

TILLOTSON-PEARSON INC.

WELCOME ABOARD!

Congratulations on the purchase of your new Freedom. She is designed for optimum performance, ease of handling and will accommodate you and your crew in ultimate comfort and safety. Freedoms utilize only the best materials resulting in solid construction that is well executed throughout.

Properly cared for your Freedom will give you years of safe and pleasurable sailing. Your owner's manual provides you with information about including commissioning, safety and maintenance. Please take the time to review the information yourself and with your dealer.

For safe, and pleasurable sailing DO NOT operate your boat without a knowledgeable, experienced skipper and crew. It is not our intent to provide ALL of the information in this manual that you will need to operate your boat safely. This manual will acquaint you with SOME of the features onboard that you may find unusual. If you are not experienced you are strongly encouraged to take courses in boating skills and safety, and to update your knowledge by reading from the many books and magazines available.

HAPPY SAILING!

Everett A. Pearson
President
TPI

INTRODUCTION

Freedom Yachts has prepared this Owner's Handbook which will provide you with some information for the safer, enjoyable use and maintenance of this proper cruising yacht. Warranty Registration Cards from the factory and the engine manufacturer are included with this manual. These cards should be filled in and returned as soon as possible.

Freedom Yachts are produced in Tillotson-Pearson's Warren and Melville, Rhode Island plants where fine sailing yachts such as Aldens, J-Boats and Rampage Sportfishing Boats are also manufactured. Our staff is comprised of craftsmen and engineers experienced in all areas of the boating industry. Each boat produced is thoroughly inspected and tested by our rigid quality control procedures.

Freedom is always seeking new and better ways to make our product the best it can be. Therefore, you may find your Freedom has equipment that differs from equipment shown in this manual. Whenever changes have been made in the specifications or equipment, they have been carefully developed and tested to be sure they meet our high quality standards.

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Freedom 28

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HIN NUMBERS

In accordance with Coast Guard Regulations, your Freedom is identified by a Hull Identification Number or "HIN". This HIN is molded into the upper starboard corner of the transom. Please have this number handy whenever contacting your dealer or Freedom Yachts for any reason.

On boats molded before August 27, 1984 the HIN number appears as follows:

T-1	* July 16 - Aug 15	"A"
S 1---Builder I.D. <i>TSP</i>	Aug 16 - Sept 15	"B"
P-1	Sept 16 - Oct 15	"C"
3-1	Oct 16 - Nov 15	"D"
6-1---Model <i>28</i>	Nov 16 - Dec 15	"E"
0-1	Dec 16 - Jan 15	"F"
0 1---Hull # <i>044</i>	Jan 16 - Feb 15	"G"
2-1	Feb 16 - Mar 15	"H"
M-1	Mar 16 - Apr 15	"I"
8 1---Model Year <i>83</i>	Apr 16 - May 15	"J"
4-1	May 16 - June 15	"K"
M---*Month Of Manufacture <i>Feb/March</i>	Jun 16 - Jul 15	"L"

On boats molded after August 27, 1984, the Coast Guard changed the format so that the HIN number appears as follows:

T-1	* January	"A"
S 1---Builder I.D.	February	"B"
P-1	March	"C"
3-1	April	"D"
6 1	May	"E"
0 1---Model & Hull #	June	"F"
0 1	July	"G"
2-1	August	"H"
A-1	September	"I"
5-----*Date Of Manufacture	October	"J"
8-1	November	"K"
5-----Model Year	December	"L"

* Letter identifies month, number identifies last digit in year manufactured.

RESPONSIBILITY OF THE OWNER

To obtain maximum safety and pleasure from your Freedom, particular attention must be paid to proper maintenance of your boat. A partial list of Owner Responsibilities follows, which is only intended as a partial guide. Please contact your local U.S. Coast Guard and Power Squadron offices for safety information on the operation of your boat.

1. Complete the Warranty Registration Cards and return them to Freedom Yachts and the engine manufacturer. Please mail any change of address or ownership to Freedom Yachts so we may keep an accurate list of owners.
2. Ensure that all items listed as the Responsibility of the Dealer are completed by your dealer. If your boat has been delivered to any address other than that of your dealer, the responsibilities of the dealer become yours, unless specific arrangements are made with your dealer.
3. Operate your boat following the instructions provided in this owner's handbook, instructions from our suppliers and applicable U.S. Coast Guard and other regulations.
4. Keep all additional safety equipment on board as required or recommended by the U.S. Coast Guard for the size of your boat and nature of use.
5. Have your boat serviced by a competent marine agency. All service should be carried out in accordance with the specifications in this owner's handbook, our supplier's manuals, and preferably by an authorized Freedom dealer.
6. Before each operation of your boat review the SAFETY section of this manual. Also, review the ANNUAL SAFETY MAINTENANCE RECOMMENDATION - p. 3.4.

RESPONSIBILITY OF YOUR DEALER

Freedom Yachts are sold only through Authorized Freedom Dealers. Our dealers have been selected because of their knowledge and expertise in the boating industry and because of their dedication to the provision of a high level of service and attention.

Your Freedom dealer is responsible for the commissioning of your boat according to the Freedom Commissioning Procedure. Please be sure your dealer completes the Commissioning Check List and returns it to Freedom Yachts. Failure to do so will complicate warranty procedures. Your yacht commissioning is as follows:

1. Clearly explaining and accurately describing the Freedom options that are best suited to enhance your needs and planned use of your new Freedom.
2. Inspecting the boat upon receipt to assess any losses or damages; filing and following through all claims against the carrier transporting your Freedom. Should you notice any loss or damage you must notify your dealer immediately or, at the latest, within 30 days after receiving your boat.
3. Inspect all equipment, installed or shipped loose, to assure that all items are received.
4. Commissioning the boat per the Commissioning Check List. Dealer's responsibility includes completing the following (p 2.4) Commissioning Check List and reviewing the same with the owner.
5. Checking all mechanical systems during actual use on a trial run.
6. Instructing you on the use of your boat and its equipment.
7. Providing assistance and service, including processing of claims, under the terms of our Limited Warranty.

CONSTRUCTION DETAILS

The technology we use for designing and constructing our boats is the most advanced in the marine industry. Only top quality, top performance materials which are thoroughly tested in our own lab are used.

Materials:

1. All Freedoms utilize a Neo Pentyl Glycol (NPG) Isophthalic Gelcoat. NPG Iso Gelcoats yield a denser, more frequently branched molecular network which inhibits migration of water molecules. Because of their structure, NPG Iso Gelcoats offer superior resistance to moisture penetration, blistering, and fading. They are formulated to yield slightly more flexibility than most gelcoats which aids in resisting cracking. Testing also indicates that Glidden NPG Iso Gelcoats produce the highest gloss and retain it through environmental exposure.
2. High performance glass fabrics are used throughout the sandwich laminate. They offer superior strength and stiffness when compared to conventional cloth and woven roving materials used by many other builders. Unidirectional fabrics require less resin and therefore produce stronger structures without excess weight. The fibers can also be oriented to yield maximum hull and deck strength and stiffness.
3. The resins used by Tillotson-Pearson are properly engineered to incorporate the correct balance of properties based on required performance. A special vinyl ester resin is used as a barrier coat behind the gelcoat to arrest moisture penetration. By arresting moisture permeation blistering cannot occur.

This vinyl ester in combination with NPG Iso Gelcoats and properly specified fibers generate the most blister resistant hull available today. The vinyl ester used by Tillotson-Pearson is also resilient like the gelcoat to further aid in crack resistance.

A high quality polyester resin is used to complete the rest of the laminate. Again the correct balance of properties are designed into the resin to assure resistance to cracking and fatigue. These designed-in properties assure that high strength and stiffness will be retained throughout the life of your vessel.

Construction Details Cont'd.

Sandwich Construction:

Sandwich construction is used in all Freedom Yachts' hulls and decks to produce lighter, faster performance boats. A fiberglass sandwich functions similarly to an "I" beam. "I" beams are used for construction because they make the most efficient use of materials based on structural criteria at reduced weights. The inner and outer skins of the sandwich function in the same way as the top and bottom flanges of the "I" beam. This means lighter hulls and decks can be produced which are actually stiffer and stronger than a solid glass hull or deck.

