Schauer®

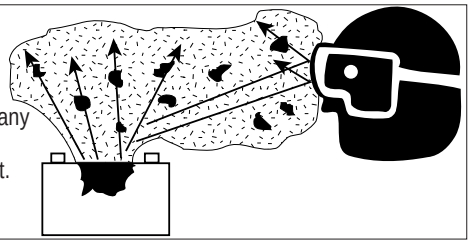
MLC BATTERY CHARGER OPERATING INSTRUCTIONS

SAVE THESE IMPORTANT SAFETY INSTRUCTIONS

BATTERY WARNINGS

DANGER!

RISK OF BATTERY EXPLOSION FROM HYDROGEN GAS. MAY RESULT IN BLINDNESS, SERIOUS INJURY, PERMANENT DISFIGUREMENT AND SCARRING.



ALWAYS assume that any battery might explode when you least expect it. Wear safety glasses for your protection.

Batteries generate explosive hydrogen gas, even during normal operation. People have been injured by battery parts flying in an explosion. They can explode under normal operating conditions, such as starting your car. They can explode under abnormal conditions, such as jump starting, or if short circuited by a tool. They can explode in a parked car or sitting on a table.

To help reduce the risk of these dangers and injury, it is of the utmost importance that each time before using your charger, you read and understand this manual, and any warnings and instructions by the battery manufacturer. Follow these instructions exactly.

TO HELP REDUCE THIS RISK:

1. Wear Personal Protective Equipment

• **ALWAYS** wear complete eye protection (THAT PROTECTS EYES FROM ALL ANGLES).

2. Avoid Flames and Sparks Near Battery and Fuel

• **ALWAYS** keep flames, matches, lighters, cigarettes or other ignition sources away from battery.

• **DO NOT** put flammable material on or under charger. **DO NOT** use near gasoline vapors.

• Make sure charger clips make good contact by twisting or rocking them back and forth several times. The second clip connection **MUST ALWAYS** be made away from the battery. **ALWAYS** plug charger into an electrical outlet **AFTER** all connections have been made. See OPERATING INSTRUCTIONS.

• If necessary to remove battery from vehicle to charge, **ALWAYS** turn off all accessories in the vehicle. Then **ALWAYS** remove grounded terminal (connected to car frame) from battery first.

• A tool touching both battery posts or battery post and car metal parts is a short circuit and will spark. When using metal tools on or near battery be extra cautious to reduce risk of short circuit, possibly causing a battery explosion. **DO NOT** drop a tool on battery.

3. Reduce Explosive Gas (hydrogen)

• Before connecting charger, **ALWAYS** add water to each cell until battery acid covers plates to help purge extra gas from cells. **DO NO**T overfill. Battery acid expands during charge. After charging fill to level specified by battery manufacturer. For a battery without removable caps (maintenance free battery), carefully follow manufacturer's instructions on charging.

• Some sealed maintenance free batteries have a battery condition indicator. A light or bright colored dot indicates low water. Such a battery needs to be replaced, not charged or jump started.

• Charge battery with caps in place. Most U.S. batteries are made with flame arresting caps. **DO NOT** pry caps off sealed batteries. Place wet cloth on batteries with non-flame arresting caps.

• Be sure area around battery is well ventilated before and during charging process. **NEVER** charge in a closed-in or restricted area.

4. Stay Away From Battery When Possible

• **NEVER** put face near battery.

• **ALWAYS** locate charger as far from battery as DC cables permit.

• **ALWAYS** keep other people away from the battery. They are not wearing safety glasses like you are.

5. Avoid Contact With Battery Acid

• Battery posts may have **acid corrosion**. **DO NOT** get corrosion in your eyes. Avoid touching eyes while working near battery.

• **ALWAYS** use a battery carrier. Carrying a battery by hand may put pressure on its ends, causing acid to be forced out vent caps.

• **ALWAYS** have plenty of fresh water and soap nearby in case battery acid contacts eyes, skin or clothing. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flood eye with cold running water for at least fifteen (15) minutes and get medical help immediately.

• In very cold weather a discharged battery may freeze. **NEVER** charge a frozen battery. Gases may form, cracking the case, and spray out battery acid.

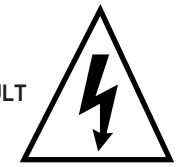
6. Follow Other Manufacturers' Recommendations

• Before using charger, read all instructions for, and caution markings on: (1) charger, (2) battery, and (3) related product using battery. Follow their recommended rate of charge.

