

Ciera Express 2452CD

Owner / Operator Manual

Hull Identification Number _____

Engine Serial Number _____



BAYLINER®



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CHAPTER 1: WELCOME ABOARD

This manual has been prepared to help you operate your boat with safety and pleasure. It contains details of the boat, the equipment supplied or fitted, its systems, and information on its operation and maintenance. Please read this manual carefully, familiarization with its contents can contribute to the safe and effective operation of your boat. Pay particular attention to **Chapter 2, SAFETY**, and **Appendix C, LIMITED WARRANTY**.

Hazard Warning Symbols

The hazard warning symbols shown below are used throughout this manual to call attention to potentially dangerous situations which could lead to either personal injury or product damage. We urge you to read these warnings carefully and follow all safety recommendations.



This symbol alerts you to immediate hazards which **WILL** cause severe personal injury or death if the warning is ignored.



This symbol alerts you to hazards or unsafe practices which **COULD** result in severe personal injury or death if the warning is ignored.



This symbol alerts you to hazards or unsafe practices which **COULD** result in minor personal injury, or cause product or property damage if the warning is ignored.



This symbol calls attention to installation, operation, or maintenance information which is important to proper operation, but is not hazard-related.

Carbon Monoxide Hazard!	Fire and/or Explosion Hazard!	Rotating Propeller Hazard!

Retailer/Dealer Service

Make certain that you receive a full explanation of all systems from the selling retailer/dealer before taking delivery of your boat. Your selling retailer/dealer is your key to service. If you experience any problems with your new boat, immediately contact the selling retailer/dealer. If for any reason your selling retailer/dealer is unable to help, you can call us direct on our customer service hotline:

+1-360-435 8957 or send us a FAX: +1-360-403 4235.

Boating Experience

If this is your first boat, or you are changing to a type of boat you are not familiar with, for your own comfort and safety, please ensure that you obtain handling and operating experience before assuming command of the boat. Your selling retailer/dealer, national sailing federation or yacht club will be pleased to advise you of local sea schools, or competent instructors.

Engine/Accessories Guidelines

Your boat's engine (or engines) and accessories were selected to provide optimum performance and utility. Installation of different engines or other accessories may cause undesirable handling characteristics. Should you choose to install different engines, or to add accessories that will affect the boat's running trim, have an experienced marine technician perform a safety inspection and a handling test before operating your boat by yourself again.

Safety Standards

Your boat's mechanical and electrical systems were designed to meet safety standards in effect at the time it was constructed. Some of these standards were mandated by law. All of them were designed to insure your safety, and the safety of other people, vessels and property.

Qualified Maintenance



To maintain the integrity and safety of your boat, only qualified people should perform maintenance on, or in any way modify, the steering system, propulsion system, engine control system, fuel system, environmental control system, or electrical system.

Failure to maintain these systems as designed could violate the laws in your jurisdiction, and could expose you and other people to the danger of bodily injury or accidental death. We recommend that you follow the instructions provided in this manual, in the engine owner's manual, and in the accessory instruction sheets included with your boat.

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General Notes

The information contained herein is subject to change without notice and is not to be used in conjunction with sales or advertising, except as may be expressly permitted in writing by US Marine. Actual operating results will vary depending on conditions and variables.

All US Marine products meet or exceed USCG and/or NMMA construction standards.

1. All dimensions are in millimeters unless otherwise specified.
2. All plywood is 12.7 mm unless otherwise specified.
3. Where necessary, importer may be required to supply and install additional hardware and equipment in accordance to local government specifications and/or standards.

Due to our commitment to product improvement, we reserve the right to change, without notice or other obligation, the specifications or other information contained in this publication.



- **A qualified operator must be in control of the boat at all times.**
- **Do not operate your boat while under the influence of alcohol or drugs.**



Keep this manual in a secure place and hand it over to the new owner when you sell the boat.

Manufactured with 1,1,1-Trichloroethane, a substance which harms public health and environment (during the manufacturing process) by destroying ozone in the upper atmosphere.

CHAPTER 2: SAFETY

This manual contains basic recommendations and guidelines for safe and enjoyable boating. It cannot, however, cover every possible situation you may encounter. We strongly recommend:

- You receive hands on training from the selling retailer/dealer and take a boating safety class.
- Regularly reviewing the safety requirements for your area.
- Properly maintain your boat and its systems.
- Have the selling retailer/dealer or a qualified marine mechanic inspect your boat at least annually.

Consider what action you would take under various emergency conditions such as a person overboard, fog, fire, a damaged hull or other bad leaks, engine breakdown, severe storm or collision.

Fire / Explosion

In the event of a fire aboard your boat,

- Your first and most important decision is deciding whether to abandon ship or stay aboard and attempt to extinguish it.
- If it is an electrical fire or other small fire that does not involve flammable liquids, you may be able to effectively extinguish it with an approved fire extinguisher.
- If however the fire involves the fuel system or other flammable liquids, the danger of explosion is increased.
- If you decide to abandon ship, make sure all passengers either wear a PFD (if there is time) or take a PFD with them over the side.
- If you do abandon ship, keep well clear of the burning boat; burning fuel can spread out over the surface of the water near the boat.

It is the responsibility of the boat owner/operator to:

- Have firefighting equipment checked at intervals indicated on the equipment.
- Replace firefighting equipment, if expired or discharged, by devices of identical or greater firefighting capacity.
- Inform passengers and crew about:
 - The location and operation of firefighting equipment
 - The location of discharge openings into the engine space
 - The location of escape hatches



FIRE / EXPLOSION HAZARD

- NEVER obstruct passage ways to exits and hatches.
 - NEVER obstruct safety controls, e.g. fuel valves, gas valves, electrical system switches.
 - NEVER obstruct portable fire extinguishers stowed in lockers.
 - NEVER leave the boat unattended when cooking and/or heating devices are in use.
 - NEVER use gas lights in the boat.
 - NEVER modify any of the boat's systems (especially electrical, fuel and gas).
 - NEVER fill any fuel tank or replace gas bottles when machinery is running or when cooking or heating appliances are in use.
 - NEVER smoke while handling fuel or gas.
1. Required fire extinguishers are only the minimum needed. We recommend installing additional extinguishers where they might be needed.
 2. Keep firefighting equipment in good condition and readily available at all times.
 3. Do not test fire extinguishers by squirting small amounts of the agent. The extinguisher might not work when needed. Always follow approved instructions when checking fire extinguishers.
 4. When replacing parts of the fire fighting installation only matching components shall be used, bearing the same designation or being equivalent in their technical and fire resistant capabilities.
 5. When fueling, always remember the following (See also - *Fueling*, Chapter 4):



Fuel vapors are explosive and can become trapped in the lower portions of a boat where they might be ignited accidentally. While fueling, all doors, hatches, and portlights must be closed.



DO NOT use fuels that incorporate any form of alcohol or alcohol derivatives. Alcohol destroys marine fuel system hoses and components, which could lead to hazardous leaks, fire or explosion.

- Turn off all electrical equipment, including engines, appliances, bilge blower, lights, etc.
- Extinguish all cigarettes, cigars or other items that may produce a spark or flame.
- Close all openings including hatches, windows, doors, and portlights.
- When you have finished fueling, replace the fill cap and wipe off any fuel spillage.
- Open the engine compartment and all windows, doors and hatches; inspect, both visually and by smell (**sniff test**), for fuel fumes or leakage. Any sign of fuel leakage, or any indication of fumes, must be investigated and corrected prior to starting the engine.

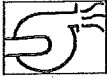
6. Before starting engines or generator, *always* remember the following (See also - *Starting*, Chapter 4):



Fuel vapors are highly explosive. To prevent a possible explosion and fire, visually and by smell (sniff test), check the engine, generator and fuel compartments for fumes or accumulation of fuel before each engine start. **ALWAYS** operate the bilge blower for at least four minutes before engine starting, during the starting process and anytime you are operating your boat below cruising speeds.



Operation of the blower is **NOT A GUARANTEE** that explosive fumes have been removed. If you smell any fuel, **DO NOT** start the engine. If the engine is already running, immediately shut off the engine and all electrical accessories. Investigate immediately.



DO NOT obstruct or modify the ventilation system.

- Ensure that ventilation systems are unobstructed and operating properly.
 - Operate the bilge blower for at least four minutes prior to starting the engine.
 - Leave the blower on until the boat is underway and up to cruising speed, then turn it off. Continuous operation of the blower may cause the blower's motor to fail.
7. Give constant attention to any open flames.
 8. Store flammable materials in approved containers.
 9. Use only marine safety approved cooking and heating systems.



Reduce the possibility of fire by securing all combustible materials away from any stove before using. **DO NOT** fit free hanging curtains or other fabrics in the vicinity of or above cookers or other open flame devices.

10. Check all paints and cleaning products for flammability.
11. Always ventilate when cleaning or painting.



Teak oil, acetone and patch paste catalyst are hazardous materials and should be used only in well ventilated areas. Follow the manufacturer's instructions. Also, **NEVER** store rags that have been wetted with acetone, teak oil, fuel or any other solvent aboard your boat. Immediately remove them from the boat and discard them properly to prevent spontaneous combustion and fire.

12. Good housekeeping in your boat is important. Cleanliness diminishes the probability of fire. Keep the bilges clean and check for fuel and gas vapors at regular intervals.
13. Keep electrical system and wiring in good condition.
14. Allow ample ventilation around batteries.
15. Always disconnect the electrical system from its power source before performing maintenance.
16. Replace blown fuses or breakers with same amperage devices.
17. Observe electrical system components carefully when energizing the electrical system.
18. Only qualified marine electrical technicians should service the boat's electrical system.



To minimize the risks of fire and explosion, **NEVER** install knife switches or other arcing devices in fuel compartments.



NEVER substitute automotive parts for marine parts. Marine electrical, ignition and fuel system parts are designed and manufactured to minimize the risks of fire and explosion.



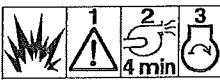
To minimize shock and fire hazard; **DO NOT** modify the boat's electrical systems or relevant drawings. **DO NOT** alter shore power connectors and use only compatible connectors. Only qualified personnel should perform electrical system maintenance.



To minimize the risk of fire and explosion only qualified personnel should install batteries and perform electrical system maintenance.



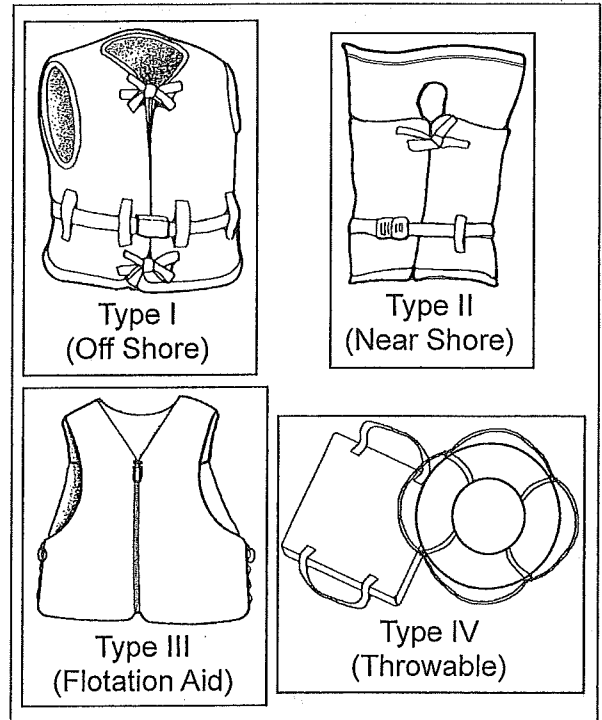
DO NOT expose the batteries to open flame or sparks. It is also important that no one smoke anywhere near the batteries.



Highly explosive fuel fumes are heavier than air and will collect in the bilge areas where they can be accidentally ignited. To prevent a possible explosion and fire, visually and by smell (sniff test), check the engine and fuel compartments for fumes or accumulation of fuel and operate the bilge blower for at least four minutes prior to engine starting, electrical system maintenance, or activation of electrical devices.

Personal Flotation Devices / Life Saving Equipment

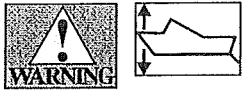
1. One approved *personal flotation device* (PFD) of suitable size is required for each person aboard a recreational boat.
2. One approved *throwable flotation device* is required.
3. Laws require that PFDs (if not worn) and throwable devices must be readily accessible at all times. They must be removed from their storage bags, unbuckled and placed where they can be accessed easily if needed.
4. Always have children and nonswimmers wear PFDs. Always check PFDs intended for young children for fit and performance in the water. Never hesitate to have everyone onboard wear lifesaving devices whenever circumstances cause the slightest doubt about safety.
5. Boat hooks can be used to assist someone who has fallen overboard and are valuable when docking or when needed to retrieve objects that have fallen overboard.
6. Have an adequate anchor and sufficient line (at least six times the depth of the water) to assure a secure hold in all types of weather and sea conditions.



Flooding / Swamping / Capsizing

Flooding, swamping or capsizing can be caused by many factors:

- Drain plugs not installed before launching.
- Disregard for hazardous weather and water conditions.
- Improper loading.
- Improper handling or anchoring.



Improper use of trim tabs can cause a loss of control. DO NOT use trim tabs in a following sea, as they may cause broaching or other unsafe handling characteristics. Do not allow people who are unfamiliar with trim tabs to operate them (see also - *Trim Tabs*, Chapter 4).

Always remember the following:

1. Install drain plugs before launching.
2. Check for proper bilge pump operation before departing.
3. Take care to properly load your boat. Do not exceed the "Maximum Capacities" label. Keep the load low and evenly distributed. Maintain adequate freeboard at all times. Consider the sea conditions, the duration of the trip, the weather and the experience of the personnel on board.
4. If using only one anchor, anchor from the bow only.
5. Adjust trim and speed to match sea conditions.
6. Close all openings during rough sea operation.

If Flooding or Swamping Occurs:

1. If the flooding is caused by wave action over the stern, attempt to turn the boat into the waves and shift weight forward.
2. Make sure the bilge pump or pumps are operating and bail with buckets or any usable container.
3. A swamped or flooded boat may become unstable and capsize. If the flooding is caused by a hole in the hull, attempt to plug the hole with anything available (rags, upholstery, canvas, clothing, etc.).

Capsizing:

If your boat ever capsizes, it is usually best to remain with it if it continues to float. You are more easily located by searchers.