Many different cores are available for use in sandwich construction. We choose end grain balsa core because it has superior physical properties in performance over all others. It has excellent thermal stability in warm or cold climates or direct sunlight. When compared with foam cores, the end grain balsa core's fatigue properties are far superior. It also has excellent impact and puncture resistant properties.

Production Control:

Great care is taken in the quality control of the production of laminated parts. The following steps are necessary to guarantee that the physical properties used to design are the same as those which are built into the part.

1. Ultrasonic inspection is used to measure thicknesses as well as to count individual plies of material in the laminate.
2. Weights are checked on a regular basis.
3. Resin burn off tests are run randomly to check on the ratio of resin to glass built into the laminates.

Gelcoat application is carefully controlled to ensure the proper coating thickness and performance. This is important when considering

Construction Details Cont'd.Production Control Cont'd.

blister resistance. Proper catalization, thickness, and low porosity are key in producing a finish that will best resist the osmotic passage of moisture. Control of catalization is also very important for weatherability. Barcol hardness testers are used to check the relative cure of both resins and gelcoats.

Assembly:

Major structural framing and bulkheading are glassed to the hull and deck using non-woven biaxial glass fabric. This provides for an integral bond between the hull, deck and frames.

By using both mechanical and adhesive fastenings, hull to deck joints of reliable integrity are achieved. Glass thicknesses are increased in the hull and deck flanges which are joined together primarily with through-bolts, capable of handling the high local stresses that are produced as loads are transmitted through the hull and deck.

Before bolting, 3M-5200 high strength urethane adhesive sealants are applied to the flanges to totally seal the joint. This combination of bolting and bonding with 5200 creates an unusually strong watertight hull to deck joint.

All internal and external hardware connections are engineered individually for long lasting integrity. Backing plates are designed as required for all deck hardware as well as additional laminate backups to ensure reliable hardware fastenings.

Through hull fittings are engineered using the highest quality bronze and glass reinforced nylon fittings available. Each metal fitting is individually grounded to protect against galvanic corrosion. 5200 sealant is used to create a watertight seal. All hull core is terminated several inches from the through hull fitting and replaced with solid glass to prevent water from contacting the core.

Construction Details Cont'd.Assembly Cont'd.

The keel sump area is designed using solid glass laminates to accommodate the locally high loads induced by the keel. Heavy duty stainless keel bolts are utilized in the keel. When the bolt holes have been bored in the sump, a potting layer of resilient epoxy is placed on the bottom of the sump and top of the keel. The keel is then snugged up to the sump as the keel bolt nuts are tightened. When the epoxy hardens a perfect fit has been produced which is watertight. Fairing is done on the keels with a special epoxy which was formulated to provide long lasting adhesion to lead. It also resists water permeation and cracking which may occur as a result of thermal cycling.

Carbon Fiber Masts:

Carbon fibers are produced by the thermal decomposition of polyacrylonitrile or "pan" for short. The "pan" precursor is spun into a filament and then stretched to orient its molecules. The filament is then subjected to 220 degrees C to stabilize its orientation. Once stabilized the filaments are heated (carbonized) at 1500 degrees C in a nitrogen atmosphere. The process in effect burns off all the compounds and chemical structure which are inherent in the pan precursor leaving only the carbon backbone of the pan molecule. The carbonized filaments are then bundled together in groups of approximately 12000 forming what is referred to as a tow of carbon. The tow is similar in size to yarn used for knitting.

Construction Details Cont'd.Carbon Fiber Masts Cont'd.

Tillotson-Pearson purchases the fiber in tow form. The fibers are then oriented on a loom and woven with very small cross fibers to hold the tows together in a form which can be handled in production. The carbon fiber is then precisely impregnated with a special resin system and laminated on an aluminum mandrel. Precise application of heat and pressure is required to cure the composite while yielding maximum physical properties. The process used by Tillotson-Pearson is the only one of its kind in existence. All spar manufacturing is done at the same facility which produces Freedom Yachts FRP structures.

Of course no spar can be produced until it has been properly designed and engineered to perform in its specific application. The key to the success and reliability of the Freedom spars is a culmination of design, manufacture and quality control expertise. Many complex techniques are used in design which require computer assistance. Every one foot length of spar is extensively analyzed in the design process so that laminates can be determined with precision and weights optimized. Each fastening and hole is analyzed for stress concentrations and potential local failure to assure reliable hardware attachment design.

Before production can begin to build a part, the quality control team checks all resin, fiber and process set points to assure that all performance requirements will be met. Skilled operators then produce the bare shaft of the spar. It is then weighed and sampled by quality control to check its physical integrity. The spar then undergoes final finishing and hardware application after which quality control will give their final seal of approval.

A specially designed system is used to monitor stress levels in the mast under harsh conditions. Twenty-four channels are simultaneously monitored by a computer which records strains, wind data, and gravitational acceleration due to slamming. This information is vital in confirming the actual stress and load conditions in the spar. It has also helped us to refine our design techniques to project actual performance more closely. This unique blend of testing, design, manufacture and quality control has been the driving force behind the driving power of the Freedom spar. It is truly a technological masterpiece.

SAFETY GUIDELINES

We strongly recommend that you contact your local U.S. Coast Guard office

for up-to-date safety requirements. Basic requirements which should be

observed include the following equipment: Distress signals, flotation devices, fire extinguishers and an emergency tiller. Also, include spare

parts kits - winches, engines, steering, etc. For the safe operation of

your boat, we urge you on a routine basis to check all running rigging

electrical equipment, fire extinguishers, running lights, diesel & propane

fuel lines, and steering cables.

RECOMMENDED TOOLS FOR ONBOARD MAINTENANCE

1. Screw Drivers
 - a) Straight - stubby - offset - jewelers set
 - b) Philips - stubby - offset - jewelers set
2. Wrecking Hammers
3. Ball Peen Hammer
4. Crow Bar
5. Set Adjustable Wrenches
6. Small Sledge Hammer
7. Rubber Mallet
8. Set Wood Chisels
9. Set open /box standard & metric to 1" and 19 mm
10. Socket set standard & metric to 1" and 19 mm
11. Pipe wrench - small & large
12. Channel locks: 12" and largest available
13. Pliers
14. Needlenose--small & large
15. Wire strippers/crimps
16. Drift punch set
17. Small level/combination T-square
18. Hand Plane
19. Hack Saw
20. Back Saw
21. Vise grips - large/small
22. Caulking Gun

SAFETY EQUIPMENT

3.2

U.S. Coast Guard regulations require certain safety and emergency equipment to be kept aboard. For the safety and comfort of all passengers, it is the owner's priority responsibility to learn and procure the equipment and to maintain it in proper working condition. Contact your local U.S.C.G. office for more complete required and recommended equipment lists. The following is not intended to be all inclusive.

Distress Signals: The U.S.C.G. requires visual distress signals be kept aboard boats 16 feet or more in length, and by all boats operating at night. Be familiar with their employment and keep them up to date.

Flotation Devices: One approved life preserved is required for each passenger aboard by the U.S.C.G. It is also recommended that a horseshoe life ring or floating seat cushion be kept ready in the cockpit in case of a man overboard situation. It is also prudent to carry safety harnesses and to wear these at night and in foul weather.

Fire Extinguisher: Two fire extinguishers are required and should be located for quick access.

Ground Tackle: Please seek out local recommendations and those available in numerous marine publications for proper anchor and rode sizes for your boat in your area. In general at least two anchors with proper size rodes should be carried. One can be stowed in a locker while the other should be ready to use. The length of the rode should be determined by the depth of the water where you sail. A ratio of 7 ft. rode to 1 ft. water depth is desirable. In some areas an all-chain rode is recommended to prevent chafing on a rope. In general, an all-chain rode is more suitable for use with an anchor windlass. It is common practice to carry a small "lunch hook" for easier short term anchorage with someone staying aboard.

Additional Equipment: Other items, some of which are required, that should be kept on board include: soft wood plugs for the seacocks; bell; hand and air horns; flashlights; first aid kit; bucket with lanyard; radar reflector; heaving line; and tools and spare parts.

RECOMMENDED TOOLS FOR ONBOARD MAINTENANCE CONT'D.