ELECTRICAL WARNINGS

DANGER!

RISK OF ELECTRICAL AND FIRE HAZARD. MAY RESULT IN DEATH, SERIOUS INJURY, SHOCK OR BURNS.
TO HELP REDUCE THIS RISK:



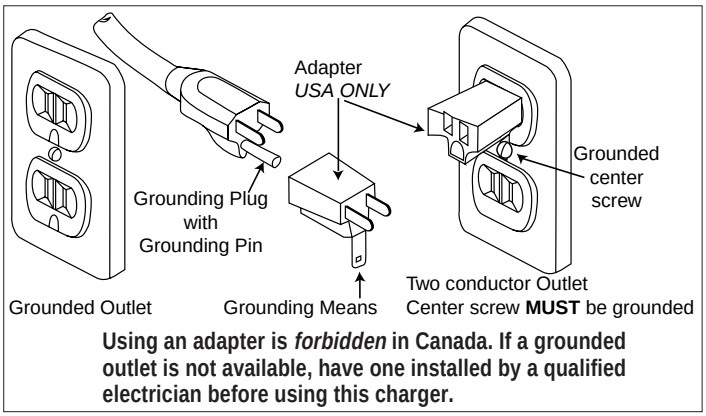
This charger, like all electrical products, **MUST** be treated with respect. Follow these instructions to reduce electrical hazard risk.

1. PROPER GROUNDING AND AC POWER CONNECTION

• Charger **MUST** be grounded to reduce risk of electric shock. 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.** If you ever feel even a slight shock from this or any electrical appliance, stop, walk away. Turn off electricity to outlet, and have it inspected by an electrician. You may have a dangerous, improperly wired outlet.

• **DANGER - NEVER** alter AC power cord or plug provided - if it will not fit outlet, have proper outlet installed by a qualified electrician or proceed as shown in the illustration below. Improper connection can result in a risk of an electric shock. This battery charger is for use on a nominal 120 volt circuit (common household current), and has a grounding plug as illustrated. A temporary adapter may be used, USA only, to connect this plug to a two-pole receptacle, as shown, if properly grounded outlet is not available. The temporary adapter should be used only until a properly grounded outlet can be installed by a qualified electrician.

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



Using an adapter is *forbidden* in Canada. If a grounded outlet is not available, have one installed by a qualified electrician before using this charger.

2. Remove Jewelry

• **ALWAYS** remove personal metal items (such as rings, bracelets, necklaces and watches) when working with a battery. A short circuit through one of these items can melt it causing a severe burn.

3. Avoid Charger Abuse

• To reduce risk of electric shock, unplug charger from outlet before attempting any maintenance or cleaning. Turning off controls will not reduce this risk.

• **DO NOT** disassemble charger. Take it to a qualified service person when service or repair is required. Incorrect reassembly may result in a risk of electric shock or fire.

• **DO NOT** expose charger to rain, snow, water, gas, oil, etc.

• **DO NOT** operate charger if it has received a sharp blow, been dropped, or otherwise damaged in any way; take it to a qualified service person.

• **DO NOT** block air holes in top or bottom of charger. **DO NOT** put charger on vehicle seat. **DO NOT** set a battery on top of charger.

• **DO NOT** operate charger with clips shorted together.

• The polarity of the charger and the battery **MUST ALWAYS** match to avoid damage to battery and charger. The second clip connection **MUST ALWAYS** be made away from the battery. (See OPERATING INSTRUCTIONS below.)

4. Proper Use of Charger and Wiring

• An extension cord should not be used unless absolutely necessary. Use of improper extension cord could result in a risk of fire and electric shock. If extension cord must be used, use **ONLY** a grounded, 3-wire type cord. **NEVER** use a 2-wire cord and an adaptor! The cord **MUST** be plugged into a grounded outlet. Make sure it is properly wired, in good electrical condition, and wire size is large enough for AC ampere rating of charger as specified below. AWG = American Wire Gauge

RECOMMENDED PROPER WIRE SIZE (AWG) IN EXTENSION CORDS FOR BATTERY CHARGERS

Charger Models	Length of Cord (feet)			
Use a cord rated to carry the charger AC input current.	25	50	100	150
	Wire Size of Cord (AWG)			
0 to 2 amperes	18	18	16	16
2 to 3 amperes	18	18	16	14
3 to 4 amperes	18	18	16	14
4 to 5 amperes	18	16	14	12
You may use heavier size wire — **NEVER** lighter.				

