

## Single 100W Solar Panel Off-Grid Installation



100 Watt Monocrystalline Solar panel



10 Amp PWM Charge Controller



9" MC4 Adaptor Kit

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**DISCLAIMER OF LIABILITY**

**There shall be no responsibility or liability whatsoever on the part of the Warrantor or its employees and representatives for injury to any persons, or damage to person or persons, or damage to property, or loss of income or profit, or any other consequential or resulting damage which may be claimed to have been incurred through the use or sale of the equipment, including any possible failure of malfunction of the equipment, or part thereof.**

**The Warrantor assumes no liability for incidental or consequential damages of any kind.**

## Introduction

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This guide is suited for 100W Complete/Basic Kits or other higher wattage single panel systems. These kits generally include the following components:

- Renogy 100W Solar Panel
- Renogy 10 Amp or 30 Amp Solar Charge Controller
- 9' MC4 Adaptor Kit or 10' MC4 Adaptor Kit

This guide requires the following tools and extra components:

- Philips or slotted screwdriver
- Wire cutter
- Wire stripper and Crimping tool
- **Battery Tray Cable**
- **12V Battery (Lead Acid batteries, including AGM and Flooded)**

## Step One: Gather Components

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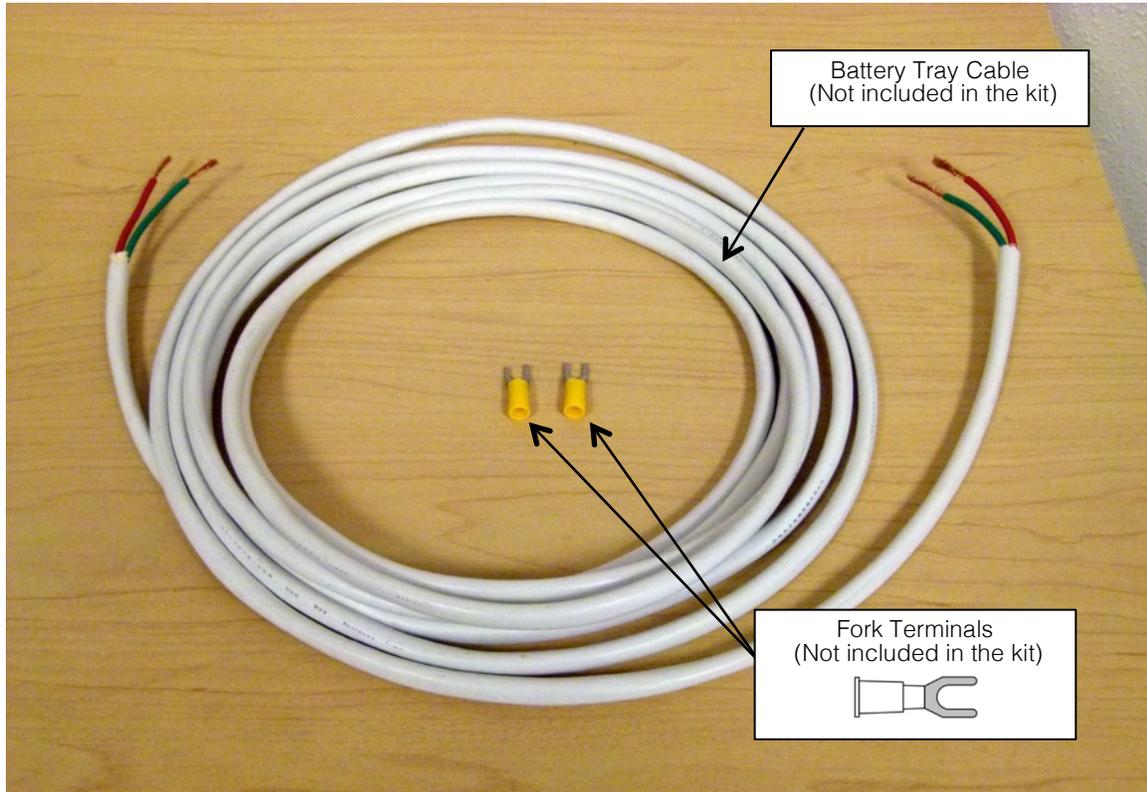
Fig. 1.1. Basic Solar Kit 100W Contents

**Fig. 1.1** The above picture shows what is included in your 100W Basic Solar Kit. If you ordered a different kit, it may include extra components such as mounting brackets and a 10' MC4 Adaptor cable instead of the 9' MC4 Adaptor Kit. Make sure all the components are included. When all of the components are gathered, move onto Step 2.