Grounding



It is the skipper's obligation to know, understand and follow all navigational markers. Be aware of depth charts at all times. No vessel is built for, nor can it sustain without damage, grounding. If grounding occurs, call for assistance immediately. Before removing vessel, inspect vessel thoroughly for holes or fiberglass cracking, fracturing or delamination. Make necessary emergency repairs before proceeding (see also - *Flooding / Swamping / Capsizing*, Chapter 2).

Running aground is often merely inconvenient but in extreme situations it may also be dangerous. As in any emergency situation the most important thing to do is remain calm, don't panic. If you find yourself aground resist the temptation to immediately put the engine in reverse and gun the engine in an attempt to back off. If the boat has grounded in mud or sand this may only cause the prop to blow more mud or sand under the boat making it even more firmly grounded. In addition, it may also pull the mud or sand into the engine water intake and up into the engine itself. Following are some brief explanations of possible actions to take in event of grounding:

1. Shift to NEUTRAL
2. Immediately switch on the bilge pumps and check the hull to see whether it has been punctured and is taking on water (if not taking on water turn the bilge pumps off). A hand operated bilge pump is a good safety item to have aboard in case the electric pumps cannot remove the water fast enough. If your boat is equipped with a Bravo stern drive and it becomes absolutely necessary, the engine's cooling pump can be brought to use. Shut down the engine, shut off the seacock, disconnect the water hose and fit the end with a filter screen; then put the end of the hose into the water in the bilge and restart the engine. Check frequently that the engine cooling system has a continuous supply of water.
3. Canvas, cushions, or even bedding can be used as temporary patches to the outside of a stove in hull, hold them in place with docking lines.
4. If taking on water rapidly it may be better to leave the boat grounded. She may sink if moved to deeper water.
5. Make a "PAN-PAN" (pronounced Pawn-pawn) distress call on channel 16 on the VHF radio, use the "MAYDAY" distress signal *only* if you or your boat are in grave and immediate danger.

If in tidal waters check the status of the tide. If coming in, it may lift the boat enough to get you free. Wakes from passing boats will also help lift you off. If the tide is falling take as many soundings as possible to determine the direction of deepest water. Then fasten the anchor line to the stern cleats, put the anchor and line in the dinghy and row the anchor out to deeper water paying out line from the dinghy. Pay attention to wind and current and set the anchor up wind or current from the boat (this is called *kedging*). Pull the boat from the grounding by pulling the anchor line and alternating with moderate reverse engine power if necessary. A "block and tackle" or "come-along" will greatly increase your pulling power and are good items to have aboard. If you need assistance make a "PAN-PAN" distress call as stated above.

Carbon Monoxide (CO)



Carbon monoxide (CO) is a poisonous gas that is colorless, odorless and about the same weight as air. It will distribute itself throughout spaces of the boat in dangerous concentrations if proper ventilation is not provided. A person breathing these fumes will become seriously ill. Direct and prolonged exposure will cause brain damage or death. Opening windows or hatches may improve ventilation. Also, NEVER operate the engine when either the slant cover or the camper cover is installed.

Because CO diffuses in the air much more rapidly than easily detectable gases you cannot rely on sight or smell to recognize its presence. CO will be produced anytime materials containing carbon are burned. Common sources of CO are internal combustion engines and open flame devices such as cooking ranges, space heaters, and charcoal grills.

The symptoms of CO poisoning include but are not limited to the following:

1. Watering and itchy eyes
2. Flushed appearance
3. Inattentiveness and the inability to think clearly
4. Ringing in the ears
5. Tightness in the chest
6. Headache and/or throbbing temples
7. Drowsiness and fatigue
8. Incoherence
9. Nausea and/or vomiting
10. Dizziness
11. Collapse
12. Convulsions

If someone is suffering from CO poisoning move the person to fresh air, administer oxygen if available, and contact medical help. If the victim is not breathing perform approved CPR procedures until medical help arrives and takes over.

To help prevent exposure to CO, be aware of your ventilation and surroundings. Running your engine in a confined space such as a boathouse or next to a seawall can allow dangerous accumulations of CO. Another boat with an engine running moored nearby can also expose you to dangerous amounts of CO. Be sure that while underway there is a good flow of fresh air through the boat and that exhaust fumes are not being pulled up into the boat by "backdrafting". Backdrafting will be greater whenever canvas is installed or if you run in a bow-up trim angle.



Gasoline portable generator sets produce CO. These units discharge their exhaust where they are located which can lead to the accumulation of CO in the area. This equipment should NEVER be used on recreational vessels.

CHAPTER 3: PREPARATION

Prior to leaving on your first outing (or, for that matter, any outing) there are certain items to check and activities to perform. Besides reading this manual and your engine manual, familiarize yourself with your boat while dockside, and consider the following suggestions:

1. Before departing on a boat trip, advise a responsible friend or relative about where you intend to cruise. Be sure to give that person a good description of your boat. Keep them advised of any changes in your cruise plans. If you fail to return, these precautions will enable your friend or relative to tell the proper authorities where to search for you and what type of boat to look for. Be sure to advise the same person when you complete your trip to prevent any false alarms about your safety.
2. Check the operation of equipment such as bilge pumps, running lights, wipers, radios, etc.
3. Obtain a reliable weather forecast and plan accordingly for everyone's comfort and safety.
4. Know your fuel tank capacity and cruising range. Carry spare fuel in proper containers. Take special precautions to prevent the accumulation of fuel vapors in confined spaces.
5. The boat operator is responsible for the safety of his passengers and himself. You should insure that everyone aboard is properly and securely seated in appropriate seating locations before starting. You should not allow sitting on the bow or transom, seatbacks, gunnels, fishing seats, or sun lounges while underway.



Do not allow anyone to ride on parts of the boat that were not designed for such use. Sitting up on seat backs, bow riding, gunwale riding, transom platform riding, or lounging on forward deck while underway is especially hazardous and will cause personal injury or death.

Do not allow anyone to occupy the swim step/transom platform while the engine is operating (this applies even when operating the engine in neutral).

6. Always instruct at least one person on board in the rudiments of boat handling in case you are disabled or fall overboard.
7. Keep an alert lookout. The operator is required by law to "maintain a proper lookout by sight (and hearing)." He must insist that he has an unobstructed view particularly to the front. No passengers, load or fishing seats should block his view when operating above idle speed.
8. Understand the meanings of navigation buoys, and never moor to one (it is against the law).
9. Always have up-to-date charts of your cruising area on board.



It is the skipper's obligation to know, understand and follow all navigational markers. Be aware of depth charts at all times. No vessel is built for, nor can it sustain without damage, grounding. If grounding occurs, call for assistance immediately. Before removing vessel, inspect vessel thoroughly for holes or fiberglass cracking, fracturing or delamination. Make necessary emergency repairs before proceeding (see also - *Flooding / Swamping / Capsizing*, Chapter 2).

10. Storm signals are for your information and safety. Learn them and be guided accordingly.
11. Always use common sense when operating your boat:
- Never drive a boat directly behind a water skier. At 40 km/h (25 m.p.h.) the boat will overtake a fallen skier who was 60 meters (200 feet) in front in 5 seconds.
 - Watch your wake. It might capsize a small craft. You are responsible for damage caused by your wake. Pass through anchorages at a minimum speed.
 - Your boat's engine must be shut down before allowing people to swim to, from, or anywhere near your boat. Before lowering the transom boarding ladder, shut the engine OFF and remove the key from the ignition switch to prevent accidental starting of the engine while swimmers are nearby. When cruising in an area where there might be swimmers or water skiers, slow down and exercise extreme caution. Always keep a down skier in sight. Keep the skier on the operator's side of the boat when approaching. NEVER back up to anyone in the water. Check your jurisdiction's laws regarding skiing observers and fallen skier warning flags.



Rotating propellers can cause serious injury or death. Your boat's engine must be OFF and the key removed from the ignition switch when people are swimming anywhere near your boat.

12. Falls are the greatest cause of injury both afloat and ashore. Eliminate tripping hazards where possible, make conspicuous those that must remain, and require that everybody on board wear proper footwear.
13. Consider what action you would take under various emergency conditions such as; a person overboard, fog, fire, a damaged hull or other bad leaks, engine breakdown, severe storm or collision (see also - *Safety*, Chapter 2):
- Keep firefighting and lifesaving equipment in good condition and readily available at all times. Do not test fire extinguishers by squirting small amounts of the agent. The extinguisher might not work when needed. Always follow approved instructions when checking fire extinguishers.
 - Know the various distress signals. A recognized distress signal used on small boats is to slowly and repeatedly raise and lower the arms outstretched to each side.
 - Have an adequate anchor and sufficient line (at least six times the depth of the water) to assure a secure hold in all types of weather and sea conditions.
 - Boat hooks are valuable when docking or when needed to retrieve objects that have fallen overboard.
 - If your boat capsizes, it is usually best to remain with it if it continues to float. You are more easily located by a search plane or boat.

Safety Equipment Recommendations



These are recommendations only. Check with the proper authorities for the exact safety requirements for your area.

The following safety-related items should be considered as part of your standard equipment:

1. Fire extinguishers (correct number and type, located for easy access)
2. Personal flotation devices
3. Fenders, lines and boat hook
4. Flares (night and day type with unexpired dates)
5. Flashlight(s) with extra batteries
6. Charts of your intended cruising area
7. First aid kit
8. Anchor and adequate line
9. Hand operated (manual) bilge pump

Tool Recommendations

The following tools should be considered as part of your tool chest:

1. Assorted screwdrivers (Phillips and flat blade)
2. Pliers (regular, channel lock and vice-grip)
3. Wrenches (box, open-end, Allen, adjustable and one wrench large enough to fit the prop nut)
4. Socket set (metric and U.S. standard)
5. Hacksaw with spare blades
6. Hammer
7. Battery jumper cables
8. Electrical tape
9. Assorted fasteners
10. Gear grease and penetrating oil
11. Block and Tackle or come-along

Miscellaneous Items

1. Engine and accessories manual
2. Spare propeller with fastening hardware
3. Extra V-belts
4. Engine lubricating oil
5. Spare fuel and oil filters
6. Portable fuel can
7. Replacement light bulbs
8. Spare set of spark plugs
9. An assortment of spare fuses
10. Spare keys
11. Marine radio and/or cellular phone

Warning Labels

The warning labels on your boat provide important safety and equipment information. Please observe the following:

1. Know the location and meaning of all warning labels.
2. Do not remove any warning labels.
3. Do not cover or otherwise obscure any warning labels.
4. Immediately replace any warning labels that become illegible.

Other Tips

1. When commissioning a new boat, do not plan an extensive trip or outing until you have taken a shakedown cruise to make sure all equipment on your boat is functioning properly and you are familiar with its operation.
2. Use big fenders or fender boards to protect your boat's hull whenever mooring next to floats, piers or other boats.
3. Carry plenty of line properly sized to your boat. We suggest at least two 10m (30') lengths of 10mm (3/8") nylon line.



Remember these are recommendations only. Check with the proper authorities for the exact safety requirements for your area.

CHAPTER 4: OPERATING

Fueling Procedures



Extinguish all cigarettes, cigars or other items that may produce a spark or flame.



Fuel vapors are explosive and can become trapped in the lower portions of a boat where they might be ignited accidentally. While fueling, all doors, hatches, and portlights must be closed.



Do not use fuels that incorporate any form of alcohol or alcohol derivatives. Alcohol destroys marine fuel system hoses and components, which could lead to hazardous leaks, fire or explosion.

1. If you're going to fuel your boat while it's in the water, be sure that it's securely moored to the dock.
2. Turn off all electrical equipment, including engines, appliances, bilge blower, lights, etc.
3. Extinguish all cigarettes, cigars or other items that may produce a spark or flame.
4. Close all openings including hatches, windows, doors, and portlights.
5. Through-deck fittings are provided for fuel tank filling. Remove the cap and insert the fuel supply nozzle, allowing the nozzle to maintain contact with the fitting; this will prevent possible static sparking.
6. After about 35 liters (10 gallons) have been pumped into the tank, inspect the engine and tank area for signs of fuel leakage. Proceed with fueling if no problem is detected.
7. Often you won't be able to fill the fuel tank to 100% of its dry-rated capacity. This is because the amount of fuel the tank will hold depends, in part, on the boat's floating attitude, which in turn affects the position of the fuel tank and its venting system. If fuel flows out the tank vent, discontinue fueling immediately. The tank will be as full as possible under the current conditions. It is advisable not to overfill the tank anyway, as you want to allow for thermal expansion of the fuel, especially on very hot days.
8. If, when filling the tank, you are not able to put fuel in at a reasonable rate, check the fuel vent line to see that it is not kinked or plugged.
9. When you have finished fueling, replace the fill cap and wipe off any fuel spillage.
10. Open the engine compartment and all windows, doors and hatches; inspect, both visually and by smell, for fuel fumes or leakage. Any sign of fuel leakage, or any indication of fumes, must be investigated and corrected prior to starting the engine.

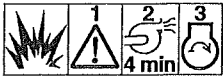
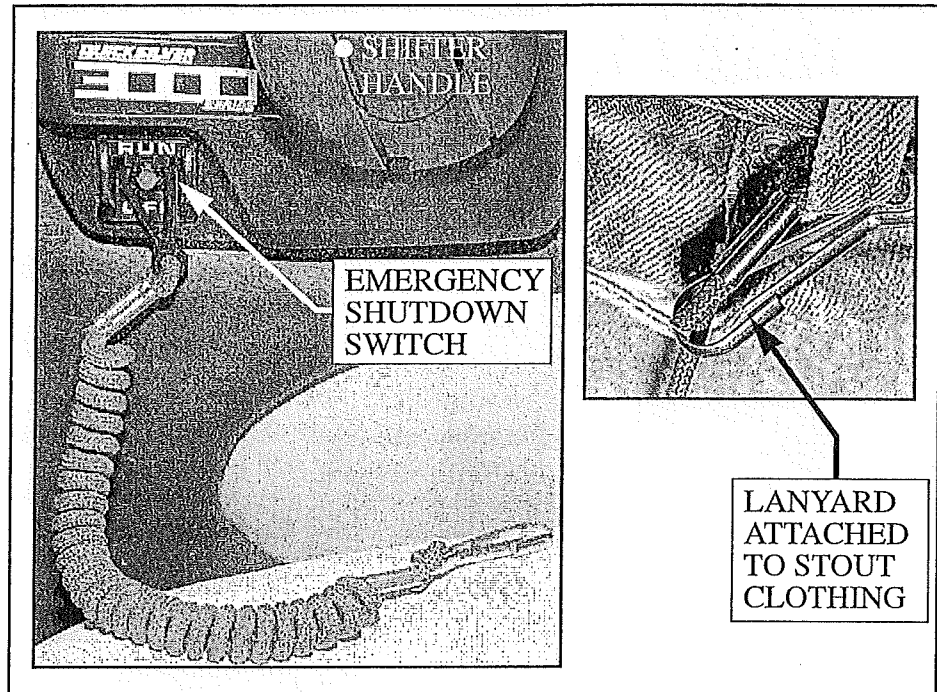
Starting (See Also - Fire / Explosion, Chapter 2)

The engine operating and maintenance manual furnished with your engine describes prestart, starting, shifting and stopping procedures. The following notes are basic reminders, and are not intended to cover every detail of engine starting. We strongly recommend that you thoroughly read and understand your engine manual.

