



ISLANDER 28

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I. POWER SYSTEM

INBOARD MODELS

Operation and maintenance procedures of the Universal Atomic 4 gasoline and Volvo Penta diesel engines are covered in the attached manuals. Additional information or parts may be obtained from the following, or one of their many local dealers.

UNIVERSAL ATOMIC 4 GASOLINE

Universal Motor, P.O. Box 180, Oshkosh, Wisconsin 54901.

VOLVO PENTA DIESEL

Volvo Penta, Box 392, S40126, Goteborg, Sweden.

The following points apply to the operation of the Atomic Four and Volvo Diesel and should be carefully followed.

A. MAIN BATTERY SWITCH

Turn the Main Battery Switch, located on the electrical panel behind the galley sink, to the position you have designated as the engine battery. When the engine is *idling*, you may switch from one battery to another for charging. **NEVER** pass through the **OFF** position when the engine is running or the Alternator Diodes will be burned out. If both batteries are of equal charge, keep selector switch in **ALL** position. This position is also used to start the engine when both batteries are low. When not operating the engine, use one battery for ship's gear, thus saving the second battery for starting the engine.

B. GAS TANK AND FUEL SHUT-OFF VALVE

A 20 gallon regular fuel tank is located under the cockpit sole, fill cap and vents aft on the port side and transom. The Fuel Shut-Off Valve is on the tank's port forward side and is reached via the seat hatch. When the handle is parallel to the fuel line it is **OPEN**, at right angles it is **CLOSED**. When not operating the engine, this valve should remain **CLOSED**. A partially filled fuel tank can cause water condensation, a major cause of sticky valves. To avoid this, we recommend keeping the tank full and the fuel injection clean.

When a diesel engine is allowed to run out of fuel, air gets into the lines and injectors, which makes it impossible to restart without bleeding. To restart, switch from empty tank to full tank and bleed pump and injectors in accordance with the manufacturer's instructions. Then restart the engine. If it runs rough after a few minutes, stop engine and bleed again.

CLOSE LEVER VALVES ON THE TANK WHEN LEAVING YOUR BOAT.

The Electric Fuel Tank Gauge has been adjusted to read *empty* with *three* gallons of fuel in the tank. This has been done by bending the float arm on the sensor so that the float sits on top of the fuel when the electric fuel gauge is at the empty mark. You should never let a tank get this low for the obvious safety reasons.

C. ENGINE COOLING WATER INTAKE VALVE

This valve must be open while the engine is running. The 1/2" Water Intake Valve is located port side of the engine. You may wish to keep this valve closed if sailing, but remember to open the valve or the engine will overheat.

D. ENGINE OIL

Since a marine engine works at maximum capacity about 90% of the time as compared to an automotive engine (which rarely works at maximum capacity at any time), the requirements for good lubricating oil are far greater. Please check engine manual for the proper type and amount of lubricating oil.

E. PROPELLER SHAFT PACKING GLAND

The Propeller Shaft Packing Gland Nut has been left loose at the factory so that water could thoroughly soak the packing at the time of launching. The Packing Nut was tightened by your dealer during launching to eliminate any excessive dripping and the Lock Nut tightened. When the engine is running and in gear, there should be some drops of water coming out of the gland or else the packing nut is too tight and will burn up.

If the packing needs to be replaced, be sure you get *square cut wax impregnated flax packing* and that it is *not wound around the shaft* but cut to form three single rings which are "stacked" on the shaft so that the cuts are staggered.

F. PROPELLER SHAFT ALIGNMENT

It is most important that shaft alignment be carefully checked at the time of launching by the selling dealer. The shaft and engine were carefully aligned at the factory but loading, trucking, and off loading can spoil this work, as well as the different set the hull may take in the water. This misalignment may also occur later and the following method is used to check and realign an engine and its propeller shaft.

1. Remove bolts holding the shaft coupling flange to the engine transmission flange and any flexible couplings.
2. Press coupling flanges together and check all around with feeler gauges for gaps between them. Zero to nine-thousandths (0.009) of an inch is tolerable.
3. If a greater gap exists between the top or bottom of the couplings, adjustment can be made by raising or lowering the front or back end of the engine using the adjustable motor mounts.
4. If a greater gap exists between the sides of the couplings, adjustment must be made by slacking off the engine mount lag bolts and prying the engine to one side or the other to close the gap.
5. When tolerance is satisfactory, re-tighten anything that has been slacked off and recheck for excessive gap. If it is still satisfactory, replace bolts in shaft coupling and tighten.

G. STARTING AND OPERATING PROCEDURES

Check all parts of the engine, looking for fuel, oil, and water leakage.

1. Engine Starting

Follow the engine starting procedure as outlined below:

- (a) Set gear control lever in neutral position.
- (b) Close the main switch. (If equipped).
- (c) Fuel Shut-Off, Water Intake Valve *open*?
- (d) Insert the engine key in the starter switch.
- (e) Set the throttle control lever slightly advanced and push stop lever to the starting position.
- (f) When the engine starts, immediately release the starter key and place the fuel control knob in the idling position. The starter key returns automatically to the running position when released.

NOTE

WHEN THE ENGINE HAS NOT BEEN OPERATED FOR A CONSIDERABLE PERIOD, ACTUATE THE ENGINE WITH THE STARTING MOTOR FOR 15 SECONDS WITH STOP LEVER (OR SWITCH) IN STOP POSITION BEFORE APPLYING STEP (5) ABOVE.

2. Engine Operation

After starting, idle the engine at 650 rpm for approximately five (5) minutes. During this time, observe the following items:

- (a) Check oil pressure and look for water discharge from exhaust if wet exhaust system.
- (b) Make sure that there are no abnormal engine sounds, vibrations, or smells.

- (c) Allow the engine to continue idling until coolant temperature reaches 120°F.

3. Operating Precautions

Keep a constant check on engine performance during operation. Periodically check the following items:

- (a) Oil pressure.
- (b) Coolant temperature.
- (c) Abnormal noise is an early sign of trouble. Always pay close attention to engine sound.
- (d) The color of exhaust gas is important. Additional information on this subject appears in the following sections. Refer to the data.
- (e) Check all parts of the engine daily for oil, coolant, and fuel leaks.