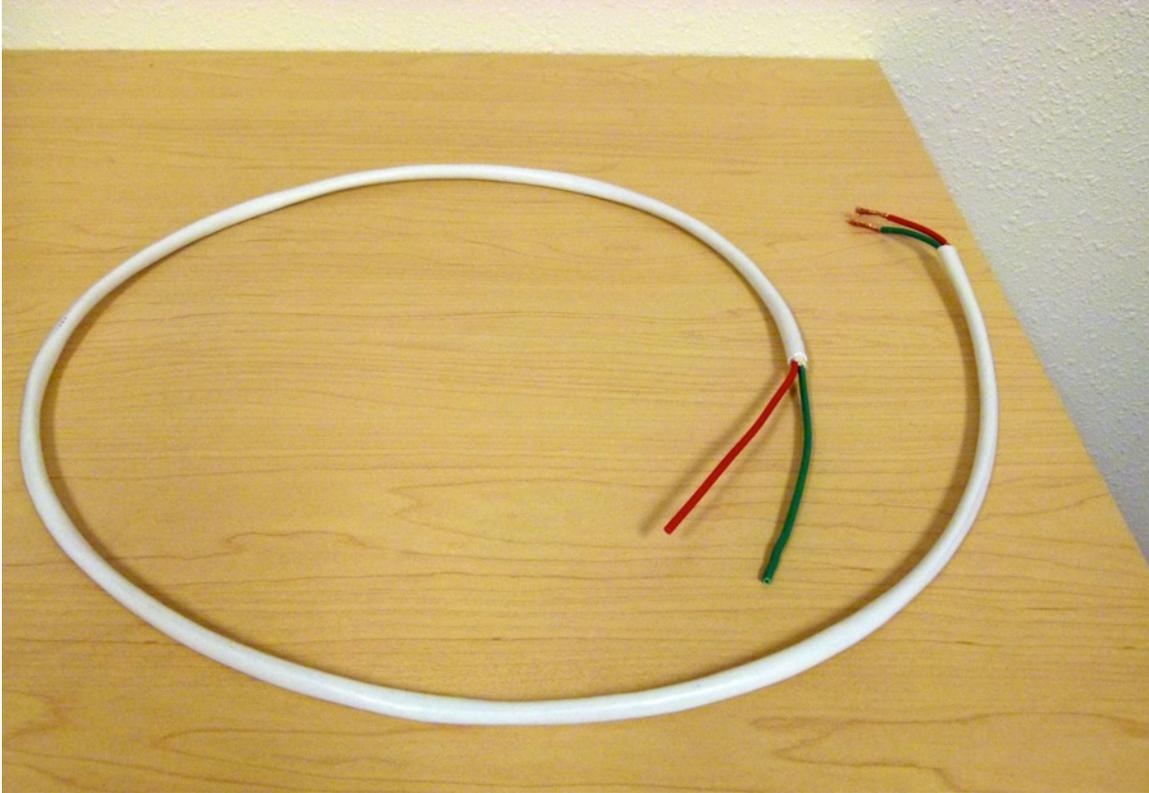
## Step Two: Connect Charge Controller to Battery

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Before making any other connections, you must first connect the solar charge controller to your battery. This is an important step. Skipping this step may damage your charge controller if you connect the solar panel into the charge controller without a battery source.

