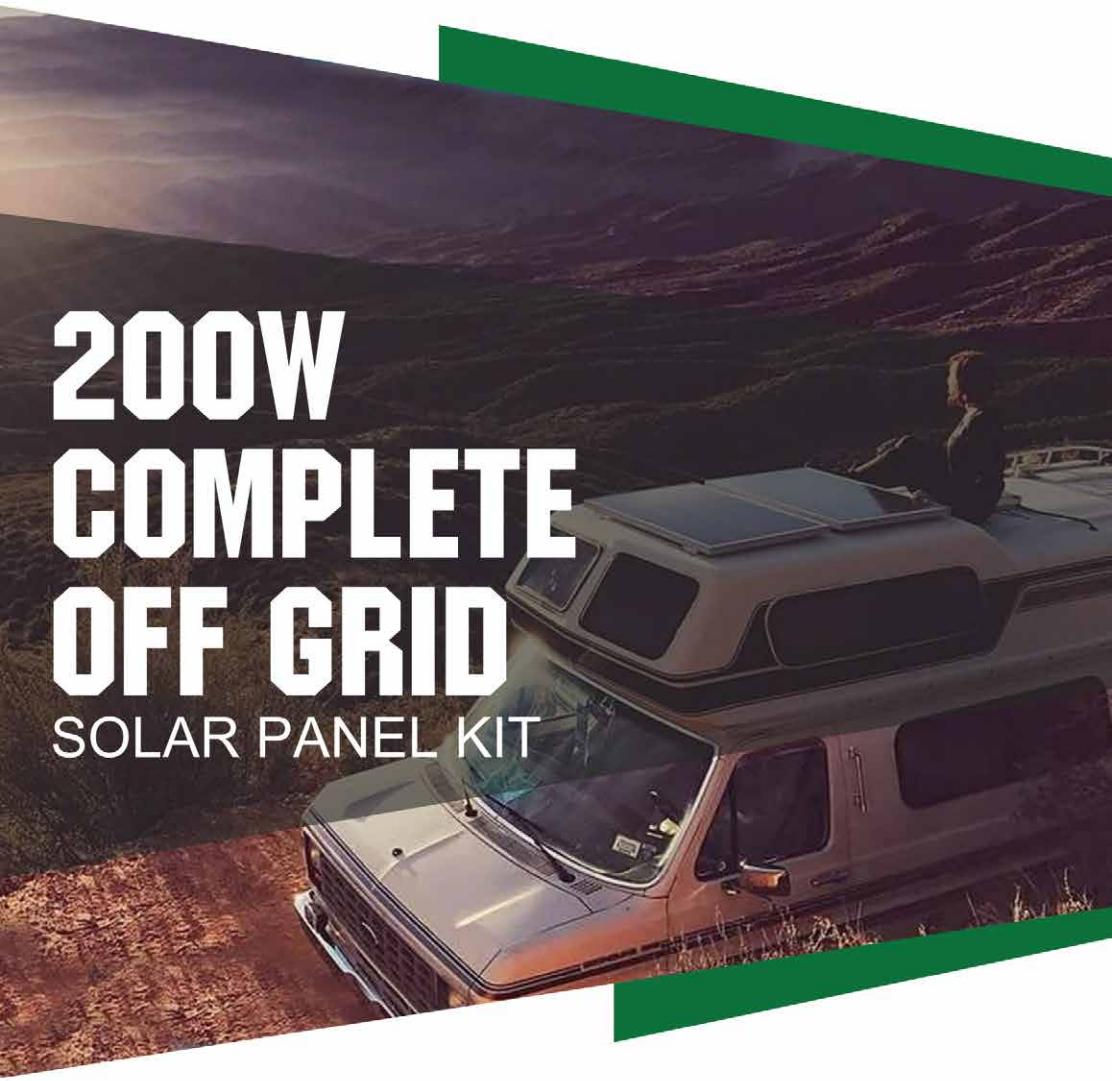
ECO-WORTHY



200W COMPLETE OFF GRID

SOLAR PANEL KIT

SUPPORT

If you are experiencing technical problems and cannot find a solution in this manual, please contact ECO-WROTHY for further assistance.

