HEAVY-DUTY
BATTERY REJUVENATOR

OWNER'S MANUAL

MODELS: RC-30A12-120, RC-30A12-240, RC-15A24-120, RC15A-24-240

READ FIRST BEFORE OPERATING CHARGER

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Rev. 1.0 06/08

Renaissance Charge would like to thank you for purchasing this high performance battery charger/rejuvenator. The revolutionary technology employed by this charger has shown that the lives of lead-acid batteries can be extended dramatically. In many cases, this charging system has demonstrated the ability to charge batteries that could not be charged with conventional, off-the-shelf chargers. New batteries have even shown to develop larger storage capacities. We are confident that charging with the Renaissance Charging System will give you longer run times and extended battery life, allowing you to get the most out of your battery powered applications. We welcome your questions, comments, and testimonials at www.r-charge.com.

Contents

Section 1: SAFETY INSTRUCTIONS

DANGER! RISK OF BATTERY EXPLOSION. MAY RESULT IN BLINDNESS, SERIOUS INJURY, PERMANENT DISFIGUREMENT AND SCARRING.

Batteries can even explode during normal operation. People have been injured by battery parts flying in an explosion. They can explode under normal operating conditions, such as starting your car. They can explode under abnormal conditions, such as jump starting, or if shorted by a tool. They can explode in a parked car or sitting on a table.

To help reduce the risk of these dangers and injury, it is of the utmost importance that before using your charger, you read and understand this manual and any warnings and instructions by the battery manufacturer.

TO MINIMIZE RISK OF INJURY, ALWAYS:

1) **Wear Personal Protective Equipment**
- ALWAYS wear complete eye protection that protects from ALL angles. Wear gloves to prevent exposure to battery chemicals.

2) **Avoid Flames and Sparks Near Battery and Fuel**
- ALWAYS keep flames, matches, lighters, cigarettes or other ignition sources away from battery.
- DO NOT put flammable material on, near, or under battery or

charger. DO NOT use near gasoline vapors.
- Do not operate the charger near a source of flame or spark.
- Do not smoke near battery while charging.
- If charger is equipped with battery clips, make sure clips make good contact by twisting or rocking them back and forth several times.
- ALWAYS be sure to turn off the battery-powered device before disconnecting the battery in preparation for charging.
- DO NOT disconnect battery from charger while charging.
- A tool touching both battery posts or causing electrical conduction to be made between the battery posts is a short circuit and will spark. When using metal tools on or near battery, be extra cautious to reduce risk of a short circuit, possibly causing a burn, fire, or battery explosion. DO NOT drop a tool on battery.

3) **Reduce Explosive Gas (Hydrogen)**
- If charging a flooded (refillable) lead-acid type battery, before connecting charger, ALWAYS add distilled water to each cell until battery acid covers plates to help purge extra gas from cells. DO NOT overfill. Battery acid expands during charge. After charging, fill to level specified by battery manufacturer.
- If battery to be charged has caps, charge battery with caps in place. DO NOT pry caps off sealed batteries. Place wet cloth on batteries with non-flame arresting caps.
- Be sure area around battery is well ventilated before and during charging process. NEVER charge any battery in a closed-in or restricted area. This may result in fire and/or explosion.

4) **Stay Away From Battery When Possible**
- NEVER put face near battery.
- ALWAYS locate charger as far from battery as cables permit.

- ALWAYS keep other people away from the battery.

5) **Avoid Contact With Battery Acid**
- Battery posts may have chemical corrosion. DO NOT get corrosion in your eyes. Avoid touching eyes while working near battery.
- ALWAYS have plenty of fresh water and soap nearby in case battery chemicals contact eyes, skin or clothing. If battery chemicals contact skin or clothing, wash immediately with soap and water. If chemicals contact eye, immediately flood eye with cold running water for at least fifteen (15) minutes and get medical help immediately.
- In very cold weather, a discharged battery may freeze. NEVER charge a frozen battery. Gases may form, cracking the case, and leaking battery chemicals.