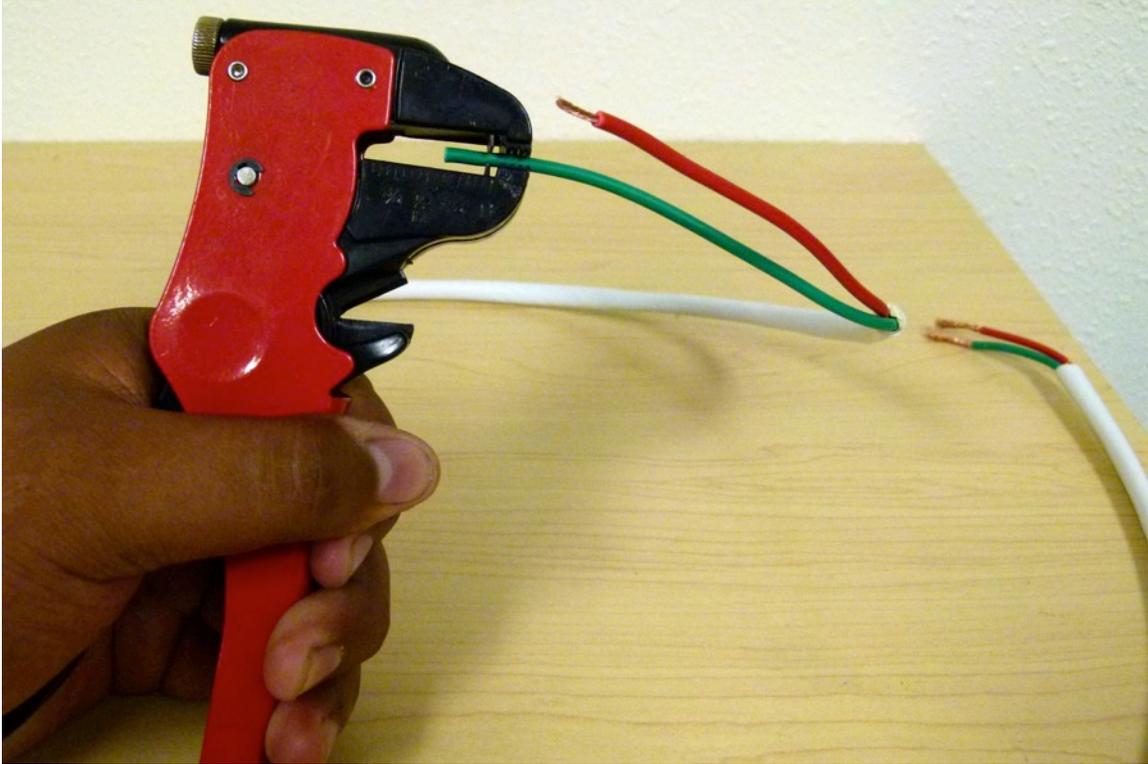


**Fig. 2.1.** Battery Tray cable with stripped ends and fork terminals



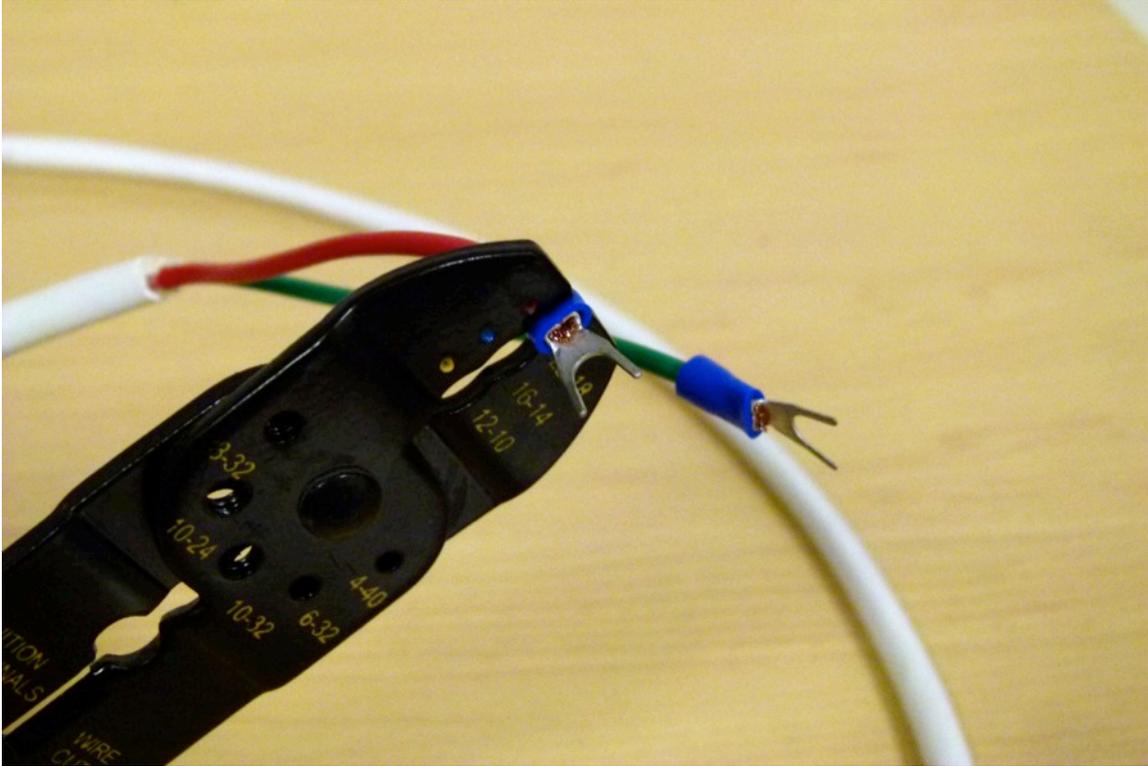
**Fig. 2.2.** Battery cables stripped at one end

**Fig. 2.1** shows a long battery tray cable and a pair of fork terminals (both not included in the kit). Mark the cables to differentiate between Positive (+) and Negative (-). Cut the cable to the appropriate length. Remove part of the insulating material so the wires can reach the battery posts. **Fig. 2.2** shows a battery tray cable that has been cut to an appropriate length.

