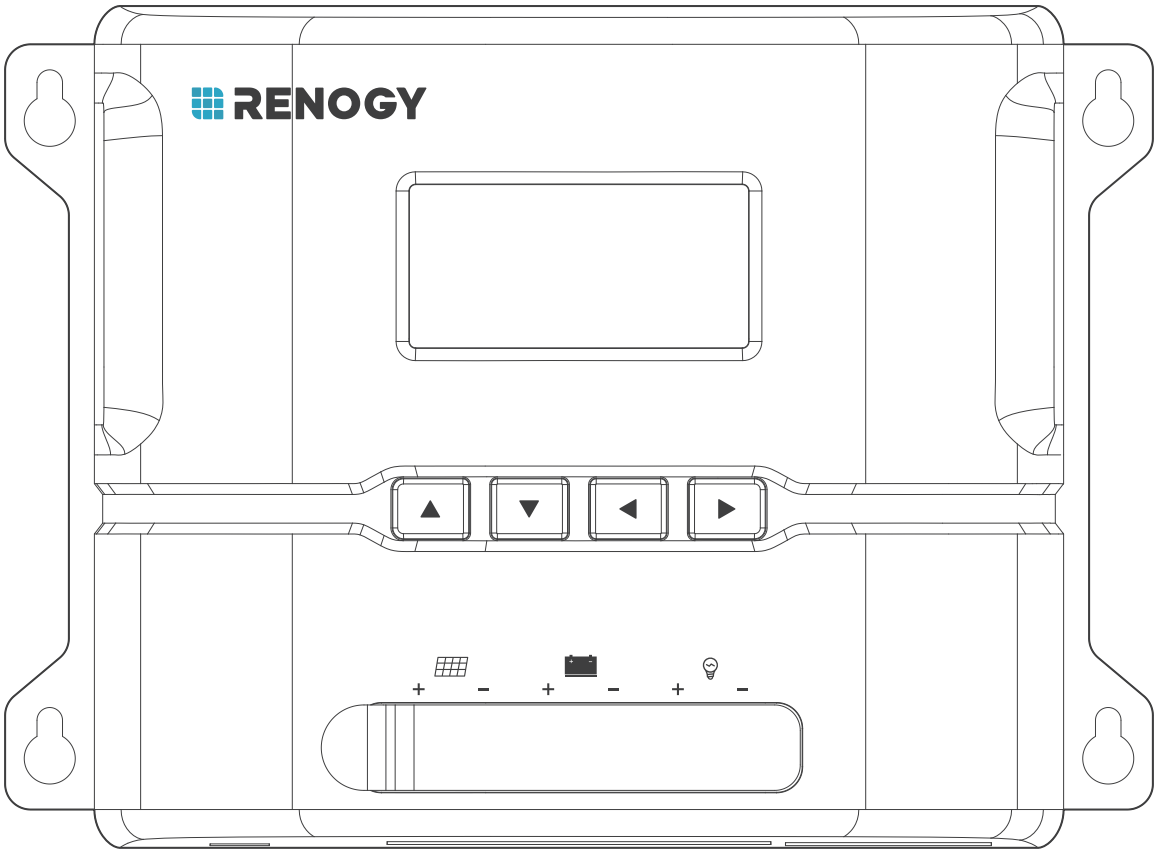
RENOGY
TRUSTED ENERGY SOLUTIONS

Rover 2 Series

MPPT Solar Charge Controller

12V/24V | 20A/30A/40A/50A

VERSION A2



USER MANUAL

Before Getting Started

The user manual provides important operation and maintenance instructions for Rover 2 Series 12V/24V 20A/30A/40A/50A 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.

Disclaimer

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Online User Manual

Visit your local Renogy website to view the complete user manual.

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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. Symbols on Product

Symbol	Description	Symbol	Description
	Keep dry		Fragile
	Ventilation		Read and understand the instruction manual before use.
	For indoor use only		Do not dispose of the product together with household waste.
R-NZ	Regulatory compliance mark	CE	CE mark of conformity EU/EEA Importer
	Australian compliance certifications	RoHS	Restriction of Hazardous Substances compliant
E57 10 R - 06 XXXX	Product complies with ECE Regulation No. 10.		Caution, risk of electric shock.
R xxx-xxxxxx	Obtained TELEC certification		Hot parts! Burned fingers when handling the parts. Wait one-half hour after switching off before handling parts

1.4. Introduction

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.

The charge controller'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.

1.5. Key Features

- **Auto Battery Voltage Detection**
  The charge controller detects 12V or 24V DC system voltages for non-lithium batteries and programmability for lithium batteries.
- **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 charge controllers in parallel for flexible system expansion.

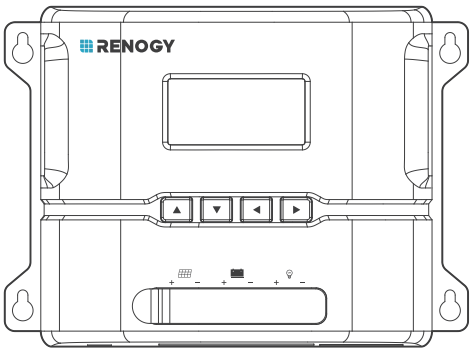
1.6. SKU

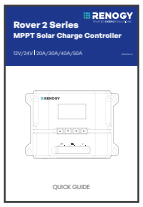
Product Name	SKU
Rover 2 Series 12V/24V 20A MPPT Solar Charge Controller	RCC-M10020-C2
Rover 2 Series 12V/24V 30A MPPT Solar Charge Controller	RCC-M10030-C2
Rover 2 Series 12V/24V 40A MPPT Solar Charge Controller	RCC-M10040-C2
Rover 2 Series 12V/24V 50A MPPT Solar Charge Controller	RCC-M10050-C2

2. Get to Know Rover 2 Series MPPT Solar Charge Controller

2.1. What's In the Box?

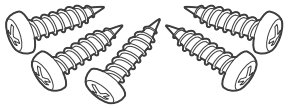
Charge Controller × 1



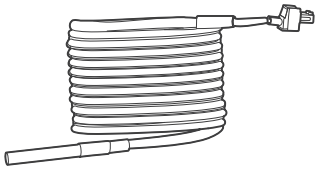


Quick Guide × 1

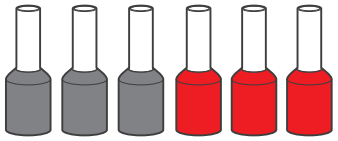
ST4*16 mm



Mounting Screws × 5
(1 extra)



Temperature Sensor × 1



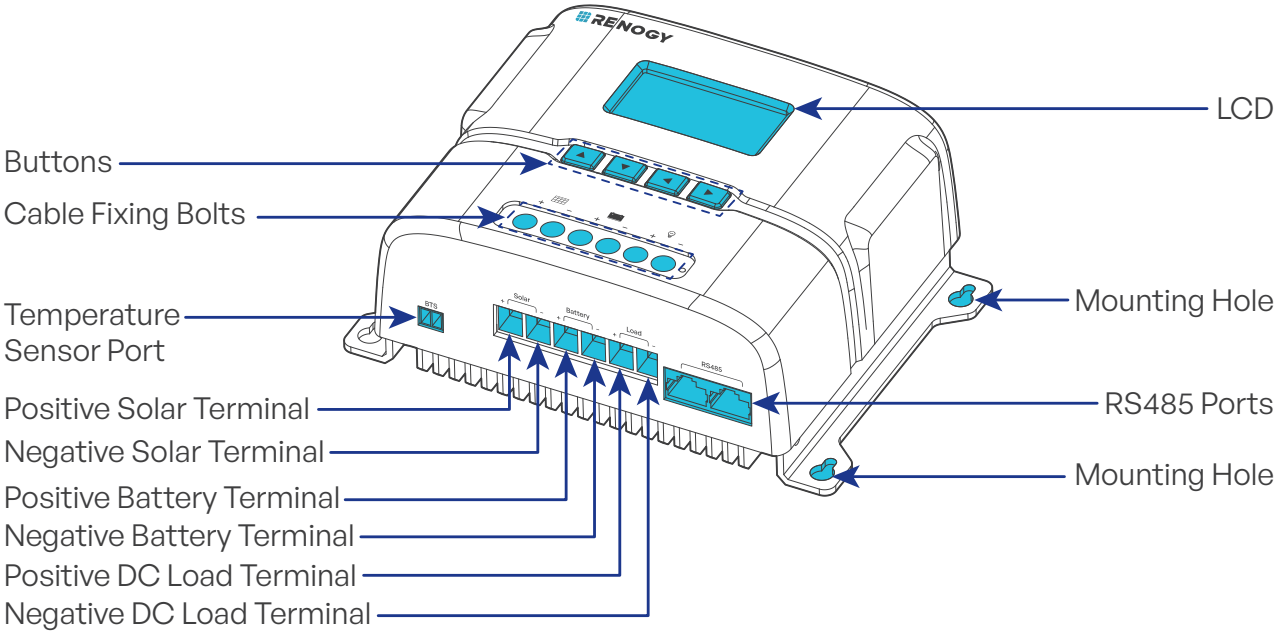
Ferrule With Insulation × 6

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.

The graphics in this guide use the RCC-M10040-C2 as an example. Port locations may vary on other models, but the wiring and usage methods are the same.

2.2. Product Overview

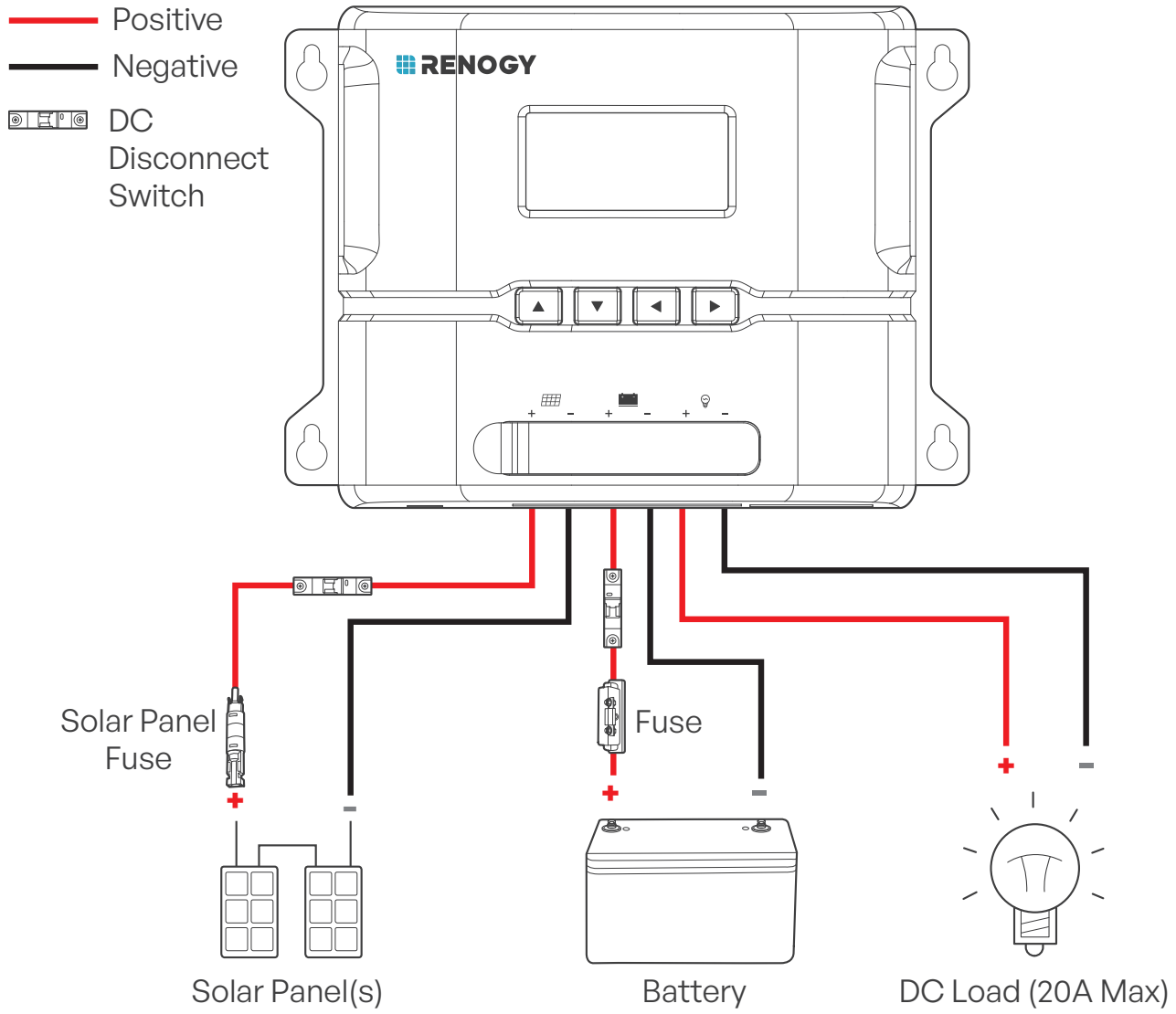


2.3. Dimensions

Model	Dimensions
RCC-M10020-C2	6.38 × 4.25 × 2.24 in / 162 × 108 × 57 mm
RCC-M10030-C2	6.38 × 4.25 × 2.44 in / 162 × 108 × 62 mm
RCC-M10040-C2	7.09 × 5.20 × 2.80 in / 180 × 132 × 71 mm
RCC-M10050-C2	7.09 × 5.20 × 3.19 in / 180 × 132 × 81 mm

Dimension tolerance: ±0.02 in (0.5 mm)

2.4. System Setup



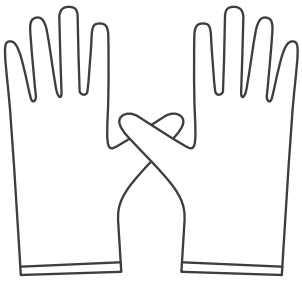
The wiring diagram only shows the key components in a typical DC-coupled off-grid energy storage system for the illustrative purpose. The wiring might be different depending on the system configuration. Additional safety devices, including disconnect switches, emergency stops, and rapid shutdown devices,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

The voltage and current ratings of the DC Disconnect Switch must exceed the system voltage and current.

