# CAL 22

## Owner's Manual

CAL
848 Airport Road, Fall River, Massachusetts 02720-4793

Dear Cal Owner:

Congratulations on your purchase of a brand new CAL sailboat. We hope it will bring you years of carefree enjoyment.

Please take time to review all the contents of this owner's packet. There is much useful and valuable information included.

Perhaps the most important item is your warranty card. Please be sure to fill it out and return it TODAY...no postage is necessary. In return, one of our Polo shirts or a Cal duffle bag will be sent to you. If your Warranty Card has been removed from the owner's packet or been lost, please contact Cal Yachts at 848 Airport Road, Fall River, MA, 02720, 617-678-5291, and we will send you a replacement. We wish to impress upon you, the owner, the importance of the Warranty Card.

1. It registers your boat under your name in our files. This will allow us to contact you directly, if any factory retrofits or repairs are necessary - this could be VERY IMPORTANT to you.

2. The U. S. Coast Guard requires us to keep a file, so that we may notify owners in case of a major recall. This file can only be accurate if we have your address. Otherwise, we must attempt to contact you through your dealer.

3. It automatically enrolls you in the CAL owners Association. As the Association is still in the formative stages, we do not expect to have the first newsletter out for a few months. Please be patient. We do welcome your ideas and suggestions at any time.

Fair winds and smooth sailing,

5-13-87 CAL

## IMPORTANT SAFETY INFORMATION

Sailing is wonderful recreation, but it is important that you take certain simple safety precautions.

The following are some of the more important boating safety precautions. We discuss most more fully later on in this booklet, but put them here for your quick review.

1. **LEARN TO BE A GOOD SAILOR.** It takes time and, often, thorough instruction to learn to be both a safe and effective sailor. Unless you have already received instruction, you should attend the classes in your area or take a home study "Skipper's Course." Write your nearest Coast Guard or local U.S. Power Squadron office for further information.

2. **DANGER OF LIGHTNING AND ELECTRICAL POWER LINES.** If your boat is struck by lightning or if the mast or rigging makes contact with an electrical power line, you may be seriously burned or killed. Even though your **CAL** boat has a lightning ground system which complies with industry standards, this still **MAY NOT** protect you if lightning should strike the boat and **WILL NOT** protect you if the mast hits an overhead power line. To best protect yourselves from these hazards:

(a) check the weather forecast before going sailing; if thunderstorms or lightning is predicted, do not go out.

(b) if you are out and find that lightning is present in your area, stay as far as possible away from the mast, boom, standing rigging, and all other metallic objects. These are all electrical conductors, which will carry electric current and cause severe shock, injury or death. Seek shelter as soon as possible.

(c) when launching your boat, stepping the mast, and when sailing, be very careful not to allow the mast or rigging to touch any overhead wire. **BEWARE OF ALL OVERHEAD WIRES**; high-voltage power transmission lines are usually not insulated and frequently look very similar to overhead telephone lines, yet they carry lethal currents. Consult nautical charts for the areas where you are sailing to make sure that there are no electrical lines which are hanging low enough that they might touch your mast or rigging. Know how the top of your mast stands from the water so that you will know whether you will pass safely beneath electrical power lines.

3. **SAFETY ACCESSORIES.** Never use your boat without carrying all of the required safety accessories, such as fire extinguisher, distress signaling equipment, and personal flotation devices.

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3. **SAFETY ACCESSORIES.** Never use your boat without carrying all of the required safety accessories, such as fire extinguisher, distress signaling equipment, and personal flotation devices.

4. **FLOAT PLAN; WEATHER.** Leave a float plan (giving details o where you are going, with whom, and when you plan to be back) so tha you can be located and so that someone will know if you are overdue and be able to start a search for you. Carefully check the weather before you go out and periodically during your sail. No matter how well designed any boat is, there are weather conditions which it cannot withstand. While your boat has been designed to be self-righting under most circumstances, this does **NOT** mean that your boat will always right itself if capsized. Wet sails or rough weather conditions might even prevent this. Furthermore, exposure to cold water for even a few minutes or to warm water for a longer period of time can cause hypothermia (a decrease in the body's temperature) an be fatal. Make sure you know what weather conditions you are going encounter and that you are well trained in bad-weather seamanship, i case the weather changes unexpectedly.

5. **REFUELING.** Exercise extreme care when refueling your boat (See Fueling Procedure.) You could cause an explosion or fire, whic could badly burn or kill you. Be sure to exhaust all fuel vapors an personally sniff to make sure there is no odor or fuel in bilge and engine areas before starting your engine. Never take a lighted matc or work with an open flame (for example, a blow torch) in or around the fuel storage compartment, because even a low level of vapors may be present and catch on fire or explode. Clean up all fuel spills immediately.

6. **110-VOLT SHORE POWER.** If you hook up to shore power, make sure the polarity-warning light and buzzer are not signaling. If th do, disconnect power immediately! This indicates that the polarity the power cord is reversed and you could get an electrical shock tha would burn or kill you.

7. **IMPAIRED CAPACITY.** Do not operate your boat while under t influence of alcohol or drugs. Check with your physician with regar to prescription medicines.

11-14-86

CAL

CAL

# LIMITED 1-YEAR WARRANTY

## Limited 30-Day Warranty For Commercial Use

Cal Sailing Yachts warrants each new Cal boat manufactured by it to be free from defects in material and workmanship, under normal noncommercial use and service, for a period of 1 year after commissioning by the original retail customer, but in no event later than two years from the date of shipment by Cal Sailing Yachts, subject to the terms and conditions stated below.

1) **WARRANTOR.** This warranty is granted by Cal Sailing Yachts, 848 Airport Road, Fall River, Massachusetts 02720-4793.
2) **PARTIES TO WHOM WARRANTY IS EXTENDED.** This warranty shall extend to any buyer (other than for purposes of resale or use in the ordinary course of the buyer's business), and any noncommercial transferee to whom such product is transferred during the warranty period and who normally uses it for personal, family or household purposes. For Cal boats used commercially, this warranty also extends but it expires thirty (30) days after commissioning by the original purchaser.
3) **PARTS COVERED.** All parts manufactured by Cal Sailing Yachts, including the hull, deck, and cabinetry are covered by this warranty; the installation work performed by Cal Sailing Yachts on components not manufactured by it, is also covered by this warranty.
4) **PARTS NOT COVERED.** The following parts are not covered by this warranty:
   a) masts, plywood, teak, external finishes (which include paint and gelcoat), and upholstery; and
   b) engines, toilets, stoves, refrigerators, batteries, ignition systems, lighting devices, blowers, propellers, and other parts and equipment manufactured by others.
   Cal Sailing Yachts will forward the owner warranties, if any, extended by other manufacturers.
5) **REMEDY.** If within the applicable warranty period any part or installation work covered by this warranty proves to be defective in material or workmanship, then Cal Sailing Yachts shall, at its sole option, repair or replace the defective part. Parts and labor shall be at the expense of Cal Sailing Yachts, but not transportation costs.
6) **PROCEDURE FOR OBTAINING PERFORMANCE UNDER THIS WARRANTY.** In order to obtain performance of the obligations under this warranty, the owner must promptly (within thirty days of discovery of the defect) notify Cal Sailing Yachts or an authorized Cal service center of the defect, and at Cal Sailing Yachts' or the authorized Cal service center's direction, return the defective part or product to be repaired or replaced under this warranty to an authorized Cal service center. If repair or replacement by an authorized Cal service center is determined by Cal Sailing Yachts to be impractical, the owner shall return the defective part or product to Cal Sailing Yachts. All transportation costs to and from the authorized Cal service center or Cal Sailing Yachts, and all haulout, launching and rigging costs, will be at the expense of the owner.
7) **DESIGN CHANGES.** Cal Sailing Yachts reserves the right to make changes in the design or material of its products without incurring any obligation to incorporate such changes in any product previously manufactured or advertised.
8) **ENTIRE WARRANTY.** This warranty may be altered only in writing signed by an officer of Cal Sailing Yachts. It may not be altered or extended orally or in writing by any other person.
9) **EXCLUSIONS AND IMPLIED WARRANTIES.** This warranty does not extend to any defect due to the negligence of others, failure to operate or maintain the product in accordance with the operation and maintenance instructions furnished with each new product, unreasonable use, accidents, alterations, or ordinary wear and tear. **IMPLIED WARRANTIES, INCLUDING THOSE OF MERCHANTABILITY, AND FITNESS, ARISING UNDER STATE LAW, ARE LIMITED IN DURATION TO THE DURATION OF THIS EXPRESS WARRANTY, WHERE SUCH LIMITATION IS PERMITTED. CAL SAILING YACHTS SHALL NOT BE RESPONSIBLE FOR LOSS OF USE OF ANY PRODUCTS, LOSS OF TIME, INCONVENIENCE, OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES WITH RESPECT TO BUSINESS OR PROPERTY, WHETHER AS A RESULT OF BREACH OF WARRANTY, NEGLIGENCE OR OTHERWISE.** Some states do not allow (a) limitations on how long an implied warranty lasts or (b) the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not be applicable. This warranty gives the owner specific legal rights, and there may also be other rights which vary from state to state.

## BACKGROUND INFORMATION

The CAL 22 represents one of the best values in today's sailboat market. The design and construction of this boat reflect over twenty years of experience and knowledge gained in the building of over 60,000 boats.

Drawing on this experience and information gathered from sailors around the country, C. Raymond Hunt Associates has designed a strong, attractive and comfortable boat, which will provide many years of sailing pleasure. Hunt Associates is a well-known design firm whose credits include custom and production power boats, the original Boston Whalers, IOR racing yachts, police, and pilot boats, as well as a string of successful production sailboats for O'Day and Cal.

Cal Sailing Yachts chooses to utilize an outside design firm, even though it would be more economical to use an in-house naval architect. Due to a lack of outside influences, an in-house designer often tends to stagnate and will sometimes produce the same design over and over. An independent naval architect has to produce new, innovative designs in order to attract new business. The wealth of experience and willingness to innovate that is typical of C. Raymond Hunt Associates, is an expense that many other manufacturers are unwilling to bear. Cal Sailing Yachts feels that it is well worth the added expense.

This manual is designed to thoroughly familiarize you with the Cal 22, while providing a wealth of information on this design in particular and on sailing in general. In the General section, you will find all the boat dimensions and features listed in detail. The Operation section provides further particulars on every aspect of the Cal 22, including construction details, operation instructions, and general information. The remaining sections - Commissioning, Maintenance, and Manuals - all contain important information about those aspects of boat ownership.

Cal Sailing Yachts reserves the right to change specifications without notice, and this manual may not reflect all such changes. Since we are always striving to improve our product, modifications and improvements are constantly in process and, therefore, it is possible that a particular boat may contain features different from those enumerated in this manual. It is impractical to revise this manual for each such modification. It is our policy to make improvements whenever it is appropriate without waiting for corresponding updates in our manual.

Full information on optional equipment may not be contained herein. Contact the option manufacturer or your Cal dealer for more information.

# CAL 22

V MAINTENANCE - Continued
Basic Rules For Battery Care And Maintenance
Stanchion Gaskets
Winterizing Your Boat
A. Exterior
B. Interior
C. Water System
D. Head System
E. Electrical System
F. Optional Inboard Engine
G. Outboard Engine
Periodic Maintenance
Periodic Maintenance Schedule

VI MANUALS
Foss Foam, Inc.//Polyurethane Foam
The Micro Reefer
Model 10P 1-Speed Winch

Cal 22
6-17-87

# GENERAL

# CAL 22

## STANDARD BOAT DIMENSIONS

### HULL DIMENSIONS

| | | |
|---|---|---|
| LOA | 22' | |
| LWL | 19'7" | |
| BEAM | 7'9" | |
| DRAFT | 3'6" | Deep Keel |
| | 2'10" | Shoal Keel |
| BALLAST | 775 Lbs. | Deep Keel |
| | 950 Lbs. | Shoal Keel |
| DISPLACEMENT | 2,100 Lbs. | Deep Keel |
| | 2,275 Lbs. | Shoal Keel |

### RIG DIMENSIONS

| | |
|---|---|
| I = | 24'7" |
| J = | 8'5" |
| P = | 25'10" |
| E = | 9'3" |

### SAIL AREA

| | |
|---|---|
| Main | 119.5 Sq. Ft. |
| 130% Genoa | 157.7 Sq. Ft. |
| Total | 277.2 Sq. Ft. |

| | |
|---|---|
| Mast Height above DWL | 32'8" |

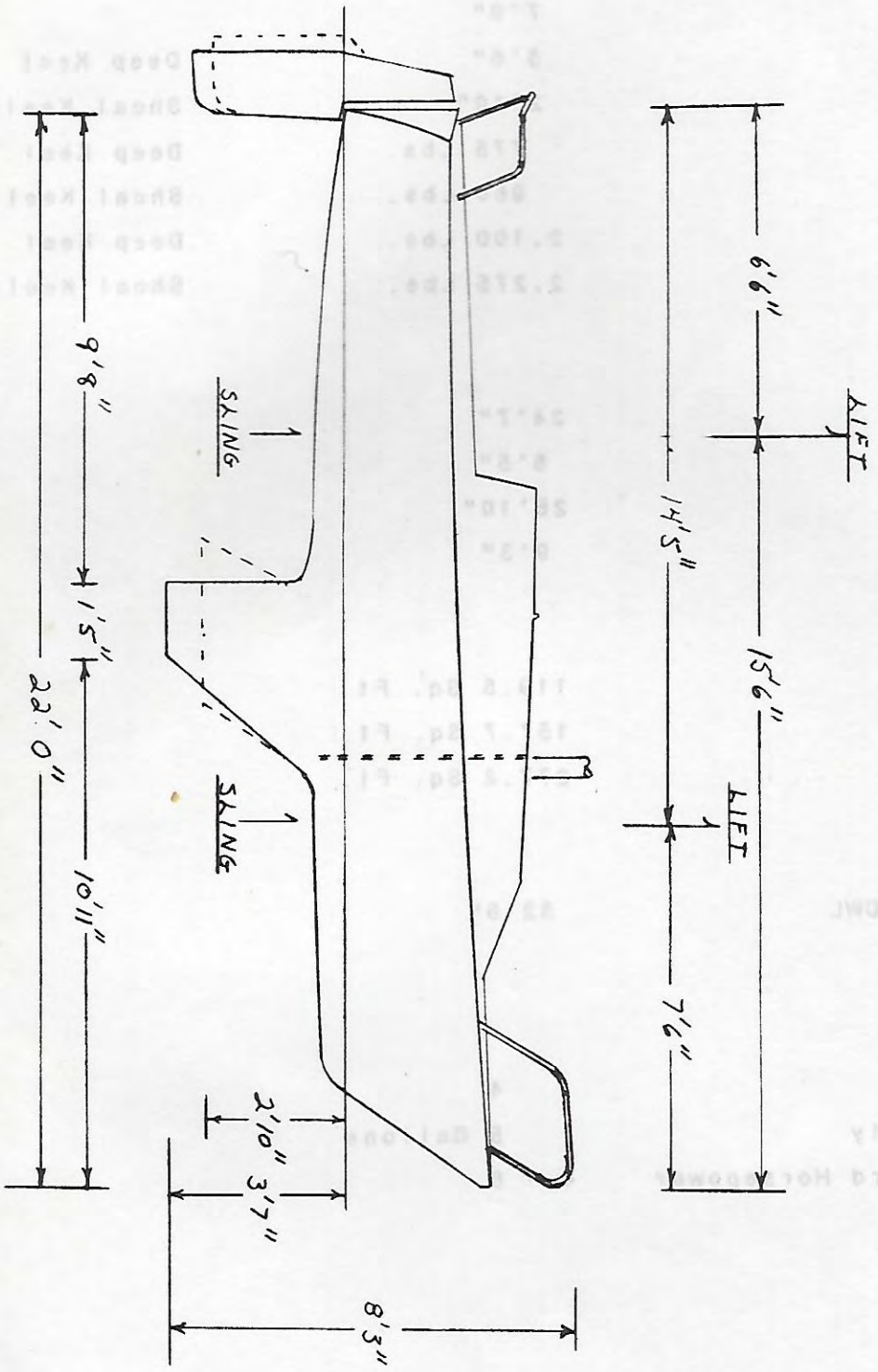
### MISCELLANEOUS

| | |
|---|---|
| Berths | 4 |
| Fresh Water Capacity | 5 Gallons |
| Recommended Outboard Horsepower | 4 - 8 |

10-30-86

BY JPF DATE 3/20/85 SUBJECT CAL 22 DOCKING PLAN SHEET NO. 1 OF 1

CHKD. BY DATE JOB NO.

