
C-CHARGER[®]

Marine Electronic Battery Charger

**Installation Instructions &
Owner's Manual**

Models Covered in this Manual	
	Model
	CI-1210A
	CI-1215A
	CI-1220A
	CI-1230A
	CI-1240A
	CI-1260A
	CI-2410A
	CI-2420A
	CI-2430A
	CI-2440A
	CI-3210A
	CI-3220A
	CI-3230A
	CI-3240A

IMPORTANT SAFETY INSTRUCTIONS

1. Save these instructions – This manual contains important safety and operating instructions for C-CHARGER®.
2. Before using battery charger read all instructions and cautionary markings on the battery charger and batteries.
3. CAUTION – To reduce risk of injury charge only lead acid type rechargeable batteries. Other types of batteries may burst, causing personal injury and damage.
4. Do not expose charger to rain or snow.
5. Use of attachments not recommended or sold by Charles Industries may result in a risk of fire, electrical shock or injuries to personnel.

THESE UNITS ARE INTENDED FOR HARD WIRED APPLICATIONS

6. An extension cord should not be used in connection with the hard wire supply unless absolutely necessary. Use of an improper extension cord could result in a risk of fire and electrical shock. If an extension cord must be used make sure: a) that the extension cord is properly wired and in good electrical condition; and b) the wire size is large enough for AC ampere rating of the charger as specified in Table 1.
7. 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.
8. Do not disassemble charge. Take it to a qualified serviceman when service or repair is required. Incorrect assembly may result in risk of electrical shock or fire.
9. To reduce risk of electrical shock disconnect the charger from AC power before attempting any maintenance or cleaning. Turning off controls will not reduce risk.

I. 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 EACH TIME BEFORE USING YOUR CHARGER YOU READ THIS MANUAL AND FOLLOW THE INSTRUCTIONS EXACTLY.
- 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 the vicinity of the battery. Review cautionary marking on these products and on engine.

II. PERSONAL PRECAUTIONS

- A. Someone should be within range of voice or close enough to come to your aid when you work near a lead acid battery.
- B. Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing or eyes.
- C. Wear complete eye protection and clothing protection. Avoid touching eyes while working near battery.
- D. If battery acid contacts skin or clothing, wash them immediately with soap and water. If acid enters eye immediately flood eye with running cold water for at least ten minutes and get medical attention immediately.
- E. NEVER smoke or allow a spark or flame in the vicinity of battery or engine.
- F. Be extra cautious to reduce risk of dropping a metal tool onto battery. It might spark or short circuit battery or other electrical parts that may cause explosion.

WARNING

FUSE OR CIRCUIT BREAKER MUST BE INSTALLED IN THE BOAT'S DC WIRING BETWEEN BATTERY AND CHARGER. SEE COAST GUARD REG.33CFR183 SUBPART 1.

- G. Remove personal metal items such as rings, bracelets, necklaces and watches when working near a lead acid battery. A lead acid battery can produce a short circuit high enough to weld a ring or the like to metal, causing a severe burn.
- H. Use charger for charging a lead acid battery only. It is not intended to supply power to a low voltage electrical system other than a marine 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.
- I. NEVER charge a frozen battery.

PREPARING TO CHARGE

- J. If necessary to remove battery from craft to charge, always remove grounded terminal from battery first. Make sure all accessories in the craft are off, so as not to cause an arc.
- K. Be sure area around battery is well ventilated while battery is being charged. Gas can be forcefully blown away using a piece of cardboard or other non-metallic material as a fan.
- L. Clean battery terminals – be careful to keep corrosion from coming in contact with eyes.
- M. Add distilled water in each cell until battery acid reaches levels specified by battery manufacturer. This helps purge excessive gas from cells. Do not overfill. For a battery without cell caps, carefully follow manufacturer's recharging instructions.
- N. Study all battery manufacturer's specific precautions, such as removing or not removing cell caps while charging and recommended rates of charge.

