



Coachmen Cross Trail User Guide

V1 11-11-22

The Coachmen Cross Trail Ford Transit is equipped with Renogy REGO System which includes the 12.8V/400AH Lithium battery (2nd battery optional), 12V/60A DC-DC Bi-Directional battery charger from alternator, 3000W Inverter Charger, and a 190W solar panel. The instructions will lay out the components and how to operate and maintain them.

Must Read Before Operating

- These instructions are for reference only, please refer to the individual product manuals for detailed instructions and data.
- Do not modify or alter the components in any way
- If issues exist, please refer to the individual product instruction manuals for more detail.
- For technical assistance please call DEHCO Inc, 1-800-621-2278
- For more information, please visit <https://www.renogy.com>

Operating Environment

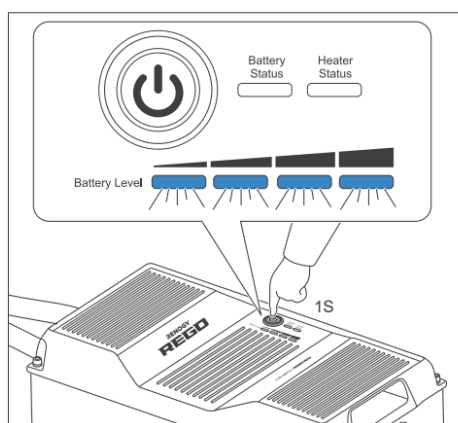
The Renogy Lithium-Ion battery is designed for the following temperatures:

- Charge Temperature Range = -4°F to 122°F or -20°C to 50°C
- Discharge Temperature Range = -4°F to 140°F or -20°C to 60°C
- Storage Temperature Range = -4°F to 113°F or -20°C to 45°C
- Operation Relative Humidity = 5% to 95%

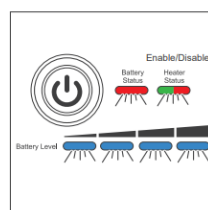
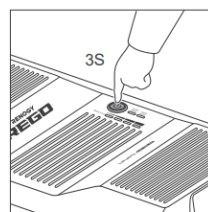
RE-inventing energy on the GO



Turning Battery ON



1. Long press the Power Button for 1 second or charge the battery to turn the battery on. The Battery Level Indicators fast flash blue simultaneously to indicate that the battery is turning on.



Turning Battery OFF For Long Storage

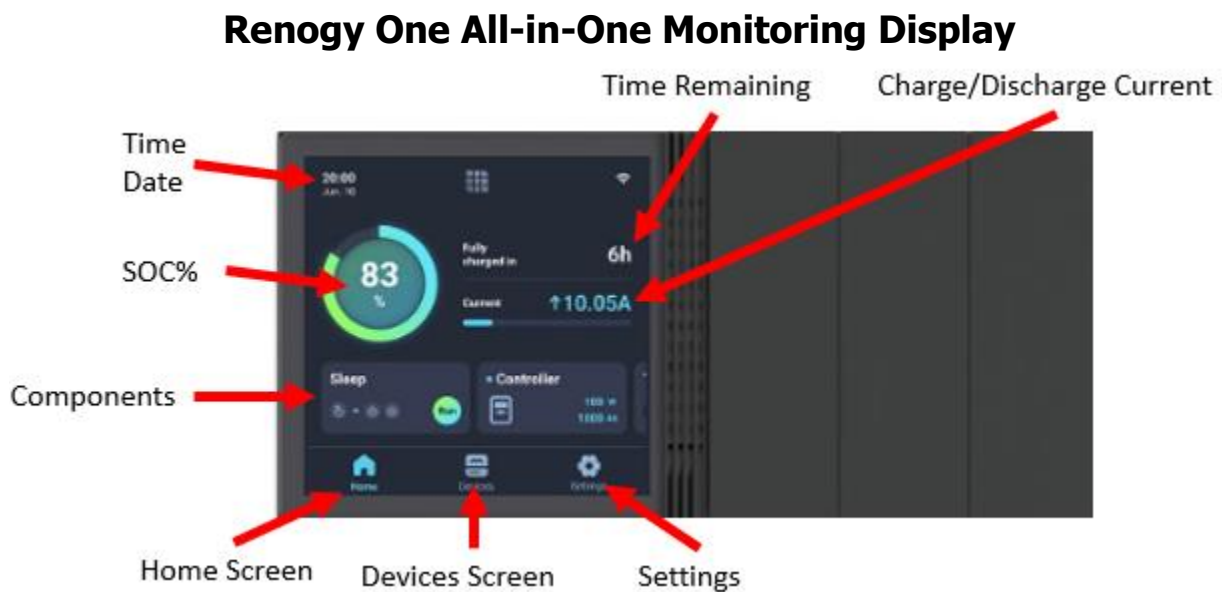
1. Long press the Power Button for 3 seconds.