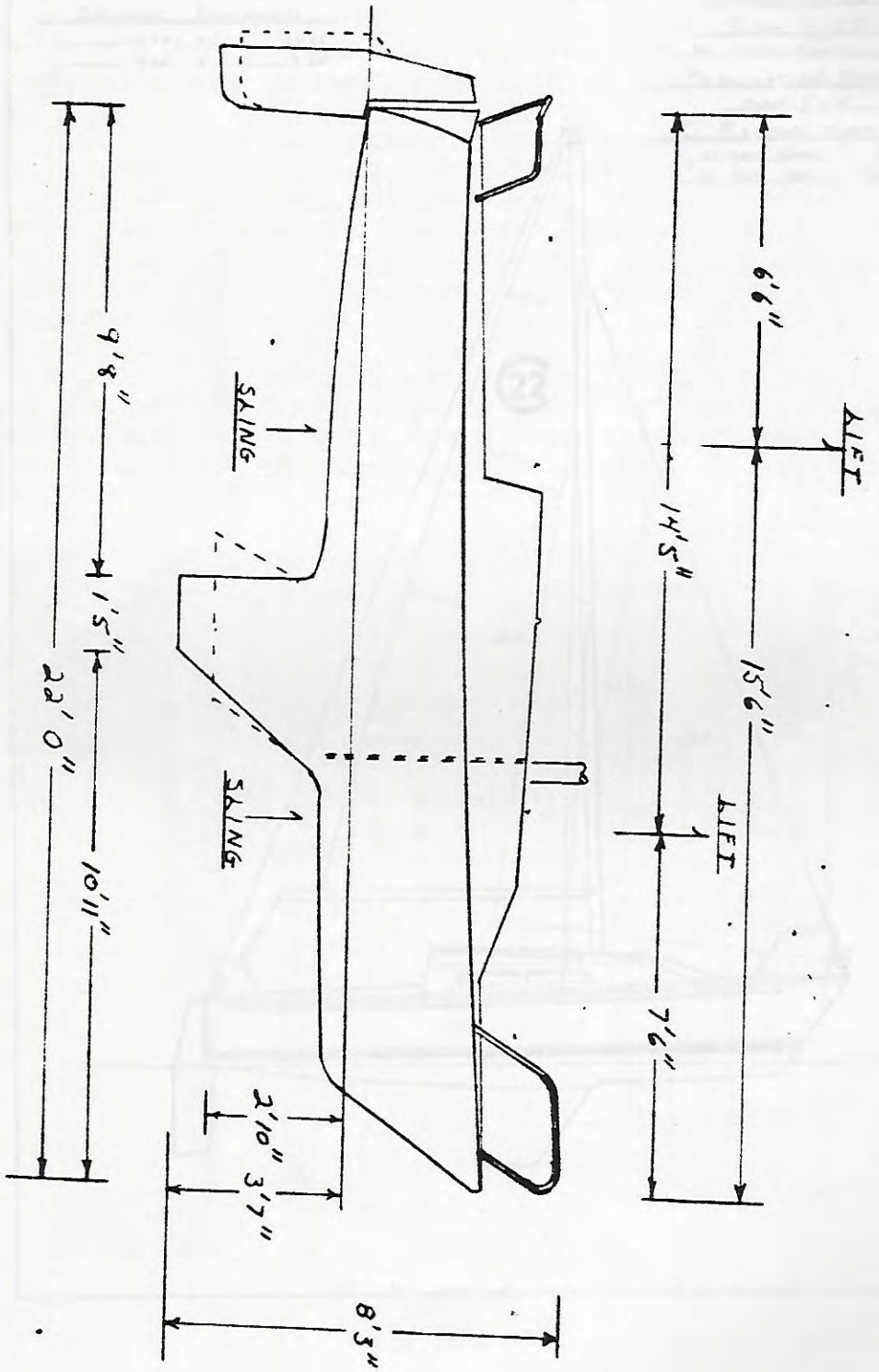


DATE 3/20/85 SUBJECT CAL 22 DOCKING PLAN

CHKD. BY ..... DATE .....

SHEET NO. 1 OF 1

JOB NO. .....



SAILPLAN DIMENSIONS

| | | | |
|---|---|---|---|
| I | 24.58 | P | 25.83 |
| J | 8.42 | E | 9.25 |

DESIGN Nº CAL-22

CAL - 22

FOR LEAR SIEGLER MARINE

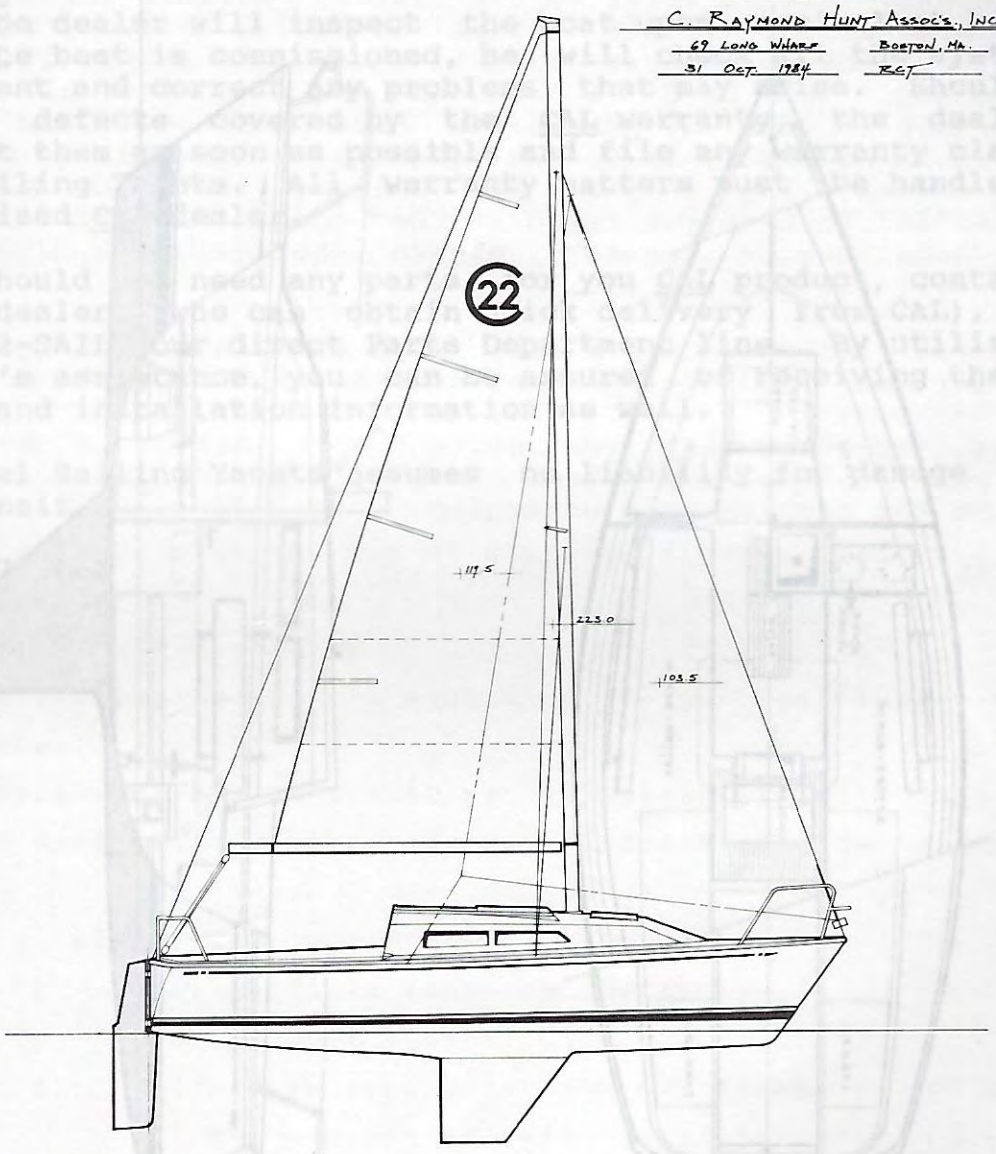
PUBLICATION SAILPLAN

SCALE: 1/2"-1-0"

C. RAYMOND HUNT ASSOC'S., INC.

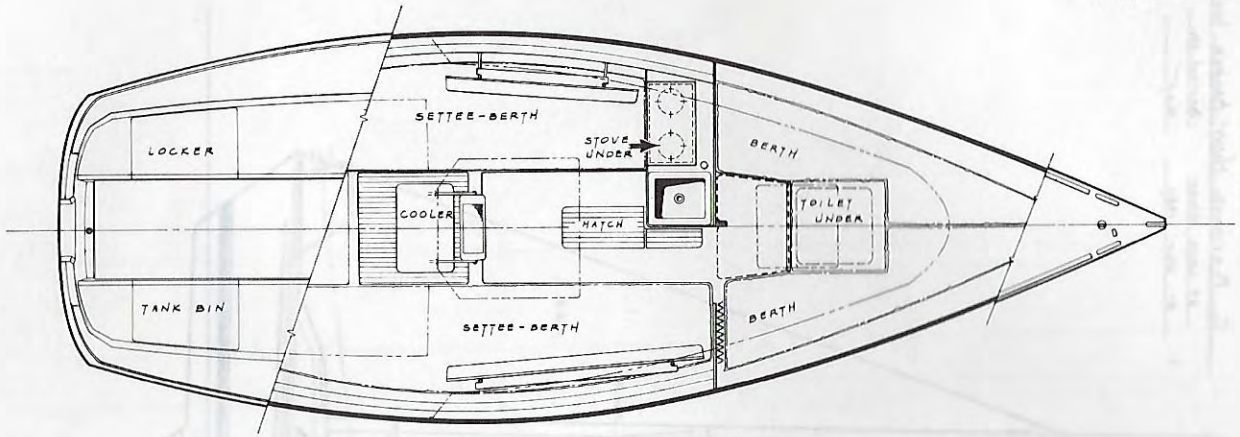
69 LONG WHARF BOSTON, MA.

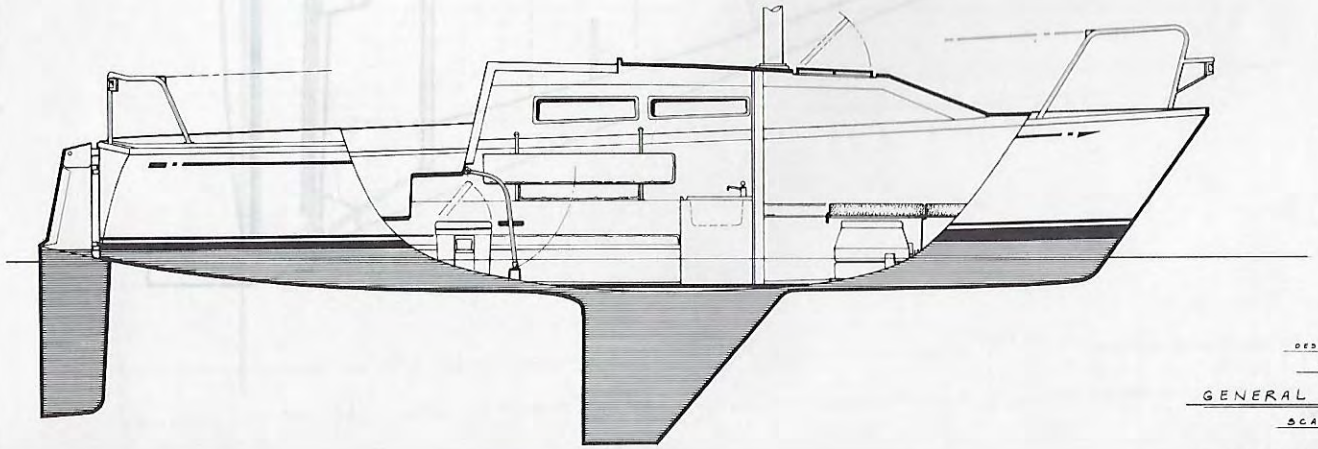
31 OCT. 1984 RCT



DIMENSIONS

| | |
|---|---|
| L. O. A. | 22'- 0" |
| L. W. L. | 19'- 7" |
| BEAM | 7'- 11" |
| DRAFT | 3'- 7" |



DESIGN NO. CAL-22

CAL 22

GENERAL ARRANGEMENT

SCALE: 1"=1'-0"

C. RAYMOND HUNT ASSOC. INC.
69 LONG WHARF, BOSTON, MASS.
NOVEMBER 1, 1964 S.M.W.

## DEALER'S RESPONSIBILITIES

Your CAL dealer is a professional. He can provide you with the service and expertise that will help you to enjoy your CAL. Rely on him for assistance in selecting any additional equipment you may need and in seeing that it is properly installed.

The dealer will inspect the boat upon arrival at his yard. When the boat is commissioned, he will check all the systems and equipment and correct any problems that may arise. Should there be any defects covered by the CAL warranty, the dealer will correct them as soon as possible and file any warranty claims with Cal Sailing Yachts. All warranty matters must be handled by an authorized CAL dealer.

Should you need any parts for you CAL product, contact your local dealer, (who can obtain quick delivery from CAL), or call 800-722-SAIL, our direct Parts Department line. By utilizing the dealer's assistance, you can be assured of receiving the proper parts and installation information as well.

Cal Sailing Yachts assumes no liability for damage incurred in transit.

4-23-87 CAL

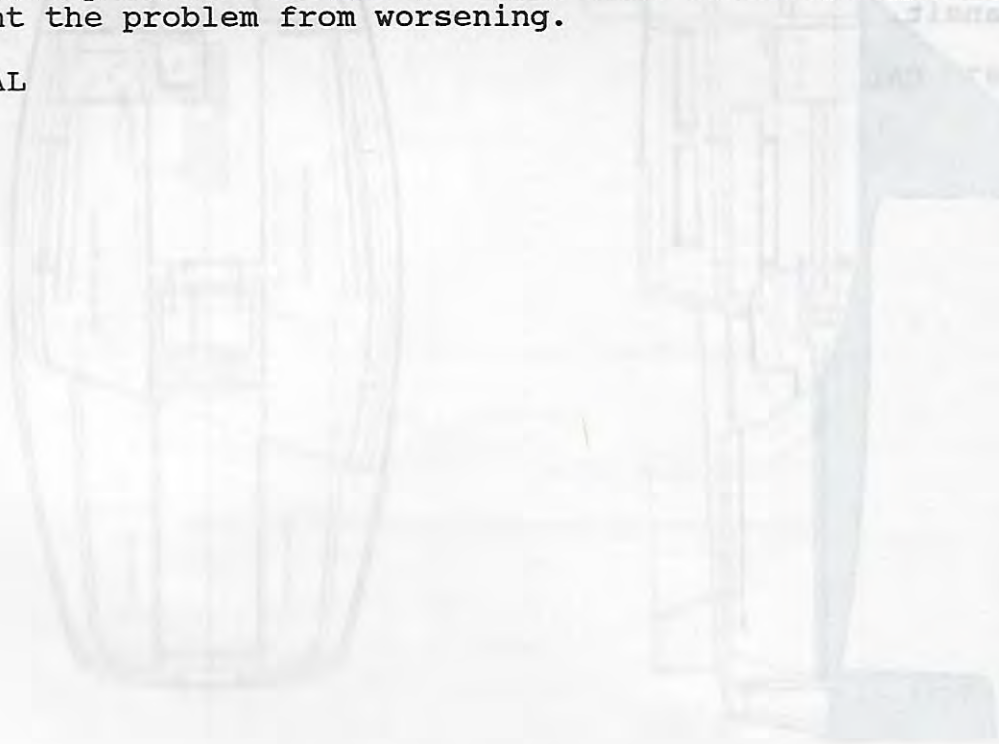
## OWNER'S RESPONSIBILITIES

Every CAL is covered by our 1-year Limited Warranty (See Limited 1-Year Warranty sheet for further information) for one year after commissioning by the original retail customer, but in no event later than two years from the date of shipment by Cal Sailing Yachts. Always refer to our Limited Warranty for complete warranty information. Within 30 days of taking delivery of your boat, fill out the warranty registration card and return it to Cal Sailing Yachts. The U. S. Coast Guard requires that all manufacturers keep records of people who have purchased their products. This is necessary in case a defect notification or product recall is needed. The only way Cal Sailing Yachts can maintain these files is to have you send in the completed card. If you have any questions or comments, please include these with the card. We will get back to you.

