# CATALINA
# 34 MK II

# OWNER'S
# MANUAL


| | |
|---|---|
| 4th Edition | January 16, 1991 |
| 5th Edition | August 26, 1992 |
| 6th Edition | August 13, 1996 |
| 7th Edition | April 22, 2002 |

# FOREWORD

Congratulations on the acquisition of your new Catalina 34 yacht. All Catalina yachts are designed and built with care, using quality materials to assure you years of sailing enjoyment with a minimum amount of upkeep and maintenance.

Before attempting maintenance or operation of your Catalina yacht, please read the Catalina Yachts Limited Warranty booklet and fill out the enclosed warranty registration card.

The registration card enables Catalina to inform you of developments and modifications to enhance the performance or comfort of your yacht. It is also important to be able to contact owners to comply with Coast Guard notification requirements.

Experienced boat yard personnel, under the direction of you authorized dealer, should handle the launching and rigging of your Catalina yacht. After the boat is launched, the dealer will complete the last stages of rigging and mast tuning.

The index page lists the contents of this manual. Warrantees and information regarding installed optional equipment have been included when available and applicable.

Maintaining your yacht properly can become a satisfying part of your sailing activities. A regular inspection is the best preventive maintenance. It will help keep your boat safe and in good condition while in use, and insure peace of mind when the boat is left unattended.

Take good care of your boat and take the time to learn and practice good seamanship.


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# PREFACE

This manual is intended and supplied to help owners of Catalina 34's understand their boats and answer common questions about maintenance and systems design specific to Catalina 34 MK II.

This manual is not intended to provide sailing instructions. It is assumed the operator will consult books written for that purpose, or take sailing lessons or courses to gain the knowledge necessary for the safe operation of the vessel.

The systems descriptions and illustrations in this manual apply to boats built at the time of publication. Our policy of constant improvement necessitates that changes have been made to the Catalina 34 since its introduction. Therefore, these illustrations and descriptions may not apply to boats built before the time of publication.

Owners of earlier hulls, who have questions not answered herein, should consult their local Catalina dealer, or write to, or e-mail Catalina Yachts. Please include your hull number in all correspondence.

The maintenance checklists contained within this manual are intended as guidelines for boats in normal service under typical conditions.

Climate and use will vary and may require additional or special maintenance. Consult with you local boat yard or Catalina dealer for specific maintenance and precautions recommended for your purposes and climate.

**CAUTION:** The aluminum and other metal parts conduct electricity. Coming in contact with or near an electrical power line or lightning can cause severe injury or death. Stay away from overhead electrical power lines when sailing and/or launching the boat.

# TABLE OF CONTENTS

YACHT NAME


| | |
|---|---|
| REGISTRATION OR DOCUMENTATION N° | PORT OF CALL |
| DATE OF COMMISSIONING | HULL NUMBER |
| OWNER'S NAME | OWNER'S ADDRESS |

| | |
|---|---|
| LENGTH OF HULL..... 34'-6"<br>LENGTH WATERLINE..... 29'-10" | DRAFT FIN KEEL ..... 5'-7"<br>DRAFT WING KEEL..... 4'-3" |
| BEAM..... 11'-9" | DISPLACEMENT FIN KEEL..... 11950 lbs.<br>DISPLACEMENT WING KEEL..... 12550 lbs. |
| MAST HEIGHT ABOVE DWL (STD) ..... 49'-7"<br>MAST HEIGHT ABOVE DWL (TALL) ..... 51'-7" | ENGINE MFG. AND MODEL<br>ENGINE SEAL NUMBER |
| FUEL CAPACITY..... 25 GAL.<br>FRESH WATER CAPACITY (TOTAL) ..... 73 GAL. | INSURANCE COMPANY<br>INSURANCE POLICY NUMBER |
| SAIL NUMBER | RADIO TELEPHONE CALL NUMBER |

# Catalina 34 MK II Specifications
# Rev: 3/7/03

## PRINCIPAL DIMENSIONS

| | | |
|---|---|---|
| Length Over All | 35' 8" | (10.87 m) |
| Length of Hull | 34' 6" | (10.52 m) |
| L.W.L. | 29' 10" | (9.09 m) |
| BEAM | 11' 9" | (3.58 m) |
| Distance from W/L to masthead: | | |
| Std: | 49' 7" | (15.11 m) |
| Tall: | 51' 7" | (15.72 m) |
| Theoretical hull speed | 7.3 knots | |

## WING KEEL

| | | |
|---|---|---|
| Draft | 4' 3" | (1.30 m) |
| Ballast | 5600 lbs. | (2540 kg) |
| Designed weight | 12550 lbs. | (5693 kg) |
| Disp/Length | 211.0 | |
| Sail Area/displ: | Std. 15.64, | Tall 16.41 |

## FIN KEEL

| | | |
|---|---|---|
| Draft | 5' 7" | (1.70 m) |
| Ballast | 5000 lbs. | (2268 kg) |
| Designed weight | 11950 lbs. | (5420 kg) |
| Disp/Length | 200.9 | |
| Sail Area/displ: | Std. 16.16, | Tall 16.96 |

## STANDARD RIG

| | | |
|---|---|---|
| Mainsail, Rated: | 231 ft² | (21.46 m²) |
| Total w/100% | | |
| Foretriangle: | 528 ft² | (49.05 m²) |
| I = | 44' - 0" | (13.41 m) |
| J = | 13' - 6" | (4.11 m) |
| P = | 38' - 6" | (11.73 m) |
| E = | 12' - 0" | (3.66 m) |

## TALL RIG

| | | |
|---|---|---|
| Mainsail, Rated: | 243 ft² | (22.57 m²) |
| Total w/100% | | |
| Foretriangle: | 554 ft² | (51.47 m²) |
| I = | 46' - 0" | (14.02 m) |
| J = | 13' - 6" | (4.11 m) |
| P = | 40' - 6" | (12.34 m) |
| E = | 12' - 0" | (3.66 m) |

## RATINGS

PHRF (May vary by area) = 150
IMCI (CE) Boat design category: "A"

## TANKAGE AND CAPACITIES

| | | |
|---|---|---|
| Water: Fwd. | 25 Gal. | (95 lt.), |
| Aft. | 42 Gal. | (159 lt.) |
| Heater, Electric & Engine heat Exchanger: | 6 Gal. | (22.7 lt.) |
| Total Water: | 73 Gal. | (276 lt.) |
| Holding Tank: | 18 Gal. | (68 lt.) |
| Fuel: | 25 Gal. | (95 lt.) |

L.P.G. Aluminum Tank 10 lbs. (4.54 kg)
Berths: 3 Doubles – 1 Single

| | | |
|---|---|---|
| Ice Box: | 4.26 ft³ | (0.12 m³) |

## HEAD ROOM

| | | |
|---|---|---|
| Max: | 6' 3" | (1.91 m) |

## ENGINE AND CONTROLS

Universal M35B, 35 HP (26.1 kW) Diesel, fresh water cooled,
4 cyl. 81.47 in³ (1.34 lt.)
Approx. fuel consumption:
0.8 GPH (3.0 LPH) @ 2200 RPM.
Edson, Pedestal steering W/40" (1.02 m) Destroyer wheel.
Compass: Ritchie SP5C.

