

# Welcome

As the new owner of America'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.

A nautical adventure is about to unfurl, bringing you excitement with each cruise and convenience from the beginning of every voyage until the moment you arrive safely at home port.

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 of the descriptions contained in this manual may differ somewhat from the actual equipment on your boat. If this occurs, please disregard those sections and refer directly to the updated information contained in the accompanying Owner's Packet.

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



# *Table of Contents*

---

## **Section 1**

### **GENERAL INFORMATION**

Warranty .....	1
For Your Information .....	1
Dealer's Responsibilities .....	1
Consumer Responsibilities .....	2
Safety .....	2
Grounding & Towing.....	4
Government Regulations .....	4

## **Section 2**

### **INTRODUCTION TO YOUR BOAT**

Specification Sheet .....	7
Bilge .....	8
Engines .....	9
Underwater Gear .....	12
Instruments & Controls .....	15
Fuel Systems .....	19
Fueling & Starting Procedures .....	21
Water Systems .....	22
Head Systems .....	25
Sleeping Accommodations .....	28

## **Section 3**

### **ELECTRICAL SYSTEMS**

DC Systems .....	29
Systems Monitor Panel .....	31
AC Systems .....	33
Generators .....	35
Electrolysis & Zinc Anodes .....	36
Lights .....	37

## **Section 4**

### **ACCESSORIES**

Air Conditioner .....	39
Canvas .....	40
Can Opener .....	41
Central Vacuum System .....	41
Coffee Maker .....	41
Halon System .....	41
Horn .....	42
Ice Maker .....	42

Power Ventilation System .....	42
Refrigerator/Freezer .....	42
Searchlight .....	43
Stereo .....	43
Stove/Microwave .....	43
Telephone .....	43
Windlasses .....	44

#### **Section 5**

#### **STORAGE & LAUNCHING PROCEDURES**

Laying-Up Instructions .....	45
Fitting Out After Storage.....	47

#### **Section 6**

#### **CARE & REFINISHING .....** .49

#### **Section 7**

#### **SERVICE INFORMATION .....** .51

Launching Checklist.....	54
--------------------------	----

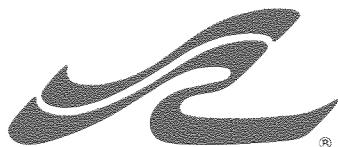


(Information in this publication is based upon the latest product specifications available at printing. Sea Ray Boats, Inc. reserves the right to make changes at any time, without notice, in the colors, equipment, specifications, materials and prices of all models, or to discontinue models. Should changes 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.)

Printed in the U.S.A. November 1988 © Sea Ray Boats, Inc.

A Brunswick Company

Proprietary rights are claimed in the following trademarks appearing in this publication:



*Sundancer®*

# Section 1

## GENERAL INFORMATION

### Warranty

For a period of one year from date of delivery to original retail purchaser, Sea Ray Boats, Inc. warrants each SEA RAY boat operated under normal, non-commercial use to be free from defects caused by faulty workmanship or materials.

During this period, warranty repairs will be made without charge by the selling SEA RAY dealer at the dealer's store or service center or, at SEA RAY's option, at one of SEA RAY's manufacturing plants. Transportation costs to and from selling SEA RAY dealer's service center or SEA RAY plant are the purchasers responsibility. All warranty repairs must be approved by an authorized SEA RAY representative.

Engines, outdrives, controls, batteries and other equipment or accessories carrying their own individual warranties provided by their respective manufacturers are not covered by the provisions of this warranty.

This warranty does not cover boats owned by other than the original retail purchaser; windshield breakage; gelcoat crazing, fading or blistering; upholstery damage, scratches or tears; leakage around windshields, hatches and canvas; boats used for commercial or racing purposes; or boats or parts which have been altered or subjected to misuse or negligence.

The obligation of Sea Ray Boats, Inc. under this warranty shall be limited to the repair or replacement of any part which Sea Ray Boats, Inc. judges to be defective. Sea Ray Boats, Inc. will not be liable for haul out, launch, towing or storage charges, inconvenience or loss of time or income, or any other special or consequential damages of any kind or nature. Implied warranties, if any, shall be limited to the duration of this written limited warranty.

Some states do not allow the exclusion or limitation of incidental or consequential damages or limitations on how long an implied warranty lasts, so the limitations and exclusions stated above may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that may vary from state to state.

### 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 oils 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.

#### 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. 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.

### 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 has been trained to perform additional pre-delivery checks and to 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 separately warranted products, warranty and registration cards, and operation, installation and maintenance instructions.
- A review of all warranties, pointing out the importance of mailing warranty cards and registrations to various manufacturers within the required time limits, and assistance in accomplishing same.
- Instructions to obtain 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 boat to assure all systems are working properly at time of accepting delivery.
- Provide proper maintenance and periodic servicing of the boat in accordance with the Service Guide and Owner's Manual.
- Return boat after 20 hours of operation to the selling dealer for its 20-hour inspection.

When contacting dealer regarding warranty or service, have all pertinent information such as serial and 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 below the gunwale, is the most important identifying fac-

tor 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 engines.

## **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.

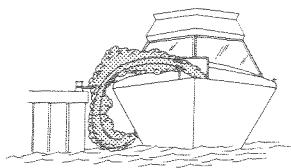
### **DANGER**

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 excess 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:

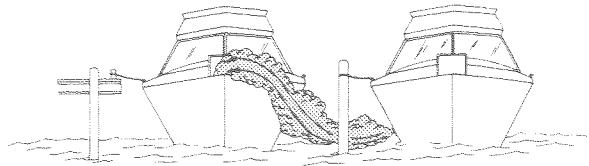
- (1) Operation at slow speeds or dead in the water.
- (2) Operation with a high bow angle attitude.
- (3) The utilization of canvas top, side curtains & back curtains.
- (4) Contributing climatic conditions, such as a head wind.
- (5) Operations of engines and/or generator in confined spaces or at dockside.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

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

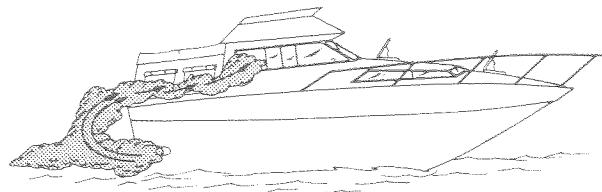
### **EXAMPLES OF HOW HIGH LEVELS OF CARBON MONOXIDE MAY ACCUMULATE**



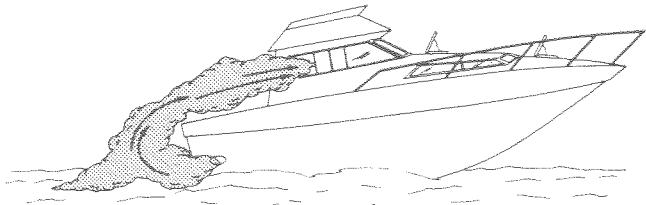
**WARNING: ANY BLOCKAGE OF HULL EXHAUST OUTLETS BY A SEAWALL BULKHEAD OR ANY OTHER OBSTRUCTION, CAN CAUSE EXCESSIVE ACCUMULATION OF CARBON MONOXIDE IN THE BOAT'S INTERIOR.**



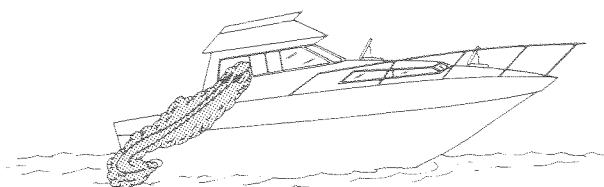
**WARNING:** WHEN YOU ARE TIED TO A DOCK AND/OR IMMEDIATELY ALONGSIDE OF OTHER VESSELS, PAY PARTICULAR ATTENTION TO THE GENERATOR EXHAUST EMISSIONS FROM THE NEARBY VESSELS.



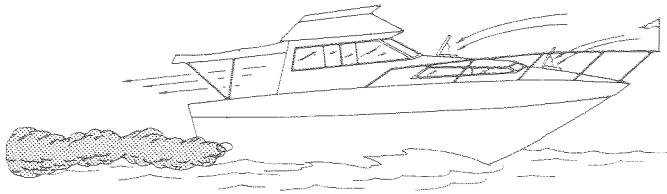
**WARNING:** WHEN OPERATING BOAT WITH CANVAS TOPS, SIDE CURTAINS, AND/OR BACK CURTAINS IN PLACE, PAY PARTICULAR ATTENTION TO THE ENGINE EXHAUST TO INSURE THAT EMISSIONS DO NOT ACCUMULATE IN BOAT INTERIOR AND PROPER VENTILATION IS ADDED.



**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.**

- Keep your boat and equipment in top condition by frequently inspecting the hull, engines and all gear.
- Use maximum caution when taking on fuel. Know your fuel tank capacity and fuel consumption at various RPM.
- Be certain there is enough fuel aboard for your anticipated cruising needs and an adequate reserve if you must change your plans for weather or other reasons.
- 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.
- Watch the weather. Check local weather reports before departure. Be especially on the lookout for strong winds and electrical storms.
- Have up-to-date charts of your area on board.
- File a float plan.
- Instruct at least one of your passengers in the basic fundamentals of handling your boat in the event you are unable to do so.
- Do not overload or improperly load your boat.
- Do not permit passengers to ride on parts of your boat not designed for such use.

## DANGER

**Boarding ladder and swim platform should not be used when engine is running.**

- CAUTION: Running boat with cabin door open (and aft berth windows on Sundancer) could induce exhaust fumes into the cabin.
- Know and obey the Rules of the Road and always maintain complete control of your boat.
- Always operate with care, courtesy and common sense.

## **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.

## **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 DECK HARDWARE FOR GROUNDING AND 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.

Some synthetic fiber rope 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 dock lines, renders it extremely dangerous if the line breaks or if the fitting to which it is attached 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. Any type of line breaking under stress is dangerous and over-stressing should be avoided. **ALWAYS STAND CLEAR OF ANY TAUT LINES.**

## **Government Regulations**

The Coast Guard is an ever-present help to the boating public. Its boating regulations prescribe minimum standards of safety, and you must equip your boat to comply with these regulations. The following is a list of the safety equipment required for a boat 26 feet to less than 40 feet. These requirements may vary from state to state. Consult your SEA RAY dealer for variations to these requirements in your area.

- At least three B-I type hand-held fire extinguishers.
- 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.)
- At least one Type 4 device designed to be grasped instead of worn (ring buoy or buoyant cushion).
- 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.
- All pyrotechnic devices must be stowed in waterproof, non-glass containers.
- One power-operated whistle or horn, audible for at least half a mile.

It is recommended that you also carry an anchor, anchor line, tie-up lines, fenders, first aid kit, waterproof flashlight, spare fuses, electrical tape and tools to make minor repairs.

## **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.

## **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 Inter-

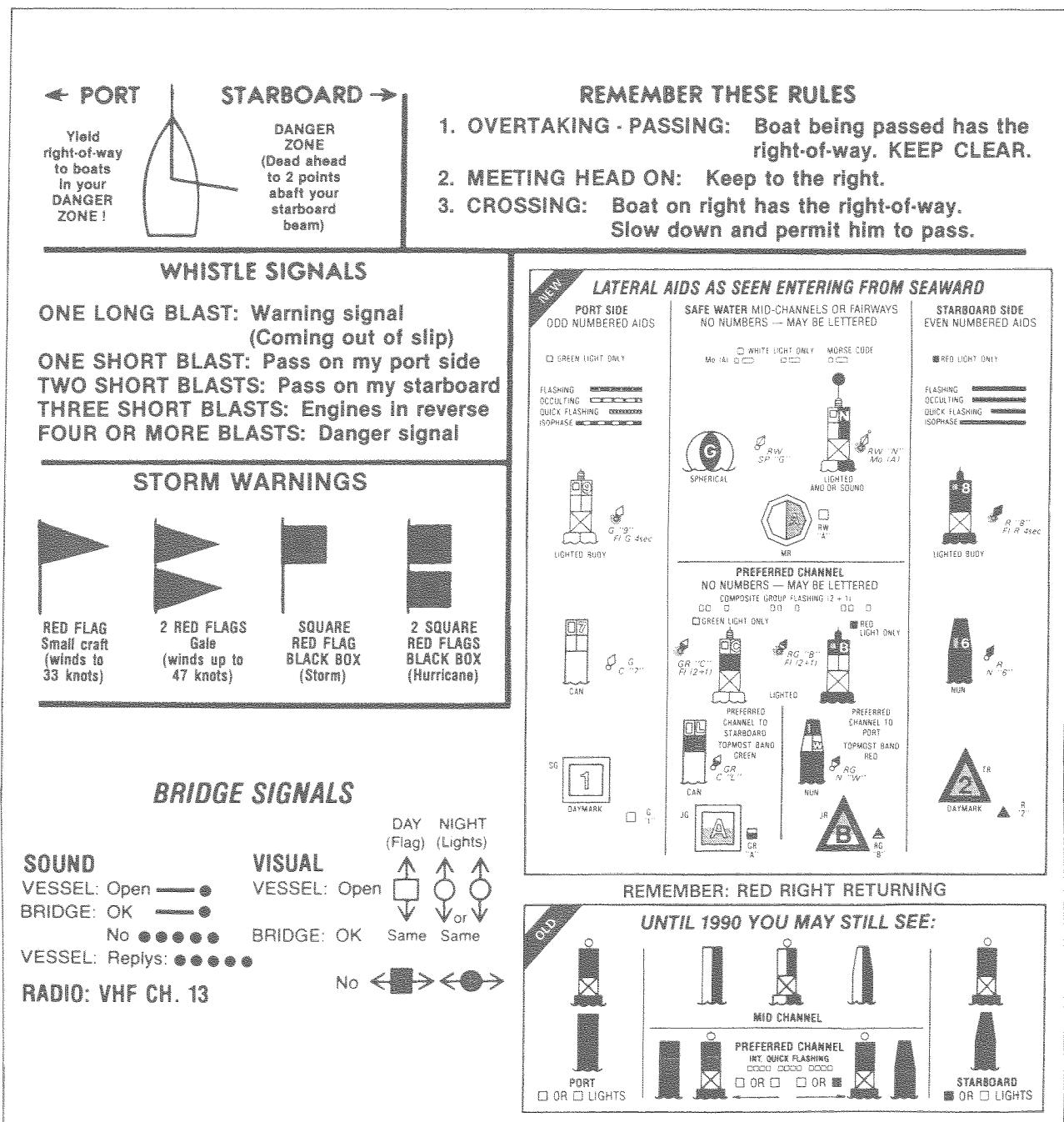
national Rules. The United States Inland Rules are applicable to all vessels inside the demarcation lines separating inland and international waters. The "Rules of the Road" can be obtained from your local Coast Guard unit or from the United States Coast Guard Headquarters (1300 E. Street NW, Washington, 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.



# Section 2

## INTRODUCTION TO YOUR BOAT

### Specification Sheet

#### 340 Express Cruiser SPECIFICATIONS

Centerline Length (w/Platform):	35'1" (10.94 m)
Centerline Length (w/o Platform):	33'7" (10.2 m)
Beam:	11'1" (3.6 m)
Dry Weight:	10,100 lbs. (4,581 kg)
Dead Rise:	21° (aft)
Draft:	29" (.736 m)
Water Capacity:	51 gal. (193.035 litres)
Fuel Capacity:	239 gal. (953.82 litres)
Usable Fuel*:	242 gal. (904.61 litres)

#### 340 Sundancer SPECIFICATIONS

Centerline Length (w/Platform):	35'1" (10.94 m)
Centerline Length (w/o Platform):	33'7" (10.2 m)
Beam:	11'1" (3.6 m)
Dry Weight:	10,500 lbs. (4,763 kg)
Dead Rise:	21° (aft)
Draft:	29" (.736 cm)
Water Capacity*:	51 gal. (193.035 litres)
Fuel Capacity:	172 gal. (651.02 litres)
Usable Fuel*:	163 gal. (616.95 litres)

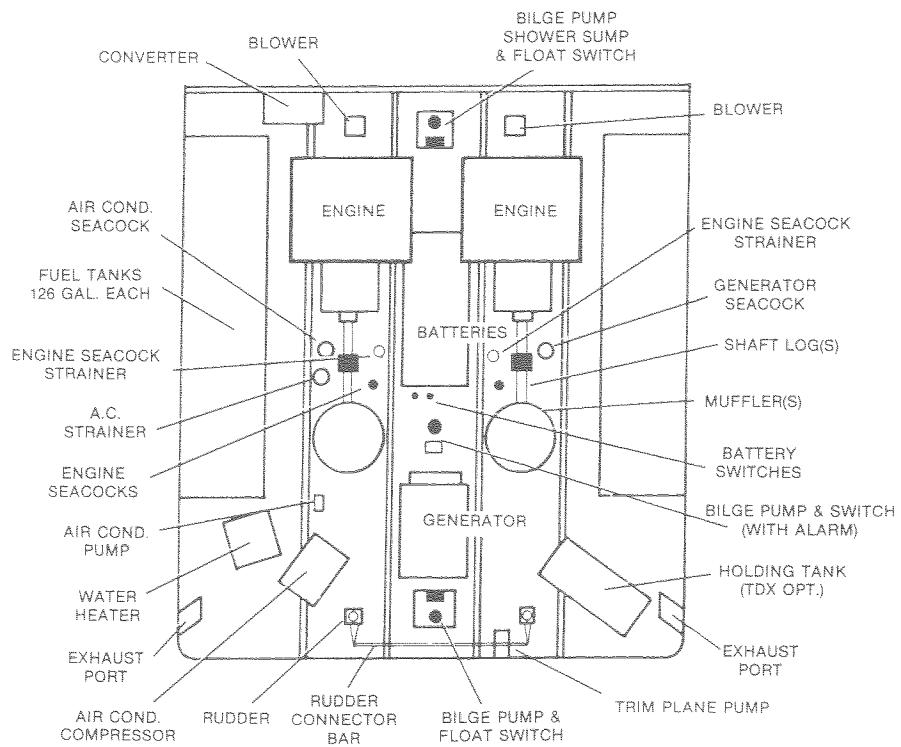
\*Allow 15% reserve for running in heavy seas.