When you sell your CAL, please drop us a note with the hull number, your name, and the name and address of the new owner.

It is important that you contact your dealer as soon as possible when problems are noted. This will assure prompt service and prevent the problem from worsening.

4-23-87 CAL



## FOR SAFE BOATING

(Reprinted by Permission of U.S. Coast Guard)

**BE PREPARED**

Take a Safe Boating Course from the Coast Guard. You can call 800-336-BOAT for information on courses in your area.

Carry all safety equipment required by Federal and State law. Federal requirements are discussed in "Federal Requirements for Recreational Boats" which can be acquired from U.S. Coast Guard Office of Boating, Public, and Consumer Affairs, Washington, D.C., 20593. State requirements will come from your local State Boating Administration. The Coast Guard also recommends: a first-aid kit, a pump or bailer, a transistor or weather radio, extra fuel, a paddle, anchor and line, and extra drinking water, also, if not a requirement, flares.

Get a Coast Guard Auxiliary Courtesy Examination. This is a free, confidential, safety inspection. Call your local Coast Guard Auxiliary for details.

Be familiar with the use of distress signals and PFD's.

**AVOID FIRES**

Handle fuels carefully.

Read the engine owner's manual for proper fuel-system maintenance.

Inspect your engine's fuel system periodically.

Heed fire extinguisher regulations and keep them in good condition.

While refueling:

a. Fill portable tanks on the dock.

b. Tie the boat securely.

c. Extinguish cigarettes and all flames on the boat. Turn off all engines and electrical equipment.

d. Keep the hose nozzle in contact with the fuel can or fill.

e. Wipe up all fuel spillage.

f. Ventilate the engine and fuel compartment.

g. Check boat for fumes.

4-3-86 C/O

FOR SAFE BOATING - Continued

BEFORE GETTING UNDERWAY

Leave a float plan: An example of a float plan follows:

Check the weather: Do not venture out, if the weather threatens.

WHILE UNDERWAY

PFD's should be worn by children and non-swimmers **AT ALL TIMES. EVERYONE SHOULD WEAR THEM, IF CONDITIONS BECOME HAZARDOUS.**

Do not operate a boat, if **INTOXICATED, FATIGUED,** or **STRESSED.** These human factors cause 50% of all boating accidents.

Keep a good lookout: This is especially true of sailboats. Keep a watch to leeward **UNDER** the headsail.

Keep away from swimmers, divers, and skiers.

Obey State and Federal laws. Know your local laws and "rules of the road".

Respect Bad Weather: Try to get to shore, if the weather turns bad. Get and carry a radio with a NOAA "weather band" on FM 162.40-162.55MHZ.

IF TROUBLE OCCURS

Radio for help. Use the emergency VHF Channel; i.e., 156.8MHZ.

Put on PFD's immediately.

Stay with the boat. In cold water, huddle together to prevent hypothermia.

FLOAT PLAN (See next page.)

Make copies of this page and use one before each trip. Fill it out and leave it with a reliable person, who will notify the Coast Guard or other rescue organization, if you fail to return on time. **DO NOT FORGET TO CANCEL THE FLOAT PLAN UPON YOUR RETURN.**

4-3-86

O/C

# FLOAT PLAN

1. Name of person reporting and telephone number.

   _____

2. Description of Boat: Type _____ Hull Color _____

   Deck Color _____ Stripe Color _____ Registration # _____

   Length _____ Name _____

   Make _____ Other Distinguishing Marks _____

   _____

3. Persons Aboard Number _____

   Name _____ Age __ Address & Phone _____

   _____

   Name _____ Age __ Address & Phone _____

   _____

   Name _____ Age __ Address & Phone _____

   _____

4. Engine Type _____ H.P. _____ Fuel Capacity _____

5. Safety Equipment: PFD's _____ Flares _____ Mirror _____

   Flashlight _____ Food _____ Water _____ EPIRB _____

   Raft or Dinghy _____

6. Radio _____ Type _____ Frequencies _____

7. Trip Expectations: Leave at _____ From _____

   Going to _____. Expect to return by _____

   and in no event later than _____

8. Automobile License No. _____ State _____

   Color and Make of Car _____ Parked at _____

   _____

9. If not returned by _____, call the Coast Guard or

   _____

   Phone Numbers _____

   _____

   _____

4-3-86

C/O

## COMING ABOARD

Here's a check list approach for your crew: (Not necessarily in order of importance.)

____ Check bilge for excessive water.

____ CHECK WEATHER CONDITIONS AND TIDES.

____ Check food supply.

____ Foul weather gear.

____ Linen, sleeping bags.

____ Fuel.

____ Water.

____ Sun screens and sunglasses.

____ Tools.

____ Docking and anchor gear.

____ Check radio operations.

____ Navigation charts and instruments.

____ FLOAT PLANS TO A FRIEND OR COAST GUARD

____ Fuel for stove.

____ Cooking and eating utensils.

____ Check battery water level.

____ Oil level, tight V-belts.

____ Check for loose electrical connections in engine room.

____ Secure tools or any loose equipment.

____ Doors and drawers secured.

____ Check steering lock to lock.

____ Check mast for rigging irregularities and tightness.

____ Halyards and sheets are clear and ready to run.

____ No lines or other obstructions near the propeller or bow.

____ Anchor ready to run.

____ Check lifelines for tightness.

____ Turn on fuel and water lines.

____ Stow all loose gear.

## GOING ASHORE

_____ Sails dry and stowed.

_____ Fuel lines and water lines turned off.

_____ Bilge pumped dry.

_____ Wallet, jewelry, and other valuables are not left onboard.

_____ Battery switch off. (optional inboard engine only.)

_____ Charger on (if applicable).

_____ Hatches and ports locked.

_____ Topsides clean.

_____ Appropriate thru-hull valves closed.

_____ Clean interior of food and rubbish.

_____ Fenders in place.

_____ Halyard secured away from mast.

_____ Dock lines secured.

_____ Loose gear stowed.

_____ Sails furled and covered.

_____ All covers in place.

_____ Main companionway locked.

_____ CHECK IN WITH WHOMEVER KEPT YOUR FLOAT PLAN.

4-9-87 ALL

## GLOSSARY

**AFT** - In the neighborhood or direction of the stern.

**BATTEN** - A thin wooden or plastic strip placed in a pocket in the leech of a sail to help hold its form.

**BLOCK** - Pulley consisting of a frame in which is set one or more sheaves or rollers. Ropes are run over these rollers.

**BOOM** - Spar at the foot of the mainsail.

**BOOM VANG** - Tackle secured to the bottom of the boom about 3' aft of the gooseneck. The other block attaches to an eye at the base of the mast. The vang's purpose is to keep the boom steady and horizontal while sailing.

**BOW** - The forward part of a boat.

**CENTERBOARD** - A keel-like device that can be hoisted or lowered in a trunk that acts as a keel in some shoal-draft boats.

**CENTERBOARD PENDANT** - Line used to raise and lower centerboard.

**CHAINPLATES** - Strips of metal fastened to the boat's hull or deck designed to take the stress of stays.

**CLEAT** - A fitting to which ropes are made fast.

**CLEVIS PIN** - A small stainless steel pin that has a hole in one end for a cotter pin and is used to secure stays to chainplates and mast fittings.

**CLEW** - The aftermost lower corner of a sail.

**COCKPIT** - An open area lower than a boat's deck where the occupants sit.

**COTTER PIN** - A straight or circular split metal pin used to hold a clevis pin in place.

**DOWNHAUL** - A device used to tighten the luff of a sail.

**FAIRLEAD** - An eye used to lead line in the direction desired.

**FOOT** - The lower edge of a sail.

**FURLING GEAR** - A mechanical device which allows the jib or mainsail to be rolled up on its stay or spar for stowing.

**GOOSENECK** - A metal device that secures the boom to the mast.

**GUDGEON** - A metal socket attached to the transom to receive the pintle of the rudder.

**GUNWALES** - The upper edge of a boat's side, where it meets the deck.

**HALYARD** - A line for hoisting (or raising) the sails.

GLOSSARY - Continued

**HEAD** - The upper corner of a sail.

**HEADBOARD** - The fitting at the head of a sail with a hole in it to receive the main halyard.

**HEADSTAY** - The foremost stay on a sailboat. A jib is set on a headstay.

**HULL** - Main body of a boat.

**JIB** - A triangular sail set forward of the mast.

**JIB SNAPS** - Small fittings that are attached to the luff of a jib, which secure the jib to the headstay

**JIBE** - The action of the mainsail when shifting from one side of the boat to the other, when heading down wind.

**JIFFY REEFING** - (See Reefing.) A quick method of reefing the mainsail, sometimes with one line.

**LAZY JACKS** - Light lines running from the mast to the boom. Their purpose is to contain the mainsail when it is lowered and to support the boom.

**LEECH** - The after edge of a sail.

**LEEWARD** - Away from the wind.

**LINE** - The common expression for a rope in use.

**LUFF** - The forward edge of a sail.

**MAINSAIL** - The principal sail on the main mast.

**MAINSHEET** - The line used to trim a mainsail.

**MAST** - An aluminum tube designed to stand on end so as to support a boom, plus one or more sails.

**MASTHEAD** - The top of the mast.

**MASTHEAD FITTING** - The fitting at the top of the mast.

**MAST STEP** - A metal fitting that holds the base of the mast in position.

**OUTHAUL** - A line used to haul the clew of a sail out to the end of the boom.

**PINTLES** - Pins on the forward side of a boat's rudder, designed to rest in and pivot on the gudgeons secured to the transom.

**PORT** - The left side of a vessel facing forward.

**REEFING** - To reduce a sail by rolling or folding up part of it.

**RIGGING** - The wire supporting the spars is called standing rigging (stays or shrouds) and the ropes used in setting and trimming sails are known as running rigging (halyards and sheets).

12-31-86 C/O

GLOSSARY - Continued

**ROLLER FURLING** - A means of reducing sail on a main or jib by rolling the sail around a rod or wire.

**RUDDER** - A vertical plate attached to the stern of a boat, used in steering it.

**SELF-RESCUING** - A feature which enables the crew to right and sail away a boat which has capsized.

**SHACKLE** - A U-shaped piece of metal with a pin across the open ends.

**SHEET** - A rope used to trim a sail.

**SHROUD** - Same as a stay.

**SLACK** - The opposite of taut. Slack away or off - to pay out.

**SLOOP** - A one-masted vessel with two or more sails.

**SPAR** - A mast, a boom, etc.

**SPREADERS** - Aluminum tubes that project from a mast in a traverse direction in order to keep a stay at proper tension and to help hold the mast erect.

**STARBOARD** - The right side of a boat, facing forward.

**STAY** - A length of wire used to support a spar.

**STEMHEAD FITTING** - The fitting nearest the bow on the deck where the headstay attaches.

**STEP** - To step a mast is to set it in position.

**STERN** - The after part of a boat.

**TABERNACLE** - A fitting designed so that the mast can be lowered when passing under obstructions; also facilitates stepping and unstepping the mast.

**TACK** - The lower forward corner of a sail.

**TILLER** - A piece of wood connected with the rudder head. By this the rudder is moved as desired.

**TOPPING LIFT** - A wire and/or rope that attaches to the top of the mast and fastens to the end of the boom. Its purpose is to hold the end of the boom up when the mainsail is lowered.

**TRIM** - To trim sails. To put them in correct relation to the wind by means of sheets.

**TRUNK** - A centerboard housing.

**TURNBUCKLE** - A device used to maintain correct tension on rigging.

**WINDWARD** - Toward the wind.

12-31-86

C/O

# COMMISSIONING

## COMMISSIONING

Your **CAL** dealer will supervise the commissioning and testing of your new boat. His knowledge and experience will insure that all systems and components will function properly when the boat is delivered to you. Please be sure to go over all systems with him, so that you understand their operations and safety features.

We have included some guidelines and instructions in this section to aid you and your dealer.

11-14-86

Cal

## SAFETY NOTE

NOTE: In the shoal-draft version of the Cal 22, the draft is 2'10" and the rudder will be 2'9". Under certain loading or sailing conditions, the rudder may become the lowest point on the boat. EXTREME CARE must be taken under these conditions to avoid grounding or other impact, which could cause rudder damage.

4-23-87 CAL

# PRE-LAUNCH CHECK LIST

1. All thru-hull valves operational, closed, and tightened. _____

2. Accessory thru-hulls installed and tightened. _____

3. Propeller in place; 2 nuts and cotter pin installed. _____

4. Sacrificial Zinc installed on shaft. _____

5. Batteries secure, filled, and charged. _____

6. Rigging installed on spar; cotter pins spread and taped. _____

7. Masthead sheaves free to rotate; lubricated. _____

8. Mast lights working. _____

9. All required safety equipment on board. _____

**NOTE: THIS IS A BASIC PRE-LAUNCH CHECK LIST. THERE ARE MANY OTHER ITEMS WHICH CAN BE AND SHOULD BE CHECKED BY THE COMMISSIONING PERSONNEL.**

6-17-86

C/O

# POST-LAUNCH CHECK LIST

1. All thru-hulls water tight. _____
2. Engine: Operational. Proper fuel in tank. _____
3. Engine and gearbox levels checked. (Refer to Engine Manual.) _____
4. Fuel tank filled and system checked for leaks. _____
5. Engine operates and passes water thru exhaust. _____
6. Engine controls operate correctly and checked for tight nuts, bolts, and spread cotter pins. _____
7. Mast stepped and mast step pins installed. _____
8. Turnbuckles attached; cotter pins spread and taped; rigging tuned. _____
9. Boom and running rigging installed. _____
10. Water tank filled. _____
11. Faucet works, and lines checked for leaks. _____
12. Stove fuel tank filled; system checked for leaks. _____
13. Electrical equipment operational. _____
14. Rudder installed and pinned. _____
15. Gudgeon and pintles greased. _____
16. Bilge free of water. _____
17. Toilets operational; hoses secure. _____
18. Deck hardware checked for leaks. _____
19. Recheck all thru-hulls and hose clamps. _____
20. Safety equipment aboard. _____
21. Warranties and manuals delivered to owner. _____
22. Warranty card sent to Cal Sailing Yachts. _____

# LIFELINES AND STANCHIONS

Your lifelines and stanchions contribute to the safety of your boat. Care should be taken to be sure all pins and fittings are secure and that any cotter rings are taped, so that they do not snag sails or other equipment. A monthly check of the turnbuckles, pelican hooks, and connector loops should be made to assure that there is adequate thread on the screw fittings.

The stanchions have two screws which hold the stanchion tube to the base. The screws should be checked once a month for tightness.

7-18-86

C/O

## RIGGING DIMENSIONS

The following table shows the critical dimensions and materials used for the standing and running rigging on your **CAL**. In the event you should need to replace any of the rigging, you can order the materials through your **CAL** dealer. If this is not convenient, this table will allow you or a local rigger to obtain the proper materials. We would strongly recommend actually measuring any standing rigging before replacing, to assure 100% accuracy.

The halyards on your **CAL** are low stretch Yacht Braid. This material was chosen for its handling ease and durability. Because of the way it is manufactured, it will not stretch as much as normal rope does.

All running rigging should be checked periodically for chafe or damage and replaced when necessary. If excessive wear is noted on running rigging, check all blocks and sheaves to be sure they are free to rotate and are properly aligned. This is especially important in roller furling systems where the halyard sits in the same place constantly. Be sure to lower your sail periodically and check the halyard.

All standing rigging should be inspected for cracks in the swages, proper installation of cotter pins, and wear on clevis pins. Replace any damaged or suspect rigging **immediately**.

As you may have noticed on some sailboats, the swaged ends of the shrouds will ooze rust and in severe cases the swage will split. One way to prevent this problem is to lightly heat up the swaged section and place a bar of beeswax against the 1 x 19 stainless steel wire. As it melts, the beeswax will run into the swaged section, sealing it from the elements.

Your jib furling gear is manufactured by an outside supplier and furnished to **CAL**. Please call the manufacturer for any parts and refer to your manual or consult your dealer with any questions.