## PROPELLER

Two blade: 15x10 RH. (38.1 cm x 25.4 cm)
Three blade: 15x9 RH. (38.1 cm x 22.9 cm)

## RIGGING

Single Spreaders
Shrouds:

| | |
|---|---|
| Upper | 5/16" (0.79 cm) wire 1x19 |
| Fwd. & Aft Lowers | 1/4" (0.64 cm) wire 1x19 |
| Forestay | 5/16" (0.79 cm) wire 1x19 |
| Backstay | 5/16" (0.79 cm) wire 1x19 |
| Backstay Bridles | 1/4" (0.64 cm) wire 1x19 |

Rope Halyards, Low Stretch, led aft.
Solid Boom Vang, Spring loaded.

## WINCHES

Primaries: #48 Lewmar, Chr. Bronze, Self Tailing.
Halyard: #30 Lewmar, Chr. Bronze, Self Tailing.

## ALL SPECIFICATIONS ARE APPROXIMATE

Note: Specifications And Or Equipment Subject To Change Without Notice.

## 2.0 COMMISHIONING CHECK LIST:

### 2.1 PRE-LAUNCH CHECK LIST:

1. _____ Shaft turns freely by hand; zinc collar installed, if required
2. _____ Check intake hoses and clamps.
3. _____ Check all through hull fittings.
4. _____ Drain plugs tight: _____ engine, _____ muffler, and _____cooling system.
5. _____ Bottom clean, paint OK.
6. _____ Hull sides clean, gel coat OK.
7. _____ Decks clean.
8. _____ Cushions, curtains, clean and in place.
9. _____ Table converts to berth OK.
10. _____ Hatch lids present and fit OK.
11. _____ Lifelines and pulpits rigged and OK.
12. _____ Spreaders taped and drilled at base end; upper and intermediate shrouds wired to tip ends and taped.
13. _____ Standing rigging pinned to mast.
14. _____ Rigging lengths verified with checklist in kit.
15. _____ Mast and boom inspected: _____ cotter pins, _____ sheaves, _____ tangs, and _____spreaders OK.
16. _____ Mast lights checked before mast is stepped.
17. _____ Masthead sheaves lubricated and rotate freely.
18. _____ Check overhead for electrical wires that may interfere with the space required to raise the mast to its full upright position. If there are wires of any kind, anywhere near the boat, do not raise the mast. Move boat to another location, away from any wires. Contact with wires can be fatal.

### 2.2 IN THE WATER CHECK:

#### 2.2.1 ELECTRICAL:

1. _____ Electrical equipment operational:
   _____ Running _____ Cabin _____ Bow
   _____ Anchor _____ Spreaders _____ Pressure
   _____ Water _____ Macerator pumps
   _____ All Other Electrical Systems
2. _____ Shore Power OK.
3. _____ Check battery switch: #1 _____ , #2 _____ OK.
4. _____ Check battery fluid levels.
5. _____ Check battery terminals for tightness.
6. _____ Check battery tie down.

#### 2.2.2 PLUMBING:

1. _____ No leaks through hull fittings with seacocks open.
2. _____ Fill all water tanks.
3. _____ Check all water tanks at fittings and vents for leaks.
4. _____ Test all faucets and foot pumps for leaks.

5. _____ Check for leaks at sink drain, sink drains OK.
6. _____ Put water in icebox and check for proper drainage.
7. _____ Check bilge pump operation, handle present.
8. _____ Check head by flushing and pumping.
9. _____ Check shower sump drain lines.
10. _____ Check holding tanks: pump, vent and fittings.
11. _____ Check head and pump handle for leaks.
12. _____ Main hatch: no leaks, slides freely, hatch boards fit OK.
13. _____ Cabin windows hose tested for leaks.
14. _____ Anchor drains OK, no leaks.
15. _____ Stove operates OK; check tank, fuel line, burner, and Oven.

**2.2.3 RIGGING AND HARDWARE:**

1. _____ Mast stepped.
2. _____ Pin, tape, and tune standing rigging.
3. _____ Blocks, cars, boom vang, cleats rigged OK.
4. _____ Test all winches, winch handles present.

**2.2.4 ENGINE:**

1. _____ No leaks: shaft, rudder, stuffing box, or shaft log.
2. _____ With coupling disconnected, engine and shaft alignment OK. Recheck alignment after rigging tuned.
3. _____ Shaft, dimpled for set bolts at coupling; bolts wired and coupling secured.
4. _____ With fuel tanks full, no leaks at fill pipes, overflow vent, or any fuel line connections.
5. _____ Transmission oil level OK.
6. _____ Crank case oil level OK.
7. _____ Check fresh water/coolant level OK.
8. _____ Fuel valves open, bleed and prime lines for diesel engine.
9. _____ Check that shaft is coupled and aligned to 0.003" maximum tolerance.
10. _____ Engine wires OK, connections tight.
11. _____ Throttle control cable travel and brackets OK.
12. _____ Transmission control cable travel and brackets OK>
13. _____ Start engine.
14. _____ Exhaust water flow OK.
15. _____ No leaks in fuel lines at fittings, fuel filter, fuel pump, or injectors.
16. _____ No engine or oil leaks.
17. _____ Idling speed set _____ R.P.M.'s.
18. _____ Check shutoff cable for diesel engine.
19. _____ Check forward and reverse shifting.
20. _____ Check engine instruments for operation, tachometer for calibration.
21. _____ Run in gear for ten (10) minutes.
22. _____ Recheck packing gland after engine stops.
23. _____ Bilge blower and vent system OK.
24. _____ Exhaust system, check for leaks, insulation in place.

## 2.3 OPERATION CHECK LIST:

1. _____ Pedestal steering operation OK, compass OK.
2. _____ Sails and halyards OK.
3. _____ Boat performance under power and sail OK.

## 2.4 FINAL CHECK:

1. _____ All accessory equipment operates OK.
2. _____ All boat, engine, and accessory literature and/or manuals aboard.
3. _____ Warranty cards completed and mailed, owner registration card attached, owner informed of warranty responsibilities.
4. _____ Engine warranty card completed and mailed.

## 3.0 MAINTENANCE GUIDE:

### 3.1 PRE-USE MAINTENANCE:

**RIGGING:**

1. _____ Inspect turnbuckles, tighten as required; inspect safety wires.
2. _____ Inspect clevis and cotter pins.
3. _____ Visually inspect spreader tips and other areas where sails my chafe during sailing, replace tape as necessary.
4. _____ Halyards free and not tangled.
5. _____ Inspect mast hardware attachment bolts, tighten as required.

**HULL AND DECK INSPECTION:**

1. _____ Bilge and compartments are dry.
2. _____ Through hull valves, hoses, and clamps OK.
3. _____ Check running lights.

**ENGINE:**

1. _____ Check engine oil and fuel levels.
2. _____ Packing gland OK, cooling water intake valve opens and closes OK.
3. _____ Throttle shift OK.

### 3.2 MONTHLY MAINTENANCE:

**RIGGING:**

1. _____ Inspect chain plates, fastening, and bolts, tighten as necessary.
2. _____ Inspect blocks, shackles, and cotter pins.
3. _____ Check rigging tune and wire condition.
4. _____ Check turnbuckles and locking pins.

**HULL AND DECK:**

1. _____ Check cockpit drains, clear debris.
2. _____ Inspect hull valves making sure they open and close freely.
3. _____ Winches turn freely, lubricate per manufacturer's recommendations.
4. _____ Clean and oil exterior teak as necessary.

**ENGINE:**

1. _____ Check oil and fluid levels.
2. _____ Battery: Check fluid levels and tie downs.
3. _____ Tighten all bolts and nuts to proper torque.
4. _____ Check fuel tank fittings and hose clamps.
5. _____ Disassemble and inspect cooling system anti-siphon valve.