2. The Battery Level Indicators, Battery Status Indicator, and Heater Status Indicator fast flash simultaneously to indicate that the battery is turning off. The color of the flashing Heater Status Indicator indicates the current heater setting.

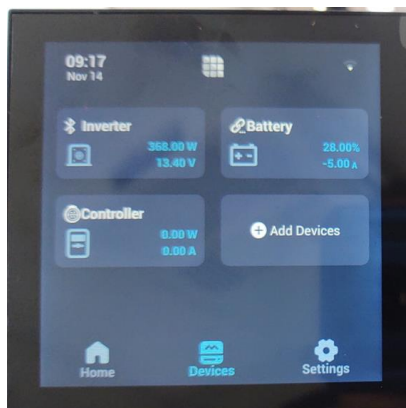
Go to www.renogy.com to view battery manual for full list of warning/protection parameters as well as Troubleshooting tips.

Basic Usage

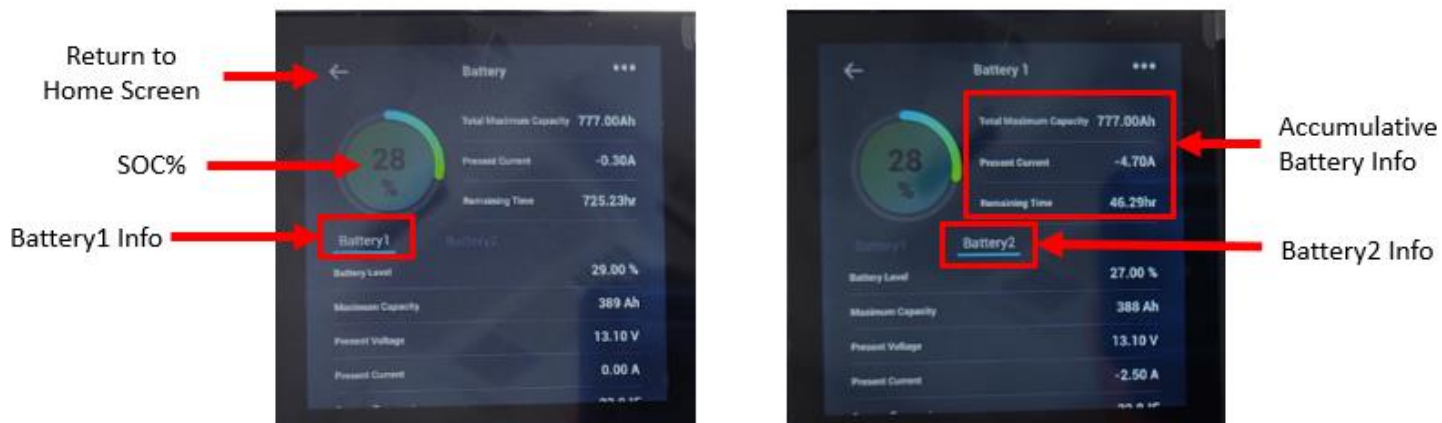
The monitor will display the following items:



If you want to see more information about an individual component, press on the component on the "Home" screen or press "Devices" and select the component you want to view.



