OWNER'S MANUAL

390 Express Cruiser

Sea Ray

Table of Contents

Section 1 GENERAL INFORMATION

Warranty

For a period of one year from the date of delivery to the original retail purchaser, Sea Ray Boats 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 the selling Sea Ray dealer's service center or to the Sea Ray plant are the responsibility of the purchaser. 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 under this warranty shall be limited to the repair or replacement of any part which is judged defective by Sea Ray Boats. Sea Ray Boats 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 in this paragraph 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 accordion-type file with alphabetical pockets 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 AND 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 RPMs 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 on obtaining local and out-of-area service during and out of warranty periods.

Consumer Responsibilities

It is the owner's responsibility to:

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

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

Sea Ray Boats 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 factor and must be included in all correspondence and orders. Failure to include it only creates delays. Also of vital importance are the engine serial numbers and part numbers when writing about or ordering parts for your 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.

- 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 RPMs.
- 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.
- Always 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.

- **Do not use the swim platform or boarding ladder while the engines are running.**

- Know and obey the Rules of the Road and always maintain complete control of your boat.

- Always operate with care, courtesy and common sense.

Grounding And 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.

- At least two B-I or one B-II 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 hand-, mouth- or power-operated whistle or horn, audible for at least half a mile.

- A bell, which, when struck, produces a clear bell-like tone.

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 International Rules. The United States Inland Rules are applicable to all vessels inside the demarcation lines separating inland and international waters. The "Rules of the Road" can be obtained from your local Coast Guard unit or from the United States Coast Guard Headquarters (1300 E. Street NW, Washington, D.C. 20226) in the publication *"Navigational Rules, International-Inland."*

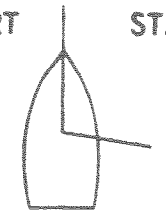
"Aids to Navigation" (Coast Guard pamphlet no. 123) explains the significance of various lights and buoys. This and other pamphlets, including the *"Boating Safety Training Manual,"*

and *"Federal Requirements For Recreational Boats"* are also available from the United States Coast Guard Headquarters.

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

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

← PORT STARBOARD →



Yield right-of-way to boats in your DANGER ZONE!

DANGER ZONE (Dead ahead to 2 points abaft your starboard beam)

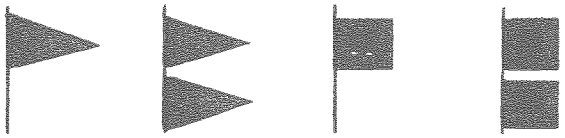
REMEMBER THESE RULES

1. **OVERTAKING-PASSING: Boat being passed has the right-of-way. KEEP CLEAR.**
2. **MEETING HEAD ON: Keep to the right.**
3. **CROSSING: Boat on right has the right-of-way. Slow down and permit him to pass.**

WHISTLE SIGNALS

ONE LONG BLAST: Warning signal (Coming out of slip)
ONE SHORT BLAST: Pass on my port side
TWO SHORT BLASTS: Pass on my starboard
THREE SHORT BLASTS: Engines in reverse
FOUR OR MORE BLASTS: Danger signal

STORM WARNINGS



RED FLAG Small craft (winds to 33 knots)

2 RED FLAGS Gale (up to 47 knots)

SQUARE RED FLAG—BLACK BOX (Storm)

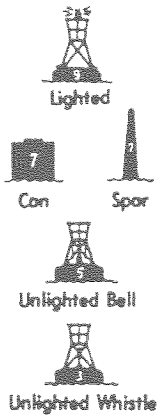
2 SQUARE RED FLAGS BLACK BOX (Hurricane)

CHANNEL BUOY GUIDE

Entering port or going upstream

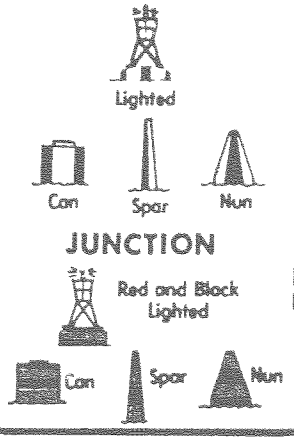
PORT SIDE

Color: Black
odd numbers



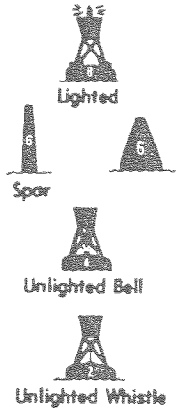
MID-CHANNEL

Color: Black & White
no numbers



STARBOARD

Color: Red
even numbers



USE COMMON SENSE AFLOAT

Specification Sheet

SR 390 EXPRESS CRUISER

SPECIFICATIONS

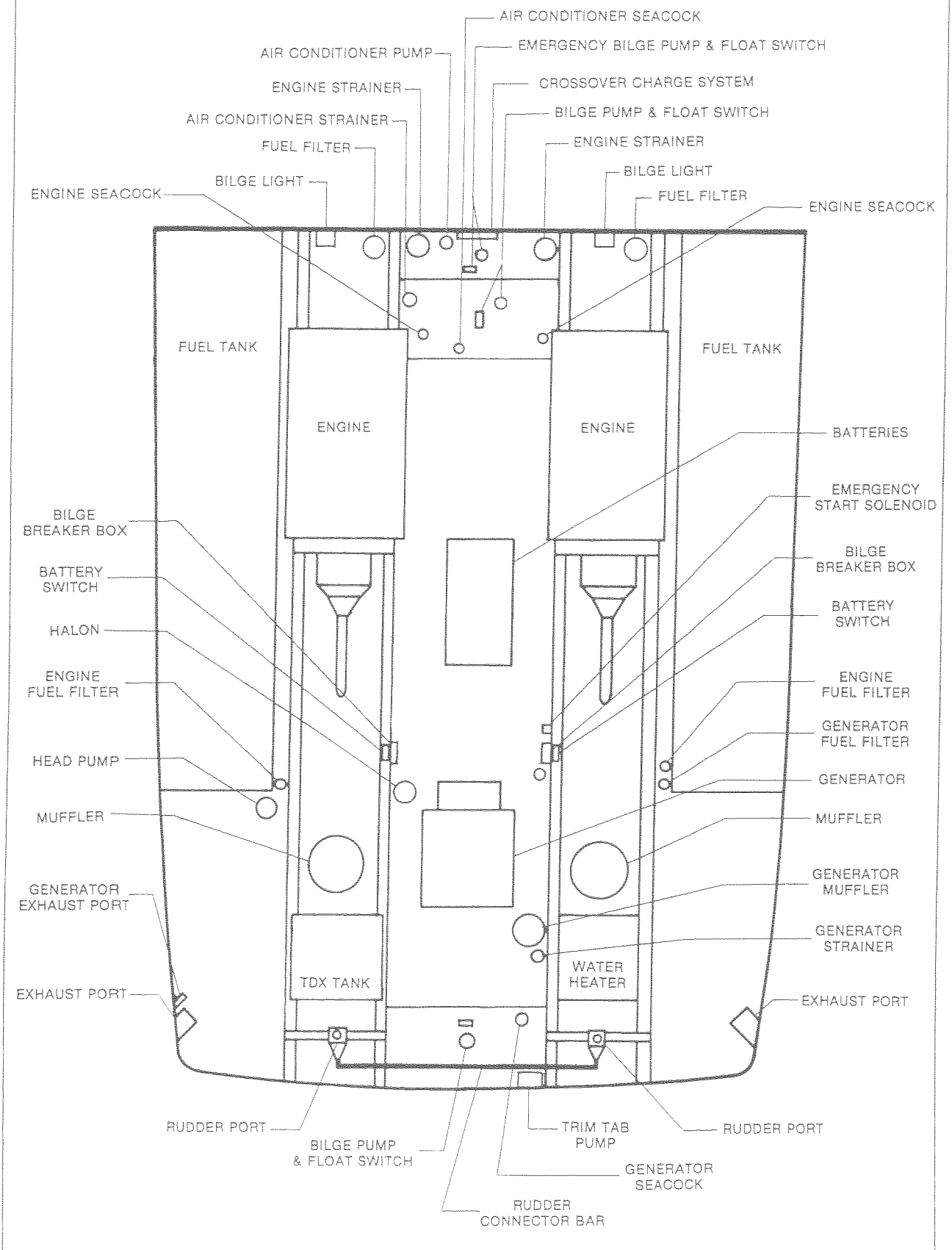
Gunwale Length:	40'6" (12.34 m)
Centerline Length:	39'0" (11.89 m)
Beam:	13'11" (4.24 m)
Approximate Weight (Gasoline, Dry):	16,400 lbs. (7,380 kg)
Dead Rise:	19°
Draft:	28" (.71 m)
Water Capacity:	100 gal. (378.5 litres)
Fuel Capacity:	300 gal. (1,135.5 litres)
Usable Fuel*:	285 gal. (1,078.8 litres)

HEIGHT DIMENSIONS

Waterline To Highest Fixed Point:	9'3" (2.82 m)
Keel To Highest Fixed Point:	11'6" (3.51 m)

* Allow 15% reserve in rough seas.

Bilge Layout



Bilge

BILGE PUMPS

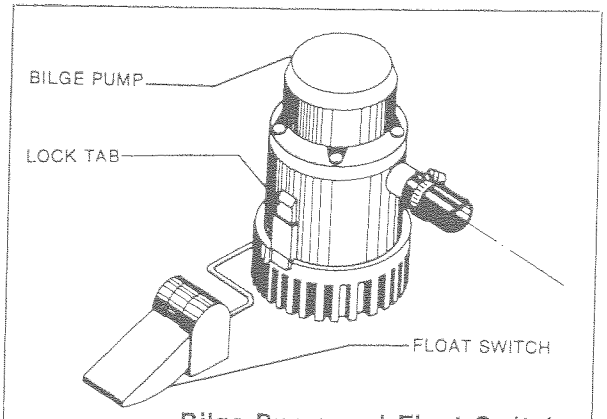
Sea Ray boats have three bilge pumps with float switches wired directly to the batteries. The two main pumps are equipped with switches on the dash with a "manual" and "auto" mode. The third pump is wired to the high water bilge alarm, located behind the dash.

When the switch is in the "manual" position, the pump will run continuously. When in the "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.



Bilge Pump and Float Switch

BLOWERS

Your 390 EC 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.

WARNING: GASOLINE VAPORS CAN EXPLODE. BEFORE STARTING ENGINE, OPERATE BLOWER FOR 4 MINUTES AND CHECK ENGINE COMPARTMENT BILGE FOR GASOLINE VAPORS.

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 cyclinders, resulting in rust and possibly bent rods. Follow the recommended maintenance schedule in your 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.

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.

ENGINE MOUNTS

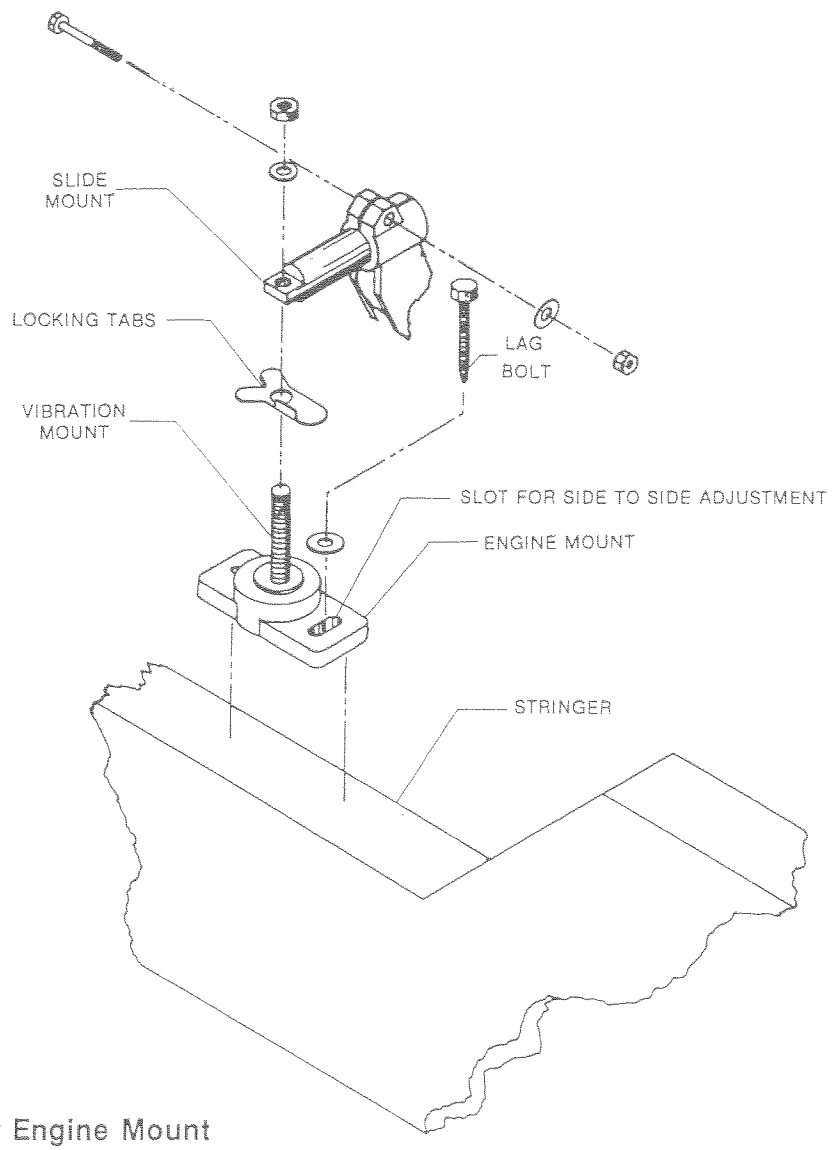
The adjustable type engine mounts permit adjustment sideways as well as vertically. Vertical adjustment nuts lock up or down on the threaded vertical stud, with a slot provided to allow side to side adjustment on the engine.