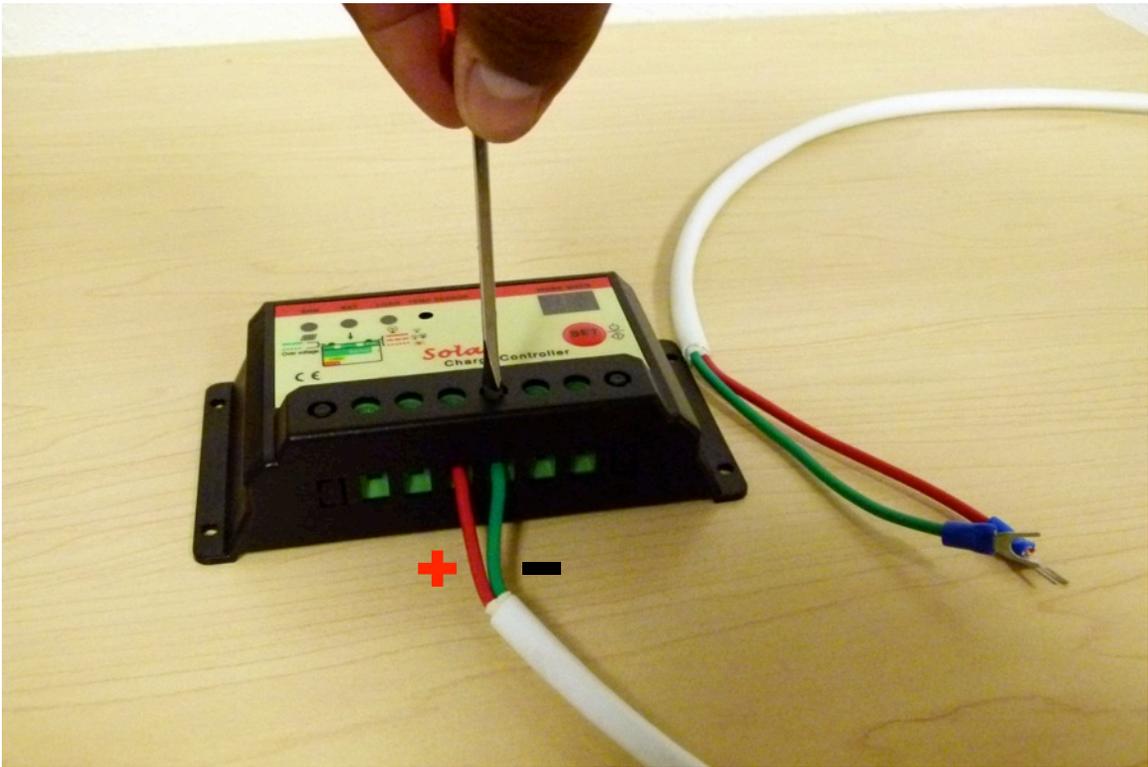


**Fig. 2.3.** Stripping the battery tray cables

Since we cut our cable to an appropriate length, one end has to be stripped in order to crimp the fork terminals. **Fig. 2.3** shows a manual wire stripper. The stripped wire should be around 1/4" long so it fits properly into the fork terminal. After you finish stripping the wire, use your crimper tool to crimp the fork terminal into the stripped wire. **Fig. 2.4** shows a completed battery tray cable with fork terminals.



