

OWNER'S MANUAL (MODEL #20060)

1 & 4 Amp CEC Smart Battery Charger/Maintainer Instructions for 12 Volt Batteries

Read Instructions Carefully for Safe Operation

**READ THE ENTIRE MANUAL BEFORE USING THIS PRODUCT.
FAILURE TO DO SO CAN RESULT IN SERIOUS INJURY OR DEATH.**

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 THE CHARGER, READ THIS MANUAL AND FOLLOW THE INSTRUCTIONS EXACTLY.

This manual will show how to use the charger safely and effectively. Please read, understand and follow these instructions and precautions carefully, as this manual contains important safety and operating instructions. The safety messages used throughout this manual contain a signal word, a message and an icon.

The signal word indicates the level of the hazard in a situation.

- ▲ DANGER** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury to the operator or bystanders.
- ▲ WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to the operator or bystanders.
- ▲ CAUTION** indicates a potentially hazardous situation which, if not avoided, could result in moderate or minor injury to the operator or bystanders.
- ▲ IMPORTANT** indicates a potentially hazardous situation which, if not avoided, could result in damage to the equipment or vehicle or property damage.

Safety messages in this manual contain two different type styles.

- Unnumbered type states the hazard
- Numbered type states how to avoid the hazard.

The icon gives a graphical description of the potential hazard.



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.

1. IMPORTANT SAFETY INSTRUCTIONS



Risk of electric shock or fire.

IMPORTANT SAFETY INSTRUCTIONS • SAVE THESE INSTRUCTIONS



- 1.1 Do not expose the charger to rain or snow.
- 1.2 Use only recommended attachments. Use of an attachment not recommended by WirthCo Engineering, Inc. may result in a risk of fire, electric shock or injury to persons or damage to property.
- 1.3 To reduce the risk of damage to the electric plug or cord, pull by the plug rather than the cord when disconnecting the charger.
- 1.4 An extension cord should not be used unless absolutely necessary. Use of an improper extension cord could result in the risk of fire and electric shock. If an extension cord must be used, make sure:
 - That the pins on the plug of the extension cord are the same number, size and shape as those of the plug on the charger
 - That the extension cord is properly wired and in good electrical condition
 - That the wire size is large enough for the AC ampere rating of the charger as specified in the table in Section 8
- 1.5 To reduce the risk of electrical shock, unplug the charger from the outlet before attempting any maintenance or cleaning.
- 1.6 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.
- 1.7 Do not operate the charger with a damaged cord or plug; take it to a qualified service person.
- 1.8 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 service person.
- 1.9 Do not disassemble the charger; take it to a qualified service person when service or repair is required. Incorrect reassembly may result in a risk of fire or electric shock.

2. PERSONAL PRECAUTIONS



Risk of explosive gases

- 2.1 Working in the vicinity of a lead-acid battery is dangerous. Batteries generate explosive gases during normal battery operation. For this reason, it is of utmost importance to follow the instructions each time the charger is used.
- 2.2 To reduce the risk of a battery explosion, follow these instructions and those published by the battery manufacturer and the manufacturer of any equipment used in the vicinity of the battery. Review the cautionary markings on these products and on the engine.
- 2.3 This charger employs parts, such as switches and circuit breakers, that tend to produce arcs and sparks. If used in a garage, locate this charger 18 inches or more above floor level.
- 2.4 NEVER smoke or allow a spark or flame in the vicinity of a battery or engine.
- 2.5 Be extra cautious to reduce the risk of dropping a metal tool onto the battery. It might spark or short-circuit the battery or other electrical part that may cause an explosion.
- 2.6 Use this charger for charging LEAD-ACID batteries only. It is not intended to supply power to a low voltage electrical system other than in a starter-motor application. Do not use this 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.
- 2.7 NEVER charge a frozen battery.
- 2.8 NEVER overcharge a battery.

3. PREPARING TO CHARGE



Risk of contact with battery acid. Battery acid is a highly corrosive sulfuric acid.