4. Engine Shut-Down

- (a) Return the throttle control lever to the idling position.
- (b) Return the fuel stop lever to the stopping position.
- (c) After the engine stops, turn the starter key from the running position to the *OFF* position.
- (d) Set the main switch to the *OFF* position. (If so equipped.)
- (e) After engine stops, carefully clean the various parts. This enables early detection of trouble, as oil, water, and fuel leakage are more easily spotted.
- (f) Take appropriate corrective action in respect to any trouble points noticed during operation and after the engine is stopped.

CAUTION

DO NOT RACE THE ENGINE IMMEDIATELY AFTER STARTING.

II. ELECTRICAL SYSTEM—STANDARD

It is important to remember that your *basic circuit breaker electrical system* may be altered to conform to the electrical requirements of your engine and additional optional accessories. The wiring diagram in this section must, in some cases, be augmented by the specific engine wiring diagram that appears in the Engine Section of this manual. Also note that the description of any special optional electrical accessory (i.e., electric bilge pump) will be found in another, more appropriate section (Plumbing) yet may appear in this section's wiring diagram or the engine wiring diagram. In the event you make any electrical modifications to your boat, be sure that you follow the *wiring diagram* or consult a competent *marine electrician*. Boat wiring is considerably different from house wiring due to the marine environment and other conditions not associated with houses.

A. BASIC CIRCUIT BREAKER ELECTRICAL SYSTEM

The Master Power Control Panel features integrated, simplified controls and circuit breaker protection to permit safe and efficient operation of your boat's electrical equipment. All panel components have been carefully selected for their proven performance in marine applications. The basic panel is of a plastic which is inherently corrosion-resistant and is doubly protected to optimize resistance to the effects of the marine environment.

Electrical current is directed from a 12 volt, 30 amp battery or batteries through the Master Power Control Panel for engine starting, battery charging, and accessory loads.

While the standard installation is one battery, many owners do considerable cruising and "living aboard" so a second battery may be added to meet these additional electrical requirements. Panel selection of *BAT 1* or *BAT 2* determines which of the two batteries will be utilized for engine starting and subsequent charging. Before activating the electrical system, use the Battery Condition Indicator to ascertain the condition of your batteries.

The Battery Compartment is under the seat hatch in the cockpit. Factory installed batteries are an automotive type whose water level and charge must be checked.

B. BATTERY CONDITION INDICATOR

This type of "indicator" or "meter" is technically referred to as a "Suppressed Zero Voltmeter." Note that calibrations do not start at zero but provide a full scale reading from 8 to 10 to 16 volts, depending on the meter. Below 8 or 10 volts, the battery charge is so low that terminal voltage readings are meaningless. Approximate voltage range interpretations are as follows:

ENGINE NOT RUNNING OR AT IDLE

Below 11	Very low battery charge
11 — 12	Low battery charge
12 — 13	Well charged battery

ENGINE RUNNING ABOVE IDLE

13 to 13½	Low charge rate
13½ to 15½	Alternator & Voltage Regulator OK
15½ or above	Voltage Regulator out of adjustment

It is important for you to understand that the reading on the Battery Condition Indicator Dial is indexed from the *toggle test switch position regardless of the master switch position* unless it is in the *BOTH* position. When the Master Switch is in the *BOTH* position then the Battery Condition Indicator Dial will indicate *both battery conditions no matter which way the toggle test switch is indexed*. When the Master Switch is in either the *OFF*, *BAT 1* or *BAT 2* positions, the meter will read the condition of the battery *towards* which you index the Toggle Test Switch. Note that panel and meter illumination is also provided by this same Toggle Test Switch.

Before activating the electrical system, check the condition of both batteries and then select the *strongest battery for engine starting*. Index the Master Switch to the strong battery, operate the *blower for five minutes*, and then start your engine. It will usually require about 15 to 30 minutes of engine running time to bring the starting battery back up to charge. Check the ammeter to assure that charging is normal and when the selected starting battery has been restored, it is placed on reserve by switching to the other battery so subsequent charging and accessory loads will be confined to this second battery. *It is a good practice to bring the first selected battery up to full charge before putting it on reserve and changing to the second battery*. Use the Master Switch in *BOTH* position *only* for emergency starting when both batteries are low, or for "top off" charging when both batteries are near full charge. When both batteries are completely charged, transfer to either battery, keeping one battery always in reserve. This is especially important when you realize that there is no way to start your inboard engine with a dead battery, like pushing a car when you're in the same predicament!!

NEVER MOVE THE MASTER SWITCH TO "OFF" WHILE THE ENGINE IS RUNNING OR THE ALTERNATOR DIODES MAY BE BURNED OUT.

C. OPERATION OF CIRCUIT BREAKER ELECTRICAL SYSTEM

Accessory loads may be selected as desired by indexing the appropriate panel breakers *ON* so current may flow from the switched battery to the accessory. A branch circuit overload will cause the accessory circuit breaker to "trip," i.e., the breaker will automatically open the circuit and its handle will flip to the *OFF* position. After correction of the fault, the breaker may be manually indexed *ON*.

The *RUNNING LIGHTS* switch activates the recessed red and green lensed lights forward and the white 12-point stern light aft. The *COMPASS LIGHT* connection for the cockpit is also on this switch. When under sail at night, these are the only lights that should be shown, except for the shining of a white light on the sails if you feel there is a real need for greater recognition.

The *WHITE STERN LIGHT* takes a GE-68 type bulb while a GE-90 bulb should be used for the *RED PORT LIGHT* and a GE-94 bulb for the *GREEN STARBOARD LIGHT*. It is important that a stronger bulb be used with the darker lenses or visibility of the lights will be considerably less than the required one mile.

The *BOW LIGHT* switch is for the 20 point white light on the mast and is to be used in conjunction with the running lights *when under power or when motor sailing*. It also serves as a quick way of illuminating the jib at night to check its trim and in emergency cases when recognition is important. This light will use a GE-68 bulb if replacement is necessary.

The cabin lights have their own individual switches, but must be activated by the *CABIN LIGHT* switch on the Master

Power Control Panel. The bulb for these lights is a GE-1141. If the cabin lights start getting dim, this is fair warning that the battery needs a charge or is getting old. Remember that you have an automotive type battery whose charge and water level must be checked at least once a month. If your boat is to be unused or stored for extended periods of time, it is advisable to remove the battery(s) and store in a warm, dry location.

