

LAUNCHING INSPECTION REPORT

BERTRAM YACHT

A DIVISION OF BERTRAM-TROJAN, Inc.

Dealer _____

 Owner _____

 Boat Name _____

Hull Number _____
 Engine Make MERCUISERS 340 HP
 P. Engine No. _____
 S. Engine No. _____
 Registry No. _____

OPERATION	INITIAL
BEFORE LAUNCHING:	
1. Both shafts turn free	
2. Engine intake scoop installed ok	
3. All other thru hull fittings ok	
4. All drain plugs tight: hull, engine muffler, exhaust wye	
5. Bottom clean and paint ok	
6. Hull sides clean and finish ok	
7. Bright work clean and finish ok	
8. Decks clean and finish ok	
9. Interior finish ok	
10. Upholstery clean and ok	
11. Bilge cleaned	
WITH BOAT IN WATER:	
12. No water leaks at shaft or rudder stuffing boxes or at shaft log	
13. No water leaks at thru hull fittings with sea cocks open	
14. Hose tested for cabin and window leaks	
15. With all switches off - no spark when battery cable touched to post	
16. All electrical equipment operated ok including: horn () running light () bilge pump () bilge blower () w/wiper ()	
17. All toilets operated ok	
18. Water (pressure) system operates ok	
19. Galley stove operates ok	
20. With fuel tanks full, no fuel leaks at fill pipes, over-flow vent, or at any fuel line connections	
21. With coupling disconnected, engine and shaft alignment ok (NOTE: alignment should be rechecked after 48 hours in the water)	

OPERATION	INITIAL
BEFORE STARTING ENGINES: (See Engine Operator's Manual)	
22. Distributor lubricated	
23. Distributor points adjusted	
24. Ignition wires in correct firing order	
25. Spark plugs and coil ok	
26. Alternator, regulator, starting motor wired correctly, connections tight	
27. Throttle control and cable travel ok	
28. Clutch control and cable travel ok	
29. Crankcase oil level at FULL mark	
30. Hyd. reverse gear oil level at FULL mark	
STARTING ENGINES:	
31. Oil pressure and exhaust water flow ok	
32. No fuel leaks in fuel lines, at fittings at fuel filter, fuel pump, carburetor	
33. No engine water leaks	
34. No engine leaks	
35. Ignition timing checked with timing light, with idling speed at 500 RPM	
36. Valve tappets adjusted	
37. Idling speed set at 500 to 700 RPM	
38. Reverse gear shifts thru all positions and is in proper adjustment	
WATER TEST BOAT: (See Engine Operator's & Boat Owner's Manuals)	
39. Boat performance ok	
40. Port engine performance ok	
41. Stbd. engine performance ok	
42. Instruments register properly	
43. Top RPM wide open throttle for one minute after warm-up: P _____ S _____	
FINAL CHECK:	
44. All accessory equipment operated ok	
45. Carpets and drapes installed	
46. All loose equipment on boat	
47. All boat, engine, accessory literature ready for new owner	

COMMENTS: _____

OWNER'S SIGNATURE

BERTRAM

33

P/N 181040

REV.A

REVISION AND EFFECTIVITY PAGE

REVISION LETTER	BOAT MODEL NUMBER AND EFFECTIVITY HULL NUMBER	CHANGES
A	MODEL 334, HULL NR. 1224 AND SUBSEQUENT MODEL 335, HULL NR. 721 AND SUBSEQUENT	Electrical systems in- formation moved to electrical systems drawings.

A WORD OF WELCOME

We are pleased that you have chosen a Bertram, and know that her unique design will give you outstanding performance and many years of boating pleasure.

Your Bertram is built of the finest, most modern materials and is manufactured under rigid quality controls. Her hull is of high-impact, multi-laminate fiberglass. High pressure laminates and vinyl throughout further reduce maintenance. She comes to you as the most thoroughly tested and trouble-free boat on the market today.

As durable as her construction is, your Bertram will benefit by reasonable care. And, as is always true with things mechanical; maintenance, adjustments, or repairs may be required from time to time for certain components. Thus, this Owner's Manual, containing a wealth of detailed information, has been specially prepared for your particular model to guide you in keeping her in yacht condition.

To fully enjoy your Bertram, you should understand her completely. To this end, we suggest that you read this manual thoroughly.

If any points arise that you do not completely understand, your Bertram dealer will be glad to assist you.

Included are warranties, ours plus those of manufacturers of engines and accessories.

When your boat requires service, contact your Bertram dealer. He has been factory trained to help you and our factory service representatives are available to help him if need be.

We wish you many years of pleasurable yachting on your new Bertram 33.

DATA SHEET

NAME OF BOAT

OWNER'S NAME & ADDRESS

HAILING PORT

HULL NUMBER

REGISTRATION NUMBER

12'6"
HEIGHT ABOVE
WATERLINE

12'6"
BEAM

3'0"
DRAFT

32'11½"
LENGTH
OVER ALL

315 US. gal.
FUEL CAPACITY

70 US. gal.
WATER CAPACITY

IGNITION KEY NUMBER

DOOR KEY NUMBER

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INITIAL CHECKLIST

Upon boarding his Bertram 33' for the first time, the wise owner will want to familiarize himself with the total operation of the various systems.

- I. Location and function of all 12 volt electrical switches, fuses and breakers.
 - a. Master Switches located under the small hatch just inside the cabin door control the on-off operation of the 12 volt system. The only 12 volt circuits excluded from the master switch control are the bilge pumps on automatic.
 - b. Master Fuses protect the wiring between the batteries and the main distribution panel. The fuses can be found on the under side of the cabin sole over the batteries.
 - c. Distribution Panel - D.C. circuit breakers, located on the bulkhead of the stairway leading to forward section, control and protect the individual electrical components such as lights, pumps and instrumentation. The starboard and port engine breakers on this panel supplement ignition keys for locking ignition circuits.
 - d. Main Circuit Breaker for Optional Generator is located under the cockpit deck on the generator sound bulkhead, outboard and starboard of the generator.
- II. Location and function of 115 volt electrical switches, fuses and breakers.

- a. Master breakers for shore, auxiliary generator, and air conditioner power are located in the 120 V.A.C. panel to the right of the 12 V.D.C. panel in the stairway. (See electrical block diagram and section on Air Conditioning Operation.)
- b. Ship-Shore Selector Switch is located on the A.C. half of the distribution panel and determines the A.C. power source.
- c. Input Voltage and Amperage Gauges on the distribution panel monitor the A.C. system. (Shore Line No. 1 or Generator).
- d. Branch Breakers include all A.C. equipment, i.e., range, refrigerator, converter outlets, etc.

III. Location, description and operation of mechanical systems such as valves, seacocks, fuel system, etc. are described in the sections which follow and their accompanying diagrams.

CONTROLS AND INSTRUMENTS

THE IMPORTANCE OF INSTRUMENTS

To avoid mechanical damage, become accustomed to checking your instruments frequently when running and particularly when first starting the engine.

IGNITION AND STARTER SWITCH:

GAS

After the corresponding engine circuit breaker is turned on, the engines are started by first turning the console ignition (or on-stop) switch to the "on" position; thereby energizing the electrical system. A starter switch for both starboard and port engines is operated to crank the engine. As soon as the engine starts, release the starter. This starter should not be operated for prolonged periods which may result in draining the batteries or overheating the starter motor or solenoid.

DIESEL

Boats powered with diesel engines use the "on - off" switch to energize the starter circuit. This toggle switch is used to energize other engine electrical components and should be left on at all time when the engine is operating. The momentary "start" toggle switch is held in the "on" position until the engine starts. To stop the diesel engine, the "on-stop" switch should be placed in the "off" position (or stop).

ACCESSORY SWITCHES

Each of these toggle switches operates lights or electrical accessories

as marked and usually they operate from the engine starting batteries. Excessive use when engine is not charging the batteries could make engine starting difficult.

BATTERY PARALLELING SWITCH:

In the event that the engine starting becomes difficult due to weak batteries the switch may be held in the starboard or port position simultaneous to operating the starter switch, e.g., if starboard is weak, throw paralleling toggle switch to port batteries to assist the weaker starboard batteries. Sufficient power should then be available to start the engine.

