

LIMITED WARRANTY

NEWMAR warrants with the original purchase of products sold by **NEWMAR**, that they shall be free from defects in material and workmanship for two years from the date of purchase.

In the event of a product failure caused by defect of material or workmanship you must return the entire product with the original packing if possible, freight pre-paid, to the place of purchase or to **NEWMAR**, 2911 W. Garry Avenue, Santa Ana, California 92704. Besides paying to send back the product, you must include proof of purchase reflecting where the product was purchased, the date of purchase and a written explanation of the alleged defect. If this product is determined to be defective by **NEWMAR**, we will repair the product and ship it back to you without charge. If non-repairable within 30 days, we will ship an equivalent or better replacement product or provide you with a refund of your purchase price.

Repairs or adjustments to be made on the defective product shall be determined by **NEWMAR** in its sole discretion. If you have any questions concerning this Limited Warranty, contact us at the above address or call Customer Service at 1-800-854-3906.

This Limited Warranty does not apply to products that have not been installed properly or maintained adequately. This Limited Warranty does not apply to damage through accident, negligence, misuse, abuse or normal wear and tear. Further, this warranty does not cover products that have been altered or modified from their original sale condition. For information regarding proper installation, please consult the instructions enclosed with the product. You may contact **NEWMAR** or an authorized retailer for additional installation instructions. It is your responsibility to check the product upon receipt for any damage during shipping and to contact the carrier or shipper regarding such damage. No person including any **NEWMAR** dealer, is authorized to assume any further liability for **NEWMAR** beyond this Limited Warranty, in connection with the products sold by **NEWMAR**. A customer's sole and exclusive recourse against **NEWMAR** is this Limited Warranty, regardless of a customer's recourse against a seller.

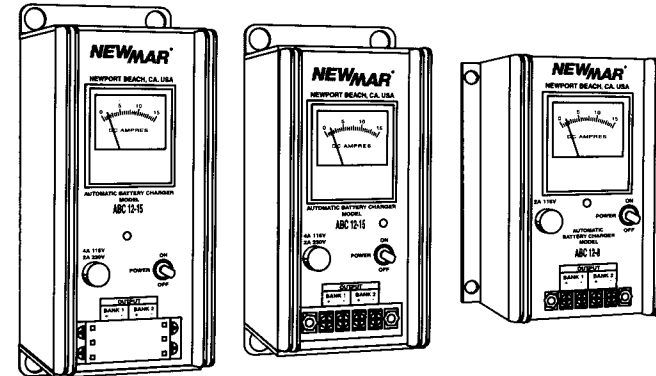
THERE ARE NO OTHER WARRANTIES EXPRESS OR IMPLIED WHICH EXIST BEYOND THE TERMS OF THIS LIMITED WARRANTY. THIS LIMITED WARRANTY IS NEWMAR'S SOLE OBLIGATION TO YOU FOR THIS PRODUCT AND CONSTITUTES YOUR EXCLUSIVE REMEDY UNDER THE LAW. NEWMAR SHALL NOT BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR INDIRECT DAMAGES CAUSED AS A RESULT OF ANY DEFECT IN WORKMANSHIP. LIABILITY IS LIMITED TO REPAIR OR REPLACEMENT OF THIS PRODUCT. NEWMAR IS NOT RESPONSIBLE FOR ANY DAMAGE THIS PRODUCT CAUSES TO ANY OTHER EQUIPMENT OR ANY OTHER PRODUCT.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Also some states do not allow the exclusion of incidental or consequential damages, so the above limitation or exclusion may not apply to you. Finally, this warranty gives you specific legal rights; however, you may also have other rights which vary from state to state.

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AS OF SEPT. 2001

NEWMAR®

ELECTRONIC POWER PRODUCTS
COMMUNICATION • NAVIGATION



AUTOMATIC BATTERY CHARGERS

MODELS:

ABC 12-8

ABC 12-15

ABC 12-25

INSTALLATION AND OPERATION MANUAL

NEWMAR®

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1) GENERAL INFORMATION

Your NEWMAR ABC Series Battery Charger is a solid state device engineered specifically to withstand the harshest environmental conditions, providing maximum performance with minimum maintenance.

These are some of the more important features of your battery charger.

- *Fully Automatic Operation* - The charger will respond automatically to battery demand, even under changing load conditions within the charger's rating, and maintain your batteries at full charge without overcharging.
- *Completely Isolated Outputs* - Two separate battery banks (common ground) may be charged simultaneously, with each bank regulated separately and charged according to demand. Isolation diodes prevent one battery bank from "bleeding" into another.
- *Thermal Protection* - An internal switch senses when the charger is overheating due to overload, high ambient temperatures or restricted air flow and will shut the charger off until a safe operating temperature is restored, thus protecting vital components.
- *Isolation Transformer* - The worry of dockline electrolysis through the charger is eliminated. Corrosion of metal parts on the boat due to stray DC currents traveling through your AC line cannot occur, as the transformer utilized in the charger maintains complete isolation between input and output.
- *Metering* - The total DC current output of your charger is easily monitored on a front panel mounted analog meter.
- *Power "ON" Switch and Indicator* - AC input power to the charger is switched on and off by a front panel mounted toggle switch and AC input is verified with a neon indicator light.
- *Fuse Protection* - Vital internal components are protected from occasional excessive current surges (such as may occur during start-up with a low battery) by an easily replaceable front-mounted AC fuse.