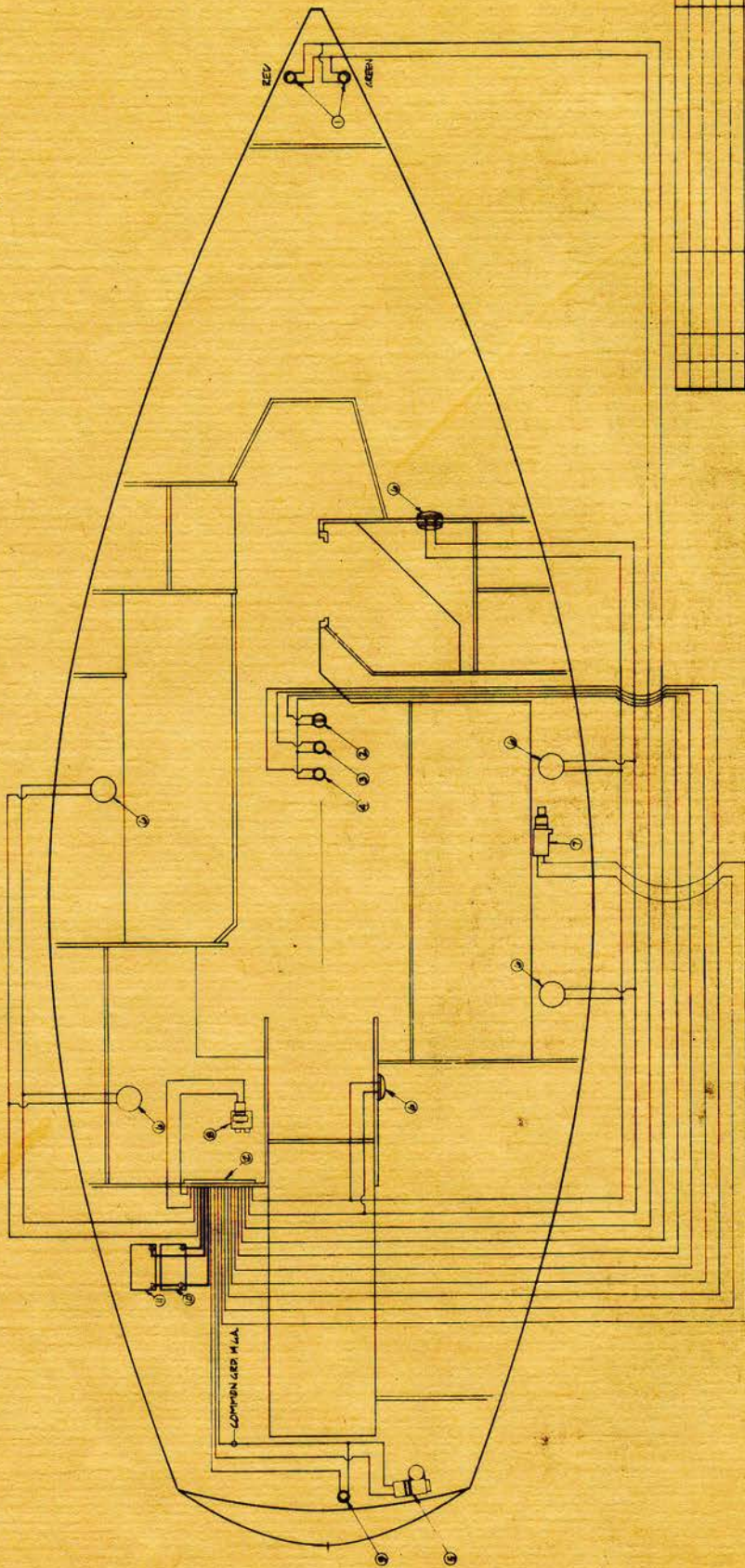
Periodically check all wires, connections, and terminals for loose connections which may cause electric sparks or power loss. This is especially important with the engine wires. When leaving the boat, *first turn off the engine, then index the Master Switch to OFF*.

D. SPREADER LIGHT

This type of "Spreader Light" is mounted so that it is really a single *FOREDECK LIGHT* and is mounted on the forward side of the mast with the *BOW LIGHT* on top and the single Foredeck Light shining downward and forward. In many respects, this is a better way of illuminating the foredeck without getting light into the skipper's eyes, is cleaner than lights hanging down from the spreaders, and is one less fitting aloft to mess with! The bulb is a GE-212-1 and it would be activated by the Spreader Light Switch on the Master Control Panel.

E. LIGHTNING GROUND

For your safety, lightning protection has been provided; it will consist of #0 9 x 21 stranded wire connecting the uppers, headstay, or backstay chainplates to a common point on one of the keel bolts.



NO.	DESCRIPTION	QTY	UNIT	PRICE	TOTAL
1	1044	1	PCB PANEL		
2	1045	1	BATTERY		
3	1046	1	BATTERY		
4	1047	1	STEERING LIGHT		
5	1048	1	WATER PUMP		
6	1049	1	WATER PUMP		
7	1050	1	WATER PUMP		
8	1051	1	WATER PUMP		
9	1052	1	WATER PUMP		
10	1053	1	WATER PUMP		
11	1054	1	WATER PUMP		
12	1055	1	WATER PUMP		
13	1056	1	WATER PUMP		
14	1057	1	WATER PUMP		
15	1058	1	WATER PUMP		
16	1059	1	WATER PUMP		
17	1060	1	WATER PUMP		
18	1061	1	WATER PUMP		
19	1062	1	WATER PUMP		
20	1063	1	WATER PUMP		
21	1064	1	WATER PUMP		
22	1065	1	WATER PUMP		
23	1066	1	WATER PUMP		
24	1067	1	WATER PUMP		
25	1068	1	WATER PUMP		
26	1069	1	WATER PUMP		
27	1070	1	WATER PUMP		
28	1071	1	WATER PUMP		
29	1072	1	WATER PUMP		
30	1073	1	WATER PUMP		
31	1074	1	WATER PUMP		
32	1075	1	WATER PUMP		
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34	1077	1	WATER PUMP		
35	1078	1	WATER PUMP		
36	1079	1	WATER PUMP		
37	1080	1	WATER PUMP		
38	1081	1	WATER PUMP		
39	1082	1	WATER PUMP		
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42	1085	1	WATER PUMP		
43	1086	1	WATER PUMP		
44	1087	1	WATER PUMP		
45	1088	1	WATER PUMP		
46	1089	1	WATER PUMP		
47	1090	1	WATER PUMP		
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57	1100	1	WATER PUMP		
58	1101	1	WATER PUMP		
59	1102	1	WATER PUMP		
60	1103	1	WATER PUMP		
61	1104	1	WATER PUMP		
62	1105	1	WATER PUMP		
63	1106	1	WATER PUMP		
64	1107	1	WATER PUMP		
65	1108	1	WATER PUMP		
66	1109	1	WATER PUMP		
67	1110	1	WATER PUMP		
68	1111	1	WATER PUMP		
69	1112	1	WATER PUMP		
70	1113	1	WATER PUMP		
71	1114	1	WATER PUMP		
72	1115	1	WATER PUMP		
73	1116	1	WATER PUMP		
74	1117	1	WATER PUMP		
75	1118	1	WATER PUMP		
76	1119	1	WATER PUMP		
77	1120	1	WATER PUMP		
78	1121	1	WATER PUMP		
79	1122	1	WATER PUMP		
80	1123	1	WATER PUMP		
81	1124	1	WATER PUMP		
82	1125	1	WATER PUMP		
83	1126	1	WATER PUMP		
84	1127	1	WATER PUMP		
85	1128	1	WATER PUMP		
86	1129	1	WATER PUMP		
87	1130	1	WATER PUMP		
88	1131	1	WATER PUMP		
89	1132	1	WATER PUMP		
90	1133	1	WATER PUMP		
91	1134	1	WATER PUMP		
92	1135	1	WATER PUMP		
93	1136	1	WATER PUMP		
94	1137	1	WATER PUMP		
95	1138	1	WATER PUMP		
96	1139	1	WATER PUMP		
97	1140	1	WATER PUMP		
98	1141	1	WATER PUMP		
99	1142	1	WATER PUMP		
100	1143	1	WATER PUMP		

