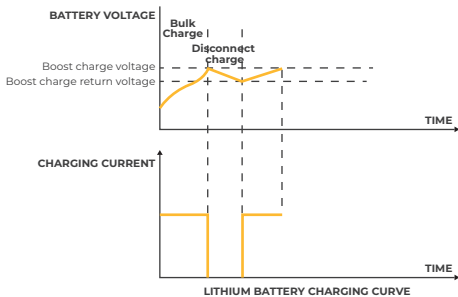


- 1 Bulk Charge:** Constant current charging, providing the maximum current to the battery until the battery voltage reaches the constant voltage stage (boost charging voltage or equalizing charging voltage).
 - 2 Boost Charge:** Constant voltage charging, the battery is charged for 120 minutes at an elevated charging voltage.
 - 3 Float Charge:** After the boost charge, the controller will reduce the battery voltage by reducing the charging current, and let the battery voltage is maintained at the set value of the floating charge voltage. During the floating charge stage, the battery is charged very weakly to ensure that the battery is maintained in a fully charged state. In the floating charge stage, the load can obtain nearly all solar power. If the load exceeds the power that solar energy can provide, the controller will not be able to maintain the battery voltage at the floating charge stage. When the battery voltage is low to the set value of boost charge return voltage, the system will exit the floating charging stage and enter the bulk charging stage again.
- Equalization:** Equalization charging raises the battery voltage to higher than the standard supplementary voltage to charge the battery. Certain

types of lead-acid batteries benefit from regular equalization charging, which can agitate the electrolyte, balance the battery voltage, complete a chemical reaction, and prevent battery vulcanization.



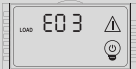
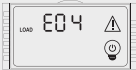
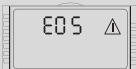
Note: Only b01, b02, b04 can perform equalization charging. The equalization charge will be carried out every 30 days, and the charge time is 120 minutes. When the battery is charged in equalization, the boost charge stage will not be performed.

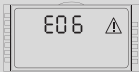
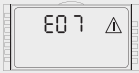

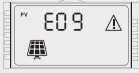
Lithium Battery Working Stage



- 1 Boost Charge Stage:** constant current charging, providing the maximum current to the battery until the battery reaches the boost charge voltage. Ternary lithium battery, LiFePO_4 , LTO can be adjusted the boost charge voltage.
- 2 Disconnect Charge stage:** when the battery reaches the boost charge voltage, the charging will be disconnected. When the battery voltage reaches the boost charge return voltage, the battery enters the boost charge stage again. The boost charge return voltage, reduce 0.5V (U12V system) / 1.0V (U24V system) on the basis of the boost charge voltage.

Error Code

Error code	Cause of failure	Solution
 <p>Battery low voltage</p>	<p>The battery over-discharge causes the voltage to be too low, which is lower than the over-discharge voltage set by the controller.</p>	<p>Charge the battery, reset the battery over-discharge voltage and over-discharge recovery voltage.</p>
 <p>Battery high voltage</p>	<p>The battery voltage is higher than the high voltage protection HVD value or the battery voltage is inconsistent with the system voltage.</p>	<p>Drop the battery voltage to the high voltage recovery HVR value or check that the battery voltage is consistent with the system voltage.</p>
 <p>Load over-current</p>	<p>Load current exceeds 30A.</p>	<p>Reduce load output current.</p>
 <p>Load short circuit</p>	<p>Load short circuit.</p>	<p>Check whether the positive and negative terminals of the load are in contact with each other and cause a short circuit.</p>
 <p>Charging current exceeds the limit current</p>	<p>The charging current exceeds 32A.</p>	<p>Reduce the power of the solar panel.</p>

Error code	Cause of failure	Solution
 <p>Low temperature</p>	<p>The internal temperature of the controller is lower than -4°F.</p>	<p>Put the controller in a suitable environment, and the controller's internal temperature is higher than 14°F to resume charging and discharging.</p>
 <p>High temperature</p>	<p>The internal temperature of the controller exceeds 176°F.</p>	<p>Put the controller is placed in a suitable environment, and the internal temperature of the controller is lower than 158°F to resume charging and discharging.</p>
 <p>Solar panel over-voltage protection</p>	<p>The voltage of the solar panel exceeds 50V.</p>	<p>The solar panel is connected in parallel or the number of solar panels is reduced, and the voltage is lower than 45V to recover.</p>
 <p>Solar panel reverse polarity</p>	<p>The positive and negative wires of the solar panel are not correctly connected to the controller.</p>	<p>check the wiring to ensure that the positive pole of the solar panel is connected to the PV terminal + of the controller, and the negative pole is connected to the PV terminal-of the controller.</p>

Note: When an error code appears, click the button to force recovery, and the error code will still exist if there is a fault.