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1.Introduction

Congratulations on purchasing a high quality renewable energy product where building your own off-grid solar system has never been easier. Although installation is quick and professional using the materials included in your kit, it is important to read this manual and understand all the mechanical and electrical requirements prior to beginning installation.

If you have any concerns about the suitability of the kit for your application, or doubts about any of the instructions in this manual, please contact our Support at (417) 459-7063 or via E-mail at ecoworthy.cs@gmail.com

2.General safety

CAUTION:
Please read the instruction manual carefully before attempting to carry out any installation or wiring. Contact Technical support for any questions concerning the installation.

CAUTION:
When solar panels are placed in sunlight or other light sources, they produce electrical energy and a voltage will appear on the output terminals. To avoid a shock hazard, keep the panel covered with a dark material during installation and avoid contact with the output terminals. Before handling the solar panel, test the voltage output of the solar panel with a voltmeter to confirm it is not outputting voltage.

1.2 Wiring & Installtion

• Disconnect all power sources before carrying out the installation.
• Make sure the correct polarity is observed when making connections between the solar panel, charge controller, and battery. Damage due to reverse polarity connection is not covered by warranty.
• Wear appropriate clothing and safety gear including protective eyewear when performing any electrical installation.

• Wiring size and installation must comply with the National Electrical Code (NEC).
• Make sure all wire connections are tight and secure, loose connections may cause sparks and intermittent behavior.
• Do not perform installation in the presence of any flammable materials.
• Make sure you work in a well-ventilated area
• Use properly insulated tools and remove metal items such as rings, bracelets, and watches.

3.Product Introduction

3.1 Overview

ECO-WORTHY 200W Complete Kit, An electricity supply project, which is clean, quiet and compatible with RV, Trailer, Shed and House roof.

The complete kit contains 2 efficient Mono-crystalline solar panels, PWM solar charger controller, Deep-Cycle Lithium batteries, Pure sine-wave Inverter, and all necessary wires. The installation components also includes resistant aluminum Z shape brackets and bolts and nuts designed for plane installation.

ECO-WORTHY offer various photovoltaic off-grid kits and combinations, designed to be modifiable and easy expandable, contact us for more information.

3.2 Package Included

2 pieces 100W 18V Mono solar panel
1 piece 600W 12V-220V Inverter
2 pieces 20Ah Lithium Battery
2 sets Z style mounting sets
1 piece 20A controller
1 pair 5m (16.4') solar cables with a connector in each.(black & red cable)
1 pair Y Style solar connector
1 piece controller to battery cable

3.2 Advantage

• Efficient Mono-crystalline solar panels, 0.8Kwh/day maximum electricity generation

• 600W Pure sine-wave Inverter (Peak Power 1200w), practicable for AC appliances, fridge, TV, radio, kettle, etc.

• Auxiliary power for RV ,Boat,Cabin,Shed

• Power supply for kinds of appliances in multiple off-grid circumstances

• 3000+ times deep cycle Lithium battery

4.Charge Controller Installation

4.1 Mounting location

Insure all terminating connections are clean and tight to prevent arcing and overheating.The controller must be installed in an area that satisfies all of the following conditions:

1. Dry: Avoid any location where water can contact the controller

2. Cool: Ambient air temperature between 30°F and 105°F (0°C and 40°C)

3. Ventilated: Allow at least 2 in (50 mm) of clearance above and below and at least 1 in (25 mm) on each side for proper air flow.