3. Preparation

3.1. Recommended Tools

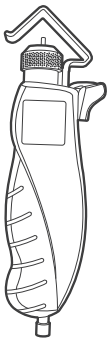
Prior to installing and configuring the charge controller, prepare the recommended tools.



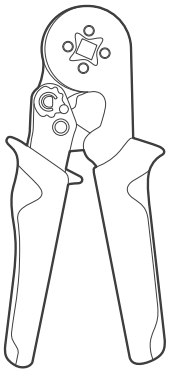
Insulating Gloves



Phillips Screwdriver (PH1)



Wire stripper



Cold-Pressed Terminal Crimping Pliers

3.2. How to Size the Fuse?

For your safety, it is recommended to install fuses on both the input and output sides of energy equipment to ensure safe operation.

Device to Solar Panel

Refer to the solar panel user manual for operating voltage parameters and calculate the corresponding fuse rating using the formula:

In the formula, Isc represents the rated current of the solar panel, and 1, 2 or 3 represents the solar panel number, respectively.

Fuse Rating = Isc (or total Isc) × 1.56, rounded up.	
Solar Panels in Series	**Solar Panels in Parallel**
Total Amps: $Isc_1 = Isc_2 = Isc_3$ Fuse = $Isc_1 * 1.56$	Total Amps: $Isc_1+Isc_2+Isc_3$ Fuse = $(Isc_1+Isc_2+Isc_3) * 1.56$

You can also refer to the table below:

Isc (or total Isc) Range	Calculated Value (Isc × 1.56)	Rounded Up Standard Fuse
0 – 6.41A	0 – 10A	10A Fuse
6.41 – 9.62A	10 – 15A	15A Fuse
9.62 – 12.82A	15 – 20A	20A Fuse
12.82 – 16.03A	20 – 25A	25A Fuse
16.03 – 19.23A	25 – 30A	30A Fuse
19.23 – 25.64A	30 – 40A	40A Fuse

Note: When selecting a fuse, check the Maximum Fuse Rating listed in the solar panel specifications. The fuse rating must not exceed this value.

Quantity Required:

- Single panel or single string (no parallel connection): A fuse may be installed on the positive output terminal of the string (not mandatory but recommended). When solar panels are connected in series, current flows along a single continuous path and remains essentially constant. Therefore, installing a properly rated fuse at the positive output terminal of the entire string provides overcurrent protection for the whole string.

- Multiple panels or strings in parallel: A fuse must be independently installed on the positive output terminal of each string (mandatory). If no more than two strings are connected in parallel, fuses are not mandatory but recommended. Parallel configurations require individual protection for each branch. If one solar panel (or sub-array) short-circuits or fails, healthy branches will feed current into the faulty branch, causing damage or danger. To prevent such reverse or abnormal current, a fuse must be installed on the positive output terminal of each parallel solar panel (or each parallel sub-array). This way, if any single branch fails, that branch can be isolated locally, protecting the other branches and maintaining safe and continuous operation of the entire system.

Device to Battery

Installation location: To ensure the auxiliary battery (especially $LiFePO_4$) reaches 100% state of charge, install the device as close to the battery as possible, ideally within 20 cm (8 inches), and no more than 1.5 m (5 feet) away, to minimize voltage drop during the final charging stage.

Model	Rated Current	Fuse Size
RCC-M10020-C2	20A	25 - 30A Fuse
RCC-M10030-C2	30A	40 - 50A Fuse
RCC-M10040-C2	40A	50 - 60A Fuse
RCC-M10050-C2	50A	65 - 80A Fuse

3.3. How to Size Wires?

Wire standards: UL-listed stranded soft copper wire with a temperature rating above 221°F (105°C) is the preferred choice, followed by stranded soft copper wire with a temperature rating above 194°F (90°C). Such wires offer excellent high-temperature performance and higher theoretical ampacity. The use of solid single-strand hard copper wire is strictly prohibited, as it is prone to fracture in vibration environments.

Fuse coordination principle: The cable's maximum current rating must be greater than the fuse rating to ensure 100% protection of the cable. In overcurrent conditions, the fuse shall blow before the cable is damaged.

Thermal requirements: Ensure the ambient temperature does not exceed 86°F (30°C). If necessary, install exhaust fans to aid heat dissipation. If the ambient temperature exceeds 86°F (30°C), ampacity must be derated by applying the correction factors from NEC Table 310.15(B).

Installation/routing: Cables shall be routed individually in air – not in conduit, not bundled, and not in contact with other cables (e.g., overhead lines or open-tray single-layer routing). If conduit is required and the number of current-carrying conductors in the same conduit exceeds 3, ampacity must be derated by applying the adjustment factors from NEC Table 310.15(C).

Voltage drop requirement: The voltage drop shall not exceed 3%.

Cable length: The length shall be calculated as the sum of the positive and negative cable lengths.

Device to Battery

Use the table below to select the wire gauge based on the fuse. The table already accounts for a voltage drop of <3%, but may not be suitable for all configurations.

Fuse Size	Cable Length (ft) / (m)	Cable Gauge Size
20 – 30A Fuse	0 - 10 ft / 0 - 3 m	10 AWG / 5.26 mm^2
	10 - 15 ft / 3 - 4.5 m	8 AWG / 8.37 mm^2
	15 - 20 ft / 4.5 - 6 m	6 AWG / 13.30 mm^2
	20 - 28 ft / 6 - 8.5 m	6 AWG / 13.30 mm^2
30 – 50A Fuse	0 - 10 ft / 0 - 3 m	8 AWG / 8.37 mm^2
	10 - 15 ft / 3 - 4.5 m	6 AWG / 13.30 mm^2
50 – 80A Fuse	0 - 10 ft / 0 - 3 m	6 AWG / 13.30 mm^2

Device to Solar Panel

Solar cables with MC4 waterproof connectors available on the market are typically 12 AWG / 4 mm^2 or 10 AWG / 6 mm^2.

- Total current ≤ 20A: You can directly use Y-branch connectors.
- Total current > 20A: Use a combiner box or busbar to connect in parallel, then use a thicker total cable to connect to the energy device. No additional fuse is required after the total output bus (though installation is optional).

You must use weather-resistant, UV-resistant PV1-F solar cables that are certified by local codes. The minimum bending radius should be ≥ 43 mm / 1.69 in.

The table below is based on copper-core PV1-F cables (rated 90°C / 194°F), DC voltage drop ≤ 3%, ambient temperature ≤ 40°C / 104°F. If ambient temperature > 40°C / 104°F, the ampacity must be adjusted according to the correction factors in NEC 310.15(B) (e.g., for 90°C/194°F insulation at 40°C/104°F ambient, the correction factor is 0.91, ~9% derating). When multiple cables are run in conduit, ampacity must be further derated by 15%–25%.

Fuse Size	Cable Length (ft) / (m)	Cable Gauge Size
0 - 10A	0–16.4 ft / 0–5 m	12 AWG / 3.33 mm^2
10 - 20A	0–26.2 ft / 0–8 m	10 AWG / 5.26 mm^2
20 - 30A	0–32.8 ft / 0–10 m	8 AWG / 8.37 mm^2
30 - 40A	0–39.4 ft / 0–12 m	6 AWG / 13.30 mm^2
40 - 50A	0–49.2 ft / 0–15 m	4 AWG / 21.15 mm^2

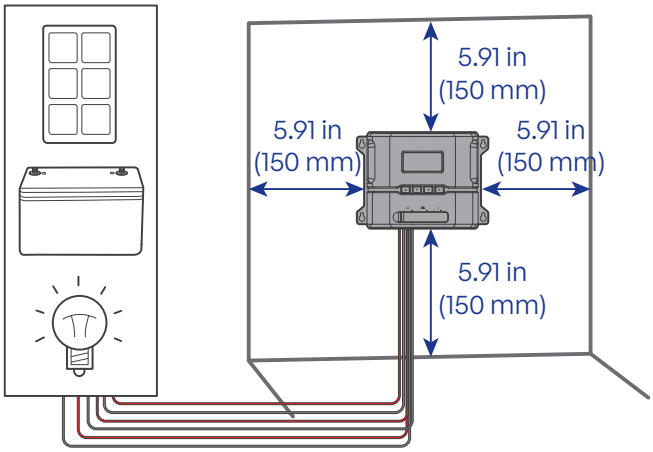
This table provides conventional recommended values. For actual selection, it is advisable to perform accurate calculations based on your specific system voltage, cable length, and allowable voltage drop. For more precise calculations, refer to the NEC 310.16 ampacity table (USA) or CSA C22.1 Tables 2/4/5 (Canada).

3.4. Charge Controller Maximum Cable Gauge (AWG)

Model	Max. Terminal Gauge Size
RCC-M10020-C2	6 AWG / 13.30 mm^2
RCC-M10030-C2	6 AWG / 13.30 mm^2
RCC-M10040-C2	6 AWG / 13.30 mm^2
RCC-M10050-C2	6 AWG / 13.30 mm^2

3.5. 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.



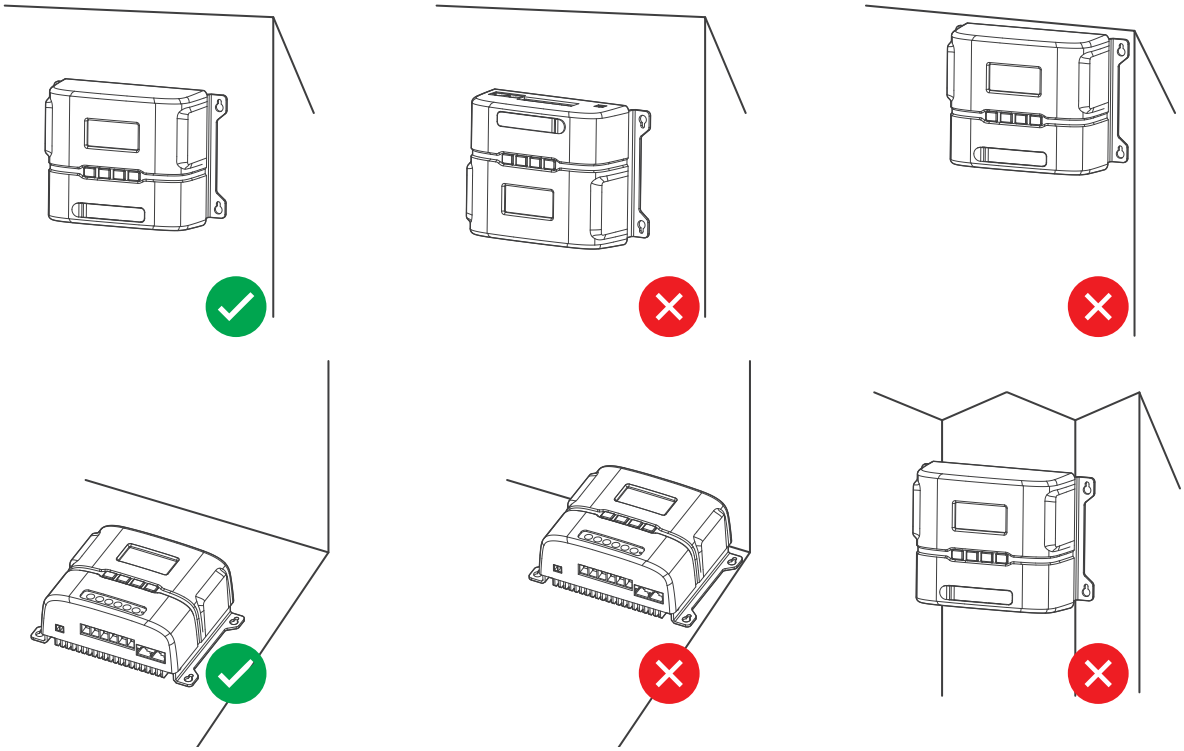


-22°F to 149°F
-30°C to 65°C
(Reduce power when the temperature is above 113°F/45°C.)

