

Sport Yacht

Welcome

As the new owner of the world's most prestigious Sport Yacht, we at Sea Ray Boats, Inc. would like to welcome you into our world-wide and ever-expanding fraternity of boating enthusiasts.

Every journey lets you enjoy the excitement of a new adventure. Your new Sport Yacht is more than a boat; it is a way of living. Our organization is dedicated to providing pleasure and fulfillment through our product quality, performance and dependability.

SEA RAY's commitment - Excellence by Design - has enabled us to create a superior craft providing you with comfort, performance, safety and dependability. All of our boats comply with the safety standards set by the United States Coast Guard and are designed, engineered and manufactured in accordance with applicable recommendations and guidelines of the National Marine Manufacturers Association (NMMA) and the American Boat and Yacht Council (ABYC).

This Owner's Manual, to be kept onboard your SEA RAY, introduces you to all the features which make our boats so incomparable. For years of trouble-free boating, take the time now to carefully review the information in the Owner's Packet and this manual and really get to know your boat!

Because our Product Development and Engineering division is continually upgrading our products, some descriptions in this manual may differ somewhat from the actual equipment on your boat. If this occurs, please refer directly to the updated information in the accompanying Owner's Packet. If such information is not included, consult your authorized dealer for assistance.

Because your purchase represents a substantial investment, we know you will want to take the necessary measures to protect its value. We suggest you plan a program for proper operation, routine periodic maintenance and attention to safety inspections. If you have questions which are not fully covered by this manual or the manufacturer's instructions, please consult your authorized dealer for assistance.


Thank you for selecting a Sea Ray®!


Bon Voyage




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.

 DANGER
The symbol shown above alerts you to immediate hazards which WILL cause severe personal injury or death if the warning is ignored.

 WARNING
The symbol shown above alerts you to hazards or unsafe practices which COULD result in severe personal injury or death if the warning is ignored.

 CAUTION
The symbol shown above alerts you to immediate hazards which COULD result in minor personal injury, or cause product or property damage if the warning is ignored.

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

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Information in this publication is based upon the latest product specifications available at printing. Sea Ray Boats, Inc. reserves the right to make changes at any time, without notice, in the colors, equipment, specifications, materials and prices of all models, or to discontinue models. Should changes in production models be made, Sea Ray® is not obligated to make similar changes or modifications to models sold prior to the date of such changes.

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Sea Ray®



Section 1 • General Information

For Your Information

OWNER'S PACKET

Throughout this manual we will be referring to your Owner's Packet. This file contains the Sea Ray® Owner's Manual, a plastic navigation chart and instructions on the warranties, use, adjustment and maintenance of installed equipment and accessories. It also contains the Engine Operator's Manual which covers the warranty, service, specification of oil and grease, proper gauge readings, 20-hour check and other precautions concerning your engines. Use your Owner's Packet to retain instructions and data on additional equipment or accessories installed after delivery.

We have included a booklet in your Owner's Packet called *You and Your Boat* published by the National Marine Manufacturers Association (NMMA). This booklet provides additional basic boat operation instructions and information.

If your copy is missing or you would like an additional copy, it is available from Dept. TM, National Marine Manufacturers Association, 401 North Michigan Ave., Chicago, IL 60611.

PARTS & EQUIPMENT

The personal equipment and supplies accumulated on a boat can amount to a great deal more weight than the owner realizes - with a possible loss of speed. Such weight should be kept to a reasonable minimum. When accessories or extra items are added, consider their weight and select their location to maintain the desired trim of the boat, fore, aft and athwartship. A drop in RPM will be noted as weight is added and it may be advisable to change propeller size to compensate. Because of these variables, Sea Ray® cannot guarantee performance standards such as speed. Consult your Sea Ray® dealer when considering the addition of a major weight.

Replacement parts or additional equipment may be purchased through your Sea Ray® dealer.

SEAWORTHY READING MATERIAL

It is beyond the scope of this manual to cover every aspect of boating and seamanship. There are many books available that provide information that you as a boat owner should become familiar with. One book that is considered to be the most well rounded in providing information about boating is *Piloting, Seamanship and Small Boat Handling*, By Charles F. Chapman. In addition, there are many free pamphlets available from your local Coast Guard Auxiliary. It is highly recommended that you read additional publications other than just this owner's manual to become a well informed boatsman.

Dealer's Responsibilities

Although your boat has undergone a series of rigid inspections throughout the manufacturing process, the final factory check is not the last one before you take delivery. Your dealer must perform additional pre-delivery checks and service your Sea Ray® in preparation for delivery.

Dealer responsibilities include providing:

- An adequate orientation in the general operation of your Sea Ray® boat.
- An "In Service Form" to be completed and signed by both the dealer and the consumer.
- An explanation of safety considerations regarding the use of containment systems and components.
- A complete Owner's Packet containing literature and information regarding your Sea Ray® boat and its separate warranted products, warranty and registration cards, and operation, installation and maintenance instructions.
- A review of all warranties, pointing out the importance of mailing warranty and registration to various manufacturers within the

required time limits, and assistance in accomplishing same.

- Instructions on obtaining local and out-of-area service during and out of warranty periods.

Consumer Responsibilities

It is the owner's responsibility to:

- Read and understand the limited warranty.
- Read all literature and instructions and use all equipment in accordance therewith.
- Examine the boat and assure all systems are working properly at the time of accepting delivery.
- Provide proper maintenance and periodic servicing of the boat in accordance with the Service Guide and Owner's Manual.
- Return the boat after 20 hours of operation to the selling dealer for its 20-hour inspection.

When contacting your dealer regarding warranties or service, please have all pertinent information such as serial numbers, model numbers, etc. on hand.

Sea Ray Boats, Inc. has a permanent record of your boat, which is retained under its "Hull Identification Number." Data is kept regarding equipment and accessories, as well as dealer/shipping information.

The "Hull Identification Number," located on the starboard side of the transom, is the most important identifying factor and must be included in all correspondence and orders. Failure to include it only creates delays. Also of vital importance are the engine serial numbers and part numbers when writing about or ordering parts for your engine(s).

WARNING

A qualified operator must be in control of the boat at all times. Do not operate the boat while under the influence of alcohol or drugs. Never operate your boat at speeds which exceed the operator's ability to react if an emergency develops. At night, turn on the appropriate navigation lights and cruise at a reduced speed that will allow you plenty of time to avoid dangerous situations.

Safety

Your safety, as well as the safety of your passengers and craft, are your responsibility. Familiarize yourself with the following safety precautions before using your boat.

1. All passengers should remain properly seated while the boat is in motion.
2. Keep your boat and equipment in top condition by frequently inspecting the hull, engines and all gear.
3. Use maximum caution when taking on fuel. Know your fuel tank capacity and fuel consumption at various RPM's.
4. Be certain there is enough fuel aboard for your anticipated cruising needs and an adequate reserve if you change your plans for weather or other reasons.
5. Make sure that regulation lifesaving and fire fighting equipment is on board and in proper working condition. They should be conspicuous, easily accessible and your passengers should be instructed in their use.
6. Watch the weather. Check local weather reports before departure. Be especially on the lookout for strong winds and electrical storms.
7. Have up-to-date charts of your area on board.
8. File a float plan with a 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. These precautions will enable your friend or relative to tell the Coast Guard where to search for

you and what type of boat to look for if you fail to return. Be sure to advise the same person when you complete your trip to prevent any false alarms about your safety.

9. Instruct your passengers in the basic fundamentals of handling and operating your boat in the event you are unable to do so and for their safety.
10. Do not overload or improperly load your boat.
11. Do not permit passengers to ride on parts of your boat not designed for such use. Instruct passengers to sit in designated seating areas while underway.
12. Never drive the boat directly behind a water skier. At 25 m.p.h. the boat will overtake a fallen skier who was 200 feet in front in 5 seconds.
13. Turn off your engine when taking swimmers or skiers aboard or when putting them overboard. **Never permit use of the transom swim platform while your engine is running.**
14. **DANGER: If your boat is equipped, the fore and aft sun pads should not be used when vessel is under way.**
15. Proper foot gear should be worn at all times to avoid slipping and falling.
16. **Always** wear non-slip foot gear while washing and waxing boat.
17. Know and obey the Rules of the Road and always maintain complete control of your boat.
18. Always operate with care, courtesy and common sense.
19. Understand the meanings of navigation buoys, and never moor to one. (It is a Federal offense.)
20. 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.
21. Storm signals are for your information and safety. Learn them and be guided accordingly.
22. A special flag (red flag with a white diagonal stripe or white and blue international "Alpha") flown from a boat or buoy means

diving operations are underway nearby. Approach with caution and stay clear by at least 30 yards.

23. Make sure your boat's motor is turned off before allowing people to swim anywhere near your boat. Shut the motor OFF and remove the key from the ignition switch so that nobody will accidentally start the motor while swimmers are nearby. Also, slow down and exercise extreme caution any time you are cruising in an area where there might be swimmers or water skiers in the water. Always keep a down skier in sight and on the operator's side of the boat when approaching the skier. Never back up to anyone in the water.
24. 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, or load should block his view when operating the boat above idle speed. Be sure that other boats or objects are not in your path before making quick turns.
25. 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.
26. Consider what action you would take under various emergency conditions such as a person overboard, fog, fire, a damaged hull or other bad leaks, motor breakdown, severe storm or collision.
27. 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 extinguishers.
28. Have onboard an adequate anchor and sufficient line to secure and hold your boat in all types of weather and sea conditions (at least six times the depth of the water).
29. Know your fuel tank capacity and cruising range. If it is necessary to carry additional fuel, do so only in proper containers. Take special precautions to prevent the accumulation of fuel vapors in confined spaces. **DO NOT store fuel or flammable liquids in closed storage areas. Ventilation has not been provided for explosive vapors.**

30. Always check for loose or trailing dock lines before getting underway. When towing a dinghy or surfboard, remember that a long line may easily become entangled with the propeller when backing down.

! DANGER

When engine is running, boarding ladder and swim platform should not be in use and transom door must be closed and secured.

! DANGER

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 aft sundeck while under way is especially hazardous and could cause personal injury or death.

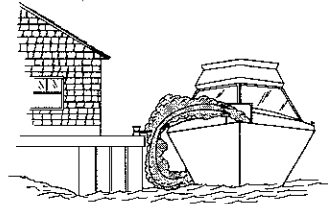
! DANGER

In all gasoline powered boats, engine and generator exhaust systems produce colorless and odorless carbon monoxide gas (CO). Direct prolonged exposure can result in CO poisoning which may be harmful or fatal. To prevent excessive exposure and reduce the possibility of accumulation of CO in the cabin and cockpit of the boat, the operator should insure adequate ventilation in each the cabin and cockpit areas, through utilization of cabin hatches, cabin doors, cabin windows, cockpit windshield windows and side windshield vents to increase air movement through cabin and cockpit areas. The following conditions tend to increase accumulation of CO in and about the boat and require the operator's particular attention:

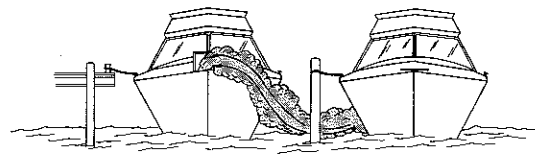
1. Operation at slow speeds or dead in the water.
2. Operation with a high bow angle attitude.
3. The utilization of canvas top, side curtain & back curtains.
4. Contributing climatic conditions, such as a head wind.
5. Operation of engines and/or generator in confined spaces or at dockside.
6. Any blockage of hull exhaust outlets.

Indications of excessive exposure to CO concentration may include nausea, dizziness & drowsiness.

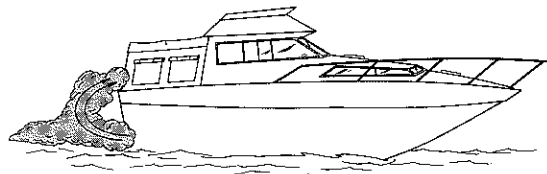
EXAMPLES OF HOW HIGH LEVELS OF CARBON MONOXIDE MAY ACCUMULATE



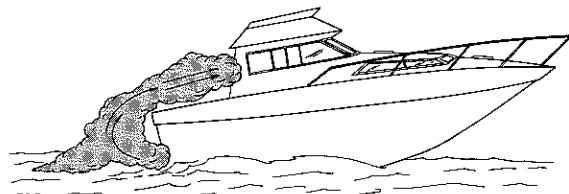
WARNING: Any blockage of hull exhaust outlets by a sea wall bulkhead or any other obstruction, can cause excessive accumulation of carbon monoxide in the boat's interior.



WARNING: When you are tied to a dock and/or immediately alongside of other vessels, pay particular attention to the generator exhaust emissions from the nearby vessels.

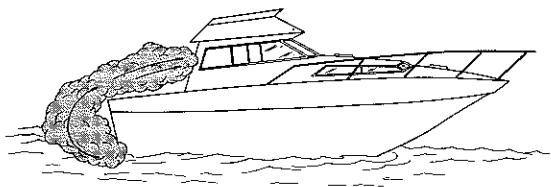


WARNING: When operating boat with canvas tops, side curtains, and/or back curtains in place, pay particular attention to the engine exhaust to insure that emissions do not accumulate in boat interior and proper ventilation is added.

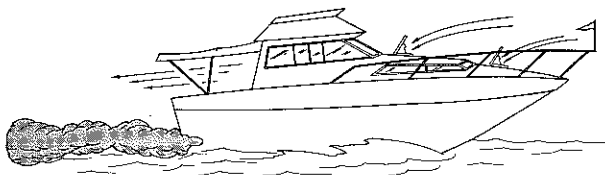


WARNING: When operating boat with high bow angle, pay particular attention to the engine exhaust emissions as to insure that


emissions do not accumulate in boat interior.



WARNING: When operating boat and/or generator with boat at slow speed or dead in the water pay particular attention to the engine exhaust emissions as to insure that emissions do not accumulate in boat interior due to wind conditions.



CORRECT VENTILATION: Open deck hatches and/or windows as necessary to provide adequate ventilation.

 WARNING	
URETHANE FOAM IS FLAMMABLE!	
Urethane foams have been used in the construction of your Sea Ray®. Do not expose urethane foams to open flames or any other direct or indirect high temperature ignition sources such as burning operations, welding, burning cigarettes, space heaters, or naked lights.	
Once ignited, urethane foams will burn rapidly, releasing great heat and consuming oxygen at a high rate. In an enclosed space the resulting deficiency of oxygen will present a danger of suffocation to the occupants. Hazardous gases released by the burning foam can be incapacitating or fatal to human beings if inhaled in sufficient quantities.	

LIGHTNING PRECAUTIONS

The basic purpose of lightning protection awareness is to ensure the safety of the boat owner and passengers during a lightning storm. Everyone on board should take the following precautions.

1. Ideally, docking your vessel and disembarking for safe haven is recommended, but if you cannot return to shore, seek shelter inside the boat and remain there until the storm has passed.
2. **Stay out of the water!** If caught swimming in the water during a storm get back into the boat and remain there until the storm has passed.
3. Lightning will seek a ground when it strikes. Avoid contact with metal parts of the boat.

Passenger Safety

As a skipper, it is up to you to look out for the safety of your passengers. As noted, the Coast Guard requires you to have one approved flotation device for each passenger aboard. Make sure that all children and non-swimmers actually wear jackets while boating. Request that your guests wear soft-soled, non-skid deck shoes. Hard-soled shoes are slippery and can result in a fall. Always see that your passengers are properly seated while underway. **Never allow passengers to sit on the fore deck, gunwale, or on top of seat backs while the boat is in motion.** Instruct at least one passenger on the proper operation of your Sea Ray® just in case something should happen to you.

Always keep your boat a safe distance from bathing beaches and areas in which skin divers may be operating. **A spinning propeller is extremely dangerous.** Always turn off the engine when taking swimmers or skiers aboard, or when putting them overboard.

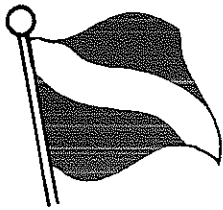
DIVING: RESPECT THESE FLAGS

Danger (Red)

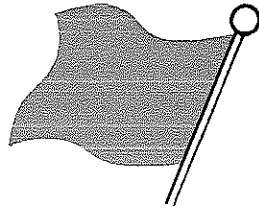
The SPORT DIVERS FLAG indicates a diver in the water. You should keep a *minimum* of 30 yards between your boat and this flag. "A life is worth more than a few feet of water."

Distress (Orange)

The DISTRESS FLAG indicates a boat or passenger in serious trouble. When seeing it, you should respond and render any assistance possible. Remember – it could be your boat displaying this flag.



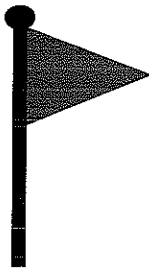
Danger



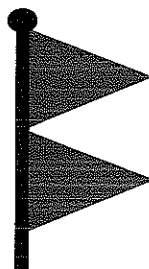
Distress

STORMS/ROUGH WEATHER

A wise boatman keeps a sharp eye out for impending storms or high winds. When a storm is detected approaching, head for the nearest shelter and wait it out. If you are unfortunate enough to be caught in open water during a storm, have everybody put on life jackets and sit low in the boat. Keep the bow headed into the waves with enough power to maintain slow headway.



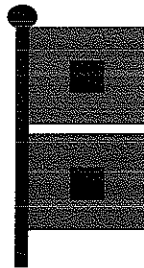
RED FLAG - *Small craft*
(winds to 33 knots)



2 RED FLAGS - *Gale*
(up to 47 knots)



**SQUARE RED FLAG -
BLACK BOX** -
(Storm)



**2 SQUARE RED
FLAGS BLACK BOX** -
(Hurricane)

BOATING SAFETY COURSES

Your local Coast Guard Auxiliary or Power Squadron generally puts on a Safe Boating Class several times a year. They are very comprehensive and generally of minimal cost to you. Call your local US Coast Guard Auxiliary or Power Squadron Flotilla for the time and place of the next class.

Regulations - Safety Procedures And Safety Equipment

SAFETY PROCEDURE AND EQUIPMENT

The safety equipment you own and the procedures you follow depend solely on you, the boat owner. Many safety features have been incorporated in your Sea Ray® but more can be added as needed to meet your particular requirements.

THINK OF YOURSELF AND OTHERS

For your personal safety and that of your passengers and other boaters, please note the following recommendations:

Boats should not be operated by inexperienced persons until complete instructions in the use of all instruments and controls, handling characteristics at all speeds and water conditions, and driver check-out is completed under the supervision of a qualified person.

Passengers should be made aware of the possibility of being thrown to the deck, or even from the boat, if they are not carefully seated while the boat is being run.

Be especially careful in the proximity of other boats, pilings, underwater obstructions, sea walls, or other obstacles.

More frequent checks and preventive maintenance are required for high performance boats. Mechanical failure at high speeds may cause very serious consequences to persons and property.

Remember that the person in control of the boat is responsible for his own acts of negligence, carelessness irresponsible operation or damage caused by his wake.

The following guidelines should always be followed:

1. Do not "show off" in tight areas or around docks.
2. Every experienced boatman knows that danger can attend high speed boating if

trouble signs and prudent operation are ignored.

3. Every experienced skipper knows that choppy water demands slower speeds.
4. And he knows that vigilant maintenance is essential to safety in operation.
5. Maximum throttle should be used for very brief periods only – damage to structure and engine may result with prolonged operation.
6. Be certain atmospheric conditions assure clear visibility and straight runs at least one mile ahead.
7. Be sure that there is no possibility of other boats coming into your course from the sides.
8. The operator is responsible for the safety of his passengers. Do not let passengers stand up.
9. Avoid sharp turns at high speed; keep one hand on the throttle at all times ready to reduce speed.

SPEED ACCORDING TO SEA CONDITIONS

Modify speed in keeping with weather and sea conditions.

If caught in heavy seas always throttle back if boat leaves the water to prevent over revving of the engine. You will damage your engine if the propeller leaves the water without reducing R.P.M.



CAUTION

To avoid undue stress on the boat, engine and components, the boat should never be run at speeds that permit the boat to become airborne.

SOME THINGS TO CHECK

Achieving good performance requires regular and above average attention to hull, engine, mechanical and electrical equipment.

The bottom must be clean and smooth and checked regularly. Passenger load and trim should be adjusted for best performance.

The propeller must match the boat and engine and be in perfect balance and condition.

Engines must be expertly tuned for maximum power output. Consult the Engine Operator's Manual and servicing dealer for details.

SAFETY REVIEW

As a boat owner, you have the responsibility for the safety of all occupants of your boat. To protect yourself, your passengers, and other boaters, follow these suggestions for safety:

1. Be careful with gasoline and gasoline fumes. Gas in the bilge is very dangerous. Use care when refueling. If gasoline is spilled inside your boat, clean it up immediately. Make certain there are no fumes in your boat before starting the engine.
2. Check all gas lines and connections periodically. Open the engine compartment and "sniff" for fumes before starting your engine.
3. Periodically check your fire extinguisher, life preservers and other safety equipment to make certain they are in good condition. Make certain that there is a U.S. Coast Guard approved life preserver for each person aboard plus one approved throwable device for man overboard protection. *Children and non-swimmers should wear life preservers at all times.*
4. Keep an alert lookout for swimmer, divers, skiers and other boats. Be extra cautious at night or in inclement weather.
5. Watch the weather. Be especially watchful for strong winds or electrical storms. Small craft storm signals are for your information and safety. Learn them and be guided accordingly.
6. Instruct at least one of your passengers in the basic fundamentals of the handling of your boat in case you are disabled or fall overboard.
7. Turn off your engine whenever skier(s) or swimmer(s) is entering or being retrieved from the water. *Never permit use of the transom swim platform while your engine is running.*
8. Do not overload or improperly load your boat. *Don't permit passengers to ride on*

parts of your boat not designed for such use.

9. Know your fuel tank capacity and your engine's hourly fuel consumption. Compute your fuel usage and use this as a backup check against the reading of your fuel gauge.
10. Watch your wake. It might capsize a smaller boat or do considerable damage to boats or property along the shore.
11. Obey the rules of the road. Neglecting this is the greatest single cause of collisions.
12. Watch your footing when on board or boarding. Require that good boat shoes be worn by your passengers to avoid the possibility of slipping.
13. Know the meaning of the buoys. Never moor to one. It is a federal offense.
14. If uncertain as to the depth of the water ahead, proceed with caution. In rough water – slow down – keep the bow headed into the waves with enough power to maintain headway.
15. Check and tighten shift, throttle and steering cable connections at least twice a year. A loose connection can result in sudden loss of steering and control.
16. Make certain the navigation lights are in working order.

Grounding & Towing

If you unfortunately find yourself aground and unable to pull off with your own power, or in need of a tow, or if you wish to help another craft from either predicament, remember that there is no way of knowing the amount of pull or strain which will be required. The stress may easily exceed the strength of the cleats and their fastenings. Cleats are designed and located for mooring use **only**.



WARNING

DO NOT use grab handles for ungrounding or towing!

The boat structure itself can be damaged by an excessive pulling strain. It is much safer, in these cases, to form a bridle by passing a line completely around the hull. Do this for both the pulling boat and the one being aided.

Towing Lines:

Some synthetic fiber ropes should not be used for pulling or towing (except a light dinghy). The characteristic ability of some types of rope to stretch, which makes it desirable for anchor and docking lines, renders it extremely dangerous if the line breaks loose while under stress.

The preferred line for towing is double-braided nylon. It has sufficient elasticity to cushion shock loads, but not so much as to create a snap-back hazard. Braid-on-braid line is stronger than three-strand twisted nylon of the same size and will not kink. Its disadvantage is that it does not float and must be watched to avoid entanglement in the towing vessel's propeller. Any type of line breaking under stress is dangerous and over-stressing should be avoided. **ALWAYS STAND CLEAR OF ANY TAUT LINES.**

Handling The Towing Boat:

The tow-line should be made fast as far forward as practicable, as in tug and towboat practice. If there is no suitable place forward, make a bridle from the forward bits, running around the superstructure to a point in the forward part of the cockpit. Use sufficient padding at contact points to prevent chafing of the hull and deck.

Cautions In Towing:

Secure the tow line so that it can be cast loose if necessary or, failing that, have a knife or hatchet ready to cut it. This line is a potential danger to anyone near if it should break and come whipping forward. Never stand near or in line with a highly strained tow line, and keep a wary eye out at all times.

In any towing situation, never have people fend off the other vessel with hands or feet; even the smallest boats coming together under these conditions can cause broken bones or severed fingers. With large vessels the risk is the loss of a whole limb, or worse.

When Not To Tow:

If you are not equipped for the job, stand by the disabled vessel. You may be able to put a

line across and assist by keeping the other craft's bow at a proper angle to the sea until help comes.

Call the Coast Guard or other salvage agency and turn the job over to them when they arrive. Don't try to be a hero, as you are more than likely neither trained nor experienced in this type of work. No boat is worth a life!

Government Regulations

The Coast Guard is an ever-present help to the boating public. Its boating regulations prescribe minimum standards of safety. You must equip your boat to comply with these regulations. These requirements may vary from state to state. Consult your Sea Ray® dealer for variations to these requirements in your area.

1. Boats 26' & over less than 40' in length: At least three (3) B-1 type hand-held fire extinguishers.
2. Boats 40' in length & over, but not over 65': At least four (4) B-1 type hand-held fire extinguishers.
3. At least one Coast Guard approved Type 1, 2, or 3 personal flotation device (life jacket) for each person aboard. (If over 20 miles offshore, they must be Type 1.)
4. At least one Type 4 device designed to be grasped instead of worn (ring buoy or buoyant cushion).
5. At least three approved hand-held red pyrotechnic distress signals; three approved aerial red pyrotechnic distress signals for night use; and three approved international orange smoke signals for daytime use.
6. All pyrotechnic devices must be stowed in waterproof, non-glass containers.
7. One power-operated whistle or horn, audible for at least half a mile.
8. Vessels from 12 meters up to and including 20 meters in length shall be fitted with a bell, or other device having similar sound characteristics replacing a bell, shall produce a clear tone.

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

9. Mooring lines
10. Fenders, lines
11. Manual bilge pump
12. Waterproof flashlight(s) with extra batteries
13. Charts of your intended cruising area
14. First aid kit
15. Anchor and adequate line
16. Boat hook

TOOL CHEST

1. Assorted screwdrivers (Phillips and flat blade)
2. Pliers (regular, vise-grip, and water pump)
3. Wrenches (box, open-end, allen, adjustable)
4. Socket set (metric or U.S. standard as appropriate)
5. Electrical tape

MISCELLANEOUS ITEMS

1. Engine and accessories manuals
2. Spare set of spark plugs and other ignition parts
3. An assortment of spare fuses

OTHER TIPS

1. When commissioning a new boat, do not plan an extensive trip or party until you have had a shakedown cruise to make sure all equipment on your boat is functioning properly and you are familiar with its operation.
2. Use fenders to protect your boat's hull whenever mooring next to floats, piers or other boats.

3. Carry plenty of line that is properly sized to your boat. We suggest at least four 30' lengths of 1/2 " nylon line.

DISCHARGE OF OIL

The Federal Water Pollution Control Act prohibits the discharge of oil or oily waste into or upon the navigable waters and contiguous zones of the United States, if such discharge causes a film or sheen upon, or discoloration of the surface of the water, or causes a sludge or emulsion beneath the surface of the water. Violators are subject to a penalty of \$5,000.

DISPOSAL OF PLASTICS AND OTHER GARBAGE IN WATERS OF THE UNITED STATES

Federal regulations prohibit the discharge of **plastic garbage anywhere** in the marine environment. Plastic includes but is not limited to: plastic bags, styrofoam, cups and lids, six-pack holders, bottles, caps, buckets, shoes, milk jugs, egg cartons, stirrers, straws, synthetic fishing nets, ropes, lines, and "bio- or photo-degradable" plastics.

NOTICE
IT IS ILLEGAL FOR ANY VESSEL TO DUMP PLASTIC TRASH ANYWHERE IN THE OCEAN OR NAVIGABLE WATERS OF THE UNITED STATES

These regulations also restrict the disposal of other types of garbage within specified distances from shore.

Learn and conform to "Annex V" of the International Convention for the Prevention of Pollution From Ships, 1973 commonly known as Annex V of MARPOL (Marine Pollution) 73/78.

Enforcement

The U.S. Coast Guard is responsible for enforcement of Annex V.

A person found to have violated these regulations may be liable for a civil penalty not to exceed \$25,000 for each violation. In addition,

criminal penalties not to exceed \$50,000 and/or imprisonment up to 5 years may be imposed.

The Coast Guard may deny vessels entry to marinas and terminals not in compliance.

WASTE MANAGEMENT

The Coast Guard is requiring any ocean-going boats 40 feet or larger to have a written "waste management" plan on board. While the requirement is aimed at commercial and passenger ships, there is no exemption for recreational boats. "Ocean-going" means any boat going beyond the three-mile coastal U.S. boundary. The written plan can be as simple as:

"All vessel refuse is placed in trash bags which are stored on board until they can be disposed of in dumpsters on shore. This policy is reviewed by all crew and passengers. The person in charge of carrying out the plan is:

Name: _____"

RULES OF THE ROAD

Your boat is subject to Coast Guard enforced marine traffic laws known as "Rules of the Road." There are two sets of rules- the United States Inland Navigational Rules and the International Rules. The United States Inland Rules are applicable to all vessels inside the demarcation lines separating inland and international waters. The "Rules of the Road" can be obtained from your local Coast Guard unit or from the United States Coast Guard Headquarters (1300 E. Street NW, Washington, D.C. 20226) in the publication "Navigational Rules, International-Inland."

"Aids to Navigation" (Coast Guard pamphlet no. 123) explains the significance of various lights and buoys. This and other pamphlets, including the "Boating Safety Training Manual," and "Federal Requirements for Recreational Boats" are also available from the United States Coast Guard Headquarters.

Because of proposed alterations in buoys and markers, we advise you to periodically contact the Coast Guard to stay apprised of impending changes.

If you have ship-to-shore radio telephone aboard, heed storm warnings and answer any distress calls. The spoken word "**MAYDAY**" is the international signal of distress. **NEVER** use this word unless there is danger close at hand -an emergency- and you are in need of immediate assistance.



Sport Yacht Specifications

Specifications	370 Express Cruiser	370 Sundancer	370 Sedan Bridge	380 Sun Sport	400 Express Cruiser	440 Express Bridge	440 Sundancer
Overall Length:	36' 10" (11.22 m)	37' 6" (11.43 m)	36' 10" (11.22 m)	38' 5" (11.70 m)	40' 4" (12.29 m)	44' 0" (13.41 m)	44' 0" (13.41 m)
w/Std. Bow Pulpit	39' 5" (12.01 m)	N/A	40' 11" (12.47 m) w/Std. Platform & Bow Pulpit	N/A	43' 0" (13.10 m)	47' 1" (14.35 m)	47' 1" (14.35 m)
w/Optional Platform	41' 5" (12.62 m)	N/A	N/A	N/A	45' 7" (13.89 m)	49' 2" (14.35 m)	49' 2" (14.35 m)
Beam:	12' 4" (3.75 m)	12' 7" (3.84 m)	12' 4" (3.75 m)	11' 0" (3.35 m)	13' 0" (3.96 m)	13' 11" (4.24 m)	13' 11" (4.24 m)
Draft:	29" (73.6 cm)	32" (81.2 cm)	31" (78.7 cm)	Down 36" (91.4 cm) Up 23" (58.4 cm)	39" (99.0 cm)	41" (104 cm)	39" (99.0 cm)
Dry Weight:	13,000 lbs. (5,896 kg)	15,420 lbs. (6,994 kg)	14,500 lbs. (6,577 kg)	11,000 lbs. (4,989 kg)	16,000 lbs. (7,257 kg)	26,500 lbs. (12,020 kg)	20,000 lbs. (9,071 kg)
Fuel Capacity:	250 gal. (946.25 liters)	275 gal. (1,041 liters)	250 gal. (946.25 liters)	300 gal. (1,136 liters)	300 gal. (1,135.5 liters)	400 gal. (1,514 liters)	400 gal. (1,514 liters)
Usable Fuel:	237 gal. (897.04 liters)	261 gal. (987.88 liters)	237 gal. (897.04 liters)	285 gal. (1,079 liters)	285 gal. (1,078.7 liters)	100 gal. (378.5 liters)	380 gal. (1,438.3 liters)
Water Capacity:	70 gal. (264.95 liters)	70 gal. (264.95 liters)	70 gal. (264.95 liters)	40 gal. (151.4 liters)	100 gal. (378.5 liters)	60 gal. (227.1 liters)	100 gal. (378.5 liters)
Holding Tank:	20 gal. (75.7 liters)	28 gal. (106 liters)	20 gal. (75.7 liters)	20 gal. (75.7 liters)	30 gal. (113.5 liters)		28 gal. (106 liters)
Gray Water Tank:							
Dead Rise:	21°	20°	21°	21°	19°	19°	19°
Height Dimensions							
Waterline To Top Of Windshield:	7' 9" (2.36 m)	8' 2" (2.49 m)	11' 3" (3.42 m) Waterline To Top Of Venturi	7' 5" (2.26 m)	7' 5" (2.26 m) Waterline To Top Of Spoiler	9' 7" (2.92 m) Waterline To Top Of Venturi	8' 9" (2.66 m)
Waterline To Top Of Spoiler:	8' 9" (2.66 m)	9' 3" (2.82 m)	15' 3" (4.64 m) Waterline To Top Of Mast Light on Spoiler	8' 3" (2.51 m)	8' 4" (2.54 m) Waterline To Top Of Optional Radar on Spoiler	16' 0" (4.87 m) Waterline To Top Of Mast Light on Spoiler	11' 10" (3.60 m)
Keel To Top Of Windshield:	9' 10" (2.99 m)	10' 3" (3.12 m)	13' 8" (4.16 m) Keel To Top Of Venturi	8' 11" (2.71 m)	10' 7" (3.22 m) Keel To Top Of Spoiler	13' 1" (3.98 m) Keel To Top Of Venturi	11' 0" (3.35 m)
Keel To Top Of Spoiler:	10' 10" (3.30 m)	11' 4" (3.45 m)	17' 8" (5.38 m) Keel To Top Of Mast Light on Spoiler	9' 9" (2.97 m)	11' 6" (3.50 m) Keel To Top Of Optional Radar on Spoiler	15' 9" (4.80 m) Keel To Top Of Spoiler	14' 1" (4.29 m)
Shipping Height Dimensions							
Windshield Installed:	117" (297 cm)	123" (312 cm)	N/A	108" (274 cm)	118" (300 cm)	157" (399 cm) Bridge Installed	158" (401 cm)
Windshield Removed:	90" (229 cm)	104" (264 cm)	N/A	86" (218 cm)	99" (251 cm)	127" (323 cm) Bridge Removed	N/A

Sea Ray® 1995 Model Year Sport Yacht Specifications. The specifications are approximations and subject to variance.
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Section 2 • Bilge & Underwater Gear

Bilge

DRAIN PLUG

Your Sea Ray® is fitted with a brass garboard drain plug. This is a threaded plug which is installed through the outside of the transom. We recommend that you remove the drain plug when dry docking your boat. **MAKE SURE TO REPLACE THE DRAIN PLUG BEFORE LAUNCHING.**

BILGE PUMPS

There is a bilge pump and float switch located in each bilge sump. The emergency high water bilge pump and float switch is located adjacent to the aft bilge pump.

Each bilge pump is equipped with a switch on the dash with a "MANUAL" and "AUTO" position. When the switches are in the "MANUAL" position, the pump(s) will run continuously. When in the "AUTO" position, the pump(s) is activated when there is enough water in the bilge to raise the float switch to its highest position; and deactivated when the water recedes. **The pumps should NOT be left in the "MANUAL" mode unless the bilge is being pumped out for servicing.**

The emergency bilge pump and float switch are wired to the high water bilge alarm. Should the pump be activated by water in the sump, the alarm will sound and the indicator light on the systems monitor panel will be on.

Each pump is protected by a breaker on the bilge D.C. breaker panel.

Some bilge pumps may be fitted with an inline check valve. Bilge pumps that must be equipped with very long discharge hoses are equipped with the check valve. The check valve prevents the residual water in the hose from coming back into the bilge which would cause the pump to cycle on and off trying to pump out the same water.

Because of the weight of water, 8.3 pounds per gallon, it is important to keep the bilge as free of water as possible.

Maintenance

Frequently inspect the area under the float switches to ensure they are free from debris and gummy bilge oil. To clean, soak in heavy duty bilge cleaner for 10 minutes, agitating several times. Check for unrestricted operation of the float. Repeat the cleaning procedure if necessary.

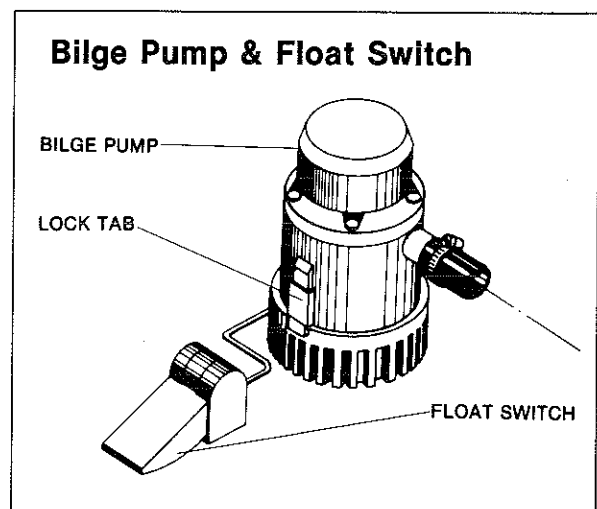
Inspect the bilge pump intakes and keep them free of dirt or material which may impede the flow of water through the pump. To clean the pump strainer, depress the lock tabs on both sides of the pump and lift the pump motor.

Inspect the check valve located in the discharge line.

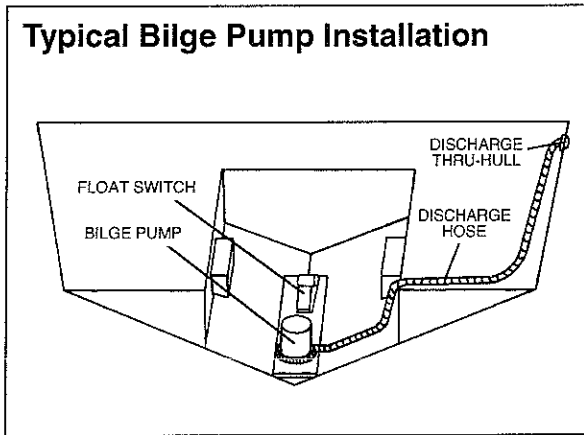
Trouble Shooting:

If water does not come out of discharge hose:

1. Depress the breaker on the bilge D.C. breaker panel to insure it has not tripped.
2. Remove the motor module to see if the impeller rotates with the power on.
3. Remove any debris that may have accumulated in the nozzle section or strainer base.
4. Check hose and connection on hull side for debris and proper connections.



Typical Bilge Pump Installation



BILGE BLOWERS

Your Sea Ray® is equipped with two in-line bilge blowers to provide bilge ventilation. The blowers are wired through two circuit breakers on the bilge D.C. breaker panel with a switch on the dash panel and main distribution panel.

With gasoline engines: Run the blowers for four minutes before starting the engines or generator; when operating below cruising speed and at all times when the generator is running.

With diesel engines: Run the blowers when operating below cruising speed to dissipate bilge heat build-up and at all times when vessel is at rest and generator is running.

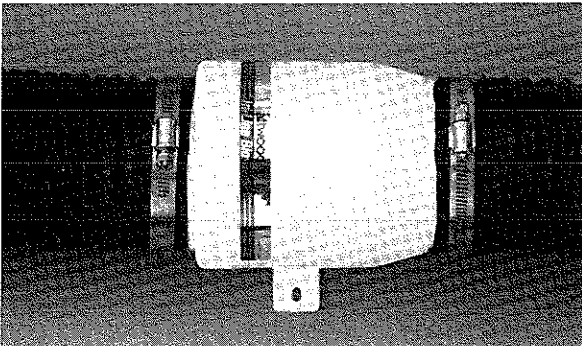
DANGER

Gasoline Vapors Can Explode

Before Starting Engine:

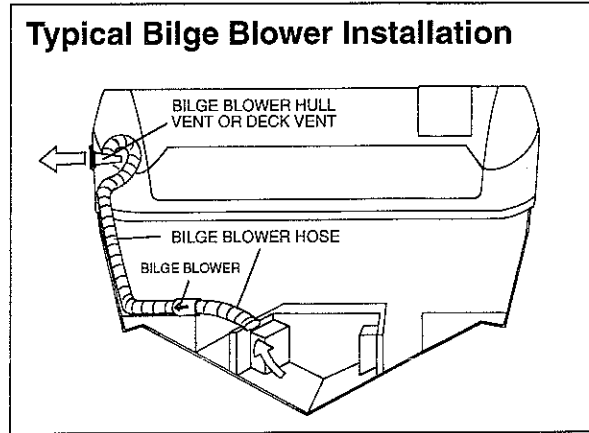
- Check engine compartment for gasoline vapors.
- Operate blower for 4 minutes.

Run Blowers Below Cruising Speed



Bilge Blower

Typical Bilge Blower Installation



Maintenance

The bilge blowers should be checked periodically to insure that the hoses are securely fastened to blowers. Check for corrosion of wires and make sure 12 volt wires are secured in place.

Trouble Shooting:

If your bilge blower fails to operate:

1. Depress the breakers on the bilge breaker box to ensure they have not tripped.
2. Check to see if the blower hose is fastened to the blower.

Engines

The engine is the heart of your SEA RAY boat. Proper attention to and maintenance of your engine will assure you of many hours of pleasurable, safe boating and will prevent unnecessary engine problems. A general maintenance program consists of proper lubrication, cleaning of fuel filters, fuel lines and air filters. When washing down, or at any other time, take care that water does not enter the carburetor (on gasoline engines), or the air inlet (on diesel engines). Water entering the carburetor or air inlet when the engine is not operating may go directly into the cylinders, resulting in rust and possibly internal engine damage.

