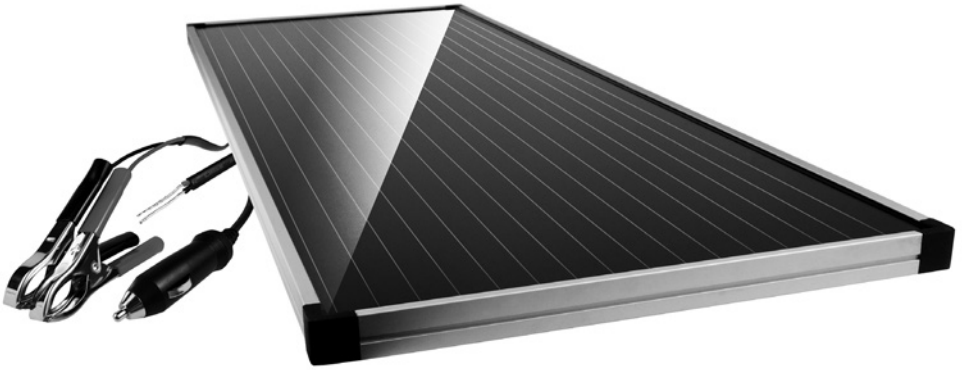


Model: SP-1500

Solar Battery Charger/Maintainer with charge controller



Voltage: 12

Wattage : 15

⚠ WARNING

READ THE ENTIRE MANUAL BEFORE USING THIS PRODUCT.
FAILURE TO DO SO COULD RESULT IN SERIOUS INJURY OR DEATH.

IMPORTANT: READ AND SAVE THIS SAFETY AND INSTRUCTION MANUAL.

SAVE THESE INSTRUCTIONS – This manual will show you how to use your solar panel safely and effectively. Please read, understand and follow these instructions and precautions carefully, as this manual contains important safety and operating instructions. The safety messages used throughout this manual contain a signal word, a message and an icon.

The signal word indicates the level of the hazard in a situation.

⚠ DANGER Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury to the operator or bystanders.

⚠ WARNING Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to the operator or bystanders.

⚠ CAUTION Indicates a potentially hazardous situation which, if not avoided, could result in moderate or minor injury to the operator or bystanders.

IMPORTANT Indicates a potentially hazardous situation which, if not avoided, could result in damage to the equipment or vehicle or property damage.

⚠ WARNING



Pursuant to California Proposition 65, this product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.

1. IMPORTANT SAFETY INSTRUCTIONS – SAVE THESE INSTRUCTIONS.

This manual contains important safety and operating instructions.



RISK OF ELECTRIC SHOCK OR FIRE.

- 1.1 Keep out of reach of children.
- 1.2 Do not expose the solar panel to rain or snow.
- 1.3 Use only recommended attachments. Use of an attachment not recommended or sold by Schumacher® Electric Corporation may result in a risk of fire, electric shock or injury to persons or damage to property.

- 1.4 To reduce the risk of electric shock, unplug the clips from the solar panel before attempting any maintenance or cleaning.
- 1.5 Do not operate the solar panel if it has received a sharp blow, been dropped or otherwise damaged in any way; take it to a qualified service person.
- 1.6 Do not disassemble the solar panel; take it to a qualified service person when service or repair is required. Incorrect reassembly may result in a risk of fire or electric shock.



RISK OF EXPLOSIVE GASES.

1.7 WORKING IN THE VICINITY OF A LEAD-ACID BATTERY IS DANGEROUS. BATTERIES GENERATE EXPLOSIVE GASES DURING NORMAL BATTERY OPERATION. FOR THIS REASON, IT IS OF UTMOST IMPORTANCE THAT YOU FOLLOW THE INSTRUCTIONS EACH TIME YOU USE THE SOLAR PANEL.

- 1.8 To reduce the risk of a battery explosion, follow these instructions and those published by the battery manufacturer and the manufacturer of any equipment you intend to use in the vicinity of the battery. Review the cautionary markings on these products and on the engine.
- 1.9 If used in a garage, locate this solar panel 18 inches (45.72 cm) or more above floor level. Do not place on wet ground, anywhere it could be accidentally stepped on or in a place or position where it could fall while being used.