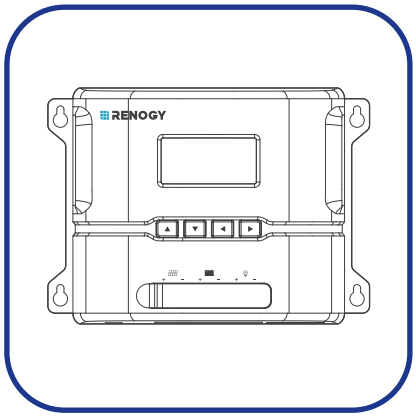
0% to 95%

- 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 -22°F to 149°F (-30°C to 65°C). To ensure optimal working efficiency, it is recommended to keep the ambient temperature range from -22°F to 113°F (-30°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.
- 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.



3.6. Check the Charge Controller

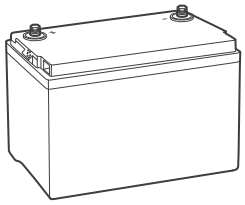


1. Inspect the charge controller for any visible damage including cracks, dents, deformation, and other visible abnormalities. All connector contacts shall be clean and dry, free of dirt and corrosion.

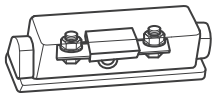
- Do not use the charge controller if there is any visible damage.
- Do not puncture, drop, crush, penetrate, shake, strike, or step on the charge controller.
- There are no serviceable parts in the charge controller. Do not open, dismantle, repair, tamper with, or modify the charge controller.
- Confirm 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.

3.7. Check the Battery

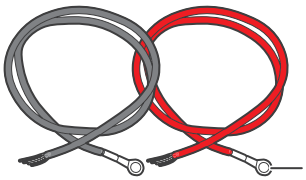
Recommended Components & Accessories



Battery (12V/24V)

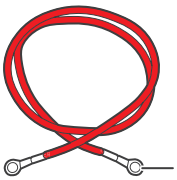


Battery Fuse × 1



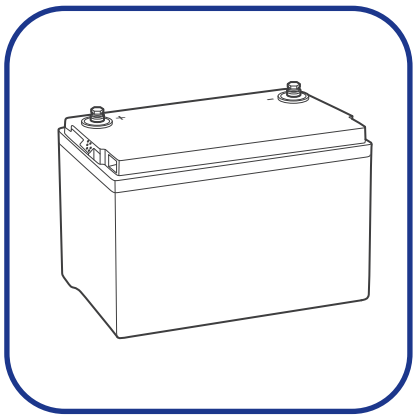
3/8 in (M10)

Battery Adapter Cables × 2



3/8 in (M10)

Fuse Cable × 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 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.

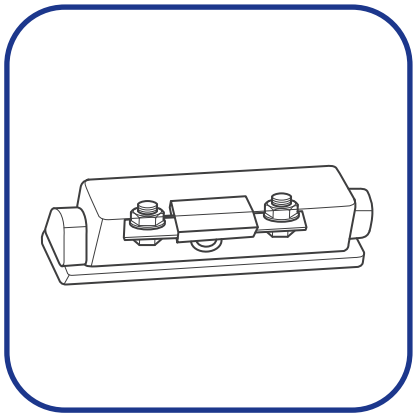
Battery or Battery Bank System Voltage	
Battery or Battery Bank System Voltage = System Voltage U	
Batteries in Series	**Batteries in Parallel**
System Voltage U: $U_1 + U_2 + U_3$	System Voltage U: $U_1 = U_2 = U_3$

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

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

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 32V.

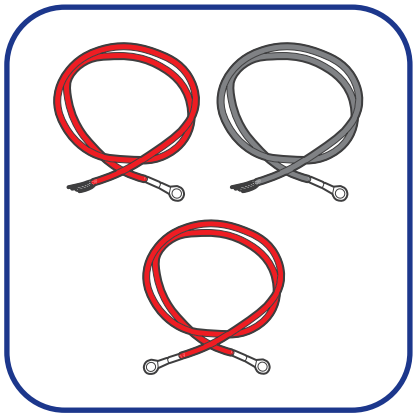
Do not connect batteries rating higher than 32V to the charge controller. Doing so will damage the charge controller.



3. Inspect the Battery 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 Battery Fuse if there is any visible damage.

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

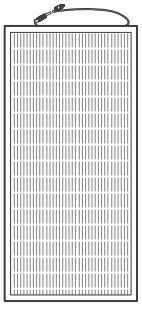


4. Inspect the Battery Adapter Cables and Fuse Cable for any visible damage including cracks, dents, deformation, and other visible abnormalities. All ring terminals are fastened to the cables.

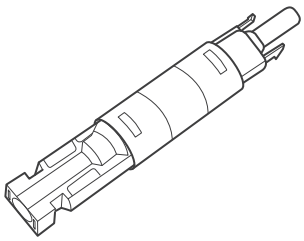
Do not use the battery adapter cables if there is any visible damage.

3.8. Check the Solar Panel(s)

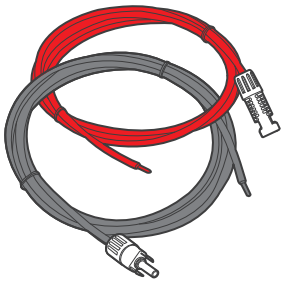
Recommended Components & Accessories



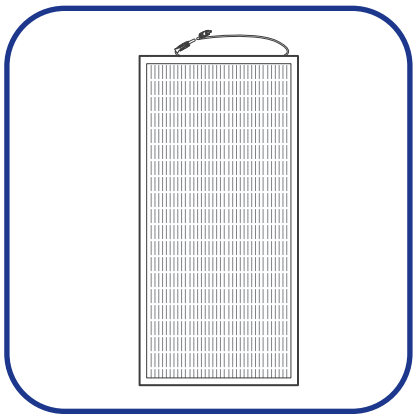
Solar Panel (s)



Solar Panel Fuse



Solar Panel Extension Cables × 2



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.

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

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

Model	Solar Panels Power (Max)
RCC-M10020-C2	300W @12V; 600W @24V
RCC-M10030-C2	450W @12V; 900W @24V
RCC-M10040-C2	600W @12V; 1200W @24V
RCC-M10050-C2	750W @12V; 1500W @24V

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 100V.

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 100V, the charge controller triggers an overvoltage alarm.

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

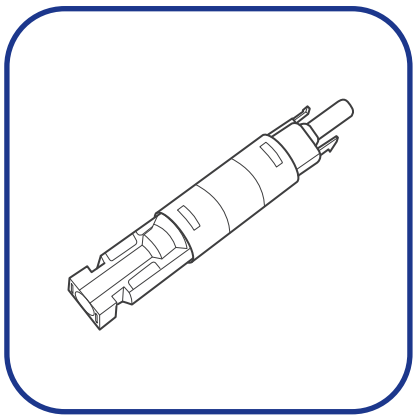
4. Read the user manual of the solar panel for the maximum short circuit current, and calculate the maximum short circuit current of solar panel or solar panel array according to the formula.

Model	Solar Panels Short-circuit Current (Isc)
RCC-M10020-C2	≤ 20A
RCC-M10030-C2	≤ 30A
RCC-M10040-C2	≤ 40A
RCC-M10050-C2	≤ 50A

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.



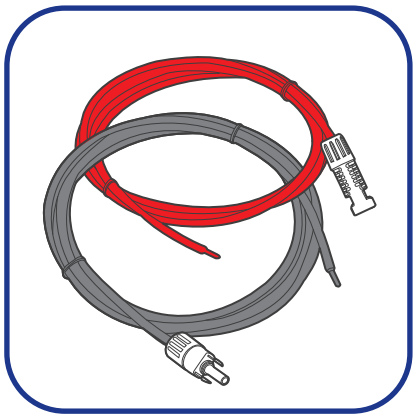
5. The appropriate current rating for the solar panel fuse should be determined by multiplying the total amperage of the solar panel array by 1.56.

   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.

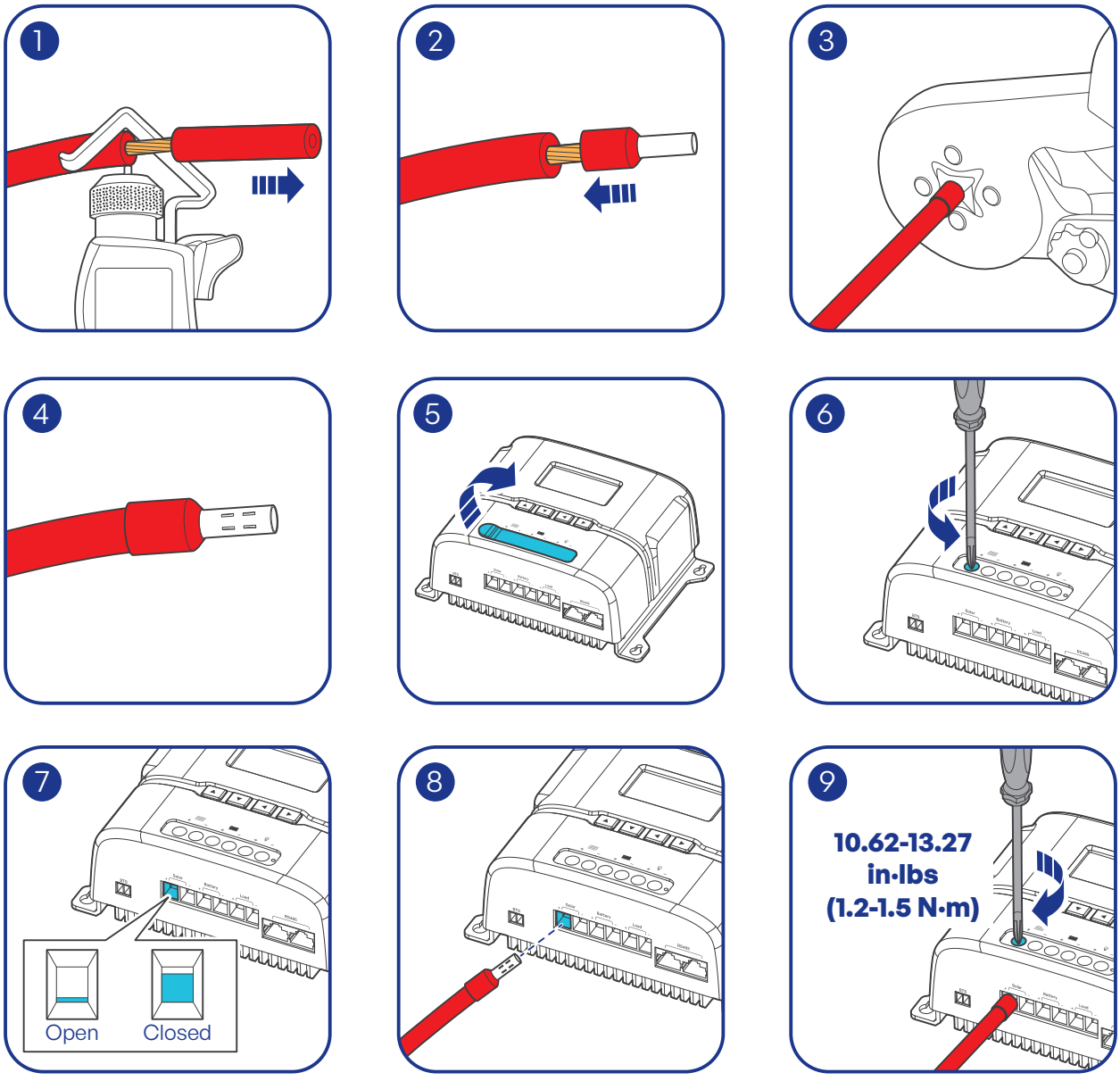


6. Inspect the Solar Panel Extension Cables for any visible damage including cracks, dents, deformation, and other visible abnormalities. All connector contacts shall be clean, dry, and free of dirt and corrosion.

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

3.9. How to Install Cables on the Charge Controller?

The illustration is based on the Solar+ terminal as an example; the wiring methods for all terminals are the same.

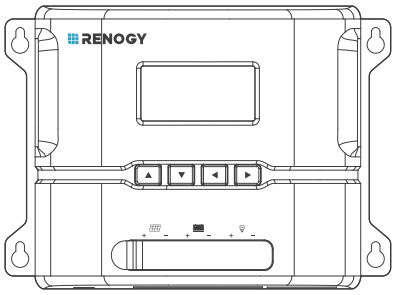


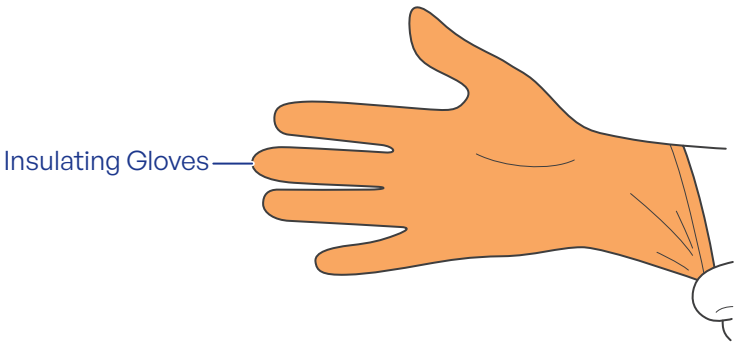
4. Installation

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.