- *Reverse Polarity Protection* - An internal DC fuse protects the charger's output wiring from high battery current in the event of reverse polarity connection to the batteries or an internal short.
- *"Universal" Input* - Your ABC charger will accept either 115 VAC or 230 VAC, 50-60 Hz input. Input voltage selection is made with a slide switch at the base of the unit.
- *Heavy Duty Construction* - Components are housed in a heavy duty anodized aluminum case designed to withstand the harsh vibration encountered in mobile and marine applications.

In addition, your ABC battery charger is warranted against any defects in materials or workmanship for one full year from time of purchase. Careful attention to these instructions should guarantee you years of trouble-free service.

II) IMPORTANT SAFETY INSTRUCTIONS SAVE THESE INSTRUCTIONS

1. **SAVE THESE INSTRUCTIONS** - This manual contains important safety and operating instructions for the "ABC" Series Battery Chargers.
2. Before using this battery charger, read all instructions and cautionary markings on (1) the battery charger (2) the battery, and (3) any product powered by the battery.
3. **CAUTION** - To reduce the risk of injury, charge only 6 cell lead-acid rechargeable batteries. Other types of batteries may burst, causing personal injury and damage.
4. Do not expose charger to rain or spray.
5. Use of an attachment not recommended or sold by NEWMAR may result in a risk of fire, electric shock or injury to persons.
6. To reduce the risk of damage to the electric plug and cord, pull by plug rather than cord when disconnecting the charger.
7. Make sure the cord is located so that it will not be stepped on, tripped over, or otherwise subjected to damage or stress.
8. An extension cord should not be used unless absolutely necessary. Use of an improper cord could result in a risk of fire and electric shock. If an extension cord must be used, make sure:
 - A) That pins on the plug of the extension cord are the same number, size and shape as those on the plug of the charger;
 - B) That the extension cord is properly wired and in good electrical condition;
 - C) That the wire is large enough for the AC ampere rating of the ABC series charger. Use the SPECIFICATIONS CHART on page 16 to determine the full load input current of your ABC charger, then use the chart on page 4 to determine the correct gauge wire for any extension cord used.

**RECOMMENDED MINIMUM AWG SIZE FOR
EXTENSION CORDS FOR ABC BATTERY CHARGERS**

AC Input Rating, Amperes		Length of Cord, Feet			
Equal to or greater than	but less than	25	50	100	150
		AWG Size of Cord			
0	2	18	18	18	16
2	3	18	18	16	14
3	4	18	18	16	14
4	5	18	18	14	12

9. Do not operate the charger with a damaged cord or plug; replace them immediately.
10. Do not operate the charger if it has received a sharp blow, been dropped, or otherwise damaged; take it to a qualified serviceman.
11. Do not disassemble the charger; take it to a qualified serviceman when service or repair is necessary. Incorrect reassembly may result in a risk of electric shock and fire.
12. To reduce the risk of electric shock, disconnect the charger from AC source before attempting any maintenance or cleaning.

WARNING -- RISK OF EXPLOSIVE GASES

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 THAT EACH TIME BEFORE USING YOUR CHARGER, YOU READ THIS MANUAL AND FOLLOW THE INSTRUCTIONS EXACTLY.
2. To reduce the risk of battery explosion, follow these instructions and those published by the battery manufacturer and by the manufacturer of any equipment you intend to use in the vicinity of the battery. Review cautionary markings on these products and on the engine.

PERSONAL PRECAUTIONS

1. Someone should be within range of your voice 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 your eyes while working near a battery.
4. If battery acid contacts skin or clothing, wash immediately with soap and water. If battery acid enters the eye, immediately flood the eye with running cold water for at least 10 minutes and get medical attention immediately.
5. NEVER smoke or allow a spark or flame in the vicinity of the battery or engine.
6. 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 and cause an explosion.
7. 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.
8. Use the battery charger for charging a 6 cell lead-acid battery only. It is not intended to supply power to a low voltage electrical system other than in a starter-motor application. Do not use the 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.
9. NEVER charge a frozen battery.

PREPARING TO CHARGE

1. Be sure the area around the battery is well ventilated.
2. Clean battery terminals. Be careful to keep corrosion from coming in contact with eyes.
3. Add distilled water in each cell until battery acid reaches level 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.
4. Study all battery manufacturer's specific precautions such as removing or not removing cell caps while charging and recommended rates of charge.

