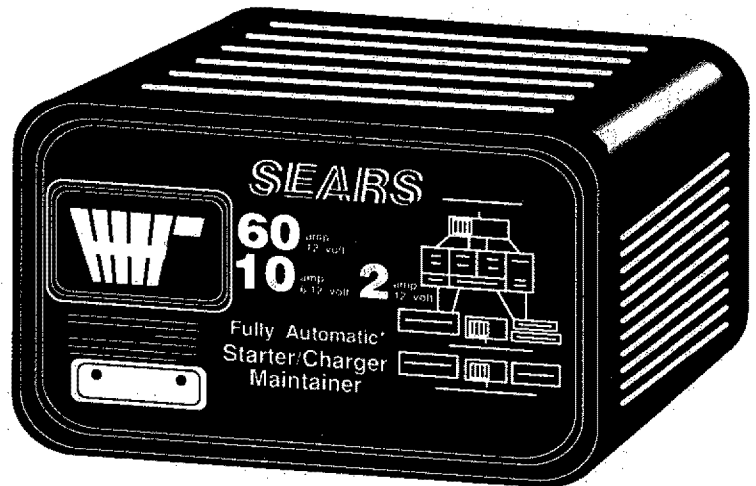


SEARS

OWNERS MANUAL

**MODEL NO.
934.716140**



**CAUTION:
Read Rules for
Safe Operations
Carefully**

**Fully Automatic
Battery Charger/Maintainer
with Engine Start
for 6 & 12 Volt Batteries**

**OPERATING AND SAFETY
INSTRUCTIONS**

Table of Contents

INTRODUCTION	1
DESCRIPTION	1
HOW BATTERIES CHARGE	2
SPARK PREVENTION	2
IMPORTANT SAFETY INSTRUCTIONS	3
SHOCK HAZARDS	3
EXPLOSION HAZARDS	4
FIRE HAZARDS	5
BATTERY ACID HAZARDS	6
SHORT CIRCUIT HAZARDS	6
MOVING PARTS HAZARDS	7
CHARGER LOCATION	8
PROVIDE REQUIRED POWER	9
EXTENSION CORDS	9
PREPARING THE BATTERY	11
OPERATING INSTRUCTIONS	12
CONNECTING TO BATTERIES INSTALLED IN VEHICLES	12
CONNECTING TO BATTERIES OUTSIDE A VEHICLE	15
CHARGING INSTRUCTIONS	16
CHARGING TIME INSTRUCTIONS	18
12 VOLT BATTERIES	18
6 VOLT BATTERIES	18
DETERMINING TIME TO CHARGE	18
AUTOMOTIVE BATTERY CHARGING TIMES	19
DEEP-CYCLE BATTERY CHARGING TIMES	19
SWITCH SETTING GUIDE	21
CHARGER CONTROLS AND FEATURES	22
PRE-CHARGE BATTERY ACTIVATION (12 Volt Only)	26
CHARGING BATTERIES WITH BUILT-IN HYDROMETER "EYE"	28
MORE ON ELECTROLYTE STRATIFICATION	28
ENGINE STARTING	30
TROUBLE SHOOTING	31
CHARGER CARE AND MAINTENANCE	32
SERVICE INFORMATION	33
NOTES AND COMMENTS	34

INTRODUCTION

FOR SAFETY'S SAKE, READ THIS INSTRUCTION MANUAL PRIOR TO OPERATION

DESCRIPTION

The Sears model 71614, Starter/Charger/Maintainer, offers the features you need to handle a wide variety of applications. Its design also eliminates much of the guesswork associated with battery charging, improves safety, and reduces the risk of overcharging.

- **10 AMP CHARGE RATES** for fast-charging 6 or 12 volt batteries
- **2 AMP CHARGE RATE** for charging small 12 volt batteries such as those used in motorcycles, lawn and garden equipment, and snowmobiles.
- **60 AMPS OF ENGINE STARTING POWER** to assist a battery that's too weak to do the job alone.
- **FULLY-AUTOMATIC 12 VOLT CHARGING** turns the charger's output off and lights a green indicator at full charge.
- **12 VOLT CHARGE MONITOR** automatically turns the charger's output back on if the battery discharges.
- **BATTERY TYPE SELECTOR** assures a full charge on both deep-cycle and regular batteries.
- **TEMPERATURE COMPENSATION** automatically adjusts the output to assure a full charge in all temperatures.
- **MANUAL 6 VOLT CHARGING** for added versatility.
- **POLARITY PROTECTION** will not allow charging to begin and lights a red indicator if the cables are hooked to a battery in reverse.
- **DOUBLE-INSULATED**, high-impact plastic enclosure reduces the risks of electric shock.
- **AUTOMATIC-RESET CIRCUIT BREAKER** prevents overload damage to the charger.

INTRODUCTION

HOW BATTERIES CHARGE

A charger DOES NOT FORCE current into a battery - it makes a limited amount of current available and the battery draws as much of it as it needs, up to or slightly greater than the OUTPUT AMP rating of the charger.

The closer a battery is to zero-charge ("dead"), the more charging current it will want to draw. When charging begins on a "dead" battery, a charger's ammeter (if so equipped) will register toward the high amps end of the scale and fall toward the zero end as the battery becomes more fully charged. KEEP IN MIND: the ammeter registers the amount of amperage being drawn from the charger by the battery, not what the charger is capable of delivering.

One would expect a battery to draw zero amps when it reaches 100% of charge. But at 100% of charge, the battery will continue to draw a low level of current and convert it into heat within the battery. If left connected to a MANUAL charger after reaching 100% of charge, the battery acid will begin to boil, resulting in overcharging and possible battery damage.

But the Sears #71614 battery charger is FULLY-AUTOMATIC. When full charge is reached, it will completely shut off the charging current to the battery. If the battery were to discharge for some reason, the charger will automatically resume charging the battery until full charge is reached again.

SPARK PREVENTION

MAKE SURE NO SPARKS OR FLAMES OCCUR NEAR THE BATTERY, especially during charging. It takes very little to ignite the explosive gasses produced by a lead-acid battery. Read, understand, and follow the SAFETY INSTRUCTIONS section of this manual before attempting to work with or near a lead-acid battery.

For more information about batteries and battery charging, contact:

Battery Council International
111 East Wacker Dr.
Chicago, IL 60601
Telephone: (312) 644-6610

and request their publication titled: BATTERY SERVICE MANUAL

IMPORTANT SAFETY INSTRUCTIONS

**DO NOT OPERATE UNTIL READING !
SAVE THESE INSTRUCTIONS !**

IMPORTANT! DO NOT ATTEMPT TO OPERATE this battery charger until you read and understand the following safety instructions, prior to each use of this battery charger, to reduce the risk of **DEATH, INJURY, AND PROPERTY DAMAGE.**

SHOCK HAZARDS



ELECTRIC SHOCK CAN KILL!

NEVER expose the battery charger to rain or snow.

NEVER attempt to plug in or operate the battery charger with defective or damaged wires, powercord or powercord plug. Have any of these parts that are defective or damaged replaced by qualified personnel **IMMEDIATELY.**

NEVER attempt to plug in charger or operate its controls with wet hands or while standing in water.

NEVER alter AC powercord or powercord plug provided with the battery charger.

NEVER use an attachment not recommended or sold by the battery charger manufacturer for use with this specific model battery charger.

NEVER operate this battery charger if it has received a sharp blow, been dropped, or similarly damaged, until after being inspected and/or repaired by qualified service personnel.

NEVER disassemble this battery charger; take it to qualified service personnel when service or repair is needed.