Important: The large adjustment lock-nuts on these mounts must be tightened properly to retain alignment.

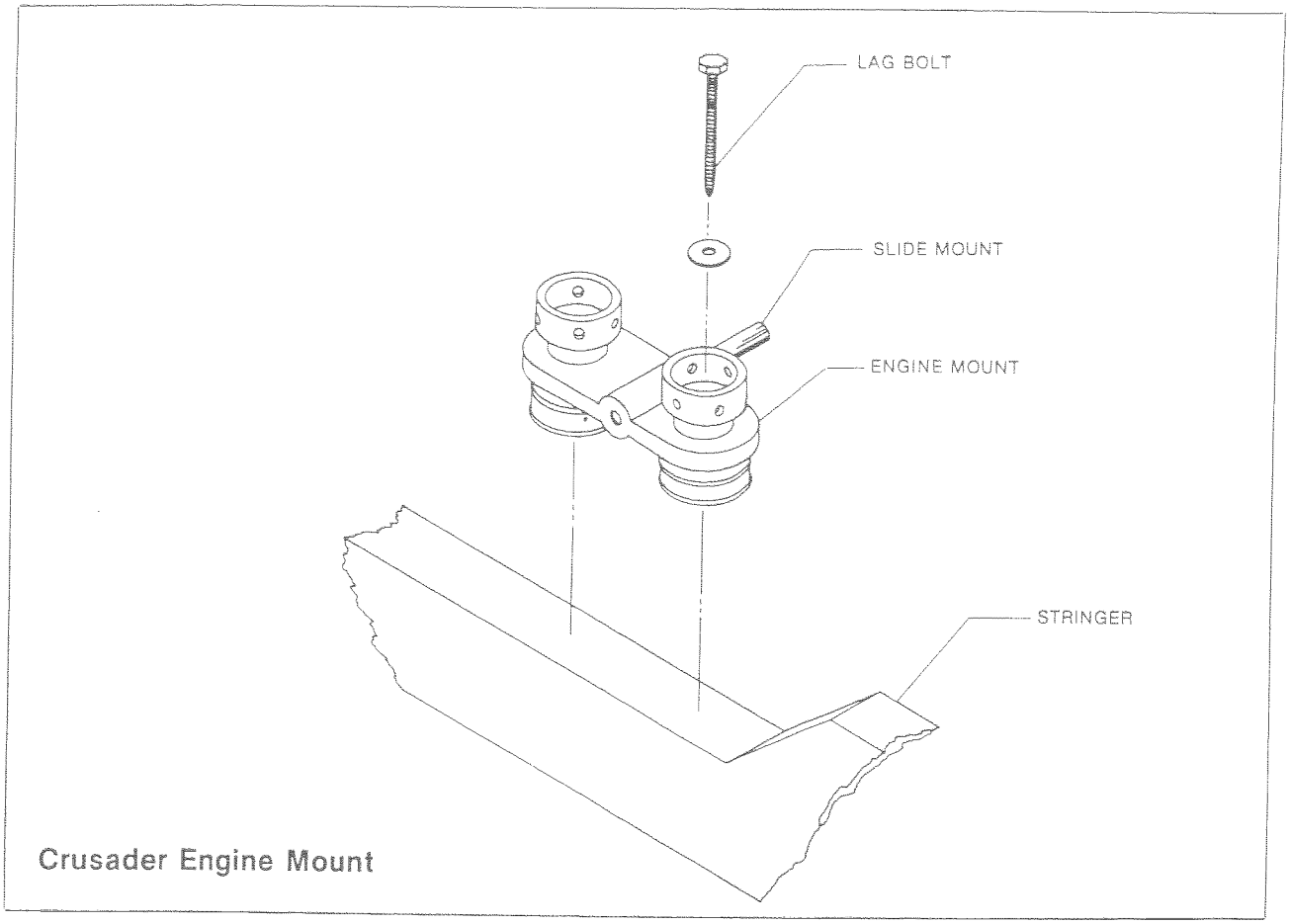
Torque Specifications:

ENGINE	STRINGER CAPS OR LAG BOLTS (FT. LBS.)	UP & DOWN ON VIBRATION MOUNTS (FT. LBS.)	SIDE TO SIDE ON VIBRATION MOUNTS (FT. LBS.)	SIDE TO SIDE ON SLIDE MOUNTS (FT. LBS.)
MERCRUISER	10	50	—	50
CRUSADER	10	—	—	50
DDA* & CATERPILLAR	65	90	45	—
PERKINS	65	90	65	20

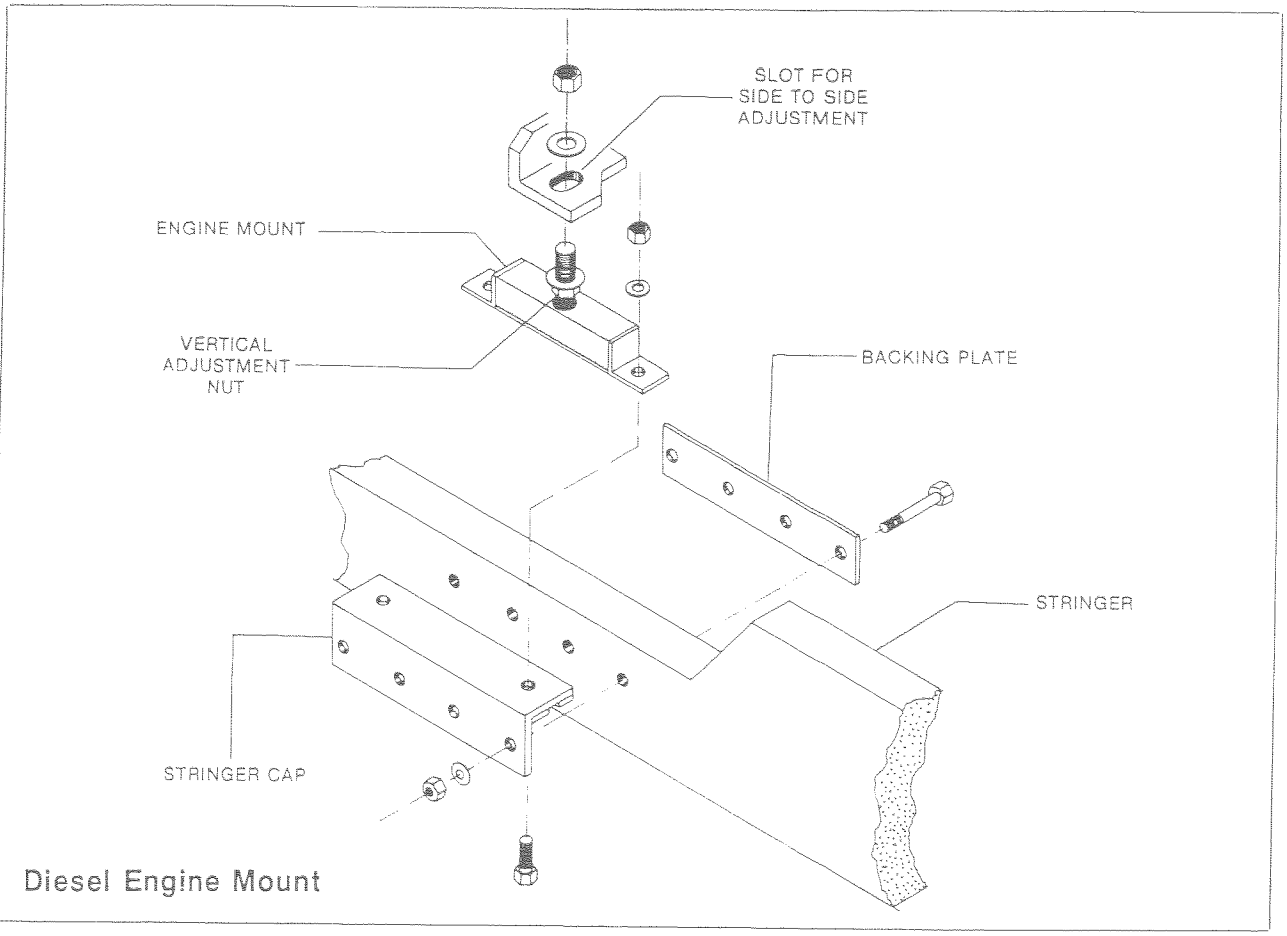
***Detroit Diesel Allison**



Mercruiser Engine Mount



Crusader Engine Mount



Diesel Engine Mount

ALARM SYSTEMS

Your engines are equipped with two alarm switches — water temperature and oil pressure connected to an alarm buzzer located behind the dash. The warning buzzer will sound if the cooling system water temperature rises too high or the engine oil pressure gets too low. Refer to the Engine Operator's Manual for proper gauge readings or aid in finding and correcting the problem.

Caution: If the 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 ALARM SOUNDS WHILE THE ENGINES ARE OPERATING, QUICKLY CHECK AND NOTE THE OIL PRESSURE AND WATER TEMPERATURE GAUGES. TURN ENGINE OFF 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.**

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). The buzzer should sound immediately or, with Mercruiser engines, after a few seconds delay.

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

ENGINE REMOVAL

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

Shut off the fuel lines and close the engine seacocks. 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.** Loosen the mounting bolts for the engine and lift the engine out, leaving the mounts bolted to the stringer caps.

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

VIBRATION AND 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 and 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.

BOAT SPEED

The catalog or advertised speed of a boat is not guaranteed. It is the speed attained in factory tests over a certified course, under favorable conditions; or it is an estimated speed based on engineering calculations.

Atmospheric conditions effect engine output. Laboratory tests show that power can vary as much as five percent, being lower in summer when temperatures are highest. Air at high altitudes has less density, resulting in loss of power and materially affecting RPM. The effect of high altitudes can be compensated for to some extent by reducing the pitch of the propeller. The Sea Ray dealer in the area can advise you.

Fuel Systems

FUEL TANKS

The two fuel tanks on board the 390 EC have a capacity of 150 gallons each and are accessible through the cockpit hatches. Fuel fills are located on the port and starboard deck walkways. Access to the fuel fill and vent hoses is gained by removing the angled panel at the aft end of the cockpit side panels.