- 3.1 Consider having someone close enough by to help in case of an accident when working near a lead-acid battery.
- 3.2 Have plenty of fresh water and soap nearby in case battery acid contacts the skin, clothing or eyes.
- 3.3 Wear complete eye and body protection, including safety goggles and protective clothing. Avoid touching the eyes while working near the battery.
- 3.4 If battery acid contacts the skin or clothing, immediately wash the area with soap and water. If acid enters the eye, immediately flood the eye with cold running water for at least 10 minutes and get medical attention right away.
- 3.5 If it is necessary to remove the battery from the vehicle to charge it, always remove the grounded terminal first. Make sure all of the accessories in the vehicle are off to prevent arcing.
- 3.6 Be sure the area around the battery is well ventilated while the battery is being charged.
- 3.7 Clean the battery terminals before charging the battery. During cleaning, keep airborne corrosion from coming into contact with the eyes, nose and mouth. Use baking soda and water to neutralize the battery acid and help eliminate airborne corrosion. Do not touch the eyes, nose or mouth.

- 3.8 Add distilled water to each cell of the battery to be charged until the battery acid reaches the level specified by the battery manufacturer. Do not overfill. For a battery without removable cell caps, such as valve regulated lead-acid batteries (VRLA), carefully follow the manufacturer's recharging instructions.
- 3.9 Read, understand and follow all instructions for the charger, battery, vehicle and any equipment used near the battery and charger. Study all of the battery manufacturer's specific precautions while charging and recommended rates of charge.
- 3.10 Determine the voltage of the battery by referring to the vehicle owner's manual. If it is not a 12 volt battery, this charger will not work.
- 3.11 Make sure that the charger's alligator clips or ring terminals are secured.

4. CHARGER LOCATION



Risk of explosion and contact with battery acid.

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

5. DC CONNECTION PRECAUTIONS

- 5.1 Connect and disconnect the DC output clips only after removing the AC plug from the electrical outlet. Never allow the clips to touch each other.
- 5.2 Attach the ring terminals or the alligator clips to the battery. It is recommended to twist or rock the alligator clips back and forth several times to make a good connection. This tends to keep the alligator clips from slipping off the battery terminals and helps reduce risk of sparking.

6. FOLLOW THESE STEPS WHEN BATTERY IS INSTALLED IN VEHICLE



A spark near the battery may cause a battery explosion. To reduce the risk of a spark near the battery:

- 6.1 Position the AC and DC cables to reduce the risk of damage by the hood, door, moving or hot engine parts.
NOTE: If it is necessary to close the hood during the charging process, ensure that the hood does not touch the metal part of the battery clips or cut the insulation of the cables.
- 6.2 Stay clear of fan blades, belts, pulleys and other parts that can cause injury.
- 6.3 Check the polarity of the battery posts. The POSITIVE (POS, P, +) battery post usually has a larger diameter than the NEGATIVE (NEG, N, -) post.
- 6.4 Connect the POSITIVE (RED) clip from the battery charger to the POSITIVE (POS, P, +) ungrounded post of the battery. Connect the NEGATIVE (BLACK) clip to the vehicle chassis or engine block away from the battery. Do not connect the clip to the carburetor, fuel lines or sheet-metal body parts. Connect to a heavy gauge metal part of the frame or engine block.
- 6.5 When disconnecting the charger, disconnect the AC cord from the wall. Next remove the NEGATIVE (NEG, N, -) from the chassis ground first, then remove the POSITIVE (POS, P, +) clip from the battery terminal. If using the ring terminal assemble as a fixed connection, just disconnect the bullet connector on the main cord. MAKE SURE THE END OF THE BULLET CONNECTOR DOES NOT COME IN CONTACT WITH ANY METAL OBJECTS.
- 6.6 See CALCULATING CHARGE TIME for length of charge information in section 11.

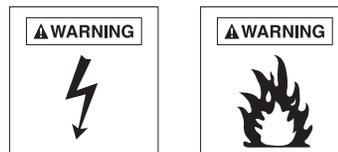
7. FOLLOW THESE STEPS WHEN BATTERY IS OUTSIDE VEHICLE.



