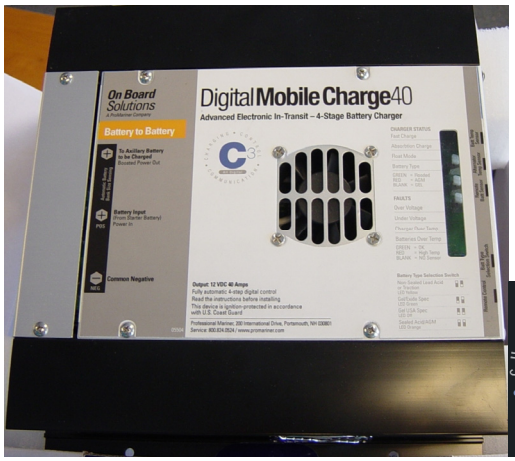
On Board Solutions
A ProMariner Company

Digital **Mobile Charge**

Advanced Electronic In-Transit 4-Stage Battery to Battery Charger



Owner's Manual and Installation Guide

Model	Part Number	Description
Digital Mobile Charge 24V to 24V Battery to Battery	05502	Advanced In-Transit 4-Stage Charger **(Input 20 Amp, Output 20 Amp)**
Digital Mobile Charge 24V to 12V Battery to Battery	05503	Advanced In-Transit 4-Stage Charger **(Input 20 Amp, Output 40 Amp)**
Digital Mobile Charge 12V to 12V Battery to Battery	05504	Advanced In-Transit 4-Stage Charger **(Input 40 Amp, Output 40 Amp)**
Digital Mobile Charge 12V to 24V Battery to Battery	05505	Advanced In-Transit 4-Stage Charger **(Input 40 Amp, Output 20 Amp)**

Your Satisfaction is Important to us. Do Not Return this Product to the Retailer or Dealer for any Service or Warranty Requirements. Please Call our Customer Care Department line at 1-800-824-0524 from 8 am to 5 pm (Eastern Time) for Warranty, Service or Installation Assistance you may need. Thank you.

IMPORTANT SAFETY NOTICE - SAVE THESE INSTRUCTIONS

Please save and read all safety, operating and installation instructions before Installing or applying power to your Digital Mobile Charge.

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Digital Mobile Charge Overview:

The best way to charge a battery is using a 4 step battery charging curve, which cannot be achieved from a standard alternator. Additionally a standard alternator cannot output a large enough charge to power an auxiliary battery bank.

First and foremost, On Board Solutions' Digital Mobile Charge ensures at all times that the power required to run the primary system of the vehicle or boat engine is not affected. The engine start battery is constantly monitored and receives top charging priority. The surplus power created by fooling the alternator is amplified into a higher voltage by the Digital Mobile Charge and is used to charge a secondary battery bank using a totally isolated digitally controlled 4 step charging curve. The engine start battery cannot discharge through this system, even in the event of a unit failure.

In summary, the Digital Mobile Charge provides your extra battery system a charge that is approximately 5 times faster than could be achieved in using the vehicles alternator. This provides in-transit charging of extra battery banks and increases the life of the batteries by de-sulphating them. The Digital Mobile Charge provides the same utility as an advanced regulator, a zero loss battery isolator, and a 4 step battery charger.

Advantages of the Digital Mobile Charge:

1) Installation: Low Cost and Simple installation. Simply connect the unit to your start battery and to your additional domestic battery bank.

2) No direct connections to the standard engine alternator, or to the outboard.
The Digital Mobile Charge replaces the need for a battery isolator and an advanced regulator, all while providing in-transit charging.

3) The Digital Mobile Charge always ensures the engine start battery is maintained and top charging priority.

4) Multiple Digital Mobile Charge units can be used. For example, if you have a 60 amp alternator, and 3 battery banks (engine start, domestic bank, and bow thruster) then 2 units can be used to run the domestic bank and the bow thruster bank. Internal programs will adjust their charger patterns to accept the second unit, all while ensuring only excess power is used and the primary start battery is not placed in jeopardy.

5) Ensures there is no voltage rise on the engine management system, eliminating the risk of alarms or damage to the system.

6) The Digital Mobile Charge isolates both the engine start battery and domestic battery bank, preventing any feedback through the unit.

