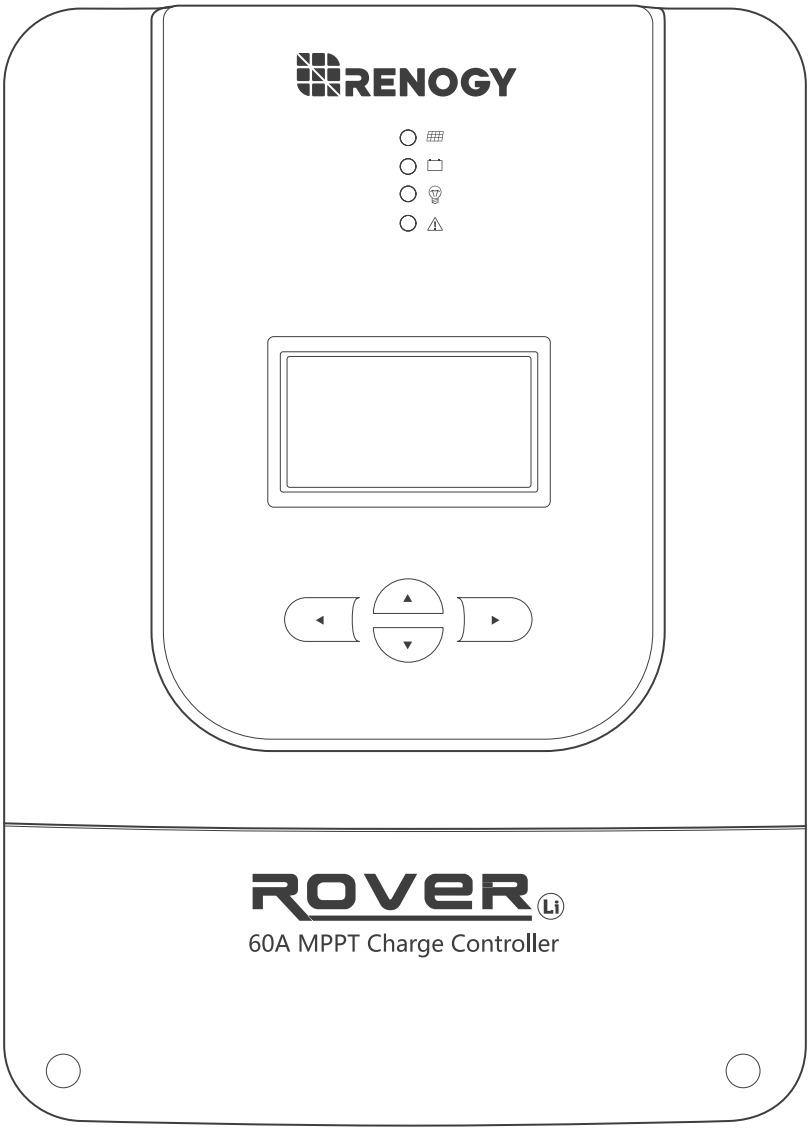
Rover

60 Amp MPPT Solar Charge Controller

12V/24V/36V/48V | 60A

RNG-CTRL-RVR60-G1

VERSION A5
April 15, 2025



USER MANUAL

Before Getting Started

The user manual provides important operation and maintenance instructions for Rover 60 Amp MPPT Solar Charge Controller (hereinafter referred to as charge controller).

Read the user manual carefully before 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.

- Renogy ensures the accuracy, sufficiency, and the 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 and 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 repair attempted by unqualified personnel, improper installation, and unsuitable 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 renogy.com.

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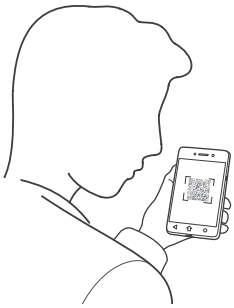
Online Manual



User Manual

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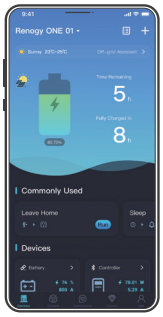

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1. General Information

1.1. Symbols Used

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

WARNING: Indicates a potentially hazardous condition that could result in personal injury or death.

CAUTION: Indicates a critical procedure for safe and proper installation and operation.

NOTE: Indicates an important step or tip for optimal performance.

1.2. Qualified Personnel

The installation and service of the charge controller must be carried out by qualified personnel. Qualified personnel refer to trained and licensed electricians or installers with all the following skills and expertise:

- Knowledge of the functional principles and operation of on-grid and off-grid energy storage system.
- Knowledge of the risks and dangers associated with the installation and service of electrical devices and acceptable mitigation methods.
- Knowledge of the installation and service of electrical devices.
- Knowledge of and adherence to the user manual and all safety precautions and best practices.
- Knowledge of local installation regulations.
- Electrical license for the installation and service of energy storage system required by the county or state.

1.3. Introduction

Rover 60 Amp MPPT Solar Charge Controller is an intelligent controller suitable for various off-grid solar applications. It protects the battery from being over-charged by the solar modules and over-discharged by the loads.

The controller features a smart tracking algorithm that maximizes the energy from the solar PV module(s) and charge the battery. At the same time, the low voltage disconnect function (LVD) will prevent the battery from overdischarging.

The Rover's charging process has been optimized for long battery life and improved system performance. The comprehensive self-diagnostics and electronic protection functions can prevent damage from installation mistakes or system faults.

1.4. Key Features

- **Auto Battery Voltage Detection**
  The charge controller detects 12V, 24V, 36V, and 48V DC system voltages for non-lithium batteries and programmability for lithium batteries.
- **High Battery Compatibility**
  The charge controller is compatible with AGM, SLD, flooded, gel, lithium, and user-defined 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 with timer control setting directly from the charge controller.
- **Parallel Mode**
  You can connect multiple Rover 60A charge controllers in parallel for flexible system expansion.

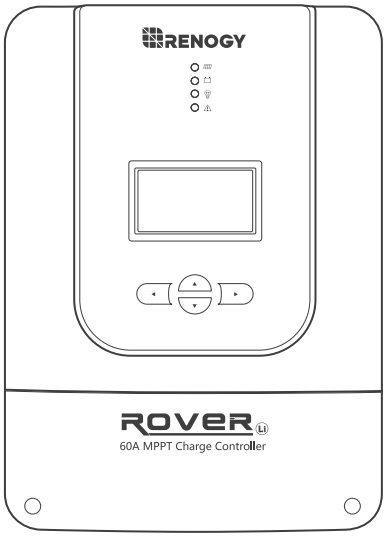
1.5. SKU

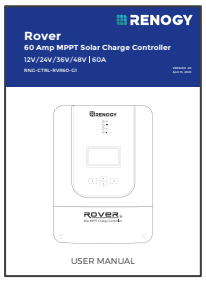
Rover 60 Amp MPPT Solar Charge Controller	RNG-CTRL-RVR60

2. Get to Know Rover 60 Amp MPPT Solar Charge Controller

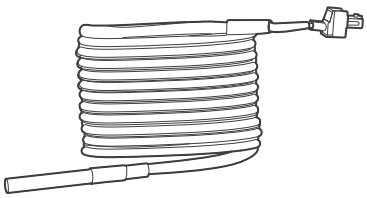
2.1. What's In the Box?

Rover 60 Amp MPPT Solar Charge Controller × 1

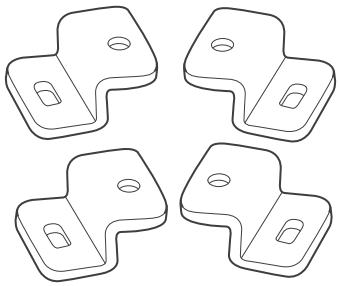




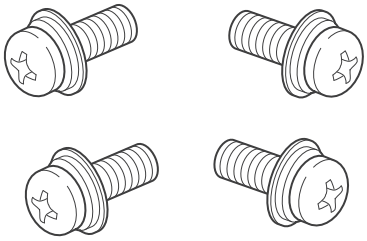
User Manual × 1



Battery Temperature Sensor (Model: RTSCC) × 1



Mounting Bracket × 4



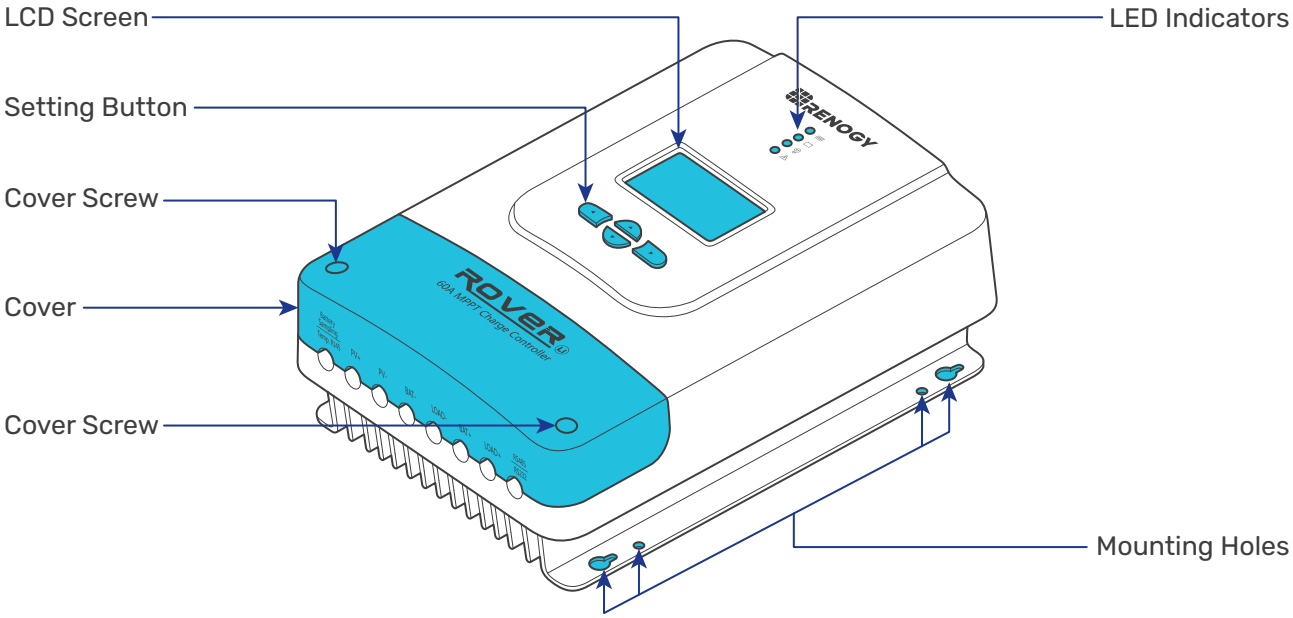
Mounting Bracket Screws x 4

Make sure that all accessories are complete and free of any signs of damage.

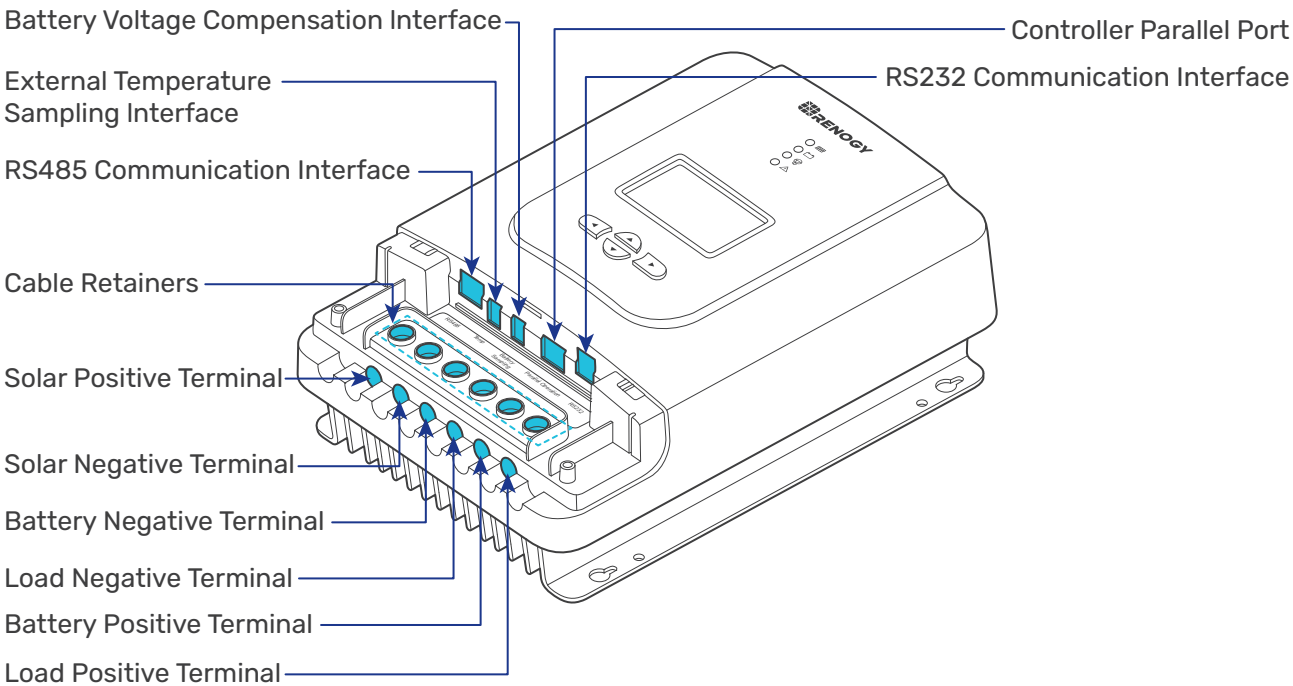
The accessories and product manual listed are crucial for the installation, excluding warranty information and any additional items. Please note that the package contents may vary depending on the specific product model.

2.2. Product Overview

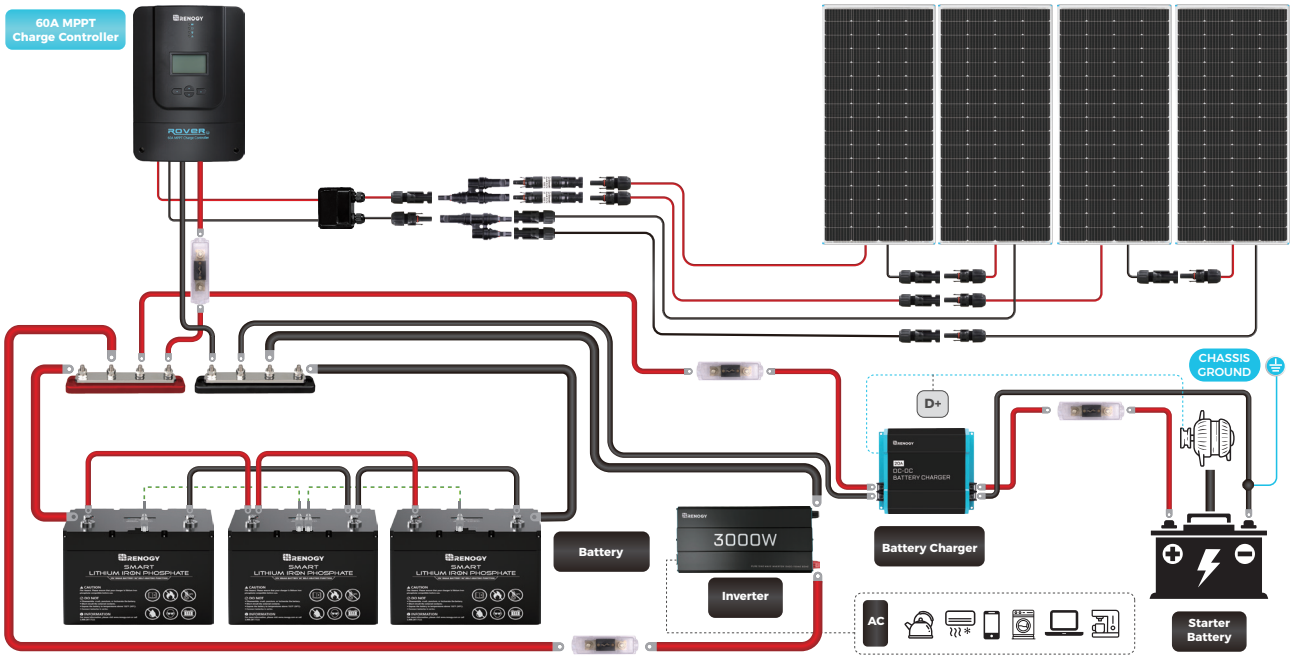
Exterior



Interior (with the cover removed)

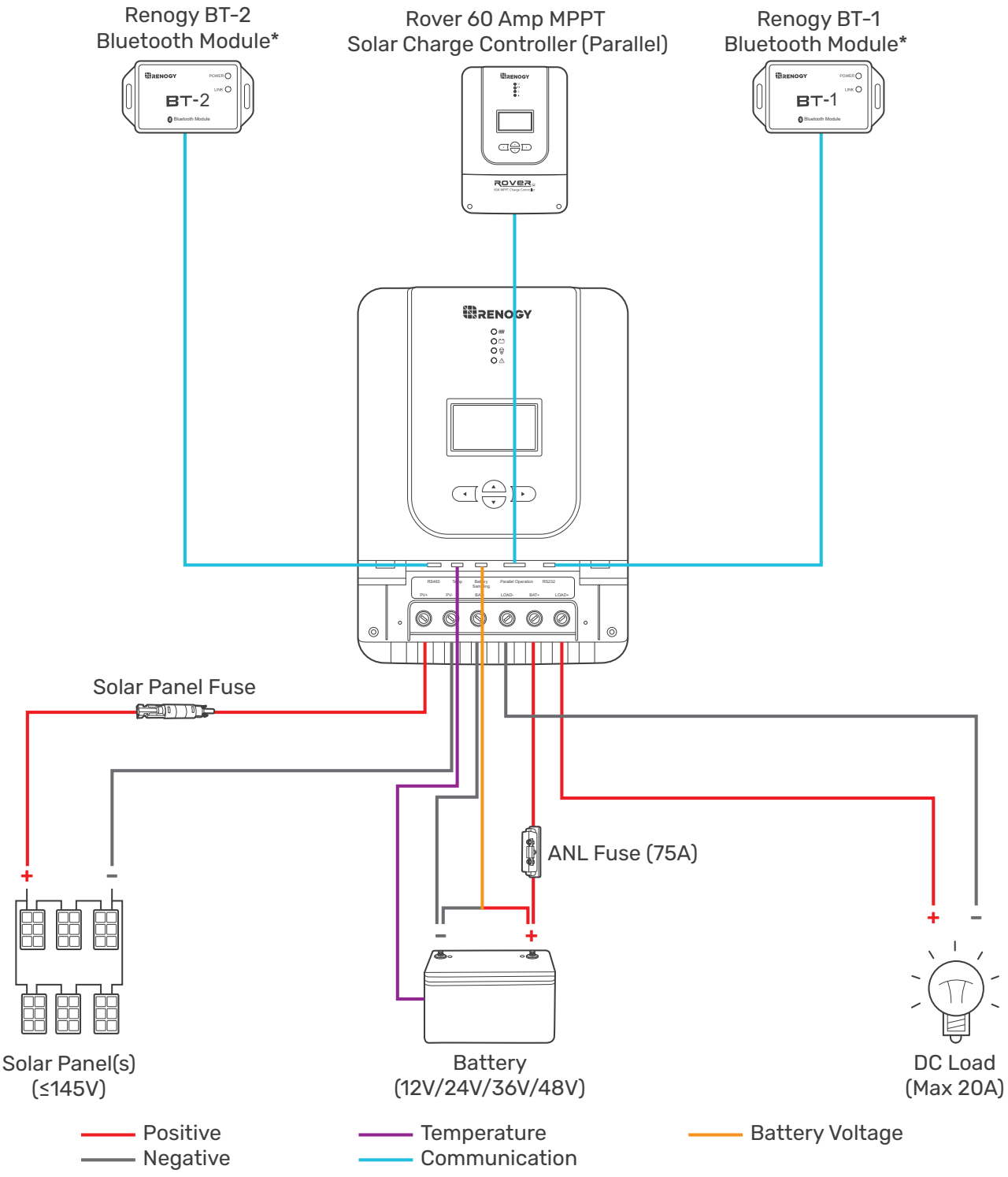


2.3. System Setup



The wiring diagram only shows the key components in a typical DC-coupled off-grid energy storage system for the illustrative purpose. The wiring might be different depending on the system configuration. Additional safety devices, including disconnect switches, emergency stops, and rapid shutdown devices, might be required. Wire the system in accordance with the regulations at the installation site.

2.4. Wiring Setup



The External Temperature Sampling Interface (Temp) can only be used with lead-acid batteries.

In this manual, the red cable represents the positive cable, and the gray cable represents the negative cable.

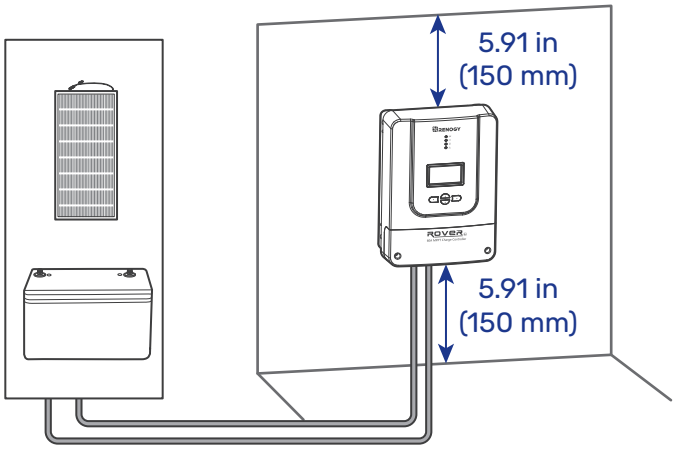
*Only install either the Renogy BT-1 Bluetooth Module or the Renogy BT-2 Bluetooth Module, as either one of them is sufficient.

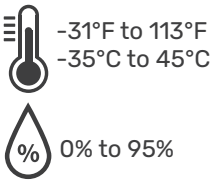
Always connect the battery terminals before the solar panel terminals.

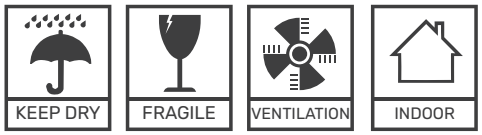
3. Preparation

3.1. Plan a Mounting Site

The charge controller requires adequate clearance for installation, wiring, and ventilation. The minimum clearance is provided below. Ventilation is highly recommended if it is mounted in an enclosure. Select a proper mounting site to ensure the charge controller can be safely connected to the battery, solar panel(s), and the other necessary devices with the relevant cables.

