

C-CHARGER[®]
FERRORESONANT BATTERY CHARGER

**INSTALLATION INSTRUCTIONS
& OWNER'S MANUAL**
AA, AE & CI Models



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INTRODUCING... THE C-CHARGER®

Thank you for purchasing the C-CHARGER®. Your C-Charger represents the latest in automatic float chargers. It is a self-regulating, ferroresonant transformer that eliminates complicated switching circuits that burn out easily. The C-Charger is designed to convert AC power to DC charging current for hard-wired applications. All of the C-Charger models operate under a wide range of input voltages yet maintain a constant output, avoiding any danger of overcharging batteries.

This manual covers the following models, listed by model number:

Table 1. Model Numbers

Model Number	Amps	System Voltage	Equalize/Float Switch	UL Approved
AA1206	6	12	N/A	✓
AA1210	10	12	N/A	✓
AA1220	20	12	N/A	✓
AA2406	6	24	N/A	✓
AA2410	10	24	N/A	✓
AA2420	20	24	N/A	✓
AA3206	6	32	N/A	
AA3210	10	32	N/A	
AA3220	20	32	N/A	
AE1206	6	12	Standard	✓
AE1210	10	12	Standard	✓
AE1220	20	12	Standard	✓
AE1230	30	12	Standard	
AE2406	6	24	Standard	✓
AE2410	10	24	Standard	✓
AE2420	20	24	Standard	✓
AE2430	30	24	Standard	
AE2440	40	24	Standard	
AE3206	6	32	Standard	
AE3210	10	32	Standard	
AE3220	20	32	Standard	
AE3230	30	32	Standard	
CI1205C	5	12	N / A	✓
CI1210C	10	12	N/A	✓
CI1215C	20	12	N/A	✓
CI1220C	30	12	N/A	✓
CI1230C	40	12	N/A	✓
CI1240C	50	12	N/A	✓
CI1260C	60	12	Optional	✓
CI2405C	5	24	N/A	✓
CI2410C	10	24	N/A	✓
CI2420C	20	24	N/A	✓

Model Number	Amps	System Voltage	Equalize/Float Switch	UL Approved
CI2430C	30	24	Optional	✓
CI2440C	40	24	Optional	✓
CI3205C	5	32	N/A	✓
CI3220C	20	32	Optional	✓
CI3230C	30	32	Optional	✓
CI3240C	40	32	Optional	✓

Warranty/Registration

Before proceeding, complete and mail back your Warranty Registration card.

Manual Purpose

With your personal safety in mind, this manual lists important safety precautions first, then covers installation, operation, maintenance, troubleshooting and warranty and customer service information.

WARNING

RISK OF EXPLOSIVE GASES! WORKING IN THE VICINITY OF A LEAD ACID BATTERY IS DANGEROUS. BATTERIES GENERATE EXPLOSIVE GASES DURING NORMAL BATTERY OPERATION. THEREFORE IT IS OF UTMOST IMPORTANCE THAT EACH TIME BEFORE USING YOUR C-CHARGER YOU READ THIS MANUAL AND FOLLOW THE INSTRUCTIONS EXACTLY.

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

French

MISE EN GARDE

Français

DES GAZ EXPLOSIFS PEUVENT ÊTRE PRÉSENTS. IL EST DANGEREUX DE TRAVAILLER À PROXIMITÉ DE BATTERIES AU PLOMB, QUI LIBÈRENT DES GAZ EXPLOSIFS DURANT LEUR UTILISATION NORMALE. AINSI, IL EST TRÈS IMPORTANT QUE VOUS LISIEZ CE GUIDE CHAQUE FOIS QUE VOUS UTILISEZ VOTRE C-CHARGER, ET QUE VOUS EN SUIVIEZ SOIGNEUSEMENT LES INSTRUCTIONS.

Afin de réduire le risque d'explosion des batteries, suivez ces instructions, celles du fabricant de vos batteries, et celles du fabricant de tout autre équipement utilisé près des batteries. Consultez les mises en garde inscrites sur ces produits et sur le moteur.