NOTE: On all diesels, the paralleling switch should be used in conjunction with the start switch.

GAUGES

Gauges are as follows: Oil Pressure, Tachometer, Voltmeters, and Water Temperature, Hour Meters, Fuel, and Fresh Water Tank. All these instruments operate on the boat's 12 Volt System.

HOUR METER

This instrument registers the number of hours that the engines have been operating, regardless of engine speed (RPM). Meters are energized by ignition switch. Engine Hour Meters are mounted just above the 120 V.A.C. Distribution Panel.

VOLTMETER

This is a battery condition meter that indicates level of charge the batteries are at, normal is 12 to 14.3 Volts.

LUBE OIL PRESSURE GAUGE

Almost all serious engine trouble will be reflected on the oil pressure gauge. Therefore, if any radical change in pressure should occur, turn the engine off immediately. During operation, there may be some slight fluctuation in gauge reading. This is normal due to the nature of the lubricating oil and temperature variation. Consult your engine manual for operating procedure.

TEMPERATURE GAUGE

The temperature gauge records the water temperature circulating through the engine. All engines are equipped with a thermostat that controls the water flow, thus determining the temperature. The Temperature and Oil Pressure Gauges should be observed simultaneously as most malfunctions will be reflected in both gauges. Consult engine manual for further information.

NOTE: If the engine temperature rises, oil pressure will drop, so this oil pressure gauge should be used in conjunction with the water temperature gauge.

TACHOMETER

This instrument registers the revolution per minute of the engine. There is no correlation of RPM's to speed of the boat due to slippage at the propeller. Selector Switch for dual control, located at lower control. See Fuel Range Chart for speed vs. RPM.

ENGINE AND MARINE GEAR

Clutch and throttle controls are installed on the port and starboard side of the steering wheel within easy reach of the helmsman. They are Twin Push-Pull Cable controls directly connected to the engine throttles and marine gear. This type of control is standard with gasoline or diesel engine installations.

Ignition switches, shut-off switches and battery paralleling switch are grouped and so marked in a location in front of the helmsman. To start either engine put ignition toggle switch in the "on" position. This will activate all instruments for this engine. Advance throttle then press starter switch and hold until engine starts.

NOTE: Never hold starter switch for over 10 seconds. If engine does not start after several tries, it is best to follow the Engine Manual recommended procedure.

STEERING SYSTEM

Steering Control (Hydraulic-Hydraulic)

The steering system consists of a hydraulic pump and pilot check valve, to which the steering wheel is attached. When the wheel is turned, hydraulic fluid is pumped to the steering cylinder attached to the rudder arm. There is a hydraulic fluid reservoir installed in the system. The reservoir contains 2 quarts of fluid under 30 PSI air pressure. This will prevent any outside air from entering the system. The reservoir has a sight glass indicating the fluid level. The air pressure can be recharged by using an ordinary tire pump. There is a valve on top of the reservoir to which the pump can be attached. The reservoir is located on the aft bulkhead starboard of the generator and is accessible through the small hatch starboard of the generator hatch.

The steering cylinder is a double acting type with direct mechanical linkage to tiller arm. The system gives instant rudder response and will provide a hydraulic lock against any rudder forces.

Additional steering control or automatic pilot may be added without adding additional steering effort.

TRIM TABS

The trim tab system on your Bertram is electric-hydraulically operated

and receives its power from the 12 VDC distribution panel. Its purpose is to regulate the attitude of the boat while underway. The trim tabs are operated from a rocker-type switch panel at the control helm. If used properly, the trim tabs will aid in trimming the boat in a fore and aft position, thus facilitating a better view for the helmsman and allowing an overall smoother ride.

When you push "bow up," the tabs move to upper position, This is "normal" position and should be best for most slow and medium cruising speeds. When running an inlet or before a following sea, have "bow up".

When pushed "bow down", tabs will lower to down position. At fast cruising or top speed, tabs should be about 1/3 to 1/2 down. Learn to judge running attitude of the boat in relation to the horizon. (Note: The tabs have a special short stroke of 1-3/4" length.)

After starting the engines of your Bertram, depress the bottom of both trim tab switches, thus assuring that the tabs are in the full "UP" position. After getting underway and upon reaching a plane, depress the top of the trim tab switches lightly, bringing the bow down slightly. The speed of your boat and the degree of choppiness of the water will determine the extent of lowering your trim tabs.

The operator should be cautioned that if the trim tabs have been used and the speed is cut to slow or idle while the boat is running, they should be returned to the normal "UP" position before accelerating again. This is to insure that the trim tabs are at an even pitch upon acceleration, thus avoiding a list. The operator should be aware that the trim tabs do not operate as a unit, but are individually controlled to allow for maneuvering. Trim tab position in following sea must be up.

Tabs can be used to correct for adverse load, seas, and wind conditions.

Never press one switch "bow down" at the same time as other is pressed

"bow up". This will trip circuit breaker on 12 V.D.C. Panel. Prolonged holding of either switch at either end of travel will also cause breaker to trip. Circuit breaker will have to be reset to "on" position to make tabs operative again.

IMPORTANT: Never back down while the tabs are in down position. Because of the force of the water in reverse, it is possible to damage both trim tab cylinders and/or internal seals of the cylinders.

LIGHTS

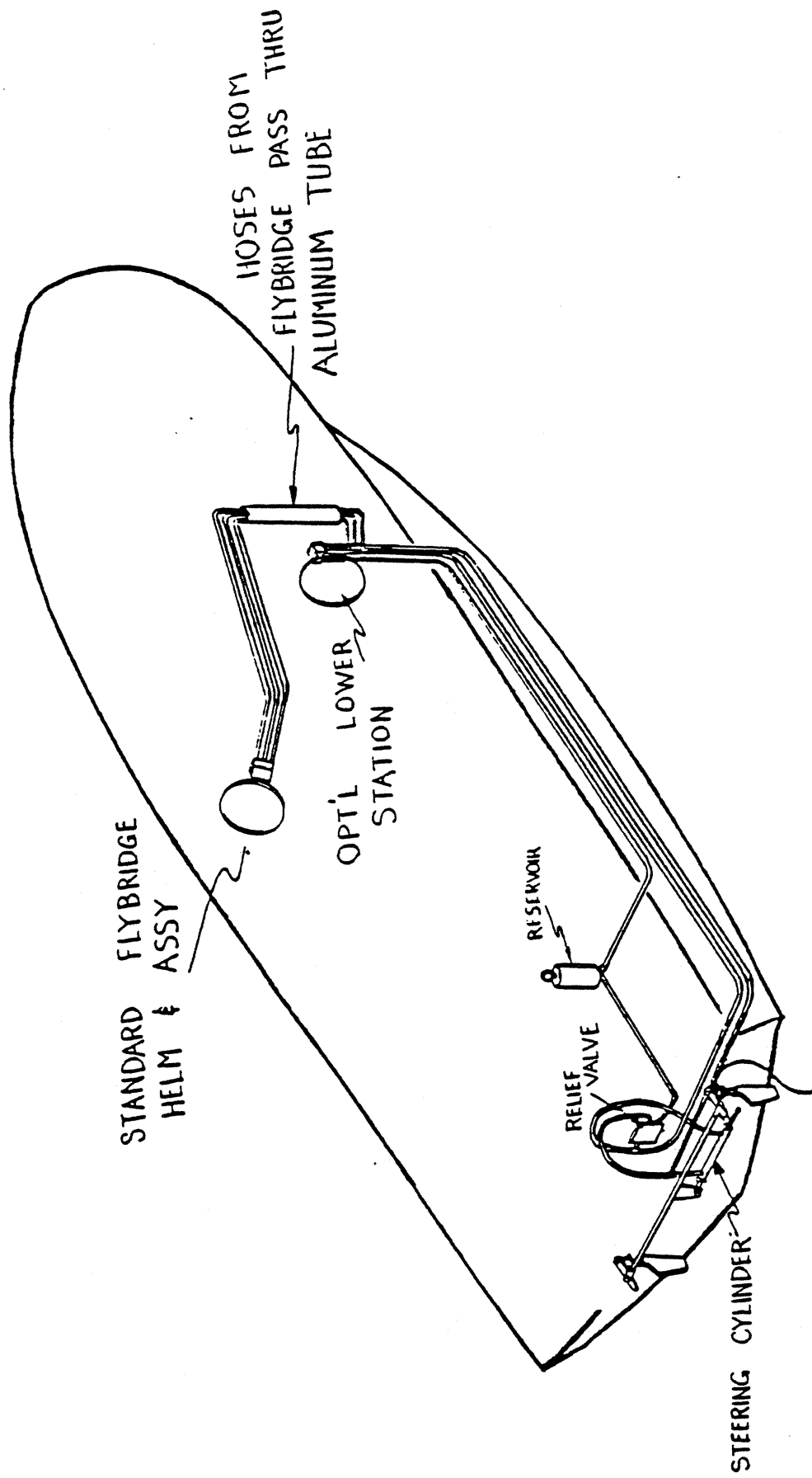
Your Bertram 33 is equipped with international navigation lights for night running. These lights should be used between one-half hour before dusk and one-half hour after dawn. The navigation light system includes the following:

