



Home » Renogy » RENOGY RNG-CTRL-RVR20 Rover Li MPPT Solar Charge Controller User

Manual ₹

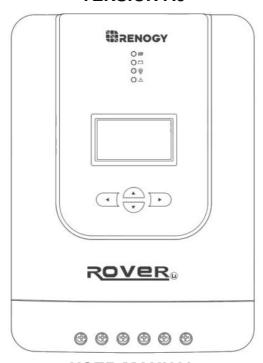


**Rover Li Series** 

MPPT Solar Charge Controller

12V/24V 20A/30A/40A

**VERSION A6** 



**USER MANUAL** 

# Contents [ hide ] 1 RNG-CTRL-RVR20 Rover Li MPPT Solar Charge Controller 2 Important Safety Information 3 Introduction 4 Charging and Activation Logic 5 Package Contents 6 Optional Accessories 7 Product Overview 8 Wiring Diagram 9 Recommended Cable and Fuse Sizing 10 Components & Tools 11 Preparation 12 Mounting 13 Installation 14 Temperature Sensor 15 Bluetooth Module (Optional) 16 Battery Type 17 System Voltage 18 Monitoring 19 Load Control 20 LED Indicators 21 Technical Specifications 22 MPPT Conversion Efficiency 23 Dimensions 24 Maintenance 25 Emergency Responses 26 Technical Support

# RNG-CTRL-RVR20 Rover Li MPPT Solar Charge Controller

# **Applicability**

27 Documents / Resources

27.1 References

The user manual applies to the following products:

- Rover Li 12V/24V 20A MPPT Solar Charge Controller (RNG-CTRL-RVR20)
- Rover Li 12V/24V 30A MPPT Solar Charge Controller (RNG-CTRL-RVR30)
- Rover Li 12V/24V 40A MPPT Solar Charge Controller (RNG-CTRL-RVR40)

#### **Disclaimer**

- Renogy ensures the accuracy, sufficiency, and applicability of information in the user manual at the time of printing due to continual product improvements that may occur.
- Renogy assumes no responsibility or liability for personal and property losses,
   whether directly or indirectly, caused by the user's failure to install and use the product in compliance with the user manual.
- Renogy is not responsible or liable for failures, damages, or injuries resulting from repairs attempted by unqualified personnel, improper installation, or operation.
- The illustrations in the user manual are for demonstration purposes only. Details may appear slightly different depending on product revision and market region.
- Renogy reserves the right to change the information in the user manual without notice. For the latest user manual, visit <u>renogy.com</u>.

### Copyright

Rover Li Series MPPT Solar Charge Controller User Manual © 2022 Renogy. All rights reserved.

All information in the user manual is subject to copyright and other intellectual property rights of Renogy and its licensors. The user manual may not be modified, reproduced, or copied, in whole or in part, without the prior written permission of Renogy and its licensors.

#### **Trademark**

The following are registered trademarks of Renogy:

RENOGY	RENOGY
--------	--------

The registered trademarks in the user manual are the property of Renogy. The

unauthorized use of the trademarks is strictly prohibited.

#### **Date and Revision**

January 2023, Revision A6

### **Important Safety Information**

The user manual provides important installation, operation, and maintenance instructions for the Rover Li Series Solar Charge Controller (hereinafter referred to as the charge controller). Read the user manual carefully before installation and operation, and save it for future reference. Failure to observe the instructions or precautions in the user manual can result in electrical shock, serious injury, or death, or can damage the charge controller, potentially rendering it inoperable. The installation and service of the charge controller might require knowledge of electricity and is recommended to be carried out by qualified personnel.

### **Symbols Used**

The following symbols are used throughout the user manual to highlight important information:

<b>▲</b> WARNING	Indicates a potentially dangerous condition that could result in injur y or death
△ CAUTION	Indicates a critical procedure for safe and proper installation and o peration
1 NOTE	Indicates an important step or tip for optimal performance
INFO INFO	Indicates that more information is available in other documents rel ating to the subject

### **General Safety Information**



• Do not puncture, drop, crush, penetrate, shake, strike, or step on the charge controller.

- Do not open, dismantle, repair, tamper with, or modify the components of the charge controller.
- Install the charge controller on a vertical surface indoors, protected from direct sunlight, high temperatures, and water. Make sure there is good ventilation.
- Do not immerse the charge controller or its components in water or other fluids.
- Keep the charge controller away from heating equipment.
- Do not insert foreign objects into the charge controller.
- Risk of explosion! Never install the charge controller in a sealed enclosure with flooded batteries! Do not install in a confined area where battery gases can accumulate.
- Confirm the polarities of the devices before connection. A reverse polarity contact will result in abnormalities.
- Refer to Recommended Cable and Fuse Sizing in this user manual, and select the appropriate cables and fuses according to the usage.
- Keep the charge controller out of the reach of children.
- Wear proper protective equipment and use insulated tools during installation and operation.
- Do not touch the connector contacts when the charge controller is in operation.
- Disconnect all connectors from the charge controller before maintenance or cleaning.
- Do not dispose of the charge controller as household waste. Comply with local, state, and federal laws and regulations and use recycling channels as required.
- In the event of fire, use fire extinguishers suitable for electrical equipment.
- If the charge controller is installed improperly on a boat, it may cause damage to the corrosion agents of the boat. Please have the charge controller installed by a qualified electrician.

### CAUTION

- Do not expose the charge controller to flammable or harsh chemicals or vapors.
- Ensure that there is no water source, including downspouts, sprinklers, or faucets above or near the charge controller.
- Ensure that the battery pack is properly connected before installation.

#### Introduction

#### **General Information**

Rover Li Series MPPT Solar Charge Controller can serve various off-grid solar systems. With the adoption of an intelligent MPPT (Maximum Power Point Tracking) algorithm, the charge controller can maximize the energy from the solar panel to charge the battery in a more efficient way. At the same time, it monitors the status of the battery in real time and prevents the battery from overcharging and overdischarge, thus extending the battery life and improving the performance of the system.

Rover Li Series MPPT Solar Charge Controller provides intelligent self-diagnosis and multiple input protection mechanisms, which can prevent damage caused by installation errors or system failures.

#### **Key Features**

#### Auto Battery Voltage Detection

The charge controller detects 12V or 24V DC system voltages for non-lithium batteries and programmability for lithium batteries.

### MPPT Technology

The charge controller supports advanced MPPT technology with tracking efficiency up to 99% and peak conversion efficiency of 98%.

### High Battery Compatibility

The charge controller is compatible with AGM, SLD, flooded, gel, lithium, and userdefined batteries.

### Full System Protection

The full system protection is meant to safeguard your system, and the self-diagnostic capability can assess and protect against reverse polarity, battery overcharging, battery overdischarging, overload, short-circuiting, and reverse current.

### Multiple Input Protection Features

The charge controller offers reverse polarity protection, overvoltage protection, short circuit protection, and reverse charging protection at night for solar panels.

#### • Diverse Load Control

You can connect DC appliances directly to the optional Load Terminals and monitor consumption or set up timer controls directly from the charge controller.

# **Charging and Activation Logic**

#### **MPPT Technology**

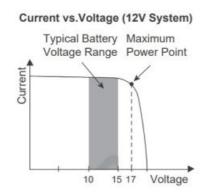
Based on MPPT technology, the charge controller can extract maximum power from the solar panel. With an automatic tracking algorithm, the MPPT technology can track the voltage of the maximum power point that changes with weather conditions, ensuring the harvest of the maximum power throughout the day.

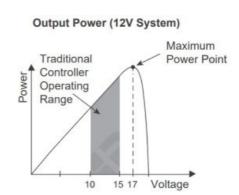
#### **■** Current Boost

Generally, the charge controller will "boost" the current in the solar system. The power generated in the solar panel is the same as the power delivered to the battery pack. Power is the product of voltage (V) x amperage (A).

Therefore, assuming 100% efficiency:

The efficiency of the charge controller is about 95%. As the maximum power point voltage of the solar system is greater than the battery pack voltage, the potential difference is proportional to the current boost. The voltage of the solar panel needs to be stepped down to a rate at which the battery can be charged in a stable manner. Compared with traditional charge controllers, the charge controller does not waste the stepped-down voltage. It is entirely possible to have the solar module input 8 amps of current into the charge controller, and have the charge controller output 10 amps of current to the battery pack. The following shows a graphic point about the output of MPPT technology.





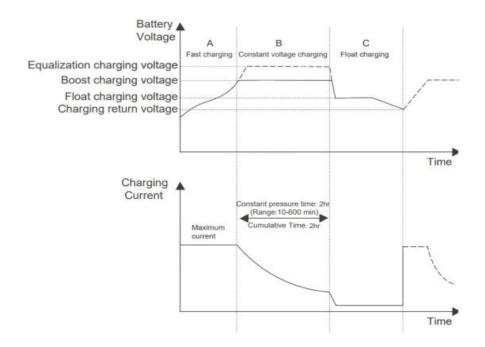
#### **■** Limiting Effectiveness

High temperature is the natural enemy of solar panels. With the increase in ambient temperature, the operating voltage (Vmp) of the solar panel decreases, which limits the

power generation of the solar panel. The charge controller encounters an inevitable decrease in charging performance even with the MPPT technology. In this case, it is better to use solar panels with a higher nominal voltage, so that the battery can still get a current boost even if the voltage drops proportionally.

#### **Four Charging Stages**

Rover Li Series MPPT Solar Charge Controller has a four-stage battery charging algorithm for a rapid, efficient, and safe battery charging. The stages include: Bulk Charging, Boost Charging, Float Charging, and Equalization.



### ■ Bulk Charging:

This algorithm is used for day-to-day charging. It uses 100% of available solar power to recharge the battery and is equivalent to a constant current. In this stage, the battery voltage has not yet reached constant voltage (equalization or boost), and the charge controller operates in constant current mode, delivering its maximum current to the batteries (MPPT Charging).

### **■** Constant Charging:

When the battery reaches the constant voltage set point, the charge controller will start to operate in constant charging mode, where it is no longer MPPT charging. The current will drop gradually. The charge stages (equalization and boost) are not carried out constantly in a full charge process to avoid too much gas precipitation or overheating of the battery.

Boost Charging: Boost stage maintains a charge for 2 hours by default. The user can adjust the constant time and preset value of the boost according to their demand.

#### **■** Float Charging:

After the constant voltage stage, the charge controller will reduce the battery voltage to a float voltage set point. Once the battery is fully charged, there will be no more chemical reactions, and all the charge current will turn into heat or gas. Because of this, the charge controller will reduce the voltage charge to a smaller quantity while lightly charging the battery. The purpose of this is to offset the power consumption while maintaining a full battery storage capacity. In the event that a load drawn from the battery exceeds the charge current, the charge controller will no longer be able to maintain the battery to a Float set point, and the charge controller will end the float charging stage and refer back to bulk charging.