A spark near the battery may cause a battery explosion. To reduce the risk of a spark near the battery:

- 7.1 Check the polarity of the battery posts. The POSITIVE (POS, P, +) battery post usually has a larger diameter than the NEGATIVE (NEG, N, -) post.
- 7.2 Attach at least a 24-inch (61 cm) long 6-gauge (AWG) insulated battery cable to the NEGATIVE (NEG, N, -) battery post.
- 7.3 Connect the POSITIVE (RED) charger clip to the POSITIVE (POS, P, +) post of the battery.
- 7.4 Position yourself and the free end of the cable previously attached to the NEGATIVE (NEG, N, -) battery post as far away from the battery as possible – then connect the NEGATIVE (BLACK) charger clip to the free end of the cable.
- 7.5 Do not face the battery when making the final connection.
- 7.6 When disconnecting the charger, always unplug the unit from the wall first. Disconnect the NEGATIVE (NEG, N, -) connection, then remove the POSITIVE (POS, P, +) connection in this sequence.

8. BATTERY CHARGING - AC CONNECTIONS



Risk of electric shock or fire.

- 8.1 This battery charger is for use on a nominal 120-volt circuit. The plug must be plugged into an outlet that is in accordance with all local codes and ordinances. The plug pins must fit the receptacle (outlet).
- 8.2 Never alter the AC cord or plug provided – if it does not fit the outlet, have a proper outlet installed by a qualified electrician. An improper connection can result in a risk of electric shock or electrocution.
NOTE: The use of an adapter plug is not recommended.
- 8.3 Recommended minimum AWG size for extension cord:

AC input rating, amperes*		AWG size of cord Length of cord feet (m)			
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	6
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 to be determined by dividing the wattage rating by the voltage rating - for example: 1200 watts/120 volts = 10 amperes

9. FEATURES

- 12 Volt – 1 & 4 Amp Smart Battery Charger/Maintainer
- 7 Stage Smart Battery Technology Prevents Overcharging
- Reverse Hook-up Protection/Spark Resistant
- Charges and Maintains Batteries from 5 to 400Amp Hours
- Includes Ring Terminals and Alligator Clip Cable Attachments



1. Power LED
2. Battery Charging LED
3. Battery Charged LED
4. Reverse Connection/Bad Battery LED
5. Alligator Clips
6. Ring Terminals
7. Fused Protection*
8. 12 Volt/1 Amp Mode Indicator
9. 1 Amp / 4 Amp Mode Select Switch
10. 12 Volt/4 Amp Mode Indicator

*The ring terminal cable attachment is equipped with a fuse. The fuse may blow if there is a surge in power or in the event of hooking the battery up backwards. If the battery charger has no power or is not working, check the fuse first. If the fuse is blown, replace it with the same type (ATO/ATC style) and same value marked on the top of the fuse before returning the charger for replacement.

10. OPERATING INSTRUCTIONS

Before using review all safety and connection directions before using charger. Failure to do so can damage battery and cause serious injury or death.

10.1 Charging:

- Connect the charger to the battery per instructions in sections 6 or 7; depending on your battery set-up.
- Connect the charger to AC outlet.
- Choose the charging amp rate by pressing the "SELECT" button.
- If the charger does not detect a properly connected battery, the "Error LED" will light until a battery is detected. Charging will not begin while the Error LED is on. When the charging begins, the "Charging LED" will light up.
- Once the charger is connected properly and the "Charging LED" is lit up, press the "SELECT" button to choose the charging amperage desired. It is always preferred to charge a battery at a low amperage. By charging the battery "low and slow" increases the life of the battery. If it is not time sensitive to charge the battery or if the purpose is to simply maintain the battery over a long period of time, select the 1 Amp setting. Otherwise select the 4 Amp setting for a faster charge rate.
- When charging is complete, the "Charged LED" will light up. Unplug the charger first from the AC outlet.
- Remove the negative connection first, then the positive connection.

10.2 Automatic Charge Mode:

- Stage One - Diagnosis: The charger's smart technology will perform a series of steps to analyze the battery's charge state and determine which stage the battery charger needs to begin with. It will also determine if the battery is good or hooked up improperly.
- Stage Two - Pre-charge: If the battery voltage is less than 12V, the charger will start with a small amount of current first to begin the charging process.
- Stage Three - Soft start: Charging to the maximum current in reasonable time, not suddenly to the maximum current.
- Stage Four - CC1, CC2, CC3 (Constant Current): Fast Speed Charging. Adjusts the current output of the charger according to the battery's state in constant current.
- Stage Five - For 12 volt batteries, the CV (Constant Voltage) Absorption to voltage is 14.6V. The charger will automatically shut off when the battery reaches 14.6V.
- Stage Six - Resting: Cut off with full charge: high energy efficiency.
- Stage Seven - Restoring: Automatic On-Off Monitoring. The charger DC output will shut off and monitor a fully charged battery. If the battery falls below 12.8VDC on a 12V battery, the charger will restart and enter Stage One.