• **DO NOT** modify charger circuitry.

• To reduce risk of damage to plug and cord when disconnecting charger, ALWAYS pull on plug - **NEVER** on cord.

• Locate cord so that it will not be stepped on, tripped over, or otherwise subject to damage or stress. **DO NOT** lay extension cord on battery or charger.

• **DO NOT** operate charger with damaged cord or plug - replace them immediately.

• Determine battery voltage by referring to vehicle or equipment owner's manual and make sure it matches DC output voltage shown on charger nameplate.

• This battery charger is designed specifically for charging automotive lead-acid batteries. **DO NOT** use with dry-cells that are commonly used with home appliances, flashlights, etc. These batteries may burst and cause injury to persons and damage to property.

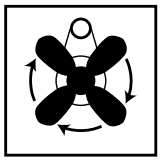
• This charger is not intended to supply low-voltage power for applications other than battery charging.

• Charging a battery on board a boat floating in water requires a battery charger specially designed to marine charging standards. Move the battery to dry land for charging with this charger.

AUTOMOTIVE WARNINGS

DANGER!

RISK OF FLYING PARTS IF USED NEAR MOVING ENGINE PARTS. MAY RESULT IN DEATH, BLINDNESS, SERIOUS INJURY, PERMANENT DISFIGUREMENT AND SCARRING.



TO HELP REDUCE THIS RISK:

• **ALWAYS** keep charger, DC clips and wires, and AC power cord and plug away from any movable parts of the vehicle including fan belts, fan blade, alternator or generator, etc.

• **ALWAYS** avoid the radiator cooling fan. On some cars it may start up without the engine running, when you least expect it.

• If your charger does not have an engine starting feature, **ALWAYS** disconnect the charger before starting the engine. If your charger has engine starting feature, **AVOID MOVING ENGINE PARTS** when starting engine.

GENERAL INFORMATION

The warnings are important. Remember, our address is on the charger, if you should lose these Safety Instructions send a stamped self addressed envelope for a new set.

The following models are covered by these instructions and come with battery clips except as noted.

FOR 12 VOLT BATTERIES:

6 amp chargers	MLC6012	
10 amp chargers	MLC10012	
20 amp chargers	MLC20012	

FOR 16 VOLT BATTERIES:

8 amp chargers	MLC816	
20 amp chargers	MLC2016	

FOR 24 VOLT BATTERIES:

7 amp chargers	MLC7024	has Cannon XLR3 connector
10 amp chargers	MLC10024	
20 amp chargers	MLC20024	order specific connector with charger

• These chargers are suitable for use on conventional, maintenance free, deep-cycle, and gel type lead-acid batteries. The MLC is an automatic battery charger, and will recognize and properly charge those lead acid batteries types. No adjustments are required.

• DRY CHARGED BATTERIES require a conditioning charge after being filled with electrolyte. Follow the battery manufacturer's charging instructions.

• This charger has Auto-Battery-Sense with short circuit and reverse connection protection. It will not turn on until it is connected to a battery. This means no sparking between the clips if they are touched together, and no voltage will be measured at the clips by a voltmeter. If connections are incorrect, the **RED POWER ON** light will not turn on.

• These chargers have fully automatic charging and maintenance modes. The chargers gradually reduce or taper the charge rate to less than 1 ampere as the battery approaches its fully charged state. The **YELLOW 80% CHARGE** light turns on to indicate that the battery is almost charged and that the charging current is beginning to taper.

• The **GREEN FULL CHARGE** light turns on when the chargers have completed the charging cycle and have automatically switched from the charging mode to the maintenance mode. Leaving the chargers connected to the battery will increase battery life as the maintenance mode (Green Light ON) prevents battery self discharge.

• The chargers can be connected to the battery for an indefinite period of time. The chargers may be used any time to extend the operating time of your battery. You do not have to wait until the battery is run down.

• These battery chargers incorporate overload protection in the DC output circuits. See Trouble Shooting section for details.

Operating Instructions

A spark near the battery may cause a battery explosion. To reduce risk of a spark near the battery when you connect the charger clips, **ONLY** connect one clip to the battery. Then, take the second clip and connect it to the car frame or engine block. If a spark should occur then, it will be far away from the battery. This type of connection works because every car battery has one cable which is connected to the body or car frame. This is called the ground cable. On most cars this cable is connected to the NEGATIVE terminal of the battery. This is called a NEGATIVE GROUND. There are some very old cars with positive grounds.

