



**MODEL US20
6/12 VOLT, 40/40/10 AMP
BATTERY CHARGER
OPERATOR'S MANUAL**

IMPORTANT SAFETY INSTRUCTIONS

1. **SAVE THESE INSTRUCTIONS.** This manual contains important safety and operating instructions for battery charger model US20. You may need to refer to these instructions at a later date.
2. **CAUTION.** To reduce risk of injury, charge only wet cell, lead-acid, automotive type 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 an 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 16AWG cord, If 50 feet- 12AWG, 100 feet-10AWG, 150 feet-8AWG.
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 manufacturers' 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 vehicles, Connect the NEGATIVE (BLACK) clamp from the battery charger to the NEGATIVE (NEG, N, -) ungrounded post of the battery. Attach the 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.
- 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 the free end of the 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.

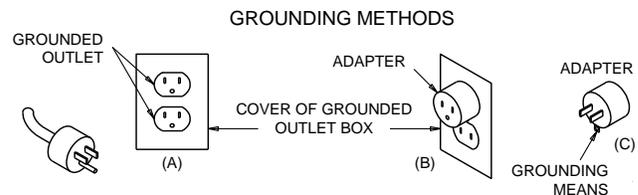
19. GROUNDING AND AC POWER CORD CONNECTION INSTRUCTIONS

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 serviced with a circuit breaker or fuse rated no higher than 20A 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. LENGTH OF CHARGE

- a. Test the battery for state of charge. Do not charge if it is over 75% charged or the battery is determined to be defective.
- b. Set beginning amps charge rate for size of battery and state of charge per charts
- c. Charge for length of time per charge,
- d. Discontinue charge when the specific gravity of electrolyte reaches 1.260 or above. A temperature compensating hydrometer should be used for this reading. Discontinue charge if the battery begins to gas excessively or when the temperature of the electrolyte reaches approximately 120°F. Do not overcharge batteries. Overcharging results in excessive water loss and eventual damage to the battery.

BATTERY SIZE TABLE			
BATTERY SIZE	SMALL	MEDIUM	LARGE
Ampere Hours	40	60	80+
Reserve Capacity	60	90	100+
Cold Cranking Amps	275	350	400+

STATE OF CHARGE TABLE				
STATE OF CHARGE	75%	50%	25%	DEAD
Specific Gravity	1.225	1.185	1.140	1.110
Open Circuit Voltage 6V	6.2	6.05	5.95	5.9
Open Circuit Voltage 12V	12.4	12.1	11.9	11.8

CHARGE RATE Vs. MINUTES CHARGE							
BATTERY SIZE	%CHARGE	MINUTES					
		15	30	45	60	75	90
SMALL	0-25	40	30	25	20	15	10
	25-50	40	20	10	10	5	5
	50-75	40	20	10	10	5	5
MEDIUM	0-25	35	30	25	20	15	10
	25-50	30	20	15	10	10	10
	50-75	30	20	15	10	10	10
LARGE	0-25	40	30	25	20	15	10
	25-50	40	30	25	20	15	10
	50-75	40	25	20	15	15	15

ASSEMBLY INSTRUCTIONS

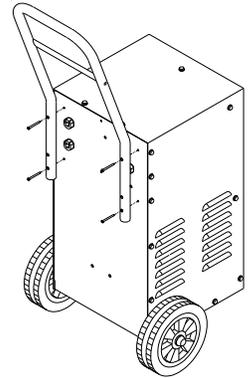
Remove four screws securing handle to charger. Attach the handle in an upright position.

OPERATING INSTRUCTIONS

CAUTION - This battery charger must be fully assembled before operating. Failure to do so may result in risk of injury.

TO CHARGE BATTERIES

Make the connections to the battery per the instructions in the previous sections. Determine if the battery is 6 or 12 volts. Set the CHARGE VOLTAGE switch to 6/12 LOW CHARGE for a 6 or 12 volt battery. If higher rate is desired, set at 12 HIGH. **DO NOT** charge a 6 volt battery at setting other than 6/12 low or charge any battery on 12V Start (Damage may occur to the battery). Set the TIMER to the desired charge time. Length of charge should be per the above chart and instructions. The Ammeter shows the amount of current being delivered to the battery. ATTENTION: When charging an AGM battery the charge should be terminated between 14.7V to 15.0V, always follow battery manufacture instructions.



12 VOLT ENGINE START

Turn off all lights and accessories in the stalled vehicle. Connect the charger to battery per previous instructions. Charge the battery on 12 HI for at least five minutes before attempting to start the vehicle. Put the switch in the 12V ENGINE START position. Start the vehicle with the charger connected to the battery. Follow the duty cycle on the unit.

NOTE: DO NOT crank the engine more than 20 seconds in any five minute period; excessive cranking may overheat and damage the starter. If the vehicle fails to start, while waiting for the starter to cool, allow the charger to continue to charge the battery. Set the CHARGE VOLTAGE switch and TIMER to OFF and remove the AC power cord from the electric outlet before disconnecting the DC clamps.