ALWAYS plug in and unplug the AC powercord by grasping the powercord plug — **NOT THE POWERCORD** — to reduce risk of damaging powercord.

ALWAYS unplug the battery charger from the AC outlet before attempting any cleaning or maintenance. Turning the charger's

SAFETY

IMPORTANT SAFETY INSTRUCTIONS

control(s) to their "OFF" position(s) alone will not remove all electricity from the charger.

EXPLOSION HAZARDS



WARNING! - RISK OF EXPLOSIVE GASSES!

Working in the vicinity of a lead-acid battery is dangerous. Batteries generate explosive gasses during normal operations and, at an even higher level, during charging. If anything is allowed to ignite these gasses, the battery may explode, sending pieces of the battery and extremely caustic battery acid out in all directions and with extreme force. Since just the slightest spark is sufficient to ignite these gasses, it is of **UTMOST IMPORTANCE** that you read this manual and follow the instructions exactly, before using your battery charger each time.



BATTERY EXPLOSION CAN KILL, INJURE, AND CAUSE PROPERTY DAMAGE! To reduce the risk of battery explosion, read, understand, and follow these instructions, those published by the battery manufacturer, and those of the manufacturer of any equipment you intend to use near the battery. Review cautionary markings on these products and on the engine. If unable to determine the battery manufacturer's requirements for charging, always charge the battery with the cell caps in place. In addition, make certain that anyone else that uses this equipment, or is a bystander in the vicinity of a charging battery, understand and follow these safety instructions as well.

NEVER smoke or allow a spark or flame in the vicinity of the battery or engine.

NEVER operate the battery charger in a closed-in area or restrict ventilation in any way.

NEVER charge a frozen battery as battery explosion can result.

NEVER connect BOTH battery charger clamps **DIRECTLY** to the two posts of the same battery. **SEE OPERATING INSTRUCTIONS FOR PROPER CONNECTION PROCEDURES.**

NEVER charge batteries other than a **LEAD-ACID** type. Especially, **DO NOT** use for charging dry-cell batteries that are

SAFETY

commonly used with toys and home appliances. These batteries may burst and cause injury to persons or damage property.

NEVER allow the DC output clamps to touch each other.

ALWAYS be extra cautious to reduce the risk of dropping a metal object, such as a tool, onto or near the battery. Doing so could produce a spark or short circuit the battery or other electrical part that could cause an explosion.

ALWAYS make sure the area around a battery is well ventilated while it is being charged. Gas can be forcefully blown away by using a piece of cardboard or other non-metallic material as a fan.

ALWAYS make sure that the AC powercord is unplugged from the AC outlet or extension cord **BEFORE** connecting or disconnecting the battery charger clamps to the battery to prevent arcing or burning.

ALWAYS locate the battery charger as far away from the battery as the DC output cables will permit.

ALWAYS twist or rock charger clamps back and forth several times on the battery post and the other point of connection at the time of initial connection. This helps keep the clamps from slipping off their points of connection which helps reduce the risk of sparking.

NOTE: DO NOT rock the clamp connected to the battery post **AFTER** the second connection (at a point away from the battery) is made or sparking may occur at the battery post.

FIRE HAZARDS



FIRE CAN KILL, INJURE, AND CAUSE PROPERTY DAMAGE!

NEVER use an attachment not recommended or sold by the battery charger manufacturer for use with your specific model charger.

NEVER disassemble the battery charger; take it to qualified service personnel when service or repair is needed.

IMPORTANT SAFETY INSTRUCTIONS

ALWAYS make sure that the AC powercord is unplugged from the AC outlet or extension cord, **BEFORE** connecting or disconnecting the battery charger clamps, to prevent arcing or burning.

BATTERY ACID HAZARDS



BATTERY ACID CAN CAUSE SERIOUS INJURY AND PROPERTY DAMAGE!

ALWAYS have someone within range of your voice and close enough to quickly come to your aid when working near a lead-acid battery.

ALWAYS have plenty of fresh water and soap nearby in case battery acid contacts eyes, skin, or clothing.

ALWAYS wear complete eye and clothing protection and avoid touching eyes while working with a battery.

ALWAYS act **QUICKLY** if contact with battery acid is made. If acid contacts skin or clothing, wash **IMMEDIATELY** with soap and water. If acid enters eye, **IMMEDIATELY** flood eye with running cold water for at least 10 minutes and get medical attention **IMMEDIATELY**.

SHORT CIRCUIT HAZARDS



ELECTRICAL SHORT CIRCUITS CAN INJURE!

ALWAYS remove personal metal items such as rings, bracelets, 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.

SAFETY

MOVING PARTS HAZARDS



MOVING ENGINE PARTS CAN INJURE!

NEVER connect or disconnect battery charger clamps to a vehicle when the engine is running.

ALWAYS stay clear of fan blades, fan belts, pulleys and other moving engine parts when working near an engine. Moving engine parts can cause severe personal injury including dismemberment.

ALWAYS make sure that battery charger cables and clamps are positioned so they will not come in contact with any moving engine parts.

CHARGER LOCATION

Locate charger in a clean, dry, stable, well-ventilated spot as far away from the battery as the DC output cables permit.

NEVER place charger directly above the battery being charged; gasses from the battery will corrode and damage the charger.

NEVER allow battery acid to drip on charger when reading specific gravity or filling the battery.

NEVER set a battery on top of the charger.

PROVIDE REQUIRED POWER

This battery charger requires a nominal 120 volt, 60 Hertz, alternating current (AC) power source. The power source must be fused at an amperage greater than or equal to the INPUT AMPS rating of this charger.

This battery charger is double-insulated and does not require a grounded AC outlet for safe operation.

DO NOT PLUG CHARGER INTO THE AC POWER SOURCE UNTIL TOLD TO DO SO IN THE OPERATING INSTRUCTIONS.



ELECTRIC SHOCK CAN KILL! To reduce risk of electric shock, never alter AC powercord or powercord plug provided on the charger. If it will not fit the outlet, have a proper outlet installed by a qualified electrician.

EXTENSION CORDS

An extension cord should not be used unless absolutely necessary. If necessary, care must be taken to select an extension cord suitable for use with your specific battery charger.



ELECTRIC SHOCK CAN KILL!



FIRE CAN KILL, INJURE, AND CAUSE PROPERTY DAMAGE!

PROVIDE REQUIRED POWER

SAFETY

To reduce risk of electric shock and fire, never alter the AC powercord or powercord plug provided on the charger. Never alter extension cords or extension cord plugs. Make sure the extension cord is properly wired and in good electrical condition. Make sure the wire size (American Wire Gauge or AWG) of the extension cord is large enough to handle your specific charger's amperage requirements as specified in the following table:

MINIMUM AWG (American Wire Gauge) EXTENSION CORD REQUIREMENTS FOR SEARS BATTERY CHARGER #71614			
Length of Extension Cord in Feet			
25 Ft.	50 Ft.	100 Ft.	150 Ft.
18 Ga.	18 Ga.	16 Ga.	14 Ga.
Gauge of Wire Required			

PREPARING THE BATTERY



BATTERY EXPLOSION CAN KILL, INJURE, AND CAUSE PROPERTY DAMAGE! Never smoke or allow a spark or flame in the vicinity of the battery or engine.

If necessary to remove the battery from the vehicle to charge it, make sure all accessories in the vehicle are off and **ALWAYS** remove the grounded cable from the battery **FIRST**.

If needed, add distilled water to each cell of the battery until battery acid reaches the manufacturer's specified level. **DO NOT OVERFILL**. This helps remove excessive explosive gasses from the battery. For maintenance free batteries without caps, carefully follow the battery manufacturer's recharging instructions.