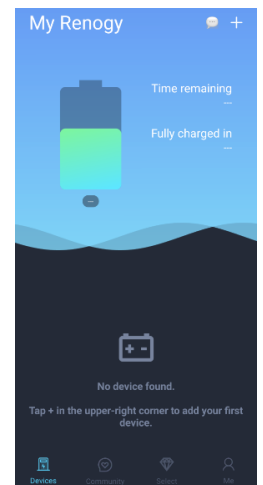
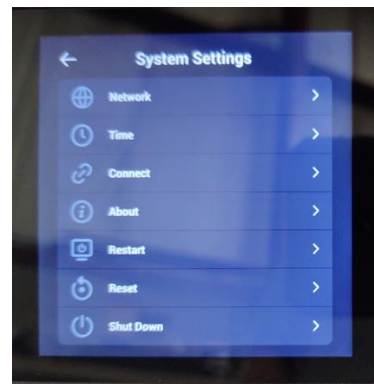
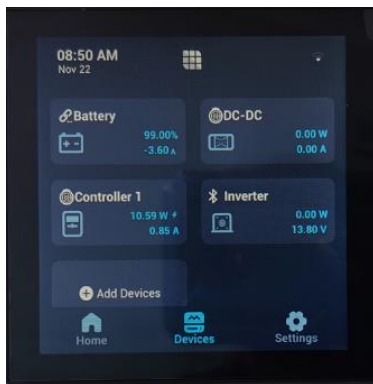
With a 2 battery setup the Renogy One will show both batteries when you select the "Battery" icon. The top information is accumulative data for both batteries and lower section will show information for each battery. It also shows SOC%.



The Renogy One monitor is wired with communication cables to the Battery(s), Charge Controller, and DC-DC Bi-Directional Charger. They will automatically show up on the Renogy One when 12V disconnect is on. Pictures below show communication cables on each component.



The Inverter Charger is displayed on Renogy One via Bluetooth. Here's how to Add Device. Touch "Devices" icon or "Settings" icon and then click on "+ Add Devices". Renogy One will list all components found. Uncheck all components except for the Inverter and click SAVE. System Settings is where you can connect to WiFi, do updates, pair/unpair your mobile device to the Renogy One through the Renogy DC Home App.



The system combiner, batteries, DC-DC Charger, and Charge Controller utilize Anderson connectors to quickly connect/disconnect components.



Getting Started

Turn battery on

Turn on battery disconnect switch

Turn on inverter charger

Make sure breakers are on and enjoy the power from the REGO system

3 ways to charge – Shore Power, Alternator, and Solar

Recovery Process

If batteries are discharged to 10V or higher depending on the load, then the BMS (battery management system) in the battery will shut down battery to prevent it from being over discharged. To turn battery back on, turn off loads and start charging battery by either connecting the RV to an external 120VAC (up to 30A) power source and ensure that the inverter charger power button is pushed in, so the inverter is on. Other option is to start the engine and charge with the DC-DC Bi-Directional Battery Charger via the chassis alternator.

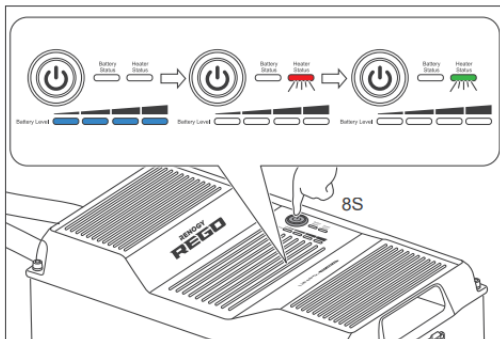
Cold Weather Recovery

Make sure battery heater is activated by steps below

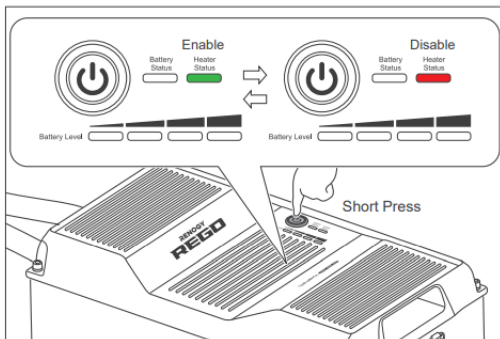
Plug into shore power or start engine to start heating process