Tug on all cables to ensure firm connection.

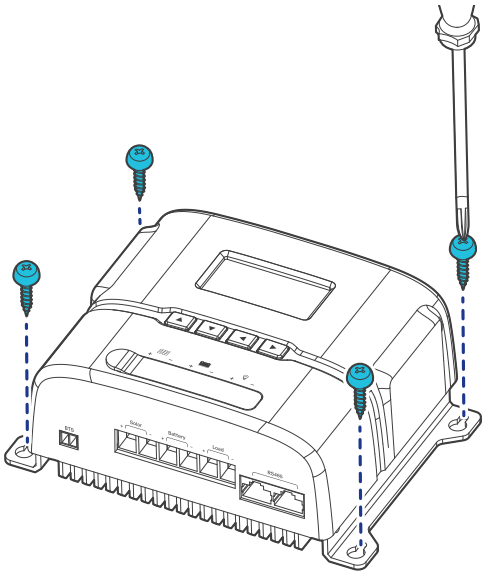
4.1. Wear Insulating Gloves





4.2. Mounting

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



26.55 in·lbs
(3 N·m)

4.3. Connect to the Battery

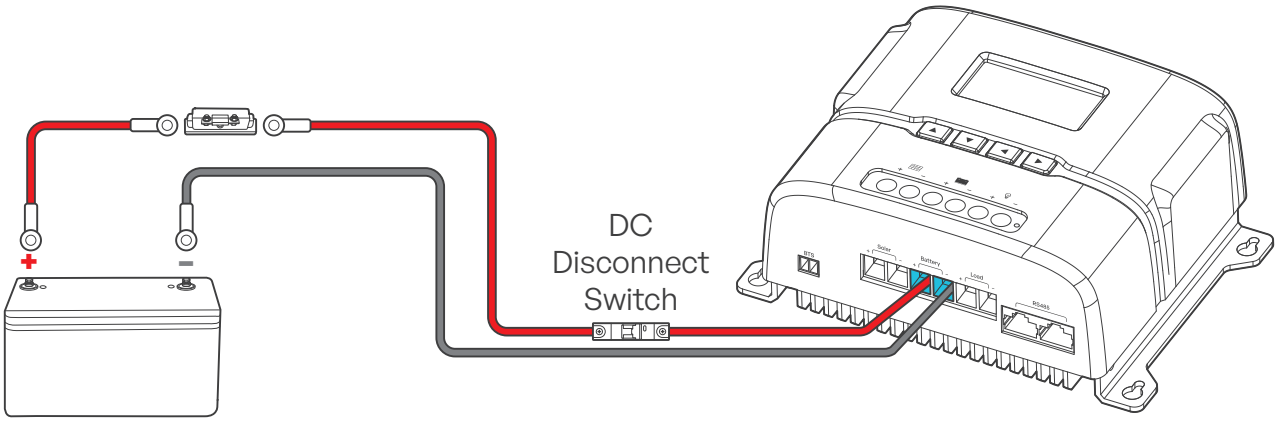
The charge controller can only be connected to 12V/24V deep-cycle, gel-sealed lead-acid batteries (GEL), flooded lead-acid batteries (FLD), sealed lead-acid batteries (SLD, AGM) or lithium iron phosphate batteries (LI).

Always connect the charge controller to a battery before connecting it to a solar panel to ensure safe and efficient operation.

> ⚠ Connecting the solar panel before the battery may damage the charge controller and void the warranty.

When wiring, always connect the negative terminal first, followed by the positive terminal.

> ℹ For installation details, see the user manual of the battery in use.



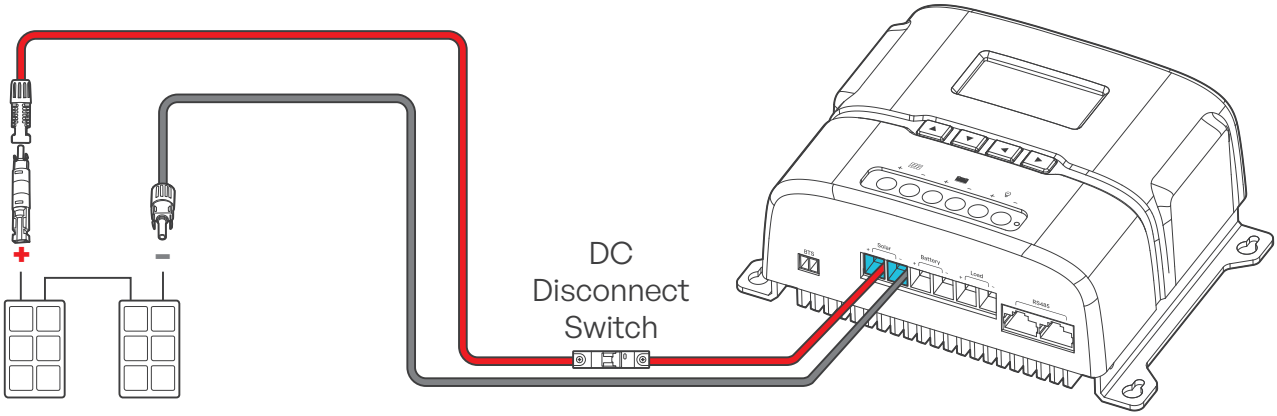
Once the cables are connected to the battery, the LCD will light up, and the charge controller enters nighttime mode.

4.4. Connect to the Solar Panel

Ensure that the solar module output does not exceed the values specified in the table below.

Model	Solar Panels Power (Max)	Solar Panels Voltage (Voc)	Solar Panels Short-circuit Current (Isc)
RCC-M10020-C2	300W @12V; 600W @24V	15V - 100V	≤ 20A
RCC-M10030-C2	450W @12V; 900W @24V		≤ 30A
RCC-M10040-C2	600W @12V; 1200W @24V		≤ 40A
RCC-M10050-C2	750W @12V; 1500W @24V		≤ 50A

When wiring, always connect the negative terminal first, followed by the positive terminal.

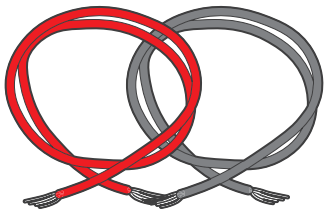


4.5. Connect to the DC Load (Optional)

Charge controller can be externally connected to and powered by a DC load (≤20A), which is optionally installed based on requirements.

The output voltage at the DC load terminals of the charge controller depends on the battery voltage. Please ensure that the DC load input voltage matches the battery voltage.

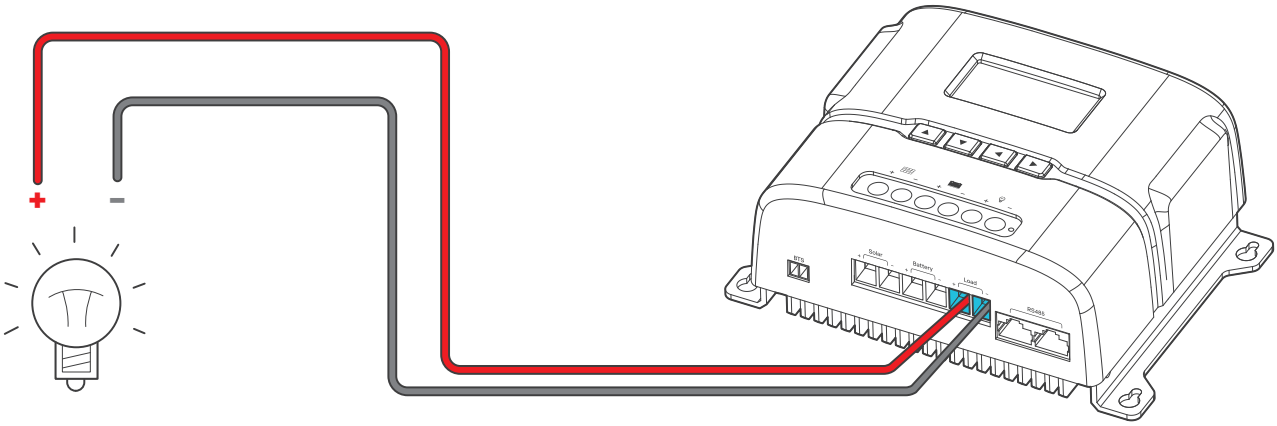
Recommended Accessories



Bare Wires × 2

Cable Length (ft) / (m)	Cable Gauge Size
0 – 13 ft / 0 – 4 m	14 AWG / 2.08 mm^2
13 – 18 ft / 4 – 5.5 m	12 AWG / 3.33 mm^2
18 – 23 ft / 5.5 – 7 m	12 AWG / 3.33 mm^2
23 – 28 ft / 7 – 8.5 m	10 AWG / 5.26 mm^2
28–40 ft / 8.5–12 m	10 AWG / 5.26 mm^2

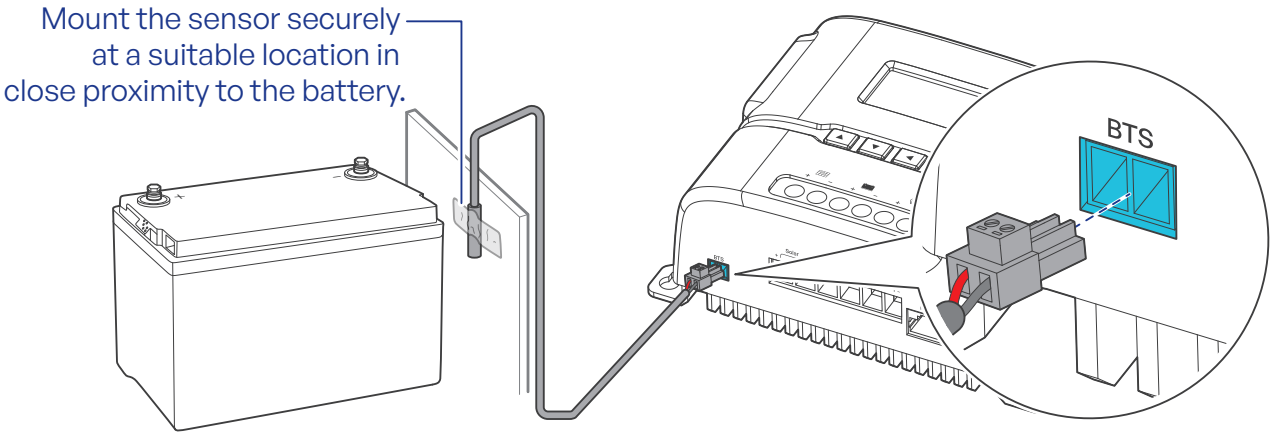
- DC load operating current needs to be less than or equal to 20A.
- Select appropriate cables based on the DC load operating current.
- The output voltage of the Load Terminals of the charge controller depends on the battery voltage. Make sure that the DC load you are installing matches the battery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



4.6. Install a Battery Temperature Sensor

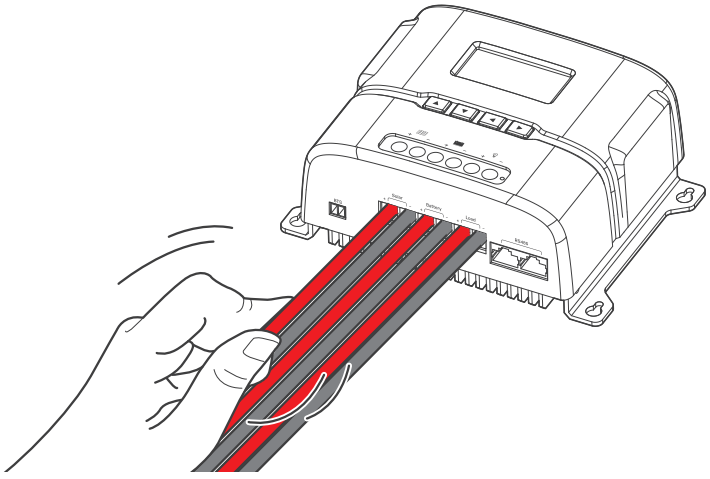
The temperature sensor measures the surrounding temperature of the battery and compensates the floating charge voltage when the battery temperature is low.

> The battery temperature sensor cable can only be used with lead-acid batteries. Do not use the temperature sensor on a LiFePO4 (LFP) battery which comes with a battery management system (BMS).



4.7. 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.



5. Parallel Connection of Charger Controllers

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

- All charge controllers must be of the same model.
- 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 RJ45 ethernet cables
- Parallel Mode is enabled on any of the charge controllers

Charging power increases with more charge controllers. You can connect up to 25 in parallel in one system. Total charging capacity depends on how many controllers are connected.