- 23. Utility Knife
- 24. Plumbers Snake 25'
- 25. Set Files
- 26. Electric drill
- 27. Multi-meter
- 28. Spare parts kits - engine, winches, steering, etc.

COMMISSIONING

On Arrival

The boat should be inspected while still on the trailer. Make sure all items listed on the bill of lading are on the trailer undamaged. Any damage or loss should be recorded on the Bill of Lading in the presence of the truck driver and prior to signing the document.

Before Launching

Read owner's manual to familiarize yourself with your boat. Check through inventory sheet and commissioning checklist. Check that the engine and head(s) have been de-winterized, and that all drain plugs are in place. Check all hose clamps and tighten as necessary. The engine fresh water cooling system is filled with permanent anti-freeze solution at the factory. Check for evaporation and add more anti-freeze solution if required.

Mark propeller shaft with fixed prop vertical and folding prop with blades opening horizontally. For best sailing speed, set shaft to this position while sailing. Never leave engine out of gear and allow the shaft to rotate while sailing. Transmission should be set in reverse while sailing with engine off.

after Launching

Refer to commissioning checklist. Please note that all boats are shipped with shaft couplings disconnected. Engine alignment and shaft coupling hook-up must be performed prior to operating the vessel.

If water does not come out the exhaust thru hull on the transom when the engine is initially started, check that the engine water intake seacock is open and not blocked. Then check the water pump impeller. (Consult the Engine Owner's Manual)

Halyards - (Refer to appropriate block; running rigging lists)

The main, spinnaker and jib halyards run inside the mast on the cat sloop. Ribbon tape messengers have been installed to facilitate pulling the halyards through.

Flag halyards are provided for each spar. These run through small mast head padeyes.

Pre-Rig Masts

All halyards, and lazy jacks should be rigged before hoisting the spars. All shackle pins should be tightened with pliers, wired shut, and taped for extra security. A sail luff slide should be slid up and down the luff track and lubricated with a silicone based lubricant to insure that it is free of dents, burrs and dirt.

Prior to hoisting a spar, slide the aluminum mast collar up the mast and tie it under the gooseneck. It is important that the collar is placed on the mast right side up prior to stepping. Assure that the mast collar does not bang against the mast causing damage. Make sure that the mast alignment bolt is in place and that the electrical mast wires are protruding through the access hole in the side of the mast.

All wiring for masthead wind indicators, antennas, and lights should be installed prior to hoisting the spars. If antennas and wind instrument sending units are installed prior to stepping the mast great caution should be taken to avoid damaging them while hoisting mast.

Hoisting Spar

Because Freedom spars lack hardware to which to attach a lifting line, hoisting the spar must be done by a skilled rigger. One procedure is to pass a lifting line twice loosely around the spar, to which a crane hook may be attached. Tie the free end of the line with a bowline around the standing part of the line. The standing end of the line can be led down the

(Consult Diagram)

Hoisting Spar Cont'd.

spar to a position just under the gooseneck, and secured with a series of half hitches. Care must be exercised in lifting the spar so that the half hitches remain tight and do not slip as they accept the weight of the spar. As with any crane load, personnel should not place themselves in a position which would result in injury if the load falls.

The overhead trim pieces around the mast opening in the deck should be removed at this time so that they are not damaged as the spar is lowered through the deck partners.

Completion of Spar Installation

After the spar is stepped, the wedges must be driven so the top of the wedge is snug with the mast, and flush with, or slightly below, the deck boss level. Use extreme care in driving the wedges to avoid hitting the spar, which can be damaged by a careless hammer blow. Use a length of soft wood to direct blows to the wedge rather than attempting to hit it directly.

After the wedge is fully driven, caulk the seams between the deck and wedge and wedge and spar. Bolt the deck collar down with caulking under the bottom flange and under each nut. Lightly sand the mast at the collar for better sealant adhesion and then add silicone. Do not use caulking with a high amount of adhesive quality (like 3M #5200), as the adhesive will make removal of the collar and wedge difficult. A tube of silicone sealant RTV is supplied for this purpose.

NOTE: DO NOT SUBSTITUTE mast wedges other than the polyurethane wedges shipped with the boat. The use of any other wedges will void all warranties of the spars. Replacements are available through TPI.

BOOM(S)

To install boom(s), secure the tack bracket to the gooseneck. Then connect the lazy jacks as described and shown in the Lazy Jack Detail diagram. Lead reef lines as shown on the Main Sail Rigging diagram.

LAZY JACKS

Port and starboard side lazy jack wires are shackled to tangs on either side of the mast at the jib halyard sheave box. The lazy jack blocks are shackled to the eye on the bottom end of the wire. After the mast is stepped and the boom connected at the gooseneck, the lazy jack lines are run. There is one line which begins dead-ended at the aft cleat on the boom underside, then runs up through the port lazy jack block, and finally down to be cleated off at its point of origin. This single line system allows for easy adjustments in boom height. Refer to Commissioning Diagram.

SHEETS

The arrangement of the sheets is shown in rigging diagrams.

NOTE: On ALL Freedoms one MUST tie a knot in the main and mizzen sheets in order to restrict the travel boom to 90 degrees. Allowing the boom to travel further than 90 degrees is not efficient, and will subject the boom gooseneck bracket to excessive strain, which after multiple incidences will cause a failure.

VANGS

Run vangs per diagram. Run all lines along deck to cockpit per line identification. Refer to following block and running rigging lists.

COMMISSIONING CHECKLISTPRELIMINARY

- Read owner's manuals
- Check propeller, nut, cotter pin and zinc
- Install transducers
- Close seacocks
- Check all hose clamps and tighten as required
- Touch up bottom paint
- Install wheel
- Dewinterize engine and heads, if so supplied
- Check engine oil, transmission and coolant levels
- Check battery charge with battery test switch on electrical panel
- Remove mast partners covers from the deck
- Pre-rig masts - run halyards; install headstay, lazy jacks, topping lift and mast collar
- Cover the cushions or remove them from boat in order to protect them during commissioning
- Mark prop shaft

LOOSE GEAR

- Fenders w/lines ready
- Dock lines ready
- Winch handles
- Ignition keys
- Bilge pump handle
- Install portlight screens

COMMISSIONING CHECKLIST CONT'D.

- Sink strainers
- Mast wedges ready on mast
- Mast retaining bolt ready
- Stow remaining loose gear

LAUNCH

- Check for leaks
- Check operation of seacocks
- Check stuffing box

ENGINE START

- Read engine owner's manual
- After launching, check alignment and hook up couplings
- Start engine
- Check exhaust for cooling water flow
- Check oil pressure, water temperature, charging gauges - stop engine immediately if not in proper ranges per engine manual
- Check transmission operation
- Check stuffing box

STEP MASTS

- Pre rig masts w/halyards, lazy jacks, collar, alignment bolt, etc.
- Install electronics wiring in masts
- Remove headliner trim pieces around mast opening in deck
- Hoist spar and lower carefully into boat

COMMISSIONING CHECKLIST CONT'D.

- Install wedges
- Install deck collars - place on mast prior to stepping mast
- Install overhead trim
- Make electrical connections at mast base

RIGGING

- Install boom and attach lazy jacks
- Lead all sheets and halyards to stoppers on deck house
- Rig reefs and vang
- Bend on sails
- Install battens

SYSTEMS CHECK

- Fill water tanks - flush tanks twice to eliminate non-toxic anti-freeze
- Check water pressure system. Bleed air from hot & cold water lines to insure that the hot water tank is full (if so equipped)
- Fill and check L.P. Have L.P. tank filled and then check system per P. 9.1
- Fill fuel tanks
- Run engine under load
- Check operation of electrical systems and pumps
- Check electronics (opt)
- Check refrigeration (opt)

COMMISSIONING CHECKLIST CONT'D.TRIAL SAIL

- Raise and lower sails
- Monitor engine performance
- Check bilge for leaks
- Check electronics (opt)
- Check autopilot (opt)
- Check reef points and lines for proper installation

CLEAN UP

- Vacuum interior including all lockers
- Clean bilge
- Oil sole (if not varnished)
- Wash down deck
- Install sail covers

tie boat securely to dock and run in gear forward and reverse for 1 hour each. Check temp., volt, pressure and vibration.