Details of Operation:

Digital Mobile Charge begins operation by monitoring the engine start battery. The unit will not start until the battery voltage exceeds approximately 13 volts for 12V models (26V for 24V models), then waits for 2.5 minutes to ensure that some charge is placed quickly into the engine start battery. After that, the Digital Mobile Charge pulls the engine battery down to no less than 13 volts for 12V models (26V for 24V models), which enables the engine battery to still receive a small charge and ensures the alternator works at its full potential.

Additionally, to further ensure the engine battery is O.K., every 20 minutes the Digital Mobile Charge stops for 3 minutes, allowing the engine start battery to be charged exclusively by the alternator. After the 3 minutes, the Digital Mobile Charge resumes battery bank charging by pulling down the engine start battery to 13 volts for 12V models (26V for 24V models) and so continues the charging cycle. After a period of time, calculated by the software, when the battery bank batteries are full, the system will float the batteries at 13.5 volts for 12V models (27V for 24V models) all while ensuring the viability of the engine battery comes first.

Other features included in this system are an alternator temp sensor, a remote battery temp sensor and a fully automatic sleep sensor, which switches the unit off when the engine has stopped.

General Safety Instructions:

- **Before connecting your batteries, read all instructions and cautionary markings on the battery charger and batteries.**
- **CAUTION -** To reduce the risk of injury; charge only lead acid type rechargeable batteries (lead acid, gel cell and AGM). Other types of batteries may burst, causing personal injury.
- Use of attachments not recommended or sold by On Board Solutions or Professional Mariner, LLC may result in a risk of fire, electrical shock or personal injury.
- Do not operate the charger if it has received a sharp blow, direct hit of force, dropped or otherwise damaged in any way.
- Do not disassemble the charger. Call the factory directly when service or repair is required.
- Incorrect assembly may result in risk of electrical shock or fire.

WARNING: RISK OF EXPLOSIVE GASESWORKING IN THE VICINITY OF A LEAD ACID BATTERY IS DANGEROUS. BATTERIES GENERATE EXPLOSIVE GASES DURING NORMAL BATTERY OPERATION. FOR THIS REASON IT IS OF EXTREME IMPORTANCE THAT EACH TIME BEFORE USING YOUR CHARGER YOU FOLLOW THE SAFETY INSTRUCTIONS FOUND IN THIS MANUAL.

To reduce risk of battery explosion, follow these instructions and those published by the Battery manufacturer, and of any equipment you intend to use in the vicinity of a battery. Review all cautionary markings and labels.

Personal Safety Precautions

1. Someone should be within the range of your voice or close enough to come to your aid when installing this product or working near lead acid batteries.

2. Wear complete eye protection and protective clothing. Avoid touching eyes while working on or with batteries. Have plenty of soap and water nearby in case of battery acid comes in contact with skin, clothing or eyes.

3. If battery acid comes in contact with skin or clothing, wash immediately with soap and water. If acid enters the eye (s) flood eye (s) with running water for at least 10 minutes and get medical attention immediately.

4. Never smoke or allow a spark or a flame in the vicinity of a battery or engine.

5. Be extra cautious to reduce the risk of dropping a metal tool onto a battery. It may spark or short-circuit the battery or other electrical parts that may cause an explosion.

6. Remove all personal metal items such as rings, bracelets, necklaces, watches and jewelry when working near a battery. A battery can produce a short circuit high enough to weld a ring or any metal, causing serious burns.

Installation Warnings-

Set the unit as you would any other high power battery charger; fit it near the batteries in a cool, dry and **well-ventilated** space to ensure the unit has the ability to dissipate the heat it will generate. **Do not place directly above or below the batteries.**

WARNING: Electrical Shock and Fire Hazards-
On Board Solutions and ProMariner recommend all wiring is done by qualified personnel. Disconnect all power sources to prevent accidental shock. It is the installer's responsibility to ensure compliance with all the applicable installation codes and regulations.

WARNING: Fire Hazard-
Do not cover or obstruct the ventilation openings. Do not install this equipment in a compartment with limited airflow; Overheating may result.

WARNING: Low Voltage - Electrical burn and spark hazard. Disconnect battery power before servicing.

WARNING: Be sure the area around the charger and batteries is well ventilated while the batteries are being charged.