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 SYSTEMS

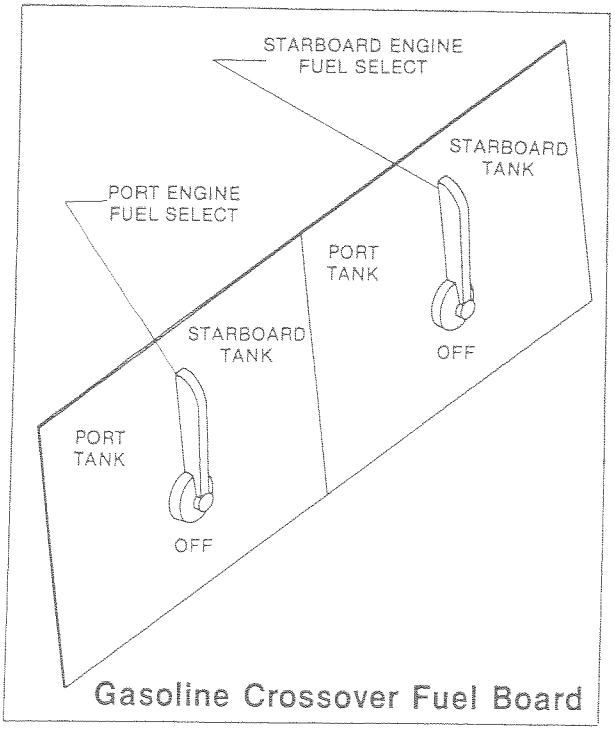
Fuel lines, filters, and all fuel system components should be checked at the start of each season and periodically thereafter, particularly after any work has been done aboard the boat which might have affected any part of the system. Be certain that all are in proper condition and that the entire system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

WARNING

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

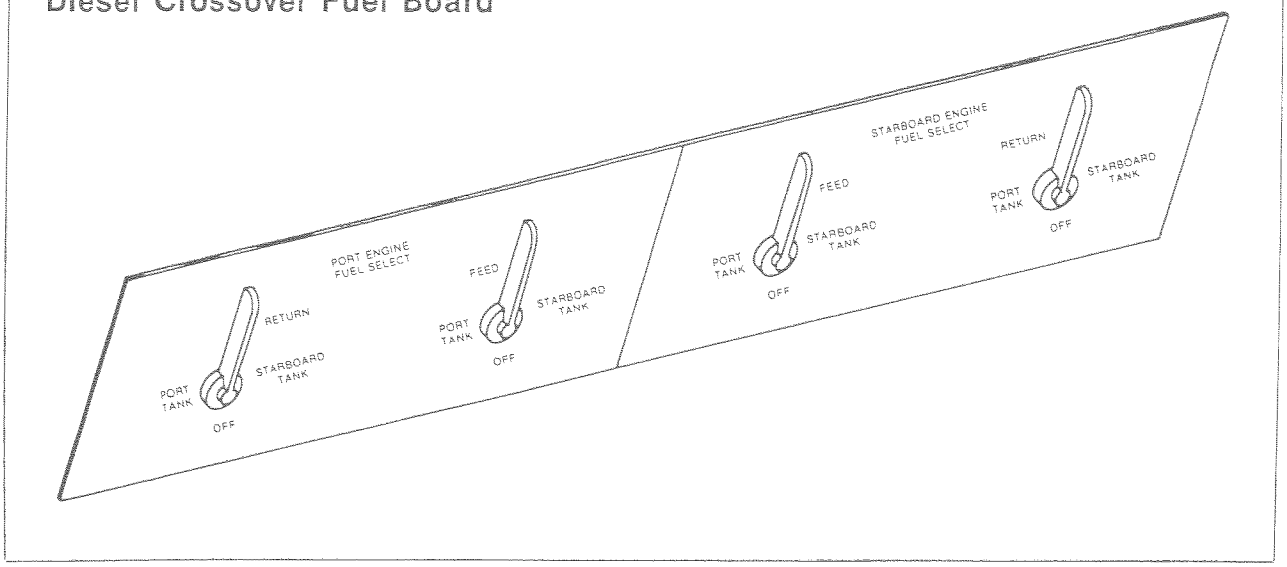
Standard Fuel System: In the standard fuel system, the port engine draws fuel off the port tank and the starboard engine draws off the starboard tank.

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 on the aft brace of the center cockpit hatch. With diesel engines, both the feed and return lines to the same tank must be open.



Gasoline Crossover Fuel Board

Diesel Crossover Fuel Board



FUEL RECOMMENDATIONS

Gasoline/Alcohol Mix: Before using any gasoline/alcohol mixed fuels, we recommend contacting the manufacturer of the engine and fuel hoses. Alcohol in gasoline can have a deteriorating effect on certain fuel system components.

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.

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.

ENGINE OIL/COOLANT CHART

ENGINE	TRANS.	OIL (QTS)	GEAR OIL (QTS)	COOLANT (QTS)	COOLANT (QTS) 50/50	COOLANT (QTS) 30/70
MERCRUISER 340	BW72C	7.0	3.0	28.0	14.0	8.4
CRUSADER 350	BW72C	7.0	3.0	33.0	16.5	9.9
DDA 6V-53T	MG506	14.0	6.4	30.0	15.0	9.0
DDA 6V-53TI	MG507	16.0	6.9	28.0	14.0	8.4
PERKINS 325 HP	MG506	39.0	6.4	53.0	26.5	15.9
CAT 3208T	MG506	15.0	6.4	58.0	29.0	17.4
CAT 3208TA	MG507	15.0	6.9	58.0	29.0	17.4

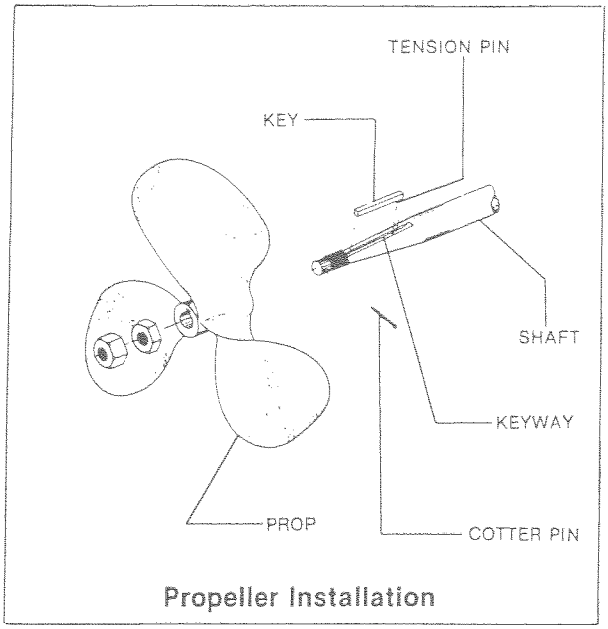
Note: Measurements are approximate.

Underwater Gear

PROPELLERS

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

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



Propeller Installation

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 small nut securely, using a 2x4 block between the propeller blade and the bottom of the boat.

(6) Then tighten the large nut while holding the small 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 large nut and small 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 - 0.13mm). Misalignment is much exaggerated in Figure A, but a slight misalignment will cause loss of power, excessive wear, noise and vibration. It should not be tolerated. When checking for parallel coupling faces (the proof of proper alignment), use a feeler gauge not more than .003 to .005 of an inch thick (0.08 - 0.13mm). With coupling faces brought together by hand — not bolted — the feeler gauge should be tightly gripped at all points around the edges of the couplings. Next, hold the engine coupling flange stationary and rotate the shaft coupling flange 90 degrees in either direction. The feeler gauge should still be tightly gripped at all points around the edges of the couplings.

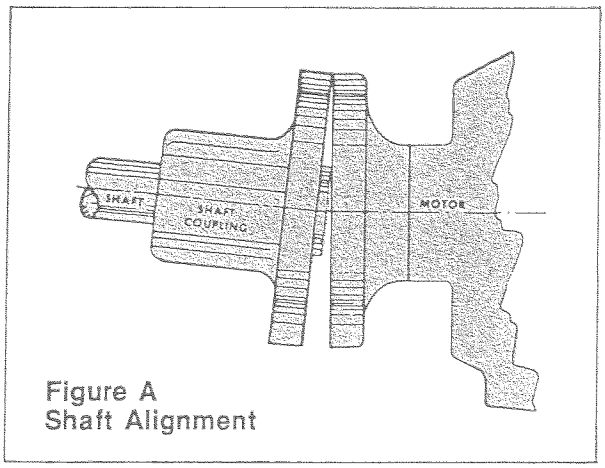


Figure A
Shaft Alignment

SHAFT LOG AND STUFFING BOX

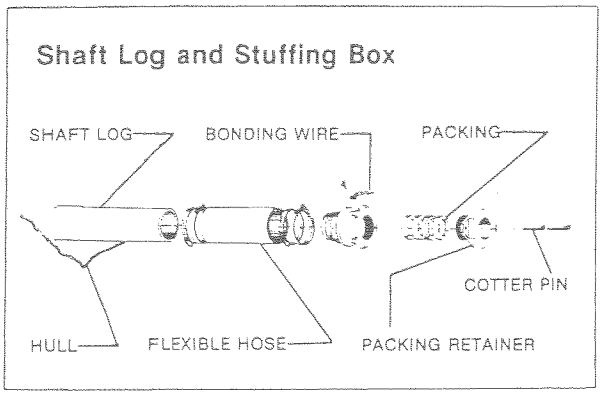
The shaft log is a fiberglass tube which provides an opening through the bottom of the boat for the propeller shaft. The stuffing box is connected to it by a short length of special flex-

ible 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.



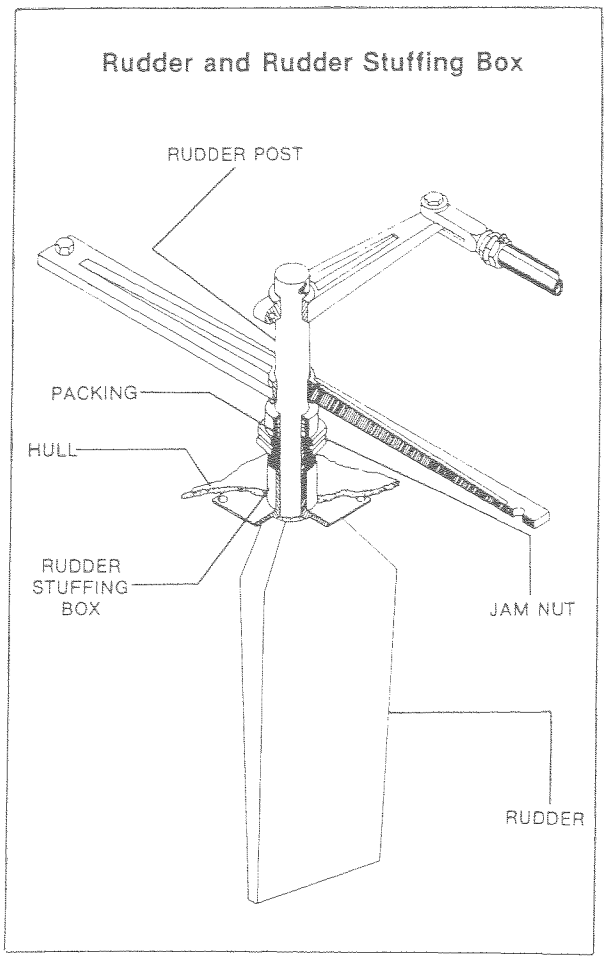
STRUT

The strut is the metal 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 1½" shaft: 1½" I.D. x 2" O.D. x 6".

RUDDER AND 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.