2. PERSONAL PRECAUTIONS

▲ WARNING



RISK OF EXPLOSIVE GASES.

- 2.1** NEVER smoke or allow a spark or flame in the vicinity of a battery or engine.
- 2.2** Remove personal metal items such as rings, bracelets, necklaces and watches when working with a lead-acid battery. A lead-acid battery can produce a short-circuit current high enough to weld a ring or the like to metal, causing a severe burn.
- 2.3** Be extra cautious to reduce the risk of dropping a metal tool onto the battery. It might spark or short-circuit the battery or other electrical part that may cause an explosion.
- 2.4** Use this solar panel for maintaining and charging LEAD-ACID batteries only. It is not intended to supply power to a low voltage electrical system other than in a starter-motor application. Do not use this solar panel for maintaining or charging dry-cell batteries that are commonly used with home appliances. These batteries may burst and cause injury to persons and damage to property.
- 2.5** NEVER maintain or charge a frozen battery.
- 2.6** Consider having someone close enough by to come to your aid when you work near a lead-acid battery.
- 2.7** Have plenty of fresh water and soap nearby in case battery acid contacts your skin, clothing or eyes.
- 2.8** Wear complete eye and body protection, including safety goggles and protective clothing. Avoid touching your eyes while working near the battery.
- 2.9** If battery acid contacts your skin or clothing, immediately wash the area with soap and water. If acid enters your eye, immediately flood the eye with cold running water for at least 10 minutes and get medical attention right away.
- 2.10** If battery acid is accidentally swallowed, drink milk, the whites of eggs or water. DO NOT induce vomiting. Seek medical attention immediately.

3. PREPARING TO MAINTAIN OR CHARGE

▲ WARNING



▲ WARNING



RISK OF CONTACT WITH BATTERY ACID. BATTERY ACID IS A HIGHLY CORROSIVE SULFURIC ACID.

- 3.1** If it is necessary to remove the battery from the vehicle to maintain or charge it, always remove the grounded terminal first. Make sure all of the accessories in the vehicle are off to prevent arcing.
- 3.2** Be sure the area around the battery is well ventilated while the battery is being maintained or charged.
- 3.3** Clean the battery terminals before maintaining or charging the battery. During cleaning, keep airborne corrosion from coming into contact with your eyes, nose and mouth. Use baking soda and water to neutralize the battery acid and help eliminate airborne corrosion. Do not touch your eyes, nose or mouth.
- 3.4** Add distilled water to each cell until the battery acid reaches the level specified by the battery manufacturer. Do not overfill. For a battery without removable cell caps, such as valve regulated lead acid batteries (VRLA), carefully follow the manufacturer's recharging instructions.
- 3.5** Read, understand and follow all instructions for the solar panel, battery, vehicle and any equipment used near the battery and solar panel. Study all of the battery manufacturer's specific precautions while in use.
- 3.6** Determine the voltage of the battery by referring to the vehicle owner's manual and make sure that the output voltage of the solar battery maintainer is the correct voltage.
- 3.7** Make sure that the solar panel cable clips make tight connections.

4. SOLAR PANEL LOCATION

▲ WARNING



▲ WARNING



▲ WARNING



RISK OF EXPLOSION AND CONTACT WITH BATTERY ACID.

- 4.1** Locate the solar panel as far away from the battery as the DC cables permit.

- 4.2 Never place the solar panel directly above the battery being charged or maintained; gases from the battery will corrode and damage the solar panel.
- 4.3 Do not set the battery on top of the solar panel.
- 4.4 Never allow battery acid to drip onto the solar panel when reading the electrolyte specific gravity or filling the battery.
- 4.5 Do not operate the solar panel in a closed-in area or restrict the ventilation in any way.

5. DC CONNECTION PRECAUTIONS

- 5.1 Never allow the clips to touch each other.
- 5.2 Attach the clips to the battery and chassis, as indicated in sections 6 and 7.