## 3.3 SEASONAL MAINTENANCE:

### RIGGING:

1. _____ Mast head pins and sheaves turn freely.
2. _____ Halyards and shackles are in good condition.
3. _____ Spreader tips and bases, and mast fittings OK.
4. _____ All shroud terminations and swaged fittings OK, check for cracks or corrosion.
5. _____ Gooseneck assembly and boom assembly OK.

### HULL, DECK, AND CABIN:

1. _____ All chain plates and through bolts tight.
2. _____ Disassemble winches and lubricate bearings and pawls.
3. _____ Inspect and coat electrical system connections, battery hold downs, and terminal connectors to prevent corrosion.
4. _____ Drain and flush fresh water system.
5. _____ Check deck hardware for leaks; remove and reseal/re-bed as required.
6. _____ Check head and anti-siphon valve in toilet.
7. _____ Hatch gaskets and hold down fasteners OK.
8. _____ Bottom, keel, and rudder condition of anti-fouling paint OK.
9. _____ Lifelines, stanchions, and pelican hooks OK.

### ENGINE:

1. _____ Check shaft alignment, repack stuffing box if necessary.
2. _____ Clean motor thoroughly.
3. _____ Inspect fuel system.
4. _____ Tune engine as per manufacturer's recommendations.

## 3.4 FIBERGLASS MAINTENANCE AND REPAIR:

One of the major benefits of a fiberglass boat is the elimination of maintenance chores required by other materials. Relatively easy maintenance rules to follow to keep your boat looking like new:

1. Each year clean and wax the exterior of the boat.

2. Touch up and patch scratches, scars, and small breaks.

3. Repair any major breaks as soon as possible to avoid additional damage to the hull or deck.

Most fiberglass boats are manufactured of two "layers" of material, permanently bonded together by a chemical reaction. A colored gel coat forms the outside surface. This is a special resin material containing concentrated color. It provides a smooth, finished surface.

The second "layer" is made up of polyester resin reinforced with laminations of fiberglass mat, cloth, or woven roving. Both the gel coat and polyester resin are

"cured" by a chemical catalyst that causes them to form a hard, strong mass that is highly resistant to impact and damage.

After sailing, a good hosing down with fresh water and a mild detergent will keep you boat sparkling fresh and clean. The non-skid surfaces may need to be scrubbed with soap. Smooth glass areas may be polished with liquid wax or any good fiberglass wax to add extra luster. In the case of older boats, where some fading of the gel coat has occurred, the surface should be buffed with polishing compound and then wax finished.

When buffing the boat to restore in finish, care should be taken not to cut through the gel coat surface. This is especially true on corner and edges of the hull. A power buffer may be used, or the work may be done by hand, using a lightly abrasive rubbing compound such as Mirro Glaze No. 1 for power buffers, or Dupont No. 7 for hand buffing. Any high quality paste wax may be used after buffing.

### 3.4.1 GEL COAT MAINTENANCE:

Exposure to sunlight, water, dust, and chemicals can be detrimental to the gel coat surface causing chalking, discoloration, yellowing, or loss of gloss. Simple periodic maintenance procedures will minimize these changes.

When not in use, keep the gel coat surface out of the sun or covered with canvas. DO NOT use sheet plastic or other non-porous materials that can trap moisture between the cover and the surface. Was the surface with a mild detergent. For best results, use a cleaner recommended for fiberglass and follow label instructions.

DO NOT use automatic dishwasher detergent, abrasives, bleaches, strong chemicals with acid bases, or ammonia. Wax at least twice yearly to restore gloss and protect the finish. Use only wax recommended for fiberglass and follow instructions carefully. NEVER wax a gel coat surface in direct sunlight.

A fine rubbing compound as well as a mild detergent will reduce the weathering and chalking accumulated on the surface. Use only a fine grit compound and follow label directions carefully. For best results, wax after compounding. DO NOT apply rubbing compound in direct sunlight.

Most scratches and nicks will be removed by using a rubbing compound followed by waxing as described above. Deep marks or gouges should be professionally repaired.

Most stains will be removed by washing with a mild detergent. For stubborn stains, use a fine abrasive household cleaner designed for fiberglass products, followed by waxing to restore original luster.

Non-soluble water stains, such as grease and oil, rubber heal marks, etc., can be removed by using a solvent such as acetone, rubbing alcohol, toluene or xylene, followed by a mild detergent. If these solvents are not effective, try a rubbing compound of fine sanding followed by a rubbing compound and then waxing.

### 3.4.2 FIBERGLASS TOUGH-UP AND REPAIRS:

**Scratches, Shallow Nicks, Gouges, Small Holes**
**(That do not penetrate through the hull)**

These repairs are easy because only the surface of the boat is damaged. They fall into two categories: (1) damage to the gel coat colored outer surface, and (2) holes or gouges that are deep enough to penetrate the fiberglass reinforced area of the boat. The repair operations are similar.

For damage to the gel coat surface, you will need a small can of gel coat, of the same color as your boat, and a small amount of catalyst. For deeper holes or gouges (1/8" or more) you will also need some short strands of fiberglass that can be trimmed from fiberglass mat or purchased in the form of "milled fibers." These materials can be purchased from your dealer.

1. Be sure the area around the damage is wiped clean and dry. Remove any wax or oil from the inside of the hole or scratch.

2. Using a power drill with a burr attachment, roughen the bottom and sides of the damaged area and feather the edge surrounding the scratch or gouge. Do not "undercut" this edge. (If the scratch or hole is shallow and penetrates only the color gel coat, skip to step No. 8)

3. On a piece of cardboard or other non-metallic material, pour a small amount of gel coat . . . just enough to fill the area being worked on. Mix an equal amount of milled fibers with this gel coat, using a putty knife or small flat stick. Then add two drops of catalyst, using an eyedropper for accurate measurement. For a half-dollar-size pile of gel coat, this amount of catalyst will give you 15 to 20 minutes working time before it begins to "gel." Carefully cut the catalyst into the gel coat and mix thoroughly.

4. Work this mixture of gel coat, fibers, and catalyst into the damaged area, using the sharp point of a putty knife or knife blade to press it into the bottom of the hole and to puncture any air bubbles that may occur. Fill the scratch or hole above the surrounding undamaged area about 1/16".

5. Lay a piece of cellophane or waxed paper over the repair to cut off the air and start the "cure."

6. After 10 to 15 minutes the patch will be partially cured. When it feels rubbery to the touch, remove the cellophane and trim flush with the surface, using a sharp razor blade or knife. Replace the cellophane and allow it to cure completely (30 minutes to an hour). The patch will shrink slightly below the surface as it cures.

7. Again use the electric drill with burr attachment to rough up the bottom and edges of the hole. Feather hole into surrounding gel coat, do not undercut.

8. Pour out a small amount of gel coat into a jar lid or on cardboard. Add a drop or two of catalyst and mix thoroughly, using a cutting motion rather than stirring. Use no fibers.

9. Using your fingertip or the tip of a putty knife, fill the hole about 1/16" above the surrounding surface with the gel coat mixture.

10. Lay a piece of cellophane over the patch to start the curing process. Repeat Step 6, trimming patch when partially cured.

11. Immediately after trimming, place another small amount of gel coat on one edge of the patch and cover with cellophane. Then, using a rubber squeegee or back of a razor blade, squeegee level with area surrounding the patch. Leave cellophane on patch for 1 to 2 hours, or overnight, for complete cure.