#### **■** Equalization:

Equalization is carried out every 30 days of the month. It is intentional overcharging of the battery for a controlled period of time. The charge controller charges the battery at a level higher than the voltage that it is typically charged to remove sulfate crystals that build up on the plates over time and balance the voltage of each cell. Periodic equalization charging is beneficial to certain types of batteries because it helps ensure the battery capacity and maintains its runtime.



### CAUTION

- It is recommended to use only non-sealed, vented, flooded, and wet cell lead acid batteries in the equalization stage.
- Do not equalize VRLA-type AGM, gel, and lithium cell batteries unless permitted by the battery manufacturer.

# **MARNING**

- Once equalization is active in the battery charging, the charge controller will not exit this stage unless there is an insufficient source of charging current from the solar panel. There should be NO load on the batteries when in equalization charging.
- Overcharging and excessive gas precipitation may damage the battery plates and

activate material shedding on them. Too high an equalization charge or too long of one may cause damage. Review the specific requirements of the battery used in the system carefully.

Equalization may increase battery voltage to a level that damages sensitive DC loads.
 Ensure that the allowable input voltages of all loads are greater than the set voltage during equalization charging.

#### **Lithium Battery Activation**

The charge controller can activate sleeping lithium batteries in most cases. Lithium batteries need to be activated when the built-in battery protection is breached, which is usually when lithium batteries are overdischarged. To awaken lithium batteries, the controller will provide a constant voltage, and after successful activation, it can continue charging like normal.

During activation, the LCD will display REF. If REF it displays for more than 2 days, it means the charge controller needs to undergo further troubleshooting. Read Troubleshooting in the user manual.





# **1** NOTE

 After connecting the charge controller with the lithium battery, set the battery type and the system voltage. For more instructions, read Setting the Battery Type and System Voltage in the user manual.

### **■** Operation Conditions

- 1. Set the battery type of the charge controller to Li. Set the correct nominal voltage of the lithium battery manually.
- 2. For 12V lithium batteries, the incoming solar voltage should be greater than or equal to 16V DC, and for 24V lithium batteries, the incoming solar voltage should be greater

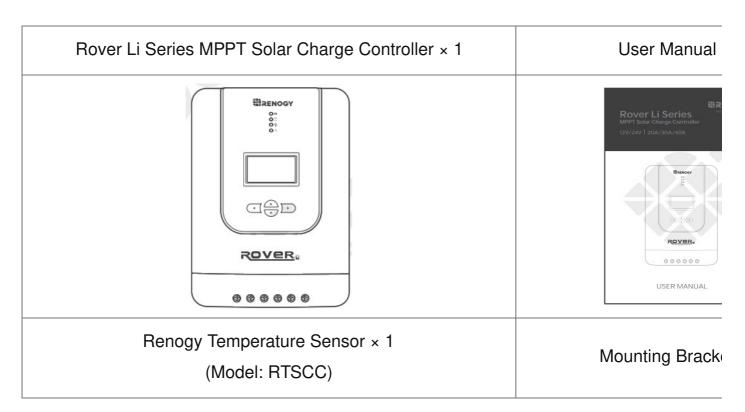
than or equal to 30V DC.

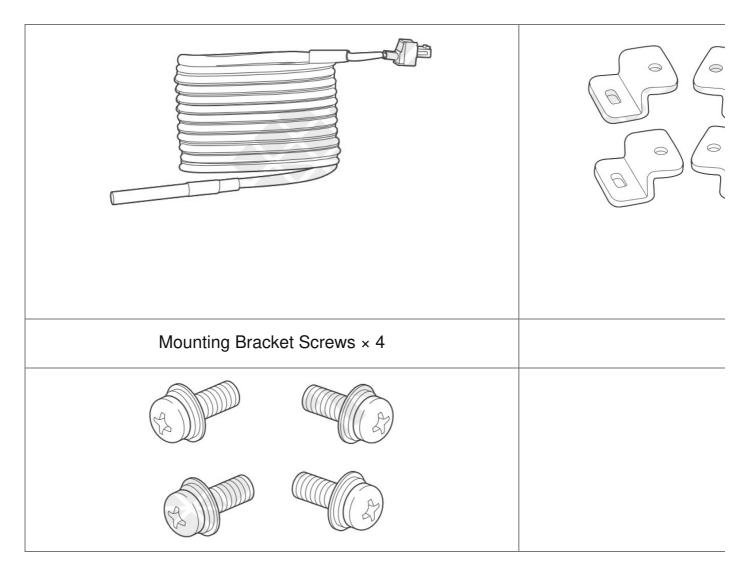
### **■** Working Logic

- 1. In lithium battery mode, the charge controller automatically enables the activation function and provides a constant voltage of over 13.2V to activate the lithium battery.
- 2. After the charge controller activates the lithium battery with a constant voltage of 13.2V for 10s, the charge controller will pause for 5s and detect the battery voltage. If the battery voltage is greater than or equal to 11V, the charge controller will exit the lithium battery activation mode.

If the battery voltage is less than 11V, the charge controller will continue to activate the lithium battery.

### **Package Contents**





# **Optional Accessories**



• You can buy the following optional accessories from renogy.com.



**Battery Fuse** 

RNG-CTRL-RVR20: 25A to 30A

RNG-CTRL-RVR30: 30A to 40A

RNG-CTRL-RVR40: 40A to 50A

The battery fuse protects the charge controller, cables, and batteries fro

m overcurrent.



#### **Solar Panel Fuse**

Solar panel fuse provides single circuit protection for solar panels, preventing damage caused by high currents.



#### **Fuse Cable**

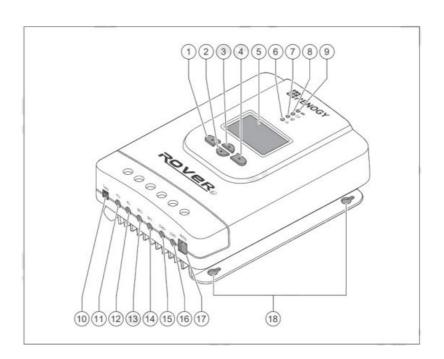
The cable is integrated with copper rings at both ends, enabling the char ge controller to be connected with an external fuse.



### Renogy BT-1 Bluetooth Module (sold separately)

Pair the Bluetooth Module with the Renogy DC Home app to monitor an d change parameters through a smartphone or tablet. Download the app by scanning the QR Code on the last page of the user manual.

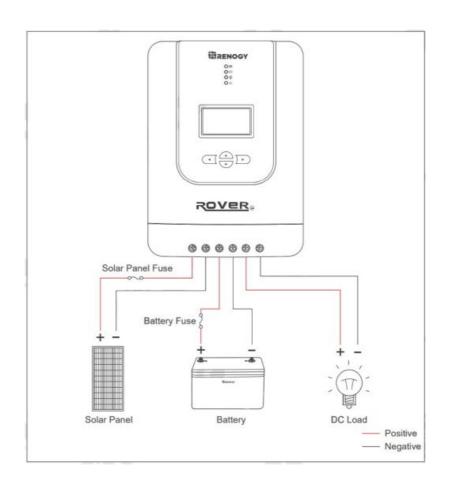
#### **Product Overview**



No.	Part & Description	No.	Part & Description
1	Return to the Previous Menu	10	Temperature Sensor Port
2	Page Down / Decrease Parameter Value	11	Positive Solar Terminal (PV+)

3	Page Up / Increase Parameter Value	12	Negative Solar Terminal (PV-)
4	Enter Sub Menu / Save Parameter Value / Turn Load On or Off in Man ual Mode	13	Positive Battery Terminal (BAT+)
5	LCD	14	Negative Battery Terminal (BAT-)
6	System Error LED Indicator	15	Positive DC Load Terminal (LOAD +)
7	Load LED Indicator	16	Negative DC Load Terminal (LOAD -)
8	Battery LED Indicator	17	RS232 Port (optional)
9	Solar LED Indicator	18	Mounting Holes

# **Wiring Diagram**



# **Recommended Cable and Fuse Sizing**

# **Recommended Cable Sizing**

Rated C urrent	Cable	Cable Length (ft)	Recommended C able Size
	Solar (input)	0-10 ft (0-3 m)	12 AWG
		11–20 ft (3–6 m)	10 AWG
		21-30 ft (6-9 m)	8 AWG
20A		0-10 ft (0-3 m)	12 AWG
	Battery (output)	11-20 ft (3-6 m)	10 AWG
		21–30 ft (6–9 m)	8 AWG
	Solar (input)	0-10 ft (0-3 m)	10 AWG
		11-20 ft (3-6 m)	8 AWG to 10 AW
		21–30 ft (6–9 m)	8 AWG
		0-10 ft (0-3 m)	10 AWG
	Battery (output)	11-20 ft (3-6 m)	8 AWG to 10 AW
		21-30 ft (6-9 m)	8 AWG
		0-10 ft (0-3 m)	8 AWG
	Solar (input)	11-20 ft (3-6 m)	6 AWG to 8 AWG
40A		21-30 ft (6-9 m)	6 AWG
		0-10 ft (0-3 m)	8 AWG
	20A 30A	Solar (input)  20A  Battery (output)  Solar (input)  Solar (input)  Solar (input)  Solar (input)	20A  Solar (input)  Battery (output)  Solar (input)  Battery (output)  Solar (input)  D-10 ft (0-3 m)  11-20 ft (3-6 m)  21-30 ft (6-9 m)  21-30 ft (6-9 m)  0-10 ft (0-3 m)  11-20 ft (3-6 m)  21-30 ft (6-9 m)  21-30 ft (6-9 m)  21-30 ft (6-9 m)  21-30 ft (6-9 m)  0-10 ft (0-3 m)  11-20 ft (3-6 m)  21-30 ft (6-9 m)  0-10 ft (0-3 m)  11-20 ft (3-6 m)  21-30 ft (6-9 m)  21-30 ft (6-9 m)

Battery (output)	11-20 ft (3-6 m)	6 AWG to 8 AWG
	21-30 ft (6-9 m)	6 AWG

# **1** NOTE

- The cable specifications listed above account for a critical, less than 3% voltage drop and may not account for all configurations.
- The size of the fuse cable is consistent with that of the corresponding cable connecting to the output terminal of the charge controller.

#### **Recommended Fuse Sizing**

For your safety, it is recommended to install fuses at both the input and output ends of the charge controller to ensure safe operations.

# **1** NOTE

 Choose appropriate fuses according to the specifications of the solar panel and the charge controller.

### **Fuse from Solar Panel to Charge Controller**

Max. Current of Solar Panel to Solar Controller Fuse = Total Amps of Solar Panel (Arr ay) \* 1.56

Solar Panels in Series	Solar Panels in Parallel
Total Amps I: $I_1=I_2=I_3$ Fuse = $I_1 * 1.56$	Total Amps I: $I_1+I_2+I_3$ Fuse = $(I_1+I_2+I_3) * 1$ .