Specification

System voltage	12V/24V
Rated charge current	30A
Rated discharge current	30A
Maximum PV input voltage	<50V
Backlight display time	15s off without operation
The maximum allowable voltage of battery terminal	<32V
No-load loss	<8mA
Working temperature	-31°F ~ 140°F
USB output	5V/2A
Temperature compensation	-3mV/°C/2V
Light control delay	1 minute
Protection level	IP32
Altitude	≤3000m
Net weight	290g
Dimensions	159×100×39(mm)
Installation size	147×80(mm)
Installation aperture	φ4.5(mm)

Electrical Parameters

Discharge parameter \ Battery charge	b01-SLA (default)	b02-AGM	b03-GEL	b04-FLA	b05-Ternary lithium battery	b06-LiFePO4	b07-LTO
High voltage protection HVD	16.0V	16.0V	16.0V	16.0V	16.0V	16.0V	16.0V
High voltage recovery HVR	15.0V	15.0V	15.0V	15.0V	15.0V	15.0V	15.0V
Boost charge voltage	14.4V	14.4V	14.2V	14.6V	12.5V	14.4V	13.5V
Equalizing charge voltage	14.6V	14.6V	-	14.8V	-	-	-
Floating charge voltage	13.8V	13.8V	13.8V	13.8V	-	-	-
Boost charge return voltage	13.2V	13.2V	13.2V	13.2V	12.0V	13.9V	13.0V
Overdischarge recovery voltage	12.6V	12.6V	12.6V	12.6V	10.5V	12.6V	11.5V
Over discharge voltage	11.1V	11.1V	11.1V	11.1V	9.5V	11.1V	10.5V
Boost charge time	120 min	120 min	120 min	120 min	-	-	-
Equalizing charge time	120 min	120 min	-	120 min	-	-	-
Equalizing charge interval	30 days	30 days	-	30 days	-	-	-
Temperature compensation mV/°C/2V	-3	-3	-3	-3	-	-	-

Note: The above data are 12V battery system parameters. If you use a 24V battery system, please set the above parameters*2.

The parameters corresponding to the yellow font can be modified by pressing the button, and the other parameters cannot be modified.

Frequently Asked Questions

Q1

If I have trouble using the controller, how can I get assistance?

A1

Send the following information to the email:

service@bouger.com,

- 1 The connection method of the solar panels (series/parallel, quantity, voltage, power).
- 2 The voltage and battery type of the battery.
- 3 The display data of the controller: battery voltage, battery charging current, the output voltage of the solar panel.

Please provide these above information with pictures and video, BougerRV will provide you with technical support faster.

Q2

Why does the controller show that the output current is very low?

A2

- 1 The output current may be low due to weak light or shadows of solar panels.
- 2 The battery may enter the float charge stage and therefore the current drops. You can use a multimeter to check the battery voltage to determine whether the battery enters the float charge stage.

Q3

Why is the battery not charging after I connected the solar panel?

There may be the following reasons: the solar panel line is connected reversely, the output voltage of the solar panel is lower than the battery voltage, and the output voltage of the solar panel is higher than the maximum PV input voltage.

A3

- 1 Check whether the line from the PV terminal to the controller is correct or not.
- 2 Check the output voltage of the solar panel. If the output voltage of the solar panel is lower than the battery voltage, you need to connect the solar panels in series to increase the voltage; if the output voltage of the solar panel is higher than 50V, you need to reduce the output of the solar panel.

Q4

How to maintain the controller in the daily use of the controller?

A4

- 1 Ensure that the system voltage and battery type of the controller are set correctly.
- 2 The controller should be installed as close to the battery as possible to avoid the voltage drop caused by too long wires, which will affect the normal voltage judgment.
- 3 The controller should be installed in a well-ventilated, non-humid environment.



BougeRV

Limitless energy, limitless life.

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