Changing Heater Settings

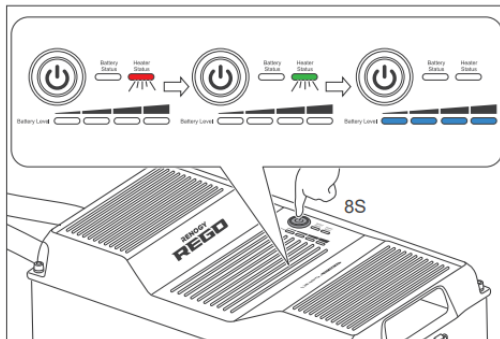
The battery leaves the factory with the heater enabled. The heater can be enabled or disabled with the Power Button.



1. Long press the Power Button for 8 seconds to enter the heater setting mode. The Heater Status Indicator flashes red and green once.



2. Short press the Power Button to enable or disable the heater. The Heater Status Indicator turns green to indicate that the heater is enabled or turns red to indicate that the heater is disabled.



3. Long press the Power Button for 8 seconds to exit the heater setting mode and save the current setting. The Heater Status Indicator flashes red and green once.

Charging

During the standard charging process, the battery is first charged at a constant current of 80A until the battery voltage reaches 14.4V. Then, the battery is charged at a constant voltage of 14.4V while tapering the charge current. The standard charging process is considered complete when the charge current is less than 20A for 10 seconds. However, leaving the battery on float can help balance the cells and does not damage the battery. The standard charging process normally takes 5.5 hours.

WARNING

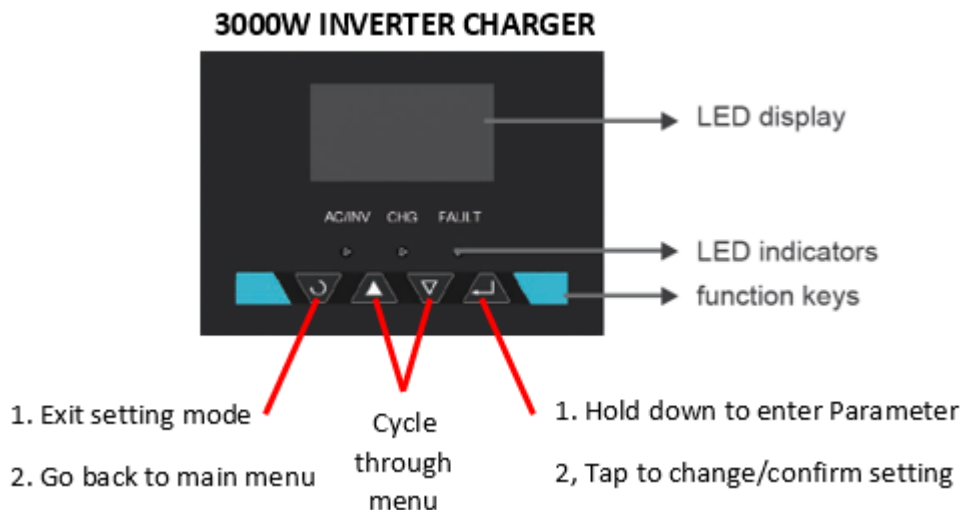
- DO NOT charge the battery at high temperatures above 131°F (55°C) or low temperatures below -4°F (-20°C). If the heater is disabled or unable to operate properly, charging the battery at low temperatures below 32°F (0°C) is NOT recommended.

Electrical Connections

The unit is equipped with a 30A 120VAC “shore power” connection. The 30A connection is always best, however, if a connection of less than 120VAC 30A is going to be used, the inverter/charger charge rate may need to be reduced, refer to “Shore Settings” below.

Shore Settings

The only adjustment needed to the inverter is to change the AC Charging Current. See below on how to change the utility charging current.