12. Using a sanding block, sand the patched area with 600 grit WET sandpaper. Finish by rubbing or buffing with a fine rubbing compound. Some slight color difference may be observed. Weathering will blend touch-up, if properly applied.

## 3.5 BOTTOM PAINTING AND PREPARATION:

Anti-fouling paint should be applied to the bottom of your Catalina if it is to be kept in either fresh or salt water for any length of time. There are many brands available. Anti-fouling paint prevents the growth of algae, barnacles, and other fouling organisms on underwater surfaces.

Catalina models are manufactured with an integrally molded blister protection system in the hull laminate. This water absorption barrier material is between the gel coat surface layer and the laminates of the hull.

The bottom may be prepared for painting using conventional dewaxing solvents, then sanding the gel coat surface or using a chemical etching type primer. The keel has been painted using epoxy primer, filler-fairing compound and finished with epoxy paint. This material is a suitable substrate for most anti-fouling systems, however a "test patch" of the intended anti-fouling paint should be tried on a small area to insure compatibility before coating the entire keel area.

## 3.6 TEAK MAINTENANCE:

### WOOD TRIM AND PARTS:

The hatch boards are teak and can be kept looking good by occasional oiling with teak oil.

Should the teak become weathered, cleaning and bleaching with a commercially available teak cleaner and bleach will restore the color of the wood. Then oil the wood with a good grade teak oil to restore the golden color of the teak. Do not use wire or hard bristle brushes on the wood, as this will remove the softer wood between the annual rings and leave a rough surface.

Teak may also be varnished with good results if the proper preparation is done. Consult your boatyard or dealer for a recommendation of a varnish suited to your climate.

## 3.7 SPAR AND RIGGING MAINTENANCE:

### STANDING RIGGING:

Your boat is equipped with stainless steel standing rigging and Dacron running rigging to give you years of trouble-free service. However, due to normal wear and tear, it is recommended that a periodic inspection be made on all fittings and wire. Turnbuckles should never be neglected and should be unscrewed from time to time to prevent seizing . . . every three months should be about right for the average sailor. A slightly bent turnbuckle shaft or broken wire in your shrouds should be replaced immediately.

Under most conditions, 1 X 19 standing rigging has a safe "working" lifespan of approximately five years: seven years under ideal conditions. Factors that reduce the life of the wire are environmental factors such as high humidity (Florida, the Caribbean, and Gulf States), high salinity (Great Lakes, Gulf States) or mooring near a sea wall with constant salt spray, extremes in temperature, and industrial pollution (pulp mills, generating plants, acid rains, and smog). High loading of the rigging, as required in most racing boats, also induces stress in the rigging system. Many of us have to deal with at least one of these conditions and should consider replacing standing rigging at the five-year limit.

Unlike running rigging wire rope, that gives clear signs that it is deteriorating by broken strands and "meat hooks," standing rigging may give no sign that failure is imminent. The usual point of failure for stays or shrouds is approximately ¼" inside the bottom swage threaded stud fitting that threads into the turnbuckle barrel.

Although the stud is compressed around the wire during the swaging process, salt water and pollutants work down into the tiny cavities between the wire strands.

The inevitable corrosive process starts in the crevice the first time the rigging becomes wet with salt water. A common method of visually monitoring swage-fitting condition, employed by distance racers and cruisers, is to dab a small ring of enamel paint around the joint between the wire and the swage fitting. This will help provide a means to see if the wire is pulling out of the fitting. Another technique used to check the condition of swage fittings is a "dye penetrant" test. This simple test detects any cracks that may develop in the fittings due to internal pressure from the corrosive process. Inexpensive dye tests kits are usually available at most welding supply stores. Dye tests are not usually required by weekend sailors, buy may be done before and extended cruise or ocean passage if any doubt about the integrity of the rigging exists.

All stainless steel wire rope rigging will develop some rust film when new. This is normal rust caused by two factors. When wire rope is manufactured, the wire strands are fed over steel rollers during the process of twisting or laying the wire. Trace amounts of the ferrous metal from the rollers and dyes are transferred to the wire strands. As this small amount of steel rusts it causes a film on the new wire. The second cause for the film is the presence of microscopic veins of ferrous material that exist in all stainless steel. After a period of time, as the surface material veins are depleted, and the stainless steel has been cleaned several times, new rust film development will slow to a minimum.

For the average sailor, the best insurance against a rigging failure is a periodic (every six months is recommended) inspection of all rigging parts, including turnbuckles, and replacement of standing rigging as required.

**IMPORTANT:**
If any wear or sign of broken strands is found on the running or standing rigging, it is time to replace that part. Using your boat when the rigging is worn could cause the rigging to fail when you least expect it.

**FITTINGS:**

Marine fittings today need little maintenance. Deck hardware should be hosed down with fresh water after each sail in salt water. Stainless steel fittings such as pulpits and lifeline stanchions should be cleaned and waxed periodically to maintain their appearance. Winches require occasional cleaning and lubrication. Where possible, a maintenance brochure for your winches has been included with this manual. Masthead fittings, halyard sheaves, etc., should be inspected, cleaned, and lubricated periodically. Keep your equipment clean of dirt and salt.

**SPARS:**

Like all other boat fittings, mast and booms suffer from salt water, air, and spray. These should be kept waxed, where possible and, at least, always hosed down with fresh water. Always see that the halyards are tied off, away from the mast. This will eliminate slapping in the wind and subsequent marking of the mast.

Find a high-pressure nozzle and shoot fresh water to the top of the mast and spreaders. This will help keep your sails clean, too, as they rub on the mast and spreaders.

Inspect spreaders and spreader brackets for signs of fatigue. See that ends of spreaders are wired and well covered with tape to prevent wear on the sails.

## 3.8 SAIL MAINTENANCE:

Your sails should be protected from chafing by padding the areas that touch the sail.

You should check your sails frequently for any signs of wear and have any tears or frayed stitches repaired immediately.

Sails should never be stored in the sun because they are susceptible to decay caused by exposure to too much ultraviolet light. Always keep your sails covered when they are not in use.

Sails should never be put away wet. If they are wet after sailing, leave them in loose bundles and dry them at your first opportunity.

For most problems such as common dirt, dried or caked salt, etc., try scrubbing the surface with a soft bristled brush and liquid detergent. Avoid harsh powder detergents and stiff brushes, as they may damage the finish or stitching. This approach should work nicely for most applications. More severe stains can be taken care of by the following:

**IMPORTANT: FOR WHITE DACRON SAILS ONLY.**

**Blood:** Soak the stained portion for 10 to 20 minutes in a solution of bleach (Clorox) and warm water: generally 10 parts water to 1 part bleach. Scrub and repeat, if necessary. Rinse thoroughly, particularly nylon, and dry completely.

**Oil, Grease, Tar, and Wax:** Warm water, soap, and elbow grease seem to be effective. On hard stains, propriety stain remover and dry cleaning fluids should do the trick. Be careful to remove all fluids, as they can soften the various resinated coatings on sailcloth.

**Rust and Metallic Stains:** These types of stains are very often the most frustrating and difficult to remove. First, scrub with soap and water, and then apply acetone, M.E.K., or alcohol. As a last resort, try soaking in a diluted mixture (5%) of oxalic acid for 15 to20 minutes. Hydrochloric acid, 2 parts to 100 in warm water, will also work.