Battery Polarity: A battery has two poles or posts. The positive battery post is usually marked POS, P, or + and is larger than the negative post which is usually marked NEG, N, or -.

The polarity of the charger and the battery **MUST ALWAYS** match to avoid damage to battery and charger. On a negative ground car: connect the positive (red) charger clip to the positive battery post first; then connect the negative (black) clip to negative ground (car frame or engine block). If you are not sure what type of ground your car has, have it checked before using charger.

Honestly now, did you review the safety instructions before connecting your charger? Follow these three steps in order. Go to STEP 1.

STEP 1. CONNECTING THE CHARGER TO BATTERY

- If charger has switch with OFF position, it MUST be set to OFF.
- AC power cord MUST be unplugged.

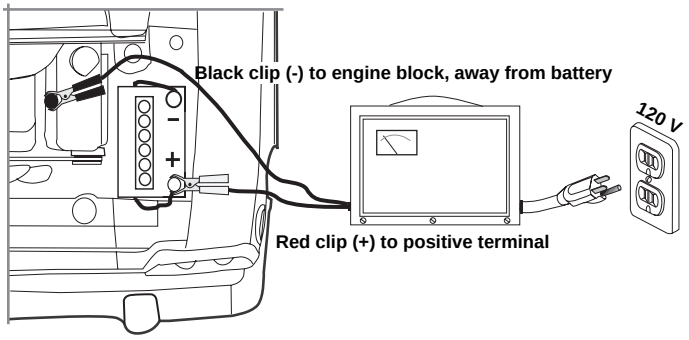
A. CHARGING BATTERY IN VEHICLE

If car has negative ground: (Most cars do, but if you are not sure have it checked.)

1. Connect POSITIVE (RED) charger clip to POSITIVE post of battery. Some newer cars have a remote positive terminal located away from the battery. Use this remote terminal for charging connections. See your car's owners manual.
2. Next connect NEGATIVE (BLACK) charger clip to car frame or engine block away from battery.

CAUTION: DO NOT connect clip to carburetor, fuel lines, or sheet metal body parts. Connect to a heavy gauge metal part of the frame or engine block. DO NOT face battery when making final connection. Go to STEP 2.

Typical Hookup - Charging Negative Ground Battery in Vehicle



For very old cars with a positive ground.

If car has positive ground: (Most cars **DO NOT**, be sure to check.)

1. Connect NEGATIVE (BLACK) charger clip to NEGATIVE ungrounded post of battery.
2. Next connect POSITIVE (RED) charger clip to car frame or engine block away from battery.

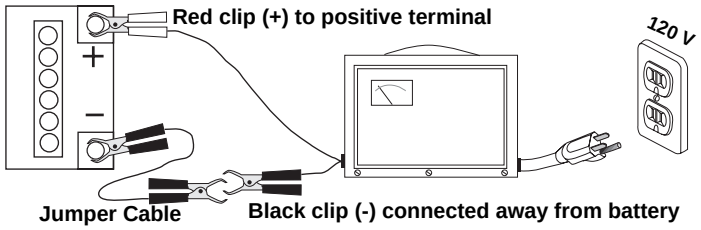
CAUTION: DO NOT connect clip to carburetor, fuel lines, or sheet metal body parts. Connect to a heavy gauge metal part of the frame or engine block. DO NOT face battery when making final connection. Go to STEP 2.

B. CHARGING BATTERY OUTSIDE VEHICLE

- Check polarity of battery posts. See above.
- Attach a jumper cable or a 6 gauge (AWG) insulated battery cable at least 24 inches long, to NEGATIVE battery post.

1. Connect POSITIVE (RED) charger clip to POSITIVE post of battery.
2. Position yourself and free end of cable as far away from battery as possible - then connect NEGATIVE (BLACK) charger clip to free end of cable. DO NOT face battery when making final connection. Go to STEP 2.

Typical hookup - Charging battery outside vehicle



STEP 2. TURNING THE CHARGER ON

- Plug the AC cord in a **grounded** outlet.
- If charger has a power switch, turn it on.
- **DO NOT** touch charger clips when the charger is on.
- The charger red POWER ON light should now be glowing indicating the battery is charging. The yellow light will turn on when the battery is about 80% charged.
- At the end of charge the green light will turn on. All three lights will now be on. The charger is now in float mode. You can leave the charger in float mode until you are ready to use the battery.
- See CHARGING TIME table for length of charge.