FREEDOM 2ERUNNING RIGGING

<u>STOCK #</u>	<u>QTY</u>	<u>DESCRIPTION</u>	<u>LENGTH</u>
26402	1	<u>Main Halyard Package</u> -Parts included are as follows:	
25056	1	Kevlar Aramid-80 3/8" - Blue	93'
25068	1	Headboard Shackle, 3/8" dia.; #3900-112 One end of rope spliced to shackle; the other end whipped.	
26403	1	<u>Jib Halyard Package</u> -Parts included are as follows:	
25648	1	Low stretch Dacron 3/8" - Red	65'
25069	1	110005 Snap Shackle One end of rope spliced to shackle; the other end is whipped.	
26404	1	<u>Boom Vang Package:</u>	
25066	1	Low Stretch Dacron 7/16" - White One end of rope spliced; other end whipped.	38'
26427	1	REEF #2 Lead aft	
25064	1	Low Stretch Dacron 3/8" - Red Both ends whipped.	61'
26428	1	REEF #1 Lead aft	
25065	1	Low Stretch Dacron 3/8" - Green Both ends whipped.	61'
26424		REEF #2 Clew Line	
25064		Low Stretch Dacron - Red	25.5'
26426		REEF #1 Clew Line	
25065		Low Stretch Dacron - Green	25.5'
26407	1	<u>Main Street:</u>	
25066	1	Low Stretch Dacron - White A 2' long eye splice is made; the other end is whipped.	70'

Running Rigging Cont'd

<u>STOCK #</u>	<u>QTY</u>	<u>DESCRIPTION</u>	<u>LENGTH</u>
26408	1	Jib Sheet:	
25050	1	Low Stretch Dacron 3/8" - White A 2" long eye splice is made, the other end is whipped.	36'
26409	1	Jib Headstay-Parts included are as follows:	
25171	1	Wire, 3/16", (7 x 7), SS	
	1	Turnbuckle, 5/16" Body x 5/16" Pin x 3/16" Wire	
	1	Eye, Marine, SS, 3/16" Wire	
26410	2	Lazy Jacks-Parts included are as follows:	
10121	1	Toggler, LL, 3/16" & 1/8" Wire	
10120	1	Wire, 3/16" (7 x 7), SS, White Vinyl Coated to 5/16"	20'
25206	2	Micropress, Oval, 3/16" Wire	
25077	1	Thimble, SS, 3/16" Wire	
25050	1	Low Stretch Dacron Braid, 5/16" - White	20'
26411	2	Traveler:	
25050	1	Low Stretch Dacron Braid, 3/8" - White A small eye splice is made on one end, The other end is whipped.	26'
26412	1	Flag Halyard:	
25219	1	Low Stretch Dacron Braid, Solid, 1/8" Luff Line Both ends have been burned.	88'
26413	1	Jib Boom Topping Lift:	
25049	1	Low Stretch Dacron Braid, 5/16" - White A small eye splice is made on one end while the other end is whipped.	24'

FREEDOM 28BLOCKS

<u>STOCK #</u>	<u>QTY</u>	<u>MFR/PART #</u>	<u>DESCRIPTION</u>
25997	2	Harken H063	Traveler control dbl. blocks on car
25907	3	Harken 011	Mainsheet sgl. blocks on boom
25634	1	Harken 007	Mainsheet dbl. block on car
25628	1	Sch 07-56	Vang fiddle block on mast collar
25629	1	Sch 07-46	Vang fiddle block on boom
25626	4	Sch 05-05	Reef blocks on mast collar
25072	2	Hook 195120	Reef hook tie to reef lines
25627	2	Sch 07-05	Halvard blocks on collar
25653	5	Sch 93-14	Shackles for blocks on collar
25078	1	Sch 93-12	Shackle for topping lift
10298	2	Harken 023	Block for Lazy Jack

STEERING SYSTEM

Your vessel is equipped with an Edson pedestal steering system. Information on maintenance of this system is included on the next two pages. Following is a list of Freedoms indicating which Edson system each model has installed. This will make the Edson Pedestal Maintenance Guide more useful.

- Freedom 44 - Standard System
- Freedom 39 Pilot - Pull-Pull System
- Freedom 39 Express - Pull-Pull System
- Freedom 36 - Radial Drive System
- Freedom 32 - Radial Drive System
- Freedom 30 - Radial Drive System
- Freedom 26 - Radial Drive System

Additionally, an emergency tiller is provided. This is generally stowed in either cockpit locker.

The emergency steering system may not allow as much rudder angle as the pedestal steering system, and the force on the tiller can be considerable, as the mechanical advantage in the pedestal system is not used. Steering with the emergency tiller may be more convenient if the steering wheel is removed from its hub. This is readily done by unscrewing the nut which holds the wheel on the hub, and pulling the wheel off the hub. Each time the steering system is inspected, check that the wheel has not seized on the hub, and can still be readily removed. A light coating of grease on the hub is recommended to prevent seizing.

Be certain to try out the emergency steering system while you are becoming acquainted with your boat, and develop the procedures necessary to rig the system quickly in the event of failure of the pedestal system.

ENGINE OPERATION

TO START ENGINE: Read Engine Owner's Manual before operating.

1. Battery switch must be ON. On any boat with two or more batteries, battery select switch should be placed in number one (1) position.
2. Turn on "MAIN" D.C. breaker on electrical panel, if applicable.
3. Be sure gear shift is in neutral.
4. Advance throttle to approximately 1/4 position.
5. PREHEAT - if engine is so equipped. If engine has not been started for some time, or in cold weather, use "PREHEAT" switch on engine control panel in cockpit to facilitate starting.
6. Turn key switch to the "ON" position. At this time the oil pressure and electric discharge warning lights and alarms will come on.
7. Turn key to 'START' position.
8. If the engine starts, check oil pressure, ammeter charge rate and discharge of cooling water. It may be necessary to momentarily speed up the engine to cause a charge to be shown on the ammeter, if so equipped. Warning lights and audible alarms should now go off. If they do not the engine should be stopped immediately and the engine manual consulted.
9. Let the engine warm up at a fast idle, perhaps 20% above minimum idle speed.
10. If engine doesn't start due to a lack of battery power, momentarily reposition battery select switch to 'BOTH'.
11. Do not crank engine for long periods of time. Extended cranking may cause cooling water to fill the muffler and back flow into the engine.

NOTE: If it is necessary to crank engine for a long time drain exhaust system at water lock before proceeding.

Engine Operation Cont'd.TO STOP ENGINE:

1. Pull stop knob and hold it until engine dies, then push knob back fully or push electric stop button on engine panel, if so equipped.

2. ONLY AFTER ENGINE HAS STOPPED - Visual and audible alarms will be effected until key is turned to "OFF" position. Shut off key switch or ignition breaker. Turning off the switch while the engine is operating will NOT stop the engine, and may damage the alternator. Be sure to shut off the switch after the engine has stopped, as leaving the switch on will maintain a flow of current to the alternator.

SAFETY PRECAUTIONS WITH DIESEL ENGINES

Diesel engines used in the marine industry today operate with very high exhaust temperatures. The result is that any defect or restriction of flow anywhere in the cooling water system running to the exhaust line can cause excessive build up of heat, which in turn could burn the exhaust hose. Also, due to high temperatures it is recommended that after running the diesel for a period of time it should be brought back to the idle position and allowed to operate for a few minutes to dissipate any excess heat.

DIESEL ENGINE SYSTEM

The most common cause of trouble with a diesel engine is contaminated or dirty fuel. Your boat is equipped with a primary fuel filter located in the engine compartment and a secondary filter on the engine. The wise skipper carries replacement filter cartridges.

Familiarize yourself with the bleeding procedure for the engine and try bleeding it yourself. The procedure only takes five minutes after you are acquainted with what to do, but can be exasperating to the uninitiated.

As with any engine, do not shift from forward to reverse at high engine RPM. Keep engine gear shift lever in "Reverse" position while sailing. The engine manufacturer's owner's manual contains a wealth of information about the engine. Take time to read the manual BEFORE you need the information due to a malfunction.