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS. This manual contains important safety and operating instructions for the C-Charger. Read the entire manual before usage. Also read all instructions and cautions for and on the C-Charger and batteries.

Environmental Precaution

Do not expose the C-Charger to rain, snow, or excessive moisture.

C-Charger Application Precaution

These units are intended for hard-wired applications. Use of attachments not recommended or sold by Charles Industries may result in risk of fire, electrical shock or personal injury.

Damaged C-Charger Precaution

Do not operate the C-Charger if it has received a sharp blow, been dropped, or otherwise damaged. See the section in this manual on *Warranty & Customer Service*.

Disassembly Precaution

Do not disassemble the C-Charger. See the sections in this manual on *Maintaining the C-Charger*, *Troubleshooting the C-Charger* and *Warranty & Customer Service*.

Mounting Precautions

The following must be taken into consideration when choosing a location for the C-Charger.

1. Do not place the C-Charger directly above the battery; gases from the battery will corrode and damage the C-Charger.
2. When reading gravity or filling the battery do not let battery acid drip on the C-Charger.
3. Do not operate the C-Charger in an enclosed area or restrict ventilation in any way.
4. Never place a battery on top of the C-Charger.

Battery Connection Precautions

A spark near the battery can cause an explosion. Use caution when connecting a battery to the C-Charger. To avoid a spark:

1. Check polarity of battery posts.
2. Attach at least a 24 inch long six gauge (AWG) insulated battery cable to the NEGATIVE (NEG, N, –) battery post.
3. Connect the RED (positive) C-Charger wire to the POSITIVE (POS, P, +) post of the battery through a fuse (not provided with the C-Charger).

Note: The amp rating of the fuse should be approximately 150% of the amp rating of the C-Charger.

4. Connect the BLACK (negative) C-Charger wire to the free end of the insulated battery cable. **Keep your face at a distance when making connections.**
5. When disconnecting the C-Charger, always do so in reverse sequence of the connecting procedure.

Maintenance/Cleaning Precaution

To reduce risk of electrical shock, disconnect the C-Charger from AC power and batteries before attempting any maintenance or cleaning.

Personal Safety Precautions

Adhere to the following personal safety precautions when installing or working with any of the C-Chargers:

1. Someone should be within voice range or close enough to come to your aid when you work near a lead acid battery.
2. Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.
3. Wear complete eye protection and clothing protection. Avoid touching eyes while working near a battery.
4. If battery acid contacts skin or clothing, wash them immediately with soap and water. If acid enters the eye, flood the eye with cold, running water for at least ten minutes and get medical attention immediately.
5. Never smoke or allow a spark or flame in the vicinity of the battery or engine.
6. Do not drop a metal tool onto the battery. It might spark or short circuit the battery or other electrical parts that may cause an explosion.

7. Remove all personal metal items such as rings, bracelets, necklaces and watches when working near a lead acid battery. A battery can produce short circuit currents high enough to weld a ring or the like to metal, causing a severe burn.
8. Do not use the C-Charger for charging dry cell batteries that are commonly used with home appliances. These batteries may burst and cause personal injury and property damage.
9. **NEVER** charge a frozen battery.

Preparing to Charge Precautions

CAUTION

To reduce risk of injury, charge only lead acid or nickel cadmium type rechargeable batteries. Other types of batteries may burst, causing personal injury and damage.

Before charging a battery with the C-Charger, read the following precautions:

1. Make sure all accessories are off.
2. If the battery must be removed, always remove the grounded terminal from the battery first.
3. Be sure the area around the battery is well ventilated while the battery is being charged. Gas can be forcefully blown away using a piece of cardboard or other non-metallic material as a "hand fan".
4. Clean battery terminals. Be careful to keep corrosion from coming in contact with eyes.
5. Add distilled water in each cell until battery acid reaches levels specified by the battery manufacturer. This helps purge excessive gas from cells. Do not overfill. For a battery without cell caps, carefully follow the manufacturer's recharging instructions.
6. Be well aware of all battery manufacturer's precautions, especially those pertaining to recommended rates of charge and whether or not cell caps should be removed while charging.