6) **Avoid Overcharging Batteries**
- NEVER overcharge a battery. A battery can vent excessive amounts of explosive gas.
- Battery chargers can overcharge a battery if left connected for an extended period of time, resulting in loss of water, creation of hydrogen gas, and excessive heating of the battery.
- Although it is normal for a battery to warm at the end of its charge, a battery under charge should never stay warm for more than a few hours before the charger shuts off. *A battery that is excessively warm or warm for an excessive amount of time is overcharging.* Batteries in substandard condition may exhibit unusual behavior while under charge resulting in an overcharging condition. It is a good idea to monitor the battery on charge whenever possible to avoid this.

7) **Follow Other Manufacturers' Recommendations**

- Before using charger, read all instructions for, and caution markings on: (1) charger, (2) battery, and (3) related product using battery. Follow their recommended rate of charge.
- **This battery charger is designed for charging SPECIFICALLY SIZED (25 to 250 amp-hour for 12V models, 12-125 amp-hour for 24V models), lead-acid batteries only. Charging a battery whose amp-hour rating is below that specified by the charger power level setting may cause the battery to heat excessively, reducing its life and creating a safety hazard.**

ELECTRICAL WARNINGS

DANGER! RISK OF ELECTRICAL AND FIRE HAZARD. MAY RESULT IN DEATH, SERIOUS INJURY, SHOCK OR BURNS.

This charger, like all electrical products, MUST be treated with respect. Follow these instructions to reduce electrical hazard risk.

1) **Proper Grounding and AC Power Connection**
- Some charger models MUST be grounded to reduce risk of electric shock. If the charger is equipped with an electric cord having an equipment grounding conductor and a grounding plug, the plug MUST be plugged into an electrical outlet that is properly installed and GROUNDED in accordance with all local codes and ordinances. If you ever feel even a slight shock from this or any electrical appliance, stop, walk away. Turn off electricity to outlet, and have it inspected by an electrician. You may have a dangerous, improperly wired outlet.
- DANGER - NEVER alter AC power 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.

2) **Remove Jewelry**
- ALWAYS remove personal metal items (such as rings, bracelets, necklaces and watches) when working with a battery. A short circuit through one of these items can melt it causing a severe burn.

3) **Avoid Charger Abuse**
- To reduce risk of electric shock, ALWAYS unplug charger from outlet before attempting any maintenance or cleaning.
- DO NOT disassemble charger. Disassembly of the charger WILL void the warranty.
- DO NOT expose charger to rain, snow, water, gas, oil, etc.
- DO NOT operate charger if it has received a sharp blow, been dropped, or otherwise damaged in any way.
- DO NOT operate charger with clips shorted together.

4) **Proper Wiring**
- Use of improper extension cord could result in a risk of fire and/or electric shock. If your charger model has a grounded, 3-wire plug, use ONLY a grounded, 3-wire type cord. NEVER use a 2-wire cord and an adaptor! The cord MUST be plugged into a grounded outlet. Make sure it is properly wired, in good electrical condition, and wire size is large enough so there is not significant line voltage drop.

5) **Proper Use of the Charger**
- DO NOT disconnect battery from charger while charging. If the battery must be disconnected from the charger before the charge cycle is complete, first turn the charger off before disconnecting from the terminals of the battery.

- To reduce risk of damage to plug and cord when disconnecting charger, ALWAYS pull on plug - NEVER on cord.
- DO NOT operate charger with damaged cord or plug - replace them immediately.
- Locate power cord and charger output leads so that they will not be stepped on, tripped over, or otherwise subject to damage or stress.
- DO NOT operate charger in or near water. Charging a battery on board a boat floating in water requires a battery charger specially designed to marine charging standards. Move the battery to dry land for charging with this charger.

Section 2: BATTERY CHARGING NOTES

1) If a battery is not *completely* recharged after each use, chemical buildup on the battery's plates increases slightly with each charge/load cycle and impedes the battery's ability to be charged and/or deliver power. If the battery is overcharged, the battery will heat, causing excessive thermal expansion and contraction. This causes damage to the internal structure of the battery, causing it to fail as well. Renaissance chargers incorporate several innovative design techniques which minimize both undercharging and overcharging.

2) In many cases, the Renaissance battery charger may be able to charge and even increase the capacity of batteries that are not able to be adequately charged with conventional battery charging techniques employed by the majority of battery chargers on the market today.