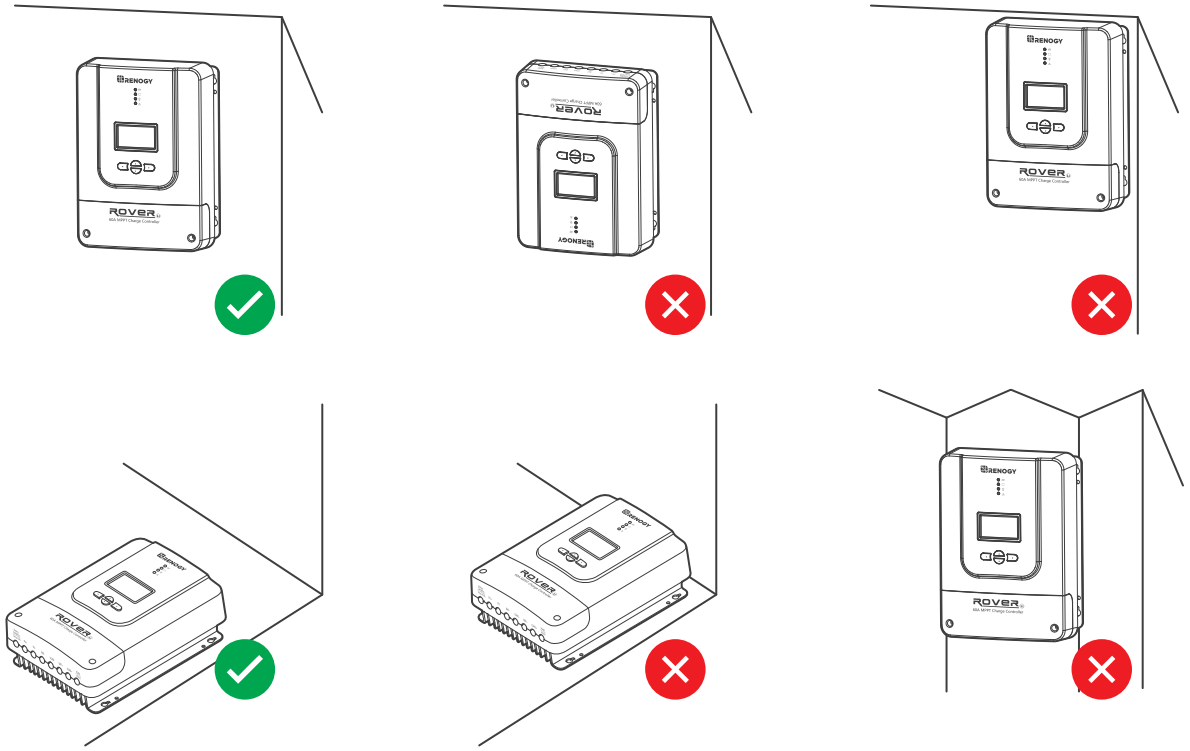






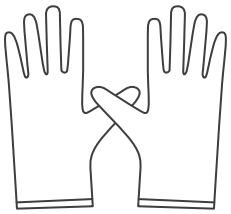
- Risk of explosion! Never install the charge controller in a sealed enclosure with flooded batteries! Do not install the charge controller in a confined area where battery gases can accumulate.
- The charge controller should be installed on a flat surface protected from direct sunlight.
- Keep the charge controller out of the reach of children and animals.
- Do not expose the charge controller to flammable or harsh chemicals or vapors.
- Make sure that the charge controller is installed in a place at ambient temperature from -31°F to 140°F (-35°C to 60°C). To ensure optimal working efficiency, it is recommended to keep the ambient temperature range from -31°F to 113°F (-35°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.
- If the charge controller is installed improperly on a boat, it may cause damage to components of the boat. Have the charge controller by a qualified electrician.
- The charge controller should be as close to the battery as possible to avoid voltage drop due to long cables.
- It is recommended that all cables (except communication cables) should not exceed 10 meters (32.8 feet) because excessively long cables result in a voltage drop. The communication cables should be shorter than 6 m (19.6 feet).
- The cable specifications listed in the user manual account for critical, less than 3% voltage drop and may not account for all configurations.
- Keep the charge controller away from EMI receptors such as TVs, radios, and other audio/visual electronics to prevent damage or interference to the equipment.

To ensure good ventilation and optimal system performance, we recommend mounting the charge controller vertically (terminals down) on a wall or horizontally on the floor.



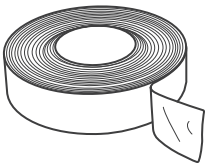
3.2. Recommended Tools

Phillips Screwdriver (#2)

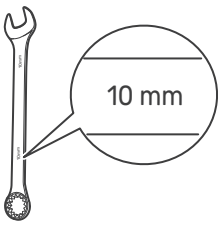


Insulating Gloves

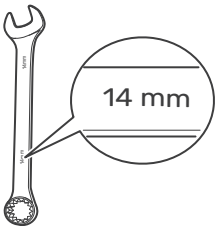
Wire stripper



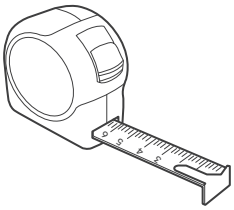
Insulation Tape



Wrench (10 mm)



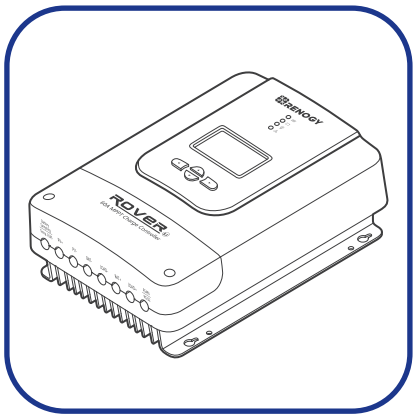
Wrench (14 mm)



Measuring Tape

Prior to installing and configuring the charge controller, prepare the recommended tools, components, and accessories.

3.3. Check the Charge Controller

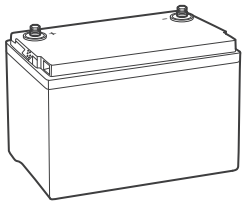


1. Inspect the charge controller for any visible damage including cracks, dents, deformation, and other visible abnormalities. All connector contacts shall be clean and dry, free of dirt and corrosion.

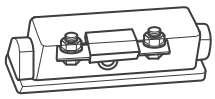
- Do not use the charge controller if there is any visible damage.
- Do not puncture, drop, crush, penetrate, shake, strike, or step on the charge controller.
- There are no serviceable parts in the charge controller. Do not open, dismantle, repair, tamper with, or modify the charge controller.
- Confirm the polarities of the devices before connection. A reverse polarity contact can result in damage to the charge controller and other connected devices, thus voiding the warranty. Reverse polarity protection does not apply if the solar panel is connected to the charge controller before the battery.
- Do not touch the connector contacts while the charge controller is in operation.
- Wear proper protective equipment and use insulated tools during installation and operation. Do not wear jewelry or other metal objects when working on or around the charge controller.
- 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.

3.4. Check the Auxiliary Battery

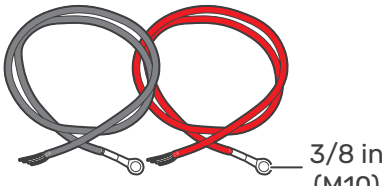
Recommended Components & Accessories



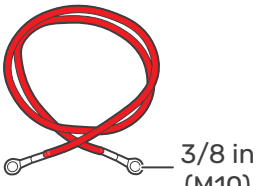
*12V/24V/36V/48V Battery (9V to 64V)



*ANL Fuse (75A) × 1

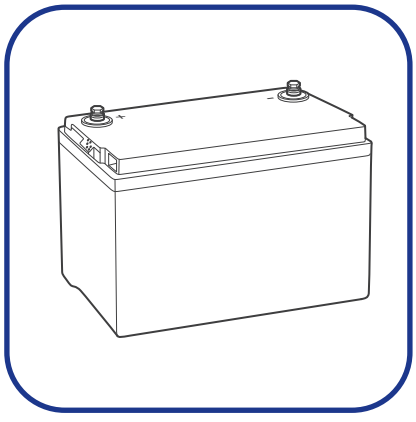


*Battery Adapter Cables (6 AWG) × 2



*Fuse Cable (6 AWG) × 1

Components and accessories marked with "*" are available on renogy.com.



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

   The charge controller can only be connected to 12V, 24V, 36V or 48V deep-cycle gel-sealed lead-acid batteries (GEL), flooded lead-acid batteries (FLD), sealed lead-acid batteries (SLD/AGM) or lithium iron phosphate batteries (LI).

Do not use the battery if there is any visible damage. Do not touch the exposed electrolyte or powder if the battery housing is damaged.

When being charged, the battery may give off explosive gas. Make sure there is good ventilation.

Take care to use a high-capacity lead-acid battery. Be sure to wear protective goggles. If carelessly getting electrolyte in your eyes, flush your eyes with clean water immediately.

Combine batteries in parallel or in series as needed. Prior to installing the charge controller, ensure all battery groups are installed properly.

Read the user manual of the battery in use carefully.

Battery or Battery Bank System Voltage	
Battery or Battery Bank System Voltage = System Voltage U	
Batteries in Series	**Batteries in Parallel**
System Voltage U: $U_1 + U_2 + U_3$	System Voltage U: $U_1 = U_2 = U_3$

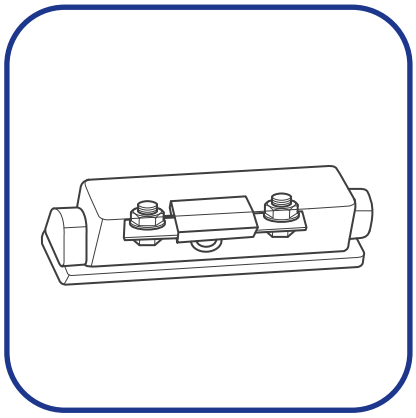
2. Check system voltage for batteries connected in series or parallel.

   This charge controller supports a maximum system voltage of 64V.

Read the battery 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 64V.

Do not connect batteries rating higher than 64V to the charge controller. Doing so will damage the charge controller.

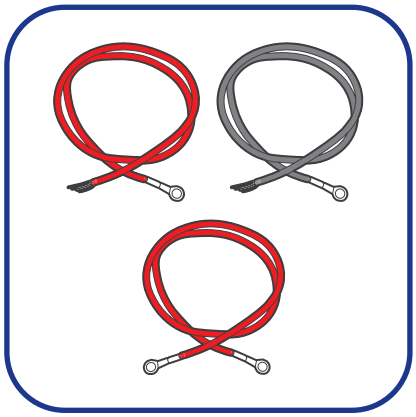
In the formula, U represents the battery voltage, and 1, 2, or 3 represents the battery number respectively.



3. Inspect the ANL Fuse (75A) for any visible damage including cracks, dents, deformation, and other visible abnormalities. All terminals shall be clean, free of dirt and corrosion, and dry.

Do not use the ANL Fuse if there is any visible damage.

For details on how to install and use the ANL Fuse, see its user manual.

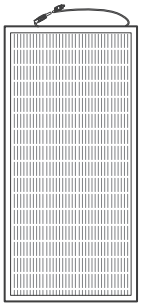


4. Inspect the Battery Adapter Cables and Fuse Cable for any visible damage including cracks, dents, deformation, and other visible abnormalities. All ring terminals are fastened to the cables.

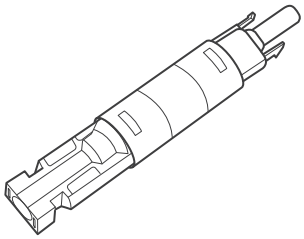
Do not use the battery adapter cables if there is any visible damage.

3.5. Check the Solar Panel(s)

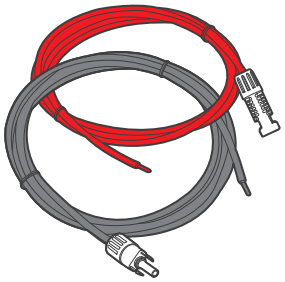
Recommended Components & Accessories



*Solar Panel (s)



*Solar Panel Fuse



*Solar Panel Extension Cables × 2

Components and accessories marked with "*" are available on renogy.com.

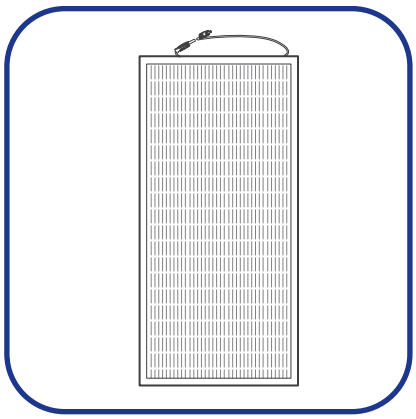
Select proper wires based on the operating current of the specific device in your power system. The table below lists recommended gauge sizes in accordance with National Electrical Code (NEC).

Maximum Current	Cable Gauge Size	Maximum Current	Cable Gauge Size
18A	16 AWG (1.31 mm²)	75A	6 AWG (13.3 mm²)
25A	14 AWG (2.08 mm²)	95A	4 AWG (21.1 mm²)
30A	12 AWG (3.31 mm²)	130A	2 AWG (33.6 mm²)
40A	10 AWG (5.26 mm²)	170A	1/0 AWG (53.5 mm²)
55A	8 AWG (8.36 mm²)		

The cable specifications listed above account for critical, less than 3% voltage drop and may not account for all configurations.

The NEC requires the overcurrent protection shall not exceed 15A for 14AWG, 20A for 12 AWG, and 30A for 10AWG copper wire.

The size of the fuse cable is consistent with that of the corresponding cable connecting to the output terminal of the charge controller.



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.

Do not use the solar panel if there is any visible damage.

Cover the solar panel prior to connecting it to the charge controller to prevent any electrical current or voltage from being generated or flowing through the system during the installation process. This reduces the risk of electrical shocks or accidents while making connections, ensuring the safety of the installer and the integrity of the equipment.

- Do not install the solar panel on a surface constructed from combustible material.
- Do not expose the solar panel to direct flame or heat sources.
- Keep the solar panel out of the reach of children.
- Keep the solar panel away from explosives and corrosive substances.
- Do not step, walk, stand, or jump on the solar panel. Localized heavy loads may cause damage to the solar cells, which will ultimately compromise the performance of the solar panel.
- Do not bend the solar panel. Bending the solar panel will cause damage to the cells and affect panel performance.
- Do not immerse the solar panel in water.
- Read the user manual of the solar panel carefully before installation.
- 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 unit.

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: $W_1 + W_2 + W_3$	Maximum Output Power W: $W_1 + W_2 + W_3$

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

Ensure that the maximum output power of the solar panel/solar panel array does not exceed the following:

System Voltage	12V	24V	36V	48V
Maximum Output Power	≤ 800W	≤ 1600W	≤ 2400W	≤ 3200W

- In the formula, W represents the output power of the solar panel, and 1, 2, or 3 represents the solar panel number respectively.

Open Circuit Voltage	
Open Circuit Voltage of Solar Panel or Solar Panel Array = Open Circuit Voltage (U)	
Solar Panels in Series	**Solar Panels in Parallel**
Open Circuit Voltage (U) = $U_1 + U_2 + U_3$	Open Circuit Voltage (U) = $U_1 = U_2 = U_3$

3. Read the user manual of the solar panel for the maximum open circuit voltage, and calculate the maximum open circuit voltage of solar panel or solar panel array according to the formula. Ensure that the open circuit voltage of the solar panel/solar panel array is no higher than 145V.

- In the formula, U represents the open circuit voltage of the solar panel, and 1, 2, or 3 represents the solar panel number respectively.
- When the maximum open circuit voltage exceeds 145V, the charge controller triggers an overvoltage alarm. If the maximum open circuit voltage reaches 150V, it will cause damage to the charge controller.

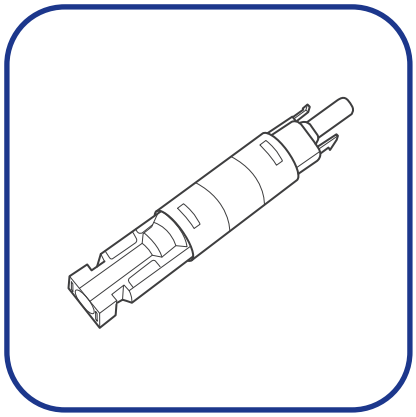
Short Circuit Current	
Short Circuit Current of Solar Panel or Solar Panel Array Isc	
Solar Panels in Series	**Solar Panels in Parallel**
$Isc = I_1 = I_2 = I_3$	$Isc = I_1 + I_2 + I_3$

4. Read the user manual of the solar panel for the maximum short circuit current, and calculate the maximum short circuit current of solar panel or solar panel array according to the formula. Ensure that the maximum short circuit does not exceed 53A.

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

Short circuit current is the abnormal flow of electric current in a power system, occurring between phases or between phase and ground (or neutral) during operation, with values often exceeding the rated current and dependent on the electrical distance from the short-circuit point to the power source. For detailed information, please refer to the specific solar panel manual.

For details about how to connect solar panels in series, parallel, and series-parallel, refer to A Guide Between Series and Parallel Connections on Renogy Learning Center.



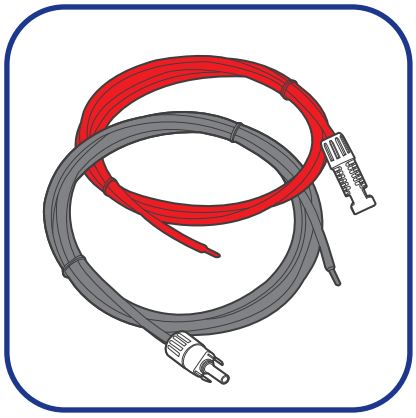
5. The appropriate current rating for the solar panel fuse should be determined by multiplying the total amperage of the solar panel array by 1.56.

   Rated Current of the Solar Panel Fuse = Short Circuit Current (Isc) of Solar Panel x 1.56

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

Do not use the solar panel fuse if there is any visible damage.

For details on how to install and use the solar panel fuse, see its user manual.

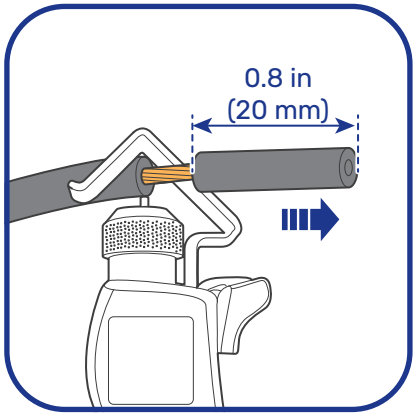


6. Inspect the Solar Panel Extension Cables for any visible damage including cracks, dents, deformation, and other visible abnormalities. All connector contacts shall be clean, dry, and free of dirt and corrosion.

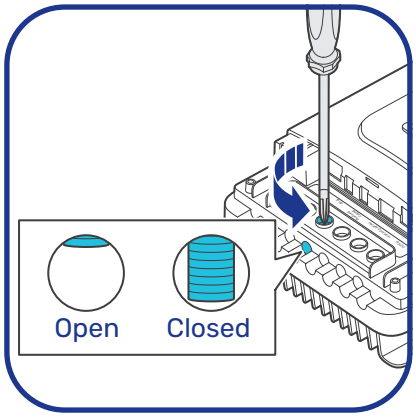
Do not use the bare wires and solar panel extension cables if there is any visible damage.

3.6. How to Install Cables on the Charge Controller?

The wiring method applies to all adapter cables. This manual uses the negative battery adapter cable as an example.

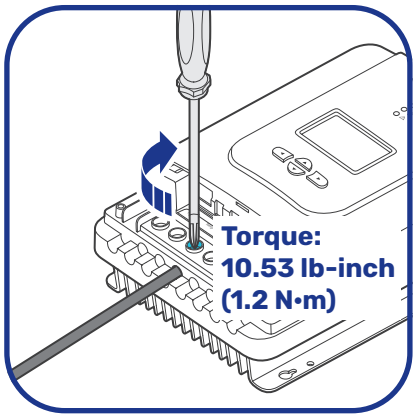


Step 1: Strip approximately 0.8 inches (20 mm) of insulation from the end of an adapter cable using a wire stripper.



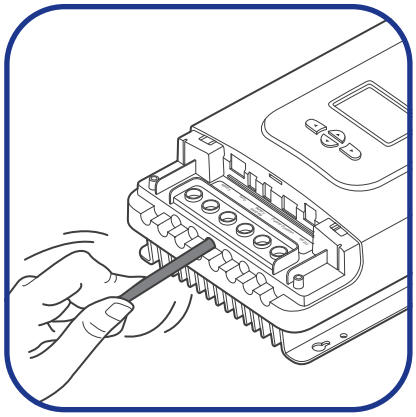
Step 2: Rotate the cable retainer of the Battery Negative Terminal (BAT-) counterclockwise with a screwdriver.

Make sure the cable retainer is completely open.



Step 3: Insert the bare end of the adapter cable into the corresponding BAT- terminal. Rotate the screws clockwise to clamp the wire down and close the cable retainer.

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



Step 4: Make sure the connection is tight and secure.

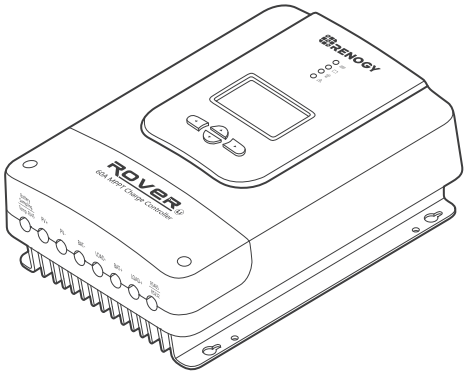
4. Installation

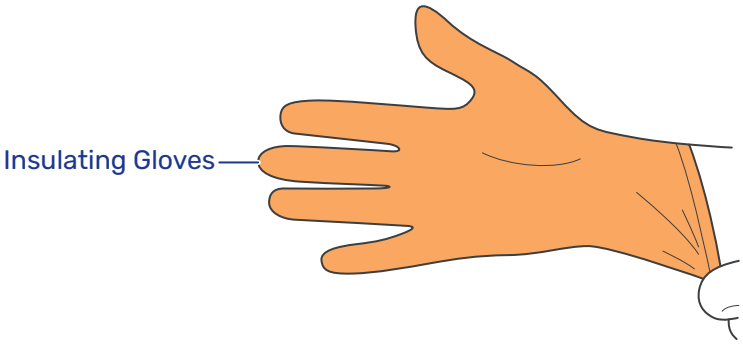
To ensure safe and efficient operation of the charge controller and to avoid potential damage or hazards, always follow the installation instructions in the sequence described in this manual.

Connect the battery to the charge controller before the solar panel. Reverse polarity protection does not apply if the solar panel is connected to the charge controller before the battery.

Tug on all cables to ensure firm connection.

4.1. Wear Insulating Gloves





4.2. Mounting

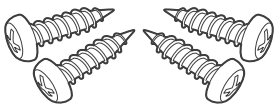
You can mount the charge controller on a flat surface with either the included brackets or the mounting holes.

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

Choose proper mounting screws specific to your installation site. This manual takes self-tapping screws for wooden walls as an example.

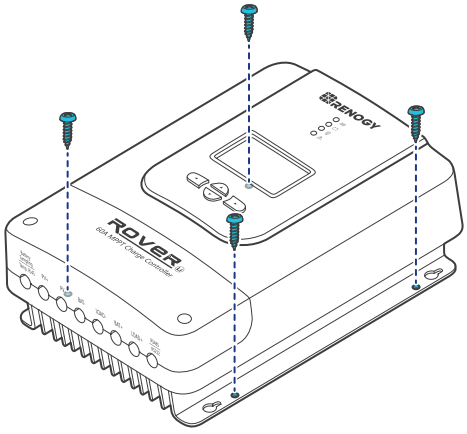
Method 1: Mounting via Integrated Holes (Direct Mounting)

Recommended Tools



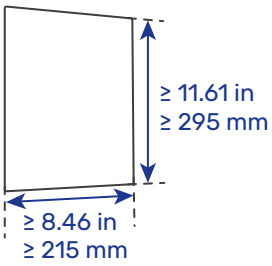
Self-tapping Screws x 4

You can directly secure the charge controller using self-tapping screws through the four small mounting holes.



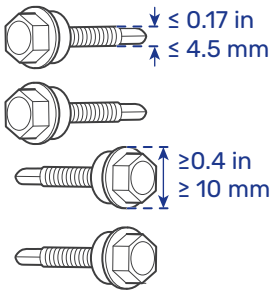
Method 2: Mounting via Integrated Holes (Wall-mounted)

Recommended Tools



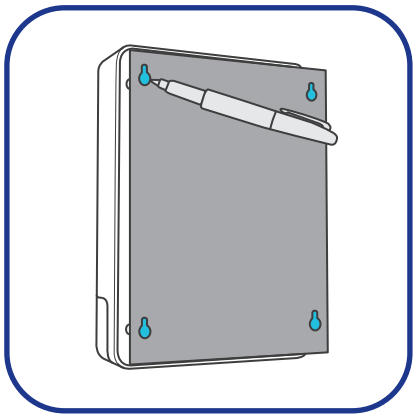
Installation Template (Letter Size)

Marker Pen

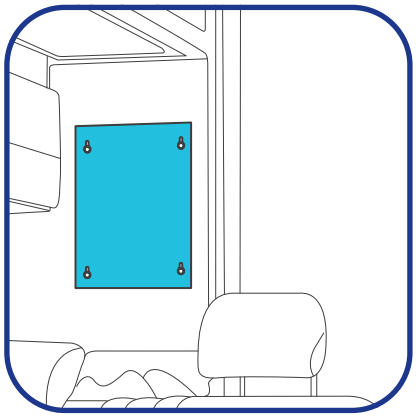


Self-tapping Screws

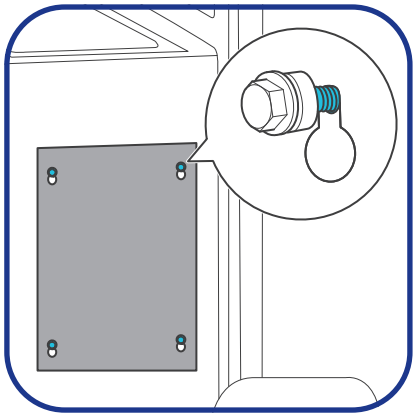
The following steps provide an example of mounting the charge controller on a wall. You can mount it on a flat surface by applying similar methods.