BATTERY ACID CAN CAUSE SERIOUS INJURY AND PROPERTY DAMAGE! Always wear complete eye and clothing protection and avoid touching eyes while working near battery.

Clean battery terminals. Be careful to keep corrosion from coming in contact with eyes.

Study all of the battery manufacturer's specific precautions such as removing or not removing cell caps while charging and recommended rates of charge. If unable to determine the battery manufacturer's requirements for charging, always charge the battery with the cell caps in place.

If battery voltage cannot be determined from the information on the battery itself, refer to the owner's manual of what ever product the battery is/was installed in.



BATTERY EXPLOSION CAN KILL, INJURE, AND CAUSE PROPERTY DAMAGE! Never attempt to charge a marine (boat) battery on board a boat. Remove battery and charge it on shore. On-Board charging requires special equipment for safe charging.

OPERATING INSTRUCTIONS

DO NOT ATTEMPT TO OPERATE THIS BATTERY CHARGER unless you have read and understand the entire SAFETY INSTRUCTIONS section of this manual.

CONNECTING TO BATTERIES INSTALLED IN VEHICLES

1. Make sure that the AC powercord is unplugged from the AC outlet.

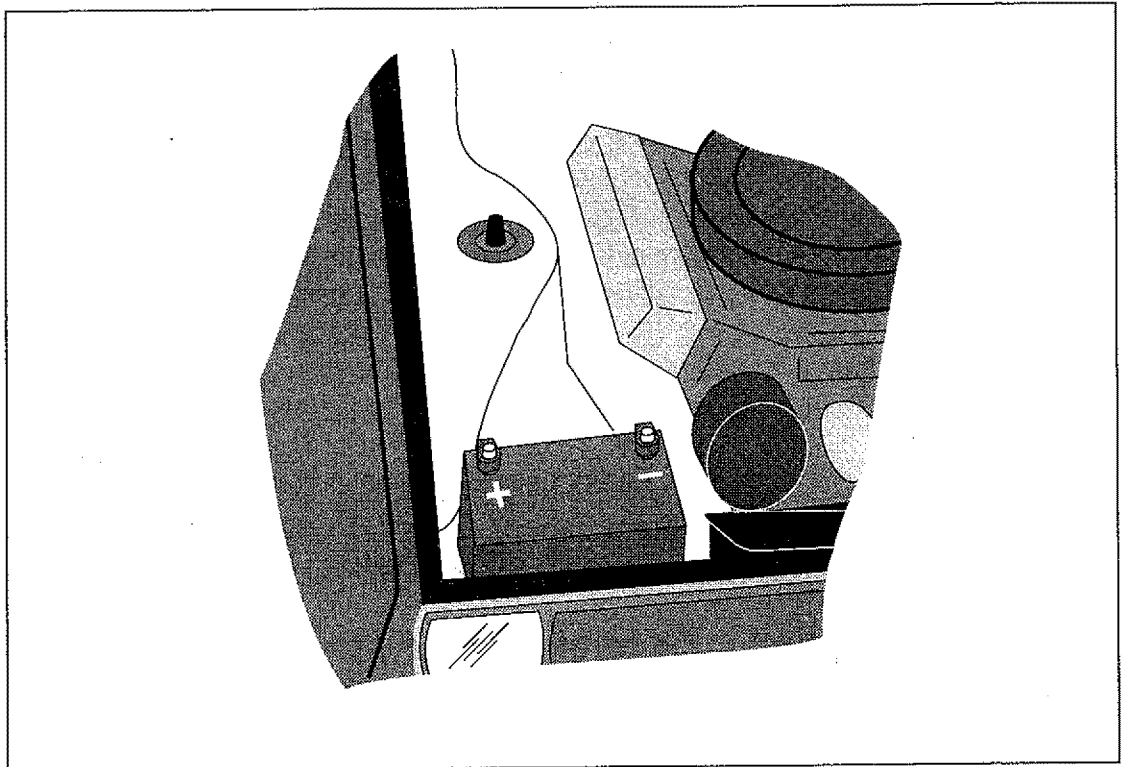


Figure 1

DO NOT PLUG CHARGER POWERCORD INTO AC POWER SOURCE OR SET ANY OF THE CHARGER'S CONTROLS UNTIL TOLD TO DO SO IN THE INSTRUCTIONS TO FOLLOW.

2. Position AC powercord and DC output cord in such a manner that will avoid damage by moving engine parts or vehicle hood and doors.



MOVING ENGINE PARTS CAN CAUSE SERIOUS INJURY! Stay clear of fan blades, belts, pulleys, and other moving engine parts to reduce risk of serious personal injury.

3. Check the polarity of the battery terminals. The **POSITIVE** terminal should be marked: **POSITIVE**, **POS**, **+**, or **P**. The **NEGATIVE** terminal should be marked: **NEGATIVE**, **NEG**, **OR N**.
4. Determine which terminal of the battery is grounded (connected) to the vehicle's chassis.
 - a. **NEGATIVE-GROUNDED VEHICLES**
(The most common type)