Islander Yachts

ELECTRICAL SCHEMATIC

28

28 ONLY

DATE: 10/1/80

BY: [Signature]

NO. 1

NO. 2

NO. 3

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IV. PLUMBING SYSTEM—STANDARD

We have attempted to keep your plumbing system as simple as possible, especially where thru-hull fittings are concerned. Wherever possible, water discharge is above the waterline and where two items can use a common below waterline thru-hull, this is accomplished. What follows then is a general description of the plumbing system, followed by a detailed Plumbing Diagram of your boat. You should become quite familiar with this system and constantly check it over to keep fresh water in your tanks and sea water outside of your hull!

In areas where below freezing temperatures are anticipated, the *entire plumbing system must be drained*. It is extremely important for about one quart of a "permanent type" anti-freeze to be pumped into the *entire marine toilet*. This is accomplished by removing the hose intake and pumping the anti-freeze through the system until it starts to run out the thru-hull opening. The thru-hull is now closed, the intake hose reattached, and your marine toilet has been "winterized" until recommissioning. The addition of anti-freeze would be a good practice with other accessories where water may sit or collect during a freeze.

A. THRU-HULLS AND THRU-HULL VALVES

All below the waterline thru-hull fittings are equipped with *gate valves*. These valves turn *clockwise* to *CLOSE* and *counterclockwise* to *OPEN*. When leaving your boat for extended periods of time, safe practice dictates closing *all* of the valves *except* those for the *cockpit scuppers*. Once a month open and close these valves to make sure they are working properly. At this time also check all valves for seepage or leaks, tighten any hose clamps that might be getting loose and replace any defective hoses. It is a good idea to open any *gate valve* all the way and then close the valve a quarter turn. In this manner, anyone can immediately tell if a valve is open or not. Open valves are sometimes broken by people trying to pry them further open, thinking they are closed.

We cannot over-emphasize the importance of these fittings, as fiberglass hulls with heavy keels don't float too well when filled with sea water.

B. FRESH WATER TANKS

A standard, polypropylene fresh water tank is located amidships, thus keeping weight out of the bow, which improves the sailing characteristics of your boat. Care must be taken so that the *air vent hole* in the *filler cap* or the *vent tube* (whichever is fitted) is not plugged or it will be impossible to pump water from this tank. The fill is located on the starboard side under the starboard berth.

C. FRESH WATER HAND PUMP AND SINK FOR GALLEY

This high-output, lever-type pump has a ball check valve to hold the vacuum on the return stroke. If the pump fails to operate after three or four strokes, first check the water tank

and the air vent hole in the filler cap. Tank *full* and vent *clear*? If difficulty is still experienced, disconnect the intake hose at the pump and blow through to the tank to clear any possible blockage. Also check the hose, as it could be kinked or have some heavy object squashing it closed. If the hose is clear and the pump still does not deliver water, disassemble the pump and look for particles blocking the internal check valve.

The stainless steel sink drains to a thru-hull directly below with its gate valve.

D. ICE BOX

Your ice box is insulated with a three inch, foamed-in-place, layer of polyurethane foam and should retain low temperatures over extended periods of time. *Since the ice box drains into the sump, it is advisable to check the sump tank before and after all outings.*

In order to get the ice box as large as possible, the lower portion, and the drain, is *below* the waterline. Thus it is not possible to drain to a thru-hull. Please remember that when a 25 pound block of ice melts, you end up with about three gallons of water in the sump!

E. MARINE TOILET

Please be sure to read the *HEAD OPERATING INSTRUCTIONS* mounted on the bulkhead. For your convenience, we will repeat these instructions.

HEAD OPERATING INSTRUCTIONS

BEFORE USING

Make sure both thru-hull valves under the head sink are open. Raise lever forward of pump handle and pump slowly to partly fill and wet inside of bowl.

AFTER USING

Raise lever and pump until bowl is cleaned. Continue with at least 15 more full strokes to flush discharge anti-syphon loop. Depress lever and pump slowly until bowl is empty.

The *smaller* valve is the water *intake* and the *larger* serves for *discharge*.

It is possible to leave the two gate valves open while sailing, provided the internal "Joker" rubber check valve is not held open by refuse, and not have any water siphon back into the bowl. In extremely heavy sailing conditions, it would be prudent to keep these two valves closed.

Periodically add a small amount of liquid detergent and pump it through the system to lubricate the internal valve mechanism.

F. HEAD SINK

The stainless steel sink drains to a thru-hull directly below

with its gate valve. In hard sailing conditions, when the boat is well heeled over and the sink is on the *lee side*, keep this valve *closed* or the sink may fill and water could be splashed into the interior.

G. MANUAL BILGE PUMP

This pump is standard and is mounted in the port cockpit seat hatch with its discharge out the transom.

