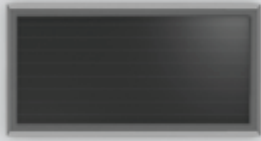




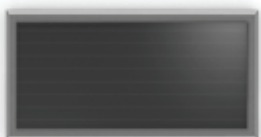


# Brunton Solar Panel Instructions

<h2>SolarFlat 2W/12V Battery "Maintainer"</h2> 	<h2>SolarFlat 5W/12V Battery "Trickle Charger"</h2> 	<h2>SolarFlat 15W/12V Battery "Charger"</h2> 	<h2>Solar Charge Controller</h2> 
<p><b>Specifications &amp; Included Items:</b></p> <p>Power Rating: Up to 2 Watts            Max Current: 120 mAmps @ 17.7 Volts            Includes: Solar Panel, 12ft wire, Battery Clamp, Female Vehicle Adaptor, Bare Wire Inter-connector and LED test light</p>	<p><b>Specifications &amp; Included Items:</b></p> <p>Power Rating: Up to 5 Watts            Max Current: 300 mAmps @ 17.7 Volts            Includes: Solar Panel, 12ft wire, Battery Clamp, Female Vehicle Adaptor, Bare Wire Inter-connector and LED test light</p>	<p><b>Specifications &amp; Included Items:</b></p> <p>Power Rating: Up to 15 Watts            Max Current: 900 mAmps @ 17.7 Volts            Includes: Solar Panel, 12ft wire, Battery Clamp, Female Vehicle Adaptor, Bare Wire Inter-connector and LED test light</p>	<p><b>Specifications:</b></p> <p>Cut-in Voltage: 13 Volts            Cut-out Voltage: 14.2 Volts            Max. Load: 105 watts / 7 amps</p>
<p><b>Installation:</b></p> <p><u>Mounting:</u>            For optimal performance, choose a high sunlight area and place securely with solar panel side facing directly towards the sun.  <i>*Note: Do not screw holes directly through front of frame. This will cause damage to solar product.</i></p> <p><u>Connecting Using Battery Clamps:</u></p> <ol style="list-style-type: none"> <li>1. Connect the Battery Clamp connector to the SolarFlat extension cord.</li> <li>2. Connect the battery clamps correctly by matching the red clamp, which is Positive (+), to the Positive (+) terminal on your battery.</li> <li>3. Connect the black clamp, which is Negative (-), to the Negative (-) terminal on your battery.</li> </ol> <p><i>*Follow this carefully to not cause any bodily harm.</i></p> <p><u>Connecting Using Female Vehicle Adaptor:</u></p> <ol style="list-style-type: none"> <li>1. Connect the Female Vehicle Adaptor connector to the SolarFlat extension cord.</li> <li>2. Connect Female Vehicle Adaptor to male cigar plug, and use to power hand-held electronic devices, such as cell-phones and cameras.</li> </ol> <p><u>Connecting Using Bare Wire Adaptor</u></p> <ol style="list-style-type: none"> <li>1. Connect the Bare Wire connector to the SolarFlat extension chord.</li> <li>2. Securely connect bare wire cables to adjoining positive and negative cables.</li> </ol> <p><i>*Note that negative bare wire cable is the cable without writing on black sheath of wire.</i></p>	<p><b>Installation:</b></p> <p><u>Mounting:</u>            For optimal performance, choose a high sunlight area and place securely with solar panel side facing directly towards the sun.  <i>*Note: Do not screw holes directly through front of frame. This will cause damage to solar product.</i></p> <p><u>Connecting Using Battery Clamps:</u></p> <ol style="list-style-type: none"> <li>1. Connect the Battery Clamp connector to the SolarFlat extension cord.</li> <li>2. Connect the battery clamps correctly by matching the red clamp, which is Positive (+), to the Positive (+) terminal on your battery.</li> <li>3. Connect the black clamp, which is Negative (-), to the Negative (-) terminal on your battery.</li> </ol> <p><i>*Follow this carefully to not cause any bodily harm.</i></p> <p><u>Connecting Using Female Vehicle Adaptor:</u></p> <ol style="list-style-type: none"> <li>1. Connect the Female Vehicle Adaptor connector to the SolarFlat extension cord.</li> <li>2. Connect Female Vehicle Adaptor to male cigar plug, and use to power hand-held electronic devices, such as cell-phones and cameras.