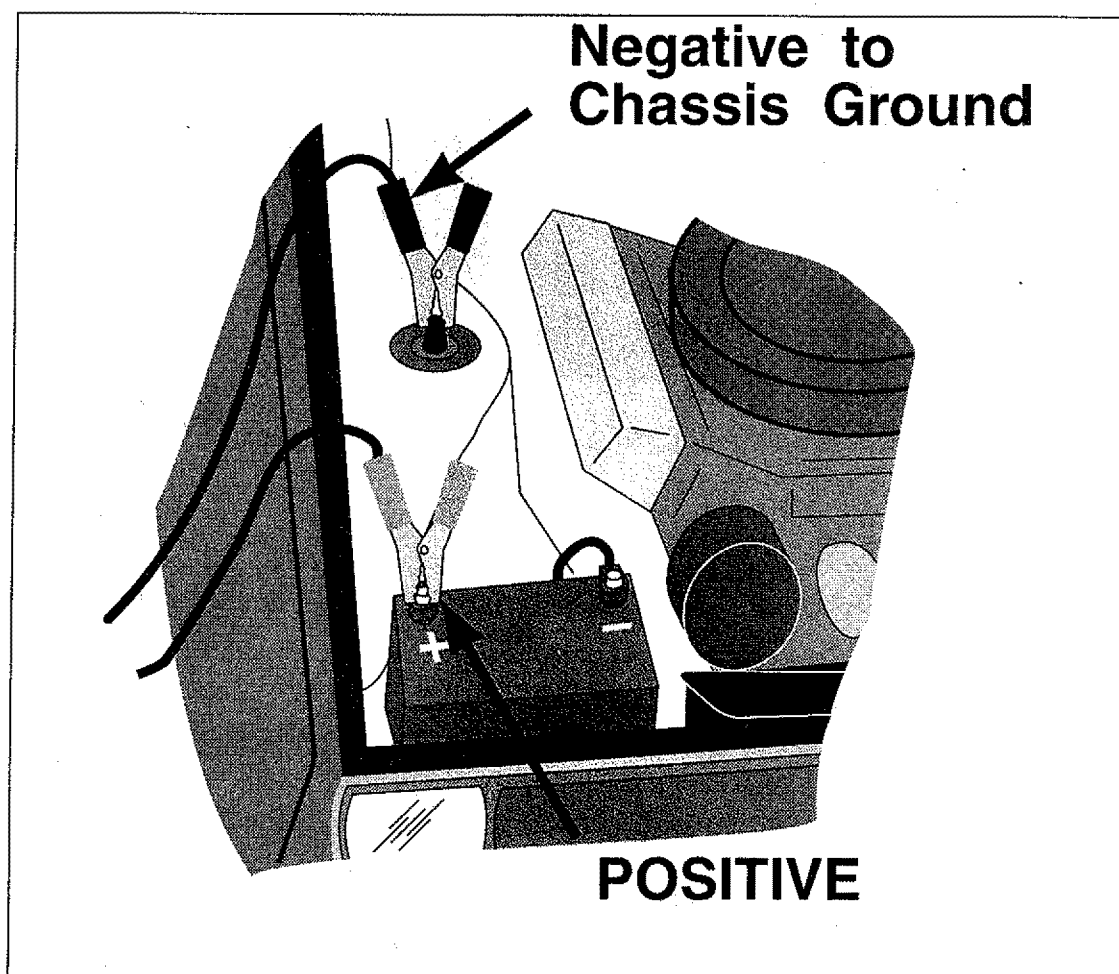


Figure 2

- i. Connect the **POSITIVE** (red) clamp from the battery charger to the **POSITIVE**, ungrounded terminal of the battery.
- ii. Connect the **NEGATIVE** (black) clamp from the battery charger to a heavy gauge metal part of the vehicle chassis or engine block away from the battery. **DO NOT** connect the **NEGATIVE** (black) charger clamp to the **NEGATIVE** battery terminal, carburetor, fuel lines, or sheetmetal body parts.

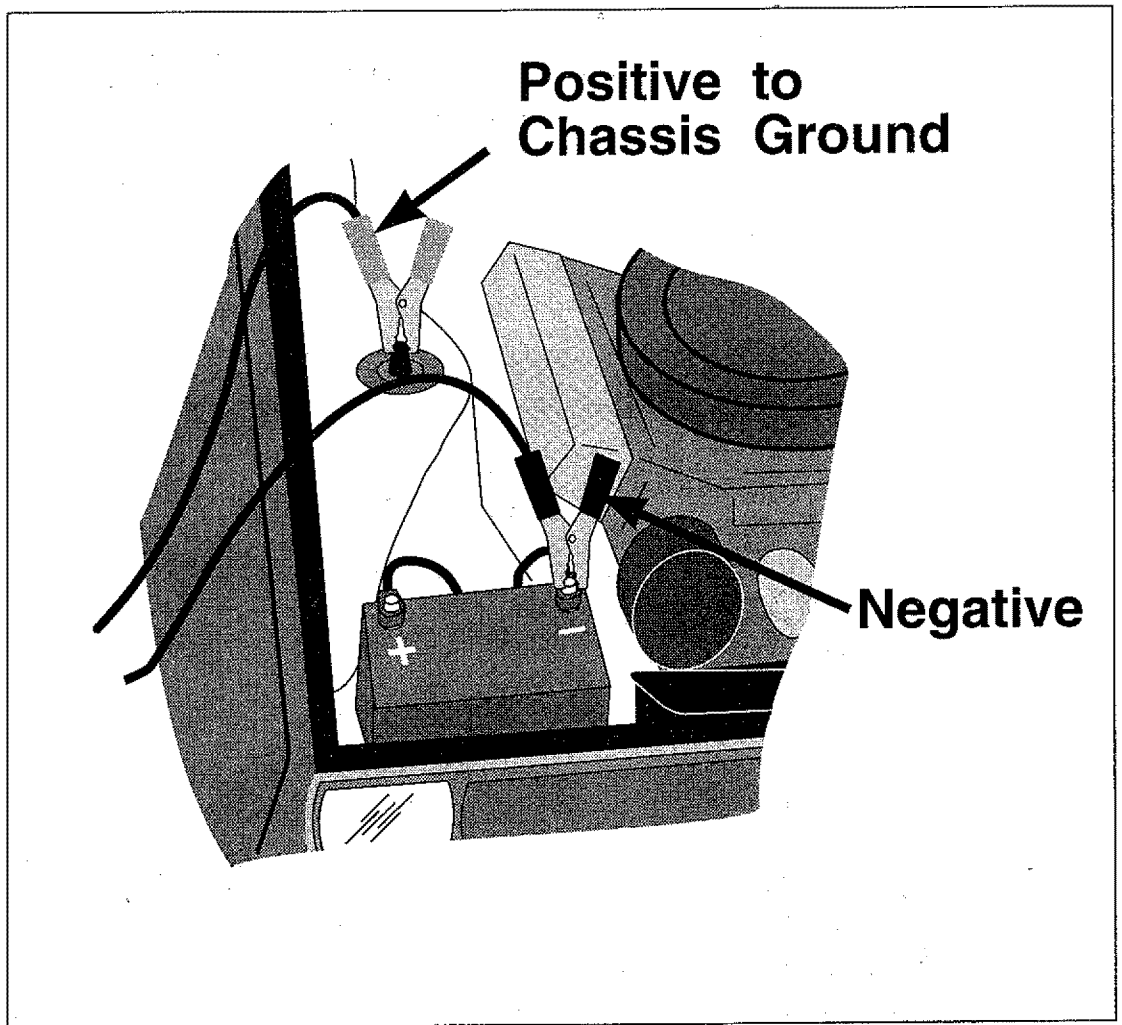


Figure 3

b. POSITIVE-GROUNDED VEHICLES

- i. Connect the NEGATIVE (black) charger clamp to the NEGATIVE, ungrounded terminal of the battery.
- ii. Connect the POSITIVE (red) charger clamp to a heavy gauge metal part of the vehicle chassis or engine block away from the battery. DO NOT connect the POSITIVE (red) charger clamp to the POSITIVE battery terminal, carburetor, fuel lines, or sheetmetal body parts.