III. FOLLOW THESE STEPS WHEN BATTERY IS OUTSIDE CRAFT. A SPARK NEAR THE BATTERY MAY CAUSE BATTERY EXPLOSION. TO REDUCE RISK OF SPARK NEAR BATTERY:

- A. Check polarity of battery posts. Positive (POS, P+) battery post usually has a larger diameter than negative (NEG, N-) post.

- B. Attach at least 24" long 6 gauge (AWG) insulated cable to negative (NEG, N-) battery post.
- C. Connect positive (red) charger clip to positive (POS, P+) post of battery.
- D. 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.
- E. Do not face battery when making final connection.
- F. When disconnecting charger, always do so in reverse sequence of connecting procedure and break first connection while as far away from battery as practical.
- G. A marine (boat) battery must be removed and charged on shore. To charge it on board requires specially designed equipment for marine use. (The equipment and operation of the C-CHARGER® is specially designed and suitable for marine use.)

IV. EXTERNAL CONNECTIONS TO CHARGE SHALL COMPLY WITH THE UNITED STATES COAST GUARD ELECTRICAL REGULATIONS (33CFR183, sub part 1) ALTHOUGH THE C-CHARGER® IS INTENDED TO BE PERMANENTLY CONNECTED (i.e. HARD WIRED) THE FOLLOWING IS OFFERED FOR REFERENCE IF CORD CONNECTED.

A. GROUNDING AND AC POWER CORD CONNECTION INSTRUCTIONS.

Charger should be grounded to reduce risk of electrical shock. Chargers equipped with an electrical cord having an equipment-grounding conductor and grounding plug, the plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.

DANGER: Never alter AC cord or plug provided. If it will not fit outlet, have the appropriate power outlet installed by a qualified electrician. Improper connections can result in a risk of an electrical shock.

A PERMANENTLY CONNECTED BATTERY CHARGER SHOULD BE GROUNDED USING TERMINAL G1, AND ALL CONNECTIONS TO BATTERY CHARGER SHOULD COMPLY WITH APPROPRIATE CODES AND ORDINANCES, BATTERY CHARGER INSTALLATION AND MAINTENANCE INSTRUCTIONS.

The C-CHARGER® is an automatic unit designed for marine applications in converting shore power to DC charging current for marine battery maintenance. The unit operates under a wide range of input voltage and maintains a constant output that avoids the danger of overcharging the marine batteries. Pay particular attention to the instructions regarding installation, operation and most important of all, study and understand the IMPORTANT SAFETY INSTRUCTIONS prominently outlined within this manual.

INSTALLATION

1. The C-CHARGER® should be mounted vertically flush on a bulkhead in a protected area way from threat of rain or spray and as close to the batteries as possible.
2. When selecting the mounting location, observe that proper ventilation is an important consideration. Even though the C-CHARGER® is designed to operate in high ambient temperatures, two feet of unrestricted area should be allowed on all sides of the unit. This allows the unit to maintain it's own circulation and cooling system.
3. As with any MARINE equipment, secure mounting is of utmost importance. The bolts or screws to be used to secure the C-CHARGER® must be a minimum of ¼ inch diameter. In the case of the bolts, they must be of sufficient length to be secured on both sides of the bulkhead. Screws, when used, should be a minimum of one inch long. The bolts or screws should be backed up with ¾ inch flat washer, and kept vibration-free with "split ring" lock washer. All hardware should be corrosion-free. To mount the C-CHARGER®, secure the upper hangers first, then, when they are tight, secure the lower holders.

ELECTRICAL WIRING

Consult the Tables at the end of this document for appropriate wiring specifications.

1. This unit is intended for hard wiring in a permanent application. Suitable hardware such as conduit or other appropriate electrical marine hardware should be selected consistent with applicable regulations.
2. Consult the wiring table for the appropriate wire gauge and avoid unnecessarily long runs or either AC or DC power.

CAUTION: NEVER WORK ON ANY ELECTRICAL EQUIPMENT WITHOUT FIRST DETERMINING THERE IS NO LIVE POWER. DOUBLE CHECK POWER CONNECTIONS AS WELL AS BATTERY TERMINATIONS.