SYNTRON SHAFT SEAL

Where the propeller shaft passes through the hull from the engine to the propeller, a syntron shaft seal is installed to prevent the ingress of water. This shaft seal consists of a number of O-rings. Owner's maintenance is limited to inspecting the clamps that hold the hose to the seal and to the fiberglass shaft log.

FUEL TANK

(For the following locations refer to Thru-Hull and Tank Location Diagrams.)

The fuel tank is an aluminum tank that has been pressure tested by the manufacturer and securely installed by TPI. Connected to each tank are the following hoses: (a) Fuel Fill; (b) Engine Feed; (c) Tank Vent; (d) Engine Return. The tank is included in the boat bonding system. A gauge is mounted on the tank top to display fuel status. Please note, however, that due to the asymmetrical shapes of the fuel tanks, the gauges register tank levels not remaining capacity.

FUEL SYSTEM

Fuel Tank:

Since diesel engines require bleeding after they have been deprived of fuel, it is important the shut-off valve be in the "ON" position (lever parallel to piping) anytime the engine is started.

Fueling:

When preparing to take on fuel, the following safety precautions should be followed at all times:

1. Properly secure boat to dock using bow, stern and spring lines.
2. Close all hatches and ports.
3. DO NOT SMOKE.
4. SHUT OFF ALL EQUIPMENT, . . . ENGINE, GENERATOR, MASTER BATTERY SWITCH, STOVE, CABIN, HEATER, RADIOS, LIGHTS, ETC.
5. If possible, all personnel not involved in fueling should leave boat.
6. Keep a fire extinguisher handy.
7. Remove fuel fill plug and clean threads of both plug and deck plate carefully so no dirt falls into filter aperture.
8. Place the nozzle of the fuel hose in the fill pipe. Keep it in contact with the deck plate rim to avoid a static electric charge.
9. Fill Slowly. DO NOT OVERFILL. Marine fuel expands with an increase in temperature. Therefore, fill only to approximately **95%** capacity.
10. If you cannot see the fuel pump, ask the attendant or a crew member to call out the gallonage.
11. If fuel tank is overfilled, fuel will leak out the tank vent, generally located on the transom. This spillage should be cleaned up immediately.

Fueling Cont'd.

12. After fueling, replace fill plate and wash up any spillage. Go below deck and check for fumes or leakage. Check bilge.
IF EITHER FUMES OR LIQUID FUEL ARE PRESENT, CORRECT THE SITUATION BEFORE PROCEEDING.

13. Open all hatches and ports to facilitate ventilation.

14. Only after you are totally satisfied that no potentially dangerous condition exists, leave the fuel dock. Be considerate of your fellow yachtsmen.

15. In the event of serious spillage, STOP FUELING IMMEDIATELY. Replace fill plate, notify attendant so he may warn others and wash down thoroughly until all traces of fumes or fuel have disappeared.

16. Do NOT fuel during electrical storms.

NOTE: In remote areas, be sure to check fuel before filling tank(s) to be sure it is water free, clean, diesel oil. Once contaminated by dirt, water, or gasoline, the tank(s) can be difficult to clean.

ENGINE FRESH WATER COOLING SYSTEM

The engine utilizes a closed system in which a mixture of water and anti-freeze is circulated within the engine for cooling. This liquid is cooled by a heat exchanger which uses sea water, in a similar fashion to the radiator on a car, using air to cool a contained liquid. The filler cap for the fresh water (closed) cooling system is located on the top of the engine manifold, and looks like a radiator cap. Use the same precautions in removing the cap from a hot engine as are appropriate for the radiator cap on an automobile - open cap slowly to allow steam to escape. Check the level in the manifold frequently. If additional liquid is needed, the liquid should be anti-freeze and a fresh water mixture.

If the fresh water system is drained, or has a substantial leak, an air lock may develop in the fresh water cooling system, especially on boats having the water heater option. It may be necessary to disconnect a hose running from the engine to the water heater and fill the hoses and exchanger inside the water heater with coolant mixture.

In northern latitudes where freezing may occur over the winter, be sure to test the coolant anti-freeze/water mixture for freezing point and add anti-freeze as needed if the system is not drained for winter lay-up.

EXHAUST SYSTEM

Your boat is equipped with a water-injected exhaust system which cools the exhaust as it exits from the engine. See following page for description and a diagram of this system. If the flow of cooling water is interrupted and the engine overheats severely, the rubber hose coming from the engine exhaust elbow may melt. Always check this hose after an occurrence of overheating.

There will always be a little water in the bottom of the water lift "pot". In fall decommissioning, the pot should be drained using the drain plug, or anti-freeze added to the pot so the residual water will not freeze.

If the engine is cranked for a prolonged period of time the engine cooling water may build up in the pot. In this very unlikely situation, the drain on the pot should be opened.

Before engine cooling water is injected into the exhaust elbow, it runs up to a point above the waterline, where either an anti-syphon valve or an overboard vent admits air to the line when the engine is off, to prevent syphoning. Especially if operating in dirty water, the anti-syphon valve may clog, and fail to admit air at engine shutdown. Check the operation of, and lubricate the anti-syphon valve frequently.



Electrical System Cont'd.110 Volt A.C. Shorepower System (Optional)

The 110 volt AC Shorepower system is functional only when the vessel is plugged into suitable power from shore. The cord provided has the standard end for the amperage service. Depending on the wiring in your facility, various adaptors may be required to plug the shore end of the cord in. The vessel end of the cord plugs into the inlet located inside the cockpit. The cord should be inserted with the socket holes matching those in the inlet, and turned to lock the socket. The outside ring on the cord should then be screwed into the flange of the inlet to give the cord additional protection from pulling out.

The switch panel for the shorepower system is located next to the DC panel.

Functions of the panel are as follows:

- A. Orange Light: Indicates that the shore power is hooked to an active shore system.
- B. AC Voltmeter: Indicates line voltage being received from the shore circuit.
The line voltage will vary with the number of appliances operating on the same circuit. In large marinas there may be a large number of boats on the same circuit, causing fluctuations.

CAUTION: Operation of AC motors with less than 90 volts is likely to result in damage to the motors.

- C. AC Normal/AC Reverse: The AC panel has a red light to show when the polarity is reversed. Care should be taken not to operate 110 AC systems on board with reversed polarity. Notify dockmaster of this problem so the shore plug can be repaired.

NOTE: Even though the switches are in the appropriate position, the shore power system in no way assures safety of personnel using electrical apparatus.

- D. Water Heater: Supplies power to the water heater 110 AC element for hot water while dockside. Note the cautions regarding the use of electrical power to heat water are contained in the plumbing section of this manual.



110 Volt A.C. Shorepower System Cont'd.

E. Outlet: Supplies power to the outlets placed throughout the cabin.

CAUTION: These precautions should be taken to avoid shock and fire hazards:

1. Turn off the boat's shore connections switch before connecting or disconnecting shore cable.
2. Connect shore-power cable to the boat first.
3. Disconnect shore-power cable at shore-outlet first.

Reprinted from ABYC Safety Standard (E-8 5-1-77)

FREEDOM 28 BOAT WIRING COLOR CODES

<u>WIRE SIZE</u>	<u>COLOR CODE</u>	<u>ITEM</u>
#12/2	Brown and Black and Red	Pumps
#14/2	Blue and Black	Cabin Lights
#16/2	Gray and Black	Navigation Lights
#14	Tan and Black	Propane Solenoid
#8	Green	Bonding System

MAST WIRING COLOR CODE

#14	<u>Orange</u>	<u>Tricolor</u>
#14	<u>Red</u>	<u>Strobe</u>
#14	<u>Green</u>	<u>Anchor</u>
#14	<u>White</u>	<u>Steaming</u>
#14	<u>Black</u>	<u>D.C. Negative</u>

ELECTRICAL SYMBOLS

<u>SYMBOL</u>	<u>ITEM</u>	<u>SYMBOL</u>	<u>ITEM</u>
	Fluorescent Lights		Propane Solenoid
	Dome Light		Compass Light
	Brass Swivel Light		Starter
	Bow and Stern Light		
	Water Pressure Pump		

Batteries

Batteries will last longer if they are kept charged during periods when they are not used. Be sure to check the water level in the batteries at least every two weeks. Adding water to a partially charged battery will lower the charge in the battery. Never add water to a battery which is charging, either via the engine alternator or a separate charger. Be careful in adding water so that the battery acid does not splash. Never add salt water to a battery. Most boat batteries have a shortened life from improper storage during lay up periods, lack of water, and the use of "quick" chargers. Distilled water is preferable for batteries, if available.

