

# **CHARGE IT!**

by **SOLAR**



## **Operator's Manual Battery Maintainer Model No. 4501**

### **⚠ WARNING**









Failure to follow instructions may cause damage or explosion, always shield eyes.  
**Read entire instruction manual before use.**

### **⚠ WARNING**

This product can expose you to chemicals, including Vinyl-Chloride, Styrene and Acrylonitrile, which are known to the State of California to cause cancer.

A

## IMPORTANT SAFETY INSTRUCTIONS - READ THESE FIRST

<b>⚠ WARNING</b>	
	Read these instructions completely before using the Battery Charger and save them for future reference. Before using the Battery Charger to charge a battery, read these instructions and the instruction manual/safety information provided by the car, truck, boat or equipment manufacturer. Following all manufacturers' instructions and safety procedures will reduce the risk of accident.
	Working around lead-acid batteries may be dangerous. Lead-acid batteries release explosive gases during normal operation, charging and jump starting. Carefully read and follow these instructions for safe use. Always follow the specific instructions in this manual and on the Battery Charger each time you use the Battery Charger. All lead-acid batteries (car, truck and boat) produce hydrogen gas which may violently explode in the presence of fire or sparks. <b>Do not smoke, use matches or a cigarette lighter while near batteries.</b> Do not handle the battery while wearing vinyl clothing because static electricity sparks are generated when vinyl clothing is rubbed. Review all cautionary material on the Battery Charger and in the engine compartment.
	Always wear eye protection, appropriate protective clothing and other safety equipment when working near lead-acid batteries. Do not touch eyes while working on or around lead-acid batteries.
	Always store clamps away from each other or common conductors. Improper storage of clamps may cause the clamps to come in contact with each other, or a common conductor, which would be hazardous if the Battery Charger was plugged into an AC outlet.
	Use extreme care while working within the engine compartment, because moving parts may cause severe injury. Read and follow all safety instructions published in the vehicle's Owner's Manual.
	Batteries being charged with the Battery Charger unit likely contain liquid acids which are hazardous if spilled.

**WARNING:** Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**NOTE:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiver antenna
- Increase the separation between remote and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio TV technician for help.

This Class B digital apparatus complies with Canadian ICES-003.

1. **SAVE THESE INSTRUCTIONS** – This manual contains important safety and operating instructions for Model No. 4501.
2. Do not expose charger to rain or snow.
3. Use of an attachment not recommended or sold by the manufacturer may result in a risk of fire, electric shock, or injury to persons.
4. To reduce risk of damage to electric plug and cord, pull by plug rather than cord when disconnecting charger.
5. An extension cord should not be used unless absolutely necessary. Use of an improper extension cord could result in a risk of fire and electric shock. If extension cord must be used, make sure:
  - a. That pins on plug of extension cord are the same number, size, and shape as those of plug on charger,
  - b. That extension cord is properly wired and in good electrical condition; and
  - c. That the wire size is large enough for the length of cord as specified below.

Cord Length: ft.(m)	25(8)	50(16)	100(31)	150(46)
AWG size of cord:	18	16	14	12

6. To prevent electric shock - Dispose of battery charger if cord becomes defective.
7. Do not operate charger if it has received a sharp blow, been dropped, or otherwise damaged in any way; take it to a qualified service center.
8. Do not disassemble charger; take it to a qualified service center when service or repair is required. Incorrect reassembly may result in a risk of electric shock or fire.
9. To reduce risk of electric shock, unplug the charger from outlet before attempting any maintenance or cleaning. Turning off controls will not reduce this risk.
10. Monitor battery charger daily when using it to maintain battery for extended periods.
11. **WARNING – RISK OF EXPLOSIVE GASES.**
  - a. Working in 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 each time before using your charger, you read this manual and follow the instructions exactly.
  - b. To reduce risk of 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 cautionary markings on these products and in the engine compartment.

