

# Solar Sign Light

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## Instruction Manual



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# I. Introduction

Thank you for purchasing the Energy Bazaar Solar-Powered Sign Light! You'll find it easy to use green energy to showcase your business, housing development, flagpole or garden sculpture. This instruction manual describes the setup and operation of the system, so please review it carefully. Should you have any questions, feel free to contact us using the "Contact Us" link on our home page [www.energybazaar.com](http://www.energybazaar.com).

# II. Parts List

The Energy Bazaar Solar Sign Light includes the following components:

- Solar Panel
- LED Spotlight (double-sided sign lights include two LED spotlights)
- Battery
- Battery Box with Charge Controller
- Long Wire (for connecting solar panel to charge controller)
- Short Wire (for connecting battery to charge controller)
- Wire weather seal
- Instruction Manual

### III. Preparation for Installation

Before you begin, plan the details of your installation. Each of the three main components have different configuration options:

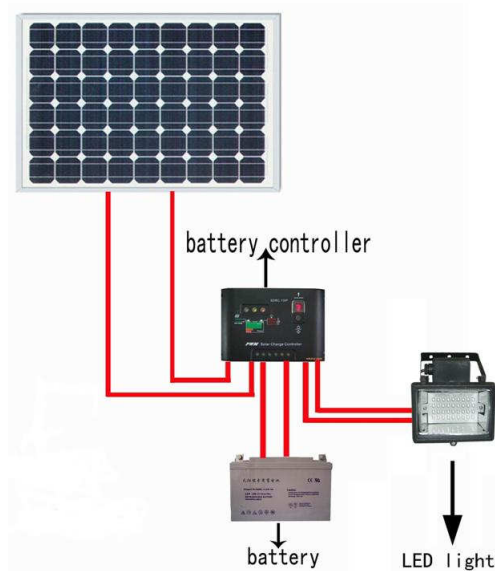
1. The spotlights can be placed above or below the sign, but for optimal results they should not be positioned greater than nine feet away from the sign (3 feet for the double-sided lights). Two holes are provided on the spotlight brackets for mounting in front of your sign.
2. The solar panel must be placed in a location where it receives full sunlight during the day, without any trees, buildings or other obstructions. Ideally, the solar panel should be mounted at a 45 degree angle toward the south. Many south-facing rooftops have a close approximation to the correct angle. Blocks and brackets can be used on top of some wider signs to achieve the appropriate angle. Energy Bazaar also sells a solar panel pole mount that provides the correct angle,
3. The battery and charge controller box has holes in the back for mounting on a wall, pole or post near the light. The box can also be placed in a protected area on the ground. If the mounting holes are not used, they should be plugged to keep water out.

You'll need the following tools & supplies before proceeding:

- A small screwdriver to attach wires to charge controller and solar panel terminals.
- Mounting screws, bolts and brackets as required for your specific installation.
- Electrical tape, to secure and insulate the battery connections.

## IV. Assembly

The charge controller controls all aspects of the system, from charging the battery to turning on and off the light. As a result each component is connected to it as shown in Figure 1.



**Figure 1. Overview of Components**

Once you have all the components laid out, follow these steps to assemble your system:

1. Insert the wire weather seal into the hole on the side of the battery box and use the nut to tighten it in place.
2. Use the short wire segment to connect the battery to the middle two connectors on the charge controller (labeled with a battery). Use a small screwdriver to secure the wires in the charge controller. Note: you may need to strip off additional wire insulation to fit the wires into the controller terminals. Securely wrap or solder the wires to the battery. Take care to match the + (black wire) and - (white wire) markings on the battery and charge controller. Use electrical tape to secure and insulate the connection.
3. Open the wire connector cover on the back of the solar panel by sliding it in the direction of the arrow. Using a Phillips screwdriver, connect the long solar panel wire to the terminals as shown in Figure 2, connecting the black wire to the terminal labeled - and the white wire to the terminal labeled +. Replace the wire connector cover.



**Figure 2. Solar Panel Wire Connection**

4. Insert the solar panel wires through the wire seal in the battery box and connect them to the left pair of terminals on the charge controller using a small screwdriver. Make sure to observe the polarity and connect the black wire to – and the white wire to +. At this point, the green LED on the charge controller should light if the solar panel is exposed to sunlight.
5. Insert the LED spotlight wire(s) through the wire seal, and connect them to the charge controller. Again, match the polarity of the wires.
6. If the red LED indicator lights, the battery capacity is low. Charge the system for at least one full sunny day before proceeding.
7. Press and hold the button on the front of the charge controller for approximately 5 seconds, and the number in the display should start flashing. Use the configuration guide in the next section to program the controller for your specific application. The simplest setting, 0, simply keeps the light on as long as it is dark.
8. After you have programmed and tested the charge controller, insert the battery and charge controller into the box as shown in Figure 3. Tighten the wire seal on the side of the battery box by screwing in the cap on the outside.