</li> </ol> <p><u>Connecting Using Bare Wire Adaptor</u></p> <ol style="list-style-type: none"> <li>1. Connect the Bare Wire connector to the SolarFlat extension chord.</li> <li>2. Securely connect bare wire cables to adjoining positive and negative cables.</li> </ol> <p><i>*Note that negative bare wire cable is the cable without writing on black sheath of wire.</i></p>	<p><b>Installation:</b></p> <p><u>Mounting:</u>            For optimal performance, choose a high sunlight area and place securely with solar panel side facing directly towards the sun.  <i>*Note: Do not screw holes directly through front of frame. This will cause damage to solar product.</i></p> <p><u>Connecting Using Battery Clamps:</u></p> <ol style="list-style-type: none"> <li>1. Connect the Battery Clamp connector to the SolarFlat extension cord.</li> <li>2. Connect the battery clamps correctly by matching the red clamp, which is Positive (+), to the Positive (+) terminal on your battery.</li> <li>3. Connect the black clamp, which is Negative (-), to the Negative (-) terminal on your battery.</li> </ol> <p><i>*Follow this carefully to not cause any bodily harm.</i></p> <p><u>Connecting Using Female Vehicle Adaptor:</u></p> <ol style="list-style-type: none"> <li>1. Connect the Female Vehicle Adaptor connector to the SolarFlat extension cord.</li> <li>2. Connect Female Vehicle Adaptor to male cigar plug, and use to power hand-held electronic devices, such as cell-phones and cameras.</li> </ol> <p><u>Connecting Using Bare Wire Adaptor</u></p> <ol style="list-style-type: none"> <li>1. Connect the Bare Wire connector to the SolarFlat extension chord.</li> <li>2. Securely connect bare wire cables to adjoining positive and negative cables.</li> </ol> <p><i>*Note that negative bare wire cable is the cable without writing on black sheath of wire.</i></p>	<p><b>Installation:</b></p> <p><u>Connecting to Battery:</u>            Connect the Solar Charge Controller (SCC) battery side (right) to the positive (+) battery terminal and the negative (-) wire to the negative (-) battery terminal.</p> <p><u>Connecting to Solar Panel:</u>            Using the bare wire adaptor from the SolarFlat extension cord, connect the positive (wire without writing) to positive and negative to negative of SCC. Ensure wire connectors are secure.</p>
<p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>• SolarFlat LED Test Light can be connected to extension cord to indicate that solar panel is functioning properly.</li> <li>• SolarFlat includes blocking diode to prevent reverse current.</li> </ul>	<p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>• SolarFlat LED Test Light can be connected to extension cord to indicate that solar panel is functioning properly.</li> <li>• SolarFlat includes blocking diode to prevent reverse current.</li> </ul>	<p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>• SolarFlat includes blocking diode to prevent reverse current.</li> <li>• It is strongly recommended to use a 7 Amp Solar Charge Controller to prevent battery overcharge. This unit is sold separately.</li> </ul>	<p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>• Solar Controller should be placed within 5ft of the battery, and in a dry, well-ventilated area.</li> <li>• Supports up to 105 Watts of power. Not advisable to use with greater wattage.</li> <li>• All connections should be parallel to ensure 12V – positive to positive and negative to negative.</li> </ul>