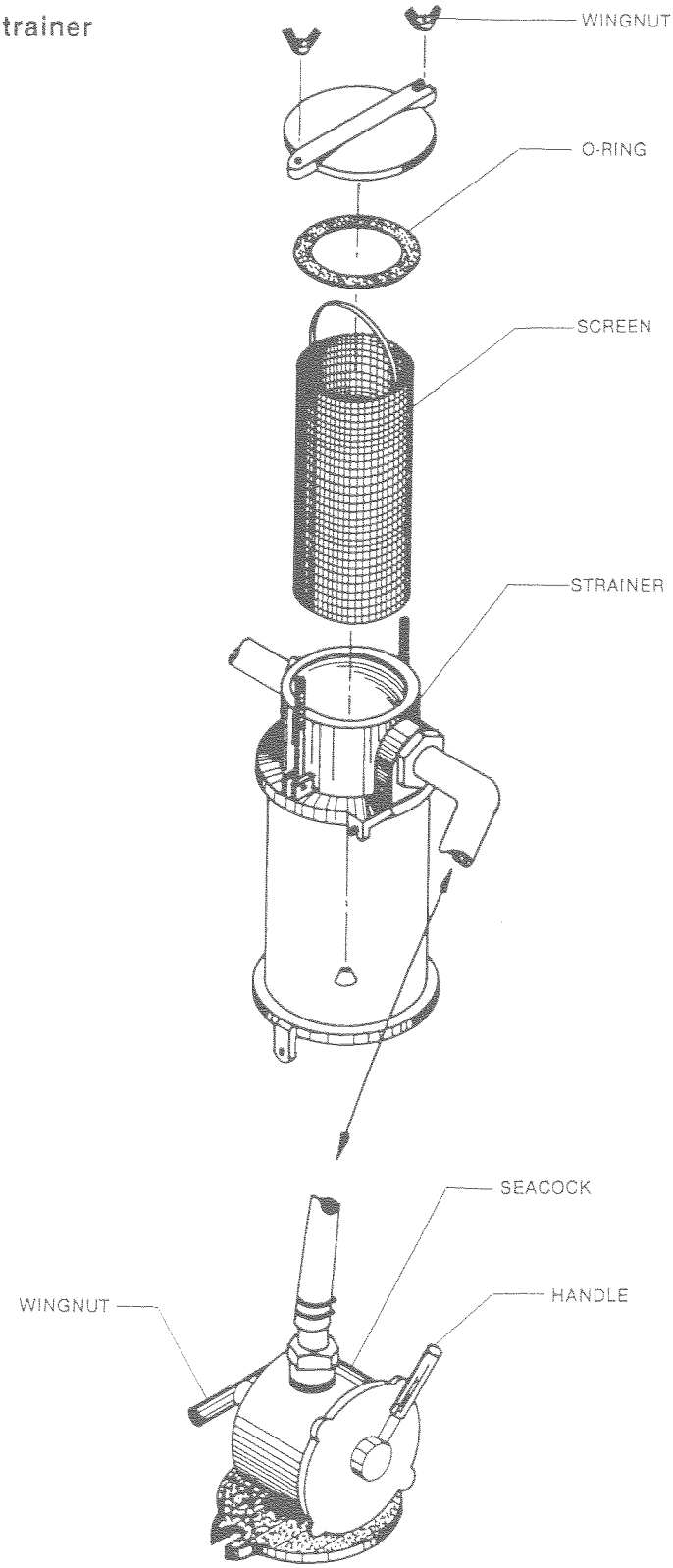
SEACOCKS AND STRAINERS

Seacocks and strainers are located in the bilge area. To open the seacock, loosen the wingnut at the bottom of the seacock then turn the permanently mounted handle vertically and tighten the wingnut. To close, loosen the wingnut, turn the handle horizontally then tighten the wingnut. **Do not over tighten.** 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.

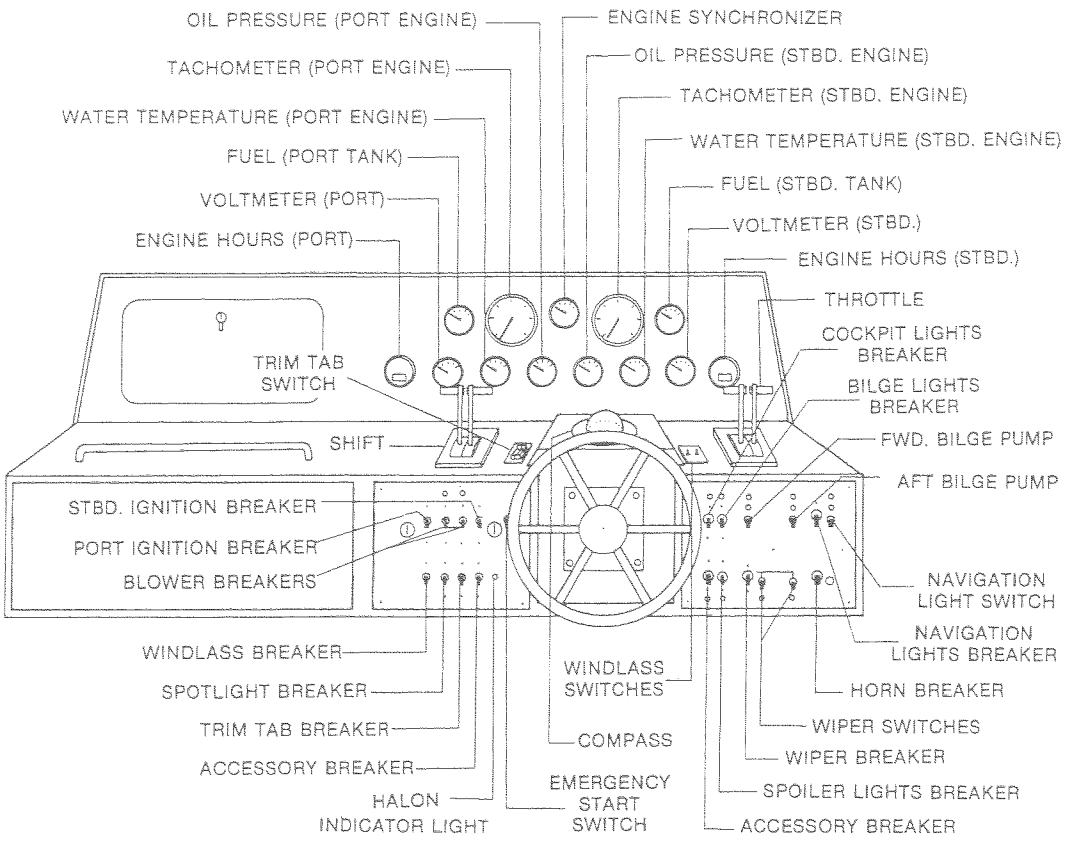
CAUTION: CLOSE ALL SEACOCKS WHEN LEAVING THE BOAT FOR ANY LENGTH OF TIME.

Seacock and Strainer



Instruments And Controls

Helm



STEERING SYSTEM

The steering system on the 390 EC is Seastar hydraulic steering. Periodically remove the plug in the helm unit and check the oil level visually. The oil level should be within 1/2" of the filler hole. A bottle of Aircraft Oil HO-15 is included with the system.

Recommended Oils:
Seastar Hydraulic Oil by Teleflex
Aircraft Oil HO-15 by Texaco

Acceptable Oils:
Univis J-43 by Exxon
Spinestic 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 Mobile
Gulf Spin 35 by Gulf
Industron 34 by Standard/Boron

Periodically check the 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 POCKET "S" IN THE OWNER'S PACKET.

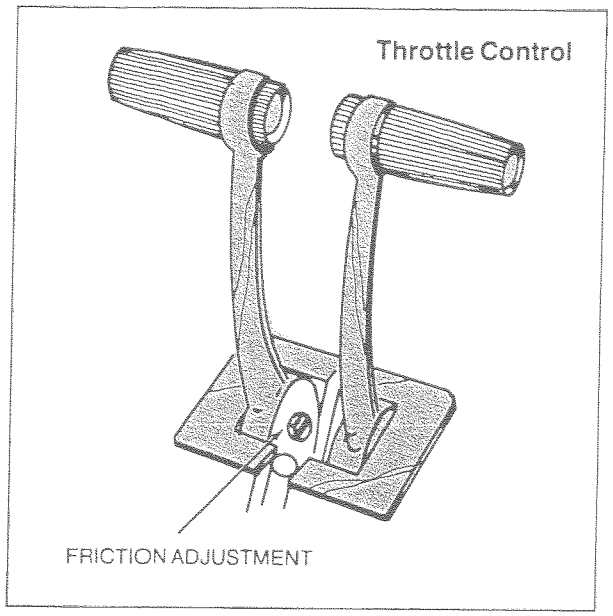
GEAR SHIFTS AND THROTTLE CONTROLS

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 adjust-

ment) can be adjusted by first removing the phillips oval head screws securing the two-section surface plate; using a 7/16" open end wrench, increase the tension by turning the nut shown clockwise; turn it counterclockwise to decrease tension. Periodically check and seasonally lubricate the linkages with a medium weight oil.

REFER TO POCKET "C" IN THE OWNER'S PACKET.



FRICTION ADJUSTMENT

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 and 4200 RPMs. When engines are not under load and running in neutral gear, they will tend to surge and indicate out of synchronization very easily.

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.

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

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

TEMPERATURE GAUGE

The 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.

VOLTMETER

The function of the voltmeter is to indicate 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 two fuel gauges indicate the amount of fuel in the port and starboard tanks respectively. 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.

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 port 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.

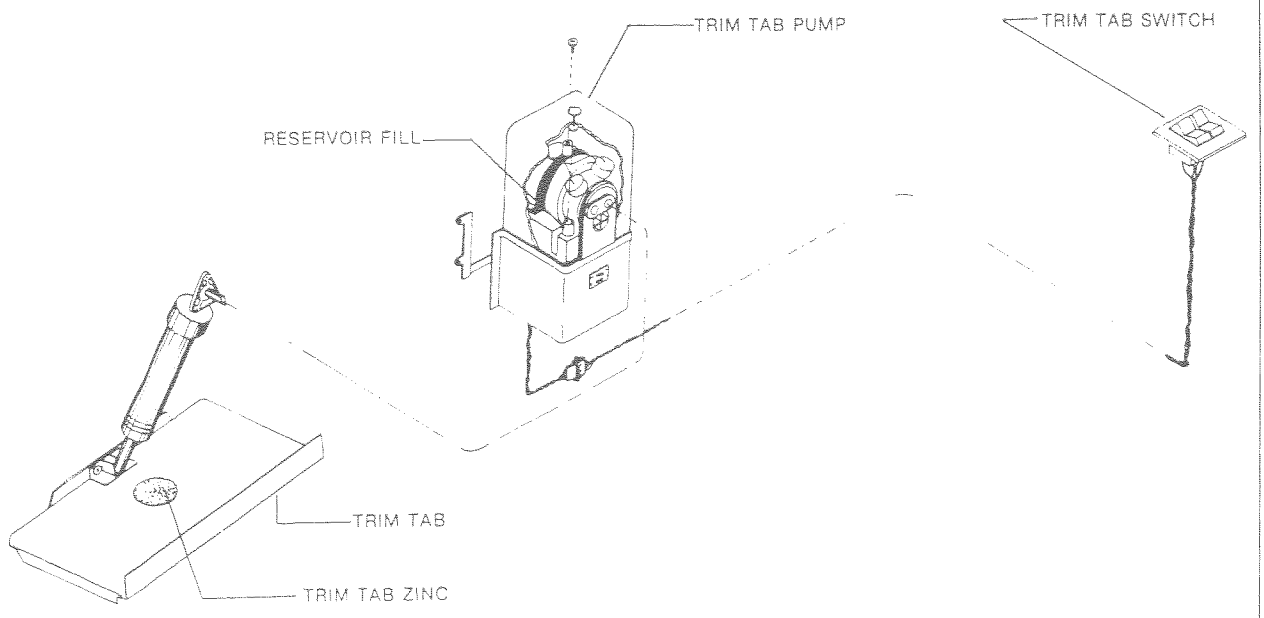
In heavy following seas or when running in an inlet best maneuverability is obtained with a bow high attitude. To be sure the planes are full up in the zero position, push the bottom halves of the rockers for several seconds.

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

REFER TO THE POCKET "T" IN THE OWNER'S PACKET.

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

Trim Tab, Pump and Switch



MARINE COMPASS

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

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

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

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

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 POCKET "C" IN THE OWNER'S PACKET.

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.
- Stop engines, 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:

- 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

a. Check the fuel tank levels.

b. Check the oil and coolant levels. See your Engine Operator's Manual for proper readings.

c. Check engines for coolant drain plug installations.

d. Check seacocks for open position.

e. Check fuel filter tops for tightness.

f. Check fuel valves.

g. Run the bilge blowers at least four minutes. Check the bilge for fuel fumes or liquid. **Do not start the engines until the source of fumes is determined and corrected and the bilge area is safely ventilated.**

h. Turn ignition breakers and keys to the "on"

position (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.

i. After ignition power is verified, check shift for neutral position and push the momentary start switch up to start the engine. Do not operate the starter for more than 30 seconds without allowing the starter to cool off for 2 minutes. This will also allow the 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 RPMs.

j. Check the oil pressure and look at exhaust port to assure that engine is pumping water.

k. 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 RPMs.

l. 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.