If offshore cruising is planned, then a pump must be mounted

that will meet the current requirements of the North American Yacht Racing Union's standards for off-shore racing events. This pump is mounted "to be operable with all cockpit seats and hatches and all cabin hatches and companionways closed." The inference here is that the pump must be operable from the cockpit and this makes sense. With a boatload of water, and more expected at any moment, you don't want to be opening hatches or trying to get below to operate a bilge pump! Naturally, the latter method is a more expensive installation, but really the only way to go, so this is how it is mounted at the factory.

V. PLUMBING SYSTEM—OPTIONAL

A. HOLDING TANK SYSTEM

Your holding tank system is designed to dispose of waste, toilet tissue, and kleenex *only*. It will not accept solid objects such as peach pits, rags, or sanitary napkins.

Holding tanks should be flushed with several gallons of water after each pump out.

Operating Procedures

1. When pumping waste into tank, be sure that both overboard discharge and deck discharge gate valves are closed.
2. When discharge from tank is desired, open only gate valve on line which is to be used for discharge. Also valve on toilet should be turned to "Pump Dry."
3. When maserator is to be used, it is important that pump is not run for more than six minutes continuously. The

pump should drain tank in no more than four minutes.

4. After discharge, insure that gate valves are again closed.
5. The switch for the maserator will be on the 12-volt panel.

B. AUTOMATIC, ELECTRIC BILGE PUMP

The factory installed optional *electric bilge pump* is connected to a switch on your Accessory Control Panel, which in turn is connected to its own Float Switch. In order to have your electric bilge pump operate *automatically*, all that is necessary is that the water in the bilge be high enough to raise the switch more than 3". The automatic side of the pump is wired to the battery and has a fuse between the pump and battery.

As with the manual bilge pump, it also discharges out the transom. This is probably the most important safety device you could have on board, for as long as the battery is charged, excess bilge water will automatically be pumped overboard.

VI. SPARS, RIGGING AND HARDWARE

One of the most rewarding activities connected with sailing is tinkering with your boat's rigging and hardware. The best skippers always seem to be looking aloft at the sails and then thinking about new fittings, or new ways of improving old ones. In this way a person acquires a thorough understanding of how and why every piece of sailing equipment works, plus how to repair and maintain it. As sailors, we too are constantly trying to achieve better and easier boat performance, thus the gear that we install is constantly being improved. What we hope to accomplish in this section is to give you the background information for setting up your boat in the beginning for normal sailing conditions.

When you need more help and information, please consult your local dealer. He is prepared to assist you in obtaining the best type of sailing hardware for your needs in your local area. One may also refer to the annual *Lands' End Yachtman's Equipment Guide*. This book should prove invaluable to you and your dealer in the selection of the best additional equipment for your boat. The latest issue may be obtained for a minimal amount (approximately \$2.50) from Lands' End Publishing Corp., 2241 North Elston Avenue, Chicago, Illinois 60614, and will be an excellent addition to any sailor's library.

CAUTION

WHEN PLACING HARDWARE IN ANY POSITION OTHER THAN THAT SPECIFIED ON THE DECK HARDWARE LAYOUT DRAWING, ALWAYS CONSULT THE WIRING DIAGRAM TO AVOID CUTTING ANY WIRES OR STRIKING ELECTRICAL FIXTURES.

A. MAST TUNE

UNDER NO CIRCUMSTANCES SHOULD ANY OF THE RIGGING BE SET UP "BAR TIGHT." FOR ALL SAILING CONDITIONS, WE RECOMMEND THAT THE MAST BE VERTICAL AND IN COLUMN, WITH THE RIGGING "FIRM." IT IS VERY IMPORTANT THAT A KNOWLEDGEABLE PERSON WHO UNDERSTANDS THIS CONCEPT OVERSEES THE INITIAL TUNING OF THE MAST AND RIGGING.

You should be able to stand facing the mast, reach out and pull on any stay and see the mast move in that direction. With a light pull or push by hand at chest height, this dock-side starting point will have both stays of equal tension with about 1" to 2" of play in the uppers and 2" to 3" of play in the lowers. The backstay and jib stay should be of equal tension and have about 1" of play. If the mast is stepped on deck the rigging will be tighter than a mast stepped on the keel. With double lowers the after lowers will be looser than the forward lowers by about 1" of play. Some of the newer tall rigs have intermediate shrouds, the tension of which should be between that of the uppers and lowers.

On a large mast you may notice a line of rivet heads running up one side of the mast. These hold a 3/4" PVC tube to the inside of the mast for the running of optional instrument wires.

The final tuning of the mast should take place while sailing to windward in a medium breeze of 8 to 10 knots. Sighting along the backside of the mast from deck level will indicate what further turnbuckle adjustment needs to be made to the *windward* side of the mast. The top of the mast *should not* "hook" to windward. In a medium breeze the mast should be straight and this is normally accomplished by taking up on the lower shrouds. *Always tack*, and then make the turnbuckle adjustments on the now *lee* or slack side of the mast and then sight the mast on the new, windward side, for further corrections. After a few tacks, the mast should be straight! Secure the rigging by inserting cotter keys into the turnbuckles, spread them open and cover with tape to prevent any snags!

Special attention should be given to the initial stretch of the rigging, especially after the first sail in a strong breeze. In windy conditions it is actually desirable to have the mast head "fall-off" slightly to leeward, giving the mast a smooth, even curve from head to dock. In a tall rig the intermediates play an important part in controlling the upper mast section and this will be especially noticeable in stronger wind conditions. After a few more sails in strong breezes, the rigging should be checked again for tune as additional stretch will occur.

B. BACKSTAYS

When racing, the backstay may be tightened to compensate for the extra forward loading applied by the Genoa. At the conclusion of the race it is very important to "slack-off" the amount you "took-up" on the backstay turnbuckle, as this avoids setting up unnecessary strains on the hull and rig. Since you want to keep the mast straight while racing, you will probably tighten up on the jib stay first so when the backstay is slacked off the mast head will hook slightly forward. When the backstay is tightened up, this "hook" will disappear and the mast will be straight.