7-18-86

CAL

CAL 22

## RUNNING RIGGING SPECIFICATIONS

| TITLE | SIZE | TYPE | LENGTH | A END | B END | EXTRA INFORMATION |
|---|---|---|---|---|---|---|
| Main Halyard | 5/16" | XLS - Red | 66' | 93-42 | Burn | |
| Main Sheet | 3/8" | TRO - Red | 48' | Eye | Burn | |
| Down Haul | 1/4" | XLS - POE | 4' | Burn | Burn | |
| Reef | 1/4" | TRO - Green | 37'6" | Burn | Burn | |
| Jib Sheet | 3/8" | TRO - Blue | 56' | Whip | Whip | One |

Starting with Hull No. 186

6-17-87

CAL 22

STANDING RIGGING SPECIFICATIONS

| TITLE | SIZE/ CONST. | PCL | FITTING A | FITTING B | EXTRA |
|---|---|---|---|---|---|
| Headstay | 1/8 1 x 19 | 25' 10 1/4" | SA 104-4 | 7854-040808 | |
| Backstay | 1/8 1 x 19 | 26' 6 3/4" | 1/8 stemball with 9 x 19 cupel | 7854-040808 | Boom hanger at 24' 10 1/2" from A |
| Tails | 1/8 1 x 19 | 6' 0" | AN 667-4 | AN 667-4 | Into DH 76 plate not in PCL |
| Cap Shrouds | 1/8 1 x 19 | 24' 8" | Dermac T | 7854-040808 | |
| Lower Shroud | 1/8 1 x 19 | 13' 2 1/4" | Dermac T | 7854-040808 | |
| Hanger | 1/8 7 x 7 | 29 1/2" | NP/Thim to 1/8-D to 0 snap | Bare | |

From Pin or Bearing of A end to end of turnbuckle stud

| | | | | |
|---|---|---|---|---|
| Headstay | 1/8" | 25' 4" | 104-4 | 5850-1032 |
| Backstay | 1/8" | 26' 0 3/4" | 1/8 stemball w/9 x 19 cupel | 5850-1032 |
| Cap Shrouds | 1/8" | 24' 2" | Dermac T | 5850-1032 |
| Lower Shrouds | 1/8" | 12' 8" | Dermac T | 5850-1032 |

With Hull No. 101
6-17-87

## WIRE RIGGING

Damage to wire rigging, even imperceptible nicks, can substantially reduce the strength of the wire. Such damage can lead to sudden and unpredictable rigging failure, loss of the mast and possible injury to occupants.

Accordingly, it is good practice to have your rigging regularly inspected by a professional rigger. In addition, you should carefully inspect the full run of all stays at least twice each year. Special attention should be given to the swage areas and any area that is subject to wear or damage, such as the headstay where the spinnaker pole may hit, or the spreader tip area.

If there is any damage or deterioration, such as broken strands or nicks, or if there is any question as to the condition of a piece of rigging, replace the rigging immediately.

12-31-86
C/O

# TO RIG THE MAST

## STANDING RIGGING

First lay the mast on two or three sawhorses, being careful to support it well. Next, remove the protective plastic wrapping from the mast. Be very careful not to scratch the mast if you use a knife to remove the wrapping. The spreaders should be taped to the mast - remove them. Clean the mast thoroughly with soap and water and apply a good coat of wax.

The rigging is in the rigging box inside the boat and consists of:

1 headstay
1 topping lift wire
1 backstay
2 backstay "legs"
2 upper shrouds
2 lower shrouds

Untape the rigging and identify each piece. Lay the rigging out straight. The bottom end of all the rigging has a turnbuckle at the lower end. First, attach the backstay to the masthead by removing the backstay turnbuckle and passing the backstay down through the aftermost hole in the masthead. BE SURE that the captive washer is under the terminal ball. Re-attach the turnbuckle and fasten it to the triangular metal plate. Attach the backstay legs to the other two holes in the plate. Now install the topping lift wire as with the backstay through the hole in the masthead inside the backstay. Next, attach the headstay, lower shrouds, and upper shrouds into their sockets by inserting the "T" terminal on the upper end into the socket. The socket for the headstay is located about 6' down from the masthead on the front of the mast. The upper shroud sockets are located on each side of the mast a couple of inches below the headstay socket. The lower shroud sockets are located on each side of the mast about 6" below the spreader sockets. Now install the spreaders in their sockets by inserting the open end of the spreader into the socket. Pass the pins through the holes in the spreader socket and the holes in the spreader. Fasten the circlip on the bottom of the spreader. Remove the spreader end cap by unscrewing the stainless steel machine screw. Pass the upper shroud wire through the opening provided in the spreader end cap. Reinsert the cap into the spreader end and re-secure the end cap by screwing the machine screw into the top of the spreader. Cover the screw with rigging tape and securely tape the spreader end or install spreader boots to prevent chafe. Run all the standing rigging to the foot of the mast, pull taut and tape it to the mast base for the moment. Remove all the cotter pins from the turnbuckles, put them in a SAFE place, and open the turnbuckles until just the cotter pin hole shows in the middle (or barrel) portion. Next, install the running rigging in the mast and boom.

## RUNNING RIGGING

The running rigging is also in the rigging box and consists of:

1 main halyard
1 outhaul line
1 reef line
2 traveler lines
1 topping lift line

Run the main halyard through the mast, using the messenger (light line) already run through the mast from the masthead. Tie the messenger to the halyard end without the shackle, and then tape over the joint to form a streamlined point. Pull the halyard out the mast, and tie both loose ends to the cleat. Run the outhaul line, reef line, and topping lift line through the boom in the same manner; the reef line to port, the outhaul in the middle, and the topping lift line to starboard. Tie stopper knots in each end of the lines to keep them from coming through the boom.

While the mast is down, attach the masthead light to the masthead, and wire it to the wires coming out the top of the mast.

## STEPPING THE MAST

You should go over the stepping procedure carefully with your dealer before taking your boat. Be sure you understand how the procedure works, as injury to people or damage to the boat can result from improper procedure.

CAUTION: BE SURE TO ALWAYS CHECK THE AREA YOU ARE RAISING THE MAST IN FOR OVERHEAD POWER WIRES. ANY CONTACT BETWEEN THE MAST AND OVERHEAD POWER WIRES WILL CAUSE SEVERE INJURY OR DEATH.
NOTE: CHECK THE MAST LIGHT FOR FUNCTION BEFORE STEPPING THE MAST.

## TO STEP THE MAST

Lay the mast on the deck of the boat with the mast base resting on the bow pulpit and the mast track down. Pad the mast at the sliding hatch to prevent any damage to the deck.

Now attach the backstay legs to the backstay chainplates. Be sure the backstay leads straight and does not go under any other shrouds. Also be sure the backstay legs lead UNDER the stern pulpit. Attach the upper shroud turnbuckle and lower shroud turnbuckle to the U-bolt chainplate on deck outboard of the cabin. Attach the lower shroud to the forward end and the upper shroud to the aft end. Again, be sure the shrouds lead fair. NOTE: TO PHYSICALLY STEP THE MAST THE FIRST TIME, YOU SHOULD HAVE AT LEAST THREE ADULTS. As you become more familiar with the procedure, you may be able to do it with two adults. Now bring the mast aft until the mast foot is directly over the mast step. Remove the mast step pin and set it beside the step. Bring the foot down to the step so that the holes in the foot line up with the hole in the aft end of the step. Install the pin and insert the cotter ring.

TO STEP THE MAST - Continued

You are now ready to put the mast up. Once, again, check to be sure the backstay, lower shrouds, and upper shrouds are all attached and that they run fair. Be sure the turnbuckles are unscrewed, so that only a small amount of thread is left inside the turnbuckle barrel. BEFORE PUTTING UP THE MAST, CHECK AGAIN FOR OVERHEAD POWER WIRES. Now have one person take the headstay and pull on it while the other two people push up the mast, pivoting it on the pin. Be sure to keep the mast straight and not twist it, as you could break the "ears" on the mast step or foot. The mast should go up smoothly and set flush on the step. CAUTION: DO NOT FORCE THE MAST! IF IT CATCHES GOING UP, CHECK ALL SHROUDS AND STAYS. CHECK THE "T" TERMINALS IN THE MAST TO BE SURE THEY ARE LEADING STRAIGHT. As soon as the mast is up, while one person applies forward tension, attach the forestay to the forward hole in the stemhead fitting. Now tighten up all the turnbuckles just enough to take the slack out. Check to make sure all the turnbuckle clevis pins have a cotter pin in them to prevent them from falling out. Next, tighten the headstay, backstay, and upper shroud turnbuckles hand tight. Occasionally, sight up the back of the mast to ensure that the mast is straight. Tighten the lower shrouds just snug. After installing the furling gear, pin all the turnbuckles with the cotter pins provided. Spread the cotter pins well open, and tape them to prevent snagging. NOTE: AFTER A FEW SAILS, THE RIGGING MAY STRETCH SLIGHTLY, MAKING RETIGHTENING NECESSARY.

INSTALLING THE JIB FURLER

Follow the manufacturer's instructions included with the furler for installation instructions.

ATTACHING THE BOOM

To attach the boom, simply slide the boom jaws over the rectangular boss on the gooseneck. This is accomplished by taking the boom, slot side up, and holding the outboard end of the boom up at approximately a 45 degree angle, sliding the jaws onto the gooseneck, and lowering the boom to a horizontal position. Run the topping lift line up through the block on the end of the topping lift wire and back to the boom end. Use the small shackle, found loose in the rigging box, to attach to the boom end fitting, and use a second, larger shackle to attach the eye to the small shackle.

RIGGING THE MAINSHEET

To rig the mainsheet, take the upper mainsheet block (the one with the line attached) and hang it from the eye on the aft/bottom side of the mast. Now attach the loose fiddle block to the traveler car mounted on the traveler on the stern pulpit. Now reeve the mainsheet down, through the upper sheave in the fiddle block from back to front, up through the upper block from front to back, and down through the lower sheave in the fiddle block from

RIGGING THE MAINSHEET - Continued

back to front and through the cam cleat jaws. Tie a stopper knot in the end.

TO ATTACH THE RUDDER

On the stern of the boat are two gudgeons into which are inserted the pintles of the rudder. After the rudder is hung on the transom, insert the rudder-lock pin in the hole in the top pintle. This is to prevent rudder loss.

TO HOIST OR RAISE THE MAINSAIL

To hoist the mainsail, first insert the battens in their pockets. The battens each fit a different pocket, and you may wish to label them. They slide in against an elastic in the pocket and then lock into the pocket on the leech.

Now take the foot of the mainsail and insert it into the slot on the boom, starting near the gooseneck. Slowly feed the sail in until it is fully on the boom. Fasten the tack grommet to the shackle on the gooseneck. Tie the outhaul line to the outhaul grommet. NOTE: THE SAIL MAY FEED STIFFLY AT FIRST, BUT WILL BECOME EASIER AS TIME GOES ON, BUT DON'T FORCE IT. Tension the outhaul line where it comes out below the gooseneck, but do not force "TENSION" lines into it.

Next, fasten the main halyard to the forward hole in the headboard and feed the luff slugs into the black plastic "GATE" located above the gooseneck. Hoist the sail fully, and cleat the halyard. Rig the reefing line. (See Jiffy Reefing.) The sail may then be lowered and furled on the boom.

TO HOIST AND OPERATE THE ROLLER FURLING JIB

NOTE: THE ROLLER FURLING JIB IS DESIGNED TO GIVE EASE OF SETTING AND FURLING THE JIB. IT IS NOT DESIGNED TO SUBSTITUTE FOR PROPER STORM SAILS.

Install the furling system per the manufacturer's instructions. Install the furling line on the drum in a clockwise manner.

HOISTING THE SAIL

To hoist the sail, tie the plain end of the halyard to the head of the jib. NOTE: DO NOT tie the sail to the plastic "traveler" slide or you may damage the furler. Next, hoist the sail by pulling on a messenger line which must be attached to the plastic traveler. Tension the luff of the jib by passing the tension line from the sail tack through the furling drum eye. Store excess messenger line and tension line by wrapping them around the furler throat. BE CAREFUL that there are no loose ends to foul the furler.

HOISTING THE SAIL - Continued

For further advice and instructions on hoisting, furling, etc., see your furler owner's manual or contact the manufacturer of the jib furler.

The jib can now be furled by pulling on the furling line. Keep LIGHT tension on one of the jib sheets while furling. BE SURE that both sheets are free to run. IF there is any resistance STOP pulling the furling line. Furling and unfurling should always be done with the boat facing into the wind. To unfurl the jib, first uncleat the furling line to make sure it is free to run. Uncleat both jib sheets. Face the boat into the wind and pull the leeward jib sheet until the jib is fully unfurled. Then re-cleat the furling line.

We recommend that the plastic furling drum and aluminum foil be washed with fresh water at least once a month. We also recommend that the jib be taken down and stowed away, if the boat is left for an extended period.

The jib sheet is attached to the clew of the jib and led aft, outside the shrouds to the block mounted on the track on the side decks, and then to the wind. The block can be adjusted fore and aft to optimize the jib lead.

Cal 22
5-13-87

# JIFFY REEFING

Your mainsail can be easily reefed, as your boat and sail are equipped with jiffy reefing. You should practice reefing the mainsail, at the dock, in calm weather, until it becomes second nature. This will allow you to reduce sail area whenever necessary, rather than sailing with too much sail up or dropping sail entirely and motoring.

## TO INSTALL THE JIFFY REEFING LINE

The reefing line is reeved through the boom (see Running Rigging) and the outboard end should go up, through the leech-reef grommet and down to the boom and tie through the foot-reef grommet. The other end will hand out of the gooneck end of the boom.

## TO REEF THE MAINSAIL

To reef the mainsail, first lightly tension the topping lift, then lower the main halyard until the luff-reef grommet (about 3' up the mainsail luff) can be hooked under the stainless steel hook at the gooseneck.

CAUTION: WHEN THE MAIN HALYARD IS LOWERED, THE AFT END OF THE BOOM WILL FALL, UNLESS RESTRAINED BY THE TOPPING LIFT.

Now, tension the main halyard and pull on the reefing line and under the gooseneck until the reefing line is tight. Cleat the reefing line. You may use small lines to secure the loose sail around the boom, if necessary.

NOTE: REEFING IS A PERSONAL PROPOSITION. YOU ARE SAILING TO HAVE FUN AND ENJOY YOUR BOAT. REEF WHENEVER YOU ARE UNCOMFORTABLE, NOT WHEN OTHER BOATS REEF.

5-12-87 Cal 22

## THE FURLING GENOA

Instructions for installation, use, and care of your furling gear and 130% genoa are provided in your owner's packet, as well as elsewhere in this manual; however, we have a few other hints.

1. Always roll up the sail, so that the blue cover is on the outside. This cover helps prevent ultraviolet degradation of the sail.

2. Remove the sail and store below, when you know that you are leaving the boat for long periods. This prevents dirt, rain, etc., from accumulating in the sail.

3. Any time furling or unfurling is difficult, STOP and find out what is wrong. DO NOT force the system.

4. When furling, furl beyond total sail wrap-up. Allow two or three wraps of the sheets. This will help prevent strong winds from getting inside the sail and pulling it out.

5. Be very careful to fully cleat the furling line, when the sail is fully or partially furled.

## CHAINPLATES

The side rigging loads are transferred directly to the hull through stainless steel rods on each side of the boat. The rods are bolted to the chainplate "U" bolts under the deck and then bolted to the interior pan. Periodically, check the tightness of these bolts to prevent problems.

4-23-87 Cal 22

OUTBOARD ENGINE

We recommend an engine of 4-8 HP for the CAL 22. Anything under 4 HP will not have sufficient power for adverse conditions. In nontidal areas or areas of no current, a smaller outboard MAY suffice. We recommend that you tailor your engine to the conditions you may encounter. Areas of strong tides or current will require a larger (6-8 HP) engine.

The outboard is mounted on the bracket located on the starboard transom, and the gas tank should be placed in the vented locker provided in the cockpit on the starboard side.

DO NOT STORE ANY GASOLINE ANYWHERE INSIDE THE BOAT!

The outboard bracket can be adjusted up and down for best immersion of the outboard (see your outboard owner's manual) and also adjusted for tilt for the best angle of attachment for your boat and its loading. The moving parts of the bracket should be lubricated frequently, as the unit is constantly exposed to salt water. Re-varnish the bracket board frequently to prevent delamination.

CAUTION: BE CAREFUL WHEN TURNING THE RUDDER BLADE, AS IT CAN COME IN CONTACT WITH THE PROPELLER.