After the appropriate lengths and wire gauges have been selected, refer to the marine charger schematic for use in wiring. Note that the terminal strip, TB1, the smaller of the two, is labeled one and two. The AC wiring connection should be made to this point. The number one terminal should be connected to the Black (hot) AC input; terminal number two should be connected to the White (neutral) input. The Green wire (ground) of the AC input should be connected to the grounding lug G1. See schematic diagram near the end of this document for more detail.

DO NOT OPERATE THIS UNIT WITHOUT THE GREEN WIRE CONNECTED TO THE CHARGER AND TO SUITABLE GROUND AT SHORE CONNECTIONS

The DC Output of the C-CHARGER® can be found on terminal board # 2 (TB2). Note that terminals #1 through #3 are internally connected with RED conductors and terminal #4 connection is BLACK. These colors indicate output polarity. There are three positive (RED) terminals for up to three battery banks, and one negative (BLACK) terminal #4, COMMON for all three banks.

IMPORTANT – CHECK BATTERY WATER LEVEL FREQUENTLY, ESPECIALLY IF BOAT IS AT DOCK FOR EXTENDED PERIODS. LOW WATER LEVELS WILL DAMAGE BATTERIES!

After you are certain all the electrical connections have been made correctly at both the battery charger, the shore power connector and most importantly, the battery banks, you may then close cover and retain it securely with the two cover screws. You may now check the charger for proper operation. You should note illumination of the power indicator, if so equipped. Otherwise you should see movement of the amp meter in a clockwise direction if the batteries are in need of a charge (there should be slight movement even if the batteries are charged).

Note: If the amp meter should deflect in the opposite direction, counter-clockwise, or should move full scale indicating excessive current, disconnect unit immediately. It is likely that a wiring error has been made. Examine wiring instructions again to assure there are proper connections. If pilot light indication or amp meter deflection is correct, you may assume the unit is working correctly. If available, a voltmeter can be used to monitor the voltage at the battery when the battery charger is turned on. One should note an increase in voltage as the battery charger is applied. If there are problems in delivering power to the batteries, the circuit breaker, on models so equipped, should be inspected. If the breaker has been tripped, it indicates a circuit fault. Again, check wiring for possible problems.

Qualified service people may examine the schematic and following maintenance parts list for repair, if necessary.

If this unit does not perform according to specifications and requires service contact Customer Service at 800-830-6523 for Return Goods Authorization. Material returned without an RMA# will be refused.

OPERATING INSTRUCTIONS

When properly installed and connected, the unit will be automatically maintaining the batteries. Some C-CHARGER® models include a combination circuit breaker/pilot light/on-off switch and amp meter. Be sure to follow all precautions detailed in “IMPORTANT SAFETY

INSTRUCTIONS” at the beginning of this manual. Abnormal conditions or loads may cause circuit breaker to trip (if so equipped). Circuit breaker can be reset with power applied.

MAINTENANCE INSTRUCTIONS

No required maintenance other than cleaning of outside cabinet. A dry cloth can be used. No adjustments are required. It may be advisable to have a qualified service person check all connections for tightness periodically, especially if craft is operated in heavy pounding seas.

Address Correspondence to:

**Charles Industries, Ltd.
Industrial Charger Group
5600 Apollo Drive
Rolling Meadows, IL 60008-4049
USA
847-806-6300
Technical Support 800-830-6523**