Too much tension on the backstay is probably the prime reason for mast and rigging failure. It has been found that tension in the backstay can increase 150% to 200% due to the wind load on the headsail and dynamic loading due to heavy seas. The tension on a shroud or stay should not exceed 25% to 30% of the cable's breaking strength at the outside limit. Below are the breaking strengths, in pounds, for 1 x 19 stainless steel wire cable as supplied by the factory:

3/32" = 1,200	3/16" = 4,700	9/32" = 10,300
1/8" = 2,100	7/32" = 6,300	5/16" = 12,500
5/32" = 3,300	1/4" = 8,200	3/8" = 17,500

VII. MAINTENANCE TIPS

Maintenance of today's fiberglass sailboats is extremely simple when compared with the upkeep necessary to keep boats of other materials in "Shipshape and Bristol Fashion." Nevertheless, certain basic maintenance practices must be followed if the bright, sparkling original appearance of your boat at delivery is to be retained throughout the years. Much of the maintenance information has been found in the foregoing sections where it is related to specific items. In this section we will try to pick up any "loose ends" and try to answer any remaining questions on keeping your boat in a yacht-like condition! You can also keep up on new ideas with the boating periodicals. *Yachting's* annual Spring Maintenance issue is a good one.

A. RUDDERS, KEELS, AND BOTTOM PAINTS

When your boat is not in use, the tiller or wheel should be snugly secured to prevent the *rudder* from moving. This constant movement of the rudder shaft in the shaft bearings and packing box will result in unnecessary wear and, consequently, in excessive play or "slop." Also, a tiller banging around in the cockpit from wave and water action on the rudder could cause considerable damage. If the rudder action is stiff, a light grease such as "Lubriplate" should be used. Each time the assembly is lubricated, also check for play at the upper and lower ends. "Nylotron" shims easily remedy excessive play.

B. SPARS, RIGGING AND HARDWARE

The surface of your *aluminum spars* is protected from corrosion by a natural film of aluminum oxide. Unfortunately, in time dirt, salt, and chemical contaminants will break through this natural protective film, causing it to appear grimy and unsightly. To prevent adherence of these materials, coat the surface of your spars with a good automotive paste wax or a commercial protective coating. Brolite Z-Spar Mono-Poxy is used on factory painted spars. It consists of a prime coat, two undercoats, and a gloss coat. This product is compatible with other paints if touch-up is required. A good hosing with fresh water helps, and *always* keep the halyards tied away from the mast. Besides protecting the aluminum oxide or painted surface, it does away with the din created by halyards slapping against the mast, which makes any anchorage sound like a tin can factory.

Periodically take a trip aloft to check the entire rig. Look for signs of chafe and check all nuts, bolts, screws, cotter keys, blocks, and masthead sheaves. Make sure the spreader tips are well covered with tape or leather to protect the sails from chafe and tearing. Take along a rag and bucket of fresh water to clean the rigging and mast on your way *up*. A clean rig means clean sails! On your way *down*, re-apply whatever protective coating you have decided to use on the mast and your work aloft is done — until the next time!

The halyards, sheets, and guys, along with all rope and wire splices, should be carefully checked before and after each sail for wear. Wire rigging must be examined for broken strands and signs of frayed sections. Particularly close scrutiny should be given to those sections which rest on sheaves. When sails are lowered, be especially careful not to pull down hard on the wire halyard. What happens is that the Nicropress thimble, which forms the loop for the dacron halyard tail, is jammed into the masthead sheaves and sheave spacer plates, causing dangerous chafe on the wire and dacron tail. The lines supplied with your boat are Dacron, have little stretch, and wear very well if not abused. Sheets and tangs often lead where they will rub together or chafe on lifelines. By adjusting leads or by applying inexpensive chafing gear, expensive damage may be prevented. When not in use, running rigging should be tied away from the mast or neatly coiled and hung in regular locations where it can readily be found. Frayed ends should be burned and whipped while chafed eye splices may be re-spliced following the instructions available from Samson Cordage Works, 470 Atlantic Avenue, Boston, Massachusetts 02210. All blocks, sheaves, turnbuckles, and winches used in conjunction with running rigging should be lubricated periodically with a light grease such as "Lubriplate" or sprayed with a protective film such as "WD-40."

Why is my stainless steel rusting? Basically, it is a galvanic action and you can prevent it with a cleaning rag! If you keep the stainless hardware on your boat free of marine growth and polished, it will last longer and look better. Saltwater sailors must hose off with fresh water after a hard, wet sail, and a rub down with a chamois helps. For a complete explanation on stainless steel in non-technical language, read John Fisher's excellent article in the January 1972 *Boating* magazine.

C. PEDESTAL STEERING

The pedestal on the optional factory installed Pedestal Steering unit is cast from a corrosion resistant aluminum which is then anodized, primed, and painted with a gloss white polyurethane enamel. All other metal parts are stainless steel or manganese bronze (exterior ones have a marine chrome finish), thus removing any magnetic attraction from around the binnacle mounted compass, which should be adjusted by a professional. Know which are the adjusting screws and then *don't* move them after they have been set.

Aluminum steering wheels are coated with white nylon, while the larger stainless steel steering wheels are polished and may be partially coated with white nylon.

This unit is virtually maintenance free, but prior to your first sail climb down below and check out the entire installation. With someone turning the wheel from stop to stop, make sure the cables are leading properly and *everything* is tightened down. Next, sea trials are in order. Check for leaks at the

packing gland where the rudder post tube has been cut away to allow for the installation of the quadrant. Now look for freedom of travel in the system and the cable tension. A *moderate* amount, enough to eliminate "backlash" or "play," is recommended, as excessive tension creates added friction and makes for harder steering.

Periodically check for loosened bolts and cable tension, especially after the first few sails. They usually need tightening as the roller chain seats in. Look for signs of wear or "fish hooks" on the cable and replace as necessary. Three or four times a year, depending upon the frequency of use of the boat, lightly oil the chain, pedestal shaft bearings, and sheave bearings with 3-in-one oil to complete your maintenance routine.

D. FIBERGLASS SURFACES

The glossy outer surface of your laminated fiberglass boat is known as "gelcoat," a polyester resin into which coloring pigments and weathering retardants have been incorporated. It should be hosed with fresh water after every outing and routinely washed with a good detergent. Use a sponge on the smooth surfaces, while a stiff deck brush will be helpful on the non-skid surfaces, followed by more fresh water to avoid streaking the topsides. Do not use abrasive cleaners as they will rapidly dull the gelcoat surface.

At *least* once a year, the smooth gelcoat surfaces should be waxed and polished with a good automotive wax or a boat wax like Meguiar's Mirror Glaze, that is especially formulated for fiberglass surfaces. A power buffer will make work on the large areas, like the hull, easier, but care must be taken not to cut through the gelcoat surface, particularly at corners and edges. Color in gelcoat, as in any material exposed to direct sunlight, tends to fade, dull, or chalk, and will require heavier buffing to bring back the original luster. For power cleaning, use a *light* abrasive cleaner such as Mirro Glaze #1, while a heavier rubbing compound such as DuPont #7 may be used when polishing by hand. After buffing, wax and polish all surfaces except the *non-skid areas*.