You must fully comply with the manual provided by the engine manufacturer. Follow the recommended maintenance and warranty schedule in your Engine Operator's Manual included in the owner's packet.

MARINE GEARS (Inboards)

Reduction Gears

A reduction gear reduces the rotating speed of the propeller shaft in relation to the engine RPM. This permits the use of a larger propeller while allowing the engine to attain its rated RPM, thereby increasing efficiency.

Reverse Gears

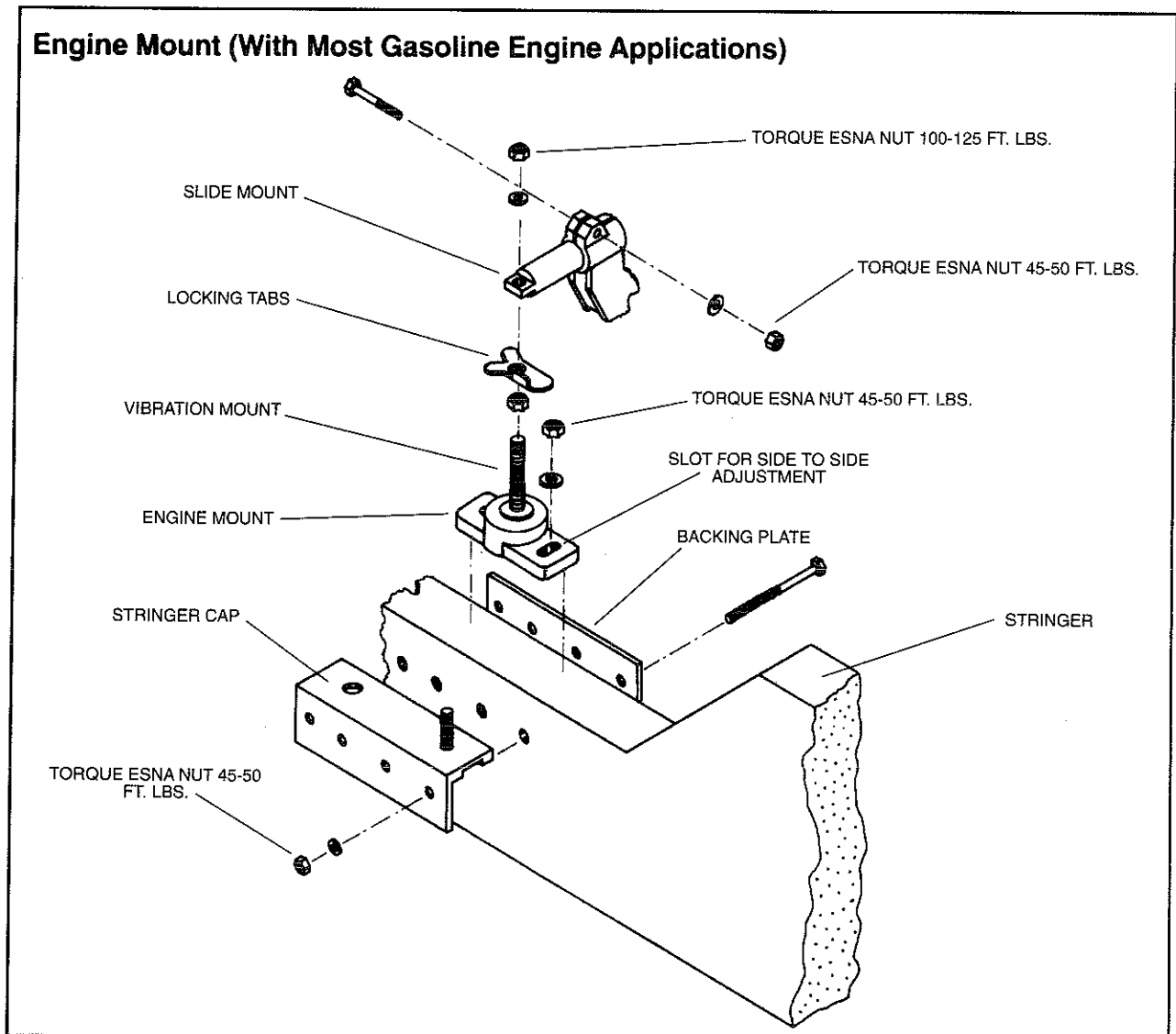
The reverse gear incorporates the clutch and controls the rotation of the propeller. The position of the clutch control or shifting lever indicates the motion which the clutch and reverse gear are transmitting. The center position of the lever indicates neutral. Engine RPM should never exceed 1000 when engaging or disengaging the clutch. Higher RPM will result in unnecessary wear and shortened life of the unit, and perhaps breakage.

Marine reverse gears are hydraulically operated, thereby making it imperative to periodically maintain and check oil level. If the correct oil level is not maintained, slippage occurs, causing damage to the clutch plates. Too much oil will cause foaming and erratic clutch operation. For additional information see the Engine Operator's Manual.

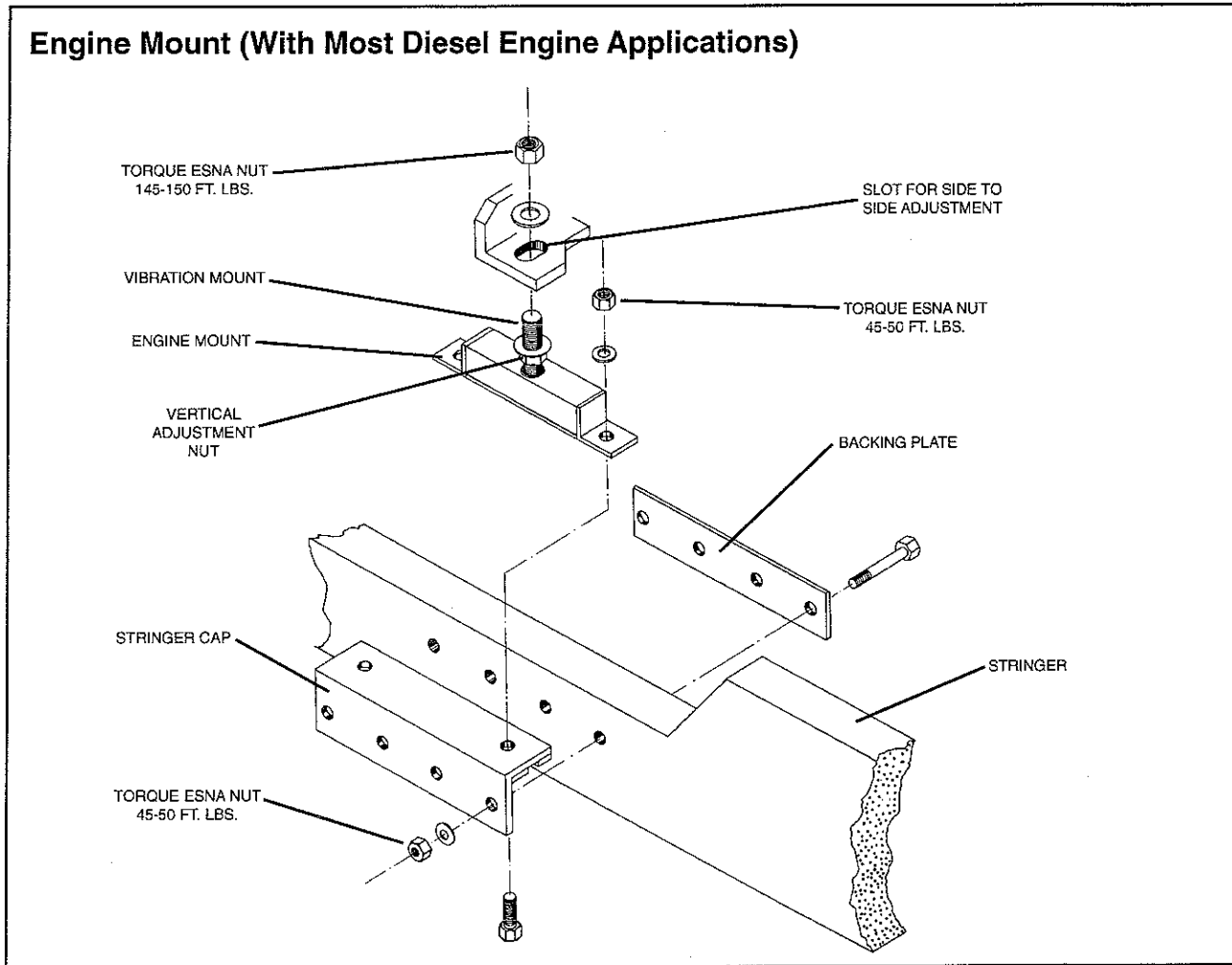
ENGINE MOUNTS

The adjustable type engine mounts permit adjustment sideways as well as vertically. Vertical adjustment nuts lock up or down on the threaded vertical stud, with a slot provided to allow side to side adjustment on the engine.

Important: The large adjustment lock-nuts on these mounts must be tightened properly to retain alignment. It is also advisable to spray a protective coating on the studs and nuts.



Engine Mount (With Most Diesel Engine Applications)



ENGINE EXHAUST SYSTEM (Inboard Engines)

Muffler System

The muffler type exhaust system used on Sea Ray® boats with inboard engines is designed so that the water from the raw water cooling system is pumped through the mufflers and then overboard through the exhaust outlet thru-hull fitting. Make sure water is flowing from the exhaust outlets while the engines are operating. A plug is located in the base of each muffler. When servicing or winterizing, remove the plug to drain the water out of each muffler. Replace the plug after all water has drained from the muffler.

Prior to every boat use, examine the exhaust system fittings to ensure tightness. Leaks in the exhaust system may permit carbon monoxide exposure.

WARNING

Hose clamps must be tight at all times to avoid exhaust leaks and possible carbon monoxide exposure.

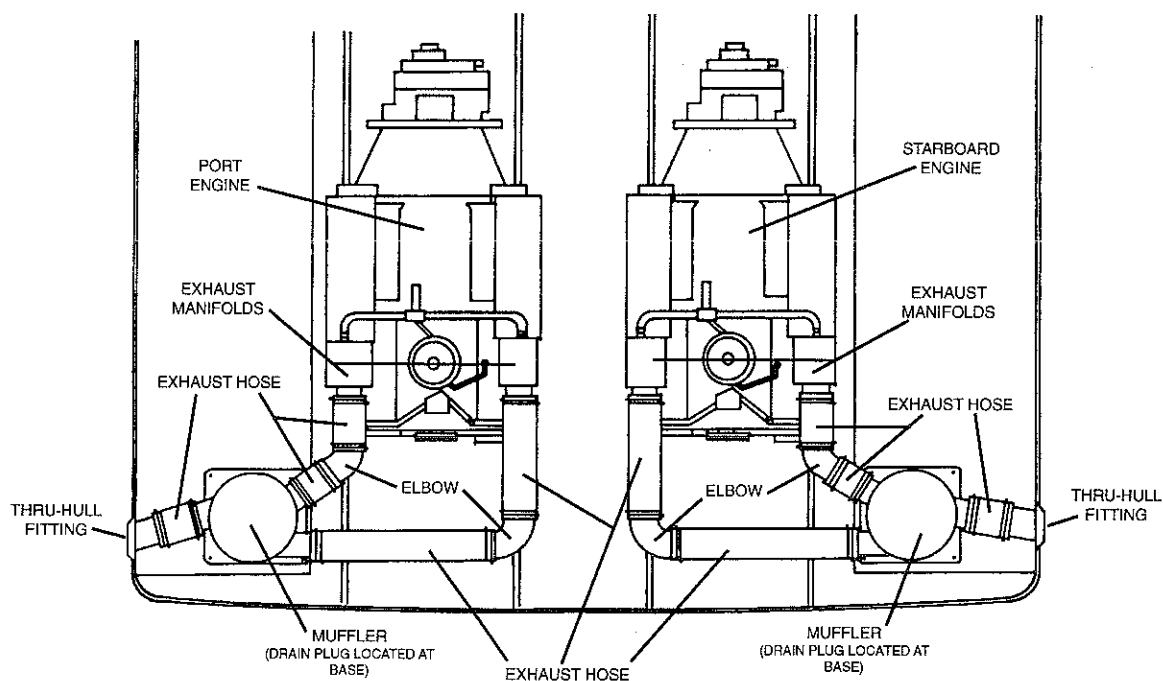
Underwater Non-Muffler System

The underwater exhaust system used on Sea Ray® boats with inboard engines is designed to expel exhaust under the boat and eliminate the need for mufflers. This system is self draining and does not need winterization.

NOTICE

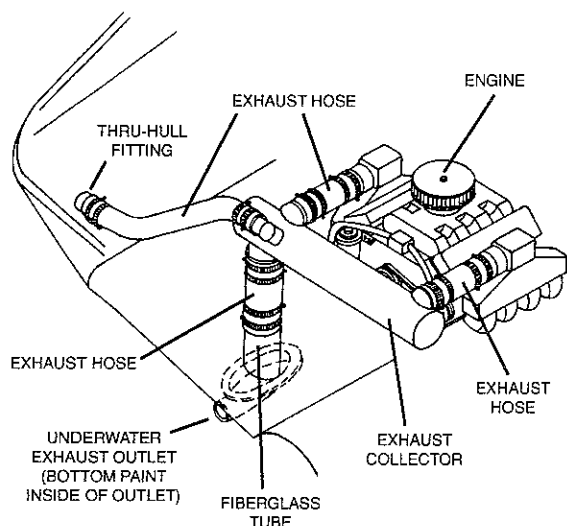
When bottom painting the boat make sure to paint inside the underwater exhaust outlet as well as the outside.

Typical Inboard Engine Exhaust Component Layout (Muffler System) (V-Drive Engines Shown)



NOTE: Muffler location and exhaust hose routing may be different than this illustration due to bilge layout requirements for differing engine and equipment options.

Typical Inboard Engine Exhaust Component Layout (Underwater Non-Muffler System)



NOTE: Exhaust hose routing may be different than this illustration due to bilge layout requirements for differing engine and equipment options.

WARNING

Hose clamps must be tight at all times to avoid exhaust leaks and possible carbon monoxide exposure.

ENGINE REMOVAL (Inboard Engines)

Should the removal of an engine become necessary, see your **Sea Ray® dealer**. The following is only a generalized procedure to follow.

1. Shut off the fuel lines and close the engine seacocks.
2. Remove all electrical wires, fuel lines, raw water intake hoses and exhaust fittings from the engine.

WARNING

Make sure to plug the fuel line to avoid fuel leakage, contamination, fire and explosion hazard.

3. Unbolt the engine coupling from the shaft coupling and then slide the shaft and coupling back from the engine.
4. Detach both throttle and shift connections. **Do not bend or twist the cables, as damage may result.**
5. Remove the mounting stud nuts for the engine and lift the engine out, leaving the mounts bolted to the stringer caps.

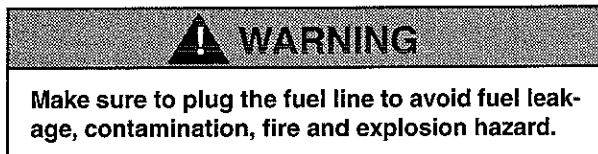
NOTE: Some V-Drive configurations may require boat to be out of the water to pull the engine. Propeller removal may be required to gain shaft clearance to remove engine.

To reinstall, reverse the above procedure. Check the coupling and shaft alignments, as well as water hoses and wiring connections. Also check for fuel and exhaust leaks and make sure seacock is open before starting engine.

(Inboard/Outboard Stern Drive Engines)

Should the removal of an engine become necessary, see your Sea Ray® dealer. The following is only a generalized procedure to follow.

1. Remove the drive unit.
2. Remove all electrical wires, fuel lines and exhaust fittings from the engine.



3. Detach both throttle and shift cables. **Do not bend or twist the cables, as damage may result.**
4. Remove transom mount bolts for the engine.
5. Remove engine mount bolts and lift the engine out.
6. Remove water intake hose.

To reinstall, reverse the above procedure. Check the water hose and wiring connections. Also check for fuel leaks.

VIBRATION & CAUSES

Some vibration is to be expected in your boat because of the action of the engines and the propeller. But excessive vibration indicates conditions which must be promptly corrected to avoid damage. The following are some conditions which may cause vibrations.

Foreign Object Interfering With Propeller Action

Weeds, ropes, fishing lines or nets can become wrapped around the propeller and/or shaft, causing vibration and loss of speed. Always stop and then reverse the propeller after going through a weedy area to unwrap and clear away any weeds which may have accumulated. Although reversing will sometimes help to unwrap lines and nets, they are difficult to remove without hauling.

Always check for loose or trailing dock lines before getting underway. When towing a dinghy or surfboard, remember that a long line may easily become entangled with the propeller when backing down.

Bent Prop (and/or Shaft*)

A badly damaged or distorted prop or shaft is an obvious cause of vibration. Even when the propeller appears to be perfect, make sure it has not been pulled off-center by the prop key.

*Engine and Shaft Out of Alignment

Although the shaft is properly aligned when it leaves the factory, after transit and after the boat has been in the water a few days, the alignment should be rechecked. The shaft coupling is the connecting point between the shaft and the engine and the alignment should be set at .003" to .005". Refer to "SHAFTS" in this section of the Owner's Manual.

*Coupling Out of True

Although an extremely unlikely condition, check the couplings if other efforts to correct the vibration fail. Check the engine half of the coupling (with dial indicator on the face) to see that it runs true with the shaft coupling. Also check the coupling keys. They must fit correctly to prevent forcing the couplings off center.

Engine Part Hitting Boat Structure

Engines are flexibly mounted to reduce transmission of vibration to the hull structure. If some part of the engine, such as the oil pan, reverse gear or reduction gear housing, contacts a stringer, brace, or part of the hull, vibration will result. The flexible shaft log allows a limited side motion of the shaft, but an excessive "whip" can cause the shaft to strike the sides of the shaft hole or the shaft log with resultant vibration.

*Other Causes

Other causes of vibration include the following: engine out of tune, a bent rudder, a worn strut bearing, a component of the exhaust system vibrating against the hull or improper contact between shaft taper and the propeller hub bore.

*Inboard Engines Only.

FRESH WATER COOLING SYSTEM

Your engine may be equipped with a fresh water cooling system; refer to your engine operator's manual. The fresh water cooling system is a closed system which helps protect engines from internal corrosion and provides more even distribution of engine temperature. Change the coolant annually.

Coolant Recommendations

The standard mixture of water and coolant is a mixture of 30% antifreeze and 70% water, which protects to 0°F (-18°C). This will allow the coolant to expand properly and maintain normal operating engine temperature. In colder climates, the coolant level should be increased to 50/50, which protects to -34°F (-37°C), for proper coverage. **To find engine coolant capacity, refer to your Engine Owner's Manual in the Owner's Packet.**

Underwater Gear

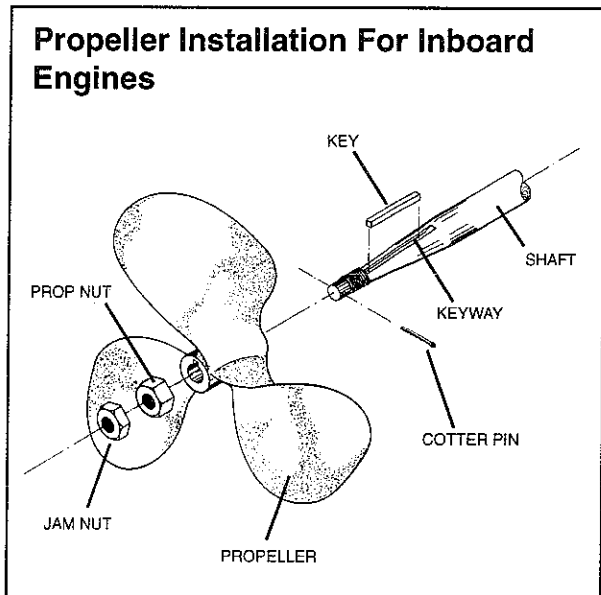
PROPELLERS

Your Sea Ray® has been equipped with propellers which our tests have shown to be the best suited for general use under normal conditions and load. In some situations you may wish to change propellers to give your boat slightly different performance

characteristics. In general, changing to a lower pitch propeller will increase acceleration and load-pulling ability, but with a slight decrease in top speed. Conversely, moving to a higher pitch propeller will attain higher top speed with a light load, but will sacrifice acceleration and power. Your particular requirements should be discussed with your Sea Ray® dealer. Under no circumstances use a propeller which allows the engine to operate at higher than recommended RPM.

Propellers should be free of nicks, excessive pitting and any distortions that alter the propellers from their original design. Badly damaged props should be replaced, but those that are chipped, bent or merely knocked out of shape can be reconditioned by your marine dealer.

When doing extensive cruising, it is advisable to carry extra propellers aboard.



Propeller installation on inboard/outboard stern drive engines is covered in the Engine Operator's Manual.

The propeller installation on the inboard engines requires the right hand propeller to be installed on the starboard side and the left hand propeller to be installed on the port side. Install in the following manner:

1. Clean the tapered end of the propeller shaft.
2. Install the propeller on the shaft taper without the key. Mark its position with a non-graphite bearing marker.

3. Remove the propeller and insert the key in the keyway.
4. Grease the shaft with a multi-lube marine grease.
5. Reinstall the propeller so its position is at the mark. (Caution should be taken to prevent the propeller from riding the key up the keyway end radius and forcing the propeller off center.)
6. Next, tighten the prop nut securely, using a 2" x 4" block between the propeller blade, strut and rudder.
7. Then tighten the jam nut while holding the prop nut in place.
8. Install a cotter pin through the hole in the shaft and bend the ends of the pin over.

NOTICE

If the jam nut and prop nut are installed properly, the propeller should not loosen. If you tighten both nuts holding only the propeller blade, the nuts could possibly thread back on the shaft to the cotter pin. It is important that the above procedure be followed.

SHAFTS

(Inboard Engines Only)

The shaft coupling is the connecting point between the shaft and the engine. The alignment should be set at .003" to .005" (0.08 - 0.13mm). Misalignment is much exaggerated in Figure A, but a slight misalignment will cause loss of power, excessive wear, noise and vibration. It should not be tolerated. When checking for parallel coupling faces (the proof of proper alignment), use a feeler gauge not more than .003 to .005 of an inch thick (0.08 - 0.13mm).

With coupling faces brought together by hand - not bolted - the feeler gauge should be tightly gripped at all points around the edges of the couplings. Next, hold the engine coupling flange stationary and rotate the shaft coupling flange 90 degrees in either direction. The feeler gauge should still be tightly gripped at all points around the edges of the couplings.

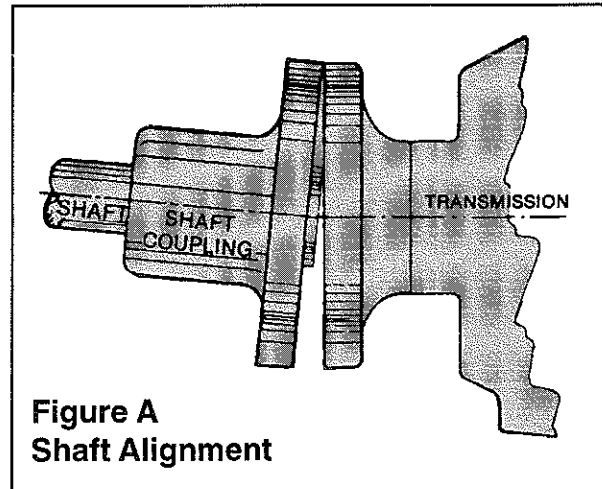


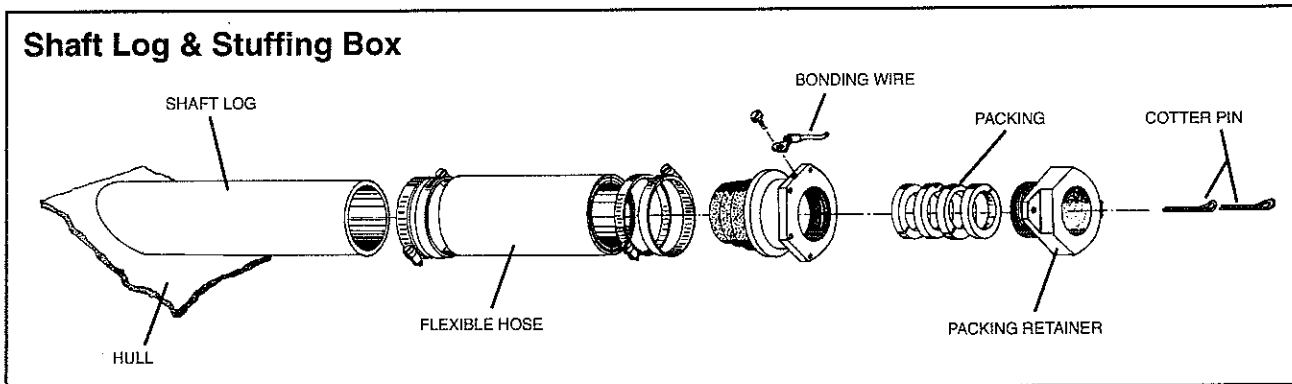
Figure A
Shaft Alignment

SHAFT LOG & STUFFING BOX

(Inboard Engines Only)

The shaft log is a fiberglass tube which provides an opening through the bottom of the boat for the propeller shaft. The stuffing box is connected to it by a short length of special flexible hose which serves to absorb normal shaft vibration. The stuffing box prevents water leaking around the shaft and into the boat.

A slow leak, about one drop every 20 seconds, is desirable to lubricate the shaft. However, if the propeller shaft stuffing box is found to be leaking excessively (due to wear caused by the rotating shaft), it can usually be stopped by hand tightening.



Do not over tighten as it will score the shaft. Tighten the stuffing box by removing the cotter pins and rotating the packing retainer clockwise until the leak becomes a slow drip. Reinstall the cotter pins.

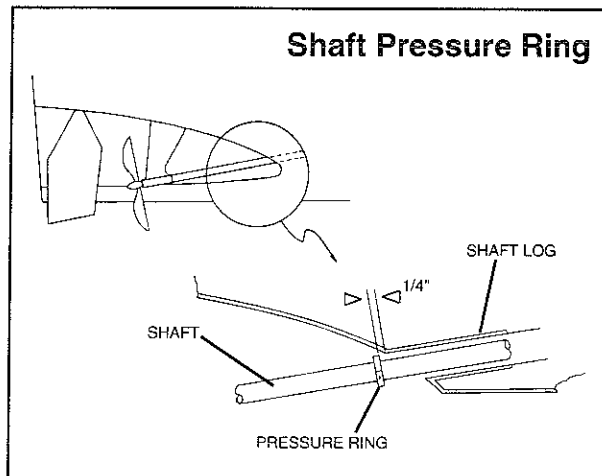
If, after the boat has been in use for some time, the stuffing box leaks persistently, remove the packing retainer and add a ring or two of packing to that which is already in place. If this is ineffective, completely remove the old packing and replace it with new packing rings. The ends of each ring should touch and the joints should be staggered. Shaft alignment and straightness must be correct or leaking will persist.

The packing material used is high temperature packing, and Chestron 329 Stern Lon-1/4" is recommended.

SHAFT PRESSURE RING (Inboard Engines Only)

The Shaft Pressure Ring is installed to deflect water into the shaft log tube to improve water lubrication of the stuffing box packing material. If the ring is ever removed it must be remounted on the propeller shaft 1/4" aft of the top side of the shaft log tube.

Shaft Pressure Ring tightness should be checked regularly. If the ring should become loose and slide down the shaft, it could block water flow through the strut bearing and cause it to overheat.



STRUT (Inboard Engines Only)

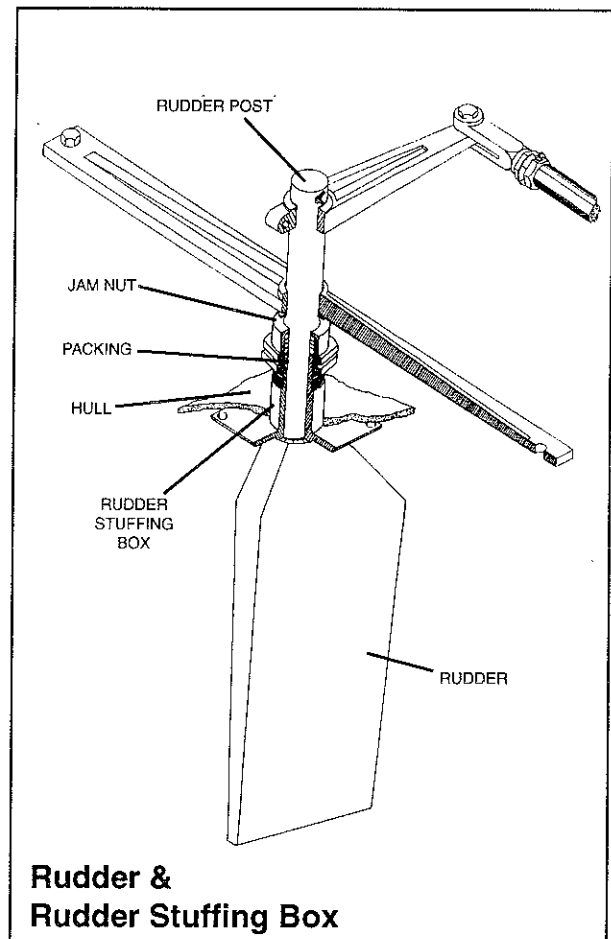
The strut is the bronze casting fastened to the bottom of the hull to support and form a bearing for the

propeller shaft. A replaceable rubber bearing is inserted to minimize wear and protect the shaft where it passes through the strut hub. During lay up periods, squirt castor oil into this bearing to keep it from freezing to the shaft. Never use machine oil or grease on rubber bearing. Periodically check all strut fastenings to assure that they are secure. To replace the rubber cutlass bearing see your Sea Ray® dealer.

RUDDER & RUDDER STUFFING BOX (Inboard Engines Only)

The rudder is the vertical flat surface aft of the propeller that pivots about a vertical axis and changes the direction of the boat through the water. The rudder stuffing box prevents water from leaking into the boat where the rudder post enters the hull.

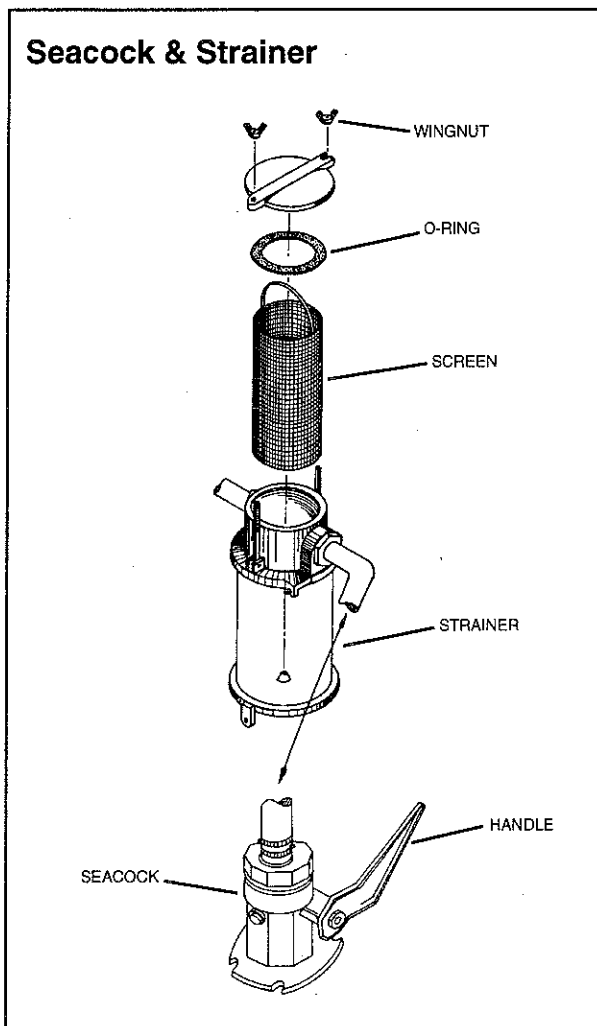
The rudder stuffing box has the same basic characteristic as the shaft stuffing box and the maintenance is the same but repacking is seldom required. If repacking is necessary, use 1/4" flax packing. The rudder requires little maintenance. The rudder post, however, should be greased with a waterproof marine grease at least once a season.



SEACOCKS & STRAINERS

Seacocks and strainers are located in the bilge area. To open the seacock, turn the handle in line with water flow (vertically). To close, turn the handle against water flow (horizontally). The seacock body should be inspected and lubricated annually.

Sea water strainers should be inspected frequently and cleaned out when clogged. To clean the strainer, close the seacock and unscrew the wingnuts on top of the strainer housing. Remove and wash the stainless steel screen. Before replacing the screen, inspect the strainer bowl for debris. After replacing the screen, replace and tighten the wingnuts, open the seacock and check for leaks.



OUTDRIVE IMPACT PROTECTION (For Sport Yachts With Inboard/Outboard Engines Only)

Impact damage can occur in either a forward or reverse direction. It can occur while trailering or in the water. When trailering, make certain outdrive unit is in its highest position. If an underwater object is struck while boat is moving forward, the hydraulic system cushions the kickup of the drive unit as it clears the object, thereby preventing or greatly reducing damage to the drive unit.

If engine should strike a submerged object, STOP ENGINE as soon as possible and examine drive unit for damage. If damage is present or suspected the boat should be taken to an authorized dealer for thorough inspection and necessary repair. Operating a damaged drive unit could cause additional damage to other parts of engine, or could affect controllability of the boat. If continued running is necessary, do so at greatly reduced speeds.

! WARNING

An impact protection system cannot be designed to ensure total protection from impact damage under ALL operating conditions. If an object is struck at a severe angle or high rate of speed, damage naturally can occur. Use extreme caution when operating in shallow water areas where known underwater obstacles are present. Use extreme care to prevent striking an under water object with drive unit while operating boat in reverse, as no impact protection is afforded to the drive unit in this position.

Service should include:

- Inspection of components and fasteners for wear and replacement of parts if worn.
- Lubrication of steering cable, by (FULLY EXTENDING) transom end of cable out of housing and applying Quicksilver 2-4C Multi-Lube on the exposed end.
- Pivot point lubrication with SAE 30W engine oil.
- Inspection and lubrication of the steering head should be made annually by an authorized dealer or whenever unusual sounds or changes in operation develop.

Sea Ray® recommends that all repairs and/or replacements to steering systems be made by qualified dealers authorized by manufacturer of the steering system of your boat.

Caution: Boat steering is not self-centering. Steering is affected by engine and propeller torque, trim plane setting, wave and current action, and the speed of the hull through the water. Constant attention and control of the direction of the boat is required for safe operation.

REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

Inboard Hydraulic Steering System

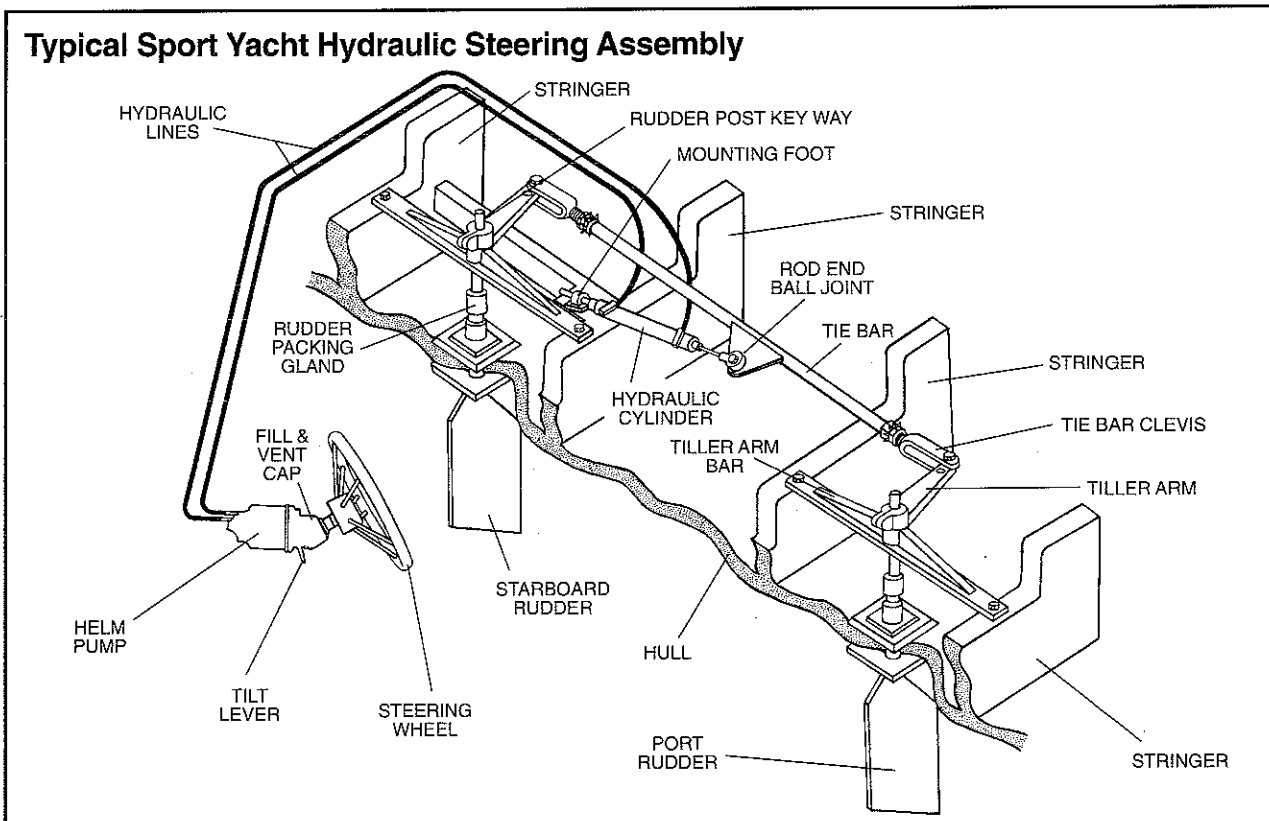
The hydraulic steering system is used primarily on boats with inboard engines, equipped with dual control stations; however it is often used on boats with a single fly bridge control station.

Periodically remove the plug in the helm unit and check the oil level visually. The oil level should be within 1/2" of the filler hole.

The system must be filled with hydraulic oil meeting Mil Spec H-5606 A. Refer to steering system owner's information in the owner's packet for specific hydraulic oils that can be used.

Periodically check the mechanical connections and linkages at the cylinder. Replace worn parts, tighten loose parts and lubricate as needed. The steering system is protected against over-pressure situations by a pressure relief valve. Sometimes when returning the wheel from a hard-over position, a slight resistance may be felt and a clicking noise may be heard. This is a completely normal situation caused by the releasing of the lockspool in the system.

REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.



Inboard/Outboard Power Assist Steering

The power assist steering used with inboard/outboard engines is a mechanical system with enclosed cable. The steering wheel is connected to the stern drive power steering unit by cable. **THE CABLE CONNECTIONS AT THE HELM AND AT THE POWER STEERING UNIT SHOULD BE INSPECTED AT LEAST TWICE A YEAR. A loose connection can result in a sudden loss of steering and control.**

Push-pull cable steering should be checked for proper lubrication of the cable, proper alignment, with no binding or looseness, and no interference in the system. Cable and attachment to the outdrive should be checked for wear, rust or corrosion on a regular basis and be properly lubricated. Check the anchor post at the aft end of the cable to be sure it is secured and free from rust and corrosion.

A routine maintenance schedule for the power assist steering system should be set up to include a Normal Service for every 50 hours of operation or 60 days (whichever comes first); and a Severe Service (after operation in salt-water) every 25 hours of operation or 30 days (whichever comes first). **NOTE: Operation in salt water is considered severe service.**

Service should include:

- Lubricate the control valve through the grease fitting with multi-purpose lubricant until grease appears around the rubber boot.
- Coat power assist steering output shaft and exposed steering cable end with special lubricant.
- Lubricate cable end guide pivot point with SAE 30W engine oil.
- Check power assist steering fluid level and add type "A" automatic transmission fluid as required to bring level up to "FULL" mark on the dipstick, which is attached to fill cap.
- Inspect all hydraulic lines and hoses as part of routine maintenance for leaks. Be certain that lines and hoses are free from friction and extreme heat and adjoining parts. Tighten fittings and clamps as needed.

- Check all bolts for tightness on a regular basis.
- Check pump pulley drive belt often for wear and proper tension. Overtight belts may cause bearing failure. Loss of the belt compounds effect steering severely.

REFER TO YOUR ENGINE OPERATOR'S MANUAL FOR PROPER FLUID LEVELS AND LUBRICANTS.

Sea Ray® recommends that all repairs and/or replacements to steering systems be made by qualified dealers authorized by manufacturer of the steering system of your boat.

CAUTION: Boat steering is not self-centering. Steering is affected by engine and propeller torque, trim plane setting, wave and current action, and the speed of the hull through the water. Constant attention and control of the direction of the boat is required for safe operation.