1. A green, 10 point light on the starboard side of the bow; two-mile visibility.
2. A red, 10 point light on the port side of the bow; two-mile visibility. Both of these lights are located inside the forward bow chock. A white 20 point light on forward edge of Hard Top.
3. A white, 12 point light on the stern; two-mile visibility.

These three lights are in operation when the navigation light switch is placed in the "Navigation" position. When this switch is placed in the anchor position, a telescopic anchor 32 point light located to the left of the clutch control comes on. This anchor light has the capability of telescoping to approximately three feet.

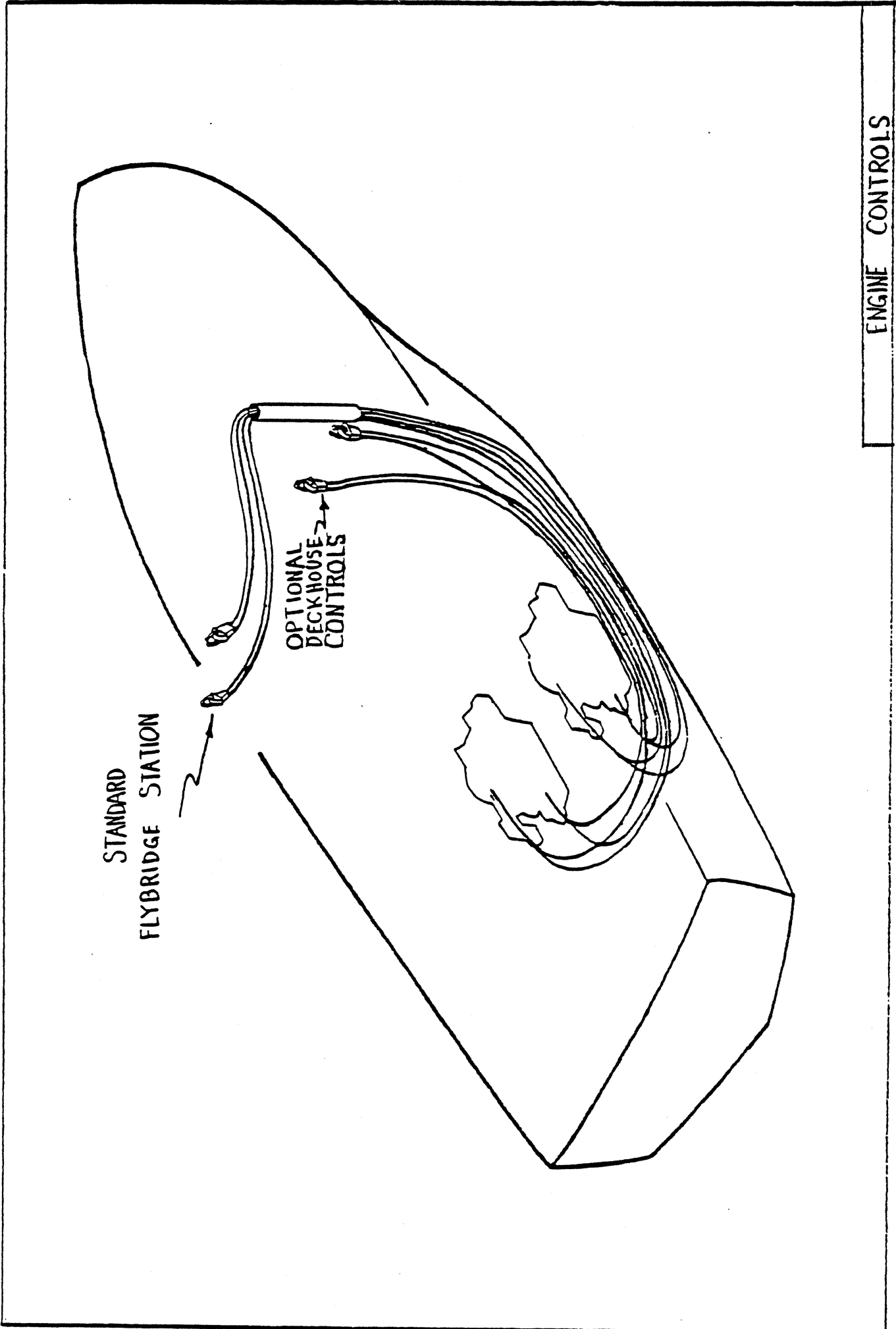
SPOTLIGHT (Optional)

The spotlight is mounted on the front of the flying bridge, ahead of the verturi wind screen and is remotely controlled from the flybridge station.



BEARING - USES MOLY--
1000 HR. CHASSIS GREASE

STEERING SYSTEM



ENGINE CONTROLS

POWER PLANT AND TRANSMISSION OF POWER

ENGINES

All necessary data and information about the engines are contained in the Engine Manual, so they are not repeated here. Just a reminder, the life and performance of the engines are dependent on the way they are cared for, so follow the manufacturer's instructions and watch the instruments carefully to obtain many hours of pleasureable boating.

MARINE GEARS

A gear unit, affixed to the after end of your engine, is a hydraulically operated forward and reverse transmission and reduction gear. Information and maintenance procedures can be found in the Engine Manual.

PROPELLER SHAFTS

Information as to size, length and material of shaft will be found on the Ship's Information page at the front of this book.

ENGINE - SHAFT ALIGNMENT

At the factory, your engines were aligned properly, but they should be checked after the first 50 hours of operation, then periodically to insure proper alignment and performance. It is especially important to check alignment when the boat has been lauched after a haul-out or dry storage. Let boat settle in the water for a day or two before making final alignment adjustments. We recommend the following procedure:

1. Remove all bolts in the coupling flanges at the end of the marine gear. Slide shaft aft until the flanges are about 1" apart.

2. The flexible hose on the shaft log does not give the shaft full support. Move the shaft up and down and from side to side to determine, as close as possible, the central position where the shaft should be normally located. At this point the boss on shaft coupling should enter recess on engine coupling without moving shaft to either side nor raising it more than ^{any} 1/8".
3. If such is not the case, move engine as indicated.
4. When you are assured that engine is roughly aligned with shaft, bring the flanges of the couplings together until they touch lightly.
5. Check for an opening between the flanges with a feeler gauge. If the opening is greater than .003" at any point, engine should be realigned by adding or removing shims, or adjusting the mount elevation bolts under those engine mounts that will correct the situation.
6. If a feeler gauge is not available, use 4 strips of paper about 1/2" wide and space them equally around and between the flanges. By gently pulling on each, the relative amount and direction of misalignment can be determined.