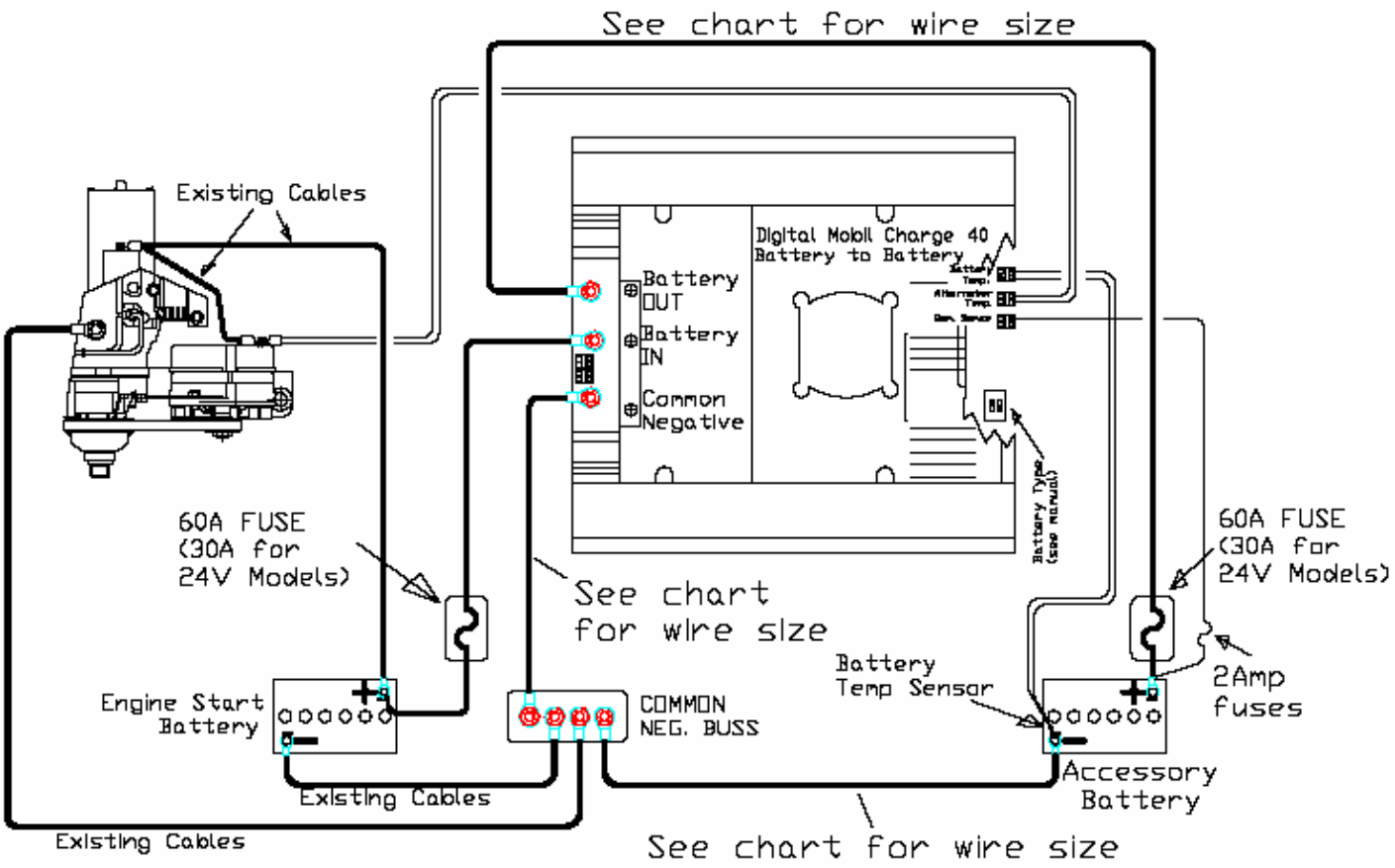
WARNING: Add distilled water in each cell until electrolyte reaches levels specified by the battery manufacturer. This helps purge excessive gases from cells. Do not overfill. Always carefully follow manufacturer's recharging instructions.

WARNING: Study all manufacturer's specific precautions, such as removing or not removing cell caps while charging, in addition to rates of charge.

WARNING: Clean battery terminals with full eye protection to prevent corrosion from coming in contact with eyes.

WARNING: If necessary to remove a battery from this charger, always remove grounded terminal from battery first. Make sure all accessories are off, as to not cause an arc.