Always be very careful when fueling your outboard engine. Whenever possible, move the tank off the boat while fueling. Check the fuel filter on your engine periodically. Clean the tank to prevent contamination. Clean up any spilled fuel promptly.

SINK DRAIN AND COCKPIT DRAIN

Be sure to check all connections for water tightness. Hose clamps should be checked at each sailing.

BILGE COVER

The bilge cover in the cabin floor located over the keel is provided so that any water in the hull can be pumped out. Be sure to check this area prior to sailing.

KEEL AND KEEL BOLTS

The keel on your CAL 22 is a solid lead casting and is attached to the hull with three 1/2" stainless steel bolts. The nuts for these bolts should be checked once a year for tightness. The keel is coated with an epoxy paint, and the joint between the keel and hull is faired with an epoxy putty. This joint may develop a slight crack over time, due to the working of the two dissimilar materials; but, as long as the keel bolts are tight and

KEEL AND KEEL BOLTS - Continued

as long as there have been no hard groundings, there should be no problem.

PREVENTIVE MAINTENANCE

Be sure that the screws and bolts on the mast tabernacle are periodically checked.

WOODWORK

Teak should be oiled at least twice a year to prevent splitting.

BOTTOM PAINT

Recommended in both fresh and salt water. Follow the directions on the can. Be sure to paint the keel and rudder as well as the bottom. See elsewhere in this manual, or see your dealer for advice on bottom coatings.

LEAKING

Should any leaks develop through hardware fastenings, hull and deck joints, etc., these can be easily fixed by applying a good marine sealant.

FOR THE RACER

The rake of the mast can be changed by adjusting the forestay and then re-adjusting the sidestays. In general, a boat will perform better while sailing to windward, with some aft rake, and better downwind with the mast plumb or slightly raked forward. Races are usually won to weather, so favor more aft rake, if anything.

SAIL SET

The furler's integral jib halyard should be taken up so that the tension on the luff, while under sail, is sufficient to prevent wrinkles. The tension on the foot and luff of the mainsail should be such that there are no stress lines or wrinkles in the sail. Apply more tension as the wind increases, which will move the draft forward and decrease heeling moment, etc. In general, the outhaul should be slackened while sailing off the wind in order to create more draft in sail.

## TELLTALES

Telltales are an invaluable aid in determining wind direction - 8 inch pieces of yarn tied to sidestays 2 ft. to 4 ft. up from the chainplate and a wind pennant on top of the mast.

6 inch to 8 inch pieces of yarn taped to the luff of the jib on both sides, every 3 feet or so, on the bottom half of the sail 8 inches back from the luff wire are excellent wind-flow guides. If you point too high, weather yarn flutters; and, if pointing too low, leeward yarn flutters. Both should flow back evenly - remember, this only tells you flow pattern for a given jib trim, so trim must be correct for sailing angle.

## MANUFACTURING CHANGES

CAL YACHTS reserves the right to make specification and design changes. If your boat is different from the enclosed instructions in any way, check with your dealer for correct procedures.

5-29-87
Cal 22

# BOTTOM COATINGS

Since the beginning of the fiberglass boat building industry manufacturers have been plagued with the problem of occasional blistering on underwater surfaces. These blisters are caused by osmotic pressure of a solvent (water), which can pass through a membrane (the gelcoat) to reach a salt (a material which will dissolve in the solvent). This can occur at ANY time through ANY gelcoat finish. Much has been written in the past few years in trade journals, chemical journals, and in the general literature discussing this problem and suggesting possible solutions. Thus far, there has been no universally accepted reason as to why this occurs in some boats and not others, nor is there a totally accepted preventive cure or fix once blisters occur.

Although gelcoat surfaces ARE NOT covered under Cal Sailing Yachts' 1-Year Warranty, we feel that as a manufacturer we would like to assist our customers in finding a solution to this problem. The best available information seems to indicate that coating the boat's underwater surfaces with an impermeable epoxy coating will assist in the prevention of gelcoat blisters. This epoxy should be a type that is recommended by the manufacturer for underwater use, and should be done when the boat is new, if at all possible. A boat that has been in the water may also benefit from having this epoxy put on, but it is best to be done before the boat is first launched.

Cal Sailing Yachts strongly recommends the use of chemical washes to prepare the boat's surface for bottom painting. Sanding will remove some of the protective gelcoat surface and could, therefore, increase the chances of blistering. If you do decide to sand, be sure to use fine sandpaper, and just dull the finish to avoid taking off any of the thin gelcoat protective layer.

Cal Sailing Yachts uses the finest available materials and the best technique in the manufacture of their product. Gelcoat blistering is a recognized fact of life in the marine fiberglass industry, the chances of which MAY BE reduced by the use of an impermeable barrier coat on the bottom at the time of initial commissioning. Application of epoxy bottom coating, as discussed above, does not alter the fact that external gel coat finishes are not covered by Cal Sailing Yachts' Limited 1-Year Warranty.

4-24-87 CAL

# BOAT STORAGE

Whenever a boat is pulled from the water, for work or storage, care must be taken to provide adequate and proper support of the hull. This is especially true of fin-keel sailboats.

It is not recommended that the weight of the boat be rested solely on the keel. Because of the small area of the keel bottom, the localized loads on the hull in the area of the keel would be severe and could result in permanent damage to the shape or structure of the boat.

If poppets are used for support, they should be located so that the pads are under bulkheads, berth fronts or pan stringers, so that the load is dispersed. Failure to properly position the poppets could result in hull depression. Be sure to use an adequate number of supports, and locate them to prevent the boat from tipping fore or aft. A storage cradle designed for this boat is available through your dealer.

Do not careen (lean the boat over on its side) a fin-keel sailboat. The hull, keel, and rudder should survive any accidental groundings. However, care must be taken to keep the boat as balanced and upright as posible to prevent excessive loads.

DANGER: WHEN YOU ARE HAULING, LAUNCHING, AND SAILING NEAR LOW OVERHEAD WIRES, YOU MUST BE VERY CAREFUL THAT THE MAST NOT TOUCH THE WIRES. THE MAST COULD CONDUCT HIGH VOLTAGE ELECTRICITY TO THE PEOPLE ON BOARD AND CAUSE SEVERE BURNS OR DEATH. THE BOAT'S LIGHTNING GROUND SYSTEM WILL NOT PROTECT YOU FROM THE HIGH VOLTAGE POWER FROM POWER LINES.

# OPERATION

## CONSTRUCTION DETAILS AND GENERAL INFORMATION

### A. HULL

The hull is hand laid up in a large female mold into which successive layers of material are laid. The mold can be rotated from side to side during the laminating process, allowing the workers to place the fiberglass more accurately and also to allow better resin penetration than would be possible with an upright mold.

The exterior of the boat is an isothphalic NPG gelcoat, which is sprayed into the mold after the stripe areas have been masked off. Next, the masking is removed, and the stripe color is sprayed on. Now, layers of multidirectional glass fiber are laid into the mold to prevent pattern transfer from the successive layers of laminate. Finally, alternating layers of multidirectional fiber and bidirectional roving are applied until the correct layup thickness is attained. The thickness will vary, depending on loads applied and will increase from sheer to the keel area.

The interior pan acts as a structural reinforcing member for the hull. The pan is bonded to the hull in every conceivable place in order to make the pan and hull act as a single unit.

There are special fiberglass bosses built into the pan - port and starboard - to act as attachment points for the chainplate rods. These rods transfer the rigging loads to the hull, reducing strain on the deck and reducing the need for load carrying bulkheads.

### B. DECK

The deck is hand laid up, using glass strand fibers, woven roving, and bidirectional roving. The deck is balsa cored for strength and weight reduction. In areas of high stress or compression, the balsa core is replaced with either plywood core, aluminum sheet, or solid glass. The nonskid area is molded in, and the deck is gelcoated as with the hull.

### C. HULL-TO-DECK JOINT

The CAL 22 hull-to-deck joint is a very effective, strong and trouble-free joint for a boat of this size. The deck has a downward-turned flange that goes over the top of the hull (as a coffee can lid goes over the can). The area under the lip is filled with a flexible bonding/sealant, and the hull/deck are mechanically fastened approximately every "9". The external aluminum gunwale guard holder is then fastened on in between each hull/deck joint fastener, giving a mechanical fastener approximately every 4 1/2 inches. The fasteners are stainless steel screws, not aluminum "pop" rivets, as with some boats of this size. A black vinyl gunwale guard is then inserted into the

C. HULL-TO-DECK JOINT - CONTINUED

aluminum holder. The gunwale guard and its aluminum holder are designed to absorb slight impacts without damage, but severe impacts should be inspected immediately. Care should be taken to avoid vertical impacts, as when the boat rolls next to a dock.

D. KEEL

The keel is an external, bolted-on, lead casting. The keel is bolted on to an external stub, which is molded as part of the hull, with large stainless steel bolts. Between the keel and keel stub is an epoxy, which acts as a sealant and adhesive. The external lead keel is generally recognized as the best way of attaching ballast, in order to get the weight as low as possible. Also, an external lead keel provides much better impact resistance than either external iron or internal ballast of any type.

The keel-to-keel stub joint is carefully faired at the factory, and the keel is epoxy coated, BUT in time, the keel will work slightly, as the bolts stretch and a small crack may occur in the fairing at this joint. This is not a problem to worry about, providing no severe impact or grounding has occurred, and, providing that the keel bolts are kept tight.

E. MAST AND RIGGING

Your Cal sailboat is equipped with a mast and rigging system that is designed to withstand extreme loads.

The mast and boom are extrusions of special marine-grade aluminum that is anodized to protect it from the elements. This anodizing is a much better coating than paint, as it is less likely to come off through abrasion.

The standing rigging that supports the mast is 1 x 19 stainless steel wire. The upper ends of the shrouds and stays are connected inside the mast. This provides cleaner airflow and less change of snagging a sail, while providing a "toggle" action which reduces wear on the wire. The lower ends are swaged onto chrome bronze turnbuckles, which also have a toggle at the lower end. Swaging is a process by which the turnbuckle part is actually squeezed into the strands of wire.

Since the standing rigging actually holds up the mast, CAL YACHTS is not tempted to undersize the rigging. We would rather use the next larger size than use rigging that is "adequate" for the job.

The running rigging, i.e., sheets, reeflines, halyards, etc., are all color coded for ease of identification and are constructed of low-stretch dacron braid. This braid is long wearing and easy to handle, while providing good tension to the sail.

Further information on the mast and rigging can be found in the Commissioning and Maintenance sections.

F. RUDDER

The rudder of the CAL 22 is composed of a rigid, closed cell, polyurethane foam, which is coated with fiberglass and gelcoated. The polyurethane foam makes a strong, light-weight rudder that has positive buoyancy.

There is additional information on the rudder, provided by the manufacturer, elsewhere in this booklet.

CARE SHOULD BE GIVEN WHEN MANEUVERING THE BOAT UNDER OUTBOARD POWER, AS CERTAIN COMBINATIONS OF RUDDER ANGLE, OUTBOARD ANGLE, AND OUTBOARD HEIGHT COULD RESULT IN CONTACT BETWEEN THE OUTBOARD MOTOR'S PROPELLER AND THE RUDDER. THIS CONTACT COULD CAUSE DAMAGE TO EITHER THE RUDDER, OUTBOARD MOTOR, OR BOTH.

G. HEAD (OPTIONAL FROM DEALER)

The CAL 22 is designed to have a portable, self-contained toilet mounted under the aft end of the vee berth. Be sure to read and follow the manufacturer's directions, and keep the unit clean.

H. ELECTRICAL SYSTEM

Your CAL 22 has a built in 12 volt electrical system for running lights and interior lights. This system is wired to the highest industry standards and should give little trouble, with only minor maintenance. You will need a 12-volt battery to power the system. This battery can be purchased from your CAL dealer and should be a marine "deep-cycle" type.

A marine "deep-cycle" battery is designed for an electrical system like the CAL 22'S, where there is no engine charging system, and it has special posts. You should get a good 12-volt battery charger, and keep the battery well charged for safety's sake. Follow the charger's instructions carefully. Without a battery charger, you will need to remove the battery after each sail to re-charge it. Be sure that your battery has a full charge before going out to sail. You never know when you will be out after dark and will need your running lights.

The battery is to be installed in the supplied battery case under the front of the cockpit. The two electrical system wires should be attached to the posts; the red wire to the positive (+) terminal; the black wire to the negative (-) terminal. The boat is wired with a negative ground, and this fact should be remembered when purchasing any electrical equipment.

The mast light must be connected by using the deck plug to port side of the mast step. Use the deck plug supplied to connect the male to female socket. Be sure to remove this plug when stepping and unstepping the mast. Also, keep the cap on, rather than the mast connector whenever possible, in order to prevent water entering the deck fitting.

H. ELECTRICAL SYSTEM - Continued

On the inside of the boat on the port aft bulkhead is a circuit breaker panel with four switches. One for interior lights; one for the running lights (red/green bow light on pulpit; white stern light on stern); one spare (for instruments - radio or?); and one for the masthead/anchor light/steaming light. In normal circumstances, you should use at night: (1) While sailing - the running light switch. (2) While under power or sailed power - the running light switch should be on and the three-position masthead light should be in the steaming-light position. (3) While at anchor at night - the three-position masthead light should be in the anchor-light position.

Be sure to check all electrical connections periodically for corrosion or loose connections. Be sure to disconnect the battery before working on any electric circuit.

A check should be made of the running lights each time you take your boat out to make sure they are operable. Replace any burnt out bulbs immediately. If for some reason one of the circuit breakers shuts itself off, investigate the reason AT ONCE. Disconnect the battery and check for shorts in the electrical system. Serious damage to your boat can result from failure to make repairs immediately.

Elsewhere in this book is a sheet on general battery care. Give your battery respect, as even a 12-volt system can cause shocks, sparks, and fires.

OVERHEAD POWER WIRES/LIGHTNING

EXTREME CAUTION should be used to avoid wires, when raising or lowering the mast. SEVERE INJURY OR DEATH may result from having the mast touch an overhead power wire. Watch your charts carefully, and avoid any areas where power wires may hang over the water where you are sailing.

You should seek shelter in order to avoid electrical storms. If caught out during an electrical storm, avoid touching any metal objects, such as shrouds, stanchions, pulpits, etc., as they may attract lightning. There are many recommended systems for protecting your boat from lightning strikes, but WE DO NOT BELIEVE THAT ANY SYSTEM CAN OFFER COMPLETE PROTECTION FROM LIGHTNING. We, therefore, urge you to watch weather reports and learn to anticipate and avoid any electrical storms.

I. PLUMBING

The water plumbing system comes with the galley and consists of a portable, 5-gallon water tank with a hose from the galley sink pump. The tank should be removed for filling and should be thoroughly flushed before each fill. Due to the translucency of the water tank, algae may grow in it, if left for long periods.

I. PLUMBING - Continued

Frequent changes of water and flushing of the tank are recommended.

Careful checks should be made of all water connections each time you board or leave your boat. This is especially true of the sink-drain system. Check all hoses and hose clamps for tightness. Make sure there are no leaks in the system.

J. INTERIOR

The interior fabric liner provides both sound and thermal insulation, while adding good visual impact without the excess weight a rigid headliner would bring. The fabric is glued directly to the deck, and if an edge or seam becomes loose from catching on something, it can be easily re-glued. The fabric is treated for mildew resistance, but should be cleaned occasionally with a good upholstery cleaner. Check and make sure the cleaner is compatible by testing the fabric in an inconspicuous place before use. Also, application of "Scotchguard" in high-use areas will help keep it clean. The bilge covers are varnished and should be re-varnished each year. The remainder of the interior wood is oiled with teak oil, and a reapplication should be done each year.

K. LIFELINES AND PULPITS

The lifelines and pulpits are safety items and should be kept in top condition. Check all cotter and clevis pins once a month. Make sure the turnbuckles have enough thread. Make sure the gate stop collar is installed just aft of the last stanchion and that the allen screw is tight. This stop collar keeps the lifelines forward from going slack when the gate is opened.

You may see slight "rust" stains on your pulpits and/or stanchions. This is not a result of "poor quality" stainless steel, but, rather, surface impurities left by the forming machines. A couple of polishings with a good metal polish should eliminate the problem.

L. STEERING

The steering system for your CAL 22 is fairly simple, but will need some attention paid to it at certain points.