SHAFT LOG AND STUFFING BOX

The shaft log is the tunnel that the propeller shaft turns in and is of fiberglass construction. On the inside end of the shaft log, there is a stuffing box attached by a flexible hose and held in place by hose clamps. This flexible hose allows for a misalignment of .010" without undue wear of the packing gland itself. The stuffing box is packed with braided flax packing. This is kept tight to keep it from leaking by the packing gland. It is normal to have a slight drip of water from the stuffing box as this serves as a lubricant, but

if the leaking is excessive, the packing gland should be tightened. Be careful not to tighten too much as this will glaze the packing and score the shaft. If necessary to repack the gland, remove boat from water, back off both lock nuts and slide the packing gland forward on the shaft. Be sure that the old packing is removed and install five $\frac{1}{4}$ " x $\frac{1}{4}$ " rings of new packing. Slide packing gland aft and tighten to a point where there is a slight drip of water. Tighten so shaft will not move. This will seat packing. Back off until shaft is free. Run shaft for a while and reset. Always use tallow flax packing. Do not spiral around shaft, each ring must be separate.

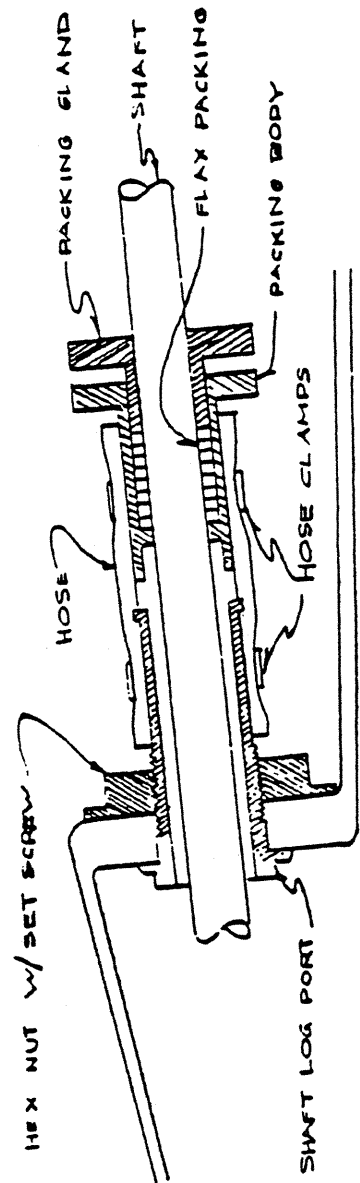
Caution: Always tighten packing gland evenly. One turn on each nut at a time will avoid any problems.

Propellers

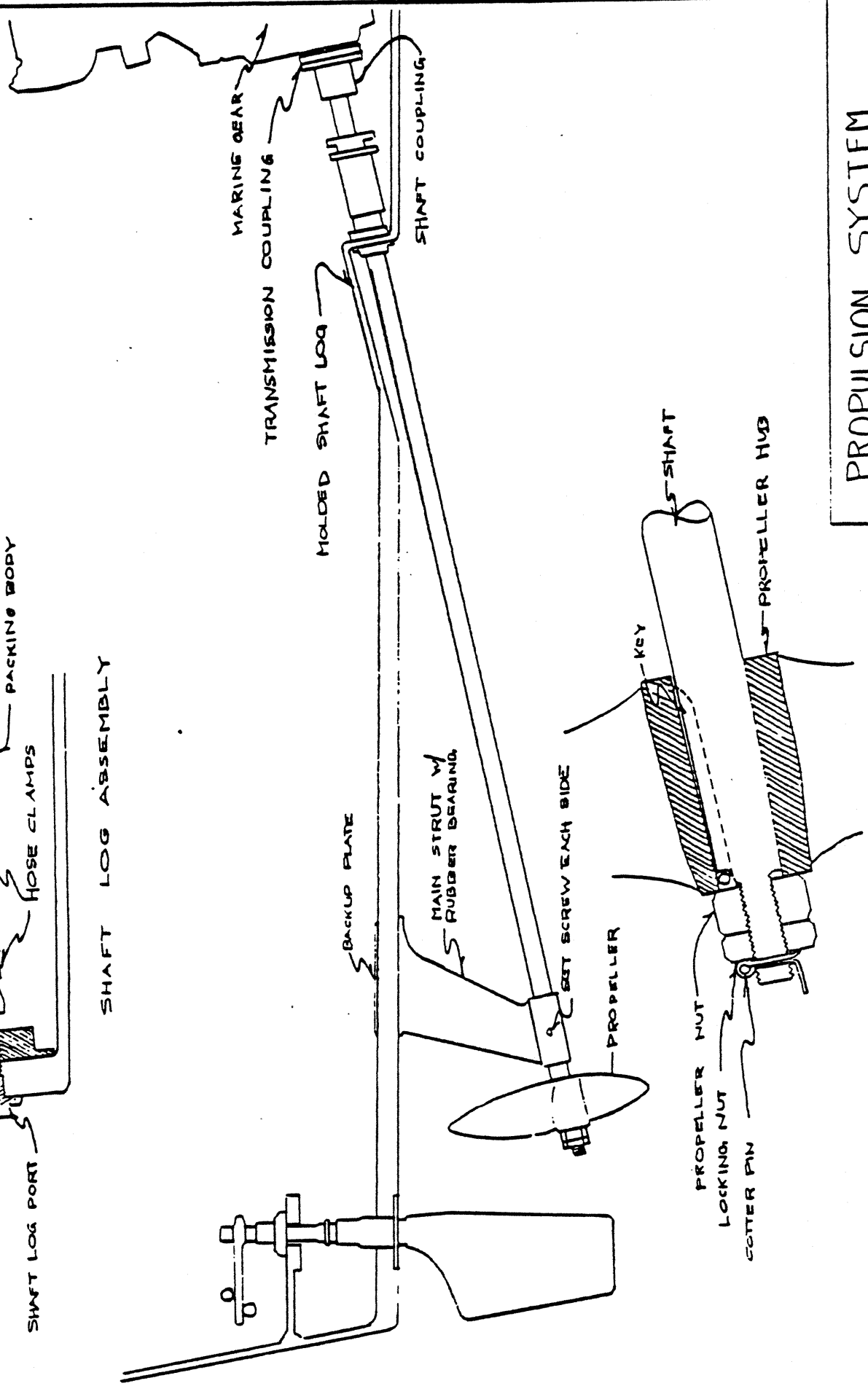
Information on propellers will be found on the Ship's Information page of this book. The propellers recommended are those with which your boat was tested. If weight has been added or the operating characteristics have been changed due to addition of special equipment, it may be necessary to change the pitch to suit existing conditions.

Installation of Propellers

Propeller bore and the end taper of the shaft must be clean and free of any obstructions. In order that the propeller seats securely on the shaft, the keyways must be free from burrs and corrosion. Insert the key with its round end forward on the shaft, then place the propeller on the shaft aligning the keyway. The key should fit snugly on each side of the keyway, but clearance at the top is essential so as not to pull the propeller off center and thereby cause vibration. After proper fitting, assemble the propeller nut, locking nut and cotter pin on the shaft. The key must go on the shaft first.



SHAFT LOG ASSEMBLY



PROPULSION SYSTEM

CLOSED COOLING SYSTEM (OPTIONAL)

Gas MerCruisers

WATER CIRCUIT

The closed cooling system employs two separate water circuits. The primary circuit (fresh water) absorbs engine and exhaust manifold heat and, in turn, transfers the heat to the secondary (raw water) circuit, by means of a heat exchanger. Raw water is pumped from a through hull fitting in the bottom of the boat through the heat exchanger and over board by way of the exhaust pipes, thus also, keeping them cool.

BREAK DOWN OF PARTS

A copper tank is located on the front of the engine. This is a four pass heat exchanger and under normal conditions this will run about 180°.

Looking at the front of the engine there are two pumps. The one on the left is the raw water pump which cools the oil heat exchangers and also supplies the water to the heat exchanger. This pump should always run cool. On the front center of the engine is the circulating pump which recirculates fresh water from the heat exchanger through the manifolds and block, then back to the heat exchanger. This pump will run hot -about 150°.

MAINTENANCE

The closed cooling system requires very little maintenance as far as lubrication, the anti-freeze will take care of this. If sea strainers have been installed, this will eliminate sea weed and trash from clogging up the exchanger. Water should be added when necessary. If all the water is lost, anti-freeze should be reinstalled.