1. Check the lubricating and cooling fluid levels if applicable.
2. Visually and by smell (**sniff test**) check for fuel, oil and coolant leaks.
3. Emergency engine shutdown lanyard must be attached to the shutdown switch and to the operator.



A serious accident can occur if the emergency engine shutoff switch lanyard is not fastened to the boat operator. In order for the emergency engine shutdown system to operate correctly, the lanyard must be physically attached to the operator (around the wrist or securely fastened to a stout piece of clothing, such as a belt loop, etc.).



Gasoline vapors are highly explosive. To prevent a possible explosion and fire, visually and by smell (**sniff test**) check the engine and fuel compartments before each engine start for fumes or accumulation of

fuel. Always operate the bilge blower for at least four minutes before engine starting, during the starting process and anytime you are operating your boat below cruising speeds.

4. Operate the bilge blower for at least four minutes prior to starting the engine. Leave the blower on until the boat is underway and up to cruising speed, then turn it off. Continuous operation of the blower may cause the blower's motor to fail.
5. Before starting the engine, ensure your boat is in deep enough water to lower the stern drive. Tilt the stern drive down to its normal running trim position by activating the trim switch, located on either the dash or the throttle lever's handle.
6. If applicable, check the oil pressure, voltmeter and temperature gauges immediately after the engine starts. Also inspect the engine compartment for fuel, cooling, or exhaust system leaks that were not apparent before you started the engine.
7. Once the engine has been started, allow it to warm-up for several minutes before getting underway.
8. Check steering operation by turning the steering wheel full port and starboard while observing the stern drive movement.

Before You Leave

Provided you have not encountered any problems, you are almost ready to go. (If you did encounter problems, do not attempt to operate your boat until they are corrected.) Before you leave, perform the following steps:

1. Check the operation of equipment such as bilge pumps, running lights, wipers, radios, etc.
2. Instruct passengers in the use and location of flotation devices and fire extinguishers.
3. Obtain a reliable weather forecast and plan accordingly for everyone's comfort and safety.
4. Notify a responsible friend or relative of your cruise plans. Upon your return or a change in your cruise schedule, notify that person again in order to avoid unnecessary concern.
5. Fill potable water tanks, if applicable.
6. Make sure your self-contained head has fresh chemical solution, if applicable.

Basic Maneuvering

When all of your predeparture checks have been completed, you will be ready to leave the dock.

Your boat features a "modified-vee" planing hull that has several handling characteristics you should be aware of.

Steering the boat at either idling or cruising speeds will generally require minimal effort. However, operating at a speed just below that required to get the hull on plane may produce excessive steering torque. This is a normal condition, though you should not continue to operate the boat at this speed. Instead, continue accelerating until the boat is on plane, where the amount of steering torque will return to normal.

Your boat may wander slightly from port to starboard when operating at idle speed in forward gear. This is a natural characteristic of deep-vee hulls and shouldn't be cause for concern. Simply correct for this wander with gentle helm inputs until you get up to cruising speed.

Another characteristic you may notice is that the helm wheel may pull in one direction or the other, depending on whether the boat is traveling in forward or reverse gear. This is caused by a non-horizontal prop shaft angle, which causes the stern of the boat to be pulled to one side as power increases, especially when starting from a fully stopped position. Again, this is a normal condition that may be minimized by adjusting the trim angle of the stern drive with the power trim. See your engine owner's manual for detailed information. Practicing maneuvers at slow speeds will help you to become familiar with all the special handling characteristics associated with your boat.

Remember that all boats steer by the stern (the feeling is much like steering your automobile in reverse). This means that the stern of your boat will swing in the direction opposite to your turn. For example, when you turn the helm wheel to the left, the stern of the boat will swing to the right as the boat goes into a left turn. This is especially important to keep in mind when docking, when operating in close quarters with other boats, or when approaching a swimmer or downed skier in the water.

Always use extreme caution when approaching someone in the water. Approach them at idle speed only, allowing your stern to swing away from them as you get close. Place the shifter in NEUTRAL and shut off the boat's engine(s) when you are still several feet from the person in the water. While they are swimming over to the boat, lower the swim ladder from the transom platform so they can board. Once everyone is aboard, return the swim ladder to its stowed position and check that everyone is safely seated before restarting the engine. If you are unfamiliar with picking up swimmers in the water, practice this maneuver with a retrievable floating object before attempting it under actual conditions.



Do not allow anyone to occupy the transom platform while the engine is operating (this applies even when operating the engine in neutral).



Rotating propellers can cause serious injury or death. Your boat's engine must be OFF and the key removed from the ignition switch when people are swimming anywhere near your boat.

Boats do not have brakes. Stopping is accomplished by backing down on the throttle. Once the boat has slowed and the engine is idling, the shifter can be placed in REVERSE. *Gradually* increasing reverse power with the throttle will allow you to stop the boat in a very short distance. Note that a boat will not respond to steering in reverse nearly as well as it does when going forward, so do not expect to accomplish tight turning maneuvers when backing up.

Once you are away from the dock, devote some time to learning how to maneuver.

- Practice docking by using an imaginary dock.
- Practice stopping and reversing.
- When operating in close quarters or docking, all maneuvering should be done at idle speed. Proceed with caution in congested areas.
- Gradually increase your speed. Get used to the boat before operating at full throttle.

Steering Pressure

As mentioned earlier in the basic maneuvering section, the boat's steering will usually pull to one side or the other to some degree. This effect is caused by a non-horizontal prop shaft angle and the torque reaction of the propeller. Adjust the prop shaft angle by using the tilt or trim switch. A small amount of steering pressure will always be present and is considered normal.

Boat Performance

Boat speeds are affected by a great many factors. Some, such as temperature and altitude, you cannot change, but some factors you can:

1. Loading: Take only necessary equipment with you. Keep weight low in the boat and balanced.
2. Propellers: Keep them in good repair and at the correct pitch. The standard propellers may not be the best for your particular boat and load conditions. If the engine RPM at full throttle is not correct (see your engine operation manual) ask your selling retailer/dealer about trying different propellers.
A slightly bent or nicked propeller will adversely affect the performance of your boat.
3. Keep your boat's bottom clean.

Trim

Trim refers to the way your boat floats in the water. When floating properly as designed, it is on an Even Keel. If it inclines to port or starboard, it Lists. If loaded too heavily forward, it Trims By The Head (or is Down By The Bow). If its draft is excessive aft, it Trims By The Stern (is Down By The Stern).

Your boat's trim can be affected by many variables such as optional equipment and loading of gear or cargo. Load gear and cargo as evenly as possible. If necessary, move heavy items to the opposite side or end to achieve proper trim.

Boat Running Trim

1. If your boat runs with its bow too high at cruising speeds, the following suggestions should help:

- Move some weight forward in the boat.
 - Adjust the stern drive trim. See your engine owner's manual for trimming instructions.
2. If your boat runs with its bow too low at cruising speeds, raise the bow by performing steps opposite of those above.

Stern Drive Trimming

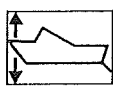
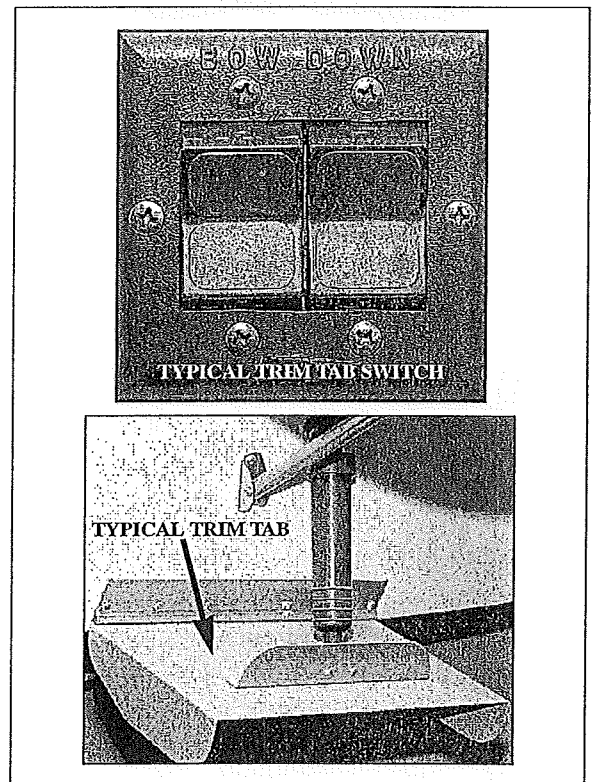
Your boat is equipped with power trim. You can change the angle of the prop shaft by pressing the trim switch. See your engine operating and maintenance manual for an explanation of the handling characteristics caused by trimming your stern drive.

Your boat is designed to give you quick acceleration with a minimum amount of time spent in the bow-up transitional planing off condition. Planing your boat is most easily and quickly accomplished by trimming the stern drive fully "under" or "in". However, once on plane, the stern drive should be trimmed out a little to avoid a bow down condition called "plowing". Plowing can cause "bow-steering" or "over-steering" and poor fuel economy. In this condition, if attempting a turn or encountering diagonal waves, a more abrupt turn than intended may result.

Trim Tabs

Trim tabs are intended for corrections to boat trim on the port and starboard axis; however they may also create very minor changes in pitch (fore and aft) attitude. For major corrections, redistribute loads.

1. If the tab position is unknown, put both tabs in the full bow-up position.
2. After the boat is up to cruising speed, level the boat by pushing the appropriate tab switch. Several short pushes are recommended, rather than one long one. Allow the boat to react to the new position of the trim tab after each touch. When installed in accordance with the manufacturer's recommendation, the port trim tab switch will operate the starboard trim tab and vice versa.
3. Both tabs can be lowered slightly to lower the bow. However, forcing the bow down with trim tabs may cause steering difficulty and a loss of efficiency.
4. Set trim tabs to full up position in following seas.



Improper use of trim tabs will cause a loss of control. Do not use trim tabs in a following sea, as they may cause broaching or other unsafe handling characteristics. Do not allow people who are unfamiliar with trim tabs to operate them.

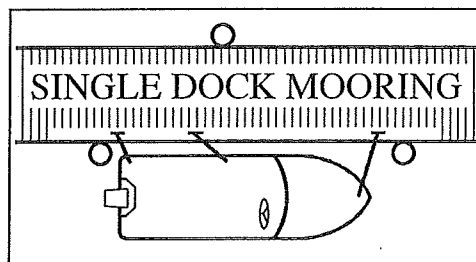
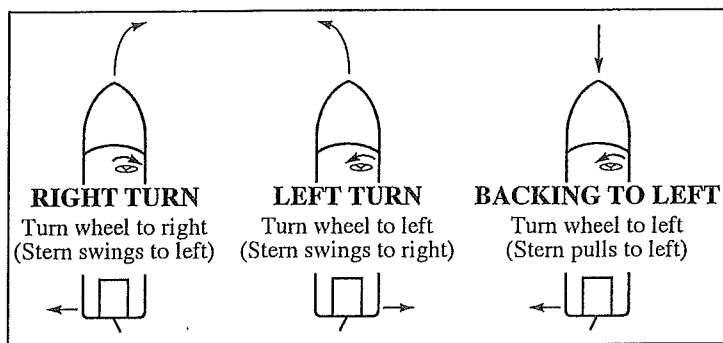
Docking

Preparation:

Proper docking requires practice and preparation. Start by making sure you have adequate mooring gear, and that it is stowed correctly and is ready for use. Your selling retailer/dealer is the best source for information concerning the amount and type of equipment you should carry.

Approaching the Dock:

When approaching a mooring area, lower your speed within a reasonable distance to allow your wake to subside before it reaches other boats or docks. As you get close to your moorage, check for any wind or current action that may affect your maneuver; then make a conservative approach with these factors in mind. Try to use the elements to your advantage. Allow them to carry the boat to the dock. If there are high winds or strong currents, it is best to approach the moorage from the lee side. While approaching, check to see that all lines are attached to the cleats on the side facing the moorage. Also insure that fenders are lowered on that side. Be sure to check that the fenders are hung at the proper height.



As you approach your moorage, it is desirable to have one person at the bow and one at the stern of the boat, each with a boat hook and a mooring line attached to a cleat. Approach at idle RPM at an angle approximately 45 degrees to the dock. When the bow is within a few feet of the dock (starboard side), the stern can be brought alongside the moorage by turning hard to port. Next, turn to starboard and at idle RPM put the engine into **REVERSE**. This will stop the boat and bring the stern closer to the dock. These steps are reversed for docking to port.



Whenever docking all crew and passengers should remain in the boat until maneuvering is complete. Do not attempt to dock with anyone standing on the transom platform. Also do not attempt to fend the boat away from objects being approached with your body including hands and feet.

Mooring:

To attach lines to deck cleats, make a loop in one end of the line and pass it through the hole in the base of cleat; then pass the loop back over the entire cleat. The line can now be used to secure your boat. Lines may be kept this way while underway if they are coiled and cannot become fouled in deck gear or props. In heavy sea conditions, all lines should be removed from the decks.

Leaving the Dock:

Take into account wind, tide, current and other forces that affect your maneuvering as you leave the dock. Most maneuvering to and from a dock is best accomplished at idle speeds.

Do not forget to release the mooring lines and stow the fenders.

When leaving a moorage on your starboard side and your bow cannot be pushed away from the dock first, start forward with the helm wheel turned to starboard for two or three feet. Then shift to reverse with steering full to port. Repeat if necessary to get the stern far enough away from the dock so you can back clear of any other boats that may be moored ahead of you (reverse steering wheel directions when leaving a dock located to port).

Towing

If it becomes necessary to have your boat towed, attach the tow line to the bow eye (if so equipped). If your boat is not equipped with a bow eye, the Coast Guard or other professional assistance should be sought to properly rig a tow bridle. Deck hardware should never be used for towing.



Never attach a towline to deck cleats or to the anchor windlass. Serious injury may result if the cleats or windlass pull free from the deck.