The rudder gudgeon and pintles should be lubricated frequently with a light coating of waterproof grease. The bolts and nuts for both the gudgeons and pintles should be checked frequently for tightness.

The rudder head assembly bolts should be checked before each sail, and the tiller pin inspected to be sure the tiller stays with the rudder.

L. STEERING - Continued

The tiller should be re-varnished at least once a year, and care should be taken when raising the tiller, as it may hit the traveler.

M. THRU HULLS

While there are no below-the-waterline thru hulls in the CAL 22, care should be taken wherever there is a hull penetration. This would be at the cockpit drain or the sink drain for the galley. The hose clamps for these thru hulls should be inspected frequently and checked for tightness. Hoses leading from the thru hulls should be checked for deterioration or leaks frequently.

N. TRAILER BOW EYE

The CAL 22 is provided with a trailer bow eye to ease loading and unloading of the boat from a trailer. This bow eye is for this use only and is not for tying up the boat, mooring the boat, or towing the boat. Cleats are provided for tie-ups and mooring; and if it is necessary to tow, a bridle should be set up to the winches or to the mast base to ease the load.

## O. NAVIGATION LIGHTS

Navigation lights must be in accordance with the rules. and regulations of the waters in which you intend to cruise.

In general, navigation lights are to be used from sunset to sunrise in all weather conditions. It is good practice to use the lights any time visibility is reduced by inclement weather.

Your CAL 22 is equipped with the following navigation lights:

A. Red and Green 10 point side lights mounted on the bow pulpit.
B. White 12 point stern light.
C. White 32 point combination bow/anchor light mounted on the mast.

A & B are wired to the "running lights" switch on the DC panel.

### BOW/STEAMING/ANCHOR LIGHT

The CAL 22 has a combination Steaming/Anchor light on the masthead. The Steaming light must be used while under power or power and sail at night. The Anchor light should be used while at anchor. There are two systems used:

1. If your CAL 22 has two switches on the panel, one marked Anchor and one marked Bow light, then the following procedure should be followed:

   a. When the Steaming/Bow light is needed, the switch labeled Bow light or Steaming light should be turned on.
   b. When the Anchor light is needed, both the Anchor-light switch and the Bow/Steaming light switch should be turned on.

2. If your CAL 22 has one, three-position switch marked Anchor-Off-Steaming/Bow, the following procedure should be followed:

   a. When the Bow/Steaming light is needed, the switch should be turned to the Bow/Steaming light position.
   b. When the Anchor light is needed, the switch should be turned to the Anchor light positon.

We recommend:

1. Underway by sail, the running lights (side lights and stern light) must be on.
2. Underway by power, the running lights and bow light must be on.
3. At anchor, both the "bow light" and "anchor light" switches be on.

# ALCOHOL STOVES

Please refer to manufacturer's manual. They cover the operation of these stoves in detail.

**WARNING**

1. THE FLAME DURING AN ALCOHOL FIRE IS QUITE OFTEN INVISIBLE.

2. DO NOT MOUNT THE FIRE EXTINGUISHER NEAR THE STOVE. DURING A FIRE, YOU MAY NOT BE ABLE TO GET TO IT.

3. WATER IS ONE OF THE BEST EXTINGUISHERS FOR ALCOHOL FIRES.

4-7-86
C/O

# MAINTENANCE

## MAINTENANCE

Occassionally deck fitting leaks may occur due to flexing of the hull and deck, movement or stress on the fitting, or deterioration of the sealant. The flexing of hull and deck is normal and may occur during racing, sailing in very heavy winds, or upon hauling or launching. These deck leaks can be easily cured by removing the leaking fittings, cleaning the fitting base and deck area thoroughly, rebedding the fitting with a good marine sealant.

7-9-86

C/O

**NOTE:** If you are planning to leave your boat in the water for any period of time, please be sure to check with your dealer and read your owner's packet or owner's manual for information about bottom coatings.

# MAINTENANCE

## A. SAIL CARE

The sails that are supplied with your CAL 22 are a mainsail with one reef and a 130% roller furling jib with acrylic cover. There are certain things that you can do to prolong your sail's life and to keep its shape.

Sails are cloth and should be protected from rubbing and chafe. This chafe frequently occurs on spreaders, shrouds, and lifelines. The areas where your sail might rub should be inspected frequently. The sails should be checked frequently for small rips or any stitching that appears loose. Sail tape, thread and sailmakers' needles could prevent a major expense.

Ultraviolet light can break down or degrade the sailcloth. After use, your sails should be furled or folded, and the mainsail should be covered with a sailcover. The furling jib should always be rolled up with the cover on the outside. Be sure to roll tightly, so that no "barber pole" striping occurs and the sail is fully covered.

A mainsail cover can be obtained from your local CAL dealer. Furling or folding the sails will ensure that your sails retain their shape for as long as possible. When the mainsail is furled, the outhaul should be slacked and the battens removed. Also, before furling or folding, the sails should be washed with fresh water to remove salt crystals, which may cut the fibers. When leaving your boat for any great length of time, the sails should be removed, cleaned, folded, and stored in their bag.

## B. INTERIOR MAINTENANCE

While your CAL sailboat is designed to be as maintenance free as possible, there are certain chores which must be performed periodically, in order to keep the boat clean. Much of this work can be done in fairly short order and should be done on a bright, sunny day in order to ventilate the boat and air cushions, curtains, etc.

### CURTAIN

The curtain should be washed once or twice a year, in order to prevent dirt and grease build up, which encourages mildew. The curtain can be easily removed for this purpose.

### SYNTHETIC FABRIC HEADLINER

The headliner of your sailboat will collect cooking grease, smoke film, etc. It should be cleaned at least once a month with a fabric cleaner of upholstery shampoo. Any cleaner should be

B. INTERIOR MAINTENANCE - Continued

SYNTHETIC FABRIC HEADLINER - Continued

tested on an area of the headliner that cannot be seen, before general use. The fabric can be "Scotchguarded" after cleaning to further protect it, but be sure to ventilate the boat well and use appropriate precautions when "Scotchguarding."

CUSHIONS

The interior cushions are made from several different fabrics and materials. Generally, any upholstery shampoo should be safe for cleaning, but as with the headliner, one should test an area on the cushion back before going ahead with the full cushion. DO NOT DRY CLEAN OR WASH. "Scotchguard" or other fabric protector is STRONGLY RECOMMENDED, when the cushions are new and after each cleaning. Be sure to "Scotchguard" in an open area.

PORTS AND HATCHES

The hatch in your CAL has an alumminum frame and acrylic plastic insert. The frame should be protected with a good metal polish, and the acrylic "window" should be cleaned with warm, soapy water frequently. DO NOT use abrasive cleaners or solvents. A plastic polish will help protect the ports. Severe scratching can sometimes be reduced with a light-duty, automotive rubbing compound and polish.

Once a month, the hatch gasket and gasket contact area should be cleaned thoroughly with soapy water and coated with a LIGHT coat of petroleum jelly or silicone spray. Oil the hinge and dog pins.

ICE CHEST (Dealer Option)

If an ice chest is not offered by your dealer, a 48 quart "Igloo" model will fit behind the step. Be sure to clean the ice chest after each use with a bleach and water mixture to prevent mildew. Also, leave the lid open when the chest is not in use to enable air to circulate. DO NOT leave water standing in the ice chest.

SINK

Stainless steel sink can be cleaned with any good stainless steel cleaner or with any nonabrasive cleaner. DO NOT use steel wood or bronze wool. A stainless polish will help prevent stains.

HIGH-PRESSURE LAMINATE

The high-pressure laminate in the galley countertop can be cleaned with a good nonabrasive cleaner and a soft cloth. Be careful of adjacent teak surfaces. DO NOT set hot pots, plates, etc., directly on the countertop; use a hot pad. Wipe up spills promptly.

B. INTERIOR MAINTENANCE - Continued

HEAD (Dealer Option)

If a portable head is not offered by your dealer, one can be purchased at many sporting goods' stores and installed in the space provided in the vee-berth area.

Be sure to keep the head and its surroundings scrupulously clean, empty it promptly, and use an approved chemical.

STOVE (Dealer Option)

If your dealer does not offer a stove, one can be purchased and installed in the space in the galley top. Use only a stove approved for marine use. Be sure to keep all flames away from flammable items; i.e., curtains, clothing, etc. Also, be sure to keep an approved fire extinguisher on board and handy.

TEAK

Your interior teak was oiled at the factory. It should be cleaned and re-oiled at least once a year. Any good teak oil should be compatible, but test it in a small area before use. We do not recommend letting your teak "go natural," as this may lead to cracking of the wood.

When your teak starts to get gray and dirty, it is the time to clean and re-oil. Be sure to wipe up any spilled or excess oil, as it may stain your gelcoat. BE SURE TO HAVE ADEQUATE VENTILATION, WHEN USING ANY CLEANERS, OILS, PAINTS, VARNISHES, ETC.

The bilge covers were varnished and should be re-varnished when any wear occurs.

BILGE

Care must be given not to sweep dirt, crumbs, etc., into the bilge. It will accumulate and smell. Some water may occur in the bilge, due to condensation against the hull, but it should be minimal. Any large accumulations of water should be checked quickly. Always keep the bilge dry and clean, which will prevent mildew.

GENERAL

When leaving the boat for any period of time, be sure to raise the covers of the lockers, prop up the cushions, leave doors open, and generally make all of the areas of the boat accessible to a smooth-air flow. This will help prevent mildew and "musty" odors in a boat that is closed up for a long period.

When any deck fitting leaks are noted, they should be taken care of quickly. Removing, cleaning, and re-bedding the fitting should prevent leaking. Remember, as fittings work and the sealant gets older, leaks will develop. Preventive maintenance will help reduce problems.

## C. EXTERIOR MAINTENANCE

### GELCOAT

The best thing that can be done for the gelcoat is to regularly wash it with detergent and water. Do not use an abrasive cleaner on gelcoat-smooth surfaces, as it will scratch and dull them and may scratch them enough to allow water under, which could cause a blister. Secondly, the hull and all smooth surfaces (not nonskid, or places where you might step) should be thoroughly waxed at least twice a year with a good fiberglass wax. Please note that if you use a silicone wax, it may make it very difficult to do good fiberglass gelcoat repairs or to paint the boat, as the silicone gets into the gelcoat and prevents adhesion of paints and gelcoat.

Gelcoat repair can be easily done by any owner, but GOOD gelcoat repair requires an expert. We recommend that, unless you are very experienced in gelcoat repair, you leave these repairs to an expert. Your CAL dealer should be able to assist you in this. Remember, keep your boat clean and wax it twice a year, and you will prolong the life of your gelcoat.

### MAST AND BOOM

The mast and boom of your CAL 22 are made of high-performance, marine aluminum. The spars are then anodized to protect them from corrosion. Due to this, halyards and lines should be kept from excessive slapping on the spars, as they could eventually wear off the anodizing.

The spars should have a coat of wax put on them before use (a good automotive wax will do). This will help protect the spar from weather, abrasion, etc. This coat of wax should be reapplied once a year.

Ideally, the spars should be removed from the boat once a year, so that close examination can be made of all fittings, tangs, sheaves, pins, etc. At this time, the spar should be waxed and all moving parts lubricated. Check carefully for worn parts and REPLACE any worn or defective parts IMMEDIATELY.

### RUNNING AND STANDING RIGGING

Your running rigging is made of low-stretch dacron line. The sheets, reef lines, and furling lines are also dacron. All this running rigging should be thoroughly inspected for chafe at least twice a year. This inspection is expecially important on a jib halyard that is used for roller furling, as the halyard sits in the same place constantly, while the sail is hoisted.

All sheets and halyards should be washed once a year, which will prolong their life by removing dirt and salt from the fibers. The sheets and reef line should be coiled tightly and can be washed in a heavy-duty washing machine with mild soap. The

C. EXTERIOR MAINTENANCE - Continued

RUNNING AND STANDING RIGGING - Continued

halyards can be messengered (tie thin string to one end) and removed from the mast, coiled, and placed in a cloth bag and washed as the sheets.

The standing rigging should be inspected once a month. All swage fittings should be inspected for cracks, and the wires should be checked for broken strands. All cotter pins, clevis pins, and turnbuckles should be checked also. REMEMBER, THE STANDING RIGGING SUPPORTS THE MAST AND SHOULD BE GIVEN CAREFUL ATTENTION!

See your jib furler's owner's manual for maintenance information.

Turnbuckles should be checked to see that they have sufficient threads exposed and that cotter pins are in place and bent over. The cotter pins in the turnbuckles should be taped to prevent snagging. Additionally, the threads should be cleaned and lubricated once a year.

The spreaders should be checked to be certain that they both have the same angle. The inboard spreader fastenings should be checked and taped. The spreader tip should be securely seized to the shroud with stainless steel seizing wire and well protected with spreader boots.

Occasionally, new rigging may develop a thin layer of rust near the swages. This is caused by impurities in the dies, that form the wire, adhering to the wire after the manufacturing process is completed. This oxidation will stop forming after two or three cleanings with a good stainless polish. One way to prevent rust around the swage fittings and to prolong the life of the swage fittings is to lightly heat up the swage fitting and to place a bar of beeswax on the wire - just above the fitting. As it melts, the beeswax will run into the swage and seal it.

Remember, ANY defect in standing or running rigging is cause for IMMEDIATE REPLACEMENT of that part.

WINCHES, BLOCKS, TACKLES, ETC.

Winches should have a teardown and re-greasing at least every six months. Follow the manufacturer's instructions, and only use a high-density winch grease. Check all winch bolts for tightness at least once a month. Hose off the winch with fresh water after each sail.

Blocks and tackles should be rinsed weekly with fresh water and have a LIGHT spray with a silicone or teflon lubricant twice a year. Be sure to check bolt tightness on all blocks, ESPECIALLY turning blocks.

C. EXTERIOR MAINTENANCE - Continued

LIFELINES, STANCHIONS, BOW AND STERN PULPITS

Do not neglect the turnbuckles, clevis pins, cotter pins, and pelican hooks on the lifelines - check them weekly. Be sure the turnbuckles and pelican hooks have enough thread and that the pelican hooks are secure. Tape or seize the pelican hooks to prevent accidental opening. The aft lifelines on the CAL 22 are nylon webbing strap, to provide comfort. The straps should be inspected frequently and replaced immediately, if any wear, cuts, tears, etc., occur.

It is not recommended that one hang fenders from the lifelines. A roll under a dock could put a severe enough strain on the fender to bend the stanchion. Clean the stanchions and pulpits with soap and water periodically, and polish with a good stainless polish. Occasionally, stainless hardware will show some rusting. (See Running and Standing Rigging above.) A couple of polishings will reduce problems. Never use steel wool on stainless, as it will leave small pieces of steel, which may cause rusting.

Clean the lifeline with a good soap and water solution, to maintain a white look. Be sure to tape any cotter pins at the bow end of the lifelines, to prevent tearing of sails.

Check all pulpits and stanchions for security. Tighten bolts, as necessary, for security and to prevent leaks.

## BASIC RULES FOR BATTERY CARE AND MAINTENANCE

1. Check liquid level in all cells once every week or two. Add water as required. Bring liquid level to 3/8 inch above top of separators. It is much better to add water in small amounts frequently than to put too much in and flood out the electrolyte, thus causing damage to adjacent wiring and equipment, plus loss of acid.

   Generally, the local drinking water in the United States is safe for use in batteries; but to be sure, check with your battery supplier.

   ADD WATER ONLY. Add no battery dopes, special liquid, or powders. These are harmful or useless.

2. Before adding water, take a hydrometer reading of one cell. (Don't use same cell each time; change around.) If above 1.225 specific gravity, battery is sufficiently charged. If below 1.225 specific gravity, remove battery for bench charge. If level is too low to read, add water and take hydrometer reading the next day.

3. After adding water, examine hold-downs. Make certain battery is secure. Hold-downs should make a snug fit, but not necessarily the tightest fit, or the container may be forced out of shape. Examine cables and terminals for tightness, corrosion, and wear. Corrosion occurs from the spilled electrolyte getting on metal, other than lead. Lead does not corrode. To remove corrosion, scrape or brush it off. Then immerse the part in an alkaline solution, such as baking soda, in the proportions of one pound soda to a gallon of water. One can tell when all the electrolyte is neutralized by observing when the bubbling stops. Wash with water, dry, and apply a prepared grease available from battery dealers.