6. FOLLOW THESE STEPS WHEN BATTERY IS INSTALLED IN VEHICLE



A SPARK NEAR THE BATTERY MAY CAUSE A BATTERY EXPLOSION. TO REDUCE THE RISK OF A SPARK NEAR THE BATTERY:

- 6.1 Position the DC cables to reduce the risk of damage by the hood, door and moving or hot engine parts. **NOTE:** If it is necessary to close the hood during the maintaining or charging process, ensure that the hood does not touch the metal part of the battery clips or cut the insulation of the cables.
- 6.2 Stay clear of fan blades, belts, pulleys and other parts that can cause injury.
- 6.3 Check the polarity of the battery posts. The POSITIVE (POS, P, +) battery post usually has a larger diameter than the NEGATIVE (NEG, N, -) post.
- 6.4 Determine which post of the battery is grounded (connected) to the chassis. If the negative post is grounded to the chassis (as in most vehicles), see step 6.5. If the positive post is grounded to the chassis, see step 6.6.
- 6.5 For a negative-grounded vehicle, connect the POSITIVE (RED) clip from the solar panel to the POSITIVE (POS, P, +) ungrounded post of the battery. Connect the NEGATIVE (BLACK) clip to the vehicle chassis or engine block away from the battery. Do not connect the clip to the carburetor, fuel lines or sheet-metal body parts. Connect to a heavy gauge metal part of the frame or engine block.
- 6.6 For a positive-grounded vehicle, connect the NEGATIVE (BLACK) clip from the solar panel to the NEGATIVE (NEG, N, -) ungrounded post of the battery. Connect the POSITIVE (RED) clip to the vehicle chassis or engine block away from the battery. Do not connect the clip to the carburetor, fuel lines or sheet-metal body parts. Connect to a heavy gauge metal part of the frame or engine block.
- 6.7 Using the quick-disconnect connector, plug the clips into the solar panel.
- 6.8 When disconnecting the solar panel, unplug the clips from the solar panel, remove the clip from the vehicle chassis, then remove the clip from the battery terminal.

7. FOLLOW THESE STEPS WHEN BATTERY IS OUTSIDE VEHICLE

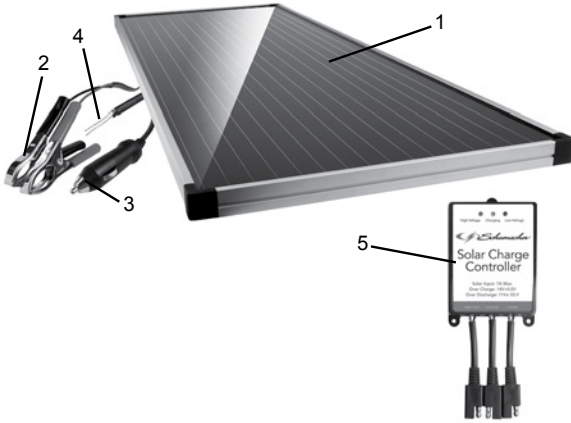


A SPARK NEAR THE BATTERY MAY CAUSE A BATTERY EXPLOSION. TO REDUCE THE RISK OF A SPARK NEAR THE BATTERY:

- 7.1 Check the polarity of the battery posts. The POSITIVE (POS, P, +) battery post usually has a larger diameter than the NEGATIVE (NEG, N, -) post.
- 7.2 Attach at least a 24-inch (61 cm) long 6-gauge (AWG) (13 mm²) insulated battery cable to the NEGATIVE (NEG, N, -) battery post.
- 7.3 Connect the POSITIVE (RED) solar panel clip to the POSITIVE (POS, P, +) post of the battery.
- 7.4 Position yourself and the free end of the cable you previously attached to the NEGATIVE (NEG, N, -) battery post as far away from the battery as possible – then connect the NEGATIVE (BLACK) solar panel clip to the free end of the cable.
- 7.5 Do not face the battery when making the final connection.
- 7.6 Using the quick-connect connector, plug the clips into the solar panel.

- 7.7 When disconnecting the solar panel, always do so in the reverse order of the connecting procedure and break the first connection while as far away from the battery as practical.
- 7.8 A marine (boat) battery must be removed and maintained or charged on shore. To maintain or charge it onboard requires equipment specially designed for marine use.