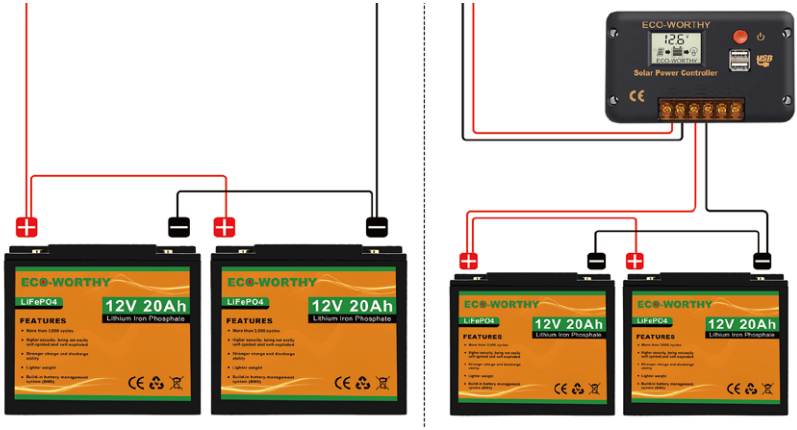
Mounting is optional but for best results, locate the charge controller as close as possible to the batteries and the batteries and charge controller as close to the panels as practical.
The controller can be mounted on a vertical or horizontal surface. Be sure to orient the controller so that any open end of the controller (if applicable) is at the top. This will prevent foreign material from settling into the unit.

4.2 Installtion

Drill the holes and make sure that the holes are sized appropriately to avoid loose screws. If you are mounting the controller on drywall, it is recommended that you use expansion anchors

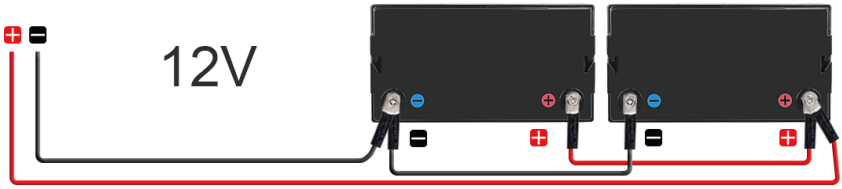
4.3 Connect controller to battery

Wire 2*20Ah batteries in parallel with the battery cables, then connect the battery group to the controller.



The battery(s) must firstly be connected to the charge controller before proceeding to any other connections. Most of PWM controllers are equipped with auto battery voltage testing function, it's necessary to measure if the charging voltage is compatible with the battery.

1.First, connect the negative cable to the negative (−) battery post. The best way to secure the battery cable to the battery post is by using a ring terminal. A bolt is sufficient to secure the ring terminal onto the battery post, allowing for better electrical contact. Next, connect the bare stranded portion of the cable to the negative (−) battery input terminal on the charge controller.



2. Similarly to the instructions described above, connect the positive cable to the positive (+) battery post. An in-line fuse can be added to this cable for better protection, a fuse holder would be commonly recommended. This is usually done with a fuse holder.

5.Solar Panel Installtion

5.1 Location

Determine a location for the solar panel that is in direct sunlight and clear of any shading by adjacent obstacles such as trees, roof overhangs, etc. Ideally, the panels will be positioned to minimize the wiring distance between the solar panel and the charge controller.

For Northern Hemisphere installations, the solar panels should be mounted at angle facing true south (true north for Southern Hemisphere installations). The mounting angle should be equal to the latitude location of where you are installing the solar panels.

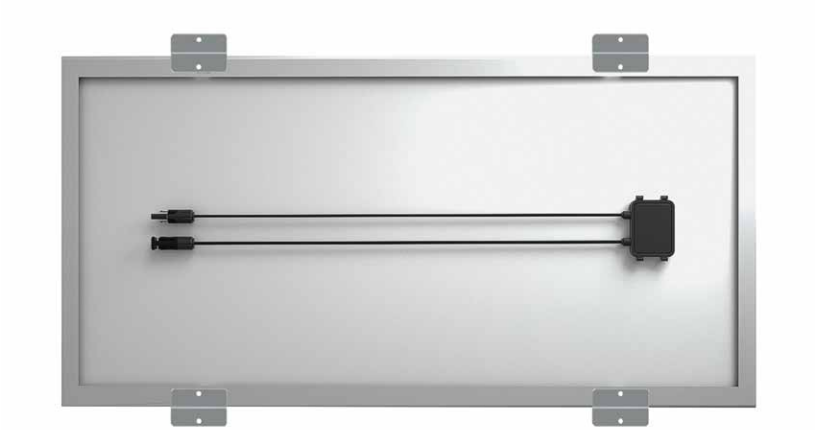
For example, the latitude of Miami, Florida, USA is 25 degrees. Therefore, solar panels installed in this area should ideally be facing true south at a tilt angle of 25 degrees.