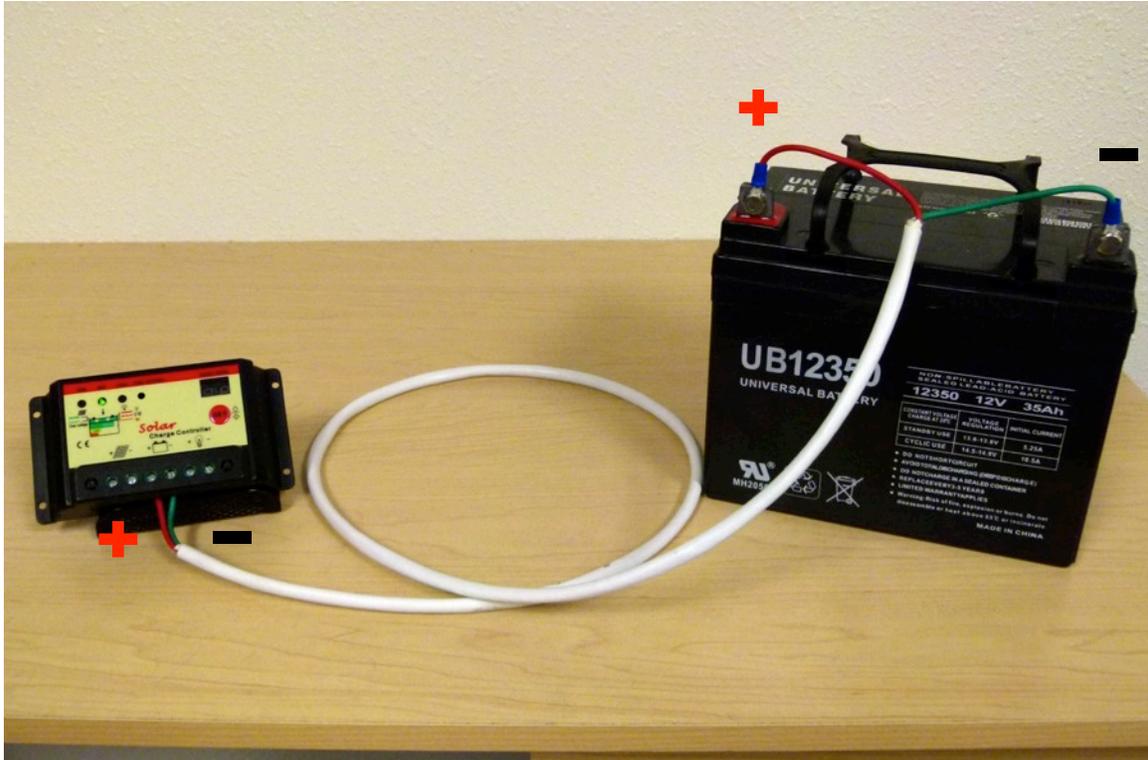
**Fig. 2.4.** Crimping fork terminals



**Fig 2.5.** Screw the stripped wire leads into the charge controller terminals

After you have finished stripping and crimping your battery cables, you can use a Philips (or flat head) screwdriver to secure them into the terminals on the charge controller. Make sure that the Positive battery (+, red) goes into the Positive (+) battery terminal labeled with a plus battery symbol on the charge controller. Also, make sure that the Negative battery (-, green in our case) goes into the Negative (-) battery terminal labeled with a minus battery symbol on the charge controller.

**Fig. 2.5** shows the proper connection. *Please note that reverse polarity connection will damage the charge controller and the resulting damage will not be covered by warranty.*



**Fig. 2.6.** Completed charge controller to 12V battery connection

Once you have made the connections to the battery terminals on the charge controller, clean the battery post terminals so they are free of corrosion or other impurities. Bolt the fork terminals to the battery posts, making sure the correct polarity is observed as shown in **Fig. 2.4**. Since the charge controller is PWM type, your battery must be 12V for a 12V solar panel system or a 24V battery for a 24V solar panel system. In this case, a 12V battery is required, since we are working with a 12V solar panel system.

As soon as the battery is connected to the charge controller, the device will **power automatically** and will light green when the battery voltage is in the right range. **Fig. 2.7** shows the charge controller being powered by the battery, and sensing that the voltage is in the right range.



Fig. 2.7. Battery LED lights solid green once connected to a battery

### Step Three: Prepare the MC4 Adaptor Kit

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The 9" Adaptor Kit or 10' Adaptor Kit already comes with the leads stripped. These adaptors help us extend the output cables of the solar panel. These cables are needed in order to connect the charge controller to the solar panel.



**Fig. 3.1.** Cutting stripped the end of the 9" MC4 cables to 3/8"

If your 9" Adaptor Kit comes with long stripped ends like the one shown in **Fig. 3.1**, then you will have to cut the bare wire to approximately 3/8" long so it fits into the charge controller PV terminal. **Fig. 3.2** shows these wires with appropriate length at the stripped end.