3) It is very important to choose the right charging rate for your application. For example, the RC-30A12-120, set to the highest

power level, would provide a fairly gentle charge to a 250 amp-hour battery. However, if a 90 amp-hour battery is substituted for the 250 amp-hour battery, the charger will charge the battery much faster and more forcefully. As such, any possible gain in capacity, resulting from the use of this type of charger will be more quickly and dramatically seen in the 90 amp-hour (the smaller) battery. In order to maintain the long life of a healthy, newer battery, a slower, gentler charge is recommended. In order to rejuvenate (and/or equalize) an older battery in substandard condition, use a faster, more forceful charge.

4) Charger models RC-30A12-120, and RC-30A12-240 are designed to charge flooded type deep cycle lead-acid batteries that are rated between 25 and 250 amp-hours (AH). Charger models RC-15A24-120, and RC-15A24-240 are designed to charge flooded type deep cycle lead-acid batteries that are rated between 12 and 125 amp-hours (AH). Using the charger to charge batteries whose capacities are smaller than the charger's rated range can result in excessive heating of the battery causing premature failure of the battery. Charging batteries larger than specified by the charger's rated range may take an excessive amount of time during which the charger may prematurely end its automatic charging cycle and/or overheat.

5) **Sealed (maintenance-free) Batteries**
Many batteries whose capacity range lies within the recommended ratings for this charger are sealed (non-refillable). And, although these batteries have the inherent advantage of being unspillable, because the water inside these batteries cannot be replenished, the batteries eventually "dry out". When this happens, the battery's life is over. These batteries are particularly susceptible to being destroyed prematurely by overcharging which causes excessive offgassing (water loss). In many cases, however, these batteries are rendered useless by undercharging, and, in many cases, conventional charging techniques are ineffective in charging them. Use the Renaissance charger, in these cases, to rejuvenate these batteries by breaking through the chemical layers and dendrite formation when other chargers cannot to amazingly restore capacity and extend battery life. Then, after these batteries have had their capacity restored, it may be of advantage to return to a slower, gentler charge or charging rate for normal routine charging. The potent, rejuvenating power of the Renaissance charger has been found to be of tremendous advantage to battery longevity when used in CHARGE mode as part of a regularly scheduled maintenance charging routine (for example, 1 out of every 5-10 charge cycles).

Section 3: OPERATING INSTRUCTIONS

FOLLOW THESE THREE STEPS IN THIS ORDER.

DO NOT attempt to charge batteries that will not charge under the normal procedures outlined in this manual. Dispose properly and immediately of all batteries that will not take a charge.

STEP 1. BEFORE OPERATING CHARGER

1) Place the charger and the battery away from any combustible material. Choose a location in accordance with the safety instructions in Section 1 of this manual.

2) Connect charger to proper voltage AC power outlet (110-120VAC for model numbers RC-30A12-120 and RC-15A24-120, 220-240VAC for models RC-30A12-240 and RC-15A24-240).

3) Disconnect battery from any circuitry the battery may be powering.

4) Check to make sure DC circuit breaker on rear of unit is not tripped. The lever should be in the ON position.

STEP 2. TURNING THE CHARGER ON

1) Connect each of charger's output connectors to the corresponding battery terminal, making sure that the charger's positive '+' red clip is connected to battery's positive '+' terminal and charger's negative '-' black clip is connected to battery's negative '-' terminal. (See figure 1 below). If the battery terminals are unlabeled, connect one way and if charging doesn't begin reverse the connections. The charger is reverse polarity protected and will not be damaged if polarity is inadvertently reversed.

2) Choose the appropriate power setting to match the capacity of the battery to be charged. One may choose to deviate from the recommended settings as marked on the panel in order to increase or decrease the charge rate as desired. (See Section 2: Part 3.) However, attempting to charge a battery too fast, using a power setting higher than recommended may cause the charger overheat the battery. This can be dangerous and certainly is not beneficial to the battery. (See Section 3: Step 2:

Part 6.)

3) Select either CYCLE or CHARGE mode.

CYCLE mode should be reserved for batteries in poor condition whose capacity has fallen below usefulness for their particular application. CYCLE mode will alternately deeply discharge and then charge the battery with higher potency pulses than the normal CHARGE mode. Also, CYCLE mode has a built in equalize feature which charges the battery for an extended time at the end of the battery's charge after a pre-determined cool down period. The alternate deep discharge/charge cycling of CYCLE mode wil continue until battery capacity is maximized. One should be especially conservative when deciding to use CYCLE mode on a starter type battery (rated in CCA instead of AH). These types of batteries have much thinner plates than those of deep-cycle battereis, and as such, each unnecessary deep discharge may shorten the lifespan of these batteries.