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

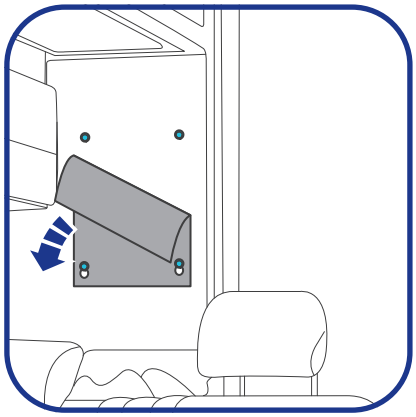


Step 2: Tape the paper to the desired location for installation.

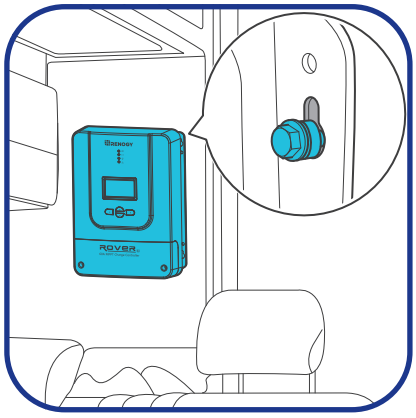


Step 3: Install the screws according to the mounting holes marked on the paper. Do not overtighten the bolt.

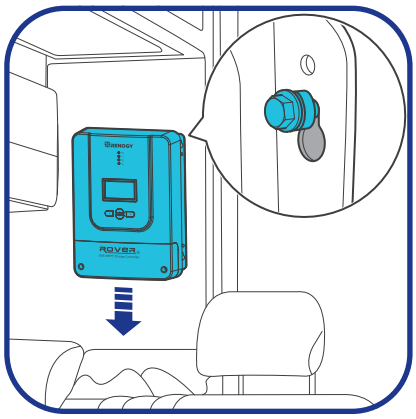
Choose appropriate screws according to the mounting holes of the charge controller, and leave some gap between the screw and the surface.



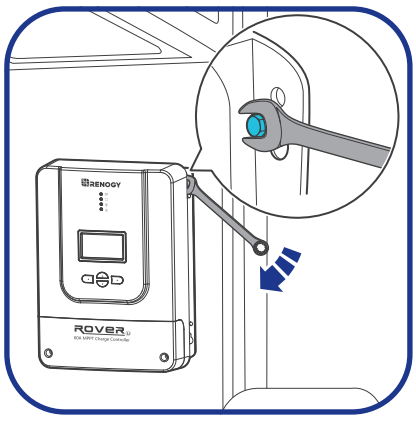
Step 4: Tear off the paper.



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



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

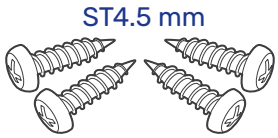


Step 7: If the screws are not secure, tighten them clockwise with a suitable wrench.

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.

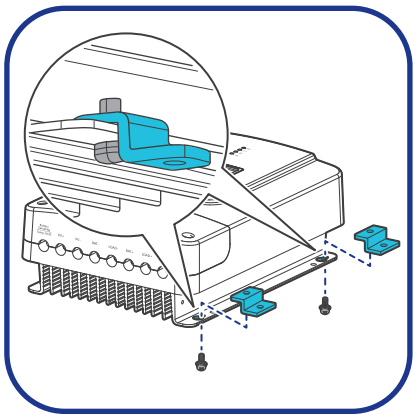
Method 3: Mounting Using Included Brackets

Recommended Tools

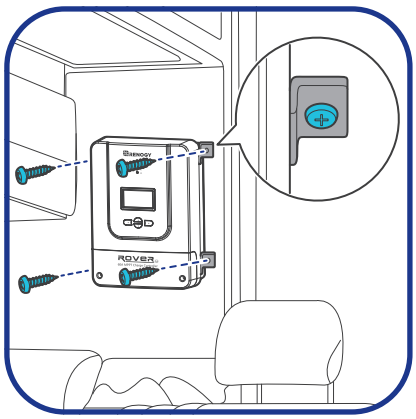


Self-tapping Screws x 4

Mounting the charge controller is relatively easy. Follow the steps below:



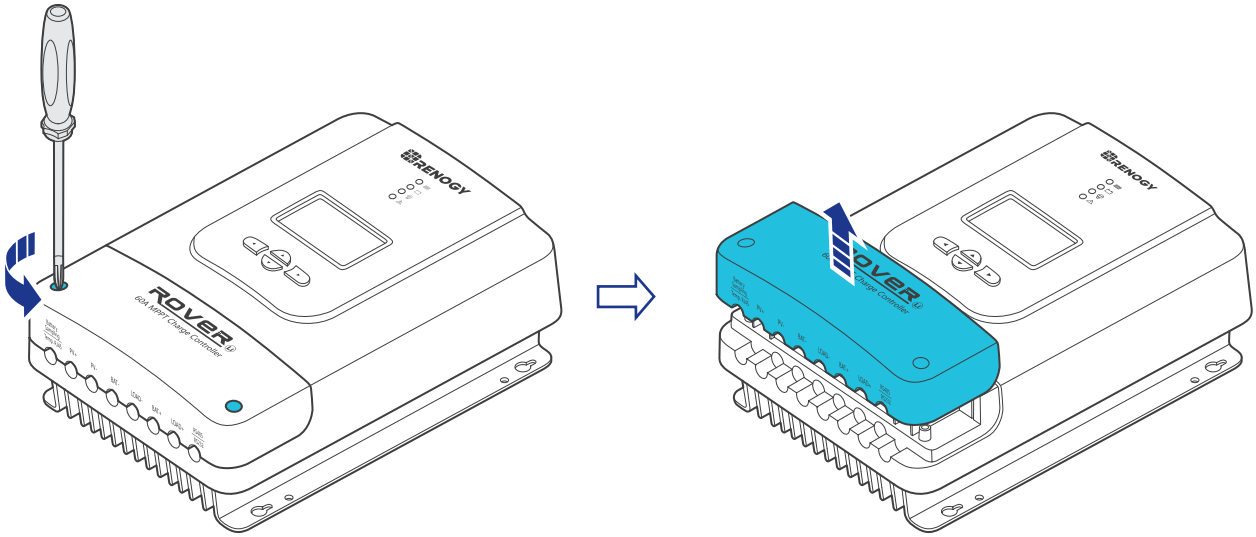
Step 1: Secure the Mounting Brackets on the mounting holes of the charge controller with proper screws.
The diagram shows the installation of the right side's two Mounting Brackets. The installation method for the left side is the same.



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

4.3. Remove the Charge Controller Cover

Use a Phillips Screwdriver (#2) to remove the two Cover Screws from the cover. Then, lift the Cover vertically to remove it.



4.4. Connect the Charger Controller to an Auxiliary Battery

Step 1: Rotate the cable retainers of the BAT-, and BAT+ terminals counterclockwise with a screwdriver. Make sure the cable retainers are completely open.

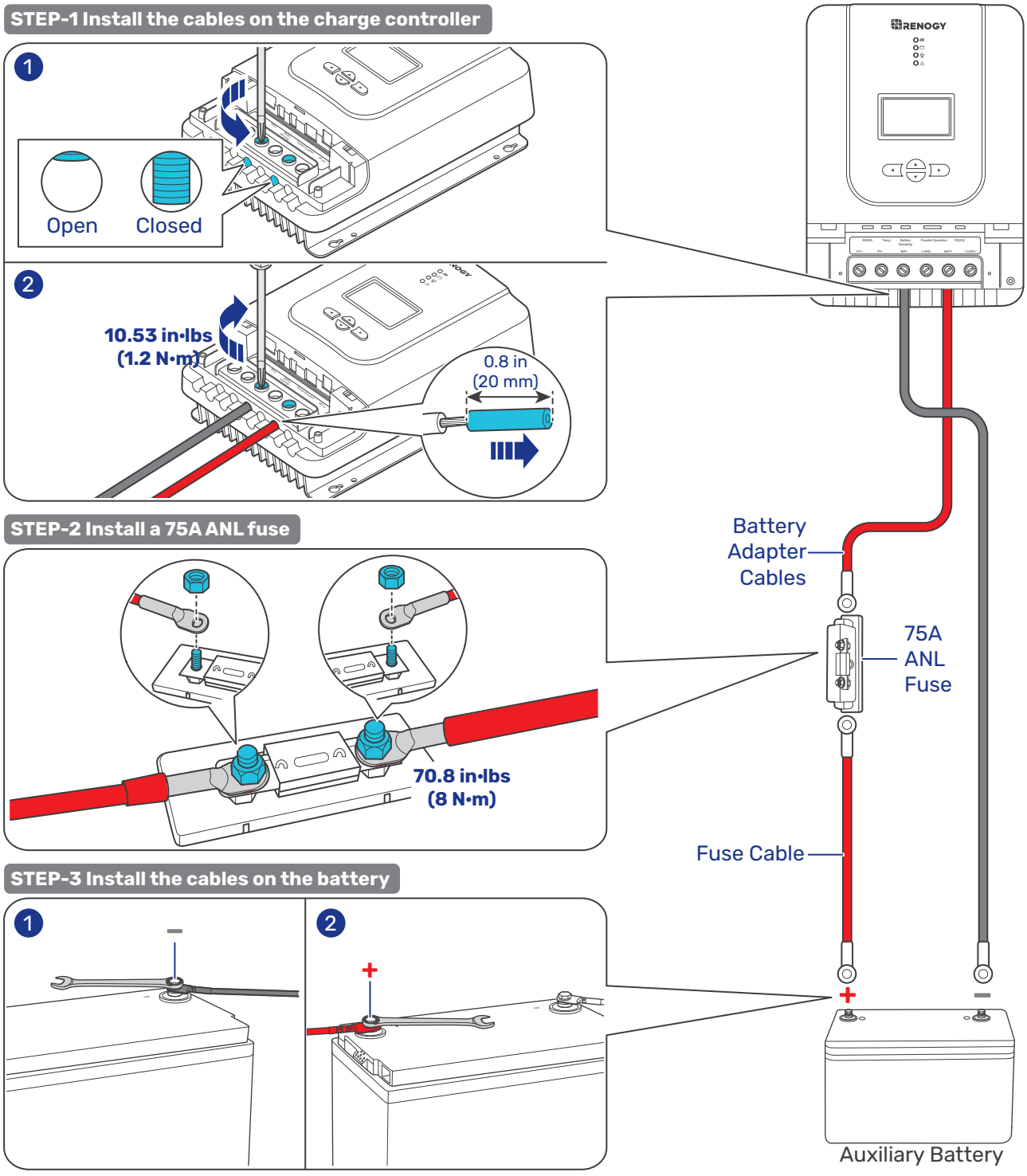
Step 2: Strip approximately 0.8 inches (20 mm) of insulation from the end of an adapter cable using a wire stripper. Insert the bare ends of the Battery Adapter Cables into the corresponding BAT+ and BAT-.

Step 3: Rotate the screws clockwise to clamp the wire down and close the cable retainers. Make sure all connections are tight and secure.

Step 4: Connect the Battery Adapter Cable connecting to the BAT+ to one end of the ANL fuse, and then connect the other end to the fuse cable.

Step 5: 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.

Step 6: Attach the Fuse Cable connecting to the ANL fuse to the positive terminal of the battery, and tighten the bolt with a wrench.



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

> ⚠ Identify the polarities (positive and negative) on the cables used for the batteries. A reverse polarity contact may damage the charge controller. Reverse polarity protection does not apply if the solar panel is connected to the charge controller before the battery.

4.5. Connect the Charger Controller to a Solar Panel

Step 1: Rotate the cable retainers of the PV-, and PV+ terminals counterclockwise with a screwdriver. Make sure the cable retainers are completely open.

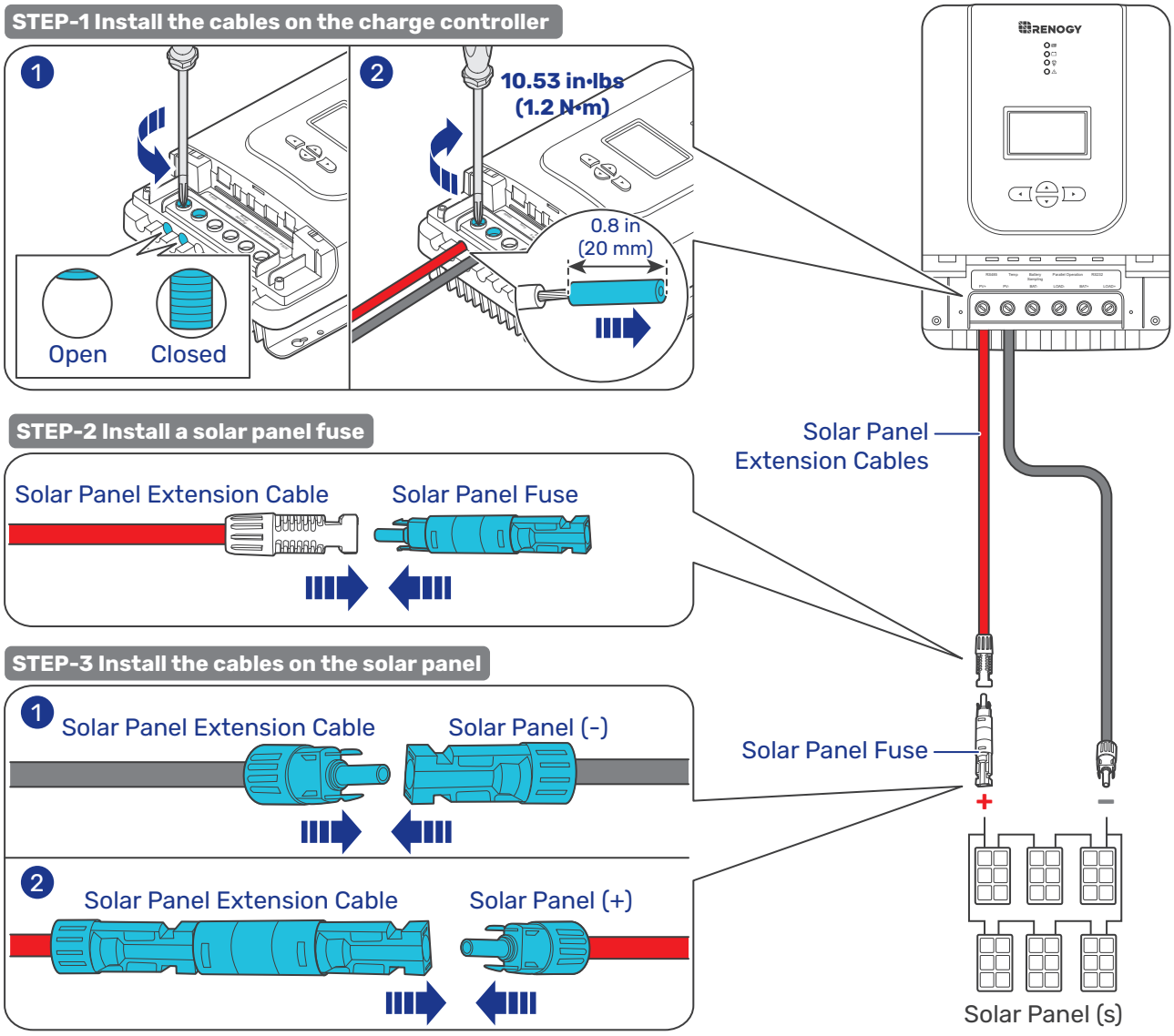
Step 2: Strip approximately 0.8 inches (20 mm) of insulation from the end of a solar panel extension cables using a wire stripper. Insert the bare ends of the Solar Panel Extension Cables into the corresponding PV+ and PV-.

> ℹ Connect the male connector of the Solar Panel Extension Cable to the PV- and the female connector to the PV+.

Step 3: Rotate the screws clockwise to clamp the wire down and close the cable retainers. Make sure all connections are tight and secure.

Step 4: Connect the Solar Panel Extension Cable connecting to PV- of the charge controller to the negative terminal of the solar panel.

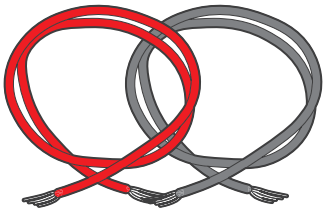
Step 5: Connect the Solar Panel Extension Cable connecting to the PV+ to one end of the solar panel fuse, and then connect the other end of the fuse to the positive terminal of the solar panel.



4.6. Install a DC load (Optional)

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

Recommended Accessories



Bare Wires (14 AWG) × 2

- DC load operating current needs to be less than or equal to 20A.
- Select appropriate cables based on the DC load operating current.
- The output voltage of the Load Terminals of the charge controller depends on the battery voltage. Make sure that the DC load you are installing matches the battery voltage to avoid damage to the DC load.

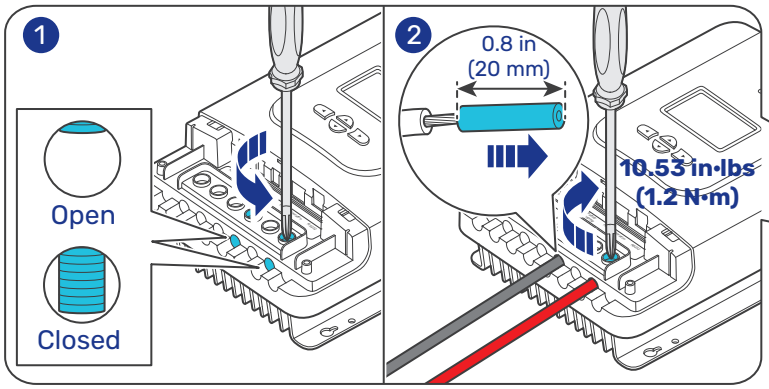
Step 1: Rotate the cable retainers of the LOAD-, and LOAD+ terminals counterclockwise with a screwdriver. Make sure the cable retainers are completely open.

Step 2: Strip approximately 0.8 inches (20 mm) of insulation from the end of a bare wires using a wire stripper. Insert the bare ends of the cables into both LOAD- and LOAD+ terminals.

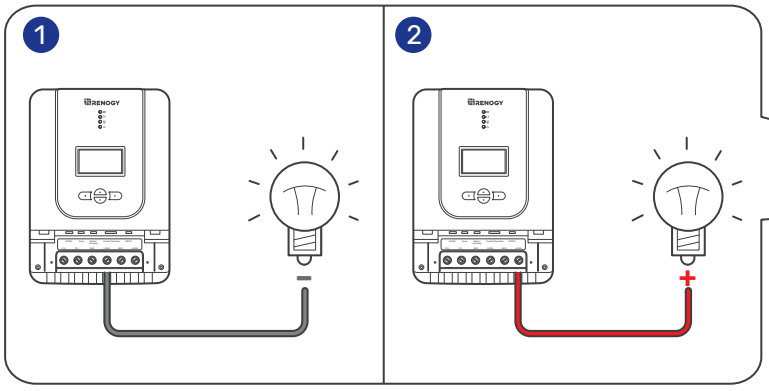
Step 3: Rotate the screws clockwise to clamp the wire down and close the cable retainers. Make sure all connections are tight and secure.

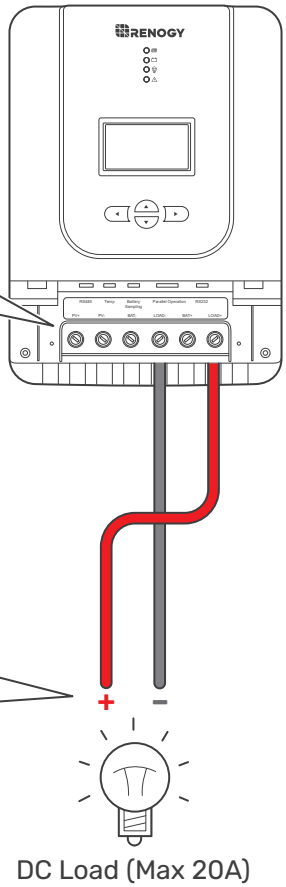
Step 4: Connect the cable at the LOAD- terminal to the negative terminal of the load and connect the cable at the LOAD+ terminal to the positive terminal of the load.

STEP-1 Install the bare wires on the charge controller



STEP-2 Connected to DC load





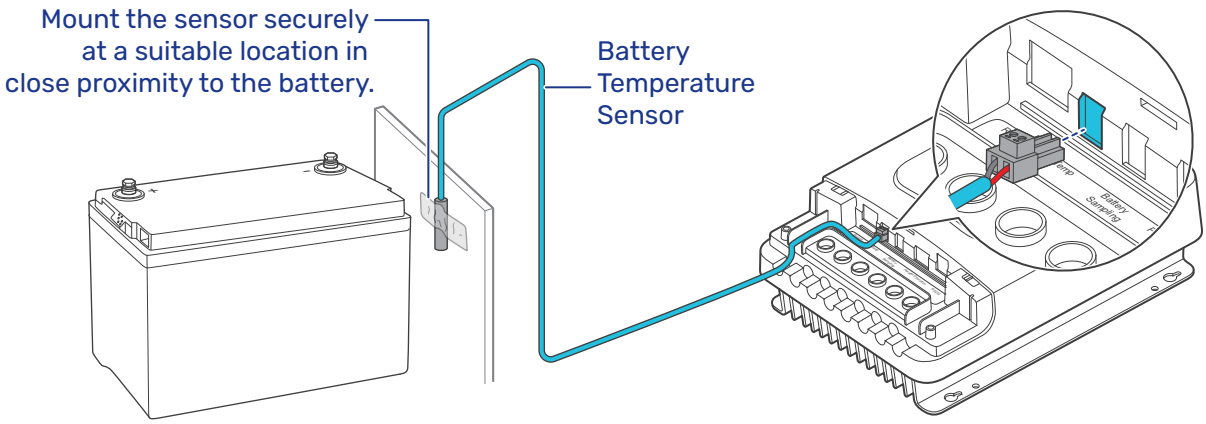
DC Load (Max 20A)

4.7. Install a Battery Temperature Sensor

The temperature sensor measures the surrounding temperature of the battery and compensates the floating charge voltage when the battery temperature is low.

Step 1: Connect the battery temperature sensor to the External Temperature Sampling Interface on the charge controller.

Step 2: Mount the other end of the sensor securely at a suitable location in close proximity to the battery.

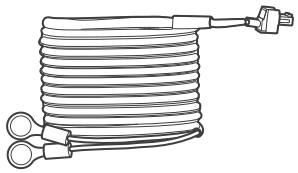


Do not use the temperature sensor on a LiFePO4 (LFP) battery which comes with a battery management system (BMS).

4.8. Install a Battery Voltage Sensor (Optional)

The Battery Voltage Sensor measures the battery voltage during discharging and compensates for any voltage drop across the cables at the battery terminal. This helps minimize the impact on the battery's operational voltage.

Recommended Accessories



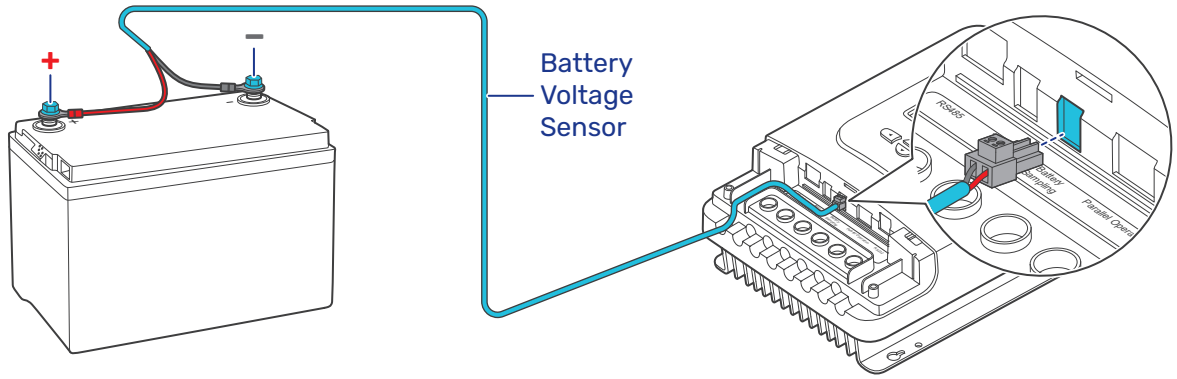
*Battery Voltage Sensor

Accessories marked with "*" are available on renogy.com.

Step 1: Connect the terminal block to the Battery Voltage Compensation Interface on the charge controller.

Step 2: Connect the Negative Ring Terminal of the Battery Voltage Sensor to the Negative Terminal on the battery.

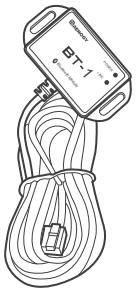
Step 3: Connect the Positive Ring Terminal of the Battery Voltage Sensor to the Positive Terminal on the battery.