8. FEATURES



1. Solar Panel
2. Quick-Disconnect 50 Amp Battery Clip Cable Assembly
3. Quick-Disconnect 12V Accessory Plug Cable Assembly
4. Tinned Wire Cable Assembly
5. Charge controller
6. (4) Plastic Mounting Brackets (not shown)
7. (4) Heat-Dissipating Foot Pads (not shown)
8. (4) Mounting Screws (not shown)

9. ASSEMBLY AND MOUNTING INSTRUCTIONS

Remove all cord wraps and uncoil the cables prior to using the solar panel.

1. The included four foot pads can be mounted to the corners of the solar panel to help increase heat dissipation (see figure 1).

To mount the solar panel (in a dry location off the ground):

1. Place the solar panel face down on a clean flat surface.
2. Place the four plastic mounting brackets in the desired location and rotate each one 90°. Tighten the mounting brackets, using a flat blade screwdriver (see figure 2).
3. Turn the solar panel right side up, and using the mounting brackets as a guide, mark and drill four mounting holes on a secure, flat surface and mount the solar panel with the four stainless steel screws provided.

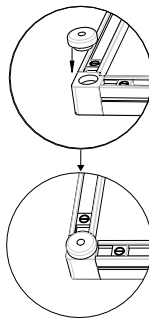


Fig. 1

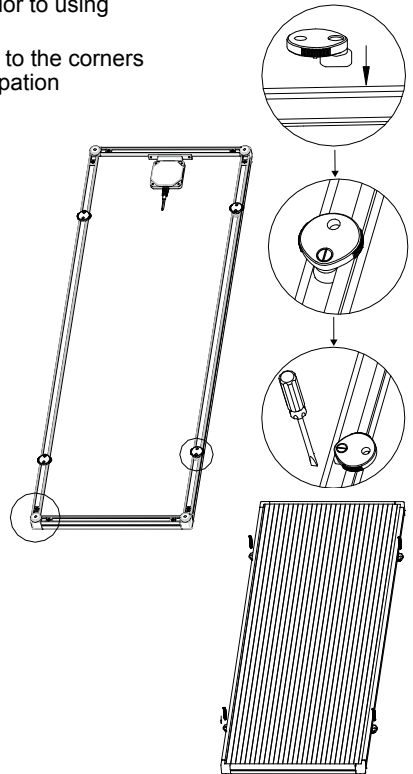


Fig. 2

NOTE: Do not over tighten the screws, or you will break the plastic frame of the solar panel.

10. USING THE SOLAR CHARGE CONTROLLER

The solar charge controller or charge regulator is designed to protect batteries from overcharge and excessive discharge when being charged by the solar panel. The controller functions to automatically assure the battery is fully charged and keep the battery fully charged without damages to the battery.

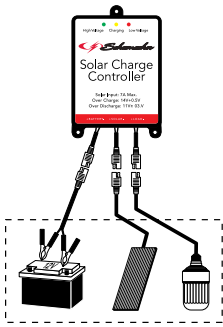
WARNING Connect and disconnect battery lead only when solar panel and load are disconnected.

- Do not exceed the maximum input ratings.
- Do not misconnect battery, solar panel and load, as this could cause reverse polarity. Avoid contact with water.
- Use only with 12V batteries. Do not connect with damaged batteries.

Follow these instructions:

Connect the solar panel, 12V rechargeable battery and application (if any), as shown in the illustration. Always connect the battery first.

When the solar panel is connected to the solar charge controller, the CHARGING (yellow) LED will light to show that the 12V rechargeable battery is receiving a charge from the solar panel.



NOTE: It is normal for the green and yellow LED to flicker back and forth during normal operation.

The charge controller provides the following protections for the whole system:

1. Charging: When the CHARGING (Yellow) LED is lit, the regulator is charging the battery.
2. Over-discharge protection: When the LOW VOLTAGE (Red) LED is lit, the charge regulator will shut off the power output to prevent damage to the battery.
3. Overcharge protection: When the HIGH VOLTAGE (Green) LED is lit, the regulator will shut off power input from solar panel to the battery.

The solar regulator can be mounted through its three mounting holes.

11. OPERATING INSTRUCTIONS

WARNING This solar panel must be properly assembled in accordance with the assembly instructions before it is used.

The solar panel does not have an ON/OFF switch. The On and Off commands are controlled by placing the solar panel in the sun only after the battery connections have been made.

