



Schumacher® ELECTRIC CORP.

801 BUSINESS CENTER DRIVE • MOUNT PROSPECT, ILLINOIS 60056-2179

Send Warranty Product Repairs to: 1025 E. Thompson Ave., Hoopeston, IL 60942-0280.

Call Customer Service if you have questions: 1-800-621-5485

A. IMPORTANT SAFETY INSTRUCTIONS

1. **SAVE THESE INSTRUCTIONS** - This manual contains important safety and operating instructions for battery charger Models.
 MODELS: #2, CM-1, SE-82-6, SE-83, SE-84, SE-86, SE-1010, SE-1010-2, SE-1015, MC-1, WS-63, WS-84, WS-86, WS-212, WS-1010, WS-1015, WS-1020.
 Also models SEC-1, SE-82-6, SEC-84, SEC-86, SEC-1010, SEC-1010-2, SEC-1015, SEC-1020.
 A BATTERY CHARGER RECEIVES AC POWER FROM THE ELECTRIC OUTLET, AND DELIVERS DC CURRENT TO THE BATTERY.
2. Before using battery charger, read all instructions and cautionary markings on (1) battery charger, (2) battery and (3) product using battery.
3. CAUTION - To reduce risk of injury, charge only lead acid type rechargeable batteries. Other types of batteries may burst causing personal injury and damage.
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 risk of damage to electric plug and cord, pull by plug rather than cord when disconnecting charger.
6. Make sure 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 improper extension cord could result in a risk of fire and electric shock. If extension cord must be used, make sure:
 - (a) That pins on plug of extension cord are the same number, size and shape as those of plug on charger;
 - (b) That extension cord is properly wired and in good electrical condition; and
 - (c) That wire size is large enough for AC ampere rating of charger as specified below

AC INPUT RATING, AMPERES		AWG SIZE OF CORD			
Equal to or Greater than	but less than	Length of Cord, Feet			
		25	50	100	150
0	2	18	18	18	18
2	3	18	18	16	14
3	4	18	18	16	14

8. Do not operate charger with damaged cord or plug - replace them immediately.
9. 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 man.
10. Do not disassemble charger; take it to a qualified serviceman when service or repair is required. Incorrect reassembly may result in a risk of electric shock or fire.
11. To reduce risk of electric shock, unplug charger from outlet before attempting any maintenance or cleaning. Turning off controls will not reduce this risk.

B. WARNING - RISK OF EXPLOSIVE GASES

1. 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 INSTRUCTION EXACTLY.

2. To reduce risk of battery explosion, follow these instructions and those published by battery manufacturer and manufacturer of any equipment you intend to use in vicinity of battery. Review cautionary marking on these products and on engine.

C. PERSONAL PRECAUTIONS

1. Someone should be within range of your voice or close enough to come to your aid when you work near a lead-acid battery.
2. Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing or eyes.
3. Wear complete eye protection and clothing protection. Avoid touching eyes while working near battery.
4. If battery 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.
5. NEVER smoke or allow a spark or flame in vicinity of battery or engine.
6. Be extra cautious not to drop a metal tool onto battery. It might spark or short circuit battery or other electrical part that may cause explosion.
7. 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.
8. Use 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 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.
9. NEVER charge a frozen battery.

D. PREPARING TO CHARGE

1. If necessary to remove battery from vehicle to charge, always remove grounded terminal from battery first. Make sure all accessories in the vehicle are off, so as not to cause an arc.
2. Be sure area around battery is well ventilated while battery is being charged. Gas can be forcefully blown away by using a piece of cardboard or other non-metallic material as a fan.
3. Clean battery terminals. Be careful to keep corrosion from coming in contact with eyes.
4. Add distilled water in each cell until battery acid reaches level specified by battery manufacturer. This helps purge excessive gas from cells. Do not overfill. For a battery without cell caps, carefully follow manufacturers recharging instructions.
5. Study all battery manufacturers specific precautions such as removing or not removing cell caps while charging and recommended rates or charge.
6. Determine voltage of battery by referring to car owner's manual and make sure that output voltage selector switch is set at correct voltage. If charger has adjustable charge rate, charge battery initially at lowest rate.

E. CHARGER LOCATION

1. Locate charger as far away from battery as DC cables permit.
2. Never place charger directly above battery being charged; gases from battery will corrode and damage charger.
3. Never allow battery acid to drip on charger when reading gravity or filling battery.
4. Do not operate charger in a closed-in area or restrict ventilation in any way.
5. Do not set a battery on top of charger.
6. Do not expose charger to rain or snow.