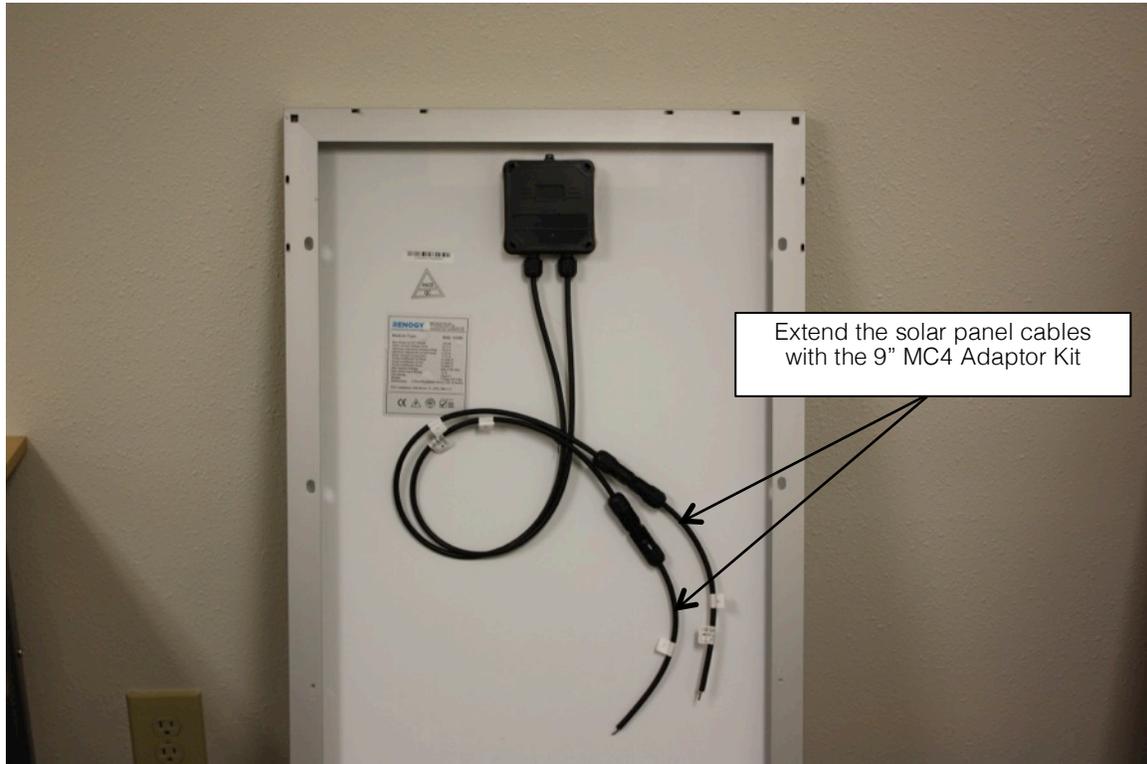
**Fig. 3.2.** Stripped MC4 Adaptor Kit wires

The same idea applies for the 10' Adaptor Kit.

#### Step Four: Connect Charge Controller to Solar Panel

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Before you proceed, you must avoid exposing the solar panel to direct sunlight. This will avoid any electrical shock hazard during installation. Make sure that the solar panel/array is covered with an opaque (dark) material to block solar irradiation.

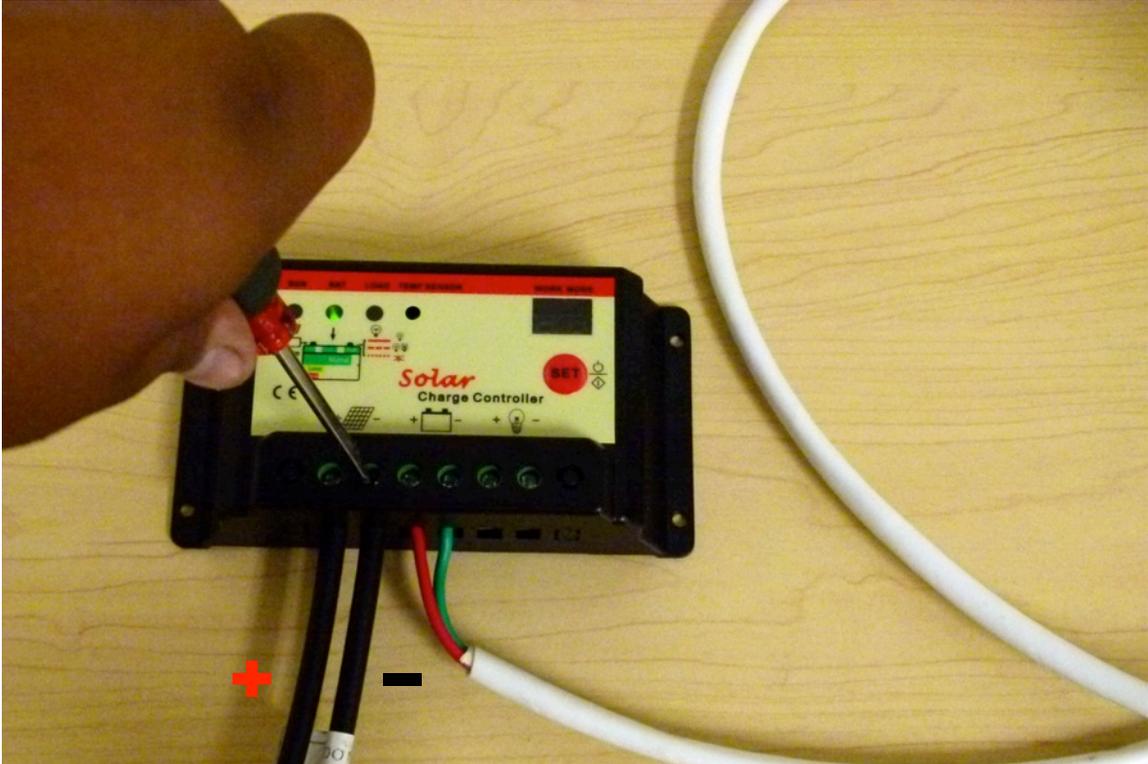


**Fig. 4.1.** Extend the output wires of the solar panel

The Positive (+) wire of the solar panel is terminated with an MC4 Female Connector (marked "+"). Connect this cable to the MC4 Male Adaptor. Make sure that the locking tabs "snap in" for a firm connection. The bare end of the Positive extension wire will now be of **Positive polarity**. *Use a piece of red sleeve or red tape near the bare end for identification as the Positive (+) wire.*

The Negative (-) wire of the solar panel is terminated with a MC4 Male Connector (marked "-"). Connect this cable to the MC4 Female Adaptor. Make sure that the locking tabs "snap in" for a firm connection. The bare end of the Negative extension wire will now be of **Negative polarity**.