**Mildew:** Hot, soapy water with a little bleach will generally prevail. After scrubbing, leave the solution on the fabric for a few minutes and rinse thoroughly. When using bleach, a residual chlorine smell may be present after rinsing. A 1% solution of Thiosulphate (photographer's Hypo) should remove all chlorine traces. Here, again, rinse and dry well.

**Paint and Varnish:** Acetone and M.E.K. should remove most common paint and stains. Varnish can be easily removed with alcohol.

Temperkote or Mylar sails are still new and developmental. At this point in time, avoid most solvents, as they may damage the fabric over a period of time. Soap and diluted bleaches should take care of most stains.

Generally speaking, use all solvents with care. Always rinse and dry sails thoroughly. It should be emphasized that nylon ripstop spinnaker fabrics are less durable and more sensitive than their polyester counterparts. Bleaches and solvents can ruin nylon if not used properly.

Follow the above guidelines, take your sails into your sail maker for periodical inspection, and you will have many effective seasons of racing and cruising pleasure.

## 3.9 INTERIOR CUSHION FABRIC COVER CLEANING:

1. Regular vacuum cleaning or brushing in the direction of the pile with a soft brush.
2. Stains should, if possible, be removed at once with a damp cloth. Do not allow stains to harden and age.
3. Greasy stains can be removed with ordinary cleaning fluid.
4. For overall cleaning, use commercial types of upholstery shampoo, using only the foam to protect the back padding from moisture. After a minute or so, remove foam and, when dry, vacuum or brush in the direction of the pile.
5. Do not use heat such as an iron or steam.
6. The use of some kind of fabric protector such as "Scotch Guard" is strongly recommended when the cushions are new, and after each cleaning.

## 3.10 CURTAIN CLEANING:

When curtains become soiled, hand wash only and air dry. Do not dry clean or place in a dryer.

## 3.11 WINDOW CLEANING:

Do not use cleaners containing ammonia to clean plastic windows as they may cause damage.

## 3.12 PORT AND HATCH MAINTENANCE:

See Lewmar ***User Notes*** enclosure (1 page).

## 3.13 THRU-HULLS / SEAVALVES MAINTENANCE:

See Forespar ***Maintenance of Marelon® Thru-Hulls / Seacocks*** enclosure (2 pages).

# 4.0 YACHT SYSTEMS

## 4.1 RIGGING:

### 4.1.1 STEPPING THE MAST:

**CAUTION:** The aluminum and other metal parts conduct electricity. Coming into contact with or near an electrical power line or lightning can cause severe injury or death. Stay away from overhead electrical power lines when sailing and/or launching the boat.

1. Before stepping the mast check all standing rigging lengths against the appropriate checklist on Pages 19 (standard) and 20 (furling).

2. Check all mast light wiring, be sure the masthead anchor light, steaming light, and deck light function. The wires exiting at the base of the spar should be taped up to prevent damage when the spar is set on the step.

3. Prepare to step the mast in the following sequence:

    a. Check all rigging lengths and inspect all end fittings.
    b. Attach all shrouds, forestay, and backstay. Tape clevis pins and spreader tips, check all halyards and secure them to the mast.
    c. Check mast wiring and mast light wiring at mast step.
    d. Before mast contacts mast step casting, make electrical connections at base of mast for mast lights and check circuits.
    e. Raise mast.

### 4.1.2 TUNING THE MAST:

To optimize performance and minimize the chance of mast failure, your mast should be tuned properly. The aims of rig tuning are as follow:

A. Ensure a straight mast athwartships.
B. Control sail shape.
C. Achieve proper helm balance in a variety of conditions.
D. Spread loads appropriately on spars, rigging, and boat.

1. First, set mast rake at 0 degree rake to ensure proper performance of the spreaders in conjunction with the shrouds. Increasing the rake of the mast allows the spreaders to fall aft of the chainplates, which neutralizes their proper function. To determine the rake of the mast hang a weight from the main halyard and adjust the headstay turnbuckle so that the weight falls just to the aft edge of the mast. Make sure that the boat is level and that there is no bend in the mast.

2. Since the boat is deck stepped, you need to induce prebend to achieve the greatest performance for your rig and sails. Inducing prebend in the

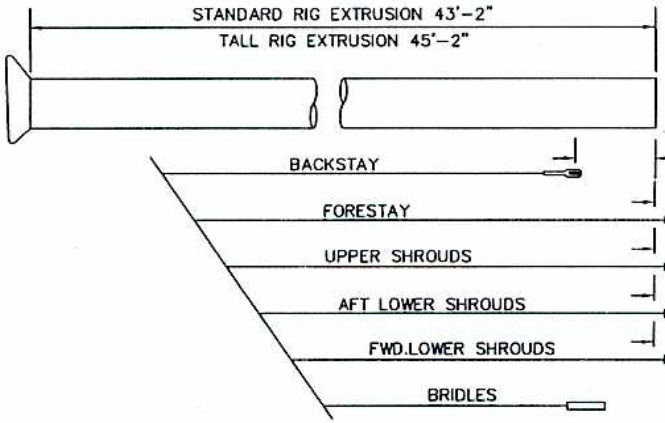
mast will increase performance of your mainsail and stabilize the middle part of the mast and thus minimize rig pump in a seaway. Before tightening your lowers, induce prebend by putting a good amount of backstay, which should pull the mast forward. To also aid in this process you can attach your main halyard to the end of your boom and cleat off the halyard so that the boom is resting parallel to the water. You can then put tension onto your boom vang to help push the mast forward in its mid section. With the combination of both backstay and vang tension you should be able to achieve the proper amount of prebend in your mast. As you tighten the lower shrouds the degree of prebend can be taken out accordingly.

3. For shroud adjustment make sure that there is enough backstay to give a slight aft bend in the mast. Next the shrouds should be adjusted. Tighten your shrouds and ensure that the mast is in column by taking your main halyard and checking that the distance from the masthead to each chainplate is equidistant. As you tighten the lower shrouds a slight amount of prebend will be taken out of the mast. Check for mast straightness by sighting up the sail track and adjust the shroud turnbuckles accordingly. Slightly ease the tension in the backstay to double check that you are happy with the fore, aft, and sideways bend of the mast (there should be of course none of the latter.)

4. The shrouds should be fine tuned while sailing to weather in a moderate breeze. Always adjust the shrouds starting from the lowers and progressing up and be sure to check for mast straightness on both tacks. Check the leeward rigging tensions as follows:

   a. Lower shrouds fairly tight with a slight decrease in tension.
   b. Continue tacking to ensure equal tension on all leeward shrouds on both tacks.
   c. Back at the dock, check that the mast is still straight athwartships.