<p><b>FAQs:</b></p> <ol style="list-style-type: none"> <li>1. Can I use the panel outdoors?              A. Yes, this panel has been weatherproofed.</li> <li>2. What type of batteries can my SolarFlat 2 charge?              A. All 12V batteries like ones used in cars, boats, RV's, motorcycles and PWC's.</li> <li>3. Can I overcharge my battery?              A. The SolarFlat 2 has a built in blocking diode that prevents battery discharge and overcharging.</li> <li>4. Will the SolarFlat 2 keep my battery fully charged?              A. The Maintainer charges your battery with the power of the sun. It compensates for key offdrain and long periods of non-use and on board electronics. It is designed to maintain batteries.</li> <li>5. How long does it take to charge a dead battery?              A. The unit is designed to maintain batteries only. If the battery is dead, we recommend a larger output solar charger such as the 5W or 15W Brunton SolarFlats.</li> <li>6. Can I extend the wire?              A. The 12' wire can be extended up to 25' without loss of power or voltage damage.</li> </ol>	<p><b>FAQs:</b></p> <ol style="list-style-type: none"> <li>1. Can I use the panel outdoors?              A. Yes, this panel has been weatherproofed, including UV protection and for weather effects of -35° F to 175° F.</li> <li>2. Will panel drain battery at night?              A. No, this panel includes a battery diode to prevent battery drain and reverse current.</li> <li>3. What type of batteries can my SolarFlat 5 charge?              A. Any deep cycle 12V battery.</li> <li>4. How long will it take to charge a battery?              A. Under ideal conditions, this panel will generate up to 300 mAmps of current. A 5W panel is not designed to charge batteries, but only trickle charge batteries thereby insuring quick starts.</li> <li>5. Can I run appliances off this panel?              A. Yes, however, the current will vary depending on the sunlight. Charging a battery is therefore the recommended installation and running protocol</li> <li>6. Do I need a Solar Controller?              A. No, a charge controller is only recommended for panels greater than 15W.</li> <li>7. How far can I extend the wire?              A. Current length should accommodate 95% of installations, however, wires can be extended up to a maximum of 30ft. with 16 gauge wire.</li> </ol>	<p><b>FAQs:</b></p> <ol style="list-style-type: none"> <li>1. What type of batteries can my SolarFlat 5 charge?              A. All 12V batteries like ones used in cars, boats, RV's, motorcycles and PWC's.</li> <li>2. Can I overcharge my battery?              A. Yes! It is recommended to use our 7 Amp Solar Controller to not overcharge the battery</li> <li>3. Will the SolarFlat15 keep my battery fully charged?              A. Yes, using the power of the sun, the SolarFlat 15 will keep a battery charged.</li> <li>4. How long does it take to charge a dead battery?              A. Under ideal conditions, this panel will generate up to 900 mAmps of current. A 40 Amp Hr. battery at 50% would take 20 Hrs. By doubling the amount of panels, you would reduce the time by half.</li> <li>5. Can I extend the wire?              A. The 12ft wires can be extended up to a maximum of 30ft. with 16 gauge wire.</li> <li>6. How many batteries can I using 1 unit?              A. The SolarFlat 15 is capable of charging a bank of batteries, but the charge will be divided.</li> <li>7. Can this solar charger run my house?              A. No, the panel is best used to charge 12V batteries</li> <li>8. Is the my solar charger weatherproof?              A. Yes, this panel is fully weatherproof.</li> </ol>	<p><b>FAQs:</b></p> <ol style="list-style-type: none"> <li>1. How many panels can I connect to my Solar Controller Charger?              A. You can connect up to 105 watts of solar power. Panels should be connected in parallel – positive to positive and negative to negative.</li> <li>2. When will the Charging Indication light (green) light up?              A. The charging controller indication green light will light up when the battery voltage reaches 14.2 Volts and the SCC will prevent the solar panels from overcharging the battery. It is normal for the SCC LED to light on and off as the battery voltage cuts in and out.</li> </ol> 