4.9. Install a Bluetooth Module (Optional)

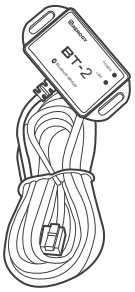
With a Renogy BT-1 Bluetooth Module or a Renogy BT-2 Bluetooth Module, the charge controller can be connected to the Renogy app for remote device monitoring. You can monitor and modify parameters of the charge controller through the Renogy app.

Recommended Components



*Renogy BT-1 Bluetooth Module

or



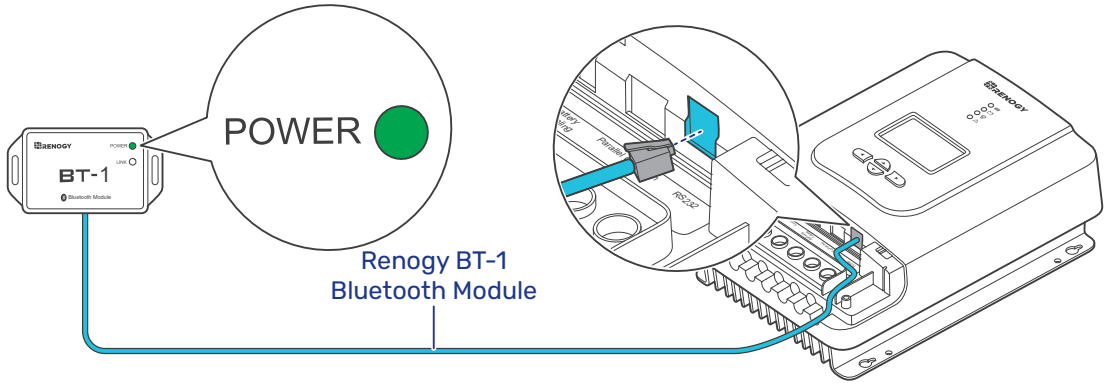
*Renogy BT-2 Bluetooth Module

- Components marked with "*" are available on renogy.com.
- Only install either the Renogy BT-1 Bluetooth Module or the Renogy BT-2 Bluetooth Module, as either one of them is sufficient.
- Make sure that the charge controller is properly installed and powered on.

Renogy BT-1 Bluetooth Module

Step 1: Connect the Renogy BT-1 Bluetooth Module to the RS232 Communication Interface on the charge controller. After the connection, the Bluetooth Module POWER indicator light will remain solid green.

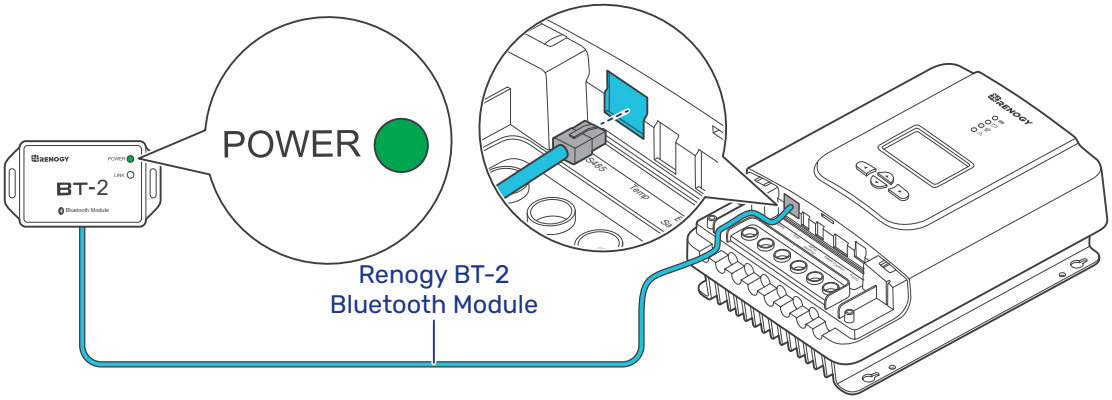
Step 2: Place the Bluetooth module in a suitable site.



Renogy BT-2 Bluetooth Module

Step 1: Connect the Renogy BT-2 Bluetooth Module to the RS485 Communication Interface on the charge controller. After the connection, the Bluetooth Module POWER indicator light will remain solid green.

Step 2: Place the Bluetooth module in a suitable site.

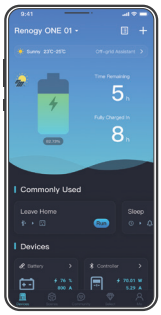


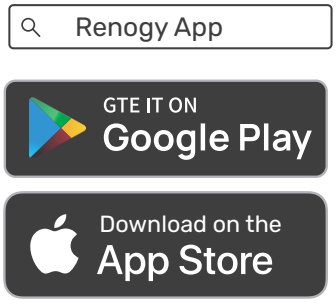
Monitoring via the Renogy App or Renogy ONE

Depending on the specific application, the charge controller can establish either short-range or long-range communication connections with monitoring devices. These monitoring devices facilitate real-time monitoring, programming, and complete system management, offering comprehensive control and enhanced flexibility.

- Make sure the Bluetooth of your phone is turned on.
- The version of the Renogy app might have been updated. Illustrations in the user manual are for reference only. Follow the instructions based on the current app version.
- Make sure that the charge controller is properly installed and powered on before it is paired with the Renogy app.
- To ensure optimal system performance, keep the phone within 10 feet (3 m) of the Renogy BT-1 Bluetooth Module or a Renogy BT-2 Bluetooth Module.

To ensure optimal connection performance, download the latest Renogy app. Login to the app with your account.





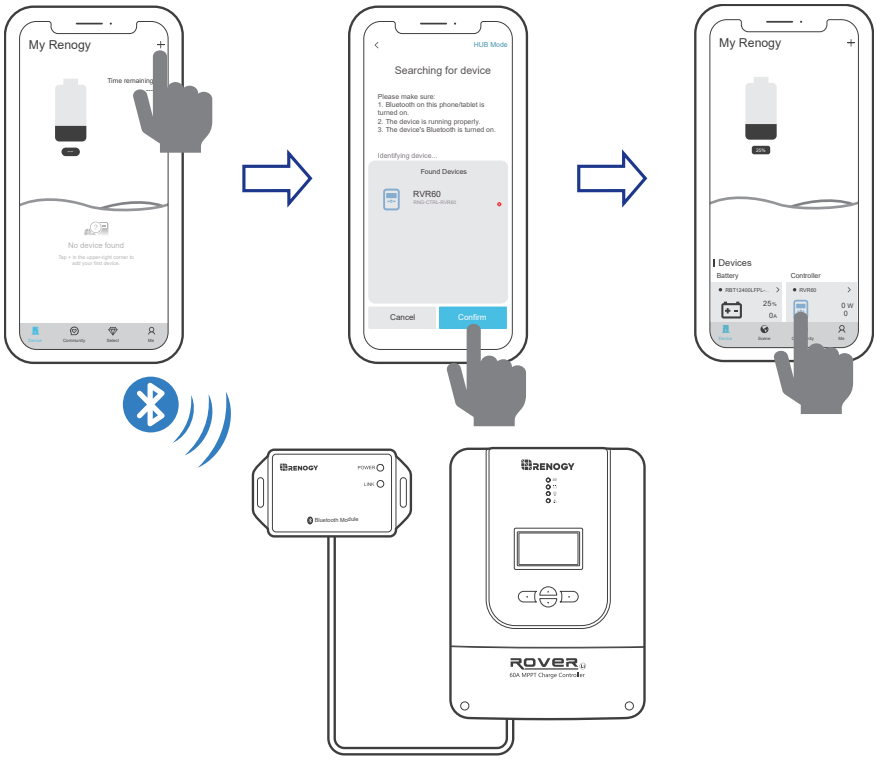
- **Short-Range Monitoring**

If only short-range monitoring is required, connect the charge controller to the Renogy app directly through the Bluetooth of your phone.

Step 1: Open the Renogy app. Tap **+** to search for new devices.

Step 2: Tap **Confirm** to add the newly found device to the device list.

Step 3: Tap the charge controller icon to enter the device information interface.



- **Wireless Long-Range Monitoring**

If long-range communication and programming are required, connect the charge controller to Renogy ONE (sold separately) through Bluetooth, and the Renogy ONE to the Renogy app through Wi-Fi.

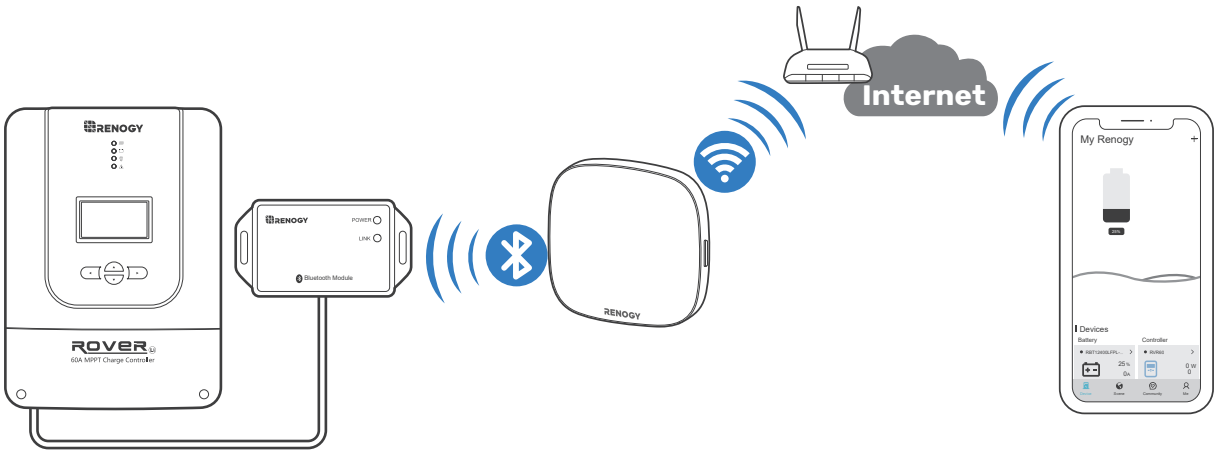
Recommended Components

*RENOGY ONE Core

- Components marked with "*" are available on renogy.com.
- Make sure that the Renogy ONE is powered on before the connection.
- For instructions on Renogy ONE, see Renogy ONE Core User Manual.
- Make sure the charge controller does not communicate with any other device.

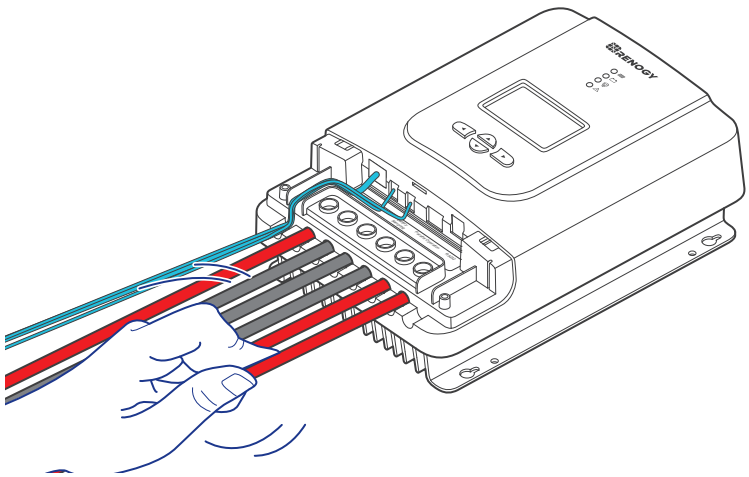
Step 1: Connect the charge controller to Renogy ONE through the Bluetooth of your phone.

Step 2: Pair the Renogy ONE with the Renogy app by scanning the QR code on Renogy ONE.



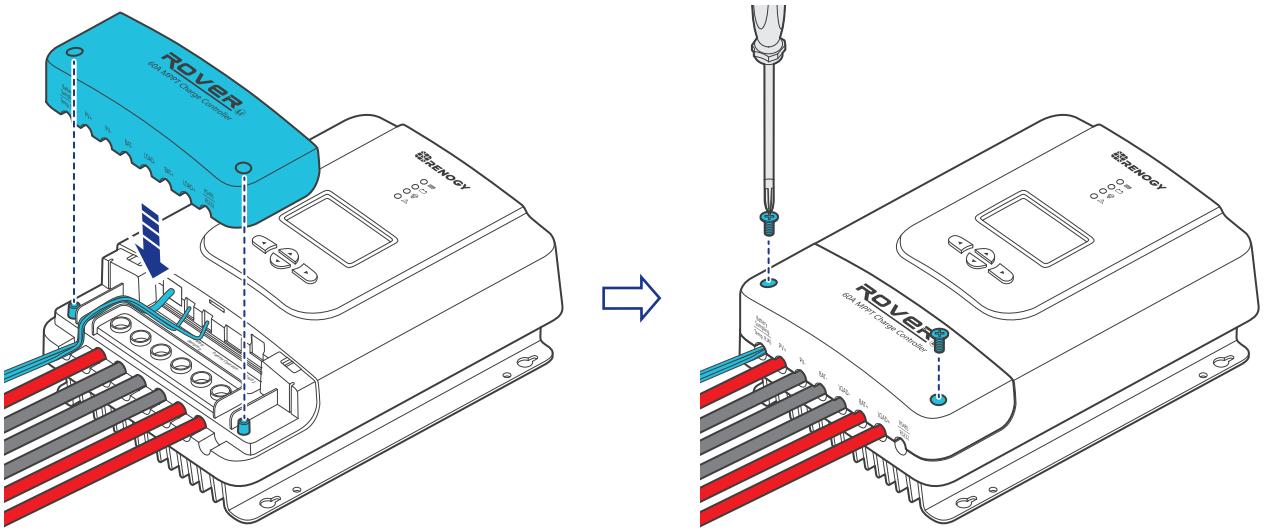
4.10. Wire Inspection

Verify that all cable connections are firmly and securely fastened. This step is essential to prevent any loose or unstable connections that could lead to operational issues or safety concerns.



4.11. Install the Charge Controller Cover

Align the two mounting slots on the charge controller, and install the Cover vertically downwards. Use a Phillips Screwdriver (#2) to securely fasten the two Cover Screws on the cover.



5. Operation

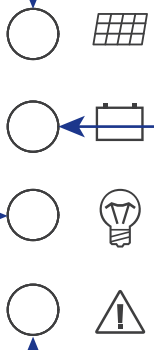
5.1. Power On/Off

The charge controller powers up upon connection to a battery and/or to a solar panel. To power it off, disconnect the solar panel from the charge controller, followed by the battery. In scenarios involving a DC breaker, simply switch the DC breaker to the OFF position.

5.2. LED Indicators

PV LED Indicator
Indicates the charging status of the charge controller.
Solid: Charging
Slow flashing: Boost charging
Fast flashing: Equalizing charging
Single flashing: Float charging
Double flashing: Limited current charging
Off: Not charging or solar panel not detected

Load LED Indicator
Indicates the operating status of connected loads(s).
Solid: Load on
Fast flashing: Overloaded or short circuited
Off: Load off

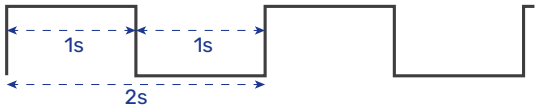
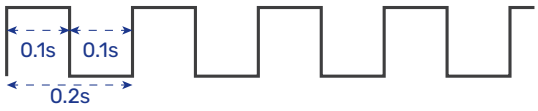
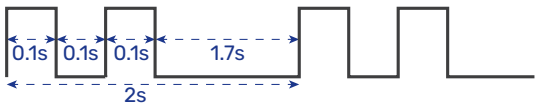


Battery LED Indicator
Indicates the battery status in real time.
Solid: Operating normally
Slow flashing: Battery over-discharged
Fast flashing: Battery over-voltage

Error LED Indicator
Indicates whether the charge controller functions correctly.
Solid: System error. Check the LCD screen for troubleshooting tips.
Off: In normal operation

Check out the graphic indications of ON, OFF, Solid, Slow Flash, Fast Flash, Single Flash, and Double Flash of LEDs in the table below:

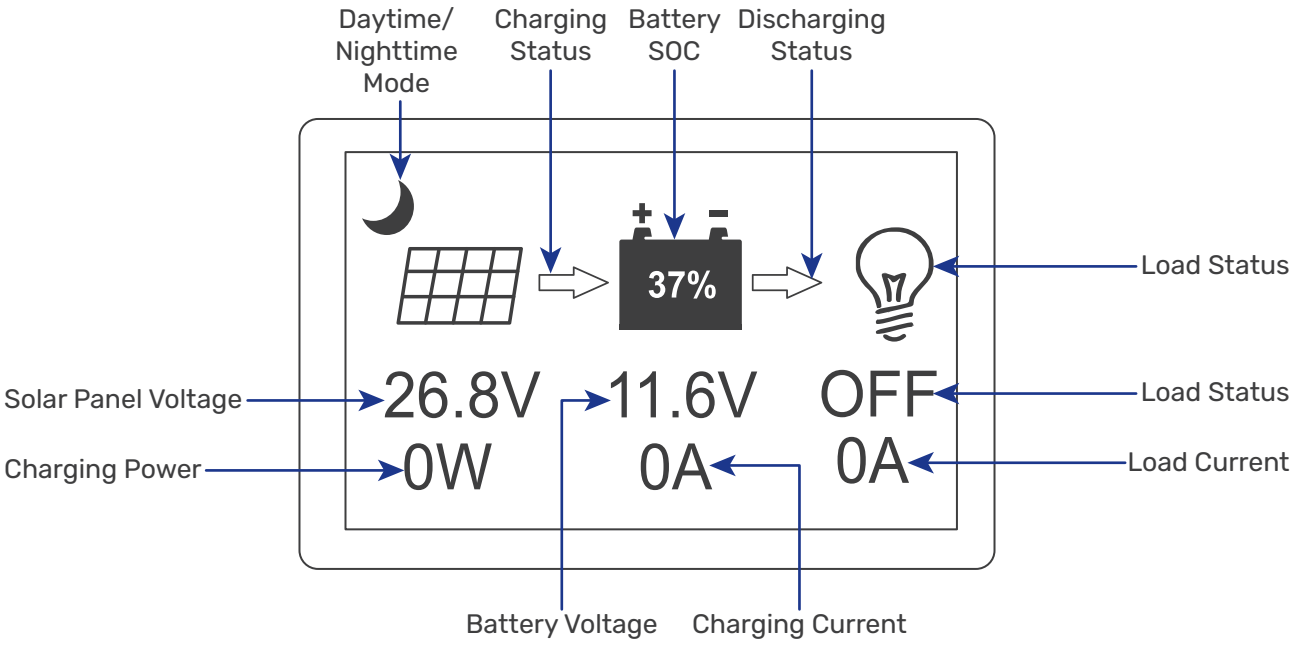
LED ON		LED OFF	

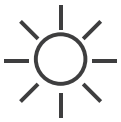
LED Pattern	Description	Graphic Expression
Solid	The LED remains continuously illuminated without any variation.	
Slow Flash	In this mode, the LED alternates between being on and off at a relatively slow and regular interval of 1s.	
Fast Flash	In this mode, the LED alternates between being on and off at a relatively fast and regular interval of 0.1s.	
Single Flash	In this mode, the LED alternates between brief 0.1s on followed by a longer 1.9s off period.	
Double Flash	In this mode, the LED alternates between brief 0.1s on-off cycles followed by a longer 1.7s off period.	

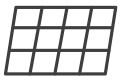
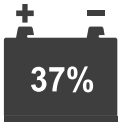
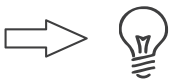
If an error occurs, refer to "10. Troubleshooting" for details, or login to the Renogy app for troubleshooting details.

5.3. LCD Screen

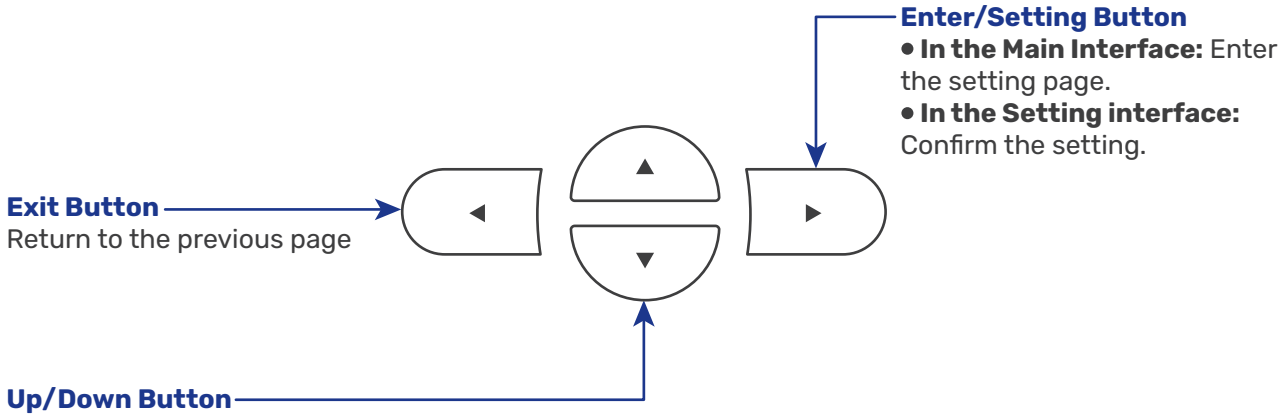
The charge controller provides an intuitive LCD screen and four setting buttons.



Icon	Parameter	Description
	Daytime Mode	In this mode, the voltage of the solar panel is greater than or equal to 6V.
	Nighttime Mode	In this mode, the voltage of the solar panel is less than 5V.

Icon	Parameter	Description
	Solar Panel	Indicates the solar panel.
	Charging (The arrow between the solar panel and the battery)	• **Dynamic:** The charge controller is charging the battery. • **Static:** The charge controller is not charging the battery.
	Battery	Indicates state of charge of the battery. Value range: 0% to 100% • **Slow flashing:** 0%, overdischarged • **Fast flashing:** 100%, overvoltage
	Load	• **Dynamic:** The load is powered on. The charge controller is powering the load.
		• **Static:** The load is powered off or the charge controller is not powering the load.
		• **Fast flashing:** Overload or short-circuit protection

5.4. Setting Buttons

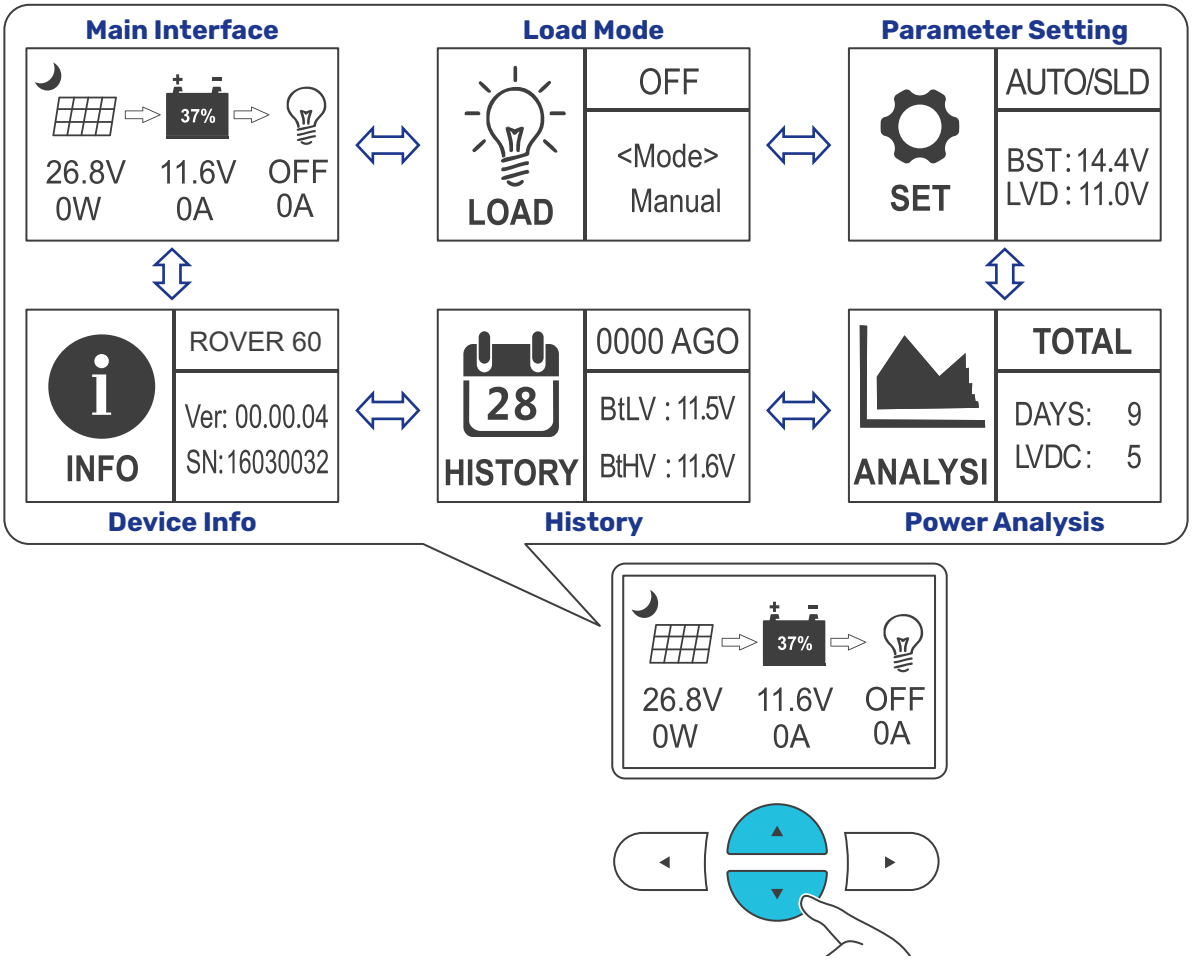


5.5. Interface Switching

The charge controller allows you to configure different parameters in the following distinct interfaces:

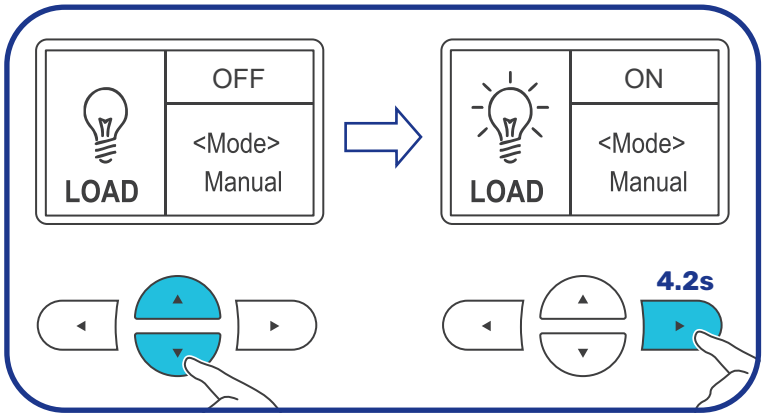
- Main Interface
- Load Mode Setting
- Parameter Setting (Charging, discharging, temperature compensation, charging duration, parallel mode and more)
- Power Analysis
- History
- Device Info

In the Main Interface, press ▲ or ▼ to navigate between different interfaces in the sequence below. For parameter setting details, see "7. Configuration" in this manual.