# CHECK OVERHANG LENGTHS BEFORE STEPPING




| STANDARD | TALL | TOP FITTING | BOTTOM FITTING |
|---|---|---|---|
| 10' - 8 1/2" | 11'-3" | EYE 5/8" PIN | FORK 5/8" PIN |
| 1'-0" | 1'-3 1/4" | EYE 5/8" PIN | 5/8" STUD |
| 0'-9 1/4" | 0'-9 1/4" | EYE 1/2" PIN | 1/2" STUD |
| 1'-0" | 0'-11 1/2" | EYE 1/2" PIN | 1/2" STUD |
| 0'-8 3/4" | 0'-8" | EYE 1/2" PIN | 1/2" STUD |
| | | FORK | 3/8" STUD |

## RUNNING RIGGING

| DESCRIPTION | MATERIAL | LENGTH | QTY. |
|---|---|---|---|
| TOPPING LIFT TAIL | 5/16" DACRON Y.B. | 100' 0" | 1 |
| REEFING LINE (1st Reef Std.) | 3/8" DACRON Y.B. | 60' 0" | 1 |
| GENOA SHEET (150% Genoa Option) | 7/16" DACRON Y.B. | 55' 0" | 2 |
| JIB SHEET (Std - Del w/ Genoa Opt) | 7/16" DACRON Y.B. | 40' 0" | 2 |
| TRAVELER CONTROL LINES (Garhauer) | 5/16" DACRON Y.B. | 30' 0" | 2 |
| SPINNAKER SHEET (Optional) | 7/16" DACRON Y.B. | 70' 0" | 2 |
| MAINSHEET | 7/16" DACRON Y.B. | 100' 0" | 1 |
| 2nd REEFING LINE (Optional) | 3/8" DACRON Y.B. | 80' 0" | 1 |
| * GARHAUER KIT INCLUDES BOOM VANG LINES | | | |

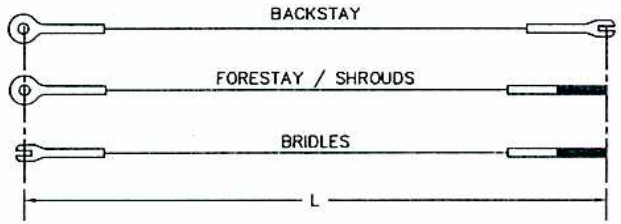
## STANDING RIGGING

| DESCRIPTION | MATERIAL | LENGTH | | QTY. |
|---|---|---|---|---|
| | | STD. | TALL | |
| BACKSTAY | 5/16" WIRE 1x19 | 32'-2 1/2" | 33'-8" | 1 |
| BACKSTAY BRIDLE** | 1/4" WIRE 1x19 | 15'-0" | 15'-0" | 2 |
| FORESTAY * | 5/16" WIRE 1x19 | 43'-11 1/4" | 46'-2 1/2" | 1 |
| UPPER SHROUDS | 5/16" WIRE 1x19 | 42'-4 1/4" | 44'-4 1/4" | 2 |
| AFT LOWER SHROUDS | 1/4" WIRE 1x19 | 22'-5 3/4" | 23'-5 1/4" | 2 |
| FWD LOWER SHROUDS | 1/4" WIRE 1x19 | 22'-2 1/2" | 23'-2" | 2 |

*For SCHAEFER furling system only **Bridle to be FORK to 3/8" STUD

## HALYARDS

| DESCRIPTION | MATERIAL | LENGTH | | QTY. |
|---|---|---|---|---|
| | | STD. | TALL | |
| MAINSAIL HALYARD | 3/8" 'ULS' LOW STRETCH | 115'-0" | 119'-0" | 1 |
| STBD. JIB HALYARD | 3/8" 'ULS' LOW STRETCH | 115'-0" | 119'-0" | 1 |
| PORT or SPINKR HALYARD | 3/8" 'ULS' LOW STRETCH | 115'-0" | 119'-0" | 1 |




NOTES: 1) TOLERANCES ±1/2"
2) MEASUREMENTS FROM CENTER OF EYE TO CENTER OF EYE OR END OF STUD

| REV.N° | DESCRIPTION | DATE |
|---|---|---|
| 14 | CORRECTED LINE MATERIALS, ADDED LENGTH DRAWING | 2/17/03 |
| 13 | TRAVELER CONTROL LINES 30', WERE LISTED AS 24' | 9/30/02 |
| 12 | STD. RIG BACKSTAY OVERHANG CORRECTED, WAS 11'-2" | 1/31/02 |
| 11 | TALL RIG BACKSTAY OVERHANG CORRECTED WAS 10' 9" | 8-28-01 |
| 10 | REMOVED FOREGUY, BOOM VANG LINES | 7-23-01 |

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SCALE: NONE | APPROVED: | DRAWN BY: DANIEL CASAL

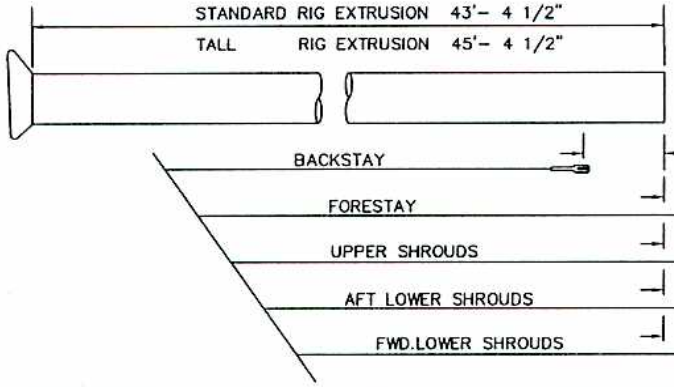
DATE: 10-15-91 | FILE: 34RIGCK.DWG

TITLE: RIGGING LENGTH

BOAT: CATALINA 34 MK II

DRAWING NUMBER: 340-34002 -14

# CHECK OVERHANG LENGTHS BEFORE STEPPING




| STANDARD | TALL | TOP FITTING | BOTTOM FITTING |
|---|---|---|---|
| 10' 2" | 10' 7 3/4" | STEMBALL EYE W/TOGGLE + EYE 5/8" PIN | FORK 5/8" PIN |
| 12 1/4" | 11 1/4" | STEMBALL EYE W/TOGGLE + EYE 5/8" PIN | 5/8" STUD |
| 11 1/4" | 9- 1/4" | STEMBALL W/ CUPEL | 1/2" STUD |
| 13" | 11" | STEMBALL W/ CUPEL + OVERSIZE CUPEL | 1/2" STUD |
| 10" | 8" | STEMBALL W/ CUPEL + OVERSIZE CUPEL | 1/2" STUD |

## RUNNING RIGGING

| DESCRIPTION | MATERIAL | LENGTH | QTY. |
|---|---|---|---|
| TOPPING LIFT TAIL | 5/16" DACRON Y.B. | 100' 0" | 1 |
| GENOA SHEET (150 % Genoa Option) | 7/16" DACRON Y.B. | 55' 0" | 2 |
| JIB SHEET (Std. -- Del w/ Genoa Opt.) | 7/16" DACRON Y.B. | 45' 0" | 2 |
| TRAVELER CONTROL LINES (Garhauer) | 5/16" DACRON Y.B. | 30' 0" | 2 |
| SPINNAKER SHEET (Spinnaker Opt.) | 7/16" DACRON Y.B. | 70' 0" | 2 |
| MAINSHEET | 7/16" DACRON Y.B. | 100' 0" | 1 |

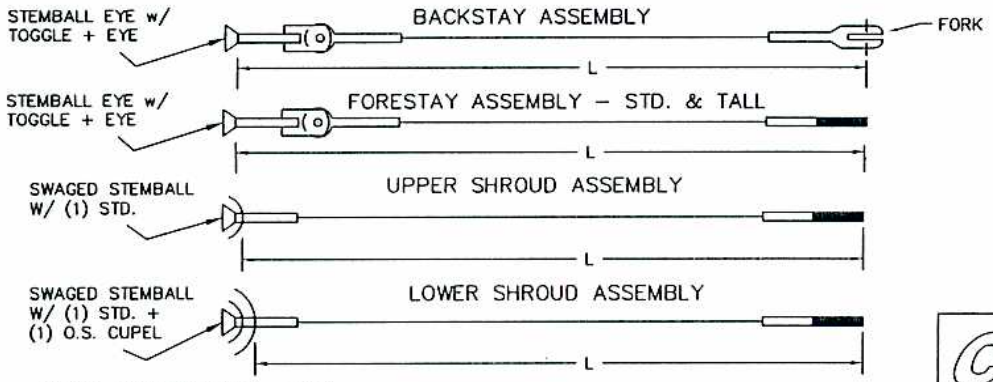
NOTE: BOOM VANG LINE SUPPLIED W/ SOLID VANG (CHARLESTON SPAR)