GEAR SHIFTS & THROTTLE CONTROLS

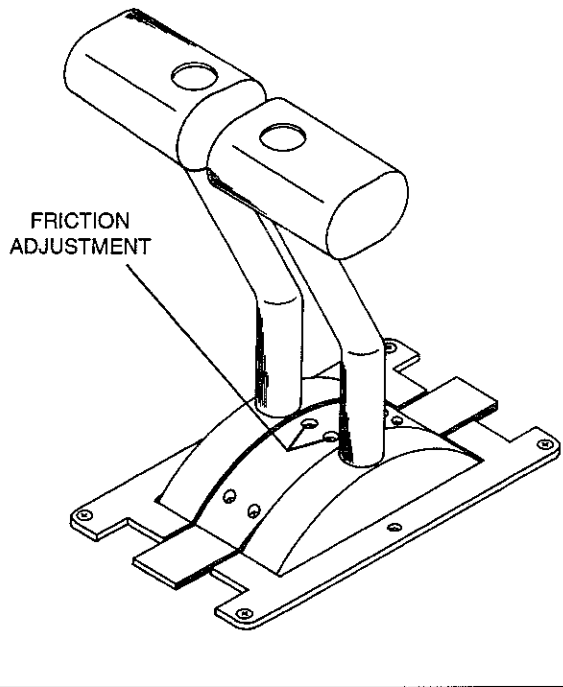
Inboard Gear Shifts & Throttle Controls

The gear shift lever for each engine, twin lever controls on port side of control station, has three positions: forward, neutral, and reverse. The control lever must be in the neutral (center) position when starting the engine(s). A positioning indent can be felt when the control is in exact neutral. Forward and reverse positions should always be in full travel extremes in either direction for a positive engagement and minimum wear.

The throttle controls, twin lever controls on starboard side of control station, regulate the RPM of the engines. If they are extremely tight or extremely loose, the hand lever brake (friction adjustment) can be adjusted. First remove the phillips oval head screws securing the surface plate; using a flat head screwdriver, increase the tension by turning the screws on the upper plate clockwise; turn then counter-clockwise to decrease tension. Periodically check and seasonally lubricate the linkage with medium weight oil.

REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

Inboard Gear Shift & Throttle Adjustments



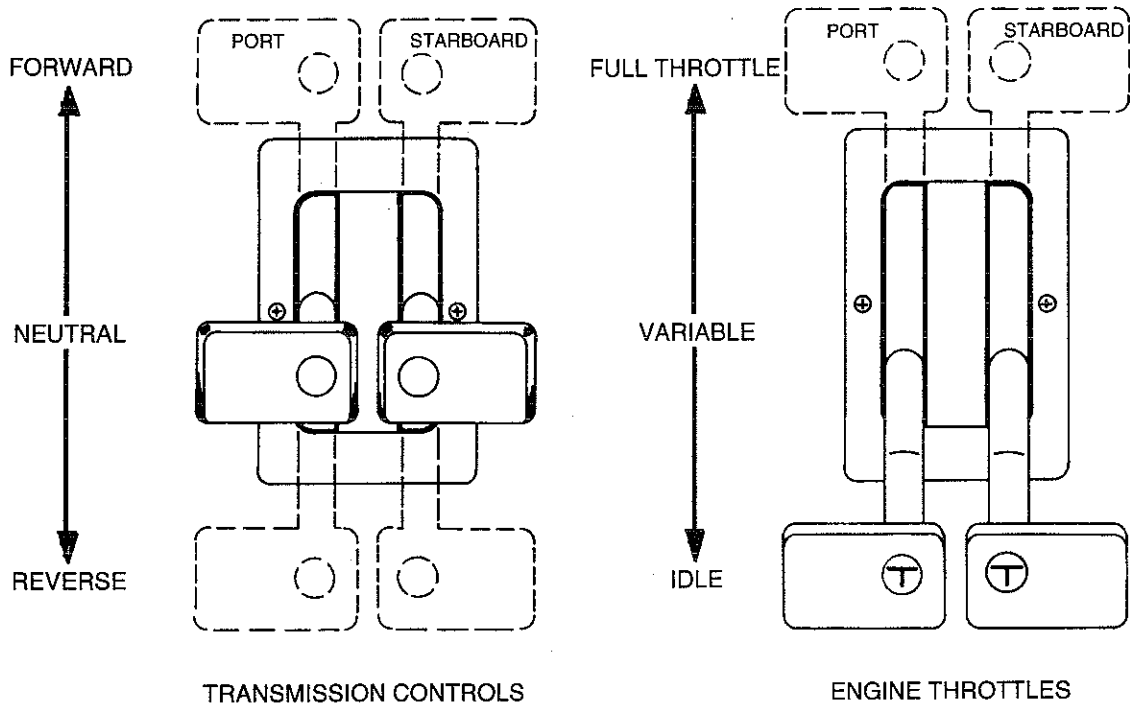
Sea Ray® 380 Super Sport Stern Drive Gear Shift & Throttle Controls

There are two gear shift levers and two throttle control levers.

The gear shift levers (short set of levers), have three positions: forward, neutral (center), and reverse. The gear shift levers must be in the neutral position when starting the engines. A positioning pin can be felt when the control is in exact neutral. Forward and reverse positions should always be in the full travel extremes in either direction for positive engagement and minimum wear. Each gear shift lever can be used independently from the other, for example, when idling one shift can be put in forward and the other in reverse for tight maneuvering. **Only shift gears with engines idling.**

The throttle controls (tall set of levers), regulate the RPM of the engines, Pushing the levers forward will increase engine RPM. Regulating RPM of the engines will control the speed of the boat through the water.

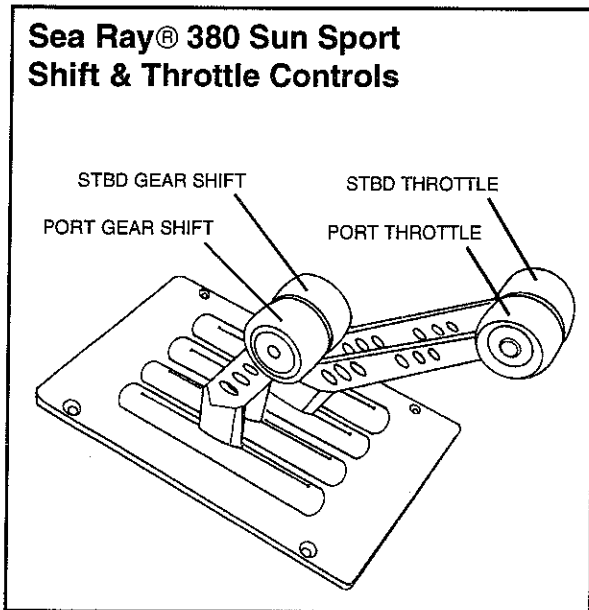
Inboard Gear Shift & Throttle Functions



Reversing

Reversing the shift mechanism will act as a "braking action" when maneuvering the boat at low speeds. Care should be taken in using reverse throttle for "braking action," as sudden slowing of the boat from forward motion will create a following wake which may rise above the transom and flood the boat if the boat is moving at too great a speed. All propellers are designed to provide maximum forward thrust, so the reverse thrust of the propeller will not be as efficient.

Periodically check and seasonally lubricate the linkages with medium weight oil.



POWER TRIM & TILT OPERATION

(For Stern Drive Engines Only)

The Power Trim and Tilt System allows the operator to raise and lower the drive units for trailering, beaching, launching, and shallow water operation. Power trim also allows the operator to adjust the angle of the drive units while underway, to provide the ideal boat angle (in relation to water surface) for a given load and water condition. In most cases, best all-around performance is obtained with the drive unit adjusted so that the boat will run at a 30° - 50° angle to the water (front of hull just slightly out of the water). The switch to operate the system is located on the helm below the steering wheel.

Moving Bow "Up" (Drive Unit "Up")

Characteristics:

- Reduces wetted surface of hull, generally increasing top speed.
- Increases clearance over submerged objects.
- May cause boat to accelerate and get up on plane slower.
- In excess, can cause bouncing, porpoising, and/or propeller ventilation.

Moving Bow "Down" (Drive Unit "Down")

Characteristics:

- Will help boat to accelerate and get up on plane faster.
- Could improve boat ride in rough water (at partial throttle).
- Will reduce boat speed in most cases.

To Raise Drive Unit for Road Transportation, Beaching, Launching or Shallow Water Operation:

- Press "TRAILER" switch until drive unit reaches desired height or end of upward travel.

NOTE: Power Trim pump motors are protected from overheating by an internal circuit breaker. If trailering switch is held depressed after drive unit reaches end of upward travel, internal circuit breaker will open and pump will stop. If this should happen, release switch and allow motor to cool for approximately one minute. Once motor is cool, circuit breaker will reset automatically and trim operation may be resumed.

CAUTION

DO NOT run engine above 1200 RPM with drive unit raised for shallow water operation, as drive unit is out beyond gimbal ring support flange and has no side support. **USE EXTREME CAUTION WHEN OPERATING BOAT WITH DRIVE UNIT RAISED.**

To Trim Bow of Boat "Up" (Drive Unit "Up")

- Press "UP" on "TRIM" switch until the drive unit moves to properly trim the boat or until trim limit switch stops upward travel.

CAUTION

NEVER trim the drive unit "Up" (bow of boat "Up") using the "TRAILER" switch while boat is underway. Severe damage to drive unit may result if the unit is raised beyond the gimbal ring support flanges at engine speeds above 1200 RPM.

To Trim Bow of Boat "Down" (Drive Unit "Down") or To Lower Drive Unit from Raised Position:

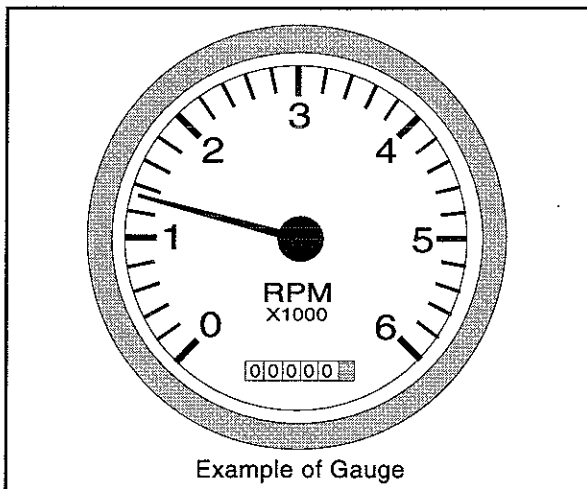
- Press "DOWN" on "TRIM" switch until the drive unit moves to properly trim boat or until the drive unit reaches the end of down travel.

ENGINE ALARM SYSTEM

Engines installed in Sea Ray® Sport Yachts utilize an audible engine alarm. The alarm indicates a problem with one or more of the following: engine water temperature, oil pressure and on some engines, stern drive oil level.

Read the Engine Operator's Manual supplied by the engine manufacturer to learn how to use it properly.

TACHOMETER (With Hourmeter)



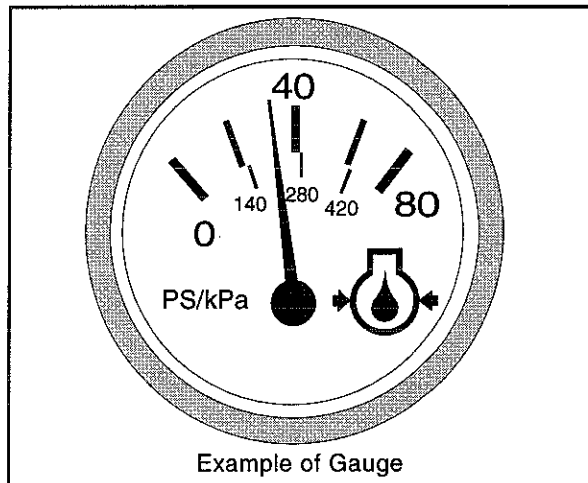
Example of Gauge

The tachometer indicates the revolutions per minute (RPM) of the engine. It does not indicate the speed of the boat through the water or over the bottom. Your Engine Operator's Manual states the maximum full throttle RPM at which your engine should operate. This should not be exceeded. The tachometer should also be used to determine the most comfortable and economical cruising RPM.

Hourmeter

The hour meter measures cumulative hours of operating time and are available for both engines and the generator. They should be used to keep a careful log of engine maintenance as well as performance data and fuel consumption. Do not leave ignition key on with the engines off, as this will increase the engine hours on the hour meter. The generator hourmeter is located in the bilge on the bilge D.C. distribution panel.

OIL PRESSURE GAUGE



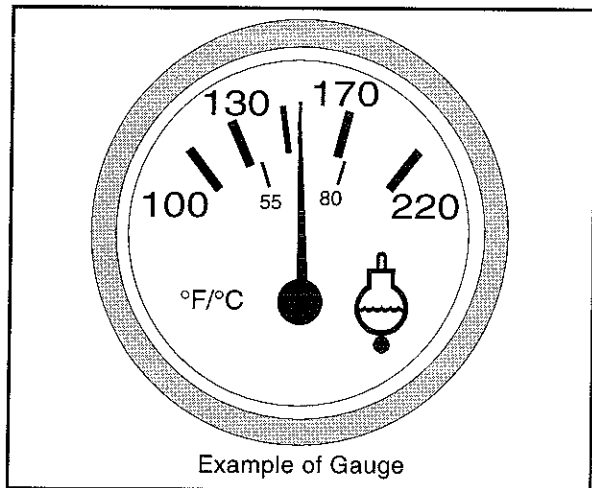
Example of Gauge

Very little serious trouble can occur in an engine which will not be reflected on the oil pressure indicator. Maximum pressure is controlled by a pre-set valve in the oil pump. Note the reading which this gauge records when the engine is new, as it is the "norm" which can be used as reference during the life of the engine.

IF A COMPLETE LOSS OF OIL PRESSURE OCCURS, TURN ENGINE OFF AT ONCE. Continued running after loss of pressure will cause engine damage. First, manually check the oil level. If low oil level is not the cause, consult your Sea Ray® dealer. **DO NOT RESTART THE ENGINE UNTIL THE PROBLEM HAS BEEN CORRECTED.**

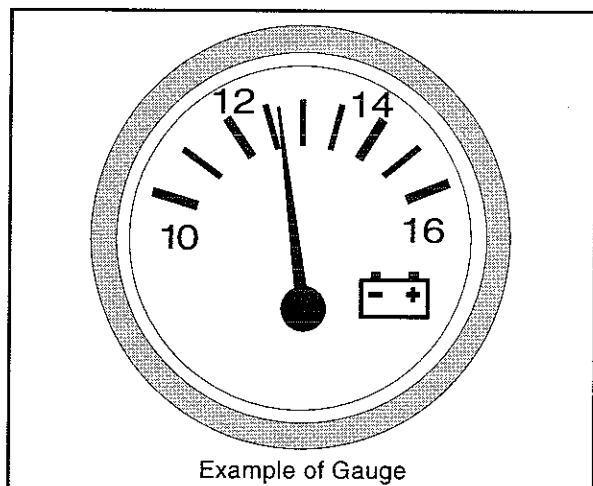
Slight fluctuations in gauge readings are not uncommon during operation and may be due to the characteristics of the lubricating oil. Greater fluctuations should be investigated. The cause may be a clogged oil filter element which should be replaced with every oil change.

WATER TEMPERATURE GAUGE



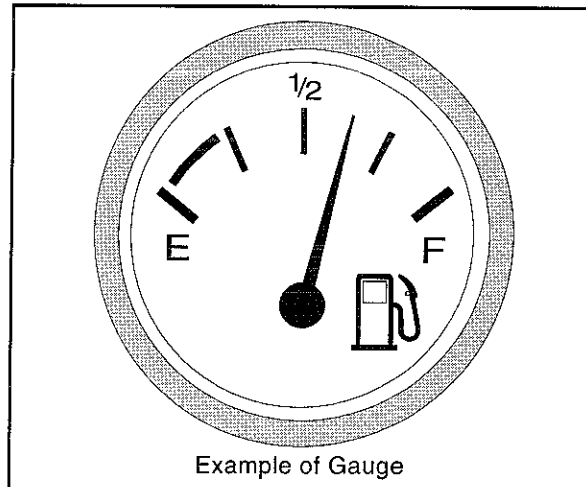
The water temperature gauge indicates temperature of the cooling water circulating inside the engine. Your engine is equipped with a thermo-stat so a predetermined engine temperature should be reached soon after starting the engine and maintained thereafter while the engine is running. Refer to your Engine Operator's Manual for proper gauge readings. **If the temperature approaches above normal on your gauge, shut down engine at once.**

VOLTMETER



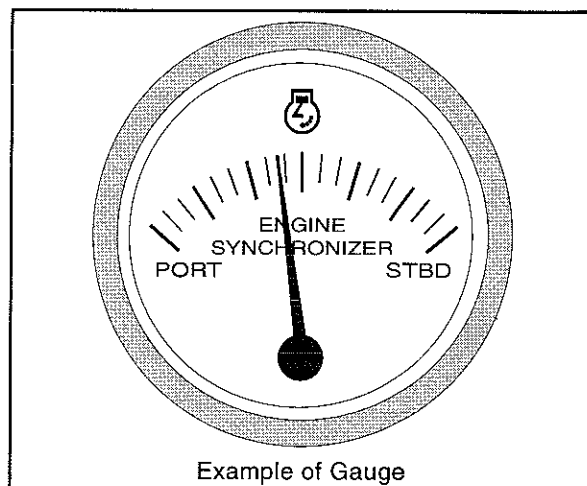
The voltmeter indicates battery voltage. Normal engine operating voltage will range between 12.0 to 15.5 volts when the alternator is charging. Significantly higher or lower readings indicate a battery problem, alternator malfunction or heavy battery drain.

FUEL GAUGE



The fuel gauge indicates the amount of fuel in the fuel tank. The most accurate reading of the fuel gauge is at idle speeds when your boat is in an approximately level position. At slow plane when your boat is in a bow up position, the gauge will read inaccurately because the fuel in the tank travels to the rear of the tank and away from the fuel sending unit. Because gauge readings are approximate, they should be compared to the hours of use versus known fuel consumption (GPH).

SYNCHRONIZER GAUGE



The synchronizer gauge indicates which engine is running slower by the needle regis-

tering to the slower engine. To synchronize the engines adjust the engine RPM with the throttles until the needle is centered in the gauge. The engine synchronizer is designed to operate between 1500 RPM and Wide Open

Throttle (WOT). When engines are not under load and running in neutral gear, they will tend to surge and indicate out of synchronization very easily.

REFER TO YOUR ENGINE OPERATOR'S MANUAL FOR PROPER GAUGE READING.

CONSOLE DIMMER

There is a "CONSOLE DIMMER" control located on the helm switch panel which controls the intensity of the gauge and switch panel lights. The gauge and switch panel lights are turned on when the navigation running lights are turned on.

NAVIGATION LIGHTS

Navigation lights must be displayed while underway from sunset to sunrise or in conditions of reduced visibility. It is wise to run at reduced speed whenever navigation lights are needed. The term "underway" denotes not at anchor or dock. Trolling or drifting with power off is considered underway and normal running lights must be displayed. At anchor, in open water, a 360 degree white anchor light must be displayed.

Although the navigation lights supplied with your Sea Ray® are of top quality, failure may occur for a variety of reasons:

1. There may be a blown fuse or tripped breaker. (Replace the fuse or reset the breaker.)
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 non-conductive grease.)
4. A wire may have come loose or may be damaged. (Repair as required.)

If your boat is equipped with a sport spoiler and you opt to install a radar, it then becomes your responsibility to reevaluate your lighting situation to make certain the navigation lights

on your boat meet government navigational lighting requirements. You will most likely have to raise the mast light. Consider the weight of the radar you install, be certain it is not too heavy for your sport spoiler.

MARINE COMPASS

A marine compass is deflected and its usefulness impaired when other instruments or objects containing iron, magnets, or electric current carrying wires are in its vicinity, A newly installed compass must be adjusted to compensate for these influences if they must remain in proximity to it.

The compensating or adjusting should be done by a qualified compass adjuster. A compass can seldom be corrected to zero deviation on all headings, so you will be provided with a deviation card or chart showing the correction to be applied when laying out a compass course or making your navigational calculations. **Keep this card at the helm at all times.**

After your compass is adjusted, do not permit items such as iron or steel to be placed near it, even temporarily, as they will affect its accuracy. The compass must be readjusted if any items which affect it are removed, relocated or added in its vicinity.

When not in use, the compass should be protected from excessive and prolonged sunlight. If your compass becomes sluggish or erratic, it should be serviced by an authorized repair station.

To keep the plexiglass dome free from scratches, remove salt deposits and dust with a damp cloth. An occasional treatment with paste wax will help preserve the dome surface.

REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

TRIM PLANES (TABS)

The trim planes on your Sea Ray® are operated with a rocker type momentary switch on the dash. They are protected by a circuit breaker on the helm switch panel which must be ON to use the trim planes (tabs).

To trim the bow of your boat down, push the top halves of both rockers down in half second bursts. If you hold the rockers down, you will over trim the boat and the bow will dig in. To correct over trimming, push bottom halves of both rockers to obtain desired planing angle.

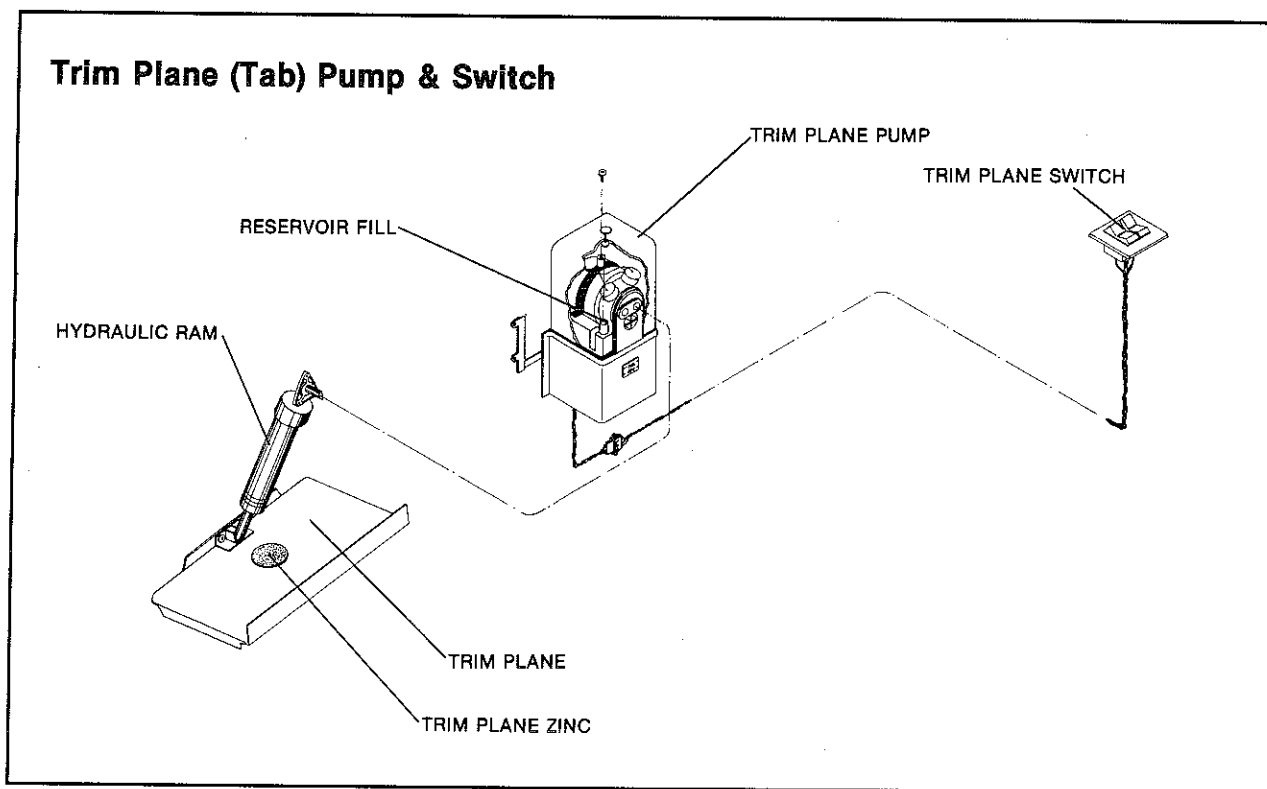
The two trim planes on the transom of your boat can also be used to trim the list of your boat that may be caused by improper storage of gear, too many people on one side or a strong cross wind. Operation of the rocker switch should be momentary short bursts to achieve proper attitude of the hull.

When running wide open, most boats do not require any trim unless heavily loaded.

In heavy following seas or when running in an inlet best maneuverability is obtained with a bow high attitude. To be sure the planes are full up in the zero position, push the bottom halves of the rockers for several seconds.

The trim plane pump is located in the bilge, mounted on the transom. To service the unit, remove the tinted plastic cover to gain access to reservoir fill plug and motor parts. Hydraulic trim planes use Type A Dexron II automatic transmission fluid, which should be filled up to the "FULL" mark on the pump base, **Add fluid with the trim planes in the up position only.**

REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.



RUNNING ATTITUDE	LIST	PUSH
BOW UP	---	TOP OF BOTH ROCKERS
BOW UP	PORT	TOP OF STARBOARD ROCKER
BOW UP	STARBOARD	TOP OF PORT ROCKER
BOW DOWN	PORT	BOTTOM OF STARBOARD ROCKER
BOW DOWN	STARBOARD	BOTTOM OF PORT ROCKER

Section 4 • Fueling & Starting

Fuel Systems

Fuel lines, filters and all fuel system components should be checked at the start of each season and periodically thereafter, particularly after any work has been done aboard the boat which might have affected any part of the system. Be certain that all are in proper condition and that the entire system is fuel tight.

Only a qualified marine mechanic should be allowed to work on the fuel system. Damage can be done to fuel system components by indiscriminate tightening of connections, including flexible fuel line sections.

WARNING

DO NOT store fuel or flammable liquids in closed storage areas. Ventilation has not been provided for explosive vapors.

CAUTION

Never start an engine until you are certain that gasoline fumes are not present in engine compartment or elsewhere in the boat.

WARNING

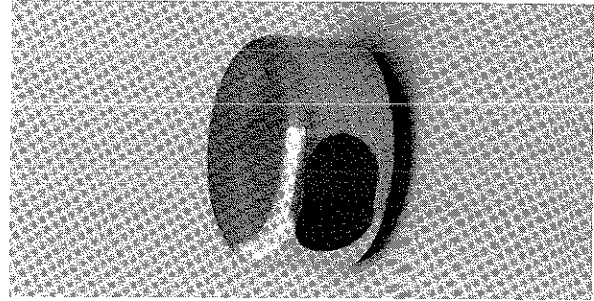
Leaking fuel is a fire and explosion hazard. Inspect system regularly. Examine fuel tanks for leaks or corrosion at least annually.

FUEL TANK

The fuel system aboard your SEA RAY consists of one or two fuel tanks, depending on boat model, and one of the following for each tank, fuel fill, fuel tank vent and an anti-siphon or electric fuel valve.

The fuel tank vent serves as a pressure/vacuum release and safety overflow. The thru-hull fitting has a flame arrester, making it imperative that you keep the screen clean and in excellent repair. Replace the screen immediately if it becomes damaged or displaced.

Periodically check the vent to assure that it is not clogged.



Fuel Vent With Screen

The gasoline engine fuel pick-ups at the fuel tank have an anti-siphon valve to prevent fuel from siphoning out in the event of line failure. Boats with diesel engines have an electric fuel valve.

ELECTRIC FUEL VALVES

Generators are equipped with an electric fuel valve. The valve is wired to the ignition switch. When the ignition is turned ON the valve opens, when the ignition is turned OFF the valve closes. The manual override knob on the side of the valve should be left in the OFF position at all times.

In the event of an electrical malfunction, the valve can be opened and closed manually by turning the manual override knob.

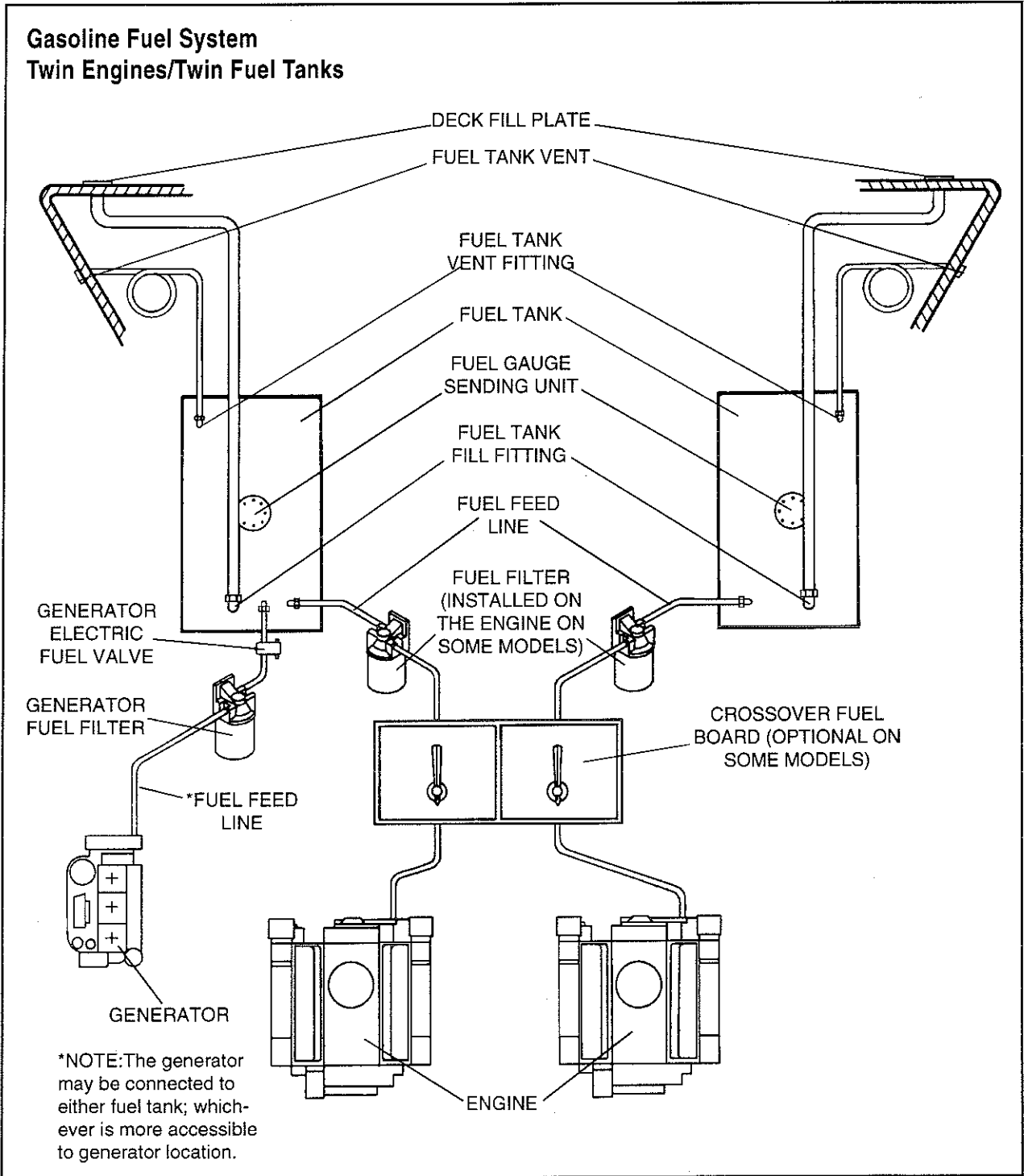
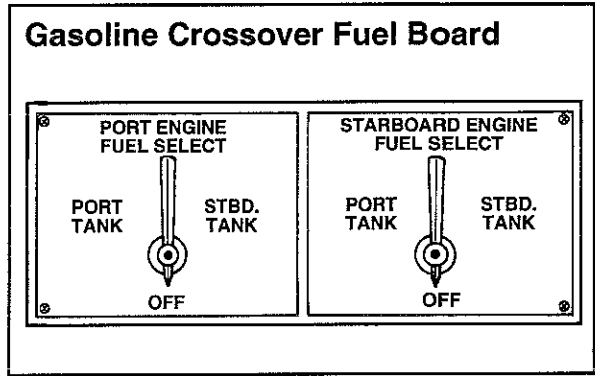
The electric fuel valve is installed in-line on the fuel hose between the fuel tank and the generator.

CROSSOVER FUEL SYSTEM

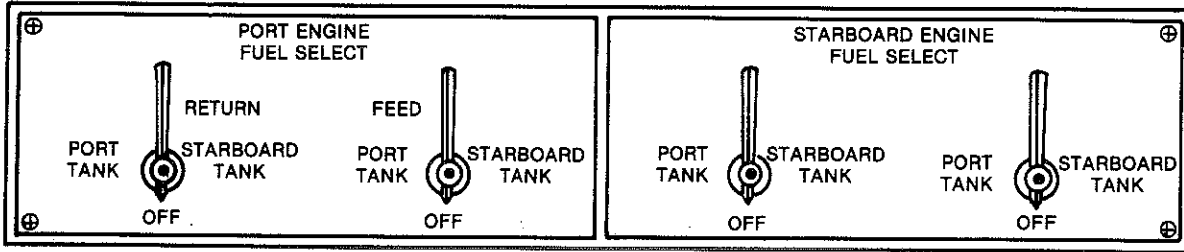
The crossover fuel system allows the engines to draw fuel from either tank. This allows switching to an alternate tank in case of fuel contamination or for even fuel weight distribution.

During normal operating conditions of boats equipped with diesel engines, set the return fuel valves to the same tank the engine is drawing fuel from. **Example:** If the port engine is drawing fuel from the port fuel tank and star-

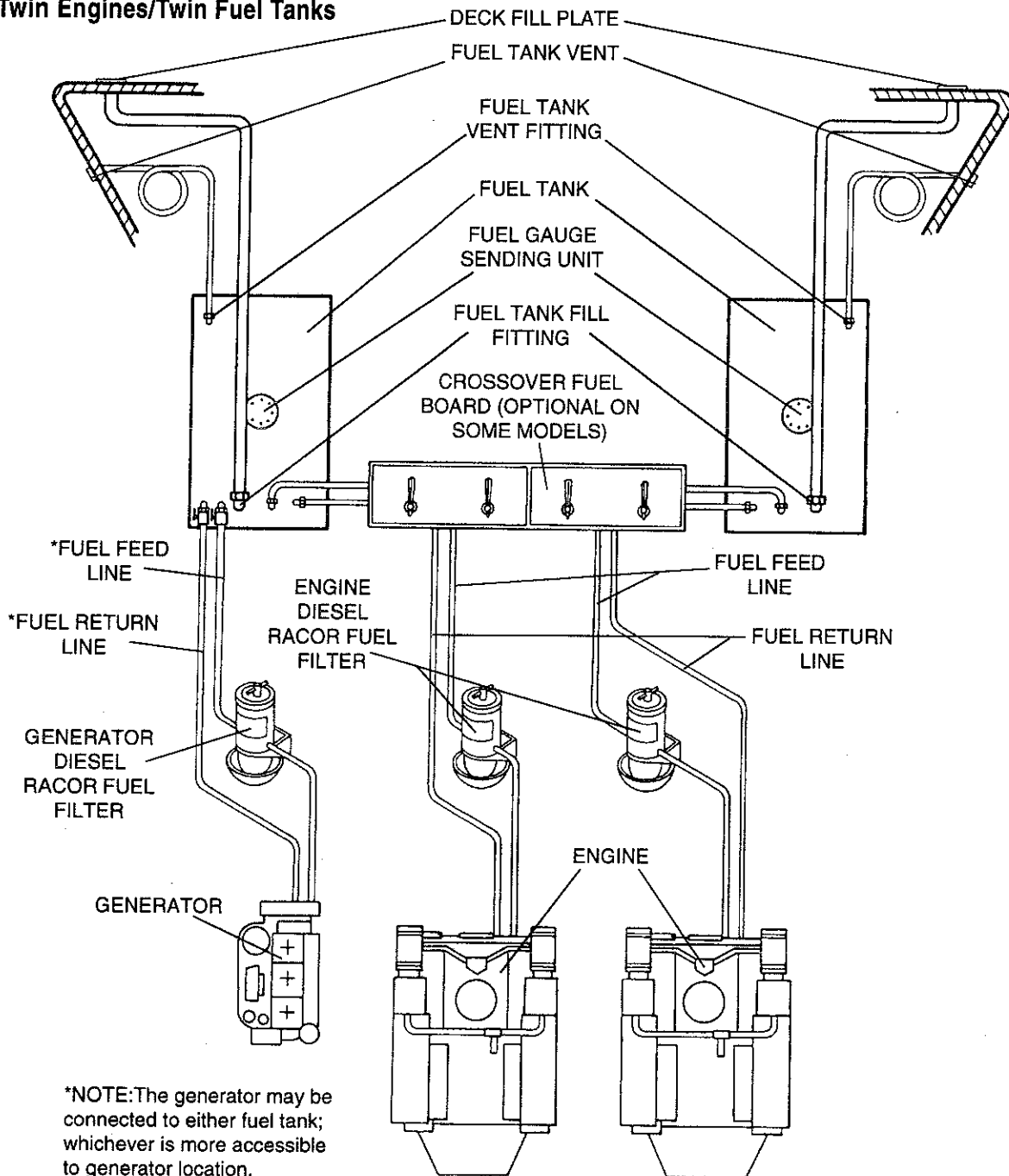
board engine is drawing fuel from the starboard fuel tank, set the return fuel valve for the port engine to the port tank and the starboard engine to the starboard tank.



Diesel Crossover Fuel Board



Diesel Fuel System Twin Engines/Twin Fuel Tanks



FUEL RECOMMENDATIONS

The quality of the fuel is very important for satisfactory engine performance and long engine life. Fuel should be clean and free of contamination. Your fuel tanks should be kept full of fuel whenever possible. This will reduce the amount of water condensation and reduce the possibility of contamination.

CAUTION

Use of improper gasolines can damage your engine seriously. Engine damage resulting from use of improper gasoline is considered misuse of engine and voids warranty.

NOTICE

Always use fresh gasoline. Gasoline forms gum and varnish deposits, and may cause trouble if held in a tank for too long.

Recommended Fuel: (Gasoline)

NOTICE

GASOLINE RECOMMENDATIONS

The use of any good grade unleaded regular or premium gasolines with a minimum posted octane rating [(A.K.I.) Anti-Knock Index] of 87, are satisfactory for use in gasoline marine engines. In areas where unleaded regular or premium gasolines are not available, a good grade leaded regular with a minimum posted octane rating (A.K.I.) of 89 may be used. However, gasolines containing alcohol, either methyl alcohol (methanol) or ethyl alcohol (ethanol) may cause increased:

1. Corrosion of metal parts.
2. Deterioration of rubber and plastic parts.
3. Fuel permeation through flexible fuel lines.
4. Wear and damage of internal engine parts.
5. Starting and operating difficulties.

AVOID USING FUELS WITH ALCOHOL ADDITIVES

Some of these adverse effects are due to the tendency of gasolines containing alcohol to absorb moisture from the air, resulting in a

phase of water and alcohol separating from the gasoline in the fuel tank.

The adverse effects of alcohol are more severe with methyl alcohol (methanol) and are worse with increasing alcohol content.

- Use a propeller that allows the engine to operate at or near the top of its maximum throttle RPM.
- Use Quicksilver Valve Lubricant or Quicksilver Valvetane Plus to help prevent recession.

Fuel Filters: (Gasoline)

The fuel filters installed on the engine should be replaced in accordance with the Engine Owner's Manual. The filters help keep the fuel free of water and contamination and keep particles from entering the engine's carburetor.

Recommended Fuel: (Diesel)

#2 Diesel fuel.

Fuel Filters: (Diesel)

Primary and secondary fuel filters are installed on your SEA RAY to help keep the fuel as clean as possible. Primary fuel filters are the Racor water separating fuel filters. The secondary fuel filters should be replaced in accordance with the Engine Owner's Manual.

Use of any methanol, gasohol or alcohol based fuel additive will damage the fuel filter.

NOTE: In rough seas, allow approximately 15% reserve when planning fuel consumption.

REFER TO THE ENGINE OPERATORS MANUAL FOR MORE DETAILED INFORMATION.

Fueling Precautions

Certain precautions must be carefully and completely observed every time a boat is fueled, even with diesel fuel. Diesel fuel is nonexplosive but it will burn.

Before Fueling:

- Make sure your boat is tied securely to the fueling pier.
- Turn off engines, bilge blowers, fans and other devices that can produce a spark.
- Close all windows, doors and hatches to prevent fumes from entering the boat.
- Disembark all people not needed for the fueling operation.
- Prohibit all smoking on board and nearby.
- Have a fire extinguisher close at hand.

While Fueling:

- Do not leave boat unattended.
- Keep nozzle or can spout in contact with the fill opening to guard against static sparks.
- Do not spill fuel.
- Do not over fill. Filling a tank until fuel flows from the vents is dangerous. Allow room for expansion.

After Fueling:

- Close fill openings.
- Wipe up any spilled fuel. Dispose of wipe up rags on shore.
- Check for fuel fumes in the bilge; continue to ventilate until odor can no longer be detected. Check for any drips or liquid fuel.

Starting Engines

The engine operation and maintenance manual furnished with your boat describes pre-start and starting procedures. The following notes are basic reminders and not intended to cover every detail of starting. We urge you to thoroughly read and understand your engine manual.

WARNING

DO NOT run the engines or generator in an enclosed area, such as a closed boat house, as there is the possibility of build-up and inhaling of carbon monoxide.

1. Check battery switch(es) for ON position.
2. Check the fuel tank level.
3. Check the oil and coolant levels. See your Engine Operator's Manual for proper readings.
4. Check engines for coolant drain plug installations.
5. (For Inboard Engines Only) Check sea-cocks for open position. Make sure strainers are clean and water tight.
6. Check fuel filter tops for tightness.
7. Check fuel valves on crossover fuel board. (If equipped)
8. With gasoline engines run bilge blowers at least four minutes. Check the bilge for fuel fumes or liquid. **Do not start the engine(s) until the source of fumes is determined and corrected and the bilge area is safely ventilated.**



DANGER

Gasoline Vapors Can Explode

Before Starting Engine:

- Check engine compartment for gasoline vapors.
- Operate blower for 4 minutes.

Run Blowers Below Cruising Speed

9. **(For single control station boats)**
Turn key(s) ON. Listen for alarm buzzers which indicate ignition power.