# Brunton Solar Panel Instructions

## SolarFlat 2W/6V Battery “Maintainer”

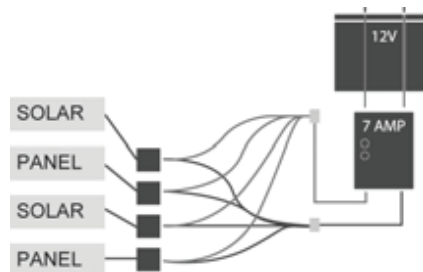


## SolarFlat 5W/24V Battery “Trickle Charger”



## Connecting Multiple Panels

- Using the included bare wire connector adaptor, join positive wires to positive wires and negative wires to negative wires to ensure voltage. Make sure all connections are tight using wire nut connectors. Insulating materials may prove helpful.
- For anything above 15W, use a Solar Controller Charger to prevent battery overcharge.



## General Solar Information

- A. How do solar cells generate electricity?  
Solar panels, also known as Photovoltaics, or PV for short, can be thought of as a direct current (DC) generator powered by the sun. When light photons of sufficient energy strike a solar cell, they knock electrons free in the structure forcing them through an external circuit (Battery or direct DC load), and then returning them to the other side of the solar cell to start the process all over again.
- B. Will solar work in my location?  
Yes, solar is universal and will work virtually anywhere, however, some locations are better than others. Irradiance is a measure of the sun’s power available at the surface of the earth, and it averages about 1000 Watts per square meter. Obviously, different parts of the world receive more sunlight than others, so they will have more “full sun hours” per day, resulting in more power from solar panels.
- C. These panels are made of amorphous type solar panels. What is the difference between amorphous and polycrystalline cells?

Amorphous solar panels contain no cells per say, but are created through a deposition process which actually forms the silicon material directly on the glass substrate. To understand this a bit clearer, think of it as spraying the silicon onto the glass in very thin layers. This film which gives amorphous panels the “thin-film” nickname, is laser patterned, which interconnects instead of physically connecting tabs which eliminates a mechanical connection that can break down and fail. The amount of silicon used in this process produces a film which is often up to 100 times thinner than that of a polycrystalline cell. Furthermore, amorphous type solar cells are better at generating electricity in all lighting conditions.

### Specifications & Included Items:

Power Rating: Up to 2 Watts  
Max Current: 150 mAmps @ 14 Volts  
Includes: Solar Panel, 12ft wire, Battery Clamp, Bare Wire Inter-connector and LED test light

### Specifications & Included Items:

Power Rating: Up to 5 Watts  
Max Current: 150 mAmps @ 36 Volts  
Includes: Solar Panel, 12ft wire, Battery Clamp, Bare Wire Inter-connector and LED test light

### Installation:

#### Mounting:

For optimal performance, choose a high sunlight area and place securely with solar panel side facing directly towards the sun.

\*Note: Do not screw holes directly through front of frame. This will cause damage to solar product.

#### Connecting Using Battery Clamps:

- Connect the Battery Clamp connector to the SolarFlat extension cord.
- Connect the battery clamps correctly by matching the red clamp, which is Positive (+), to the Positive (+) terminal on your battery.
- Connect the black clamp, which is Negative (-), to the Negative (-) terminal on your battery.

\*Follow this carefully to not cause any bodily harm.

#### Connecting Using Bare Wire Adaptor

- Connect the Bare Wire connector to the SolarFlat extension chord.
- Securely connect bare wire cables to adjoining positive and negative cables.

\*Note that negative bare wire cable is the cable without writing on black sheath of wire.

### Installation:

#### Mounting:

For optimal performance, choose a high sunlight area and place securely with solar panel side facing directly towards the sun.

\*Note: Do not screw holes directly through front of frame. This will cause damage to solar product.

#### Connecting Using Battery Clamps:

- Connect the Battery Clamp connector to the SolarFlat extension cord.
- Connect the battery clamps correctly by matching the red clamp, which is Positive (+), to the Positive (+) terminal on your battery.
- Connect the black clamp, which is Negative (-), to the Negative (-) terminal on your battery.

\*Follow this carefully to not cause any bodily harm.

#### Connecting Using Bare Wire Adaptor

- Connect the Bare Wire connector to the SolarFlat extension chord.
- Securely connect bare wire cables to adjoining positive and negative cables.

\*Note that negative bare wire cable is the cable without writing on black sheath of wire.

## General Testing Protocol (For Solar Charge Controller)

Always test outdoors under optimal sunlight conditions.

### A. Testing SolarFlats for Voltage

Connect Voltmeter to each individual panel separately and observe open voltage. Open Voltage can range from 16 Volts to 24 Volts. Once all panels are tested for voltage, proceed to step B.