GROUNDING AND AC POWER CORD CONNECTION

1. The charger should be grounded to reduce the risk of electric shock.
2. The ABC battery charger is provided with an AC power cord with a grounding pin for use with a standard AC outlet. This plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.

DANGER: Never alter the AC cord or plug provided. If it will not fit the outlet, have a proper outlet installed by a qualified electrician. Improper connection can result in a risk of electric shock.

3. If the charger is to be hard-wired it should be connected to a grounded metal permanent wiring system; or an equipment grounding conductor should be run with circuit conductors and connected to the equipment grounding lead on the battery charger. Connections to the battery charger should comply with all local ordinances.

EXTERNAL CONNECTIONS TO THE CHARGER SHALL COMPLY WITH THE UNITED STATES COAST GUARD ELECTRICAL REGULATIONS (33CFR183, SUB-PART I).

II) INSTALLATION

A) Materials: Your NEWMAR ABC Series Battery Charger comes with the following materials: (4) ring lug crimp connectors (4) rubber grommets, (4) eyelet washers, (1) fuse for 230 VAC applications, (1) Customer Satisfaction/Warranty card and (1) Installation/Operation Manual.

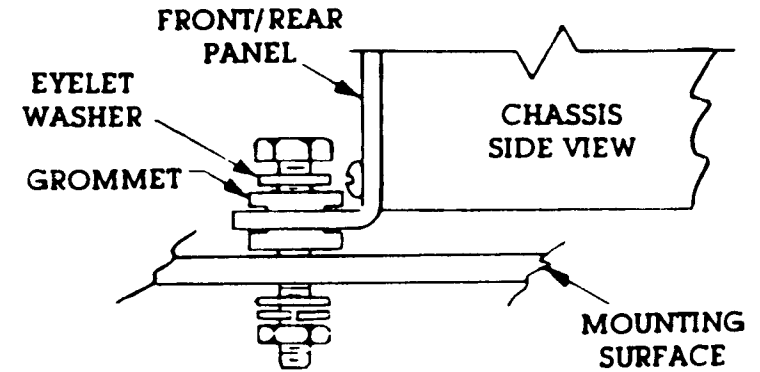
Check to see that these have been included with the packaging. For any missing items, please contact the factory.

(B) Location: The battery charger should be mounted on a bulkhead or other suitable mounting surface as close to the batteries to be charged as possible. The area should be well ventilated and free from excessive moisture, exhaust manifolds and battery fumes. Vertical mounting will facilitate cooler operation but horizontal mounting is acceptable when this is impossible. A minimum of 6" space above and below the unit is recommended for adequate ventilation. A thermal switch within the charger will cycle the unit on and off if the temperature is too great. If this thermal cycling is noted the charger should be relocated.

IMPORTANT: Although the ABC Charger is constructed of materials and in a manner which makes it highly resistive to the corrosive effects of moisture in the environment, it is not waterproof. Do not mount the charger where there is a possibility of water entering the unit. Evidence of water entry into the charger will void the warranty.

C) Mounting: You will require (4) #8 or #10 screws or bolts with washers to mount the charger. Install the rubber grommets into the mounting flanges prior to mounting. (Use WD-40 or a similar lubricant to ease installation of the grommets.) FIGURE 1 illustrates the proper mounting configuration:

FIGURE 1: ABC CHARGER MOUNTING



E) DC Output Wiring:

Remove the yellow output terminal cover. Using the crimp lug connectors provided attach your DC wires to the output terminals of the charger. The correct gauge for DC wires will depend on the model you have and the length of the run from the charger to the batteries. Use the chart below to determine the correct gauge.

DC Wire Size Table:

Model	Distance from Batteries			
	5'	10'	15'	20'
Wire Gauge AWG (MM)				
ABC 12-8	#16, (1.5 mm)	#14, (2.5 mm)	#12, (4 mm)	#12, (4 mm)
ABC 12-15	#14, (2.5 mm)	#12, (4 mm)	#10, (6mm)	#10, (6 mm)
ABC 12-25	#12, (4 mm)	#10, (6 mm)	#8, (10 mm)	#8, (10 mm)

Run your wires as directly as possible to the posts of the batteries. Ensure that you connections are tight and that correct polarity is carefully observed at all times. The battery posts should be free of any rust or corrosion