Instruments

While under way, instruments should be checked frequently for possible indications of trouble.

1. *Speedometer* — Indicates boat speed.
2. *Tachometer* — Indicates engine revolutions per minute (RPM). The tachometer is useful for monitoring engine speed to avoid exceeding the maximum RPM rating. In addition, it can be used to detect performance changes by comparing speedometer readings at various RPM.
3. *Voltmeter* — Indicates the condition of the battery. With the ignition switch on and the engine not running, readings in the 11.5 - 12.5 volt range are considered normal. Readings below 10 volts indicate a seriously discharged condition. With the engine running (over 1500 RPM), readings of 13 - 14 volts are considered normal. Readings below this indicate a severely discharged battery or a nonfunctional charging system (See also - *Electrical System*, Chapter 5).
4. *Temperature Gauge* — Indicates engine coolant temperature. If the gauge reads in the danger area, shut off the engine and diagnose the problem. A common cause of overheating is picking up a foreign object in the seawater intake. Usually, raising and lowering your stern drive will free it. Backing up in reverse gear, then pulling ahead in forward gear for 3 -5M (10 - 15 ft.) is helpful, too.
5. *Fuel Gauge*—Indicates approximate fuel level. It is always good to keep track of the amount of fuel you pump aboard, as well as your running time and estimated fuel usage as a double check against the gauge.
6. *Oil Pressure Gauge*—Indicates engine oil pressure. Low oil pressure readings are generally caused by low oil quantity. In any case, immediately shut down the engine and diagnose the problem.
7. *Compass*—Your boat may be equipped with a compass for use in navigation. It is vitally important that you have your compass professionally swung before using it for marine navigation. Your selling retailer/dealer can provide this service or refer you to local shops that perform this work.

CHAPTER 5: COMPONENTS/SYSTEMS

This chapter contains highlights of some of your boat's onboard systems and components. Additional details are included in literature supplied with your boat.

Bilge Blower

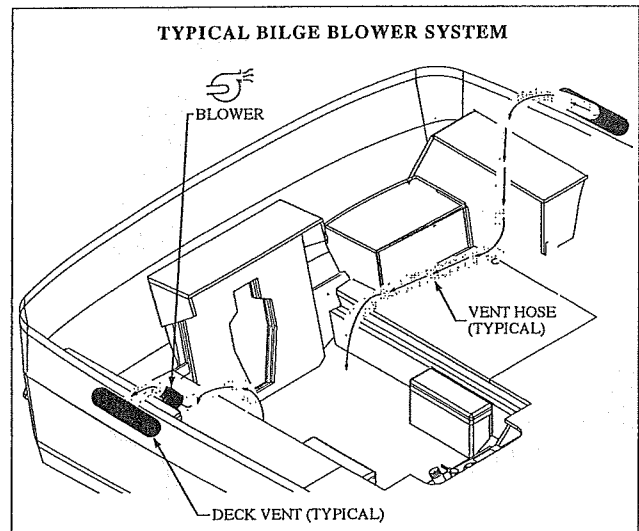


Do not obstruct or modify the ventilation system.



Operation of the blower system is NOT A GUARANTEE that explosive

fumes have been removed. If you smell any fuel, DO NOT start the engine. If the engine is already running, immediately shut off the engine and all electrical accessories. Investigate immediately.



The bilge blower removes fumes from the engine compartment and draws fresh air into the compartment through the deck vents.

To ensure fresh air circulation, operate the bilge blower for at least four minutes before starting the engine, during starting, and while operating the boat below cruising speed.

Starter Motor

Do not operate the starter for more than 30 seconds at a time. Allow at least one minute for cooling between start attempts. If the starter does not operate, check the battery charge and all direct wiring for shorts or loose connections. The starter can be damaged if excess bilge water is allowed to come in contact with it.

This model may be equipped with optional single dockside inlet, check for proper polarity as outlined above. Activate the AC system by first turning on the master breaker, then each individual component breaker as required.

When using shore power, simultaneous operation of several AC accessories can result in an overloaded circuit. It may be necessary to turn off one accessory while operating another.

Fuel System



It is very important that the fuel system be inspected thoroughly the first time it is filled and then at each subsequent filling. For your safety and the safety of your passengers, the fueling instructions in this manual must be followed.



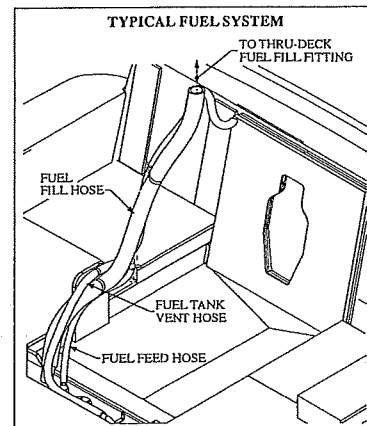
Avoid the storage or handling of gear near the fuel lines, fittings and tank.

1. Fuel Fills and Vents:

Fuel fills are located either on the aft deck or on the side decks adjacent to the aft cockpit. Fuel receptacle caps are marked "GAS". Fuel vents are normally located in the hull or transom below and in the same general area as the fill. If you experience difficulty filling the fuel tank, check to see that the fuel fill and vent lines are free of obstructions and kinks.

2. Antisiphon Valves:

Your boat may be equipped with an antisiphon valve, which is an integral part of the barb fitting on the fuel tank to which the neoprene fuel line attaches. The valve is spring loaded and is opened by fuel pump vacuum. These valves will prevent gasoline from siphoning from the fuel tank in the event of a fuel line rupture.



If an engine running problem is diagnosed as fuel starvation, the antisiphon valve should be checked. In the event the valve is stuck or clogged, it should be cleaned or replaced while the engine is shut down. Under no circumstances should it be removed except in an emergency.

3. Fuel Filters:

All fuel tanks are equipped with a fine mesh screen filter on the fuel pickup tube in the tank or on the tank to fuel line fitting. In addition, when supplied by the engine manufacturer, an additional filter is installed on the engine. Fuel filters should be replaced periodically to ensure that they are clean and free of debris.

Consult your selling retailer/dealer or local marina concerning fuel additives that help to prevent fungus or other growth in your fuel tanks.

Navigation Lights

Vessels are required to have navigation lights turned on from “dusk to dawn” or in conditions of reduced visibility. It is wise to run at reduced speed whenever navigation lights are needed. Although the navigation lights supplied with your boat are of top quality, failure may occur for a variety of reasons:

1. There may be a blown fuse. (Replace the fuse in the switch panel.)
2. The bulb may be burned out. (Carry spare bulbs for replacement.)
3. The bulb base may be corroded. (Clean the base periodically and coat it with nonconductive grease.)
4. A wire may have come loose or may be damaged. (Repair as required.)



Avoid the storage of gear where it would block the navigation lights from view.



Prolonged operation of cabin interior lights (overnight) will result in a drained battery. Be conservative in the use of battery power.

Depth Sounder

Your boat may come equipped with a depth sounder. It will provide you with measurements of water depth beneath the boat. In many cases it may help you locate schools of fish. The depth sounder comes with its own owner’s manual. We suggest that you read it carefully before using the unit.



DO NOT use the depth sounder as a navigational aid to prevent collision, grounding, boat damage or personal injury. When the boat is moving, submerged objects will not be seen until they are already under the boat. Bottom depths may change too quickly to allow time for the boat operator to react. If you suspect shallow water or submerged objects, operate the boat at very slow speeds.

Cleats / Bow and Stern Eyes / Lifting

Cleats are intended for mooring use only and must not be used for lifting the boat.

The bow eye should be used to haul the boat onto a trailer. The stern eyes should be used as tie points for trailering the boat. The bow and stern eyes may be used for short term lifting of the boat such as for service. Long term lifting with the bow and stern eyes may cause stress on the fiberglass and gelcoat.

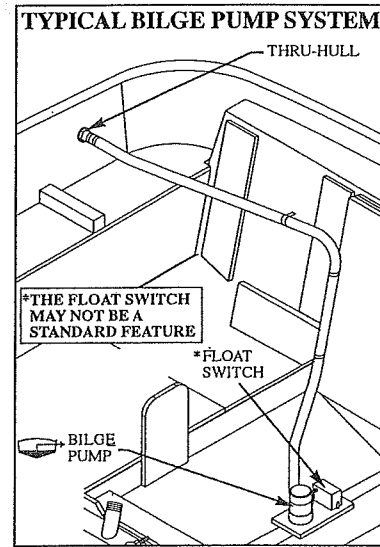
For long term storage use flat, wide belt-type slings and spreaders long enough to keep pressure from gunwales. Do not place slings where they may lift on underwater fittings.

Bilge Pump

This boat is equipped with two bilge pumps located at the lowest points of the bilge. The flow rate of each pump is 31.6 L (8.3 gal) per minute.

Operation of the bilge pumps should be checked frequently. To check the bilge pumps, activate the dash-mounted switch and verify that any water in the bilge is pumped overboard. If bilge water is present and the pump motor is running but not pumping, check the pump housing for debris. If the pump is clear but still does not move water, check the discharge hose for kinks or a collapsed area.

The autofloat switch should also be checked frequently for proper operation. As you raise the float to its full upward position, the bilge pump should turn on. If raising the float does not switch the pump on, check the in-line fuse at the battery switch board. Make sure it has not blown. If the fuse is good, but the switch still does not work, it usually indicates a bad switch, or possibly a low battery. In either case, call your selling retailer/dealer for further assistance.



Discharge of oil, oil waste or fuel into navigable waters is prohibited by law. Violators are subject to legal action by the local authorities.

Potable Water System

Your boat may be equipped with the optional pressurized water system. Pressure type (demand) systems operate any time the electrical switch for the pump is in the ON position. Make sure the switch is OFF when the boat is not in use, or whenever the water tank is empty.

Air Conditioning

Your boat may be equipped with an optional air conditioning system. Operating instructions can be found in the boat's literature package. Be sure to read and carefully follow the manufacturer's instructions.

Marine Head with Holding Tank

Sea water is used to flush waste from the toilet into the holding tank. The holding tank is plumbed to a waste fitting on the deck for use at a dockside pump-out station, and to a macerator pump so that waste may be pumped overboard where regulations permit. The switch for the macerator is usually located at the helm station.

If at any time you are unable to pump water into the bowl, the probable cause is debris in the pump diaphragm. To remedy this, shut the inlet seacock and dismantle the pump. The pump is generally held together with six screws. The design is simple and the problem will be obvious when the pump body is split open.

To winterize the toilet, shut off the intake valve and pump until the bowl is dry. Remove the drain plug in the base and pump again to remove all water. Do not fill the bowl with antifreeze. The inlet seacock should be left closed while the boat is underway, or whenever the boat is left moored in the water.

110-volt receptacles in the galley are equipped with ground fault circuit interrupters to protect users from electric shock. This device will also protect other **labeled** outlets.

Electrical System



SHOCK and/or FIRE HAZARD!

To minimize the risk of shock and/or fire:

- Only qualified personnel should perform electrical system maintenance.
- NEVER install knife switches or other arcing devices in fuel compartments.
- NEVER substitute automotive parts for marine parts. Electrical, ignition and fuel system parts on your boat are designed and manufactured to comply with Rules and Regulations to minimize risks of fire and explosion.
- Do not modify the boat's electrical systems (including shore power connectors) or relevant drawings.



FIRE and/or EXPLOSION HAZARD! Batteries produce explosive hydrogen gas. Explosive fuel fumes are heavier than air and will collect in the bilge areas.

To minimize the risk of fire and/or explosion:

- ALWAYS operate the bilge blowers for at least four minutes prior to engine starting, electrical system maintenance, or activation of electrical devices.
- Only qualified personnel should install batteries and perform electrical system maintenance.
- NEVER expose the batteries to open flame or sparks. NO SMOKING anywhere near the batteries.
- Insure that all battery switches are in the OFF position before performing any work in the engine spaces.



All electrical connections are susceptible to corrosion. To help prevent electrical malfunction due to corrosion, keep all exposed electrical connections clean and protect them with a good quality spray-on protectant such as Corrosion Guard®.

12-Volt DC

1. Battery:

The key to a good marine electrical system is the battery (the batteries are selling retailer/dealer - installed items). Refer to the engine manual for battery rating requirement information.

The condition of the battery can be read on the voltmeter when the ignition switch is in the ON position (see also - *Instruments*, Chapter 4).



You should never disconnect the battery cables while the engine is running, as this can cause damage to your boat's electrical system components.



The battery charging systems (alternator and, if applicable, battery charger) installed are designed to charge conventional lead-acid batteries. Before installing gel-cell or other new technology batteries, consult with the battery manufacturer about charging system requirements.

Check the battery electrolyte level regularly. Remove the caps on top of the battery and observe the level of the fluid inside. If the lead plates are exposed, add distilled water until they are covered again. Corroded terminals can impair battery performance and charging ability. Clean them with baking soda and water; then coat them with a preservative or a light film of grease. Be sure all battery connections are tight. When storing the boat, it is best to remove the battery, give it a full charge, and store it inside away from extreme temperatures.

2. Fuses and Circuit Breakers:

Both the engine and accessory circuits are protected by a large circuit breaker located on the engine. In addition a fuse block for branch accessory circuits is located behind the helm panel. Wires are color coded to indicate which accessory each fuse services. Some items, such as radios and bilge pumps, may be fused individually at the unit. Auto float switches are fused at the battery.

3. Voltages:

All boats use either 110-volt AC/60 Hertz, 240-volt AC/60 Hertz or 220-volt AC/50 Hertz single phase systems, and 12-volt DC or 24-volt DC. Electrical distribution panels are labeled with voltage and frequency of AC and DC.

Alternating Current (AC) Option

AC electrical system diagrams are provided in the back of this manual.

The AC system is energized by shore power. The shore power receptacle is rated at 30- amps and the appropriate power cord is furnished. Since not every shore installation has 30-amp service, we recommend that 15- and 20-amp adapters be purchased. However, whenever 15- or 20-amp adapters are used, there will be a corresponding drop in supplied power from the dockside system.



ELECTRIC SHOCK and/or ELECTRICAL SYSTEM DAMAGE HAZARD.

NEVER hook dockside power to your boat overseas unless you purchased the overseas option, which is rated for 220-volt/50 Hertz, whereas standard domestic systems are rated for 110-volt/60 Hertz power.

Whenever possible, use double insulated or three wire protected electrical appliances.



ELECTRIC SHOCK and/or ELECTRICAL SYSTEM DAMAGE HAZARD.