# **1** NOTE

In the formula, I represents the maximum output current of the solar panel, and 1, 2,
 or 3 represents the solar panel number, respectively.



• Read the user manual of the solar panel to obtain working voltage parameters, and calculate the corresponding fuse current according to the formula.

# **Components & Tools**



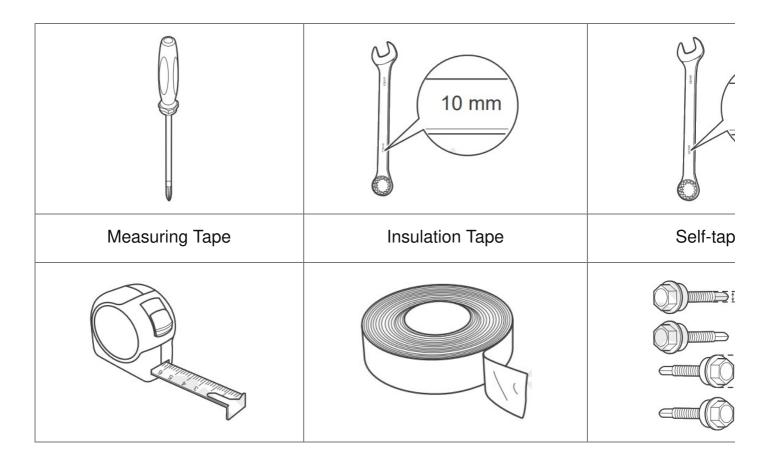
• The adapter cable used in this manual can be made by yourself or purchased from <a href="renogy.com">renogy.com</a> according to the names in Recommended Components.

### **Recommended Components**

Battery	Battery Adapter Cable (Ring Termin
#RENOGY	
Solar Panel	Solar Panel Extension C

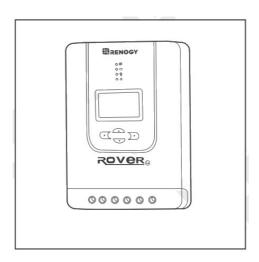
## **Required Tools**

Phillips screwdriver (#2)	Wrench (10 mm)	Wrench



# **Preparation**

### Inspection



1. Inspect the charge controller for any visible damage, including cracks, dents, deformation, and other visible abnormalities. All connector contacts shall be clean, dry, and free of dirt and corrosion.

# **MARNING**

• Do not use the charge controller if it has any visible damage.

#### **Environment**

Install the charge controller indoors and prevent its components from being exposed to direct sunlight. Prevent water from entering the charge controller. Make sure there is good ventilation.

Make sure that the charge controller is installed with an ambient temperature range from -4°F to 140°F or -20°C to 60°C. To ensure optimal working efficiency, it is recommended to keep the ambient temperature range from -4°F to 113°F or -20°C to 45°C. Make sure that the charge controller is installed in an environment with relative humidity between 0% and 95% and no condensation.

# **1** NOTE

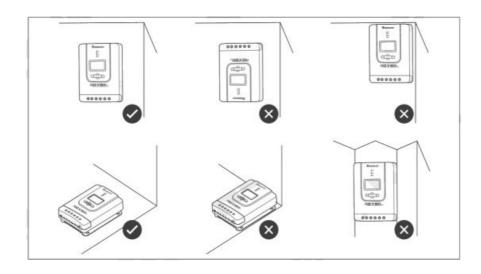
 Install the charge controller as close to the battery as possible to avoid voltage drops due to long cables.

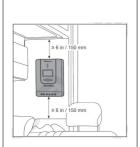
# **A** WARNING

 Risk of explosion! Never install the charge controller in a sealed enclosure with flooded batteries!

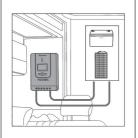
#### **Placement**

The charge controller can be fixed vertically (terminals facing down) to a wall or horizontally to the floor.





1. Ensure that there is enough space to install the cable. The charge controller requires at least 6 inches (150 mm) of clearance above an d below for proper air flow. Ventilation is highly recommended if it is mounted in an enclosure.

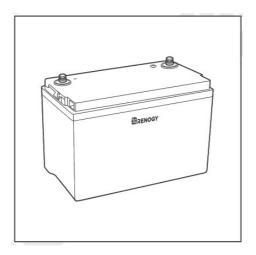


2. Measure the length of the cables connecting to the battery and the solar panel to make sure that they can be connected to the charge controller.

# **1** NOTE

- If the Battery Adapter Cable or Solar Panel Extension Cable is not long enough, you can use more extension cables or reselect the installation site.
- Read the Recommended Cable and Fuse Sizing in this manual, and select appropriate cables according to the usage.

### **Checking Battery**



 Inspect the battery for any visible damage, including cracks, dents, deformation, and other visible abnormalities. All connector contacts shall be clean, dry, and free of dirt and corrosion.



Read the user manual of the battery carefully before installation.

# 1 NOTE

- Make sure the battery is working normally.
- The charge controller can only be applied to deep-cycle gel, flooded, SLD, AGM, and Li batteries.
- Be sure to wear protective goggles. If getting electrolytes in your eyes, flush your eyes with clean water immediately.



#### CAUTION

• Do not dispose of batteries as household waste. Comply with local, state, and federal laws and regulations and use recycling channels as required.



#### WARNING

- Do not use the battery if it has any visible damage.
- Do not touch the exposed electrolyte or powder if the battery housing is damaged.
- The battery may produce explosive gases when being charged. Make sure there is good ventilation.

System Voltage		
Battery or Battery Pack System Voltage = System Voltage U		
Batteries in Series Batteries in Parallel		
System Voltage U: U <sub>1</sub> +U <sub>2</sub> +U <sub>3</sub>	System Voltage U: U <sub>1</sub> =U <sub>2</sub> =U <sub>3</sub>	

2. Combine the batteries in parallel or series as needed. This charge controller supports a maximum system voltage of 32V. Read the user manual for battery voltage parameters, and calculate the voltage of the battery or battery pack system according to the formula to ensure that it does not exceed 32V.

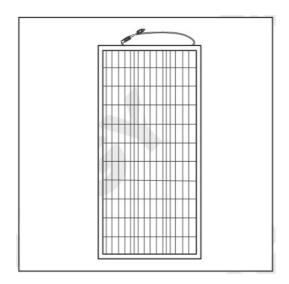
# **I** NOTE

• In the formula, U represents the battery voltage, and 1, 2, or 3 represents the battery number, respectively.

#### WARNING

• Do not use the charge controller if the battery or battery pack system voltage exceeds 32V. Doing so will cause damage to the charge controller.

#### **Checking Solar Panel**



1. Inspect the solar panel for any visible damage, including cracks, dents, deformation, and other visible abnormalities. All connector contacts shall be clean, dry, and free of dirt and corrosion.

### INFO

• Read the user manual of the solar panel carefully before installation.

# **1** NOTE

- The solar panels can be combined in parallel or in series as needed.
- Identify the polarities (positive and negative) on the cables used for solar panels. A reverse polarity contact may damage the charge controller.

### **MARNING**

Do not use the solar panel if it has any visible damage.

# **Maximum Output Power**

Maximum Output Power of Solar Panel or Solar Panel Array = Maximum Solar Input Power W

Solar Panels in Series	Solar Panels in Parallel
Maximum Output Power W: W <sub>1</sub> +W <sub>2</sub> +W <sub>3</sub>	Maximum Output Power W: W <sub>1</sub> +W <sub>2</sub> +W <sub>3</sub>

2. Read the user manual of the solar panel, and calculate the maximum output power of the solar panel or the solar panel array according to the formula.

# **1** NOTE

• In the formula, W represents the maximum output power of the solar panel, and 1,

2, or 3 represents the solar panel number, respectively.

Model	RNG-CTRL-RVR 2	RNG-CTRL-RVR 3	RNG-CTRL-RVR 40
Rated Solar Inp	12V @ ≤ 260W	12V @ ≤ 400W	12V @ ≤ 520W
ut Power	24V @ ≤ 520W	24V @ ≤ 800W	24V @ ≤ 1040W

Working Voltage	
Working Voltage of Solar Panel or Solar Panel Array = Working voltage U	
Solar Panels in Series	Solar Panels in Parallel
Working Voltage U: U <sub>1</sub> +U <sub>2</sub> +U <sub>3</sub>	Working Voltage U: U <sub>1</sub> =U <sub>2</sub> =U <sub>3</sub>

3. Read the user manual of the solar panel, and calculate the working voltage of the solar panel or the solar panel array according to the formula.

# **1** NOTE

• In the formula, U represents the working voltage of the solar panel, and 1, 2, or 3 represents the solar panel number, respectively.

# **MARNING**

• Ensure that the working voltage of the solar panel or the solar panel array does not exceed 100V.

# **Mounting**

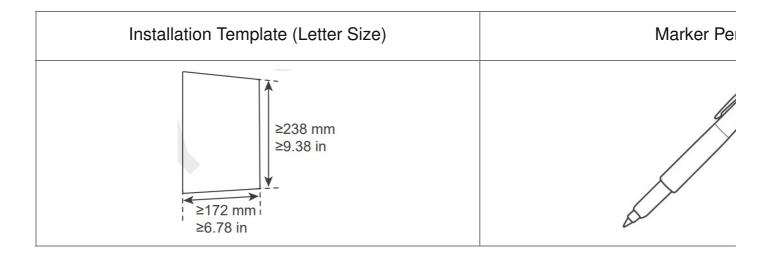
The charge controller can be mounted on a vertical surface with mounting holes or provided with brackets.

# **1** NOTE

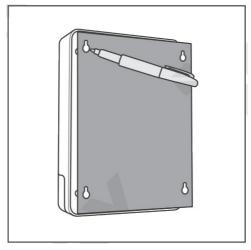
• Make sure that the charge controller is installed firmly to prevent it from falling off.

#### Wall-mounted

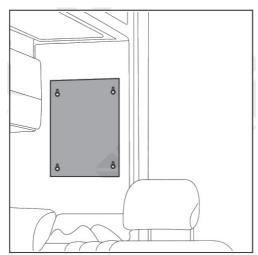
#### **Required Tools**



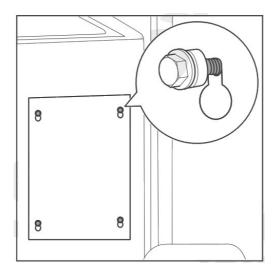
1. Mark the four mounting holes on a piece of paper.