4. Examine battery for broken or cracked covers, case, and cracks in sealing compound. If any of the above defects are present, remove battery at once and have repaired. Acid loss from any of the above defects will shorten battery life. Acid escaping through cracked covers or sealing compound will cause corrosion of terminals, cables, carrier, and adjacent parts.

5. Batteries should be recharged if hydrometer reading is below 1.225.

6. DO NOT LEAVE A BATTERY ON CHARGE FOR MORE THAN 48 HOURS. STOP CHARGE when two hydrometer readings recorded two hours apart show no increase, or when terminal voltage readings recorded two hours apart show no increase.

BASIC RULES FOR BATTERY CARE AND MAINTENANCE - Continued

6. Continued

If there is no rise in voltage or specific gravity in a period of two hours, further charging is USELESS and MAY DAMAGE BATTERY BEYOND REPAIR. Have your supplier check battery for possible acid adjustment or repair.

7. On this bench recharge, the specific gravity is expected to read certain values before considered serviceable for continued use. The hydrometer reading should be above 1.260. The full charge gravity when new was 1.270 - 1.290. If battery does not register as above, have your battery supplier inspect it. He may be able to adjust acid or make repairs.

8. In cold weather, do not fill cells with water and let stand without running motor long enough to allow water to mix with acid, as freezing might occur.

9. Spare batteries should be recharged at least every 4 or 5 weeks, in order that the specific gravity may be maintained at 1.240 or above.

10. Use a battery with sufficient ability to carry the connected load.

11. Wash dirt and corrosion off top of battery to eliminate intercell discharge.

12. Neutralize corrosion in battery box by washing with solution of baking soda as recommended in No. 3; rinse with water.

13. The amount of water which is needed by the different cells will be a clue to other problems. For example, if each week the water, which was put in the previous week has been used, it is reasonable to expect that too much charging current has passed through the battery; hence, the voltage regulator should be checked.

All cells in the battery should take the same amount of water. If one cell should take more than the others and does this each week, it would be expected that the container is leaking. Whether the leakage is through the bottom of the container, or from the sides of the container, can be determined by examination.

# STANCHION GASKETS

In our constant effort to upgrade and eliminate potential problems, we have started to use a gasket under the stanchion bases to reduce leaking problems. These gaskets do not require large fastener pressures to do their job. If leaking occurs, try just a small (1/2 turn) to the fasteners. Under no circumstances should the fasteners be tightened until the gaskets "ooze" out from under the stanchions. At the factory we have also bedded the gasket in silicone sealant.

If there are any questions relative to the above, please do not hesitate to contact us.

4-14-87 All

# WINTERIZING YOUR BOAT

If you keep your boat in a colder climate, you will probably haul it out. At this time the boat should be "winterized." Winterization comprises a multitude of items (See Periodic Maintenance Schedule) that you can do to your boat to make it easier to re-commission it in the Spring. Obviously, this is an "ideal" list, but there are items here that must be done.

## A. EXTERIOR

1. Remove all slime and growth when the boat comes out of the water.

2. Wax the hull.

3. Remove the mast, remove spreaders and rigging. Messenger all halyards. Take all halyards, sheets, etc., home and wash them. Wax the mast and spreaders. Remember to label everything - it's amazing how your memory will fade by Spring.

## B. INTERIOR

1. If possible, remove EVERYTHING loose. Take it home, eat the food, clean the cushions, sort out all the stuff, and throw away all the junk. Clean everything up.

2. Prop up the bunk tops to allow air to circulate. Open all drawers, doors, etc., a crack to allow air in.

3. If possible, put a light bulb or two in the boat. Drop lights work fine. Use a low wattage 25 or 40 watt bulb. This will keep the interior slightly warm and promote air circulation. Be sure to tie off the light so it does not tip over or hit anything.

4. Empty the bilge and swab it clean and dry. Do not forget the engine bilge.

## C. WATER SYSTEM

1. Empty the water tanks as much as possible. (There will always be a small amount of water left.)

2. Add a potable water antifreeze, sold in marine and RV stores (do not use ordinary antifreeze, it is poisonous), to your water tank and a small amount of water. Pump this water antifreeze mixture thru the water lines to all faucets. Don't forget to pump some from both tanks, if your boat has two.

3. Close the sink drain thru hulls, or plug the sink, if the thru hull is above the waterline.

WINTERIZING YOUR BOAT - Continued

D. HEAD SYSTEM

1. Empty the holding tank, and flush it out with fresh water several times. Add a holding tank chemical.

2. Pump all the water out of the head.

3. Shut off the head intake thru hull.

4. Remove the head intake line from the thru hull. Put it in a can of potable water antifreeze mixed properly with water, and pump it thru the head.

5. Re-connect the intake line to the thru hull.

6. Shut the discharge thru hull (if applicable).

E. ELECTRICAL SYSTEM

1. Remove all electronics.

2. Remove all batteries. Take them home and occasionally trickle charge them over the winter. (See Basic Rules For Battery Care.) Do not set them on a concrete floor.

3. Clean all connections and spray with CRC.

F. OPTIONAL INBOARD ENGINE (See also the engine owner's manual.)

1. Fill fuel tank. This will keep water from condensing. Add a fuel stabilizer (consult your marine store or mechanic).

2. Run the engine until warm.

3. Change the oil and filter.

4. Change the fuel filter.

5. Clean the raw water strainer.

6. Check the fresh water cooling system for the proper antifreeze/water mixture.

7. Shut off the engine intake thru hull.

8. Remove the engine water intake line and put it in a pail with a 50/50 antifreeze water mixture.

9. Start the engine and run the antifreeze/water mixture thru the engine until the pail is empty or the anti-

WINTERIZING YOUR BOAT - Continued

F. OPTIONAL INBOARD ENGINE - Continued

9. freeze mixture comes out the exhaust. Do not run the engine dry! Shut down the engine and re-connect the water intake line.

10. Put a rag sprayed with CRC or WD40 loosely into the exhaust pipe on the transom. This will keep moisture out of the engine.

G. OUTBOARD ENGINE

1. Take it home and store it in a safe place. Be VERY CAREFUL storing the gas tank, as the gasoline is very flammable.

Finally, cover with a good winter cover and visit once or twice a month to check.

4-14-87 All

# PERIODIC MAINTENANCE

The following list of items and their accompanying numbers is in no way intended to be all that should be done to your sailboat. This is only a suggested general list and is not intended to override the individual manufacturer's manual. It also is not arranged in any special order. The numbers are in numerical order and not in priority order. Some numbers and their meanings may also seem redundant, but we feel it is better to be redundant than lax.

ALWAYS FOLLOW THE OWNER'S MANUAL THAT COMES WITH THE ENGINES, HEADS, ETC.

4-14-87 All

# PERIODIC MAINTENANCE

| | End of First Week | Monthly | Winterizing | Remarks |
|---|---|---|---|---|
| Deck Fittings | 2,5 | | 1,4,5 | |
| Rudder Blade | | 1 | 1 | |
| Propeller | | 1 | 1, 4, 5 | |
| Bilges | 1 | 1 | 4,7 | |
| Cockpit Drain Hoses | 2 | 2,5 | 2,4,5,7 | 7 Some cockpit hoses have low points that hold water |
| Pumps | 1 | 1,2,5 | 1,4,5,7,8 | |
| Water Tanks | 2 | 2 | 1,4,7 | |
| Piping, Fresh Water | 2 | 2 | 1,4,7 | |
| Lighting | | | 1,3,4 | 3=WD-40 or CRC |
| Battery | 1 | 1,4 | 1,4,8 | 4=Clean with baking soda and water solution |
| Fuel Filter | 1,5 | 1,5 | 1,5 | Check engine owner's manual for further info. |
| Air Filter | 1 | 1,5 | 1,5 | " " " " |
| Engine Clamps | 1,5 | 1,4,5 | 1,3,4,5 | |
| Mast, Boom | 1,3 | 1,3,4,5 | 1,3,4,5,6 | |
| Standing Rigging | 1,5 | 1,4 | 1,3,4,5,6 | |
| Running Rigging | 1 | 1,3,4 | 1,3,4,5,6 | |
| Winches | 1,5 | 1,3,4,5 | 1,3,4,5 | |
| Hose Clamps | 5 | 1,5 | 1,3,4,5 | Do not overtighten |

1. Check conditon
2. Check watertightness
3. Lubricate
4. Clean with fresh water
5. Check tightness
6. Grease
7. Drain and/or anti-freeze
8. Disconnect

PERIODIC MAINTENANCE - Continued

| | End of First Week | Monthly | Winterizing | Remarks |
|---|---|---|---|---|
| Chainplates and Rods | 1,2,5 | 1,2,4,5 | 1,2,4,5 | Rebed at least twice a year |
| Tiller Strap, if applicable | 1,3,5 | 1,3,4,5 | 1,3,4,5 | |
| Bilges | Check daily - more often, if the boat is leaking | | | |
| Stoves, Alcohol | 1,5 | 1,5 | 1,4,5 | |

1. Check condition
2. Check watertightness
3. Lubricate
4. Clean with fresh water
5. Check tightness
6. Grease
7. Drain and/or anti-freeze
8. Disconnect

# O'DAY/CAL SUPPLIERS

## I MAST SUPPLIES AND PARTS (including lights):

DAMCO SPARS:
Dwyer Aluminum Mast
3 Jefferson Road
P. O. Box 201
Branford, CT 06405
203-481-0122

Z SPARS
Z Diffusion
P. O. Box 437
500 Wood Street
Bristol, RI 02809
401-253-1515

ISOMAT SPARS:

Bay Sailing Equipment
986 Cherry Street
Fall River, MA 02720
617-678-4419

Sparcraft
2501 Alton Avenue
Irvine, CA 92714
214-957-3222

ISOMAT SPARS:

Engineer Marine Systems, Inc.
80 NW 73rd Street
Miami, FL 33150
305-751-6071

Yacht Riggers
4448 27th Avenue West
Seattle, WA 90199
206-282-7737

## II PUMPS:

BILGE PUMPS

IMTRA Corp.
151 Mystic Avenue
Medford, MA 02155
617-391-5660

ELECTRIC BILGE PUMPS/SHOWER SUMP PUMP

Rule Industries
Cape Ann Industrial Park
Gloucester, MA 01930
617-281-0440

HOLDING TANK PUMPS

IMTRA Corp.
151 Mystic Avenue
Medford, MA 02155
617-391-5660

HOLDING TANK PUMPS

Jabsco Products ITT
1485 Dale Way
Costa Mesa, CA 92626
714-545-8251

## III ENGINES:

UNIVERSAL DIESELS:

Universal Medalist Ind.
123 Jackson Street
Oshkosh, WI 54901
414-231-4100

WESTERBEKE DIESELS:

Westerbeke
Avon Industrial Park
Avon, MA 02322
617-588-7700

YANMAR DIESELS:

Mack Boring & Parts Co.
2365 Route 22
Union, NJ 07083
201-964-0700

6-18-87 O/C

O'DAY/CAL SUPPLIERS - Continued

IV SAILS

Neil Pryde Sails
Distributed by:

Gurley Trading Co., Inc.
P. O. Box 156
10801 Dale St., Suite E-1
Stanton, CA 90680
714-527-3165

SAILS

Gurley Trading Co., Inc.
303 Bridgeport Avenue
Milford, CT 06460
203-874-1847

V HEADS

GROCO
Gross Mechanical Labs
7240 Standard Drive
Hanover, MD 21076-1380
301-796-5242

HEADS

Mansfield Sanitary, Inc.
Big Prairie
Ohio 44611
216-496-2301

VI WINCHES

Barient/IMI
New Whitfield St.
Guilford, Ct 06437
203-453-4374

VII LIGHTS:

RUNNING LIGHTS:

Lucas
High Seas
4861 24th Avenue
Port Huron, MI 48060
313-385-4411

MAST LIGHTS - See Mast Supplier

VIII CIRCUIT BREAKERS AND PANELS

Lorco
17 Tinker Avenue
Londonderry, NH 03053
603-669-6270

6-18-87 O/C

FOSS FOAM, INC. // POLYURETHANE FOAM

## YOUR FOSS FIBERGLASS & URETHANE RUDDER

The Foss Company has been producing sailboat rudders for over 20 years for most major boat companies. The fiberglass blade with its rigid urethane core makes an extremely strong, dependable rudder.

The near neutral buoyancy of your rudder helps the performance of your boat by reducing total weight, as well as reducing the moment of inertia in the stern. Near neutral buoyancy also is helpful, should the rudder ever need to be removed for steering system repairs. The boat does not need to be hauled out of the water to remove the rudder.

Tough fiberglass and urethane plastic used in the construction of your rudder is nearly indestructable. The urethane core is composed of a strong rigid closed cell urethane. Water, diesel solvents, or marine borers will not damage your rudder blade.

When you paint your rudder the first time, particular attention should be paid to the paint manufacturer's instructions for preparing the surface. Solvent washing is not enough. The rudder must be sanded heavily to remove a heavy coating of mold release. We recommend white paints be used. White is a popular color, as it is easy to see weeds and other debris which can catch on your rudder.

Surface repairs may be performed by cleaning, drying, and roughing up the damaged area and applying bondo or any similar filler with a putty knife. Should a small blister appear, it may be filled with resin or cut away and repaired. Once the patch has dried, it may be sanded smooth and painted directly with bottom paint or any coating you desire.

We do not recommend the use of dark colors on your rudder, as they generate heat when the boat is out of the water in the sun. Since the rudder is made of cellular material, this heat can cause dimensional changes and cosmetic damage. If the rudder is painted with a dark color, it should be shielded from the sun with a white wrapping when the boat is out of the water. The rudder warranty excludes damage caused by heat.

You should make periodic inspections of your rudder and look for possible damage from grounding or electrolysis.

REPRINTED FROM FOSS FOAM BULLETIN
Foss Foam, Inc.
4480 - 126th Ave. N.
Clearwater, FL 33520

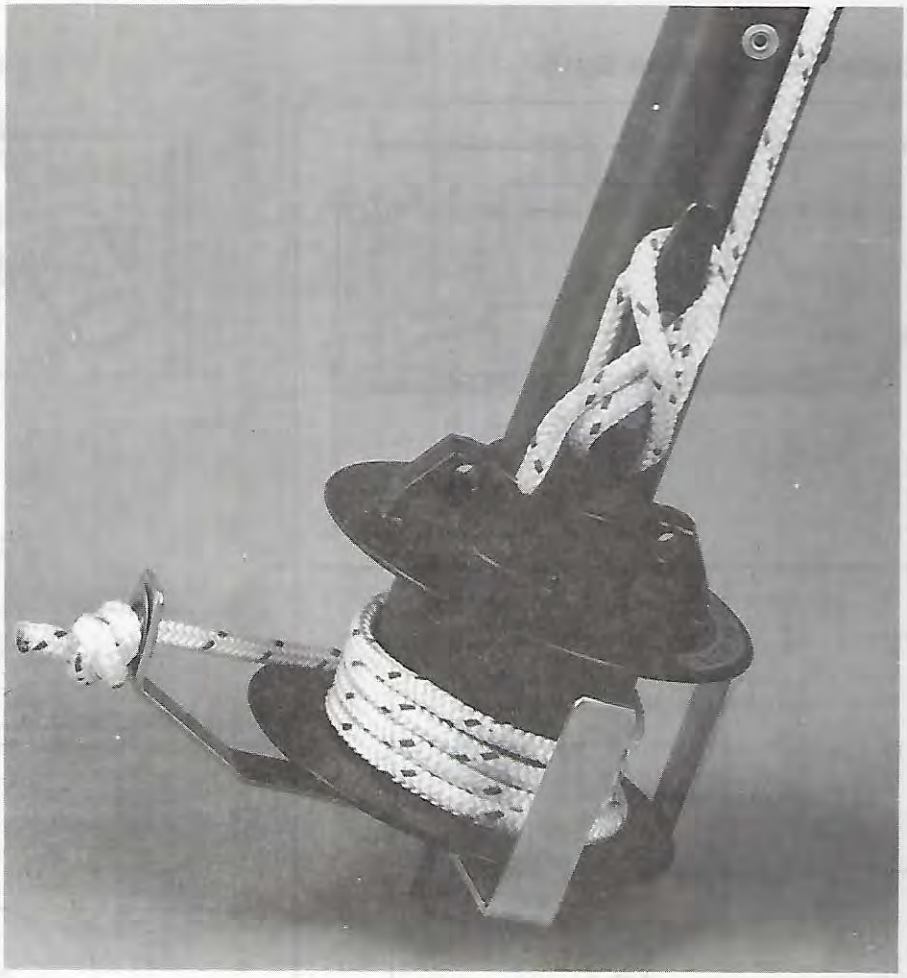
# The Micro Reefer™

## You can trailer it, too.

Finally. Advanced reefing and furling for boats 15 to 22 feet. The easy installation...efficient reefing...and low maintenance of the world's most popular furling system, the **Reefer,** is available for trailerable sailboats.