Grounding Precautions

When the C-Charger is permanently mounted, it must have a grounding conductor.

1. The C-Charger should be connected to a metal, grounded, permanent wiring system. An equipment-grounding conductor should be run with circuit wiring and connected through the C-Charger housing grommets to the equipment grounding terminal or lead on the C-Charger.
2. Connections to the C-Charger should comply with all local codes and ordinances.

MISES EN GARDE IMPORTANTES

CONSERVEZ CES INSTRUCTIONS. Ce guide contient d'importantes instructions sur la sécurité et l'utilisation du C-Charger. Lisez le guide en entier avant d'utiliser le chargeur. Lisez également les instructions et mises en garde inscrites sur le C-Charger et celles relatives aux batteries.

Exposition du C-Charger aux intempéries

N'exposez pas le C-Charger à la pluie, à la neige, ou à l'humidité excessive.

Applications recommandées

Ces appareils sont conçus pour les applications locales permanentes. L'utilisation d'accessoires non recommandés ni vendus par Charles Marine Products présente des risques d'incendie, de chocs électriques ou de blessures.

C-Charger endommagé

N'utilisez pas le C-Charger s'il a reçu un coup brusque, s'il est tombé ou s'il est endommagé.

Démontage

Ne démontez pas le C-Charger.

Entretien et nettoyage

Afin de réduire le risque de chocs électriques, débranchez le C-Charger de la source de courant CA avant d'effectuer tout entretien ou nettoyage.

Précautions personnelles:

1. Demeurez à portée de voix ou près d'une autre personne pouvant vous venir en aide lorsque vous travaillez à proximité d'une batterie au plomb.
2. Prévoyez une bonne quantité d'eau fraîche et du savon en cas de contact des yeux, de la peau ou des vêtements avec l'acide de la batterie.
3. Portez un équipement de protection complet pour les yeux et les vêtements. Évitez de toucher vos yeux lorsque vous travaillez près d'une batterie.
4. Si l'acide de la batterie entre en contact avec la peau ou les vêtements, lavez-les immédiatement avec de l'eau et du savon. En cas de contact oculaire, rincez aussitôt les yeux à l'eau courante pendant au moins dix minutes et consultez le médecin immédiatement.
5. Ne fumez jamais et ne tolérez jamais les flammes ou les étincelles à proximité de la batterie ou du moteur.
6. Évitez de laisser tomber des objets métalliques sur la batterie. Cela peut produire une étincelle ou provoquer un court-circuit dans la pile ou dans tout autre élément électrique pouvant causer une explosion.
7. Retirez tout objet personnel de métal comme les bagues, bracelets, colliers et montres lorsque vous travaillez près d'une batterie au plomb. Une batterie au plomb peut produire un court-circuit suffisamment fort pour faire fondre ces articles et provoquer des brûlures graves.
8. Le C-Charger n'est pas conçu pour alimenter un système électrique de basse tension autre que celui d'une application marine. N'utilisez pas le C-Charger pour charger les batteries à anode sèche employées dans les appareils ménagers. Ces batteries peuvent exploser et causer des blessures et des dommages.
9. **NE CHARGEZ JAMAIS** une batterie gelée.

Préparation du chargeur

French

ATTENTION

Français

Afin de réduire les risques de blessures, ne chargez que des batteries rechargeables au plomb. Les autres types de batteries peuvent exploser et causer des blessures et des dommages.

1. Si la batterie doit être d'abord retirée de l'embarcation, débranchez toujours la mise à la terre de la batterie en premier lieu. Éteignez tous les accessoires de l'embarcation, afin d'éviter de produire un arc électrique.
2. Assurez-vous que l'endroit où se trouve la batterie soit bien aéré lorsque la batterie est chargée. Les gaz peuvent être éloignés à l'aide d'un éventail fait de carton ou de tout autre matériau non-métallique.
3. Nettoyez les bornes de la batterie. Évitez le contact de la corrosion avec les yeux.