Installation of the Digital Mobile Charge:



Wiring: Connect all wiring with fuses removed from wiring fuse holders to protect against accidental shorting and the units Sleep and an Auto Start feature. If the input voltage (engine start battery) is above 13 volts for 12V models (26V for 24V models), then the unit will auto start. Ensure all wiring is correct before re-inserting wiring fuses.

Total Length from first battery to second battery including all negative and positive cables:

Cable Sizes			
12 Volt Models (Input & Output Specific)		**24 Volt Models (Input & Output Specific)**	
10ft	8 AWG Gauge	10ft	12 AWG Gauge
20ft	6 AWG Gauge	20ft	8 AWG Gauge
30ft	4 AWG Gauge	30ft	6 AWG Gauge
40ft	2 AWG Gauge	40ft	6 AWG Gauge
50ft	2 AWG Gauge	50ft	4 AWG Gauge
60ft	1 AWG Gauge	60ft	4 AWG Gauge
12V Model Fuse: 60 amp		**24V Model Fuse: 30 amp**	

NOTE: Cable sizes are voltage specific. For example: for a 12v to 12v model, use the 12v table for input and output cable sizing. For a 12v to 24v model, use the 12v table for input cable sizing and use the 24v table to size your output cable.

Battery Temp Sensor: Simply connect the ring end of one of the enclosed temperature sensor to a battery terminal post (negative or positive) Be sure not to crush the temp sensor which is enclosed inside the yellow ring terminal, as this will destroy the processor chip. Connect the wire end of the temp sensor to the connector marked Battery Temp on the Digital Mobile Charge. Simply push the small lever down and insert one wire into each side. There is no polarity on these wires. The output voltage will be reduced in the event the battery temperature increases due to battery failure. If the battery exceeds 50 degrees Celsius, the Digital Mobile Charge will switch off, as a major battery failure has most likely occurred.

Alternator high temp disengage: This is another supplied temperature sensor which should be connected to your alternator output post (b+) and will disengage the Digital Mobile Charge in the event the alternator reaches 100 deg Celsius. A warning LED will illuminate when the alternator reaches the threshold temperature. When the alternator cools down to 80 degrees Celsius, the system automatically reengages and continues charging.

Battery Charging Voltage Monitoring: As a standard feature, this unit senses all the control voltages at the unit. However, if you want to sense the voltage at the domestic battery bank directly to overcome the voltage drop in the cable run, then simply connect a cable from the domestic sense connection directly to the domestic battery.

Positioning Battery Type Selector Switch:

Program the battery type into the unit. Do so by positioning the battery type dip switches on the unit to the appropriate battery type.

There are 4 possible battery type selections:

1) Non-Sealed Lead Acid Battery (Orange LED)
2) Exide Gel Battery (Green LED)
3) Gel Battery (All others except Exide) (No LED)
4) AGM Battery (Red LED)

Understanding Battery Types

There are three primary types of batteries in the marketplace today; Flooded (Lead Acid), AGM (Absorbed Glass Mat) and GEL cell (Gelled Electrolyte Lead-Acid). Traditionally, the most common type of batteries used are Flooded (Lead Acid batteries).

Almost all GEL cell batteries will state that they are GEL cell on the battery case or labels. **(Shown below)** are typical battery voltages at absorption and float levels.

Battery Type	12V Charging Profile	24V Charging Profile	Battery Information
Flooded (Lead Acid)	14.6 Absorption, 13.3 Float	29.2 Absorption, 26.6 Float	Water filled (with or without Removable caps)
AGM (Absorbed Glass Mat)	14.4 Absorption, 13.3 Float	28.8 Absorption, 26.6 Float	Sealed
GEL cell	14.1 Absorption, 13.8 Float	28.2 Absorption, 27.6 Float	Sealed

NOTE: AGM (Absorbed Glass Mat) batteries are not GEL (Gelled Electrolyte Lead-Acid) batteries. AGM batteries are charged at the same charging profile as Flooded (Lead Acid).

***If you are still unsure as to what kind of battery you have, we recommend that you contact the manufacturer of the battery.