**Fig. 4.1** shows the extension of the output cables of the solar panels using the 9" MC4 Adaptor Kit. **Avoid contact between these two cables, as they can short your solar panel.**



**Fig. 4.2.** Screw solar panel extension cables into the charge controller terminals

Next, screw the bare ends of solar panel from **Fig. 4.1** into the solar charge controller terminals. Use a Philips (or flat head) screwdriver to secure the bare ends into the terminals on the charge controller. Make sure that the Positive output wire (+, previously labeled with red tape) goes into the Positive (+) PV terminal labeled with a plus solar panel symbol on the charge controller. Also, make sure that the Negative output (-) goes into the Negative (-) PV terminal labeled with a minus solar panel symbol on the charge controller.

**Fig. 4.2** shows the proper connection. ***Please note that reverse polarity connection will damage the charge controller and the resulting damage will not be covered by warranty.***

Once you connect the solar extension cables into the charge controller PV terminals, the green LED indicator will light up if there is enough sunlight.

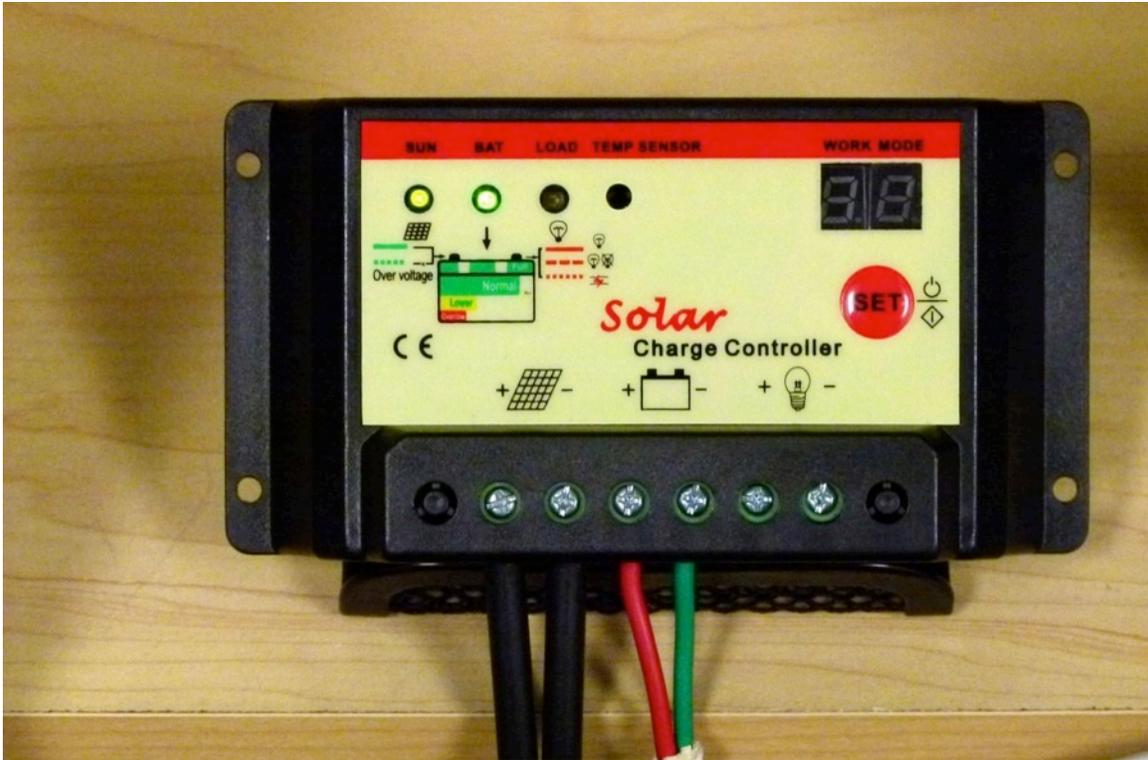


Fig. 4.3. Solar input green LED indicates the charge controller is now charging the battery