CONNECTING TO BATTERIES OUTSIDE A VEHICLE

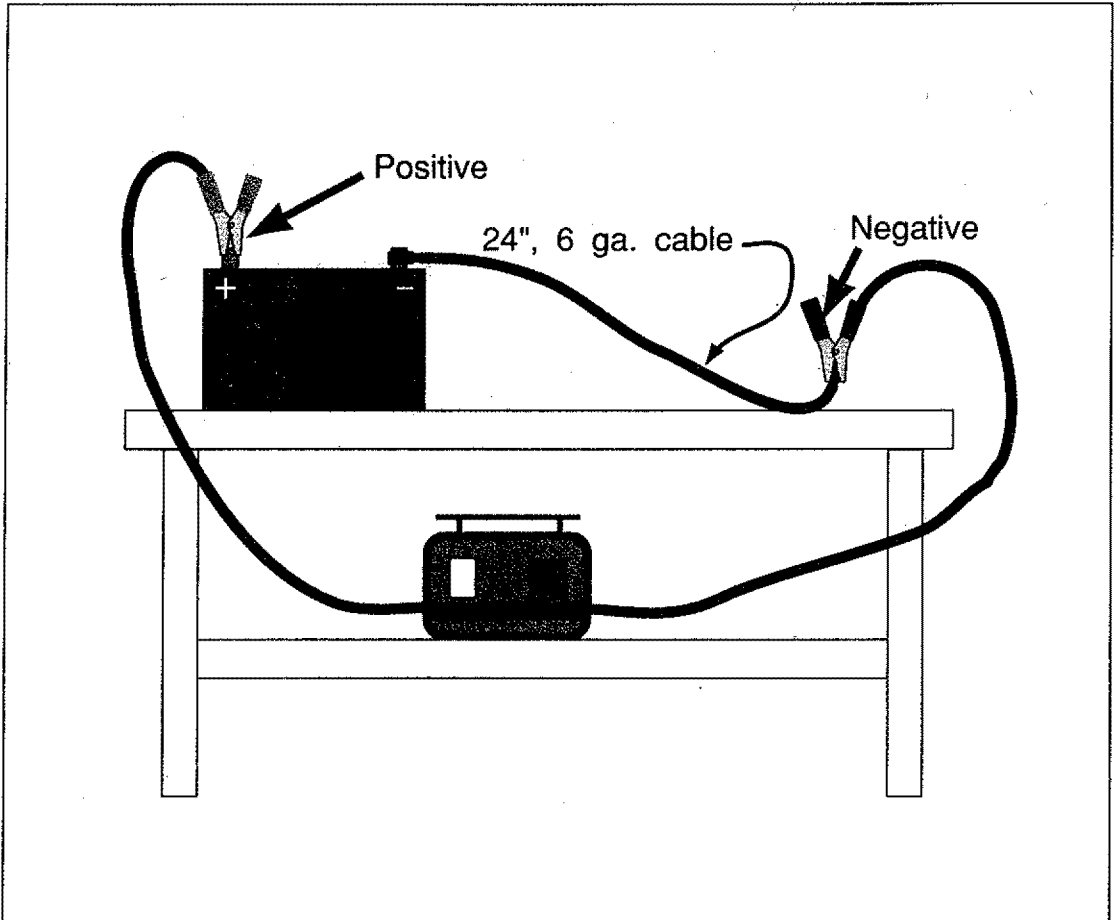


Figure 4

1. Make sure that the AC powercord is unplugged from the AC power source.

DO NOT PLUG CHARGER POWERCORD INTO AC POWER SOURCE OR SET ANY OF THE CHARGER'S CONTROLS UNTIL TOLD TO DO SO IN THE INSTRUCTIONS TO FOLLOW.

2. Check the polarity of the battery terminals. The POSITIVE terminal should be marked: POSITIVE, POS, +, or P. The NEGATIVE terminal should be marked: NEGATIVE, NEG, -, OR N.
3. Attach a battery cable, AT LEAST 24" long and #6 AWG (American Wire Gauge) in size, to the NEGATIVE terminal of the battery.

OPERATING INSTRUCTIONS



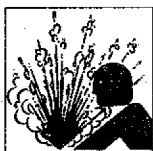
BATTERY EXPLOSION CAN KILL, INJURE, AND CAUSE PROPERTY DAMAGE!

To reduce the risk of battery explosion, **NEVER CONNECT BOTH BATTERY CHARGER CLAMPS DIRECTLY TO THE TWO POSTS OF A BATTERY.**

4. Connect the POSITIVE (red) charger clamp to the POSITIVE battery terminal.
5. Position yourself and the free end of the cable (attached to the NEGATIVE battery terminal) as far away from the battery as the cable will allow. Then, **WHILE FACING AWAY FROM THE BATTERY**, connect the NEGATIVE charger clamp to the free end of the cable.

CHARGING INSTRUCTIONS

1. Set BATTERY TYPE SELECTOR for the type of battery to be charged. See BATTERY TYPE SELECTOR in the CHARGER CONTROLS AND FEATURES section of this manual.
2. Set FUNCTION SELECTOR to CHARGE.
3. Set AMP SELECTOR to the charging amps desired, for the voltage battery being charged. See AMP SELECTOR in the CHARGER CONTROLS AND FEATURES section of this manual.
4. See CHARGING TIME INSTRUCTIONS section to determine how long to leave the charger connected to the battery.



BATTERY EXPLOSION CAN KILL, INJURE, AND CAUSE PROPERTY DAMAGE! To reduce risk of battery explosion, do not overcharge a lead-acid battery.

5. Plug the charger's AC powercord into a 120 volt, 60 Hz, AC outlet.

IMPORTANT: Be sure to read the CHARGER CONTROLS AND FEATURES section of this manual to verify that the charger has been activated and is charging the battery. Certain battery conditions can require pre-charge activation before charging will begin. The indicator lights and ammeter will tell you if special activation procedures are necessary.

6. When you wish to disconnect the charger from the battery, unplug the charger's AC powercord from the AC outlet.



BATTERY EXPLOSION CAN KILL, INJURE AND CAUSE PROPERTY DAMAGE! To reduce risk of battery explosion, follow the charger cable removal steps below **EXACTLY**.

- a. **FOR BATTERIES INSTALLED IN VEHICLES**, remove the charger clamp attached to the vehicle's chassis **FIRST**, then remove the charger clamp attached to the battery.
- b. **FOR BATTERIES NOT IN A VEHICLE**, remove the Negative (black) charger clamp from the cable (attached to the negative battery terminal) **FIRST**, as far from the battery as the cable will permit. Then remove the Positive (red) charger clamp attached to the positive battery terminal.

CHARGING TIME INSTRUCTIONS

12 VOLT BATTERIES

The AUTOMATIC CHARGING CIRCUIT will prevent over charging a 12 volt battery, so accurate calculation of length of charging time is unnecessary. When full charge is reached, the output of the charger will be turned off and the green CHARGE COMPLETE INDICATOR will turn on. If the charger is left connected to the battery, it will monitor the battery's state of charge and turn the charger's output back on if the battery discharges.

However, for an idea as to how long the charging process may take, see the following CHARGING TIME CHART or CHARGING TIME EQUATIONS.

6 VOLT BATTERIES

The 6 volt charging setting is a **MANUAL** operation. When the battery reaches full charge, the charger must be promptly unplugged from the AC outlet and disconnected from the battery. If this is not done, overcharging can occur that could result in damage to the battery.

Use the CHARGING TIME CHART or CHARGING TIME EQUATIONS to determine how long to charge your 6 volt battery.

ALWAYS set a time-warning device, such as an alarm clock, to remind you to discontinue charging.

DETERMINING TIME TO CHARGE

1. Determine the battery's present state of charge with a hydrometer or electronic percent-of-charge tester.
2. Convert hydrometer readings to percent of charge.

SPECIFIC GRAVITY	PERCENT OF CHARGE
1.265	100%
1.225	75%
1.190	50%
1.155	25%
1.120	0%

Table 1

CAUTION - Batteries that are 25% charged or lower can easily freeze and should be charged at once, but DO NOT CHARGE A BATTERY THAT IS ALREADY FROZEN.

- To determine time to charge on chart below, find the section for the voltage of the battery to be charged. Follow the row to the right, from the amp setting to be used, to where it meets the percent-of-charge column that comes closest to the battery's present state of charge.

Automotive Battery Charging Times

	Battery % Of Charge	75%	50%	25%	0%
	TIME TO CHARGE (HOURS)				
	Charger Amp				
6 volt Batteries	10	2 ² / ₃	5	7	9
12 volt Batteries	2	6 ¹ / ₂	12	18	23
	10	1 ² / ₃	3 ¹ / ₃	5	6 ¹ / ₂

Table 2

NOTE: Times given are for an average-size automotive battery. For small batteries, use equation 1.

12-Volt Deep-Cycle Battery Charging Times

Amp-Hour Size of Battery	Battery % of Charge	75%	50%	25%	0%
	Hours to Charge (using 10 Amp, 12 Volt Setting)				
115 Amp/Hr		3.5 Hrs	7 Hrs	10 Hrs	14 Hrs

Table 3

NOTE: These times are for reference only. Actual times may vary due to battery design and physical condition of the battery.

For a more accurate determination of length of charging time, use Equation 1.

CHARGING TIME INSTRUCTIONS

First, determine percent-of-charge-NEEDED to bring the battery to full charge. This is 100% minus the present percent of charge of the battery (determined above). Then, to use it in the equation, express the percent-of-charge-needed as a decimal.