## STANDING RIGGING

| DESCRIPTION | MATERIAL | LENGTH | | QTY. |
|---|---|---|---|---|
| | | STD. | TALL | |
| BACKSTAY | 5/16" WIRE 1x19 | 33' - 3" | 34'-9 1/4" | 1 |
| BACKSTAY BRIDLE ** | 1/4" WIRE 1x19 | 15'-0" | 15'-0" | 2 |
| FORESTAY * | 5/16" WIRE 1x19 | 44'-2 1/8" | 46' - 7/8" | 1 |
| UPPER SHROUDS | 5/16" WIRE 1x19 | 43'- 1/4" | 44' -10 1/4" | 2 |
| AFT LOWER SHROUDS | 1/4" WIRE 1x19 | 23'-2 1/2" | 24' - 1/2" | 2 |
| FWD LOWER SHROUDS | 1/4" WIRE 1x19 | 22'-11 1/2" | 23' - 9 1/2" | 2 |

*For SCHAEFER furling system only

**Bridle to be FORK to 3/8" STUD




NOTES: 1) TOLERANCES ± 1/2"
2) MEASUREMENTS FROM CENTER OF EYE TO CENTER OF EYE OR END OF STUD

## HALYARDS

| DESCRIPTION | MATERIAL | LENGTH | | QTY. |
|---|---|---|---|---|
| | | STD. | TALL | |
| MAINSAIL HALYARD | 3/8" 'ULS' LOW STRETCH | 115'-0" | 117'-0" | 1 |
| STBD. JIB HALYARD | 3/8" 'ULS' LOW STRETCH | 115'-0" | 117'-0" | 1 |
| PORT or SPINKR HALYARD | 3/8" 'ULS' LOW STRETCH | 115'-0" | 117'-0" | 1 |

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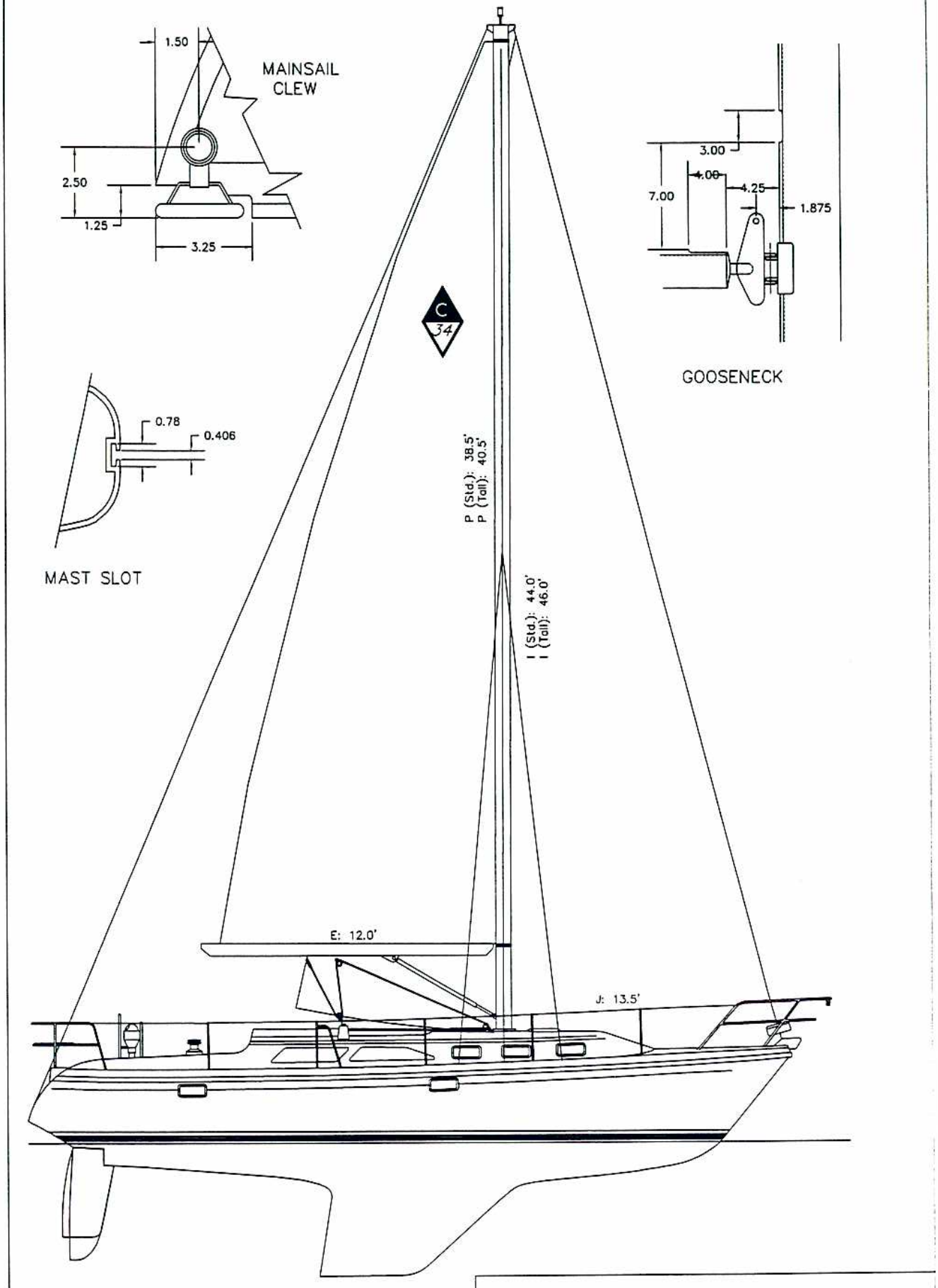
| | | |
|---|---|---|
| SCALE: NONE | APPROVED BY: | DRAWN BY E.W.S |
| DATE: 11-1-96 | FILE: 34RFRIG | REV DATE: 5.30.02 |

TITLE: RIGGING LENGTH — CHARLESTON SPARS

BOAT: CATALINA 34 II FURLING MAST ONLY

DRAWING NUMBER 340-34004-N2

| REV. | DESCRIPTION | DATE |
|---|---|---|
| NEW-2 | CORRECTED LINE MATERIALS, ADDED OPT. NOTES, DEL FOREGUY | 2/17/03 |
| NEW-1 | -2" FROM ALL SHROUDS ON TALL RIG, CHANGED OVERHANGS, BS, #1629 | 5/30/02 |
| NEW-0 | RELEASE OF NEW LENGTHS FOR FURLING MAST | 5/3/02 |