> Connecting more than 16 charge controllers in parallel will significantly reduce system efficiency; therefore, it is recommended to limit the parallel count to 16 or fewer.

You must ensure that the maximum total output current of the charge controllers connected in parallel does not exceed the battery's continuous charging current. The calculation is as follows:

Maximum output current of a single charge controller × Number of charge controllers = Maximum total output current of the parallel-connected charge controllers

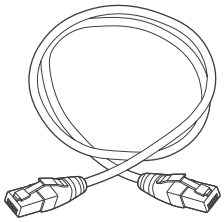
The maximum total output current of the parallel-connected charge controllers must be less than the battery's continuous charging current.

Example with two 20A charge controllers:

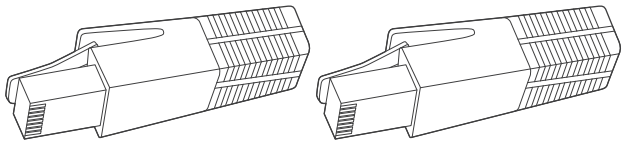
20A × 2 = 40A. The 40A must be less than the battery's continuous charging current.

5.1. Parallel Installation

Recommended Accessories



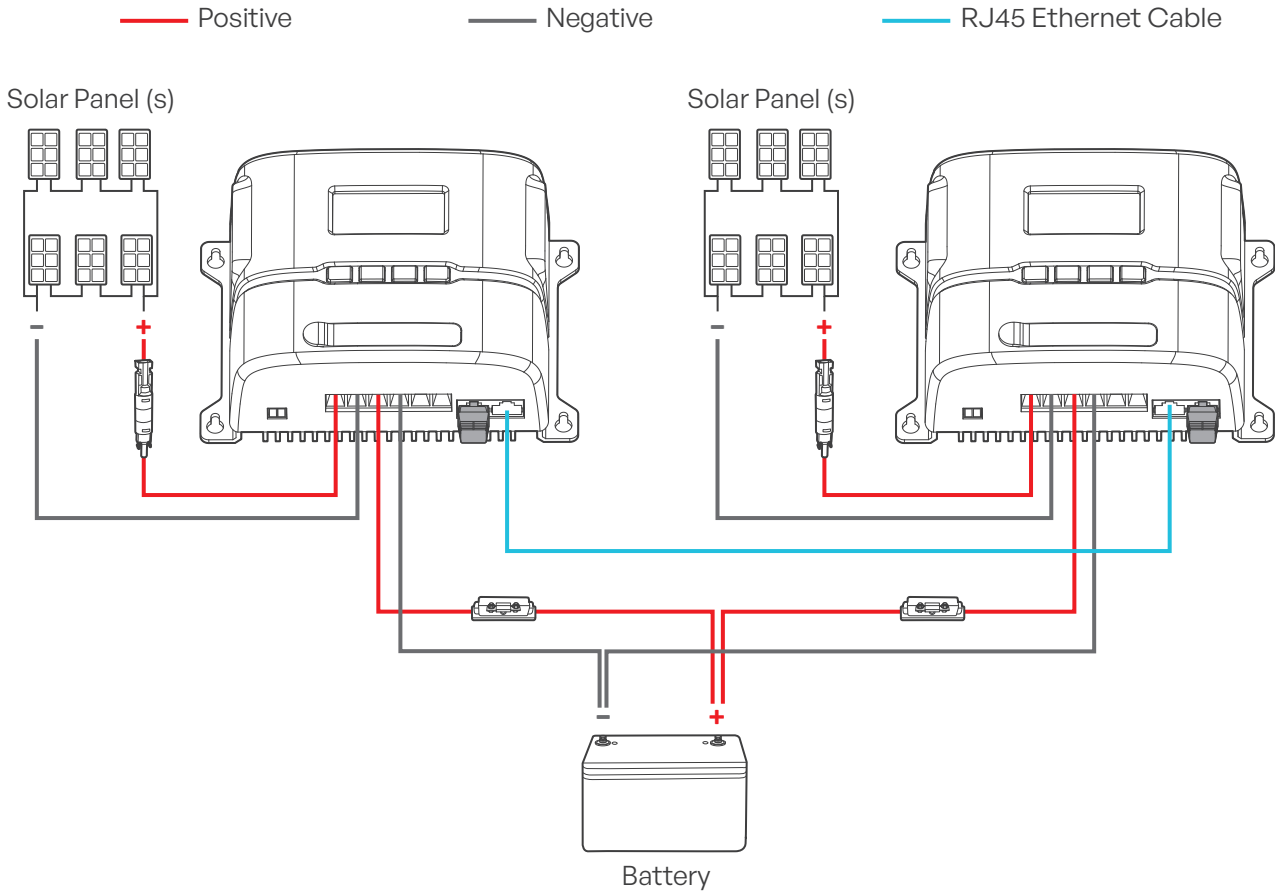
RJ45 Ethernet Cable
(CAT5 or above)



8-Pin RJ45 Connector Termination Resistor × 2
(SKU: RCA1TP-R45-G1) (Available at Renogy official stores)

Charge controllers communicate with each other via RJ45 Ethernet Cables.

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 RS485 Ports. Insert an 8-pin RJ45 connector termination resistor into the unused RS485 ports on both ends of the charge controller.



The diagram is based on a scenario with two charge controllers. Similar rules apply to scenarios with more charge controllers.

5.2. Set Parallel Mode

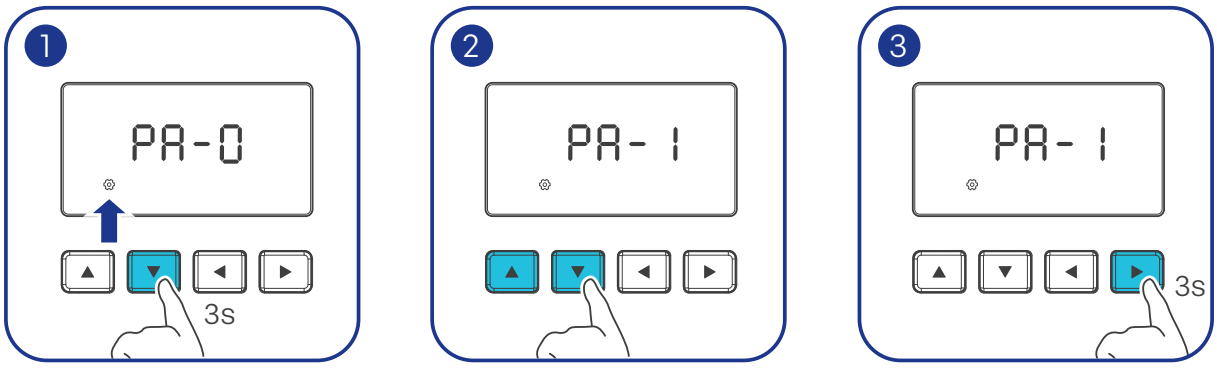
Before configuring the parallel mode, ensure all charge controllers are installed correctly.

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.

Step 1: Press the Up or Down button to navigate to the Parallel Machine Switch page. Press and hold the Right button for 3 seconds until the "Settings" icon illuminates.

Step 2: Press the Up or Down button to enable or disable parallel mode. 0 indicates disabled, 1 indicates enabled.

Step 3: Press and hold the Right button for 3 seconds to save the settings.



Step 4: Each charge controller in parallel must be configured according to steps 1 through 3.

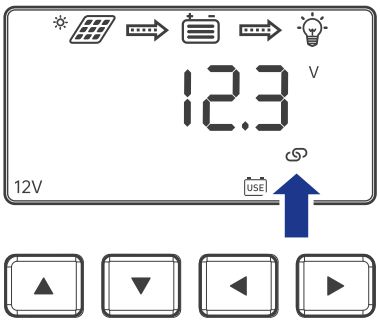
Step 5: Once paralleled, setting parameters on any one charge controller will automatically sync to the rest, with no repeated actions required.

Note: The parallel icon on the LCD means paralleling is successful. But note that the icon appears only on slave units, not on the master.

Master unit



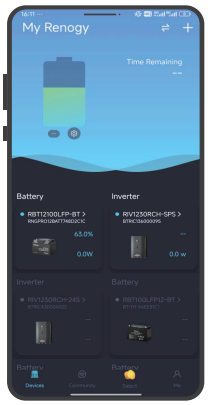
Slave unit



Under normal circumstances, parallel communication between charge controllers takes approximately 10 seconds. However, as the number of charge controllers increases, the time required will also increase, typically not exceeding 2 minutes. If the parallel connection fails, try disconnecting the input power from all charge controllers and then reapplying power. If the issue persists, please contact Renogy after-sales support.

6. Monitor

Download the Renogy app. Login to the app with your account.



Renogy App

GET IT ON Google Play

Download on the App Store

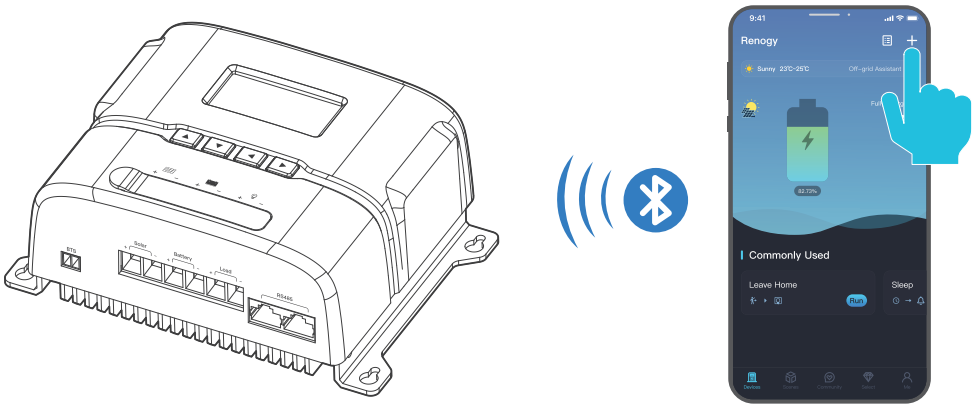
The version of the Renogy app might have been updated. Illustrations in the user manual are for reference only. Follow the instructions based on the current app version.

To ensure optimal system performance, keep the phone or Renogy ONE Core within 10 feet (3 m) of the charge controller.

You can receive fault alarms on Renogy app when the charge controller is faulty. Please login to the Renogy app for troubleshooting details.

6.1. Short-Range Monitoring via Renogy App

Pair the charge controller with the Renogy app. Monitor and modify the parameters of the charge controller via the app.



6.2. Wireless Long-Range Monitoring



Renogy ONE Core
(Available at Renogy official stores)

7. Operation

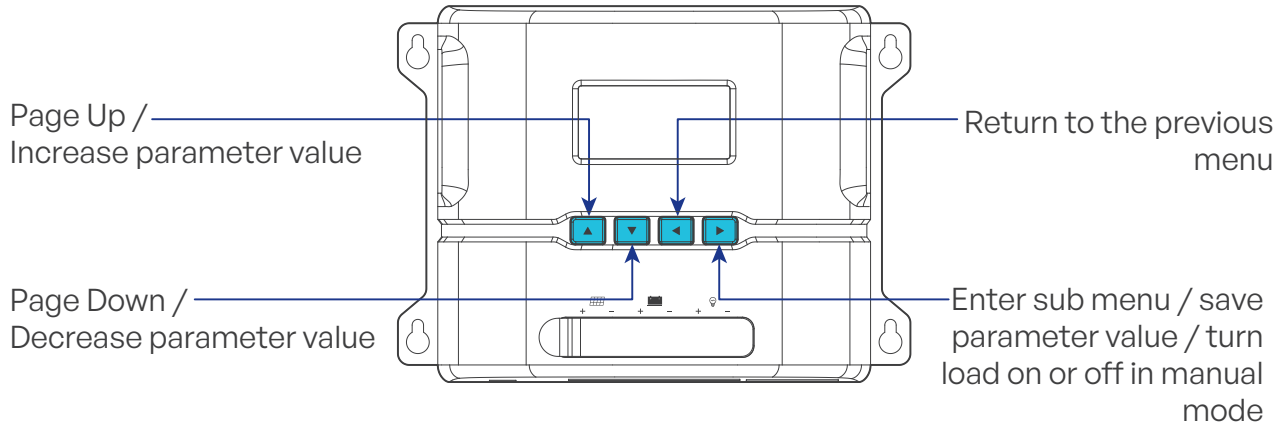
7.1. Power On/Off

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.