(For dual control station boats)

Turn "MASTER IGNITION" breakers and keys, located on main distribution panel, ON. Listen for alarm buzzers which indicate ignition power.

NOTE: With gasoline engines there is about a ten (10) second delay before the buzzer sounds.

10. **(For single control station boats)**
After ignition power is verified, check shift for neutral position and turn the key switch to the momentary start position to start the engine(s).

(For dual control station boats)

After ignition power is verified, check shift for neutral position and push ignition toggle switch up to the momentary start position to start the engine(s).

Important: Do not operate starter for more than 10 seconds without allowing starter to cool off for 2 minutes. This will also allow the batteries to recover between starting attempts. Once engine has started and sufficient oil pressure is achieved alarm buzzer will stop.

Important: Check engine RPM on tachometer as soon as engine starts, Do not allow RPM to exceed 1,500. Move throttle lever down to decrease RPM.

Alarm will sound when:

- Engine oil pressure is too low.
 - Engine temperature is too hot.
 - Outdrive oil is too low. (Stern drive only)
 - Transmission temperature is too hot. (Inboard only)
 - Engine stalls.
11. Check the oil pressure and with inboard engines look at exhaust port to assure that the engine is pumping water.
 12. Let the engines warm up at idle and check for leaks. If engine is cold, run for a short period of time at fast idle speed that does not exceed 1500 RPM.
 13. Shut down the engines and recheck fluid levels; top off if necessary.

NOTE: For general operation of the engine, its instruments and controls follow detailed instructions on "Engine Break-in" in the Engine Operator's Manual.

Stopping Inboard/Outboard Engines

1. Bring shift/throttle controls to "IDLE/NEUTRAL" position.
2. Secure mooring lines.

3. Idle engine for 5 minutes to cool the engine.
4. Turn ignition switches to OFF position.
5. Turn battery switch OFF.

Stopping Inboard Engines

1. Bring throttle controls to "IDLE" position.
2. Bring gear shift controls to "NEUTRAL" position.
3. Secure mooring lines.
4. Idle engine for 5 minutes to cool the engine.
5. Turn ignition switches to OFF position.
6. Turn battery switches OFF.
7. Turn fuel valves OFF.

Emergency Stop Switch (Dual Control Station Boats Only)

Your boat may be equipped with an emergency stop switch. The emergency stop switch gives the boat operator the ability to shut down the engines from the opposite control station from which they were started from. The switch need not be used if starting and stopping the engines from the same control station.

Operation Of Emergency Stop Switch:

1. If the momentary start switch is in the RUN position, switch to OFF position.
2. Press and hold the emergency stop switch until the engine(s) come to a complete stop. Then release switch.

NOTE: Run bilge blowers for 4 minutes before restarting engine(s). Follow engine starting instructions.

Section 5 • Water System

Water Systems

The fresh water system aboard your boat is pressurized. When a faucet is opened, pressure in the tank is reduced as the water level drops. A pump is activated by a pressure sensing switch in the pump. The pump will continue to run after all faucets are closed and the pressure set point of the sensor is reached.

Hot water is provided by either a heat exchanger connected with the engine or an electric hot water heater.

The fresh water system is activated by the "FRESH WATER PUMP" circuit breaker on the main distribution panel. The breaker must be ON to operate the head, shower, ice maker, fresh water wash down or faucets.

FILLING THE WATER TANK

To fill your water tank you should use a plastic hose. Do not use a rubber hose; it can give the water a disagreeable flavor. The hose should be kept for filling use only. After using the hose it should be emptied. Start at one end and raise the hose to shoulder level and walk to the opposite end of the hose, allowing the remaining water to flow out. You should store your water tank filling hose in a dry clean place. It is also a good practice to cover the ends of the hose to keep the inside clean.

To begin initial operation, fill the tank with water and open all faucets, both hot and cold. Switch the pump to the ON position. Allow time for the water heater to fill. Shut off each faucet, cold first, as flow becomes steady and free of air. Shutting off the last faucet should cause the pump to shut off.

CHECKING WATER LEVEL

To check the water level in the tank, press the water level switch on the main distribution panel. The display will indicate the amount of water in the tank.

SANITIZING WATER SYSTEM

Although your dealer initially sanitizes the water system, if the system has not been used for a long period of time or you suspect it may be contaminated, use a water treatment additive to sanitize the potable water system. Water treatment additives are available at marine/RV supply stores.

If water treatment additives are not available, adhere to the following procedure for complete sanitation of your potable water system.

1. Prepare a chlorine solution using one gallon of water and 1/4 cup Clorox or Purex household bleach (5% Hypochlorite solution). With tank empty, pour chlorine solution into tank, using one gallon solution for each 15 gallons of tank capacity.
2. Complete filling of tank with fresh water. Open each faucet and drain cock until air has been released and the entire system is filled.
3. Allow to stand for three hours.
4. Drain and flush with potable fresh water.
5. To remove excessive chlorine taste or odor which might remain, prepare a solution of one quart vinegar to five gallons water and allow this solution to agitate in the tank for several days by vehicle motion.
6. Drain tank and again flush with potable water.

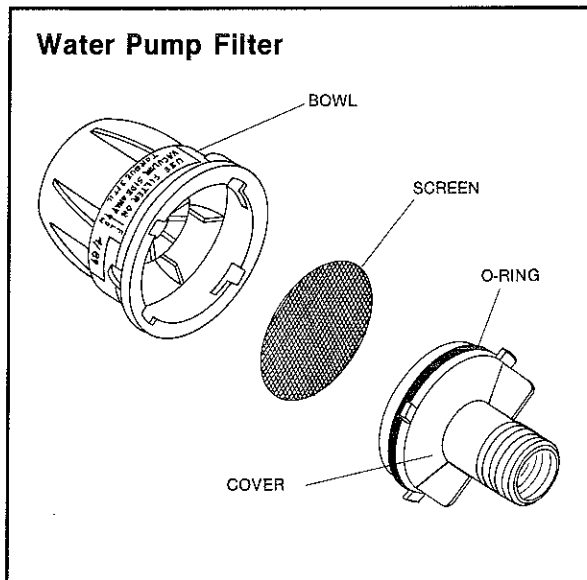
WATER PUMP & FILTER

The pump has a filter to prevent particles from entering the pump head. The filter should be checked and cleaned periodically. Refer to the bilge diagram to find water pump and filter location.

Some water tanks, where the pump is installed lower than the tank, are fitted with a shut-off valve located in-line between the tank and the pump. The valve is provided so that you can

disconnect the water pump connections without having to drain the water tank.

Before servicing the system, turn the "WATER SYSTEM" breaker OFF and release pressure on the system by opening a faucet. To clean the filter, remove the screen and rinse with clean water. Replace, making sure the O-ring is in place when replacing the cover



PNEUMATIC ACCUMULATOR TANK

The pre-pressurized pneumatic accumulator tank is located adjacent to the water pump and filter. The function of the tank is to provide the pressurized water system with an air back-pressure water reservoir, which provides instant water pressure to the faucet outlets before the pump must start.

REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.



Pneumatic Accumulator Tank

WATER HEATER

The water heater is located in the bilge. It runs on the 120 volt dockside system or generator and has a "WATER HEATER" circuit breaker on the main distribution panel that must be ON to operate the unit.

The water heater has a check valve to prevent hot water from back washing into the cold water source and a pressure relief valve to avoid damage to the heater from over pressure or too high a temperature.

The hot water exchanger is designed to heat water without having to turn the hot water heater on. It works by pumping water from the engine cooling system, out the intake manifold to the hot water heater. It is then circulated through a coil inside the water heater where it heats the potable water. The water from the engine then exits the water heater and returns to the engine through the engine water pump.

Initial Start-Up Or After Winterization:

1. Make sure the "WATER HEATER" breaker is OFF.
2. Make sure drain and pressure relief valve is closed.
3. Fill the heater with water by turning ON the "FRESH WATER PUMP" breaker.
4. Open the hot water faucets until all air is eliminated from the system.
5. Make certain the heater is full of water. **COMPLETE FAILURE OF THE HEATING ELEMENTS WILL RESULT IF THEY ARE NOT COMPLETELY IMMERSSED IN WATER AT ALL TIMES.**
6. Turn the "WATER HEATER" breaker ON.

The water heater is equipped with an adjustable combination temperature regulating control and manual reset high limit device located behind the lower access cover. **ALWAYS DISCONNECT POWER TO THE UNIT BEFORE REMOVING THE ACCESS COVER.** Refer to the water heater information in the "Owner's Packet" for instructions on adjusting the thermostat.

To maintain water heater properly, drain whenever the possibility of freezing occurs and frequently inspect lines and connections for leaks.

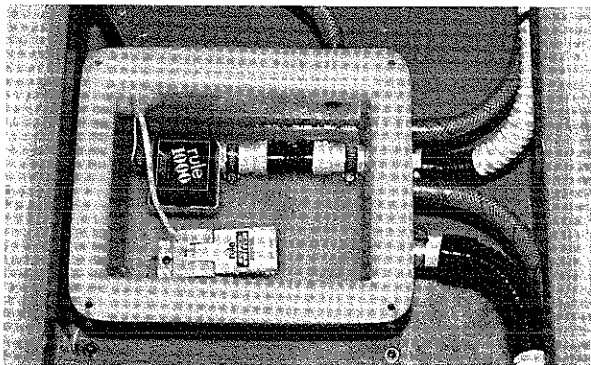
REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

SHOWER SYSTEM

The shower drains into a self contained shower sump containing a pump and float switch. (**NOTE:** Air conditioner condensation also drains into the shower sump.) The sump pump is fully automatic and is protected by a breaker on the bilge D.C. distribution panel. Check the pump and float switch for obstructions and proper working order.

The shower sump pump indicator light on the systems monitor panel comes on when the pump is running. The pump comes on when there is enough water in the sump to raise the float switch and start the pump. If it does not come on after one or two gallons of water drain from the shower, turn the water off and check the pump and float switch for proper operation.

After using the shower, it is recommended that you run a gallon of clean water through the shower drain to clean out soap residue. Check the pump and float switch for obstructions and proper working order.



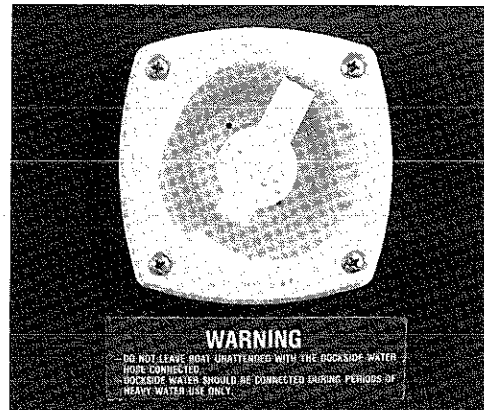
Shower Sump

FRESH WATER WASHDOWN

The washdown spigot is located in the cockpit. The system uses water from the fresh water tank. The "WATER SYSTEM" breaker must be ON to operate the system.

DOCKSIDE WATER INLET

The dockside water inlet allows use of a dockside water source to provide water for the boat's fresh water system.

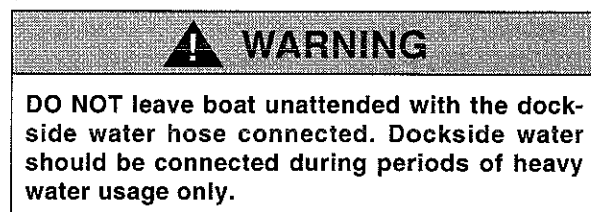


Dockside Water Inlet

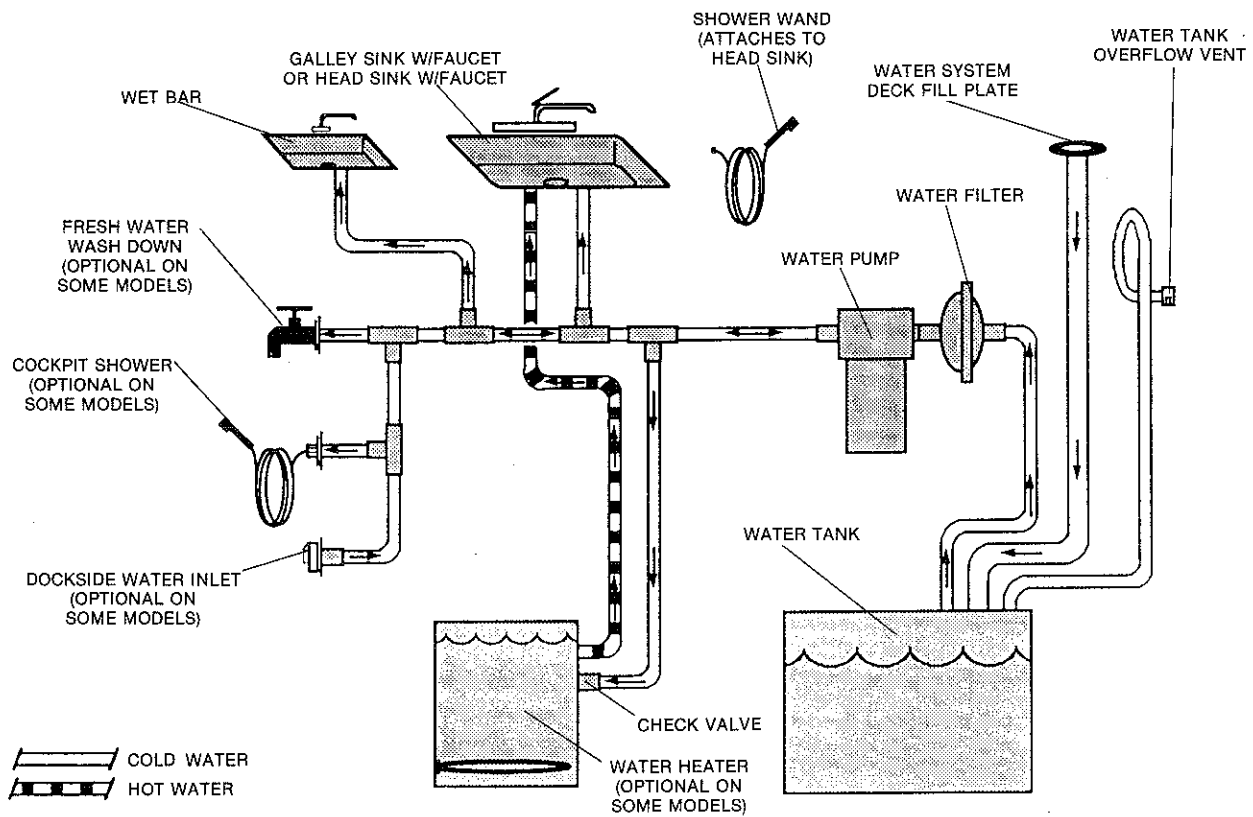
To use the system:

1. Make sure the "WATER SYSTEM" breaker is OFF.
2. Remove the plug from the face of the dockside water inlet.
3. Connect a drinking water hose to the water outlet on the dock, then to the dockside water inlet on the boat and turn on the water at the dock.

All fresh water faucets and showers are now usable. To disconnect the system, reverse the procedure, making sure the plug is reinstalled tightly.



Typical Pressure Water System Component Layout*



*NOTE: This diagram is NOT meant to be an exact representation of the water system in your boat, but instead depicts a typical water system arrangement with optional accessories. The accessories shown may not be available as standard equipment or even available as options. This diagram is not drawn to scale.

GRAY WATER SYSTEM

(Optional On Some Models)

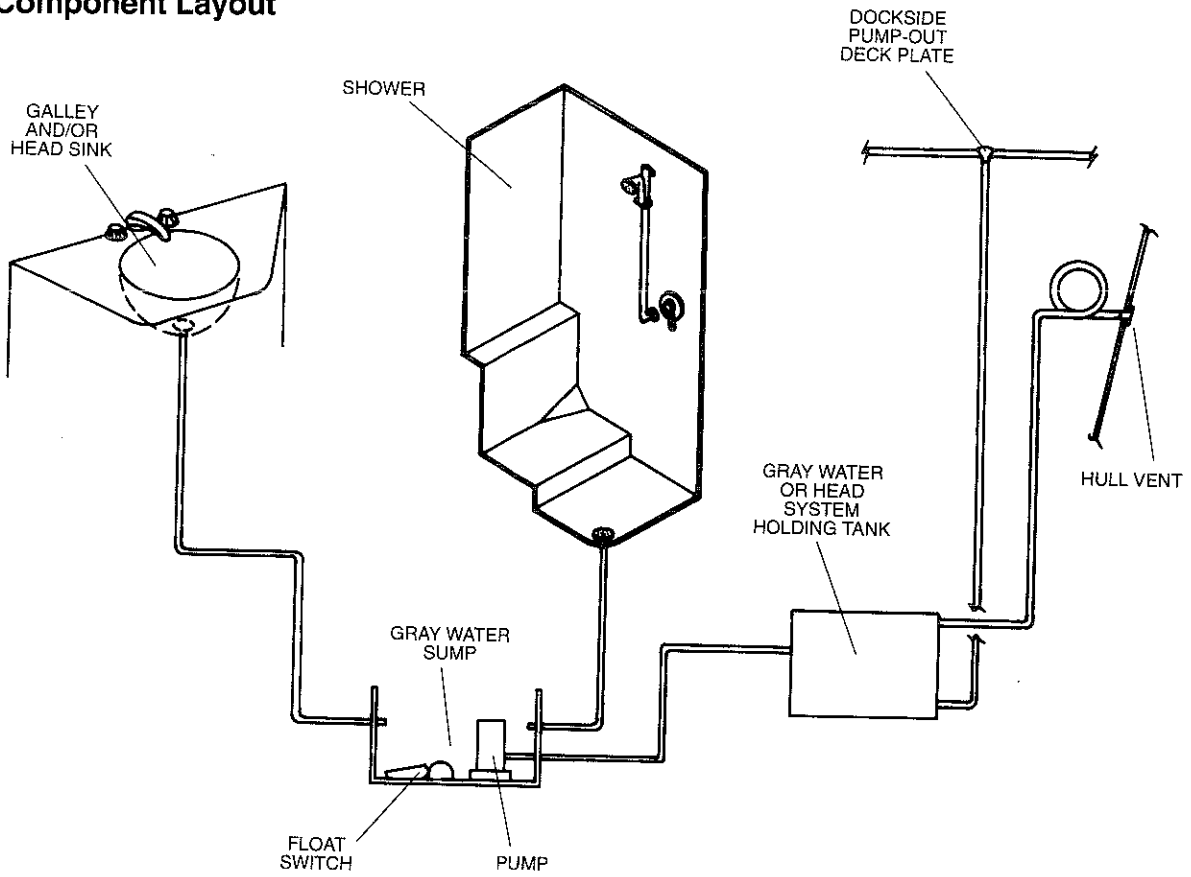
The gray water system is designed for boats that are used in areas that restrict overboard water discharge.

The system directs waste water from accessories such as the galley and head sinks and shower to a sump that is fitted with a float switch and pump that pumps the water to the gray water tank. The tank must be emptied when it becomes full.

To empty the gray water system holding tank with the dockside pump out:

The services of a dockside pump out station will be needed. Follow instructions at the station and make sure pump out station hose is inserted into the deck plate marked "GRAY WATER/WASTE".

Typical Gray Water System Component Layout



Section 6 • Head System

Head Systems

Your SEA RAY Sport Yacht is available with a variety of head system options. Below is a description of each option. You should be aware of which option(s) your boat is equipped and read the sections pertaining to it. The owner's packet in your boat contains information pertaining to your head system that should be carefully read.

CAUTION

Do not place facial tissue, paper towels or sanitary napkins in head.

REQUIREMENTS FOR VESSEL OPERATORS

The Environmental Protection Agency (EPA) standards state that in freshwater lakes, freshwater reservoirs or other freshwater impoundments whose inlets or outlets are such as to prevent the ingress or egress by vessel traffic subject to this regulation, or in rivers not capable of navigation by interstate vessel traffic subject to this regulation marine sanitation devices certified by the U.S. Coast Guard installed on all vessels shall be designed and operated to prevent the overboard discharge of sewage, treated or untreated, or of any waste derived from sewage. The EPA standards further state that this shall not be construed to prohibit the carriage of Coast Guard-certified flow through treatment devices which have been secured so as to prevent such discharges. They also state that waters where a Coast Guard certified marine sanitation device permitting discharge is allowed include coastal waters and estuaries, the Great Lakes and interconnecting waterways, freshwater lakes and impoundments accessible through locks, and other flowing waters that are navigable interstate by vessels subject to this regulation (40 CFR 140.3).

MANUAL FLUSH HEAD WITH HOLDING TANK

To operate the standard manual flush head move valve lever to "WET BOWL" position and operate pump handle to pump water into the bowl. Return valve lever to "DRY BOWL" position. To empty toilet bowl leave valve lever in "DRY BOWL" position and operate pump handle until bowl has been cleared.

Waste from head is directed into the holding tank. There is an indicator panel on the main distribution panel or in the head which indicates "3/4 FULL," "FULL" and "DO NOT FLUSH." When the "FULL" light is on, the "DO NOT FLUSH" light will also be on. The holding tank must be emptied before the head can be reused.

To empty holding tank, the services of a dock-side pump out station will be needed. Follow instructions at the station and make sure pump out station hose is inserted into the deck plate marked "WASTE". The holding tank can also be emptied through utilization of the macerator if your boat is equipped with this option (see "MACERATOR OPTION").

NOTE: In boats with both macerator and dock-side pump-out options, make sure the Y-Valve handle is in the dock-side pump-out position.

REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

VACU-FLUSH HEAD

The Vacu-Flush head utilizes a "HEAD SYSTEM" breaker on the main distribution panel. The foot pedal at the base of the toilet opens a mechanical seal and vacuum forces waste through the opening in the bowl to an accumulator tank, through the vacuum pump and then to the holding tank or treatment tank.

To Operate:

1. Turn ON the "WATER SYSTEM" breaker.
2. Turn ON the "HEAD SYSTEM" breaker and "TREATMENT SYSTEM" breaker if the boat is equipped with the San-X treatment system.

REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

HOLDING TANK OPERATION

Waste from the head is directed into the holding tank located in the bilge. The holding tank fluid level indicator is located on the main distribution panel or in the head which indicates "3/4 FULL," "FULL" and "DO NOT FLUSH." When the "FULL" light is on, the "DO NOT FLUSH" light will also be on. When these lights are ON, the holding tank must be emptied before the head can be reused.

To empty holding tank, the services of a dockside pump out station will be needed. Follow instructions at the station and make sure pump out station hose is inserted into the deck plate marked "WASTE". The holding tank can also be emptied through utilization of the macerator if your boat is equipped with this option (see "MACERATOR OPTION" in this section).

SAN-X TREATMENT SYSTEM (Optional)

The San-X system utilizes a "HEAD SYSTEM" breaker, and a "TREATMENT SYSTEM" breaker located on the main distribution panel. There is an indicator panel on the main distribution panel indicating "POWER," "3/4 FULL" and "FULL, DO NOT FLUSH." When the "FULL, DO NOT FLUSH" light is on the treatment tank must be emptied before the head can be reused.

With the San-X system, waste is held in the holding tank and treated in a bacteria controlling solution while being processed by a macerator. The waste can either be held in the holding tank for later discharge or immediately discharged after treatment. If waste is to be discharged, make certain overboard discharge seacock is in the "OPEN" position. The San-X system has a 3-position control switch on the

main distribution panel with the following modes:

Normal:

Waste is held in treatment tank.

Hold:

Chemicals are injected and the 20 minute treatment cycle starts. Upon completion of cycle, waste is held in the tank.

Discharge:

Injects chemicals into the tank and starts the 20 minute treatment cycle. When the cycle is complete, waste is automatically discharged. Make certain overboard discharge seacock is in the "OPEN" position.

After the tank is emptied, a pint of bacteria controlling chemical is automatically pumped into the tank. Approximately one gallon of treatment chemical is required for eight treatment cycles.

For Normal Operation:

1. Turn the "WATER SYSTEM" breaker ON.
2. Turn the "HEAD SYSTEM" breaker and "TREATMENT SYSTEM" breaker ON.
3. Set San-X control switch to "NORMAL" position.

For Treatment Operation:

1. Turn "TREATMENT SYSTEM" breaker ON.
2. Select "HOLD" or "DISCHARGE" functions on "WASTE SYSTEM CONTROL" panel.

REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

DOCKSIDE SAN-X PUMP OUT (Optional)

When the San-X system is equipped with this option it can be emptied with the services of a dockside pump out station.

Follow instructions at the station and make sure pump out station hose is inserted into the deck plate marked "WASTE".

DIRECT OVERBOARD DISCHARGE

The Direct Overboard Discharge system is designed to control the directional flow of sewage either directly overboard or to the holding/treatment tank.

The system is equipped with a Y-Valve to change the direction of waste flow. The Y-Valve is mounted in-line with the bilge head system hose routing.

To direct waste to the holding/treatment tank turn the Y-Valve handle to the holding tank position. To direct waste overboard, open the overboard discharge seacock, located on the bilge floor, then turn the Y-Valve handle to the overboard position.

DISCHARGE OF SEWAGE DIRECTLY OVERBOARD IS FOR USE WHERE APPROVED ONLY.

NOTICE
<p>There is the possibility of being fined for having an operable direct overboard discharge in U.S. waters. Removing handle of seacock, in closed position, or other means must be utilized to avoid fine.</p>

MACERATOR OPTION

The macerator gives the boat operator the means of discharging the holding tank contents directly overboard through a seacock in the bottom of the hull. This option is available in conjunction with the dockside pump out. **DISCHARGE OF SEWAGE DIRECTLY OVERBOARD IS FOR USE WHERE APPROVED ONLY.**

The system is equipped with a Y-Valve to change the direction of waste flow. The Y-Valve is mounted in-line with the bilge head system hose routing.

To direct waste from the holding tank to dockside pump out, turn the Y-Valve handle to the dockside pump out position. To direct waste from the holding tank to the macerator, open the overboard discharge seacock then turn the Y-Valve handle to the macerator position.

To operate the macerator:

1. Turn ON the "HEAD SYSTEM" breaker and open the waste discharge seacock located on the bilge floor.
2. Turn Y-Valve handle to macerator position.
3. Operate discharge switch located in the head.
4. When tank is empty, release the switch and close waste discharge seacock.

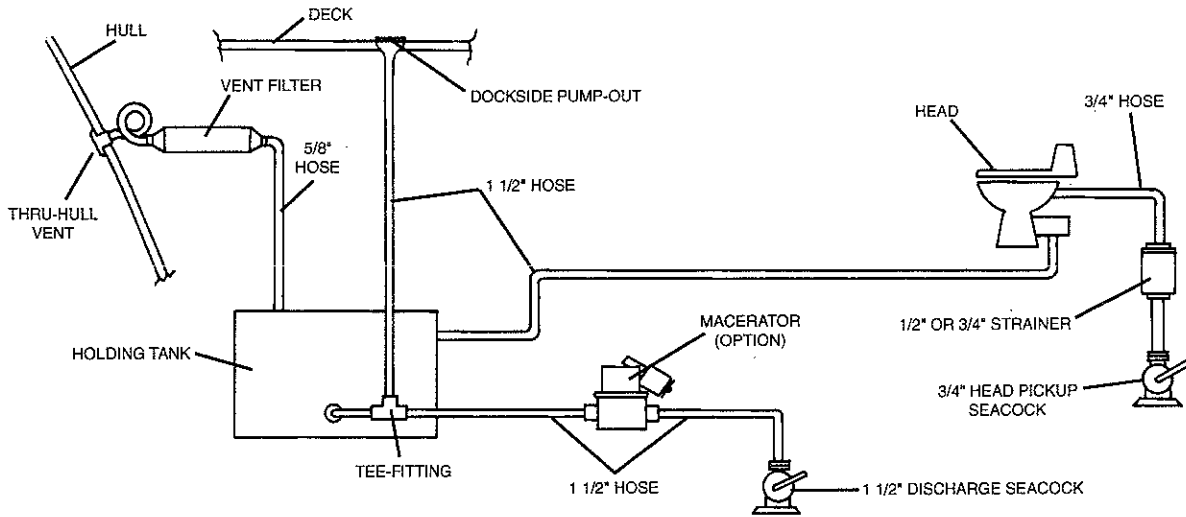
NOTE: There is the possibility of being fined for having an operable direct overboard discharge in U.S. waters. Removing handle of seacock, in closed position, or other means must be utilized to avoid fine.

ELECTRIC HEAD (International Option)

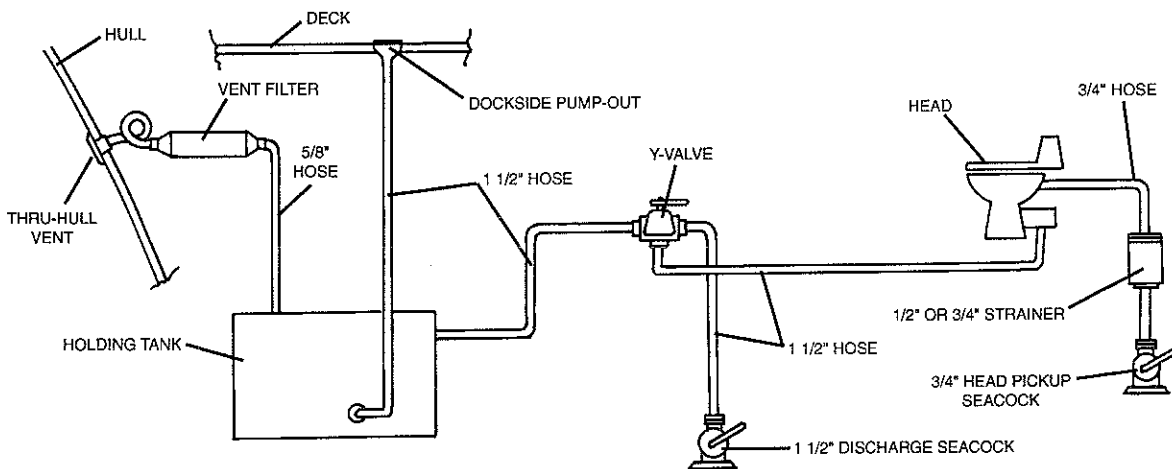
The Electric Head system consists of a seacock, raw water strainer and an electric pump that is an integral part of the head unit. The momentary switch, located near the head unit, activates the electric pump which pumps raw water through the system and discharges waste directly overboard. The system is protected by a "HEAD SYSTEM" breaker on the helm switch panel or main distribution panel that must be ON to use the system.

REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

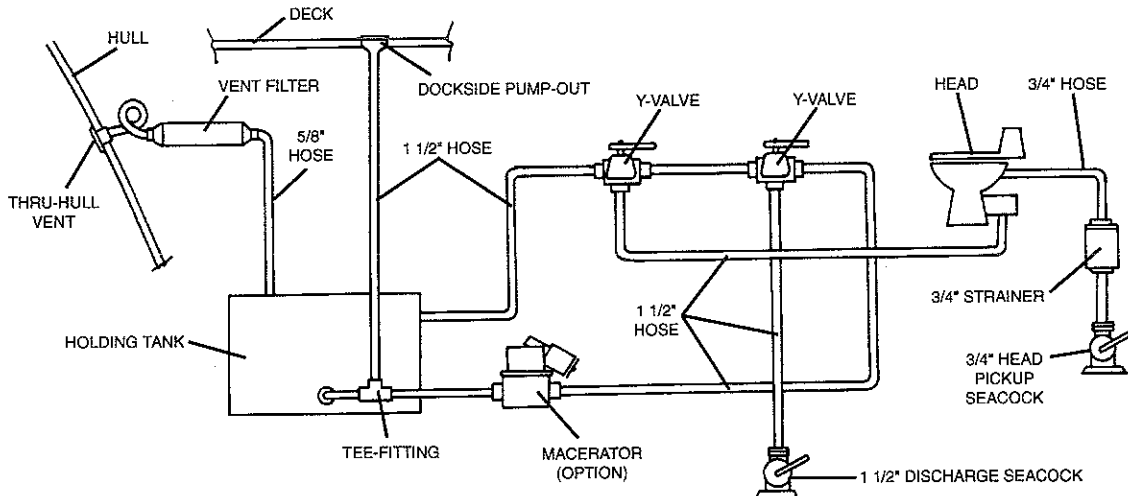
Manual Flush With Holding Tank, Dockside Pump-Out & Macerator



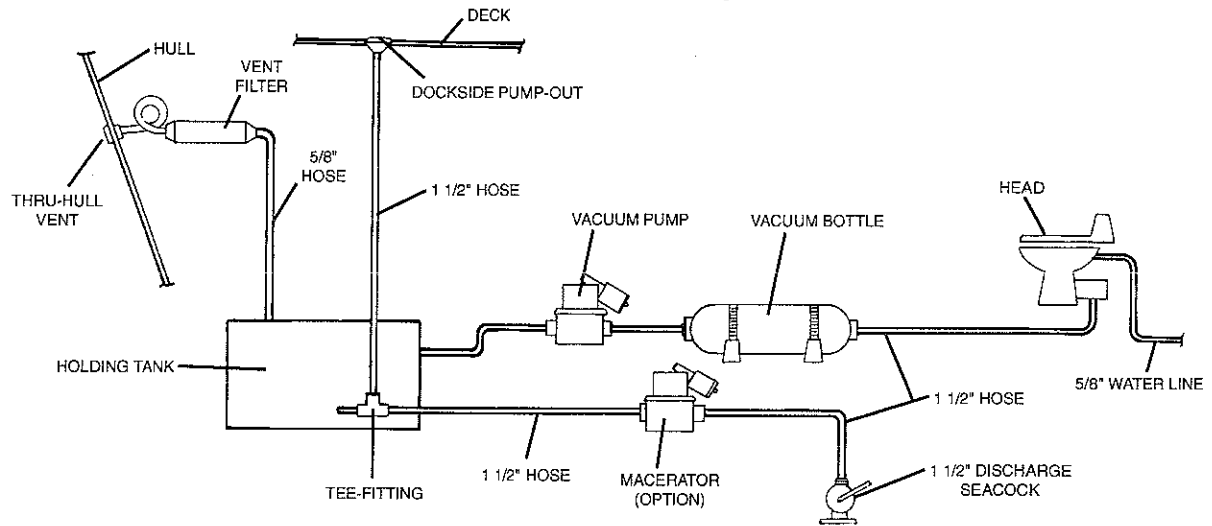
Manual Flush With Holding Tank, Dockside Pump-Out & Direct Overboard Discharge



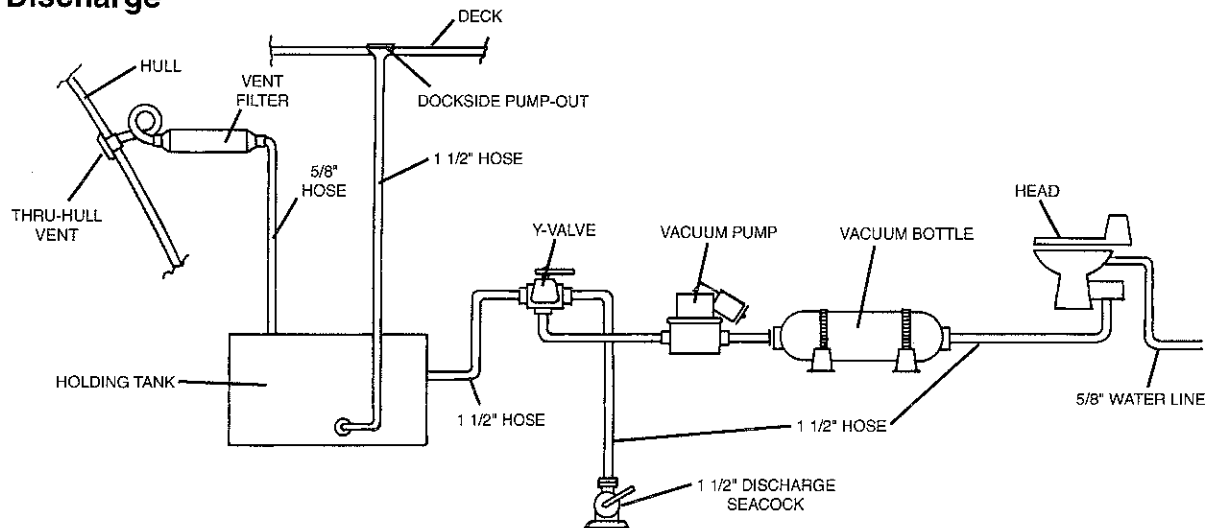
Manual Flush With Holding Tank, Dockside Pump-Out, Direct Overboard Discharge & Macerator



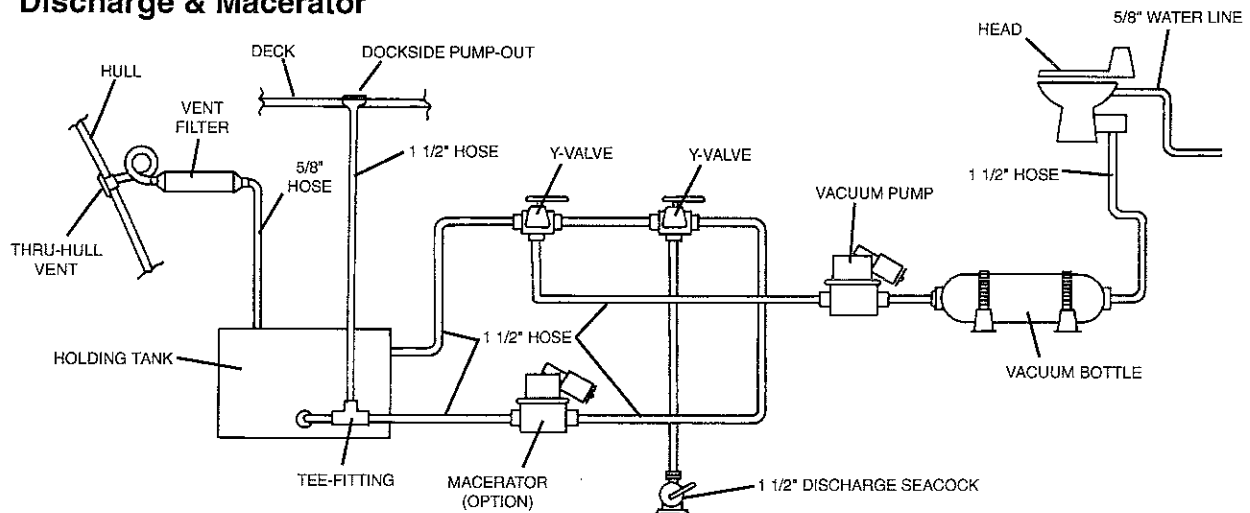
Vacuum Flush With Holding Tank, Dockside Pump-Out & Macerator



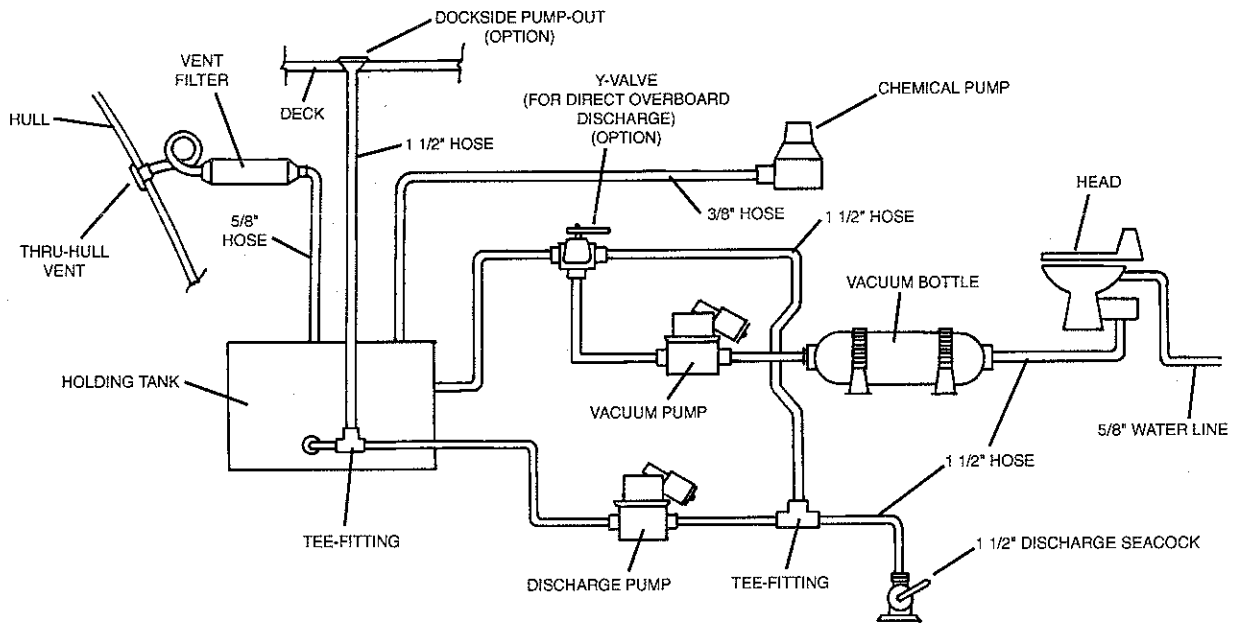
Vacuum Flush With Holding Tank, Dockside Pump-Out & Direct Overboard Discharge



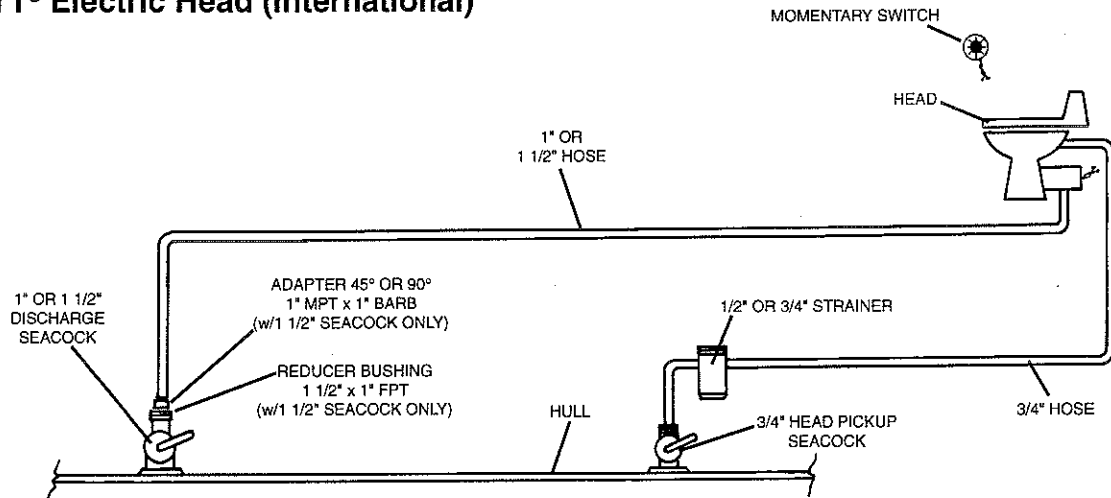
Vacuum Flush With Holding Tank, Dockside Pump-Out, Direct Overboard Discharge & Macerator



Vacuum Flush Head w/San-X Treatment System, Dockside Pump-Out & Direct Overboard Discharge



ITT® Electric Head (International)



Section 7 • Electrical System

D.C. System

The 12 volt direct current (D.C.) electrical system derives its power from the batteries, which are kept charged by an engine-driven alternator and an A.C. converter. The battery voltage is indicated by the voltmeter on the main distribution panel. The batteries supply power through the circuit breakers on the bilge D.C. distribution panel then to the helm and main distribution panel breakers. The 12 volt dash systems are protected by the "CONTROL STATION MAIN" breaker, or the "ACCESSORY" breaker on the bilge D.C. distribution panel. The 12 volt functions on the main distribution panel are also protected by the "CABIN MAIN" breaker on the bilge D.C. distribution panel.