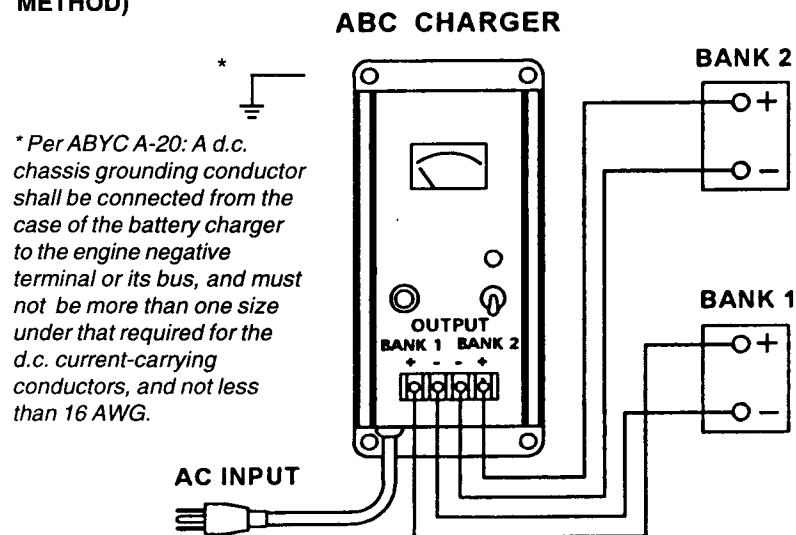
IMPORTANT NOTE: EVEN MOMENTARY REVERSE POLARITY CONNECTION MAY SEVERELY DAMAGE YOUR CHARGER. THE POSITIVE (+) TERMINAL MUST BE WIRED TO THE POSITIVE POST OF THE BATTERY AND THE NEGATIVE OR COMMON (-) TERMINAL TO THE NEGATIVE POST. ALSO, DO NOT CONNECT THE CHARGER'S TWO BANKS TO TWO BATTERIES WHICH ARE WIRED IN SERIES. THIS WILL RESULT IN A DIRECT SHORT ACROSS ONE BATTERY.

When charging only one bank of batteries, it is only necessary to attach your charging leads to common (-) and one of the two positive (+) terminals or leads. You will not get additional charge current by jumpering the second output to the first. The charger is able to deliver its full rated output through a single bank when only one is used.

NOTE: It is not recommended to attempt to increase battery bank capacity by splitting the output of one of the banks with a battery isolator. Over or under charging of the batteries can occur. Also, overload of the charger may occur with the increased load.

Two common methods of connection when two separate battery banks are to be charged are illustrated in FIGURES 2 and 3.

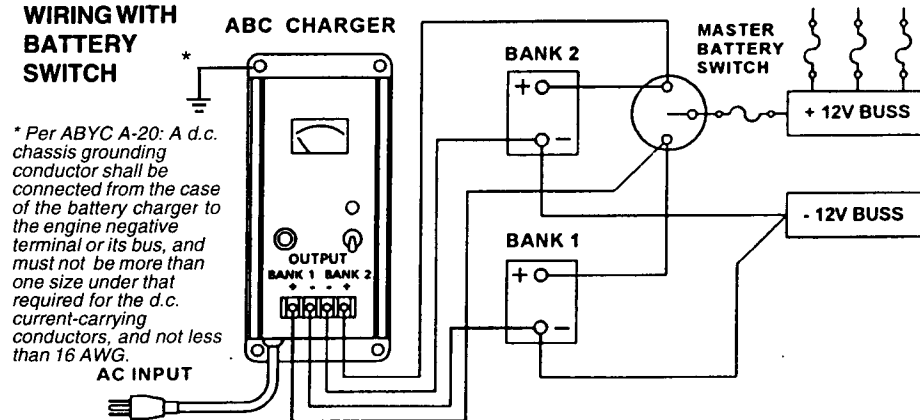
**FIGURE 2:
SIMPLE DC
WIRING
(PREFERRED
METHOD)**



Note: These diagrams do not illustrate complete systems. Refer to ABYC Standards E-8) AC Electrical Systems on Boats, and E-9) DC Electrical Systems on Boats, and A-20) Battery Charging Devices.

IMPORTANT: Install fuses at batteries per ABYC recommendations.

**FIGURE 3:
WIRING WITH
BATTERY
SWITCH**



Re-install the yellow output terminal cover to protect against accidental shorting of the output terminals in the future.

F) Input Voltage Selection: Your ABC charger is shipped from the factory ready to accept 115 VAC input. If the unit is used in a 230 VAC application, you must:

1. Move the input selector switch to the 230 VAC position. This switch is located on the bottom of the charger. You will need to use a ball point pen or similar object to accomplish this. *Ensure that AC input to the charger has been disconnected before moving the selector switch.*
2. Replace the input fuse with one of the proper value for 230 VAC operation. A fuse of the proper value has been provided with the charger. *Always ensure that AC input has been disconnected before replacing the input fuse.* Check the table below to ensure that you are using the proper input fuse:

Caution: If AC input power is derived from 220-240 VAC with two hot leads, an external fuse or circuit breaker must be used to protect the unfused (formerly neutral, now hot) AC input.