#### HEIGHT DIMENSIONS

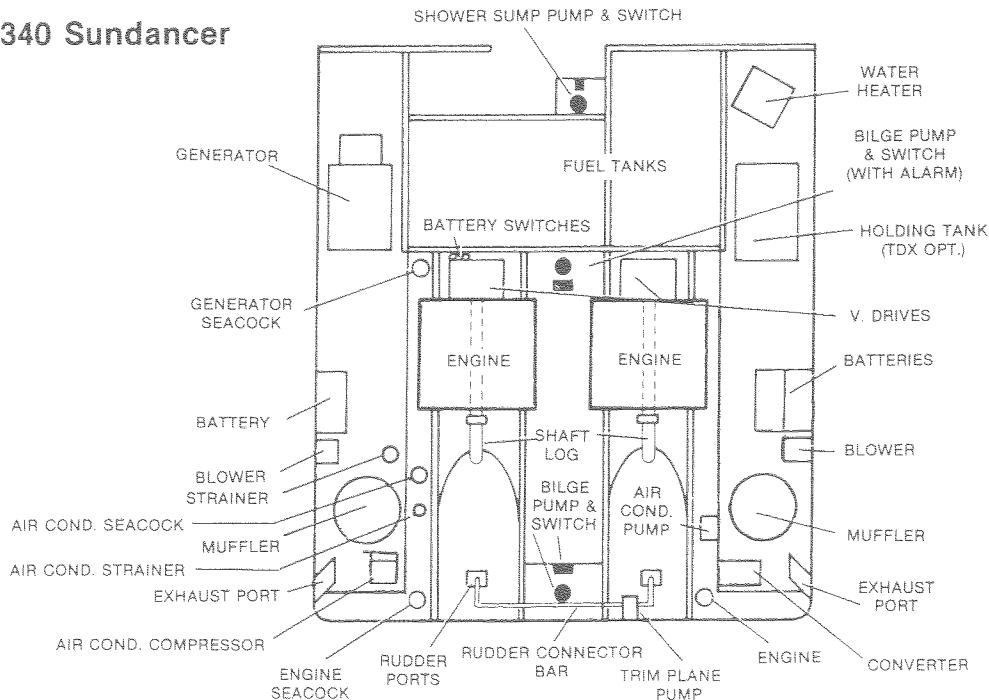
Waterline to highest fixed point:	10'9" (3.32 m)
With spoiler:	9'10" (3.00 m)
Waterline to highest point including canvas:	8'8" (2.64 m)
With spoiler:	9'10" (3.00 m)
Keel to highest fixed point:	9'8" (2.95 m)
With spoiler:	11'5" (3.48 m)

## Bilge

### 340 Express Cruiser



### 340 Sundancer



# Bilge

## BILGE PUMPS

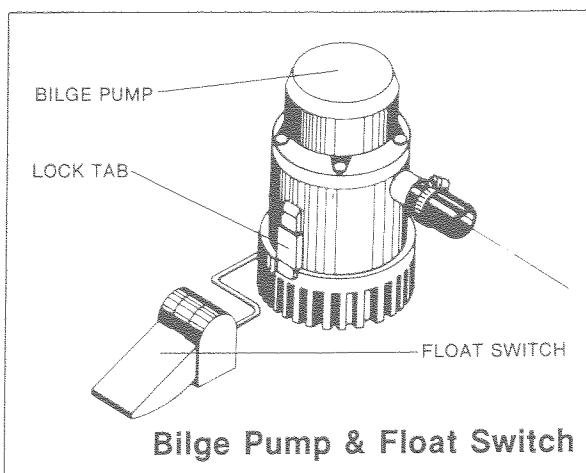
SEA RAY boats have three bilge pumps with float switches wired directly to the batteries. The two main pumps are equipped with switches on the dash with a "MANUAL" and "AUTO" mode. The third pump is wired to the high water bilge alarm located under the helm.

When the switch is in "MANUAL" position, the pump will run continuously. When in "AUTO" position, the pump is activated when there is enough water in the bilge to raise the float switch to its highest position; and deactivated when the water level recedes. **The pumps should be left in the "AUTO" mode unless the bilge is being pumped out for servicing.**

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

Frequently inspect the area under the float switches to assure 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 cover.



### Trouble Shooting:

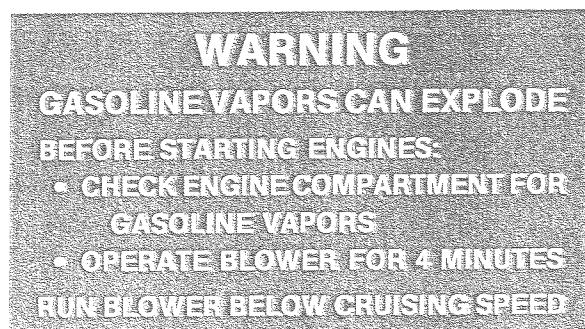
If the water does not come out of the discharge hose:

- (1) Check the breaker on the bilge breaker box.

- (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.

## BLOWERS

Your SEA RAY boat is equipped with two in-line bilge blowers to provide bilge ventilation. The blowers are wired through a circuit breaker panel with a double switch on the dash panel. Run the blowers for four minutes before starting the engines, when operating below cruising speed, and when the generator is running.



### Maintenance:

The bilge blowers should be checked periodically to insure that hoses are securely fastened to the 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) Check the breaker at the helm switch panel.
- (2) Check to see if the blower hose is fastened to the blowers.

## Engines

The engines are the heart of your SEA RAY boat. Proper attention to and maintenance of your engines 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. Follow the recommended maintenance schedule in your Engine Operator's Manual.

Marine reverse gears are hydraulically operated, thereby making it imperative to periodically maintain and check the oil level. If the correct oil level is not maintained, slippage will occur, 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.

## MARINE GEARS

### 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 for the unit, and perhaps breakage.

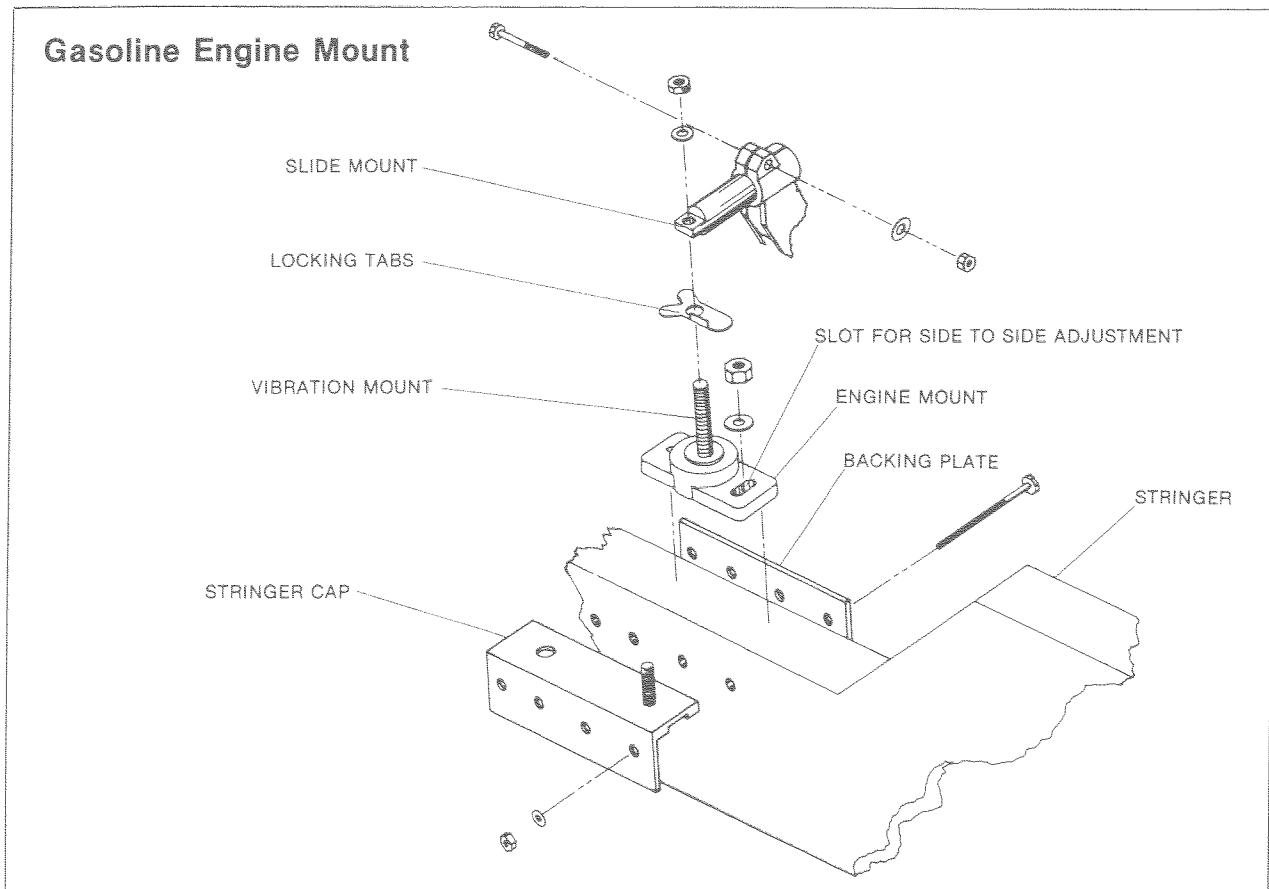
## ENGINE MOUNTS

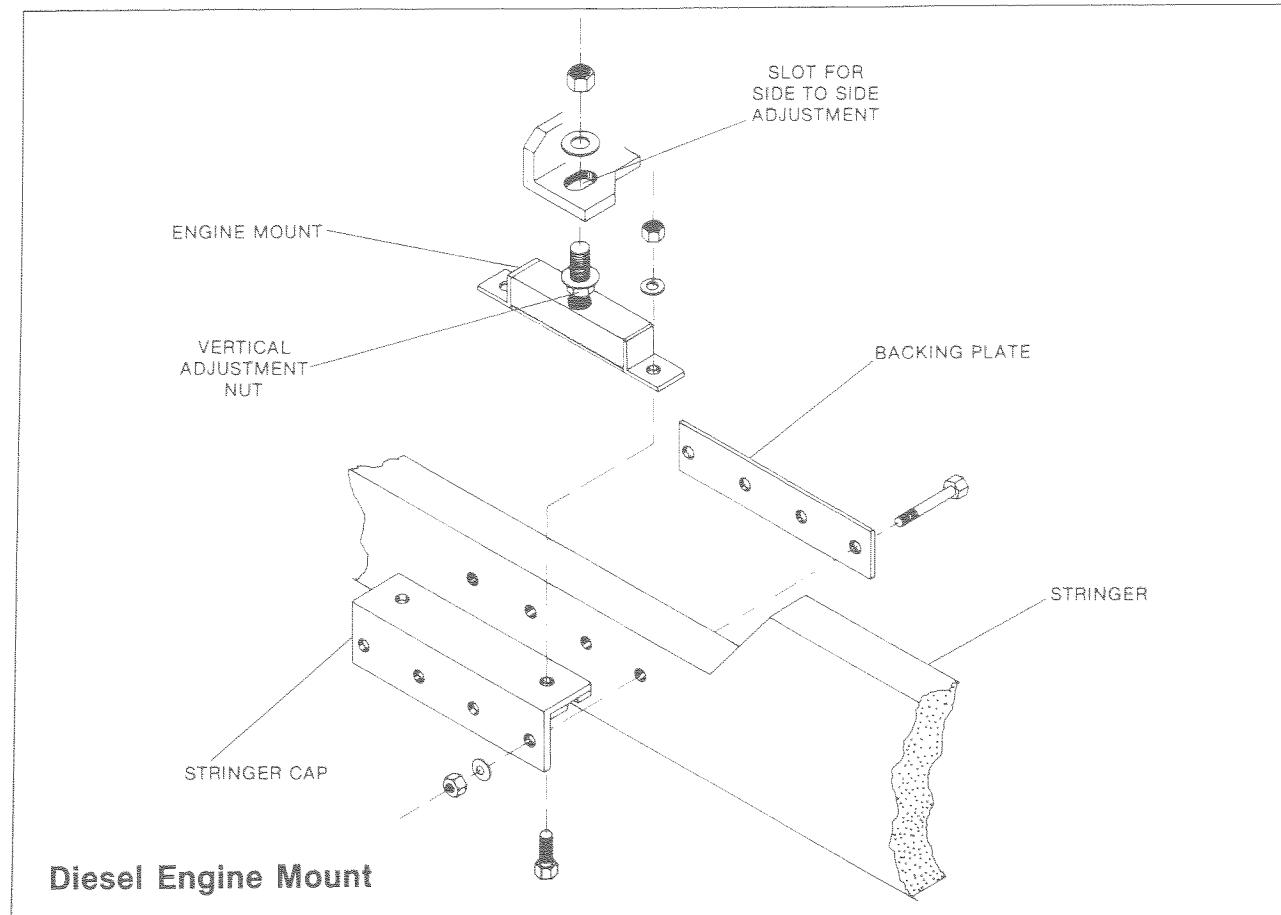
The adjustable type engine mounts permit adjustment sideways as well as vertically. Vertical adjustment nuts lock up or down on the threaded vertical stud, with a slot provided to allow side to side adjustment on the engine.

**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 REMOVAL

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





For Express Cruiser model, remove cockpit seats. Shut off the fuel lines and close the engine seacock. Remove all electrical wires, fuel lines and raw water intake hoses from the engine. Unbolt the engine coupling from the shaft coupling and then slide the shaft and coupling back from the engine. Detach both throttle and shift cables. **Do not bend or twist the cables, as damage may result.**

Remove the mounting bolts for the engine and lift the engine out, leaving the mounts bolted to the stringer caps.

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

## 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. Following are some of the 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. The alignment should be set at .003" to .005". Refer to page 13.

### Couplings 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 coupling 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.

## FRESH WATER COOLING SYSTEM

The fresh water cooling system is a closed system which helps protect engines from internal corrosion and provides more even distribution of engine temperature. The system is standard with all diesel engines. The tank is located forward on the engine with an overflow bottle located below the tank on the bulkhead. Change the coolant annually.

## COOLANT RECOMMENDATIONS

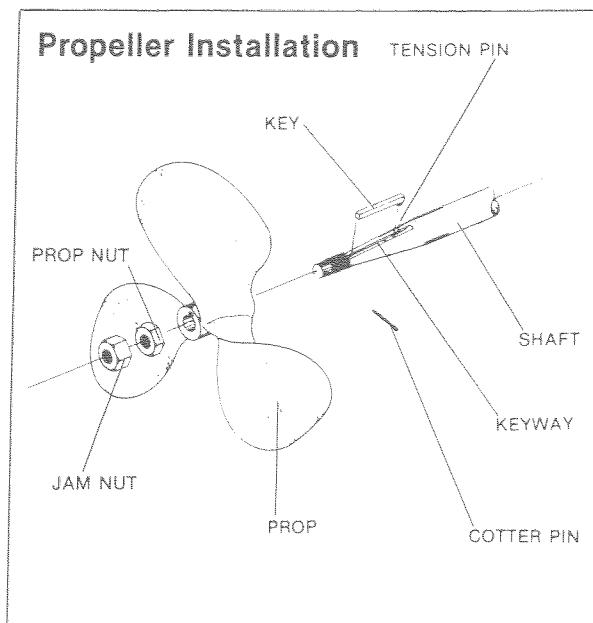
The standard mixture of water and coolant is a mixture of 30% antifreeze and 70% water, which protects to 0°F (-18°C). This will allow the coolant to expand properly and maintain normal operating engine temperature. In colder climates, the coolant level should be increased to 50/50, which protects to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

## Underwater Gear

### PROPELLERS

Propellers should be free from nicks, excessive pitting and any distortions that alter the propeller 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:

For proper rotation, the installation of propellers on in-board engine boats 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) Grease the shaft with a multi-lube marine grease.
- (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. Push down to put the tension pin in place.
- (4) 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.)

- (5) Next, tighten the prop nut securely, using a 2 x 4 block between the propeller blade and the bottom of the boat.
- (6) Then tighten the jam nut while holding the prop nut in place.
- (7) Install a cotter pin through the hole in the shaft and bend the ends of the pin over.

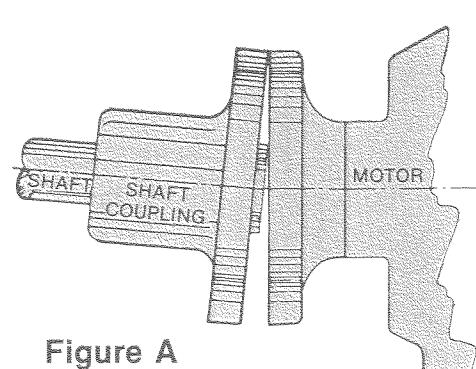
**Note:** If the jam nut and prop nut are installed properly, the propeller should not loosen. If you tighten both nuts holding only the propeller blade, the nuts could possibly thread back on the shaft to the cotter pin. It is important that the above procedure be followed.

## SHAFTS

The shaft coupling is the connecting point between the shaft and the engine, and the alignment should be set at .003" to .005" (0.08 — 0.13 mm). 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 - 0.13 mm). 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.

### Shaft sizes (diameter x length):

Express Cruiser: 1-1/4" x 54"  
Sundancer: 1-1/4" x 48"



**Figure A**  
**Shaft Alignment**

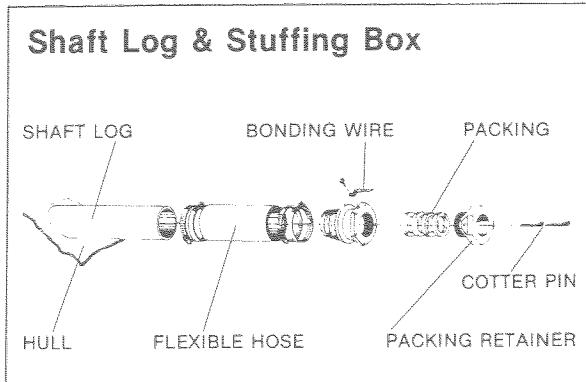
## SHAFT LOG & STUFFING BOX

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.

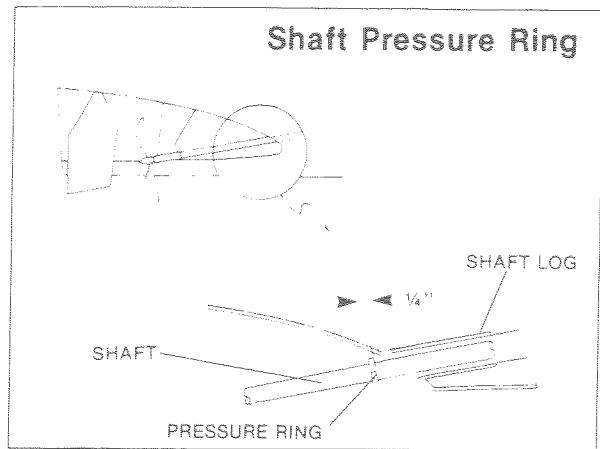
The packing material used is high temperature packing, and Chestron 329 Stern Lon-1/4" is recommended.



## SHAFT PRESSURE RING

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.