The negative terminal of each bank of batteries is attached to the ground studs of the propulsion engines and generator. This "negative ground system" is the approved system for marine D.C. electrical systems. Additional equipment must be adaptable to the negative ground system, and when installing, it will be necessary to stipulate that each item's current supply be taken from the 12 volt distribution buss bar. If additional circuit protection is required, it should be added in that area. Do not allow any power feeds for accessory equipment to be taken from the voltmeter terminals.

Enlist the aid of your dealer for a careful analysis of D.C. power needs on your boat. It may be necessary to add batteries or auxiliary charging methods to supply adequate power for the additional accessories you require.

BATTERIES

The batteries in your boat have been selected for their ability to furnish starting power based on engine starting requirements as well as their ability to power the D.C. system.

When replacing a battery refer to your engine operation and maintenance manual to find the recommended battery for the engine installed in your boat.

Sea Ray® recommended batteries are available through your local Sea Ray® dealer.

ALWAYS DISCONNECT BATTERY CABLES BEFORE DOING ANY WORK ON THE ENGINE'S ELECTRICAL SYSTEM OR ALTERNATOR WIRING TO PREVENT ARCING OR DAMAGE TO THE ALTERNATOR.

To remove the battery cables:

1. Turn OFF all items drawing power from the batteries.
2. Turn OFF the "CONVERTER" breaker.
3. Turn OFF battery switches.
4. Remove the positive cable first, then the negative cable. To replace the cables, reverse the procedure.



Battery maintenance:


Check the fluid level in the cells approximately every 4 weeks, and more often in summer and hot zones.


The fluid level must be between the lower and the upper markings.

Only replenish with distilled water. Do not use metal funnels.

Coat battery terminal clamps with silicone grease. Keep battery clean and dry.


Only use a battery charger designed to charge automotive/marine batteries when batteries are disconnected from the boats electrical circuit.

 CAUTION
<p>While the engine is running the battery terminal clamps must not be loosened or detached nor should the battery switch(es) be turned off, otherwise the alternator and other electronic units will be damaged.</p>

 DANGER
<ul style="list-style-type: none">• Never use an open flame in the battery storage area.• Avoid striking sparks near the battery.• A battery will explode if a flame or spark ignites the free hydrogen given off during charging.

IGNITION PROTECTION

To avoid the possibility of creating sparks in a gasoline environment all electrical components in the bilge are ignition protected.

 DANGER
GASOLINE VAPORS CAN EXPLODE
<p>Any marine engine or generator electrical component replacement MUST be marine rated ignition protected.</p>

Protective terminal covers, such as rubber boots on electrical connections, must be in place when engine is operating or working in the bilge.

ELECTRICAL SYSTEM BREAKERS

In the event it becomes necessary to replace an electrical breaker, **REPLACE BREAKER ONLY WITH BREAKER OF THE SAME**

AMPERAGE. The breaker's amperage is marked on the breaker.

If a breaker is replaced with a breaker of lower amperage it will be insufficient to carry the electrical load of the equipment it is connected to and cause nuisance tripping.

If a breaker is replaced with a breaker of higher amperage it will not provide adequate protection against an electrical malfunction and create a possible fire hazard.

MAIN D.C. BREAKER PANEL

The main D.C. breaker panel, located in the bilge, distributes 12 volt power to all of the boats 12 volt D.C. accessories; including sending power to the 12 volt breakers on the main distribution panel and control station switch and breaker panel.

In the event one of the breakers trip, determine and correct the fault, then reset by depressing the tripped breaker.

BATTERY SWITCHES

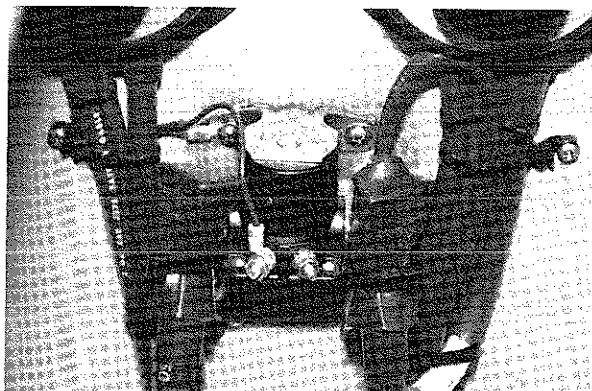
When the switches are in the OFF position, all 12 volt current to the engines and accessories are turned off, except power to the bilge pumps and mercathode. The battery switches must be ON to start the engines or generator. Turn battery switches OFF when leaving boat for extended time to save batteries. **CAUTION: ALWAYS STOP ENGINES BEFORE SWITCHING TO "OFF" POSITION.**

NOTE: The bilge pumps and emergency bilge pump **CANNOT** be turned OFF with the battery switches. The entire remaining D.C. system **CAN** be turned OFF with the battery switches.

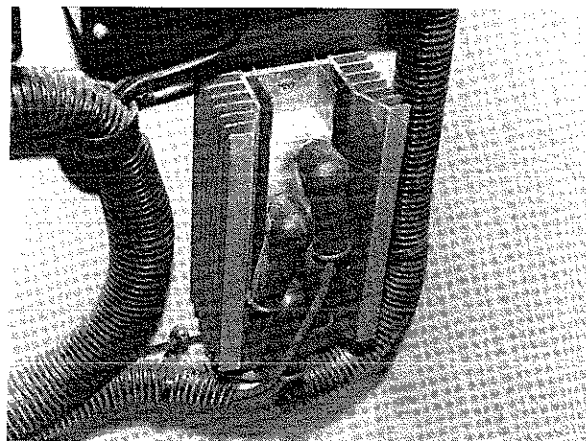
EMERGENCY START SYSTEM

The emergency start system utilizes a momentary switch, located on the control station switch panel and an emergency start solenoid, located in the bilge. Holding the switch energizes the solenoid which parallels the batteries to assist in starting. Use emergency start when the charge of one bank of batteries is insufficient to start corresponding engine. To engage emergency start system, start whichever engine has sufficient battery power,

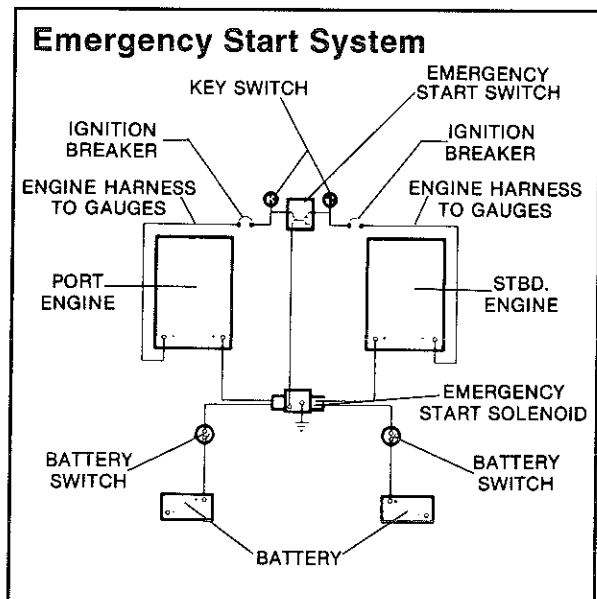
then hold emergency start switch while starting the other engine.



Emergency Start Solenoid



Crossover Charge Battery Isolator



CROSSOVER CHARGING SYSTEM

The crossover charging system utilizes a battery isolator which isolates the battery banks from each other. It is an automatic system with no switches, and is designed to charge both banks of batteries from both engine alternators, when necessary.

SYSTEMS MONITOR PANEL

The systems monitor panel, located at the control station, monitors critical engine functions, bilge pumps, high water emergency bilge pump, shower sump pump and generator shutdown. It is equipped with a test button to test the indicator lights and the engine alarm buzzer. Both "IGNITION" breakers and switches must be ON to test the engine functions. The panel is protected by a 3 amp fuse installed on the terminal board behind the switch panel.

Each engine is equipped with three alarm senders; water temperature, oil pressure and transmission temperature, which are connected to the alarm buzzer and appropriate indicator light on the systems monitor panel.

The warning buzzer and corresponding indicator light will be activated if the cooling system water temperature rises too high, the engine oil pressure gets too low, or the transmission temperature rises too high. Refer to the Engine Operator's Manual for proper gauge readings or aid in finding and correcting the problem.

NOTICE

If an engine stalls during docking or slow maneuvering, the buzzer will sound until the engine is restarted. The buzzer will also sound while the engines are cranking and will continue until they start.

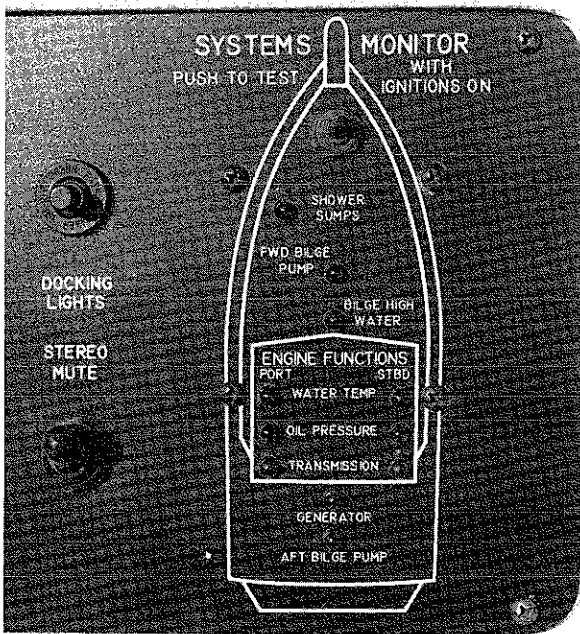
CAUTION

If the oil or water lights and alarm come on while running, quickly check and note the oil pressure and water temperature gauges. Turn off engine immediately. Check for leaks and see if the cooling water pick-up is blocked or clogged. If necessary, clear the water pickup of any foreign matter. **DO NOT RESTART THE ENGINE UNTIL CAUSE FOR ALARM SOUNDING HAS BEEN FOUND AND CORRECTED.**

It is recommended that the system be tested at least once every five hours of operation. To test the engine alarm, push the engine ignition switches to the RUN position (without cranking the engine). **NOTE:** With gasoline engines there is a ten (10) second delay before the buzzer sounds.

In the event the bilge high water alarm and light are activated, immediate attention to the bilge is required.

LIGHT	INDICATES (When Light)
SUMPPUMP	SHOWER SUMP PUMP IS RUNNING
EMERGENCY FWD PUMP	EMERGENCY BILGE PUMP IS RUNNING
FWD BILGE PUMP	BILGE PUMP IS RUNNING
WATER TEMP.	ENGINE COOLING SYSTEM IS TOO HOT
OIL PRESSURE	ENGINE OIL PRESSURE IS TOO LOW
TRANSMISSION	TRANSMISSION TEMPERATURE IS TOO HOT
AFT BILGE PUMP	BILGE PUMP IS RUNNING
EMERGENCY BILGE PUMP	EMERGENCY BILGE PUMP IS RUNNING
GENERATOR SHUTDOWN	GENERATOR OIL PRESSURE IS TOO LOW



Systems Monitor Panel

12 VOLT ACCESSORY RECEPTACLE

Your Sea Ray® Sport Yacht may have a 12 volt accessory receptacle at the control station. It is a cigarette lighter style receptacle to be used with any 12 volt accessories using this type of plug.

HALOGEN LIGHTING

CAUTION

The filament bulb used in all halogen-cycle lamps generate intense heat, are pressurized and could shatter if scratched or damaged. Glass halogen-cycle bulbs should be protected against contact with liquids when operating.

The bulb **MUST** be protected from contaminants, use appropriate protection, such as clean cloth gloves, when handling or disposing of all halogen-cycle bulbs. Wear eye protection. Turn power off when installing or before removing lamp. Allow lamp to cool before removal.

Remove grease or fingerprints from quartz halogen-cycle bulbs with a grease-free solvent, (alcohol), before use.

ELECTRONICS CIRCUIT WITH GROUND PLATE

The 50 amp electronics circuit utilizes a circuit breaker in the main D.C. breaker panel to feed the fuse block. The fuse block is to be used for electronic equipment only. There is a static ground buss located at the control station for mounting of electronic equipment static grounds only, not for current carrying grounds. It is grounded via a ground plate mounted on the bottom of the hull. Do not use bottom paint on the ground plate as it will destroy the effective area of grounding.

A. C. Systems

120 VAC/60 Hz ELECTRICAL SYSTEM

The 120 volt A.C. electrical systems operate on the two dockside 30 amp, 60 cycle shore power lines or the optional 50 amp and 30 amp lines or the optional onboard generator.

NOTICE

The actual usage of equipment will depend on the amperage output of the power source available.

On boats equipped with the standard dual 30 amp shore power system it may be difficult to operate all 120 volt appliances simultaneously. Use good common sense while operating several options at once, as the amperage draw of the accessories selected may be greater than the A.C. electrical system can provide through its configuration. It may be necessary to turn off some accessories while operating others.

Line voltage from the generator or shore power is shown by the voltmeter on the main distribution panel. The ammeter indicates amperes being drawn through the circuit breakers on the main distribution panel.

The main distribution panel main breakers are equipped with a source selector slide to pre-

vent the generator and shore power from being energized at the same time and damaging the electrical system. Both breakers must be in the OFF position before switching to an alternate power source.

CAUTION

Under no circumstances over-ride the source select system.

The 120 volt wiring installed on Sea Ray® boats consists of three color-coded wires. The black wire is the "hot" feed, white is the common, or neutral, and the green wire is the ground. All branch breakers and switches for A.C. equipment are installed on the "hot" wire. The green conductor of the shore power is connected through a galvanic isolator and then connected to the main D.C. ground buss bar behind the main distribution panel. The main breaker may trip if there is a surge in line voltage, an electrical storm or an onboard system overload. The main breaker interrupts both the neutral and hot feeds in the A.C. circuit to prevent equipment damage due to internal overloads and external surges.

CAUTION

Never operate shore power at less than 105 volts.

220 VAC/50 Hz ELECTRICAL SYSTEM (International Option)

The 220 volt A.C. electrical systems operate on the two dockside 16 amp, 50 cycle shore power lines or the optional 32 amp and 16 amp lines or the optional onboard generator.

NOTICE

The actual usage of equipment will depend on the amperage output of the power source available.

On boats equipped with the dual 16 amp shore power system it may be difficult to operate all 220 volt appliances simultaneously. Use good common sense while operating several options at once, as the amperage draw of the

accessories selected may be greater than the A.C. electrical system can provide through its configuration. It may be necessary to turn off some accessories while operating others.

Line voltage from the generator or shore power is shown by the voltmeters on the main distribution panel. The ammeters indicates amperes being drawn through the appropriate power source's circuit breakers on the main distribution panel.

The main distribution panel main breakers are equipped with a source selector slide to prevent the generator and shore power from being energized at the same time and damaging the electrical system. Both breakers must be in the OFF position before switching to an alternate power source.

⚠ CAUTION

Under no circumstances over-ride the source select system.

The 220 volt wiring installed on Sea Ray® boats consists of three color-coded wires. The black wire is the "hot" feed, white is the common, or neutral, and the green wire is the ground. All branch breakers and switches for A.C. equipment are installed on the "hot" wire. The green conductor of the shore power is connected through a galvanic isolator and then connected to the main D.C. ground buss bar behind the main distribution panel. The main breaker may trip if there is a surge in line voltage, an electrical storm or an onboard system overload. The main breaker interrupts both the neutral and hot feeds in the A.C. circuit to prevent equipment damage due to internal overloads and external surges.

⚠ CAUTION

Never operate 220 volt shore power at less than 205 volts

SHORE POWER HOOK-UP

1. Make sure the "MAIN" breaker and all "A.C." branch breakers on the main distribution panel are OFF.
2. Ensure dockside breaker is OFF, then plug the shore power cord(s) into the inlet on

the side of the deck; turn clockwise to lock. Thread the locking ring on the inlet to secure cable and prevent accidental unplugging.

⚠ CAUTION

Shore power cord should be secured or routed to avoid laying or falling into water and to avoid stress on shore power plug and inlet.

3. Plug the dockside cord into the shore power outlet box on the dock. Turn the circuit breaker on the dock to the ON position.
4. Check the polarity lights on the main distribution panel. The "NORMAL" lights should be on. If the "POLARITY" lights are on, have the dockmaster check the dockside power for a reversed connection or reversed wiring. CAUTION: Do not energize main breaker under reversed polarity conditions.
5. If polarity is "NORMAL," slide the shuttle mechanism to expose the "SHORE" breaker and switch it to the ON position.
6. Turn individual breakers ON.

MAINTENANCE FOR SHORE POWER CABLE SET & SHORE POWER INLETS

⚠ WARNING

Disconnect the power cable from power source before performing maintenance.

The metallic parts of your cable set and inlet are made to resist corrosion. In salt water environment, life of the product can be increased by periodically wiping the exposed parts with fresh water, drying and spraying with a moisture repellent.

A soiled cable can be cleaned with grease cutting household detergent. A periodic application of vinyl protector will help both ends and cable maintain their original appearance.

In case of salt water spray or immersion: rinse plug end and/or connector end thoroughly in

fresh water, shake or blow out excess water and allow to dry. Spray with a moisture repellent before reuse.

SERVICING THE MAIN DISTRIBUTION PANEL

(Servicing should be referred to a qualified electrician).

To replace a faulty component (breaker or indicator light) in the main distribution panel:

1. Turn all breakers OFF.
2. Make sure the generator (if equipped) is OFF.
3. Unplug the shore power.
4. Remove screws from all sides except the hinged side of panel. The main distribution panel is hinged to swing open for servicing.

Reverse the procedure for closing the panel.

Main Distribution Panel Controls & Functions

NOTE: The following main distribution panel descriptions are based on standard construction with the 120 volt A.C. system. If your boat is equipped with the optional 220 volt A.C. system the owner/operator should keep in mind that all 120 volt A.C. items listed here, such as breakers and meters, would actually be 220 volt A.C. items.

1. LINE 1 120 VOLT MAIN BREAKERS:

- GENERATOR 120V breaker
- SHORE 120V breaker

Power source selection. Supplies power to line 1 branch breakers on main distribution panel from either shore power or generator.

2. POWER/REVERSED POLARITY indicator lights

Indicates wiring connections for main shore power system. When shore power

connection is correct, the "POWER" or "NORMAL" light will be lit.

3. LINE 2 120 VOLT MAIN BREAKERS:

- GENERATOR 120V breaker
- SHORE 120V breaker

Power source selection.

Supplies power to line 2 branch breakers on main distribution panel from either shore power or generator.

4. POWER/REVERSED POLARITY indicator lights

Indicates reversed polarity for Line 2 shore power system. When shore power connection is correct the "POWER" light will be lit.

5. GENERATOR START/STOP SWITCH

Depress top momentary to start or bottom to stop generator. Run position in center.

6. GENERATOR PREHEAT SWITCH

Depress to preheat glow plugs on diesel generator.

7. BILGE BLOWER ON/OFF SWITCH

Turns the bilge blowers ON and OFF.

8. PORT IGNITION KEY SWITCH

Master keyswitch for providing ignition power to control station port engine ignition switch.

9. PORT IGNITION 12V breaker

Turn ON to supply power to the port engine ignition keyswitch.

10. STARBOARD IGNITION KEY SWITCH

Master keyswitch for providing ignition power to control station starboard engine ignition switch.

11. STARBOARD IGNITION 12V breaker

Turn ON to supply power to the starboard engine ignition keyswitch.

12. BATTERY BANK SELECTOR SWITCH

Selects which bank of batteries is indicated on the voltmeter. Monitors starboard bank until switch is depressed to monitor port bank.

13. WATER LEVEL SWITCH & INDICATOR PANEL

Depress switch to indicate on the lighted display how much water is in the water tank.

14. **VOLTMETER D.C.**
Indicates the amount of D.C. volts being produced.
15. **WASTE LEVEL INDICATOR PANEL**
Indicates power to head system and amount of waste in holding tank when head system breaker is ON.
16. **TANK SELECT MONITOR SWITCH**
PORT position displays waste level in port holding tank. STBD position displays waste level in starboard holding tank.
17. **WASTE SYSTEM CONTROL SWITCH**
Operates macerator with holding tank macerator option. With San X option selects normal operation, treat & discharge or treat & hold.
18. **AMMETER D.C.**
Indicates the amount of D.C. amps being drawn through the D.C. branch breakers.
19. **HEAD SYSTEM 12V breaker**
Supplies power to the Vacu-Flush head system and waste level indicator panel.
20. **TREATMENT SYSTEM DISCHARGE PUMP 12V breaker**
Supplies power to holding tank system, waste level indicator, macerator option or to the optional San X treatment system.
21. **POWER VENTS 12V breaker**
Supplies power to the power vents in galley and head.
22. **REFRIGERATOR 12V breaker**
Supplies D.C. power to the refrigerator/freezer.
23. **ACCESSORY 12V breaker**
Supplies power to cabin stereo.
24. **ENTERTAINMENT 12V breaker**
Unused (Supplied for owner's use.)
25. **FRESH WATER PUMP #2 12V breaker**
Supplies power to second fresh water pump.
26. **FRESH WATER PUMP #1 12V breaker**
Supplies power to first fresh water pump.
27. **AFT CABIN LIGHTING 12V breaker**
Supplies power to salon, guest stateroom and aft head lighting.
28. **FWD. CABIN LIGHTING 12V breaker**
Supplies power to forward stateroom, forward head and dining area lighting.
29. **ACCESSORY 120V breaker**
Unused
30. **ACCESSORY 120V breaker**
Unused
31. **FWD AIR CONDITIONER 120V breaker**
Supplies power to the forward stateroom air conditioner.
32. **MICROWAVE 120V breaker**
Supplies power to microwave.
33. **WATER HEATER 120V breaker**
Turns on hot water heater.
34. **STBD SYSTEMS 120V breaker**
Supplies power to starboard salon lighting, stereo system, VCR and television, bridge receptacle and bridge icemaker.
35. **SALON AIR CONDITIONER 120V breaker**
Supplies power to the salon air conditioner.
36. **AIR CONDITIONER PUMP RELAY 120V breaker**
Turns on air conditioner raw water cooling pump.
37. **CONVERTER 120V breaker**
Turns on the 120V A.C. to 12V D.C. converter.
38. **STOVE 120V breaker**
Supplies power to the stove.
39. **PORT SYSTEMS 120V breaker**
Supplies power to port lighting, port salon receptacle and cockpit receptacle.
40. **GALLEY SYSTEMS 120V breaker**
Supplies power to galley outlet, refrigerator/freezer, blender option, wall vacuum option and galley A.C. lighting.
41. **AC AMMETER 120V (Line 1)**
Indicates the amount of 120 volt amperage being used by the equipment that is energized on line 1.
42. **AC AMMETER 120V (Line 2)**
Indicates the amount of 120 volt amperage being used by the equipment that is energized on line 2.
43. **AC VOLTMETER 120V (Line 2)**
Indicates the 120 volt A.C. power source voltage.
44. **AC VOLTMETER 120V (Line 1)**
Indicates the 120 volt A.C. power source voltage.

ELECTRICAL SYSTEM BREAKERS

In the event it becomes necessary to replace an electrical breaker, **REPLACE BREAKER ONLY WITH BREAKER OF THE SAME RATINGS.** The breaker's amperage is marked on the breaker.

If a breaker is replaced with a breaker of lower amperage it will be insufficient to carry the electrical load of the equipment it is connected to and cause nuisance tripping.

If a breaker is replaced with a breaker of higher amperage it will not provide adequate protection against an electrical malfunction and create a possible fire hazard.

Converter

The A.C. to D.C. converter is fully automatic, utilizing all solid state components to maintain the 12 volt system onboard. The converter is self-regulating and self-limiting. The unit will supply power to operate the 12 volt accessories as well as charge the banks of batteries.

The converter operates off dockside power or the generator systems. The converter will not over-charge the batteries; it is designed to cycle on and off as charge is needed. The only switch for the unit is the circuit breaker located on the main distribution panel.

NOTICE

Leave the converter running at all times to maintain the 12 volt system voltage.



WARNING

**Never block air circulation through the unit.
Never store any gear on top of the unit.**

REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

Ground Fault Interrupter Outlets

The ground fault interrupter outlet(s) (GFI) is located in the galley and/or head. Each outlet is equipped with a test and reset switch in the center face plate. All exposed 120 volt outlets are protected by this outlet.

The GFI receptacle is designed to protect people from the line-to-ground shock hazards which could occur from defective power tools or appliances operating from this device, or from down-line outlets protected by it. It does not prevent line to ground electric shock, but does limit the time of exposure to a period considered safe for normally healthy persons. It does not protect persons against line-to-line, or line-to-neutral faults.

The GFI receptacle does not protect against short circuits or overloads. This is the function of the circuit breaker.

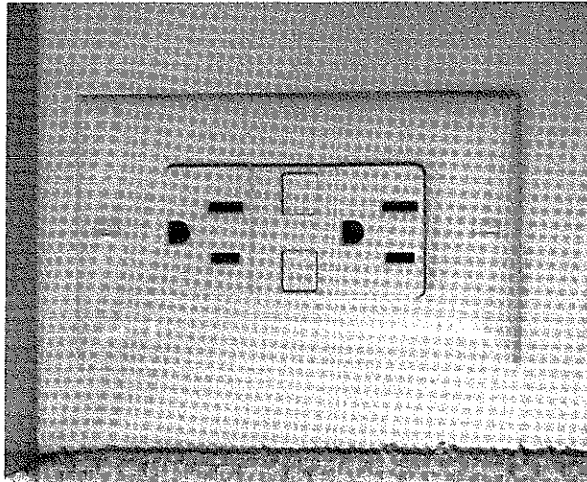
In the event of power failure which has not affected the fuse or breaker serving these particular outlets, unplug all cord-connected appliances from the GFCI protected outlets, and restore power by pressing in the RESET button on the GFCI receptacle. To test, press the TEST button. The RESET button will pop out indicating that power is off at all the GFCI protected outlets. Push the RESET back in and reconnect the appliances one at a time. A defective appliance which trips the GFCI should be repaired at once.

If the RESET button will not stay in after all appliances have been disconnected from the circuit call a qualified electrician.

If the RESET button does not pop out when the TEST button is pressed PROTECTION IS LOST. Do not use any outlets on the circuit. Call a qualified electrician. TEST REMINDER: FOR MAXIMUM PROTECTION AGAINST ELECTRICAL SHOCK HAZARD. TEST YOUR GROUND FAULT CIRCUIT INTERRUPTER AT LEAST ONCE A MONTH. TEST PROCEDURE: 1. Push TEST button. The RESET button will pop out. Power is now off a all outlets protected by the GFCI, indicating that the device is functioning properly. 2. If RESET does not pop out when testing, do not use any outlets on this circuit. Protection is lost. Call a qualified electrician. 3. To restore power, push RESET button. Enter date on record card.

⚠ CAUTION

Persons with heart problems or other conditions which make them susceptible to electric shock may still be injured by ground faults on circuits protected by the GFI receptacle. No safety devices yet designed will protect against all hazards or carelessly handled or misused electrical equipment or wiring.



GFI Outlet

Generator (If Equipped)

Your Generator Owner's Manual can be found in the Owner's Packet onboard. We highly recommend the reading of this manual to familiarize yourself with the operation of the generator.

⚠ DANGER

Gasoline Vapors Can Explode

Before Starting Engine:

- Check engine compartment for gasoline vapors.
- Operate blower for 4 minutes.

Run Blowers Below Cruising Speed

STARTING THE GENERATOR

⚠ CAUTION

Do Not Run The Generator In An Enclosed Area, Such As A Closed Boat House, As There Is The Possibility Of Build-Up And Inhaling Of Carbon Monoxide.

NOTICE

Prestart generator prior to getting underway as there is a possibility that it will not pick up water if started underway. Make sure the "MAIN GENERATOR" breaker is "OFF" and there is no load on the generator before starting it.

To start the Generator: (Remote control switches located on the main distribution panel or local switches on the generator set.)

1. Check fuel tank levels.
2. Check the oil and coolant levels. See your Generator Operator's Manual for proper readings.
3. Check generator for coolant drain plug installations.
4. Open the generator seacock.
5. Run the bilge blowers for at least four minutes before starting and any time the generator is running. **If fuel fumes are detected do not start the generator until the source of fumes is determined and corrected and the bilge area is safely ventilated.**
6. With some generators, preheat unit prior to starting. Preheat time should not exceed 30 seconds. Longer periods of preheat can ruin the manifold heater and glow plugs, although during cold weather, an additional few seconds of preheating during cranking will help prevent misfires as the unit starts running.
7. If your generator is equipped with the "PREHEAT" switch, continue holding it while depressing the momentary starter switch to activate the starter motor on the generator.

8. As soon as the generator set starts, release the switch(es). Check generator exhaust port to verify that water is flowing. If not, shut generator down and refer to your generator operator's manual.

SHIFTING FROM SHORE POWER TO GENERATOR POWER

1. Turn all A.C. systems and branch circuit breakers OFF. Turn both main breakers on the main distribution panel OFF.
2. Start the generator.
3. Slide the source select shuttle mechanism on the main distribution panel to expose the "GENERATOR" breaker(s) and turn it ON.
4. Turn the individual system breakers ON.

STOPPING THE GENERATOR

1. Prior to generator shut down, transfer to shore power **or** turn OFF all A.C. equipment and breakers including main breakers and allow the generator to run a few minutes to cool down.
2. Stop the generator set by switching "START/RUN/STOP" switch on main distribution panel to STOP position or holding stop switch on generator until generator stops.
3. Leave stop switch on main distribution panel in the stop position when generator is not in use, to prevent overheating electric fuel valve.

REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

CARBON MONOXIDE MONITOR

The carbon monoxide (CO) monitor is provided when the boat is equipped with a gasoline generator.

The CO monitor is an electronic instrument that detects CO. When a potential hazard exists the monitor will alert the occupants by a flashing "DANGER" light and alarm.

The monitor is mounted in the cabin and operates through a 1 amp breaker located behind the helm dash panel or on the main distribution panel.

It is extremely important that you become totally familiar with your CO monitor and its functions. SEE THE OWNER'S HANDBOOK IN YOUR OWNER'S PACKET FOR DETAILED INFORMATION AND OPERATING INSTRUCTIONS.

Electrolysis & Zinc Anodes

Electrolytic corrosion of metals on power boats can result in serious deterioration. The boat owner must be aware of the possibilities of galvanic action, (the deterioration of metals due to dissimilar characteristics when placed in salt water), and/or electrolysis. It is the owner's responsibility to check for and replace damaged parts due to galvanic deterioration. Refer to your Sea Ray® dealer to investigate the source of stray corrosive currents.

Sport Yachts with inboard engines have zinc plates installed on the transom below the water line. Sport Yachts with stern drives have zinc plates installed on the stern drive units. If your Sport Yacht is equipped with trim planes (tabs), zinc plates are on the trim planes (tabs).

Zinc plates protect underwater hardware. Zinc, being much less "noble" than copper based alloys and aluminum used in Sea Ray® underwater fittings, will deteriorate first and protect the more noble parts.

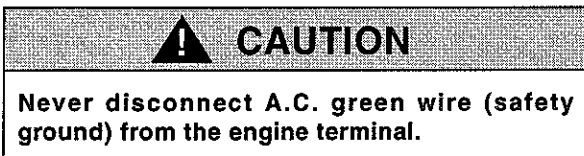
Zinc anodes generally require replacement about once a year. (In salt water areas, replace every six months.) The need to replace anodes more frequently may indicate a stray current problem within the boat or at the slip or mooring. If zinc anodes do not need replacing after one year, they may not be providing proper protection. Loose anodes or low-grade zinc may be the problem.

DO NOT PAINT BETWEEN THE ZINC AND THE METAL IT CONTACTS, AND DO NOT PAINT OVER THE ZINC.

When an A.C. shore power system is connected to the boat, the underwater metal fittings will, in effect, be connected through the water to grounded metals ashore. The zincs will be

consumed at a faster rate unless the marina maintains a protective system to prevent this. In this case, hanging a zinc in the water bonded to the metal outlet box on the dock will reduce zinc loss on the boat. Do not connect this zinc to the boat's ground system.

It is extremely important that all electrically operated D.C. equipment and accessories be wired so that the ground polarity of each device is the same as that of the battery. Sea Ray® boats have a negative ground system, which is the recommended practice throughout the marine industry. All metal items (fuel tanks, underwater gear, etc.) in the boat are connected to the zinc anode by the green bonding wire.



Electrolysis can also be caused by "stray currents" due to a fault in an electrical item, even though correctly grounded. A galvanic current isolator (zinc saver) is standard on all Sea Ray® boats. It is installed between the shore power ground and the boats' A.C. grounding connection to the D.C. bonding system. This connection maintains the safety ground from dockside power while stopping the flow of D.C. corrosive currents.

Section 8 • Accessories

NOTE: Not all accessories described here are standard equipment or even available as options on every Sea Ray® Sport Yacht. Options and features subject to change without notice. It is advisable to refer to the owner's packet and read information provided by individual equipment manufacturers for operation and maintenance of equipment.

Air Conditioning & Heating

The air conditioning/heating system installed in your Sea Ray® is of the size and capacity best suited for the size of your Sport Yacht.

The system is fitted with a return air filter that should be cleaned once a month and is located in the air intake grill. To remove the air filter for cleaning, pull out the grill and slide filter out.

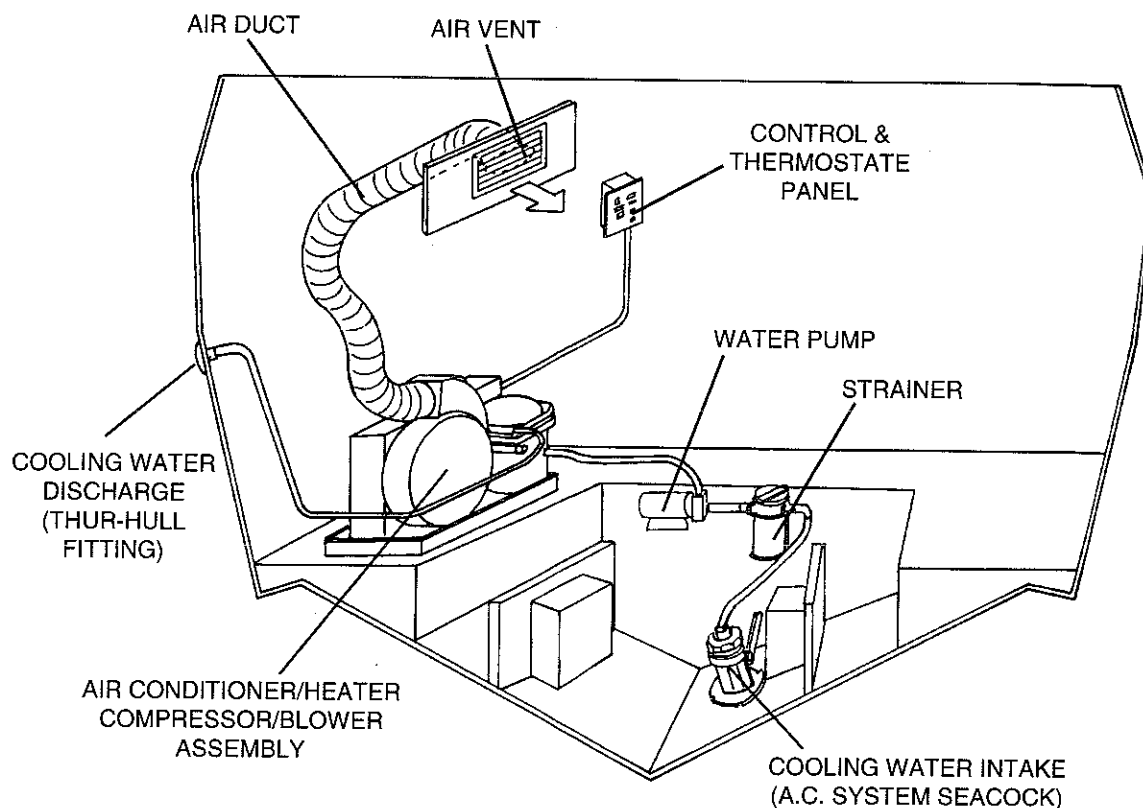
The system is cooled to maintain optimal operating temperature by a raw water pump. The pump draws water through a seacock in the bilge and filters it through a sea water strainer. (The sea water strainer should be inspected and cleaned frequently. To clean strainer refer to "Section 2, Seacocks & Strainers"). The water passes through the air conditioning/heating unit, then flows overboard.

To Start System:

1. Make sure the seacock for the cooling pump is open.
2. Turn ON the "AIR CONDITIONER PUMP/RELAY" circuit breaker on the main distribution panel.

REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

Typical Air Conditioning Component Arrangement



Canvas

CARE & MAINTENANCE

Care and maintenance instructions have been provided by the canvas manufacturer for the canvas used on your Sea Ray®. The information can be found in the boat's owner's packet.

Storage:

Do not fold or crease any of the clear vinyl panels, as cracking will result. Do not fold or store any canvas while wet. All canvas should be rolled or folded when dry and stored in a clean dry place.

REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

HATCH COVERS

The canvas hatch covers are stretched and fitted over the deck hatch and are used to cut down on the amount of sunlight entering the cabin through the hatch. It is advisable to install the hatch covers whenever the air conditioner is being used.

CONVERTIBLE TOP / SUN SHADE AND BOOT (For Cockpit Control Station Sport Yachts Only)

The convertible top installs over the cockpit seating area for protection from the elements. The front portion of the top can be rolled back and secured by two built-in zippers to convert it to the sun shade position. The two middle bow straps adjust to put tension on the middle bows.

The top can be rolled up on the aft support when not in use. The boot zips over the top after it is rolled up on the aft support.

When installing or storing the convertible top, the securing pins must be removed from support tubes.

SIDE CURTAINS (For Cockpit Control Station Sport Yachts Only)

The transparent vinyl side curtains snap to the side of the windshield frame and zip to the underside of the convertible top. There is a port and starboard side curtain, which roll up for storage when not in use. Do not fold the side curtain since permanent damage can occur to the vinyl material.

NOTICE

Keep vinyl side curtains from touching stainless steel bows on bimini top. Prolonged contact in the hot sun may cause damage to clear vinyl material.

AFT CURTAIN

The aft curtain extends over the cockpit area from the aft end of the convertible top.

Installation Procedure:

1. Zip aft cover to zipper track on convertible top approximately 6 inches on both sides of center.
2. Snap center snap at transom.
3. Snap all snaps along both sides up to side curtain.
4. Zip up side curtain and aft cover.

CAUTION

Roll the aft cover up for storage to avoid damage to vinyl windows.

WINDSHIELD COVER

The windshield cover set helps to cut down on the amount of sun light entering the boats interior. The windshield cover set helps to prevent the interior from fading and gives you added privacy. To install the canvas covers, simply unroll and snap to the windshield frame. The windshield cover set will cover the port and starboard salon side windows.

BIMINI TOP & BOOT (For Fly Bridge Sport Yachts Only)

The bimini top installs over the bridge and rolls up on the aft support when not in use. When installing or storing the bimini top, the pins must be removed from the support tubes. The boot zips over the bimini top after it is rolled up on the aft support.

BRIDGE ENCLOSURE (For Fly Bridge Sport Yachts Only)

The bridge enclosure attaches to the bimini top. It encloses the bridge to allow operation in inclement weather.

To install the enclosure:

1. Pull up on the canvas and zip the top edge of the enclosure about six inches on each side.
2. Snap the bottom edge of the canvas.
3. Zip the top edge the rest of the way.
4. Install the side curtain panels by zipping them to the top and snapping bottoms to the bridge.
5. The back curtain for the enclosure zips to the back edge and clips at the bottom.

Storage: Roll the vinyl panels up. Do not fold.

