



# Manual Battery Charger

## OWNERS MANUAL



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105-4 105-5

105-9 105-12

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**PLEASE SAVE THIS OWNERS MANUAL AND READ BEFORE EACH USE.**

This manual will explain how to use the charger safely and effectively.

Please read and follow these instructions and precautions carefully.

### 1. IMPORTANT SAFETY INSTRUCTIONS – SAVE THESE INSTRUCTIONS

- 1.1 **SAVE THESE INSTRUCTIONS** – This manual contains important safety and operating instructions.
- 1.2 Keep out of reach of children.
- 1.3 Do not expose the charger to rain or snow.
- 1.4 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.
- 1.5 To reduce the risk of damage to electric plug and cord, pull by the plug rather than the cord when disconnecting charger.
- 1.6 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 an extension cord must be used, make sure:
  - The pins on plug of extension cord are the same number, size and shape as those of plug on charger.
  - The extension cord is properly wired and in good electrical condition.
  - The wire size is large enough for AC ampere rating of charger as specified in section 8.
- 1.7 Do not operate charger with damaged cord or plug – replace the cord or plug immediately.
- 1.8 Do not operate charger if it has received a sharp blow, been dropped, or otherwise damaged in any way; take it to a qualified serviceperson.
- 1.9 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.
- 1.10 To reduce risk of electric shock, unplug charger from outlet before attempting any maintenance or cleaning. Turning off controls will not reduce this risk.
- 1.11 **WARNING: RISK OF EXPLOSIVE GASES.**
  - a. 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 YOU FOLLOW THE INSTRUCTIONS EACH TIME YOU USE THE CHARGER.
  - b. 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 markings on these products and on engine.

### 2. PERSONAL SAFETY PRECAUTIONS

- 2.1 Consider having someone close enough by to come to your aid when you work near a lead-acid battery.
- 2.2 Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.
- 2.3 Wear complete eye protection and clothing protection. Avoid touching eyes while working near battery.
- 2.4 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.
- 2.5 NEVER smoke or allow a spark or flame in vicinity of battery or engine.
- 2.6 Be extra cautious to reduce risk of dropping a metal tool onto battery. It might spark or short-circuit battery or other electrical part that may cause explosion.
- 2.7 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.

- 2.8 Use charger for charging LEAD-ACID (STD, AGM, GEL or deep-cycle) rechargeable batteries. It is not intended to supply power to a low voltage electrical system other than in a starter-motor 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.
- 2.9 NEVER charge a frozen battery.

### 3. PREPARING TO CHARGE

- 3.1 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.
- 3.2 Be sure area around battery is well ventilated while battery is being charged.
- 3.3 Clean battery terminals. Be careful to keep corrosion from coming in contact with eyes.
- 3.4 Add distilled water in each cell until battery acid reaches level specified by battery manufacturer. Do not overfill. For a battery without removable cell caps, such as valve regulated lead acid batteries, carefully follow manufacturer's recharging instructions.
- 3.5 Study all battery manufacturer's specific precautions while charging and recommended rates of charge.
- 3.6 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.

### 4. CHARGER LOCATION

- 4.1 Locate charger as far away from battery as DC cables permit.
- 4.2 Never place charger directly above battery being charged; gases from battery will corrode and damage charger.
- 4.3 Never allow battery acid to drip on charger when reading electrolyte specific gravity or filling battery.
- 4.4 Do not operate charger in a closed-in area or restrict ventilation in any way.
- 4.5 Do not set a battery on top of charger.

### 5. DC CONNECTION PRECAUTIONS

- 5.1 Connect and disconnect DC output clips only after setting any charger switches to "off" position and removing AC cord from electric outlet. Never allow the clips of charger to touch each other. Clips may be energized and they may spark.
- 5.2 Attach clips to battery and chassis, as indicated in sections 6 and 7.

### 6. FOLLOW THESE STEPS WHEN BATTERY IS INSTALLED IN VEHICLE

#### **WARNING: A SPARK NEAR THE BATTERY MAY CAUSE A BATTERY EXPLOSION. TO REDUCE THE RISK OF A SPARK NEAR THE BATTERY:**

- 6.1 Position AC and DC cords to reduce risk of damage by hood, door, or moving engine part.
- 6.2 Stay clear of fan blades, belts, pulleys, and other parts that can cause injury to persons.
- 6.3 Check polarity of battery posts. POSITIVE (POS, P, +) battery post usually has larger diameter than NEGATIVE (NEG, N, -) post.
- 6.4 Determine which post of battery is grounded (connected) to the chassis. If negative post is grounded to chassis (as in most vehicles), see (6.5). If positive post is grounded to the chassis, see (6.6).
- 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 gauge metal part of the frame or engine block.
- 6.6 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 gauge metal part of the frame or engine block.
- 6.7 When disconnecting charger, turn switches to off, disconnect AC cord, remove clip from vehicle chassis, and then remove clip from battery terminal.
- 6.8 See *Calculating Charge Time* for length of charge information.