2. Tape the paper to the desired location for installation.

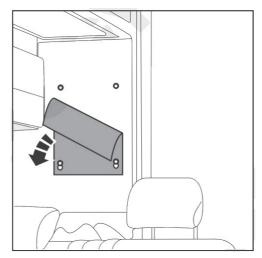


3. Install the screws according to the mounting holes marked on the paper. Do not overtighten the bolt.

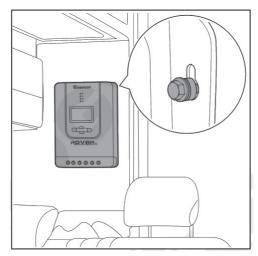


# **1** NOTE

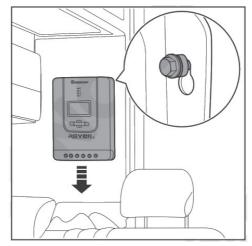
- Choose appropriate screws according to the mounting holes of the charge controller, and leave some gap between the screw and the surface.
- 4. Tear off the paper.



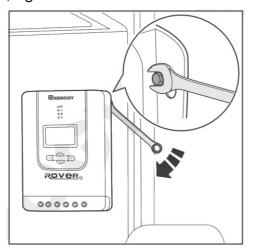
5. Hang the charge controller on the wall and verify all screw heads are in the mounting holes.



6. Release the charge controller and slide it down into place. Tighten the screws.



7. If the screws are not secure, tighten them clockwise with a suitable wrench

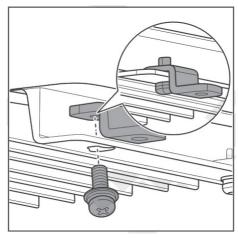


# **1** NOTE

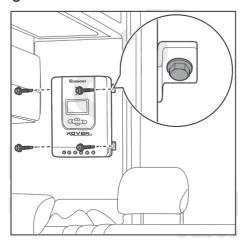
 If the gap between the charge controller and the mounting surface is too large and the screws cannot be tightened with a wrench, remove the charge controller and adjust the screws. Ensure that there is no gap between the charge controller and the surface.

### **Mounting with Brackets**

1. Secure the Mounting Brackets on the mounting holes of the charge controller with the Mounting Bracket Screws.



2. Place the charge controller against a flat surface and secure it with screws.



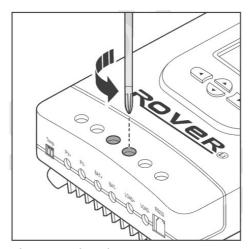
# **1** NOTE

• Choose appropriate screws according to the mounting holes of the charge controller.

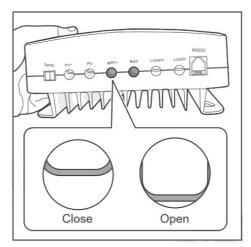
### Installation

### **Battery Wiring**

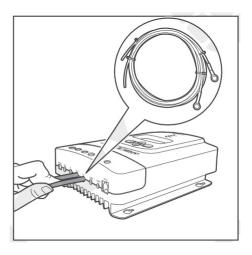
1. Rotate the cable retainer of the BAT – and BAT + terminals counterclockwise with a screwdriver.



2. Make sure the cable retainer is completely open.



3. Insert the bare ends of the Battery Adapter Cables into the corresponding BAT+ and BAT-.

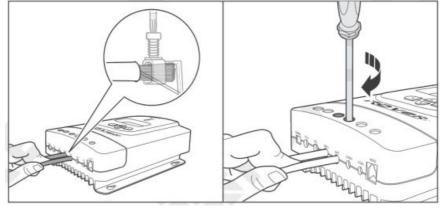


# **1** NOTE

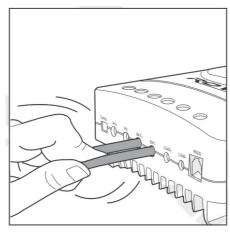
- Strip off some of the protective sheath of cables and insert the bare ends of the cables into the screw terminals.
- 4. Rotate the screws clockwise to clamp the wire down and close the cable retainer.

# **1** NOTE

• The torque of the cable retainer is 1.2 N⋅m (10.53 lb-inch). Do not overtighten the cable retainer screws. Otherwise, it will lead to stripped screws or screw bending.



5. Make sure all connections are tight and secure.



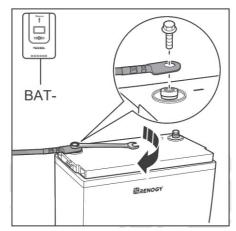
6. Attach the Battery Adapter Cable connecting to the BAT – of the charge controller to the negative terminal of the battery, and tighten the bolt with a wrench.

# **1** NOTE

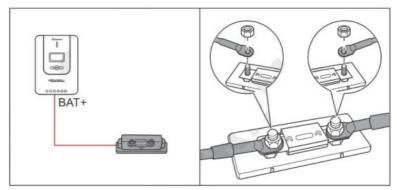
- Select a suitable wrench according to the specifications of the positive and negative wire fixing bolts of the battery.
- Make sure all connections are tight and secure.

### **MARNING**

• Identify the polarities (positive and negative) on the cables used for the batteries. A reverse polarity contact may damage the charge controller.

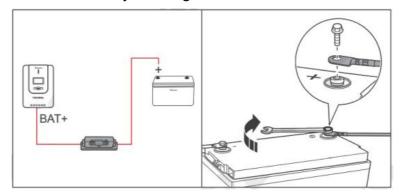


7. For your safety, it is recommended to use a battery fuse. Connect the Battery Adapter Cable connecting to the BAT+ to one end of the battery fuse, and then connect the other end to the fuse cable.

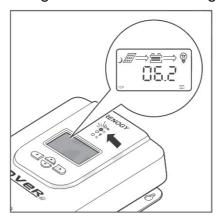


8. Attach the Battery Adapter Cable connecting to the BAT+ of the charge controller to

the positive terminal of the battery, and tighten the bolt with a wrench.

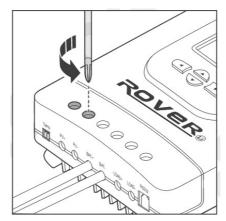


9. Once the tray cables are connected to the battery, the LCD and the Battery LED Indicator will light up, and the charge controller enters nighttime mode

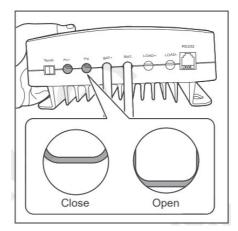


### **Solar Wiring**

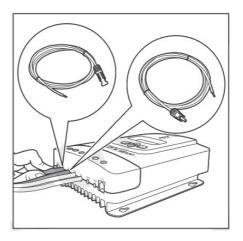
 Rotate the cable retainer of the PV – and PV + terminals counterclockwise with a screwdriver.



2. Make sure the terminal hatch is completely open.

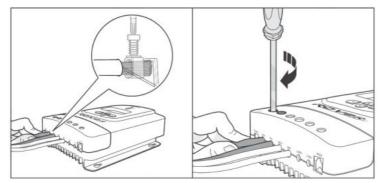


3. Insert the bare ends of the Solar Panel Extension Cables into the corresponding PV+ and PV-.



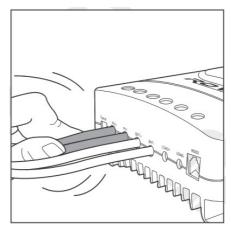
# **1** NOTE

- Strip off some of the protective sheath of cables and insert the bare ends of the cables into the screw terminals.
- Connect the male connector of the Solar Panel Extension Cable to the PV- and the female connector to the PV+.
- 4. Rotate the screws clockwise to clamp the wire down and close the cable retainer.

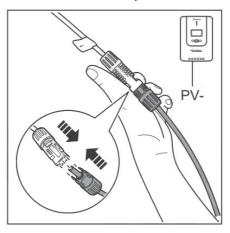


# **1** NOTE

- The torque of the cable retainer is 1.2 N·m (10.53 lb-inch). Do not overtighten the cable retainer screws. Otherwise, it will lead to stripped screws or screw bending.
- 5. Make sure all connections are tight and secure.

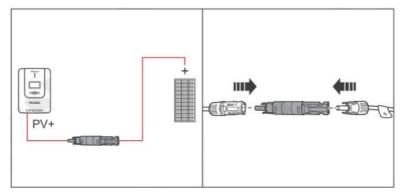


6. Connect the Solar Panel Extension Cable, connecting to the PV of the charge controller to the negative terminal of the solar panel.



# **1** NOTE

• Make sure all connections are tight and secure.



7. For your safety, it is recommended to use a battery fuse and a solar panel fuse. Connect the Solar Panel Extension Cable connecting to the PV+ to one end of the solar panel fuse, and then connect the other end of the fuse to the positive terminal of the solar panel.

# **1** NOTE

- Read the Recommended Cable and Fuse Sizing in this manual, and select appropriate solar panel fuses according to the usage.
- Remove the cover of the solar panels or place them face up after connection.



8. Once the Solar Panel Extension Cables are connected to the solar panels, the Solar LED Indicator will light up, and the charge controller enters daytime mode.

The charge controller needs troubleshooting if any of the following errors occur:

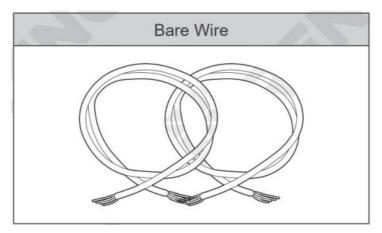
- The LCD does not light up.
- The battery voltage is not displayed on the LCD.
- The Battery LED Indicator or the Solar LED Indicator does not light up.

Read Troubleshooting in the user manual. For more instructions, contact our customer service through <u>renogy.com/contact-us/</u>.

# **Load Wiring (Optional)**

You can choose to connect the charge controller to a DC load (≤20A) on demand.

#### **Recommended Accessories**

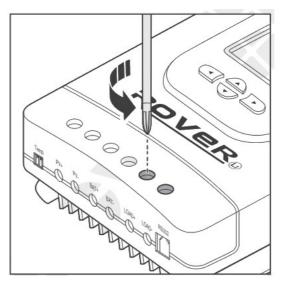


# **1** NOTE

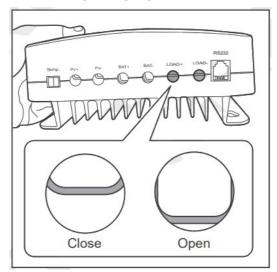
- DC load operating current needs to be less than or equal to 20A.
- Select appropriate cables based on the DC load operating current.
- The DC load is powered by batteries, so ensure that the DC load is compatible with the battery voltage. If a 12V DC load is installed in a 24V battery system, the incorrect

connection will damage the charge controller and void the warranty.

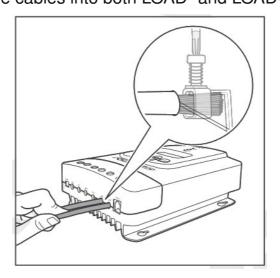
1. Rotate the cable retainer of the LOAD – and LOAD + terminals counterclockwise with a screwdriver.



