

## AMMETER

The Ammeter indicates the amount of current, measured in amps, that is being drawn by the battery. As a battery takes on a charge, it draws less current from the charger. Correspondingly, the meter will show less current being drawn by the battery. When the current stops decreasing, the battery is charged. The start area of the meter indicates a high rate of current being drawn from the charger. When cranking an engine, the meter needle will be at the extreme right side of the start area. The 2 amp charge rate may indicate some activity on the meter, although the meter does not have the resolution to display this low rate.

## 12. OPERATING INSTRUCTIONS

**WARNING: A SPARK NEAR BATTERY MAY CAUSE AN EXPLOSION.**

### CHARGING A BATTERY IN THE VEHICLE

1. Turn off all the vehicle's accessories.
2. Keep the hood open.
3. Clean the battery terminals.
4. Set the timer to the OFF position.
5. Lay the AC/DC cables away from any fan blades, belts, pulleys and other moving parts.
6. Connect the battery, following the precautions listed in sections 6 and 7.
7. Connect the charger to an electrical outlet.
8. Select the desired charge rate.
9. Set the timer to the charge time; **MONITOR THE CHARGER AND THE BATTERY.**
10. When disconnecting the charger, set the timer to the OFF position, disconnect the charger from the AC power, remove the clamp from the vehicle chassis, and then remove the clamp from the battery terminal.

### CHARGING A BATTERY OUTSIDE OF THE VEHICLE

1. Place battery in a well-ventilated area.
2. Set the timer to the OFF position.
3. Clean the battery terminals.
4. Connect the battery, following the precautions listed in sections 6 and 7.
5. Connect the charger to the electrical outlet.
6. Select the desired charge rate.
7. Set the timer to the charge time; **MONITOR THE CHARGER AND THE BATTERY.**
8. When disconnecting the charger, set the timer to the OFF position, disconnect the charger from the AC power, disconnect the negative clamp, and finally the positive clamp.
9. A marine (boat) battery must be removed and charged on shore.

### USING CHARGE MODE

Use for charging automotive, marine and deep-cycle batteries. Monitor the charging process and stop when the battery is fully charged. Not doing so may damage your battery and result in property damage or personal injury.

### USING BOOST MODE

Use Boost mode for quickly adding energy to a severely discharged or large capacity battery prior to Engine Start. Monitor the boosting process.

### USING THE ENGINE START FEATURE

Your battery charger can be used to jump start your car if the battery is low. Follow all safety instructions and precautions for charging your battery. Wear complete eye protection and protective clothing.

**WARNING:** Using the ENGINE START feature WITHOUT a battery installed in the vehicle could damage the vehicle's electrical system.

**NOTE:** If you have charged the battery and it still will not start your car, do not use the Engine Start feature, or it could damage the vehicle's electrical system. Have the battery checked.

1. Set the timer to the OFF position.
2. With the charger unplugged from the AC outlet, connect the charger to the battery following the instructions given in the *Follow These Steps When Battery Is Installed In Vehicle* section.
3. Plug the charger's AC power cord into the AC outlet.
4. With the charger plugged in and connected to the battery of the vehicle, set the Charge Rate selector switch to the Engine Start position.
5. Crank the engine until it starts or 5 seconds pass. If the engine does not start, wait 3 minutes before cranking again. This will precharge the battery.

**NOTE:** During extremely cold weather, or if the battery is under 2 volts, use Boost or Engine Start for 5 minutes before cranking the engine.

6. If the engine fails to start, use Boost or Engine Start for 5 more minutes before attempting to crank the engine again.
7. After the engine starts, move the timer to the OFF position and unplug the AC power cord before disconnecting the battery clamps from the vehicle.
8. Clean and store the charger in a dry location.

**NOTE:** If the engine does turn over but never starts, there is not a problem with the starting system; there is a problem somewhere else with the vehicle. STOP cranking the engine until the other problem has been diagnosed and corrected.

### FAN OPERATION

It is normal for the fan to run while the timer is on. Keep the area near the charger clear of obstructions, to allow the fan to operate efficiently.

## 13. CALCULATING CHARGE TIME

When you know the percent of charge and the Amp hour (Ah) rating of your battery, you can calculate the approximate time needed to bring your battery to a full charge.

**Example:** Amp hour rating =  $\frac{\text{Reserve capacity}}{2} + 16$

**NOTE:** The Reserve Capacity can be obtained from the battery's specification sheet or the owners manual.

### To calculate the time needed for a charge:

1. Find the percentage of charge needed.
2. Multiply the Amp hour rating by the charge needed, and divide by the charge rate.
3. Multiply the results by 1.25 to find the total time needed, in hours, to bring the battery to full charge.
4. Add an additional hour for a deep-cycle battery.

### Example:

$\frac{\text{Ah rating} \times \% \text{ of charge needed}}{\text{Charger Amp setting}} \times 1.25 = \text{hrs of charge}$

$\frac{100 \text{ (Ah rating)} \times .50 \text{ (charge needed)}}{20 \text{ (Charger Setting)}} \times 1.25 = 3.125 \text{ hrs}$

$\frac{100 \times .50}{20} \times 1.25 = 3.125$

You need to charge a 100 Ampere hour battery for a little more than 3 hrs at the 20 Amp charge rate, using this example.

Use the following table to determine the time it will take to bring a battery to full charge.

The times given are for batteries with a 50% charge prior to recharging.

CCA = Cold Cranking Amps Ah = Amp Hour

RC = Reserve Capacity NR = Not Recommended