F. DC CONNECTION PRECAUTIONS

1. Connect and disconnect DC output clips only after setting any charger switches to off

position and removing AC cord from electric outlet. Never allow clips to touch each other.
2. Attach clips to battery posts and twist or rock back and forth several times to make a good connection. This tends to keep clips from slipping off terminate and helps to reduce risk of sparking.

G. FOLLOW THESE STEPS WHEN BATTERY IS INSTALLED IN VEHICLE. A SPARK NEAR BATTERY MAY CAUSE BATTERY EXPLOSION. TO REDUCE RISK OF SPARK NEAR BATTERY, DO AS FOLLOWS:

1. Position AC and DC cords to reduce risk of damage by hood, door, or moving engine part.
2. Stay clear of fan blades, belts, pulleys, and other parts that can cause injury to persons.
3. Check polarity of battery posts. POSITIVE (POS, P. +) battery post usually has larger diameter than NEGATIVE (NEG, N. -) post.
4. Determine which post of battery is grounded (connected to the chassis). If negative post is grounded to chassis (as in most vehicles), see #5. If positive post is grounded to the chassis, see #6.
5. For negative-grounded vehicle, connect POSITIVE (RED) clip from battery charger to POSITIVE (POS, P. +) ungrounded post of battery. Connect NEGATIVE (BLACK) clip to vehicle chassis or engine block away from battery. Do not connect clip to carburetor, fuel lines, or sheet-metal body parts. Connect to a heavy gage metal part of the frame or engine block.
6. For positive-grounded vehicle, connect NEGATIVE (BLACK) clip from battery charger to NEGATIVE (NEG, N. -) ungrounded post of battery. Connect POSITIVE (RED) clip to vehicle chassis or engine block away from battery. Do not connect clip to carburetor, fuel lines, or sheet-metal body parts. Connect to a heavy gage metal part of the frame or engine block.
7. When disconnecting charger, turn switches to off, disconnect AC cord, remove clip from vehicle chassis, and then remove clip from battery terminal, in that order.
8. See operating instructions for length of charge information.

H. FOLLOW THESE STEPS WHEN BATTERY IS OUTSIDE VEHICLE. A SPARK NEAR THE BATTERY MAY CAUSE BATTERY EXPLOSION. TO REDUCE RISK OF A SPARK NEAR BATTERY, DO AS FOLLOWS:

1. Check polarity of battery posts. POSITIVE (POS, P. +) battery post usually has a larger diameter than NEGATIVE (NEG, N. -) post.
2. Attach at least a 24-inch-long 6-gauge (AWG) insulated battery cable to NEGATIVE (NEG, N. -) battery post.
3. Connect POSITIVE (RED) charger clip to POSITIVE (POS, P. +) post of battery.
4. 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.
5. Do not face battery when making final connection.
6. When disconnecting charger, always do so in reverse sequence of connecting procedure and break first connection while as far away from battery as practical.
7. A marine (boat) battery must be removed and charged on shore. To charge it on board requires equipment specially designed for marine use.

I. GROUNDING AND AC POWER CORD CONNECTION INSTRUCTIONS

Charger should 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.

DANGER - Never alter AC cord or plug provided - if it will not fit outlet, have proper outlet

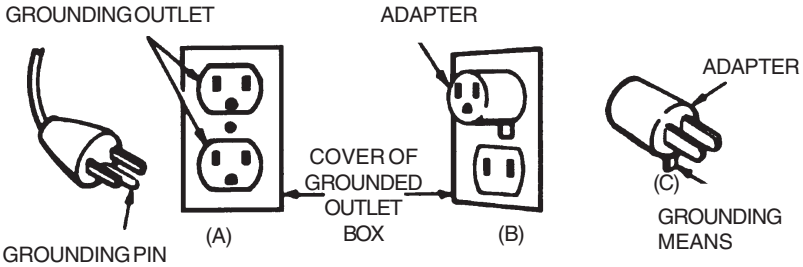
Installed by a qualified electrician. Improper connection can result in a risk of an electric shock.

This battery charger is for use on a nominal 117-volt circuit, and has a grounding plug that looks like the plug illustrated in sketch A in Figure 1. A temporary adapter, which looks like the adapter illustrated in sketches B and C, may be used to connect this plug to a two-pole receptacle as shown in sketch B if a 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, 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.

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.

