Automatic Battery Charger

OWNER'S MANUAL

PLEASE SAVE THIS OWNER'S 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 serviceman.

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 12V LEAD-ACID (STD, AGM or GEL) 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 *Operating Instructions* 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:

Length of cord (feet)	25	50	100	150
AWG* size of cord	16	12	10	8

*AWG-American Wire Gauge

9. ASSEMBLY INSTRUCTIONS

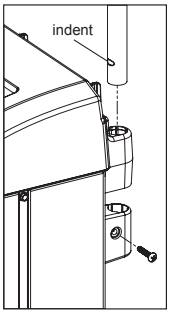
9.1 Remove all cord wraps and uncoil the cables prior to using the battery charger.

9.2 FOR MODELS WITH ATTACHED HANDLE

Extend the handle from the retracted position by pulling it upward until it locks into place. (Press the small silver buttons inward, if necessary.)

9.3 FOR MODELS WITHOUT ATTACHED HANDLE

Parts Included
(2) #10 x 1.0" screws (1) handle
Tools Needed
Phillips-head screwdriver (not included)



Attach the handle:

1. The indentation in handle must face the front of the charger.
2. Place each end of handle into its bracket, aligning with the screw holes.
3. Insert screws as shown.

10. CONTROL PANEL

RATE SELECTION BUTTON

Use this button to select one of the following:

- **6<>2A CHARGE/MAINTAIN –** For charging small and large batteries. **Not recommended for industrial applications.**
- **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.

START/STOP BUTTON

Press to immediately begin charging your properly connected battery. If the button is not pressed, charging should begin automatically in 30 seconds.

LED INDICATORS

ON (yellow/orange) LED lit: The charger is charging the battery.

CHARGED/MAINTAINING (green) LED lit: The battery is fully charged and the charger is in maintain mode.

CLAMPS REVERSED/BAD BATTERY (red) LED lit: The charger has detected a problem with the battery. See *Troubleshooting* for more information.

CLAMPS REVERSED/BAD BATTERY (red) LED flashing: The connections are reversed.

NOTE: See *Operating Instructions* for a complete description of the charger modes.

11. OPERATING INSTRUCTIONS

WARNING: A SPARK NEAR THE 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. Place the charger on a dry, non-flammable surface.
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 a live, grounded 120V AC outlet.
8. Select the charge rate.
9. Press the START button to begin charging immediately. If not pressed within 30 seconds, charging will begin immediately. With the Charge rate selected, charging of the battery will automatically complete. Even with Charge rate selected, the charger will automatically use the Boost rate, during first 10 minutes, if needed, and then switch to the Charge rate to charge the battery efficiently.
10. When charging is complete, indicated by Charged/Maintaining LED lit, or if you are done, press STOP button, disconnect the charger from the AC power, disconnect the clamp attached to vehicle's chassis, and finally remove the clamp from battery terminal.

CHARGING A BATTERY OUTSIDE OF THE VEHICLE

1. Place battery in a well-ventilated area.
2. Clean the battery terminals.
3. Connect the battery, following the precautions listed in sections 6 and 7.
4. Connect the charger to a live grounded 120V AC outlet.
5. Select the charge rate.
6. Press the START button to begin charging immediately. If not pressed within 30 seconds, charging will begin immediately. With the Charge rate selected, charging of the battery will automatically complete. Even with Charge rate selected, the charger will automatically use the Boost rate, during first 10 minutes, if needed, and then switch to the Charge rate to charge the battery efficiently.
7. When charging is complete, indicated by Charged/Maintaining LED lit, or if you are done, press STOP button, disconnect the charger from the AC power, disconnect the negative clamp, and finally the positive clamp.
8. A marine (boat) battery must be removed and charged on shore.

CHARGE TIME

Charge time will depend on battery size, as depicted in the chart below.

APPLICATION	BATTERY SIZE	CHARGING TIME (Hours) 2A	6A	8A	10A
POWERSPORTS	6Ah	6	2	1.75	1.5
	32Ah	15	5	4.5	4
AUTOMOTIVE	300 CCA	12	4	3.5	3
	1000 CCA	30	10	8.5	7
MARINE	50Ah	15	5	4.25	3.5
	105Ah	33	11	9.5	8

Times are based on a 50% discharged battery and may change, depending on age and condition of battery.

AUTOMATIC CHARGING MODE

When the 6<>2A Charge rate is selected, the charger switches to the maintain mode automatically after the battery is charged.

ABORTED CHARGE

If charging cannot be completed normally, charging will abort. When charging aborts, the charger's output is shut off and the Bad Battery (red) LED will light. Do not continue attempting to charge this battery. Have it checked or replaced.

DESULFATION MODE

Desulfation could take 8 to 10 hours. If desulfation fails, charging will abort and the Bad Battery (red) LED will light.

COMPLETION OF CHARGE

Charge completion is indicated by the Charged/Maintaining (green) LED. When lit, the charger has switched to the maintain mode of operation.