2. Make sure the cable retainer is completely open.

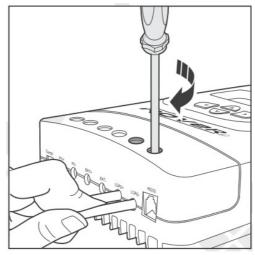


3. Insert the bare ends of the cables into both LOAD- and LOAD+ terminals.



**1** NOTE

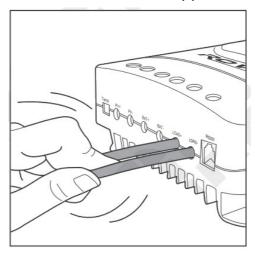
• Strip some insulation off bare wires according to the depth of the installation hole.



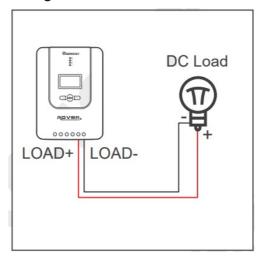
4. Rotate the screws clockwise to clamp the wire down and close the cable retainer.

# **1** NOTE

• The torque of the cable retainer is 1.2 N⋅m (10.53 lb-inch). Do not overtighten the cable retainer screws. Otherwise, it will lead to stripped screws or screw bending.



5. Make sure all connections are tight and secure.



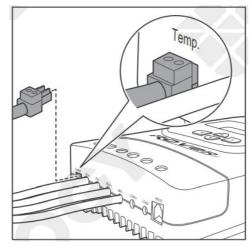
6. Connect the cable at the LOAD- terminal to the negative terminal of the load, and connect the cable at the LOAD+ terminal to the positive terminal of the load.

# **Temperature Sensor**

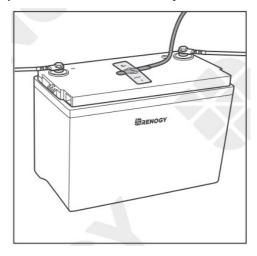
The temperature sensor can detect the temperature of the battery and send the temperature to the charge controller for charging voltage calibration, ensuring that the charge controller (with operating temperature ranging from -35°C to 45°C or -31°F to 113°F) can charge the battery normally.

# **A** CAUTION

- Do not use the temperature sensor on a LiFePO4 (LFP) battery that comes with a battery management system (BMS).
- 1. Insert the green connector of the Temperature Sensor into the Temperature Sensor Port of the charge controller.



2. Adhere the sensor to the top or side of the battery with the insulation tape.



# **Bluetooth Module (Optional)**

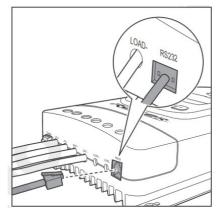
With a Renogy BT-1 Bluetooth Module, the charge controller can be connected to the DC Home app for remote device monitoring. You can monitor and modify parameters of the charge controller through the DC Home app.

## INFO

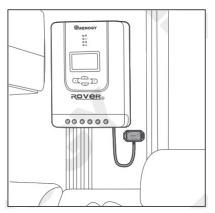
 Read the user manual of the Renogy BT-1 Bluetooth Module carefully before connection.

## **1** NOTE

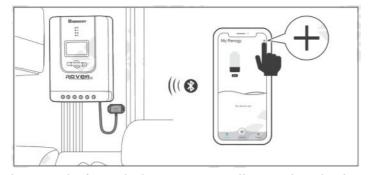
- Make sure that the charge controller is turned on before the connection.
- Scan the QR code on the last page of the user manual to download the DC Home app.
- 1. Connect the Bluetooth Module to the RS232 port on the charge controller.



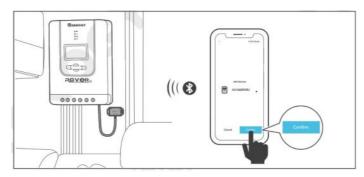
2. Place the Bluetooth module in a suitable site.



3. Open the DC Home app. Tap + to search for new devices.



4. Tap Confirm to add the newly found charge controller to the device list.



5. Tap the charge controller to check parameters of the charge controller. To modify parameters, see User Mode in the user manual.



### **Battery Type**

### **Setting the Battery Type**

Set the battery type immediately after installing the charge controller. If the charge controller has been connected to a Renogy BT-1 Bluetooth Module, you can also set the battery type from the DC Home app. For more details, see User Mode in this manual.

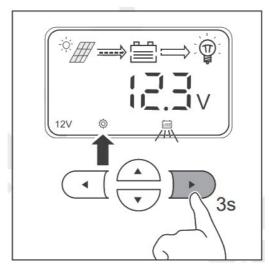


### **A** WARNING

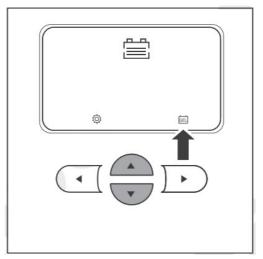
• Refer to the technical specifications of the battery provided by the manufacturer when choosing a preset battery. Incorrect battery type selection resulting in damage will not be covered by warranty.



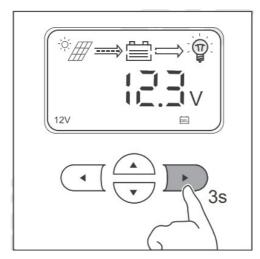
- To cancel the setting and exit, press <1.
- 1. Press and hold be the charge controller for about 3 seconds until it is lit up and the battery type icon starts flashing.



2. Press or to select the desired battery type.



3. After the battery type has been selected, press and hold ▶ for about 3 seconds to save the settings.



### **Battery Charging Parameters**

If your battery is not compatible with the preset charging configuration of the charge controller, enter the user mode to program battery parameters. If the charge controller has been connected to a Renogy BT-1 Bluetooth Module, you can also program battery parameters through the DC Home app. For more instructions, read the User Mode in this manual.

# **MARNING**

• Before modifying battery parameters, check the table below first. Incorrect parameter setting will damage the charge controller and void the warranty.

Battery Typ e Paramete rs	AGM / SLD	Gel	Flood	Li (LF P)	User Mod e	User Recommen ded
Overvoltage Shutdown	16.0V	16.0V	16.0V	16.0V*	[16.0V]	_
Equalizatio n Volatge	_	14.6V	14.8V	_	14.4V	9.0-17.0V
Boost Volta	14.2V	14.4V	14.6V	14.4V*	14.4V	9.0-17.0V
Float Voltag	13.8V	13.8V	13.8V	_	14.4V	9.0-17.0V
Boost Return Volt age	13.2V	13.2V	13.2V	13.2V	[13.2V]	_
Undervolta ge Warning	12.0V	12.0V	12.0V	12.0V	[12.0V]	_
Undervolta ge Return	12.2V	12.2V	12.2V	12.2V	[12.2V]	9.0-17.0V
Low Voltag e Disconne ct	11.0V	11.0V	11.0V	11.0V	[11.1V]	9.0-17.0V

Low Voltag e Reconnec t	12.6V	12.6V	12.6V	12.6V	[12.6V]	9.0-17.0V
Equalization	_	2 hour	2 hour	_	[0-300 min	_
Boost Duration	2 hour	2 hour	2 hour	_	0-300 min	10-300 min

### **1** NOTE

- The parameters listed in the table above apply to 12V batteries. For the 24V batteries, double the number of parameters.
- Parameters in square brackets ([]) are automatically adjusted according to the relevant settings and cannot be set directly.
- \* By default, Boost Voltage and Overvoltage Shutdown values are set to 14.4V and 16.0V, respectively, for lithium batteries. Manual modification of Boost Voltage for lithium batteries may trigger Overvoltage Shutdown alarms. Therefore, the Rover Li charge controller automatically sets the Overvoltage Shutdown parameter to a value of Boost Voltage plus 2 to ensure normal battery charging.
- For the default values of User Mode, refer to the DC Home App.

#### **User Mode**



#### MARNING.

 Before modifying battery parameters in user mode, check the table below and consult the battery manufacturer to check whether modification is allowed. Incorrect parameter setting will damage the charge controller and void the warranty.

Parameters	Description	
	Rover Li 12V/24V 20A MPPT Solar Charge Controller (RNG -CTRL-RVR20)	

Model	Rover Li 12V/24V 30A MPPT Solar Charge Controller (RNG -CTRL-RVR30)	
	Rover Li 12V/24V 40A MPPT Solar Charge Controller (RNG -CTRL-RVR40)	
Overvoltage Shutdow n	The default protection voltage is 16V. Improper settings may affect the safe use of the battery. Please consult the battery manufacturer and check if this voltage value needs to be m odified.	
Boost Voltage	This value affects whether the battery can be fully charged.  Please consult the battery manufacturer and set the value p roperly.	
Float Voltage	This value affects whether the battery can be fully charged.  Please consult the battery manufacturer and set the value p roperly.	
Equalization Voltage	<ol> <li>For lead-acid batteries, please consult your battery manuf acturer to obtain the voltage value and then complete the se ttings according to the feedback.</li> <li>If no equalization is required, set it to the same voltage as Boost.</li> </ol>	
Undervoltage Warnin		
Low Voltage Shutdow	This voltage value affects the life of the battery. Consult the battery manufacturer and check if this voltage value needs to be set.	
Low Voltage Reconne		

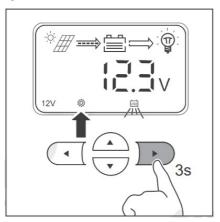
	Description	Parameters
--	-------------	------------

<b>Boost Duration</b>	
<b>Equalization Duration</b>	Please consult the battery manufacturer if it is necessary to set these values.
Equalization Interval	

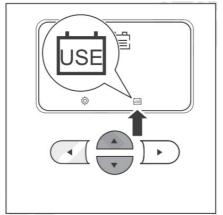
### **Setting via the Charge Controller**

# **1** NOTE

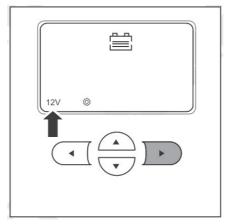
- To cancel the setting and exit, press <1.
- 1. Press and hold \( \bullet \) the charge controller for about 3 seconds until \( \bullet \) it is lit up and the battery type icon starts flashing.



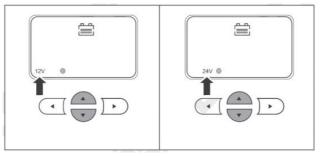
2. Press or to select \( \overline{\substack{\substack{\substack{substac



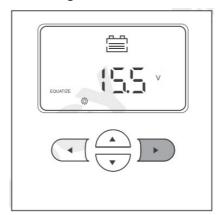
3. Press ightharpoonup to set the system voltage.