Input Fuse Value Table

Model	115 VAC Input	230 VAC Input
ABC 12-8	2 amp	1 amp
ABC 12-15	4 amp	2 amp
ABC 12-25	6 amp	3 amp

G) AC Input Wiring: Your ABC charger has been provided with a standard U.S.A. three-wire cord with molded plug. In typical marine installations, it may be wired to a separate dedicated fuse or circuit breaker on an AC distribution panel. Use the table on page 10 to determine the proper circuit breaker or fuse value.

Panel Breaker Table

	115 VAC Input	230 VAC Input
ABC 12-8	5 amp	5 amp
ABC 12-15	10 amp	5 amp
ABC 12-25	10 amp	5 amp

If the ABC charger is modified for hard-wiring, all AC input wiring should be 3 conductor type (stranded, not solid) minimum gauge 16 AWG. Verify that your wires are disconnected from shore power or any other AC power source before proceeding. Color coding of the AC input wiring is as follows:

Black..... AC Hot (fused)
 White AC Neutral (unfused)
 Green AC Ground (safety, earth)

Note: All charger wiring should be in accordance with Coast Guard and A.B.Y.C. regulations and recommendations. For information governing these, see the REFERENCE APPENDIX at the end of this manual.

IV) OPERATION

Start Up

1) Before powering up your charger, disconnect any DC loads to the batteries. Apply AC power by putting the power switch on the front panel to the "ON" position. Observe the DC ammeter on the front panel. This will give some indication of the state of charge of your batteries. If the meter is reading mid-scale, it is an indication that the batteries are in a relatively low state of charge. The charger, sensing this, is supplying a fairly high amount of current to the batteries. If the meter needle is vibrating at, or near, the bottom of the scale the batteries are at or nearing full charge. (This needle vibration or pulsing is normal and does not indicate a defective charger.) The charger will supply small pulses of current when batteries are in this condition to keep them "topped off" and compensate for the natural self-discharge of battery systems.

2) Apply a load to the charger by switching on some lights, a pump or some other DC appliance. Observe the charger meter. It should read approximately the same as the expected current draw of the appliance. As current is drawn from the battery, the charger will automatically increase its output to resupply it.

Note: If the AC input fuse should blow upon first application of power to the charger, it does not necessarily indicate a failure of the unit. There are several possible causes which may be checked. If this occurs, disconnect AC power to the charger and consult the TROUBLESHOOTING section of this manual.

If the input fuse does need replacing, be sure to replace it with the same type and value for continued protection. (See Input Fuse Value Table on page 9.)

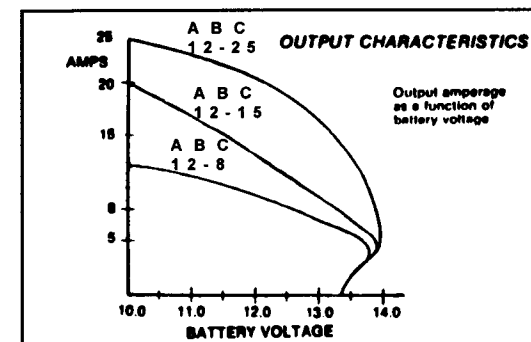
Normal Operation

When there is no load on your batteries the charger will, as part of the charge cycle, bring them up to a finishing voltage of approximately 13.4 volts and "float" them there. The amount of time this takes will depend on the relative state of discharge of the batteries as well as battery bank capacity. If the charger is properly matched to your battery system and you are certain there is no DC load upon it, recharge time, even for deeply discharged batteries will rarely exceed 72 hours. If after this length of time the charger's output has failed to fall below 3 amps, disconnect the charger and consult the TROUBLESHOOTING section of this manual.

Note: Batteries which have been allowed to remain in a deeply discharged condition for a long period of time may be unable to accept and hold a charge.

The graph in FIGURE 4 illustrates how the output of the charger is directly related to rising battery voltage as charging takes place

FIGURE 4: OUTPUT CHARACTERISTICS



In general, it is recommended that the charger be left on continuously. This will maintain batteries at peak voltage and will automatically compensate for any load changes. Repeatedly allowing batteries to become completely discharged before recharging them is not recommended and can put unnecessary wear and tear on the charger. Leaving the charger on continuously will prevent this. While the charger has been engineered to minimize battery gassing and water loss, monthly checks of the water level are strongly recommended. If your batteries are not "Maintenance Free" type, maintaining the correct water level is essential to assure maximum output and long life.

In order to maximize the life of your charger, some attention should be given to operating it within the current range it was designed to handle. The following are output current specifications for each model:

ABC 12-8 8 amps intermittent, 4 amps continuous

ABC 12-15 15 amps intermittent, 7.5 amps continuous

ABC 12-25 25 amps intermittent, 12.5 amps continuous

Note that the output current is rated for both intermittent and continuous duty. The continuous duty rating is the amount of current that the charger can deliver non-stop (in normal ambient temperatures) without overheating. The intermittent rating is the amount of current the charger will deliver for short periods of time (about 20 minutes maximum) before overheating. If the charger is properly matched to the battery system, this normally is adequate time to bring the battery voltage to a point where the current draw on the charger is within the unit's continuous duty rating.