Regardless of the amount of care lavished on your boat, occasional scratches, cracks, small gouges, along with a badly crushed section or even a large hole, are bound to appear. It is best to discuss the proper course of action with your local dealer or a professional who is *skilled in the repair of fiberglass sailboats*. Two excellent books are presently available that will give you the background information necessary to be knowledgeable in this area. *How to Repair Fiberglass Boats* is published by Ferro Corp., One Erieview Plaza, Cleveland, Ohio 44114 at \$3.00. Another more definitive book *Fiberglass Boats: Construction and Maintenance* by Boughton Cobb, Jr., is available through Yachting Publishing Corp., 50 West 44th Street, New York, New York 10036, at \$3.00. *Fiberglass Boat Care and Repair Manual* by H. B. Fred Kuhls Company also

gives some very good basic information. Minor gelcoat touch-up and patching is not difficult. It takes a little study, practice, and, if possible, help from a knowledgeable person!

E. WOODWORK

The exterior and interior trim is teak, one of the most durable and decorative of all hardwoods — but it must be maintained to keep it from splitting and discoloring.

Teak may be maintained in three ways:

1. Leaving the teak untreated and allowing it to weather naturally can cause splitting and a poor appearance. Bronze wool or fine sandpaper should be used periodically to clean the surface and a commercially available preparation such as Teak-Brite should be applied to combat the dull gray appearance of naturally weathered wood and help eliminate splitting.
2. A second way is to help teak maintain its natural color and life longer by treating regularly with a preparation such as Weldwood's "Wood Life."

CAUTION

NEVER USE STEEL WOOL INSTEAD OF BRONZE WOOL OR SANDPAPER. SMALL FILAMENTS OF STEEL CAN BREAK OFF AND CAUSE RUST SPOTS THAT ARE VERY DIFFICULT TO REMOVE.

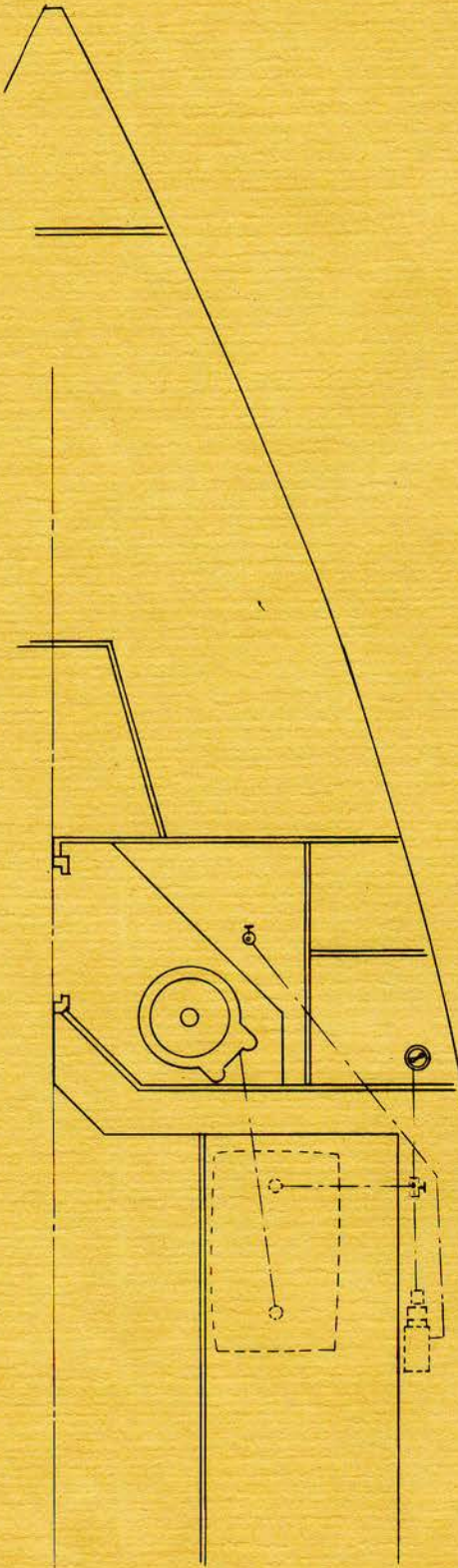
3. The third alternative for maintaining your exterior teak — varnishing — imparts the last word in a yacht finish but requires the most maintenance. However, for those who wish a "Bristol" condition yacht, it is the only way to go! If you decide to varnish, be prepared to add at least one additional coat approximately every four months. If the teak has been "oiled," it must be cleaned by scraping and/or heavy sanding with #80 or #10 paper before sealing and varnishing.

While the teak still has its original color and texture, smooth with medium grit sandpaper (#120), dust the surface carefully and seal with a good sealer such as Brolite S-94 Clear Acrylic Sealer. Make sure you select a dry warm day, and do not seal or varnish much after noon as afternoon dampness will prevent proper drying and cause your varnish job to look discolored and uneven. Allow the sealer to dry at least overnight, then smooth the raised grain with #120 paper, dust carefully, and apply the first coat of a good quality spar varnish. The second and third coats are applied with at least a day's wait in between and sanding with #120 or #180, depending upon the roughness of the grain, will provide a minimum varnish covering for your exterior wood trim. Four or five coats are better, now sanding in between with #180 sandpaper, and several thin coats always result in a far superior finish to a lesser number of thicker coats. A good rub with a chamois after hosing down will keep the gloss and also lengthen varnish life.

F. MAINTENANCE TIMETABLE

Engine alignment	At least twice yearly.
Shaft packing gland	Each time boat is used.
Rudder packing gland	At least once a month during season
Thru-hulls (including hoses and clamps)	Each time boat is used.
Tanks and fittings	Each time they are filled.
Mast and rigging	Cursory inspection each time boat is used, thorough inspection at least twice a month during season.
Engines	Cursory inspection, such as crankcase and transmission, oil level, oil/fuel/water leaks, water level in closed systems, tightness of mount bolts, each time boat is used, thorough inspection at each oil change.
Steering	At least once a month during season.
Deck Hardware (including cleats, blocks, etc.)	At least once a month during season.
Electrical	At least twice yearly.
Hull (including bonds, bulkheads, chainplate bolts, etc.)	At least every two months.