## 7. FOLLOW THESE STEPS WHEN BATTERY IS OUTSIDE VEHICLE

**WARNING: A SPARK NEAR THE BATTERY MAY CAUSE A BATTERY EXPLOSION.  
TO REDUCE THE RISK OF A SPARK NEAR THE BATTERY:**

- 7.1 Check polarity of battery posts. POSITIVE (POS, P, +) battery post usually has a larger diameter than NEGATIVE (NEG, N, -) post.
- 7.2 Attach at least a 24-inch-long 6-gauge (AWG) insulated battery cable to NEGATIVE (NEG, N, -) battery post.
- 7.3 Connect POSITIVE (RED) charger clip to POSITIVE (POS, P, +) post of battery.
- 7.4 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.
- 7.5 Do not face battery when making final connection.
- 7.6 When disconnecting charger, always do so in reverse sequence of connecting procedure and break first connection while as far away from battery as practical.
- 7.7 A marine (boat) battery must be removed and charged on shore. To charge it on board requires equipment specially designed for marine use.

## 8. GROUNDING AND AC POWER CORD CONNECTIONS

- 8.1 This battery charger is for use on a nominal 120 volt circuit and has a grounded plug. The charger must be grounded, to reduce the risk of electric shock. The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances. The plug pins must fit the receptacle (outlet). Do not use with an ungrounded system.
- 8.2 **DANGER:** Never alter the AC cord or plug provided – if it does not fit the outlet, have a proper grounded outlet installed by a qualified electrician. An improper connection can result in a risk of an electric shock or electrocution.

**NOTE:** Pursuant to Canadian Regulations, use of an adapter plug is not allowed in Canada. Use of an adapter plug in the United States is not recommended and should not be used.

### 8.3 USING AN EXTENSION CORD

The use of an extension cord is not recommended. If you must use an extension cord, follow these guidelines:

- Pins on plug of extension cord must be the same number, size, and shape as those of plug on charger.
- Ensure that the extension cord is properly wired and in good electrical condition.
- Wire size must be large enough for the AC ampere rating of charger, as specified:

#### Recommended minimum AWG size for an extension cord

AC input rating, amperes*		Length of cord, feet (m) / AWG size of cord			
At least	But less than	25 (7.6)	50 (15.2)	100 (30.5)	150 (45.6)
0	2	18	18	18	16
2	3	18	18	16	14
3	4	18	18	16	14
4	5	18	18	14	12
5	6	18	16	14	12
6	8	18	16	12	10
8	10	18	14	12	10
10	12	16	14	10	8
12	14	16	12	10	8
14	16	16	12	10	8
16	18	14	12	8	8
18	20	14	12	8	6

\*If the input rating of a charger is given in watts, rather than in amperes, the corresponding ampere rating is determined by dividing the wattage rating by the voltage rating, for example: 1200 watts/120 volts=10 amperes.

## 9. ASSEMBLY INSTRUCTIONS

- 9.1 Remove all cord wraps and uncoil the cables prior to using the battery charger.
- 9.2 Extend the handle from the retracted position by pulling it upward until it locks into place. (Press the small silver buttons inward, if necessary.)

## 10. CONTROL PANEL

### CHARGE RATE SELECTOR SWITCH

Use the charge rate selector switch to select the charge rate or engine start setting.

**Charge** – For charging small and large batteries.

**Boost** – For quickly adding energy to a severely discharged or large capacity battery prior to Engine Start.

**Engine Start** – Provides additional amps for cranking an engine with a weak or run-down battery. Always use in combination with a battery.

### TIMER

The timer allows you to set a specified time for charging. After the timer expires, the charger stops charging your battery. The main function of the timer is to prevent overcharging, while allowing a battery time to obtain a satisfactory charge. **Monitor the charger and battery.** To properly set the timer, you must know the size of the battery (in ampere hours) or reserve capacity (in minutes) and the state of charge. It is important that you determine the appropriate state of charge of your battery and set the timer accordingly.