Care should be taken to insure that the loads on your battery system do not exceed the charger's ability to handle them. The charger has thermal protection built in which will cause it to shut itself down when overheated and automatically return to service when it has cooled sufficiently. However, this cycling on and off puts a great deal of stress on the components and will severely shorten the life of the charger. If this thermal cycling is noted, at least some of the DC load should be reduced or the charger should be relocated to where there is a freer flow of cooling air.

OPERATION WITH ENGINE:

In general, it is permissible to allow the charger to remain connected to AC power while the engine is started and while it is running. As the alternator or generator starts to charge the battery, the charger output will decrease. When the battery voltage exceeds 13.4 VDC the charger will shut off and stay off as long as the batteries are in this high state of charge. If the battery voltage should drop below 13.4 VDC the charger will automatically return to service.

When starting engines, the charger will provide a starting "boost", however, if the batteries have a weak charge, it is best to allow them ample time to attain a full charge before attempting to start the engine.

V) TROUBLESHOOTING

<u>PROBLEM</u>	<u>POSSIBLE CAUSE</u>	<u>SOLUTION</u>
A. Input fuse blows during engine cranking.	Batteries too weak in charge for charger to remain on while cranking	Turn charger off during engine cranking or allow time for charger to charge batteries before attempting engine start.
B. Batteries not coming up in charge.	Extremely discharged batteries causing charger to thermally cycle on and off.	Shut off all 12 volt loads on battery system - allow time for charger to recharge batteries. Leave charger on all the time to prevent recurrence.
C. Input fuse blows when charger is turned on or when connected to batteries.	Extremely discharged batteries causing severe overload of charger.	Disconnect all batteries except one - allow charger to charge this battery. Once charged, connect 2nd battery - repeat procedure if more than two batteries in system. Leave charger on all the time to prevent recurrence.

<u>PROBLEM</u>	<u>POSSIBLE CAUSE</u>	<u>SOLUTION</u>
D. Charger repeatedly blows input fuse with no batteries connected.	1. Charger set for 115 VAC operation in 230 VAC application.	1. Move input selector switch at base of unit to 230 VAC position. Make sure correct input fuse value is installed for 230 VAC operation.
	2. Internal short	2. Return for service to servicing marine dealer where charger was purchased or contact Newmar for Return Authorization Number
E. Charger does not taper back in charge - continues to charge at 3 amps or greater.	1. Load still connected to battery.	1. Turn off main battery switch to DC electrical panel or turn <u>all</u> 12 volt loads off.
	2. Bad cell in one of batteries charger is connected to.	2. Check for shorted cell in all batteries using a hydrometer. Replace battery if cell is shorted.
	3. Defective charger.	3. Return for service to servicing Marine dealer where charger was purchased or contact Newmar for Return Authorization Number.
F. Charger does not charge.	1. Charger set for 230 VAC operation in 115 VAC application.	1. Set input selector switch at base of unit to 115 VAC. Make sure correct input fuse value is installed for 115 VAC operation.
	2. Blown input fuse.	2. Replace fuse with correct fuse value. (See Troubleshooting Sections A, C & D if fuse problem persists).
	3. Charger is not receiving AC input.	3. Using a voltmeter confirm charger is receiving AC input, check input connections.
	4. Charger's output is not connected to batteries.	4. Refer to installation diagram for proper connection to batteries. Check connections at charger and at batteries.
G. Low output voltage measured across charger output.	Batteries not connected to charger. It is <u>normal</u> to read 12 volts or less across either output bank when no batteries are connected.	Check charging leads from charger to batteries.

PROBLEM	POSSIBLE CAUSE	SOLUTION
H. Reverse polarity connection to battery - no charging.	Reverse polarity to battery has caused DC fuse to blow.	Return for service to servicing marine dealer where charger was purchased or contact NEWMAR for Return Authorization Number.