NOTE: Keep vinyl side curtains from touching stainless steel bows on bimini top. Prolonged contact in the hot sun may cause damage to clear vinyl material.

BRIDGE COVER (Fly Bridge Sport Yachts Only)

The bridge cover stretches over the bridge and snaps in place to keep it clean and dry when the boat is not in use.

To install:

1. Spread cover over bridge.
2. Fit front over venturi.
3. Snap along the sides and then across the back.

Coffee Maker

The drip coffee maker operates on the 120 volt system. It is protected by the "GALLEY SYSTEMS" breaker on the main distribution panel which must be ON to operate the coffee maker.

To keep the coffee maker operating efficiently, the mineral deposits left by water must be flushed out using the cleaning method described in the instruction booklet.

REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

Entertainment Center (Optional Equipment)

The Sport Yacht entertainment center equipment options vary from Sport Yacht to Sport Yacht. Refer to the owner's packet to find individual instructions for the equipment installed on your Sport Yacht.

REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

TELEVISION SIGNAL SELECTOR & ANTENNA TUNER

To operate the TV signal selector push the button marked "SHIP" for onboard TV antenna reception. Push the button marked "SHORE" for dockside cable reception.

Your Sport Yacht may be equipped with a 12 volt TV antenna tuner located adjacent to the signal selector. To operate turn ON the 12 volt "ACCESSORY" breaker on the main distribution panel. Press the button on the face of the box to turn ON and rotate knob to get best reception.

CABLE TELEVISION CONNECTION

The dockside telephone inlet is shared by the TV cable inlet inside the same waterproof cap. The inlet is located next to the shore power inlet.

1. Open the TV cable/telephone inlet cover.
2. Connect the TV coax cable to the TV cable receptacle.
3. Run the cable to the dockside receptacle and connect coax cable into receptacle.

12 VOLT STEREO

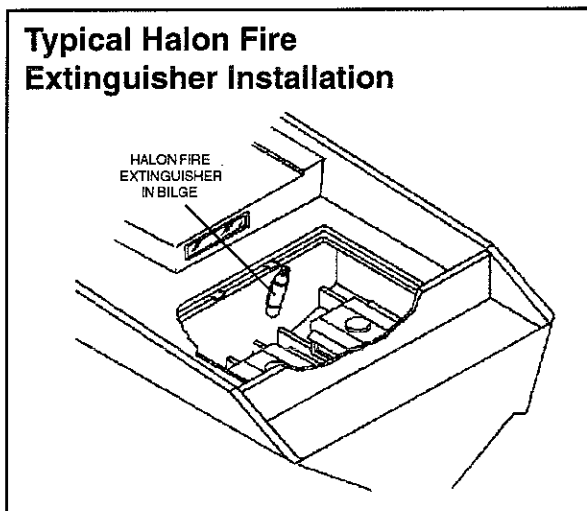
The stereo is protected by the stereo breaker on the dash and/or main distribution panel. There is a stereo mute switch located on the helm switch panel. The stereo mute switch is used to turn off the cockpit speakers. The power source and fuse protection for the stereo memory and clock is inside the bilge D.C. distribution panel. Power is maintained even if the battery switch is off.

REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

Halon System

The system uses halon fire extinguishant and is installed in the bilge. Location will differ from boat model to boat model due to different bilge layout requirements. In the event of a fire, the heat sensitive automatic head will release the halon as a vapor, totally flooding the area in fire-killing concentrations. The system indicator light is wired to the ignition and is turned ON when the ignition is turned ON.

Typical Halon Fire Extinguisher Installation



The halon indicator light is located on the helm instrument panel. Under normal circum-

stances, when the ignition is ON the indicator light is lit. If the unit discharges, the light will go out.

WHEN ACTUATION OCCURS, IMMEDIATELY SHUT DOWN ALL ENGINES, POWERED VENTILATION, ELECTRICAL SYSTEMS AND EXTINGUISH ALL SMOKING MATERIALS. DO NOT OPEN THE ENGINE COMPARTMENT IMMEDIATELY!! THIS FEEDS OXYGEN TO THE FIRE AND FLASHBACK COULD OCCUR.

On boats equipped with diesel engines and generators the halon system incorporates an engine shutdown switch with override system.

Allow the Halon to "soak" the compartment for at least fifteen (15) minutes and for hot metals or fuels to cool before cautiously inspecting for cause of damage. Have portable extinguishers at hand and ready. Do not breathe fumes or vapors caused by the fire.

REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

Horn

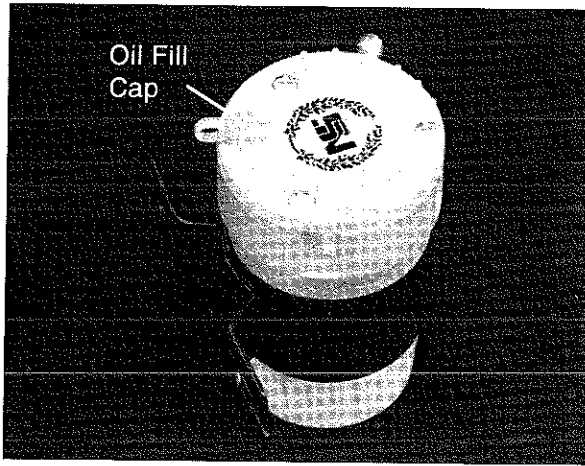
Electric Horn

The horn is operated by a momentary switch on the dash and is protected by a circuit breaker on the dash breaker panel. There is no maintenance required on the horn itself, although it is advisable to avoid spraying water directly into the horn.

Air Horn

The dual air horn is operated and protected by a momentary button and "HORN" breaker on the dash switch panel. The compressor for the horn should be lubricated once a month by inserting a few drops of light weight oil in the oil feeder located on the compressor cover. The compressor is located under the forward starboard bridge seating.

REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.



Air Horn Compressor

Ice Maker

The 120 volt "GALLEY SYSTEMS" breaker supplies power to the ice maker and must be ON to operate the unit; and the 12 volt "FRESH WATER PUMP #1" and "FRESH WATER PUMP #2" breakers must also be ON to supply water to the ice maker. Do not block air flow through the ventilation panels at the bottom of the unit.

To start unit:

1. Make sure water tank is full.
2. Turn "FRESH WATER PUMP #1," "FRESH WATER PUMP #2" and "GALLEY SYSTEMS" breakers ON.
3. Turn ON ice maker switch, located under the ice maker door.

As a precaution, the first few cycles of ice cubes should not be used because of possible contamination in the line. Once the ice maker is full, the unit will shut off automatically and cycle as ice cubes are used.

To remove the ice maker:

1. Make sure the "FRESH WATER PUMP #1," "FRESH WATER PUMP #2" and "GALLEY SYSTEMS" breakers are OFF.
2. Close petcock water valve to ice maker inside passenger seat floor storage box.
3. Remove screws securing the unit to the cabinet.

4. Slide the ice maker out.
5. Disconnect the ice maker water lines and unplug.

REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

Oil Change System

The oil change system simplifies changing the oil in the engines and generator. The pump is self priming and pumps in either direction. Reservoir jugs are provided to pump the old oil into and to store new oil. The oil pump is protected by the "OIL CHANGER" breaker on the bilge D.C. distribution panel.

Operating instructions: (Service one engine at a time.)

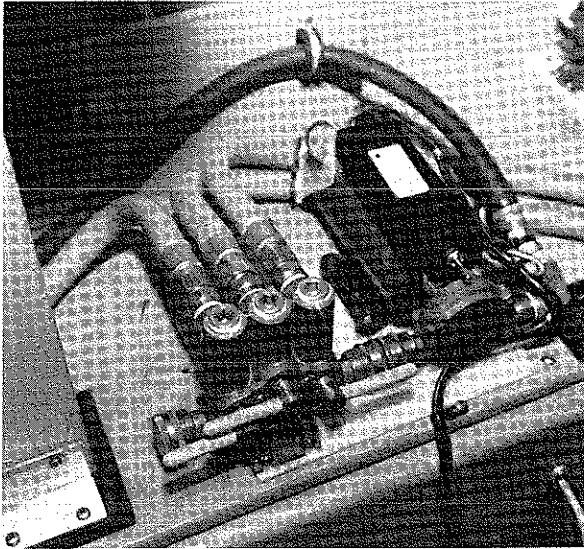
1. Run engines for several minutes to warm the oil and mix the sludge.
2. Loosen the wing nut on the back of the valve leading to the first engine to be serviced. Turn the valve to the open position in line with valve body (vertical) and hand tighten the wing nut.
3. Turn the pump on (switch position indicates the direction of flow) and pump the old oil into containers to be disposed of properly.
4. After the oil has been pumped out of the engine, place the pump discharge hose into a container of premeasured fresh oil and reverse the pump switch to pump the fresh oil into the engine. **NOTE: Fresh oil should be at least 60° F.**

CAUTION

Have only one valve open at a time. Make sure other valves are closed to prevent accidental over filling.

5. When pumping is complete, shut the pump off and close the valve leading to the engine by loosening the wing nut, closing the valve and hand tighten the wing nut.
6. Repeat for each engine or generator to be serviced.

REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.



Oil Change Pump & Valve Assembly

Power Ventilation System

The power ventilation system removes stagnant air and odor from the head and galley by means of a 12 volt exhaust fan mounted to the bulkhead. They are powered by the "POWER VENTS" breaker on the main distribution panel and turned ON and OFF by the switch in each location.

Refrigerator/Freezer

The refrigerator/freezer operates on the 12 volt D.C. system and, if the boat is equipped, the 120 volt A.C. system.

When the boat is equipped with a 120 volt system the refrigerator /freezer automatically switches from A.C. to D.C. when the A.C. power source is disconnected. Always operate on A.C. power when available, either shore power or generator. Turn the thermostat to the OFF position to prohibit operation on A.C. or D.C. power. Operation on D.C. is only recommended when engine(s) are operating and batteries are charging.

A single thermostat controls the operation of the refrigerator and freezer on A.C. or D.C. The control knob is located inside the refrigerator compartment. The higher number the knob is set on, the colder the temperature.

12 Volt System

The 12 volt system utilizes a 15 amp "REFRIGERATOR" breaker located on the dash. To operate the unit on 12 volt power, preferably with engines operating, turn the switch on the refrigerator to ON.

120 Volt System

The 120 volt system utilizes a 10 amp "REFRIGERATOR/ICE MAKER" breaker, which is located on the main distribution panel. To operate the unit on 120 volt power, connect the shore power system, turn the "MAIN" breaker ON then turn the "REFRIGERATOR" breaker ON.

Maintenance:

The refrigerator/freezer requires little maintenance other than routine defrosting and cleaning. To defrost the freezer, turn the temperature selection knob to the OFF position and leave it until the frost melts. To clean the cabinet and interior of both the freezer and refrigerator, use a mild detergent such as a dishwashing liquid. Surfaces should be rinsed and dried carefully and thoroughly. The condenser, located at the back of the unit, should be cleaned every six months. To clean the condenser, use a stiff brush and a vacuum cleaner.

To Remove The Refrigerator:

1. Turn the 12 volt battery switch OFF, and the 120 volt "OUTLET" breaker OFF.
2. Remove plugs and screws securing frame around unit.
3. Pull unit straight out and unplug.

CAUTION

Do not cover refrigerator vents.

REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

Searchlight

The searchlight is a spotlight and floodlight combination. The searchlight is controlled by a power switch and joystick for directional control. The left position of the power switch serves as spotlight and slow movement, the right position serves as floodlight and fast movement. The joystick moves the beam up, down, right or left. The searchlight is protected by two fuses on the face of the searchlight control plate.

REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

Stoves

ALCOHOL

The alcohol stove has one burner and an integral tank which holds about one quart of alcohol and is pressurized by using the built-in pump. Fill tank 3/4 full with denatured ethyl alcohol.

CAUTION

Use marine stove alcohol fuel only.

REFER TO THE STOVE OPERATOR'S MANUAL FOUND IN YOUR OWNER'S PACKET FOR DETAILED OPERATING INSTRUCTIONS.

WARNING

- Open flame cooking appliances consume oxygen. This can cause asphyxiation or death.
- Maintain open ventilation
- DO NOT use this appliance for comfort heating.

WARNING

- Liquid fuel may ignite, causing severe burns.
- Before filling, turn off stove burner.
- Follow manufacturer's instructions.

REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

ELECTRIC

The 120 volt "STOVE" breaker on the main distribution panel supplies power to the stove and must be ON to operate the stove.

REFER TO THE STOVE OPERATORS MANUAL FOUND IN YOUR OWNER'S PACKET FOR DETAILED OPERATING INSTRUCTIONS.

REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

ALCOHOL/ELECTRIC

The alcohol/electric stove operates on the 120 volt shore power system, the onboard generator, (if applicable), or alcohol.

CAUTION

Use marine stove alcohol fuel only.

REFER TO THE STOVE OPERATORS MANUAL FOUND IN YOUR OWNER'S PACKET FOR DETAILED OPERATING INSTRUCTIONS.

WARNING

- Open flame cooking appliances consume oxygen. This can cause asphyxiation or death.
- Maintain open ventilation
- DO NOT use this appliance for comfort heating.

! WARNING

- Liquid fuel may ignite, causing severe burns
- Before filling, turn off stove burner.
- Follow manufacturer's instructions.

REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

Microwave

The 120 volt "MICROWAVE" breaker on the main distribution panel supplies power to the microwave and must be ON to operate unit. REFER TO THE MICROWAVE OPERATOR'S MANUAL FOUND IN YOUR OWNER'S PACKET FOR DETAILED OPERATING INSTRUCTIONS.

Telephone

The telephone option consists of a waterproof inlet, a fifty foot shore cord and telephone outlet in the boat. The dockside telephone inlet is shared by the TV cable inlet inside the same waterproof cap. The inlet is located next to the shore power inlet.

Telephone System Hookup:

1. Open the telephone/TV cable inlet cover.
2. Connect shore cord to dock telephone inlet and then to the boat inlet.
3. Telephone outlet(s) in the boat are now operational.

Wall Vacuum System

The wall vacuum unit is wired to the 120 volt "OUTLETS" breaker which must be ON to operate the system. The 24 foot hose connects to the inlet on the face of the vacuum system. The disposable bag is located behind the bottom panel on the unit. An ON/OFF switch is located on the face of the unit.

! CAUTION

This is a DRY vacuum ONLY. Do NOT vacuum liquids or wet carpet. Damage to equipment or electrical shock may result.

REFER TO OWNER'S PACKET FOR INSTRUCTIONS AND WARRANTY INFORMATION.

Windlass

The windlass is wired to the 12 volt system through the "WINDLASS" breaker located on the bilge breaker box. The "ACCESSORY" switch on the helm switch panel must be ON to operate the windlass. REFER TO WINDLASS OPERATOR'S MANUAL FOUND IN YOUR OWNER'S PACKET FOR DETAILED OPERATING INSTRUCTIONS.

NOTICE

Use the safety hook supplied to insure that the anchor is held in place should the windlass fail. Do not use the safety hook to support the anchor in a stored position. The windlass should always support the anchor and insure that it is held in the roller device securely.

Electric Windshield Vent (Available On Some Models)

To operate the vent turn on the "WINDSHIELD VENT" breaker on the control station switch panel. To open or close vent push up or down on the "WINDSHIELD VENT" switch on the control station switch panel.

Cockpit Step

Some Sport Yachts are fitted with a removable cockpit step. The step must be installed correctly (utilizing the securing pins) to provide a solid platform.

To install the step:

1. The leg must be in the down position. Press the button on the side of the leg to release the catch to allow the leg to be moved to the down position.
2. Position the step into place on the side panel track that is provided for the step to attach to.
3. Insert the pins into the holes that secure the step to the side panel track.



CAUTION

Failure to use the securing pins will result in the step being unstable and could fall over when stepped on.

Section 9 • Storage & Launching

Laying-Up Instructions

LIFTING THE BOAT

When lifting the boat always keep the bow higher than the stern to drain the exhaust lines and to prevent water from running forward through the manifold and into the engine where it can become trapped. It may seem expedient to lift only the stern when changing a propeller, but this can result in water entering the engine cylinders, causing hydrostatic lock and resulting in possible internal engine damage and quite possibly engine failure. Even a small amount of water in the engine can cause rust and is to be avoided.

With fiberglass boats, severe gelcoat crazing or more serious hull damage can occur during launching and hauling if pressure is created on the gunwales by slings. Flat, wide belting-type slings and spreaders long enough to keep pressure from the gunwales are necessary. Cable-type slings should be avoided. Do not place the slings where they may lift on the

underwater fittings. There are sling tag the sides of the deck showing where to place slings for lifting the boat.

Never hoist the boat with an appreciable amount of water in the bilge. Fuel and water tanks should preferably be empty, especially if of large capacity.

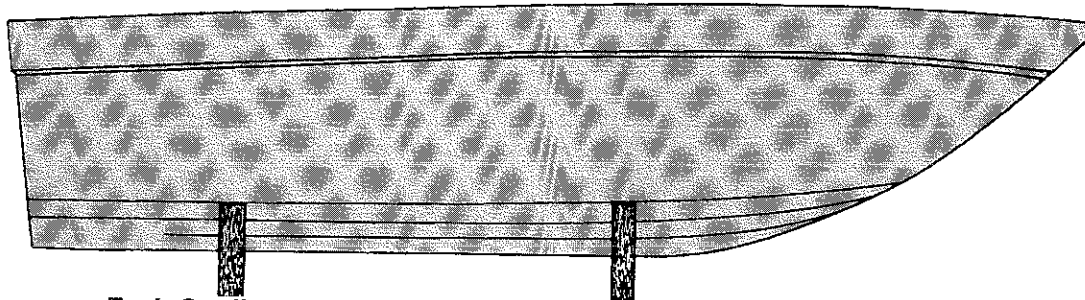
CAUTION

Do not use cleats, bow eyes or stern eyes for lifting.

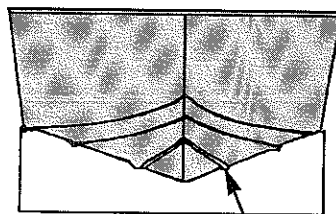
SUPPORTING THE BOAT DURING STORAGE

A cradle is the ideal support for the boat whenever it is not in the water. Properly designed and constructed, it will provide support at the proper points, which is essential to avoid stress on the hull. Boat placement on the cradle should line-up as closely as possible to the sling tags on the side of the deck. Do not rest boat on underwater fittings.

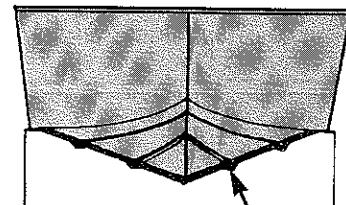
Proper Storage On Cradle



Each Cradle should be forward of sling tags on deck.



RIGHT (NO GAP)



WRONG (GAP)

DRAINING THE BOAT

In climates where freezing occurs, it is important that the bilge be completely drained and dried out when the boat is laid up for the winter. Sport Yacht are equipped with a drain plug for this purpose. Some compartments in the bilge may not drain completely because of the position of the boat. They should be pumped out and sponged until totally free of water.

The boat's entire fresh water system must be drained. Open all faucets throughout the boat. Open a connection at the lowest point in the fresh water lines to completely drain them. Break the connections on each side of the water pump. Drain the heads. Drain the water heater. Break the lower connection if necessary.

The engine cooling system and the exhaust system must be free of water if there is danger of freezing. Drain plugs are provided on the engine for this purpose. It is necessary to open a connection or two in the exhaust system to drain the lowest portions; these should be reassembled securely immediately after draining is accomplished.

CONSULT YOUR ENGINE OPERATOR'S MANUAL FOR DETAILED INFORMATION ON PREPARING THE ENGINE FOR STORAGE.

WINTERIZATION CHECKLIST FOR BOATS STORED ON LAND

1. Boat Storage

- Store boat in a bow high attitude.
- Remove hull drain plug.
- Pour one (1) pint of 50% water/antifreeze mixture in each bilge pump sump.

2. Water System

- Turn ON fresh water pump.
- Open all faucets, let system drain completely, leave faucets open.
- Turn OFF fresh water pump.
- Remove hoses from water pump.
- Remove hoses from water heater and open drain plug.
- Blow out all lines to clean.
- Pour one (1) pint of 50% water/antifreeze mixture in shower drain to fill shower sump.

3. Ice Maker

- Shut OFF water supply.
- Disconnect the water line at the garden hose connection on the solenoid valve.
- Allow the unit to run for one hour. Remove any ice cubes ejected during this period.
- Shut OFF the electricity and prop the door open to allow the unit to thaw.
- After it has thawed, wipe it dry.

4. Engines

- Flush engines with fresh water.
- Remove engine drain plugs.
- **Refer to your Engine Operator's Manual for detailed information on preparing the engines for storage and winterization.**

5. Generator

- Flush generator with fresh water.
- Remove generator drain plugs, open petcocks and seacocks.
- Remove drain plugs from muffler and strainer.
- **Refer to your Generator Operator's Manual for detailed information on preparing the generator for storage and winterization.**

6. Air Conditioner

- Close thru-hull seacock, remove hoses from sea water pump.
- Flush with fresh water through hose from sea water pump.
- Blow out water lines with air pressure.
- Loosen the screws on the pump head, allowing water to drain from the pump.
- Remove hoses from condensing unit.
- Remove strainer plug.

7. Batteries


- Remove from boat.
- Remove grease and dirt from top surface.
- Grease terminal bolts.
- Store on wooden pallet or thick plastic in a cool dry place. Do not store on concrete.
- Keep under a trickle charge.
- When replacing battery in service, remove excess grease from terminals, recharge as necessary and reinstall in boat.

8. Head System - Manual Flush System With Holding Tank

- Flush entire system thoroughly with fresh water.
- Pump out holding tank.
- Remove water line from inlet fitting located on back side of manual pump.
- Pump one gallon of antifreeze mixed with one gallon of water through toilet.
- Drain toilet by removing the drain plug in the base and operating the pump handle.
- Pump out holding tank.

9. Head System - Vacu-Flush System With Holding Tank


- Flush entire system thoroughly with fresh water.
- Pump out holding tank.
- Shut "WATER SYSTEM" breaker OFF on the helm switch panel and remove hoses from each side of water pump.
- Remove water line from inlet fitting located on back bottom half of water valve on head.
- Flush one gallon antifreeze mixed with one gallon of water through toilet and let vacuum pump run for one or two minutes.
- Pump out holding tank.

 CAUTION
Use an automotive or commercial ethylene glycol base antifreeze. Do not use alcohol base products.

10. Fuel Systems


Gasoline:

- Fill fuel tank with gasoline and a gasoline stabilizer and conditioner such as "Stabil," to treat the gasoline.
- Run engines for ten minutes to ensure that all gas in the carburetor and fuel lines are treated.

 CAUTION
Do not overfill. Filling a tank until the fuel flows from vents is dangerous. Allow room for expansion.

Diesel:

- Diesel fuel must be treated with a biocide, "Biobor," which prevents bacteria and fungi from contaminating diesel fuel that contains some water.
- Diesel fuel should also get a petroleum distillate additive, such as "Sta-bil" or "Racor RX1000." This will help assimilate water in the fuel and prevent freezing problems.
- Fill fuel tanks with the treated fuel.
- Run engines for ten minutes to ensure that all diesel fuel in injectors and fuel lines are treated.

 CAUTION
Do not overfill. Filling a tank until the fuel flows from vents is dangerous. Allow room for expansion.

REFER TO INDIVIDUAL OWNER'S MANUALS FOR SPECIFIC PROCEDURES.

Fitting Out After Storage

FUEL SYSTEM

Check the entire fuel system for loose connections, worn hoses, leaks, etc. and repair. This is a primary safety precaution.

EXHAUST SYSTEM

Examine the complete exhaust system, from engine to transom. It is imperative that the entire exhaust system be vapor proof and water tight. If a plug or cover was used at the exhaust port, don't forget to remove it. Also check the drain plugs on the bottom of the mufflers. Do not over tighten. Recheck the system with the engines running.

BATTERIES

Before installing the batteries, clean the terminal posts with a wire brush or steel wool and then attach the cables. After the cable clamps are tightened, smear the post and clamps with vaseline or grease to exclude air and acid. Do

not apply grease before attaching and tightening the terminal clamps. Examine all wiring.

MISCELLANEOUS

1. Check all thru-hull fittings for unobstructed water passage. Be alert for any deteriorated hoses and/or fittings below the water line which might fail in service and admit water.
2. For inboard engines only: Inspect the stuffing boxes. They should be just tight enough to prevent excessive leaking. Over-tightening will destroy the packing and score the shaft. Check the hose clamps for tightness.
3. For inboard engines only: Make sure the rudder clevis pin on each side of the tie bars are in and safety wired.
4. For inboard engines only: Check all strut fastenings and thru-hull fastenings.
5. Test the navigation lights.
6. Check all wiring for loose connections.
7. Check all switches and equipment for proper operation.
8. Check bilge blowers for proper operation. Turn ON blowers and place hand over hull blower vent to make sure air is coming from vent.
9. Anchor lines and gear should be inspected and replaced if necessary.
10. If your Sport Yacht is equipped with a hull drain plug, make sure it is in place.
11. Clean bilge thoroughly if it was not done at lay-up.
12. Check all engine and generator fluid levels.

Section 10 • Care & Refinishing

Fiberglass & Gelcoat

The fiberglass hull, deck and some interior parts consist of the molded shell and exterior gelcoat. The gelcoat is the outer surface, often colored, that presents the shiny smooth appearance which is associated with fiberglass products. In some areas, this gel coat surface is painted or taped for styling purpose.

Wash the fiberglass regularly with clean, fresh water. Wax gelcoated surfaces to maintain the luster. In northern climates, a semiannual waxing may suffice for the season. In southern climates, a quarterly application of wax will be required for adequate protection.

WARNING

Gelcoat surfaces are slippery when wet. Use extreme care when walking on wet gelcoat.

WARNING

Care should be utilized in waxing commonly walked upon areas of the boat to insure that they are not dangerously slippery.

If the gelcoated surface gloss cannot be restored by waxing, power buff with a rubbing compound such as 3M Super Duty #05955, followed with 3M Finesse-It 2 #05928, then wax.

An alternate method is to use Meguiars #44 Heavy Duty Color Restorer followed with Meguiars #50 Boat Cleaner/Polish, then wax.

Recommended waxes are; 3M Imperial Hand Glaze #05990 or Meguiars #26 Hiteck Yellow Wax.

If gelcoat is not maintained and becomes heavily oxidized, light sanding may be required before buffing.

CAUTION

If your boat is equipped with a forward deck sun pad it should not be left on the deck when not in use. The gelcoat finish may be affected over a prolonged period of time.

STAINS & SCRATCHES

Gelcoat and painted surfaces are very resistant to deep stains. Common surface stains can be removed with diluted household detergents, providing these detergents do not contain ammonia or chlorine. Porcelain-cleaning powders are too abrasive and often contain chlorine and ammonia, either of which would permanently discolor the gelcoat and paint. Alcohol or kerosene can be used for difficult stains but should be washed away promptly with a mild detergent and water. **Never use acetone or any ketone solvents.**

Minor scratches and deeper stains which do not penetrate the gel coat may be removed by light sanding and buffing.

SPECIAL CARE FOR BOATS THAT ARE MOORED

If permanently moored in salt water or fresh water, your boat will collect marine growth on its bottom. This will detract from the boat's beauty and greatly affect its performance. There are two methods of preventing this:

- Periodically haul the boat out of the water and scrub the bottom with a bristle brush and a solution of soap and water.
- Paint the hull below the waterline with a good grade of antifouling paint. **DO NOT paint the engine drive surfaces.**

NOTE: There are EPA regulations regarding bottom paint application. Consult your Sea Ray® dealer for proper application methods.

Care For Bottom Paint

From time to time a slight algae or slime forms on all vessels. The bottom painted portion of the hull can be wiped off with a coarse turkish towel or a piece of old rug while the boat is in the water. Do not use a stiff or abrasive material to clean the bottom paint.

The bottom paint should be inspected annually. If it needs repainting, flush the old paint and wash with hot water and laundry detergent. Rinse well and let surface dry completely. Feather any deep scratches with sandpaper and repaint, following the directions on the bottom paint label. Replacement coating can be ordered from your Sea Ray® dealer.

Fiberglass hulls should never be hauled, painted and relaunched the same day since this does not allow sufficient time for the moisture which has been absorbed into the old paint film to completely dry out. Generally, 24 to 36 hours of drying time is required.

Bilge/Engine Compartment

1. Pump the bilges dry and remove all loose dirt. Be sure that 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 or engine gaskets. Oil stains can be removed by using a bilge cleaner available from your dealer or a 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. Tighten all terminals securely and spray them with light marine preservative oil.
3. Inspect the entire fuel system (including fill lines and vents) 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 over tighten them. Clean fuel filters and vent screens.
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.

5. Refer to your engine operators manual for engine maintenance details. Wipe off engines to remove accumulated dust and grease. If a solvent is used, make sure it is nonflammable. Go over the entire engine and tighten nuts, bolts, and screws. Inspect the wiring on the engine and clean and tighten the terminals. Inspect the belts and tighten them if needed. Clean and lubricate the battery terminals; fill the battery cells with distilled water as needed.

Topside Areas

1. Check grab rails for loose screws, breaks, sharp edged, 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 or they may mildew and rot.
2. Stainless steel and alloy fittings should be cleaned with soap and water or household glass cleaner. Remove rust spots as soon as possible with a brass, silver or chrome cleaner. Irreversible pitting will develop under rust that remains for any period of time. Never use an abrasive like sandpaper or steel wool on stainless. These may actually cause rust. To help protect the stainless we recommend the use of a good car wax.
3. When instruments are exposed to a salt-water 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.

Plexiglass

Never use a dry cloth or duster, or glass cleaning solutions on Plexiglass.

To clean Plexiglass™, first flood it with water to wash off as much dirt as possible. Next, use your bare hand, with plenty of water, to feel and dislodge any caked dirt or mud. A soft, grit-free cloth may then be used with a nonabrasive soap or detergent. A soft sponge, kept clean for this purpose, is excellent. Blot dry with a clean damp chamois.

Grease and oil may be removed from Plexiglass with kerosene, hexane, white (not aviation or ethyl) gasoline or aliphatic naphtha (no aromatic content).

Do not use solvents such as acetone, silicone spray, benzene, carbon tetrachloride, fire extinguisher fluid, dry cleaning fluid or lacquer thinner on acrylic, since they attack the surface.

Remove fine scratches with fine automotive acrylic rubbing and polishing compounds.

Teak

Teak does not require refinishing but should be cleaned occasionally with a teak cleaner, obtainable at marine supply stores. Do not use steel wool in cleaning teak — it leaves rust specks. Bronze wool is available and should be used. Several penetrating protective coatings are available for treating teak and their use is considered advantageous. Because some cleaners can damage gel coats and aluminum, always read the directions before using any cleaner.

Interior Wood Trim

The wood trim has been sealed and lacquered. Keep dusted and treat like household furniture. Because some cleaners can damage wood, always read the directions before using any cleaner.

To repair scratches in lacquer, lightly sand area with 320 grit sand paper. Spray or brush on first coat of Sherwin Williams Sand Sealer

#T67-F22, let dry. Lightly sand and feather area with 320 grit sand paper and spray or brush second coat of Sherwin Williams Moisture Resistance Lacquer #T70-F22, let dry. Apply additional coats as required.

Upholsteries

Exterior fabrics should be cleaned with a sponge or very soft scrub brush and a mild soap and warm water solution. Rinse after scrubbing with plenty of cold, clean water and allow the fabric to air dry in a well ventilated place, preferably away from direct sunlight.

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.



CAUTION

Sun pad should not be left on deck when not in use. May affect gel coat finish.

CLEANING RECOMMENDATIONS FOR G&T® MARINE HEADLINER AND FABRICS

Always clean immediately. Test an unseen area of fabric before cleaning stain.

Type of Stain	Steps			Cleaning Recommendations
	1	2	3	
Water Stain	B	C	E	A. White cloth - Westley's Clear Magic. B. White cloth - Westley's Clear Magic - air hose C. Lendow Glass Cleaner. D. Lift Off Spot Remover. E. Clothes shaver to remove lint. F. Follow instructions of staining agent manufacturer. *suntan lotions, wet leaves, permanent markers and some other products contain dyes that permanently stain.
Motor Oil	A			
Spray Paint	A	D	F	
Mildew	A	E		
Yellow Mustard	A	D		
Wet Leaves*	A			
Oil Base Paint	A	D	F	
Suntan Lotion*	A	F		
Chewing Gum	D			
Tar	D	A		
Lipstick	A			
Ketchup	A			
Grease	A	D		
Ball Point Ink	A			
Household Soil	A			
Permanent Marker*	A	F		
Coffee, Tea	A			
Chocolate	A			
Adhesive	D			
Teak Oil	D			
Latex Paint	A	D	F	
Crayon	A	D		

Section 11 • Fueling & Starting

Useful Service Information

OWNER _____

HOME PORT _____

BOAT NAME _____

REGISTRATION # _____ STATE _____

HULL SERIAL # _____

WARRANTY REGISTRATION DATE _____

ENGINE MAKE & MODEL _____

SERIAL # _____

OUTDRIVE RATIO _____

SERIAL # _____

PROPELLER SIZE _____

PART # _____

FUEL CAPACITY _____

WATER CAPACITY _____

KEY #, IGNITION _____ DOOR _____

SELLING DEALER _____

CITY & STATE _____

LENGTH _____

BEAM _____

DRAFT _____

VERTICAL CLEARANCE _____

ESTIMATED WEIGHT _____

GENERATOR SERIAL # _____

MODEL # _____ KILOWATTS _____

Service Guide

NOTE: The Service Guide is based on average operating conditions. Under severe operating conditions, intervals should be shortened. Operation in salt water is considered severe operating

REFER TO YOUR ENGINE OPERATOR'S MANUAL FOR DETAILS

	BEFORE EVERY USE	AFTER FIRST 20 HRS.	EVERY 50 HOURS	EVERY 100 HOURS	ANNUALLY
CHECK ENGINE OIL LEVEL	●				
CHANGE ENGINE OIL				●	●
CHECK GENERATOR OIL LEVEL	●				
REPLACE OIL FILTER				●	●
REPLACE ENGINE MOUNTED FUEL FILTER				●	
CHECK TRANSMISSION FLUID LEVEL	●				
CHANGE TRANSMISSION FLUID					●
CLEAN CRANKCASE VENTILATING SYSTEM		●		●	
CLEAN TRANSMISSION OIL STRAINER SCREEN					●
CHECK COOLING SYSTEM HOSES & CONNECTIONS FOR LEAKS (WITH ENGINES RUNNING)	●				
TIGHTEN ENGINE MOUNT FASTENERS		●			●
CHECK FOR LOOSE, DAMAGED OR MISSING PARTS	●				
CHECK WATER PICK-UP & WATER IMPELLERS					●
CHECK ACCESSORY DRIVE BELTS	●				
CHANGE ANTIFREEZE					●
CLEAN AIR CLEANERS		●		●	
CHECK ZINCS IN HEAT EXCHANGER	EVERY 25 HOURS				

Equipment Listed To Service May Not Be Standard Equipment or Even Available as Options On Your Particular Sea Ray®. Service Equipment Which Your Boat is Equipped With.

REFER TO THIS MANUAL FOR DETAILS.

	BEFORE EVERY USE	AFTER FIRST 20 HRS.	EVERY 50 HOURS	EVERY 100 HOURS	ANNUALLY
CHECK SEA WATER STRAINERS & SECOCKS*	•	•	•		
LUBRICATE SEACOCKS*					•
CHECK ENGINE ALARMS	•				
CHECK EXHAUST SYSTEM FOR LEAKS	•	•		•	
CHECK FUEL SYSTEM LINES & CONNECTIONS	•	•	•		
CHANGE WATER SEPARATING FUEL FILTER		•			•
CHECK PACKING GLAND ON PROP SHAFT**	•	•	•		
CHECK RUDDER PACKING, TIGHTEN FOR NO LEAKS**		•	•		•
INSPECT CLEVIS PIN ON RUDDER TIE BAR**		•	•		
LUBRICATE RUDDER SHAFT**					•
LUBRICATE THROTTLE & SHIFT LINKAGE PIVOT POINTS		•		•	•
CHECK BATTERY ELECTROLYTE LEVEL	•	•	•		
CHECK ALL ELECTRICAL CONNECTIONS (Including Dockside Power Inlet)		•			•
INSPECT PROPELLER FOR POSSIBLE DAMAGE			•		
CHECK ENGINE TO SHAFT ALIGNMENT**		•			•
CHECK WATER SYSTEM PUMP FILTER		•	•		•
INSPECT FRESH WATER PUMP & WATER SYSTEM*		•		•	
CHECK SAN-X TREATMENT CHEMICAL*	•				
CHECK FLUID IN TRIM PLANE PUMPS		•			•
TEST 120 VOLT GFI OUTLET					•
CHECK OIL IN STEERING SYSTEM	EVERY 3 MONTHS				

*Equipment Listed To Service May Not Be Standard Equipment or Even Available as Options On Your Particular Sea Ray® Sport Yacht. Service Equipment Which Your Boat Is Equipped With.

**Service for inboard engines only.

Quick Reference Departure Checklist

Dealer _____ Boat Length & Model _____

Owner _____

BEFORE DEPARTING

1. Weather Conditions - Safe To Go Out
2. Required Documents - All On Board
3. Navigation Equipment - All On Board
4. Coast Guard Equipment - Required Equipment On Board
5. Transom Drain Plug - Installed
6. Bilge Pumps - Working & Clean
7. Blowers - Working
8. Navigation Lights - Working
9. Horn - Working
10. Trim Planes (Tabs) - Working
11. Fresh Water Tank - Full
12. Head System Holding Tank - Empty
13. Fuel Tanks - Filled With Recommended Fuel
14. Fuel System - Check For Leaks, Fumes
15. Fuel Filter - Check For Tightness & Clean
16. Diesel Racor Fuel Filters - Clean & Water Free
17. Engine Coolant Drain Plugs - Secured
18. Steering Fluid - Full
19. Steering System - Working Smoothly & Properly
20. Engine Oil - Check Level
21. Transmission Fluid - Check Level
(Inboard Engines Only)
22. Engine Coolant - Check Level
(If Applicable)
23. Engine Seacocks - Check For Open Position
(Inboard Engines Only)
24. Shore Power Cord - Removed

STARTING ENGINE(S)

WARNING

Do Not Run The Generator Or Engines In An Enclosed Area, Such As A Closed Boat House, As There is The Possibility Of Build-Up And Inhaling Of Carbon Monoxide.

1. Engine Compartment - Ventilated
2. Blower(s) - Run At Least 4 Minutes & When Operating Below Cruising Speeds & While Operating Generator
3. Fuel Valves - Open (If Applicable)
4. Bilge Area - Check For Leaks, Fumes
5. Battery Switches - Check For ON Position
6. Throttle Only Buttons - Hold In And Advance Until Throttle Is Out Of Neutral Position
(Stern Drive Engines Only)
7. Gear Shift Controls - In Neutral Position
8. Throttle Controls - Advance Throttle Slightly As Required While Operating Starter
9. Ignition Breakers - Turn ON
10. Alarm (Test) - Should Sound After A Few Seconds
11. Ignition Key - Turn Clockwise To START
12. Momentary Start Switch - Hold In Start Position Until Engine Starts, Then Release
13. Exhaust Port - Check To See That Engines Are Pumping Water

Important: Do Not Continue To Operate Starter For More Than 10 Seconds Without Pausing To Allow Starter Motor To Cool off For 2 Minutes. This Also Will Allow Battery To Recover Between Starting Attempts.

AFTER STARTING ENGINE(S)

1. Oil Pressure Gauges - Check For Normal Reading*
2. Water Temperature Gauges - Check For Normal Reading*
3. Voltmeters - Check For Normal Reading*
4. Fuel Gauge - Check For Adequate Level
5. Fuel Lines - Check For Leaks, Fumes
6. Engine Operation - Check Idle and Shift
7. Water Test Boat - Note RPM And General Operation


*Refer To Engine Owner's Manual For Proper Readings.

STOPPING ENGINE(S)

1. Throttle Controls - Bring To Neutral Position
2. Gear Shift Controls - Bring To Neutral Position
3. Mooring Lines - Tied Securely To Dock
4. Idle Engines For 5 Minutes - To Cool Engines
5. Ignition Key - Turn To OFF Position
6. Battery Switches - Turn To OFF Position

OPERATING GENERATOR

1. Generator Seacock - Open

 WARNING
Do Not Run The Generator Or Engines In An Enclosed Area, Such As A Closed Boat House, As There is The Possibility Of Build-Up And Inhaling Of Carbon Monoxide.

2. Bilge Blowers - Run For At Least 4 Minutes & Any Time Generator Is Running
3. Depress PREHEAT (If Applicable) - Preheat Time Should Not Exceed 30 Seconds

4. START Switch - Depress Until Generator Starts
5. Generator Starts - Release The START Switch Only (If Diesel Continue Holding Pre-Heat For A Few Seconds)
6. Load The Generator - Turn ON Generator Main Breaker On Main Distribution Panel. Turn A.C. Breakers ON

Stopping:

1. Breakers - Turn A.C. Breakers OFF. Turn OFF Generator Main Breaker On Main Distribution Panel
2. Generator - Let Run A Few Minutes To Cool
3. STOP Switch - Depress To Stop The Generator Set

Nautical Terms

abeam – object 90 degrees to center line on either side of boat.

abaft – a point on a boat that is aft of another.

aft – toward the rear or stern of the boat.

beam – the width of a boat.

bow – the fore part of a boat.

bulkhead – vertical partition in a boat.

chine – meeting juncture of topside and bottom of boat.

chock – deck fitting, used as guides for mooring or anchor lines.

cleat – deck fitting with arms or horns on which lines may be made fast.

cockpit – an open space aft of a decked area from which a boat is steered.

deck – upper structure which covers the hull.

draft – depth of water required to float boat.

fathom – six feet.

freeboard – height of topside from water line to deck.

garboard – the strake next to a ship's keel.

gunwale (pronounced gun'1) – meeting junction of hull and deck.

hatch – an opening in deck to provide access below.

head – toilet or toilet area in a boat.

headroom – vertical distance between the deck and cabin or canopy top.

helm – steering console.

hull – the basic part of a boat, a watertight vessel that provides buoyancy to float the weight of the craft and its load.

keel – the major longitudinal member of a hull - the lowest external portion of a boat.

knot – unit of speed in nautical miles per hours.

lee – the side that is sheltered from the wind.

port – term designating left side of the boat.

scupper – holes permitting water to drain overboard from deck or cockpit.

sheer – curve or sweep of the deck as viewed from the side.

starboard – term designating right side of the boat.

stern – the aft end of a boat.

stern drive – outboard unit of a inboard/outboard (I/O) engine installation.

stringer – longitudinal members fastened inside the hull for additional structural strength.

topside – the top portion of the outer surface of the hull on each side above the water line.

transom – vertical part of stern.

wake – disturbed water that a boat leaves behind as a result of the forward motion.

windward – toward the direction from which the wind is blowing.