5.6. Turn On/Off DC load

The charge controller is factory-set to manual load mode by default. You can customize the load output mode, and for more details, please refer to section "7.3. Configure Load Output Mode" in this manual.



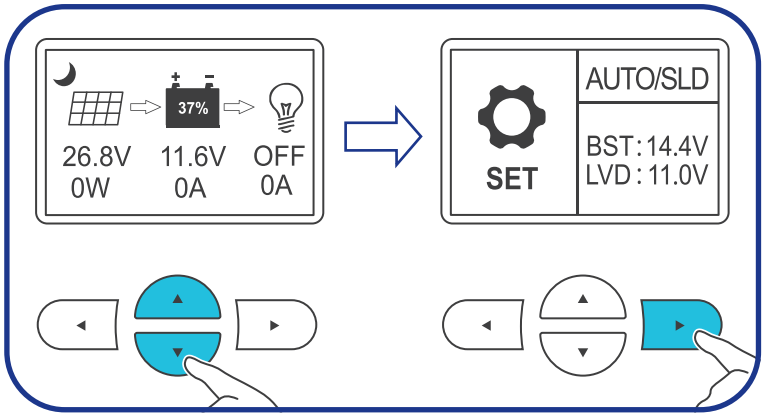
In the Main Interface, navigate to the Load Mode interface by pressing the ▲ or ▼ button on the charge controller. Press and hold the ▶ for 4.2 seconds to turn on or off the load.

5.7. Set a Battery Type

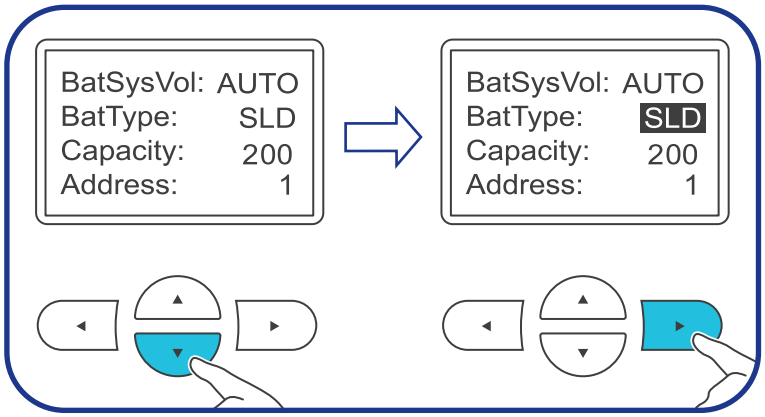
Upon installing the charge controller, set a correct battery type in the Parameter Setting Interface.

> It is essential to ensure that the battery type is set correctly to avoid any potential damage to the charge controller because any damage to the charge controller resulting from an incorrect battery type setting voids the warranty.

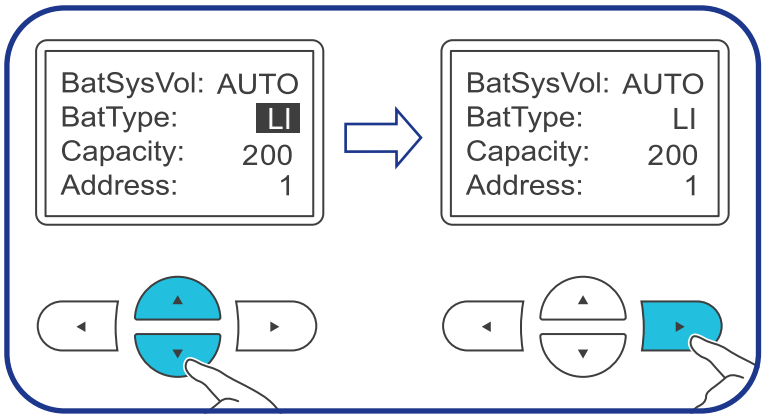
To set a battery type, follow the steps below:



Step 1: In the Main Interface, navigate to the Parameter Setting interface by pressing the ▲ or ▼ button on the charge controller. Press ▶ to enter the details setting interface.



Step 2: Press ▼ to jump to the **BatType** option. Press ▶, and the **BatType** option value flashes.



Step 3: Press the ▲ or ▼ button to switch between different battery types. Press ▶ to save the settings, or press ◀ to cancel the setting

You can set the battery type to the following:

- **SLD:** Sealed lead-acid battery
- **FLD:** Flooded lead-acid battery
- **GEL:** Gel battery
- **LI:** Lithium battery
- **USE:** User-defined

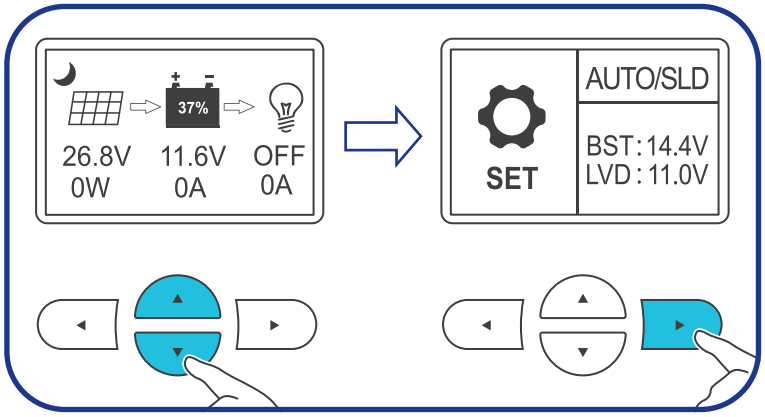
5.8. Set a Battery Voltage

Upon installing the charge controller, set the correct battery voltage in the Parameter Setting Interface. The Battery Voltage can be set to 12V, 24V, 36V, 48V, or AUTO.

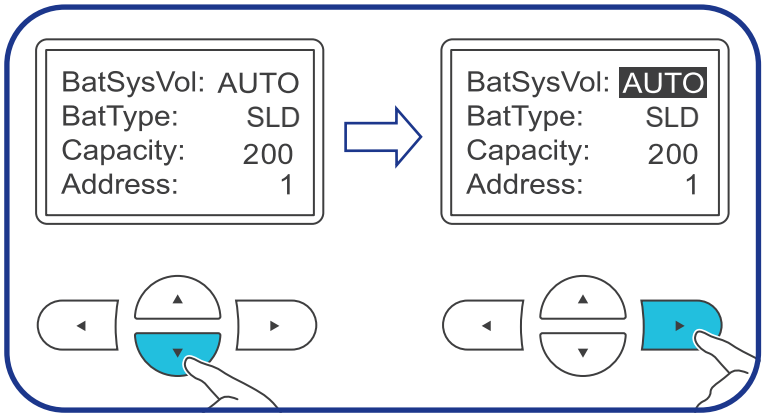
For non-lithium batteries, you can set it to AUTO, and the charge controller will automatically detect the nominal voltage (12V, 24V, 36V, or 48V). In lithium battery mode, there is no AUTO option.

> It is essential to ensure that the battery voltage is set correctly to avoid any potential damage to the charge controller because any damage to the charge controller resulting from an incorrect battery type setting voids the warranty.

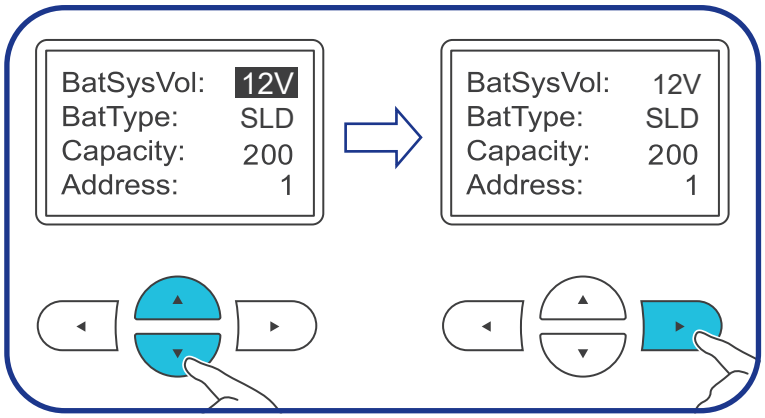
To set a battery voltage, follow the steps below:



Step 1: In the Main Interface, navigate to the Parameter Setting interface by pressing the ▲ or ▼ button on the charge controller. Press ▶ to enter the details setting interface.



Step 2: Press ▼ to jump to the **BatSysVol** option. Press ▶, and the **BatSysVol** option value flashes.



Step 3: Press the ▲ or ▼ button to switch between different battery voltage. Press ▶ to save the settings, or press ◀ to cancel the setting.

You can set the battery voltage to the following:

- 12V
- 24V
- 36V
- 48V
- AUTO

5.9. USE Mode

The USE Mode allows you to maximize the charge controller. You can customize the charging parameters based on your needs.

⚠ 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.

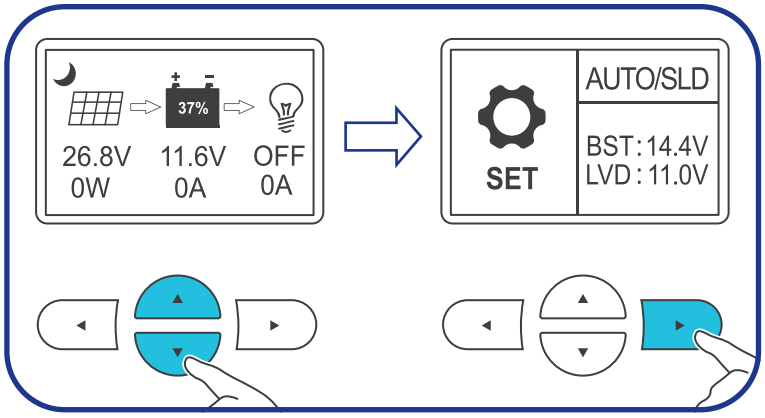
Configurable Settings

Parameters	Description
Overvoltage Shutdown (OverVolDsc)	The default protection voltage is 17V For 12V systems (for 24V, 36V, and 48V systems, the charge controller doubles, triples, and quadruples the parameter values respectively while remaining the display value as 12V systems). Improper setting may affect safe use of the battery. Please consult the battery manufacturer and check if this voltage value needs to be modified.

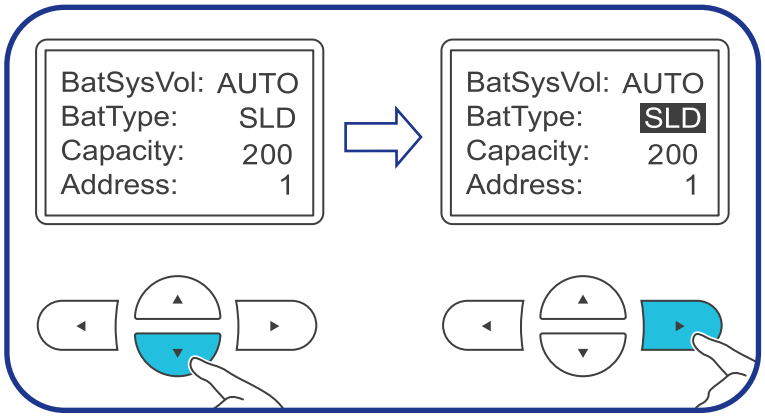
Parameters	Description
Boost Voltage (BstChgVol)	This value affects whether the battery can be fully charged. Please consult the battery manufacturer and set the value properly.
Float Voltage (FltChgVol)	This value affects whether the battery can be fully charged. Please consult the battery manufacturer and set the value properly.
Equalization Voltage (EquChgVol)	1. For lead-acid batteries, please consult your battery manufacturer to obtain the voltage value and then complete the settings according to the feedback. 2. If no equalization is required, set it to the same voltage as Boost.
Undervoltage Warning (UndVolWrn)	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 Shutdown	
Low Voltage Reconnect	
Boost Duration (Bst-Time)	Please consult the battery manufacturer if it is necessary to set these values.
Equalization Duration (Equ-Time)	
Equalization Interval	

Setting Instructions

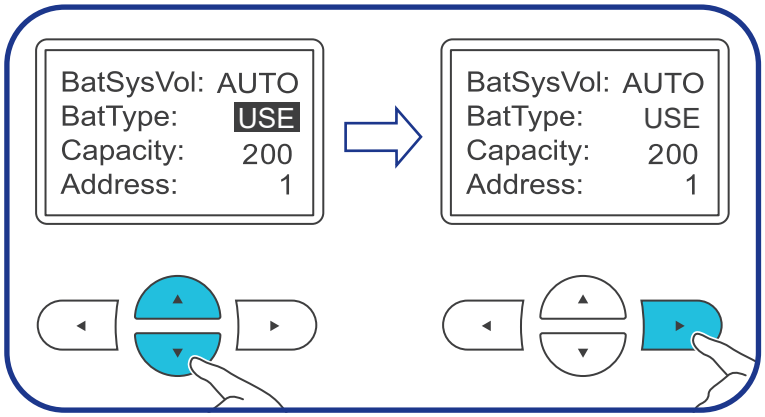
You can configure the USE Mode on the LCD screen on the charge controller or in the Renogy app. For details on how to configure the mode in the app, see "Monitoring via Renogy or Renogy ONE".



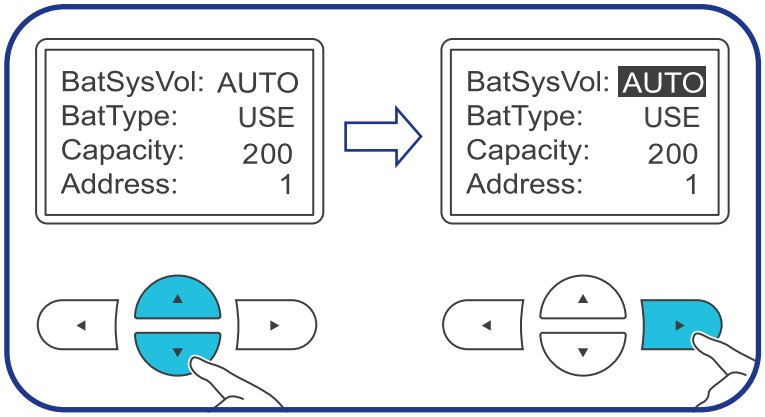
Step 1: In the Main Interface, navigate to the Parameter Setting interface by pressing the ▲ or ▼ button on the charge controller. Press ▶ to enter the details setting interface.



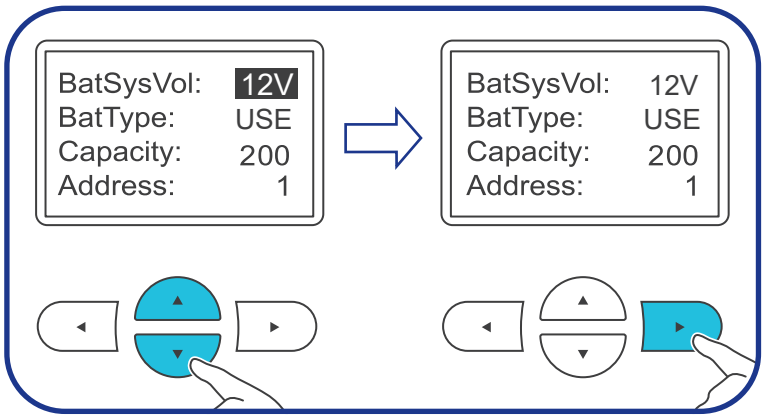
Step 2: Press ▼ to jump to the **BatType** option. Press ▶, and the **BatType** option value flashes.



Step 3: Choose "**USE**" by pressing the ▲ or ▼ button. Press ▶ to save the settings.



Step 4: Press ▲ or ▼ to jump to the parameter (such as **BatSysVol** and **OverVolDsc**) that you want to modify. Press ▶ to enter the setting interface (indicating by the flashing icon).



Step 5: Choose a required value by pressing the ▲ or ▼ button. Press ▶ to save the settings, or press ◀ to cancel the setting.

- Overcharging and excessive gas precipitation may damage the battery plates and activate material shedding on them. Too high of 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.

6. In-Built LCD Monitoring

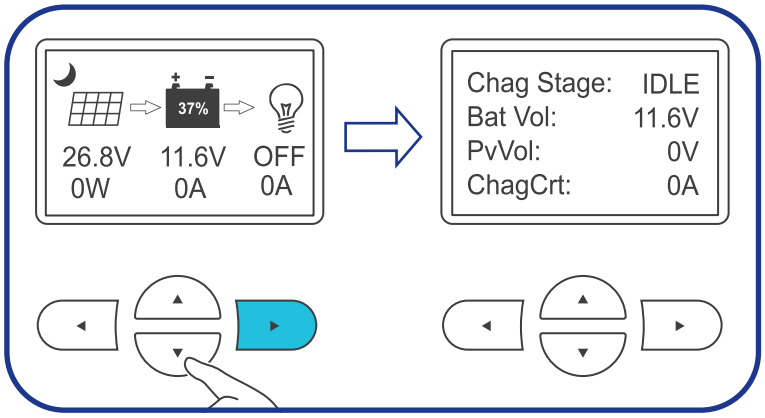
You can monitor the performance of the charge controller and other connected devices through the following methods:

- In-built LCD screen on the charge controller
- Renogy app (free of charge. For details, see "Monitoring via Renogy or Renogy ONE".)
- Renogy ONE Core (sold separately. For details, see "Monitoring via Renogy or Renogy ONE".)

The LCD screen allows system-wide monitoring while the Renogy app and Renogy ONE Core allow for limited monitoring. You can chose any or all of them based on your needs.

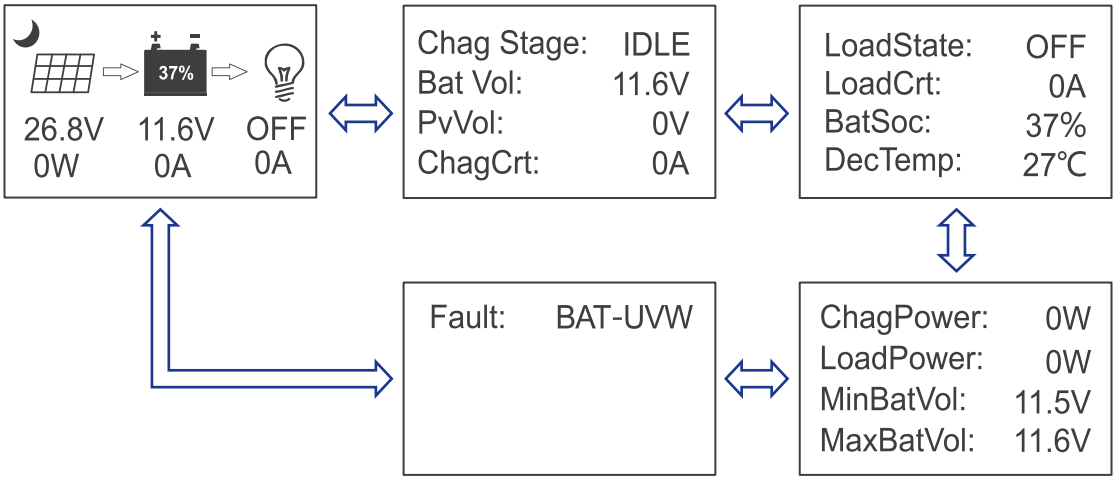
> The LCD screen illustrations in this chapter are based on 12V systems. For 24V, 36V, and 48V systems, the charge controller automatically doubles, triples, and quadruples the parameter values respectively while remaining the display value as 12V systems.

6.1. General Monitoring



Rover 60A charge controller provides fast monitoring of general solar parameters. Navigate to the Main Interface and press the ▶ button.

Use ▲ or ▼ to page up and down respectively.



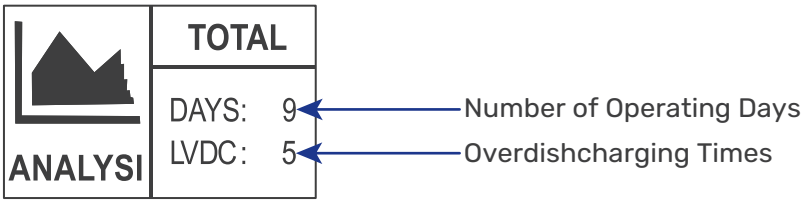
You can check the following parameters:

Parameter Name	Description
ChagState	Indicates the charging status and stage of the charge controller. Options include: ● Idle: not charging ● MPPT: MPPT charging ● EQU: Equalizing charging ● BST: Boost charging ● FLT: Float charging ● LIMIT: Current-limited charging
BatVol	Indicates the actual battery voltage.
PvVol	Indicates the actual solar panel voltage.
ChagCrt	Indicates the charging current at the moment.
LoadState	● On: Load output is on. ● Off: Load output is off.
LoadCrt	Indicates the load current.
BatSoc	Indicates remaining battery capacity.
DevTemp	Indicates the temperature of the charge controller.
ChagPower	Indicates the charging power.
LoadPower	Indicates the load power.
MinBatVol	Indicates the minimum battery voltage of the day.
MaxBatVol	Indicates the maximum battery voltage of the day.
Fault	Represents the fault status of the charge controller, solar panel, battery, and load. Options include: ● BAT-LDV: Battery overdischarge ● BAT-OVD: Battery overvoltage ● BAT-UVW: Battery under-voltage warning ● L-SHTCRT: Load short-circuit ● L-OVRCRT: Load overcurrent ● DEV-OVRTMP: Internal over-temperature of the charge controller ● BAT-OVRTMP: Battery over-temperature ● PV-OVP: Solar panel over wattage ● PV-OC-OVD: Solar panel overvoltage ● PV-REV: Solar panel reverse polarity warning ● BAT-REV: Battery reverse polarity warning

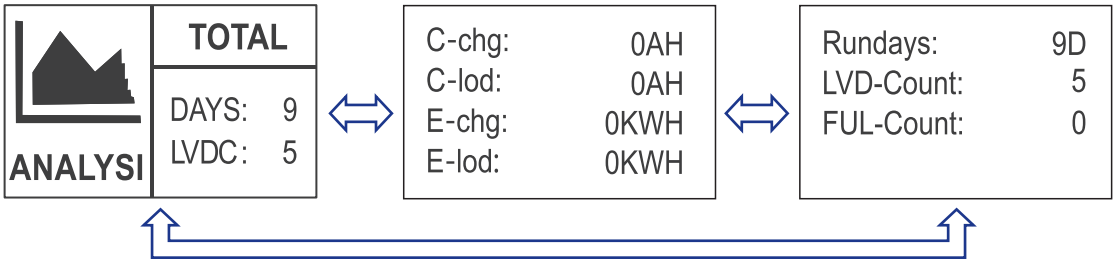
6.2. Check Power Analysis

The Rover 60A charge controller allows you to get a glimpse of how much power you have generated and consumed during the operating period.