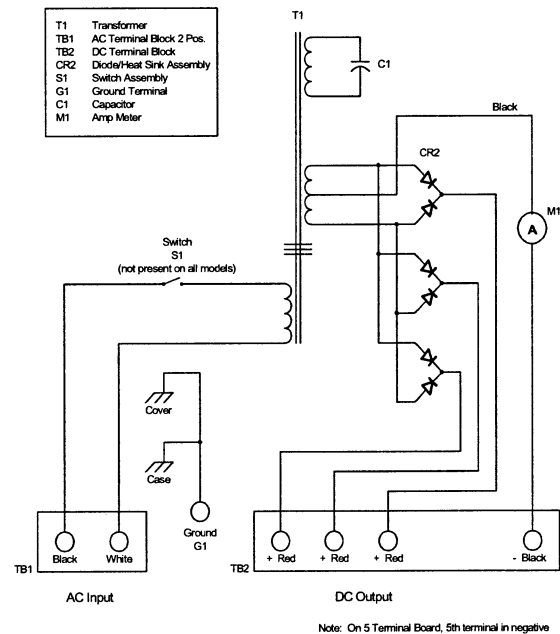


Table 1					
Recommended Minimum AWG Size For Extension Cords for Battery Chargers					
Model	Max AC Amps	Wire Size	Cord Length		
			25'	50'	100'
CI-1210A	4		18 AWG	16 AWG	14 AWG
CI-1215A	5		18 AWG	16 AWG	14 AWG
CI-1220A	6		18 AWG	16 AWG	14 AWG
CI-1230A	8		16 AWG	16 AWG	14 AWG
CI-1240A	12		14 AWG	12 AWG	10 AWG
CI-1260A	15		12 AWG	10 AWG	8 AWG
CI-2410A	6		18 AWG	16 AWG	14 AWG
CI-2420A	12		14 AWG	12 AWG	10 AWG
CI-2430A	15		12 AWG	10 AWG	8 AWG
CI-2440A	20		12 AWG	10 AWG	8 AWG
CI-3210A	8		16 AWG	16 AWG	14 AWG
CI-3220A	15		12 AWG	10 AWG	8 AWG
CI-3230A	20		12 AWG	10 AWG	8 AWG
CI-3240A	25		10 AWG	8 AWG	6 AWG

Table 2					
Minimum Wire Size to Input of Charger: 120 VAC Shore Power					
Model	Max AC Amps	Wire Size	Cord Length		
			25'	50'	100'
CI-1210A	4		18 AWG	16 AWG	14 AWG
CI-1215A	5		18 AWG	16 AWG	14 AWG
CI-1220A	6		18 AWG	16 AWG	14 AWG
CI-1230A	8		16 AWG	16 AWG	14 AWG
CI-1240A	12		14 AWG	12 AWG	10 AWG
CI-1260A	15		12 AWG	10 AWG	8 AWG
CI-2410A	6		18 AWG	16 AWG	14 AWG
CI-2420A	12		14 AWG	12 AWG	10 AWG
CI-2430A	15		12 AWG	10 AWG	8 AWG
CI-2440A	20		12 AWG	10 AWG	8 AWG
CI-3210A	8		16 AWG	16 AWG	14 AWG
CI-3220A	15		12 AWG	10 AWG	8 AWG
CI-3230A	20		12 AWG	10 AWG	8 AWG
CI-3240A	25		10 AWG	8 AWG	6 AWG

Table 3					
Minimum Wire Size to Input of Charger: 220 VAC Shore Power					
Model	Max AC Amps	Wire Size	Cord Length		
			25'	50'	100'
CI-1220A	3		18 AWG	16 AWG	14 AWG
CI-1230A	4		16 AWG	16 AWG	14 AWG
CI-1240A	4.5		14 AWG	12 AWG	10 AWG
CI-1260A	8		12 AWG	10 AWG	8 AWG
CI-2440A	11		12 AWG	10 AWG	8 AWG

Table 4				
Minimum Wire Size from Output of Charger to Battery				
Model	Max DC Amps	Wire Size	Cord Length	
			15'	25'
CI-1210A	15		14 AWG	12 AWG
CI-1215A	22		12 AWG	10 AWG
CI-1220A	30		10 AWG	8 AWG
CI-1230A	45		10 AWG	8 AWG
CI-1240A	60		8 AWG	6 AWG
CI-1260A	90		6 AWG	4 AWG
CI-2410A	15		14 AWG	16 AWG
CI-2420A	30		12 AWG	10 AWG
CI-2430A	45		10 AWG	8 AWG
CI-2440A	60		8 AWG	6 AWG
CI-3210A	15		12 AWG	12 AWG
CI-3220A	30		12 AWG	10 AWG
CI-3230A	45		10 AWG	8 AWG
CI-3240A	60		8 AWG	6 AWG