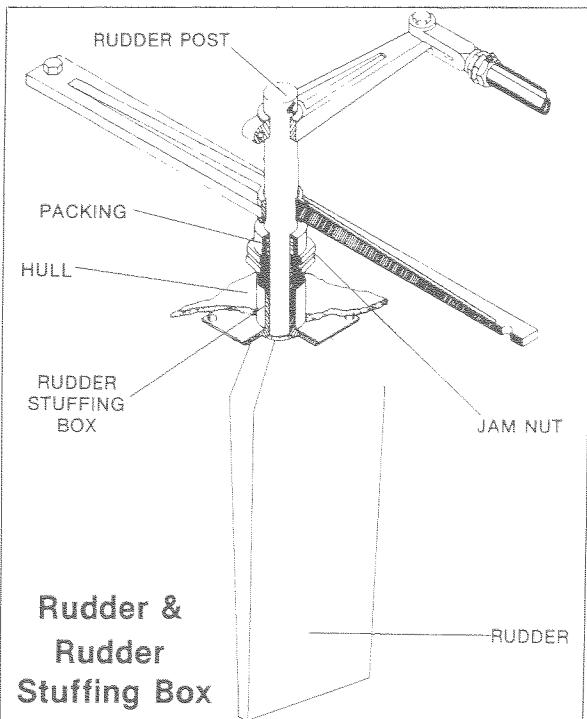


## STRUT

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 layup periods, squirt castor oil into this bearing to keep it from freezing to the shaft. **Never use machine oil or grease on a rubber bearing.** Periodically check all strut fastenings to assure that they are secure. To replace the rubber cutlass bearing, specify size: For a 1-1/4" shaft: 1-1/4" I.D. x 1-3/4" O.D. x 5".

## RUDDER & RUDDER STUFFING BOX

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.

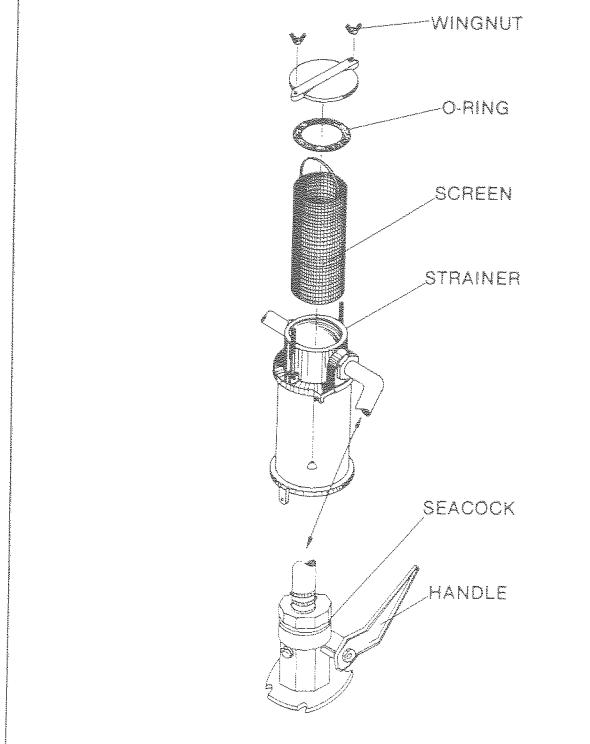
## **SEACOCKS & STRAINERS**

Seacocks and strainers are located in the bilge area. To open the seacock, turn the handle vertically. To close, turn the handle horizontally. The seacock body should be inspected and lubricated annually.

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

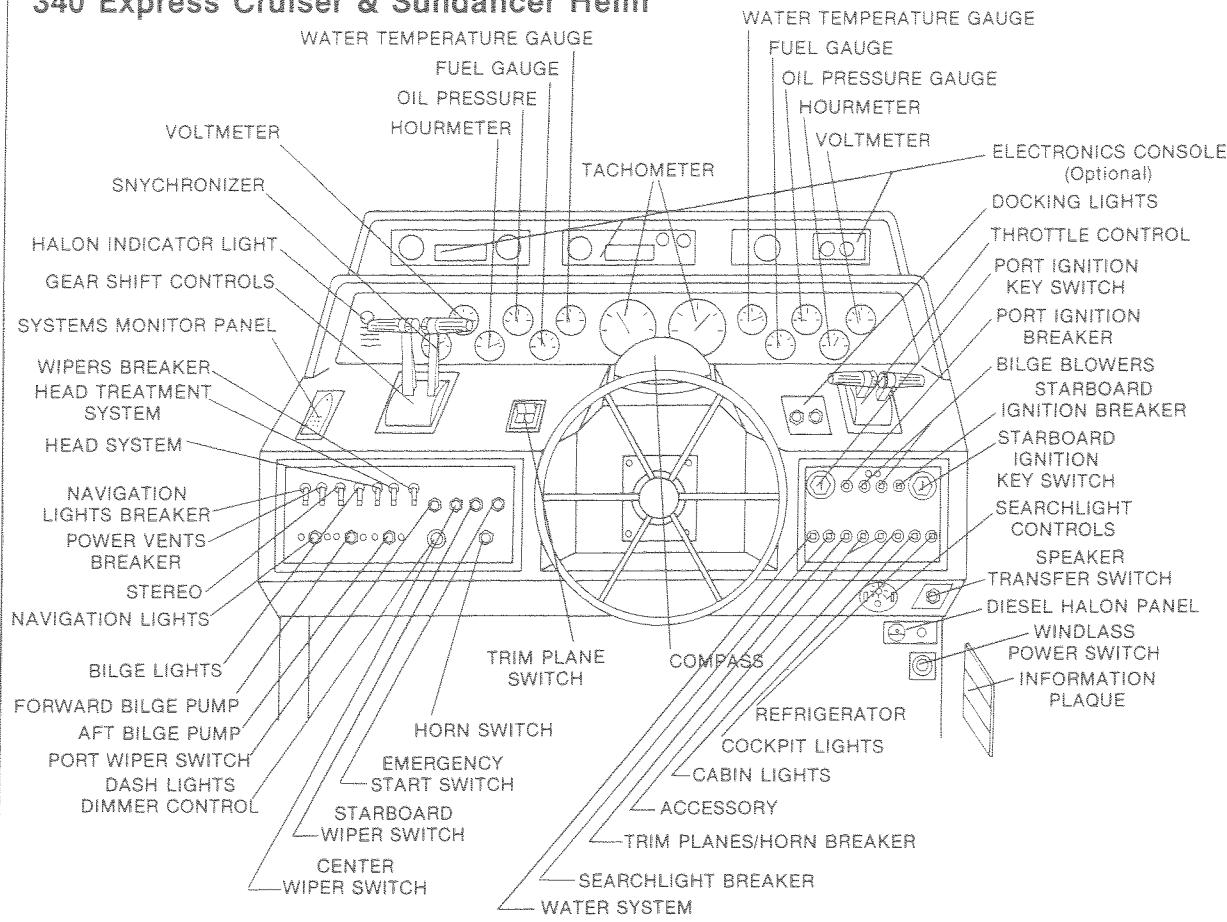
**CAUTION: CLOSE ALL SEACOCKS WHEN LEAVING BOAT FOR ANY LENGTH OF TIME.**

## **Seacock & Strainer**



# Instruments & Controls

## 340 Express Cruiser & Sundancer Helm



### MECHANICAL STEERING SYSTEM

A routine maintenance schedule should be set up for the mechanical steering system. Include a Normal Service for every 50 hours of operation or 60 days (whichever comes first); and a Severe Service (after operation in saltwater) every 25 hours of operation or 30 days (whichever comes first).

#### Service should include:

- Inspection of components and fasteners for wear and replacement of parts if worn.
- Lubrication of steering cable, by FULLY RETRACTING transom end of cable in to housing and applying Quicksilver 2-4-C Multi-Lube through the grease fitting.
- 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.

### HYDRAULIC STEERING SYSTEM

Hydraulic steering is standard on all 340 Express Cruiser and Sundancer models with optional autopilot. Periodic maintenance is suggested, by removing the plug in the helm and checking the oil level visually.

On boats with an upper and lower control station, the oil level must be checked and oil added at the upper station. The oil level should be within 1/2" of the filler hole. A bottle of Aircraft Oil HO-15 is included with the system.

#### Recommended Oils:

Seastar Hydraulic Oil by Teleflex  
Syten Hydraulic Oil by Teleflex  
Aircraft Oil HO-15 by Texaco

#### Acceptable Oils:

Univis J-43 by Exxon  
Spineastic 10 by Texaco  
Spindura 10 by Texaco  
Spindale B by Amoco  
E.P. Machine by Chevron  
Veedol Hydro Trans 60 by Getty

Velocite No. 6 by Mobil  
Gulf Spin 35 by Gulf  
Industron 34 by Standard/Boron

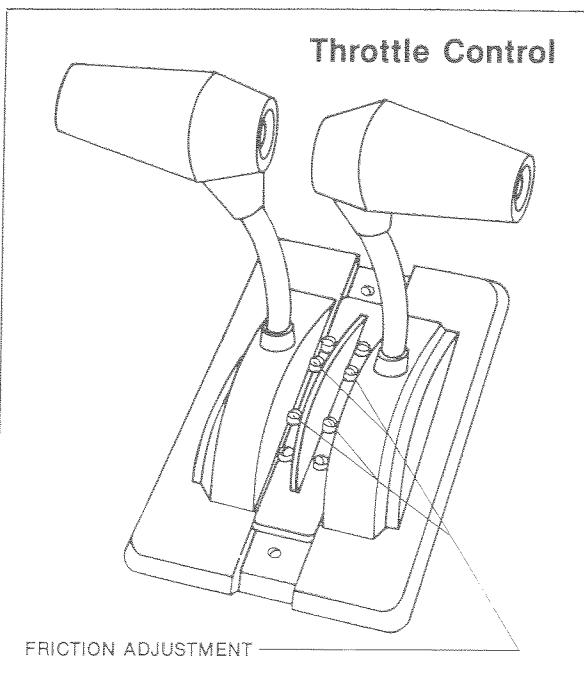
Periodically check mechanical connections and linkages at the cylinder. Replace worn parts, tighten loose parts and lubricate as needed. Seastar steering systems are protected against over-pressure situations by a pressure relief valve. Sometimes when returning the wheel from a hard-over position, a 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.

## **GEAR SHIFTS & THROTTLE CONTROLS**

The gear shift lever for each engine has three positions: forward, neutral (center), and reverse (aft). The control lever must be in the neutral (center) position when starting the engine. 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.

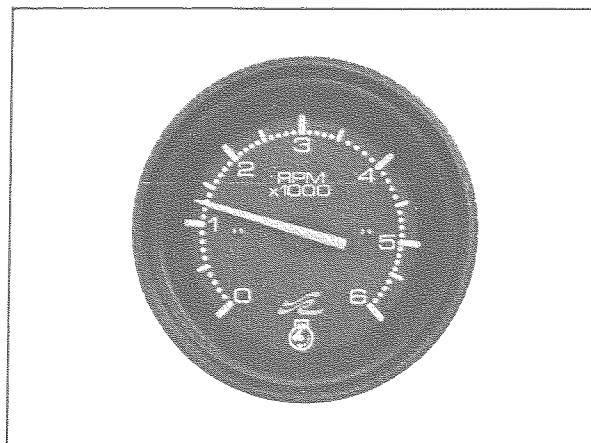
The throttle controls regulate the RPM of the engines. If they are extremely tight or extremely loose, the hand lever brake (friction adjustment) can be adjusted by first removing the phillips oval head screws securing the surface plate; using a flat head screwdriver, increase the tension by turning the screws shown on the upper plate clockwise; turn them counter-



clockwise to decrease tension. Periodically check and seasonally lubricate the linkages with a medium weight oil.

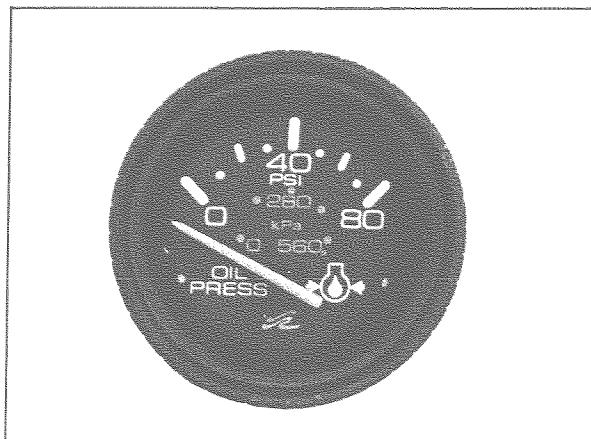
REFER TO OWNER'S PACKET.

## **TACHOMETER**



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.

## **OIL PRESSURE GAUGE**

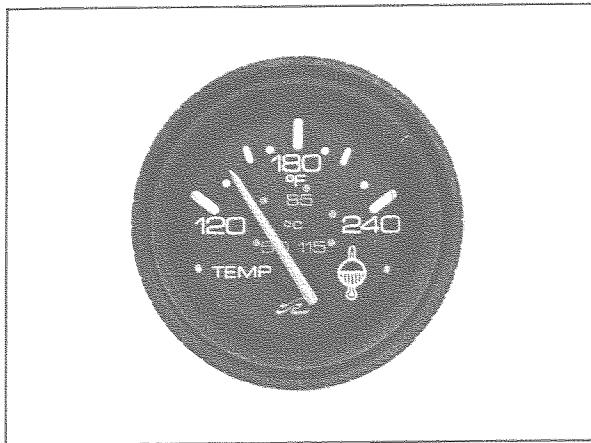


Very little serious trouble can occur in an engine which will not be reflected on the oil pressure indicator. Maximum pressure is controlled by a pre-set valve in the oil pump. Note the reading which this gauge records when the engine is new, as it is the "norm" which can be used as reference during 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 oil level. If low oil level is not the cause, consult your SEA RAY dealer. **DO NOT RESTART ENGINE UNTIL THE PROBLEM HAS BEEN CORRECTED.**

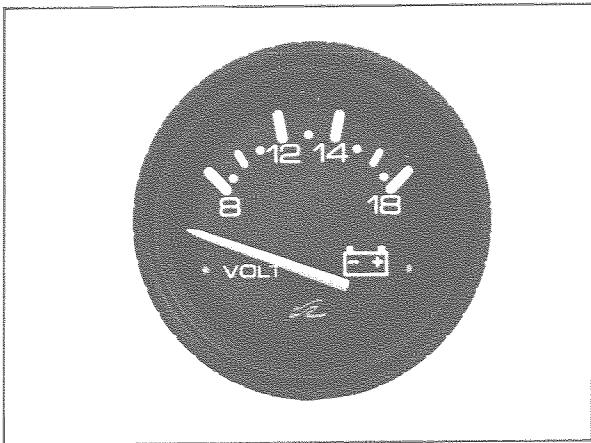
Slight fluctuations in gauge readings are not uncommon during operation and may be due to the characteristics of the lubricating oil. Greater fluctuations should be investigated. The cause may be a clogged oil filter element which should be replaced with every oil change.

### WATER TEMPERATURE GAUGE



The water temperature gauge indicates the cooling water temperature inside the engine. Marine engines draw external water, circulate it through the heat exchanger on the engine and expel it overboard through the exhaust system. Refer to your Engine Operator's Manual for proper gauge readings. **If temperature approaches above normal on your gauge, shut down engine at once.**

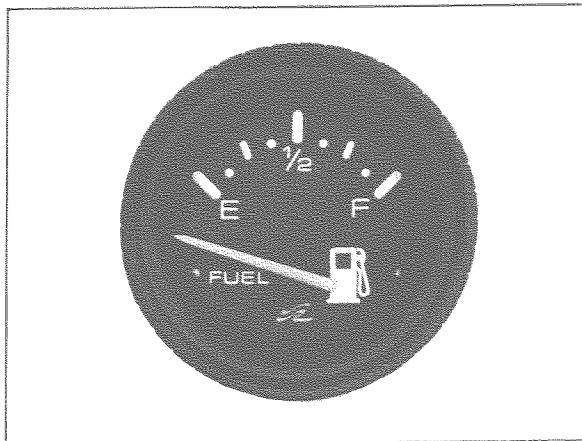
### VOLTMETER



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.

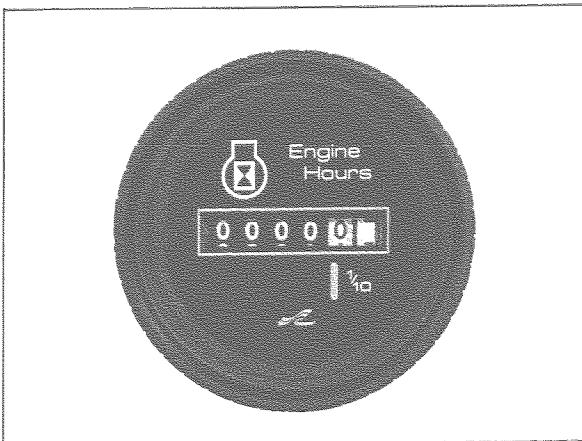
REFER TO YOUR ENGINE OPERATOR'S MANUAL FOR PROPER GAUGE READINGS.

### 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).

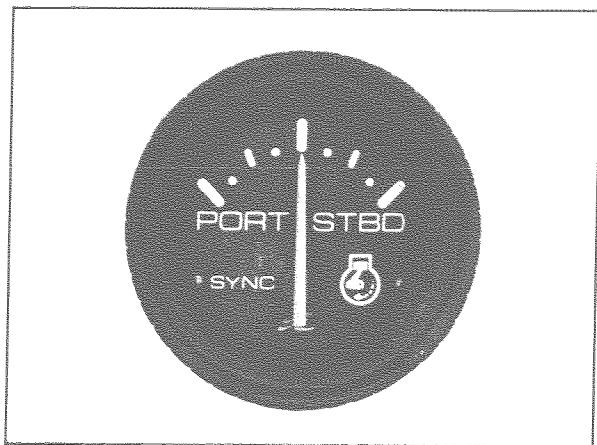
### HOUR METER



The hour meters measure 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 the ignition key on with the engines off, as this will increase the engine hours on the hour meter.

## SYNCHRONIZER



The synchronizer gauge indicates which engine is running slower by the needle registering 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 READINGS.**

## TRIM PLANES

The trim planes on your SEA RAY boat are operated with a rocker type momentary switch on the dash. They are protected by a 20 amp circuit breaker on the dash 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 the bottom halves of both rockers to obtain the desired planing angle.