4. Press or to select 12V or 24V system voltage according to the usage.



5. Press box to set the equalization voltage.



6. Press o or to adjust the equalization voltage according to the usage.

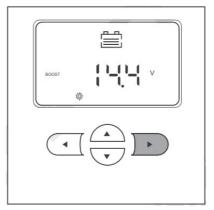


### CAUTION

- Overcharging and excessive gas precipitation may damage the battery plates and activate material shedding on them. Too high an equalization charging voltage or too long of equalization charging may damage the battery. Review the specific requirements of the battery used in the system carefully.
- It is recommended to use only non-sealed, vented, flooded, and wet cell lead acid

batteries in the equalization stage.

- Do not equalize VRLA-type AGM, gel, and lithium cell batteries unless permitted by battery manufacturers.
- If no equalization is required, set it to the same voltage as Boost.
- 7. Press to set the boost voltage.



8. Press o or to adjust the boost voltage according to the usage.



9. Press boto set the float voltage.



10. Press or voltage according to the usage.



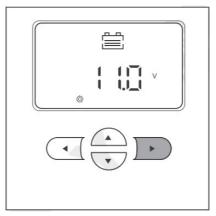
11. Press box to set the overdischarge return voltage.



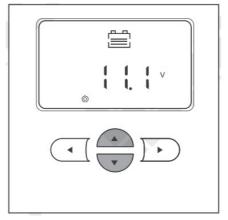
12. Press or value adjust the overdischarge return voltage according to the usage.



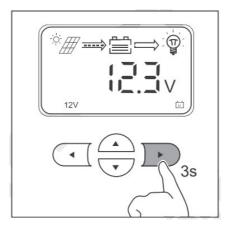
13. Press boto set the overdischarge voltage.



14. Press or vo to adjust the overdischarge voltage according to the usage.



15. After the settings are completed, press and hold ▶ for about 3 seconds to save the settings.

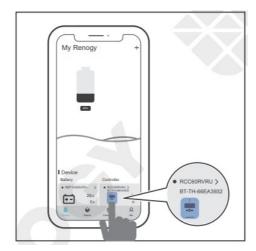


### Setting via the DC Home app

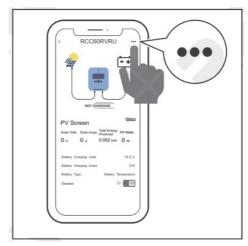
If the charge controller has been connected to a Renogy BT-1 Bluetooth Module, add the charge controller to the DC Home app first. For more instructions, see the Bluetooth Module (Optional) in the user manual.

# **1** NOTE

- Make sure the Bluetooth on your phone is turned on.
- Make sure the Renogy BT-1 Bluetooth Module is powered on.
- Illustrations of the DC Home app in this user manual are for reference only. Follow the instructions based on the current app version.
- 1. Tap the charge controller to enter the device details interface.



2. Tap ••• in the upper-right corner.



3. Tap Settings to enter the mode selection interface.



4. In this interface, you can customize multiple parameters of the battery. When the parameters are modified, Setting Success appears on the interface, indicating that the parameter setting is completed.



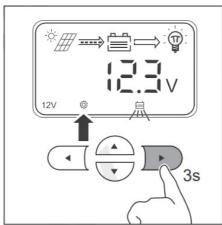
### **System Voltage**

The charge controller is simple and easy to use. For common AGM, SLD, gel, and flooded batteries, the charge controller can automatically identify the 12V/24V system voltage.

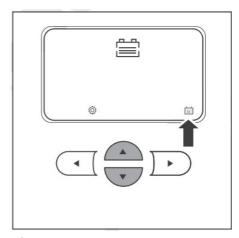
For the lithium battery, set the system voltage manually.

# **1** NOTE

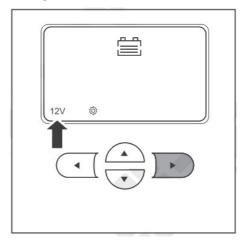
- To cancel the setting and exit, press <a>.</a>.
- 1. Press and hold ightharpoonup in the main interface for about 3 seconds until ightharpoonup it is lit up and the battery type icon starts flashing.



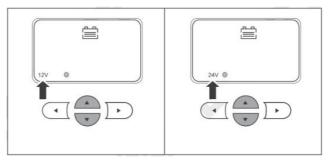
2. Press or to select .



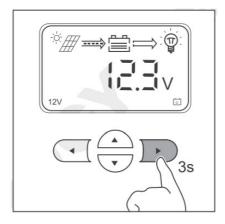
3. Press boto set the system voltage.



4. Press or select 12V or 24V system voltage according to the usage.



5. After the settings are completed, press and hold properties for about 3 seconds to save the settings.

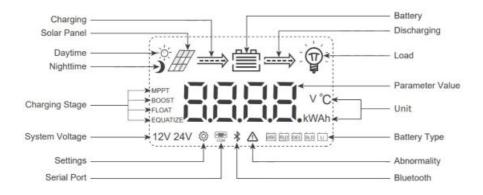


# **Monitoring**

The charge controller is equipped with an LCD and 4 buttons. You can check the status

of the charge controller and set parameters with the buttons.

# **Monitoring Menu**



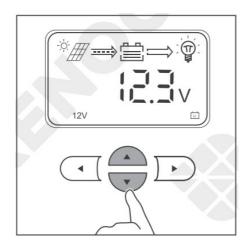
Icon	Parameter	Description
-;-;-	Daytime Mode	The voltage of the solar panel is greater than or equal to 10V.
)#	Nighttime Mode	The voltage of the solar panel is less than 10 V.
==== <del>}</del>	Charging (The arr ow between the s olar panel and the battery)	<ul> <li>Dynamic: The charge controller is charging the battery.</li> <li>Static: The charge controller is not charging the battery.</li> </ul>
==== <del>}</del>	Discharging (The arrow between the battery and the I oad)	<ul> <li>Dynamic: The charge controller is powering the load.</li> <li>Static: The charge controller is not powerin g the load.</li> </ul>

	Battery	Indicates four levels of the battery power (ba sed on the battery voltage):  0-24% 25~49% 50~75% 75~100%
	Load	The load is powered off, or the charge contro ller is not charging the load.  The load is powered on.
MPPT BOOST FLOAT EQUATIZE	Charging Status	<ul> <li>MPPT: The charge controller charges the b attery with all the energy from the solar panel.</li> <li>BOOST: When the battery is charged to the set point of the constant voltage, the charge controller will operate in the constant chargin g mode. The charging current gradually decreases.</li> <li>FLOAT: The charge controller charges the b attery with a small current to prevent the battery from self-discharging.</li> <li>EQUATIZE: The charge controller charges the battery at a level higher than the voltage that it is typically charged to remove sulfate crystals that build up on the plates over time and balance the voltage of each cell. Periodic equalization charging is beneficial to certain types of batteries because it helps ensure the battery capacity and maintain its runtime.</li> </ul>

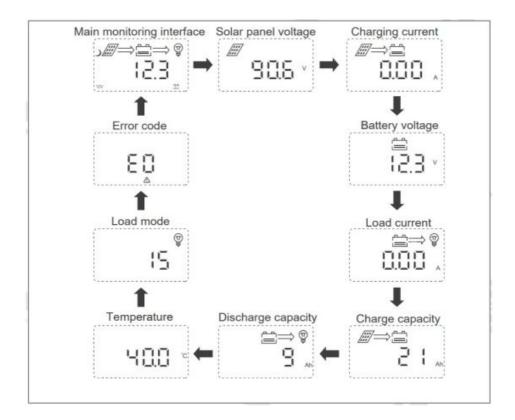
	Value / Unit	8888	Indicates the parameters of the s olar panel or the battery
		V	Indicates the voltage of the solar panel or the battery
		<sup>5</sup> C	Indicates the temperature of the charge controller or the temperat ure sensor (if connected)
V°C • kWAh		Kw	Used by the manufacturer for tes ting It lights up for a short time when the charge controller is powered on.
		A	Indicates the charging/dischargin g current of the battery
		Ah	Indicates the charging/dischargin g current of the battery in an hou
12V 24V	System Voltage	controller (12V or 2 to set the nually. Fo	ithium batteries, the charge automatically identifies the voltage 4V). For lithium batteries, you need voltage in the charge controller ma or details, see System Voltage.
		12V 24V	The system voltage is 12V.  The system voltage is 24V.
			The System voltage is 24 v.

Setting	Lights up when setting parameters	
Serial Port	Used by the manufacturer for testing It lights up for a short time when the charge ontroller is powered on.	
Bluetooth	Used by the manufacturer for testing It lights up for a short time when the charge c ontroller is powered on.	
Abnormality	Fault Check the error code on the LCD.	
Battery Type	User-defined battery  FLD Flooded battery  GEL Gel battery  SLD Sealed lead-acid battery  Lithium battery	
	Serial Port  Bluetooth  Abnormality	

# **Checking Parameters**

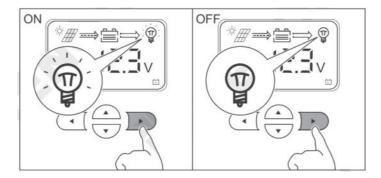


Press riangle or  $ilde{ to}$  to check parameters.



### **Load Control**

### **Turning Load On / Off**



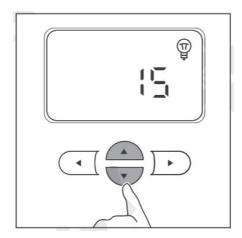
If the charge controller is connected to the DC load, press ightharpoonup to turn the load on or off.

### **Switching Load Mode**

You can set the way to turn on  $\slash\hspace{-0.6em}$  off the DC load.

# **1** NOTE

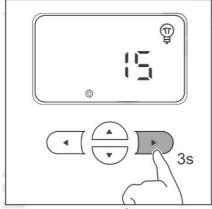
• To cancel the setting and exit, press <1.



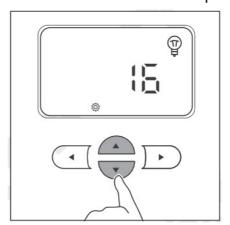
1. Press or to select the load mode.

### **NOTE**

• This interface displays the current load mode.



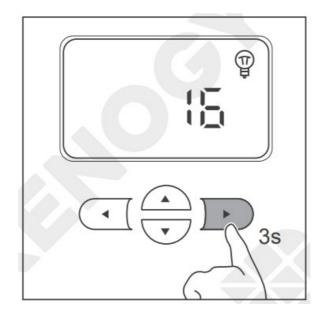
2. Press and hold properties for about 3 seconds until it is lit up.