TROUBLE SHOOTING

Normal temperature for the unit will be 193° with a surge temperature of 220°. This means that after a hard run and then return to idle a rise of temperature will be noted, not over five minutes.

If a high temperature is noted, or steam comes from the engine room:

1. Remove cap from heat exchanger (use rag over cap, check water level, fill if necessary.

NOTE: Engine must be running.

If unit will not hold water check for a blown hose. Before replacing hose make sure nipple and inside of hose are free of paint. If fresh water is not available, salt water may be used temporarily. However, at first opportunity the system must be flushed, removing all salt water from block and manifold by means of drain plugs located in lower side of block and under side of manifold.

2. Check belts for tightness - Described in MerCruiser Operating Manual.
3. Look inside heat exchanger. Check for water flow. This will tell you that the fresh water pump is working.
4. Next check exhaust overboard discharge for water flow. If no water, impellers in raw water pump are possibly bad.
5. In gasoline engine powered boats, the Velocijet Exhaust System will become very loud if raw water flow ceases.
6. Could be losing water through cap. Make sure #12 cap is on unit.
7. Sea strainer could be clogged.
8. CAUTION: Above all DO NOT try to change water lines or remove thermostat.

BOAT SPEED

Boat speed is dependent on many variable factors, so no catalog or advertised speed can be guaranteed. A short discussion of some of the more important factors affecting boat speed are presented below.

ENGINE EFFICIENCY

With normal care and maintenance the engine will maintain peak efficiency. However, if they are neglected, the power will fall off and expensive repairs could become necessary. Take care of the engines!

ATMOSPHERIC CONDITIONS

Engines will develop more power when the ambient air and water temperatures are cool. In fact the power variations due to temperature can be as much as ten percent. For this reason greater speeds are generally obtained in the spring and fall, rather than in the summer.

PERSONAL EQUIPMENT AND ACCESSORIES

All personal equipment and accessories added to the boat will tend to decrease the speed, just as adding passengers will. Often the effect of this added weight is not taken into consideration in the performance of the boat.

MARINE GROWTH

In order to obtain maximum speed, the bottom of the boat must be kept free of marine growth including moss. Any growth on the boat's bottom will increase the resistance of the boat as it moves through the water, thus decreasing speed.

WATER IN THE BILGE

Since a barrel of water weighs over 400 pounds, the bilges must be kept pumped dry in order to keep excess weight down. As mentioned before, added weight will reduce boat speed.

DAMAGED UNDERWATER EQUIPMENT

Loss of speed and excessive vibration can result from damaged propellers, shafts, or struts, or misaligned rudders. The rudders on your 33' Bertram should not be towed in or out at all.

FUEL SYSTEM

FUELING INSTRUCTIONS

These steps should be followed in this order each time your Bertram is fueled:

1. Close windows, doors, hatches and engine hatch.
2. Do not operate any equipment: This means engines, power plant, galley stove, or bilge blower.
3. Make sure the filling hose nozzle is touching the yacht's fill pipe fitting before any fuel is pumped.
4. Top the tanks until fuel overflows through the vent fitting on hull side below fill pipe.

CAUTION: The first time the tanks are filled a thorough check should be made to insure that fuel does overflow through vent. If this does not occur immediately notify your dealer and the Bertram factory.

5. Open windows, hatches and engine hatch. Then visually and by the smell, check for fuel leaks or fuel fumes. At the same time, open the the fuel feed lines located close to the tank and inspect all fuel lines and fittings.
6. Operate the bilge blower and leave it running until engines are started. Start engines after operating the blower for a minimum of five minutes.
7. Close engine hatch and other hatches after main engines and auxiliary generator have been running for some time.

FUEL SYSTEM

The Bertram 33 has a molded fiberglass fuel tank with a capacity of 260

usable gallons. The tank is constructed in accordance with accepted standards, made of fire retardant resins and is located under the cockpit sole laminated to the hull. This fuel tank is not an integral part of the hull. The vent and fuel gauge sender are located at the middle of the tank under the small hatch in the center of the cockpit deck. There are two shut off valves in all fuel feed lines: one at the fuel filter, and another at the tank. The tank vent line is located in the hullside directly below the fuel fill.

FUEL

Use only the fuel recommended by the engine manufacturer. Should you be forced to use lower than specified octane in gasoline engines, do not exceed 2700 RPM under any conditions as severe internal damage to the engines could result at a faster RPM. See the engine operator's manual for more information.

PAGES 22 AND 23 INTENTIONALLY LEFT BLANK

FRESH WATER SYSTEM

The fresh water tank has a capacity of 70 gallons. The filling connection is forward on the starboard side deck and the vent is in the hull side directly below it.

CAUTION: When filling water tank, do not use the full city water pressure. As is, it is possible to use more pressure and volume than the vent line can discharge: thereby causing the tank to rupture. It is suggested not to leave the hose unattended while filling the water tank. A dockside water connection is located inside the cockpit under the shoreline receptacles on the starboard side. This connection is a convenience to use while at dockside allowing the use of available water, bypassing the water tank and the fresh water pump.

WATER HEATER

The 10 gallon water heater installed in front of the port engine adjacent to the water tank has an electric immersion type element and also is heated by the hot water from the port engine. The thermostat for the element is preset at 150°, but can be set to any desired temperature by removing the cover plate, parting the fiberglass insulation and repositioning the indicator to the desired temperature. This thermostat also contains a reset button which must be reset if it has been tripped due to high temperatures. A relief valve is also preset if the pressure in the heater tank should exceed 50 PSI or a temperature of 212° F. The 110 Volt power for the immersion unit is obtained from the 110 Volt section of the breaker panel marked "Water Heater".

OPERATION

To START pump for the first time or after system has lost prime, check storage tank for water. Be sure master switch and circuit breakers are on.

Open one or two faucets to demand the pump operation and allow water to flow from the faucet. When pump is primed and water runs from open faucet, close the faucets. Pressure should build up to 40 PS0, whereupon pump can be shut off. If faucet is reopened pressure will begin to drop and the pump will start.

MAINTENANCE

Fall Lay-Up: It is always best to store electrical equipment in a warm, dry place over the winter. If possible, remove the pump and motor assembly for such storage. If the pump is to be left on the boat through the winter, it must be thoroughly drained. Remove inlet and outlet connections from the pump. Remove pump from motor and hold upside down while turning shaft. If possible, blow water out with compressed air. Dilute any water remaining in pump with alcohol.

Trouble Shooting:

1. Pump Noisy: Be sure that water supply line from storage tank is unrestricted.
2. Pump starts when water has not been drawn from system. This is caused by a leaky check valve which allows pressurized water to bleed back in to the storage tank. Clean check valve and replace worn or damaged parts.
3. Excessive current drain. Fuse blows - pump tight, probably due to damage from freezing. Replace damaged pump parts.

ELECTRICAL

GENERAL

Your Bertram has two circuit breaker protected electrical systems: a 12 Volt D.C. System which operates on power from the engine starting batteries, and a 120 Volt A.C. System that is powered from a shore connection or the optional A.C. generator.

BATTERIES

There are two batteries: one for the starboard engine and one for the port engine, which are charged by the engine alternator or by an optional 115 Volt A.C. converter. These batteries are always independent. Paralleling is for assistance in starting only.

SHORE POWER

Your Bertram has either one (1) or two (2) shore lines (of 30 Amperes each) depending on whether it has air-conditioning or not. The shore-line connections are on the starboard side inside the aft cockpit and are protected by circuit breakers directly over each receptacle.

Bertram shore lines are wired in accordance with current industry standards, however, you may find some dock outlets improperly wired. Check the polarity lights for each shore circuit on the A.C. supply section of the electrical panel. If the AMBER light is lit, the polarity is correct and you may safely turn on the shore circuit breaker. If the RED light is lit, the polarity is reversed and correction must be made on the dock before turning on the circuit breakers.

Shore Line Nr. 1 supplies A.C. Distribution when the generator is not used.

Shore Line Nr. 2 (installed only with air-conditioner) is used only for the air-conditioner. If dock outlets are less than 30 Ampere capacity, it will be necessary to plug each shore connector into separate dock outlets in order to avoid blowing dock fuses.