STARTING DIESEL ENGINES AFTER SERVICING OR RUNNING OUT OF FUEL

After servicing the engine or running out of fuel, diesel engines must be bled. Use steps a. through d. from above, then the following procedure, depending on the engine you have.

Perkins: Fill the Racor filter to the brim and replace the top. The Perkins engines are equipped with a lever action type primer pump, located centrally on the engines on the starboard side at the bottom of the fuel supply pumps. They also use a fuel bleed valve located on the engine secondary fuel filter tops.

To bleed the engine, loosen the valve and pump the primer until the Racor is full and air free fuel is flowing from the bleed screws.

Stewart & Stevenson: Fill the Racor filter to the brim and replace the top. The primer pump on Stewart & Stevenson engines is located inboard and forward. It can be released by pushing down and rotating a half turn. Once released, it should be pumped until the Racor fuel filter is full and resistance is felt at the pump.

Caterpillar: Fill the Racor filter to the brim and replace the top. The Caterpillar engines are equipped with a push/pull type primer pump, located on the secondary fuel filter inboard on both engines. They also use a fuel bleed valve located centrally at the forward end of the engine.

After bleeding the engine, continue with steps f. through l. from above.

Water Systems

The fresh water system is activated by a 15 amp circuit breaker on the main distribution panel. The breaker must be on to operate the head, shower, ice maker, fresh water wash down or faucets. To begin initial operation, fill the tank with water and open all faucets, both hot and cold. Turn the water system breaker to the "on" position. 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 390 EC water tank is located under the center salon floor and has a 100 gallon capacity. The water fill is on the port side of the deck. Fill the water tank only from sources known to provide safe, pure drinking water.

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

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% Hypochloride 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.

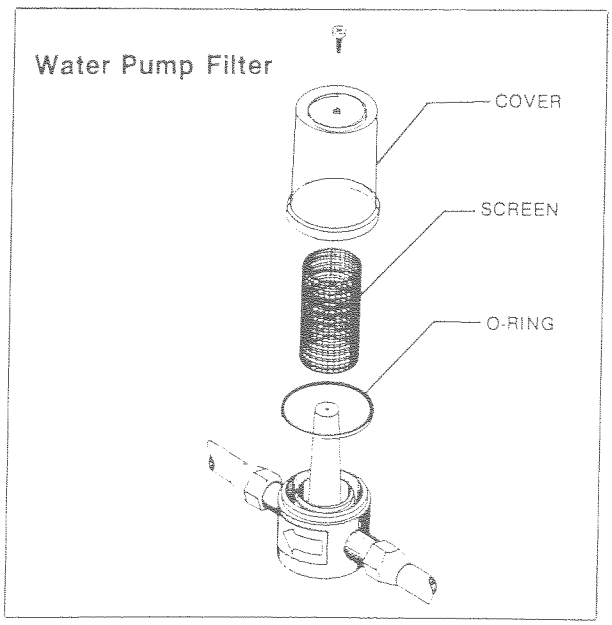
(4) Drain and flush with potable fresh water.

(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. The pump has a filter to prevent particles from entering the pump head. It should be checked and cleaned periodically. For access to the pump filter, remove the screws securing the top step and lift the step out. Before servicing the system, turn the water system breaker off and release pressure on the system by opening the faucets. To clean the filter, remove the screen and rinse with clean water. Replace, making sure the O-ring is in place when replacing the cover.



WATER HEATER

The 390 EC water heater is located in the bilge aft of the starboard muffler and has an 11 gallon capacity. Access to the heater is through the aft liner hatch. It runs on the 110 volt dockside system or generator and is protected by 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.**

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 the heater is full of water and that the cold water inlet valve is open. **COMPLETE FAILURE OF THE HEATING ELEMENTS WILL RESULT IF THEY ARE NOT COMPLETELY IMMERSED IN WATER AT ALL TIMES.**

(5) Turn the 110 volt breaker "on".

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

REFER TO POCKET "W" IN THE OWNER'S PACKET.

SHOWER SYSTEM

The shower wand in the 390 EC can be adjusted on the slide mount or used as a hand-held unit. The shower drains into the shower sump which is equipped with a pump and float switch. Access to the pump and switch is through the floor hatch outside the head door. The pump is fully automatic and is protected by the 10 amp breaker in the bilge breaker box. The shower has an indicator panel with lights indicating "run" and "auto". **The "auto" light should always be on. If it is not, do not run water through the drain.** Check the pump and float switch for obstructions and proper working order. The "run" light comes on when there is enough water in the sump to raise the float switch and start the pump. If it does not come on after one to two gallons of water drain from

the shower, turn the water off and check the pump and float switch for proper operation.

FRESH WATER WASHDOWN

The 390 EC is equipped with fresh water spigot located on the port angled panel in the cockpit. The system uses water from the fresh water tank and the water system breaker on the main distribution panel must be on to operate the system.

Head Systems

MANUAL FLUSH

The manual flush head with holding tank utilizes a hand pump on the side of the head to remove sewage to the holding tank for dockside pumpout. The holding tank has a 30 gallon capacity and is located in the bilge, aft of the port muffler. The head has an indicator panel with "¾ Full", "Full" and "Do Not Flush" lights. When the "Full" light is on, the "Do Not Flush" light should also be on and the head should not be used until the holding tank is pumped out at a dockside system.

VACU-FLUSH

The Vacu-Flush head on the 390 EC is available with either a holding tank or a TDX system. The TDX system utilizes a 15 amp head breaker and a 15 amp treatment breaker located on the main distribution panel. The holding tank system uses only the head breaker.

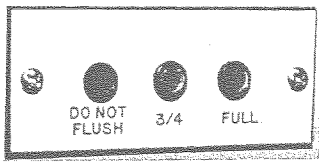
The foot pedal at the base of the toilet opens a mechanical seal and the vacuum forces waste through the opening in the bowl to a tank, through the vacuum pump and then to the holding tank or treatment tank. With holding tank system, the waste is held in the 30-gallon tank until it is pumped out at a dockside system. With the TDX system, the waste is held in a 7 gallon treatment/holding tank until treated. Both systems have indicator panels in the heads with "¾ Full", "Full" and "Do Not Flush" lights. When the "Full" light is on, the "Do Not Flush" light should also be on. The TDX system has a switch control panel above the aft end of the salon gunwale cabinet with indicator lights and a 3-position switch with the following modes:

Normal: Waste is held in treatment tank.

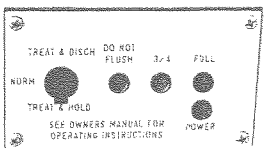
Treat and Hold: Chemicals are injected and the 20 minute treatment cycle starts. Upon completion of cycle, waste is held in the tank.

Treat and Discharge: Injects chemicals into the tank and starts the 20 minute treatment cycle. When the cycle is complete, waste is automatically discharged.

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



HEAD INDICATOR PANEL



TDX CONTROL PANEL

Operating Instructions:

(1) Lift flush pedal with toe to allow 2 inches of water into toilet bowl.

(2) Flush toilet by pressing pedal until ball valve is completely open and holding until sewage clears toilet base and vacuum is gone.

(3) Release pedal. Be sure ball seal is fully closed to allow positive seal for next operation.

Caution: Do not use facial tissue or sanitary napkins in this head.

ELECTRIC HEAD

Note: The Electric Head is available on overseas boats 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 POCKET "H" IN THE OWNER'S PACKET.

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 helm 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

Your Sea Ray installed batteries have been selected for their ability to furnish starting power based on engine starting requirements.

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 THE BATTERY CABLES BEFORE DOING ANY 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) Remove the positive cable first, then the negative cable. To replace the cables, reverse the procedure.

Under the cap of each battery is a grid to prevent foreign matter from falling into the cells. The water level of each cell should be about ½" above the grid. This leaves a large space above the cell to accommodate the electrolyte expansion during charging, so that none will be forced through the vent in the cell cap.

A water level monitor that indicates low battery water level is located below the helm and is standard with factory installed batteries.

ANY ACID SPILLED ON THE BATTERIES, BATTERY BOXES OR OTHER PARTS SHOULD BE NEUTRALIZED AND CLEANED UP WITH BAKING SODA AND WARM WATER. The terminals and clamp bolt nuts should be cleaned in the same manner. The battery manufacturer recommends that the terminal and battery tops be coated with soft seal CRC or an equivalent as a corrosion preventative.

Testing Batteries:

a. A hydrometer with temperature reading and correction factor combination should be used to test each cell.

b. Do not test batteries right after adding water.

c. For accuracy, the charging device must be turned off for at least 20 minutes before testing the batteries.

d. The average charge at different specific gravity readings will be:

Full charge Specific gravity 1.260

¾ **charge** Specific gravity 1.220

½ **charge** Specific gravity 1.190

Because batteries will freeze and damage their containers when discharged, all batteries should be kept at or above 1.230 specific gravity reading in freezing weather. A battery that has its electrolyte under 1.230 for long periods will have internal chemical damage.

When adding water to battery cells in freezing weather, be sure to recharge sufficiently to thoroughly mix with electolyte to prevent freezing.

The freezing points are:

Specific Gravity	Freezing Point
1.260 full charge	-70°F (-57°C)
1.230	-40°F (-40°C)
1.200	-18°F (-28°C)
1.170	0°F (-18°C)
1.125	14°F (-10°C)
1.100	20°F (-7°C)

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

Always install battery covers to prevent shorting.

Recheck battery terminals for tightness and never disconnect under load.

Fill batteries with distilled water only.

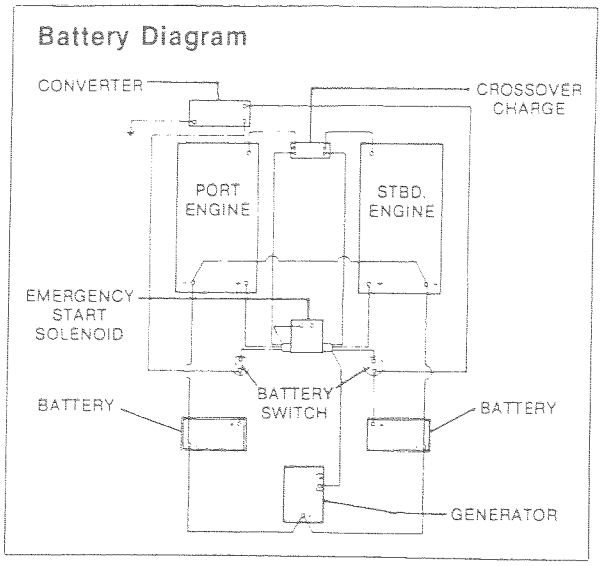
NEVER USE AN OPEN FLAME IN THE BATTERY STORAGE AREA.

AVOID STRIKING SPARKS AT THE TERMINALS.

A BATTERY WILL EXPLODE IF A FLAME OR SPARK IGNITES THE FREE HYDROGEN GIVEN OFF DURING CHARGING.

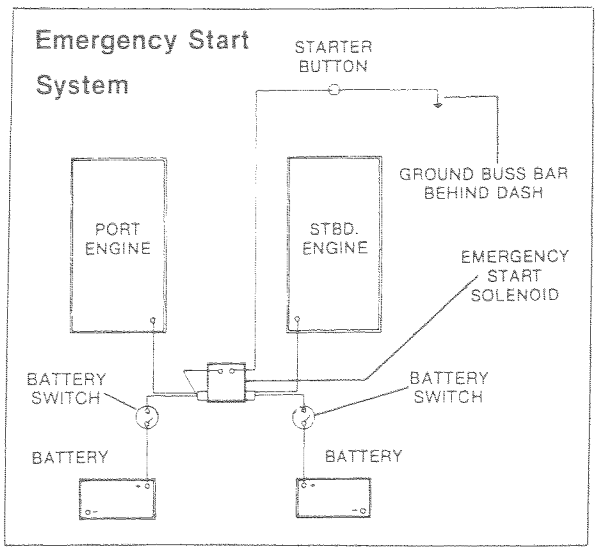
BATTERY SWITCHES

The battery switches are located on the liner supports in the bilge. Each switch handles its own bank of batteries. They must be on to start the engines or the generator. **CAUTION: ALWAYS STOP ENGINES BEFORE SWITCHING TO THE OFF POSITION.**



EMERGENCY START SYSTEM

The emergency start switch is a momentary toggle switch located on the dash next to the ignition switches which 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. Activate the emergency start switch before the ignition switch.