Fig. 4.4. Completed Solar Panel with battery system

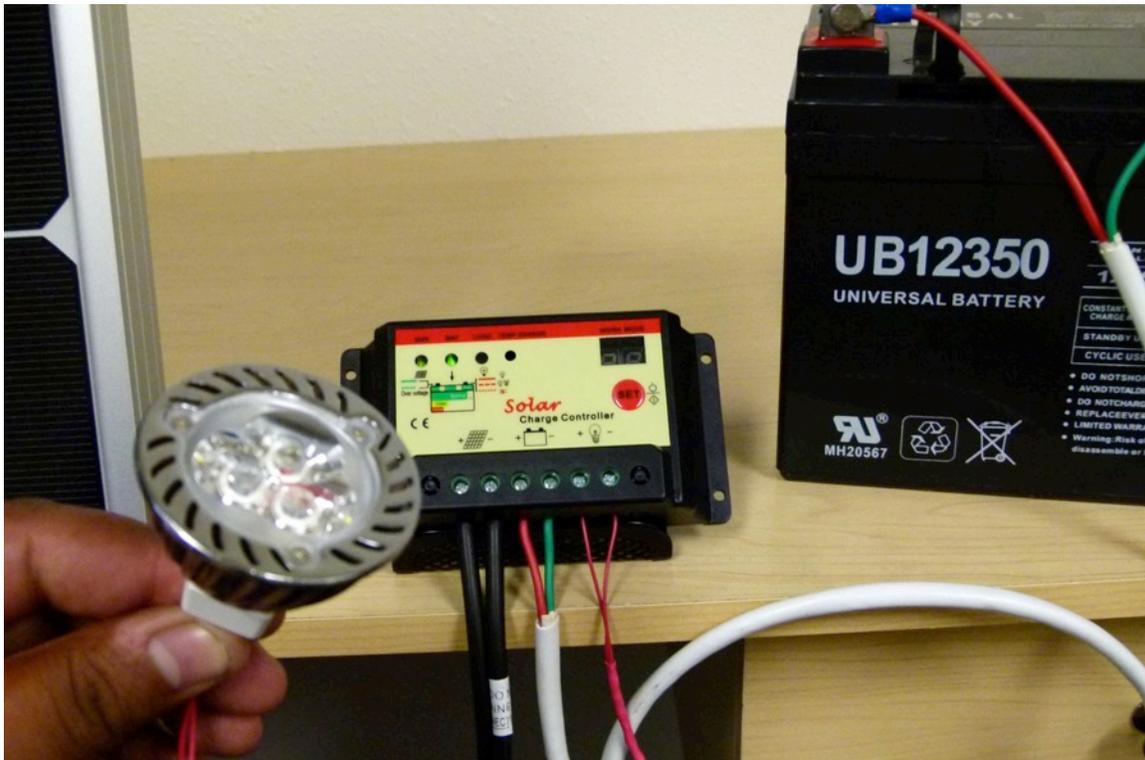
Once you have finalized the connections shown in Fig. 4.4, you have completed your solar power system installation. Your system is now ready to harness solar energy. Find a dry

location to mount your charge controller and battery placement. If you want to extend the solar panel output cables, it is recommended that you replace the 9" MC4 Adaptor Kit with the 10' MC4 Adaptor Kit.

#### **Step Five: Connect Charge Controller to 12VDC Application (Optional)**

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This step is **optional**. You can skip this step anytime since the DC load terminal labeled with a "bulb" icon is only suitable for low power 12VDC LED/Bulb lighting.



**Fig. 5.1.** Connecting a 12VDC LED Bulb to the Load terminal

When you are ready, connect your LED bulb (not include in the kit) to the Load Terminal as shown in **Fig. 5.1**. For some LED bulbs the polarity doesn't matter like the one shown in **Fig. 5.1**. However, if your LED Bulb has a Positive and Negative leads, make sure to match them on the charge controller. **Please do not connect devices such as power inverters, high power DC motors/pumps or other 12VDC electronics with heavy electrical load.**



**Fig. 5.2.** Connecting a 12VDC LED Bulb to the Load terminal

Once you made the final connections, go ahead and press the SET button on the charge controller, this will turn on the work mode of the Load Terminal. To test the functionality of the work mode, press and hold the SET button until the display starts to flash. Once it is flashing, release the button, and every time you press the SET button, the number on the display will change. Keep pressing the SET button until you see the number **17** (10A charge controller) or **7**. "Seven Dot" (30A charge controller). Once there is no sunlight, there will be no current flowing into the charge controller, once this happens, the LED bulb will automatically turn on. Once the sun rises the LED bulb will turn off. An orange LED will light up in the LOAD terminal indicating that it is working properly as shown in **Fig. 5.2**. If the orange or red LED battery indicator light turns on, the battery capacity is low and needs to be charged before completing the system installation.

For more information about your panel specifications, solar charge controller operation, or any other inquiry, please read over the included manual for each component.