Monitor the electrical control panel's polarity indicators when connecting shore power to your boat. A green light illuminating after the power cord is plugged into the boat's external power receptacle indicates acceptable electrical power. Therefore, you may energize the main breaker switches. However, a red light indicates reversed polarity, which could cause electrical system damage and possible electrical shock injuries. In this case, **DO NOT** energize the main breaker switches. Instead, immediately disconnect the shore power cord (always from the dockside outlet first) and notify marina management.

Before connecting to shore power, ensure all breakers and switches on the AC Master Panel are in the OFF position. Always attach the shore power cord to the boat inlet first; then to the dock connection, thereby avoiding accidental dropping of the "Hot" cord into the water. Correspondingly, remove the dock connection before removing the cord from the boat.

CHAPTER 6: GENERAL MAINTENANCE AND REPAIRS

In addition to instructions found elsewhere in this manual and in the literature specific to certain components, the following information is provided for general maintenance and repairs.

Conditions vary widely in different areas, and since frequency and type of use can differ greatly between owners, intervals for maintenance are not listed here. Common sense should determine the frequency of maintenance.

Bilges/Engine Compartment

1. Pump the bilges dry and remove all loose dirt. Be sure all limber holes are open. If there is oil in the bilge and the source is not known, look for leaks in engine oil lines, coolers, transmission or engine gaskets. Oil stains can be removed by using a bilge cleaner available from your selling retailer/dealer or marina. **Do not** use flammable solvents.
2. Check all wiring to be sure it is properly supported, that its insulation is intact, and that there are no loose or corroded terminals. If there are corroded terminals, they should be replaced or thoroughly cleaned with sandpaper. Tighten all terminals securely and spray them with a light marine preservative oil.
3. Inspect the entire fuel system (including fill lines, vents, and supply lines) for any evidence of leakage. Any stains around joints could indicate a leak. Try a wrench on all fittings to be sure they are not loose, but do not overtighten them. Clean fuel filters and vent screens. Operate all valves to be sure they are in good condition. This is best performed by a qualified mechanic.
4. Inspect the entire bottom for evidence of seepage, damage or deterioration, paying particular attention to hull fittings, hoses, and clamps. Straighten kinked hoses and replace any that do not feel pliable. Tighten loose hose clamps and replace those that are corroded. Tighten any loose nuts, bolts, or screws. Operate seacocks to be sure they are in good condition. Seacocks need lubrication to ensure a long working life.
5. **Refer to your engine operating manual for engine maintenance details.** Wipe off engine(s) to remove accumulated dust and grease. If a solvent is used, make sure it is nonflammable. Go over the entire engine and tighten loose nuts, bolts, and screws, including the mounts (however, do not turn the mount adjusting screws). Inspect the wiring on the engine and clean and tighten the terminals. Inspect the belts and tighten them if needed. Replace any belt that is cracked or frayed. Clean and lubricate the battery terminals; fill the cells with distilled water as needed.

Interior and Topside Areas

1. Test all electrical equipment to make sure they operate properly. Inspect all wiring for proper support, sound insulation and tight terminals.
2. Check ladder and grab rails for loose screws, breaks, sharp edges, etc. that might be hazardous in rough weather. Inventory and inspect life jackets for tears and deterioration. Check your first aid kit to make sure it is complete. Check the signaling equipment. Inspect anchor, mooring and towing lines and repair or replace as required. **DO NOT** stow wet lines as they may mildew and rot.
3. Salt and brackish water are capable of etching and damaging window glass. Keeping windows clean is the best preventive measure you can take. When window cleaning, flush with plenty of fresh water.

4. Stainless steel railings and fittings should be cleaned with soap and water or household glass cleaner. To prevent pitting on stainless steel railings and fittings, remove rust spots immediately with brass, silver or chrome cleaner. Then coat with a good automobile or boat wax.
Never clean stainless steel with mineral acids or bleaches.
Avoid contamination leading to rust and/or corrosion by not allowing stainless steel railings and fittings to be in constant contact with iron, steel or other metals.
5. A variety of high quality fabrics have been used in the construction of your boat. Proper care and cleaning of all fabrics on a regular basis will contribute to their long life. The most important thing to remember is that stains **must** be cleaned up immediately if the original beauty and strength of the fabric are to be maintained over a long period of time. Independent laboratory testing has shown that some sunscreen lotions and oils can permanently stain most types of vinyls and fabrics, so exercise care when using these products.
Prior to cleaning any fabric, we suggest that you **test your cleaning solution and method on a hidden or inconspicuous area**. That way, if that particular cleaning method causes damage, it will be confined to a small, less noticeable area.
Convertible tops and vinyl upholstery can be cleaned using a mild soap and warm water solution also. Rinse after scrubbing with plenty of cold, clean water and air dry in a well ventilated place, again preferably away from direct sunlight. For detailed vinyl cleaning instructions see the Nautolex® insert in your owner's packet.
Vinyl cleaners and conditioners are **NOT** recommended for use on upholstery, as they tend to remove plasticizers that extend the life of the vinyl. To prevent rainwater seepage at the seams, a coating of ScotchGard® can be applied.
Mildew can occur if your boat does not have adequate ventilation. Heat alone will not prevent mildew; you must also provide for fresh air circulation. If mildew does occur, it often can be removed using a solution of warm water and laundry bleach (one cup of bleach to one gallon of warm water). Brush the solution into the affected area, let it sit for 10 to 15 minutes, and rinse with plenty of cold, clean water. Air dry in a well ventilated place, once again preferably away from direct sunlight.
If at all possible, the vinyl top parts of your boat should be stored indoors in a fairly warm, dry place. This will greatly extend the life of the material.
6. When marine instruments are exposed to a saltwater environment, salt crystals may form on the bezel and the plastic covers. These salt crystals should be removed with a soft, damp cloth; never use abrasives or rough, dirty cloths to wipe plastic parts. Mild household detergents or plastic cleaners can be used to keep the instruments bright and clean.

Hull

1. The finish on a fiberglass boat is similar to that of an automobile and will respond to the same system of care and cleaning.
Use a sponge and a mild soap and warm water solution to clean exterior surfaces of your boat. Rinse the boat well with plenty of clean water. Use a quality boat wax to protect the finish. Note that there are a variety of polishes and cleaners for fiberglass on the market. We suggest that you experiment with different brands to determine which work best for you.
2. Almost unavoidable during the life of your boat is damage to the gelcoat or colored surface. This is not as serious as you might think. Repair is not costly and can be done by the novice.
Scratches: If the scratch does not penetrate the gelcoat surface, it can be repaired with automotive rubbing compound. Dampen a soft rag and apply the compound with a continuous circular motion. The scratch may not disappear completely; however, its noticeability will decrease.

Gouges and Chips: To repair, obtain “patch paste” from your selling retailer/dealer and follow this recommended procedure:

- Clean the area to be repaired of wax and oil. Acetone is a good solvent.
- Mix a small portion of patch paste and catalyst according to the manufacturer’s instructions.
- Apply the paste to the gouge with a putty knife or flat-edged stick; try to match the paste to the surface contour of the area being repaired. It is better to have an excess of paste, rather than not enough.
- Allow the paste to harden thoroughly. In most climates, one to two hours should be sufficient.
- Shape the patch as desired, using fine wet sandpaper.
- Finish by using automotive rubbing compound in the same manner as you did for small scratches.



Acetone and patch paste catalyst are hazardous materials and should be used only in well ventilated areas. Follow the manufacturer’s instructions. Also, never store rags that have been wetted with acetone, teak oil, fuel or any other solvent aboard your boat. Immediately remove them from the boat and discard them properly to prevent spontaneous combustion and fire.

3. Bottom paint on boats is designed to dissolve slowly to prevent marine growth. Therefore, it is unusual to find a boat bottom that does not need repainting after a season’s use.

Periodically haul the boat out of the water and scrub the bottom with a bristle brush and a solution of soap and water. It is not always necessary to repaint the bottom each time it is scrubbed, but no bare spots should be permitted. Our recommended procedure for painting the bottom is as follows:

- Prepare the bottom by sanding, cleaning and fairing as required.
- It is imperative that the new paint be applied over a perfectly dry surface. Fiberglass hulls should never be hauled, painted and relaunched on the same day, since this does not allow sufficient time for the moisture which has been absorbed into old paint film to completely dry out. Generally, 24-36 hours of drying time will be required.



If your boat is to be moored (for any length of time), US Marine recommends the application of an epoxy barrier coating, such as International Paint Company’s Interlux “Interprotect 2000 or 3000 Systems®”. This application will help seal the hull bottom and reduce the possibility of gelcoat blistering. The barrier coating should be covered with several coats of antifouling paint. Note that many states regulate the chemical content of bottom paints in order to meet environmental standards. Check with your local selling retailer/dealer about recommended bottom paints, and about laws that are in effect in your area.

4. Whenever your boat is out of the water you should check all metal parts for stray current or galvanic corrosion. Stray current corrosion, or electrolysis, can be prevented several ways. The following are the most common causes and the simplest cures:
 - Wiring may leak a certain amount of electricity: Keep a clean, dry bilge.
 - If your boat is moored, we recommend that you contact someone in your area specializing in corrosion control and have them check your boat in its moorage to see that it is properly protected.
5. Propellers should be inspected often for damage.

Storage

The following suggestions are offered for storage at the end of your boating season.

1. If your boat is to be stored out of the water, it is extremely important that its hull is properly supported to avoid permanent hull distortion. If your boat is stored inside, it should be in a well-ventilated building.
2. A temporary winter cover is recommended if covered storage isn't available. A proper winter cover should keep the weather off the boat, but still provide adequate ventilation. Wrapping a boat in a tight plastic cover can do more damage than good. Dampness and lack of air circulation provide ideal conditions for the fungi that cause mildew and dry rot.
3. If you are storing your boat on its trailer:
 - Now is a good time to repack the trailer's wheel bearings. Your local auto service center can help you.
 - Block the trailer wheels off the ground to avoid tire deterioration.
 - Loosen the stern tie-downs to avoid stress on the hull.
4. If you are storing your boat up on blocks:

Use three blocks, each with at least two square feet of bearing surface. Place one block under each corner of the transom, with the third one going up forward under the keel. Preferably, the forward block should be V-shaped, and should be located under a bulkhead.
5. Outdoors, boat should be stored bow up with the drain plug out.
6. Refer to your engine manual for engine and fuel storage instructions.



Fire and explosion hazard.

Thermally expanding fuel could flow out of the fuel tank vent and accidentally ignite. Always allow for thermal expansion when filling your fuel tank.

7. Fuel tanks should be filled so there is little air space, thereby minimizing condensation.
8. Refer to your engine manual for storage procedures related to the batteries, and to the engine seawater cooling system.
9. Thoroughly clean your boat. If possible, remove cushions, mattresses, blankets, towels, and other items that can hold moisture and cause mildew. Such items left on board should be positioned for maximum air circulation. Stand mattresses and cushions on edge. Prop open doors, hatches, cabinets and ski lockers to allow fresh air to circulate.
10. Clean all deck hardware; then coat the hardware with rust inhibitor.
11. Lubricate the steering mechanism and throttle control linkage.
12. Close all seacocks.

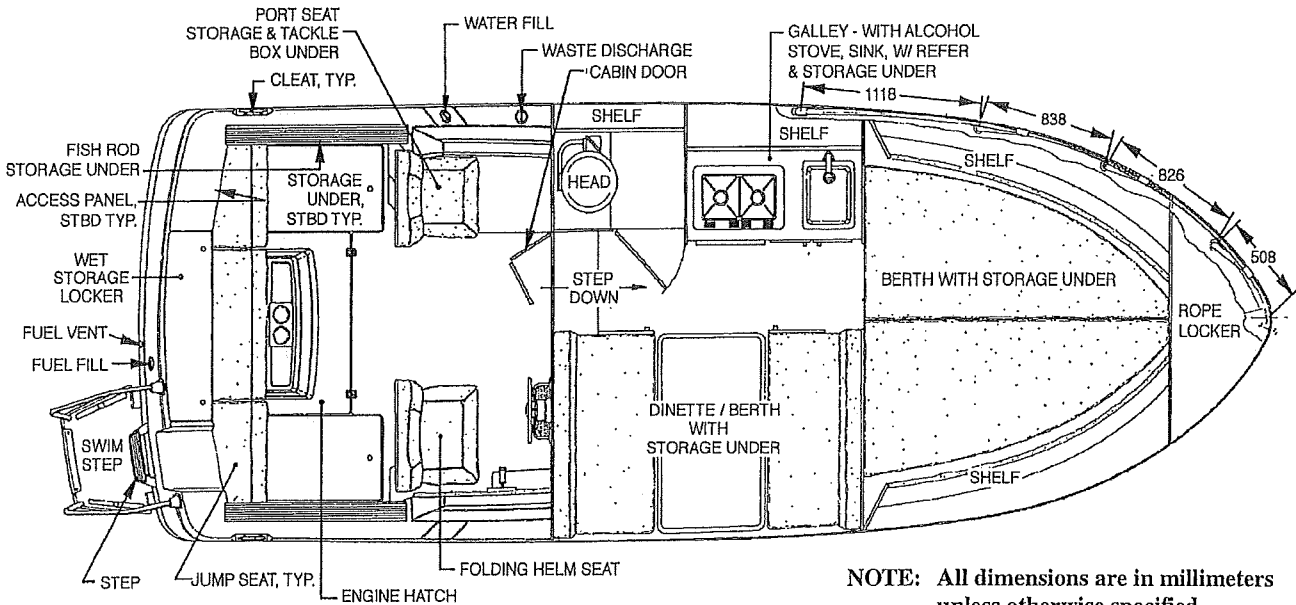
We hope these preventive measures will help make getting ready again in the spring easier. Should you have any questions, your selling retailer/dealer is anxious to provide assistance.

