OWNERS MANUAL

Model:
SE-4020-CA
Automatic Battery Charger

PLEASE SAVE THIS OWNERS MANUAL AND READ BEFORE EACH USE. This manual will explain how to use the battery charger safely and effectively. Please read and follow these instructions and precautions carefully.

CONTENTS

IMPORTANT SAFETY INSTRUCTIONS

WARNING – RISK OF EXPLOSIVE GASES

WORKING IN THE VICINITY OF A LEAD-ACID BATTERY IS DANGEROUS. BATTERIES GENERATE EXPLOSIVE GASES DURING NORMAL OPERATION. FOR THIS REASON, IT IS IMPORTANT THAT YOU FOLLOW THESE INSTRUCTIONS EACH TIME YOU USE THE CHARGER.

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

WARNING: Pursuant to California Proposition 65, this product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.

- Use the battery charger on LEAD-ACID and AGM-type rechargeable batteries with recommended rated capacities of 12Ah (6V) and 22-59Ah (12V), as used in automobiles, trucks, tractors, airplanes, vans, RVs, trolling motors, etc. This charger is not intended to supply power to low-voltage electrical systems, other than in a motor-starting application.

  WARNING: Do not use battery charger with dry cell batteries that are commonly used with home appliances. These batteries may burst and cause injury or damage to property.
- Use only attachments recommended or sold by the battery charger's manufacturer. Use of non-recommended attachments may result in a fire, electric shock or injury.
- Locate the battery charger's power cord so it cannot be stepped on, tripped over, or subjected to damage or stress.
- Do not operate the charger if it has received a sharp blow, been dropped, or otherwise damaged in any way. Take it to a qualified professional for inspection and repair.
- Do not disassemble the charger. Take it to a qualified professional when service or repair is required.
- Keep out of reach of children.
- To reduce the risk of electric shock, unplug the charger from the outlet before attempting any maintenance or cleaning.
- Do not use an extension cord.
- Always charge the battery in a well-ventilated area
- Do not set the charger on flammable materials, such as carpeting, upholstery, paper, cardboard, etc.

  WARNING: RISK OF EXPLOSIVE GAS.
- Operate the charger as far away from the battery as DC charger cables permit.
- Do not expose the charger to rain or snow.
- NEVER charge a frozen battery.
- NEVER set a battery on top of the charger.
- NEVER place the charger directly above a battery being charged. Gases from the battery will corrode and damage the charger.
- NEVER touch the battery clamps together when the charger is energized.
- When disconnecting the battery charger, pull by the plug, not by the cord. Pulling on the cord may cause damage to the cord or plug.
- Do not operate the charger with damaged cord or plug.
- NEVER allow battery acid to drip onto the charger.
- NEVER overcharge a battery.

PERSONAL SAFETY PRECAUTIONS

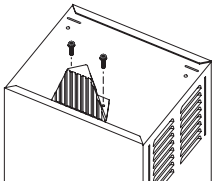
- Wear complete eye protection and protective clothing when working near lead-acid batteries. Always have someone nearby for help.
- Have plenty of fresh water, soap and baking soda nearby for use, in case battery acid contacts your eyes, skin, or clothing. Wash immediately with soap and water and seek medical attention.
- If battery acid comes in contact with eyes, flush eyes immediately for a minimum 10 minutes and get medical attention.
- Neutralize any acid spills thoroughly with baking soda before attempting to clean up.
- Remove all personal metal items from your body, such as rings, bracelets, necklaces and watches. A battery can produce a short circuit current high enough to weld a ring to metal, causing a severe burn.
- NEVER smoke or allow a spark or flame in the vicinity of the battery or engine.
- Do not drop a metal tool onto the battery.
- If it is necessary to remove the battery from the vehicle to charge it, always remove the grounded terminal first.

ASSEMBLY INSTRUCTIONS

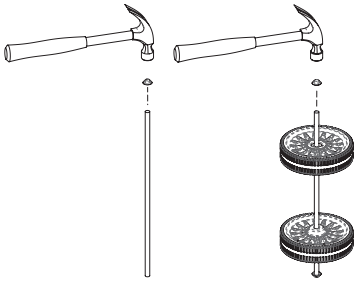
It is important to fully assemble your charger before use. Remove all cord wraps and uncoil the cables prior to using the battery charger. Follow these instructions for assembly.

PARTS	TOOLS NEEDED
(2) 10-32 thread cutting screws	3/8" wrench (for mounting foot)
(2) 10-24 x 5/8" thread cutting screws	5/16" wrench (for mounting wheels)
(4) 8-32 x 1" pan head screws	1/4" wrench (for mounting handle)
(2) wheels	hammer
(1) axle	flat-head screwdriver
(2) axle caps	Phillips-head screwdriver
(2) axle brackets	
(1) handle	
(1) foot	

1. **Attach the foot:** Remove the charger from the packing materials and place upside down on a flat surface. Attach the foot and secure it with the two 10-24 x 5/8" thread cutting screws provided.