1995 450 Sundancer Supplemental Information

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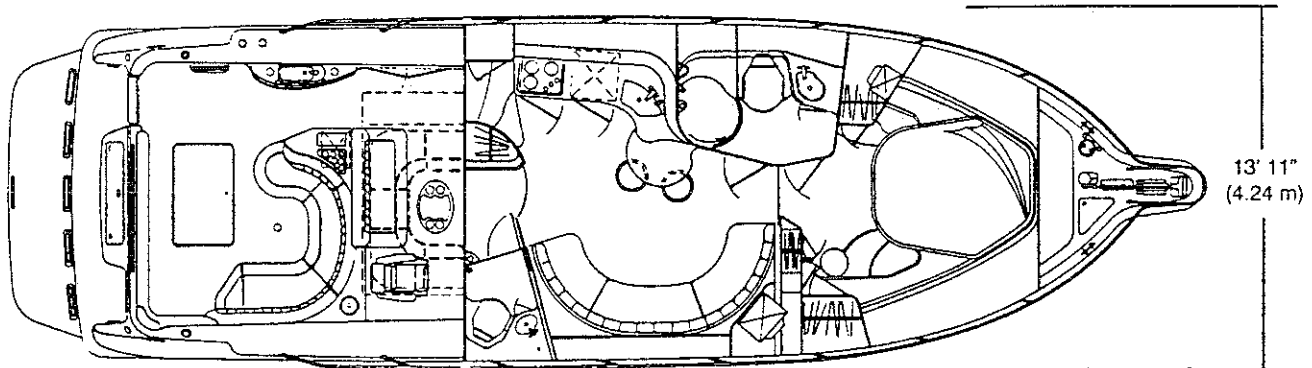
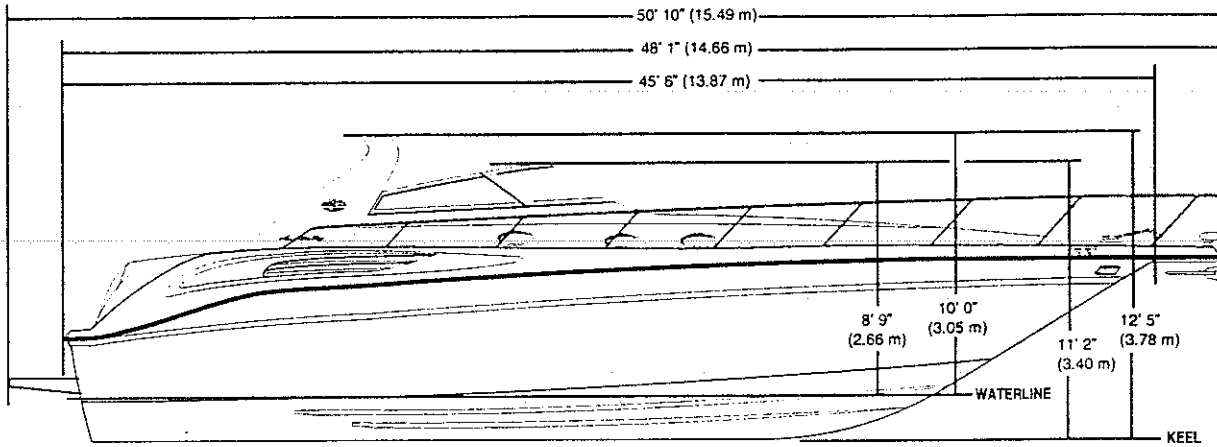
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Note: Sea Ray® reserves the right to update and/or change accessories or options without notice. Not all accessories shown in pictures, illustrations or described herein are standard equipment or even available as options. The specification measurements are approximations and subject to variance.



Sea Ray Boats, Inc. 2600 Sea Ray Blvd., Knoxville, TN 37914. For information call 1-800-SRBOATS. Sea Ray International Fax No. 615-971-5462. Sold Worldwide. Note: Not all accessories shown in pictures or described herein are standard equipment or even available as options. Options and features are subject to change without notice.

Specifications & Dimensions



SPECIFICATIONS

Overall Length	45' 6" (13.87 m)
w/Standard Bow Pulpit	48' 1" (14.66 m)
w/Optional Platform	50' 10" (15.49 m)
Beam	13' 11" (4.24 m)
Draft	43" (109 cm)
Dry Weight – Standard Power ...	22,500 lbs. (10,206 kg)
Fuel Capacity	400 gal. (1,514 liters)
Usable Fuel	380 gal. (1,438 liters)
Water Capacity	100 gal. (378.5 liters)
Holding Tank	60 gal. (227 liters)
Dead Rise	19°

HEIGHT DIMENSIONS

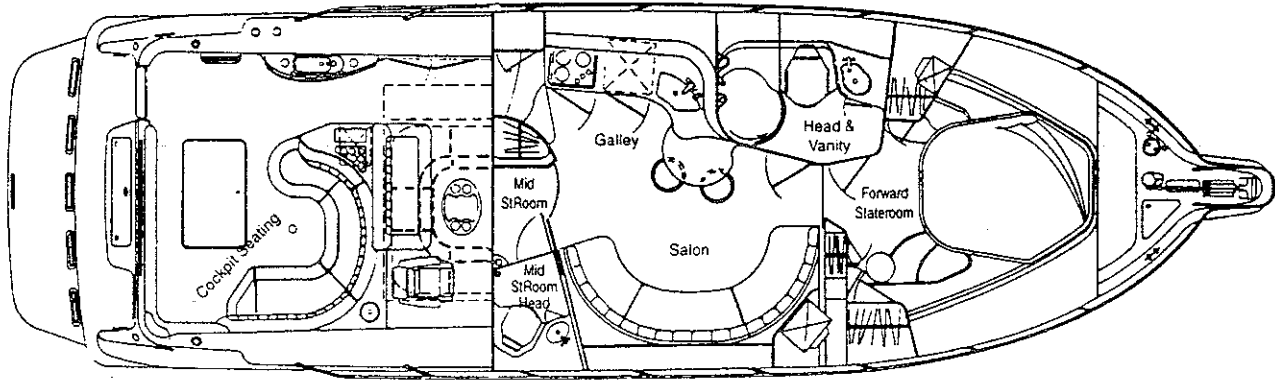
Waterline To Top Of Windshield	8' 9" (2.66 m)
Waterline To Top Of Spoiler	10' 0" (3.05 m)
Keel To Top Of Windshield	11' 2" (3.40 m)
Keel To Top Of Spoiler	12' 5" (3.78 m)

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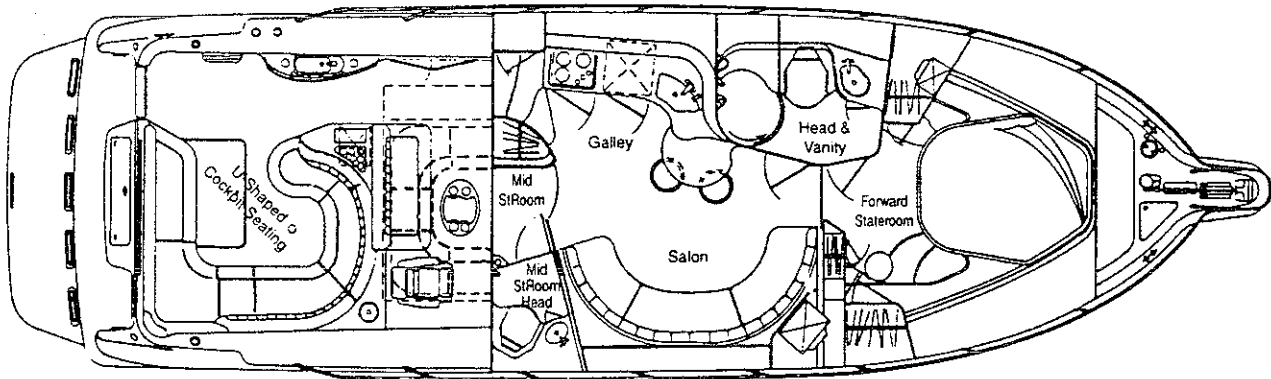
Sea Ray
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Floor Plans

ACCOMMODATIONS PLAN WITH STANDARD COCKPIT SEATING



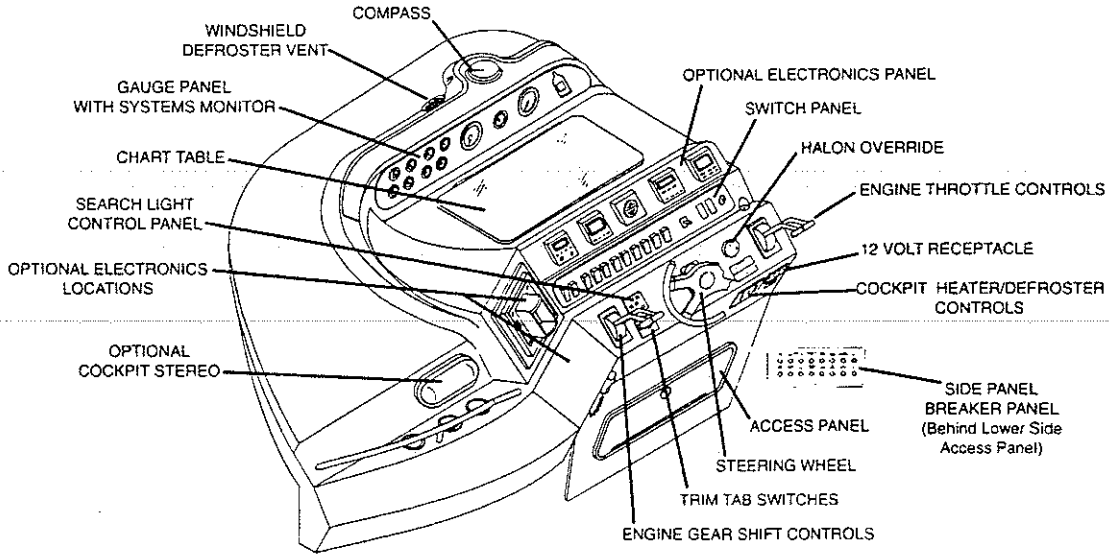
ACCOMMODATIONS PLAN WITH OPTIONAL COCKPIT SEATING



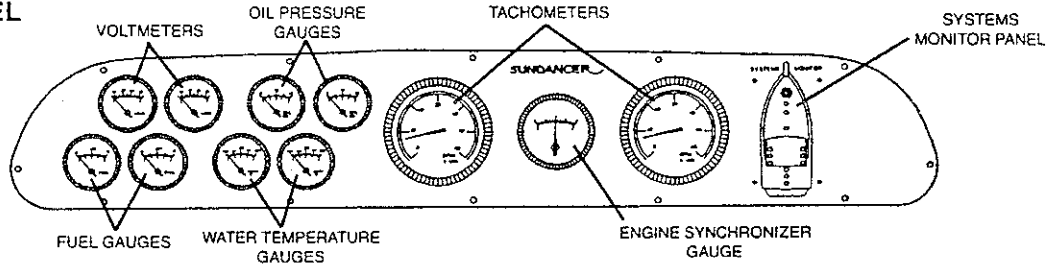
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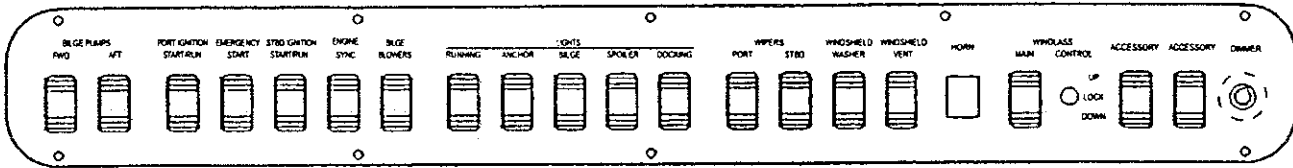
Dash Layout



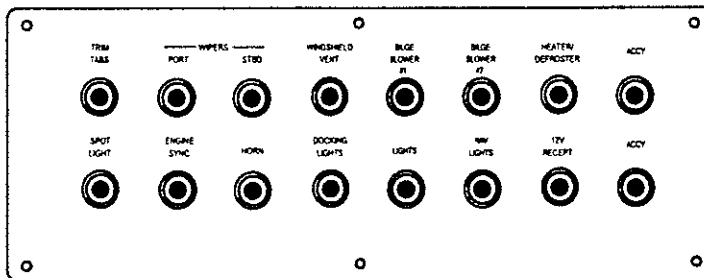
GAUGE PANEL



SWITCH PANEL



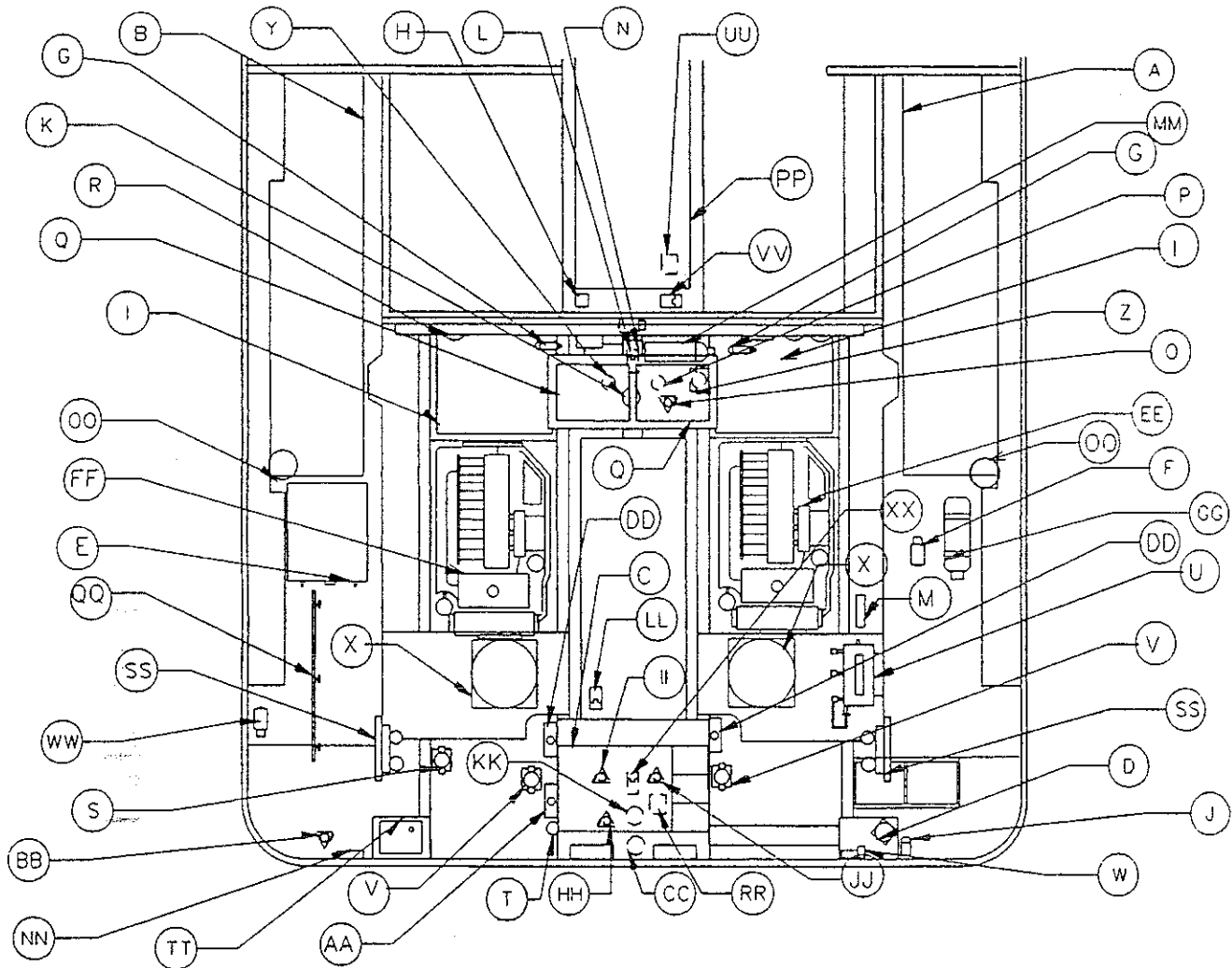
SIDE PANEL BREAKER PANEL



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Bilge Layout



BILGE COMPONENTS:

- A. STBD FUEL TANK
- B. PORT FUEL TANK
- C. GENERATOR
- D. GENERATOR MUFFLER
- E. WATER HEATER
- F. AFT VACUUM PUMP
- G. HOLDING TANK FILTER
- H. HIGH WATER BILGE PUMP
- I. HOLDING TANK
- J. TRIM TAB PUMP
- K. FWD BILGE PUMP
- L. FWD FLOAT SWITCH
- M. OPT. GROUND BAR
- N. A/C PUMP
- O. A/C SEACOCK
- P. TRANSDUCER
- Q. STBD & PORT BATTERY BOX
- R. BILGE COMPONENT BOARD

- S. GENERATOR STRAINER
- T. GENERATOR FUEL FILTER
- U. OIL EXCHANGER PUMP & VALVES
- V. ENGINE STRAINERS
- W. OPT AUTO PILOT PUMP
- X. MUFFLERS
- Y. OPT SUM LOG
- Z. A/C STRAINER
- AA. GENERATOR RECOVERY BOTTLE
- BB. OPT DISCHARGE SEACOCK
- CC. AFT BILGE PUMP
- DD. OPT ENGINE COOLANT RECOVERY BOTTLE
- EE. STBD ENGINE
- FF. PORT ENGINE
- GG. VACUUM BOTTLE
- HH. GENERATOR SEACOCK
- II. PORT ENGINE SEACOCK
- JJ. STBD ENGINE SEACOCK

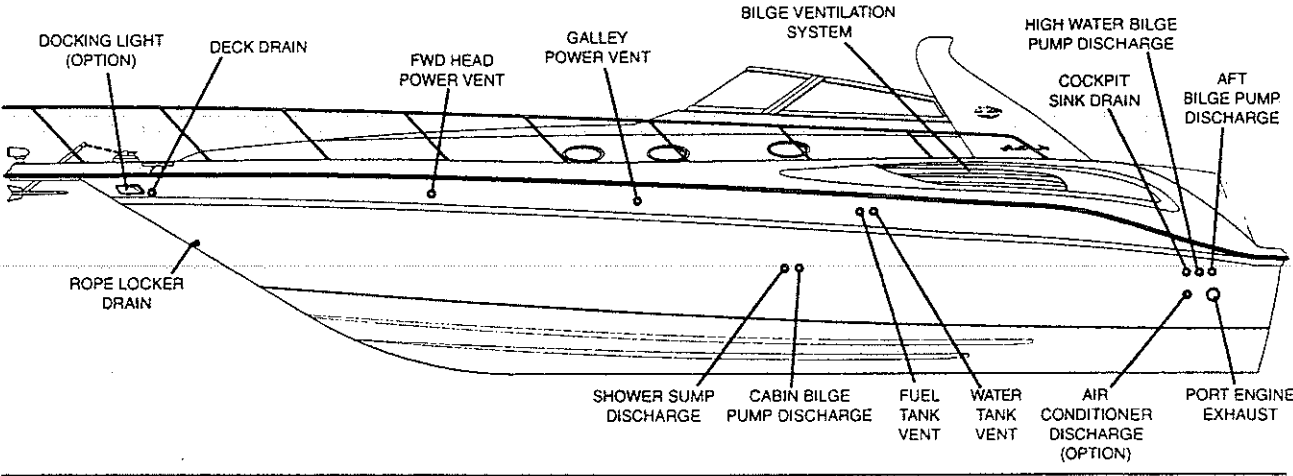
- KK. AFT HIGH WATER BILGE PUMP
- LL. AFT HIGH WATER FLOAT SWITCH
- MM. HALON
- NN. AFT BILGE GROUND BUSS
- OO. BILGE BLOWER
- PP. WATER TANK
- QQ. CROSS-OVER FUEL BOARD
- RR. AFT MANUAL BILGE PUMP PICK-UP
- SS. FUEL WATER SEPARATOR
- TT. GENERATOR BATTERY
- UU. FWD MANUAL BILGE PUMP PICK-UP
- VV. HIGH WATER FLOAT SWITCH
- WW. OPT DISCHARGE PUMP
- XX. AFT FLOAT SWITCH

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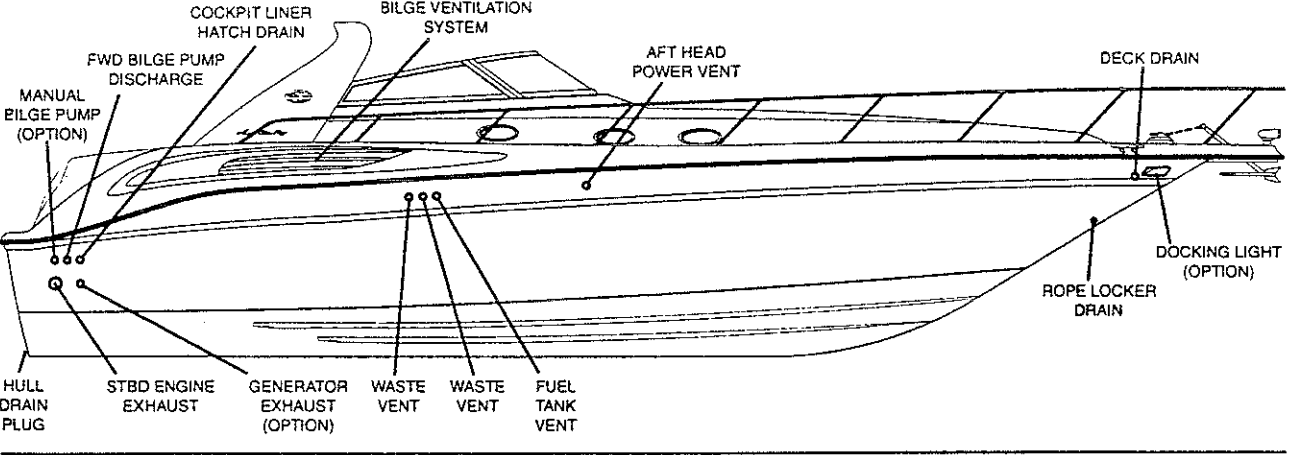
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Location of Through-Hull Fittings

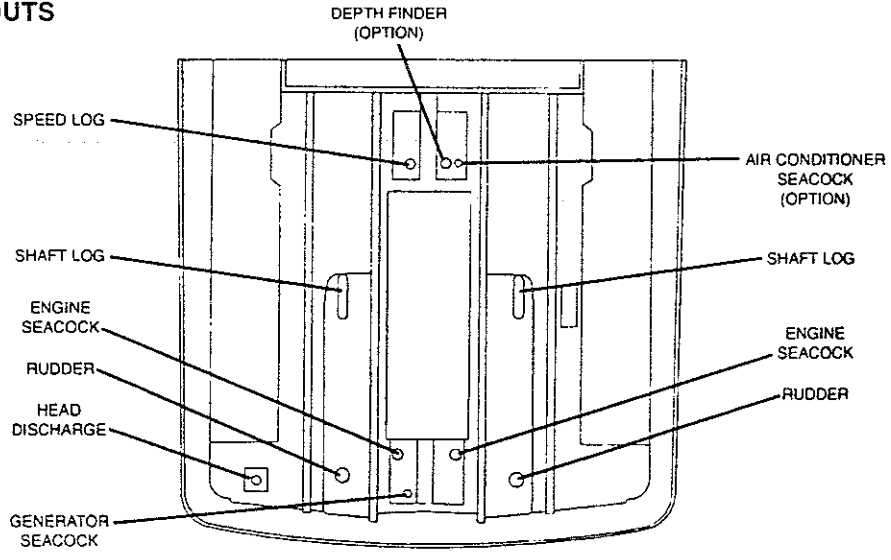
PORT SIDE



STARBOARD SIDE



BILGE HULL CUTOUTS



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Special Features

BILGE BLOWERS

The Sea Ray® 450 Sundancer® blower switches have a two way switching capability. The blower module allows the blowers to be turned ON and OFF at either the control station or the main distribution panel. Also, they can be turned ON at one station and turned OFF at the other.

Blower Switch Lights:

Lights On: When the blowers are turned ON, the lights in the switches will come on and stay on indicating that the blowers are functioning correctly.

Lights Blinking: If the lights are blinking, it is an indication that one of the blower breakers has tripped. Reset the tripped breaker.

Lights Not On or Blinking: If you try to turn ON the blowers and no lights come on then both breakers are tripped and the switch is not receiving power. Reset the tripped breakers.

REFER TO "SECTION 2, BILGE & UNDERWATER GEAR" FOR MORE INFORMATION.

GENERATOR STARTING ADDENDUM

The generator is equipped with a module that simplifies the starting procedure. There are two generator modules, one for Westerbeke generators and one for Kohler generators.



CAUTION

Refer to "Section 7, Electrical System" for detailed generator starting procedures. Follow preliminary starting procedures 1 through 4.

Westerbeke® Generator

Starting The Generator:

1. Press and release the "GENERATOR" switch on the main distribution panel. This puts the generator into the preheat mode and the light in the switch will begin to flash for approximately 30 seconds.

At the end of the 30 second period the light begins to flash rapidly indicating that the generator must be started in the next few seconds or the cycle must be repeated.

2. When the light on the switch begins to flash the generator is ready to start. Push and hold the "GENERATOR" switch until the unit starts then release the switch.
3. Once the generator is started the light will stay on continuously.

Stopping The Generator:

1. Press the "GENERATOR" switch until the unit stops.

After stopping the generator, the module will need a few seconds to reset before restarting is possible.

Bypass Switch

To start the Westerbeke® generator from the generator mounted controls, a bypass switch, located on the side of the generator mounted control box, must be turned ON. The bypass switch must be OFF to start and stop the generator from the main distribution panel.

Kohler® Generator

Same as above except the preheat time is approximately 15 seconds.

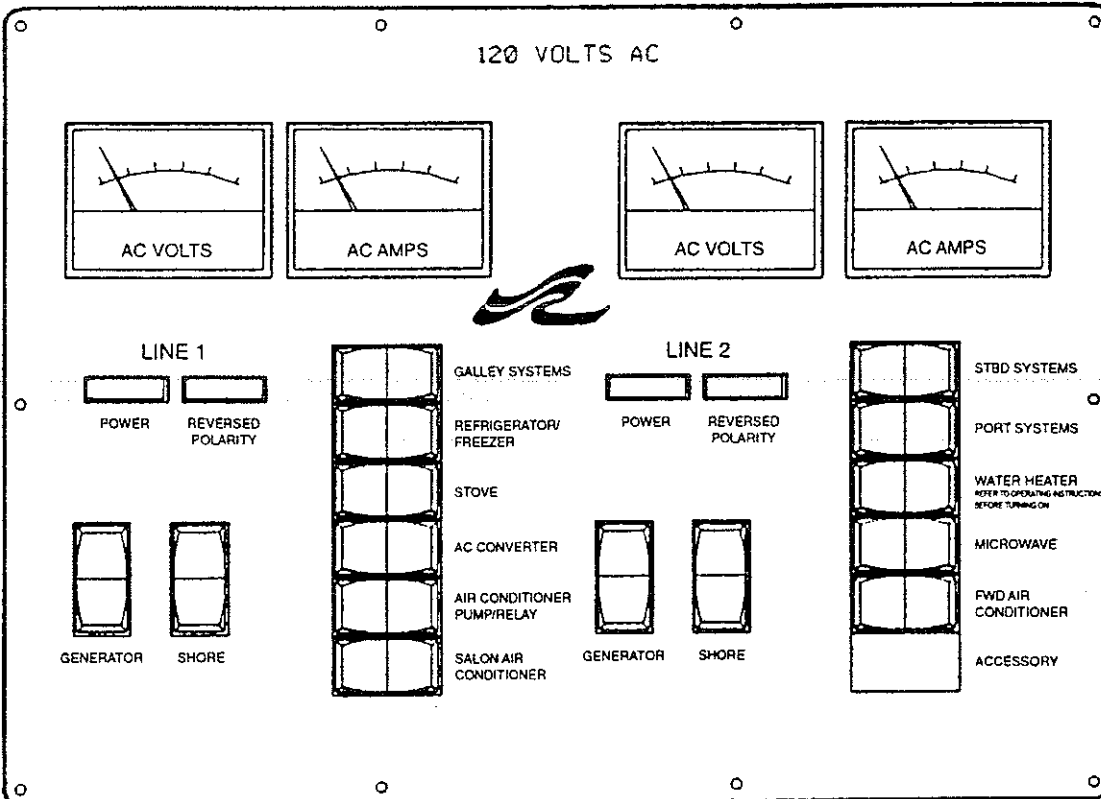
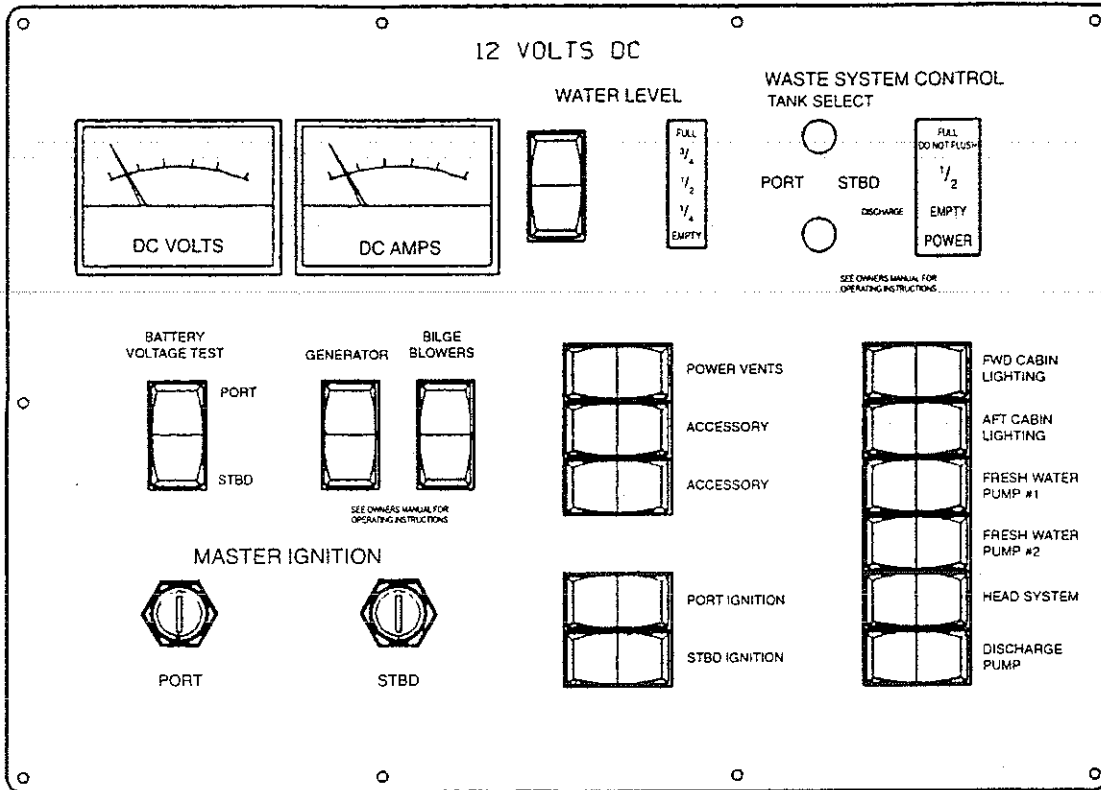
COCKPIT HEATER/DEFROSTER

The cockpit heater/defroster will blow hot or cool air on the helmsman and windshield. The control panel for the system is located on the lower right side of the dash. The heater/defroster module is located behind the lower access panel on the control station side panel. Note that the starboard engine must be operating to supply heat for the unit to blow hot air. The breaker for the unit is located on the side panel breaker panel.

To Operate:

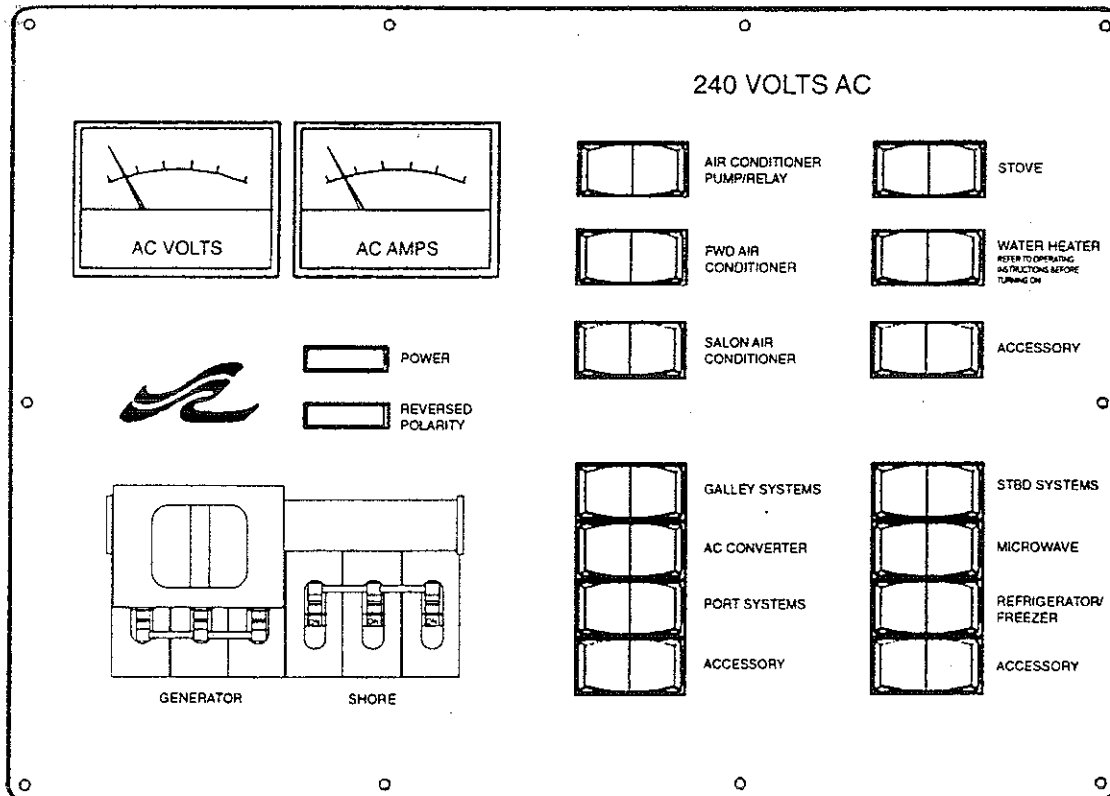
1. Press rocker switch to "HEAT" or "COOL".
2. Turn rotary switch from OFF to one of the three fan speeds.