3. Press or to adjust the value. Different values indicate the corresponding load modes. You can select the mode according to the table below.

alue Mode	Description
-----------	-------------

0	Automatic mode	When the voltage of the solar panel is less than 10V for 5 minutes, the charge controller will automatically supply power to the load.  The charge controller will automatically stop supplying power to the load until the solar panel voltage is greater than or equal to 10V or the battery triggers the undervoltage warning.
1–14	Timing mode	This parameter indicates the supply duration in hour s. For example,1 indicates that the charge controller supplies power to the load for an hour.  When the solar panel voltage is less than 10V, the charge controller automatically supplies power to the load for 1-14 hours (the time depends on the voltage).  If the solar panel voltage is greater than or equal to 10V or the battery triggers the undervoltage warning, the charge controller automatically stops supplying power to the load.
15	Manual mode	Factory default mode  Press > to turn the load on/off the load.
16	No delay mode	When the solar panel voltage is less than 10V, the c harge controller immediately supplies power to the I oad.  The charge controller will automatically stop supplying power to the load until the solar panel voltage is greater than or equal to 10V or the battery triggers the undervoltage warning.
17	24-hour mode	The charge controller keeps supplying power to the I oad until the battery triggers the undervoltage warning.



4. After the settings are completed, press and hold properties for about 3 seconds to save the settings.

### **LED Indicators**

Indicator	Description	Function
O <b>    </b>	Solar Panel LED Indicator	Indicates the charging status of the charge controller
0	Battery LED Indicator	Indicates the working status of the batt ery
○ <b>©</b>	Load LED Indicator	Indicates the working status of the loa
○ <u></u>	System Error LED Indicato	Indicates whether the charge controller is operating normally When the charge controller is faulty, the indicator lights up.

### **Solar Panel LED Indicator**

Indicator	Color	Status	Description
-----------	-------	--------	-------------

	White	ON	The solar panel is charging the battery
	White	Slow flash f	The charge controller is in the boost c harging stage.
	White	Single flash	The charge controller is in the float ch arging stage.
O <b>    </b>	White	Flash for 0.1	The charge controller is in the equalization charging stage.
	White	Double flash	The solar panel is charging the battery slowly. The current is too low. Make su re that the solar panel is not covered.
	0	OFF	The voltage of the solar panel is too lo w, or the solar panel is not detected.

# **Battery LED Indicator**

Indicator	Color	Status	Description
	White	ON	The battery is operating normally.
	White	Slow flash f	The battery is overdischarging. Charg e the battery as soon as possible.
0	White	Flash for 0.1	The battery voltage is too high. Discon nect the battery from the charge contr oller and check whether the battery is damaged.
	0	OFF	No battery is detected.

### **Load LED Indicator**

Indicator	Color	Status Description	
	White	ON	The load is powered on.
	White	Flash for 0.1	Overload or short circuit. At the same t ime, the System Error LED Indicator li ghts up.  Check the error code for troubleshooting. For more details, see <a href="Troubleshooting">Troubleshooting</a> ing in the user manual.
	0	OFF	The load is powered off.

# **System Error LED Indicator**

Indicator	Color	Status	Description
○ <u>∧</u>	White	ON	Fault For more details, see <u>Troubleshooting</u> in the user manual.
	0	OFF	The charge controller is operating nor mally.

### **Common Faults**

Fault	Troubleshooting

This indicates the solar panel voltage may be too low or the panel cannot be detected by the charge controller. F ollow the troubleshooting steps below:

1. Inspect the solar panel for any visible damage and may

- 1. Inspect the solar panel for any visible damage and ma ke sure it works normally. If the voltage of the solar panel is too low at night, check it again during the day.
- 2. Inspect the solar panel and keep it away from the shel ter.
- 3. Make sure the voltage of the solar panel is higher than the battery voltage. Otherwise, the solar panel cannot charge the battery.
- 4. Identify the polarities (positive and negative) on the ca bles used for the solar panel. A reverse polarity contact will cause the charge controller to work abnormally.
- 5. Make sure the cables of the solar panel are properly c onnected to the PV+ and PV- of the charge controller.
- 6. Inspect the cable of the solar panel for any visible da mage.
- 7. Inspect the fuse of the solar panel for any visible dam age.

For technical support, please contact our customer service through <a href="renogy.com/contact-us/">renogy.com/contact-us/</a>.

The solar panel is connect ed, but the LED indicator o f the solar panel does not li ght up. The battery is connected. However, the indicators of the charge controller LCD and battery LED can not light up.

The battery needs troubleshooting if it can not be detect ed. Follow the troubleshooting steps below:

- 1. Inspect the battery and replace it with a new one if it h as any visible damage.
- 2. Measure the battery voltage with a multimeter and ma ke sure the system voltage of the battery is 12V or 24V. Otherwise, the battery can not be detected by the charg e controller.
- 3. Identify the polarities (positive and negative) on the ca bles used for the battery. A reverse polarity contact will c ause the charge controller to work abnormally.
- 4. Make sure the cable of the battery is properly connect ed to the BAT+ and BAT- of the charge controller.
- 5. Inspect the cable of the battery for any visible damage.
- 6. Inspect the fuse of the battery for any visible damage. For technical support, please contact our customer service through <a href="mailto:renogy.com/contact-us/">renogy.com/contact-us/</a>.

The charging current of the charge controller or the solar panel current is lower than expected

- 1. The charge controller is in the float charging stage, an d the charging current will gradually drop until the battery is fully charged.
- 2. Inspect the solar panel and keep it away from the shel ter.
- 3. Check whether the sunlight intensity is high enough.
- 4. If the temperature of the charge controller is too high, the error code will not be displayed. Shut down the charge controller until the temperature drops to a standard value.
- 5. Select the appropriate cables and fuses according to the Recommended Cable and Fuse Sizing in this manual.
- 6. The voltage drops because the Solar Panel Extension Cable is too long.

- 1. Identify the polarities (positive and negative) on the ca bles used for the battery. A reverse polarity contact will c ause the charge controller to work abnormally. Connect t he battery first and then the solar panel. Otherwise, the charge controller may be damaged.
- 2. Measure the voltages of the battery, BAT+, and BATof the charge controller with a multimeter. If the voltages
  are inconsistent, the circuit is interrupted. Inspect the cir
  cuit and the battery fuse for any visible damage or incorr
  ect connections.

REF displays over 1 to 2 days

- 3. The preset battery voltage is incorrect. Measure the b attery voltage with a multimeter, and then reset the syste m voltage according to the actual use. For details, refer t o <a href="System Voltage">System Voltage</a> in this user manual. Disconnect the battery from the charge controller and reconnect it to activa te the battery.
- 4. The discharging speed of the battery is faster than the charging speed. Turn off or disconnect the load of the battery and charge the battery immediately to prevent the lithium battery from triggering BMS protection due to low voltage.

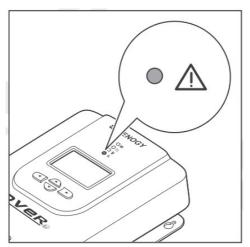
After the voltage of the lithium battery is restored, the battery will automatically exit the activation mode and work normally.

The load cannot be power ed on after connection.

- 1. Identify the polarities (positive and negative) on the ca bles used for the battery. A reverse polarity contact will c ause the load to work abnormally.
- 2. Make sure the load cables are properly connected.
- 3. Ensure that the load works normally. If the load is dam aged, replace it with a new one.
- 4. Check the load mode. For details, refer to <u>Switching L</u> <u>oad Mode</u> in this manual.
- 5. Check the battery voltage. If the battery voltage is too low, charge the battery immediately.

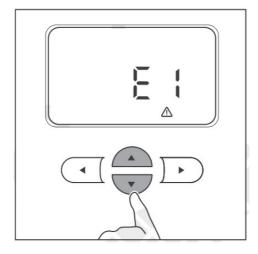
#### **Error Codes**

1. Under normal conditions, the System Error LED Indicator of the charge controller will not light up.



2. Press or enter the fault codes interface.

Perform troubleshooting according to the steps listed in the table below.



Icon	Description	Troubleshooting		
	No fault is detected	The charge controller works normally.		
E	Battery overdischarge	Measure the battery voltage with a multimeter. I f the battery voltage is too low, disconnect the I oad from the battery and charge the battery.		
	Battery overcharge	Measure the battery voltage with a multimeter. I f the battery voltage is too high, disconnect the battery from the charge controller and replace t he battery with a new one.		
	Load short circuit	Follow the troubleshooting steps below:  1. Disconnect the load. Measure the load voltage with a multimeter and ensure that the load voltage matches the battery voltage.  2. Make sure the load is properly connected.  3. Inspect the load for any visible damage.  4. Disconnect the battery from the charge controller and restart the charge controller.  5. If the fault code remains, replace the load with a new one.  For technical support, please contact our customer service through renogy.com/contact-us/.		
	Load overload	1. Check the load voltage. If the system voltage of the charge controller is 12V, the load port can only be connected to the 12V DC load. Other wise, connect the load port with the 24V DC load.  2. The maximum current of the load port on the charge controller is 20A. Ensure that the rated I oad charge current does not exceed 20A.		

Charge controller over temperature	Follow the troubleshooting steps below:  1. Shortpress  or  to check the temperat ure.  If the temperature is too high, disconnect all de vices from the charge controller immediately.  2. Ensure that the charge controller is installed on a flat surface indoors, protected from direct sunlight, high temperature, and water.  3. Make sure there is good ventilation.  4. Select the appropriate cables and fuses according to the Recommended Cable and Fuse Sizing in this manual.  5. Reconnect the charge controller after the temperature drops to a standard value.
Solar panel overcurren	<ol> <li>Make sure the solar panel is not short-circuit ed.</li> <li>Ensure that the power of the solar panel doe s not exceed the rated power of the charge controller.</li> </ol>
Solar panel overvoltag e	The maximum DC input voltage of the charge c ontroller is 100V. Make sure the voltage of the s olar panel array is less than or equal to 100V. O therwise, reduce the number of solar panels.

# **1** NOTE

• For technical support, please contact our customer service through renogy.com/contact-us/.