4. Ajoutez de l'eau distillée dans chaque cellule jusqu'à ce que l'acide atteigne le niveau spécifié par le fabricant. Ceci contribue à éliminer les excès de gaz dans les cellules. N'ajoutez pas trop de liquide. Si les cellules ne possèdent pas de couvercle, suivez les instructions du fabricant pour charger la batterie.
5. Étudiez toutes les mises en garde du fabricant de la batterie. Par exemple, vérifiez s'il faut retirer les couvercles des cellules pendant la charge, et prenez connaissance des taux de charge recommandés.

Mise à la terre

1. Votre C-Charger doit être relié à une canalisation électrique mise à la terre, métallique et permanente. Un conducteur de protection doit être relié au circuit de branchement, et branché à la borne de mise à la terre (GRN) du C-Charger, à l'aide des passe-fils.
2. Les connections au C-Charger doivent être conformes à tous les codes et ordonnances locaux.

INSTALLING THE C-CHARGER

Verifying Proper Battery/Charger Type

C-Charger models may be used for charging LEAD ACID or NICKEL CADMIUM batteries. Confirm the intended battery type with the model number on the product identification label located on the C-Charger (refer to Table 1). All C-Chargers have been factory preset. If your C-Charger model does not match your intended battery type, contact Charles Industries Customer Service at 847/806-6300 for assistance.

Note: AA model C-Chargers have an optional temperature compensation device that needs to be installed before the C-Charger is installed. If the unit purchased has the temperature compensation option, install it before permanently installing the C-Charger. Turn to the section in this manual that describes the installation of the temperature compensation option.

Choosing Mounting Location

When choosing an area to permanently mount the C-Charger, use the following guidelines.

1. The C-Charger should be mounted vertically.
2. Choose a protected area away from rain or spray and as close to the batteries as possible.
3. The C-Charger is designed to operate in high ambient temperatures with the proper ventilation. Six inches of unobstructed area on all sides of the unit should be allowed for air circulation and cooling.
4. Wire entry is provided on both the left and right sides of the C-Charger.
5. It is best not to have the C-Charger come in direct contact with people.

Choosing Mounting Hardware

As with any equipment, secure mounting is of utmost importance. The bolts or screws used to secure the C-Charger should be sufficient length to assure a vibration-free mounting. The preferred fastener is a machine bolt backed with a flat washer and lock washer as well as a nut. All hardware should be corrosion-resistant.

Mounting the C-Charger

All corrosion-resistant mounting hardware should be readily available. Follow the steps below to mount the C-Charger.

Step	Action
1.	Hold the C-Charger vertically flush.
2.	Mark the mounting holes.

Step	Action
3.	Remove the C-Charger.
4.	Drill the mounting holes.
5.	Insert the screws through the drilled holes on one side.
6.	Tighten the nuts approximately halfway.
7.	Align the mounting slots on the C-Charger with the hardware and slide the C-Charger's mounting flange under the screwheads.
8.	Insert the mounting hardware for the other side.
9.	Secure all mounting hardware.

Choosing Electrical Wiring Hardware

The C-Charger is intended for hard-wiring in a permanent application. Conduit or other appropriate electrical installation hardware should be used.

Note: Input power connection wires must be suitable for at least 90 degrees centigrade.

Choosing Wire Gauge

Use Table 2 and Table 3 to determine the appropriate wire gauges. Avoid unnecessary long runs of either AC or DC power lines.



Before working on electrical equipment, first determine there is no live power! Double check power connections and all battery terminations.