**B****PERSONAL PRECAUTIONS**

1. Someone should be within range of your voice or close enough to come to your aid when you work near a lead-acid battery.
2. Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.
3. Wear complete eye protection and clothing protection. Avoid touching eyes while working near battery.
4. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flood eye with cold running water for at least 10 minutes and get medical attention immediately.
5. NEVER smoke or allow a spark or flame in vicinity of battery or engine.
6. Be extra cautious to reduce risk of dropping a metal tool onto battery. It might spark or short-circuit battery or other electrical part that may cause explosion.
7. 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 other jewelry to metal, causing a severe burn.
8. Use charger for 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 battery charger for charging dry-cell batteries that are commonly used with home appliances. These batteries may burst and cause injury to persons and damage to property.
9. NEVER charge a frozen battery.

**C****PREPARATION****PREPARING TO CHARGE BATTERY:**

1. If it is necessary to remove battery from vehicle to charge, always remove grounded terminal from battery first. Make sure all accessories in the vehicle are off, so as not to cause an arc.
2. Be sure area around battery is well ventilated while battery is being charged. Gas can be forcefully blown away by using a piece of cardboard or other non-metallic material as a fan.
3. Clean battery terminals with a mixture of baking soda and hot water. Be careful to keep corrosion from coming in contact with eyes.

4. Add distilled water in each cell until battery acid reaches level specified by battery manufacturer. This helps purge excessive gas from cells. Do not overfill. For Maintenance Free Batteries - carefully follow manufacturer's recharging instructions.
5. Study all battery manufacturer's specific precautions such as removing or not removing cell caps while charging and recommended rates of charge.
6. Determine voltage of battery by referring to vehicle owner's manual and make sure that charger output voltage matches vehicle voltage.

**D****LOCATING THE CHARGER**

1. Locate the charger as far away from the battery as DC cables permit.
2. Never place the charger directly above the battery being charged; gases from the battery will corrode and damage the charger.
3. Never allow battery acid to drip on the charger when reading specific gravity or filling the battery.
4. Do not operate the charger in a closed area or restrict ventilation in any way.
5. Do not set a battery on top of the charger.
6. Locate the charger at least 18" above the floor.
7. Do not place the charger where rain, snow, or other moisture could drip on it.

**E****BATTERY CHARGER CONNECTION PRECAUTIONS**

1. CAUTION: Connect and disconnect DC output clips only after setting any switches with an OFF position to OFF and removing AC power cord from electric outlet. Never allow clips to touch each other.
2. When hooking up charger, attach one clip to battery and the other to a point away from battery (see sections F & G). Do not hook up charger until reading sections A–J.
3. Always make battery connections prior to plugging charger into AC outlet.

To reduce explosion risk, never connect both clips directly to the battery. When making each connection, twist or rock clip back and forth several times to make a good connection and to reduce the risk of a clip slipping off and creating a spark. Do not twist or rock clip on the battery after the second clip connection is made.

## F CHARGING A BATTERY THAT IS INSTALLED IN A VEHICLE

CAUTION: A MARINE (BOAT) BATTERY MUST BE REMOVED AND CHARGED ON SHORE. TO CHARGE IT ON BOARD REQUIRES EQUIPMENT SPECIALLY DESIGNED FOR MARINE USE.

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

1. Position AC and DC cords to reduce risk of damage by hood, door, or moving engine part.
2. Stay clear of fan blades, belts, pulleys, and other parts that can cause injury to persons.
3. Check polarity of battery posts. POSITIVE (POS, P, +) battery post usually has larger diameter than NEGATIVE (NEG, N, -) post.
4. Determine which post of battery is grounded (connected) to the chassis. If the negative post is grounded to the chassis (as in most vehicles), see Figure 1 and instruction 5a. If the positive post is grounded to the chassis, see instruction 5b.
5. a) For NEGATIVE GROUNDED vehicle, connect POSITIVE (Red) clip from the battery charger to the POSITIVE (POS, P, +) ungrounded post of the battery.  
b) For POSITIVE GROUNDED vehicle, connect the NEGATIVE (Black) clip from the battery charger to the NEGATIVE (NEG, N, -) ungrounded post of the battery. (This arrangement is usually found in pre-1970 foreign vehicles or pre-1970 farm tractors. This is a rare occurrence.)
6. Connect the remaining battery charger clip to the vehicle chassis or engine block, as far away from the battery as possible. Do not connect the clip to carburetor, fuel lines, or sheet metal body parts. Connect to a heavy gauge metal part of the frame or engine block.
7. When disconnecting charger, disconnect AC cord, remove clip from vehicle chassis, and then remove clip from battery terminal.
8. Refer to the Operating Instructions for information on setting selector switches.