Figure 3. Battery and Charge Controller in Box

# V. Configuration



All the functions of the charge controller are programmed with the single button on the front of the controller:

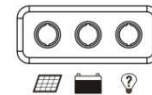
1. Pressing the button on the front panel of the charge controller will turn on an LED display that indicates which lighting control option has been selected.
2. Pressing and holding the button for 5 seconds enables you to change to a different control option.
3. The controller requires 10 minutes of continuous transition values before it starts to work. This constraint avoids false transitions due to dark storm clouds during the day and lightning and lights from passing cars at night.
4. The following table provides a brief description of each option for the charge controller below:

0,1,2,3,4,5,6,7	For DC output
0.,1.,2.,3.,4.,5.,6.,7.	For 1Hz output (flashing)
0 or 0.	Dusk-to-Dawn, light is on all light
1 or 1.	4 hours light is turn on after sundown
2 or 2.	6 hours light is turn on after sundown
3 or 3.	8 hours light is turn on after sundown
4 or 4.	10 hours light is turn on after sundown
5 or 5.	12 hours light is turn on after sundown
6 or 6.	Lights remain turned off, ON/OFF mode
7 or 7.	Test mode, lights on after it detects no light, lights off after it detects light.

Three LEDs on the front of the charge controller describes the status of the system:



Green ON when solar is charging battery.  
 Green blink when the system over voltage.  
 Green ON when battery level in the right range.  
 Green slowly flashing when battery level full.  
 Yellow ON when battery level low.  
 Red ON when loads cut off.  
 Red ON when the output is on.  
 Red slowly flashing when an overload occurs (the load amps is 1.25 times of rated current for 60 seconds, or the load amps is 1.5 times of rated current for 5 seconds).  
 Red blink when the load is short-circuit.



Please note:

1. The output will cut off once there is overload or short circuit. To reset, press the button on the front panel and wait 30 seconds.
2. After over-discharge, the controller will resume to work when the battery is charged

to 13.1V. After over-discharged, the controller will resume working when you press the button after the battery voltage exceeds 12.6V. Avoid over-discharging, since this can shorten the life of the battery.

## VI. Maintenance

The following inspections and maintenance tasks are recommended at least once per year for best controller performance:

1. Tighten all the terminals. Inspect for loose, broken, or burnt wire connections. Be certain no loose strands of wire are touching other terminals.
2. Check that the controller is securely mounted in a clean environment. Inspect for dirt, insects and corrosion.
3. Check the air flow around the controller is not blocked.
4. Protect from sun and rain. Confirm that water is not collecting under the cover.
5. Check that the controller functions and LED indicators are correct for the system conditions at that time.
6. Make sure the PV array is clean and clear of debris and snow. Confirm the array is oriented correctly for the installation location.

## VII. Troubleshooting

Provide detailed information on the expected timetable for the project. Break the project into phases, and provide a schedule for each phase.

### **Problem: Charging LED indicator is off when it is daytime**

Recommendations:

- The green Charging LED should be on if its daytime.
- Check that the proper battery type has been selected.
- Check that all wire connections in the system are correct and tight. Check the polarity(+ and -) of the connections
- Measure the PV array open-circuit voltage and confirm it is within normal limits. If the voltage is low or zero, check the connections at the PV array itself. Disconnect the PV from the controller when working on the PV array.
- Measure the PV voltage and the battery voltage at the controller terminals. If the voltage at the terminals is the same (within a few tenths of volts) the PV array is charging the battery. If the PV voltage is close to the open circuit voltage of the panels and the battery voltage is low, the controller is not charging the batteries and may be damaged.

### **Problem: Charging LED indicator is blinking**

Recommendations:

- First check the operating conditions to confirm that the voltage is higher than specifications. Consider the temperature compensation of the controller's PWM setpoint. For example, at 0°C the controller will regulate at about 15 volts
- Check that all wire connections in the system are correct and tight.

### **Problem: Load LED indicator is blinking, or flashing or on red (load not operating properly)**

Recommendations:

- Check that the load is turned on. Check that no system fuses are defective.
- Check connections to the load, and other controller and battery connections. Make sure voltage drops in the system wires are not too high.
- If the LED indicator is blinking and no output, check if the load is a short circuit. Disconnect the load, and press the switch button, the controller will return to work after 30 seconds.

- If the LED indicator is flashing and no output, check if the load is over the rated power. Reduce the load, and press the switch button, the controller will return to work after 30 seconds.

# VIII. Specifications

## **Solar Panel**

Dimensions: 14" x 12" x 1.25"  
Nominal Power Output: 10 Watts  
Voltage Mpp: 17.5 Volts  
Current Mpp: 0.57 Amps

## **Light Fixture (standard)**

Dimensions (excluding bracket): 6.5" x 5" x 5"  
Light Source: 6 extra-large white LEDs  
Power Consumption: 6 Watts

## **Light Fixture (double-sided pair)**

Dimensions (excluding bracket): 5.25" x 4" x 3"  
Light Source: 30 white LEDs  
Power Consumption: 5 Watts each

## **Battery**

12 Volt, 7 Amp-Hour Sealed Lead Acid

## **Charge Controller**

Maximum load: 12 volts at 10 amps  
Operating temperature: -20°F to 120°F