Table 2. Minimum Wire Size from Output of C-Charger to Battery

Model			DC Amp Max	15' Length	25' Length
AA1206	AE1206	CI1205C	10	14 AWG	12 AWG
AA1210	AE1210	CI1210C	15	14 AWG	12 AWG
		CI1215C	22	12 AWG	10 AWG
AA1220	AE1220	CI1220C	30	10 AWG	8 AWG
	AE1230	CI1230C	45	8 AWG	6 AWG
		CI1240C	60	6 AWG	4 AWG
		CI1260C	90	4 AWG	2 AWG
AA2406	AE2406	CI2405C	7.5	16 AWG	14 AWG
AA2410	AE2410	CI2410C	15	14 AWG	12 AWG
AA2420	AE2420	CI2420C	30	10 AWG	8 AWG
	AE2430	CI2430C	45	8 AWG	6 AWG
AA3206	AE3206		9	16 AWG	14 AWG
		CI2440C	60	6 AWG	4 AWG
AA3210	AE3210	CI3210C	15	14 AWG	12 AWG
		CI3220C	30	10 AWG	8 AWG
	AE3230	CI3230C	45	8 AWG	6 AWG
		CI 3240C	60	6 AWG	4 AWG

Table 3. Minimum Wire Size to Input of C-Charger

120 VAC POWER INPUT TO C-CHARGER						
Model			AC Amp Max	25' Length	50' Length	100' Length
AA1206	AE1206	CI1205C	1.5	18 AWG	18 AWG	18 AWG
AA1210	AE1210	CI1210C	2.5	18 AWG	18 AWG	16 AWG
		CI1215C	4	18 AWG	16 AWG	14 AWG
AA1220	AE1220	CI1220C	5	18 AWG	16 AWG	14 AWG
	AE1230	CI1230C	8	16 AWG	14 AWG	12 AWG
		CI1240C	12	14 AWG	12 AWG	10 AWG
		CI1260C	15	14 AWG	12 AWG	10 AWG
AA2406	AE2406	CI2405C	3	18 AWG	18 AWG	16 AWG
AA2410	AE2410	CI2410C	5	18 AWG	16 AWG	14 AWG
AA2420	AE2420	CI2420C	10	16 AWG	14 AWG	12 AWG
	AE2430	CI2430C	15	14 AWG	12 AWG	10 AWG
AA3206	AE3206		4.5	18 AWG	16 AWG	14 AWG
		CI2440C	20	12 AWG	10 AWG	8 AWG
AA3210	AE3210	CI3210C	8	16 AWG	14 AWG	12 AWG
		CI3220C	15	14 AWG	12 AWG	10 AWG
	AE3230	CI3230C	20	12 AWG	10 AWG	8 AWG
		CI 3240C	25	12 AWG	10 AWG	8 AWG
220 VAC POWER INPUT TO C-CHARGER						
Model			AC Amp Max	25' Length	50' Length	100' Length
AA1206	AE1206	CI1205C	1.5	18 AWG	18 AWG	18 AWG
AA1210	AE1210	CI1210C	1.5	18 AWG	18 AWG	18 AWG
AA1210	AE1210	CI1210C	1.5	18 AWG	18 AWG	18 AWG
		CI1215C	2	18 AWG	18 AWG	18 AWG
AA1220	AE1220	CI1220C	2.5	18 AWG	18 AWG	16 AWG
	AE1230	CI1230C	4	18 AWG	16 AWG	14 AWG
		CI1240C	6	16 AWG	14 AWG	14 AWG
		CI1260C	8	16 AWG	14 AWG	12 AWG
AA2406	AE2406	CI2405C	1.5	18 AWG	18 AWG	18 AWG
AA2410	AE2410	CI2410C	2.5	18 AWG	18 AWG	16 AWG
AA2420	AE2420	CI2420C	5	18 AWG	16 AWG	14 AWG
	AE2430	CI2430C	8	16 AWG	14 AWG	12 AWG
AA3206	AE3206		3	18 AWG	18 AWG	16 AWG
		CI2440C	10	16 AWG	14 AWG	12 AWG
AA3210	AE3210	CI3210C	4	18 AWG	16 AWG	14 AWG
		CI3220C	8	16 AWG	14 AWG	12 AWG
	AE3230	CI3230C	10	16 AWG	14 AWG	12 AWG
		CI 3240C	13	14 AWG	12 AWG	10 AWG

Wiring the C-Charger

CAUTION

Make sure there is no live power. Do not work on electrical equipment if there is live power present. Power connections and battery terminations must be disabled.