# **Technical Specifications**

Parameter Value
-----------------

Model	RNG-CTRL-RVR 20	RNG-CTRL-RVR 30	RNG-CTRL-RVR 40	
Rated Battery Input Voltag e	Non-lithium 12V/24V (automatic recognition) Lithium 12 V/24V (manual setting)			
Battery Input Voltage Rang e	10V to 32V DC			
Rated Charge Current	20A 30A 40A			
Rated Load Charge Current	20A			
Dated Calar Input Davier	12V @ 260W	12V @ 400W	12V @ 520W	
Rated Solar Input Power	24V @ 520W	24V @ 800W	24V @ 1040W	
Maximum Solar Input Powe	520W	800W	1040W	
Maximum Solar Input Volta ge (Voc)	100V DC			
Solar Input Voltage Range (	15V to 100V DC			
Power Concumption	≤100mA @12V			
Power Consumption	≤58mA @24V			
MPPT Tracking Efficiency	>99%			
Conversion Efficiency	≤98%			
Charger Efficiency	>95%			
MPPT Operating Voltage R ange	17V to 100V DC			

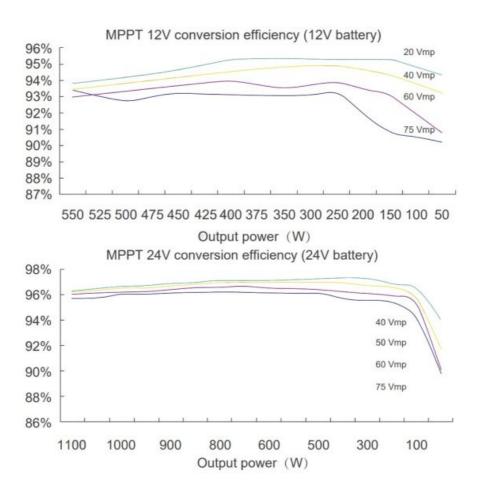
Temperature Compensation	Non-lithium: -3mV / °C / 2V Lithium: 0mV / °C / 2V; no c ompensation			
Charger Algorithm	Lead-acid battery: 3-stage charging (Bulk, Boost, and FI oat) with Equalization Lithium batteries: 2-stage charging (Bulk and Boost)			
Charger Preset	AGM, Gel, Flooded, Li, User-defined			
Cable Size	8 AWG to 12 A			
Grounding	Common Negative			
Communication	RS232 Modbus			
Operating Temperature	-31°F to 113°F / -35°C to 45°C			

Storage Temperature	-31°F to 167°F or -35°C to 75°C				
Humidity	0% to 95% RH				
Maximum Operating Altitud e	≤3000m				
Cooling	Heat Sink				
Enclosure Rating	IP32				
Dimensions (L x W x H)	8.27 x 5.95 x 2.69 in 210 x 151 x 68 mm	9.38 x 6.78 x 3.05 in 238 x 172 x 77 mm			
Weight	3.1 lbs / 1.4 kg	4.4 lbs / 2.0 kg			
Regulatory and Safety Spe cifications	FCC Part 15 Class B, CE, RoHS, RCM				

# **MPPT Conversion Efficiency**

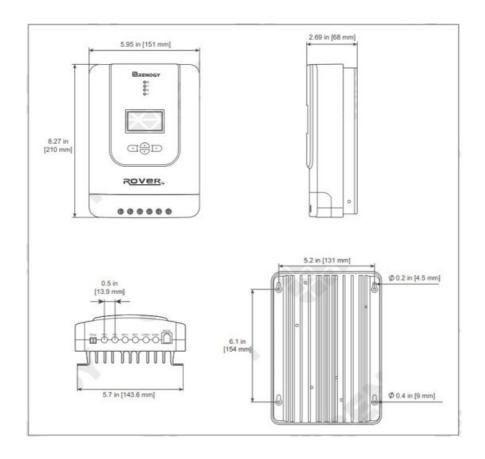
Light Intensity: 1000W/m<sup>2</sup>

Temperature: 25°C

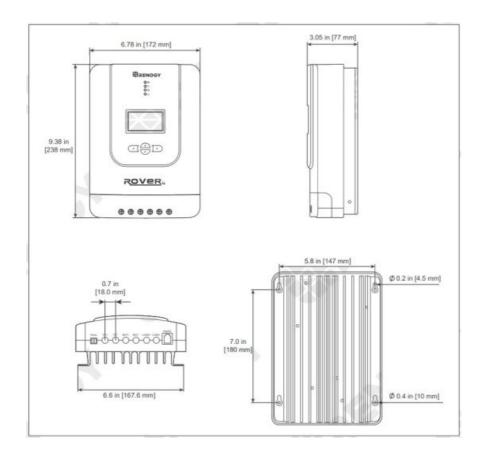


### **Dimensions**

**RNG-CTRL-RVR20** 



### RNG-CTRL-RVR30 or RNG-CTRL-RVR40



**1** NOTE

• Dimension tolerance: ±0.2 in (0.5 mm)

#### **Maintenance**

### Inspection

For optimum performance, it is recommended to perform these tasks regularly.

- Check the appearance of the charge controller to make sure it is clean and dry.
- Ensure the charge controller is mounted in a clean, dry, and ventilated area.
- Ensure there is no damage or wear on the cables. Ensure the firmness of the Anderson connectors and check if there are any loose, damaged, or burnt connections.
- Make sure that the indicators are in the normal state.
- Ensure there is no corrosion, insulation damage, or discoloration marks of overheating or burning.



 In some applications, corrosion may exist around the contacts inside the Anderson connector.

Corrosion can loosen springs and increase resistance, leading to premature connection failure. Apply dielectric grease to each connector contact periodically. Dielectric grease repels moisture and protects the connector contacts from corrosion.

### **MARNING**

 Risk of electric shock! Make sure that all power is turned off before touching the terminals on the charge controller.

### Cleaning

Follow the steps below to clean the charge controller regularly.

- Disconnect all Anderson connectors that are connected to the charge controller.
- Wipe the housing and connector contacts with a dry cloth or non-metallic brush. If it is still dirty, you can use household cleaners.
- Dry the charge controller with a clean cloth and keep the area around the charge controller clean and dry.
- Make sure the charge controller is completely dry before reconnecting it to the solar panel and the battery.
- When reconnecting, the battery must be connected first, then the solar panel.

### **Storage**

Follow the tips below to ensure that the charge controller is stored properly.

- Disconnect all Anderson connectors that are connected to the charge controller.
- By applying dielectric grease to each connector contact, the dielectric grease repels moisture and protects the connector contacts from corrosion.
- Store the charge controller in a well-ventilated, dry, and clean environment with a temperature between -13°F and 149°F.

### **Emergency Responses**

In the event of any threat to health or safety, always begin with the steps below before addressing other suggestions.

- Immediately contact the fire department or other relevant emergency response team.
- Notify all people who might be affected and ensure that they can evacuate the area.



### **MARNING**

ONLY perform the suggested actions below if it is safe to do so.

#### **Fire**

- 1. Disconnect all cables connected to the charge controller.
- 2. Put out the fire with a fire extinguisher. Acceptable fire extinguishers include water, CO<sub>2</sub>, and ABC.



#### WARNING

• Do not use type D (flammable metal) fire extinguishers.

### **Flooding**

- 1. If the charge controller is submerged in water, stay away from the water.
- 2. Disconnect all cables connected to the charge controller.

#### **Smell**

- 1. Disconnect all the cables from the charge controller.
- 2. Ensure that nothing is in contact with the charge controller.
- 3. Ventilate the room.

#### **Noise**

- 1. Disconnect all cables connected to the charge controller.
- 2. Make sure no foreign objects are stuck in the Anderson connector.

### **Technical Support**

For additional support, contact the Renogy technical support team through renogy.com/contactus.

Have the following information available when contacting Renogy.

- Owner name
- Contact information
- Order number
- Purchase channel
- Serial number
- Brief description of the issue



# Renogy offers premium services worldwide:

North America	US	www.renogy.com	CN	www.renogy.cn
Asia / Pacific	UK	uk.renogy.com	CA	ca.renogy.com
	AU	au.renogy.com	JP	renogy.jp
Europe	FR	fr.renogy.com	DE	de.renogy.com
	ES	es.renogy.com	KR	kr.renogy.com

#### **FCC Statement**

This device complies with Part 15 of the FCC Rules. FCC ID: 2ANPBRSMLP4-G2.

Operation is subject to the following two conditions:

1. This device may not cause harmful interference.

2. This device must accept any interference received, including interference that may

cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital

device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide

reasonable protection against harmful interference in a residential installation. This

equipment generates, uses, and can radiate radio frequency energy and, if not installed

and used in accordance with the instructions, may cause harmful interference to radio

communications. However, there is no guarantee that interference will not occur in a

particular installation. If this equipment does cause harmful interference to radio or

television reception, which can be determined by turning the equipment off and on, the

user is encouraged to try to correct the interference by one or more of the following

measures:

1. Orient or relocate the receiving antenna.

2. Increase the separation between the equipment and receiver.

3. Connect the equipment into an outlet on a circuit different from that to which the

receiver is connected.

4. Consult the dealer or an experienced radio / TV technician for help.

**FCC Radiation Exposure Statement** 

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled

environment. This equipment should be installed and operated with a minimum distance

of 20 cm between the radiator & your body.

**RENOGY** Find Your Energy Freedom™

**RENOGY.COM** 

Visit <u>renogy.com</u> to find relevant documentation or get more support via "<u>Contact Us</u>".

Renogy reserves the right to change the contents of this manual without notice.

Manufacturer: RENOGY New Energy Co., Ltd

Address: No.66, East Ningbo Road, Room 624-625

Taicang German Overseas Students Pioneer Park, Jiangsu 215000 CN

EC REP

eVatmaster Consulting GmbH

Battinastr.30

60325 Frankfurt am Main, Germany

contact@evatmaster.com

Manufacturer: RENOGY New Energy Co., Ltd

Address: No.66, East Ningbo Road, Room 624-625

Taicang German Overseas Students Pioneer Park, Jiangsu 215000 CN

UK REP

**EVATOST CONSULTING LTD** 

Suite 11, First Floor, Moy Road Business Centre, Taffs Well, Cardiff, Wales, CF15 7QR

contact@evatmaster.com

Join the Renogy Power Plus Community by downloading the DC Home App.

Find your e-warranty here, and more.



https://www.renogy-dchome.com/activity/#/?id=22&type=3

### **Documents / Resources**



RENOGY RNG-CTRL-RVR20 Rover Li MPPT Solar Charge Controller

[pdf] User Manual

RNG-CTRL-RVR20, RNG-CTRL-RVR30, RNG-CTRL-RVR40, RNG-CTRL-RVR20 Rover Li MPPT Solar Charge Controller, RNG-CTRL-RVR20, Rov er Li MPPT Solar Charge Controller, MPPT Solar Charge Controller, Solar Charge Controller, Charge Controller

#### References

User Manual

- Renogy
- charge controller, MPPT Solar Charge Controller, Renogy, RNG-CTRL-RVR20, RNG-CTRL-RVR20 Rover Li MPPT Solar Charge Controller, RNG-CTRL-RVR30, RNG-CTRL-RVR40, Rover Li MPPT Solar Charge Controller, Solar Charge Controller

### Leave a comment

Your email address will not be published. Required fields are marked\*

Comment *
Name
Email
Website
☐ Save my name, email, and website in this browser for the next time I comment.
Post Comment
Post Comment
Search:
e.g. whirlpool wrf535swhz

Manuals+ | Upload | Deep Search | Privacy Policy | @manuals.plus | YouTube

This website is an independent publication and is neither affiliated with nor endorsed by any of the trademark owners. The "Bluetooth®" word mark and logos are registered trademarks owned by Bluetooth SIG, Inc. The "Wi-Fi®" word mark and logos are registered trademarks owned by the Wi-Fi Alliance. Any use of these marks on this website does not imply any affiliation with or endorsement.