**FIGURE 1
GROUNDING METHODS**



J. OPERATION INSTRUCTIONS

This battery charger is equipped with a self-resetting circuit breaker. This device protects the charger from temporary overloads. In the event of an overload, the circuit breaker will trip open, and after a short cooling off period will reset automatically. This process is known as cycling and can be recognized by an audible clicking sound.

K. OUTPUT VOLTAGE SELECTOR SWITCH

Set output voltage selector switch to match voltage of battery to be charged. For models without voltage selector switch make sure voltage of battery matches that of the charger. Battery charger models having a voltage selector switch are for charging a 6 or a 12 Volt battery. Those having no voltage switch are intended for charging a 12 Volt battery only.

L. OUTPUT CURRENT SELECTOR SWITCH

In addition to the voltage selector switch, some models are equipped with a two position switch, allowing the operator to select the ampere charge rate to a battery, as follows:

MODELS WS or SE- or SEC-	SWITCH SETTING
82-6	6 or 2 Amps (Trickle)
1010-2	10 or 2 Amps (Trickle)
1015	15 or 3 Amps (Trickle)
1020	20 or 3 Amps (Trickle)

Before making any connections to battery, read instructions F, G and H carefully.

Connect DC output clips only when AC power supply cord is removed from electrical outlet.

Never allow clips to touch each other.

- M. CHARGE PERIOD: The approximate required time to bring a battery to full charge state depends upon the number of ampere hours (AH) depleted from the battery. AH's are determined by multiplying the number of hours times the number of Amps supplied by a battery to a load.

For example - If a load was connected to a battery, which drew 7 Amps for a period of 5 hours, the battery will have supplied 35 AH. The approximate recharge time would then be calculated by dividing the 35 AH depleted from the battery, by the ampere charge rate of the charger. To allow for tapering of the charge rate add 25 percent to the charge time.

Indications of a fully charged battery are:

When the ammeter indicates the charge rate has tapered to approximately one half the charger rated output.

A hydrometer reading of the specific gravity of the electrolyte (fluid) of a battery in good condition should be between 1.250 and 1.285.

When a battery reaches 80 - 85% of full charge bubbles will appear on the surface of the fluid. As the battery nears full charge, bubbling will become more noticeably vigorous.

Disconnecting from Battery:

Before disconnecting from battery read instructions F, G and H carefully.

- N. STORAGE: Store battery charger in a dry area.

O. PROBLEM CHECKLIST

1. If no meter reading, check the following:
 - a. Remove the charger power cord plug from the AC outlet and recheck the battery charger clips for clean, tight connections.
 - b. Check voltage selector switch for proper setting.
 - c. Check for voltage at the AC outlet by plugging in a lamp or other appliance.
2. If Ammeter pointer moves to extreme right, remains a short time, then returns to zero, accompanied by a clicking sound, check the following:
 - a. Possibly, the charger connections are reversed. (Positive to negative, instead of positive to positive).

- b. A severely discharged, but otherwise good battery. In this situation, the circuit breaker will continue to cycle and the ammeter pointer will swing from one side to the other, until the battery has recovered sufficiently to allow a normal charging rate.
 - c. A defective battery may cause repeated circuit breaker cycling. A battery in this condition will not accept a charge and should be replaced.
 - d. Check voltage switch for proper setting.
3. If charging current is less than full output rating of the charger, check the following:
- a. Perhaps battery is partially charged.
 - b. Perhaps battery is sulphated and will not accept full charge rate.
 - c. Perhaps power line is providing low AC supply voltage.

LIMITED WARRANTY

SCHUMACHER ELECTRIC CORPORATION 801 BUSINESS CENTER DRIVE, MOUNT PROSPECT, ILLINOIS 60056-2179 MAKES THIS LIMITED WARRANTY TO THE ORIGINAL PURCHASER AT RETAIL OF THIS PRODUCT. THIS LIMITED WARRANTY IS NOT TRANSFERABLE.

Schumacher Electric Corporation warrants this battery charger for two years from date of purchase at retail against defective material or workmanship. If such should occur, the unit will be repaired or replaced at the option of the manufacturer. It is the obligation of the purchaser to forward the unit together with proof of purchase, transportation and/or mailing charges prepaid to the manufacturer or its authorized representative.

This limited warranty is void if the product is misused, subjected to careless handling or repaired by anyone other than the manufacturer or its authorized representative.

The manufacturer makes no warranty other than this limited warranty and expressly excludes any implied warranty including any warranty for consequential damages.

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