

10. CONTROL PANEL

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.

CHARGE RATE SELECTOR SWITCH

Use the Charge Rate selector switch to select the charge rate or engine starting setting you require.

Switch #1 – Use this switch to select the 55 Amp Charge Rate ↔ 150 Amp Engine Start and the 20 Amp Charge Rate. Switch #2 must be in the down position (Select Position) when using Switch #1.

- **Switch #2** – Use this switch to select the 2 amp Charge Rate and the OFF position. Also, use to select use of Switch #1. Note that Switch #1 is only effective when Switch #2 is set to “Select Position.”
- **2A Slow Charge Rate** – For small batteries, such as those commonly used in garden tractors, snowmobiles and motorcycles.
- **20A Rapid and 55A Boost Charge Rate** – For charging automotive, marine and deep-cycle batteries. Not intended for industrial applications.
- **Engine Start 150A** – Provides 150 amps for cranking an engine with a weak or run-down battery. Always use in combination with a battery.

11. OPERATING INSTRUCTIONS

WARNING: A spark near battery may cause battery 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 charge rate switch to the OFF position.
5. Lay the AC/DC cables away from any fan blades, belts, pulleys and other moving parts that can cause injury.
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. Monitor the charger and the battery.
10. When disconnecting the charger, set the charge rate switch 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. First, place battery in a well-ventilated area.
2. Set the charge rate switch 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. Monitor the charger and the battery.
8. When disconnecting the charger, set the charge rate switch 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.

MANUAL CHARGING MODE

When manual mode is performed, the charger will continue to charge and will not shut off. Monitor the charging process and stop when the battery is fully charged. Not doing so may cause damage to your battery or result in other property damage or personal injury.

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 cause damage to 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 switch #2 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 CHARGING A BATTERY IN THE VEHICLE section.
3. Plug the charger AC power cord into the AC outlet.
4. With the charger plugged in and connected to the battery of the vehicle, set switch #1 to the engine start position, and set switch #2 to the down position.
5. Crank the engine until it starts or 3 seconds pass. If the engine does not start, wait 6 minutes before cranking

again. This allows the charger and battery to cool down.

NOTE: During extremely cold weather, or if the battery is under 2 volts, charge the battery for 5 minutes before cranking the engine.

6. If the engine fails to start, charge the battery for 5 more minutes before attempting to crank the engine again.
7. After the engine starts, move switch #2 to the OFF position and unplug the AC power cord before disconnecting the battery clips 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.

12. 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:

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

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.

Ah – Ampere Hours

NR – the charger setting is NOT RECOMMENDED.

CCA – Cold Cranking Amps

RC – Reserve Capacity

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

BATTERY SIZE/RATING			CHARGE RATE/CHARGING TIME		
			2 AMP	20 AMP	55 AMP
SMALL BATTERIES	Motorcycle, garden tractor, etc.	6-12 Ah	2-3¼ hrs	NR	NR
		12-32 Ah	3¾-10 hrs	NR	NR
CARS/ TRUCKS	200-315 CCA	40-60 RC	11¼-14½ hrs	1-1½ hrs	25-32 min
	315-550 CCA	60-85 RC	NR	1½-2 hrs	32-40 min
	550-1000 CCA	80-190 RC	NR	2-3½ hrs	40-76 min
MARINE/DEEP-CYCLE		80 RC	NR	1¾ hrs	NR
		140 RC	NR	2¾ hrs	NR
		160 RC	NR	3 hrs	NR
		180 RC	NR	3¼ hrs	NR