CHAPTER 7: PRODUCT SPECIFICATIONS

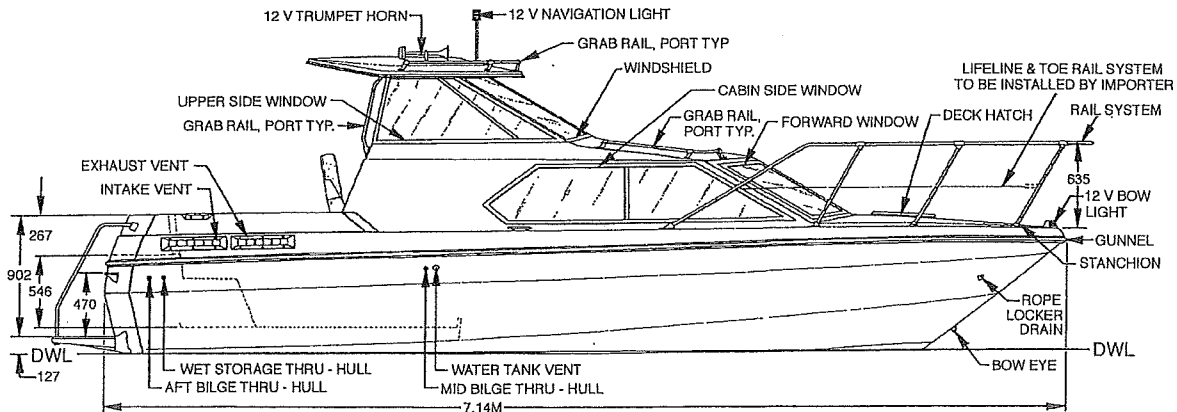
Navigation Class Intended - "C" (Inshore). Boat designed for voyages in coastal waters, large bays, estuaries, lakes, and rivers, where conditions up to and including wind force six (6) (Beaufort Scale) and significant wave heights up to and including two (2) meters (6.58 ft) may be experienced.

Overall Length	7.14 m (23' 5")
Bridge Clearance	2.54 m (8' 4")
Bridge Clearance Max	2.54 m (8' 4")
Waterline Length	5.72 m (18' 9")
Beam	2.54 m (8' 4")
Loaded Freeboard Fwd	81.3 cm (2' 8")
Loaded Freeboard Aft	91.4 cm (3' 0")
Maximum Draft	88.9 cm (2' 11")
Loaded Weight	2214 Kg (4882 lb)
Fuel Capacity	295 L (78 gal)
85% of Fuel Capacity	250.7 L (66.3 gal)
Water Capacity	75.7 L (20 gal)

Holding Tank Capacity	75.7 L (20 gal)
Total Admissible Power	223.7 kW (300 hp)
Battery Capacity	Dealer Installed
U.S. COAST GUARD MAXIMUM CAPACITIES	
Maximum Persons, Number	12
Maximum Persons, Weight	1800 lb
Maximum Load	1950 lb
CE/ISO MAXIMUM CAPACITIES	
Maximum Persons	10
Maximum Weight	880 Kg
Maximum Rated Power	186kW



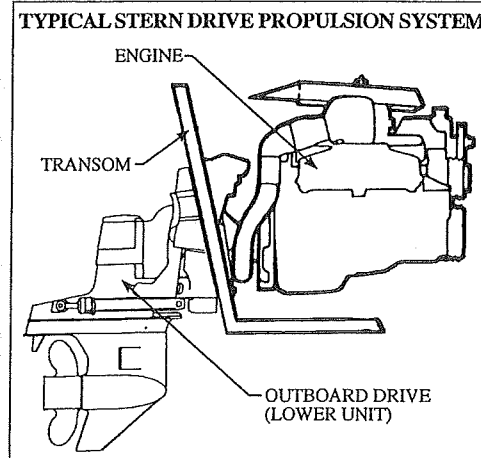
NOTE: All dimensions are in millimeters unless otherwise specified.



MerCruiser Engines



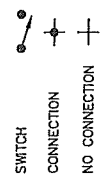
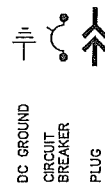
Usable power (kW or HP @ RPM) listed below will be reduced by gear losses.



Pkg Wt. Lbs.	Pkg Wt. Kg.	Manufacturer's Description	Engine Configuration	Drive Type	Rating HP	Rating kW	Full Throttle RPM (X100)
907	411	5.7L Alpha 1	V-8	Stern Drive	210	156	42-46
985	447	5.7LX Bravo 2	V-8	Stern Drive	250	186	44-48
893	405	5.0L Alpha 1	V-8	Stern Drive	220	164	44-48
985	447	5.7L Bravo 2	V-8	Stern Drive	250	186	44-48
1050	477	350 Mag MPI Bravo 3	V-8	Stern Drive	300	224	44-48

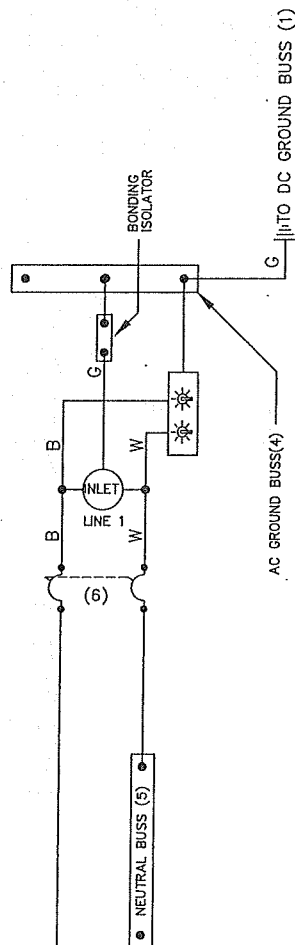
CHAPTER 8: DRAWINGS AND DIAGRAMS

Single Dockside Wiring Diagram

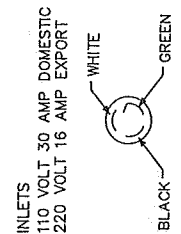


COLOR CODES: B - BLACK
BL - BLUE
G - GREEN
O - ORANGE
PU - PURPLE
R - RED
T - TAN
W - WHITE
Y - YELLOW
LT - LIGHT
DK - DARK

- (2) 5A 14/3 BATTERY CHARGER
- (2) 10A 14/3 RECEPTACLES
- (2) 10A 14/3 WATER HEATER
- (2) 10A 12/3 RANGE
- (2) 2A 14/3 REFRIGERATOR
- (NOTE - A)

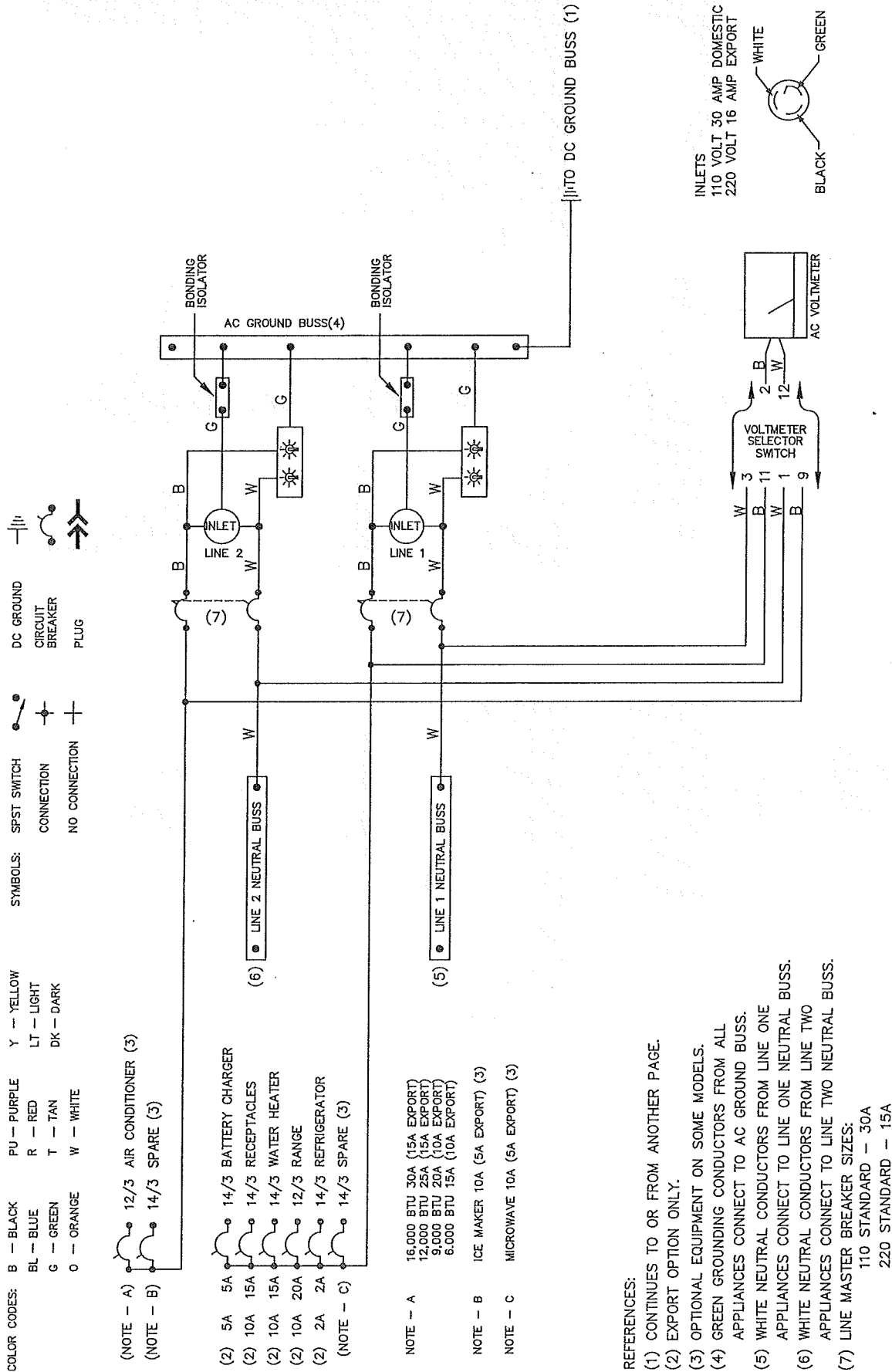


NOTE - A ICE MAKER 10A (5A EXPORT) (3) OR MICROWAVE 10A (5A EXPORT) (3)

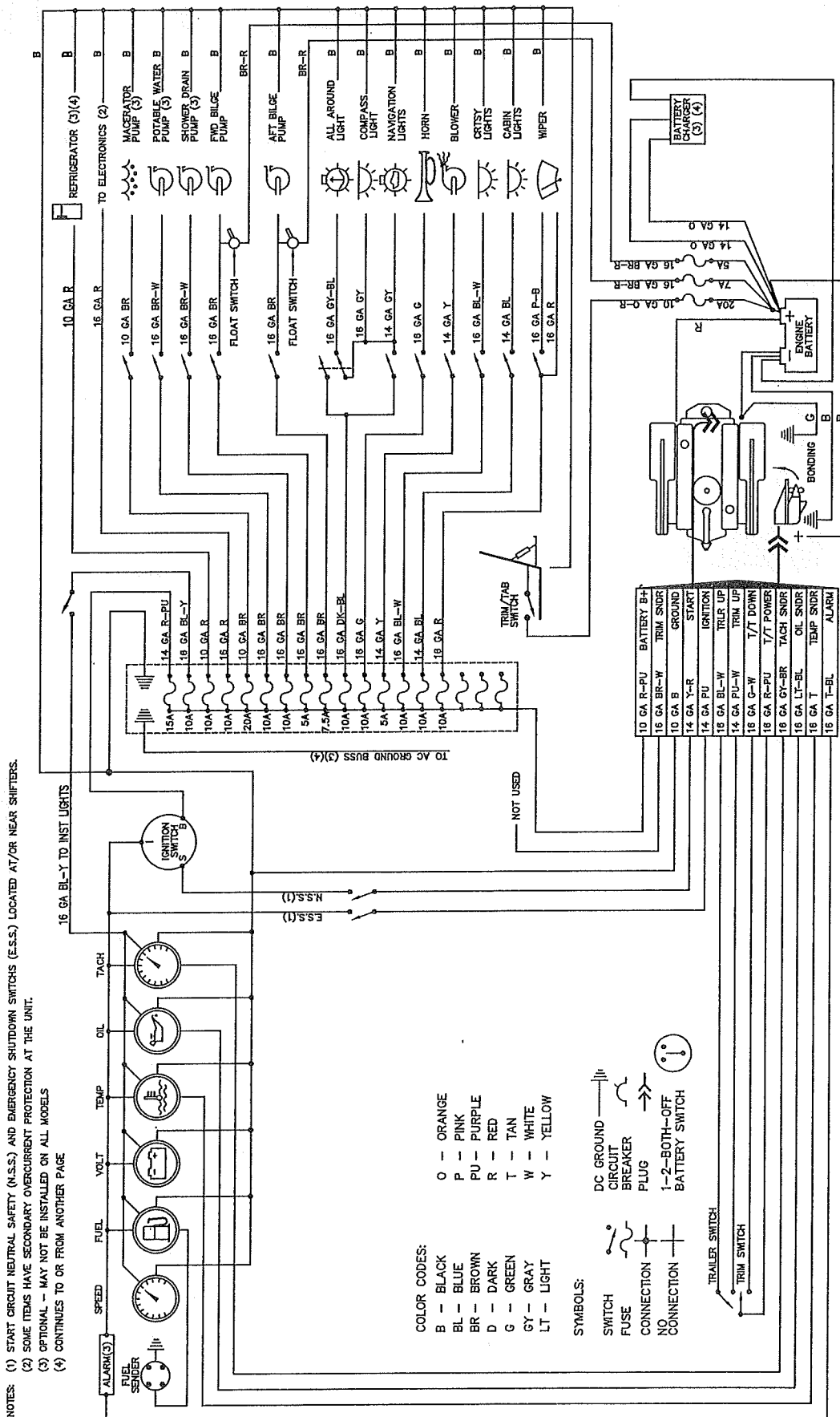


- REFERENCES:
- (1) CONTINUES TO OR FROM ANOTHER PAGE.
 - (2) EXPORT OPTION ONLY.
 - (3) OPTIONAL EQUIPMENT ON SOME MODELS.
 - (4) GREEN GROUNDING CONDUCTORS FROM LINE APPLIANCES CONNECT TO AC GROUND BUSS.
 - (5) WHITE NEUTRAL CONDUCTORS FROM LINE APPLIANCES CONNECT TO NEUTRAL BUSS.
 - (6) LINE MASTER BREAKER SIZES:
110 STANDARD - 30A
220 STANDARD - 15A