STEP 3. TURNING THE CHARGER OFF

- Unplug the AC power cord from the outlet.
- Set the selector switch to OFF.
- Remove charger clip connected to car frame: If charging battery outside a vehicle, remove clip connected away from battery.
- Remove clip connected to battery post.

CHARGING TIME

Time To Charge Fully Discharged Battery

Battery Type	Battery Rating	Charger Output Rating (Amps) 1	2	4	6	10	12	15	20	40
Cars/Trucks etc.	**RC**	Time to charge your battery (hours)								(min)
230 CCA	40	TRICKLE 13	7	4	3	2	2	1		20
315 CCA	60	20	10	7	4	3	3	2		30
450 CCA	70	23	12	8	5	4	3	2		35
550 CCA	85	28	14	9	6	5	4	3		43
875 CCA	125	42	21	14	8	7	6	4		60
Motorcycle Garden Tractor	**AH**	Note change in ratings below to AH. Time to charge your battery (hours)								(min)
small	12	13	7	NR	NR	NR	NR	NR	NR	NR
large	32	36	18	9	NR	NR	NR	NR	NR	NR
Deep Cycle	55	NR	NR	15	10	6	5	4	NR	NR
Deep Cycle	80	NR	NR	NR	15	9	7	6	NR	NR
Deep Cycle	105	NR	NR	NR	NR	12	10	8	NR	NR

min = minutes for Fast Chargers NR = Not Recommended for this size battery

Charging times for your battery may be different from these. If your battery is only half discharged you will need only half the time to charge.

Some old batteries may not accept a charge and will heat up on charging. **CAUTION:** If at any time the battery gets hot (above 125 degrees F) or acid comes out of vent caps, STOP charging. Have your battery checked. Charging may not be possible. It may have to be replaced.

CAUTION: After these times, or slightly longer, if the green light never turrns on, suspect the following two battery problems. 1) Sulfated battery (worn out), 2) shorted cell in battery. Stop charging and have battery checked.

Charging times for the car batteries are based on their **Reserve Capacity** ratings [**RC**]. We assumed the batteries were fully discharged.

Charging times for the motorcycle and deep cycle batteries are based on their **Ampere Hour** ratings [**AH**]. The motorcycle/garden tractor batteries and deep cycle batteries were assumed to be 70 per cent discharged.

There is no relationship between **Cold Cranking** rating [**CCA**] and charge time. Two batteries may have the same **CCA** rating, but very different RC ratings. **ALWAYS** use **RC** or **AH** ratings to determine charge time. If you do not know the rating for your battery, ask your battery dealer.

STORAGE

Clean clips. Repack charger and instruction manual. Store in a dry place not subject to subzero temperatures which could cause the cord insulation to become stiff and possibly crack when uncoiled.

The Meaning of Short Circuit and Reverse Polarity Protection.

In the old days touching charger clips together made a spark which let you know that the charger was working. With these Short Circuit protected chargers there will be **NO** spark. Besides you are not supposed to plug the charger in until after you have connected it to the battery.

If you should connect to the battery in reverse polarity there will be no current flow.

TROUBLE SHOOTING

Indicator Lights Red	Yellow	Green	Circuit Breaker*	Battery Temperature	Battery Problems
on	turns on soon but dim	never on	no clicks	normal	Worn out battery - needs to be replaced
on	long time before turns on	2 to 6 hours before turns on	may click a few times	normal	Deeply discharged good battery, specific gravity near 1.120
on	dim on-off-then on-brighter	2 to 4 hours before turns on	may click several times while yellow is off	normal	Severely over discharged battery (example: car light left on several days)
on	may turn on	never on	several clicks at beginning - occasional clicks later	gets warm and may smell	Shorted cells - battery must be replaced
					Hookup Problems
off	never on	never on	no clicks	normal	Reversed polarity or battery below 5 volts.
on	never on	never on	continous clicking starts in 4 to 5 minutes	gets very warm and smelly	Voltage Mismatch - wrong charger for this battery
off	never on	never on	no clicks	normal	NO power - check AC outlet; check charger connection to battery.

*The charger is protected against overloads by a self-resetting DC circuit breaker. An overload is indicated by a distinct “click” of the DC circuit breaker as it trips. It resets itself, clicking after a few minutes of cooling. If the overload condition still exists, the cycle will repeat.

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