MAINTAIN MODE (FLOAT MODE MONITORING)

When the Charged/Maintaining (green) LED is lit, the charger has started maintain mode. In this mode, the charger keeps the battery fully charged by delivering a small current when necessary. If the charger has to provide an excessive maintain current for a continuous 12 hour period, it will go into abort mode (see *Aborted Charge* section). This is usually caused by a drain on the battery or the battery could be bad.

MAINTAINING A BATTERY

This unit charges and maintains 12V batteries, keeping them at full charge.

NOTE: The maintain mode technology allows you to safely charge and maintain a healthy battery for extended periods of time. However, problems with the battery, electrical problems in the vehicle, improper connections or other unanticipated conditions could cause excessive current draws. As such, occasionally monitoring your battery and the charging process is required.

USING THE ENGINE START FEATURE

Your battery charger can be used to jump start your car if the battery is low. Follow all safety instructions and precautions for charging your battery. Wear complete eye protection and protective clothing.

WARNING: Using the Engine Start feature WITHOUT a battery installed in the vehicle could cause damage to the vehicle's electrical system.

NOTE: If you have charged the battery and it still will not start your car, do not use the Engine Start feature, or it could damage the vehicle's electrical system. Have the battery checked.

1. With the charger unplugged from the AC outlet, connect the charger to the battery following the instructions given in *Follow These Steps When Battery is Installed in Vehicle.*
2. Connect the charger to a live grounded 120V AC outlet.
3. With the charger plugged in and connected to the battery and chassis, press the Rate Selection button until the Engine Start LED is lit, and then press the START button.
4. Crank the engine until it starts or 7 seconds pass. If the engine does not start, repeat. Do not crank during the cool down period (see below). This allows the charger and battery to cool down. **NOTE:** During extremely cold weather, or if the battery is under 2 volts, charge the battery for 5 minutes before cranking the engine.
5. If the engine fails to start, charge the battery for 5 more minutes before attempting to crank the engine again.

6. After the engine starts, unplug the AC power cord before disconnecting the battery clamps from the vehicle.
7. 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.

ENGINE STARTING NOTES

During the starting sequence listed above, the charger is set to one of four states:

- **Wait for ready** – The charger charges the battery for 2 minutes before the Wait for Cranking state. While waiting for ready, the engine can be cranked. For severely discharged batteries, it is not recommended to crank during this time.
- **Wait for cranking** – The charger waits until the engine is actually being cranked before delivering the amps for engine start.
- **Cranking** – When cranking is detected, the charger will automatically deliver up to its maximum output as required by the starting system for up to 7 seconds.
- **Cool Down** – After repeated cranking during a 3-minute ready period, the charger enters a mandatory 3 minute (180 second) cool down state. After 2 hours of Engine Starting, the unit will automatically exit from the charging mode, just as if the STOP button had been pressed; the ON LED will not be lit.

POWER-UP AUTO-START

This charger is equipped with an auto-start feature, which is triggered only when the charger is first powered up. If the START button is not pressed within 30 seconds, the unit will search for a battery. If the unit detects a battery that is properly connected, the unit will set the rate to Boost, and it will automatically start the charge process. The On (yellow/orange) LED will light.

FAN OPERATION

The fan will operate as needed and it is normal for the fan to sometimes operate continuously. Keep the area near the charger clear of obstructions to allow the fan to operate efficiently.

12. 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. Do not store the clamps on the handle, clipped together, on or around metal, or clipped to the cables.

13. 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.

PROBLEM	POSSIBLE CAUSE	SOLUTION
Engine start does not work.	Drawing more than the Engine Start rate.	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.
	Failure to wait 3 minutes (180 seconds) between cranks.	When the Engine Start LED blinks, wait 3 minutes of rest time before the next crank.
	The charger may be overheated.	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.
	Battery may be severely discharged.	On a severely discharged battery, use the Boost rate for 10 to 15 minutes, to help assist in cranking.
The red Clamps Reversed/ Bad Battery LED is lit.	The battery voltage is still under 10V (for a 12V battery) or 5V (for a 6V battery) after 2 hours of charging.	The battery could be bad. Have it checked or replaced.
	The charger cannot desulfate the battery.	The battery could not be desulfated; have it checked or replaced.
	The battery was unable to reach the "full charge" voltage.	May be caused by trying to charge a large battery or bank of batteries on too low of a current setting. Try again with a higher current setting or have the battery checked or replaced.
	The charger was unable to keep the battery fully charged in maintain mode.	The battery won't hold a charge. May be caused by a drain on the battery or the battery could be bad. Make sure there are no loads on the battery. If there are remove them. If there are none, have the battery checked or replaced.
	The charger detected that the battery may be getting too hot (thermal runaway).	The charger automatically shuts the current off if it detects the battery may be getting too hot. Have the battery checked or replaced.
	The battery voltage dropped too low during the maintain mode.	May be caused by a drain on the battery or the battery could be bad. Make sure there are no loads on the battery. If there are remove them. If there are none, have the battery checked or replaced.

14. LIMITED WARRANTY AND SERVICE

For repairs, returns, or information on our two-year limited warranty, please call 1-800-621-5485 or visit schumacherelectric.com.