Battery Chargers

A proper marine battery charger is strongly recommended. The use of inexpensive automotive type battery chargers which do not have built-in isolation transformers can cause electrolysis to the vessel. One safeguard is to disconnect the NEGATIVE battery lead from the engine when using any charger other than a high quality marine charger with a built-in isolation transformer.

Always ventilate the battery compartment when using a battery charger.

An excellent source for a more thorough understanding of your boat's electric system may be found in a book entitled THE TWELVE VOLT DOCTOR'S PRACTICE HANDBOOK, published by Spar Creek Instruments Co, 616 3rd Street, Annapolis, MD 21403 (301-267-6565).



LIGHTNING PROTECTION

The masts are grounded to the keel and engine in accordance with industry practice. In spite of this grounding, there can be no assurance that personnel or the boat will not suffer injury if the vessel is hit by lightning.

The following are adapted from the ABYC safety standards, are suggestions only, and in no way guarantee safety.

1. If possible, remain inside a closed boat during a lightning storm. Do not contact any metallic objects inside the vessel.
2. Avoid making contact with any items connected to the lightning conductive system (mast step support, etc.) and especially in a way to bridge between two of them.
3. No one should be in the water during a lightning storm.
4. If the boat has been struck by lightning, compasses and electrical gear should be checked to determine that no damage or change in calibration has taken place.

Plumbing System

Fresh Water System

The vents for the water tank(s) are located below deck to prevent seawater from entering the tanks while heeling. The overflow when the tanks are full will run into the bilge. The overflow when filling the tanks can be misconstrued to be indicative of a structural leak, since this water also ends up in the bilge. Tank(s) fill through separate fill fittings located on the deck. Each time a tank is filled, it is wise to wipe off the threads on the deck fitting to remove dirt which may prevent a good seal.

Please note that on boats which have more than one water tank, only one valve should be kept open at a time. This is especially important while sailing at significant angles of heel where the water from one tank will drain through the open valves to the tank on the low side and will overflow through the vent into the bilge. It is possible to lose an entire tank of water if this restriction is not observed.

When a tank has run dry, be sure to close the valve to the empty tank before opening the valve to the full tank. This will minimize the amount of air sucked in by the pressure water system when a tank has run dry; the pressure system may have difficulty overcoming the air in the water lines. After the valves have been changed so that there is water available to the pressure pump, and the pump is turned on at the electrical panel, open a water faucet to allow air to escape. Eventually, there will be a trickle of water. When this happens, close the faucet momentarily to allow the pump to build up pressure; then open the faucet until a steady stream of water issues from the faucet. It may be necessary to repeat the process several times to bleed all the air from the system.

Read the caution regarding the hot water system, if the vessel is equipped with shorepower.

The water in your tanks may develop a taste after a period of time. This will happen to any water in any tanks, as it grows 'flat'. The addition of a commercial water preservation agent such as Sudbury Aqua Fresh crystals will greatly improve the taste of water stored for a long period.

Fresh Water System Cont'd.Water Heater Caution

When the water heater is operating from shore power, a continuous supply of water must be available to the heater. Be certain that the pressure water pump is "ON", and that the tank from which water is being withdrawn does contain water. If the electric element in the water heater is allowed to operate without water even for a few minutes, it WILL BURN OUT. Due to this potential risk, water heater elements are excluded from warranty.

Before taking a shower, check that the sump pump is operational so the shower drain water will not flood the bilge.

Head & Galley Sink Drains

The head and galley sink drains connect to separate thru-hulls above the water line.

WATER TANK(S)

This tank is rotationally molded from polyethylene. Connected to this tank are the following hoses: (a) Fill hose; (b) Feed Hose; (c) Vent Hose. The vent hose is internal and any overflow ends up in the bilges.

(See Thru-Hull and Tank Location diagrams - 5.5-1 for the Tank location.)

HEAD SYSTEM

HEAD

It is always good seamanship to close the intake and discharge seacock (if installed) for the head when leaving the vessel. Also, be certain, while sailing, that the flush control valve or lever on the head is not left in the flush position so as to prevent the head from filling with water which will spill as the boat heels.

Y VALVE - Opt.

If your vessel is operated outside the territorial waters of the U.S., the "Y" valve may be shifted to pump toilet effluence directly overboard. Note that this practice is illegal in U.S. waters and will result in a substantial fine. Some waters prohibit the existence of a "Y" valve, so the device should be removed for navigation in these waters. Conformance with sanitation laws is an owner responsibility. Please see the diagram showing the direction of effluent flow to be sure the handle on the "Y" valve is properly positioned (see p. 7.3-1).

HOLDING TANK

Your vessel is equipped with a holding tank for retention of sewage. The holding tank, like the water tank, is also made from polyethylene and is connected to the following hoses: (a) Waste Discharge Hose from the Head; (b) Pump-out Hose leading to deck plate; (c) Vent hose. This tank vents overboard.

Seawater is used to flush the head, and the sea water and effluent are pumped into the holding tank by pumping the toilet. A deck fitting is provided through which the holding tank may be evacuated by a shoreside pump-out station.

With the standard holding tank, it is not necessary to "precharge" the tank by adding water before using the system. Be certain that the pump on the toilet is pumped several additional strokes after waste has been evacuated from the bowl to insure that the effluence is pumped through the hoses and into the tank.

Care should be taken not to overfill the holding tank as effluent will block the vent hose and may damage the tank. If the toilet is difficult to pump, check to see if the holding tank is overfilled. The holding tank must be pumped out before winter storage, and a small amount of potable anti-freeze added to the residual water.

EXTERIOR MAINTENANCE

Attention should be given regularly to the maintenance of the exterior of your boat to keep its appearance looking new. The following guide will be helpful.

Fiberglass

Even though fiberglass construction has vastly reduced upkeep, some attention to gelcoat surfaces is necessary to maintain the appearance of the finish. After a few years exposure with no protection, the finish may begin to fade or chalk. The twice annual application of a good commercially available wax containing an ultraviolet shield will preserve the appearance of this finish for many years. Be sure fiberglass surfaces are clean and free of salt before applying wax. Abrasive cleansers should not be used for general cleaning. A cleaner with no abrasive properties, such as Spic and Span, is preferred. On the non-skid areas which are difficult to wax, a coating such as Armor All, which is used for coating vinyl tops, will restore the finish.

In the fiberglass molding process, a wax is used on the mold to prevent the part from sticking to the mold. Some of this wax will end up on the fiberglass part. Especially during the first year, the residual wax on the deck may yellow a little, as it is affected by sunlight and airborne contaminants. Eventually, normal washings will remove this wax. If more rapid removal is required, a commercial wax stripper can be carefully applied.

Bottom Paint

One coat of bottom paint is applied at the factory. Generally, a second coat applied before launching will afford the best protection. Check with your dealer for a paint compatible with the factory applied paint. A non-compatible paint may lift the factory applied paint.

Bottom paint should be lightly sanded before recoating. Always wear a respirator when sanding bottom paint - it is toxic. After several coats, it will be necessary to remove the accumulation of bottom paint, preferably by sanding with a rotary sponge-backed pad, or with paint remover designed for use with fiberglass.

Bottom Paint Cont'd.Zincs

Every boat should have a shaft zinc installed as a sacrificial anode to protect the propeller and shaft from electrolysis. These zincs can deteriorate very quickly so frequent inspections should be made.

Exterior Teak

If left untreated, exterior teak will discolor rapidly, turning a dull gray color. Teak is relatively open grain wood, and eventually mildew may form in the grain, resulting in a very dark color.