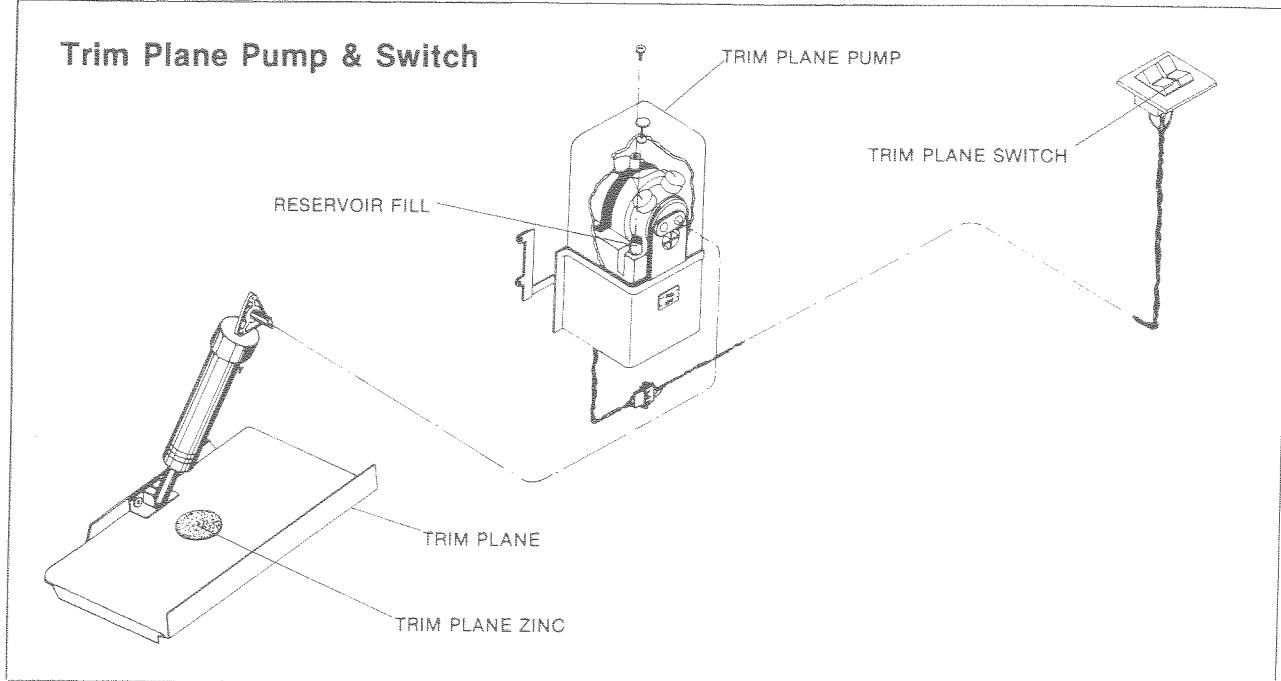
The two trim planes on the transom of your boat can also be used to trim the list of your boat that may be caused by improper storage of gear, too many people on one side or a strong crosswind. Operation of the rocker switch should be momentary short bursts to achieve proper attitude of the hull.

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. Access to the pump is through the aft cockpit hatch. To service the unit, remove the tinted plastic cover to gain access to the reservoir fill plug and motor parts.

### Trim Plane Pump & Switch



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

The hydraulic trim tabs 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.

## 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 deviation 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.

Your compass is equipped for night use with a 12 volt light that turns "ON" with the "NAVIGATION LIGHTS" breaker.

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.

## Fuel System

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.

### FUEL TANKS

Each of the two fuel tanks on board the Express Cruiser have a 126 gallon capacity for a total of 252 gallons and both are accessible through the cockpit hatches. The Sundancer's starboard fuel tank holds 82 gallons and the port fuel tank holds 90 gallons for a total 172 gallon capacity. These tanks can be reached by removing the aft berth bunk top.

Fuel fills are located on the port and starboard deck walkways. Access to the fill and vent hoses on board the Express Cruiser is gained by removing the lower aft cockpit panels, and by removing the access panels on the forward cockpit panels on the Sundancer.

The fuel pick-ups at the gasoline tanks have an anti-siphon device for safety in case of line failure. Boats with diesel engines have manual shut-off valves on the fuel tanks.

Your SEA RAY is equipped with a fuel tank vent which serves as a pressure/vacuum release and safety overflow. Periodically check the vent to assure that it is not clogged.



Fuel Vent With Screen

## **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 the 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.**

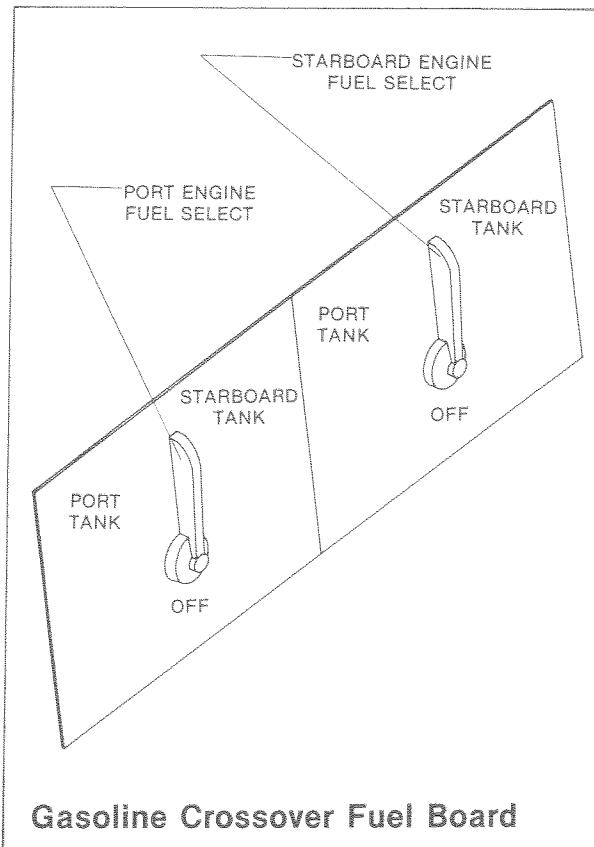
### **STANDARD FUEL SYSTEM**

In the standard fuel system, the port engine draws fuel off the port tank and the starboard engine draws off the starboard tank.

### **CROSSOVER FUEL SYSTEM**

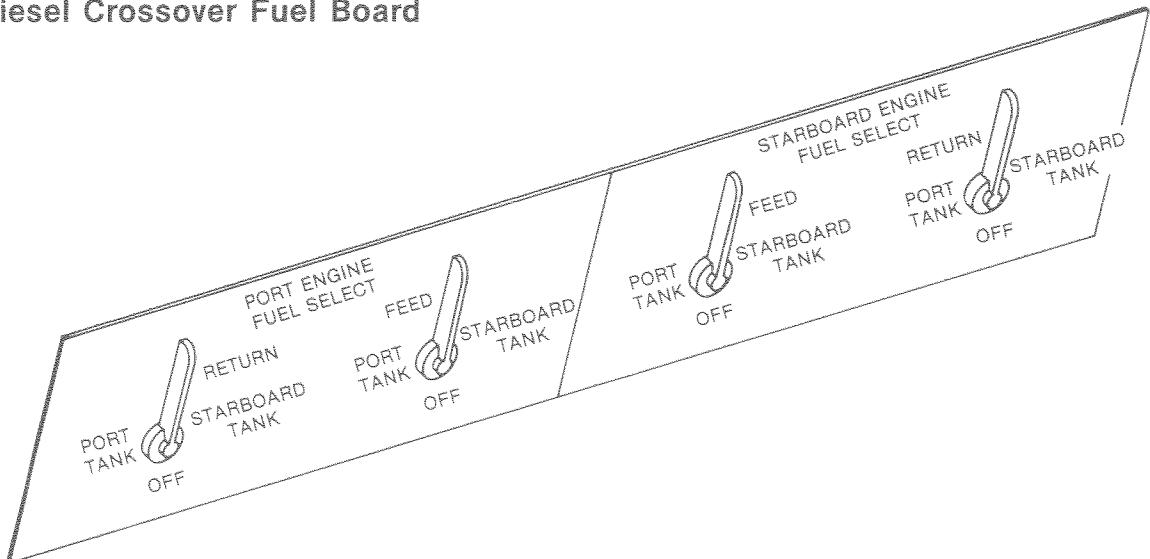
The crossover fuel system allows the generator and both engines to draw fuel from either tank.

This allows switching to an alternate tank in case of fuel contamination or for even fuel weight distribution. The fuel valves are located midship on the forward bilge bulkhead. With diesel engines, the feed and return lines to the same tank must be open.



**Gasoline Crossover Fuel Board**

### **Diesel Crossover Fuel Board**



## FUEL RECOMMENDATIONS

### **NOTICE GASOLINE RECOMMENDATIONS**

The use of any good grade regular leaded, premium, low-lead or lead-free automotive gasolines with a minimum posted octane rating of 86 are satisfactory for use in gasoline marine engines. Gasoline containing alcohol, either Methyl alcohol (Methanol) or Ethyl (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**

SEA RAY recommends the use of Shell Unleaded Gasoline for all gasoline engines used in SEA RAY boats.

Other gasolines acceptable for use are unleaded, alcohol free gasolines from Amoco Oil Co., Exxon, Marathon Petroleum Co., Mobil Oil Corp., Standard Oil and Texaco, Inc.

#### **Diesel Additives:**

"Racor" diesel fuel additive should be added to the fuel tanks on a monthly basis and when winterizing to help keep injectors, pumps, fuel tanks and lines free of gum, sludge and wax and to help cold weather starts. Use of any methanol, gasohol or alcohol based fuel additive will damage the fuel filter. It is highly recommended that you keep the fuel tanks full to reduce condensation.

**NOTE: IN ROUGH SEAS, ALLOW APPROXIMATELY 15% RESERVE WHEN PLANNING FUEL CONSUMPTION.**

## Fueling Precautions

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

#### **Before Fueling:**

- Make sure your boat is tied securely to the fueling pier.
- Turn off engines, 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.
- Open all windows, doors and hatches; turn on bilge blowers. Ventilate the boat for at least four minutes.
- Check for fuel fumes in the bilge; continue ventilation until odor can no longer be detected. Check for any drips or liquid fuel.

## Starting Engines

- (1) Check battery switches for "ON" position.
- (2) Check the fuel tank levels.
- (3) Check oil and coolant levels. See Engine Operator's Manual for proper readings.
- (4) Check engines for coolant drain plug installations.
- (5) Check seacock for open position.
- (6) Check fuel filter tops for tightness.
- (7) Check fuel valves.
- (8) Run bilge blowers at least four minutes. Check bilge for fuel fumes or liquid. Do not start engines until the source of fumes is determined and corrected and the bilge area is safely ventilated.

## WARNING

**GASOLINE VAPORS CAN EXPLODE**  
**BEFORE STARTING ENGINES:**  
• **CHECK ENGINE COMPARTMENT FOR GASOLINE VAPORS**  
• **OPERATE BLOWER FOR 4 MINUTES**  
**RUN BLOWER BELOW CRUISING SPEED**

- (9) Turn "IGNITION" breakers and keys on the main distribution panel "ON." (With diesel engines, the "HALON SYSTEM" breaker must be "ON.") Listen for alarm buzzers which indicate ignition power. With Mercruiser engines, there will be a few seconds delay before the buzzer sounds.
- (10) After ignition power is verified, check shift for neutral position and push momentary start switch up to start the engine. **Do not operate starter for more than 10 seconds without allowing the starter to cool off for 2 minutes.** This will also allow batteries to recover between starting attempts.

**Important:** Check engine RPM on tachometer as soon as engines start. Do not

allow RPM to exceed 1500. Move throttle levers down to decrease RPM.

- (11) Check oil pressure and look at exhaust port to assure that 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.

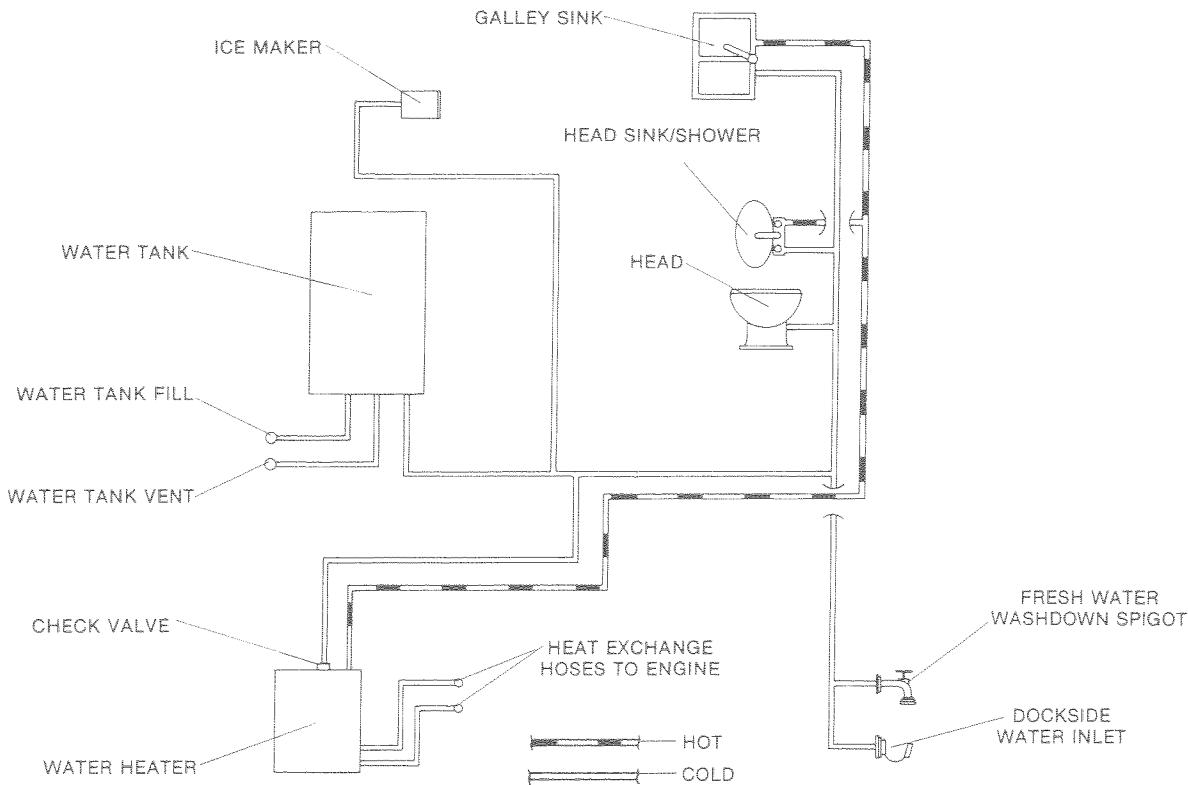
Move shift lever forward to shift into "FORWARD" gear or backward to shift into "REVERSE." Always shift gears with engine idling.

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

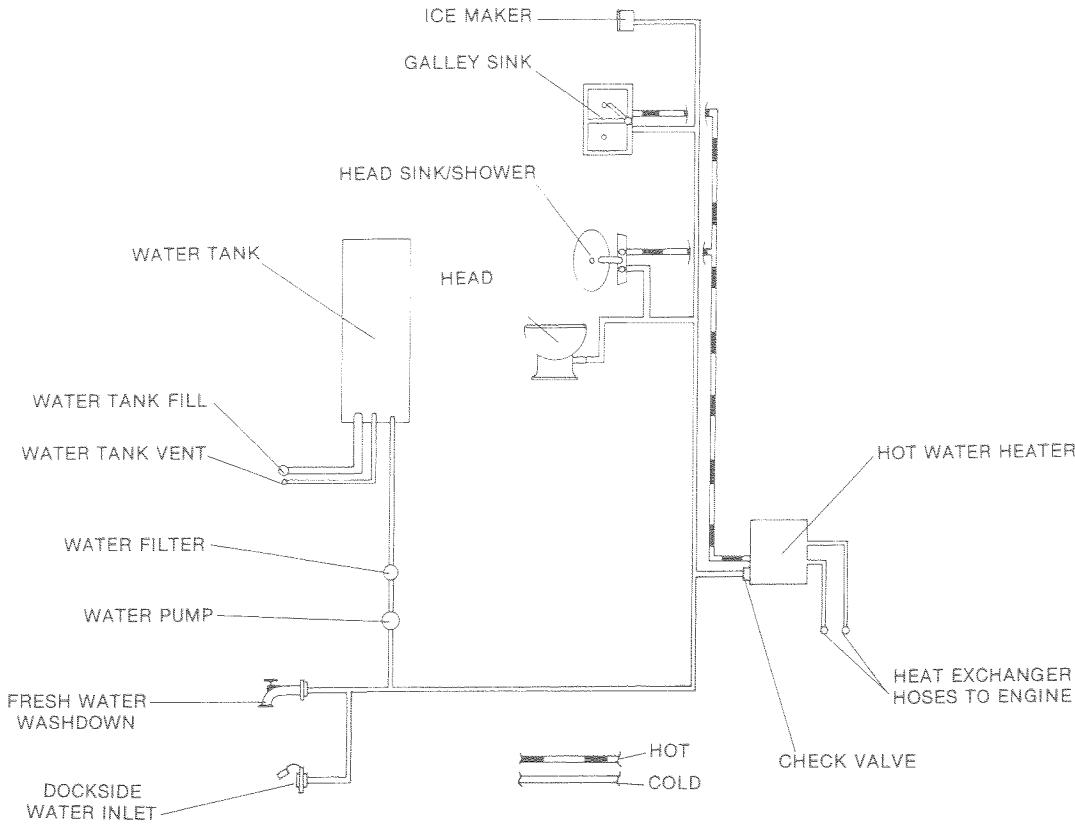
## Water Systems

The fresh water system is activated by a circuit breaker on the dash panel. The breaker must

### 340 Express Cruiser Water System



## 340 Sundancer Water Systems



be "ON" to operate head, shower, ice maker, fresh water wash down or faucets. To begin initial operation, fill tank with water and open all faucets, both hot and cold. Turn "WATER SYSTEM" breaker "ON." Allow time for the hot water heater to fill. Shut off each faucet as flow becomes steady and free of air. Shutting off the last faucet should cause the pump to shut off.

### WATER TANK

The water tank on the Express Cruiser has a 52 gallon capacity and is located below the center cabin floor. Access to the water tank is through the hatch beside the head door. The hatch is fastened down with screws at each corner. The water tank on the Sundancer model has a 50 gallon capacity and is located on the port side under the dinette seating. Access to the water tank is through a hatch under the aft dinette seat. The hatch is fastened down with screws at each corner. The water tanks are filled through the deck fill plate on the walkway of the Express Cruiser and Sundancer. Fill the tanks only from sources known to provide safe, pure drinking water.

To check the water level in the tanks, hold the water level switch on the main distribution panel toward "WATER LEVEL." The lights will indicate the amount of water in the tanks.

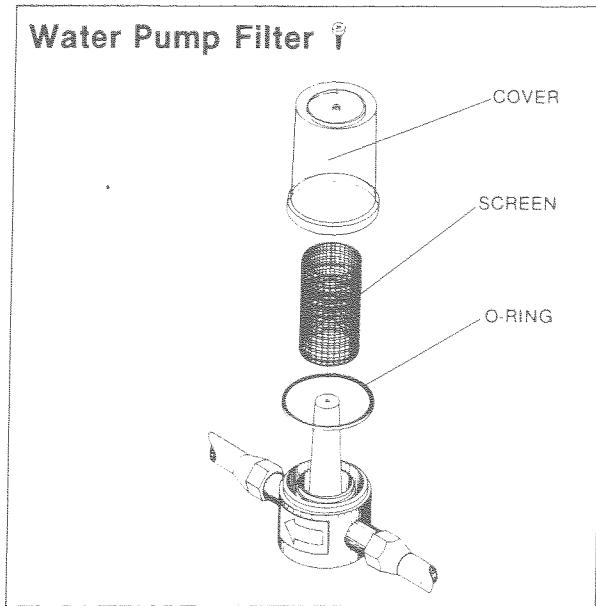
Although your dealer initially sanitizes the water system, if the system has not been used for a long period of time or you suspect it may be contaminated, adhere to the following procedure for complete sanitation of your potable water system.

- (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

The water pump for the fresh water system is located under the cabin steps. A filter prevents particles from entering the pumphead. It should be checked and cleaned periodically.