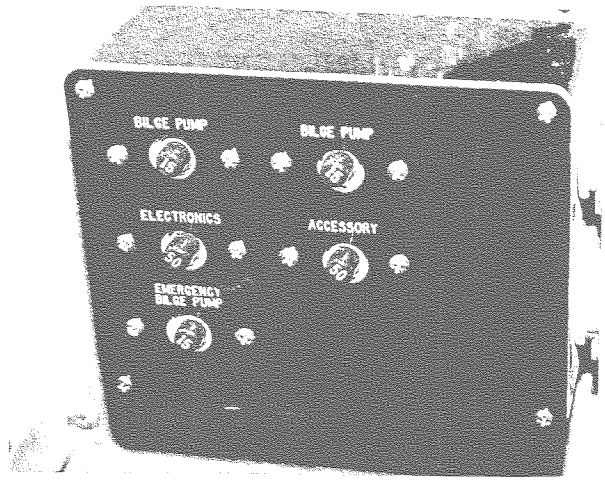


CROSSOVER CHARGING SYSTEM

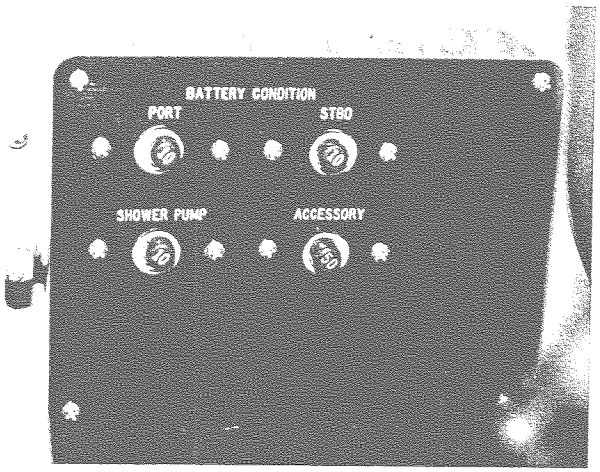
The crossover charging system utilizes a battery isolator unit with an electronic sensor to determine a low battery bank and send power to it from the engine alternators. It is an automatic system with no switches, and designed to charge both banks of batteries from both engine alternators, when necessary.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

BILGE BREAKER BOX

The 390 EC has two bilge breaker boxes located on the inboard side of the stringers. The starboard breaker box contains a 50 amp accessory breaker, 10 amp breakers for the battery condition and a 10 amp breaker for the shower sump pump. The port breaker box contains a 50 amp accessory breaker, a 50 amp breaker for the electronics fuse block and three 15 amp breakers for the three bilge pumps.



PORT BILGE BREAKER BOX



STARBOARD BILGE BREAKER BOX

ELECTRONICS CIRCUIT WITH GROUND PLATE

The 50 amp electronics circuit utilizes a circuit breaker in the port bilge breaker box to feed a fuse block located under the upper dash. **The fuse block is to be used for electronic equipment only.** 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.**

BREAKER	AMPS
MAIN DISTRIBUTION PANEL	
WATER SYSTEM	15
ACCESSORY (EA.)	15
FWD. LIGHTS	15
AFT LIGHTS	15
POWER VENTS	15
HEAD VENT (ONLY)	10
GALLEY VENT (ONLY)	10
HEAD (VACU-FLUSH)	15
HEAD (MANUAL)	5
HEAD (ELECTRIC)	25
TREATMENT	15
STEREO	10
REFRIGERATOR	15
DASH	
PORT SWITCH PANEL	
IGNITION (EA.)	10
SPOTLIGHT	15
TRIM TABS	20
WINDLASS	30
STARBOARD SWITCH PANEL	
HALON	5
ACCESSORY	15
BILGE LIGHTS	15
COCKPT LIGHTS	5
HORN	15
NAVIGATION LIGHTS	10
SPOILER LIGHTS	5
WIPERS (1)	10
WIPERS (2)	20

WIRE COLOR CODE

- ENGINE HARNESS
  - 16 AWG Blue, oil pressure sender
  - 16 AWG Blue/Brown, alarm sender
  - 16 AWG Gray, tachometer sender
  - 16 AWG Brown, 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, battery cable (positive)
  - 4/0 Black, 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
  - 16 AWG Orange, preheat
  - 16 AWG White, stop
  - 16 AWG Brown/Red, Halon

- ONAN GENERATOR
  - 16 AWG Green/White, power
  - 16 AWG White/Black,start
  - 16 AWG Violet, "on" light
  - 16 AWG Orange, preheat
  - 16 AWG White, stop
  - 16 AWG Brown/Red, Halon

- HALON SYSTEM
  - 10 AWG Red, power
  - 10 AWG Black, 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, 110 AC hot
  - 14 AWG White-romex, 110 AC neutral
  - 14 AWG Green-romex, bonding system

- CONVERTER INDICATOR
  - 16 AWG Orange, charge indicator positive
  - 16 AWG Orange/Black, charge indicator negative

- BILGE BLOWERS/POWER VENTS
  - 16 AWG Yellow, blower motor power
  - 16 AWG Black, ground

- WATER SYSTEM
  - 16 AWG Brown/White, pumps
  - 16 AWG Black, ground; empty indicator light
  - 16 AWG Green, ⅔ level indicator light
  - 16 AWG White, ⅓ level indicator light

- HOLDING TANK SYSTEM
  - 16 AWG Green, "full/do not flush"
  - 16 AWG White, "¾ full"
  - 16 AWG Red, power

- TDX 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, "¾" indicator light
  - 16 AWG Black, ground

- TDX 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, "¾ full"
  - 16 AWG Orange, "full"

- ELECTRIC HEAD
  - 8 AWG Red, power to switch
  - 10 AWG Red/Violet, power to pump
  - 10 AWG Black, ground

- TRIM TABS
  - 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

- WINDLASS
  8 AWG Red, power
  8 AWG Black, ground
  16 AWG Purple, fused hot
  16 AWG Green, ground
  16 AWG Brown, solenoid feed
  16 AWG White, down
  16 AWG Blue, up

- AUTOPILOT
  8 AWG Red, power
  8 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 off the two dockside 30 amp 110 volt, 60 cycle shore power systems or the onboard generator. The main distribution panel is equipped with a rotary transfer switch to select the power source. **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 indicates 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 cord 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, 3) an electrical storm, or 4) an onboard system overload. The main breaker protects all A.C. components and appliances 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.

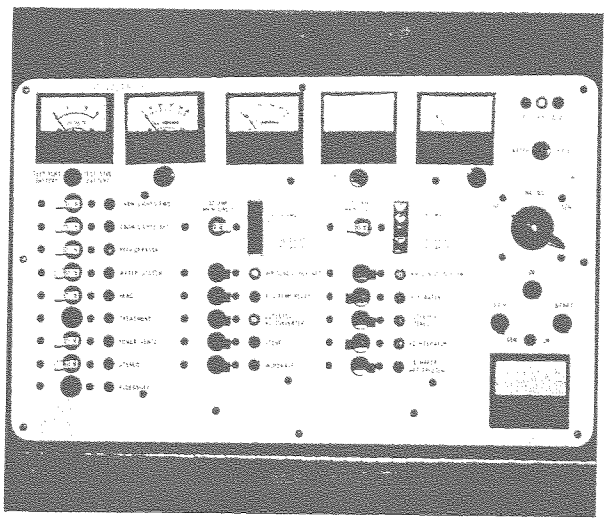
(2) Plug the shore power cord into the inlet on the side of the deck; turn clockwise to lock. Thread the black locking ring on the inlet to secure the cable and prevent accidental unplugging.

(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", turn the rotary switch on the main distribution panel to "LINE 1" or "LINE 1 & 2".

(6) Turn individual breakers on.



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 of the panel. The main distribution panel is hinged on the bottom to swing open for servicing.

Reverse the procedure for closing the panel.

BREAKERS

MAIN DISTRIBUTION PANEL	
110 VOLT BREAKERS	
BREAKER	AMPS
STOVE	20
MICROWAVE	15
HOT WATER	15
OUTLETS/STEREO	15
REFRIGERATOR	15
ICE MAKER	15
OUTLETS/AC CONVERTER	15
AIR CONDITIONER PUMP	15
FORWARD AIR CONDITIONER	20
AFT AIR CONDITIONER	20
GENERATOR/SHORE POWER	30

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 off dockside power or the generator systems. The converter will not over-charge the batteries; it is designed to cycle on and off as charge is needed. An indicator panel is located below the starboard dash switch panel. The red light below the A.C. converter "on" light, indicates that 110 volts is on and that the converter is charging the 12 volt system. The only switch for the unit is the circuit breaker located on the main distribution panel. The converter is mounted on the midship bulkhead.

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

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

REFER TO POCKET "C" IN THE OWNER'S PACKET.

GROUND FAULT INTERRUPTER OUTLETS

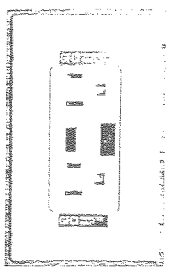
The ground fault interrupter outlets (GFI) are located in the galley and the head. They are equipped with a test and reset switch in the center of the face plate. All 110 volt outlets and 110 volt lighting are protected by the outlets.

The receptacles employ 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 the switch marked "RESET". This 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 outlets or 110 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, BUT SUCH SHOCK WILL BE OF LESS THAN NORMALLY DANGEROUS DURATION.



GFI OUTLET

Generators

GENERATOR AMPERAGE OUTPUTS

GASOLINE	
ONAN 6.5 KW (110 V)	59.0 amps
WESTERBEKE 8.0 KW (110 V)	72.0 amps
DIESEL	
ONAN 8.0 KW (110 V)	72.0 amps
WESTERBEKE 8.0 KW (110 V)	72.0 amps

AMP DRAW OF ACCESSORIES

REFRIGERATOR/FREEZER (110 V)	8.0 amps
ICE MAKER (110 V)	4.2 amps
RANGE WITH OVEN (110 V)	30.0 amps
RANGE (110 V)	18.0 amps
MICROWAVE (110 V)	11.0 amps
CONVERTER (110 V)	4.5 amps
WATER HEATER (110 V)	12.0 amps
FWD. AIR CONDITIONER (110 V)	
HEAT (Full load)	12.0 amps
COOL (Full load)	10.0 amps
COMPRESSOR	9.0 amps
AFT AIR CONDITIONER (110 V)	
HEAT (Full load)	18.0 amps
COOL (Full load)	16.0 amps
COMPRESSOR	13.0 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 THE MAIN GENERATOR BREAKER IS OFF AND THERE IS NO LOAD ON THE GENERATOR BEFORE STARTING IT.

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

(1) Open the generator seacock.

(2) With diesel engines, 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 engines, preheat the 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 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 the 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:

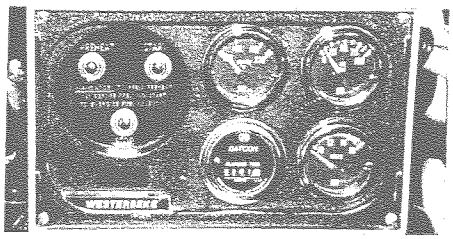
(1) Turn all A.C. systems off.

(2) Start the generator.

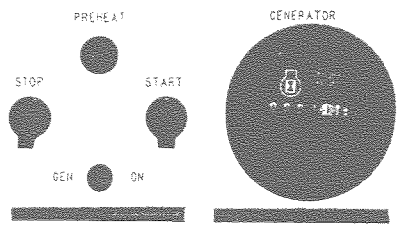
(3) Turn the rotary transfer switch to the "generator" position.

(4) Turn the A.C. breakers on.

REFER TO POCKET "G" IN THE OWNER'S PACKET.