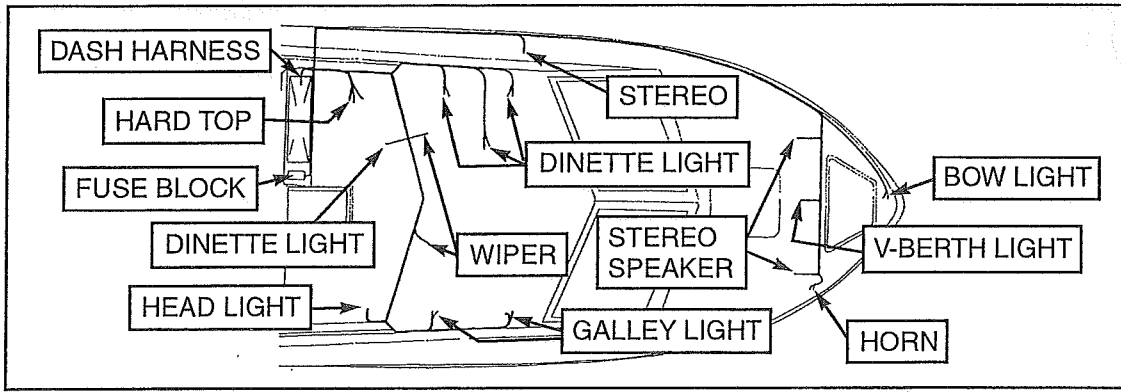
Dual Dockside Wiring Diagram



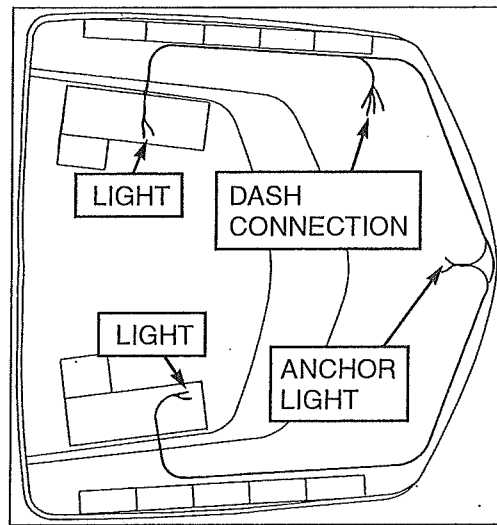
Gas Engine Electrical System Wiring Diagram



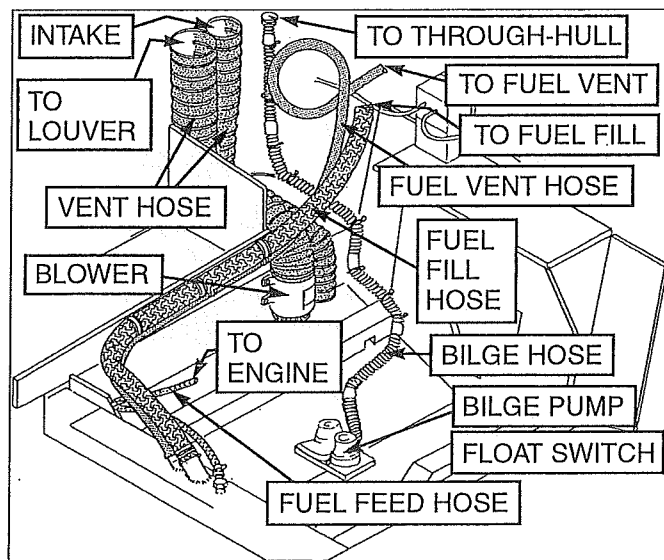
Deck Electrical Routing



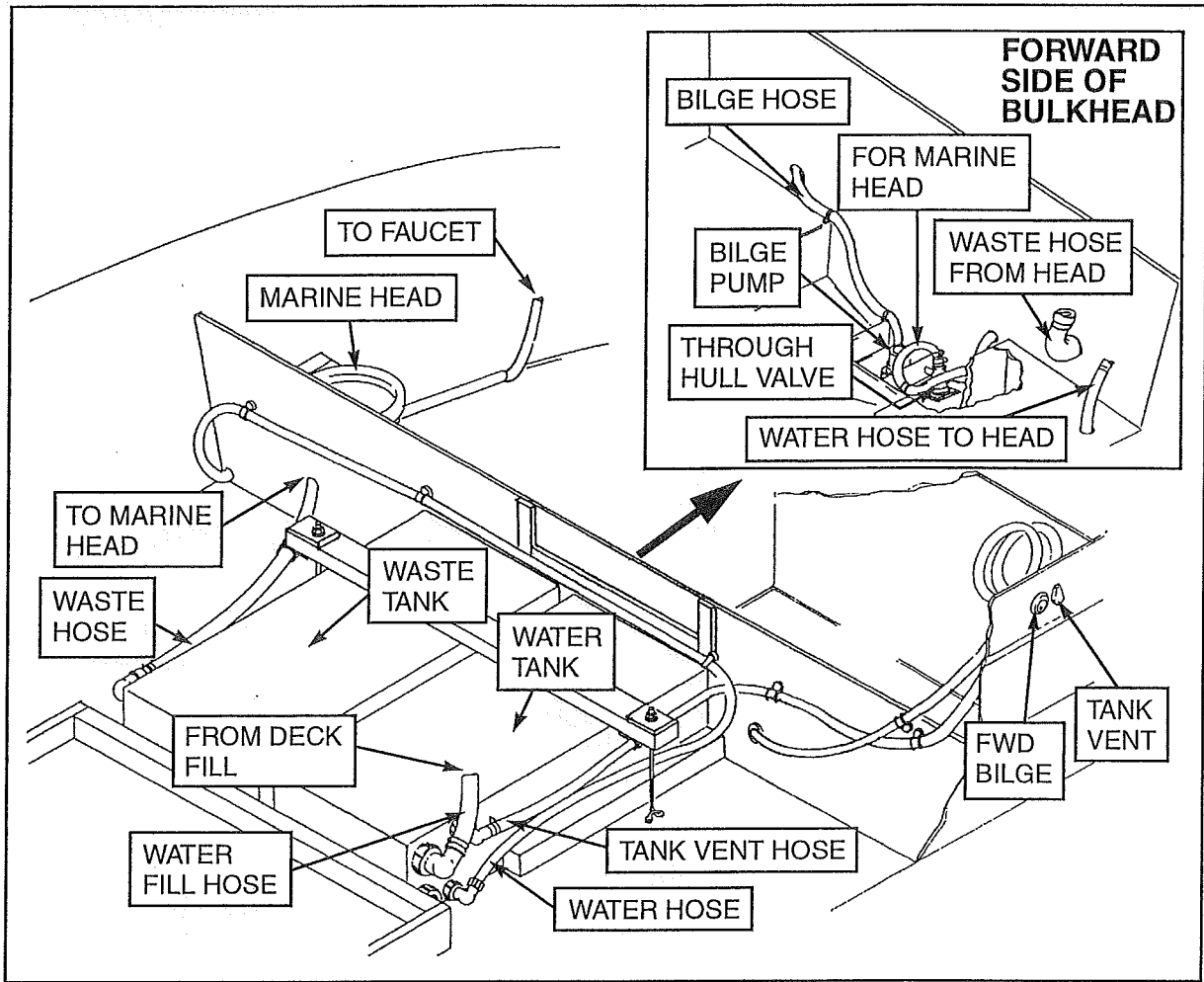
Hardtop Electrical Routing



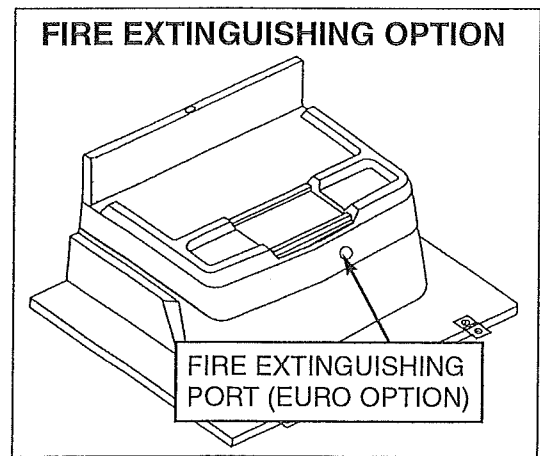
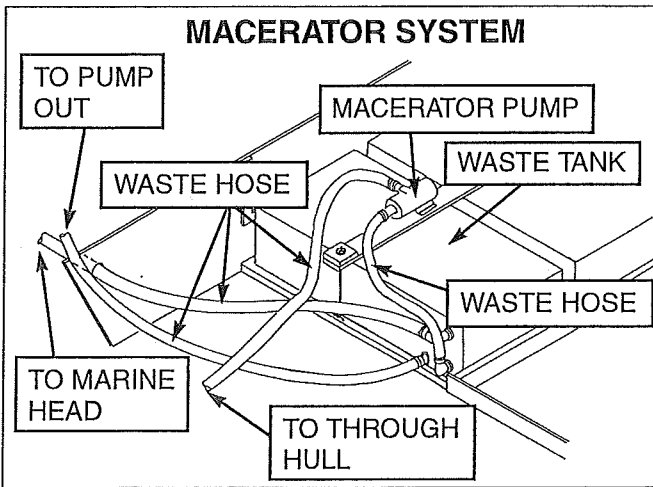
Fuel, Aft Bilge Pumping and Blower System



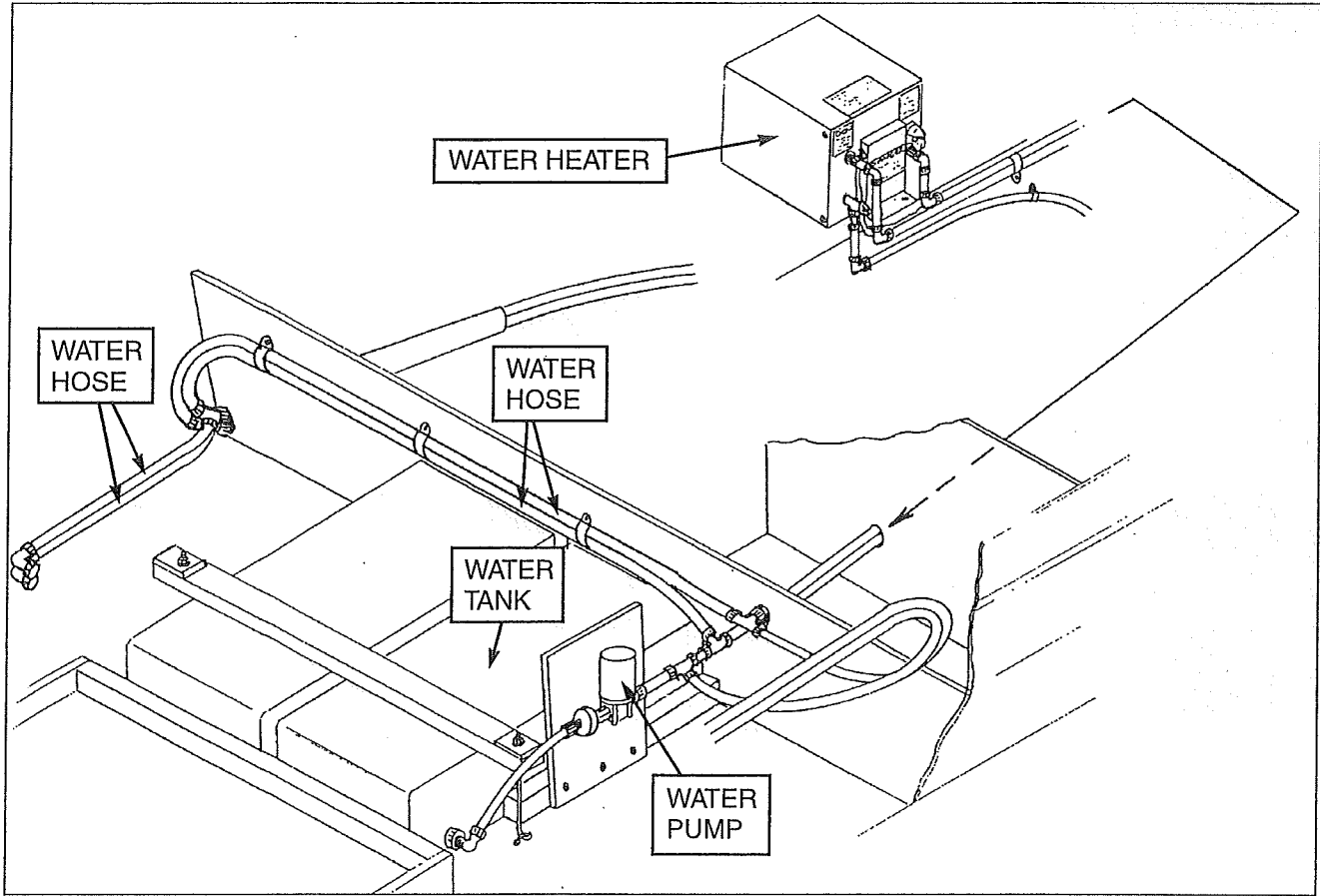
Forward Bilge Pumping and Water Tanks



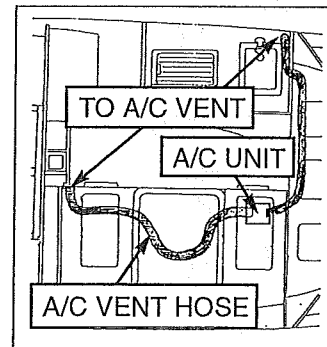
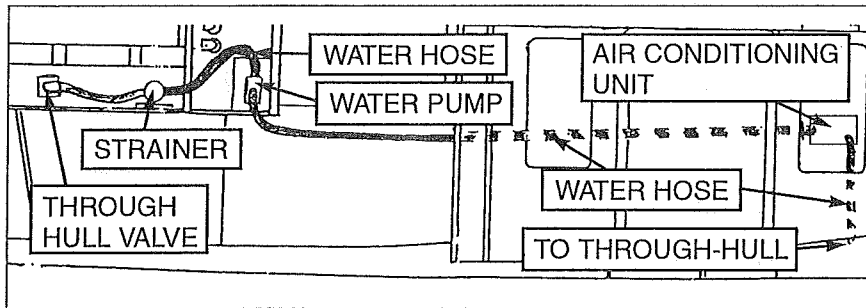
Macerator and Fire Extinguishing Option