The optional generator can be used to supply A.C. power if shore current is limited.

ELECTRICAL PANEL

The electrical panel is on the starboard panel of the stairway leading forward. There are two separate sections: the 12 Volt Direct Current Distribution Panel, and the 120 Volt Alternating Current distribution Panel with the optional 120 Volt generator and air-conditioning panel.

12 VOLT D.C. DISTRIBUTION PANEL

This section of the panel is the forward-most section.

At the top of the panel are two main breakers, the port main and the starboard main. In order to energize the 12 Volt Panel, both of these switches must be in the "\ON" position.

Below the port main breaker are nine more red breaker switches. These switches are connected to the port main breaker switch and are labeled according to the item they control.

Also below the starboard main breaker are nine breaker switches, which are controlled by the starboard main breaker switch. These too are labeled according to the unit they control.

At the bottom of the 12 Volt Direct Current Distribution Panel is a battery condition volt meter and a selector switch, which allows the boat operator to check the condition of the port or starboard battery. A normal meter reading should be about 12.6 or as indicated in red letters on the meter, 100%. The battery condition meter draws negligible current and can be left on as long as desired.

115 VOLT A.C. DISTRIBUTION PANEL

In the center of this panel is the Shore Line Nr. 1 Cir-

cuit breaker and polarity lights along with the generator remote control. This switch prevents the accidental use of both shore and generator current on any piece of equipment.

The A.C. voltage and ammeter gauges in the upper section of the panel measure the power in use. The ammeter will not indicate the current used by the air-conditioner and the volt meter cannot measure Shore Line Nr. 2.

The Ship-Shore transfer switch permits selection of power source for the 120 V.A.C. distribution Panel. "SHIPS POWER" refers to the auxiliary generator and has nothing to do with the boat's battery power.

STARTING GENERATOR

1. Be sure master battery switch (on generator battery box) is turned "ON" and that fuel valves are open.
2. Run generator blower at least 4 minutes before starting.
3. Ship-Shore transfer switch may be in any position.
4. Hold "ON/STOP" switch in the "ON" position until generator starts. If battery is weak, use the "BAT.PAR." switch also.
5. To use generator, turn Ship-Shore transfer switch to Ship's Power and turn on required circuit breakers for items desired to function.
6. To stop generator, hold "ON/STOP" switch in "STOP" position.

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AIR CONDITIONING POWER OPTIONAL

On the lower section of the 120 V.A.C. Electrical Panel you will find a circuit breaker and polarity lights for Shore No. 2. This shore line can be used only for the air conditioning system.

If you wish to use the generator to power the air conditioner, have the air conditioning power selector switch in the generator position.

When necessary, Shore Line No. 1 can be used for the 120 V.A.C. equipment and the generator can supply power for the air conditioner.

ELECTRICAL ACCESSORIES

GENERAL

The Bertram 33' is fitted out with the finest electrical accessories available. Most of the accessories are standard equipment such as the 120 V.A.C. electric stove, the 120 V.A.C. electric refrigerator, the engine compartment blower, the electric bilge pump, the shower sump pump, an electric horn and the fresh water system (previously covered on pages 26 and 27).

STOVE (ELECTRIC)

The electric stove installed has three burners, powered by 120 Volts from the 120 Volt section of the Bertram Distribution Panel. The stove itself has been wired to provide satisfactory operation with a minimum of power.

REFRIGERATOR

The refrigerator is a 120 V.A.C. unit with a capacity of 4 cubic feet. The compressor for the refrigerator is an integral part of the unit located behind the mesh at the bottom of the box. The circuit breaker for 120 V.A.C. operation is located in the 120 V.A.C. section of the Distribution Panel.

ENGINE COMPARTMENT BLOWER

The engine compartment blowers are located along the hull side in the engine compartment. The blowers take a suction from the lowest part of the engine compartment by means of two flexible hoses. The two blowers are powered by the 12 volt section of

the Bertram Electrical Panel. The switch to operate the blower is located at the bridge control panel and the corresponding circuit breaker is on the Electrical Panel. The blower should be run for at least five minutes before starting the engines and after the engines have stopped until no more fumes are present in the engine compartment.

ELECTRIC BILGE PUMPS

The forward bilge pump is located under the large hatch in the forward companionway. It is powered by the 12 volt system directly wired through a circuit breaker to the batteries. The aft bilge pump is installed at the transom and can be controlled from either control station. *+ 1 in engine room.*

SHOWER SUMP PUMP

There is a shower sump pump installed directly to the shower drain. This is a 12 volt pump controlled by its own float switch located in the sump. The "Shower Pump" circuit breaker must be on for operation. (See drainage diagram.)

WINDSHIELD WIPER

There are optional windshield wipers installed on the deckhouse windshield which are powered from the 12 volt section of the Electrical Panel. Breaker switch must be "On" to operate. The wipers are turned on and off at the control panel to the starboard of the lower control helm.

HORN

The horn installed on the cabin top is energized by 12 volt power from the battery. The horn is controlled by a switch at the control panel(s) and the 12 volt section of the circuit breaker panel.

OPTIONAL AIR CONDITIONING SYSTEM

BASIC AIR CONDITIONER INSTRUCTIONS

Before operating the air conditioner unit for the first time, make sure that the seacock has been opened which allows raw water to cool the condenser.

On the thermostat, select the desired results by placing the knob to either "Heat" or "Cool"; the fan may be placed in the "High" position.

Turn the thermostat "On" and set to the desired temperature. For daily operation, this unit may be operated exclusively from the thermostat position.

For further information, refer to the Air Conditioning Manual.

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COMMANDING YOUR BERTRAM

OPERATING YOUR BERTRAM

Upon boarding your Bertram 33' Convertible, lift the hatch between the engines and check for water in the bilge. Smell for gas fumes. Turn on the master battery switches. Pull the oil dipstick on both engines and check that the oil registers at the "full" mark. Turn on the circuit breakers for the port engine, starboard engine, blower, and horn on the 12 volt distribution panel.

Proceed to the operating station of the boat. If more than one station of operation is located on the boat, then all ignition switches must be in the "On" position. Be certain the clutches are in the neutral position as the starter will not engage in gear. Turn on the blower and allow it to run for at least five (5) minutes prior to starting engines. Engage the "On-Stop" or ignition switch and hold the "Start" switch until the engine starts. If the engine does not start within one minute, release the starter switch, as excessive cranking will result in unnecessary wear of the starter motor and drain on the batteries. When starting diesel engines we recommend using the battery parallel switch while the starter motor is engaged.

If problems in starting persist, the throttle level may be pumped two or three times, as is done to the accelerator of an automobile. Do not pump the accelerator excessively, as this will result in flooding the engine.

Upon starting the engines, be sure that water is flowing from the exhaust at the lower transom of the boat as this cools your engines.

MANEUVERING

Your Bertram has twin propellers rotating in opposite directions in order

to balance the torque. You can engage one engine in forward gear, and the other in reverse gear. This will turn the boat completely around in its own length if the rudder is left in the center position. You can, of course, make such a turn in either direction. Port engine forward and starboard engine in reverse spins you clockwise. Starboard engine forward and port engine in reverse spins you counter-clockwise. You can accentuate the spin by full rudder in the spin's direction.

In docking, approach at a slow speed, and at a 30 degree angle. When your bow is about 5 feet from the dock, put the dockside engine in neutral, and the far-side engine in reverse. This will reduce your forward movement and bring your stern alongside the dock. Usually docking can be accomplished with the clutches alone. No steering or use of the throttle is required.

CRUISING SPEEDS

You'll find your Bertram handles easily and creates little wake at slow speeds. As you increase speed, your Bertram will increase her angle of trim. That is, the bow rises. From a maximum angle, she will start to level off, and assume a planing attitude. Do not stay at the maximum angle, or "on the hump" any longer than necessary. Take note of your engine RPM's on the hump. Then cruise either under that speed or over it. Best cruising speed also depends on the type of engines your Bertram has. But as a rule, top cruising speed RPM should be 10% to 15% for diesel and 20% to 30% for gas less than the top RPM. Engine performance will be affected to a slight degree by atmospheric conditions. You will find your engines develop less power in warm air temperatures. Similarly, dry air reduces power, as will high altitudes. If you are cruising regularly in waters well above sea level, you will want to change carburetor adjustments to get a better air fuel mixture.