DIESEL GENERATOR CONTROLS ON MAIN DISTRIBUTION PANEL



DIESEL GENERATOR CONTROLS

GENERATOR OIL/COOLANT CHART

GENERATOR	OIL (QTS.)	COOLANT (QTS.)	COOLANT (QTS.) 50/50	COOLANT (QTS.) 30/70
ONAN 6.5 KW (Gas)	3.5	3.5	1.75	1.05
WESTERBEKE 8.0 KW (Gas)	4.0	5.0	2.50	1.50
ONAN 8.0 KW (Diesel)	4.0	3.0	1.50	0.90
WESTERBEKE 8.0 KW (Diesel)	4.0	5.0	2.50	1.50

LIGHTS

AREA	TYPE	LOCATION	VOLTS	BREAKER	BULB
V-BERTH	DOUBLE DOME	ABOVE VANITY	12	FWD. CABIN	#1141
	FLUORESCENT	ABOVE HEADBOARD	12	FWD. CABIN	FTB18T6
	SWIVEL	ON GUNWALE CABINETS	12	FWD. CABIN	25 W
	STEP	ON BUNK BASE	12	COCKPIT	#53
	COURTESY	IN HANGING LOCKER	12	FWD. CABIN	#1891
HEAD	SINGLE DOME	SHOWER	12	FWD. CABIN	#1141
	DOUBLE DOME	HEAD	12	FWD. CABIN	#1141
STARBOARD STATEROOM	DOUBLE DOME	OVERHEAD	12	FWD. CABIN	#1141
	SWIVEL	SIDE OF HANGING LOCKER	12	FWD. CABIN	25 W
	SWIVEL	AFT END OF UPPER BUNK	12	AFT CABIN	25 W
	COURTESY	IN HANGING LOCKER	12	FWD. CABIN	#1891
	STEP	ABOVE NIGHTSTAND	12	COCKPIT	#53
GALLEY	FLUORESCENT	OVERHEAD	110	OUTLET/STEREO	FC12T9
	SWIVEL	ON UPPER CABINET	12	AFT CABIN	25 W
	SWIVEL	ON FWD. BULKHEAD	12	AFT CABIN	25 W
	DOUBLE DOME	ABOVE AFT COUNTER	12	AFT CABIN	#1141
	SINGLE DOME	IN STORAGE UNDER SINK	12	AFT CABIN	#1141
	STEP	INBOARD REFRIGERATOR BULKHEAD	12	COCKPIT	#53
SALON	SWIVEL	ABOVE FWD. END OF SOFA	12	AFT CABIN	25 W
	SWIVEL	ABOVE AFT END OF SOFA	12	AFT CABIN	25 W
	FLUORESCENT	OVERHEAD	110	OUTLET/CONV.	FC12T9
COCKPIT	SINGLE DOME	BOTTOM OF SIDE STORAGE	12	COCKPIT	#1141
	INDIRECT	BOTTOM OF SPOILER	12	SPOILER	#90
BILGE	SINGLE DOME	ON MIDSHIP BULKHEAD	12	BILGE	#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

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.

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. THE ATTACHING SCREWS OR BOLTS SHOULD BE SLIGHTLY RECESSED.

When an A.C. shore power system is connected to the boat, the underwater metal fittings will, in effect, be connected, through the water, to grounded metals ashore. The zincs will be consumed at a faster rate unless the marina maintains a protective system to prevent this. In this case, hanging a zinc in the water bonded to the metal outlet box on the dock will reduce zinc loss on the boat. Do not connect this zinc to the boat's ground system.

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

Electrolysis can also be caused by "stray currents" due to a fault in an electrical item, even though correctly grounded. A galvanic current 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.

Section 4 — ACCESSORIES

Air Conditioner

The 390 EC 110-volt air conditioning system consists of a forward 9,000 BTU unit, an aft 16,000 BTU unit and a single 110-volt sea water pump. The forward unit is located under the starboard stateroom lower bunk and serves the foreward stateroom and the starboard stateroom. Its controls are located on the forward stateroom bunk base. The aft unit is located under the aft end of the port salon sofa and serves the salon, galley and head. The controls are on the forward end of the sofa base. The forward air conditioner has a 20 amp breaker and the aft air conditioner has a 25 amp breaker on the main distribution panel. Both units use a 10 amp breaker for the pump and relay.

Each unit also has a return air grill — one on the bottom of the v-berth hanging locker and one on the sofa base, that must be cleaned periodically. To remove the mesh screen, simply pull the louvered panel out, slide the screen out and wash in warm soapy water. Air dry before replacing. The air conditioner condensation drains into the shower sump located below the hallway floor.

To start unit:

a. Make sure the seacock for the cooling pump is open.

b. Set the control knob on the air conditioner control switch assembly to "OFF".

c. Turn the main circuit breaker on the main distribution panel to "ON".

d. Turn the air conditioner pump breaker "ON".

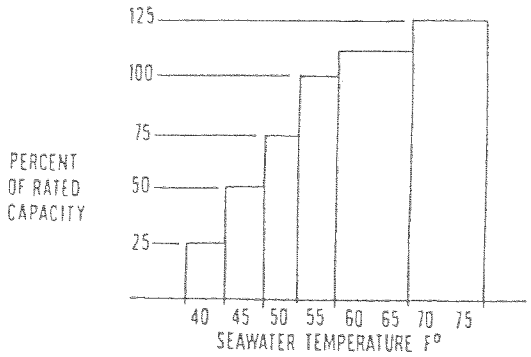
e. Turn the air conditioner breaker "ON".

f. 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.

g. 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.)

HEAT CYCLE EFFICIENCY



h. Turn the thermostat clockwise for cooling or counterclockwise for heating.

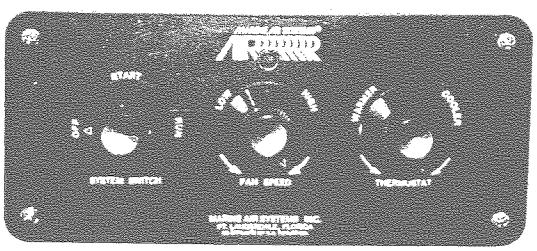
i. Set the fan speed to high.

j. To set the thermostat, allow the 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.

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

Cool cycle - Set to desired speed.

REFER TO POCKET "A" IN THE OWNER'S PACKET.



AIR CONDITIONER CONTROL

Autopilot

The autopilot is a 12 volt automatic steering control system consisting of a control unit, a magnetic compass with a course sensor and a hydraulic drive unit (pumpset). It is wired to the 20 amp accessory breaker on the dash switch panel.

The autopilot utilizes three controls: 1) the course setting, 2) the sea state control to optimize course accuracy and 3) the rudder control that adjusts the amount of correcting rudder applied.

Note: The autopilot is not intended to take the place of a person, but rather to assist in steering the vessel. It is intended for operation in open waters, clear of all obstructions and other vessels. The heading of the vessel must be observed constantly. TO DEACTIVATE THE AUTOPILOT, TURN THE SEA STATE CONTROL TO THE "OFF" POSITION.

REFER TO POCKET "A" IN THE OWNER'S PACKET.

Canvas

CANVAS CARE AND MAINTENANCE

Cleaning: 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 ½ cup (4 oz.) Clorox, ½ 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 POCKET "C" IN THE OWNER'S PACKET.

WINDSHIELD COVER SET

The windshield cover set prevents the interior from fading and gives you added privacy. To install the canvas covers, simply unroll and snap to the windshield frame. The windshield cover set will cover the entire front windshield and side windows.

HATCH COVERS

The canvas hatch covers snap in place over the deck hatches and 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.

CONVERTIBLE TOP & BOOT

The convertible top is designed to allow for boat operation in inclement weather and to aid in keeping the boat clean when not in use. The top is mounted on a pivot bracket on the windshield frame. The forward support folds forward and stretches the canvas over the helm area. For storage, roll the canvas up on the supports and zip the boot over them.

AFT CURTAIN

The aft curtain zips to the convertible top, slopes down, and then snaps to the teak deck plates. It may be used as a storage cover or while underway. The sides unsnap and roll up for easy access to the boat without removing the entire cover.

Installation Procedure:

1. Zip the aft cover to the zipper track on the convertible top approximately 6 inches on both sides of center.

2. Starting at the center of the transom, snap the snaps along the back and up the sides.

3. Zip the top of the aft cover up completely.

Electronics

The electronics package consists of a depth indicator, a VHF radio, a speed/log/trim indicator and a Loran C navigator. All are wired to the electronics fuse block behind the dash and are protected by individual fuses. The fuse block is protected by the 50 amp electronics breaker in the port bilge breaker box.

DEPTH INDICATOR

The depth indicator consists of a digital readout and a transducer located in the bilge aft of the starboard engine. The alarm selector switch on the front of the digital indicator has five alarm positions: 4, 8, 10, 20 and 40 feet.

VHF

The VHF marine band FM transceiver features channel scanning, a 25/1 watt switch for maximum or minimum transmitting power, a dimmer switch to control the display brightness and keyboard illumination and volume and squelch controls.

SPEED/LOG/TRIM INDICATOR

The speed/log/trim indicator has a single control knob with six positions. Speed is shown in nautical miles per hour on the digital readout and is automatically given in tenths of a knot when traveling at less than 20 knots. The trim and set positions provide the trim increase or decrease from the set speed. The log position starts accumulating the distance traveled from .1 nautical miles to a maximum of 199 nautical miles. The reset position clears the log distance traveled to zero.

LORAN C

The Loran C is used for off-shore navigation and has the ability to locate your position by using the Loran stations in your area to give the longitute and latitude coordinates. To function properly, the Loran C must first be initialized to your geographic region. Refer to the operator's manual for instructions on initializing and operating the Loran C navigator.

REFER TO POCKET "E" IN THE OWNER'S PACKET.

Halon System

The Fire Boy system uses Dupont Halon 1301 Fire Extinguishant and is installed in the bilge between the engines. In the event of a fire, the heat sensitive automatic head will release the Halon 1301 as a vapor, totally flooding the area in fire-killing concentrations. The system is wired to a 5 amp breaker on the dash that must be on before starting the diesel engines or the diesel generator.

On diesel installations, the system incorporates an engine shut-down switch with override system.

The system has an indicator light to indicate to the helmsman when the unit has discharged. Under normal circumstances, when the Halon breaker is "ON", the indicator light is on. 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 1301 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 POCKET "H" IN THE OWNER'S PACKET.

Horn

The dual air horn is operated by the momentary toggle switch on the dash and is protected by a 15 amp circuit breaker located on the dash. The compressor for the horn should be lubricated once a month by inserting a few drops of oil in the oil feeder located in the compressor cover.

REFER TO POCKET "H" IN THE OWNER'S PACKET.

Ice Maker

The ice maker is installed in the inboard side of the port cockpit seat base and has a pin at the top to secure the door. Do not block air flow through the ventilation panels at the bottom of the unit.

To start the unit, **make sure the water tanks are full,** turn the water system and ice maker breakers on, then turn the switch on at the bottom of the ice maker. As a precaution, the first few cycles of ice cubes should not be used because of possible contamination in the line. Once the ice maker is full, the unit will shut off automatically and cycle as ice cubes are used.

To remove the ice maker:

1. Make sure the water system and ice maker breakers are off.
2. Disconnect the ice maker water lines through the canvas access panel in the front storage area.
3. Remove the grill at the bottom of the ice maker and then the screws securing the ice maker to the floor.
4. Remove the access panel on the aft side of the seat base.
5. Slide the ice maker out.

REFER TO POCKET "I" IN THE OWNER'S PACKET.

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 mounted into the bulkheads. They are protected by a 15 amp breaker on the main distribution panel and are controlled by the switch beside each vent.

Refrigerator/Freezer

The refrigerator/freezer operates off the 110 volt (A.C.) system or the 12 volt (D.C.) system and is protected by the 15 amp refrigerator breakers on the main distribution panel. It automatically switches from A.C. to D.C. when the A.C. power source is disconnected. Always operate on A.C. power when available. Turning the thermostat to the "off" position will prohibit operation on A.C. or D.C. power.

A single thermostat controls the operation of the refrigerator on A.C. or D.C. The control knob is located at the upper right and to the rear of the food compartment. The higher number the knob is set on, the colder the temperature.

The refrigerator/freezer requires no 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 is located at the back of unit and should be cleaned every six months. Before cleaning the condenser, turn the unit off and allow the condenser time to cool. To clean the condenser, use a stiff brush and a vacuum cleaner.

To Remove The Refrigerator:

1. Remove the screws securing the top step and lift the step out.
2. Unplug the refrigerator from the outlet on the midship bulkhead.
3. Remove the screws around the refrigerator and then pull out.

REFER TO POCKET "R" IN THE OWNER'S PACKET.