In the Main Interface, navigate to the Power Analysis interface by pressing the ▲ or ▼ button on the charge controller.



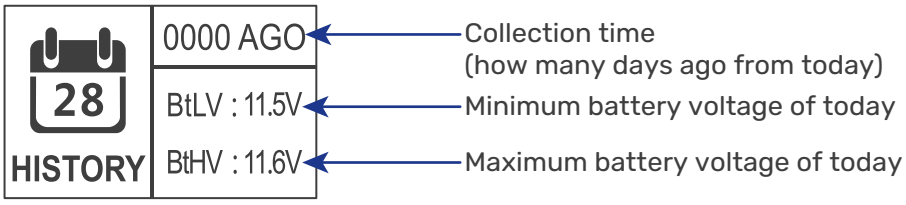
Press ▶ to see the details.



Parameter Name	Description
C-chg	Total ampere hours that are produced by the connected solar panel(s).
C-lod	Total ampere hours that are consumed by the connected load(s).
E-chg	Total kilowatt-hours that are produced by the connected solar panel(s).
E-lod	Total kilowatt-hours that are consumed by the connected load(s).
Rundays	Total number of operating days of the charge controller.
LVD-Count	Total overdischarge times of the battery recorded by the charge controller.
FUL-Count	Total full charge times of the battery recorded by the charge controller.

6.3. Check Solar History

The Rover 60A charge controller allows you to check your solar history.

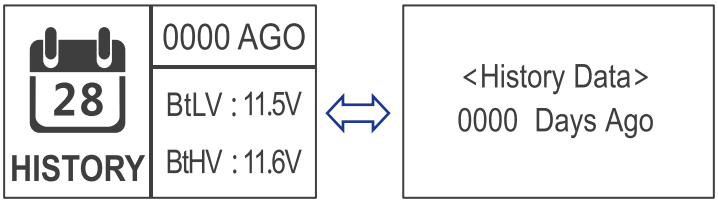


Collection Time

To modify the Collection Time, follow the steps below:

Step 1: In the Main Interface, navigate to the History interface by pressing the ▲ or ▼ button on the charge controller.

Step 2: Press ▶ to enter the <History Data> setting interface, and the value option flashes. You can set the Collection Time to a value from 0000 to 9999. Setting it to “0000“ means the charge controller gathers solar charging data of the current day while “0001” corresponds to data collected yesterday.

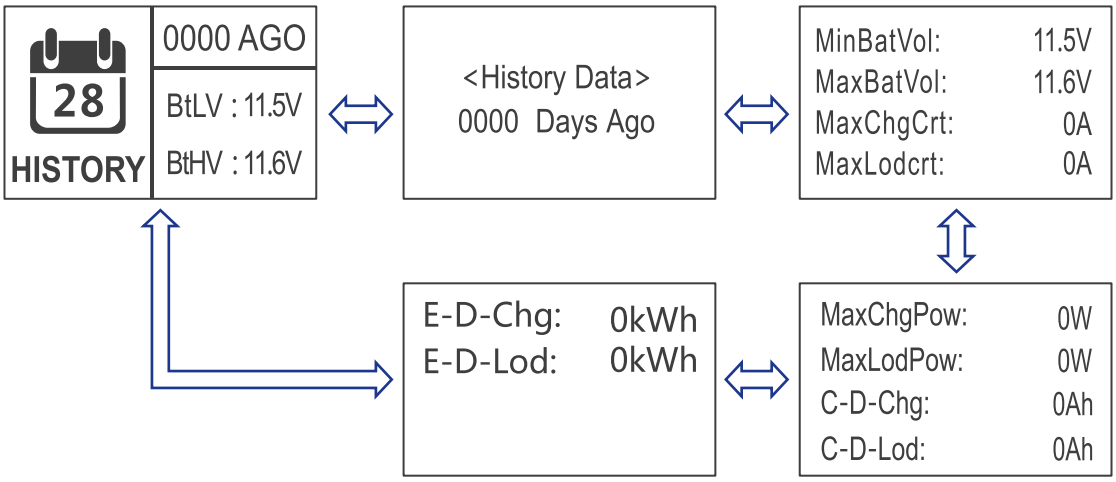


Step 3: Press ▶ to save the settings. Press ◀ to cancel the setting and exit the setting interface.

History Details

The Rover 60A charge controller allows you to check the battery and load details during the selected collection time.

In the History interface, press ▶ to check the details.



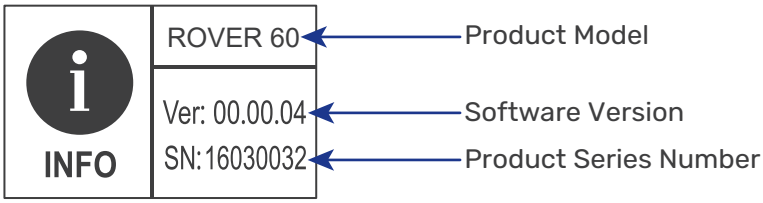
To clear history, see "7.2. Miscellaneous Settings".

Parameter Name	Description
MinBatVol	The minimum battery voltage within the collection time recorded by the charge controller
MaxBatVoll	The maximum battery voltage within the collection time recorded by the charge controller
MaxChgCrtl	The maximum charging current within the collection time recorded by the charge controller
MaxLodCrtl	The maximum discharging current to the load within the collection time recorded by the charge controller
MaxChgPow	The maximum charged power within the collection time recorded by the charge controller
MaxLodPow	The maximum discharged power to the load within the collection time recorded by the charge controller
C-D-Chg	Total charged amperage-hours within the collection time recorded by the charge controller
C-D-Lod	Total discharged amperage-hours within the collection time recorded by the charge controller
E-D-Chg	Total generated power within the collection time recorded by the charge controller
E-D-Lod	Total consumed power within the collection time recorded by the charge controller

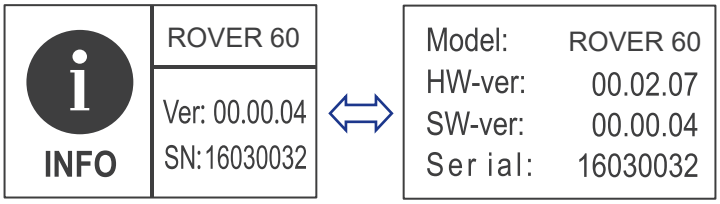
6.4. Check Device Info

In the Main Interface, navigate to the Device Info interface by pressing the ▲ or ▼ button on the charge controller.

In the Device Info interface, you can check the following of the charge controller:



Press ▶ to see the details.



Parameter Name	Description
Model	Charge controller model
HW-ver	Hardware version of the charge controller.
SW-ver	Software version of the charge controller.
Serial	Series number of the charge controller

7. Configuration

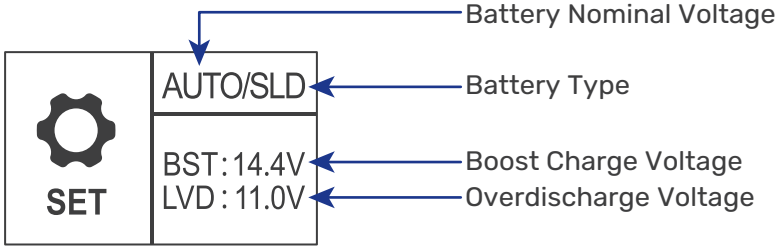
You can configure the charge controller and other connected devices through the following methods:

- In-built LCD screen and setting buttons on the charge controller
- Renogy app (free of charge. For installation details, see "Monitoring via Renogy or Renogy ONE". For detailed configuration instructions, please refer to the Renogy app.)
- Renogy ONE Core (sold separately. For installation details, see "Monitoring via Renogy or Renogy ONE". For detailed configuration instructions, please refer to the Renogy ONE Core.)

The LCD screen and setting buttons allow full settings while the Renogy app and Renogy ONE Core allow for limited configurations. You can chose any or all of them based on your needs.

7.1. Configure Battery Charging Parameters

The LCD screen illustrations in this chapter are based on 12V systems. For 24V, 36V, and 48V systems, the charge controller automatically doubles, triples, and quadruples the parameter values respectively while remaining the display value as 12V systems.



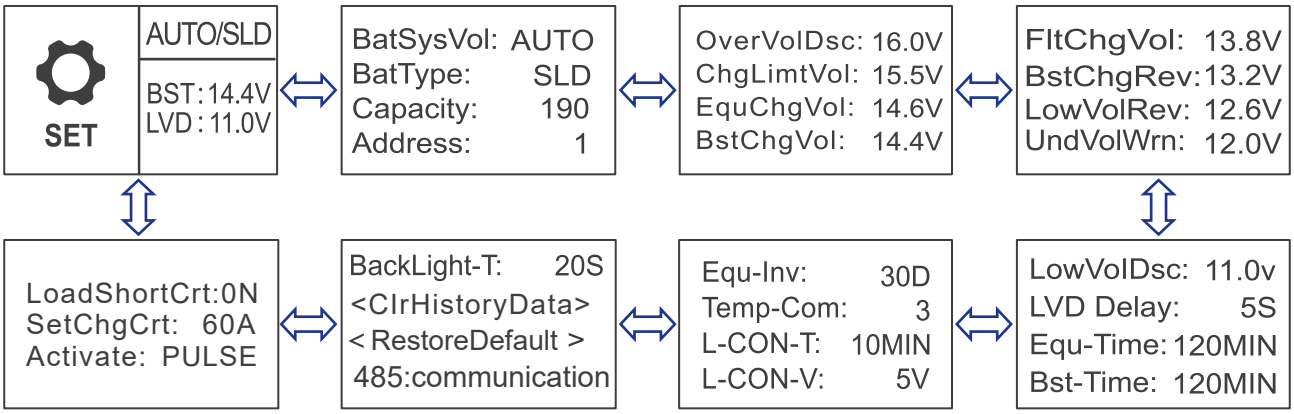
Setting Instructions

To set a battery charging parameter, follow the steps below:

Step 1: In the Main Interface, navigate to the Parameter Setting interface by pressing the ▲ or ▼ button on the charge controller. Press ▶ to enter the details setting interface.

Step 2: Press ▲ or ▼ to jump to the parameter that you want to modify. Press ▶, and the parameter value flashes.

Step 3: Press the ▲ or ▼ button to change the value. Press ▶ to save the settings, or press ◀ to cancel the setting.



General Charging Parameters

Rover 60A charge controller allows you to configure multiple charging parameters for the connected battery.

Parameter Name	Description
BatSysVol	Indicates the nominal battery voltage. Options include: ● 12V ● 24V ● 36V ● 48V ● AUTO (Not applicable to LI batteries)
BatType	Indicates the battery type. Options include: ● SLD: Sealed lead-acid battery ● FLD: Flooded lead-acid battery ● GEL: Gel battery ● LI: Lithium battery ● USE: User-defined
Capacity	Indicates the nominal battery capacity. Range: 0000 to 9999
Address	Indicates the charge controller address. (For details, see"8. Parallel Connection of Charger Controllers") Range: 1 to 60
OverVolDsc	Indicates the overvoltage shutdown threshold. Note: This parameter is configurable only when BatType is set to “USE”. Value range: 9.0V to 17.0V
ChgLimitVol	Indicates the maximum charging voltage. Note: This parameter is configurable only when BatType is set to “USE”. Value range: 9.0V to 17.0V
EquChgVol	Indicates the equalizing charging voltage. Note: This parameter is configurable only when BatType is set to “USE”. Value range: 9.0V to 17.0V

Parameter Name	Description
BstChgVol	Indicates the boost charging voltage. Note: This parameter is configurable only when BatType is set to “USE“ or “LI”. Value range: 9.0V to 17.0V
FltChgVol	Indicates the float charging voltage. Note: This parameter is configurable only when BatType is set to “USE”. Value range: 9.0V to 17.0V
BstChgRev	Indicates the boost charging return voltage. Note: This parameter is configurable only when BatType is set to “USE”. Value range: 9.0V to 17.0V
LowVolRev	Indicates the Over-discharge return voltage. Note: This parameter is configurable only when BatType is set to “USE“ or “LI”. Value range: 9.0V to 17.0V
UndVolWrn	Indicates the voltage that triggers an undervoltage warning. Note: This parameter is configurable only when BatType is set to “USE”. Value range: 9.0V to 17.0V
LowVolDisc	Indicates the voltage that triggers a disconnection from the battery due to low battery voltage. Note: This parameter is configurable only when BatType is set to “USE“ or “LI”. Value range: 9.0V to 17.0V
LVD Delay	Indicates the delay after which the charge controller disconnects load output from the battery due to low battery voltage. Note: This parameter is configurable only when BatType is set to “USE”. Range: 0s to 60s
Equ-Time	Indicates the equalizing charging duration. Note: This parameter is configurable only when BatType is set to “USE”. Range: 0 to 300 Min
Bst-Time	Indicates the boost charging duration. Note: This parameter is configurable only when BatType is set to “USE”. Range: 0 to 300 Min
Equ-Inv	Indicates the equalizing charging interval. Note: This parameter is configurable only when BatType is set to “USE”. Range: 0 to 30 days
Temp-Com	Indicates the temperature compensation voltage during charging. Range: 0 mV to 5mV/°C/2V
L-CON-T	Indicates the time delay after which the load output will be on at night when the solar panel is no longer producing any power. This parameter is valid only when the Load Output Mode is set to Light+ On and the solar output voltage is below 5V. Range: 0 to 60 Min For details, see "7.3. Configure Load Output Mode".
L-CON-V	Indicates the solar output voltage which triggers the Load Output Mode on. Range: 5V to 11V; default: 10V For details, see "7.3. Configure Load Output Mode".
BackLight-T	Indicates the duration after which the LCD screen automatically turns off in the event of no activity on the setting buttons. Setting Backlight-T to “On” means the LCD remains always on. Range: 1s to 600s
<ClrHistoryData>	● YES: Clear history data. ● NO: Cancel history data clearing.

Parameter Name	Description
<Restore Default>	● YES: Reset the charge controller to factory mode. ● NO: Exist factory mode restoration.
485	● Communication: Bluetooth ● Parallel CHG: In parallel
LoadShortCrt	● ON (default): Short-Circuit Protection on ● OFF: Short-Circuit Protection off (Caution: This may damage the charge controller.)
SetChgCrt	Indicates the maximum charging current. Setting SetChgCrt to “0A” means the charge controller stops charging or discharging. Range: 0A to 60A
Activate	● Indicates the activation function for lithium batteries. ● OFF: Activation off (applicable to lead-acid batteries only) ● PULSE (default): Constant voltage + time mode (applicable to all lithium batteries) ● CV: Constant voltage mode (applicable to all lithium batteries) For details, see "9.3. Activate Lithium Batteries".

Recommended Charging Parameters

The table below illustrates the default and recommended parameters for batteries that can be connected to the charge controller. The parameters may vary depending on the specific battery you use. Read the user manual of the specific battery or contact the battery manufacturer for help if necessary.

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

Read the user manual of the battery when customizing a preset battery. Incorrect battery type selection damages the charge controller and voids the warranty.

The parameters listed in the table below apply to 12V batteries. For 24V, 36V, and 48V batteries, double, triple, and quadruple the parameter values respectively.

The LCD screen illustrations in this chapter are based on 12V systems. For 24V, 36V, and 48V systems, the charge controller automatically doubles, triples, and quadruples the parameter values respectively while remaining the display value as 12V systems.

Battery Type / Parameters	SLD	GEL	FLD	LI	USE	Supported Range
Overvoltage Shutdown (OverVolDsc)	16.0V	16.0V	16.0V	16.0V*	[16.0V]	–
Equalizing Volatge (EquChgVol)	–	14.6V	14.8V	–	14.4V	9.0-17.0V
Boost Voltage (BstChgVol)	14.2V	14.4V	14.6V	14.4V*	14.4V	9.0-17.0V
Float Voltage (FltChgVol)	13.8V	13.8V	13.8V	–	14.4V	9.0-17.0V

Parameters \ Battery Type	SLD	GEL	FLD	LI	USE	Supported Range
Boost Return Voltage (BstChgRev)	13.2V	13.2V	13.2V	13.2V	[13.2V]	–
Undervoltage Warning (UndVolWrn)	12.0V	12.0V	12.0V	12.0V	[12.0V]	–
Undervoltage Return (LowVolRev)	–	–	–	–	–	–
Low Voltage Disconnect (LowVolDisc)	11.0V	11.0V	11.0V	11.0V	11.1V	9.0-17.0V
Low Voltage Reconnect	12.6V	12.6V	12.6V	12.6V	12.6V	9.0-17.0V
Equalization Duration (Equ-Time)	–	2 hours	2 hours	–	[0-300 min]	–
Boost Duration (Bst-Time)	2 hours	2 hours	2 hours	–	0-300 min	10-300 min

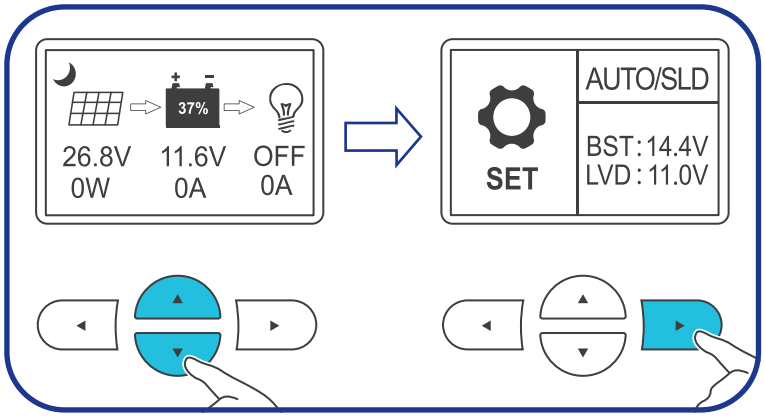
- Parameters in square brackets ([ ]) are automatically adjusted according to the relevant settings, and cannot be set directly.
- *For lithium batteries, the default Boost Voltage and Overvoltage Shutdown values are set to 14.4V and 16.0V respectively. Manual modification on Boost Voltage may trigger Overvoltage Shutdown alarms. Therefore, the Rover 60A charge controller automatically sets the Overvoltage Shutdown parameter to a value of Boost Voltage plus 2 to ensure normal battery charging. For details, refer to the specific battery manual.
- For the default values of USE Mode, refer to the latest Renogy App.

7.2. Miscellaneous Settings

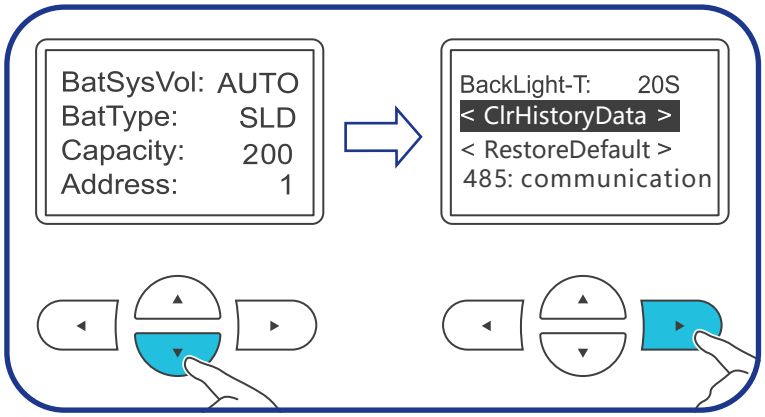
Clear History

You can clear the power history recorded by the charge controller in the Parameter Setting interface.

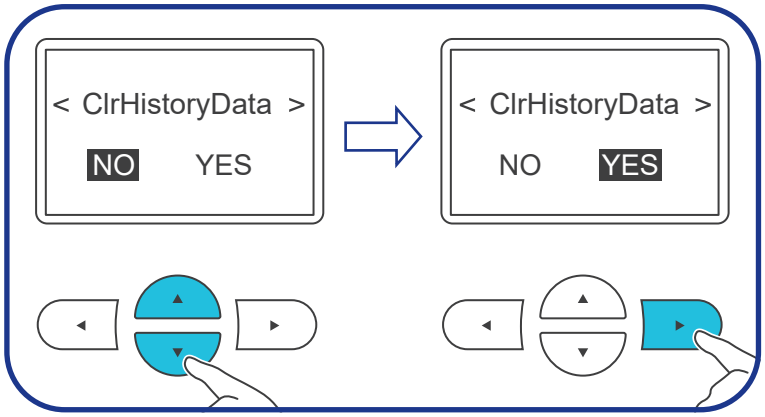
Clearing the history is an irreversible action; therefore, it is imperative to exercise caution when initiating this process.



Step 1: In the Main Interface, navigate to the Parameter Setting interface by pressing the ▲ or ▼ button on the charge controller. Press ▶ to enter the details setting interface.



Step 2: Press ▼, to jump to **<ClrHistoryData>**. Press ▶ to enter the settings.

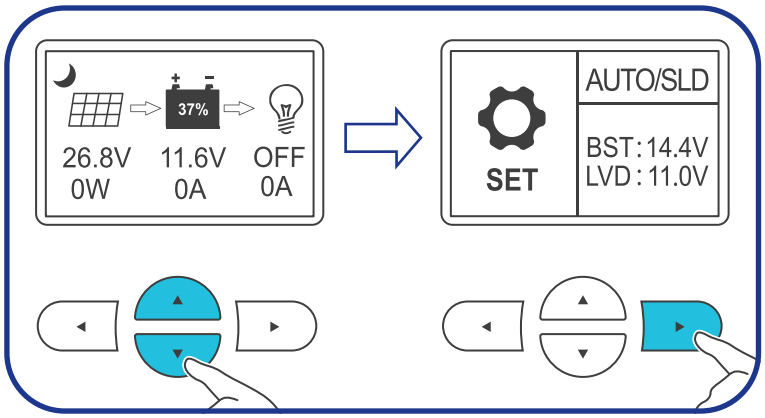


Step 3: Choose "Yes" by pressing the ▲ or ▼ button. Press ▶ to save the settings.

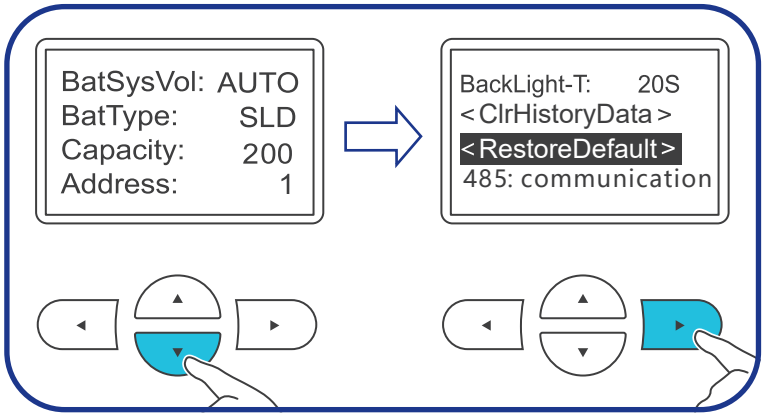
Restore to Factory Default

You can restore all settings to factory default in the Parameter Setting interface.

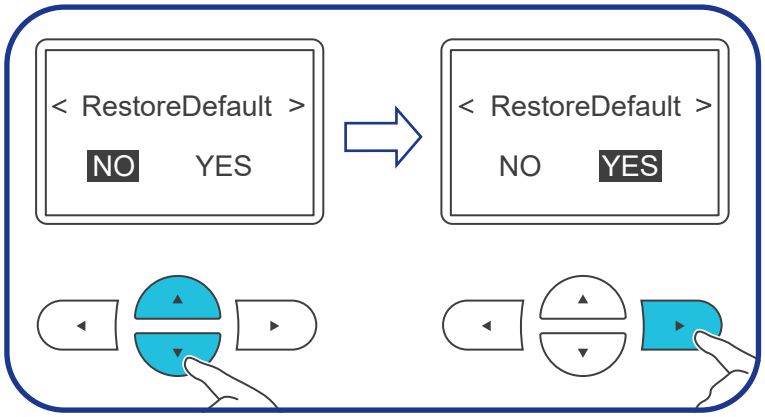
> ⚠ Factory default restoration is an irreversible action; therefore, it is imperative to exercise caution when initiating this process.