Gone forever are the inefficiencies of behind the headstay furling systems...excessive sag on the wind...inability to reef and short halyard life.

The **Micro Reefer** has been designed specifically for daysailers and cruising boats with headstay wire sizes up to 1/8". It is the first system that allows efficient reefing of headsails while its flexible torque bearings make launching fast and easy.



### Features:

- Choice of low profile continuous or spool drum.
- Only reefing system that is trailerable.
- Double grooved foil makes sail changes easy.
- Fits over existing headstay – prevents sag.
- Maintains sail shape even while reefed.
- Internal halyard eliminates halyard wrap.
- Multi-part cunningham tensions the sail not the system.
- Aerodynamic T-6 aluminum foil 7 foot sections for easy handling and storage.
- Low friction head fitting. Slim and rugged – won't foul halyards.
- Flexible torque bearings for care-free stepping of mast/easy trailering.
- Simple owner installations.
- Fits over existing turnbuckle.
- Low maintenance – non-corrosive materials.

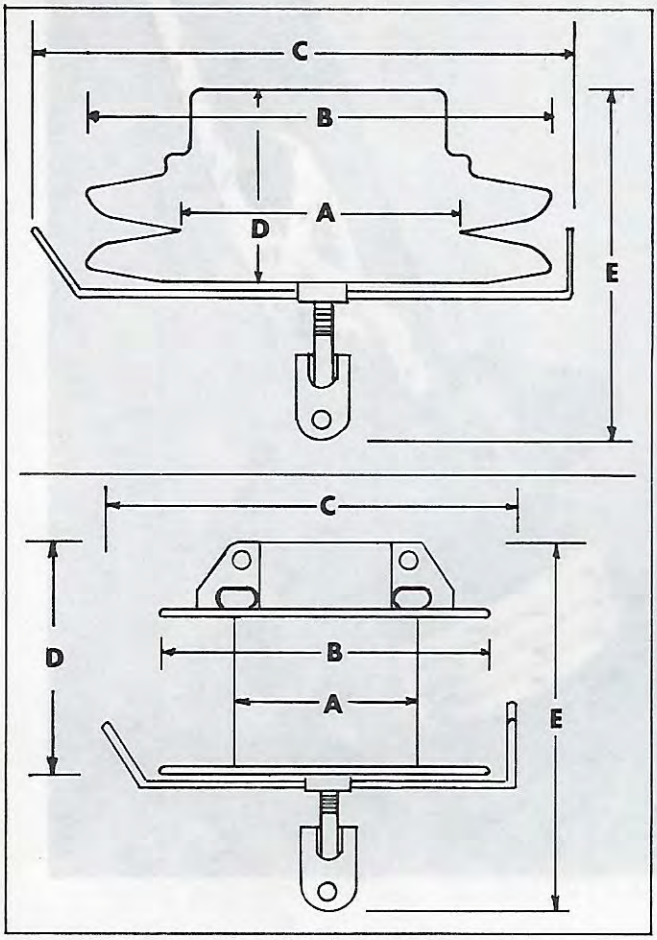
### The Micro Reefer Selection Guide

| Model No. | Size | Boat Length (in ft.) | Boat Displace. (in lbs.) | Headstay Wire Size | Turnbuckle Stud Size | No. Supplied Extrusions | Max. Headstay Length (in ft.) | Sailmakers Luff Deductions St'd./Navtec |
|---|---|---|---|---|---|---|---|---|
| 2001C | #1 | to 19 | 3,000 | 3/32", 1/8" | 1/4" | 3 | 22 | 15/21 |
| 2001S | #1 | to 19 | 3,000 | 3/32", 1/8" | 1/4 | 3 | 22 | 15/21 |
| 2002C | #2 | 16-22 | 3,000 | 3/32", 1/8" | 1/4" | 4 | 29 | 15/21 |
| 2002S | #2 | 16-22 | 3,000 | 3/32", 1/8" | 1/4" | 4 | 29 | 15/21 |


## CRUISING DESIGN, INC.

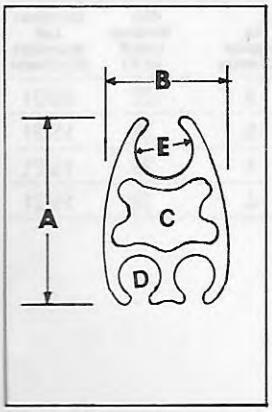
**Advanced Equipment to Simplify Cruising & Racing**
Box 151, Peabody, Massachusetts 01960
(617) 532-2712 800-343-0214 (Outside Mass. Only)

## Micro Reefer Drum Data

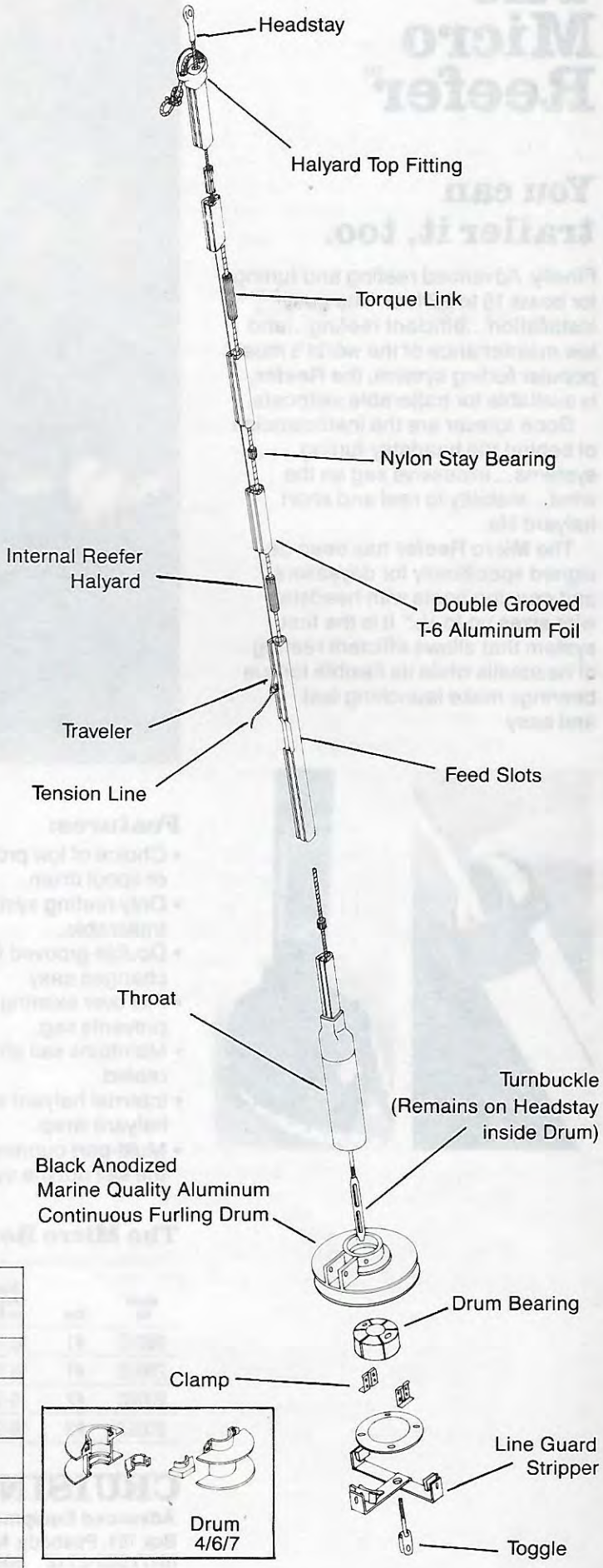



| | Continuous | Spool |
|---|---|---|
| A Drum I.D. | 3 1/2" | 2 3/4" |
| B Drum O.D. | 4 3/4" | 5" |
| C Line Guard | 5 3/4" | 5 1/4" |
| D Drum Ht. | 1 1/8" | 2 1/2" |
| E Toggle/Tack | 7 1/4" | 7" |
| Line Size | 3/8" | 1/4" |
| Drum Capacity | — | 60 ft. |
| Clamp | 1/4" | 1/4" |

## The Micro Reefer™ Extrusion Data

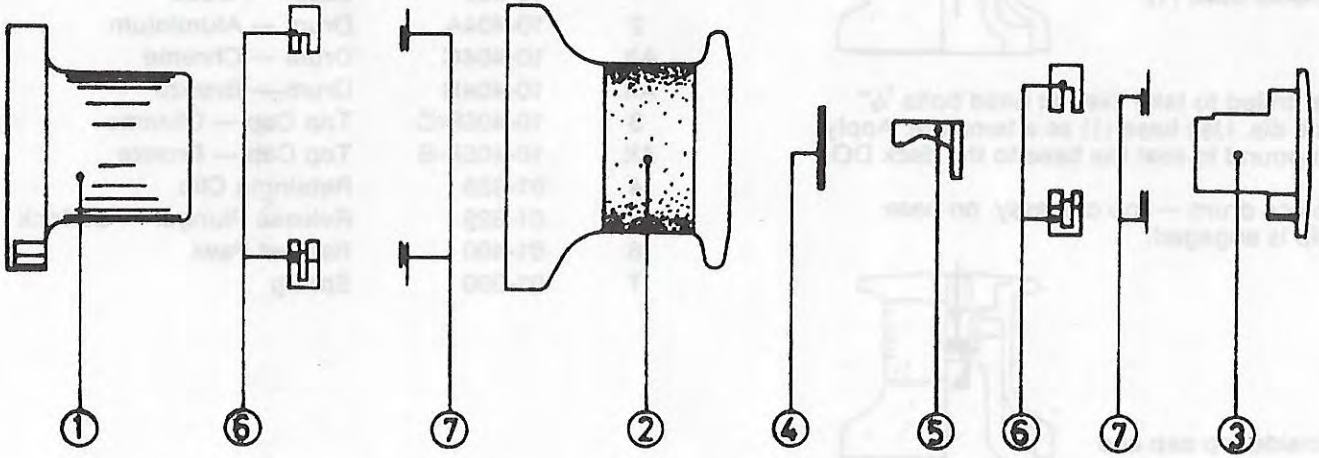



| | Micro |
|---|---|
| A Fore/Aft Dm. | 1" |
| B Port/Strb'd Dm. | 11/16" |
| C Max. Stud Dia. (excl. flats) | .313" |
| D Sail Tape Size | #4 |
| E Halyard Groove | 5/16" |
| Wt./ft. | .32/ft. |
| Max. Stay Size | 1/8" |



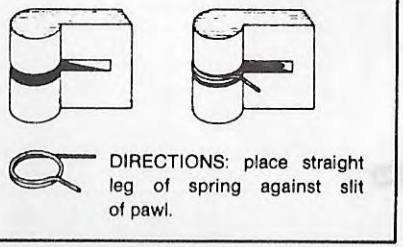
# MAINTENANCE & SERVICE INFORMATION

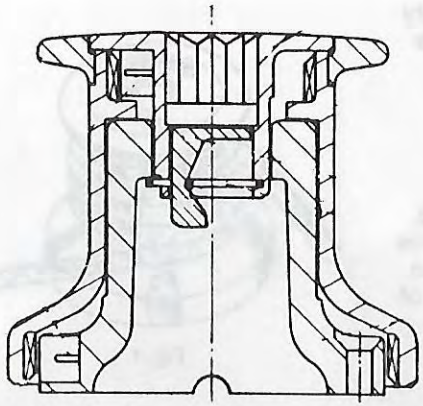
# MODEL 10P 1-SPEED WINCH

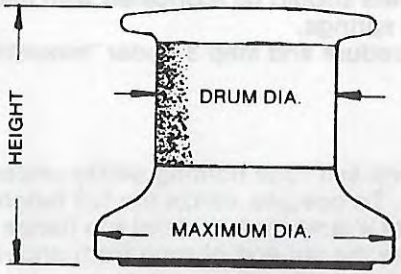




PLACEMENT OF SPRING AGAINST PAWL

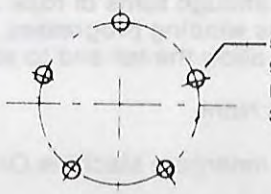


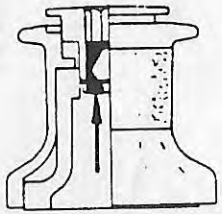



**MODEL 10P**

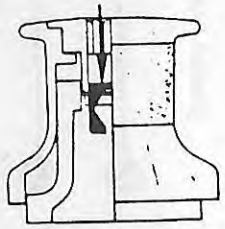
| | 1st | 2nd |
|---|---|---|
| **GEAR RATIO** | 1:1 | — |
| **POWER RATIO** | 7.6:1 | — |
| DRUM DIA. | 66mm | $2\frac{5}{8}$" |
| MAXIMUM DIA. | 111mm | $4\frac{3}{8}$" |
| HEIGHT | 95mm | $3\frac{3}{4}$" |



## MOUNTING INSTRUCTIONS



1. Depress Barlock (release plunger) (5) inside base (1) until top cap (3) is released. Remove base (1) out of drum (2).
2. Bolt base (1) to flat and smooth surface drilled to take five flat head bolts ½" (6 mm) dia. on 3.150" (80 mm) bolt circle dia. Use base (1) as a template. Apply only light coat of bedding (sealing) compound to seal the base to the deck DO NOT block the drain grooves.
3. Insert top cap (3) back into drum and place drum — top cap assy. on base. Push down and rotate until retaining clip is engaged.



## TO LUBRICATE & DISASSEMBLE:

1. Depress Barlock (release plunger) (5) inside top cap and lift drum-top cap assy. off base (1).
2. Remove ratchet pawls (6) and springs (7) from top cap (3) and base (1). DO NOT remove retaining clip (4) and plunger (5) from top cap (3).
3. Clean all parts in petroleum solvent. Replace any parts showing damage or excessive wear. During the assembly procedure, all bearings should be liberally greased with Barient — Barlube. The pawls should be lubricated with machine oil only — NEVER grease the pawls and springs.
4. To assemble — reverse dismantling procedure and step 3 under "mounting instructions".

## SELF ROPE HOLDING — TRIMMING:

A feature of this winch is its unique tailing and self rope holding ability under load. The winch may be used by one person only. To operate: utilize the full height of the drum barrel, using enough turns of rope until it jams underside of top flange of the drum (see fig. 1). As winding progresses, free the tail end of rope from underside of top flange . Do not allow the tail end to advance further than one turn.

**TOOL REQUIRED:** None

**LUBRICANT:** Non detergent Machine Oil (SAE 30); Barient Barlube.

## INSPECTION & LUBRICATION:

Quarterly lubrication is recommended. Inspect more frequently in a racing season. Monthly cleaning and lubrication of the aluminium drum winches is advisable.

| Item | Part No. | Description | Qty |
|---|---|---|---|
| 1 | 16-302 | Base — Plastic | 1 |
| 2 | 10-404A | Drum — Aluminium | 1 |
| Alt. | 10-404C | Drum — Chrome | 1 |
| Alt. | 10-404B | Drum — Bronze | 1 |
| 3 | 10-405P-C | Top Cap — Chrome | 1 |
| Alt. | 10-405P-B | Top Cap — Bronze | 1 |
| 4 | 01-328 | Retaining Clip | 1 |
| 5 | 01-329 | Release Plunger — Barlock | 1 |
| 6 | 01-400 | Ratchet Pawl | 4 |
| 7 | 01-300 | Spring | 4 |

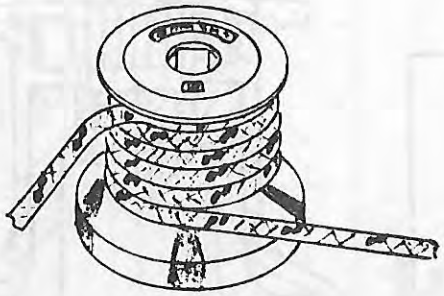


Fig. 1