If you wish to maintain the warm brown color, the teak must be kept clean and oiled. The grain of the teak will raise as the wood is wetted. The job of keeping up the teak will be much easier if the wood is sanded very smooth. Use sandpaper for this purpose, and be careful not to scratch the gelcoat. The best routine for bringing back discolored teak is to scrub thoroughly with a teak cleaner and water, allow to dry, and sand. Then apply multiple coats of a high grade teak oil. Some teak cleaners will stain the gelcoat, so be sure to hose off the deck and topsides thoroughly.

A good applicator for teak oil is a small piece of a sponge, perhaps 1" square by about 3" long, with one end tapered to allow application close to the deck without touching the gelcoat. Most teak oils will stain the gelcoat and are difficult to remove. Therefore, be careful and clean up drips promptly.

CAUTION! Some teak oils are extremely flammable. Be sure that any rag used with teak oil is taken off the boat and disposed of in proper containers, rags may spontaneously combust. Many fires have been started through combustion of teak oil soaked rags.

Deck Hardware! (Blocks, stoppers, etc. excluding winches)

As frequently as possible, wash deck hardware with fresh water to remove accumulated salt and general grime. Lubricate sheaves, bearings, etc. with silicone spray (WD 40 is a popular brand). Avoid overspray on deck as it will get slippery.

Exterior Teak Cont'd.Winches

Like all fine machinery, winches do require periodic maintenance to assure their proper operation. Failure to properly maintain winches may result in their malfunction, which may cause injury.

Specific instructions for the winches installed on your vessel are included with the other manufacturer's literature. At least twice a year, winches should be disassembled, cleaned, and lubricated. Note that the gears and bearings are lubricated with grease, but pawls and pawl springs should have only light oil applied. Kits of spare parts for winches are available and we recommend you obtain appropriate kits for your vessel.

Deck Hatches

Non-skid tape is a good idea on the translucent deck hatches as they become slippery when wet. The tops of the hatches are made from plastic, which will be scratched by ground-in sand, coral, etc. If more privacy is desired, sand the inside of the hatch cover with #120 sandpaper which will "frost" the surface.

Portlights

The ports are glazed with "Plexiglass" or "Lexan", noted for their high impact resistance. Gritty cleaning agents with abrasives, such as cleanser, will scratch. Use only mild soap and water to clean the ports.

Some chemical solvents, notably Acetone, will also injure the port lights.

INTERIOR MAINTENANCE

As on the deck, the interior gelcoat surfaces should be cleaned periodically with non-abrasive cleansers and smooth areas should be waxed. Use a coating such as Armor All to maintain the non-skid areas.

All solid and plywood teak surfaces have been oiled prior to delivery. If more oil is desired, it can be easily applied with a foam brush or sponge. For an even finish the oil should be rubbed with a rag shortly after application. The factory applied oil finish on the teak makes a good base for varnish if so desired. (Be sure any rag having even a trace of teak oil is removed from boat.)

The bilges are painted air dry gelcoat. They should be washed regularly to prevent the growth of mildew which can foul the bilge pumps.

The interior and exterior stainless steel surfaces can be treated with Neverdull or other light abrasive stainless steel cleansers. Toothpaste also works well as a cleanser for this purpose.

ELECTRICAL

- _____ Disconnect power source when effecting repairs or adjustments to electrical systems to avoid potential electrification.
- _____ Check battery charge, terminal connections, and electrolyte level.
- _____ Check electrical panel, breakers and switch condition and operation tightness of wire connections.
- _____ Check running light operation.
- _____ Check ground wire attachment to keel, mast step, thru hulls, and engine.
- _____ Propane system - check the seal of the electrical solenoid valve and make sure it closes when switched to "OFF" position.

MECHANICAL SYSTEMS

- _____ Check stove fuel system, hoses, clamps and shut offs.
- _____ Check heating stove - clearances and exhaust pipes.

ENGINE AND DRIVE TRAIN SYSTEM

- _____ Consult engine owner's manual maintenance guide.
- _____ Check engine fluid levels and systems for leaks - shut off controls.
- _____ Check throttle action - start and stop controls, cable clamps, and locknut.
- _____ Check shifter cable clamps and locknuts.
- _____ Check exhaust system soundness, hose clamps, and waterlock canister.
- _____ Check coolant system, hose clamps, intake, and filters.
- _____ Check transmission shift lever action, control cables, clamps and locknut; fluid level and alignment.
- _____ Check alignment of shaft, coupling, and prop attachment - key, nuts and cotterpin.
- _____ Check shaft log tube integrity, packing, hoses and clamps.
- _____ Check strut bolt attachment, cutless bearing and shaft bolts.
- _____ Check all engine wire connections.

KEELS

- _____ Check keel bolt nuts for tightness. *(On cradle to 90 foot pounds.)

PLUMBING

- _____ Check bilge pump function, hose clamps, and strainer. Clean, disassemble, repair/replace and lubricate as required.

REPAIRS

All necessary repairs should be completed before continuing to use the boat. To replace with new equipment is often a much safer course to take. If it is not possible to return equipment to a new condition through repairs, equipment should be replaced for safety sake. *Do not arbitrarily tighten steel bolts. Adjustment may break bedding compound bond and cause leakage.

ANNUAL SAFETY MAINTENANCE CHECK LIST

The following list has been compiled as a guide to check critical safety related components of the boat. It is very important that this maintenance inspection be completed each year to assure the ongoing safety of your boat. This list is not all inclusive. It is intended as a guide only.

RUNNING RIGGING

- _____ Check running rigging lines for wear at splice, turning blocks, etc.
- _____ Inspect blocks & shackles for wear and tear. Clean and lubricate or replace as required.
- _____ Service winches, per enclosed guide, check for free operation and ratchet stop function.

DECK HARDWARE

- _____ Check lifeline integrity, stanchion, and rail attachment to deck.
- _____ Check all cleats for signs of fatigue. Tighten fasteners or replace as required.

STEERING SYSTEM

- _____ Consult Edson maintenance guide (p 5.1-1).
- _____ Check rudder for cracks from fatigue or impact damage.
- _____ Check rudder post play in bearing tube.
- _____ Check that radial drive wheel is securely attached to rudder post.
- _____ Check integrity of cables, chain and fittings.
- _____ Check steering wheel shaft lubrication and condition of shaft/wheel
- _____ key and nut.

THRU HULL AND SEACOCKS

- _____ Disassemble seacocks and ballvalves. Clean and check for any sign of deterioration and replace/reassemble and lubricate as required.
- _____ Check seacock integrity.
- _____ Check seacock attachment to hull.
- _____ Check for free operation and lubrication frequently.
- _____ Check hose, integrity, attachment and clamps.

PROPANE STOVE - OPTIONAL

(Refer to Propane System Diagram)

The propane (LP) gas stove installed on your vessel will give heat comparable to a home gas stove.

"In the interest of safety it is important that the properties of liquefied petroleum gases be understood and that safe practices for their use be followed. Under moderate pressure the gases liquefy; upon relief of the pressure they are readily converted in to the gaseous state. Advantage of this characteristic is taken in their usage, and for convenience they are shipped and stored under pressure as liquids. In their gaseous state they present a hazard comparable to any flammable natural or manufactured gas, except that they are heavier than air. Although the vapors tend to sink to the bottom of an enclosed compartment into which they are released, they will diffuse throughout, and are not readily dispelled by overhead ventilation. Safety requires the prevention of escape of any liquefied petroleum gases, for when mixed with air in certain proportions they will explode if ignited."*

*Reprinted from A.B.Y.C. Safety Standard #A-1-70.

In addition to the manual shut-off valve located on L.P. tanks, the vessel is equipped with an electrically operated solenoid valve which shuts off the flow of gas at the tank. This valve is a "normally closed" valve; therefore electrical power must be provided so gas can flow to the stove.

Typical Stove Operation Routine

1. Check that all burner (including oven) knobs are off.
2. Check manual valve on tank and open if necessary. Make sure selector valve is on full tank (if so equipped).
3. Be sure battery switch is on and 12 volt power is available.
4. Turn on circuit breaker for solenoid valve, and separate control for stove (if provided).
5. Open burner valve on stove slightly and light burner. Note: some stoves may have a device which shuts off the flow of gas until burner is hot. On these stoves, an override button is provided which must be held in until the burner is lighted and hot. Refer to stove manufacturer's instructions provided with the vessel.



Stove Operation Cont'd.