EXAMPLE:

Battery's Present State of Charge = 25%

Percent-Of-Charge-Needed: $100\% - 25\% = 75\%$

To express as a decimal, insert a decimal point two digits to the left of the percent sign (%), then drop the percent sign: $75\% = .75$

Next, use this decimal in the equation below, along with the battery's amp-hour rating, and the charge rate (amp) setting selected on the charger, to determine time to charge.

$$\left(\frac{\text{Amp Hour Rating of Battery} \times \text{Percent of Charge NEEDED}}{\text{Amp Setting Selected On Charger}} \right) \times 1.25 = \text{Hours to Charge}$$

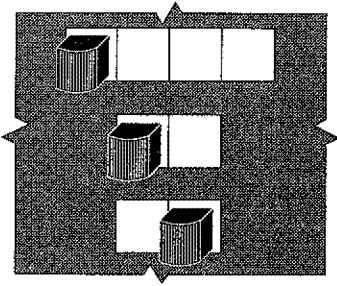
Equation 1

NOTE: If the battery is rated in RESERVE CAPACITY, use the following equation to convert reserve capacity to amp-hours.

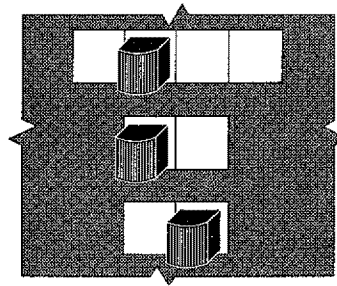
$$\text{Amp Hour Rating} = \frac{(\text{Reserve Capacity})}{2} + 15.5$$

Equation 2

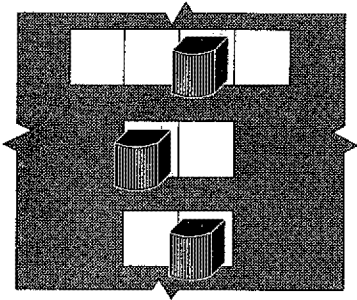
SWITCH SETTING GUIDE



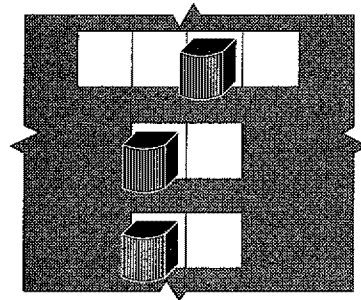
Manual Charging 6-Volt Batteries



Automatic Charging Small 12-Volt Batteries

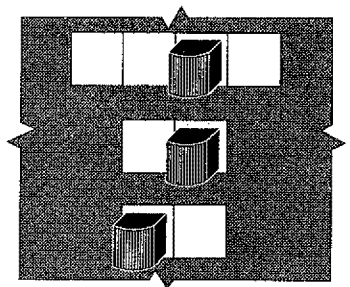


Automatic Charging Larger Standard 12-Volt Batteries

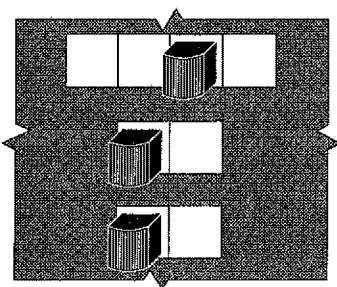


Automatic Charging 12-Volt Deep-Cycle and Lead-Calcium (Delco Freedom) Batteries

Deep-Discharged, Lead-Calcium 12-Volt Battery Activation (See PRE-CHARGE BATTERY ACTIVATION)

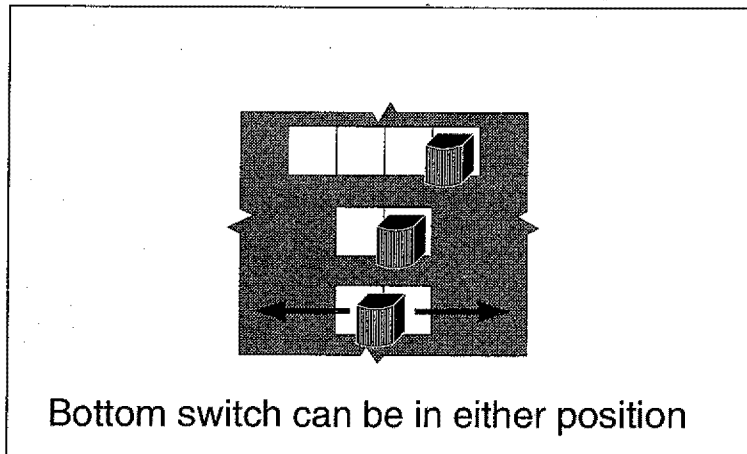


For 1st 10 Minutes:



Then:

CHARGER CONTROLS AND FEATURES



Engine Starting

CHARGER CONTROLS AND FEATURES

AMP SELECTOR is to be set to the same voltage as the battery to be charged: 6 or 12 volts. For 12 volt batteries, there are 2 charge rate settings to choose from: 10 amps or 2 amps. These two settings are controlled by the **AUTOMATIC CHARGING CIRCUIT**. The 6 volt setting is a 10 amp manual charge rate.

NOTE: The 2 amp setting should be selected to charge only **SMALL** 12 volt batteries. If used to charge larger automotive or deep-cycle batteries, full charge may never be fully reached.

When the switch is set to its right-most setting, 60 amps of engine starting power is available. When this setting is used, the **FUNCTION SELECTOR** must be set to the right or **START** position.

IMPORTANT! The 6 volt setting is **NOT** automatic. The charger must be manually disconnected when a 6 volt battery reaches full charge to prevent overcharging and battery damage.

SMALL 12 VOLT BATTERIES, such as those used in motorcycles, lawn tractors, and snowmobiles, have a maximum charge rate limit. Unless otherwise stated on a particular battery, always charge small 12 volt batteries on the 2 amp setting to prevent battery damage.

FUNCTION SELECTOR has 2 positions: **CHARGE** and **START/ACTIVATE**. It must be set in the **CHARGE** position when ever 6 or 12 volt charging is desired. The only time it is moved to **START/ACTIVATE** is for engine starting or pre-charge activation.

IMPORTANT! If charging is attempted when the FUNCTION SELECTOR is in the START position, the automatic circuitry will be bypassed, causing all settings to be manual.

BATTERY TYPE SELECTOR must be set for the type of battery being charged. Set to the left DEEP-CYCLE position for charging deep-cycle batteries or any other battery with a built-in hydrometer "eye", such as the Delco Freedom battery. Set all other battery types to the right ALL OTHER position.

CAUTION - SET SWITCH CORRECTLY!

Charging a standard battery on the DEEP-CYCLE setting may result in excessive gassing and possible overcharging.

Charging a deep-cycle battery on the ALL OTHERS setting will result in an undercharged battery.

Charging a battery (such as a Delco Freedom) with a built-in hydrometer "eye" on the ALL OTHERS setting will result in a fully charged battery, but the "eye" may fail to change to indicate a satisfactory charge level.

AUTOMATIC CHARGING CIRCUIT controls the two 12 volt settings. It monitors the battery's state of charge and automatically reduces the current to the battery as it nears full charge. In some cases, it will taper to such a low rate that the ammeter will appear to be on or near zero for some time. When full charge is reached, the output to the battery is completely shut off and the green CHARGE COMPLETE indicator comes on. At this point, the charger continues to monitor the battery's state of charge. If the battery discharges for any reason, the charger will turn the output back on until the battery reaches full charge once again.

NOTE: The 2 amp setting should be selected to charge only SMALL 12 volt batteries. If used to charge larger automotive or deep-cycle batteries, full charge may never be fully reached.