Step 1: In the Main Interface, navigate to the Parameter Setting interface by pressing the ▲ or ▼ button on the charge controller. Press ▶ to enter the details setting interface.



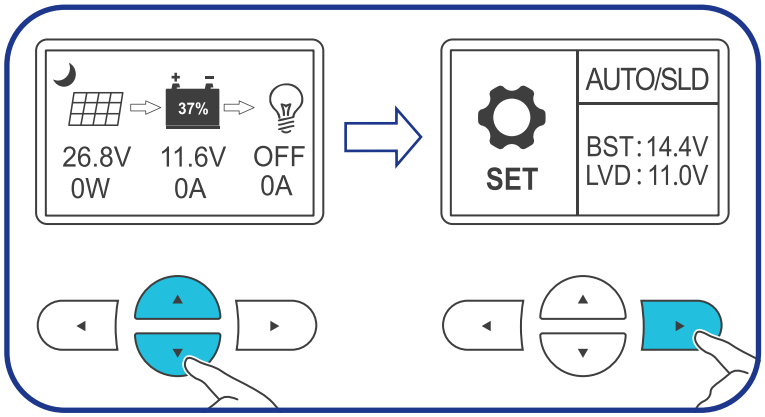
Step 2: Press ▼, to jump to **<RestoreDefault>**. Press ▶ to enter the setting interface.



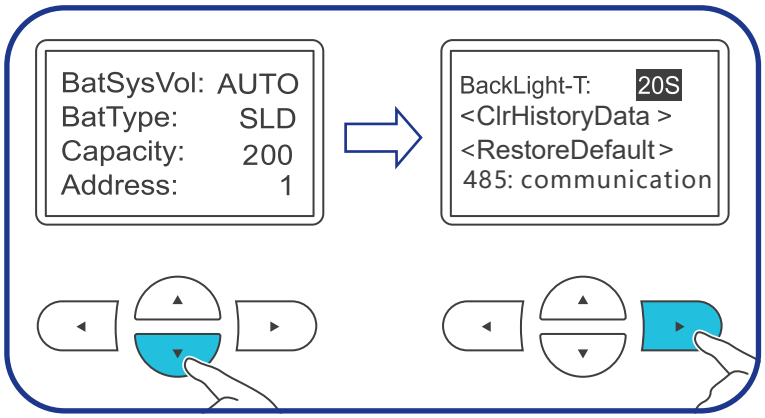
Step 3: Choose “Yes” by pressing the ▲ or ▼ button. Press ▶ to save the settings.

Set LCD Backlight Timer

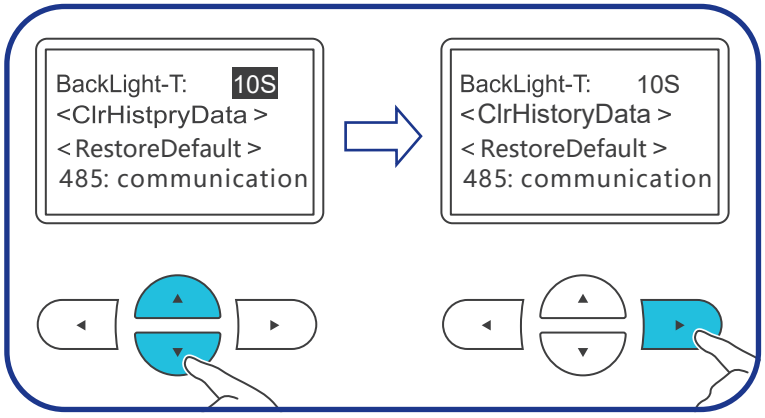
You can configure the duration after which the LCD screen automatically turns off in the event of no activity on the setting buttons.



Step 1: In the Main Interface, navigate to the Parameter Setting interface by pressing the ▲ or ▼ button on the charge controller. Press ▶ to enter the details setting interface.



Step 2: Press ▼, to jump to **<BackLight-T>**. Press ▶ to enter the setting interface (indicating by the flashing icon).



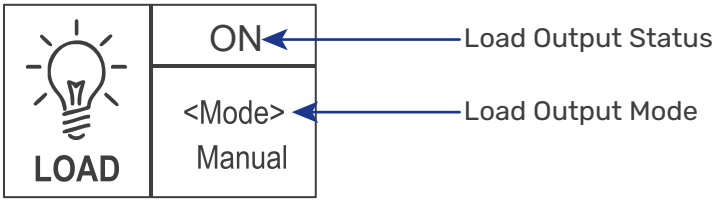
Step 3: Set it to a required value by pressing the ▲ or ▼ button. Press ▶ to save the settings.

7.3. Configure Load Output Mode

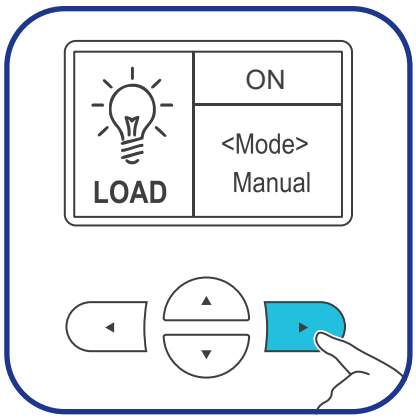
You can configure the load output status and mode on the charge controller.

In the Main Interface, navigate to the Load Mode interface by pressing the ▲ or ▼ button on the charge controller.

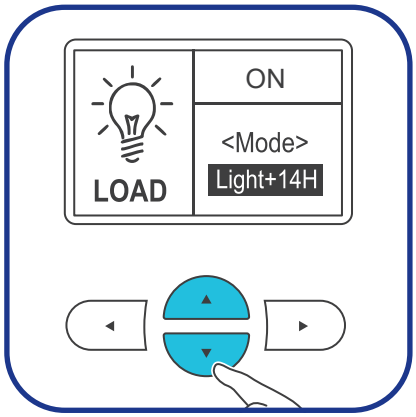
In the Load Mode interface, you can configure the following:



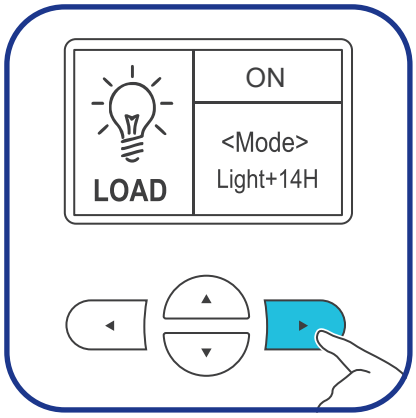
To modify the Load Output Mode, ensure the Load Output Status is ON.



Step 1: Press ▶. Upon the flashing of the **<Mode>** option



Step 2: You can modify the mode by pressing the ▲ or ▼ button on the charge controller.



Step 3: Press ▶ to save the settings, or press ◀ to cancel the setting.

Alternatively, you can press and hold ▶ to switch it ON and OFF when the <Mode> is set to "Manual".

The charge controller supports both automated and manual load output modes. The details are listed in the table below:

Mode	Description
Light+ On	Light Control Mode. ● The load output will be on when the output voltage of the solar panel is below L-CON-V after a specific time period (set by L-CON-T). ● The load output will be turned off when the output voltage of the solar panel is above L-CON-V.
Light+ XXH	Time Control Mode. ● The charge controller enables load output after a specific time delay of L-CON-T when the output voltage of the solar panel is below L-CON-V. The load output remains on for XX hours. Range: 1H to 14H
Manual	Manual Mode (factory default) In this mode, you can turn the load output ON/OFF by pressing the ▶ button on the charge controller at any time.
Debug	● When the solar output voltage is below L-CON-V, the charge controller automatically turns on the load output. ● When the solar output voltage is above L-CON-V, the charge controller automatically turns off the load output. For details, see "7.1. Configure Battery Charging Parameters".
Normal On	Always On Mode. In this mode, the load output is always on.

8. Parallel Connection of Charger Controllers

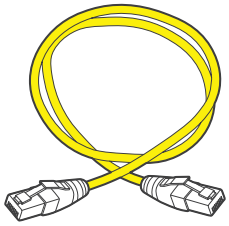
To provide more charging power, you can connect multiple Rover 60A charger controllers in parallel for system expansion when all of the following are met:

- All to-be-charged batteries are connected in series, parallel, or series-parallel in a group.
- Each charger controller is connected to independent solar panels
- Charger controllers are connected via RS-485 communication cables
- Parallel Mode* is enabled on any of the charge controllers

A larger number of charge controllers leads to a higher charging power. You can connect up to 16 Rover 60A charge controllers in a power system. The charging capability relates to the number of charge controllers in parallel.

8.1. Parallel Installation

Recommended Accessories

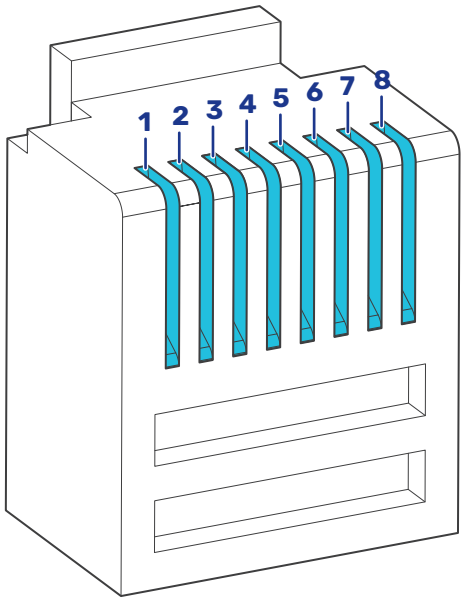


RJ45 Ethernet Cable
(CAT5 or above)

Rover 60A charge controllers communicate with each other via RS-485 communication protocol. A qualified RS-485 communication cable shall meet the following:

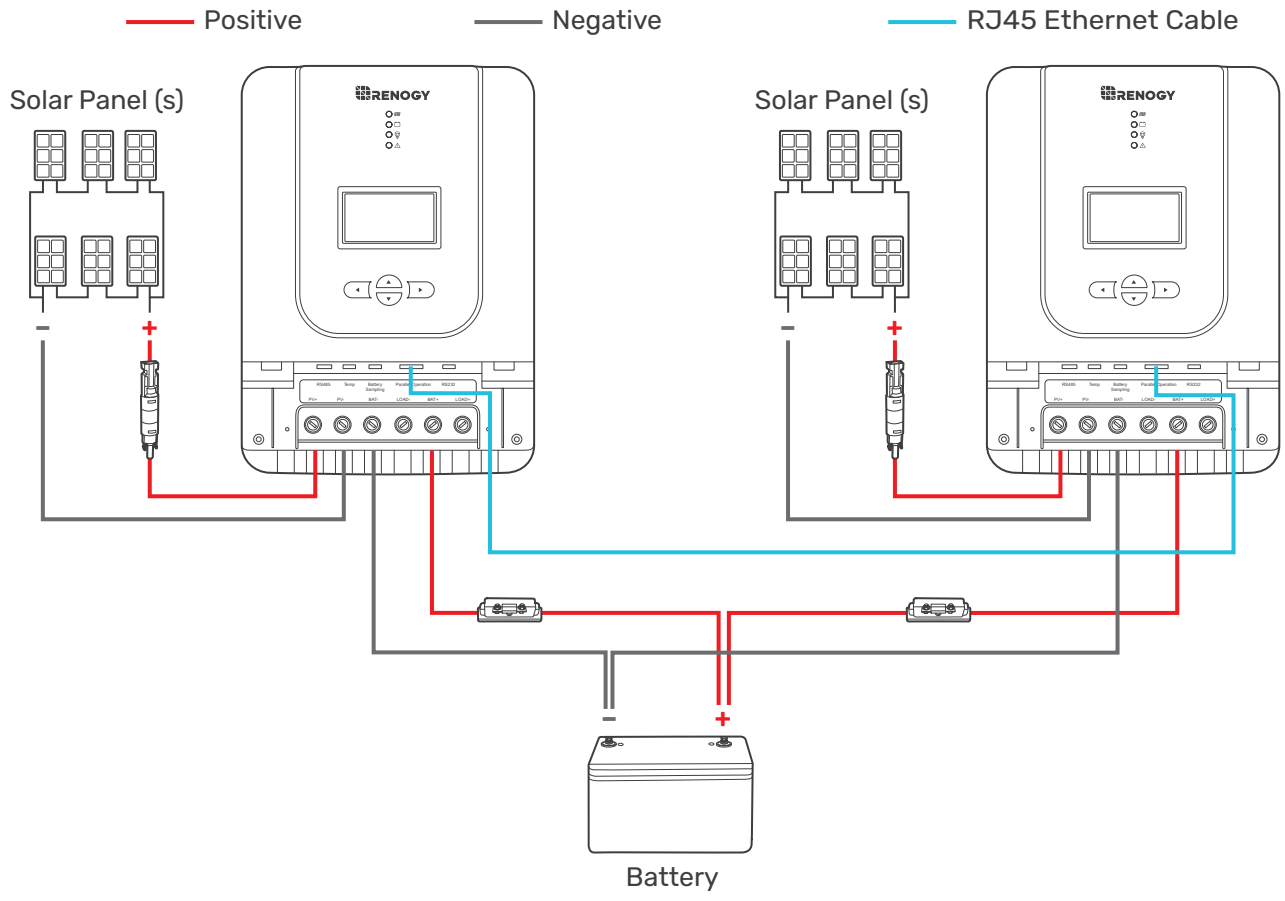
- RJ45 connectors
- Power supply at 5V and 200 mA
- Default baudrate: 9600 kps, no parity bit; data bit: 8 bits; stop bit: 1 bit

The pinout definitions of a RS-485 communication cable is displayed in the table below:

RS-485 Connector	Pinout No.	Definition
	1	Power out
	2	D+
	3	D-
	4	Shielded power ground
	5	NC
	6	CAN_H
	7	NC
	8	CAN_L

The illustrations are based on a scenario involving two Rover charger controllers. Similar rules apply to scenarios where more charge controllers are required.

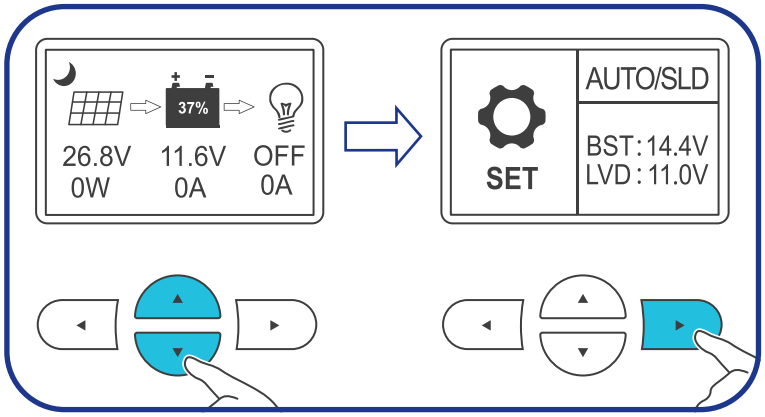
Connect each charge controller to the battery as shown in the figure below, and connect a RJ45 Ethernet cable from one charge controller to the other via their Controller Parallel Ports.



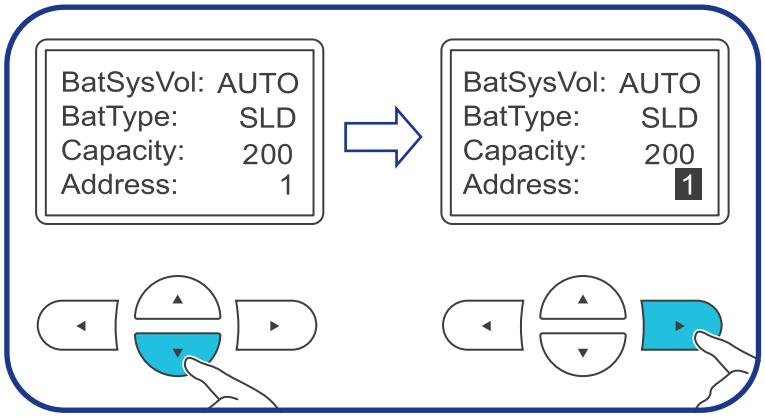
8.2. Set Parallel Mode

Before configuring the parallel mode, ensure all charge controllers are installed correctly.

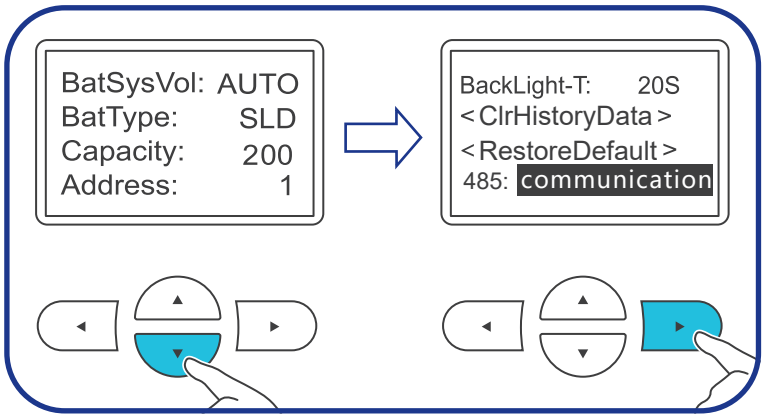
Only one charge controller works as the host and the other(s) work(s) as the slave(s). The host charge controller enables centralized management of charging status, phase, and constant charging voltage for all slave controllers. On the host charge controller, perform the following:



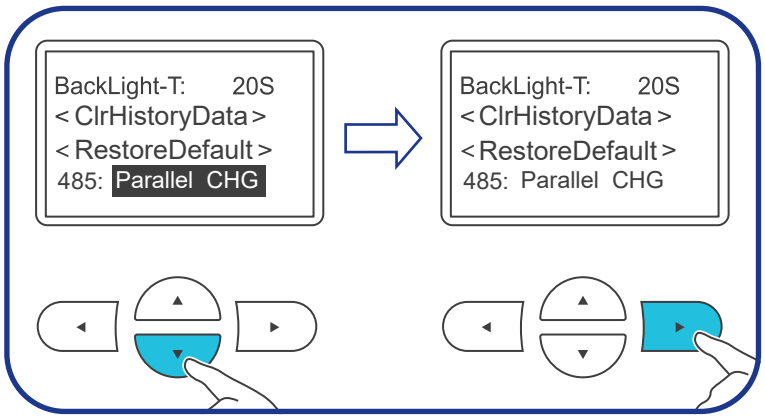
Step 1: In the Main Interface, navigate to the Parameter Setting interface by pressing the ▲ or ▼ button on the charge controller. Press ▶ to enter the details setting interface.



Step 2: Press ▼, to jump to **Address**. Press ▶ to enter the setting interface (indicating by the flashing icon). Press the ▲ or ▼ button to set the Address to "1". Press ▶ to save the settings.



Step 3: Press ▼, to jump to **485**. Press ▶ to enter the setting interface (indicating by the flashing icon).



Step 4: Choose "**Parallel CHG**" by pressing the ▲ or ▼ button. Press ▶ to save the settings.

On slave charge controllers, repeat Steps 1 to 4, and assign a unique address to each controller ranging from "2" to "60".

9 Working Logic

9.1. Charging Algorithm

Rover 60 Amp MPPT Solar Charge Controller adopts the Maximum Power Point Tracking (MPPT) technology to extract the maximum power from connected solar panels. With an automatic tracking algorithm, the charge controller can track the voltage of the maximum power point that changes with weather conditions, ensuring the harvest of the maximum power throughout the day.

Ideally, 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 power into the charge controller equals that into the battery as shown below:

Power In = Power Out

Volts In * Amps In = Volts Out * Amps Out

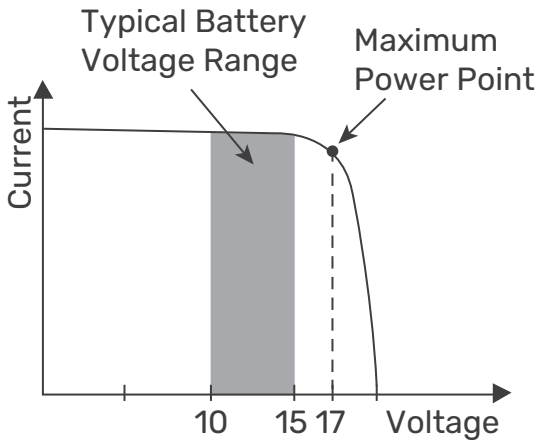
However, the voltage of the maximum power point, also known as peak power voltage (Vmp), varies with sunlight intensity and with solar cell temperature. In scenarios where the solar panel Vmp drops due to weather conditions, an MPPT charge controller adjusts the output current to get the most power from the solar panels.

Current Boost

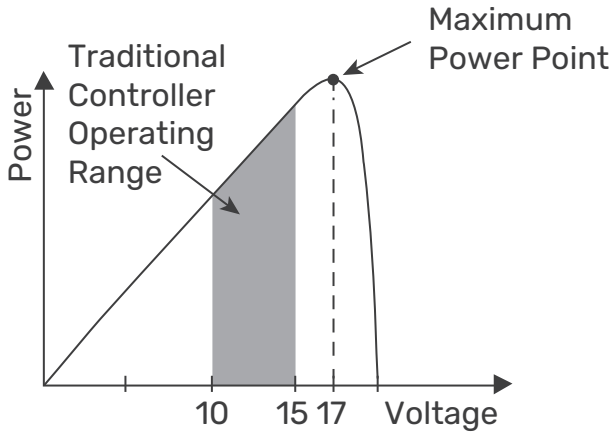
As the maximum power point voltage (Vmp) of the solar system is greater than the battery voltage, the potential difference is proportional to the current boost. The voltage of the solar panel needs to be stepped down to a rate at which the battery can be charged in a stable manner. Compared with traditional charge controllers, the Rover charge controller does not waste the stepped down voltage.

It will “boost” the current in the solar system at a conversion efficiency of up to 98%. 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.

Current vs.Voltage (12V System)



Output Power (12V System)

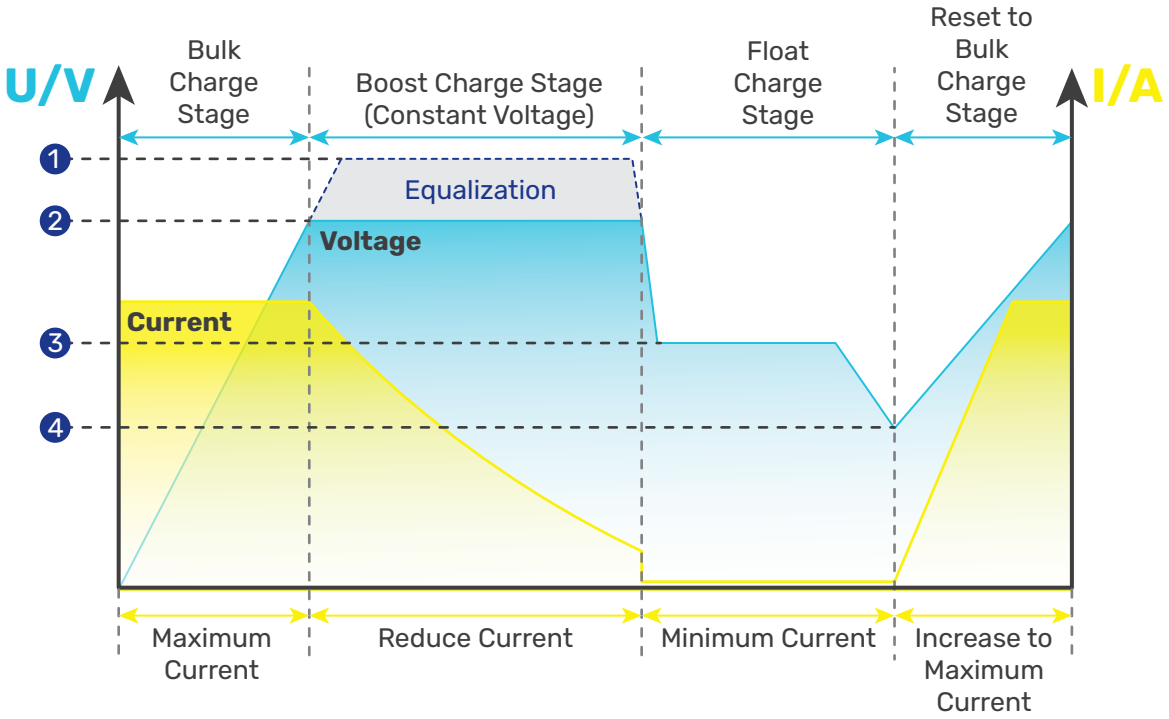


Limiting Effectiveness

High temperature is the natural enemy of solar panels. With the increase of ambient temperature, the Vmp of the solar panel decreases, which limits the power generation of the solar panel. The charge controller encounters an inevitably decrease in charging performance even with the MPPT technology. In this case, it is better to use solar panels with higher nominal voltage, so that the battery can still get current boost even if the voltage drops proportionally.