6. Never, ever, leave a lighted burner unattended. A gust of wind may blow the flame out and allow gas to continue to flow from burner. L.P. gas is heavier than air and may explode.
7. If gas odor is observed, immediately open floor boards and vacate vessel. Do not do anything which may cause a spark. Do close manual valve on tank. Open all hatches and seek aid immediately.
8. When cooking is completed:
 - A. Turn off electrical power at switch for stove, and at panel (if separate).
 - B. After flame of burner in use has gone out, turn off knob for burner. (This will purge gas from lines.)
 - C. If you are leaving vessel, good seamanship dictates also turning off manual valve on tank.

CAUTION:

1. Keep container valves closed when boat is unattended. Close them immediately in any emergency.
2. Be sure all appliance valves are closed before opening container valve.
3. Always apply lit match or other flame to burner before opening valve.
4. Close master valve on appliance whenever appliance is not in use.

Propane Leak Test

All of the connections in the propane system should be checked during the initial commissioning, at least twice a month thereafter, and every time a bottle is refilled.

Locate leakage by the application of liquid detergent or a soapy water solution at the connections. Repeat the test for each container in a multi-container system.

Also check for leaks by watching the propane gauge. If the pressure drops while no one is cooking then retest all connections until the leak is discovered.

NEVER USE FLAME TO CHECK FOR LEAKS.

*Reprinted from A.B.Y.C. Safety Standard A-1-70.

WINTER STORAGE

Sails, Sheets and Lines

Sails and lines should be removed at the end of each season and stored in a warm, dry place. If it is possible to dry them thoroughly, they should be rinsed with fresh water before storage.

Engine and Fuel System

Check the engine manual for maintenance guidance during the season and for the specific haul out procedures necessary to winterize the engine. Fill fuel tank(s) to minimize condensation and add an anti-bacterial agent.

Batteries

If the vessel is equipped with an automatic battery charger and a reliable power source is available, batteries may be left on "Charge" onboard throughout the winter (in latitudes below 40 degrees North). Check batteries for electrolyte level at least once per month, but add water sparingly, as the water may freeze before going into solution with the existing electrolyte.

Preferred treatment is to remove the batteries from the vessel, and store in a heated area, recharging periodically to maintain full charge status. (Required treatment in latitudes above 40 degrees North.)

Head

As with the engine, the specific procedures for preparation for winter storage and recommissioning are contained in the manufacturer's manual.

Fresh Water System

Drain all tanks in preparation for winter storage. Be sure to drain the water between the heater and the check valve installed in the supply line. Add an anti-freeze solution specifically designed for Marine/RV potable water systems to the residual water in the water tanks, and pump with both manual and pressure pumps until all lines are full of anti-freeze solution. DO NOT use automotive radiator-type anti-freeze, as most are poisonous and may damage the plumbing.

Bilges

Be sure to pump the bilge completely dry.

Winter Storage Cont'd.

Ventilation

Leave the dorade vents in place and open so that the boat can get air during the winter. If a winter cover is used, it is recommended that the hatches be left partially open to enhance air circulation. This will help to prevent mildew. Also, it is recommended that boat cushions be removed and stored indoors for this same reason.

Winter Cover

If storing outdoors, a winter cover is recommended. It can be as simple as a rectangular piece of canvas forming a tent over the boat. A rige pole (formed by 2" x 4" 's along the centerline) several feet above the cabin top, well supported at several places along its length, is sufficient to support the center. The stanchions can be removed from their sockets, and ropes tied from the rige pole to the sockets to help support the cover. Use carpeting to pad any areas of chafe. Lash the cover tightly to the cradle, avoiding any grommets in contact with the gelcoat.

If at all possible, use a cover which does not extend partially over the gelcoat. Uneven covering with winter covers may cause color variation in topsides. Plastic covers may trap water in between the hull and the cover, causing premature failure of the gelcoat.

Cradle

Make sure that the boat is adequately supported and that any suspected weakness has been reinforced. The keel of the boat must rest solidly on the main beam. The vertical risers are not intended to carry the load, merely to stabilize the boat.

Storing of Masts

While carbon fiber spars are exceedingly strong along their long axis, they can be damaged by crushing of the tubular section. Always store masts on well-padded supports and do not place any weight on top of the mast(s). Do not use tape directly on the mast surfaces, or the paint may lift when the tape is removed. Plastic coverings can also abrade the paint coating and should be avoided. There is no harm in leaving carbon fiber spars installed in the boat through the winter providing the boat hull is adequately supported and a large build up of ice does not occur on the spar.

SAILING CHARACTERISTICS

Simplicity is one of the key ingredients in any Freedom Yacht. This is most obvious in the absence of stays. Consequently, there are no complex tuning instructions normally associated with the average stayed rig. There is only one place to put this mast. The apparent confusion of lines in the cockpit quickly dissipates when you familiarize yourself with the function of each line. The purpose of so many lines is to give you complete and safe control from the cockpit. For your convenience rope hooks are installed so each line can be hung up out of the way.

TO HOIST SAIL

Remove the sail cover, untie the stops and hook up the halyard to the headboard. Be sure the halyard is inside the two lazy jacks. Check batten tension - basically you want the battens to be tied in tightly for light to medium winds and looser for heavier winds. This does not mean that you have to adjust batten tension every time you go sailing. Set them only once for the most consistent weather in your sailing area. Release the main sheet and ease the boom vang. Haul the main halyard up by hand for at least two-thirds of the way, then switch to the winch. Care should be taken to maintain the sail, headboard and battens between the lazy jacks. This is best accomplished by keeping the bow of the boat head-to-wind. Winch the halyard up until the luff has the tension you desire. The top of the headboard should be about 3 inches below the mast top. Adjust outhaul tension (more tension in heavy winds, less tension in lighter winds).

Check the lazy jacks, which are adjustable and double as a topping lift. You may want to ease off the lazy jacks slightly so that the sail leech supports the boom. Otherwise when you trim down on the boom, you will be trimming against the lazy jacks.**

**Be sure to re-tension the lazy jacks before lowering the sail, or reefing, to keep the boom from falling or possibly injuring crew underneath.

TRIMMING SAILS

Start with the traveler in the center position. In any sort of a breeze you will want to carry the traveler down slightly - about over the edge of the companionway. If you wish to reduce heeling, let the traveler



Sailing Characteristics Cont'd.

down further. The main sheet controls the basic angle of the sail, but when close hauled, the main sheet also governs leech tension. If you haul hard on the main sheet you will tend to close the leech; this puts the sail in one plane and is good for developing full power in lighter winds and flatter seas. If you ease the sheet slightly, you will note the top battens fall off slightly. The sail now has "twist" - that is, it is operating in several vertical planes. This kind of trim is useful for moderate breezes with choppy seas. Traveler adjustment is another variable here, and you really have to experiment to find what works best for your style of steering - with any particular wind/sea combination.

For offwind performance it is very important to set up sufficient vang tension. It is easier to set up the vang when the sail is trimmed to windward. Remember, on all Freedoms you must tie a knot in the sheets, in order to restrict the travel of the boom to 90 degrees. Allowing the boom to travel further than 90 degrees is not efficient, and will subject the boom gooseneck bracket to excessive strain, which after some time will cause a failure. //

Reefing

We've made reefing just about as simple as it can be and it's all done from the cockpit. There are two reefing lines - one to port and one to starboard. The procedure is to ease the main sheet and vang to relieve pressure on the sail. Lower the main halyard to the first reef position (you can mark this on the halyard) and then simply winch in the reefing line. Being continuous, the reefing line will first bring the new tack down to the boom. Then the line will pull the new clew down. Because of the stabilizing influence of the batten, you should not have to lash the sail further.

Hoisting and Trimming the Jib

Remove the sail cover and sail ties, shackle jib halyard to head of sail and release the stopper on the jib sheet so that sail will luff when hoisted. Halyard tension should only be sufficient to flatten luff. The jib boom system is designed to automatically increase tension on the headstay in order to maintain an efficient leading edge. The headstay should not be pretensioned. Tighten turnbuckle only to remove slack in the wire. The rig will provide all the tension required. When the sail is up, adjust jib boom topping lift as required to allow for proper sheeting.