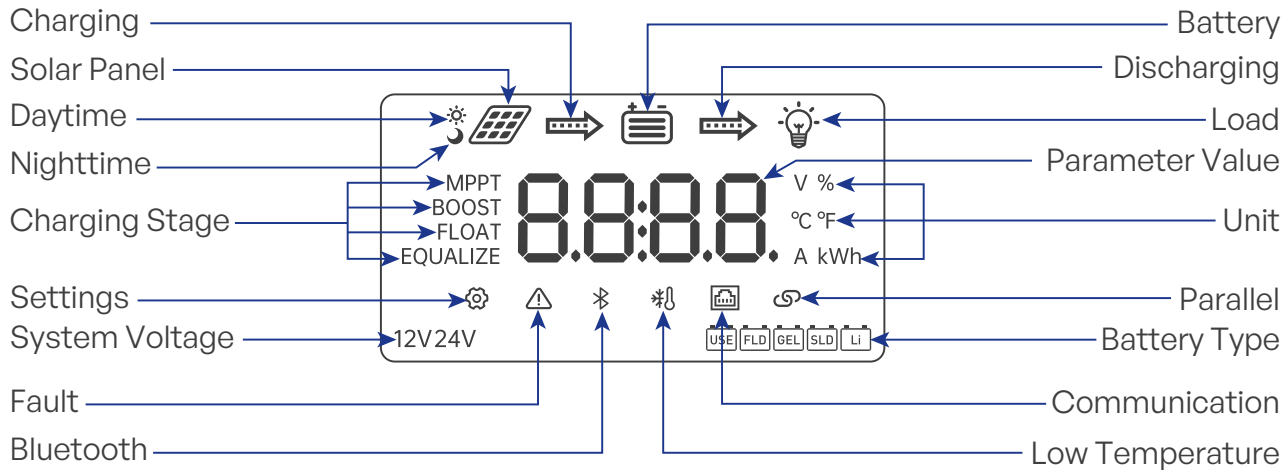
7.2. Buttons and Screen

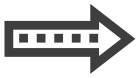
Charge controller is equipped with an LCD and 4 buttons.

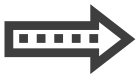
Buttons



LCD



Icon	Parameter	Description
	Daytime Mode	The voltage of the solar panel is greater than or equal to 15V.
	Nighttime Mode	The voltage of the solar panel is less than 15V.
	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.

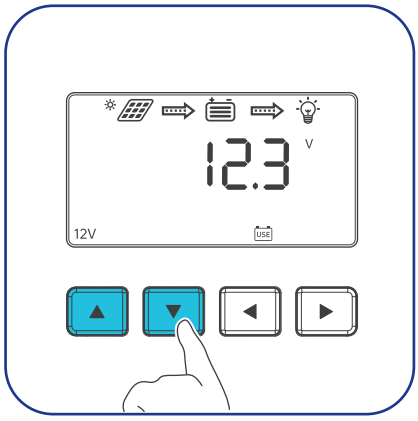
Icon	Parameter	Description	
	Discharging (The arrow between the battery and the load)	Dynamic: The charge controller is powering the load.	
		Static: The charge controller is not powering the load.	
	Battery	Indicates four levels of the battery power (based on the battery voltage):	
			0 - 24%
			25 - 49%
			50 - 74%
			75 - 100%
	Load	The load is powered off or the charge controller is not charging the load.	
		The load is powered on.	
MPPT BOOST FLOAT EQUALIZE	Charging Status	MPPT: The charge controller charges the battery with all the energy from the solar panel.	
		BOOST: When the battery is charged to the set point of the constant voltage, the charge controller will operate in the constant charging mode. The charging current gradually decreases.	
		FLOAT: The charge controller charges the battery with a small current to prevent the battery from self-discharging.	
		EQUALIZE: The charge controller charges the battery at a level higher than the voltage that it is typically charged to remove sulfate crystals that build up on the plates over time and balance the voltage of each cell. Periodic equalization charging is beneficial to certain types of batteries because it helps ensure the battery capacity and maintain its runtime.	
	Value / Unit		Parameter value.
		V % ℃ ℉ A kWh	Parameter unit.

Icon	Parameter	Description	
12V 24V	System Voltage	For non-lithium batteries, the charge controller automatically identifies the voltage (12V or 24V). For lithium batteries, you need to set the voltage in the charge controller manually.	
		12V	The system voltage is 12V.
		24V	The system voltage is 24V.
	Setting	Lights up when setting parameters.	
	Fault	When the charge controller fault, it lights up. Check the error code on the LCD.	
	Bluetooth	Lights up after successful bluetooth connection.	
	Low Temperature	This feature is disabled by default and can be enabled via the Renogy app. Note that a battery temperature sensor must be installed for this feature to work; otherwise, it will not function. When the temperature measured by the battery temperature sensor drops below the preset low threshold, the charge controller will immediately stop charging the battery.	
	Communication	Used by the manufacturer for testing. It lights up for a short time when the charge controller is powered on.	
	Parallel	After parallel connection is successfully established, the Parallel icon on the slave unit illuminates, while the master unit's icon does not.	
	Battery Type	USE	User-defined battery
		FLD	Flooded battery
		GEL	Gel battery
		SLD	Sealed lead-acid battery
		Li	Lithium battery

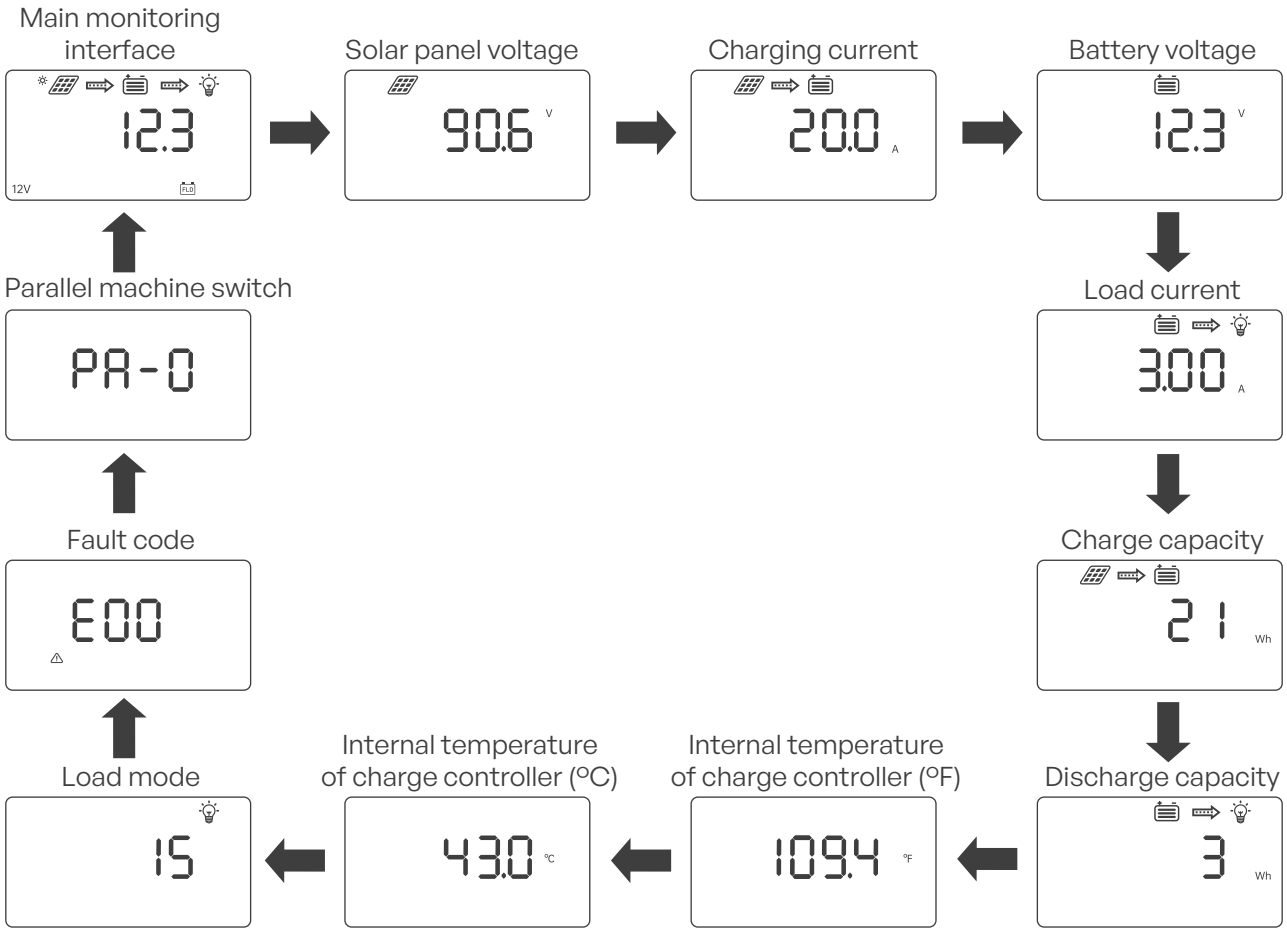
7.3. Checking Parameters

You can check the parameters through the charge controller's LCD or the Renogy app.

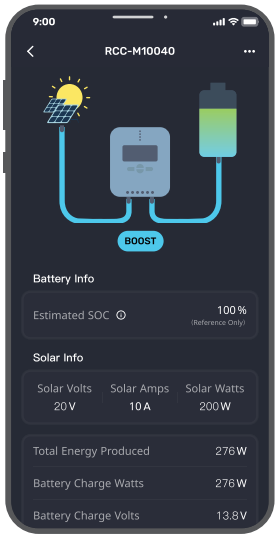
Checking via the Charge Controller



Press Up or Down button to check parameters.



Checking via the Renogy App



7.4. Battery Type

After the charge controller is properly installed and powered on, please ensure the battery type is set correctly (factory default is FLD). An incorrect battery type setting may damage the controller, and any damage resulting from such incorrect settings will not be covered under warranty.

Setting the battery type to USE mode allows you to customize your battery parameters. You can modify the parameters in the Renogy app.

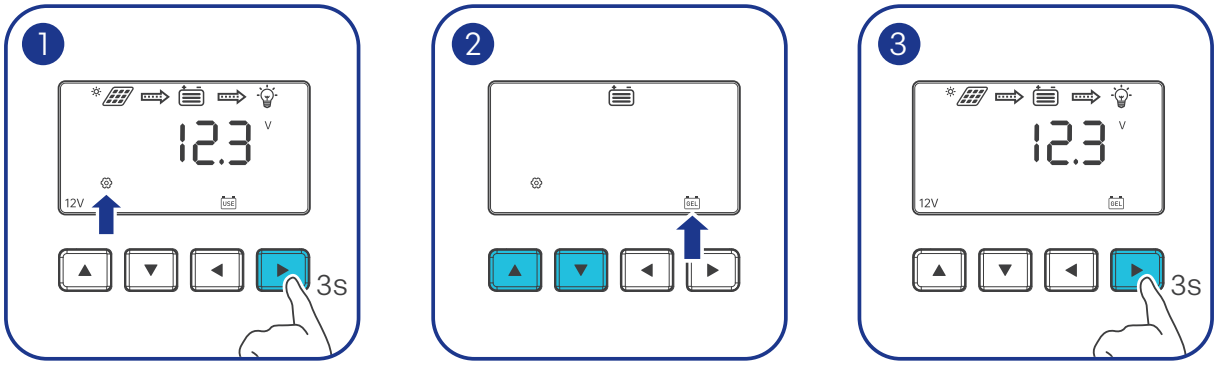
You may set the battery type through the charge controller's LCD and buttons, or via the Renogy app.

Setting via the Charge Controller

1. Press and hold the right button in the main interface for about 3 seconds until “Settings” icon is lit up and the battery type icon starts flashing.

2. Click the Up or Down button to select the desired battery type.

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



Setting via the Renogy App



7.5. System Voltage

Charge controller is very simple to use. For common AGM/SLD/GEL/FLD lead-acid batteries, charge controller can automatically adapt its 12V/24V rated voltage.

If the battery is Li battery, please set the system voltage manually. You may set the system voltage through the charge controller's LCD and buttons, or via the Renogy app.