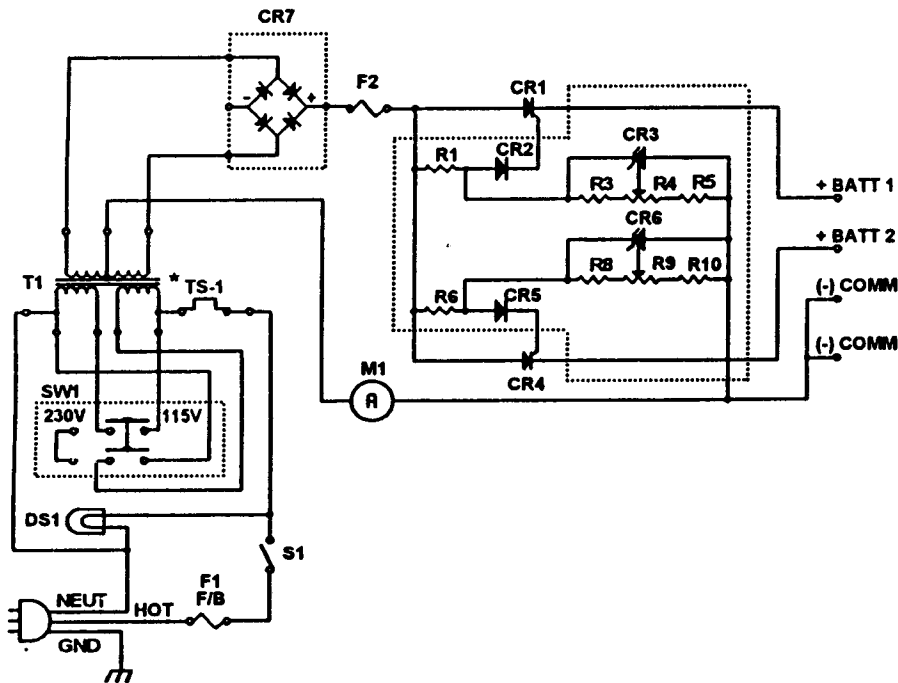
VI) FIELD SERVICE INFORMATION

Important Note:

Information provided in this section is intended solely as an aid to qualified field service technicians. Any repair or adjustment by someone other than a qualified electronic technician which results in damage to the charger or auxiliary equipment shall void all warranties and release Newmar from any liability.

Spare components for the charger can be ordered from the factory when they have been determined by the field technician to be defective and in need of replacement. Using the schematic diagram provided in FIGURE 5, the location of the component in the circuitry may be determined and the schematic reference used when ordering.

FIGURE 5: SCHEMATIC DIAGRAM



*Note: Thermal switch mounted inside transformer. If defective, transformer must be replaced.

The manufacturer's part numbers or description and the schematic references for their location in the circuit are listed in the PARTS TABLE.

PARTS TABLE (All Models)

Schematic Ref.	MODEL NUMBER		
	ABC 12-8	ABC 12-15	ABC 12-25
F1 115VAC 230 VAC	2 Amp Fast 1 Amp Blow	4 Amp Fast 2 Amp Blow	6 Amp Fast 3 Amp Blow
T1	13398	12626	13397
F2	20 Amp Fast Blow	HBO-70	HBO-70
CR1, CR4	IS-120	SIPS235 or C228A	SIPS235 or C228A
CR2, CR5	IN4004	IN4004	IN4004
CR3, CR6	TL-431	TL-431	TL-431
CR7	DB3502	DB3502	DB3502
R1, R6	82 Ω	82 Ω	82 Ω
R3, R8	10K Ω	10K Ω	10K Ω
R4, R9	Pot., Vert, 1K Ω	Pot., Vert, 1K Ω	Pot., Vert, 1K Ω
R5, R10	2K Ω	2K Ω	2K Ω
M1	0-15A, EMICO	0-15A, EMICO	0-30A, EMICO
SW1	640-2021-0	640-2021-0	640-2021-0
S1	640-0002-0	640-0002-0	640-0001-1
DS1	250 VOLT, RED 577-4001-1	250 VOLT, RED 577-4001-1	250 VOLT, RED 577-4001-1

All Resistors Carbon, 1/2 watt, 5%

The chart below may be used as a handy reference for all ABC series chargers regarding performance specifications and physical characteristics:

SPECIFICATIONS

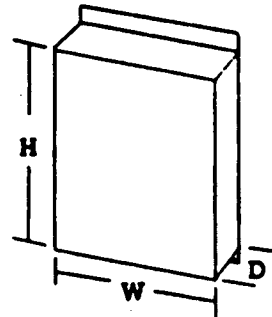
MODEL	INPUT AMPS @ Full Load 115/230 VAC	OUTPUT			CASE SIZE	WEIGHT	
		Volts	Banks	Amps.		LBS.	KG.
ABC 12-8	1.5/1.75	12	2	8	B-1	9	4.1
ABC 12-15	3/1.5	12	2	15	B-2	12	5.5
ABC 12-25	5/1.5	12	2	25	B-3	14	6.4

INPUT RATINGS (All Models)

REF.	VOLTAGE	FREQUENCY
115 VAC Oper:	105-125VAC	50-60 HZ
230 VAC Oper:	210-250VAC	50-60 HZ

CHARGER CHARACTERISTICS

DUTY CYCLE RATINGS	OPERATING TEMP RATING	FLOAT VOLTAGE
Rated charging output 20 minutes derate to 50% for continuous output	0-40° C	13.4VDC



CASE SIZE Dimensions Inches

	H	W	D
B-1	8.0	6.0	4.2
B-2	8.1	4.7	6.2
B-3	10.2	4.7	6.2

(Centimeters)

	H	W	D
B-1	20.3	15.2	10.6
B-2	20.6	11.9	15.8
B-3	25.9	11.9	15.8

VII) BATTERY CARE TIPS

Regular maintenance and proper care will assure you of reliable service from the most depended upon and sometimes most neglected items, your batteries and battery charger. NEWMAR battery chargers are designed to keep your batteries fully charged but your batteries also need proper regular maintenance to provide a maximum life of service.