The famous Bertram V-Hull cushions pounding by slicing rather than slapping waves. You'll be able to go out in weather that keeps ordinary boats at their moorings. But even Bertrams can encounter extreme conditions that call for sensible seamanship. While your Bertram will withstand far greater punishment than you will probably ever subject her to, speed should be reduced under severe conditions in the interest of your comfort, and to reduce needless strain on the engines.

CRUISING

In order to avoid going aground or damaging underwater gear, it is important to know the draft of your Bertram, or the amount of water you must have under you at all times. Draft will vary depending on how many people and how much equipment or personal effects you are carrying. Draft will be somewhat less in salt water than in fresh water.

You can determine maximum draft by measuring the freeboard from the sheer to the water line at the center of the transom. Subtract this freeboard from the hull depth at the transom (see docking plan in this manual) to get the hull draft at the transom. Add depth of underwater gear as indicated in the Docking Plan, and you have the maximum draft. Record the figure where you can refer to it quickly.

If you plan to travel waterways crossed by bridges, you'll also want to know the height of your Bertram from the waterline. Take your measurement when your Bertram is lightened of its fuel, passengers and equipment. This will give you a small safety factor when the boat is loaded.

Your Bertram has an inherent ability to carry comparatively high loads without appreciably reducing performance. But for the best results try to maintain the original trim of the boat. You can do this by noticing her trim carefully when she is first launched, before extra equipment has gone aboard. Of

course, all gear and equipment should be properly stored while cruising.

CALLING AT PORTS AWAY FROM HOME

You are not likely to have trouble with shore current in the United States. However, you should be careful when using 30 Amp. service with a pigtail adapter. This is a low capacity adapter and should not be used when the demands exceeds 1,700 to 2,000 Watts. When cruising abroad, check shore power for 120 Volt, single-phase, A.C., 60 Hertz.

Also, when cruising abroad, try to purchase fuel equal to American standards. (See Fuel Systems section for requirements in your engines.) Carry extra fuel filters with you, since replacements may be necessary.

In some areas, it is advisable to use water purifying tablets of the iodine type. Be sure to take these with you when cruising to places where the water supply is suspect.

LEAVING YOUR BERTRAM

The following are procedures to follow when leaving your boat overnight or for a short period of time.

1. Lock all ignition or engine circuits.
2. Lock all doors, windows, and hatches.
3. Make sure mooring lines are well secured with adequate allowance for the tide.
4. Fenders and spring lines should be set.
5. The Automatic bilge pump should be left on the "AUTO" position. If for some reason your boat is taking on water, the batteries should be checked frequently.

The following steps should be followed when leaving your boat for longer periods of time, such as a week or more:

1. Follow all of the above steps.
2. Turn master battery switch to OFF position.
3. Close all seacocks or valves.
4. Turn off all fuel valves.

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MAINTENANCE

PERIODIC MAINTENANCE

The maintenance the Bertram 33' requires during the boating season depends to a great extent on the conditions under which the boat is used. Adequate ventilation of the cabin during periods of non-use will reduce the interior maintenance, and keeping the exterior waxed will minimize the exterior maintenance.

In this section, a suggested preventive maintenance program is set forth for the boat under "average" conditions, and if this program is used, it should be used in conjunction with the periodic maintenance recommendations in the respective operating manuals for the engines and generators

DAILY

1. Pump bilges as required.
2. Ventilate engine compartment (open hatches).
3. Check engine lubricating oil levels.
4. Check engine coolant levels (if fresh water cooled).
5. Check generator lubricating oil level.
6. Check fuel, water, and oil systems for leaks.
7. Visually check raw water strainers for dirt accumulation. Clean as necessary.
8. With engines running, check engine circulating water by observing engine exhausts. Water should be exhausting at the transom outlet.
9. Check battery water level.
10. Top off fuel tanks and water tanks at end of day's operation.
11. Wash down boat with fresh water.

WHEN YOU FIRST TAKE COMMAND AND THEN EVERY 100 HOURS OR 60 DAYS

Following is the breakdown of items to check and inspect associated with the areas indicated:

EXTERIOR

1. Exterior fiberglass finish; clean and wax.
2. Clean all hardware and apply protective polish. Tighten any loose fittings.
3. Clean all exterior seat cushions. Clean covers with mild soap solution or light Clorox solution. Wash any cleaning materials off with fresh water.

INTERIOR

1. Completely air out the boat.
2. Air out all life jackets.
3. If any mildew is found, thoroughly wash down the area with Clorox solution.
4. Operate all drawers and doors. Slight adjustment may be necessary on the doors and drawers due to expansion from moisture. Drawers can be made to slide easier by using wax or lubricant.
5. Check all fire extinguishers for full charge.

V-BERTH

1. Operation of lights.
2. 110 Volt duplex plug-in for operation.
3. Bow hatch for operation and water tight fit.

HEAD

1. Operation of lights.
2. 110 Volt duplex plug-in for operation.

GALLEY

1. Hot and cold water faucets for operation.
2. Sink drain for pluggage and leaks.
3. Lights and duplex plug-ins for operation.
4. Clean and check stove for operation.
5. Refrigerator for operation. Defrost and clean refrigerator with a solution of baking soda.

ENGINE COMPARTMENT

1. Follow periodic preventive maintenance for engines and marine gears as specified in the engine manual.
2. Stuffing boxes.
3. Exhaust hoses and hose clamps.
4. Raw water strainers.
5. Engine mounting bolts to see that they are tight. If bolts are found to be loose, realign the engine. If coupling must be broken loose, lubricate coupling bolts.
6. All hoses on engines, and hose clamps.
7. Fuel lines, flare nuts, and valves for leaks.
8. Morse Control cable brackets for tightness.
9. Electrical connections. Clean if corroded.
10. Exhaust blower for operation and hose for leaks.
11. Wiring to see that it is not rubbing or insulation worn off.
12. Gauge senders and alarm system make-break switches.
13. Fresh water system lines and fittings for leaks.
14. Fresh water pump for condition and operation.
15. Hot water tank and connections for leaks.

16. Air conditioning (if installed)
 - a. Condensing units
 - b. Hoses and hose clamps
 - c. Clean raw water pump and pickup
 - d. Operation of pump
17. Lights in engine compartment.
18. Studs for ground plates.
19. All battery cells with hydrometer. They should be between 1.250 and 1.265. Add water if necessary.
20. Battery terminals, scrape and pack with Vaseline.
21. Follow periodic preventive maintenance for generator as specified in generator operator's manual.
22. Generator mounting bolts for tightness.
23. Check generator for oil leaks, If leaks are found, have generator manufacturer's service representative inspect and correct.
24. Clean out stringer limber holes.
25. Remove and clean screen on bilge pump and check operation of pump.

DECKHOUSE

1. Operation of all switches, gauges, and controls.
2. Electrical connections for tightness and corrossions.
3. Lubricate Morse Control heads and cables.
4. Air conditioning evaporator (if installed)
 - a. Check for water leaks.
 - b. Check electrical connections for tightness and corrosion.
 - c. Remove return air screen and clean.

LAZARETTE

1. All fuel lines, flare nuts and valves for leaks.
2. Inspect rudder ports for leaks.
3. All fittings for steering system; clevis bolts, rudder arms, lock nuts and lock bolts for tightness and smooth operation.
4. Operation of bilge pump.

FLYBRIDGE

1. Operation of all switches, gauges and controls.
2. Electrical connections for tightness and corrosion.
3. Lubricate control heads and cables.

AS REQUIRED

1. Pull boat out of the water, scrub if necessary.

CARE OF FIBERGLASS

The fiberglass construction which makes up the entire hull and most of the superstructure, consists of several parts. The exterior layer gelcoat is a special polyester resin into which coloring pigments have been incorporated to give built-in color. Just beneath the gelcoat, is a series of a glass fabric laminations bonded together with polyester resin. The complete lamination and gelcoat are bonded together by a chemical action, and the part is a one-piece unit. The outside gelcoat -- approximately 0.015 inch depth -- give the fiberglass part its glossy finish. The following recommendations will help you keep this unique material in the same condition it was when it left the factory.