Setting via the Charge Controller

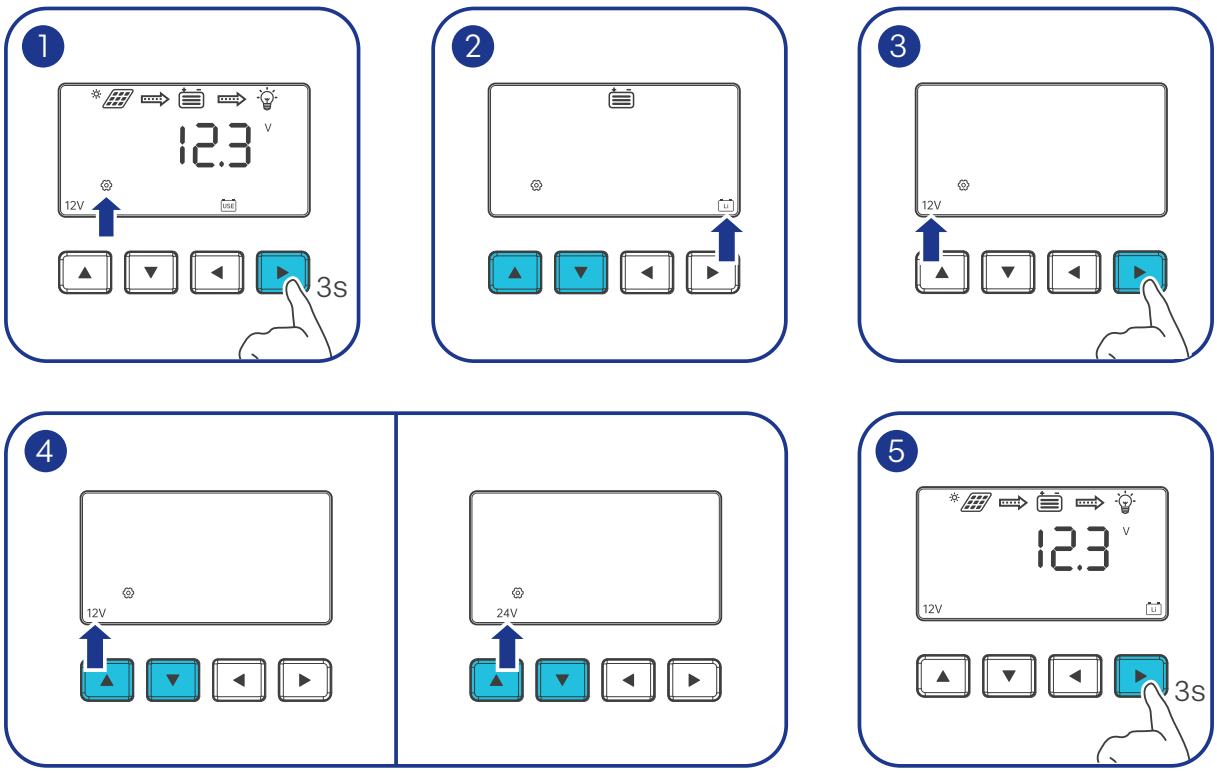
1. Press and hold the right button in the main interface for 3 seconds until "Settings" icon is lit up and the battery type icon starts flashing.

2. Click the Up or Down button to select “Li”.

3. Click the right button to enter the system voltage setting interface.

4. Based on the usage, click the Up or Down button to select 12V or 24V system voltage.

5. After the system voltage has been selected, press and hold the right button for about 3 seconds to save successfully.



Setting via the Renogy App



7.6. User 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.

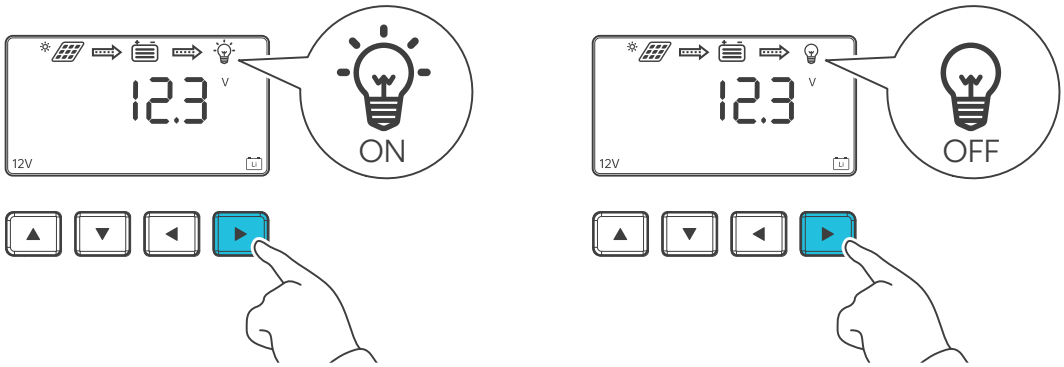
Parameters	Description
Overvoltage Shutdown	The default protection voltage is 16V (For 24V systems, multiply by 2). Improper setting may affect safe use of the battery. Please consult the battery manufacturer and check if this voltage value needs to be modified.
Boost Voltage	This value affects whether the battery can be fully charged. Please consult the battery manufacturer and set the value properly.
Float Voltage	This value affects whether the battery can be fully charged. Please consult the battery manufacturer and set the value properly.
Equalization Voltage	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	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	Please consult the battery manufacturer if it is necessary to set these values.
Equalization Duration	
Equalization Interval	

You can modify the parameters in the Renogy app.



7.7. Turning Load on/off

If a DC load is connected, you can switch the load on/off by short pressing the right button.



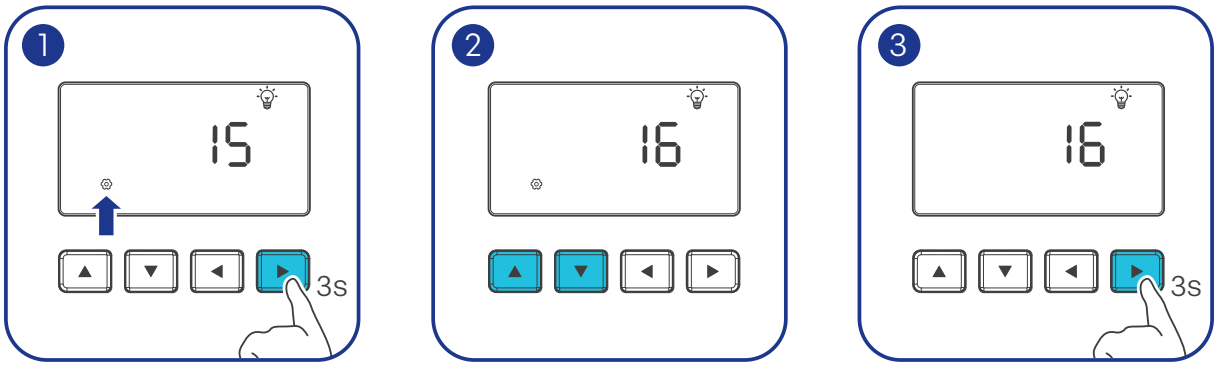
You may set the load on/off method through the charge controller's LCD and buttons, or via the Renogy app.

Setting via the Charge Controller

Step 1: Press the Up or Down button to navigate to the Load Mode page. Press and hold the Right button for 3 seconds until the "Settings" icon illuminates.

Step 2: Press the Up or Down button to switch modes.

Step 3: Press and hold the Right button for 3 seconds to save the settings.



The meanings of the different values are listed in the following table.

Value	Mode	Description
0	Automatic mode	When the charge controller enters night mode (solar panel voltage remains below 15V for 5 minutes), it will automatically use the battery to power the load until it enters day mode (solar panel voltage reaches 15V) and stops supplying power to the load. During the power supply process, if the battery triggers an undervoltage warning, the charge controller will stop using the battery to power the load.
1–14	Timing mode	Setting Range: 1 to 14 hours. When the charge controller enters night mode (solar panel voltage remains below 15V for 5 minutes), it will automatically use the battery to power the load for 1 to 14 hours, until the set time is reached or the charge controller enters day mode (solar panel voltage reaches 15V) and stops supplying power to the load. During the power supply process, if the battery triggers an undervoltage warning, the charge controller will stop using the battery to power the load.
15	Manual mode	Factory default mode Press Right button to turn the on / off the load.
16	No delay mode	When the solar panel voltage is less than 15V, the charge controller immediately supplies power to the load. The charge controller will automatically stop supplying power to the load until the solar panel voltage is greater than or equal to 15V or the battery triggers the undervoltage warning.
17	24-hour mode	The charge controller keeps supplying power to the load until the battery triggers the undervoltage warning.

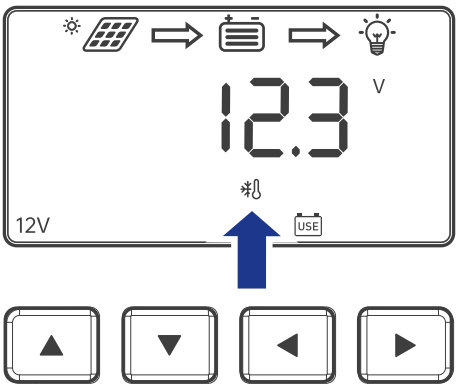
Setting via the Renogy App



7.8. Low-Temperature Charge Inhibit Function

Once the battery temperature sensor is installed on the charge controller, the controller monitors the battery temperature. If the temperature falls below the set low threshold, the low-temperature charge inhibit function is automatically triggered, and charging is stopped. At the same time, the Low Temperature icon on the LCD illuminates.

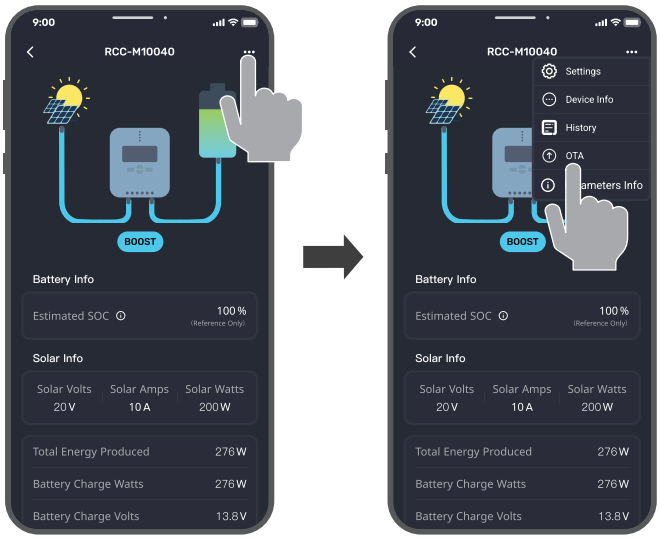
$LiFePO_4$ (LFP) batteries equipped with a Battery Management System (BMS) have built-in low-temperature protection and therefore do not require enabling this function.



Battery Type	Battery Temperature	
	Trigger	Recovery
Lithium battery	≤ 28.4°F / -2°C	≥ 39.2°F / 4°C
Non-lithium battery	≤ -32.8°F / -36°C	≥ -20.2°F / -29°C

7.9. OTA Update

OTA upgrades are available via the Renogy app..



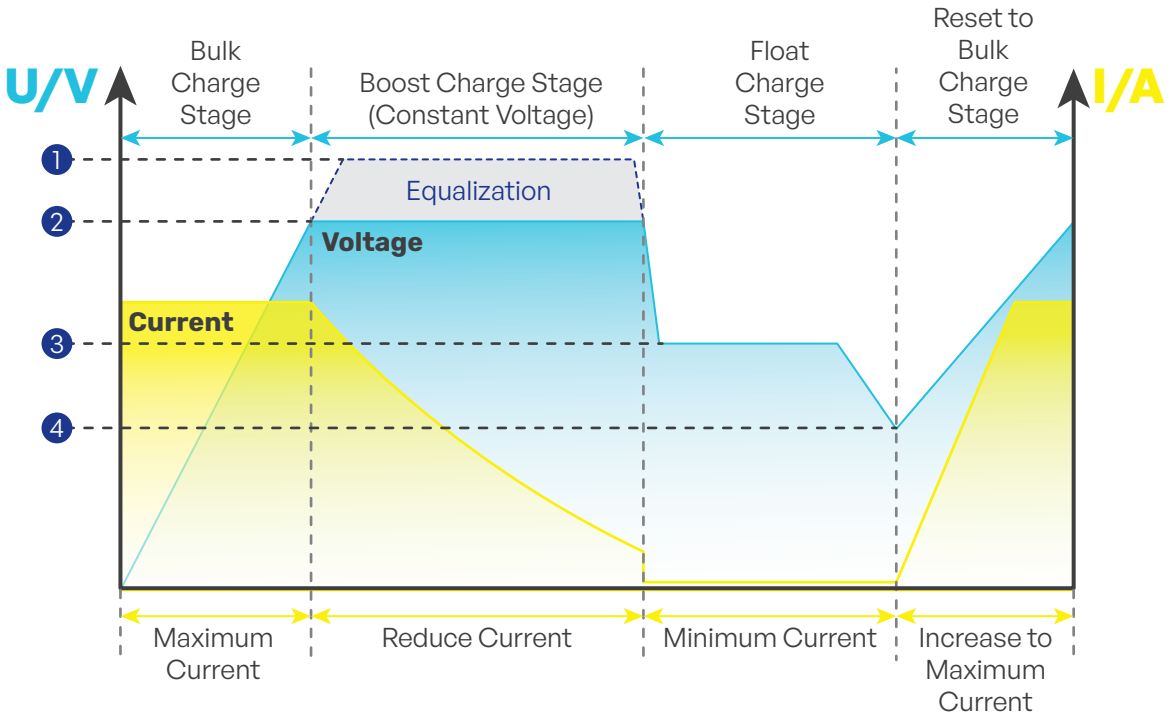
While the upgrade is in progress, the charge controller LCD will show "OtA" in sync



8. Working Logic

8.1. Adaptive Four-Stage Charging

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.

8.2. Battery Charging Parameters

The parameters listed in the table above apply to 12V batteries. For the 24V batteries, double the number of the parameters.

Parameters in square brackets ([ ]) are automatically adjusted according to the relevant settings, and cannot be set directly.

* By default, Boost Voltage and Overvoltage Shutdown values are set to 14.4V and 16.0V respectively for lithium batteries. Manual modification on Boost Voltage for lithium batteries may trigger Overvoltage Shutdown alarms. Therefore, the Rover Li charge controller automatically sets the Overvoltage Shutdown parameter to a value of Boost Voltage plus 2 to ensure normal battery charging.