Wire lengths and gauges should be selected and accessible. Refer to the C-Charger schematic when more detail is necessary.

Make the AC Wiring Connections

The AC terminal strip is labeled “B” and “W” and includes a ground screw.

Step	Action
1.	Connect the terminal labeled “B” to the black (hot) AC input.
2.	Connect the terminal labeled “W” to the white (neutral) AC input.
3.	Connect the ground screw to the green (ground) wire of the AC input.

Make the DC Wiring Connections

The DC terminal strip is labeled “+” and “-”.

Step	Action
1.	Connect the black wire to the terminal labeled “-”.
2.	Connect the red wire to the terminal labeled “+”.

Verify C-Charger Operation

Step	Action
1.	Verify that all electrical connections have been made correctly at both the C-Charger and the battery.
2.	Close the cover and secure it with the screws provided.
3.	Turn on the C-Charger. The ammeter will move in a clockwise direction if the batteries need to be charged. If the batteries are already charged there will be a slight movement in the ammeter. <i>Note: If the ammeter moves in a counterclockwise direction or moves full scale, indicating excessive current, disconnect the C-Charger immediately. Refer to the section in this manual on Troubleshooting.</i>
4.	Use a voltmeter to monitor the voltage at the battery. There will be an increase in voltage as the battery charger is applied.

OPERATING THE C-CHARGER

When properly installed and connected, the C-Charger will maintain batteries. Always follow all precautions in the **IMPORTANT SAFETY INSTRUCTIONS** section in this manual.

Note: Abnormal conditions of loads may cause a circuit breaker to trip.

Proper Operation

If the C-Charger is equipped with a float/equalize switch, consult the battery instruction manual for proper operation. Normally the switch is in the float position. The equalize light indicates when the C-Charger is in the equalize mode.

On AA Series C-Chargers the power light is on, the low and high voltage lights are off and the equalize light may or may not be on. If the equalize light is on it will automatically turn off when the battery voltage reaches the high voltage limit.

Indicator Light Definitions – AA Series Battery C-Chargers

The four lights on the cover of the AA Series C-Charger indicate the present status of the unit. To determine the status of the C-Charger refer to Table 4.

The AE Series C-Chargers may have an optional alarm package available.

Table 4. C-Charger Status

HI DC (red)	LO DC (red)	Equalize (yellow)	AC ON (green)	C-Charger Status
Off	Off	Off	Off	No power. Either the power is turned off or the circuit breaker to the C-Charger is off. If the power and/or circuit breaker are on refer to the section in this manual on <i>Troubleshooting</i> .
Off	On	Off	On	AC power is being supplied to the C-Charger, however the battery is below the low voltage limit (lead acid 2.12 VAC or nickel cadmium 1.45 VAC)
Off	Off	On	On	AC power is being supplied to the C-Charger however, the battery needs to equalize the voltage. When the voltage reaches the high voltage limit the EQUALIZE light will automatically turn off.
Off	Off	Off	On	AC power is being supplied to the C-Charger and the battery is being charged.
On	Off	Off	On	The battery is above the high voltage limit (lead acid 2.33 VDC or nickel cadmium 1.55 VDC)

Note: The C-Charger continuously monitors the battery voltage and therefore will automatically switch between float and equalize to regulate the voltage.

Voltage Adjustments

Different batteries have different recharge rates. If the C-Charger frequently switches between float and equalize, as may happen with oversized chargers, the voltage limits are set too close together and need to be adjusted. To adjust the voltage follow the procedure below:

Step	Action
1.	Open the C-Charger cover.
2.	Locate the potentiometer labeled HI and LO at the top edge of the circuit board.
3.	Make adjustments with a <i>trim pot adjustment tool</i> . Turn <i>counterclockwise</i> to increase limits Turn <i>clockwise</i> to decrease limits
4.	A red light will come on indicating the new limit is set.