DC & AC Main Distribution Panels



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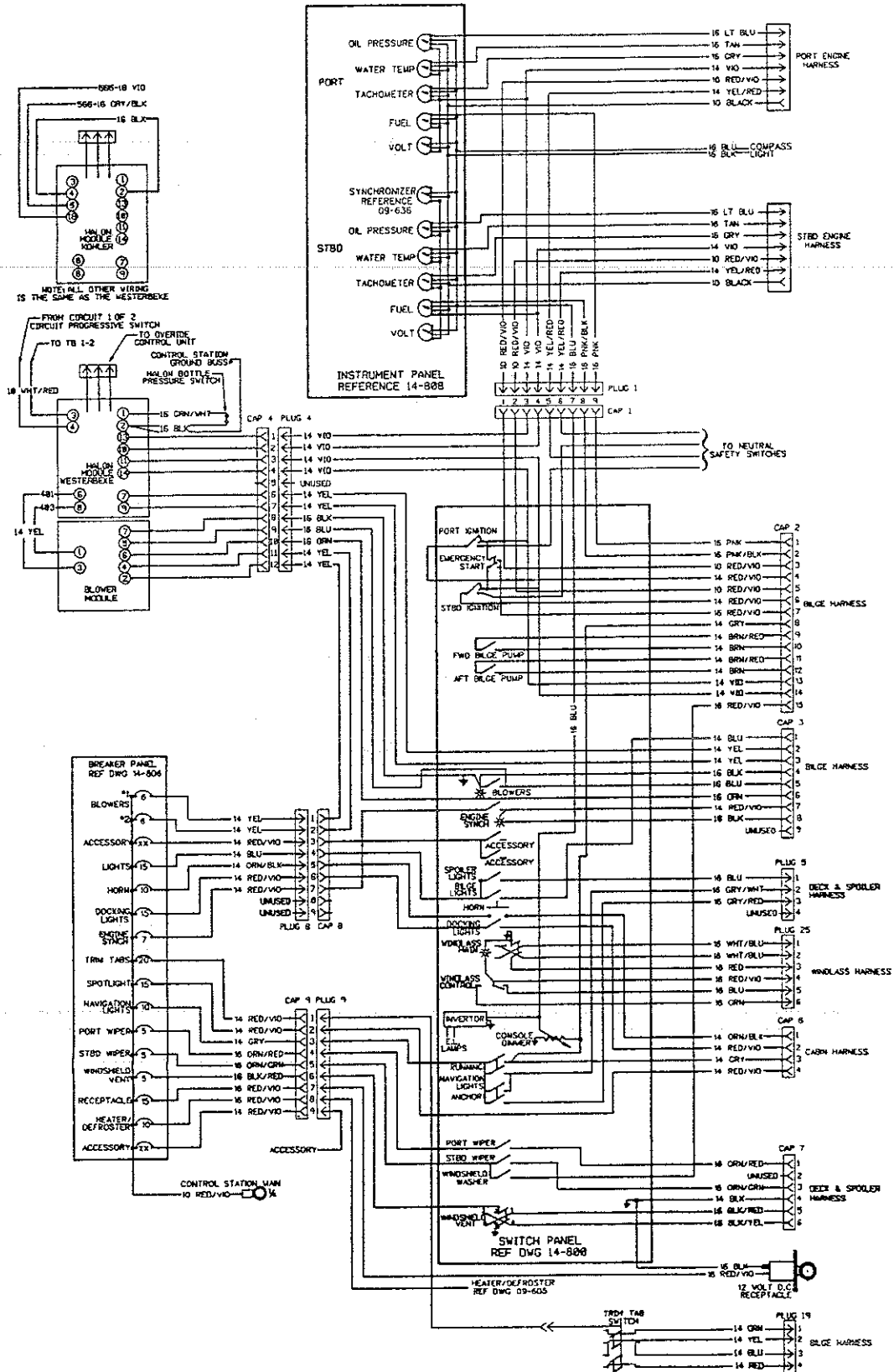
AC Main Distribution Panel Option (240 Volt)



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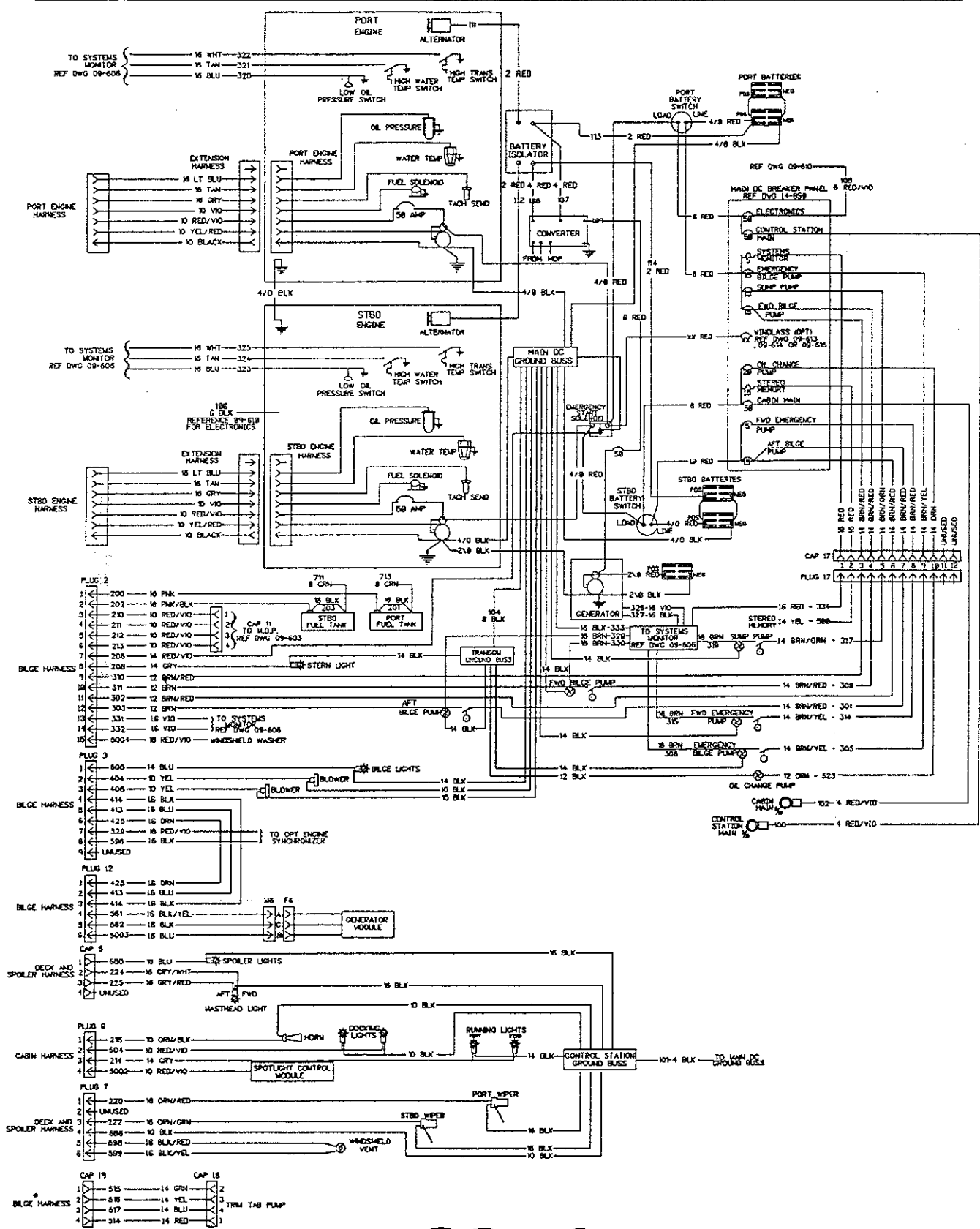
DC Wiring Schematic (1 of 2)



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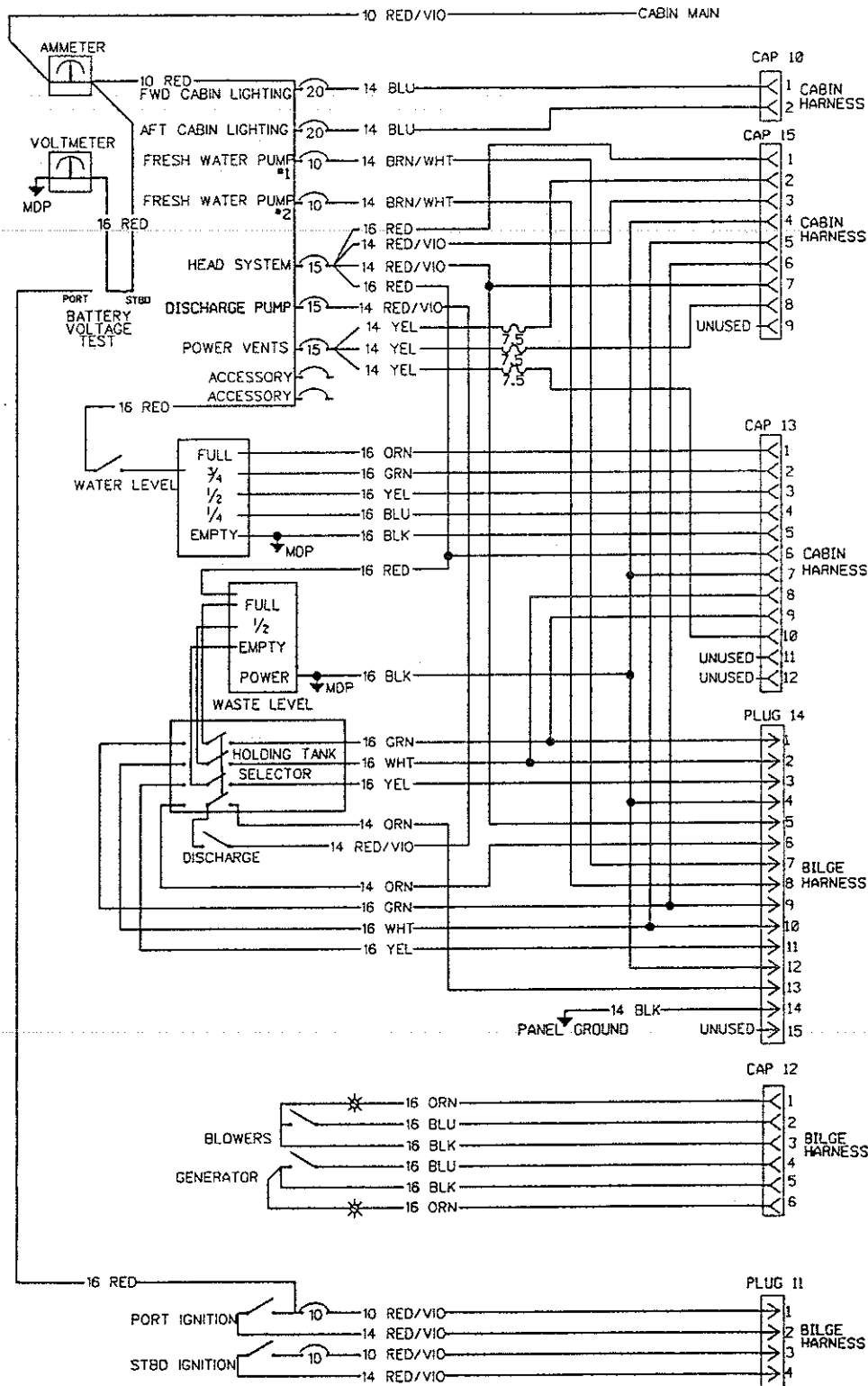
DC Wiring Schematic (2 of 2)



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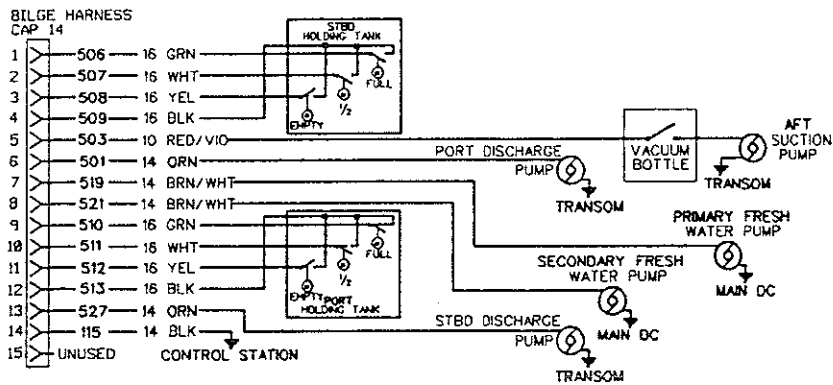
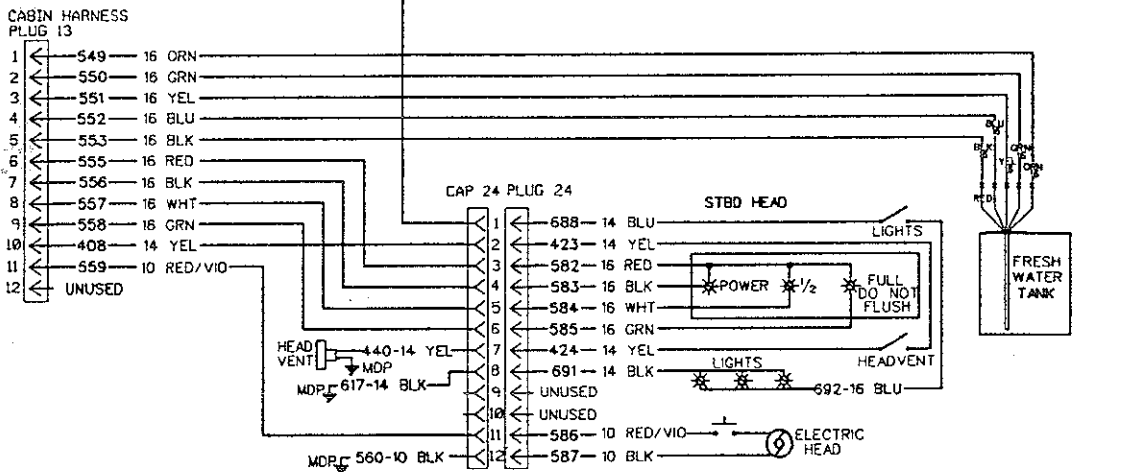
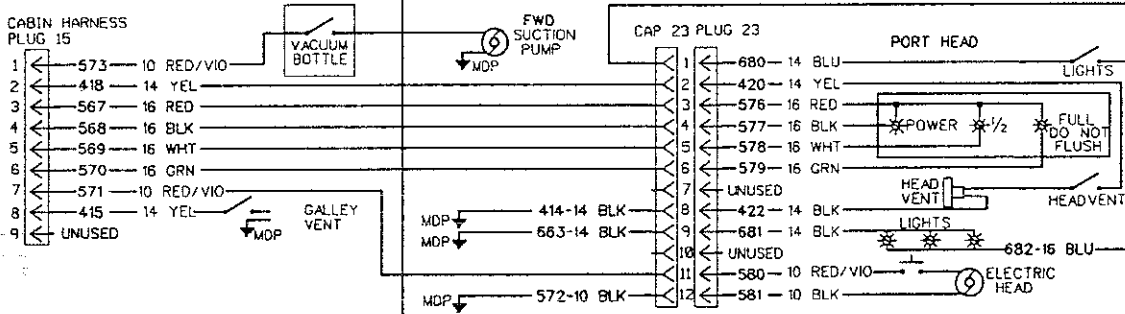
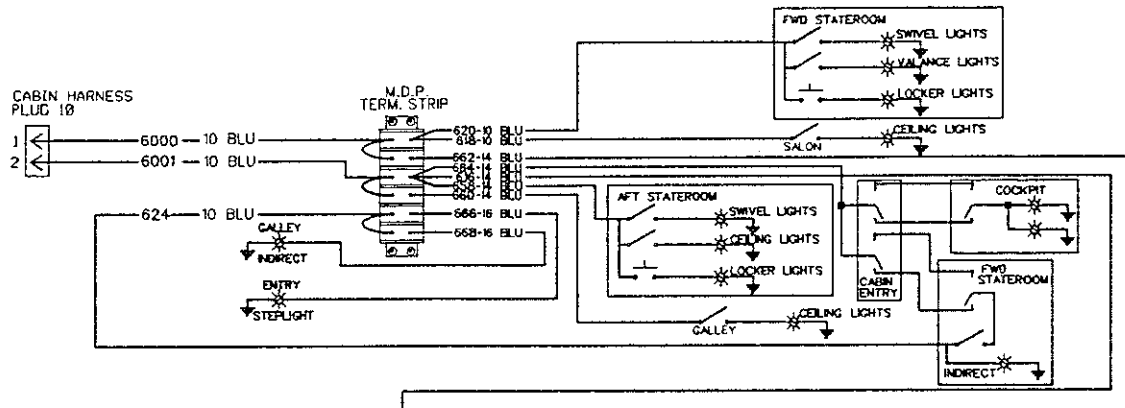
Cabin DC Wiring Schematic (1 of 2)



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Cabin DC Wiring Schematic (2 of 2)

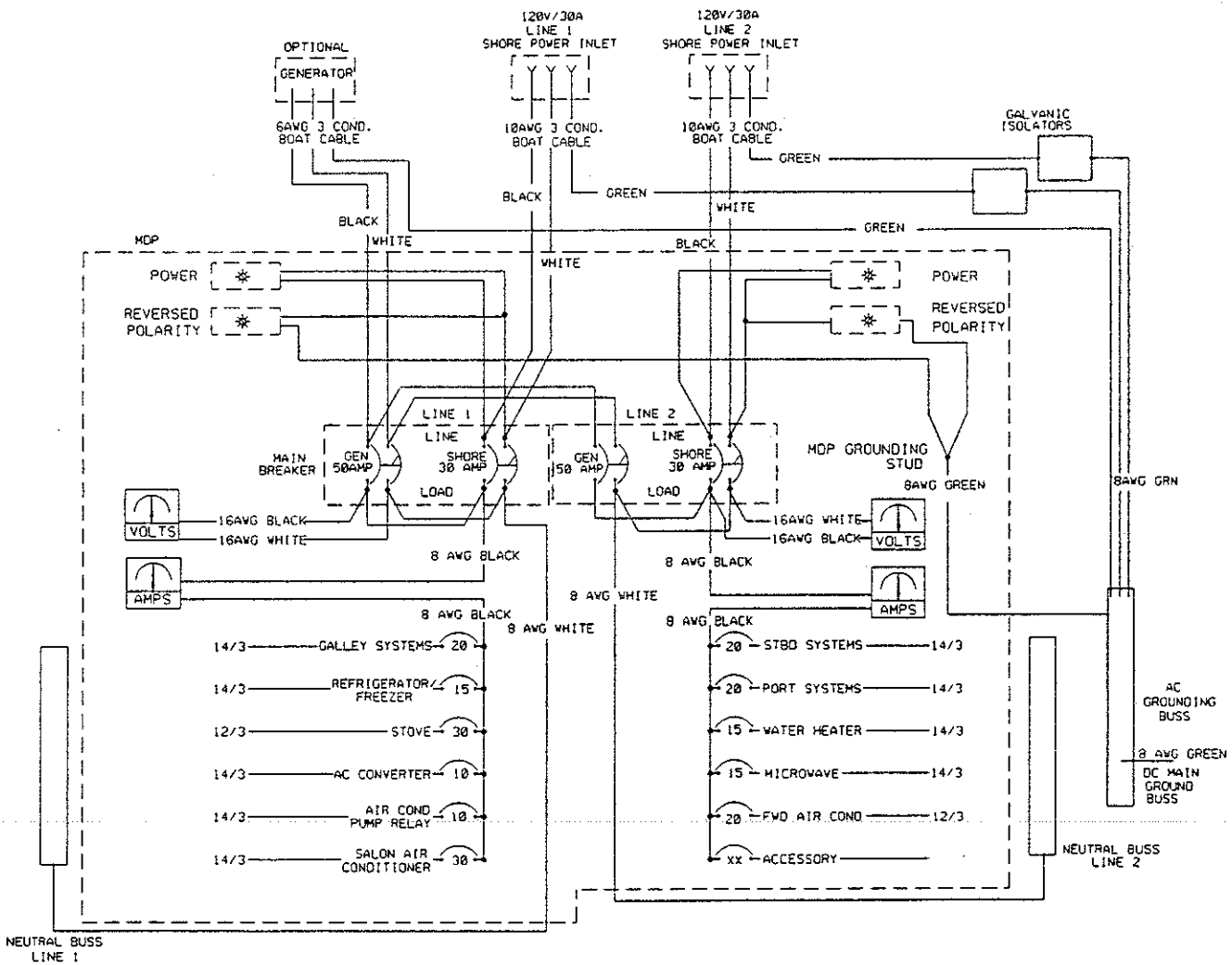


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AC Wiring Schematic (120 Volt/30 Cycle)

(U.S. Domestic)

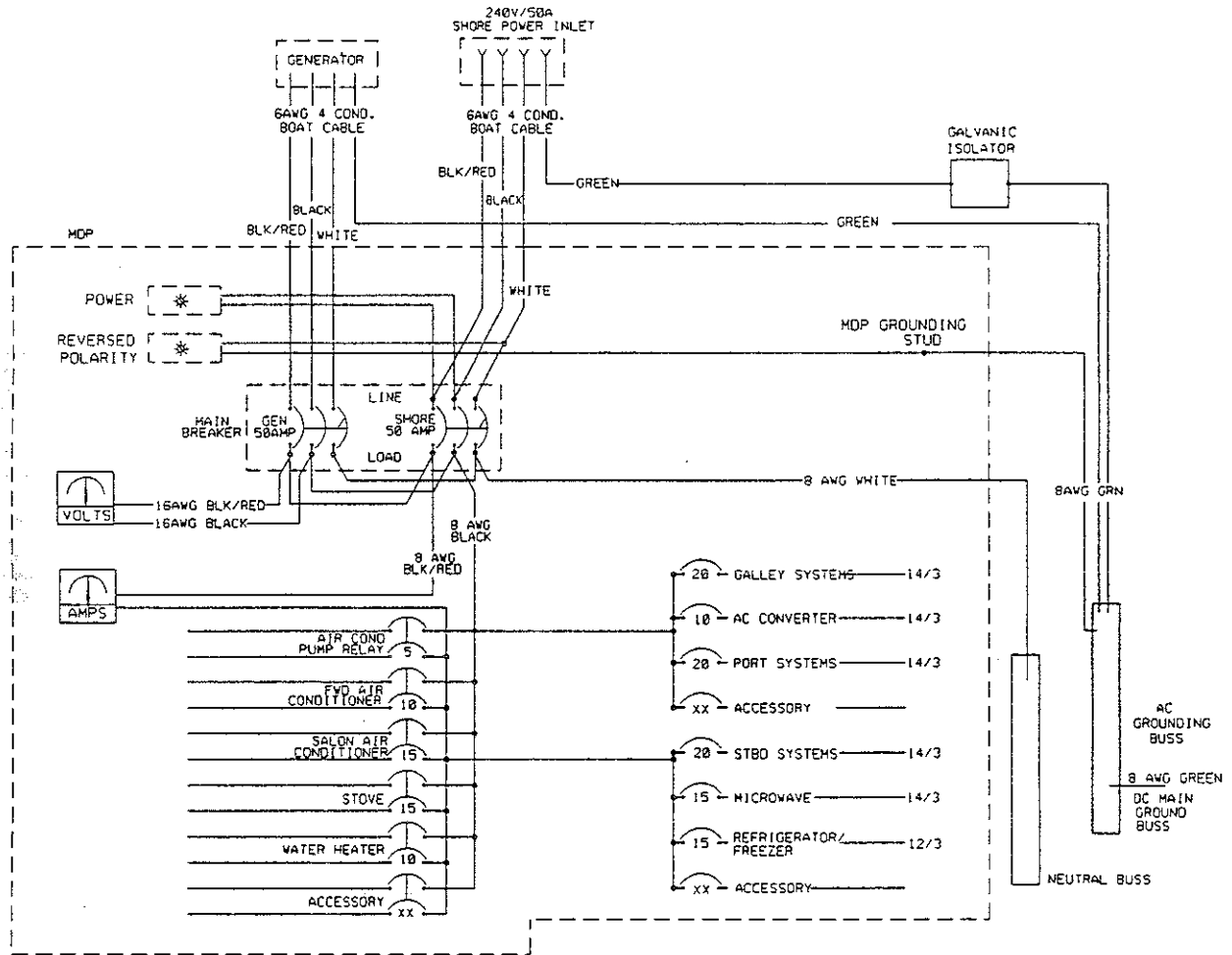


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AC Wiring Schematic (240 Volt/60 Cycle)

(U.S. Domestic Option)

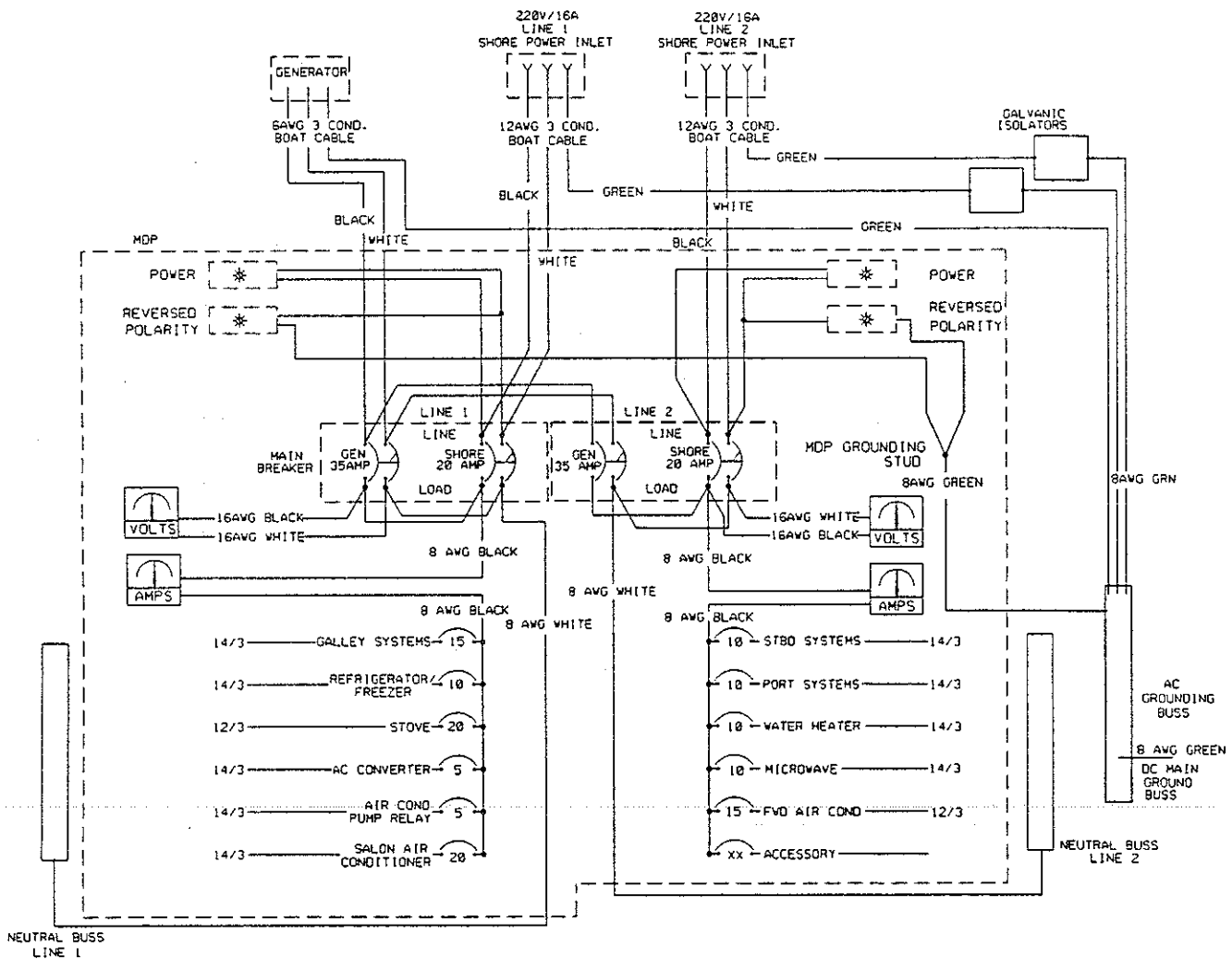


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AC Wiring Schematic (220 Volt/50 Cycle)

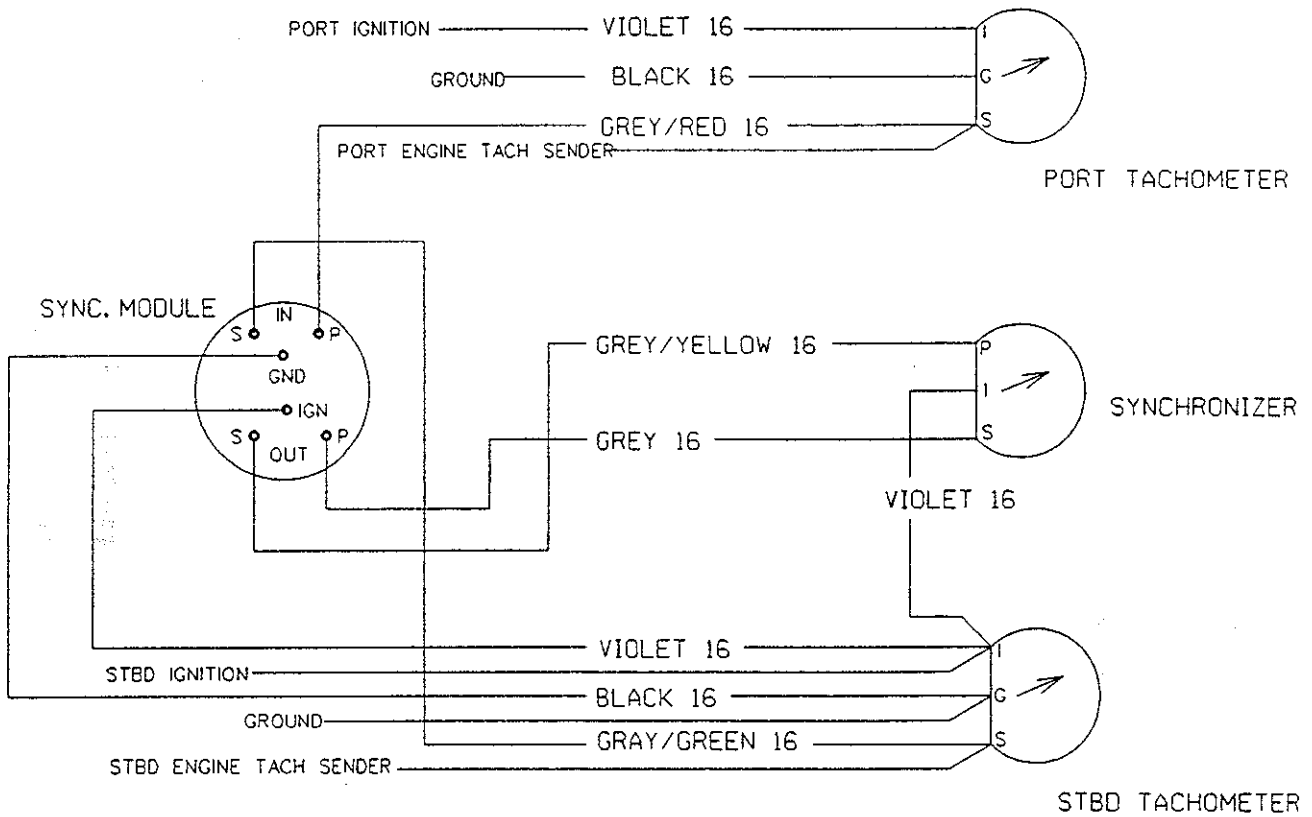
(International Option)



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Engine Synchronizer Module Wiring

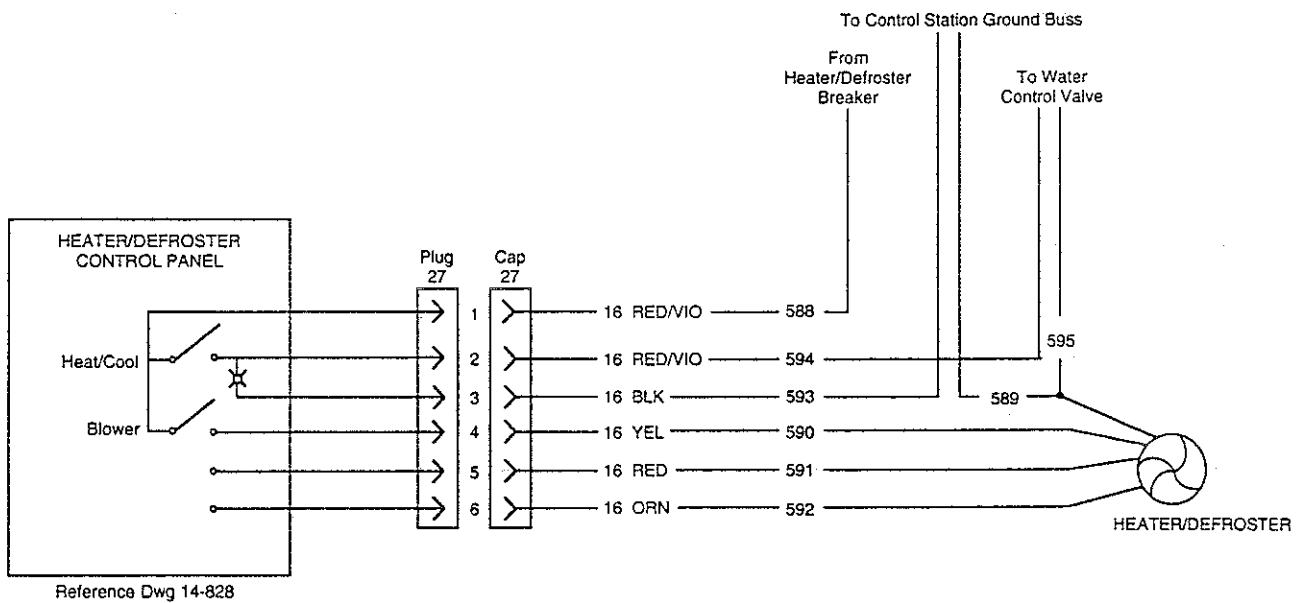


NOTE: WIRED AS SHOWN, GAUGE WILL INDICATE TOWARD SLOWER ENGINE.

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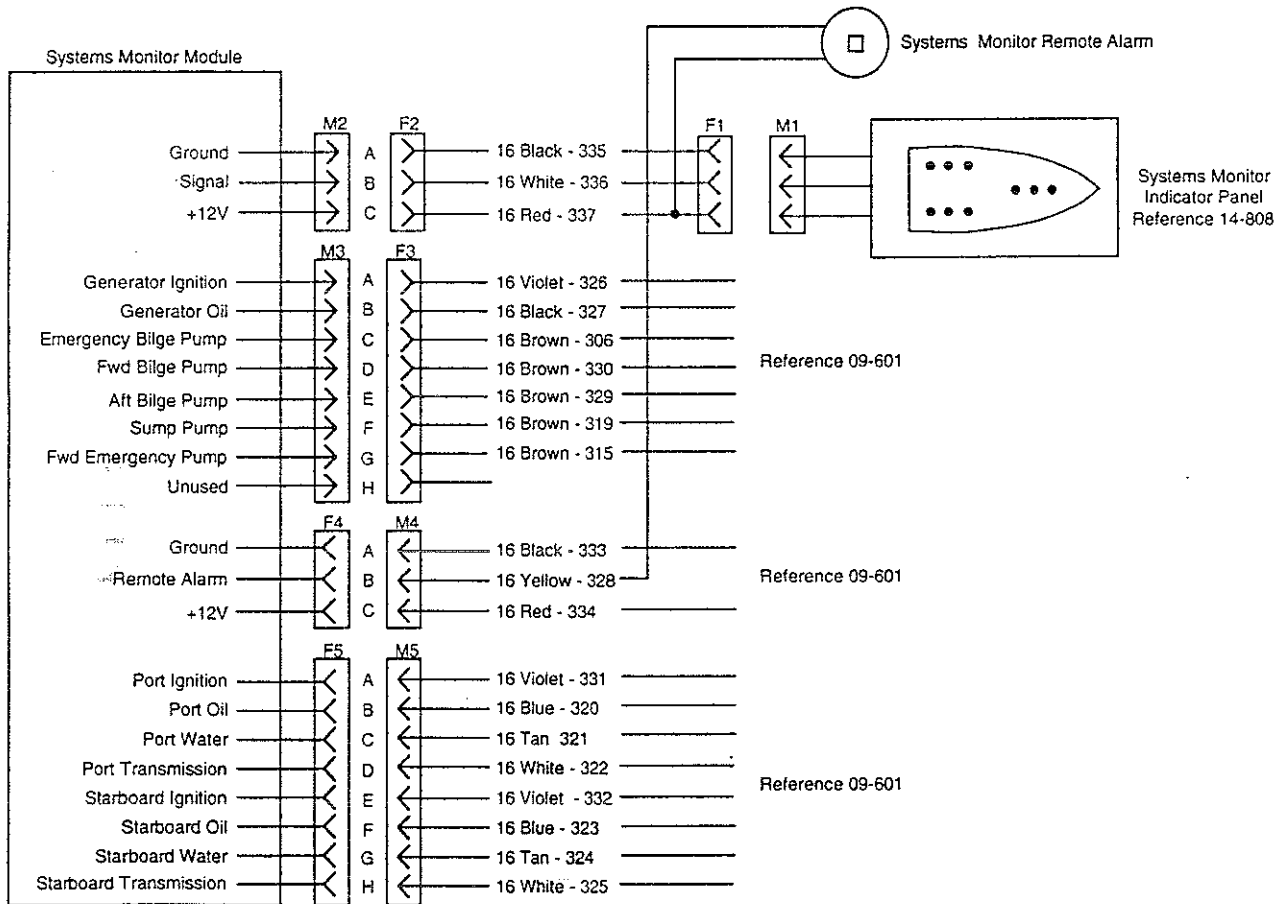
Cockpit Heater/Defroster Wiring Diagram



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Systems Monitor Schematic

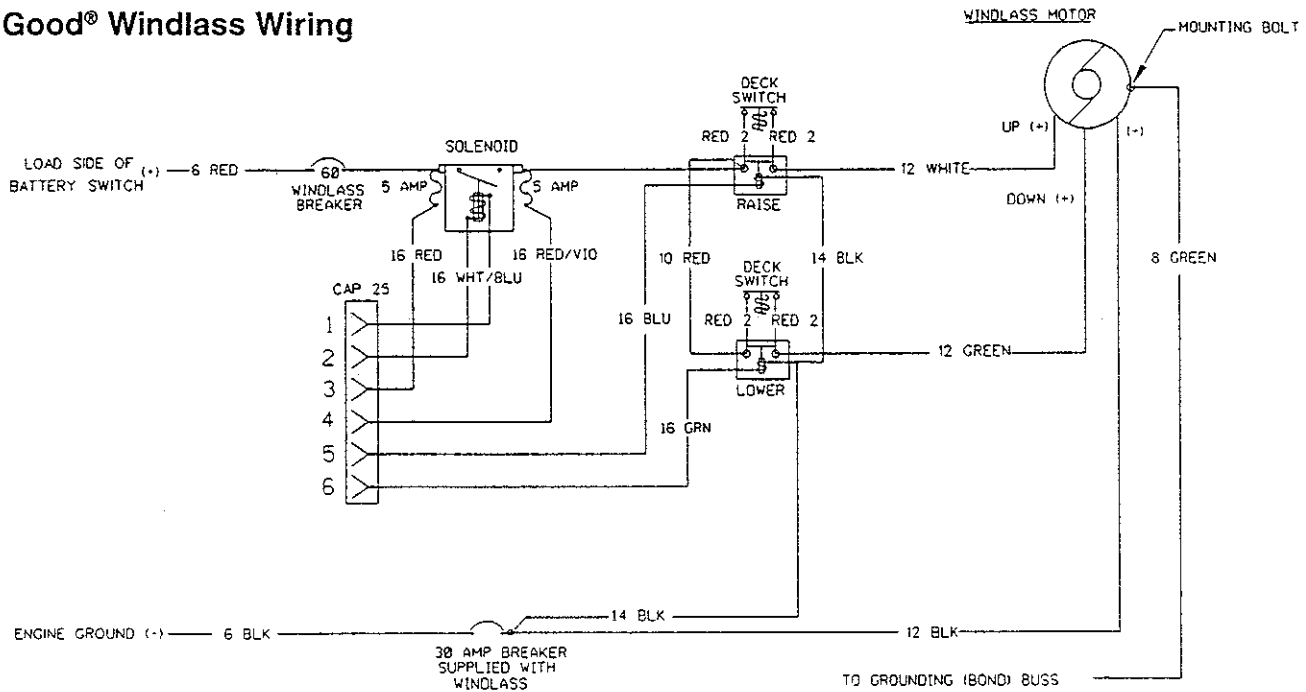


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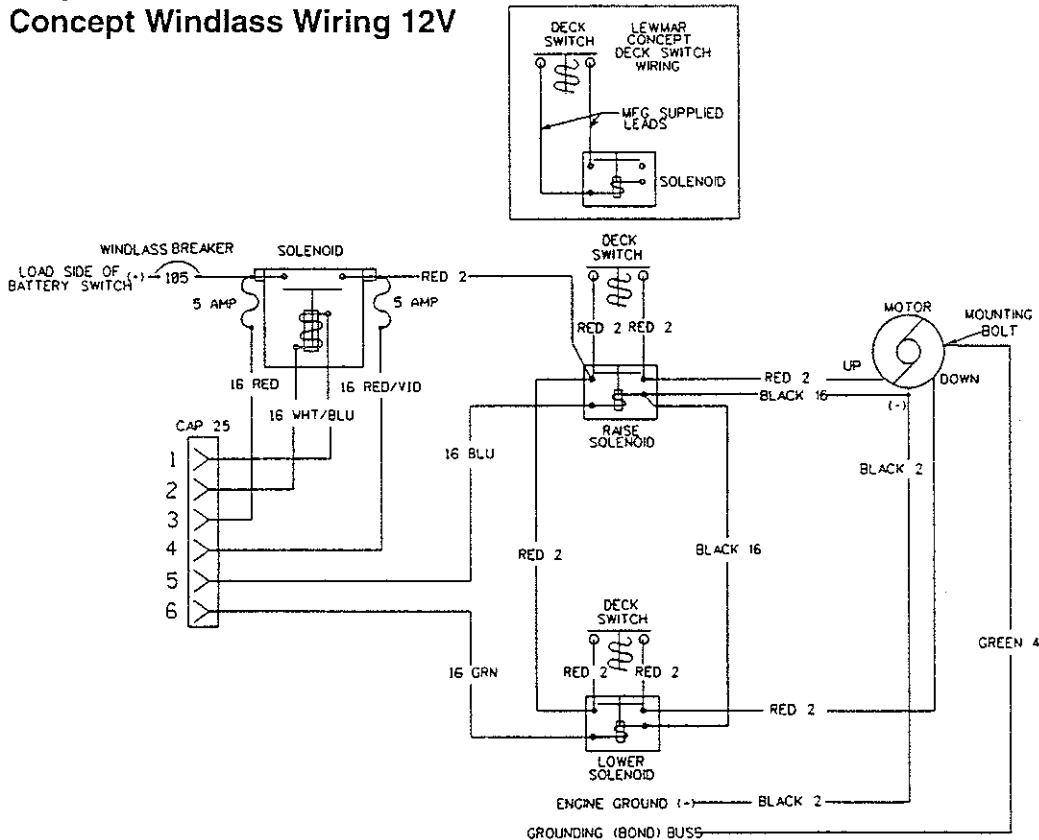


Windlass Wiring

Good® Windlass Wiring



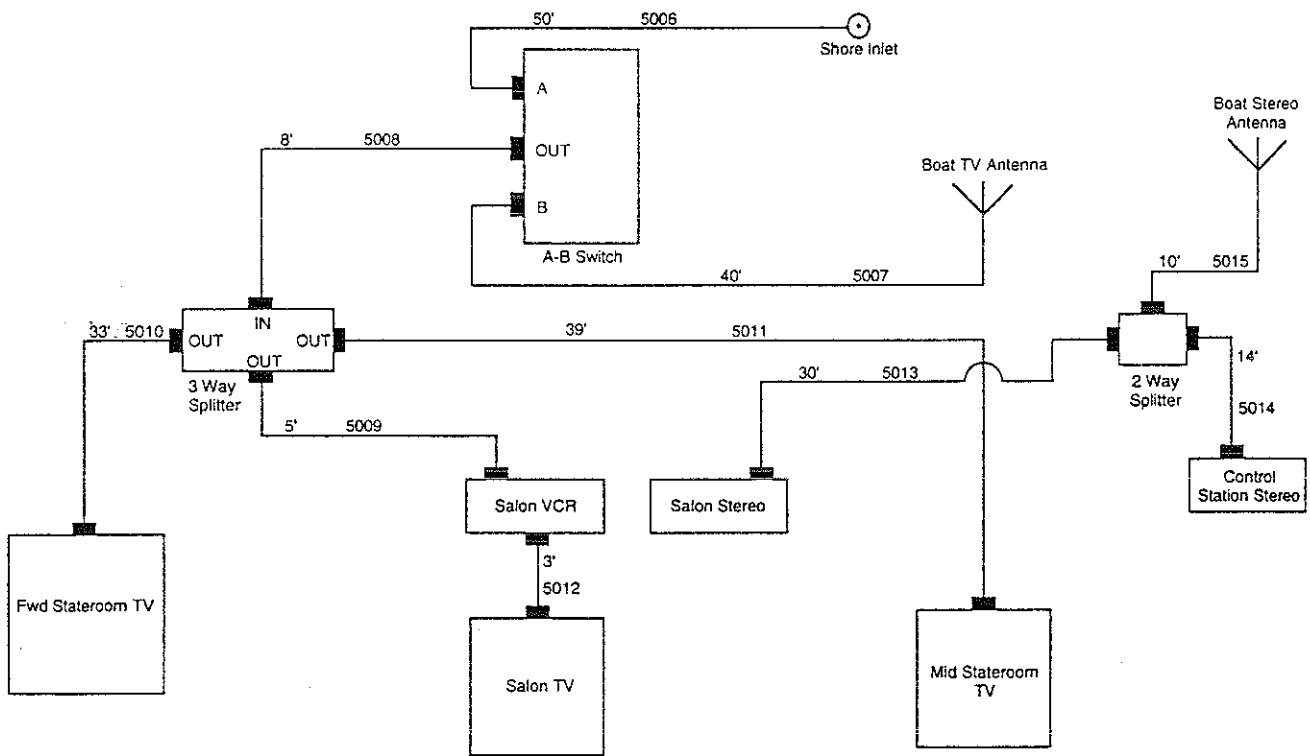
Lofrans® Leopard Windlass & Lewmar® Concept Windlass Wiring 12V



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TV & Stereo Coaxial Cable Wiring



RG-59/U Coaxial Cable

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International Homologations

This vessel and its systems have been constructed in accordance with standards and specifications in effect at the time of manufacture by the various regulatory authorities as listed below.

1. Ministere De La Mer - France
2. Registro Italiano Navale - Italy
3. Det Norske Veritas - Norway
4. Securite des Nauires - Canada
5. J.C.I. (Japan Craft Inspection) - Japan
6. N.K.K. (Nippon Kaiji Kyokai) - Japan
7. B.S.I. (British Standards Institute) - England
8. Ministerio Obras Publicas Y Transporters - Spain

Further information may be obtained from Sea Ray® Customer Service. 1-800-SRBOATS.

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