Before servicing the system, turn "OFF" the "WATER SYSTEM" breaker and release pressure on the system by opening faucets. To clean, remove the screw in the top of the filter case and remove the screen. Rinse the screen out with clean water. Make certain the "O" ring is in place when replacing the cover.



## WATER HEATER

The water heater has a 6-gallon capacity and runs on 120 volt dockside power or generator and also on the engine cooling water and has a 15 amp circuit breaker on the main distribution panel. The water heater has a check valve to prevent hot water from backwashing into the cold water source and a pressure relief valve to avoid damage to the heater from over pressure or too high a temperature. **Note: The thermostat is preset and is not adjustable.**

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) Fill the heater with water.
- (3) Open the hot water faucets until all air is eliminated from the system.
- (4) Make certain heater is full of water and the cold water inlet valve is open. **COMPLETE FAILURE OF THE HEATING ELEMENTS WILL RESULT IF THEY ARE NOT COMPLETELY IMMERSSED IN WATER AT ALL TIMES.**
- (5) Turn the "WATER HEATER" breaker "ON."

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.

## SHOWER SYSTEM

The shower is a hand-held unit that attaches to the head sink faucet. When not in use, it can be stored on the white peg in the aft outboard corner of the head or in the cabinet. On the Express Cruiser water from the shower drains into the forward bilge sump. On the Sundancer the water drains into the shower sump located in the aft berth companionway floor beneath the carpet. For access to the pump, grasp the nylon strap and pull the carpet back; then unscrew the white access plate. After using the shower, it is recommended that you run a gallon of clean water through the shower drain to clean out soap residue. A plastic roll-down shower curtain is provided to protect the door and prevent water seepage.

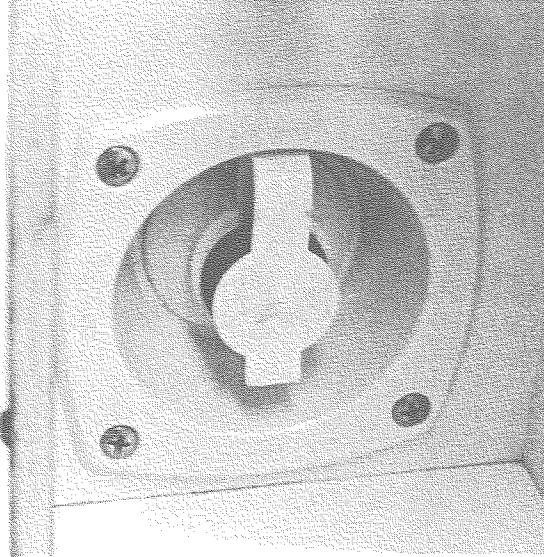
## FRESH WATER WASHDOWN

The freshwater washdown spigot is located on the aft end of the cockpit lower side panel, the port panel on the Sundancer, and the starboard panel on the Express Cruiser. The water for this system comes from the fresh water tank and the water system breaker on the dash panel must be on to operate it.

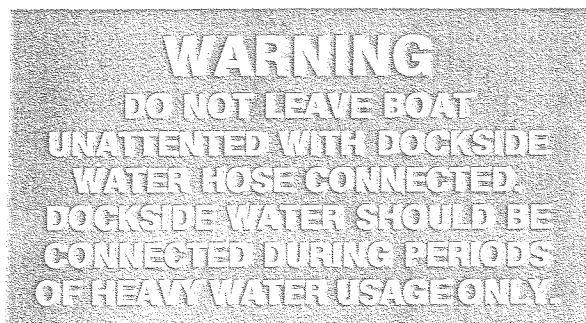
## DOCKSIDE WATER INLET

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

To use the system, first make sure the "WATER SYSTEM" breaker on the bilge distribution panel is "OFF." Remove the watertight plug from the face of the inlet and connect a drinking water hose. Connect the other end of the hose to the water spigot on the dock and turn the spigot on. All fresh water faucets and showers are now usable. To disconnect the system, reverse the procedure, making sure the watertight plug is reinstalled tightly.



Dockside Water Inlet



## Head Systems

### MANUAL FLUSH HEAD

To operate the manual flush head move valve lever to "WET BOWL" open position and

operate pump handle to pump water into bowl. Return valve lever to "DRY BOWL" closed position. To empty toilet bowl leave valve lever in "DRY BOWL" closed position and operate pump handle until bowl has been cleared.

### VACU-FLUSH HEAD

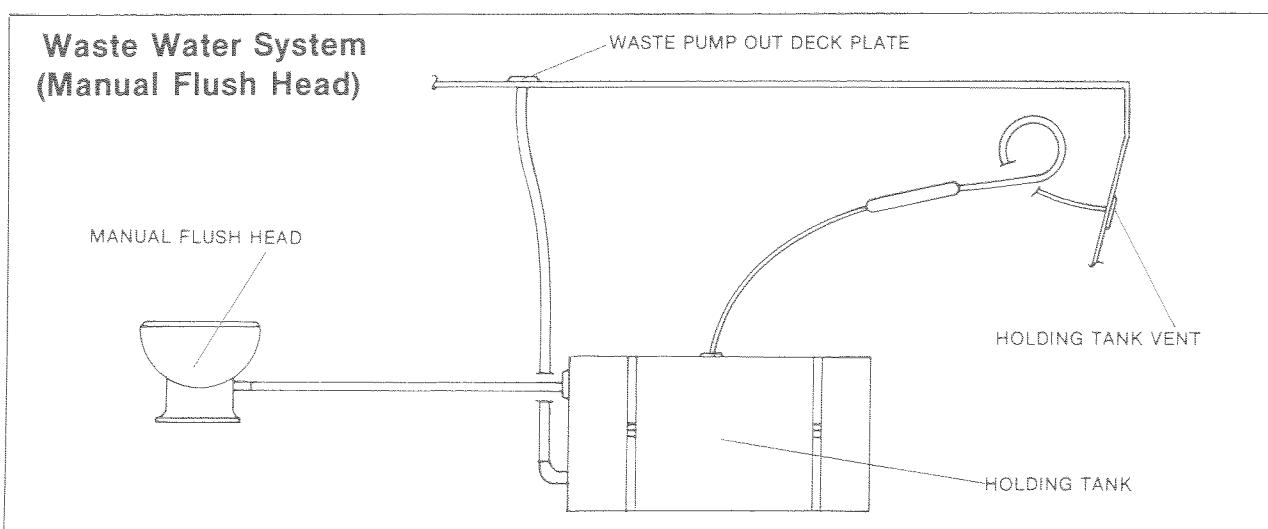
The Vacu-Flush head is available with a holding tank or the San X system and utilizes a 15 amp "HEAD SYSTEM" breaker on the main distribution panel. The foot pedal at the base of the toilet opens a mechanical seal and the vacuum forces waste through opening in the bowl to an accumulator tank, through the vacuum pump and then to the holding tank or treatment tank.

#### To Operate:

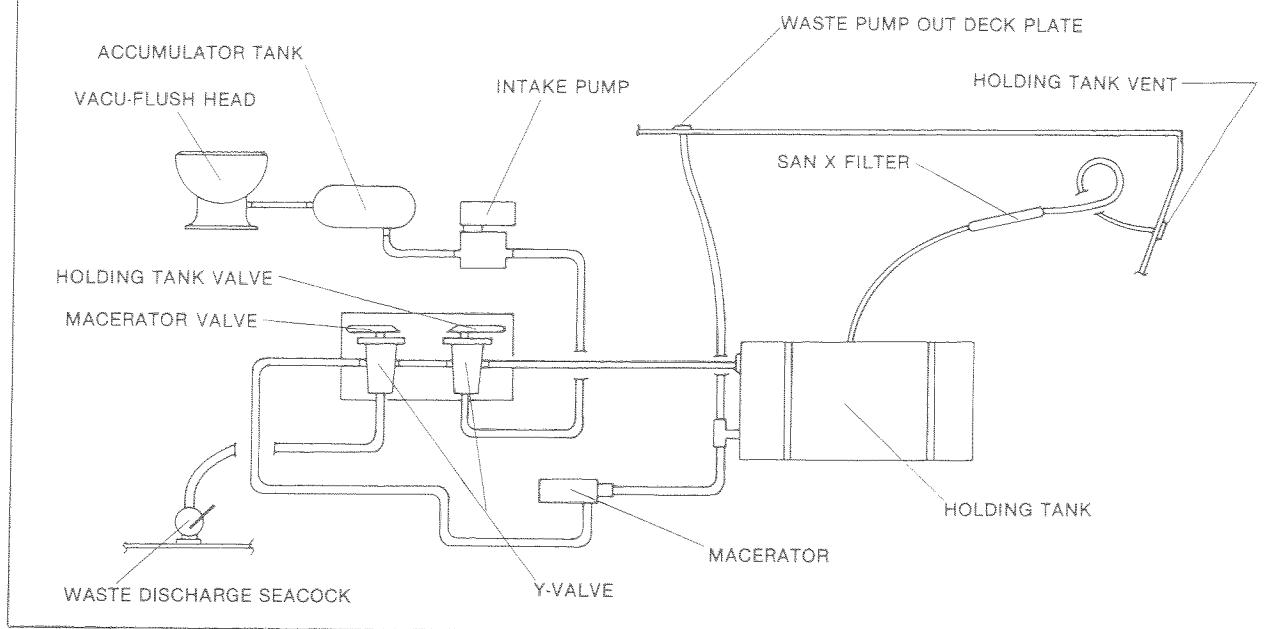
- (1) Turn "ON" the "WATER SYSTEM" breaker.
- (2) Turn "ON" the "HEAD SYSTEM" breaker and "TREATMENT SYSTEM" breaker if boat is equipped with San X treatment system.

### HOLDING TANK OPERATION

Waste from the head is directed into the holding tank located in the starboard side of the bilge. There is an indicator panel in the head indicating "3/4 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 the holding tank the services of a dockside waste pump out station will be needed. Follow instructions at station and make sure pumpout station hose is inserted into deck plate marked "WASTE."



## Vacu-Flush Head with Holding Tank & Overboard Discharge



## SAN X TREATMENT SYSTEM

The San X system utilizes a "HEAD" breaker and a "HOLDING TANK SYSTEM" breaker located on the main distribution panel and a relay box located behind the main distribution panel. There is an indicator panel in the head indicating "3/4 FULL," "FULL" and "DO NOT FLUSH." When the "FULL" light is on, the "DO NOT FLUSH" light will also be 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 "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.

### Treat and Hold:

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

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

### For Treatment Operation:

- (1) Turn the "TREATMENT SYSTEM" breaker "ON."
- (2) Select "TREAT AND HOLD" or "TREAT AND DISCHARGE" functions on the San X control panel.

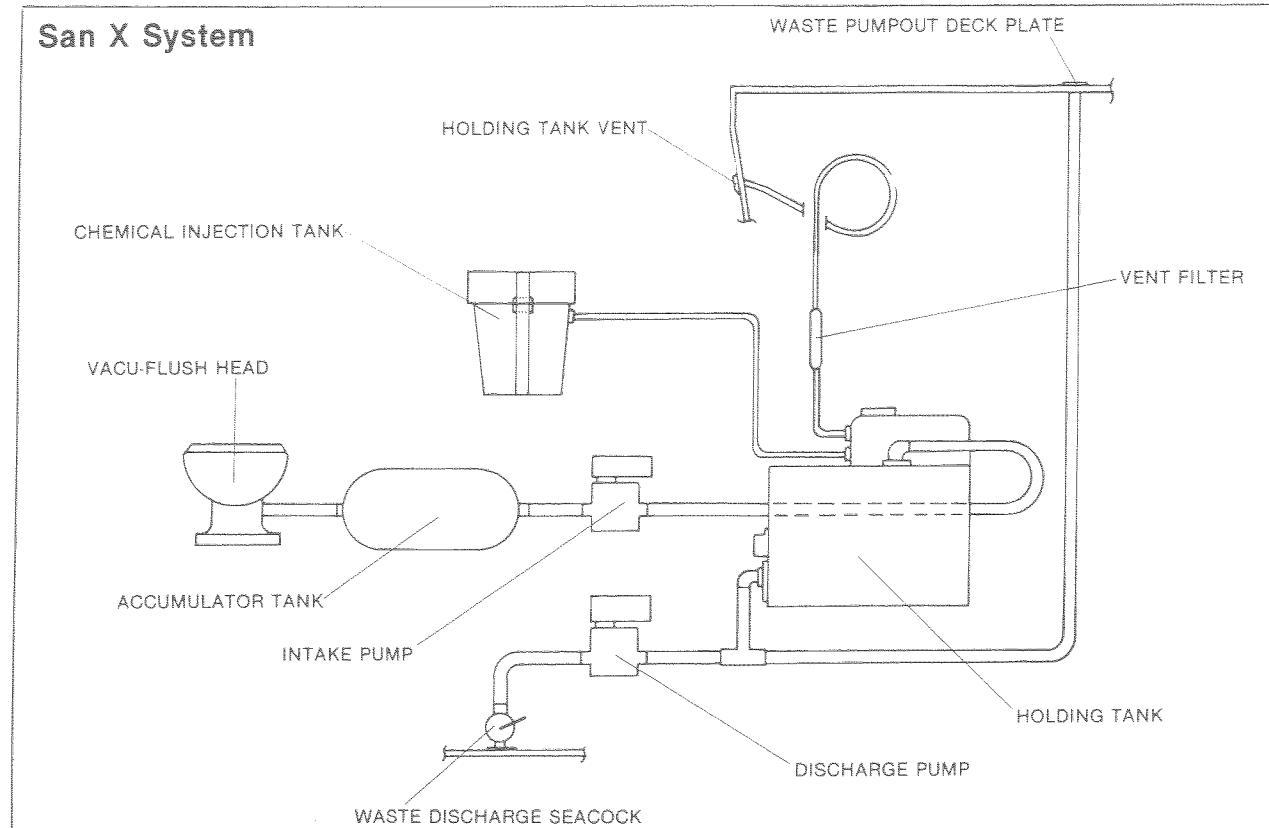
REFER TO OWNER'S PACKET.

## VENT FILTER

The vent filter is designed to control odors associated with head system operations. The filter must be changed at the beginning of each boating season to be effective. The filter is accessible through the center salon floor hatch opening to the bilge.

Note: Do not overfill the holding tank as this will flood the vent filter and render it useless. Filter replacement will then be required.

## San X System



### DIRECT OVERBOARD DISCHARGE (Overseas Only)

The direct overboard discharge Y-Valve allows waste to be directed to a holding/treatment tank to be pumped out at a later time or directly overboard. The Y-Valve is mounted in the aft starboard side of the bilge.

To direct waste to the holding/treatment tank turn the Y-Valve handle to the aft position. To direct waste overboard, open the overboard discharge seacock, located on the bilge floor just forward of the holding/treatment tank, then turn the overboard discharge valve to the forward position. **DISCHARGE OF SEWAGE DIRECTLY OVERBOARD IS FOR USE WHERE APPROVED ONLY.**

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

#### **Operation:**

- (1) To direct waste from head to holding tank, turn holding tank valve arrow to the left.
- (2) To direct waste from the holding tank through the macerator and then overboard, turn the macerator valve arrow to the right.

- (3) To direct waste from the head to directly overboard, turn holding tank valve arrow to the right and the macerator valve arrow to the left.

### MACERATOR OPTION

The purpose of the macerator is to give 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.

#### **To operate the macerator:**

- (1) Open the macerator seacock located on the aft starboard bilge floor.
- (2) Turn the key switch located in the head.
- (3) When tank is empty, close macerator seacock.

### ELECTRIC HEAD

#### (Overseas Only)

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 25 amp circuit breaker on the main distribution panel.

REFER TO OWNER'S PACKET.

## Sleeping Accommodations

To convert the dinette to a bunk, first remove the dinette table and support legs, then lift the seat up until you hear a "click," which will disengage the lock. To lay flat, fold down both parts. To return, raise the back until it is securely in place. The lock will automatically engage.

### 340 Sundancer:

To ready the bunk for sleeping in the aft berth, there is a spacer board in the companionway, below the cushion. Slide out the spacer board to fit into the track and place the small cushion into the space so the velcro on the spacer board holds the cushion in place.

**CAUTION:** Running engines with windows in aft berth and cabin doors open could induce exhaust fumes into cabin.



Dinette



Dinette W/Table Removed & Seat Bases Raised



Push Back On Seat Base Until You Hear A Click, Then Lower Base



Dinette In Sleeping Position

# Section 3

## ELECTRICAL SYSTEMS

### D.C. Systems

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 charge is indicated by the voltmeter on the dash panel. The batteries supply power through the circuit breakers in the bilge breaker boxes then to the dash and main distribution panel. The D.C. circuit breakers on the dash panels and main distribution panel have green indicator lights and operate all 12 volt accessories onboard.

The negative terminal of each bank of batteries is attached to the grounding studs of the propulsion engines and the 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 main distribution panel. 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 provided with your SEA RAY have been selected for their ability to furnish starting power based on engine starting requirements.

The batteries are sealed using an absorbed electrolyte principle and offer high reserve capacity and cold cranking performance. Other features of these batteries are no leakage or acid spills, no water addition, no corrosion and reduced damage caused by overcharge.

A low-voltage battery (9 volts rather than the nominal 12 volts) will not actuate the voltage regulator even though it might start the engine.

Consequently, the alternator cannot deliver a charge to the battery, and it will be necessary to have it recharged ashore.

**ALWAYS DISCONNECT BATTERY CABLES BEFORE DOING WORK ON THE ENGINE'S ELECTRICAL OR ALTERNATOR WIRING TO PREVENT SPARKING 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 cables, reverse the procedure.

Batteries in storage or idle for months at a time should be kept under trickle charge or should be fully charged once a month.

**Recheck battery terminals for tightness and never disconnect under load.**

**NEVER USE AN OPEN FLAME IN THE BATTERY STORAGE AREA.**

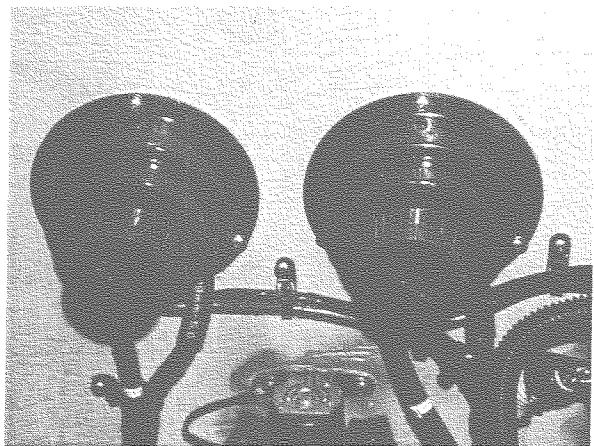
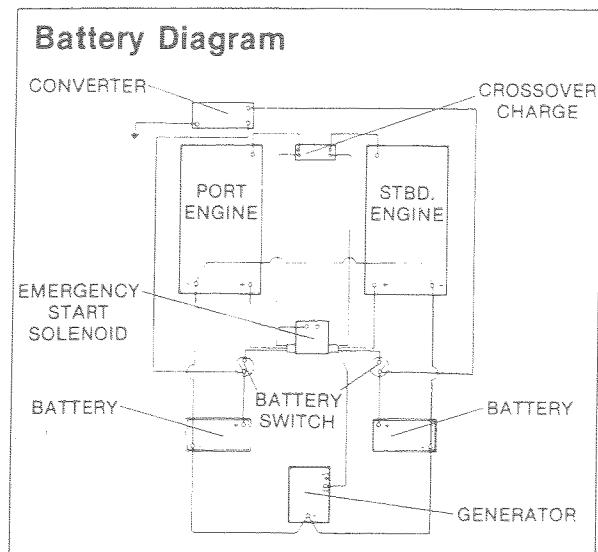
**AVOID STRIKING SPARKS AT TERMINALS.**

**REFER TO OWNER'S PACKET.**

### BATTERY SWITCHES

The 340 Express Cruiser battery switches are located on the mid-bilge liner support. The 340 Sundancer battery switches are located on the forward bilge bulkhead.