It's hard to get a perfect installation angle due to limit of installation space.
Try to make it a ideal angel face to the sun, to get the output power as much as possible.

5.1.1 Use Z-Brackets on an rv roof: “Flat Mount”

When mounting a panel using Z-Brackets, a well-nut (also known as “expansion nut”) is often used on a pre-drilled hole. This procedure safely secures the panel on thin cabin roofs or RV roofs. Using a well-nut is recommended, as the rubber expansion prevents water leakage.(The Z-Bracket set does not include well nuts)

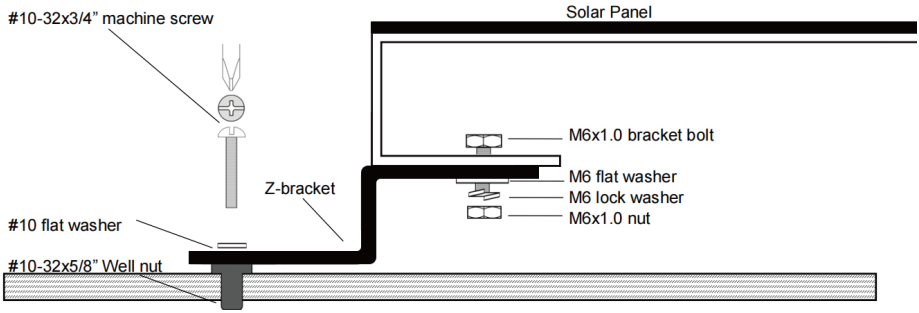
Step1： Attaching the Z-Bracket to a solar panel
Locate the mounting holes on the solar panel.Solar Panels have four mounting holes on each side.



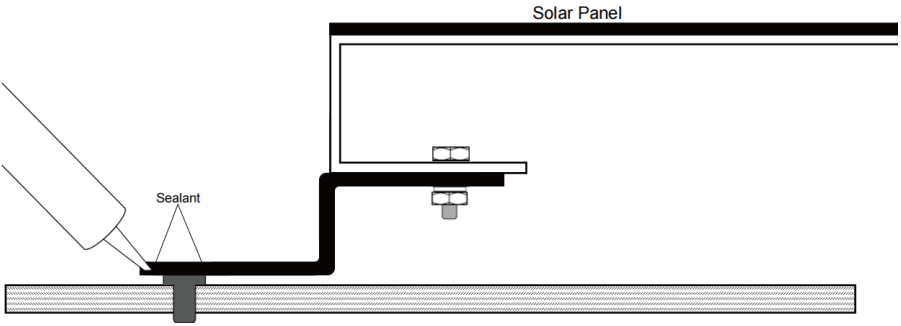
Step2： Mark and drill holes
With the Z-Brackets attached to the frame, the panel can be laid on a mounting surface, making it easier to mark the holes for the well-nut.

Step 3: Attaching the panel to the roof

Figure picture below illustrates the correct way to use the well-nut. The rubber flange has to be flushed on the roofline. The Z-Bracket,along with the flat washer and lock washer, hold the well-nut in place when the screw is fastened.



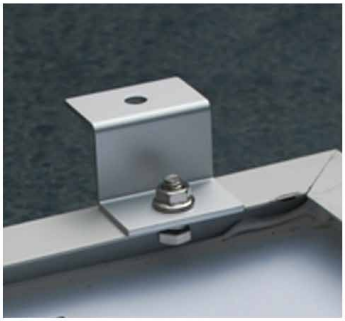
Gently insert the well nut into the drill hole . Be careful not to push the well nut flange completely into the holes. Make sure the flange is flushed on the roofline.Before attaching the panel to the roof, a film of caulk can be laid between the RV roof and the Z-Bracket. Even though the well-nut provides a watertight bond, this provides additional sealant.



5.1.2 Well-nuts and blind holes

The well-nut does not only work for thin RV roofs, but also works in blind holes. Tightening a well-nut in a blind hole will cause the body to expand and apply pressure against the walls of the hole. This also creates a secure hold of the solar module.