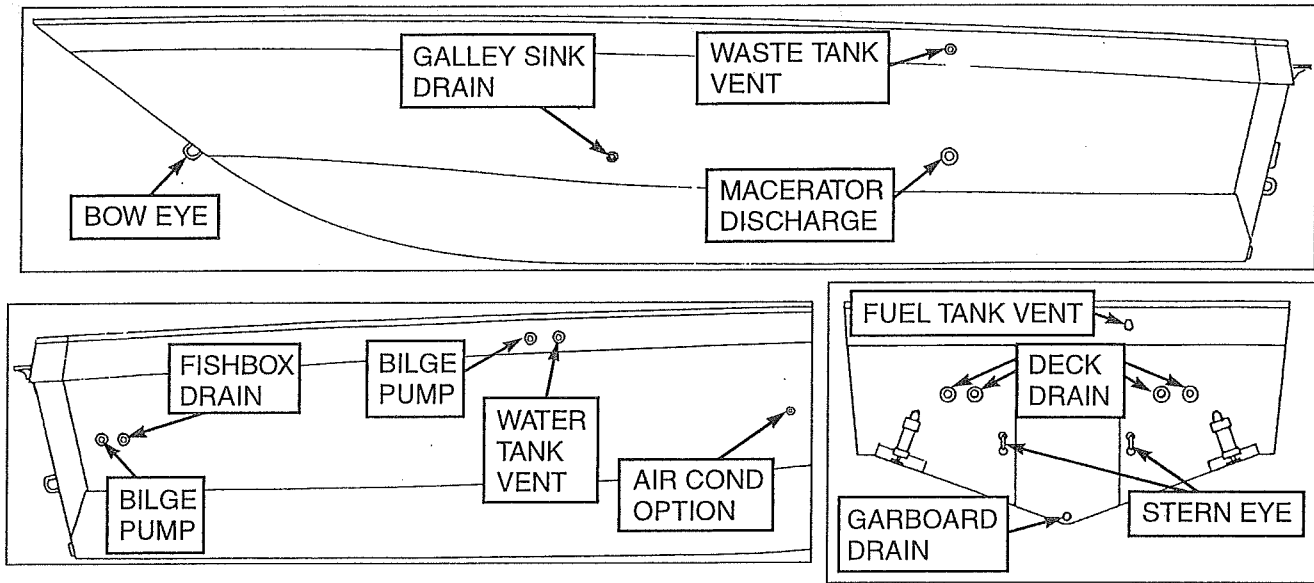
Water System Option



Air Conditioning Option

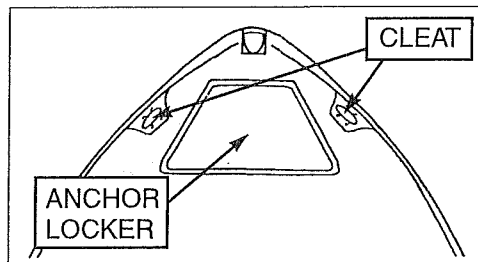


Through-Hull Location

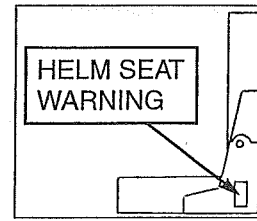
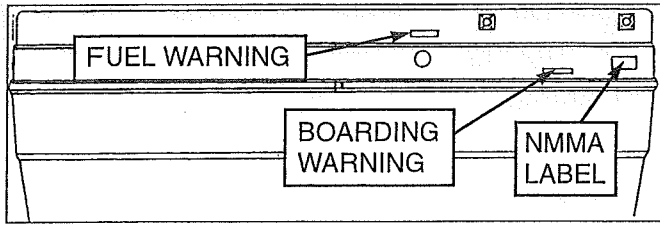


Anchoring Arrangement

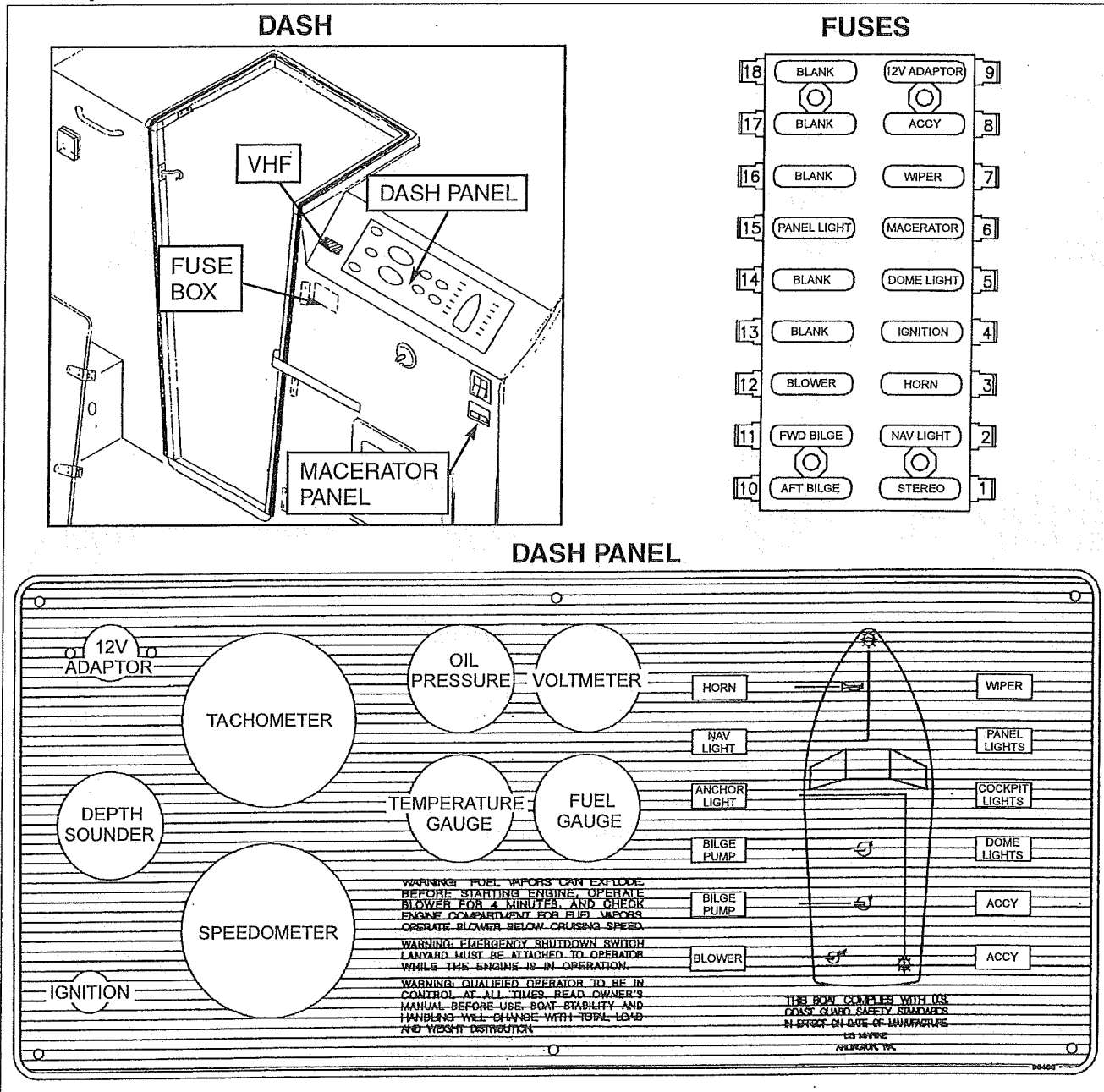
Your boat is equipped with an anchor storage hatch. Stow the anchor in the hatch when not in use. Before using the anchor be sure the anchor line is secured to the bow eye or bow cleat.



Labels and Warnings




Dash Layout




CHAPTER 9: ISO SYMBOLS


The ISO symbols shown below are used throughout your boat to identify and describe the various systems and components.


Air Cooled Charge Air Cooler

Intake Air (For Combustion)


Air, General


Anchor


Blower


Compass


Counter Clockwise Rotation


Crankshaft Power


Disengage


Elapsed Time


Electric Generator

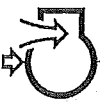
Electrical Preheat for Diesel Eng.


Engage


Engine


Engine Air Intake


Engine Inlet Air Filter


Engine Inlet Air Pressure

Engine Inlet Air Temperature


Engine Exhaust Gas Pressure



















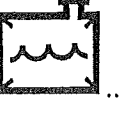
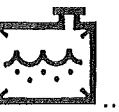




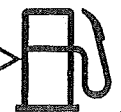
Engine Exhaust Gas

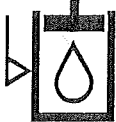
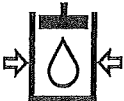






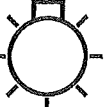


Engine Exhaust Gas Temperature






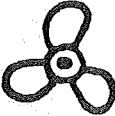

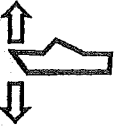






Engine Oil


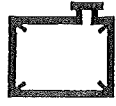

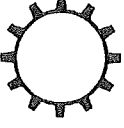
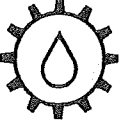
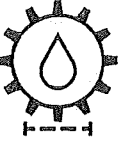






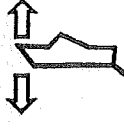
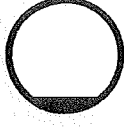
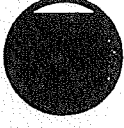
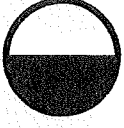

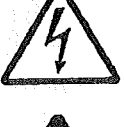






Engine Oil Temperature

Engine Oil Pressure

- | | | | |
|---|---|---|-------------------------------|
|  |Engine Oil Filter |  |Fuel Filter |
|  |Engine Oil Level |  |Fuel Shut Off |
|  |Engine Coolant |  |Fuel, Diesel |
|  |Engine Water Jacket Drain |  |Fuel, Unleaded |
|  |Engine Start |  |Fuel, Liquid Propane Gas |
|  |Engine Rotation Speed Expressed in R/MIN |  |Fuel Tank, Diesel |
|  |Exhaust Gas |  |Fuel Tank, LPG |
|  |Filter |  |Fuel Tank, Unleaded |
|  |Fresh Water |  |Heat Exchanger |
|  |Fresh Water Tank |  |Holding Tank |
|  |Fresh Water Cooled Charged Air |  |Horn |
|  |Fuel General |  |Hydraulic Oil Filter |
|  |Fuel Level | | |

- Hydraulic Oil Level
- Hydraulic Oil Presser
- Hydraulic Oil Temperature
- Hydraulic Oil
- Hydraulic System Malfunction
- Hydraulic System
- Interior Light
- Lift Point
- Light
- Lubricating Oil
- Malfunction

- No Open Flame
- Oil Tank
- Outboard Drive
- Outboard Drive Tilt
- Pressure
- Propeller
- Propshaft Power
- Propulsion System Trim
- Propulsion System Trim, Bow Up
- Propulsion System Trim, Bow Down
- Pump
- Read Owners Manual
- Seawater
- Shift Only Fwd-N-Rev

- Sling Location
- Tank
- Throttle/Shift
- Transmission
- Transmission Oil
- Transmission Oil Filter
- Transmission Oil Level
- Transmission Oil Malfunction
- Transmission Oil Pressure
- Transmission Oil Temperature
- Trim Tab Operation, Bow Down
- Trim Tab Operation, Bow Up
- Trim Tab Operation
- Volume Empty
- Volume Full
- Volume Half Full
- Warning
- Warning Electrical Hazard
- Warning Fire Risk
- Warning Hot
- Waste Water, Sewage
- Water Flushing Connector
- Windshield Washer Tank
- Windshield Wiper and Washer

CHAPTER 10: NAUTICAL TERMS

- Abeam:** To one side of a vessel, at a right angle to the fore-and-aft line.
- Aft:** Near or at the stern.
- Beam:** The width of the hull.
- Bilge:** The lowest portion inside a boat (in a fiberglass boat, generally the underdeck and lower portion of the engine compartment).
- Bow:** The forward portion of the boat.
- Chine:** The intersection of the side and bottom of a V-bottom boat.
- Draft:** Vertical distance from the waterline of the boat to the lowest point of the boat.
- Fathom:** A measurement of 1.83m (6 ft.), generally used to measure water depth.
- Freeboard:** Vertical distance from the deck to the waterline.
- Gunwale:** The upper edge of the side of a boat.
- Hatch:** A deck opening providing access to the space below. Normally fitted with a cover.
- Head:** Toilet or toilet room.
- Helm:** The tiller, wheel, and other steering gear.
- Keel:** The lowest external portion of the hull.
- Knot:** Nautical mile per hour; one nautical mile is 1851.96m (6,076 ft.); a land mile is 1609.34m (5,280 ft.)

Lee: The direction toward which the wind blows.

Port: To the left side of the boat facing forward.

Portlight: A hinged window in the boat's cabin or hull.

Scupper: An opening in a deck or cockpit permitting water to drain overboard.

Stanchion: A fixed, upright post used for support (of rails or lifelines).

Starboard: To the right side of the boat facing forward.

Stern: The after portion of the boat.

Stern Drive: Inboard/outboard propulsion unit.

Transom: The transverse part of the stern.

Windward: The direction from which the wind is blowing.

CHAPTER 11: LIMITED WARRANTY

US Marine warrants to the original purchaser of its 1998 model boats, purchased from an authorized retailer/dealer, operated under normal, noncommercial use that the selling retailer/dealer will:

1. Repair any structural hull defect which occurs within five (5) years of the date of delivery.
2. Repair or replace any parts found to be defective in factory material or workmanship within one (1) year of the date of delivery.

What Is Not Covered

This warranty does not apply to:

1. Engines, drive trains, controls, props, batteries, or other equipment or accessories carrying their own individual warranties;
2. Engines, parts or accessories not installed by US Marine;
3. Plexiglass windscreen breakage; rainwater leakage on runabout models; rainwater leakage through convertible tops; minor gelcoat discoloration, cracks or crazing or air voids;
4. Hull blisters that form below the waterline;
5. Normal deterioration, i.e. wear, tear, or corrosion of hardware, vinyl, tops, vinyl and fabric upholstery, plastic, metal, wood, or trim tape;
6. Any US Marine boat which has been overpowered according to the maximum horsepower specifications on the capacity plate provided on each US Marine outboard boat;
7. Any US Marine boat used for commercial purposes;
8. Any defect caused by failure of the customer to provide reasonable care and maintenance.

Other Limitations

THERE ARE NO OTHER EXPRESS WARRANTIES ON THIS BOAT. TO THE EXTENT ALLOWED BY LAW:

1. Any implied warranty of merchantability is limited to the duration of one year.
2. Neither US Marine nor the selling retailer/dealer shall have any responsibility for loss of use of the boat, loss of time, inconvenience, commercial loss or consequential damages.
3. Some jurisdictions do not allow limitations on how long any implied warranty lasts, so the above limitation may not apply to you. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Your Obligation

In order to comply with regulations, it is essential that your warranty registration card be submitted within 30 days of delivery of your boat. Return of this card is a condition precedent to warranty coverage. Before any warranty work is performed, we require that you contact your selling retailer/dealer to request warranty assistance.

We require that you return your boat, at your expense, to your selling retailer/dealer or, if necessary, to the US Marine factory. You will be responsible for all transportation, haulouts and other expenses incurred in returning the boat for warranty service.

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