The automatic charging circuit is temperature compensating. This will assure that a full charge is reached regardless of the temperature at which it is being used.

REVERSE HOOK-UP PROTECTION CIRCUIT will not allow the charger to begin charging and will light the red REVERSE HOOK-UP indicator if the charger is connected to the battery in reverse.

CHARGER CONTROLS AND FEATURES

CHARGE COMPLETE INDICATOR light turns on when the battery reaches full charge. This light only operates when the charger is in one of the two 12 volt charging modes and the **FUNCTION SELECTOR** is set to **CHARGE**. It will indicate complete charge even if the charger is unplugged.

REVERSE HOOK-UP INDICATOR light turns on when the charger clamps are connected to a battery in reverse. This light will turn on whenever a reverse hook-up occurs, regardless of how the three switches are set.

AMMETER indicates the charging current being drawn from the charger by the battery. As the battery becomes more fully charged, the charge rate lessens and the ammeter needle moves toward the lower amp numbers on the meter.

CAUTION - DO NOT USE AMMETER TO DETERMINE WHEN FULL CHARGE IS REACHED!

When charging small 12 volt batteries on the 2 amp setting, or when any battery nears full charge, the ammeter needle will be very close to zero. When charging 12 volt batteries, the automatic circuit is in control of the charging process. When full charge is reached, the output shuts off and the green **CHARGE COMPLETE** indicator lights up. But when charging 6 volt batteries, overcharging can occur if the charger is not disconnected once full charge is reached. Therefore, it is important to follow the **CHARGING TIME INSTRUCTIONS**, earlier in this manual, when charging 6 volt batteries. When the charger will be used for engine starting, the ammeter needle will move into the "Start" range on the ammeter.

Several battery conditions can also cause the ammeter to appear to indicate a battery near full charge, when in fact charging has only begun.

- Cold Battery
- Sulfated Battery
- Deeply-Discharged Lead-Calcium Battery (many newer automotive batteries)

COLD BATTERIES (temperatures lower than 32 degrees F or 0 degrees C) will begin charging at a low rate of charge. But as the battery warms up through charging, the charge rate will increase. Then, as the battery charges up, the charge rate will decrease normally.

SULFATED and DEEPLY-DISCHARGED LEAD-CALCIUM BATTERIES require a special activation procedure. Refer to the following PRE-CHARGE ACTIVATION instructions.

SHORTED BATTERIES - When the battery being charged has a short circuit, the ammeter will "pin" to the far right in the "Start" range. If after 5 to 10 minutes of charging, the needle has not started to move toward lower amperages, unplug the charger and discontinue charging. If available, use a voltmeter and read the voltage of the battery. If the voltage is under 12.0 volts for a 12 volt battery, or 6.0 volts for a 6 volt battery, plug the charger back in and resume charging. If after another 15 to 20 minutes, the ammeter has failed to move toward lower amperages, repeat the voltmeter test. If the voltage has not increased, the battery needs to be serviced or replaced.

PRE-CHARGE BATTERY ACTIVATION (12 Volt Only)

The need for pre-charge activation is indicated when the ammeter reads zero and neither the REVERSE HOOK-UP or CHARGE COMPLETE indicators are lit, or if a battery is known to be dead and the CHARGE COMPLETE light comes on after charging just a few minutes. It should be needed only when charging sulfated or deeply-discharged lead-calcium batteries (such as the Delco Freedom and many newer automotive batteries).

Pre-charge activation is a two-step process:

CHARGER ACTIVATION - These types of batteries can be down to such a low voltage (less than 1 volt) that they can "trick" the automatic circuit into thinking that the charger is not connected to a battery and will not allow charging to begin. The automatic circuit must then be temporarily bypassed until the battery voltage is raised to a level that the charger can detect.

CAUTION - IF "CHARGE COMPLETE" INDICATOR IS LIT, DO NOT ATTEMPT PRE-CHARGE ACTIVATION UNTIL VERIFYING (WITH HYDROMETER OR ELECTRONIC PERCENT OF CHARGE TESTER) THAT THE BATTERY IS DISCHARGED.

1. With the AMP SELECTOR set to the desired charge setting, move the FUNCTION SELECTOR to ACTIVATE. The charger's automatic circuit is now bypassed and the charger is in a manual charge mode.
2. Allow the charger to charge for 10 minutes, then move the FUNCTION SELECTOR back to CHARGE to return to automatic charging.

The green light and ammeter needle will now be pulsing rapidly. The pulsing will begin to slow and the ammeter needle will be slightly off zero. When the needle reaches about 2 amps, the green light will go off completely.

3. The charger is now in control of the charging process.

NOTE: If the green light goes out AND the ammeter falls back to zero, repeat steps 1 and 2 above.

BATTERY ACTIVATION - After activating the charger, the ammeter may continue to display very low amps until the sulfate barrier, on the plates of the battery, is broken through. This can take as long as 4 to 8 hours. After breaking through the sulfate barrier, the ammeter will register higher amps. Charging will now

progress normally and the ammeter will decrease as the battery takes a charge.

If you estimated the length of time to charge the battery, charging time begins from the time the charger finally breaks through the sulfate barrier.

It should be noted that battery activation time cannot be shortened. Each individual battery and its condition will determine how long it takes to break through the sulfate barrier.

CAUTION - DO NOT LEAVE CHARGER UNATTENDED DURING PRE-CHARGE ACTIVATION. OVERCHARGING COULD OCCUR, RESULTING IN BATTERY DAMAGE OR EXPLOSION. RETURN TO THE "CHARGE" FUNCTION WITHIN 10 TO 15 MINUTES.

CHARGING BATTERIES WITH BUILT-IN HYDROMETER "EYE"

Often, maintenance free lead-calcium batteries are equipped with a built-in hydrometer "eye" that indicates the battery's state of charge (such as the Delco Freedom). Many deep-cycle batteries are also equipped with this "eye". In order to make the "eye" indicate properly at full charge, it is important to follow these instructions.

1. Always charge these batteries with the BATTERY TYPE SELECTOR set to DEEP-CYCLE, regardless of battery type.
2. After the green CHARGE COMPLETE indicator comes on, it may take more than 1 hour for the "eye" to indicate full charge.
3. Always follow the battery manufacturer's instructions. Some recommend tilting or lightly shaking the battery once an hour during charging. This helps mix the acid that has stratified during charging, with the stronger acid at the bottom of the battery.

NOTE: Regardless of whether or not the "eye" indicates full charge, if the green CHARGE COMPLETE indicator comes on, the battery is at full charge.