Start-up and Test Procedure:

When the Digital Mobile Charge first starts up, the top battery type LED will illuminate yellow, red, green, or yellow flashing depending on the battery type selected, and the Fast Charge LED (3 down) will begin flashing slowly. This green LED slow flashes to shows that the unit is working but is inactive for the first 2.5 min. with the intention of allowing the engine start battery to recover a little.

After about 2.5 min. the Fast Charge green LED will stop flashing and change to a continuous green light and the unit will begin charging, or the unit will shut down to rest mode if the battery voltage is to low. It can do so because the Digital Mobile Charge is constantly sensing the voltage from the input battery. If the voltage is above 11 volts for 12v models (22 volts for 24v models) then the system will come on for about 5 min., it will sense that the input battery voltage is to low to continue and the unit will go into sleep mode.

If your vehicle has a normal / healthy engine start battery, The Digital Mobile Charge will begin Fast Charging after the initial 2.5 minutes, and that current to the engine start battery will be provided in addition to the amplified current being provided to the domestic battery bank by the Digital Mobile Charge. This high current output to the domestic battery bank will continue in cycles of 20 minutes on and 3 minutes off to ensure the engine start battery is always O.K.

Once the domestic battery bank reaches its charging voltage (depending on the battery type setting but between 13.5-14v for 12v models or 27v-28v for 24v models), the Absorption LED will illuminate and the high rate of charging will continue for a period of time calculated by the Digital Mobile Charge. This time period is determined by what battery type you have selected and the state of discharge of the domestic battery bank (1-6hrs). The rest period continues to be 3 minutes off for every 20 minutes off. After the calculated amount of time is over, the unit drops to float with no switch off period. A Float LED indication tells the operator the domestic battery bank is charged and is being held at a maintenance voltage.

The Digital Mobile Charge will attempt to hold the battery voltage at the above described Float range. If current is demanded, the Digital Mobile Charge will try to meet that demand and keep the domestic battery bank at float. However, if the domestic battery bank falls below approximately 12.8v for 12v models (25.6v for 24v models) for more than 15 minutes, the system will reset into the Fast Charging mode again. Additionally, if the input voltage falls below 12.8v for 12v models (25.6v for 24v models) the unit will assume that the input is switched off and will switch the system into rest mode to conserve energy. Only if the input voltage rises again, by running the engine again for example, will the system restart.

If on start up nothing happens, be sure to test the battery voltage. It should be above 11 volts for 12v models (22 volts for 24v models), to see the unit working, start up the engine and ensure you are getting at least 13.5vdc for 12v models (27v for 24vdc models) at the battery.

Description of LED's found on Unit:

1) BATTERY TYPE- Tri Colored LED: This simply displays the battery type that the user has set the Battery Type Switch to**:**

1) Non-Sealed Lead Acid Battery (Orange LED)
2) Exide Gel Battery (Green LED)
3) Gel Battery (All others except Exide) (No LED)
4) AGM Battery (Red LED)

2) ALTERNATOR TEMP- Yellow: This monitors the temperature of the alternator and disengages the unit in the event of the alternator reaching 100 deg C, which waits for the alternator to cool down then automatically re-engages.

3) **FAST CHARGE**: Green: This should be on from start up (slow flash shows unit is on but on rest mode for the first 2.5 minutes upon start-up and approx. every 20 min after) and shows that the alternator should be working at it's maximum. This LED should remain on until the Float Mode LED comes on and signals the high charge rate is complete.

4) **ABSORPTION CHARGE**: Yellow: Timer Activated: This LED comes on when the voltage reaches about 13.9 - 14 volts (27.8v – 28v for 24v models). The software will calculate the timing for the Absorption Charge and depending on how long it took to turn on, will dictate how long the timing cycle will remain on. This will vary from 1 - 6 hours. This light will remain on until the Absorption Charge is over.

5) **FLOAT MODE**: Green Float Mode LED: This indicates that Absorption charge cycles are now over and should remain on after all the high charge lights are out. The system is now running at a maintenance charge rate of approximately 14 volts for 12v models or (28v for 24v models) at the battery.

6) **HIGH INPUT VOLTAGE**: This LED will warn you of high input voltage and switch off the Digital Mobile Charger charging output. Specifically, this LED means that your alternators own regulator may have failed and the alternator can now run unregulated, possibly damaging your batteries.

