



MODEL 9410 12 VOLT, 0-10 AMP BATTERY CHARGER WITH DEEP DISCHARGE RECOVERY

OPERATOR'S MANUAL

IMPORTANT SAFETY INSTRUCTIONS

1. **SAVE THESE INSTRUCTIONS.** This manual contains important safety and operating instructions for battery charger you have purchased. You may need to refer to these instructions at a later date.
2. **CAUTION.** To reduce risk of injury, charge only lead-acid rechargeable batteries. Other types of batteries may burst causing personal injury and property damage.
3. Do not expose the charger to rain or snow if specifically warned on the unit not to do so.
4. Use of an attachment not recommended or sold by the battery charger manufacturer may result in a risk of fire, electric shock, or injury to persons.
5. To reduce the risk of damage to the electric plug and cord, pull by the plug rather than the cord when disconnecting the charger.
6. Make sure the cord is located so that it will not be stepped on, tripped over, or otherwise subjected to damage or stress.
7. An extension cord should not be used unless absolutely necessary. Use of a improper extension cord could result in a risk of fire and electric shock. If an extension cord must be used, make sure:
 - a. That the pins on the plug of extension cord are the same number, size, and shape as those of the plug on the charger;
 - b. That the extension cord is properly wired and in good condition; and
 - c. If the length of the extension cord is less than 25 feet, use a 18AWG cord, If 50 feet- 18AWG, 100 feet-16AWG, 150 feet-14AWG.
8. Do not operate the charger with a damaged cord or plug, replace them immediately.
9. Do not operate the charger if it has received a sharp blow, been dropped, or otherwise damaged in any way; take it to a qualified serviceman.
10. Do not disassemble the charger; take it to a qualified serviceman when service or repair is required. Incorrect reassembly may result in risk of electric shock or fire.
11. To reduce the risk of electric shock, unplug the charger from the outlet before attempting any maintenance or cleaning. Turning off the controls will not reduce this risk.
12. **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 the risk of battery explosion, follow these instructions and those published by the battery manufacturer and manufacturer of any equipment you intend to use in vicinity of the battery. Review cautionary markings on these products and on the engine.
13. **PERSONAL PRECAUTIONS**
 - a. Someone should be within range of your voice or close enough to come to your aid when you work near a lead-acid battery.
 - b. Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.
 - c. Wear complete eye protection, and clothing protection. Avoid touching eyes while working near battery.
 - d. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enter eyes, immediately flood eyes with running cold water for at least 10 minutes and get medical attention immediately.
 - e. NEVER smoke or allow a spark or flame in vicinity of the battery or engine.
 - f. Be extra cautious to reduce risk of dropping a metal tool onto the battery. It might spark or short circuit the battery or other electrical parts that may cause an explosion.
 - g. 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.
 - h. Use this charger for charging a LEAD-ACID battery only. It is not intended to supply power to a low-voltage electrical system other than in an automotive application. Do not use this 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.
 - i. NEVER charge a frozen battery.
14. **PREPARING TO CHARGE**
 - a. If necessary to remove battery from vehicle to charge, always remove the grounded terminal from the battery first. Make sure all accessories in the vehicle are off, so as not to cause an arc.
 - b. Be sure the area around the battery is well ventilated while the battery is being charged. Gas can be forcefully blown away by using a piece of cardboard or other non-metallic material as a fan.
 - c. Clean the battery terminals. Be careful to keep corrosion from coming in contact with eyes.
 - d. Add distilled water in each cell until battery acid reaches level specified by the battery manufacturer. This helps purge excessive gas from cells. Do not overfill. For a battery without cell caps, carefully follow the manufacturer's recharging instructions.
 - e. Study all battery manufacturer's specific precautions such as removing or not removing the cell caps while charging and the recommended rates of charge.
 - f. Determine voltage of the battery by referring to the car owner's manual and make sure that the output voltage selector switch is set at the correct voltage. If the charger has adjustable charge rate, charge the battery initially at the lowest rate.

15. CHARGER LOCATION

- Locate the charger as far away from the battery as the DC cables permit.
- Never place the charger directly above the battery being charged; gases from the battery will corrode and damage the charger.
- Never allow battery acid to drop on the charger when reading the specific gravity or filling battery.
- Do not operate the charger in a closed-in area, or restrict ventilation in any way.
- Do not set a battery on top of the charger.