You MUST disconnect the solar panel from the 12 volt power outlet or battery when starting the engine or driving the vehicle. Electrical surges from the alternator when starting and running may damage the solar panel.

NOTE: The clips and 12V output are always live.

Charging and Maintaining a battery

1. Ensure that all of the solar panel components are in place and in good working condition. For example, make sure the plastic boots are on the battery clips.
2. Decide whether you are going to use the 12 volt accessory plug or the 50 Amp battery clips to connect the solar controller to the vehicle. Connect the proper cable to the solar controller, making sure the connection is secure.
 - If using the 12 volt accessory plug, plug the connector into the vehicle's power outlet making sure the connection is secure.
 - If using the 50 Amp battery clips, connect the battery, following the precautions listed in sections 6 and 7.
3. Place the solar panel in the sun. For optimum solar panel output, face the front (glass) side of the solar panel towards the sun, making sure there are no shadows being cast on the panel by the vehicle or other objects. The best orientation to place the solar panel is in a south to north direction with the panel tilted at a suitable angle. The best angle would be the same as your local latitude.
4. To disconnect, reverse the procedure.

The Schumacher SP-1500 is a battery charger/maintainer that charges small batteries and maintains large 12 volt batteries, keeping them at full charge. However, if you were to use this unit to *charge* a large battery, you may lose some of the battery's capacity. This would cause the battery to be unable to hold a charge and become useless.

NOTE: The maintain mode technology utilized in Schumacher maintainers allows you to safely maintain a healthy battery for extended periods of time. However, problems with the battery, electrical problems in the vehicle, improper connections or other unanticipated conditions could cause excessive current draws. As such, occasionally monitoring your battery and the maintaining process is recommended.

Using The Quick-Disconnect Cable Assemblies

Connect either of the two output cable assemblies to the solar panel. Do not place the solar controller on wet ground, anywhere it could be accidentally stepped on or in a place or position where it could fall while being used. Never use the output cables together or for other applications, as reverse polarity and/or overcharge conditions will occur.

50 Amp Battery Clip Cable Assembly

1. Connect the end of the solar charge controller output cable to the end of the 50 amp battery clips cable.
2. Follow the steps in sections 6 and 7 to connect the output clips to the battery.
3. After a good electrical connection is made to the battery, connect the solar panel to the charger controller and place it in the sun, per the instructions in step 4 of the solar panel location section.

12V Accessory Plug Cable Assembly

Maintain or charge your battery without lifting the hood.

1. Connect the end of the 12V accessory plug cable to the solar charge controller.
2. Insert the 12V accessory plug into the 12V accessory outlet.
3. Route the power cord from the solar panel through the vehicle's open window.
4. Place the solar panel in the sun, per the instructions in step 3 of the Operating Instructions section.

12. MAINTENANCE INSTRUCTIONS

- 12.1 After use and before performing maintenance, unplug and disconnect the solar panel (see sections 6, 7 and 8).
- 12.2 Use a dry cloth to wipe all battery corrosion and other dirt or oil from the battery clips, cords and the solar panel.
- 12.3 The solar panel uses a glass substrate; please handle with care.
- 12.4 Always keep the glass surface clean using a soft cloth in order to ensure its maximum output.
- 12.5 Ensure that all of the solar panel components are in place and in good working condition, for example, the plastic boots on the battery clips.
- 12.6 Servicing does not require opening the unit, as there are no user-serviceable parts.
- 12.7 All other servicing should be performed by qualified service personnel.

13. MOVING AND STORAGE INSTRUCTIONS

- 13.1 Store the solar panel unplugged, in an upright position.
- 13.2 Store inside, in a cool, dry place.
- 13.3 Do not store the clips clipped together, on or around metal, or clipped to cables.
- 13.4 If the solar panel is moved around the shop or transported to another location, take care to avoid/prevent damage to the cords, clips and solar panel. Failure to do so could result in personal injury or property damage.

SPECIFICATIONS

Peak Power Output.....	15 Watt
Tested under Standard Condition	AM1.5, 100mW/cm ² , 25°C
Optimum Working Voltage	17.50 V
Optimum Working Current	850 mA