REVISIONS			DATE	APPROVED
LTR	DESCRIPTION			



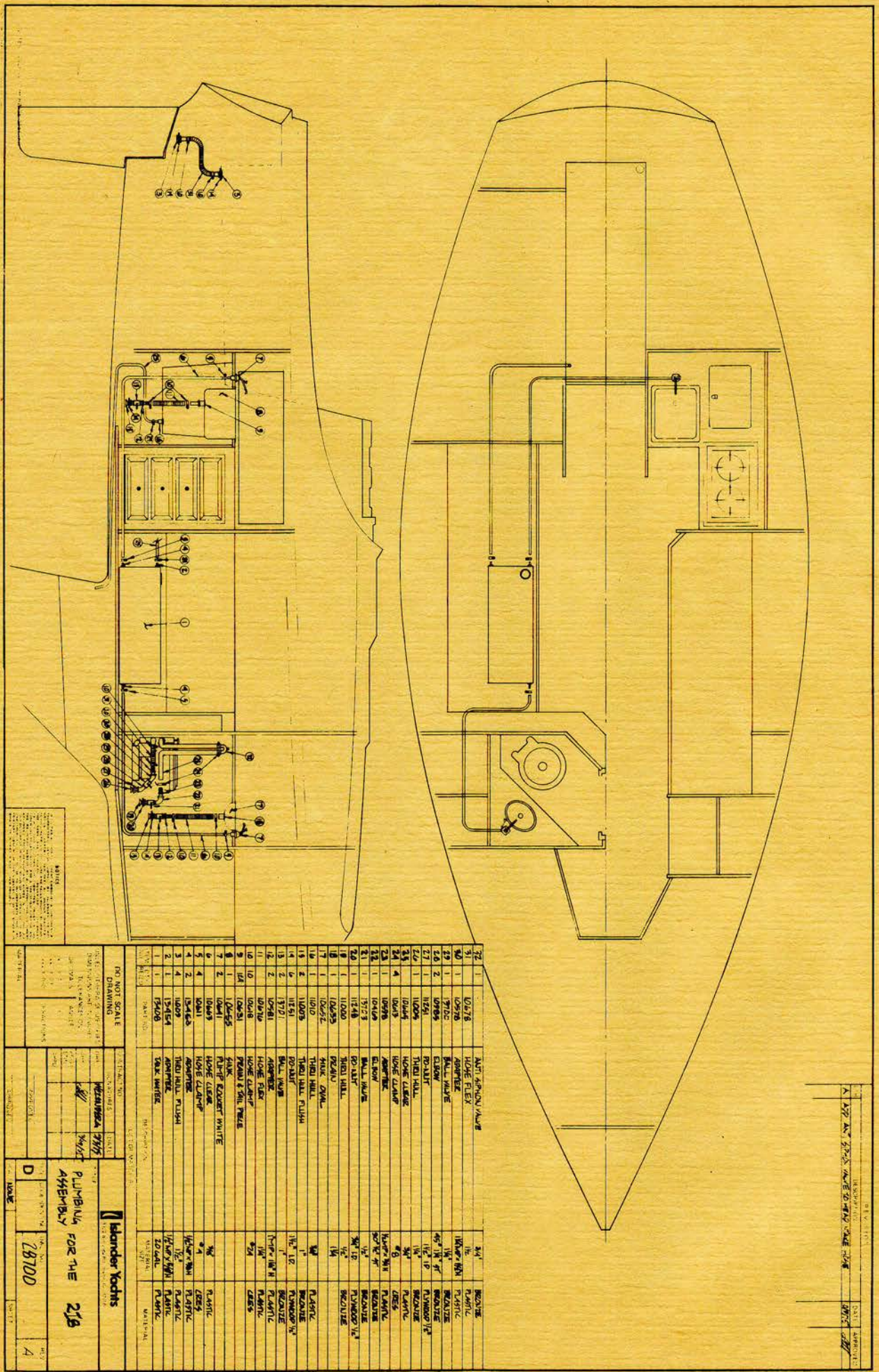
NOTE:
DECK PLATE TO HAVE
2 EA. 3/16" VENT HOLES

ITEM NO.	QTY	PART NO.	DESCRIPTION	MATERIAL
17	2	10615	HOSE CLAMP	1/2" L
16	1	10671	HOSE CLAMP	3/4" L
15	6	10624	HOSE CLAMP	3/8" L
14	1	13493	HOSE	1 1/2" L
13	1	10599	ADAPTER	3/4" MPX 3/4" H
12	1	13702	BALL VALVE	3/4" BRZ
11	1	11001	THRU HULL	3/4" BRZ
10	1	13700	BALL VALVE	1 1/4" BRZ
9	1	10976	NIPPLE	1 1/4" L
8	1	11063	DECK PLATE / WASTE / VENTED W/ 2 EA. 3/16" HOLES	3/4" L
7	3	10576	ADAPTER	1 1/2" MPX 1 1/2" H
6	1	10614	TEE	1 1/2" L
5	1	10597	NIPPLE	1 1/2" L
4	1	13709	REDUCER	1 1/2" X 1 1/4" L
3	1	10605	MALE ADAPTER	1 1/2" H
2	2	13720	FILL	1 1/2" H
1	1	13788	FIRESTONE FLEX-N-RIT TANK	15 GAL RUBBER

Islander Yachts 1922 Buranda Rd. Irvine, Ca. 92705	
CONTRACT NO. 1122N124 DATE 10/20/79	
SIGNATURES DRF WENB24 CHK PROJ. ENG. APPD.	TITLE HOLDING TANK ASSEMBLY ISLANDER 210
DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON DECIMALS X ± .1 .XX ± .03 .XXX ± .010	SIZE CODE IDENT NO. C DWG. NO. 131574 REV.
MATERIAL APPROVED APPROVED	SCALE 1/2" = 1'-0" SHEET

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NOTES: UNLESS OTHERWISE SPECIFIED



NO.	DESCRIPTION	QTY	UNIT	REMARKS
1	WATER VALVE	1	EA	
2	WATER VALVE	1	EA	
3	WATER VALVE	1	EA	
4	WATER VALVE	1	EA	
5	WATER VALVE	1	EA	
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29	WATER VALVE	1	EA	
30	WATER VALVE	1	EA	
31	WATER VALVE	1	EA	
32	WATER VALVE	1	EA	

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