Using the Z-Brackets on a house roof
The Z-Brackets can also be used on a house roof if the proper roof penetration sealant is used between the roof and the Z-Bracket. A roof penetration sealant is necessary, as water might leak into the house if the holes are not properly sealed.

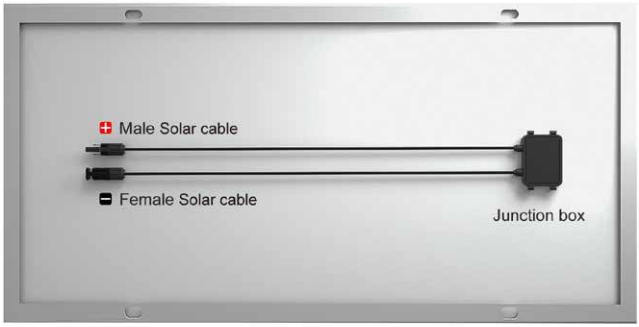


5.2 solar panel connection

Do NOT connect the solar panels to the solar charge controller until the solar charge controller has been completely connected to the 12v volt batteries

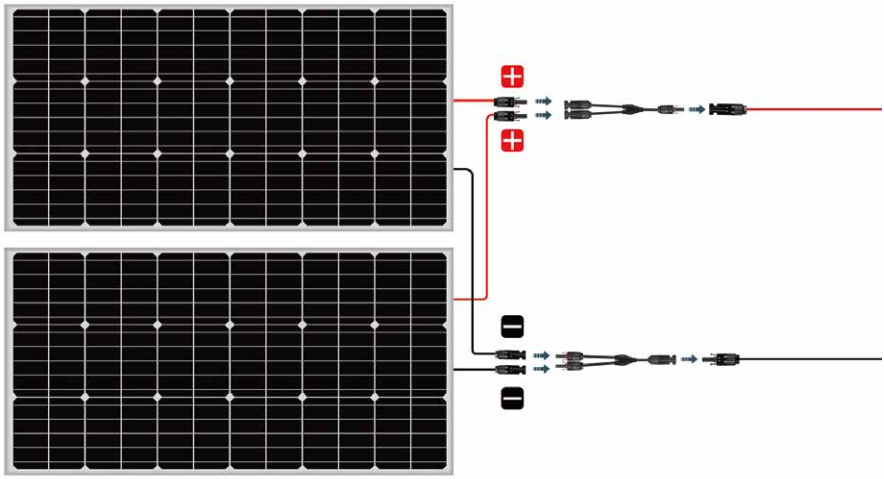
Each ECO-WORTHY Solar Panel will have an a pair of solar cable Connector System that consists of male and female connectors. This type of connector system is easy to install and uses a “snap-in” type of safety locking clips to lock the two mating connectors. The “snap in” feature avoids unintentional disconnection. The mating contacts are sealed against the ingress of dust and water.

Solar cable Connectors and mating contacts



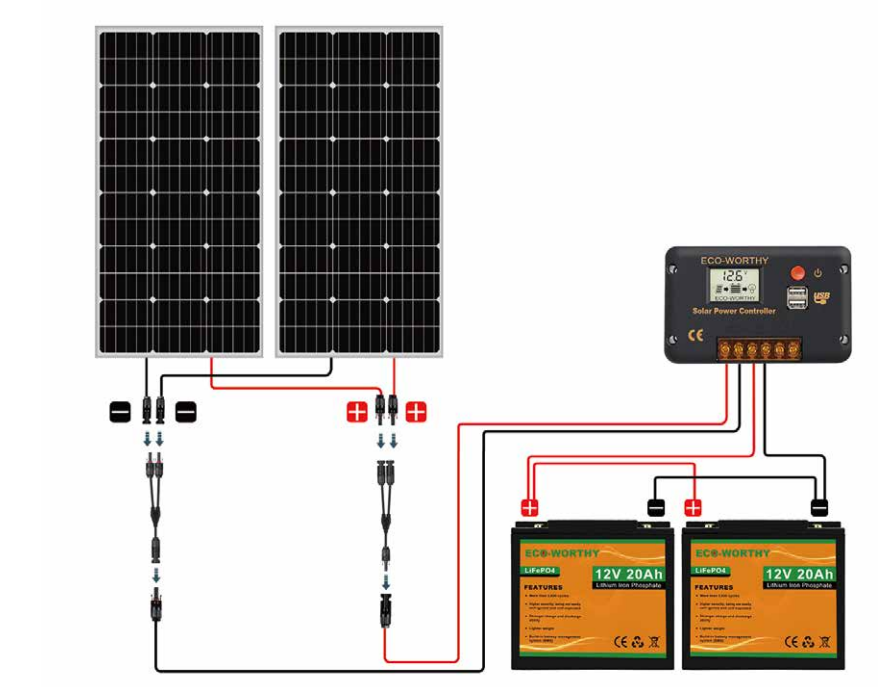
5.2.1 Connect every 2 solar parallel in series