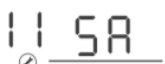


How to change to Lithium Battery type and settings for RBT12400LFPL-SHBT battery

1. Hold down right button until it shows 00
2. Press up/down arrows and go to 05
3. Hold right arrow
4. Press up/down arrow and change to b-0
5. Hold right arrow to make change
6. Set 94 to ALb, set 26 to 14.4V, Set 27 to 13.2V, right arrow to save
7. Press left button to return to main screen
8. To save, turn off inverter and then back on

11 Maximum Utility Charging

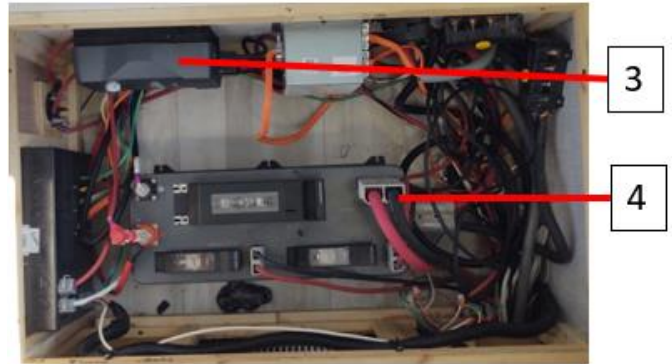
The PCL inverter chargers can operate like battery chargers converting incoming AC power into DC recharging power. The 2000W has a 65A max while the 3000W has a 75A max adjustable battery charging.

11	Maximum utility charging current	 The default is the maximum value (65A-2KW, 75A-3KW), with a 5A minimum.
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How to Change Inverter Charge Current Parameter

1. Hold right back arrow button on Inverter to enter parameter settings
2. Press UP or DOWN and go to Parameter 11 and then press right button
3. Parameter setting will begin to flash, then change the AC Charging Current from 0-75A by intervals of 5A to desired charging current
4. Press Right button to accept change
5. Press Left button to exit setting menu
6. Turn inverter off and then back on with the remote button to save setting

COMPONENT LOCATIONS



1) RIV1230RCL-1SS

12V/3000W Inverter Charger

- 75A AC Charge
- On/Off Remote Switch
- Lithium Battery Activation
- Bluetooth
- Operating Temp (-4°F to 113°F)



3) RCC60REGO

12V/60A MPPT Charge Controller

- 60A Rated Solar Charge Current
- 800W Max Solar PV Input
- 100V Max PV Input Voltage
- Lithium Battery and Heater Activation
- RV-C, ModBus, Bluetooth



2) RBC1260DO-12B

12V/60A Bidirectional DC-DC Battery Charger

- 60A Rated Alternator Charge Current
- 800W Max Solar PV Input
- House battery can charge chassis battery when needed
- Lithium Battery and Heater Activation
- RV-C, ModBus, Bluetooth
- Triggered with Ignition On



4) REC400RSCB-4P

System Combiner

- Anderson connectors to quickly connect or disconnect components
- Central HUB for all REGO component connections
- 355A Fuse for Inverter Charger
- 80A Fuses for Charge Controller and DC-DC Battery Charger
- 12V output terminals





5) RMS-LP4

All-in-One Energy Monitoring

- Monitors Battery, Solar, Inverter and DC-DC charger
- Support multiple communication methods, Bluetooth, WiFi, LoRa, Zigbee, Modbus, RV-C
- Can be linked to mobile device through Renogy DC Home App

6) RIV1230RCL-1SS INVERTER ON/OFF BUTTON

Inverter Charger ON/OFF Remote Switch

- Inverter must be turned on to charge by shore power
- Turn off inverter when not using 120V loads or charging by shore power to save battery %SOC



7) RBT12400LFPL-SHBT

12.8V/400AH Lithium Battery

- 5.12kWh Stored Power (1 battery)
- 10.24kWh Stored Power (2 battery)
- 350A Max Continuous Discharging Current (-20°C to 60°C)
- Self-Heating
- Fully Charged 14.4V
- Max Continuous Charging
5A (-4°F to 32°F)
200A (32°F to 59°F / 122°F to 131°F)
300A (59°F to 122°F)
- Bluetooth