7) **LOW INPUT VOLTAGE**: Yellow: Low Voltage Warning: This is simply saying that there is low voltage at the main battery bank and has no active function. For information only, this usually indicates a defective alternator, or perhaps a defective main battery.

8) **HIGH OUTPUT VOLTAGE**: This LED will warn you and switch off the charging. This LED indicates that either the Digital Mobile Charge may have failed and was in the process of overcharging your battery bank, or you have some other charging source on your output battery bank which is overcharging the batteries and the Digital Mobile Charge thinks it is our unit.

9) **LOW OUTPUT VOLTAGE**: Yellow: Low Voltage Warning: This is simply saying that there is low voltage at the output battery bank and that the unit is unable to keep up with your demand on the battery bank, or the unit has failed and is not working.

10) **HIGH BATTERY TEMP**: Red: This LED shows that the battery temperature sensor has picked up a temperature in excess of 50 deg C at its source (where ever you have fitted it) this will trip the unit until it has been reset.

11) **CHARGER OVER TEMP**: Yellow: This device monitors both heat sinks and in the event of that exceeding 75 deg C the unit will switch off until the temperature has been reduced. It is important not to install the Digital Mobile Charge inside a **small hot engine room**.

12) **UNIT FAILURE**: Red: This LED will give an indication in the event of a total unit failure.

Specifications:

Pre set voltages

Minimum input voltage the unit will run at: 13 volts for 12v models (26v for 24v models)
Voltage the unit switches off and drops into sleep mode: below 12.8 v for at least 15 minutes (25.6v for 24v models)

Power consumption on sleep mode: 5 ma
Max input voltage trip: 15.5V (31V for 24V models)
Max output voltage trip: 15.5V (31V for 24V models)

All voltages refer to a default temperature of 20 deg C. If the battery temperature sensor is used, these voltages will vary with the battery temperature, as the Digital Mobile Charge takes this into account.

Alternator temp disengage:	100 deg C
Reset Alternator:	80 deg C
Battery temp trip:	50 deg C
Heat sink trip:	70 deg C
Heat sink reset:	60 deg C
Low battery alarm:	12.5V (25v for 24v models)
Low battery regulation:	13V (26v for 24v models)
High battery voltage trip:	15.5V (31v for 24v models)
Max input current at:	12V = 45 amps

Amp meter +/- 10%
Voltmeter +/- 1%

Customer Service & Warranty:

We are committed to customer satisfaction and value your business. If at any time during the warranty period you experience a problem with your new Digital Mobile Charge, simply call us at 1-800-824-0524 during standard business hours (8:30 AM – 5 PM Eastern Time) for Technical Support.

DIGITAL MOBILE CHARGE
TWO YEAR LIMITED FACTORY WARRANTY

Each product is guaranteed against defects in material and workmanship to the original consumer in normal use for two full years from the date of purchase. On Board Solutions and Professional Mariner, LLC at its discretion, will repair or replace free of charge any defects in material or workmanship. The following conditions apply:

- Warranty is calculated from date of manufacture if not registered within two weeks of sale.
- Warranty void if damage occurs due to negligent repairs.
- Customer is responsible for returning the product to On Board Solutions and Professional Mariner, LLC. Inbound shipping costs must be prepaid.
- This warranty does not cover blemishes due to normal wear and tear or damages caused by accidents, abuse alterations or misuse.

Purchase or other acceptance of the product shall be on the condition and agreement that On Board Solutions and Professional Mariner SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND. (Some states do not allow the exclusion or limitation of consequential damages, so the above limitations may not apply to you.) This warranty is made in lieu of all other obligations or liabilities on the part of Onboard Solutions and Professional Mariner. Additionally, On Board Solutions and Professional Mariner neither assumes nor authorizes any person for any obligation or liability in connection with the sale of this product.

To make a claim under warranty, call Factory Service at 1-800-824-0524. Follow the company's return policy, which will be provided by the company. On Board Solutions and Professional Mariner will make its best effort to repair or replace the product, if found to be defective within the terms of the warranty, within 30 days after return of the product to the company. On Board Solutions and Professional Mariner will ship the repaired or replaced product back to the purchaser.

Please contact Customer Service for additional assistance. This warranty provides to you specific legal rights and you may also have other rights, which vary from state to state. This warranty is in lieu of all other, expressed or implied.

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Please Register your product with the enclosed warranty card, or online at www.promariner.com