16. DC CONNECTION PRECAUTIONS

- Connect and disconnect the DC output clamps only after setting the charger switches to the OFF position and removing the AC cord from the electric outlet. Never allow the clamps to touch each other.
- Attach the DC clamps to the battery post and twist or rock back and forth several times to make a good connection. This tends to keep the clamps from slipping off the terminals and helps to reduce the risk of sparking.

17. FOLLOW THESE STEPS WHEN THE BATTERY IS INSTALLED IN A VEHICLE. A SPARK NEAR THE BATTERY MAY CAUSE A BATTERY EXPLOSION. TO REDUCE THE RISK OF A SPARK NEAR THE BATTERY:

- Position the AC and DC cords to reduce the risk of damage by the hood, door, or moving engine parts.
- Stay clear of fan blades, belts, pulleys, and other parts that can cause injury to persons.
- Check the polarity of the battery post. The POSITIVE (POS, P, +) battery post usually has a larger diameter than the NEGATIVE (NEG, N, -) post.
- 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 item "e". If the positive post is grounded to the chassis, see item "f".
- For negative-grounded vehicles, connect the POSITIVE (RED) clamp from the battery charger to the POSITIVE (POS, P, +) ungrounded post of the battery. Connect the NEGATIVE (BLACK) clamp to the vehicle chassis, heavy gauge metal part of the frame, or engine block, away from the battery. Do not connect to the carburetor, fuel lines, or sheet metal body parts.
- For positive-grounded vehicle, connect NEGATIVE (BLACK) clamp from the battery charger to the NEGATIVE (NEG, N, -) ungrounded post of the battery. Connect POSITIVE (RED) clamp to the vehicle chassis or engine block away from the battery. Do not connect the clamp to the carburetor, fuel lines, or sheet-metal body parts. Connect to a heavy gauge metal part of the frame or engine block.
- When disconnecting the charger, turn the switches to OFF, disconnect the AC cord, remove the clamp from the vehicle chassis, and then remove the clamp from the battery terminal.
- See the operating instructions for length of charge information.

18. FOLLOW THESE STEPS WHEN THE BATTERY IS OUTSIDE THE VEHICLE. A SPARK NEAR THE BATTERY MAY CAUSE BATTERY EXPLOSION. TO REDUCE THE RISK OF A SPARK NEAR THE BATTERY:

- Check the polarity of the battery post. The POSITIVE (POS, P, +) usually has a larger diameter than the NEGATIVE (NEG, N, -) post.
- Attach at least a 24 inch long 6-gauge (AWG) insulated battery cable to the NEGATIVE (NEG, N, -) battery post.
- Connect the POSITIVE (RED) charger clamp to the POSITIVE (POS, P, +) post of the battery.
- Position yourself and free end of cable as far away from the battery as possible - then connect the NEGATIVE (BLACK) charger clamp to the free end of cable.
- Do not face the battery when making the final connection.
- When disconnecting the charger, always do so in reverse sequence of connecting procedure, and break the first connection while standing as far away from the battery as practical.
- A marine (boat) battery must be removed and charged on shore. To charge it on board requires equipment specially designed for marine use.

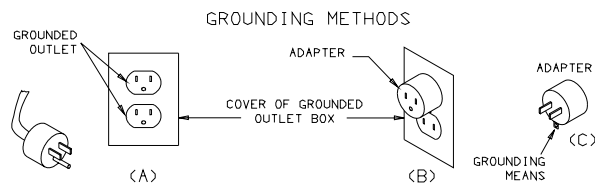
19. GROUNDING AND AC POWER CORD CONNECTION INSTRUCTIONS

The charger should be grounded to reduce the risk of electric shock. This charger is equipped with an electric cord having an equipment grounding conductor and a grounding plug. The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.

DANGER. Never alter the AC cord or plug provided - if it will not fit the outlet, have a proper outlet installed by a qualified electrician.

Improper connection can result in a risk of an electric shock. This battery charger is for use on a nominal 120-volt circuit, and has a grounding plug that looks like the plug illustrated in FIGURE (A). A temporary adapter, which looks like the adapter illustrated in FIGURE (C), may be used to connect this plug to a two-pole receptacle, as shown in FIGURE (B), until a properly grounded outlet can be installed by a qualified electrician.