Searchlight

The 7" searchlight is a spotlight and floodlight combination. The light is operated from the dash by three controls - a three position switch, a directional switch and a rheostat. The three position switch has spotlight, floodlight and off positions. The directional switch moves the light up, down, right and left, and the rheostat controls the speed of the movement. The 15 amp spotlight breaker on the port dash panel must be on to operate the light.

REFER TO POCKET "S" IN THE OWNER'S PACKET.

Stereos

AM/FM CASSETTE PLAYER

The Panasonic AM/FM cassette player features

an AM/FM stereo with station select push buttons, a cassette player with repeatrack, locking fast forward and rewind, separate controls for bass, treble, balance and fader and an LCD quartz digital clock with hour and minute time set buttons. The stereo has two speakers in the main cabin and two in the cockpit. Each pair of speakers has an individual volume control.

To remove the stereo:

1. Remove the snap caps and the screws they cover on the stereo face plate.
2. Pull the face plate and stereo out.
3. Unplug the stereo.

DELUXE STEREO

The Panasonic deluxe stereo is a 12-volt system with booster featuring an AM/FM stereo with preset station select buttons, memory buttons, scan tuning and seek tuning. The cassette player has a tape program sensor to locate the start of each program, Dolby noise reduction, auto-reverse, tape direction indicator and tape selector. The stereo also has a fader, treble and bass controls and an LCD digital clock. Two speakers are located in the cabin and two in the cockpit. Each pair has individual volume controls. The procedure for removal is the same as the AM/FM cassette player.

TECHNICS 110V STEREO

The Technics 110V stereo is an AM/FM stereo cassette receiver with remote control. In addition to the usual features of an AM/FM cassette player, the system features FM/AM preset tuning, memory, mic-mixing volume control, Dolby noise reduction, tape pause, tape side indicator, a timer and connections for a turntable, headphones, microphone, tape deck and video cassette recorder.

To clean the face of the stereo, use a soft dry cloth. If the surface is extremely dirty, use a soft cloth dipped in a mild soap and water solution. Wring out before wiping the unit and afterwards wipe with a soft dry cloth. **Never use alcohol, paint thinner, benzine nor a chemically treated cloth to clean the unit.**

To remove the stereo:

1. Make sure all 110V power is off.
2. Remove the screws in the top of the main distribution panel and swing open.
3. Unplug the stereo.
4. Lift the stereo up then out to disengage it from the bracket.

REFER TO THE POCKET "S" IN THE OWNER'S PACKET.

Stoves

ELECTRIC

The electric range or range and oven combination operates off the shore power or generator. The 20 amp stove breaker on the main distribution panel must be on to operate them.

Cleaning: MAKE CERTAIN ALL SWITCHES ARE OFF BEFORE CLEANING. The best way to clean the metal and porcelain enamel surfaces 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. A gentle cleansing powder or chemical grease remover can be used on porcelain enamel surfaces without harming the finish.

MICROWAVE OVEN

The microwave oven in the 390 EC features a rotating glass tray, three power settings, timed defrost, timed cook and an internal light. It has a 15 amp breaker on the main distribution panel that must be on to use the microwave. Details on operating and cooking can be found in the instructions and cookbook included.

To remove the microwave:

1. Make sure the microwave breaker is off.
2. Remove the drawer below the microwave.
3. Remove the screws securing the microwave to the mounting board.
4. Slide the microwave out and unplug.

REFER TO POCKET "M" IN THE OWNER'S PACKET.

Telephone

The telephone option consists of a waterproof

inlet on the port side of the deck, a fifty foot shore cord and telephone outlets above the forward end of the sofa and on and on the bottom of the forward stateroom upper vanity cabinet.

Windlasses

SIMPSON LAWRENCE

The Simpson Lawrence windlass is designed to handle either rope or chain. Using the gipsy-type windlass requires operation from the front deck with a foot-activated control switch. The windlass will free-fall line when feeding out. The clutch/brake controls will slow down and stop the rate of feed. An emergency hand lever engages on the gipsy teeth and allows pulling power in excess of 700 pounds. If chain is used, a digital chain run indicator shows the amount of chain let out. Included with the windlass package are 200 feet of ½" nylon line, 6' of 3/8" anchor chain and a Danforth 20-H anchor.

POWERWINCH AUTOMATIC WINDLASS

The Powerwinch windlass is operated directly from the dash with a control switch. The line is fed in and out so the anchor can be raised and lowered without going onto the deck. The anchor will stow itself and coil the line in the rope locker. The 12 volt circuit breaker must be on for the unit to operate. Included with the windlass are 200 feet of 5/8" line and a 20-H Danforth anchor.

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

REFER TO POCKET "W" IN THE OWNER'S PACKET.

Section 5 STORAGE & SLEEPING ACCOMMODATIONS

Storage

The 390 EC has a total of 211 cubic feet of storage space divided as follows:

Forward Stateroom	68.5 cubic feet
Starboard Stateroom	23.5 cubic feet
Head	11.4 cubic feet
Galley	54.0 cubic feet
Salon	23.8 cubic feet
Cockpit	29.8 cubic feet

In addition to the drawers, cabinets and hanging lockers, there are storage areas under the mattress of the forward bunk and the sofa cushions and floor storage in the forward stateroom and galley. **Caution: Do not store sharp objects in the storage area under the forward stateroom bunk.** There is also a bottle and glass storage area in the galley.

DINETTE BUNK CUSHION ARRANGEMENT

Sleeping Accommodations

The 390 EC has comfortable sleeping accommodations for six people. In addition to the forward and starboard stateroom bunks, the salon sofa converts into a bunk. To convert the sofa to a bunk, slide the board under the cushions out and insert the stainless tubes into the holes on the bottom of the board. To convert the starboard stateroom bunk to a sofa, unhook the upholstery slings at the ceiling and lower the top bunk. It becomes the back for the sofa.

Section 6 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 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 bent rods 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.

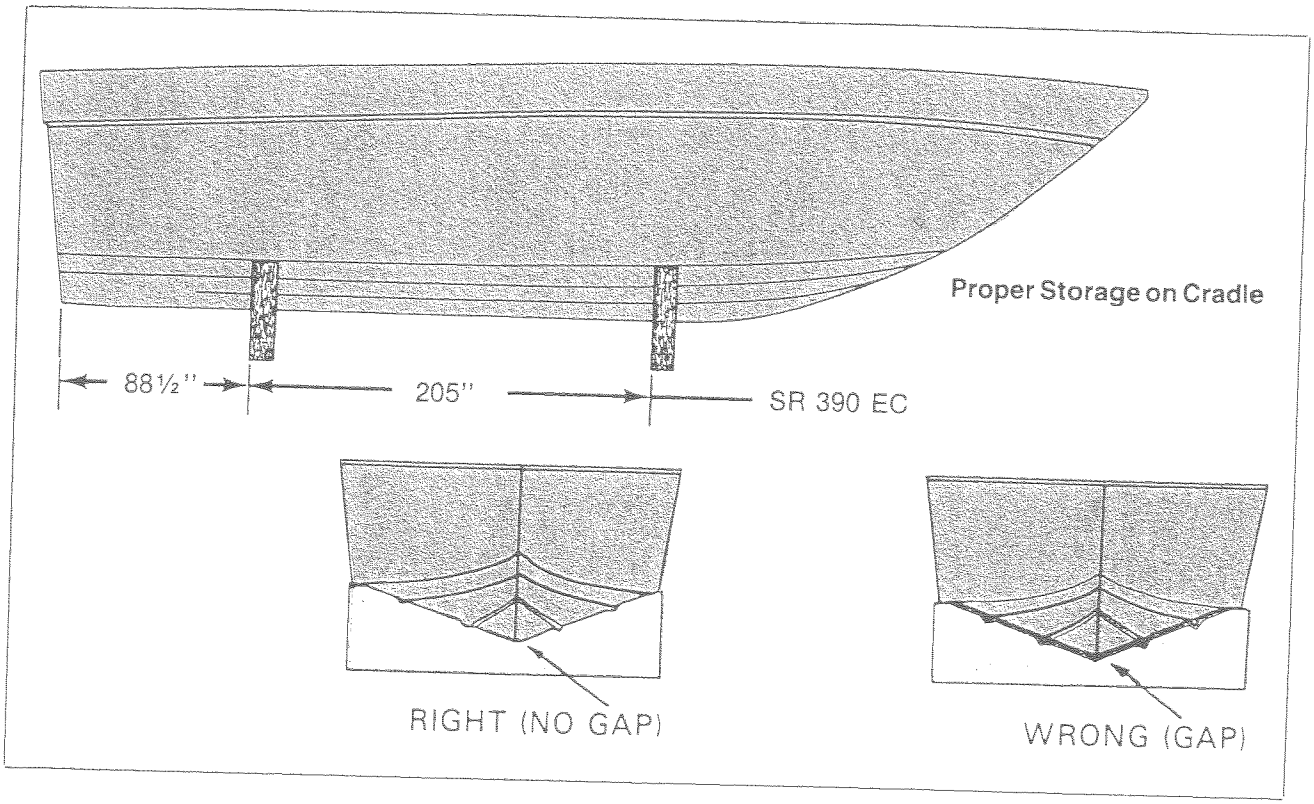
CAUTION: DO NOT USE THE CLEATS FOR LIFTING.

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



Proper Storage on Cradle

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 pumped out and sponged until completely free of water.

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

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**
   a. Store boat in a bow high attitude.
   b. Remove hull drain plug.
   c. Pour one (1) pint of anti-freeze in each bilge pump sump.

2. **Water System**
   a. Turn off fresh water pumps.
   b. Open all faucets.
   c. Remove hoses from water pumps and water heater.
   d. Blow out all lines to clean.

3. **Ice Maker**
   a. Shut off water supply.
   b. Disconnect the water line at the garden hose connection on the solenoid valve.
   c. Allow the unit to run for one hour. Remove any ice cubes ejected during this period.
   d. Shut off the electricity and prop the door open to allow the unit to thaw.
   e. After it has thawed, wipe it dry.

4. **Engines**
   a. Flush engines with fresh water.
   b. Remove engine drain plugs, open petcocks and seacocks.
   c. Remove seawater strainer plugs — if applicable.

5. **Generator**
   a. Flush generator with fresh water.
   b. Remove drain plugs from generator, strainer and mufflers.

6. **Air Conditioner**
   a. Flush with fresh water.
   b. Remove hoses from condensing unit and sea water pump.
   c. Remove strainer plug.
   d. Blow out all lines to clean.

7. **Batteries**
   a. Remove from boat and store away from freezing temperatures.
   b. Store on a wooden pallet and keep under a trickle charge.

8. **Heads**
   a. All units should be pumped dry and flushed with fresh water.
   b. Pour anti-freeze into unit to protect from freezing.

9. **Fuel Systems**
   a. Add "Racor" fuel additive to diesel fuel tanks.
   b. Add a gasoline stabilizer to gasoline tanks.

REFER TO INDIVIDUAL OWNER'S MANUALS FOR SPECIFIC PROCEDURES.

Fitting Out After Storage

FUEL SYSTEM

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

EXHAUST SYSTEM

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

a. 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.

b. 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.

c. Make sure the rudder clevis pin on each side of the tie bars is in and safetied.

d. Check all strut fastenings and thru-hull fastenings.

e. Test the navigation lights.

f. Check all wiring for loose connections.

g. Check all switches and equipment for proper operation. Anchor lines and gear should be inspected and replaced if necessary.

h. Make sure the hull drain plug is in place.

i. Clean the bilge thoroughly if it was not done at lay-up.

Section 7 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 DuPont No. 7, or power buff with Mirror-Glaze No. 1, then wax.

STAINS AND 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 allowed 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 ("Boater's 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.

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 "fur", ceiling and cushion materials should only be cleaned with dry cleaning fluid. It is the **only** approved solvent.

Section 8 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
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 AND 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 AND CONNECTIONS	X	X	X		
CHANGE WATER SEPARATING FUEL FILTER		X			X
CHECK GENERATOR OIL LEVEL	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 BATTERY ELECTROLYTE LEVEL	X	X	X		
CHECK ALL ELECTRICAL CONNECTIONS		X			X
INSPECT PROPELLER FOR POSSIBLE DAMAGE			X		
CHECK ENGINE TO SHAFT ALIGNMENT		X			X
INSPECT FRESH WATER PUMP & WATER SYSTEM		X		X	
CHECK TDX TREATMENT CHEMICAL	X				
CHECK FLUID IN TRIM TAB 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				