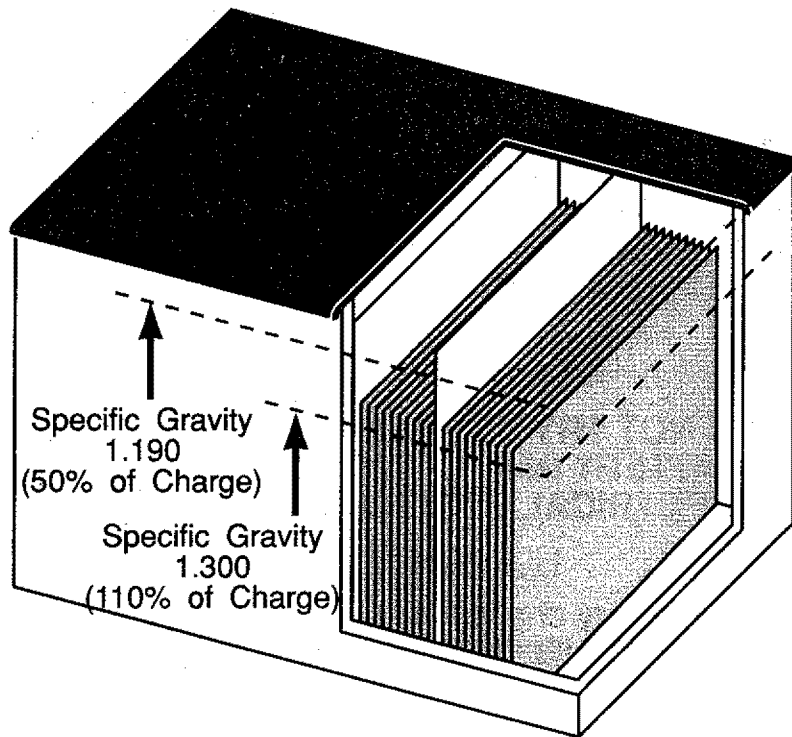
More On Electrolyte Stratification

When a battery is charged, the electrolyte around the plates in the battery will increase in specific gravity faster than the electrolyte above the plates.

The built-in "eye", found in many of today's batteries, is a hydrometer that measures the specific gravity of the electrolyte above the battery plates.

When a battery being recharged, finally reaches full charge (specific gravity of 1.265), the electrolyte above the plates of the battery will have a specific gravity of only about 1.190, or 50% of charge. But the electrolyte surrounding the battery plates will have a specific gravity of as much as 1.300, or about 110% of charge. When these two layers of electrolyte finally mix, the resulting electrolyte will have a specific gravity of 1.265 or 100% of charge.

Since the "eye" is reading the electrolyte above the plates, it will not initially indicate full charge when, in fact, the battery is at full



Specific Gravity Illustration

charge. After the two layers of electrolyte finally mix, the "eye" will register full charge.

This problem has lead Delco to recommend the gentle shaking of a Freedom battery once each hour during charging. This helps mix the stratified electrolyte.

With this particular fully-automatic battery charger, when the CHARGE COMPLETE indicator lights up, the battery is at full charge. The "eye" on the battery will probably not indicate full charge, but the battery is indeed at full charge. After sitting for awhile (usually an hour or two, but possible as long as a day), the electrolyte will mix and the "eye" will indicate full charge.

Non-automatic chargers will more readily get the "eye" to indicate full charge, but is accomplished through overcharging. This causes the electrolyte to bubble and gas, which mixes the stratified electrolyte quicker. This practice is not recommended, especially on deep-cycle batteries, as it is harmful to the battery over time.

ENGINE STARTING

This battery charger can provide a high-current output to help start a vehicle that has a weak battery. However, some vehicles' on-board computers can be damaged if jump starting is tried. **ALWAYS READ THE VEHICLE OPERATOR'S MANUAL BEFORE AUXILLIARY STARTING** to determine if jump starting can do damage to the vehicle. If not, read and follow these instructions.

CAUTION - DO NOT TRY TO BOOST START A VEHICLE WITHOUT A BATTERY IN IT, OR YOU MAY DAMAGE THE VEHICLE'S ELECTRICAL SYSTEM.

1. Connect the battery charger to the vehicle according to the previous OPERATING INSTRUCTIONS.
2. Charge battery for 5 to 10 minutes at the appropriate charge rate for size of battery.
3. Set the AMP SELECTOR to the 60A ENGINE START setting, and the FUNCTION SELECTOR to START.
4. Then try to start the vehicle. If the vehicle doesn't start after about 2 to 3 seconds, STOP and wait 3 to 4 minutes. Repeat until engine starts.

NOTE: If the engine spins, but fails to start after several starting attempts, there is some problem with the engine other than its starting system. Discontinue cranking the engine until the other problem is found and corrected.

CAUTION - Excessive engine starting can damage vehicle starter motors.

NOTE: This battery charger has an internal thermal protector to prevent overheating and damage to the battery charger. If, after repeated starting attempts, the ammeter registers zero output, wait 3 to 4 minutes for the charger to cool. The thermal protector will automatically reset and allow you to continue.

TROUBLE SHOOTING

1. NO AMMETER READING and NO INDICATOR LIGHTS (Charging has not yet started)

- a. Make sure charger is plugged into a LIVE AC outlet
- b. After unplugging unit, check connections at battery. Make sure the clamps are making good contact with the battery terminal and other point of connection.
- c. If charging a 12 volt battery, see PRE-CHARGE BATTERY ACTIVATION
- d. Check to see that battery is capable of being charged. It may be damaged, sulfated, or have an open circuit.
- e. Make sure you have selected the proper charge voltage for the battery being charged.

2. NO AMMETER READING and NO INDICATOR LIGHTS (Charging has been in process)

- a. Battery is nearing full charge, green light will eventually turn on.
- b. The 2 amp setting has been selected for charging a larger 12 volt battery. In this mode, full charge may never be reached to allow the CHARGE COMPLETE light to turn on. Switch to 10 amp, 12 volt setting.

3. NO AMMETER READING, REVERSE HOOK-UP INDICATOR IS ON

- a. The charger's output cables are reversed at the battery and other point of connection. Unplug charger, correct the hook-up, then plug charger in and resume charging.

4. NO AMMETER READING, but CHARGE COMPLETE INDICATOR IS LIT

- a. Battery is fully charged. Charger may be disconnected at any time.

5. CHARGE COMPLETE INDICATOR IS ON, BUT BATTERY EYE DOES NOT INDICATE FULL CHARGE.

- a. Make sure BATTERY TYPE SELECTOR is set to DEEP-CYCLE when charging any deep-cycle or lead-calcium battery. This is especially important for batteries with built-in hydrometer "eyes".

TROUBLE SHOOTING

- b. See CHARGING BATTERIES WITH BUILT-IN HYDROMETER EYE.
- 6. **CHARGE COMPLETE INDICATOR IS ON, BUT SPECIFIC GRAVITY IS LESS THAN FULL CHARGE.**
 - a. See MORE ON ELECTROLYTE STRATIFICATION.
- 7. **AMMETER AND CHARGE COMPLETE INDICATOR ARE PULSING.**
 - a. See PRECHARGE BATTERY ACTIVATION.

CHARGER CARE AND MAINTENANCE

CAUTION - Make sure charger is unplugged from AC 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. Coil the input and output cables neatly around the cable wrap/handle on the rear of the charger after each use. This will help prevent damage to the cables and the charger.
3. If needed, the case may be wiped clean with a soft cloth.

Any other service to this battery charger must be done by a qualified repair facility. There are no user-servicable parts inside.

SERVICE INFORMATION

ELECTRIC SHOCK CAN KILL! To reduce risk of electric shock, do not attempt to perform any servicing operations other than those listed in the **CHARGER CARE AND MAINTENANCE** section of this manual. Any additional service must be performed by qualified service personnel.

Now that you have purchased your battery charger, should a need ever exist for service, simply contact any Sears Service Center or Sears, Roebuck and Co. store. Be sure to provide the model number of your charger which is: 934.716140.

There are no user servicable parts in this battery charger, and electronic recalibration is required following any servicing. Only Sears Service Centers can properly service this product.

FULL 1-YEAR WARRANTY

If, within 1-year from the date of purchase, this battery charger fails due to a defect in materials or workmanship, simply return it to the nearest Sears store throughout the United States, and Sears will repair or replace it, free of charge.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Sears, Roebuck and Co., Dept. 698/731A, Sears Tower, Chicago, Illinois 60684.

SEARS ROEBUCK AND CO., CHICAGO, IL. 60684 U.S.A.