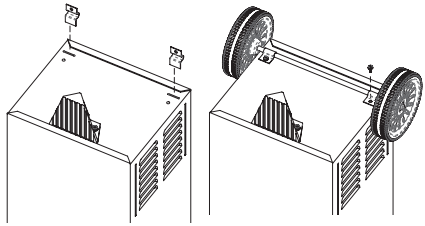


2. **Assemble the wheels and axle:** Hold the axle upright on the floor or work surface. Then, using a hammer, tap one of the axle caps onto the top end of the axle. Be sure to tap the axle cap on straight. Slide both wheels onto the axle with the recessed hubs facing out as shown. Install the second axle cap.

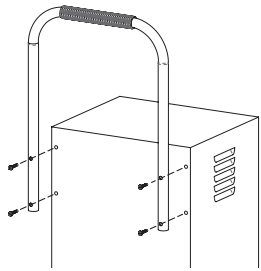


3. **Mount the axle to the charger:** Place one end of each bracket into the slot on the bottom of the charger. Place the axle assembly under each bracket. Attach the brackets, using the two 10-32 thread cutting screws provided.

   NOTE: Be careful not to drop the brackets inside of the charger case.



4. **Attach the handle:** Turn the charger right side up onto its foot and wheels. Align the handle, so the screw holes are aligned with the screw holes on each side of the charger. Attach the handle, using the four 8-32 x 1" pan head screws provided.



GROUNDING AND AC POWER CORD CONNECTIONS

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.

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.

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 below:

Length of cord (feet)	25	50	100	150
AWG* size of cord	14	12	8	8

*AWG-American Wire Gauge

CONTROL PANEL

ON/OFF SWITCH

Use this switch to select between the CHARGE/MAINTAIN rate, BOOST rate or the ENGINE START mode.

- **OFF –** When the switch is in this position (middle), the charger is turned off.
- **BOOST or CHARGE/MAINTAIN –** When the switch is in this position, the Rate Selection button can be set to either the 6A<>2A Charging/Maintaining or the 40 amp Boost setting.
- **ENGINE START –** When the switch is in this position, the Engine Start LED will illuminate.

DIGITAL DISPLAY

The Digital Display gives a digital indication of amperage or time. The display will show the amperage when the charger is charging a battery. During timer operation, the display shows the remaining time. When the charger goes into charging mode, the display will automatically change to On (to show charging has started). If you manually stop the charging process (by pressing the Rate Selection button) before the battery is fully charged, the display will show OFF.

NOTE: During charging, the display will go into sleep mode and will not show the amperage of the battery. To turn the display back on, press the Display button.

DISPLAY BUTTON

Use this button to set the function of the digital display to one of the following:

- **AMPS –** The display shows the selected charge rate, in amps.
- **TIME –** The display shows the remaining time during Boost mode.

RATE SELECTION BUTTON

Use this button to select one of the following:

- **CHARGE/MAINTAIN 6A<>2A –** For charging small and large batteries. Not recommended for industrial applications.
- **BOOST 40A –** This setting may be used for a quick boost, prior to using the engine start setting. Do not use this setting to charge your battery.
- **ENGINE START 200A –** Provides 200 amps for cranking an engine with a weak or run-down battery. Always use in combination with a battery.

LED INDICATORS

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

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

CHARGING (yellow/orange) LED flashing: The charger is in abort mode.

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

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

TIMER BUTTON

The timer allows the battery to receive a BOOST for a designated amount of time.

IMPORTANT: To accurately set the timer, you must know the size of the battery (in ampere hours) or reserve capacity (in minutes) and the state of charge (see table). The time limit is 240 minutes.

12V Battery Reading	Battery Condition
12.8 volts or more	Charged
12.2 to 12.7 volts	Needs Charging
Less than 12.2 volts	Discharged

To set the timer:

1. Press the DISPLAY BUTTON and choose TIME.
2. Press the TIMER BUTTON to set the appropriate time.
3. To turn off the timer, press the DISPLAY BUTTON and choose a different setting.