DANGER. Before using an adapter as illustrated, be certain that the center screw of the outlet plate is grounded. The green-colored rigid ear or lug extending from the adapter must be connected to a properly grounded outlet - make certain it is grounded. If necessary, replace the original outlet cover plate screw with a longer screw that will secure the adapter ear or lug to the outlet cover plate and make ground connection to grounded outlet.



NOTE: USE OF AN ADAPTER IS NOT ALLOWED IN CANADA. IF A GROUNDING TYPE RECEPTACLE IS NOT AVAILABLE, DO NOT USE THIS APPLIANCE UNTIL THE PROPER OUTLET IS INSTALLED BY A QUALIFIED ELECTRICIAN.

20. CHARGE PERIOD

The approximate required time to bring a battery to full charge state depends upon the number of ampere-hours (AH) depleted from the battery. AHs are determined by multiplying the number of hours times the number of Amps supplied by a battery to a load and normally indicated on the battery. For example - if a load was connected to a battery, which drew 7 Amps for a period of 5 hours, the battery will have supplied 35 AH. The approximate recharge time would then be calculated by dividing the 35 AH depleted from the battery, by the ampere charge rate of the charger. To allow for tapering of the charge rate add 25 percent to the charge time.

OPERATING INSTRUCTIONS

- * **CONTINUOUS RED LIGHT** - Indicates AC power is on.
- * **CONTINUOUS GREEN LIGHT** - Indicates correct connection. If when battery is connected, the green light does not light, check for proper polarity or poor connections. If the battery voltage is below 1 volt the green light will not come on.
- * **CONTINUOUS YELLOW LIGHT** - Indicates charging.
- * **BLINKING YELLOW LIGHT** - Indicates battery is near end of charge and is in the float charge mode.
- * **BLINKING GREEN LIGHT** - Indicates charging is complete and is in the standby mode.
- * **ALTERNATING GREEN AND YELLOW LIGHTS** - Flooded batteries only. Indicates first stage of deep discharge recovery process.

NOTES:

FIVE SECOND DELAY - To avoid sparking, the charger control tests for correct polarity before applying current to the battery. When connected properly, the green light will come on for 5 seconds before the yellow light comes on.

BATTERY TEST - During the 5 second period when the green light is on, the charger will test for a deep discharged battery.

BATTERY CHARGE - After testing the battery, the control will select a charging rate suitable for the voltage and state of charge of the battery. A small battery, or a nearly charged battery will cause the charger to rapidly step down in current to avoid heating and gassing.

FINISH CHARGE - In order to reach a 100 % state of charge on the battery, a finish charge cycle has been programmed into the charger. During the finish cycle, the yellow light will blink. If the battery is good, there will be enough charge in the battery at this time to start a vehicle when the yellow light is blinking. If desired, the battery can be removed and replaced in the vehicle. The vehicle alternator will finish charging the battery.

NOTE: To avoid sparking, always pull the AC cord plug from the outlet receptacle to disconnect charger power before removing the output clamps.

BATTERY MAINTAINER - If the charger is left connected to the battery, it will begin recharging if the terminal voltage falls below 12.5 VDC. It is recommended that the electrolyte level on flooded batteries be checked regularly when charging batteries for an extended period of time.

DEEP DISCHARGE RECOVERY - If the charger determines a battery is deeply discharged, it will attempt to recover the battery with a program designed to enhance charge acceptance. Because of the voltage levels required for recovery, this program is not included for sealed batteries.

VRLA BATTERIES - All sealed batteries are valve regulated batteries. They will be of two types, gel cell or absorptive glass mat (AGM). VRLA batteries have voltage limit restrictions during charging to prevent gassing because their sealed construction prevents replenishing the electrolyte. Never charge a VRLA battery with the selector switch in the FLOODED position.