For the default values of User Mode, refer to the Renogy App.

Battery Type / Parameters	AGM / SLD	Gel	Flooded	Li (LFP)	USE Mode	User Recommended
Overvoltage Shutdown	16.0V	16.0V	16.0V	16.0V*	[16.0V]	—
Equalization Volatge	—	14.6V	14.8V	—	14.4V	9.0-17.0V
Boost Voltage	14.4V	14.2V	14.6V	14.4V*	14.4V	9.0-17.0V
Float Voltage	13.8V	13.8V	13.8V	—	14.4V	9.0-17.0V
Boost Return Voltage	14.1V	13.9V	14.3V	14.1V*	14.1V	—
Undervoltage Warning	12.0V	12.0V	12.0V	12.0V	[12.0V]	—
Undervoltage Return	12.2V	12.2V	12.2V	12.2V	12.2V	9.0-17.0V
Low Voltage Disconnect	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	—	2 hours	2 hours	—	[0-300 min]	—
Boost Duration	2 hours	2 hours	2 hours	—	0-300 min	10-300 min

8.3. Activate Lithium Batteries

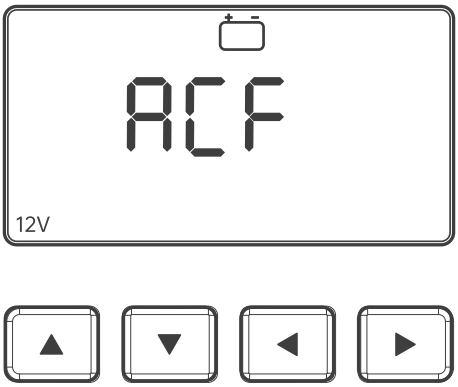
The charge controller can activate connected lithium batteries. Lithium batteries may enter sleep mode when the in-built protection is triggered. In such case, the charge controller provides a small current to reactivate the sleeping lithium battery. The lithium battery can be charged normally after successful activation.

The lithium battery activation feature can be enabled or disabled via the Renogy app.

Note: Before enabling this feature, the battery type must be set to LI



When the charge controller begins activating the lithium battery, the LCD screen will display "ACF".

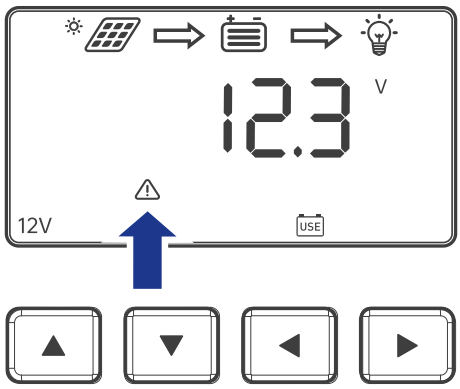


9. Troubleshooting

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

9.1. Fault Code / Information

When a fault occurs with the charge controller, the fault code can be viewed on the LCD, or fault information can be checked via the Renogy app.



Checking via the Charge Controller

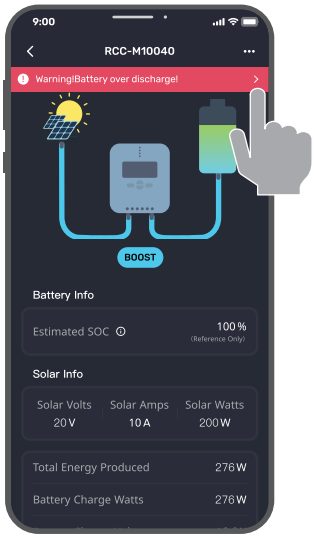
Press the Up or Down button to navigate to the Fault Code page.



Fault Code	Fault Message	Possible Causes	Solutions
E00	Normal operation – no protection triggered	N/A	No action required. The charge controller is functioning properly.
E01	Battery over-discharge protection	Battery voltage has dropped below the Low Voltage Disconnect set point.	Turn off or disconnect all loads connected to the battery, and recharge the battery immediately.
E02	Battery overvoltage protection	Battery voltage exceeds the overvoltage limit (12V system >16V; 24V system >32V).	1. If the battery type is set to LI or USE, manually select the correct system voltage. 2. Stop charging and allow the battery voltage to settle. 3. Measure the battery voltage with a multimeter. If the voltage remains abnormally high, check the battery health or replace it.

Fault Code	Fault Message	Possible Causes	Solutions
E04	Load short-circuit protection	A short circuit has occurred on the load output terminals.	Follow the troubleshooting steps below: 1. Turn off the load. Inspect all load wiring for damage or short circuits. Repair or replace faulty cables. 2. Check the load for any visible damage. 3. Disconnect the battery from the charge controller to restart the controller.
E05	Load overload protection	Load power exceeds the controller's rated load output capacity (maximum 20A).	Reduce the total load current to 20A or less. Disconnect non-essential loads and ensure the load does not exceed the rated output.
E06	Charge controller internal over-temperature protection	Internal temperature exceeds 185°F / 85°C and charging is disabled; resumes below 167°F / 75°C. Note: Power-limiting mode engages above 154°F / 68°C and recovers below 153°F / 67°C.	1. Improve ventilation around the charge controller and move it to a cooler location. 2. Ensure the heatsink is not obstructed and that the ambient temperature remains within -22°F / -30°C to 149°F / 65°C. The optimal ambient temperature range is -22°F / -30°C to 113°F / 45°C.
E07	High ambient temperature protection (BTS sensor connected)	The attached Battery Temperature Sensor (BTS) detects an ambient temperature exceeding 149°F / 65°C and charging is disabled; resumes below 140°F / 60°C. Note: Power-limiting mode engages above 113°F / 45°C and recovers below 113°F / 45°C.	1. Verify that the sensor is correctly positioned and not exposed to direct heat sources. 2. Lower the ambient temperature and increase airflow around the sensor and controller. Maintain the ambient temperature within -22°F / -30°C to 149°F / 65°C. The optimal ambient temperature range is -22°F / -30°C to 113°F / 45°C.
E10	Solar panel overvoltage protection	Solar panel open-circuit voltage exceeds 100V.	1. Check the solar panel array configuration. Reduce the number of series-connected panels to lower the voltage. 2. Ensure the total solar panel open-circuit voltage does not exceed 100V.
E13	Solar panel reverse polarity protection	The charge controller's input terminals are connected with reversed polarity.	Disconnect the solar panels and reconnect with correct polarity (positive to positive, negative to negative).
E14	Battery reverse polarity protection	The charge controller's output terminals are connected with reversed polarity.	Disconnect the battery and reconnect with correct polarity (positive to positive, negative to negative).

Checking via the Renogy app



9.2. Common Faults

Fault Phenomenon	Troubleshooting
The solar panel is connected, but it is not working.	Follow the troubleshooting steps below: 1. If the solar panel voltage is too low at night, check it again during the day. 2. Make sure the solar panel's light-receiving surface is not shaded. 3. Ensure the solar panel voltage is higher than the battery voltage. Otherwise, the solar panel cannot charge the battery. 4. Inspect the solar panel for any visible damage and make sure it works properly. 5. Check the wiring for any damage, loose connections, short circuits, or reverse polarity, and ensure the wiring is normal. 6. Check the solar panel fuse for any damage.
The battery is connected, but the charge controller's LCD does not light up.	Follow the steps below: 1. Measure the battery voltage with a multimeter. If the voltage is below 8V, the charge controller cannot detect the battery; charge the battery first. 2. Inspect the battery for any visible damage and ensure it works properly. If there is any visible damage, replace the battery with a new one. 3. Check the wiring for any damage, loose connections, short circuits, or reverse polarity, and ensure the wiring is normal. 4. Check the battery fuse for any damage.

Fault Phenomenon	Troubleshooting
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 decrease until the battery is fully charged. 2. Make sure the solar panel's light-receiving surface is not shaded. 3. Check whether the sunlight intensity is sufficient. 4. If the charge controller temperature is too high, an error code may not be displayed. Turn off the charge controller and restart it after the temperature drops to a normal level. 5. An excessively long cable between the solar panel and the charge controller can cause voltage drop.
The lithium battery activation time exceeds 1 to 2 days.	1. Check the wiring for any damage, loose connections, short circuits, or reverse polarity, and ensure the wiring is normal. 2. The battery nominal voltage does not match the charge controller system voltage. Reset the charge controller system voltage according to the battery nominal voltage. 3. The battery discharging rate is faster than the charging rate. Turn off or disconnect the battery load to prevent the battery from triggering BMS protection due to low voltage. Once the lithium battery voltage is restored, the battery will automatically exit the activation mode and work normally.
The load cannot be powered on after connection.	1. Check the wiring for any damage, loose connections, short circuits, or reverse polarity, and ensure the wiring is normal. 2. Make sure the load works properly. If the load is damaged, replace it with a new one. 3. Check the battery voltage. If the battery voltage is too low, protection will be automatically triggered and power supply will be cut off. Charge the battery immediately.

10. Technical Specifications

Model	RCC-M10020-C2	RCC-M10030-C2	RCC-M10040-C2	RCC-M10050-C2
Nominal System Voltage	12V / 24V (Non-lithium: auto-detection; Lithium: manual setting)			
Rated Charging Current	20A	30A	40A	50A
Maximum Solar Input Power	300W @12V; 600W @24V	450W @12V; 900W @24V	600W @12V; 1200W @24V	750W @12V; 1500W @24V
Solar Input Voltage Range	15 to 100 Voc			
Battery Input Voltage Range	8V to 32V			
Supported Battery Types	GEL / SLD / FLD / Li / User			
MPPT Tracking Efficiency	≥ 99%			
Max Charge Conversion Efficiency	97%			
Temperature Compensation Coefficient	-3mV/2V/°C			
Standby Power Consumption	30mA @ 12V; 20mA @ 24V			
Communication	Bluetooth & RS-485			
Terminal Size	6 AWG (Max)			
Rated Load Output Current	20A			
Cooling Method	Natural convection			
Operating Temperature	-22°F to 149°F /-30°C to 65°C (Power reduction above 113°F / 45°C)			
Storage Temperature	-31°F to 167°F / -35°C to 75°C			
Humidity	0 to 95%, non-condensing			
Ingress Protection	IP32			
Altitude	≤ 9843 ft / ≤ 3000m			
Dimensions (W×H×D)	6.38 × 4.25 × 2.24 in / 162 × 108 × 57 mm	6.38 × 4.25 × 2.44 in / 162 × 108 × 62 mm	7.09 × 5.20 × 2.80 in / 180 × 132 × 71 mm	7.09 × 5.20 × 3.19 in / 180 × 132 × 81 mm
Weight	1.06 lbs / 0.48 kg	1.54 lbs / 0.7 kg	2.20 lbs / 1 kg	2.65 lbs / 1.2 kg
Protection Functions	Solar: overvoltage / reverse polarity Battery: overvoltage / undervoltage / reverse polarity / short-circuit Controller: overcurrent / overtemperature / anti-reverse charging			
Warranty	2 years			
Certifications	RCM, FCC, CE, UKCA, ICID, RoHS, Reach, TSCA/CA65, TELEC, RF, R10			

11. Maintenance

11.1. 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.
- 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.

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.

11.2. Cleaning

Follow the steps below to clean the charge controller regularly.

- Wear proper protective equipment and use insulated tools during operation.
- Disconnect all cables connected to the charge controller.
- 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.
- 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.

11.3. Storage

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

- Disconnect the solar panel cables first, then disconnect the battery cables. When disconnecting any device, always remove the positive terminal first, followed by the negative terminal.
- 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).

12. 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.

12.1. Fire

1. Disconnect all cables connected to the charge controller.
2. In the event of a fire, use a fire extinguisher suitable for electrical equipment, such as a FM-200, CO_2, or dry powder extinguisher. A fire blanket or sand can also be used to extinguish the fire. If a suitable fire extinguisher is not available, evacuate immediately and contact the fire department.

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

12.2. Flooding

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

12.3. Smell

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

12.4. Noise

1. Disconnect all cables connected to the charge controller.
2. Ensure that the terminals of the charge controller are free of foreign objects.

Renogy Support

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

support@renogy.com

1(909)2877111

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

contentservice@renogy.com

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

renogy.com/learning-center

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
Spain | es.renogy.com	France | fr.renogy.com
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Join Our Facebook Community Today. Scan the QR code to connect with like-minded people and Renogy engineers. You will get:

- Priority access to our latest launches & special events
- Insider Q&A sessions with our engineers
- Endless solar project ideas & sources

Warranty Statement

For full warranty terms and conditions, visit the warranty page of the RENOGY website at https://www.renogy.com/warranty.

Australia

RNG AU PTY LTD

3/11 David St, Dandenong VIC 3175

Tel: 1800 560 588

North America and Other Countries

RNG International Inc.

5050 S Archibald Ave, Ontario, CA 91762, USA

Tel: +1 (909) 287 7111

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 1 kW 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

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

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