To build a 12v DC solar panel kit with 2 panels, wire them in parallel with the Y branch connectors.



5.2.2 Connect solar panels to controller

Wire the panels' positive and negative posts comes from the Y branches separately to the P&N posts of the controller with 1 pair of solar cable.



6.Inverter Wiring

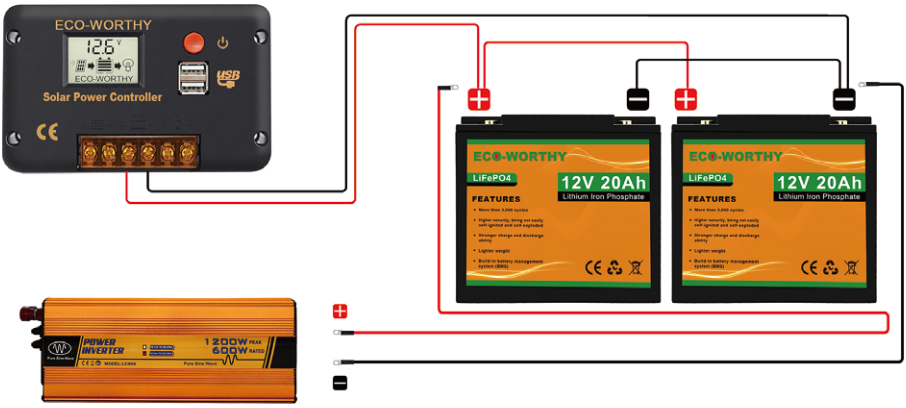
A power inverter, or inverter, is an electrical device that transform the direct current (DC) from the panel to alternating current (AC) for those AC appliances.

Diagram

Step 1: Set the switch to OFF position (inverter and appliances).

Step 2: Connecting inverter to battery

Connect the battery cables to their respective colors on the inverter.



Step 3: Connecting electrical appliances to inverter

Make sure the power load is within the rated power of the inverter. The start power of the appliances should not exceed the peak power of the inverter.

Caution!

The negative battery terminal and the chassis ground of the inverter should be connected to a system ground.

Once the devices are connected to the AC outlet, they are ready to be powered. When the inverter is not in use, it is recommended that you turn off the inverter (switch in OFF position)

7.Maintenance

The following maintenance is recommended to ensure optimum performance and longevity of the solar system:

• Clean the glass surface of the solar panel when necessary. Always use water and a soft sponge or cloth for cleaning. A mild, non-abrasive cleaning agent can be used to remove dirt.

• Check the electrical and mechanical connections every six months to verify that they are clean, secure and undamaged.

• Inspect the solar panels and make sure the surfaces are free from dust, dirt, and other debris; clean with a wet cloth or glass cleaner if necessary.

• Check to make sure all structural components, mechanical fasteners, and electrical connections are secure, clean, and corrosion-free.

• Check and maintain the battery electrolyte levels at regular intervals as per the battery manufacturer's recommendations if flooded wet cell lead acid batteries are used.

• Check and replace damaged components if necessary

8.Support

This product is covered by a 1 year warranty provided by ECO-WORTHY Ltd. We will refund or a partial refund or replace any products with defects at our discretion.

If you are experiencing technical problems and cannot find a solution in this manual, please contact ECO-WROTHY for further assistance.

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