9.2. Adaptive Four-Stage Charging

Rover 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.



1. Equalization charging voltage
2. Boost charging voltage
3. Float charging voltage
4. Low Voltage Disconnect Recover charging voltage

Adjust the time depending on the specific battery bank size.

Bulk Charge Stage

The charge controller will supply constant current until the battery voltage reaches the boost voltage. It uses 100% of available solar power to recharge the battery.

Boost Charge Stage

The charge controller will supply constant voltage and reduce the current slowly through this stage.

Default boost duration: 2 hours. After this time, the charger will enter the float stage.

Boost Duration is not applicable to lithium batteries.

The stage is determined by internal software in the charge controller.

Float Charge Stage

During this stage the charge controller will supply a constant voltage which is determined by the battery selected and will keep current at a minimum level. This stage acts as a trickle charger.

After reaching a constant voltage in the charging process, the charge controller reduces the voltage to a float level. At this point, the battery is fully charged, and any excess current is converted to heat or gas. The charger then maintains a lower voltage to offset power consumption, ensuring a full battery capacity. If a load exceeds the charge current, the charger exits float mode and returns to bulk charging.

Float charging is not applicable to lithium batteries.

Equalization

This stage is only available for batteries with equalization, such as non-sealed, vented, flooded, and wet cell lead acid batteries. During this stage the batteries are charged at a higher voltage than normal

and for most batteries this could cause damage. Refer to the user manual of the battery or contact the battery manufacturer to see if this stage is needed.

- During Equalization charging, the charge controller remains in this stage until sufficient charging current is sourced from the solar panel. Note that there should be no load on the batteries during Equalization charging.
- Overcharging and excessive gas precipitation can harm battery plates, leading to material shedding. Carefully review the battery's specific requirements to avoid damage from prolonged or excessively high Equalization charging.
- Equalization may elevate battery voltage to levels that could damage sensitive DC loads. Ensure that the allowable input voltages of all loads exceed the set voltage during Equalization charging.

9.3. Activate Lithium Batteries

The charge controller can activate connected lithium batteries. Lithium batteries may enter sleep mode when the in-built protection is triggered. In such case, the charge controller provides a small current to reactivate the sleeping lithium battery. The lithium battery can be charged normally after successful activation. By default, the charge controller enables the lithium battery activation function when the battery type is set to LI or USE. You can set the function mode manually with the parameter Activate in the Parameter Setting interface. For details, see "7.1. Configure Battery Charging Parameters".

Operation Condition

The activation function applies only when the battery type is set to LI or USE on the charge controller. For details, see "5.7. Set a Battery Type".

Operation Logic

- **PULSE Mode (Default)**

In lithium battery mode, the charge controller automatically enables the activation function and provides a constant voltage of 14.4V (for 12V systems), 28.8V (for 24V systems), 43.2V (for 36V systems), or 57.6V (for 48V systems) to activate the lithium battery.

After activation for 1 minute, the charge controller temporarily stops activation and detects the battery voltage again. If the battery voltage is no less than 0V, the charge controller will automatically turn off the activation mode. Otherwise, it will continue to activate the lithium battery.

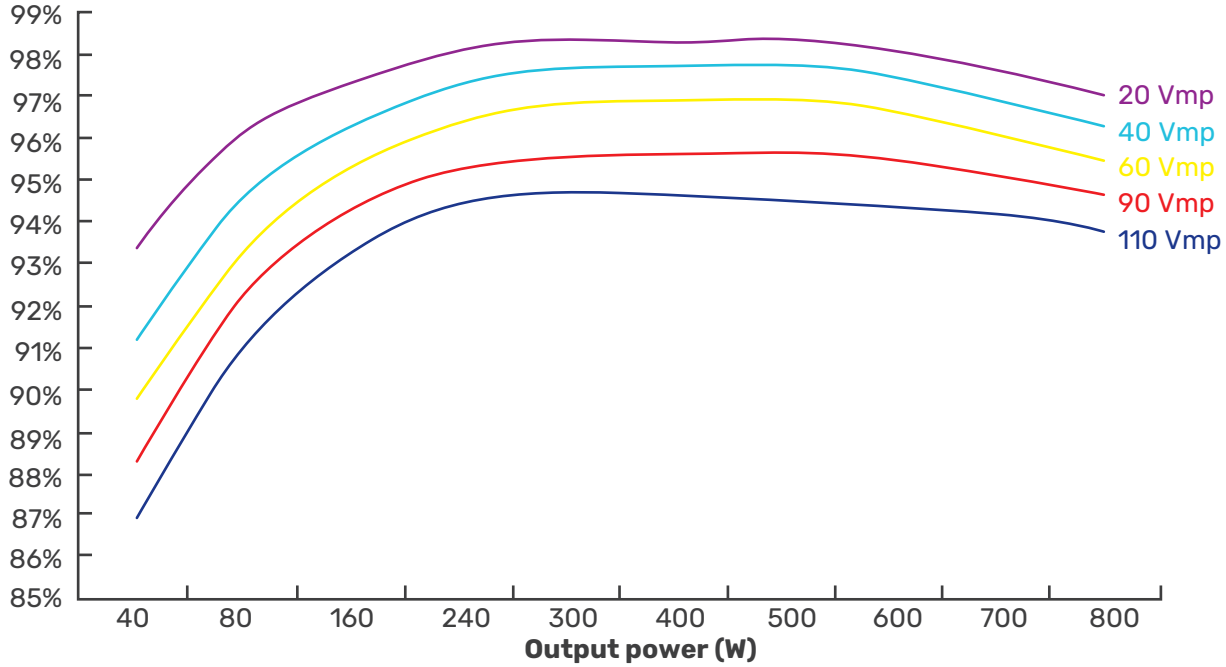
- **CV Mode**

In lithium battery mode, the charge controller automatically enables the activation function and provides a constant voltage of 14.4V (for 12V systems), 28.8V (for 24V systems), 43.2V (for 36V systems), or 57.6V (for 48V systems) to activate the lithium battery until the battery is successfully activated (the battery voltage is no less than 0V).

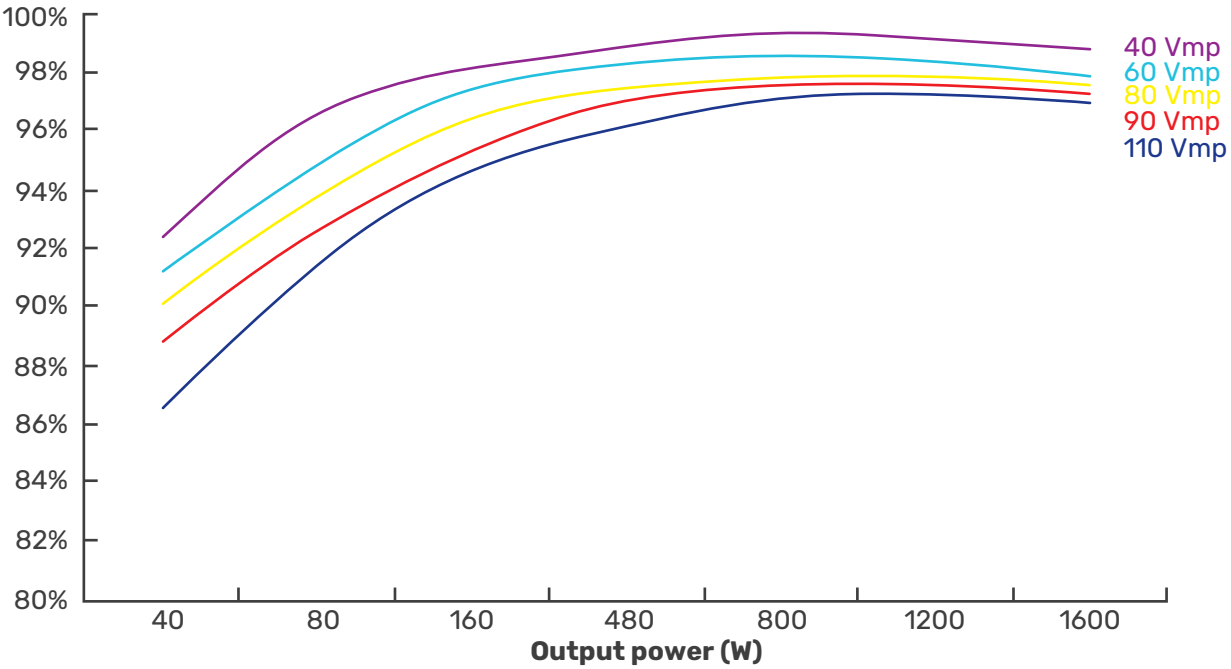
9.4. Conversion Efficiency

Light Intensity: 1000W/m² **Temperature: 25°C**

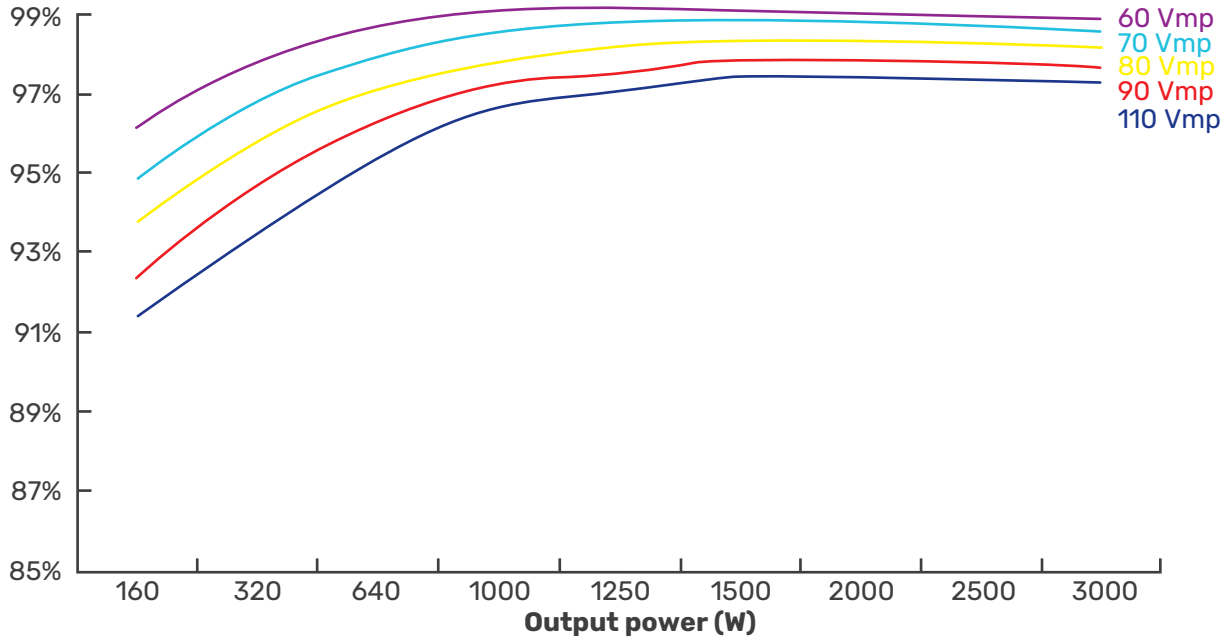
MPPT 12V conversion efficiency (12V battery)



MPPT 24V conversion efficiency (24V battery)

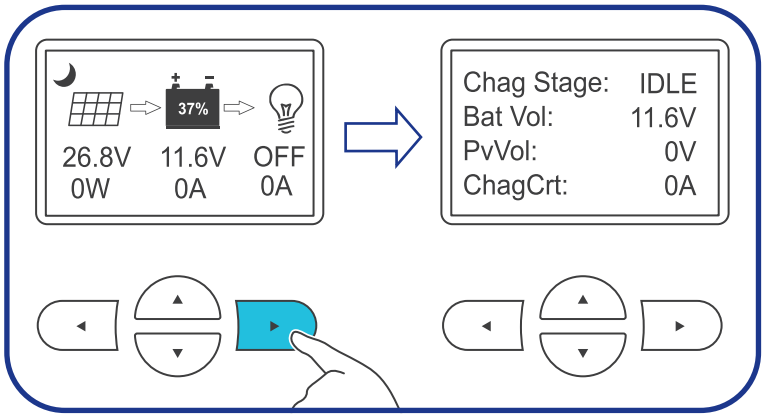


MPPT 48V conversion efficiency (48V battery)

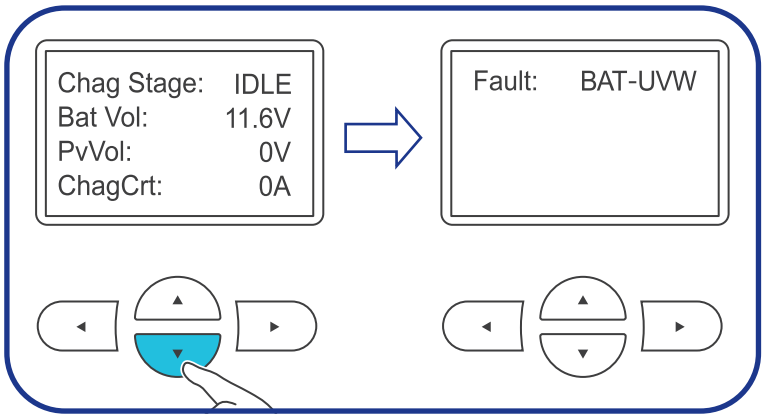


10. Troubleshooting

When an error occurs, the Error LED Indicator is solid on. You can check the error details on the LCD of the charge controller.



Step 1: In the Main Interface, press ▶ to enter the details setting interface.



Step 2: Press ▼, to jump to **Fault**. Check the fault details in "6.1. General Monitoring".

This section discusses general troubleshooting tips specific to LED indicator status.

Fault	Troubleshooting
The solar panel is connected, but the PV LED Indicator cannot light up.	This indicates the solar panel voltage may be too low or the panel cannot be detected by the charge controller. Follow the troubleshooting steps below: 1. Inspect the solar panel for any visible damage and make 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 shelter. 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 cables 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 connected to the Solar + and Solar - of the charge controller. 6. Inspect the cable of the solar panel for any visible damage. 7. Inspect the fuse of the solar panel for any visible damage. For technical support, please contact our customer service through renogy.com/contact-us.
The battery is connected. However, the indicators of the charge controller LCD and Battery LED Indicator cannot light up.	The battery needs troubleshooting if it can not be detected. Follow the troubleshooting steps below: 1. Inspect the battery and replace it with a new one if it has any visible damage. 2. Measure the battery voltage with a multimeter and make sure the system voltage of the battery is 12V, 24V, 36V, or 48V. Otherwise, the battery can not be detected by the charge controller. 3. Identify the polarities (positive and negative) on the cables used for the battery. A reverse polarity contact will cause the charge controller to work abnormally. 4. Make sure the cable of the battery is properly connected to the Battery + and Battery - 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 renogy.com/contact-us.
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, and the charging current will gradually drop until the battery is fully charged. 2. Inspect the solar panel and keep it away from the shelter. 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 "3.5. Check the Solar Panel(s)" in this manual. 6. The voltage drops because the Solar Panel Extension Cable is too long.

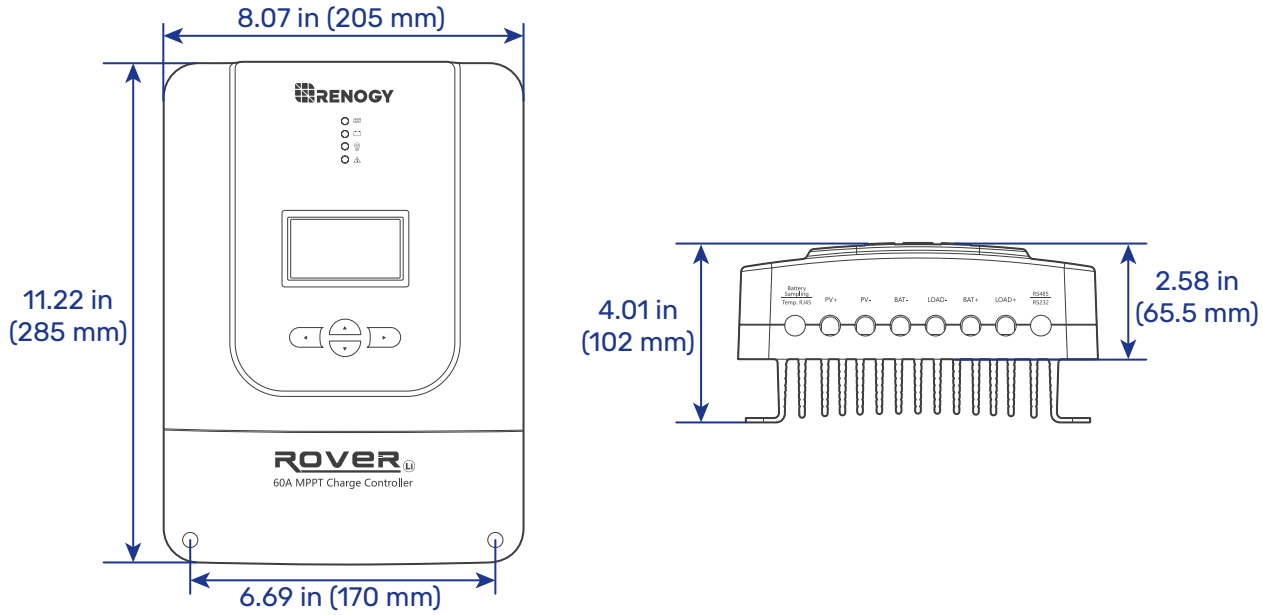
Fault	Troubleshooting
The lithium activation lasts more than 1 to 2 days but the battery is still in sleep mode.	1. Identify the polarities (positive and negative) on the cables used for the battery. A reverse polarity contact will cause the charge controller to work abnormally. Connect the battery first and then the solar panel. Otherwise, the charge controller may be damaged. 2. Measure the voltages of the battery, Battery +, and Battery - of the charge controller with a multimeter. If the voltages are inconsistent, the circuit is interrupted. Inspect the circuit and the battery fuse for any visible damage or incorrect connection. 3. The preset battery voltage is incorrect. Measure the battery voltage with a multimeter, and then reset the system voltage according to the actual use. For details, refer to "5.8. Set a Battery Voltage" in this user manual. Disconnect the battery from the charge controller and reconnect to it to activate 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 powered on after connection.	1. Identify the polarities (positive and negative) on the cables used for the battery. A reverse polarity contact will cause 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 damaged, replace it with a new one. 4. Check the load mode. For details, refer to "7.3. Configure Load Output Mode" in this manual. 5. Check the battery voltage. If the battery voltage is too low, charge the battery immediately.

For more latest troubleshooting tips, see Troubleshoot Renogy Rover 60A Charger Controller on Renogy Learning Center.

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

11. Dimensions & Specifications

11.1. Dimensions



Dimension tolerance: ±0.2 in (0.5 mm)

11.2. Technical Specifications

Parameter	Value
Nominal System Voltage	12V/24V/36V/48V Auto Recognition
Battery Input Voltage Range	9V to 64V DC
Rated Charge Current	60A
Maximum Solar Input Power	12V Battery: 800 W 24V Battery: 1600W 36V Battery: 2400W 48V Battery: 3200W
Maximum Solar Input Voltage (Voc)	145V
Self-consumption	0.7W to 1.2W
MPPT Tracking Efficiency	> 99%
Conversion Efficiency	≤ 98%
Temperature Compensation	Lithium: 0mV / °C / 2V; no compensation Non-lithium: -3mV / °C / 2V
Charger Algorithm	Lithium: Bulk and Boost Non-lithium: Bulk, Boost, and Equalize
Supported Battery Types	AGM, SLD, flooded, gel, lithium, and user-defined batteries
Terminal Size	4 AWG (Max)
Grounding	Common negative
Communication	RS232 RS485

Parameter	Value
Operating Temperature	-31°F to 140°F /-35°C to 60°C (Power reduction above 113°F / 45°C)
Storage Temperature	-31°F to 167°F / -35°C to 75°C
Humidity	0% to 95% RH
Cooling	Heat Sink
Enclosure Rating	IP32
Dimensions (LxWxH)	11.20 x 8.10 x 4.00 in / 285 x 205 x 102 mm
Weight	7.9 lbs/ 3.6kg
Regulatory and Safety Specifications	ETL Listed to UL 1741
Warranty	2 years

12. Maintenance

12.1. Inspection

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

- Ensure the charge controller is installed in a clean, dry, and ventilated area.
- Ensure there is no damage or wear on the cables.
- Ensure the firmness of the connectors and check if there are any loose, damaged or burnt connections.
- Make sure the indicators are in proper condition.
- Ensure there is no corrosion, insulation damage, or discoloration marks of overheating or burning.
- If the charge controller is dirty, use a damp cloth to clean the outside of the device to prevent dust and dirt from accumulating. Before the charge controller is powered on, make sure it is completely dry after cleaning.
- Make sure the ventilation holes are not blocked.

In some applications, corrosion may exist around the terminals. Corrosion can loosen springs and increase resistance, leading to premature connection failure. Apply dielectric grease to each terminals contact periodically. Dielectric grease repels moisture and protects the terminals contacts from corrosion.

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

12.2. Cleaning

Follow the steps below to clean the charge controller regularly.

- Disconnect all cables connected to the charge controller.
- Wear proper protective equipment and use insulated tools during operation. Be careful when touching bare terminals of capacitors as they may retain high lethal voltages even after power is removed.
- Wipe the housing of the charge controller and connector contacts with a dry cloth or nonmetallic brush. If it is still dirty, you can use household cleaners.
- Make sure the ventilation holes are not blocked.
- 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 battery.

12.3. Storage

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

- Disconnect all cables connected to the charge controller.
- By applying dielectric grease to each terminals, 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 the temperature between -31°F to 167°F (-35°C to 75°C).

13. 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.

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

13.1. 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_2, and ABC.

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

13.2. Flooding

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

13.3. Smell

1. Ventilate the room. Disconnect all cables connected to the charge controller.
2. Ensure that nothing is in contact with the charge controller.

13.4. Noise

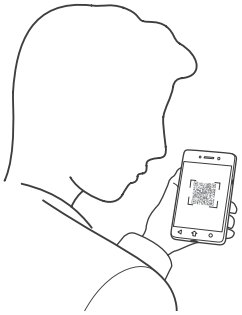
1. Disconnect all cables connected to the charge controller.
2. Make sure no foreign objects are stuck in the fan of the charge controller or the ring terminal.

Renogy Support

To discuss inaccuracies or omissions in this quick guide or user manual, visit or contact us at:

renogy.com/support/downloads

contentservice@renogy.com



Questionnaire Investigation

To explore more possibilities of solar systems, visit Renogy Learning Center at:

renogy.com/learning-center

For technical questions about your product in the U.S., contact the Renogy technical support team through:

renogy.com/contact-us

1(909)2877111

For technical support outside the U.S., visit the local website below:

Canada	ca.renogy.com	China	www.renogy.cn
Australia	au.renogy.com	Japan	jp.renogy.com
South Korea	kr.renogy.com	Germany	de.renogy.com
United Kingdom	uk.renogy.com	Other Europe	eu.renogy.com

FCC

FCC Statement

This device complies with Part 15 of the FCC Rules. 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.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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) Reorient 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 minimum distance 20 cm between the radiator & your body.

Renogy Empowered

Renogy aims to empower people around the world through education and distribution of DIY-friendly renewable energy solutions.

We intend to be a driving force for sustainable living and energy independence.

In support of this effort, our range of solar products makes it possible for you to minimize your carbon footprint by reducing the need for grid power.

Live Sustainably with Renogy

Did you know? In a given month, a 1kW solar energy system will...

- Save 170 pounds of coal from being burned
- Save 300 pounds of CO_2 from being released into the atmosphere
- Save 105 gallons of water from being consumed

Renogy Power PLUS

Renogy Power Plus allows you to stay in the loop with upcoming solar energy innovations, share your experiences with your solar energy journey, and connect with like-minded people who are changing the world in the Renogy Power Plus community.

YouTube @Renogy Solar @renogyofficial @Renogy

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