▲ IMPORTANT Follow all safety instructions and precautions for charging your battery. Wear complete eye protection and clothing protection. Charge your battery in a well-ventilated area.

NOTE: During extremely cold weather, charge the battery for 5 minutes before cranking the engine. If the engine fails to start, charge the battery for 5 more minutes before attempting to crank the engine again. After the engine starts unplug the AC power cord before disconnecting the battery clips from the vehicle.

11. CALCULATING CHARGE TIME

- Use the following table to more accurately determine the time it will take to bring a battery to full charge. First, identify where your battery fits into the chart.
- The times given are for batteries with a 50% charge prior to recharging. Add more time for severely discharged batteries.

Battery Size/Rating		Charging Time	
Small Batteries (6 Volt)	Motorcycle, Garden, Tractor, Etc.	6 - 12 AH	2 - 4 hrs
		12 - 32 AH	4 - 10 hrs
Cars/Trucks (12 Volt)	200 - 315 CCA	40 - 60 RC	11¼ - 14½ hrs
	315 - 550 CCA	60 - 85 RC	14½ - 18¼ hrs
	550 - 1000 CCA	80 - 190 RC	18¼ - 34¾ hrs
Marine/Deep Cycle (12 Volt)		80 RC	17½ hrs
		140 RC	27 hrs
		160 RC	30 hrs
		180 RC	33 hrs

12. MAINTENANCE INSTRUCTIONS

This charger requires minimal maintenance. As with any appliance or tool, a few common sense rules will prolong the life of the battery charger. ALWAYS BE SURE THE CHARGER IS UNPLUGGED BEFORE PERFORMING ANY MAINTENANCE OR CLEANING.

- 12.1 Store in a clean, dry place
- 12.2 Coil up the cords when not in use.
- 12.3 Clean the case and cords with a slightly damp cloth.
- 12.4 Clean any corrosion from the clamps with a solution of water and baking soda.
- 12.5 Examine the cords periodically for cracking or other damage and have them replaced if necessary.

⚠ WARNING All other service should be done by qualified personnel only.

13. STORAGE INSTRUCTIONS

- 13.1 Store the charger unplugged. The cord will still conduct electricity until it is unplugged from the outlet.
- 13.2 Store inside, in cool, dry place.
- 13.3 Do not store the clips clipped together, on or around metal or clipped to cables.

14. TROUBLESHOOTING

Problem	Cause	Solution
Bad Battery	The Error LED may light when the battery voltage is less than 2V; or the battery has a faulty condition such as open, shorted cell or sulfated condition.	Have the battery tested by a qualified technician.
Battery not accepting a charge	Lack of AC input power	Make sure that the charger is plugged into AC outlet and POWER LED is lit.
	Faulty connections to battery terminals	Unplug the charger and check the battery connection; ensure that there is a good connection at the battery terminal/post and/or vehicle chassis
	Wrong charge voltage selection	Check that the correct charge voltage was selected for the battery being charged.
	Battery voltage too low	Ensure enough charging time was allowed to charge battery.
	Charging a very cold battery	If the battery to be charged is extremely cold (in temperatures below freezing 0), it will not accept a high rate of charge, so the initial charger rate will be slow. The rate of charger will increase as the battery warms. Never attempt to charge a frozen battery.

15. BEFORE RETURNING FOR REPAIRS

- 15.1 When a charging problem arises, make certain that the battery is capable of accepting a normal charge. Be sure to double check all connections, AC outlet for power, charger clips or ring terminals are clean and for proper polarity.
- 15.2 Check the fuse holder on the ring terminal cable attachment. In the rare occurrence the fuse blows, replace the fuse with the same type (ATO/ATC style) and same amperage marked on the top of the fuse before returning.
- 15.3 When a battery is very cold, partially charged or sulfated, it will not draw the full rated amperes from the charger. It is both dangerous and damaging to a battery to force higher amperage into it than it can effectively use.