### B. Test Connection to Charge Controller for Voltage.

Reconnect SolarFlats, can connect to Charge Controller as per Charge Controller instructions. Measure open circuit voltage at the battery side of the Charge Controller. Open circuit should read 5-10% lower than without Charge Controller, resulting in measurement between 15V and 23.5V.

### C. Connect Charge Controller to Battery.

First, disconnect solar panels and connect Charge Controller to battery. Always connect Charge Controller to battery first and remove last. Observe polarity – positive to positive and negative to negative.

### D. Reconnect Solar Panels to Charge Controller.

If battery voltage is 14.2 or higher, the GREEN light should be on. If battery voltage is between 13 and 14.2, the YELLOW light should be on. If battery voltage is 13 or lower, the Yellow light should be on.

If all testing results with voltages within the above indicated ranges, solar system is in acceptable range. If voltage reading indicates lower ranges, repeat above connections and retest.

## Limited Warranty

**THESE PRODUCTS ARE WARRANTED FROM DEFECTS IN WORKMANSHIP AND FUNCTIONALLITY FOR A PERIOD INDICATED ON THE PACKAGING. THIS WARRANTY DOES NOT APPLY IN THE EVENT OF MISUSE OR ABUSE OF THE PRODUCT, OR AS A RESULT OF UNAUTHORIZED REPAIRS OR ALTERATIONS. POWER OUTPUT IS WARRANTED UP TO 80% OF STATED OUTPUT AND MUST BE TESTED UNDER FULL SUNLIGHT CONDITIONS. TO ADDRESS WARRANTY ISSUES, PLEASE CONTACT BRUNTON, INC. CUSTOMER SERVICE:**

**2255 BRUNTON COURT  
RIVERTON, WY, USA, 82501  
PHONE: 307.857.4700  
WWW.BRUNTON.COM**

### Notes:

- SolarFlat LED Test Light can be connected to extension cord to indicate that solar panel is functioning properly.
- SolarFlat includes blocking diode to prevent reverse current.

### Notes:

- SolarFlat LED Test Light can be connected to extension cord to indicate that solar panel is functioning properly.
- SolarFlat includes blocking diode to prevent reverse current.

### FAQs:

- Can I use the panel outdoors?  
A. Yes, this panel has been weatherproofed.
- What type of batteries can my SolarFlat 2 charge?  
A. All 6V batteries like ones used in deer feeders and cameras.
- Can I overcharge my battery?  
A. The SolarFlat 2 has a built in blocking diode that prevents battery discharge and overcharging.
- Will the SolarFlat 2 keep my battery fully charged?  
A. The Maintainer charges your battery with the power of the sun. It compensates for key offdrain and long periods of non-use and on board electronics. It is designed to maintain batteries.
- How long does it take to charge a dead battery?  
A. The unit is designed to maintain batteries only. If the battery is dead, we recommend a larger output solar charger such as the 5W or 15W Brunton SolarFlats.
- Can I extend the wire?  
A. The 12' wire can be extended up to 24' without loss of power of voltage damage.

### FAQs:

- Can I use the panel outdoors?  
A. Yes, this panel has been weatherproofed, including UV protection and for weather effects of -35° F to 175 ° F.
- Will panel drain battery at night?  
A. No, this panel includes a battery diode to prevent battery drain and reverse current.
- What type of batteries can my SolarFlat 5 charge?  
A. Any deep cycle 24V battery.
- How long will it take to charge a battery?  
A. Under ideal conditions, this panel will generate up to 36V and 150 mAmps of current. A 5W panel is not designed to charge batteries, but only trickle charge batteries thereby insuring quick starts.
- Can I run appliances off this panel?  
A. Yes, however, the current will vary depending on the sunlight. Charging a battery is therefore the recommended installation and running protocol
- Do I need a Solar Controller?  
A. No, a charge controller is only recommended for panels greater than 15W.
- How far can I extend the wire?  
A. Current length should accommodate 95% of installations, however, wires can be extended up to a maximum of 30ft. with 16 gauge wire.

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