If CHARGE mode is selected, the charger will charge the battery once until the battery can accept no further charge, then automatically shut off. CHARGE mode, although less agressive than CYCLE mode, is still far more potent than conventional charging. Use CHARGE mode from time to time on a conventionally charged battery, as part of a regularly scheduled maintenance routine, to keep it functioning optimally and maintain maximum longevity.

At the completion of either the CYCLE or CHARGE process, the charger will shut down and display a solid green LED status, after which the charger will automatically "float" charge

the battery from time to time while displaying a flashing green LED status.

4) Turn the charger on. LED should flash red until battery is connected. If charging does not begin, check the DC circuit breaker on the rear panel and be sure it is switched to the ON position. If charging still does not begin, check to see that battery polarity is not reversed (Section 3: Step 2: Part 1). If charging still does not begin, battery voltage may be too low for the charger to detect it. If this is the case, another battery can be connected in parallel with the dead battery in order to initiate the charge process. Once charging begins, after a few minutes, turn the charger off (to avoid sparking) and remove the jumper battery. During the charging process, the LED indicator will show solid (non-flashing) red.

5) Make sure the battery does not become disconnected from the charger while the charger is charging the battery. This can make a dangerous spark which can cause an explosion. Note also that if the battery gets disconnected and reconnected while under charge, the automatic charge cycle will be reset, possibly causing the charging process to take longer than necessary.

6) Generally, if the charger's power level is set in accordance with the printed recommended range for the battery on charge, charging should complete within 6-10 hours. Charging may take longer for the large batteries at the top end of of the range of the charger's highest power setting. Also, charging times for identically rated (sized) batteries may be different from these depending on brand, condition, or ambient temperature. If the battery is only half discharged, it will need only half the time to

charge. Some old batteries may not accept a charge and will heat up on charging. It is common for a battery's *first* few charge cycles on the Renaissance charger to take longer than normal as a result of the charger's rejuvenating characteristics.

CAUTION

If at any time the battery:
1) Gets hot (above 140°F or 60°C) or
2) Stays warm (above 100°F or 38°C) for more than 4 hours,
STOP CHARGING.

DO NOT attempt to charge batteries that will not charge under the normal procedures outlined in this manual. Dispose properly and immediately of all batteries that will not take a charge.

7) This charger is not intended nor designed to supply power for applications other than battery charging. Never charge a battery while the battery is powering another appliance or load.

STEP 3. TURNING THE CHARGER OFF

As stated previously, after the battery is charged, the LED indicator will turn to solid (non-flashing) green, indicating that the charging cycle is finished. After the charging cycle is over, the charger will continue to perform a maintenance (float) type charge, flashing the LED green from time to time. If the LED is either solid red or flashing green, it is important to turn the charger off before disconnecting the battery from the charger. The charge cycle may be stopped at any time by turning the charger's power switch OFF.

Section 4: DATA OUTPUT OPTION

Operation status, loading data, and battery capacity gains may all be optionally monitored through the use of the RS-232 serial data port located on the rear panel of the rejuvenator, a COM port installed on a personal computer, and a VT100 terminal emulation program such as Hyperterminal® or Tera Term Pro which is currently available for free download at the following link.

http://hp.vector.co.jp/authors/VA002416/teraterm.html

In order to function correctly, a COM port must be properly installed, selected, and set on the computer. COM settings should be set in ther terminal emulation program as follows:

Terminal Size = 80 x 24 (for optimal viewing)
Baude Rate = 2400
Data = 8 Bit
Parity = None
Stop = 1 Bit
Flow Control = None

Use the software's logging feature to save the data output to a text file for later reference if desired.

Section 5: TROUBLESHOOTING

1) **Charger will not come on (no LED)**
- Charger is not plugged into AC wall receptacle.

- There is no power to the AC wall receptacle.
- The AC circuit breaker on the rear panel has tripped. Press the white button in the center of the breaker to reset it. If the breaker trips again, DO NOT attempt to operate charger. Have charger serviced by factory-authorized service center only.