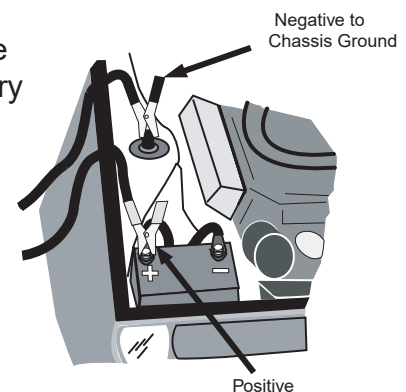


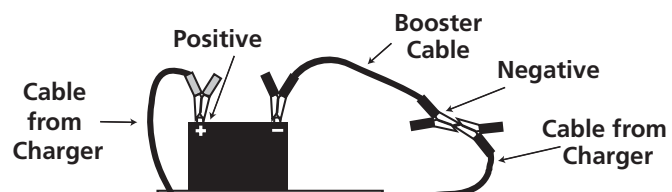
Figure 1

**G****CHARGING A BATTERY OUTSIDE OF THE VEHICLE**

CAUTION: A MARINE (BOAT) BATTERY MUST BE REMOVED AND CHARGED ON SHORE. TO CHARGE IT ON BOARD REQUIRES EQUIPMENT SPECIALLY DESIGNED FOR MARINE USE.

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

1. Check polarity of battery posts. POSITIVE (POS, P, +) battery post usually has a larger diameter than NEGATIVE (NEG, N, -) post.
2. Attach at least a 24" long, #6 gauge (AWG) insulated battery cable to NEGATIVE (Neg, N, -) battery post.
3. Connect POSITIVE (RED) charger clip to POSITIVE (POS, P, +) post of battery.
4. Position yourself and the free end of the cable (installed in step #2) as FAR away from the battery as possible. FACING AWAY FROM THE BATTERY, connect the NEGATIVE (Black) charger clip to the free end of the cable.
5. When charging is complete, disconnect charger, always in reverse sequence of connecting procedure and break first connection while as far away from battery as practical.

**H****OPERATING INSTRUCTIONS**

1. The battery maintainer comes with the output options: Clamp set, ring terminal set and 12V adapter. Choose the option that best meets your specific needs and connect it to the output lead.
2. Make a proper battery connection based on the output option chosen (see section F or G as applicable).
3. Plug the maintainer into an AC receptacle:
  - If a blinking red LED lights, this indicates a reverse polarity condition has been detected. Disconnect from AC power supply immediately and check all battery connections until the cause is found and corrected.
  - If a red LED lights solid, the charger has begun charging. Assuming you achieve a solid red LED upon AC connection, the charger will execute its multi-step charging process.

- As the battery approaches full charge, the LED indicator will change to a blinking green LED.
- Once the battery has reached full charge, the LED indicator will light solid green. The battery will be maintained until it is disconnected from the charger.

**Note:** If the blinking red ERROR LED lights after the charging routine has started, this indicates a fault has occurred or a shorted cell has been detected. Disconnect from AC power and test the battery to ensure proper condition. For extremely large batteries, the charging routine could timeout during one of the charging steps and, in this case, restarting the charging process should resolve the issue.

4. When you are finished with the charging process, disconnect AC power cord from AC outlet, and then disconnect DC leads from battery/vehicle in the reverse sequence of the connection procedure.



## CHARGER CARE & MAINTENANCE

**CAUTION** – Make sure charger is unplugged from electrical outlet before performing any maintenance.

A minimum amount of care can keep your battery charger working and looking good for years.

1. Clean the clamps after each use. Wipe off any battery fluid that may have come in contact with the clamps to prevent corrosion. Battery fluid may be neutralized with a solution of water and baking soda.
2. If needed, the case may be wiped clean with a soft cloth.

There are no user-serviceable parts inside.