An equalize voltage may be initiated manually by pressing the *Equalize* button. The C-Charger will enter the equalize mode and not resume a float voltage until the battery has reached the high voltage limit.

TEMPERATURE COMPENSATION OPTION FOR AA MODEL C-CHARGERS

The AA model C-Chargers have an optional temperature compensation device that must be connected before installation. The temperature compensation device monitors the ambient temperature of the battery and varies the voltage limits 2.5 mV/cell/°C for lead acid batteries and 3.0 mV/cell/°C for nickel cadmium batteries. Follow the procedure below to connect the temperature compensation device to a AA Series C-Charger.

Note: The temperature compensation device must be connected prior to installing the C-Charger. If the ambient battery temperature is above 25° C the voltage limits will be the same with or without the temperature compensation device.

Step	Action
1.	Open the C-Charger cover.
2.	Locate the small terminal block between the AC and DC terminal blocks.
3.	Connect the red wire of the temperature probe to terminal 4.
4.	Connect the black wire of the temperature probe to terminal 5.
5.	Securely attach the other end of the temperature probe to the side of the battery.
6.	Locate the small rectangular jumper labeled J1 on the circuit board.
7.	Move the J1 jumper to the W/C position. <i>Note: Never operate the C-Charger without the jumper in either the STD or W/C position.</i>
8.	Close the C-Charger cover.
9.	Follow the procedure in this manual to install the C-Charger.

MAINTAINING THE C-CHARGER

There are no adjustment or maintenance requirements for the C-Charger other than cleaning the outside cabinet with a dry cloth. Periodically have all connections checked by a qualified service person.

CAUTION

Check battery water levels frequently. Low water levels will damage batteries!

TROUBLESHOOTING THE C-CHARGER

If there is a problem with the C-Charger, check that all connections are correct and secure. If all connections are good, see if the problem is covered in Table 5. If the problem is not covered in Table 5, or if the C-Charger still malfunctions after performing the solution given, contact Charles Industries for technical assistance.

Table 5. Troubleshooting Suggestions

Item	Condition	Solution
1.	Not clear if batteries are fully charged.	As the batteries charge, the ammeter gradually falls. When it reads zero, the batteries are fully charged.
2.	It takes too long to charge batteries.	The C-Charger brings a discharged battery voltage level up slowly to avoid shortening the life of the battery. The recharge time depends on the degree of discharge.
3.	The ammeter deflects in a counter-clockwise direction.	Disconnect the unit immediately. Examine wiring instructions again to assure proper connections. A movement in a counter-clockwise direction or a full-scale movement indicates excessive current. A wiring error is suspected. A voltmeter can monitor the voltage at the battery when the C-Charger is turned on. An increase in voltage should occur as power is applied.

WARRANTY & CUSTOMER SERVICE

Warranty

CHARLES INDUSTRIES warrants the C-Charger® will be free from defects in materials and workmanship which cause mechanical failure for two (2) years, as set forth in the Limited Warranty. Review this warranty carefully for information on what is covered by its terms. Complete and return the warranty registration card within ten (10) days of purchase to establish proof of ownership and validate the warranty coverage. You must provide notice of any alleged defect in material or workmanship within thirty (30) days of discovering the problem, and within the warranty period. Follow the procedure outlined below to obtain warranty service.

Warranty Service and Repair

If the unit fails to operate properly after following all the instructions in the manual, or if the C-Charger requires service, take the following steps:

1. Contact Charles Industries Customer Service and obtain a "Returned Goods Authorization" (RGA) number and a Service Center address.
2. Ship or mail the C-Charger together with the RGA to the appropriate Service Center. Shipping costs to and from the Service Center are your responsibility.
3. When service is complete, Charles Industries will return the C-Charger to you.

Customer Service

If technical assistance or customer service is required, contact Charles Industries Industrial Group at:

847/806-6300 (Customer Service)

847/806-6231 (FAX)

For correspondence only, mail to:

Charles Industries, Ltd.

Charles Center

5600 Apollo Drive

Rolling Meadows, IL 60008-4049