OPERATING INSTRUCTIONS

WARNING: A spark near battery may cause battery 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 ON/OFF switch to the OFF position.
5. Lay the AC/DC cables away from any fan blades, belts, pulleys and other moving parts that can cause injury.
6. For a negative-ground vehicle (as in most vehicles), connect the charger's POSITIVE (RED) clamp to the POSITIVE (POS, P, +) battery post. Next, connect the charger's NEGATIVE (BLACK) clamp to the vehicle chassis or engine block, away from the battery.
7. For a positive-ground vehicle, connect the charger's NEGATIVE (BLACK) clamp to the NEGATIVE (NEG, N, -) battery post. Next, connect the charger's POSITIVE (RED) clamp to the vehicle chassis or engine block away from the battery. NEVER connect any clamps to the carburetor, fuel lines or sheet-metal body parts.
8. Connect the charger to an electrical outlet.
9. With the charger plugged in and connected to the battery of the vehicle, set the ON/OFF switch to the Boost or Charge/Maintain position.
10. Select the desired rate and time.
11. If using Boost mode, set the DISPLAY button to TIME, then use the TIMER button to set the time, in minutes.
12. When disconnecting the charger, set the ON/OFF switch 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. First, place battery in a well-ventilated area.
2. Set the ON/OFF switch to the OFF position.
3. Clean the battery terminals.
4. Connect a 24-inch long, 6-gauge (AWG) insulated battery cable to the NEGATIVE (NEG, N, -) battery post (i.e., jumper cable) (not provided).
5. Connect the POSITIVE (RED) charger clamp to the POSITIVE (POS, P, +) battery post.
6. Position yourself and the "negative post extension" cable as far away from the battery as possible, and connect the NEGATIVE (BLACK) charger clamp to the cable's free end.
7. Connect the charger to the electrical outlet.
8. With the charger plugged in and connected to the battery of the vehicle, set the ON/OFF switch to the Boost or Charge/Maintain position.
9. Select the desired rate and time.
10. If using Boost mode, set the DISPLAY button to TIME, then use the TIMER button to set the time, in minutes.
11. When disconnecting the charger, set the ON/OFF switch to the OFF position, disconnect the charger from the AC power, disconnect the negative clamp, and finally the positive clamp.
12. A marine (boat) battery must be removed and charged on shore.

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 will 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 will damage the vehicle's electrical system. Have the battery checked.

1. Set the ON/OFF switch 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 CHARGING A BATTERY IN THE VEHICLE section.

3. Plug the charger AC power cord into the AC outlet.
4. With the charger plugged in and connected to the battery of the vehicle, set the ON/OFF switch to the Engine Start position. The Engine Start LED will illuminate.
5. Crank the engine until it starts or 5 seconds pass. If the engine does not start, wait 3 minutes before cranking again. This allows the charger and battery to cool down.

NOTE: During extremely cold weather, or if the battery is under 2 volts, boost the battery for 5 minutes before cranking the engine.

6. If the engine fails to start, use the 40A Boost rate for 5 minutes before attempting to crank the engine again.
7. After the engine starts, move the ON/OFF switch 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.

AUTOMATIC CHARGING MODE

When an Automatic Charge is performed, 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 CHARGING (yellow/orange) LED will flash. The digital display will show an error code (see the Troubleshooting section for a description of the error codes).To reset after an aborted charge, unplug the charger from the AC outlet, wait a few moments and plug it back in.

DESULFATION MODE

Desulfation could take 8 to 10 hours. If desulfation fails, charging will abort and the CHARGING (yellow/orange) LED will flash.

COMPLETION OF CHARGE

Charge completion is indicated by the CHARGED/MAINTAINING (green) LED. When pulsing, the charger has switched to the maintain mode of operation.

MAINTAIN MODE (FLOAT-MODE MONITORING)

When the CHARGED/MAINTAINING (green) LED is pulsing, 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 its maximum 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. Make sure there are no loads on the battery. If there are, remove them. If there are none, have the battery checked or replaced.

MAINTAINING A BATTERY

The SE-4220-CA charges and maintains 6 and 12 volt 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.

GENERAL CHARGING NOTES

Fan: It is normal for the fan to be on all the time. Keep the area near the charger clear of obstructions to allow the fan to operate efficiently.

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.

TROUBLESHOOTING AND ERROR CODES

Error Codes

ERROR CODE	DESCRIPTION	REASON/SOLUTION
F01	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.
F02	The charger cannot desulfate the battery.	The battery could not be desulfated; have it checked or replaced.
F03	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.
F04	The connections to the battery are reversed.	The battery is connected backwards. Unplug the charger and reverse the connections to the battery.
F05	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.
F06	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.

If you get an error code, check the connections and settings and/or replace the battery.

Troubleshooting

PROBLEM	POSSIBLE CAUSE	REASON/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.
	Battery is defective.	Have the battery checked.
Three LEDs come on for 2 seconds, then turn off.	The charger is plugged into an AC outlet.	No problem; this is normal.
Engine start does not work.	Drawing more than 200 amps.	Crank time varies with the amount of current drawn. If cranking draws more than 200 amps, 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.