8) RSP200D-G1

200-WATT 12 VOLT MONOCRYSTALLINE SOLAR PANEL

- Size - 26" x 64" x 1 3/8"
- Operating Voltage – 21V
- Operating Current – 9.52A

Inverter Faults

NOTE

The following fault codes will have a caution symbol when experiencing the fault

Warning Code	Warning Event	Icon On
03	Battery over voltage	03⚠
04	Battery low voltage	04⚠
05	Inverter over temperature	05⚠
07	Inverter overload	07⚠
88	Transformer phase reversal	88⚠
89	Frequency is out of range	89⚠

NOTE

The following will experience an error display as well as the fault code

Fault Code	Fault Event	Icon on
02	Heat sink over temperature	02—
03	Battery voltage is too high	03—
04	Battery voltage is too low	04—
05	Output short circuit	05—
06	Output is too high or too low	06—
07	Overload	07—
99	Inverter fail to slow start	99—

Common Issues

There are several issues that can cause fault, the most common are:

1. Battery Low Voltage Warning (04) when battery needs to be charged
2. Inverter Overload (07) when loads exceed the 3000W rated output power
3. Make sure inverter remote button is on when charging with shore power or using 120V circuits
4. Turn inverter remote button off when not charging or 120V loads to help prevent no load power consumption by the inverter

Battery 101

How to quickly calculate power for consumption, and recharge. There is a physical limit to the amount of stored power, so power must be budgeted. You can determine what each activity, or load will "cost you" in watt-hours. This will help you understand power usage, and how to make your reserve last when shore power is not available.

To be able to manage capacity, and "budget" loads there needs to be a basic understanding of a few mathematic equations to convert energy from one source to the same source as the battery. The first step is a basic understanding of electrical terms.

The battery is rated at 12.8VDC at 400aH. An "aH" is amp-hour, or a rating for battery capacity which means that it will supply 400 amps of current for one hour. This means that to determine the capacity that a load will consume we will need to use a few calculations to move the loads of various power sources to one value.

To make calculations easy, we will use watt-hour(s) or Wh. Watts is a measure of power, and it's the product of the current and voltage of a specific load or device, and to determine watt-hours, simply multiply the wattage (in watts) by the time it's used (in hours).

Example:

Coffee pot consumes 12.5A and it connects to the 120VAC outlet.

$$(12.5A) \times (120V) = 1500W$$

To determine the watt-hours of the activity, first determine the load in watts, then multiply the wattage (in watts) by the time it's used (in hours).

Example:

Making coffee for breakfast and the coffee pot was on for 30 minutes:

$$Wh = (1500W) \times (.5 \text{ Hours})$$

$$Wh = 750 \text{ Wh}$$

The battery has 400 Ampere Hours at 12.8VDC, or 5,120Wh of power available at 100% SOC for each battery. Each 1% of SOC (state of charge) is equal to 4A at 12.8VDC, or 51.2Wh (12.8V x 4A) per 1% of SOC. To determine current reserve capacity, in SOC% left after the usage, divide the Wh's of usage by 51.2Wh to determine the SOC % that the activity would cost. Then you can compare that SOC percentage from the current SOC percentage to determine if you want to perform that activity. Continuing our example from above:

Example:

Making coffee for breakfast and the coffee pot was on for 30 minutes:

$$Wh = (1500W) \times (.5 \text{ Hours})$$

$$Wh = 750 \text{ Wh}$$

$$SOC\% = 750Wh / 51.2Wh = 14.65\%$$

SOC% Cost for 30 minutes of coffee is roughly 14-15% SOC

The display will give you current SOC%, and the calculations can be used to determine what loads will cost in SOC, to help determine how long the current capacity can last before recharging. Recharging uses the same calculations, so you simply convert the amps of charging to watt hours, then SOC%. The only difference is you add from current SOC% instead of subtracting. To simplify this, a chart was comprised of typical loads and charge values. With corresponding Wh and SOC percentage are.