ALWAYS READ AND FOLLOW THE BATTERY MANUFACTURER'S INSTRUCTIONS.

Battery Installation

Batteries must be securely mounted to prevent them from falling over when the vehicle or boat is in motion. A loose battery can do serious damage. Batteries should be mounted in a battery box to contain any acid spill. Batteries give off a certain amount of hydrogen gas when they are charging. When concentrated, this gas is highly explosive. Therefore make sure they are in an accessible place with adequate ventilation for any hydrogen gas discharge.

Cleaning Batteries

Dirt and electrolyte salts can build up on the top of your batteries. This accumulation conducts electricity stored in the battery and can cause the battery to discharge by itself. Therefore, at least twice a year, it is a good idea to disconnect the battery cables and scrub the battery with a baking soda solution. Rinse with fresh water and dry with a clean cloth.

You may wish to purchase a set of terminal post corrosion prevention rings. These are alkali-saturated felt rings that slip over the battery post to reduce corrosion. Do not apply grease to any part of the battery terminals, but you may use an occasional light spray of silicone lubricant.

Routine Checks and Maintenance

Batteries should periodically be "exercised" (slowly discharged and then recharged) to keep them in top condition. New batteries may need to be exercised before they will be capable of their full rating.

If your batteries are not the sealed type, water should be added to them whenever needed. The electrolyte should cover the plates by about 1/2", allowing a small air space at the top. Do not fill the cells up to the filler cap as this could cause the battery to sputter out electrolyte when it is being charged. Only distilled water should be used - never plain tap water. Tap water contains chemicals and elements that can alter the properties of the electrolyte, including specific gravity. Some chemicals may also create an insulating coating on the battery plates which will retard current flow.

The rate that water is lost by the battery is dependent on several factors; battery condition, ambient temperature, battery use, charge voltage, etc. It is normal for batteries which are not maintenance-free to require topping off about once a month.

A battery's state of charge may be monitored by checking the specific gravity or by open circuit voltage. You may use the following table to evaluate the condition of your batteries:

Battery Condition Table

Specific Gravity Measured by Hydrometer @ 80°F	Open Circuit Voltage*			State of Discharge
	12V System	24 V System	32V System	
1.265	12.6 or more	25.2 or more	33.6 or more	Fully Charged
1.225	12.4	24.8	33.1	25% Discharged
1.190	12.2	24.4	32.5	50% Discharged
1.155	12.0	24.0	32	75% Discharged
1.120	11.7 or less	23.4 or less	31.2 or less	100% Discharged

*Note: Wait at least 5 minutes after charging or discharging before checking specific gravity or open circuit voltage. The battery's voltage needs to stabilize in order to get an accurate reading.

Troubleshooting Your Battery System

If your battery will not accept or hold a charge, one of the following conditions may exist:

1. **A BAD BATTERY.** You may have a battery with an open or shorted cell, a battery without any "life" left. Check by charging the battery until all cells have a specific gravity of 1.225 or greater at 80° F. If you are unable to obtain 1.225 in each cell, replace the battery.

2. **A BAD BATTERY CHARGER.** If the battery open circuit voltage is low and/or the hydrometer indicates your batteries are low, the battery charger should be providing current to the batteries. If it is not, check the input fuse and check to see that you have charging voltage on the output with no battery attached. *Note: You will not get an accurate voltage reading on the output of the charger with no batteries attached. This is checked merely to ensure that you do not have an open circuit on the output.*

The battery charger has a thermal cutout switch to turn the charger off if it is overheating. If you suspect this is the case, the charger may need to be relocated to an area with better ventilation.

3. **ELECTRICAL LEAKAGE.** You may have a previously unsuspected source of current drain from the battery. To check for a leakage of this sort, disconnect the battery ground cable and connect an ammeter between the negative battery post and ground. If you have a reading over .1 amp, there is a source of current drain from the batteries which must be located and removed.

VIII) REFERENCE APPENDIX

* For more information about boat wiring to conform to U.S. Coast Guard regulations, write to:

Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

REQUEST: 33 CFR 183 Subpart I

* For information about American Boat and Yacht Council recommendations for boat wiring, write to:

American Boat & Yacht Council
3069 Soloman's Island Road
Edgewater, MD 21037

REQUEST: Standards & Recommended Practices for Small Craft
AC Systems - Section E8
DC Systems - Section E9

* For additional installation instructions, refer to:
ANSI NFPA 302