### 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.

## 11. 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.

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

**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:**

$\text{Ah rating} \times \% \text{ of charge needed} \times 1.25 = \text{hrs of charge}$

Charger Amp setting

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

$100 \times .50 \times 1.25 = 3.125$   
20

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

BATTERY SIZE/RATING			CHARGE RATE/CHARGING TIME		
			10A	20A	40A
SMALL BATTERIES	Motorcycle, garden tractor, etc.	6-12 Ah	NR	NR	NR
		12-32 Ah	NR	NR	NR
CARS/TRUCKS	200-315 CCA	40-60 RC	2¼-3 h	1-1½ h	½-¾ h
	315-550 CCA	60-85 RC	3-3¾ h	1½-2 h	¾-1 h
	550-1000 CCA	85-190 RC	3¾-7 h	2-3½ h	1-1¾ h
MARINE/DEEP-CYCLE		80 RC	3½ h	1¾ h	NR
		140 RC	5½ h	2¾ h	NR
		160 RC	6 h	3 h	NR
		180 RC	6½ h	3¾ h	NR

**13. MAINTENANCE AND CARE**

A minimal amount of care can keep your battery charger working properly for years.

- Clean the clamps each time you are finished charging. Wipe off any battery fluid that may have come in contact with the clamps to prevent corrosion.
- Occasionally cleaning the case of the charger with a soft cloth will keep the finish shiny and help prevent corrosion.
- Coil the input and output cords neatly when storing the charger. This will help prevent accidental damage to the cords and charger.
- Store the charger unplugged from the AC power outlet in an upright position.
- Store inside, in a cool, dry place.
- Store the clamps on the storage areas provided on the handle. Do not store the clamps clipped together, on or around metal, or clipped to the cables.

**14. TROUBLESHOOTING**

PROBLEM	POSSIBLE CAUSE	SOLUTION
Charger will not turn on when properly connected.	AC outlet is dead.	Check for open fuse or circuit breaker supplying AC outlet.
	Poor electrical connection.	Check power cord and extension cord for loose fitting plug.
The battery is connected and the charger is on, but is not charging.	Clamps are not making a good connection.	Check for poor connection at battery and frame. Make sure connecting points are clean. Rock the clamps back and forth for a better connection.

<b>PROBLEM</b>	<b>POSSIBLE CAUSE</b>	<b>SOLUTION</b>
The charger is making an audible clicking sound.	<p>Circuit breaker is cycling.</p> <p>Battery is defective.</p> <p>Shorted battery cables or clips.</p> <p>Severely discharged battery, but otherwise it is a good battery.</p> <p>Reverse connections at battery.</p>	<p>The settings may be wrong. Check the charger settings.</p> <p>Have the battery checked.</p> <p>Circuit breaker cycles when current draw is too high. Check for shorted cables or clips and replace if necessary.</p> <p>The battery may not want to accept a charge due to a run-down state. Allow charging to continue until battery has a chance to recover sufficiently to take a charge. If more than 20 minutes, stop charging and have the battery checked.</p> <p>Shut the charger off and correct the lead connections.</p>
Charger makes a loud buzz or hum.	<p>Transformer laminations vibrate (buzz).</p> <p>Shorted Diode Assembly or Output Rectifier Assembly (hum).</p>	<p>No problem, this is a normal condition.</p> <p>Have charger checked by a qualified technician.</p>
Short or no start cycle when cranking engine.	<p>Drawing more than the Engine Start rate.</p> <p>Failure to wait 3 minutes between cranks.</p> <p>Clamps are not making a good connection.</p> <p>AC cord and/or extension cord is loose.</p> <p>No power at receptacle.</p> <p>The charger may be overheated.</p> <p>Battery may be severely discharged.</p>	<p>Crank time varies with the amount of current drawn. If cranking draws more than the Engine Start rate, crank time may be less than 5 seconds.</p> <p>Wait 3 minutes of rest time before the next crank.</p> <p>Check for poor connection at battery and frame.</p> <p>Check power cord and extension cord for loose fitting plug.</p> <p>Check for open fuse or circuit breaker supplying AC outlet.</p> <p>The thermal protector may have tripped and needs a little longer to reset. Make sure the charger vents are not blocked. Wait and try again.</p> <p>On a severely discharged battery, use the Boost setting for 10 to 15 minutes, to help assist in cranking.</p>

## 15. BEFORE RETURNING FOR REPAIRS

For REPAIRS OR RETURNS, visit [365rma.com](http://365rma.com)

Visit [schumacherelectric.com](http://schumacherelectric.com) for Replacement Parts.

## 16. LIMITED WARRANTY

For information on our one year limited warranty, please visit [schumacherelectric.com](http://schumacherelectric.com) or call 1-800-621-5485 to request a copy.

Go to [schumacherelectric.com](http://schumacherelectric.com) to register your product online.

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