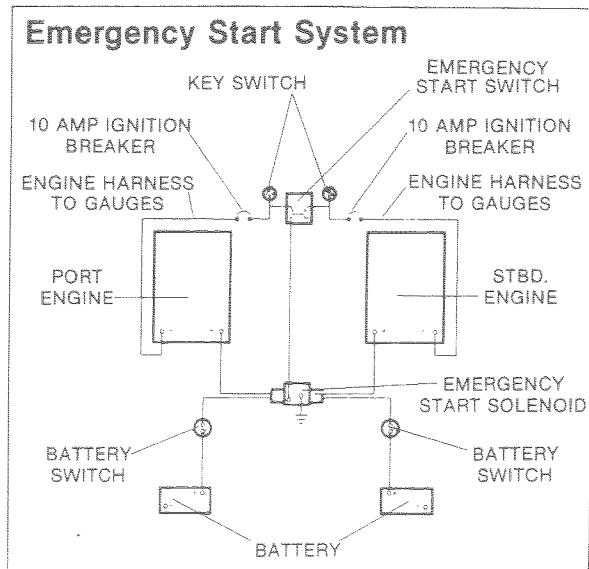
When switches are in the "OFF" position all 12 volt current to engines, generator and accessories is turned off except power to the bilge pumps. The battery switches must be "ON" to start the engines or generator. Turn battery switches "OFF" when leaving boat for extended time to save batteries. **CAUTION: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



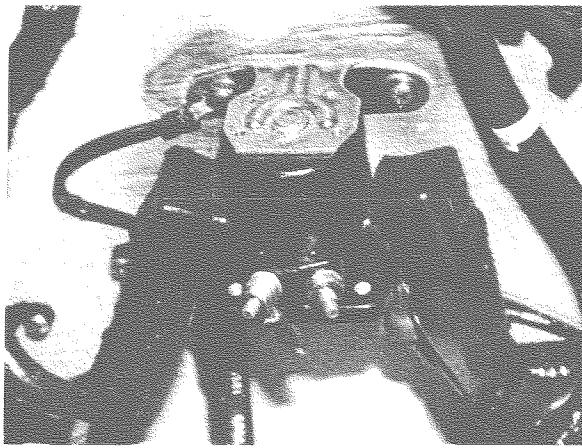
Battery Switches

## EMERGENCY START SYSTEM

The emergency start system utilizes a momentary toggle switch, located on the dash panel and as emergency start solenoid, located in the



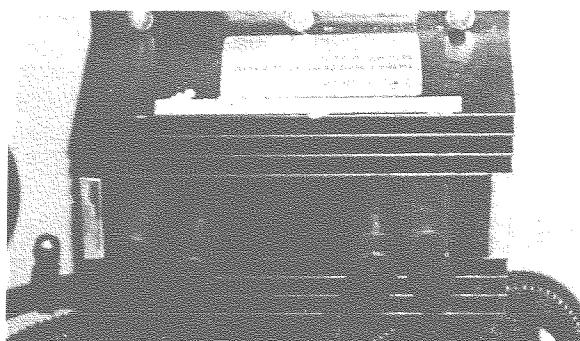
bilge. Holding the switch parallels the batteries to assist in starting. Use the emergency start when the charge of one bank of batteries is insufficient to start the corresponding engine. To engage emergency start system, start whichever engine has sufficient battery power, then hold emergency start switch while starting the other engine.



Emergency Start Solenoid

## CROSSOVER CHARGING SYSTEM

The crossover charging system utilizes a battery isolator unit with an electronic sensor to determine a low battery bank and send power to it from the engine alternators. It is an automatic system with no switches, and designed to charge both banks of batteries from both engine alternators, when necessary. The isolator is located behind the main distribution panel.

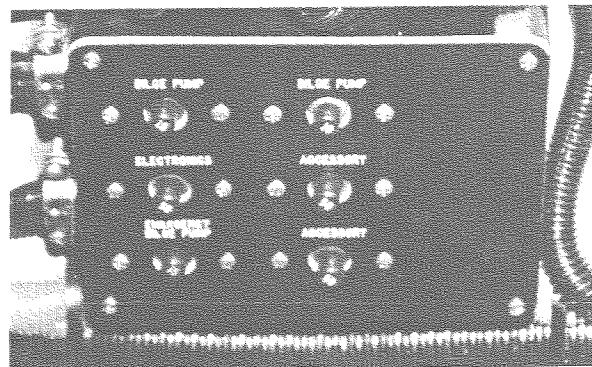


Crossover Charge Battery Isolator

## BILGE BREAKER BOX

The breaker box is located on the center liner brace under the center cockpit hatch on the Express Cruiser model and forward of the port engine on the Sundancer model. The Express Cruiser breaker box has three 50 amp breakers, two for accessories and one for electronics, and three 15 amp breakers for the bilge pumps.

The Sundancer model has three 50 amp breakers, two 15 amp for the bilge pumps and one 10 amp breaker for the shower sump pump (forward bilge pump).



Bilge Breaker Box

Operator's Manual for proper gauge readings or aid in finding and correcting the problem.

**Caution:** 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. **IF THE TRANSMISSION, OIL OR WATER LIGHTS AND ALARM COME ON WHILE RUNNING, QUICKLY CHECK AND NOTE THE OIL PRESSURE AND WATER TEMPERATURE GAUGES AND SYSTEMS MONITOR PANEL. TURN OFF ENGINE IMMEDIATELY.** Check for leaks and see if the cooling water pick-up is blocked or clogged. If necessary, clear the water pick-up of any foreign matter. **DO NOT RESTART THE ENGINE UNTIL CAUSE FOR ALARM SOUNDING HAS BEEN FOUND AND CORRECTED.**

## NAVIGATION LIGHTS

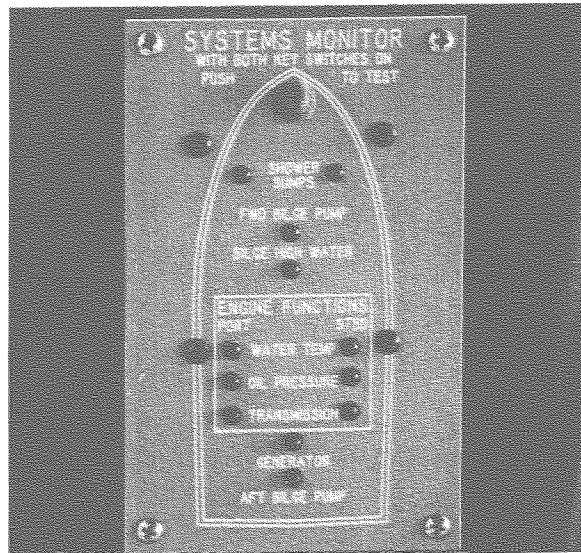
Navigation lights must be displayed while underway from sunset to sunrise. The term "underway" denotes not at anchor or dock. Trolling or drifting with power off is considered underway, and normal *running* lights must be displayed. At anchor, in open water, a 32-point white *anchor* light must be displayed.

To operate the "RUNNING" lights, push up on the "NAVIGATION LIGHTS" switch, to operate the "ANCHOR" lights, push down on the "NAVIGATION LIGHTS" switch.

## SYSTEMS MONITOR PANEL

The systems monitor panel, located on the helm, monitors the engines, transmissions, generator, bilge pumps, emergency high water bilge pump and shower sump pumps. It is equipped with a test button at the top of the panel to test the indicator lights and the engine alarm buzzer. Both "IGNITION" breakers must be "ON" to test the engine functions. The panel is protected by a 5 amp fuse installed inline behind the panel. The engines and generator are equipped with two alarm senders, water temperature and oil pressure which are connected to the alarm buzzer and indicator light on the systems monitor panel. Some engines have transmission temperature alarms that are also connected to the panel.

The warning buzzer and corresponding indicator light will be activated if the cooling system water temperature rises too high, engine oil pressure gets too low, or transmission temperature rises too high. Refer to the Engine



Systems Monitor Panel

LIGHT	INDICATES (WHEN LIT)
SHOWER PUMP	SUMP PUMP IS RUNNING
TRANSMISSION	TEMP. IS TOO HIGH
OIL	PRESSURE IS TOO LOW
WATER	ENGINE COOLING SYSTEM IS TOO HOT
BILGE HIGH WATER	EMERGENCY BILGE PUMP IS RUNNING
GENERATOR	GEN. HAS SHUT DOWN
FWD. BILGE PUMP	FWD. PUMP IS RUNNING
AFT BILGE PUMP	AFT PUMP IS RUNNING

It is recommended that the system be tested at least once every five hours of operation. To test the engine alarm, turn the key to the "ON" position (without cranking the engine).

In addition to the audible alarm system, your engines are equipped with mechanical gauges that indicate the engine oil pressure and water temperature.

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

## **ELECTRONICS CIRCUIT WITH GROUND PLATE**

The electronics circuit utilizes a 50 amp electronics breaker on the bilge breaker box to feed the fuse block terminal strip. The accessory breakers draw power from the terminal strip and each electronics unit will draw from the breaker and common grounding bar.

The 340 Express Cruiser electronics circuit fuse block is located behind the small helm kick panel door. The 340 Sundancer fuse block is located behind the starboard helm side panel access.

(To obtain circuit breakers and installation services consult your SEA RAY dealer.)

The circuit 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.**

## **WIRE COLOR CODE**

### **• Engine Harness**

16 AWG Blue, oil pressure sender  
16 AWG Blue/Tan, alarm sender  
16 AWG Gray, tachometer sender  
16 AWG Tan, temperature sender  
16 AWG Purple, ignition  
16 AWG Yellow/Red, start circuit  
10 AWG Red, engine hot  
10 AWG Black, engine ground

### **• Battery Wiring**

4/0 Red (Diesel), battery cable (positive)  
4/0 Black (Diesel), battery cable (negative)  
2/0 Red (Gas), battery cable (positive)  
2/0 Black (Gas), battery cable (negative)  
2 AWG Red, generator power (positive)  
2 AWG Black, generator ground (negative)

6 AWG Red, crossover charge  
16 AWG Red, emergency start  
10 AWG Red, ignition switch

### **• Westerbeke Generator**

10 AWG Red, power  
10 AWG Red/Violet, start  
10 AWG Green, preheat (Diesel Only)  
10 AWG White/Red, stop  
16 AWG Brown/Red, halon

### **• Mercruiser Quicksilver Generator**

16 AWG Red/Violet, power  
16 AWG Yellow/Red, start  
16 AWG Green, ground  
16 AWG White/Blue, preheat (Diesel Only)  
16 AWG Green/White, stop  
16 AWG Brown/Red, halon

### **• Halon System**

10 AWG Red, power  
16 AWG Green/White, ground (through switch on halon)  
16 AWG Purple, engine shutdown

### **• Bilge/Shower Pumps**

16 AWG Brown/Violet, auto mode  
16 AWG Brown, manual mode  
16 AWG Black, ground  
16 AWG White, bilge high water alarm

### **• Converter**

8 AWG Red, power  
8 AWG Black, ground  
14 AWG Black-romex, 120 AC hot  
14 AWG White-romex, 120 AC neutral  
14 AWG Green-romex, bonding system

### **• Converter Indicator**

16 AWG Orange, charge indicator positive

### **• Power Vents**

16 AWG Yellow, blower motor power  
16 AWG Black, ground

### **• Bilge Blowers**

14 AWG Yellow, blower motor power  
14 AWG Black, ground

### **• Water System**

16 AWG Brown/White, pumps  
16 AWG Black, ground; empty indicator light  
16 AWG Green, 2/3 level indicator light  
16 AWG White, 1/3 level indicator light

### **• Holding Tank System**

16 AWG Green, "FULL/DO NOT FLUSH"  
16 AWG White, "3/4 FULL"  
16 AWG Red, power

- San X System

10 AWG Red, discharge pump  
10 AWG Green, macerator  
10 AWG Black, ground  
16 AWG White, chemical pump  
16 AWG White/Blue, "FULL" indicator light  
16 AWG Yellow, "3/4" indicator light  
16 AWG Black, ground

- San X System Control

16 AWG Red, treat and hold  
16 AWG Black, treat and discharge  
16 AWG Orange/Black, power positive  
16 AWG Brown/White, power negative  
16 AWG White, power  
16 AWG Blue, "DO NOT FLUSH"  
16 AWG Green, "3/4 FULL"  
16 AWG Orange, "FULL"

- Trim Planes

10 AWG Red, power  
16 AWG Red, port valve  
16 AWG Green, starboard valve  
16 AWG Blue, pump pressure  
16 AWG Yellow, pump retract

- Spotlight

10 Red, power  
16 AWG Orange, high beam  
16 AWG Gray, low beam  
16 AWG Yellow, left  
16 AWG Green, down  
16 AWG Blue, right  
16 AWG Purple, up  
16 AWG Black, ground

- Horn

10 AWG Red, power  
10 AWG Black, ground

- Bilge Lights

16 AWG Blue, power  
16 AWG Black, ground

- Wipers

16 AWG Orange, wiper motor power  
16 AWG Black, ground

- Lights

16 AWG Gray, running lights & mast light  
16 AWG Gray/White, anchor light  
16 AWG Blue, cabin light circuits

- Stereo

16 AWG Brown, right speaker positive  
16 AWG White, right speaker negative  
16 AWG Yellow, left speaker positive  
16 AWG Green, left speaker negative  
16 AWG Red/Violet, power  
16 AWG Black, ground

## A.C. Systems

The A.C. electrical systems operate on the standard dockside 30 amp 120 volt, 60 cycle shore power system or the onboard generator. The main distribution panel is equipped with a slide lock switch to select the power source. The optional secondary 30-amp system is designed for use with the air conditioning system. It alleviates a major portion of the load on the standard 30-amp dockside system and allows more options to be used at the same time. The system includes a 50-foot shore power cord, a 30-amp main breaker and a 30-amp air conditioner breaker.

**CAUTION: THE TOTAL USAGE OF OPTIONS WILL DEPEND ON THE AMP OUTPUT OF THE POWER SOURCE AVAILABLE.**

The system circuit breakers are equipped with amber indicator lights on the main distribution panel. The line voltage from the generator or shore power is shown by the voltmeter on the main distribution panel. The ammeters indicate the amperes being drawn through the circuit breakers.

**CAUTION: NEVER OPERATE SHORE POWER AT LESS THAN 105 VOLTS.**

The wiring installed on SEA RAY boats consists of three color-coded wires. The black wire is the "hot" feed, the white is the common, or neutral, and the green wire is the ground. All distribution breakers and switches for A.C. equipment are installed on the "hot" wire. A circuit breaker is placed on both the white neutral feed and the hot feed wire from shore power inlets. The green conductor of the shore power is connected to the ground buss bar behind the main distribution panel. The main breaker will trip if there is 1) a reversed shore power connection, 2) a surge in line voltage, or 3) an onboard system overload. The main breaker protects the A.C. circuit from damage and should be checked after storms and surges.

### Shore Power Hook-Up:

- (1) Make sure the "MAIN" breaker and all "A.C." breakers on the main distribution panel are "OFF."
- (2) Plug the shore power cord into the inlet on the side of the deck; turn clockwise to lock. Thread the black locking ring on the inlet to secure the cable and prevent accidental unplugging.
- (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 "REVERSED" lights are on, check the dockside power for a reversed connection or reversed wiring.
  - (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."

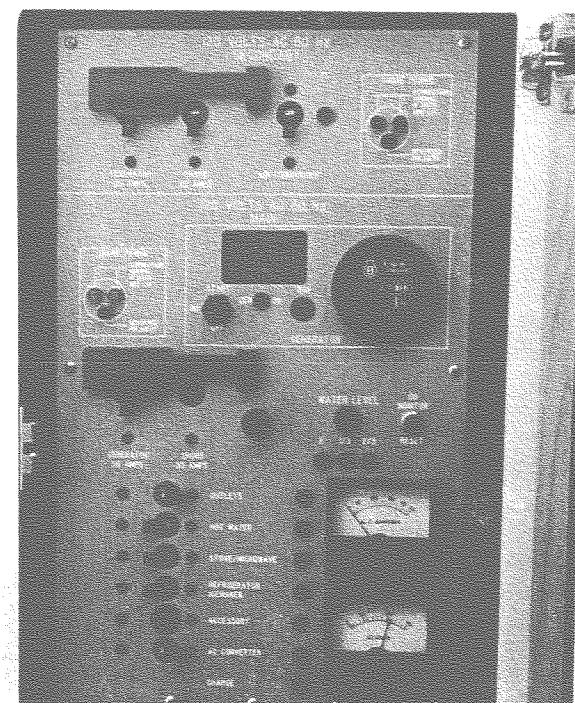
## Maintenance for Shore Power Cable Set & Shore Power Inlets:

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.

**WARNING: DISCONNECT THE POWER CABLE FROM POWER SOURCE BEFORE PERFORMING MAINTENANCE.**



## Main Distribution Panel

## Servicing The Main Distribution Panel:

To replace a breaker or indicator light in the main distribution panel:

- (1) Turn all breakers "OFF."
  - (2) Make sure the generator is "OFF."
  - (3) Unplug the shore power.
  - (4) Remove the screws from the top and sides of the panel. The main distribution panel is hinged on the bottom to swing open for servicing.

Reverse the procedure for closing the panel.

CONVERTER

The A.C. to D.C. converter is fully automatic, utilizing all solid state components to maintain the 12 volt system on board. The converter is self-regulating and self-adjusting. The unit will supply power to operate 12 volt accessories as well as charge the banks of batteries. The maximum capacity of the converter is 30 amps.

The converter operates on 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. An indicator panel is located beside the main distribution panel. The only switch for the unit is the circuit breaker located on the main distribution panel.

**NOTE:** Leave the converter running at all times to maintain the 12 volt system.

**WARNING: NEVER BLOCK AIR CIRCULATION  
THROUGH UNIT. NEVER STORE ANY GEAR  
ON TOP OF THE UNIT.**

REFER TO OWNER'S PACKET.