CHARGING SULFATED BATTERIES

If your battery has sat in the discharged state for an extended period of time, it can become SULFATED. This usually is seen as a white deposit near the top of the battery. The sulfate is formed when a battery with low water levels remains discharged for an extended time. Sulfated batteries exhibit the characteristic of accepting no charge regardless of the rate of charge.

The charging method is two staged. The first stage of attempting to break down the sulfation to allow the battery to accept a charge must be closely watched to avoid excessive charge rates as the battery begins to charge and overheating. The second stage is a slow charging to restore the battery to full charge.

READ AND FOLLOW ALL PRECAUTIONS AND WARNINGS IN YOUR INSTRUCTION MANUAL BEFORE ATTEMPTING TO CHARGE SULFATED BATTERIES. FAILURE TO OBSERVE THESE WARNINGS MAY RESULT IN PROPERTY DAMAGE OR SERIOUS PERSONAL INJURY OR DEATH.

To recharge a sulfated battery:

1. Attach the battery clamps as described in the instruction manual.
2. Always use the charger's lowest rate when turning the charger on. Set the charger to the charger's highest rate for the voltage of the battery being charged.

CAUTION: NEVER CHARGE A BATTERY AT VOLTAGES RATES ABOVE THAT OF THE BATTERY.

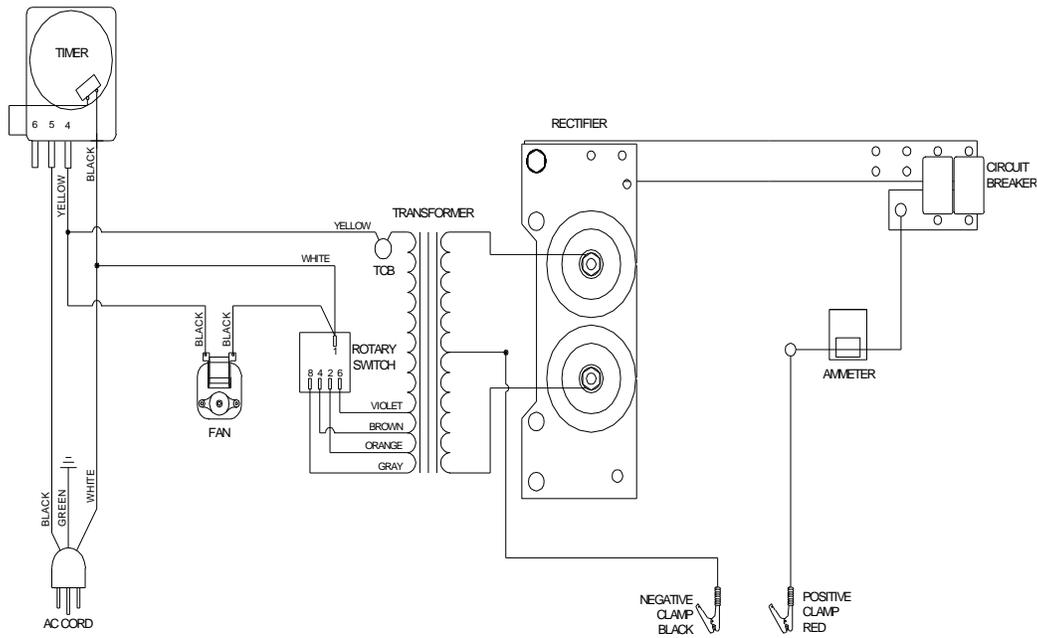
3. The battery will show little or no amperage at the start of the charging process. This will continue until the sulfation begins to break down.

CAUTION: AS THE SULFATION BREAKS DOWN, THE AMPERAGE MAY RAPIDLY RISE. CONSTANT ATTENTION MUST BE OBSERVED TO PREVENT SERIOUS OVERHEATING OF THE BATTERY.

4. Lower the charge rate to the lowest rate for the voltage of battery being charged.
5. Charge the battery at this low rate until the electrolyte reaches the fully charged state as described in the tables in your instruction manual. This may take as long as two or three days.

NOTE: SOME BATTERIES MAY BE SO BADLY SULFATED THEY CAN NOT BE RESTORED TO A NORMAL OPERATING CONDITION, REGARDLESS OF THE RATE OF CHARGE OR THE LENGTH OF TIME THE CHARGE IS APPLIED. IF THE BATTERY CANNOT BE RESTORED TO A FULLY CHARGED CONDITION BY A SLOW CHARGING, IT SHOULD BE REPLACED.

WIRING DIAGRAM



MODEL US20 REPAIR PARTS LIST

Switch w/knob.....	611187	DC Circuit Breaker (1 ea).....	610069
Axle w/nuts.....	610287	Ammeter.....	610695
Wheels w/nuts.....	605672	AC Cord.....	611248
Transformer.....	611199	DC Cable Set.....	611496
Rectifier.....	611200	Handle.....	605213
Fan Blade.....	611201	Clamp Bar.....	610517
Fan Motor.....	611202	Cabinet, Front-Base-Back.....	611409
Leg.....	610825	Cabinet, Top-Sides.....	611207
Pointer Knob.....	603147	Timer w/knob.....	611245

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 DC Cable Set. 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.