SEASONAL CARE (At Fitting Out Time)

1. Clean surface with soap and water.
2. Treat with an automotive type rubbing compound. Use lightly.

3. Wax and polish the surface with an automotive type wax. Some modern products give you rubbing and waxing action in one. These products are acceptable.

LOSS OF GLOSS

To restore the glossy appearance of the gelcoat surfaces, a light buffing may be advisable. For hand buffing, use a slightly abrasive rubbing compound similar to DuPont No. 7. If a power buffer is used, Mirro-Glaze No. 1 or a similar product is recommended. After buffing, the surface should be waxed and polished as described above for Seasonal Care.

STAINS

The fiberglass gelcoat surface is highly resistant to stains, most of which can be removed easily with household detergent. Crayon, lipstick or shoe polish can be removed with plain alcohol. Ink spots will come off with Ajax or similar detergent. While penetrating stains are very uncommon, some products with unusual chemical contents may go too deep for ordinary methods of removal. In such cases, weak solutions of acids or alkalies, such as hydrochloric acid or ammonia can be tried. These may, however, produce a slight discoloration in the gelcoat. If none of the above methods are successful, it may be necessary to sand down through the gelcoat to remove the stain. This will require refinishing (see below).

SCRATCHES AND ABRASIONS

Those that do not penetrate the full thickness of the gelcoat can be treated by lightly sanding and buffing the area. Larger scratches that penetrate the gelcoat, but do not go deeply into the fiberglass or weaken the structure, can also be repaired, as follows:

1. Clean the damaged area, first with mineral spirits or turpentine to remove dirt and wax. Follow with detergent and rinse. Allow to dry completely.
2. Secure a small amount of pigmented gelcoat resin matching the color of the area to be repaired. This is available to you from your Bertram dealer.
3. Add two drops of catalyst per cubic inch of gelcoat, and mix thoroughly, the mixture will gel in 15 minutes.
4. Fill scratch with the mixture before it hardens, and round off about 1/16" to 1/8" above surrounding surface.
5. Lay a piece of wax paper or cellophane on top of the patch and press lightly to remove air. Take off wax paper after 20 minutes, and allow patch to cure overnight.
6. Sand down patch with 600 grit wet sandpaper. Finish by rubbing and buffing with regular buffing compound.

Any repairs to fiberglass that are more extensive than those described here should be made only with the help and advice of your Bertram dealer.

PAINTING FIBERGLASS SURFACES

1. Thoroughly clean fiberglass part to be painted, removing any wax with mineral spirits, turpentine or other commercial solvents. Then wash with detergent and rinse.
2. After surface is dry, sand lightly with garnet, fine oxide, or #220 sandpaper. Wipe clean of all dust.
3. Apply two thin coats of primer as recommended by marine paint manufacturer.
4. Apply a marine paint of good quality as the manufacturer recommends.
5. Bottom anti-fouling paint should be applied as per the manufacturer's instructions. Bertram's usual procedure is to apply Pettit Trinidad "75"

anti-fouling paint, unless an owner requests a different brand. Before repainting the bottom, a check should be made to insure that the brand and type of paint is compatible with the type presently on the bottom.

NOTE: Some types of bottom paint are not compatible with Pettit unless a primer is used first.

In painting anti-fouling, make sure the trib tab assembly is covered. Including hydraulic cylinders, make sure the lower portion of the cylinder, where the ram comes out of the cylinder, has been covered well.

NOTE: Never paint on ground plates, depth sounder transducer, or electrolysis zincs.

STORING YOUR BERTRAM

DRY STORAGE

Indoor storage is generally preferred, if there is good ventilation and the location is otherwise safe and dry. For any special instructions on covering for outdoor storage, refer to Docking Plan drawing. To keep the bilge dry, remove the bilge drain plug and open all valves and/or seacocks. Drain all tanks, water lines and pumps of water to prevent damage from freezing. Add antifreeze to any low position lines that can't be drained. In warm climates draining will prevent water stagnation.

Open windows, portlights and hatches sufficiently to allow air to circulate. Also, leave locker doors and drawers open. Dry out ice chests and refrigerators. If possible, remove mattresses and cushions, clean and store in a dry place. If they must be left aboard, prop up on one end for maximum ventilation.

Synthetic material lines need only proper handling and occasional cleaning. Natural fiber lines should be dried and kept in a well ventilated place. With all toilets, water supply and discharge lines drained apply a light coat of oil to all metal parts. Caution: Do Not oil any rubber or leather parts.

To protect chrome, stainless or aluminum deck hardware, first remove any salt deposits with water. Then clean with a good quality non-abrasive type metal cleaner. Finally, give items a light coat of grease.

Check propellers for nicks, dents, and bent blades. Check struts and shafts also. Any replacement or repairs should be made at this time instead of during the spring rush. Be sure all linkage on steering, engine and other controls are free and well lubricated. Disconnect shafts from engine. Remove batteries and make arrangements for storage for periodic recharging.

WET STORAGE

All the above applies, except of course valves and seacocks should remain closed, and the electrical master switch placed in the OFF position. Also recommended is the using of zinc "fish" as pointed out below under electrolysis.

CREVICE CORROSION

It is advisable to rotate the shafts about every 30 days to prevent a condition called crevice corrosion, occurring on the shafts in the area of the struts and shaft logs. This might occur if shafts remain in the same position over a long period of time when the boat remains in the water, as in wet storage.

ELECTROLYSIS

When the boat remains idle for extended periods of time, it is suggested a zinc "fish" be placed over the side by means of a heavy wire with a clip attached at the other end. The clip should be attached to an engine, gear or ground plate with the fish remaining in the water. This will prevent electrolytic action effecting the components mounted in or on the hull. When the "fish" is greatly dissolved, it should be replaced as it will no longer be effective. These items can be purchased from marine stores or made up if desired. Remove from the water before any attempt is made to move the boat under power.

FITTING OUT

In order to ensure maximum pleasure and enjoyment after an extended lay up a thorough check of the boat and equipment is necessary with maintenance being done as indicated. The following list should serve as a guide for the more important items to be accomplished (not necessarily in the order to be done);

PRE-LAUNCH AND POST-LAUNCH CHECKS

In all likelihood, your Bertram has been delivered to you in the water, with these checks made by your Bertram Dealer. However, when hauled, and you are fitting out for a new season, be sure these checks are made.

PRE-LAUNCH

1. Thru-hull strainers clear and secure. Bilge drain plug should be in place and secure.
2. Shafts should turn freely.
3. Secure propeller nut, jam nut, cotter pin.
4. Do rudders fit well in rudder port?
5. Are set screws on struts in place?

AFTER-LAUNCH

1. Are seacocks or valves free and operable?
2. Are supply and discharge lines secure?
3. Are fittings tight?
4. Make sure stuffing boxes are adjusted and locked.
5. Check shaft alignment. (Procedure outlines in power plant and transmission of power section.)
6. Make sure packing glands are adjusted and locked.
7. Are bilge pumps working?
8. Are bilge blowers working?

ELECTRICAL SYSTEM CHECK

1. Batteries are properly charged at 1.260 sg. If below 1.220 sg. have them charged.
2. Engine wire looms¹ secure, away from exhaust manifold, connections tight.

3. Check the standard and optional electrically operated equipment to make sure each is working properly.

ENGINE CHECK

1. Fuel lines and cooling lines secure and tight fittings.
2. Exhaust fittings secure and tight.
3. Engine coupling, lock wire, lock washer, key in place.
4. Engine mount fastening tight, locked.
5. See engine manual for service instructions.

CONTROLS CHECK

1. Clutch adjusted, fittings secured.
2. Throttle adjusted, fittings secured.
3. Emergency shut down, adjusted, fittings secured (diesel only).
4. Steering positive, linkage secure, rudder moves freely.
5. All gauges, water temperature, oil pressure, tachometer, voltmeter fully operating (after starting engines).