## **GROUND FAULT INTERRUPTER OUTLET**

The ground fault interrupter outlet (GFI) is located in the head, inside the medicine cabinet. It is equipped with a test and reset switch in the center of the face plate. All 120 volt outlets and 120 volt lighting are protected by the outlet.

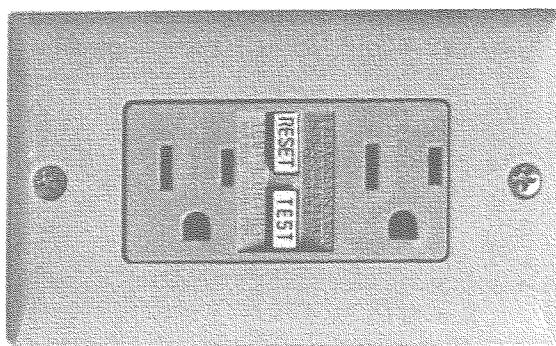
The receptacle employs a ground-fault circuit interrupter to provide protection against the hazards of ground-fault currents that can cause

loss of life. An example of ground-fault current is the current which would flow through a person who is using an appliance with faulty insulation and at the same time, is in contact with an electrical ground such as a plumbing fixture, wet floor or earth.

If, for example, the electric razor you are using gets wet, the breaker will automatically trip to avoid electrical shock. To reset, push switch marked "RESET." The outlet should be checked periodically by pushing the test button on the outlet itself. When this is done, there should be no power in the outlet or 120 volt lights.

**THE GROUND-FAULT RECEPTACLE WILL NOT PROTECT AGAINST SHORT CIRCUITS OR OVERLOADS.** The circuit breaker in the electrical panel which supplies power to the circuit provides that protection.

**CAUTION: EVEN WITH THE PROTECTION OF THE GFI OUTLET, AN ELECTRICAL SHOCK MAY OCCUR, SUCH SHOCK WILL BE OF LESS THAN NORMALLY DANGEROUS DURATION.**



GFI Outlet

## Generators

Your Generator Owner's Manual can be found in the Owner's Packet on board your SEA RAY. We suggest the reading of this manual to familiarize yourself with the operation of your generator.

### AMP DRAW OF ACCESSORIES

REFRIGERATOR FREEZER (120 V)	8.0 amps
ICE MAKER (120 V)	4.2 amps
RANGE (120 V)	17.9 amps
MICROWAVE (120 V)	11.0 amps
CONVERTER (120 V)	3.0 amps

WATER HEATER (120 V)	13.6 amps
AIR CONDITIONER (120 V)	
HEAT (Full Load)	18.0 amps
COOL (Full Load)	16.0 amps
COMPRESSOR	2.9 amps
AIR CONDITIONER PUMP	2.0 amps

### STARTING THE GENERATOR

**NOTE: PRE-START THE GENERATOR PRIOR TO GETTING UNDERWAY AS THERE IS A POSSIBILITY IT WILL NOT PICK UP WATER IF STARTED UNDERWAY. MAKE SURE "MAIN GENERATOR" BREAKER IS "OFF" AND THERE IS NO LOAD ON THE GENERATOR BEFORE STARTING IT.**

**To start Generator: (Switches located at the main distribution panel or on the generator set.)**

- (1) Open the generator seacock.
- (2) With diesel generators, turn the "HALON" breaker "ON."
- (3) Run the bilge blowers for at least four minutes before starting and any time the generator is running.
- (4) With diesel 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.
- (5) Hold the momentary starter switch "ON" to activate the starter motor on the generator.
- (6) As soon as the generator set starts, release the switch.
- (7) Load the generator by turning the individual equipment breakers "ON."

#### **Stopping:**

- (1) After load is removed from the generator set, let it run a few minutes to cool.
- (2) Stop the generator set by holding the momentary stop switch.

**CAUTION: DO NOT RUN THE GENERATOR OR ENGINES IN AN ENCLOSED AREA, SUCH AS A CLOSED BOAT HOUSE, AS THERE IS THE POSSIBILITY OF INHALING EXHAUST FUMES AND THE BUILD UP OF CARBON MONOXIDE.**

#### To shift from shore power to generator power:

- (1) Turn all A.C. systems "OFF."
- (2) Start the generator.
- (3) Slide the shuttle mechanism on the main distribution panel to expose the "GENERATOR" breaker and turn it to the "ON" position.
- (4) Turn individual breakers "ON."

REFER TO OWNER'S PACKET.

#### CARBON MONOXIDE MONITOR

The carbon monoxide (CO) monitor is an electronic instrument that detects CO. When a potential hazard exists the monitor will alert the helmsman by a flashing "Health Hazard" light and alarm.

The monitor is mounted in the cabin and operates on a 1 amp fuse located on the main distribution panel. The monitor is on any time the battery switch is on.

It is extremely important that you become totally familiar with your CO monitor and its functions. SEE THE OWNER'S HANDBOOK 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.

Zinc plates are installed to protect underwater hardware. Zinc, being much less "noble" than copper based alloys used in SEA RAY underwater fittings, will deteriorate first and protect the more noble parts. Do not install more than one zinc bar at a time as an excess of zinc will only increase its rate of deterioration without adding protection.

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 zincks 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 blocker is standard on all SEA RAY boats. It is installed at the A.C. ground 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.

## LIGHTS

AREA	TYPE	LOCATION	VOLTS	BREAKER	BULB
V-BERTH	DOUBLE DOME	OVERHEAD	12	CABIN	#1141
	FLUORESCENT	ABOVE ROPE LOCKER DOOR	12	CABIN	F8T5D
	SWIVEL	ON GUNWALE CABINETS	12	CABIN	25 W
	STEP	ON BUNK BASE	12	CABIN	#53
	COURTESY LT.	HANGING LOCKER	12	CABIN	#1891
HEAD	DOUBLE DOME	OVERHEAD	12	CABIN	#1141
GALLEY	SWIVEL	ABOVE GALLEY	12	CABIN	#93
DINETTE	SWIVEL	DINETTE	12	CABIN	25 W
	STEP	ON STEP	12	COCKPIT	#53
	STEP	INSIDE LIQUOR CABINET	12	COCKPIT	#53
	COURTESY LT.	HANGING LOCKER**	12	CABIN	#1891
AFT BERTH**	SWIVEL	ABOVE BUNK	12	CABIN	25 W
COCKPIT	SINGLE DOME	UNDER SIDE STORAGES	12	COCKPIT	#90
BILGE	SINGLE DOME	BILGE	12	ACCESSORY	#1141
MAST LIGHT			12	NAV. LIGHTS	Fig. 71*
RUNNING LIGHTS			12	NAV. LIGHTS	#90
COMPASS LIGHT			12	NAV. LIGHTS	#330
TRANSOM LIGHT			12	NAV. LIGHTS	#212-2

\* Manufactured by "Perko"      \*\* Sundancer only

# Section 4

## ACCESORIES

### Air Conditioner

remove the filter for cleaning, pull out the grill and slide the filter out. Wash in warm soapy water. Air dry before replacing. Clean filter once a month.

The air conditioning/heating system operates on the secondary 120 volt system on the main distribution panel. The secondary 120 volt system consists of a secondary shore power connection on the deck of the boat, a secondary slide lock breaker on the main distribution panel selecting "SHORE" or "GENERATOR" power, an air conditioner breaker and shore power polarity lights.

#### Express Cruiser

The A/C system consists of a 12,000 BTU unit, raw water pump, water strainer and seacock. The "AIR CONDITIONER" breaker must be "ON" to use the system.

The A/C unit is located below the aft outboard end of the gallery. The A/C controls are located in the upper outboard aft galley cabinet.

The water pump, strainer and seacock are located aft of the starboard engine.

The water condensation drains into the forward bilge sump.

#### Sundancer

The A/C system consists of a 16,000 BTU unit, raw water pump, water strainer and seacock. The "AIR CONDITIONER" breaker must be "ON" to use the system.

The A/C unit is located below the forward dinette seat base. The A/C controls are located in the upper forward dinette cabinet.

The water pump, strainer and seacock are located on the port aft side of the port engine.

The water condensation drains into the mid berth floor sump.

#### Express Cruiser & Sundancer

Each unit's air filter is located behind the metal grill adjacent to the A/C unit. **CAUTION: AIR CONDITIONER RETURN AIR GRILL SHOULD NOT BE OBSTRUCTED FOR ANY REASON.** To

remove the filter for cleaning, pull out the grill and slide the filter out. Wash in warm soapy water. Air dry before replacing. Clean filter once a month.

The system is cooled to maintain optimal operating temperature by the raw water pump. The pump draws water through the seacock in the bilge and filters it through the sea water strainer adjacent to the pump. (The sea water strainer should be inspected frequently and cleaned out when plugged. To clean strainer, see section titled "Seaocks and Strainers" in "Introduction To Your Boat.") The water passes through the air conditioning/heating unit, then flows overboard.

#### To start unit:

- (1) Make sure the seacock for the cooling pump is open.
- (2) Set the control knob on the air conditioner control switch assembly to "OFF."
- (3) Turn the "SECONDARY MAIN CIRCUIT" breaker on the main distribution panel to "ON."
- (4) Turn the "AIR CONDITIONER" breaker "ON."
- (5) Turn the control knob to "START." This will start the cooling fan only. The sea water pump will cycle on and off with the compressor.
- (6) Turn the control knob to "RUN" to activate the compressor to start heating or cooling. (Note: Reversed cycle operation is effected by the water temperature that is cycled through the equipment. Thus, as the water temperature is reduced, so is the capacity of the output of warm air.)
- (7) Turn the thermostat clockwise for cooling or counterclockwise for heating.
- (8) Set the fan speed to high.
- (9) To set thermostat, allow unit to run until the boat is at the desired temperature, then turn the thermostat knob toward the center position on the switch until the first

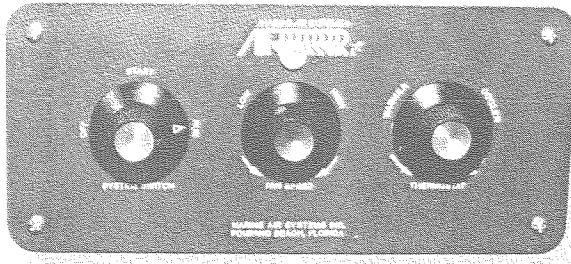
click; now the air conditioning unit will maintain a constant temperature.

(10) Fan speed:

Heat cycle - run at low speed for first 5 to 15 minutes then switch to medium speed.

Cool cycle - set to desired speed.

REFER TO OWNER'S PACKET.



Air Conditioner Control

## Canvas

### CANVAS CARE & MAINTENANCE

Brush the canvas with a soft-bristled brush and hose down at regular intervals to remove dust and dirt particles. It may be washed in a mild solution of Lux or Ivory soap and Borateem in lukewarm water (no more than 100°F). Rinse thoroughly to remove soap. **Do not use detergents.**

For more stubborn cases, soak the canvas in a solution of 1/2 cup (4 oz.) Clorox, 1/2 cup (4 oz.) Ivory soap and one gallon warm water, for about 20 minutes. Rinse with cold water to remove all soap. **Note:** This method may remove part of the water repellence, so apply a water repellent treatment as necessary.

The canvas may be washed in an automatic washer on the "COLD" cycle using 2 cups Clorox and 1 cup Ivory flakes. **DO NOT DRY IN A DRYER - ALLOW CANVAS TO LINE DRY ONLY.** The fabric is 100% acrylic and it will shrink. Canvas may be dry cleaned, but a water repellent treatment will then be necessary.

#### 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.

## HATCH COVERS

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

## CONVERTIBLE TOP & BOOT

The convertible top installs over the cockpit seating area in the Express Cruiser and Sun-dancer and rolls up on the aft support when not in use. The two middle bow straps adjust to put tension on the middle bows. 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.

## SIDE CURTAINS

The transparent vinyl side curtains snap to the side of the windshield frame and zip to the underside of the 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.**

## AFT CURTAIN

The aft curtain may be used while underway or as a storage cover.

#### Installation Procedure:

- (1) Zip aft cover to zipper track on canvas top approximately 6 inches on both sides of center.
- (2) Snap center snap at transom teak deck plate.
- (3) Snap all snaps along either side up to side curtain.
- (4) Zip up side curtain and aft cover.
- (5) Snap all snaps along other side up to side curtain.
- (6) Zip up side curtain and aft cover.
- (7) Zip up aft cover completely.

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

## Can Opener

The recessed can opener automatically pierces the can and starts cutting when you push the lever on the right to "OPEN." After starting the can opener, let go of the lever and it will automatically stop when the can is open. To replace or clean the cutter blade, first lift out the magnet support arm, then slide out the cutter blade. Wash cutter assembly in hot, soapy water and dry.

### To remove the can opener:

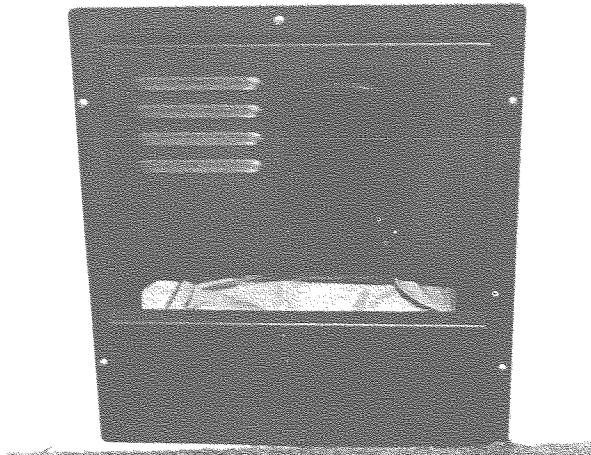
- (1) Make sure the "GALLEY FUNCTION" breaker is "OFF."
- (2) Grasp front of can opener and pull out.
- (3) Unplug can opener.

REFER TO OWNER'S PACKET.

## Central Vacuum System

The central vacuum system is a 120 volt unit located on the port V-berth hanging locker. It is wired to the 20 amp starboard "LIGHTING" breaker on the main distribution panel, which must be "ON" to operate the system. The 24 foot hose connects to the inlet on the central vacuum system. The disposable bag is located behind the bottom panel on the central vacuum unit. The built in switch on the hose inlet fitting activates the vacuum when the hose connector is plugged in.

REFER TO OWNER'S PACKET.



Central Vacuum System (Bottom Panel Open Showing Disposable Bay)

## Coffee Maker

The drip coffee maker operates off the 120 volt system and is protected by the 20 amp port "LIGHTING" 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.

### To remove the coffee maker:

- (1) Make sure the "GALLEY FUNCTION" breaker is "OFF."
- (2) Remove the carafe and water reservoir.
- (3) Remove the screws going through the right and left sides.
- (4) Pull out coffee maker.
- (5) Unplug the coffee maker.

REFER TO OWNER'S PACKET.

## Halon System

The system uses Halon Fire Extinguisher and is installed in the bilge on the forward side of the mid-bilge liner support and is accessible through the aft center salon hatch. 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 is wired to a 5 amp breaker on the main distribution panel that must be "ON" before starting diesel engines or generator.

On diesel installations the system incorporates an engine shut-down switch with an override system and a 12 volt 5 amp breaker which must be "ON" to start the engines or generator.

The system has an indicator light to indicate to the helmsman when the unit has discharged. Under normal circumstances, when the engines or generator are operating 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.**

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 or damage. Have portable extinguishers at hand and ready. Do not breathe fumes or vapors caused by the fire.

REFER TO OWNER'S PACKET.

## Horns

The dual trumpet horns are operated by the momentary toggle switch on the dash. There is no maintenance required on the trumpet horn itself, although it is advisable to avoid spraying water directly into the horns.

REFER TO OWNER'S PACKET.

## Ice Maker

The ice maker is installed on the port side of the salon and is equipped with a snap at the top to secure the door. Do not block air flow through the ventilation panels below.

### To start the unit:

- (1) Make sure the water tank is full.
- (2) Turn the "WATER SYSTEM" and "ICE MAKER" 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 ice maker:

- (1) Make sure the "WATER SYSTEM" and "ICE MAKER" breakers are "OFF."
- (2) Remove the grill at the bottom of the ice maker and then the screws securing the ice maker to the floor.
- (3) Slide the ice maker out.
- (4) Disconnect the ice maker water lines and unplug.

REFER TO ICE MAKER OPERATOR'S MANUAL IN YOUR OWNER'S PACKET FOR DETAILED OPERATING INSTRUCTIONS.

## Power Ventilation System

The power ventilation system removes stagnant air and cooking odors from the head and galley areas by means of 12 volt exhaust fans. They are controlled by a breaker on the dash panel and the switch beside each vent.

## Refrigerator/Freezer

The refrigerator/freezer operates on the 12 volt (D.C.) system or the 120 volt (A.C.) 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. Turning the thermostat to the "OFF" position will prohibit operation on A.C. or D.C. power. Operation on D.C. is only recommended when the engines are operating to keep batteries charged.

A single thermostat controls the operation of the refrigerator and freezer on A.C. or D.C. The control knob is located at the upper right side of the freezer 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 and green indicator light to show power "ON." Each is located on the main distribution panel.

To operate the unit on 12 volt power, preferably with engines operating, turn "ON" the "REFRIGERATOR" switch on the main distribution panel.

### 120 Volt System

The 120 volt system utilizes a 5 amp "REFRIGERATOR" breaker and amber indicator light to show power "ON." Each 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 "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 dish-washing 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 120 volt A.C. system "OFF."
- (2) Turn "REFRIGERATOR" breakers "OFF."
- (3) Remove screws securing unit to floor.
- (4) Cover floor for protection.
- (5) Slide out unit and unplug.

**CAUTION: DO NOT COVER REFRIGERATOR VENTS.**

REFER TO OWNER'S PACKET.

## Searchlight

The 12 Volt "SPOTLIGHT" breaker on the bridge breaker panel supplies power to the searchlight and must be "ON" to operate the searchlight.

The searchlight is a spotlight and floodlight combination. The light is operated from the dash by a power switch and joystick for directional control. The left and right positions of the power switch serve two functions. The left position 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 plate.

REFER TO OWNER'S PACKET.

## Stereo

The 12 volt "STEREO" breaker on the main distribution panel supplies power to the stereo and must be "ON" to operate the unit. REFER TO YOUR STEREO OPERATOR'S MANUAL IN YOUR OWNER'S PACKET FOR DETAILED OPERATING INSTRUCTIONS.

## Stoves

### ELECTRIC

The electric stove on your boat operates on the shore power or the generator. The "STOVE" breaker on the main distribution panel must be "ON." The stove has been converted to a 4.0 KW rating to permit all elements to be operated at one time.

#### Cleaning:

**MAKE CERTAIN ALL SWITCHES ARE "OFF" BEFORE CLEANING.** The best way to clean the metal on your range is to wipe with a damp cloth, then dry thoroughly. **NEVER** use coarse cleansers, steel wool scouring pads or metal brushes to clean chrome as they will leave scratches that cannot be removed.

REFER TO OWNER'S PACKET.

## MICROWAVE OVEN

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.

#### To remove the microwave:

- (1) Make sure the "MICROWAVE" breaker is "OFF."
- (2) Without air conditioning, remove drawer under microwave and remove screws securing microwave from bottom.
- (3) With air conditioning, remove return air grille.