2) **Charge cycle will not begin (flashing LED)**
- Battery is not connected to charger. Check to make sure good electrical contact is made. The battery connections may have become corroded or tarnished, preventing the charger from detecting the presence of the battery. If this is the case, clean the battery clips and/or battery terminals and try again.
- Charger polarity is reversed. Battery '+' is not connected to charger '+', '-' to '-', etc. Reverse battery connections and try again.
- DC circuit breaker has tripped. Check to make sure the battery is of proper rated voltage (12V for RC-30A12 models or 24V for RC-15A24 models). Reset the breaker on the back panel by switching the lever to the ON position. If the circuit breaker persistently trips, lower the POWER setting, allow circuit breaker to cool, then attempt to restart charging process. If tripping continues, battery may have shorted cells and may need to be replaced.
- Battery resting voltage is extremely low. This is easily verfied by checking the battery with a voltmeter. If this is the case, another battery can be connected in parallel with the dead battery in order to initiate the charge process. Once charging begins, after a few minutes, turn the charger off (to avoid sparking) and remove the jumper battery. DO NOT attempt to charge batteries that will not charge under the normal

procedures outlined in this manual. Dispose properly and immediately of all batteries that will not take a charge.

3) **Battery becomes too hot (greater than 140° F or 60°C)**
- Battery is too small for charger. See Section 2.
- Battery is in poor condition. If one area of the battery is excessively hotter than another area while battery is under charge or load, this may indicate a failed cell. Replace battery.

4) **Charging cycle doesn't end (green light never comes on).**
- Interrupted power source. If the line voltage is interrupted, surged, or erratic (i.e. a brownout, blackout etc.), the circuitry in the charger may cause the charger to act erratically. Disconnect the charger from the power source, disconnect the batttery from the charger, and check to see that the battery is charged. If not, then, repeat the charging process as normal after correcting any abnormal line voltage condition(s).
- Battery connections are not secure. Poor electrical connection can cause intermittent electrical contact, causing the charge cycle to keep repeating. Correct as necessary.

5) **Erratic data or no data viewed though optional COM port connection**
- COM port not installed correctly. Verify through the computer's operating system that the COM port has been installed and is working properly.
- Wrong COM port selected in terminal emulation program. Verify that the COM port reported as working by the operating system is the same number as that chosen in the terminal emulation program.
- COM port set incorrectly. Verify that the settings in the terminal emulation program match those stated in Section 4.

Section 6: SPECIFICATIONS

RC-30A12-120 12V Battery Rejuvenator
- INPUT: 110-120V AC, 8.5A MAX, 50-60 HZ
- OUTPUT: 2-35A DC INTO 12V BATTERY

RC-30A12-240 12V Battery Rejuvenator
- INPUT: 220-240V AC, 4.2A MAX, 50-60 HZ
- OUTPUT: 2-35A DC INTO 12V BATTERY

RC-15A24-120 24V Battery Rejuvenator
- INPUT: 110-120V AC, 8.5A MAX, 50-60 HZ
- OUTPUT: 1-17A DC INTO 24V BATTERY

RC-15A24-240 24V Battery Rejuvenator
- INPUT: 220-240V AC, 4.2A MAX, 50-60 HZ
- OUTPUT: 1-17A DC INTO 24V BATTERY

MADE IN U.S.A.

Charging Notes:

ONE (1) YEAR LIMITED WARRANTY

This equipment is warranted to be free from defects in material or workmanship for one (1) year from date of purchase. Repair (or, at our option, replacement) will therefore be made of any unit which proves to be defective during this period provided the unit is returned properly packed, with all transportation charges prepaid, to the store from which it was purchased. Any repair approved hereunder will be made without charge to the owner for parts and/or labor. This limited warranty extends only to the original purchaser, is not transferable, and is limited to the purchase price of the equipment. In no event will Renaissance Charger, LLC. be liable for any incidental or consequential damages resulting from the equipment or any defect.

Claims under this limited warranty must be accompanied by the original sales receipt or shipping documents that establish date of purchase.

This limited warranty does not extend to units which have been subjected to misuse, abuse, neglect, or accident or to units that have been used in violation of operating instructions. Equipment which, in our judgment, shows evidence of having been altered, modified, or serviced without our authorization will be ineligible for service under this limited warranty.

This warranty gives you specific rights, and you also may have other rights which vary from state to state. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion(s) or limitation(s) may not apply to you.