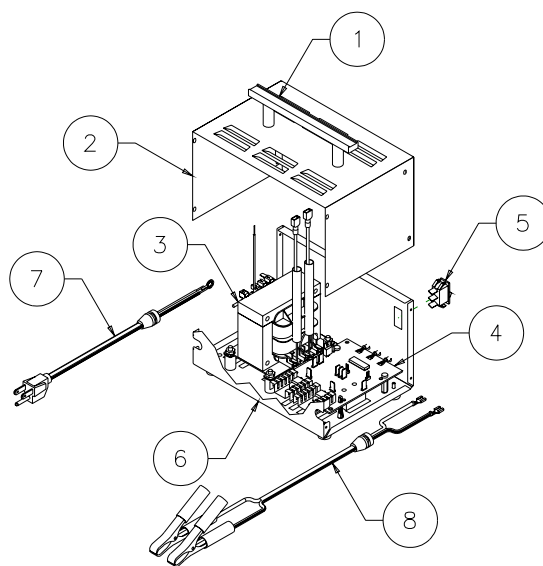
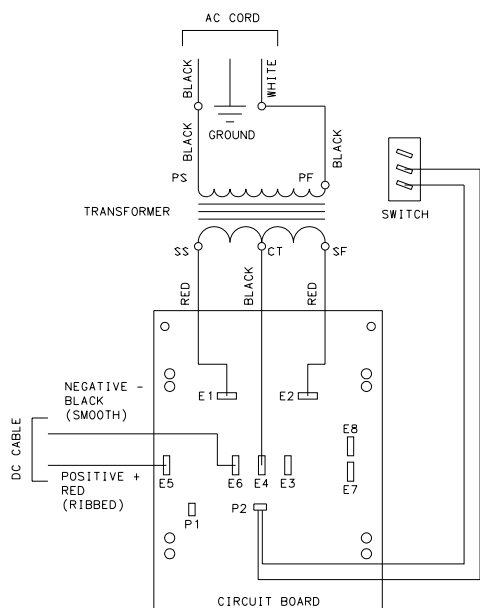
OPERATING PROCEDURE:

1. Put selector switch in the position which matches the type of battery being charged.
2. Plug AC cord into outlet. The Red light should come on.
3. Connect the BLACK clamp to the negative (-) terminal of the battery. Connect the RED clamp to the positive (+) terminal of the battery. The GREEN light will come on for about 5 seconds.
4. The YELLOW light will come on when the GREEN light goes off and charging will begin.
5. When in FLOODED battery charging, if the battery is deeply discharged, the YELLOW and GREEN lights will alternate on and off for about 1 minute.
6. The battery is between 80% and 99% state of charge when the YELLOW light blinks. The charger is in the finish charge mode.
7. The battery has been fully charged when the GREEN light is blinking. No current is supplied to the battery and the charger is in the standby mode.

NOTES:

- a. If the charger is connected to a battery which will not accept a charge, the charger will continue to attempt to charge it as long as the battery is connected. Discontinue charging after a reasonable amount of time or if the battery feels hot.
- b. If the charger is connected to a fully charged battery, the charger will go into the finish charge mode then shut off and the GREEN light will blink.
- c. Not all deeply discharged batteries can be recovered.
- d. Some batteries which have been recovered from a deep discharge will maintain an acceptable open circuit terminal voltage but have reduced capacity under load. Always load test or otherwise test a recovered battery to determine if the CCA capacity is within 80% of the rated value.
- e. Any time a malfunction is suspected reset the control by pulling the AC plug.

WIRING DIAGRAM



MODEL 9410 REPAIR PARTS

<u>Item</u>	<u>Description</u>	<u>Part No.</u>	<u>Item</u>	<u>Description</u>	<u>Part No.</u>
1	Handle	610619	6	Cabinet Base	610939
2	Cabinet top	610932	7	A.C. Cord	610936
3	Transformer	610937	8	D.C. Cord	610615
4	Circuit board	610938	9	Stand-off (Set of 2)	610759
5	Rate switch	610620			

MAINTENANCE INSTRUCTIONS

Worn clamps should be replaced. Worn parts can lead to poor connections and present a safety hazard. See parts list for part number of D.C. Cord kit. Any Maintenance or repair of this unit that involves disassembly of the cabinet should be done only by a qualified serviceman. Incorrect reassembly may result in a risk of electric shock when the unit is subsequently used.

ILLUSTRATION LISTING 27-657E.MAN 9410 - ENGLISH

FIG.	FILE	DESCRIPTION
1	LOGO.eps	AEC logo
2	PLUG-ENG.PLT	GROUNDING ADAPTER - ENGLISH
3	37-581E.PLT	WIRING DIAGRAM 9410 - ENGLISH
4	27-657xv.PLT	EXPLODED VIEW 9410