## Telephone

The telephone option consists of a waterproof inlet on the port side of the deck, a fifty foot shore cord and telephone outlet. The outlet is located forward on the upper vanity in V-berth of the Sundancer and aft of the main distribution panel on the Express Cruiser.

REFER TO OWNER'S PACKET.

## **Windlass**

---

The windlass is wired to the 12 volt system through the windlass bilge breaker box located in the bilge.

There is a main windlass power switch in the salon next to the main distribution panel which must be "ON" to operate the windlass. REFER TO THE WINDLASS OPERATOR'S MANUAL IN YOUR OWNER'S PACKET FOR DETAILED OPERATING INSTRUCTIONS.

**NOTE: USE THE SAFETY HOOK SUPPLIED TO INSURE THAT THE ANCHOR IS HELD IN PLACE SHOULD THE WINDLASS FAIL.**

# Section 5

## STORAGE & LAUNCHING PROCEDURES

### 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 itself 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 the slings. Flat, wide belting-type slings and spreaders long enough to keep pressure from the gunwales are necessary.

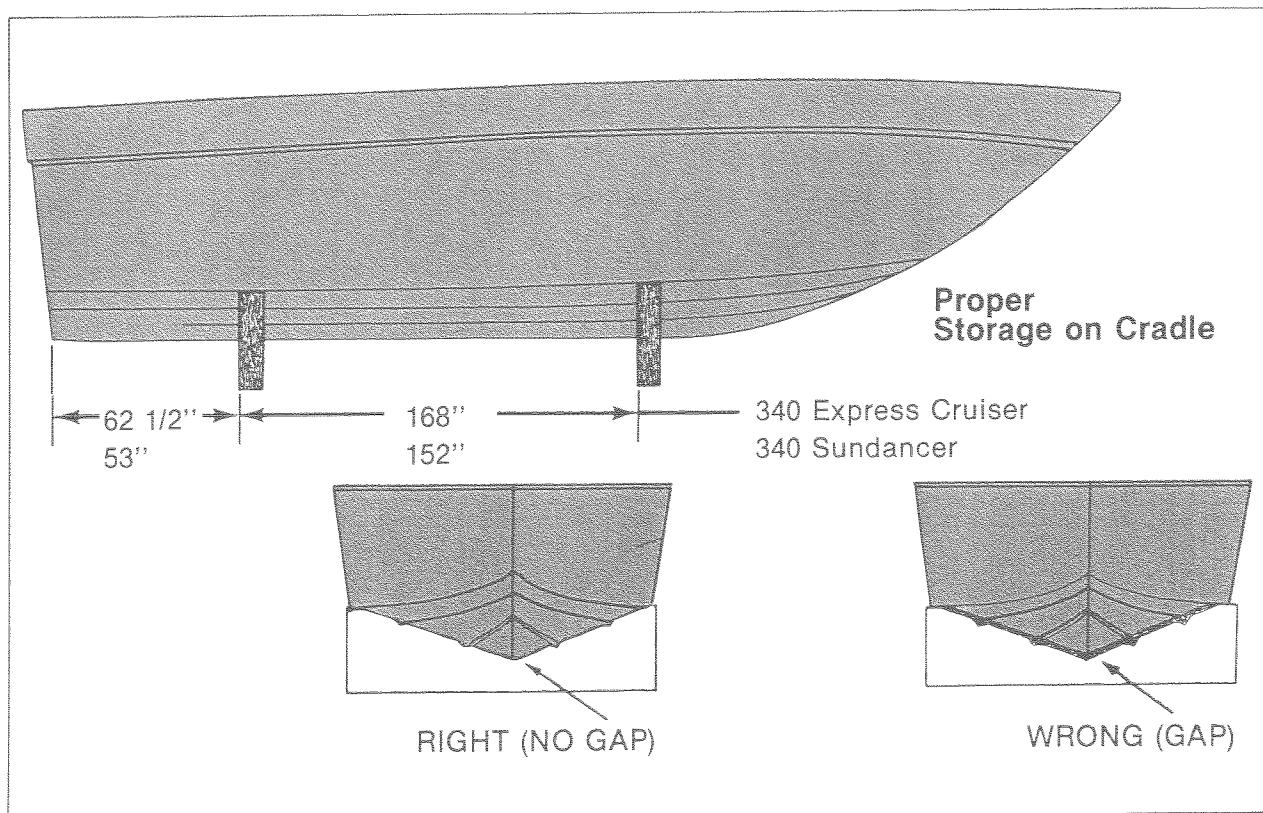
Cable-type slings should be avoided. Do not place the slings where they may lift on the propeller shaft or other underwater fittings. The slings should be in accordance with the designated areas imprinted on the deck to assure the least amount of stress on the hull.

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 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.



## 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. All boats 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 totally pumped out and sponged until completely free of water.

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 each side of the water pump.
- Remove hoses from water heater and open drain plug.
- Blow out all lines to clean.

### (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) Fuel Systems

#### **Gasoline:**

- Fill fuel tanks 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 carburetor and fuel lines is treated.

#### **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 RX100." 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 is treated.

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

### (5) Engines

- Flush engines with fresh water.
- Remove engine drain plugs, open pet-cocks and seacock.
- Remove drain plugs from mufflers and strainers.
- If the boat is equipped with a heat exchanger to heat water from the engine, break the connection to the heat exchanger to drain it and the lines.
- Refer to your Engine Operator's Manual for detailed information on preparing the engine for storage and winterization.

### (6) Generator

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

### (7) Air Conditioner

- Close thru-hull seacock, remove hoses from sea water pump.
- Flush system 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.

### (8) Batteries

- Remove battery 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.

#### **(9) Head System — Manual Flush System With Holding Tank**

- Flush entire system thoroughly with fresh water.
- Pump out holding tank.
- Shut "OFF" the "WATER" breaker on dash panel and remove hoses from each side of the water pump.
- Remove the 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.

#### **10 Head System — Vacu-Flush System With Holding Tank or San X System**

- Flush entire system thoroughly with fresh water.
- On San X system, replace chemical bottle with 1/2 quart of antifreeze mixed with 1/2 quart water.
- Pump out holding tank or set control switch to "TREAT AND DISCHARGE" on San X model.
- Shut "OFF" the "WATER" breaker on dash panel and remove hoses from each side of water pump.
- Remove the 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 or set control switch to "TREAT AND DISCHARGE" on San X model and run through one complete cycle.
- On San X model remove antifreeze solution from chemical reservoir and replace empty reservoir on treatment device.

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

REFER TO INDIVIDUAL OWNER'S MANUALS FOR SPECIFIC PROCEDURES.

## **Fitting Out After Storage**

### **FUEL SYSTEM**

Check the entire fuel system for loose connec-

tions, 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 overtighten. 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.

### **SHAFT ALIGNMENT**

After winter storage and launching, some engine-to-shaft misalignment can be expected. Refer to page 13 for instructions on checking the alignment.

### **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) 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) Make sure the rudder clevis pin on each side of the tie bars is in and safetied.
- (4) 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. Anchor lines and gear

should be inspected and replaced if necessary.

- (8) Make sure the hull drain plug is in place.
- (9) Clean the bilge thoroughly if it was not done at lay-up.
- (10) Check all engine and generator fluid levels.

# Section 6

## CARE & REFINISHING

### Fiberglass

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 gelcoat surface is painted or taped for styling purposes.

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

If the gelcoated surface gloss cannot be restored by waxing, hand buff with a rubbing compound such as 3M Super Duty #05955, or power buff with 3M Finesse-It #13084, then wax.

### STAINS & SCRATCHES

Gelcoat 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. 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 gelcoat may be removed by light sanding and buffing.

### 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 brush or abrasive material to clean the bottom.

The bottom paint should be inspected annually. If it needs repainting, flush the old paint and wash with hot water and Tide detergent. Rinse well and let surface dry completely. Feather any deep scratches with sandpaper and repaint, following the directions on the Sea Hawk 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.

### Deck Hardware

The deck hardware on your boat consists of stainless steel and marinium castings. Frequent cleaning with polish will extend their life and enhance their appearance. ("Boaters' Choice Rust and Stain Remover" is recommended.) A daily rinsing with fresh water to remove the salt spray deposits will prolong the quality finish.

### 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 non-abrasive 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, benzine, carbon tetrachloride, fire extinguisher fluid, dry cleaning fluid or lacquer thinner on plexiglass, since they attack the surface.**

Most minor scratches can be removed or reduced by hand polishing or buffing.

## 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 gelcoats and aluminum, always consult the directions before using any cleaner.

## Cherry Wood

The cherry wood has been sealed and lacquered. Keep dusted and treat like household furniture. Because some cleaners can damage wood, always consult 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 Resistant Lacquer #T70-F22, let dry. Apply additional coats as required.

## Vinyl

An occasional surface washing with warm water and soap will keep the interior and exterior vinyls in good condition for many years.

**Note: We do not recommend use of any cleaners or sealers on interior or exterior vinyls.**

## Window Channels

To avoid unnecessary deterioration of the nylon pile incorporated in some sliding window channels, solutions containing sodium or calcium hypochlorite, found in many household cleaners and bleaching solutions, should not be used for washing sliding windows. Most mild detergents, liquid or powder, are satisfactory, but if the cleaning agent gives off an odor of chlorine, it should be avoided.

## Interior Fabrics

The wall, ceiling and cushion materials should only be cleaned with dry cleaning fluid. It is the only approved solvent.

# Section 7

## SERVICE INFORMATION

### Useful Service Information

OWNER \_\_\_\_\_

HOME PORT \_\_\_\_\_

BOAT NAME \_\_\_\_\_

REGISTRATION NUMBER \_\_\_\_\_ STATE \_\_\_\_\_

HULL SERIAL NUMBER \_\_\_\_\_

WARRANTY REGISTRATION DATE \_\_\_\_\_

ENGINE MAKE & MODEL \_\_\_\_\_

SERIAL NUMBER PORT \_\_\_\_\_ STARBOARD \_\_\_\_\_

GEAR MAKE & REDUCTION RATIO \_\_\_\_\_

SERIAL NUMBER PORT \_\_\_\_\_ STARBOARD \_\_\_\_\_

PROPELLER SIZE \_\_\_\_\_ SIZE \_\_\_\_\_

PART NUMBER PORT \_\_\_\_\_ STARBOARD \_\_\_\_\_

SHAFT SIZE (DIAMETER X LENGTH) \_\_\_\_\_ MATERIAL \_\_\_\_\_

FUEL CAPACITY \_\_\_\_\_

WATER CAPACITY \_\_\_\_\_

KEY NUMBER, IGNITION \_\_\_\_\_ DOOR \_\_\_\_\_

SELLING DEALER \_\_\_\_\_

CITY & STATE \_\_\_\_\_

LENGTH \_\_\_\_\_

BEAM \_\_\_\_\_

DRAFT \_\_\_\_\_

VERTICAL CLEARANCE \_\_\_\_\_

ESTIMATED WEIGHT \_\_\_\_\_

BATTERY VOLTAGE \_\_\_\_\_ GENERATOR KW \_\_\_\_\_

## Service Guide

NOTE: The Service Guide is based on average operating conditions. Under severe operating conditions, intervals should be shortened.

**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	X				
CHANGE ENGINE OIL		X		X	X
CHECK GENERATOR OIL LEVEL	X				
REPLACE OIL FILTER		X		X	X
REPLACE FUEL FILTER				X	
CHECK TRANSMISSION FLUID LEVEL	X	X	X		
CHANGE TRANSMISSION FLUID					X
CLEAN ALTERNATOR EXTERNAL SCREEN				X	X
CLEAN CRANKCASE VENTILATING SYSTEM		X		X	
CLEAN TRANSMISSION OIL STRAINER SCREEN					X
CHECK COOLING SYSTEM HOSES & CONNECTIONS FOR LEAKS (WITH ENGINES RUNNING)	X	X		X	
TIGHTEN ENGINE MOUNT FASTENERS		X			X
CHECK FOR LOOSE, DAMAGED OR MISSING PARTS	X	X		X	X
CHECK PICK-UP & WATER IMPELLER					X
CHECK WATER PUMP & ALTERNATOR BELTS	X	X	X		
CHANGE ANTIFREEZE					X
CLEAN FLAME ARRESTER (GAS)		X		X	
REPLACE CARBURETOR FUEL INLET FILTER (GAS)		X			
CHECK CONDITION OF SPARK PLUGS (GAS)					X
CHECK ZINCS IN HEAT EXCHANGER		EVERY 25 HOURS			
CHANGE AIR FILTER (DIESEL)		EVERY 3 MONTHS			

**REFER TO THIS MANUAL FOR DETAILS.**

	BEFORE EVERY USE	AFTER FIRST 20 HRS.	EVERY 50 HOURS	EVERY 100 HOURS	ANNUALLY
CHECK SEAWATER STRAINERS & SEACOCKS	X	X	X		
LUBRICATE SEACOCKS					X
CHECK ENGINE ALARMS	X				
CHECK EXHAUST SYSTEM FOR LEAKS	X	X		X	
CHECK FUEL SYSTEM LINES & CONNECTIONS	X	X	X		
CHANGE WATER SEPARATING FUEL FILTER		X			X
CHECK PACKING GLAND ON PROP SHAFT	X	X	X		
CHECK RUDDER PACKING, TIGHTEN FOR NO LEAKS		X	X		X
INSPECT CLEVIS PIN ON RUDDER TIE BAR		X	X		
LUBRICATE RUDDER SHAFT					X
LUBRICATE THROTTLE & SHIFT LINKAGE PIVOT POINTS		X		X	X
CHECK ALL ELECTRICAL CONNECTIONS		X			X
INSPECT PROPELLER FOR POSSIBLE DAMAGE			X		
CHECK ENGINE TO SHAFT ALIGNMENT		X			X
CHECK WATER SYSTEM PUMP FILTER		X	X		X
INSPECT FRESH WATER PUMP & WATER SYSTEM		X		X	
CHECK SAN X TREATMENT CHEMICAL	X				
CHANGE HEAD SYSTEM VENT FILTER					X
CHECK FLUID IN TRIM PLANE PUMP		X			X
TEST GFI OUTLET					X
CHECK OIL IN STEERING SYSTEM		EVERY 3 MONTHS			
ADD "RACOR" FUEL ADDITIVE TO FUEL TANKS (DIESEL)		EVERY MONTH			

# Launching Checklist

Dealer \_\_\_\_\_ Boat Length & Model \_\_\_\_\_

Owner \_\_\_\_\_

## Before Leaving

- |                                |                               |  |  |
|--------------------------------|-------------------------------|--|--|
| (1) Personal Floatation Device | — One For Each Person         | (7) Gear Shift Controls                      | — In Neutral Position  |
| (2) Throw Ring/Buoyant Cushion | — At Least One                | (8) Throttle Controls                        | — Pump Throttle Slightly As Required While Operating Starter |
| (3) Weather Conditions         | — Safe To Go Out              | (9) Ignition Breakers                        | — Turn ON  |
| (4) Required Documents         | — All On Board                | (10) Ignition Key                            | — Turn Clockwise To ON                                       |
| (5) Navigation Equipment       | — All On Board                | (11) Momentary Start Switch<br>On Fly Bridge | — Hold ON Until Engines Start Then Release                   |
| (6) Coast Guard Equipment      | — Required Equipment On Board | (12) Exhaust Port                            | — Check To See That Engines Are Pumping Water                |

## Prior To Launching Boat

- |   |                                 |
|---|---------------------------------|
| (1) Bilge Pump(s)                       | — Working & Clean               |
| (2) Blower(s)                           | — Working                       |
| (3) Navigation Lights                   | — Working                       |
| (4) Horn                                | — Working                       |
| (5) Trim Planes                         | — Working                       |
| (6) Fuel Tanks                          | — Filled With Recommended Fuel  |
| (7) Fuel System                         | — Check For Leaks, Fumes        |
| (8) Fuel Filter                         | — Check For Tightness & Clean   |
| (9) Diesel Racor Fuel Filters           | — Clean & Water Free            |
| (10) Engine Coolant Drain Plugs         | — Secured                       |
| (11) Steering Fluid                     | — Full ( <i>If Applicable</i> ) |
| (12) Steering System                    | — Working Smoothly & Properly   |
| (13) Oil                                | — Check Level                   |
| (14) Transmission Fluid                 | — Check Level                   |
| (15) Engine Coolant (If Closed Cooling) | — Check Level                   |
| (16) Engine Seacocks                    | — Check For Open Position       |
| (17) Alarms                             | — Test Systems Monitor Panel    |
| (18) Shore Power Cord                   | — Removed                       |

**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 Gauge(s)      | — Check For Normal Reading*      |
| (2) Water Temperature Gauge(s) | — Check For Normal Reading*      |
| (3) Voltmeter                  | — Check For Normal Reading*      |
| (4) Fuel Gauges                | — 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

## Starting Engines

- |  |  |
|--|--|
| (1) Engine Compartment                             | — Ventilated   |
| (2) Blowers  | — Run At Least 4 Min. & When Operating Below Cruising Speeds & While Operating Generator |
| (3) Fuel Shut-Off Valve                            | — Open ( <i>If Applicable</i> )  |
| (4) Bilge Area                                     | — Check For Leaks, Fumes   |
| (5) Battery Switch(es)<br>( <i>If Applicable</i> ) | — Check For ON Position  |
| (6) Halon Breaker (Diesel Only)                    | — Must Be ON To Start The Engines  |

## Stopping The Engines

- |  |   |
|--|---|
| (1) Throttle Control(s)                    | — Bring To Idle Position                          |
| (2) Gear Shift Controls                    | — Bring to Neutral Position                       |
| (3) Bow & Stern Mooring Lines              | — Tied Securely To Dock                           |
| (4) Ignition Key or Momentary Start Switch | — Switch To Off Position                          |
| (5) Battery Switches                       | — Switch To OFF Position                          |
| (6) Fuel Shut-Off                          | — Switch To OFF Position ( <i>If Applicable</i> ) |

## **Generator Starting Instructions**

---

### **Starting:**

- (1) Generator Seacock — Open
- (2) Bilge Blowers — Run For At Least 4 Minutes & Any Time Generator Is Running
- (3) Halon Breakers (Diesel Only) — Must Be ON To Start The Generator
- (4) Depress PREHEAT (Diesel Only) — Preheat Time Should Not Exceed 30 Seconds
- (5) START Switch — Depress Until Generator Starts
- (6) Generator Starts — Release The START Switch Only. (If Diesel Continue Holding Pre-heat For A Few Seconds)
- (7) Load The Generator — Put Power Selector On Main Distribution Panel To SHIP Position. Turn A.C. Breakers ON

### **Stopping:**

- (1) Breakers — Turn All Breakers OFF
- (2) Generator — Let Run A Few Minutes To Cool
- (3) Momentary STOP Switch — Hold To Stop The Generator Set

**Caution: Do Not Run The Generator Or Engines In An Enclosed Area, Such As A Closed Boat House, As There Is The Possibility Of Inhaling Exhaust Fumes And The Build Up Of Carbon Monoxide.**