1.50
MAINSAIL
CLEW
2.50
1.25
3.25
3.00
4.00
4.25
7.00
1.875
GOOSENECK
C
34
0.78
0.406
MAST SLOT
P (Std.): 38.5'
P (Tall): 40.5'
I (Std.): 44.0'
I (Tall): 46.0'
E: 12.0'
J: 13.5'
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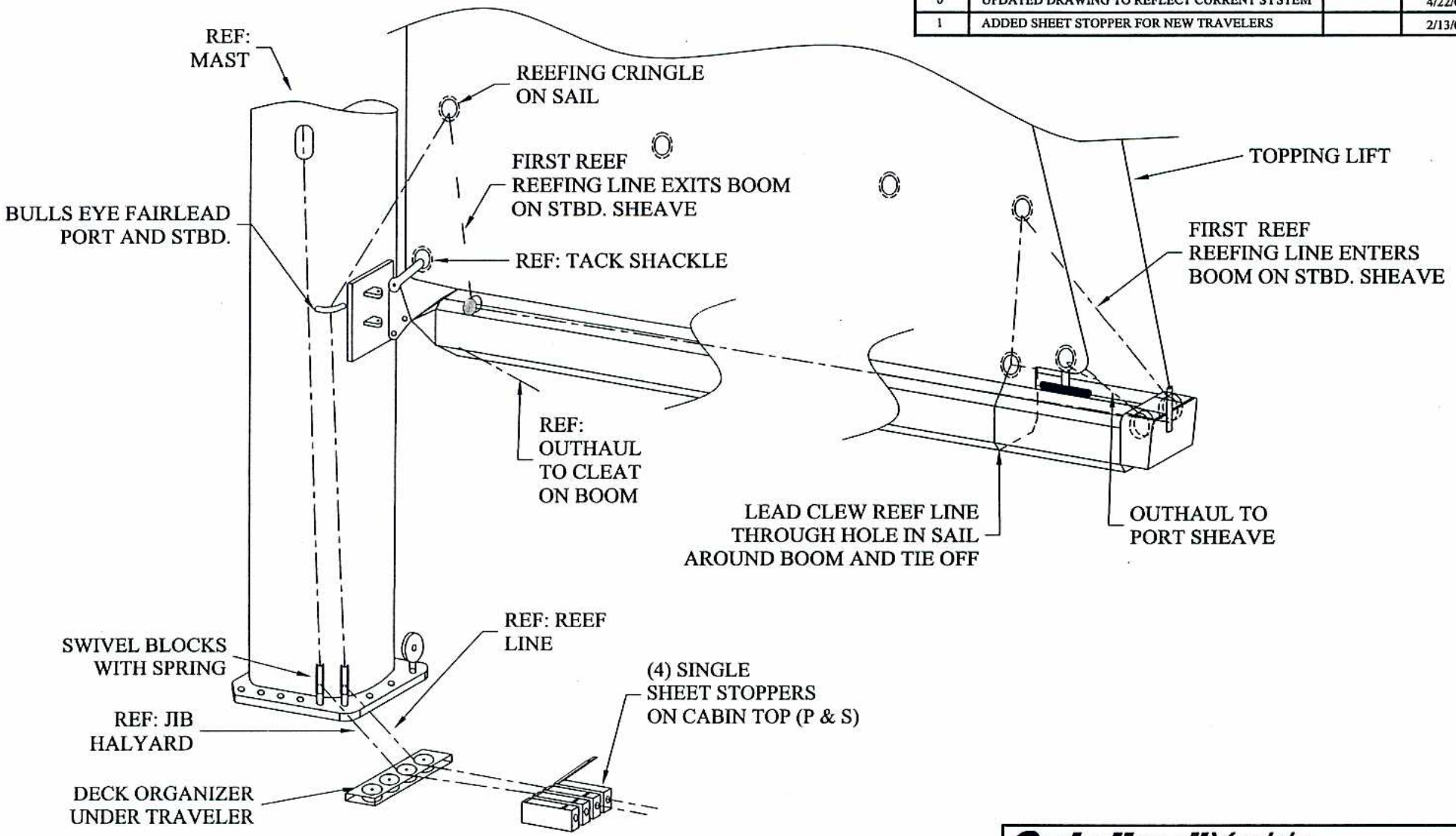
SAIL PLAN

| REV | DESCRIPTION | APPROVAL | DATE |
|---|---|---|---|
| 0 | UPDATED DRAWING TO REFLECT CURRENT SYSTEM | | 4/22/02 |
| 1 | ADDED SHEET STOPPER FOR NEW TRAVELERS | | 2/13/03 |




NOTES:
1) REEFING LINE 3/8" x 60' DACRON.
2) STD. SINGLE LINE REEF SHOWN,
OPTIONAL SECOND REEF OPPOSITE SIDE.



UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
GENERAL TOLERANCES
ANGLES : ±0.5°
X.X : ±0.1
X.XX : ±0.01
X.XXX : ±0.005
SURFACE FINISH: 63
DO NOT SCALE DRAWING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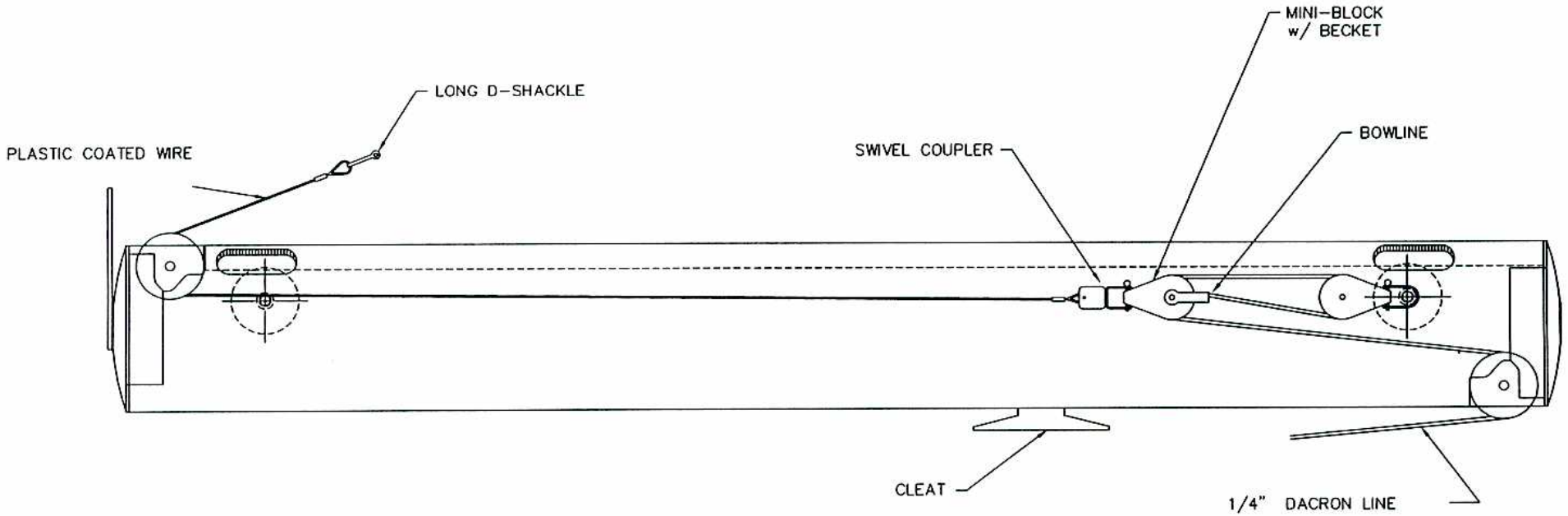
| | | |
|---|---|---|
| SCALE: NONE | APPROVED BY: | DRAWN BY: K.W.N. |
| DATE: 4/22/02 | | REVISED 2/13/03 |

# MAIN SAIL REEFING

| BOAT: | DRAWING NUMBER |
|---|---|
| CATALINA 34 MK II | 320-34005-0 |

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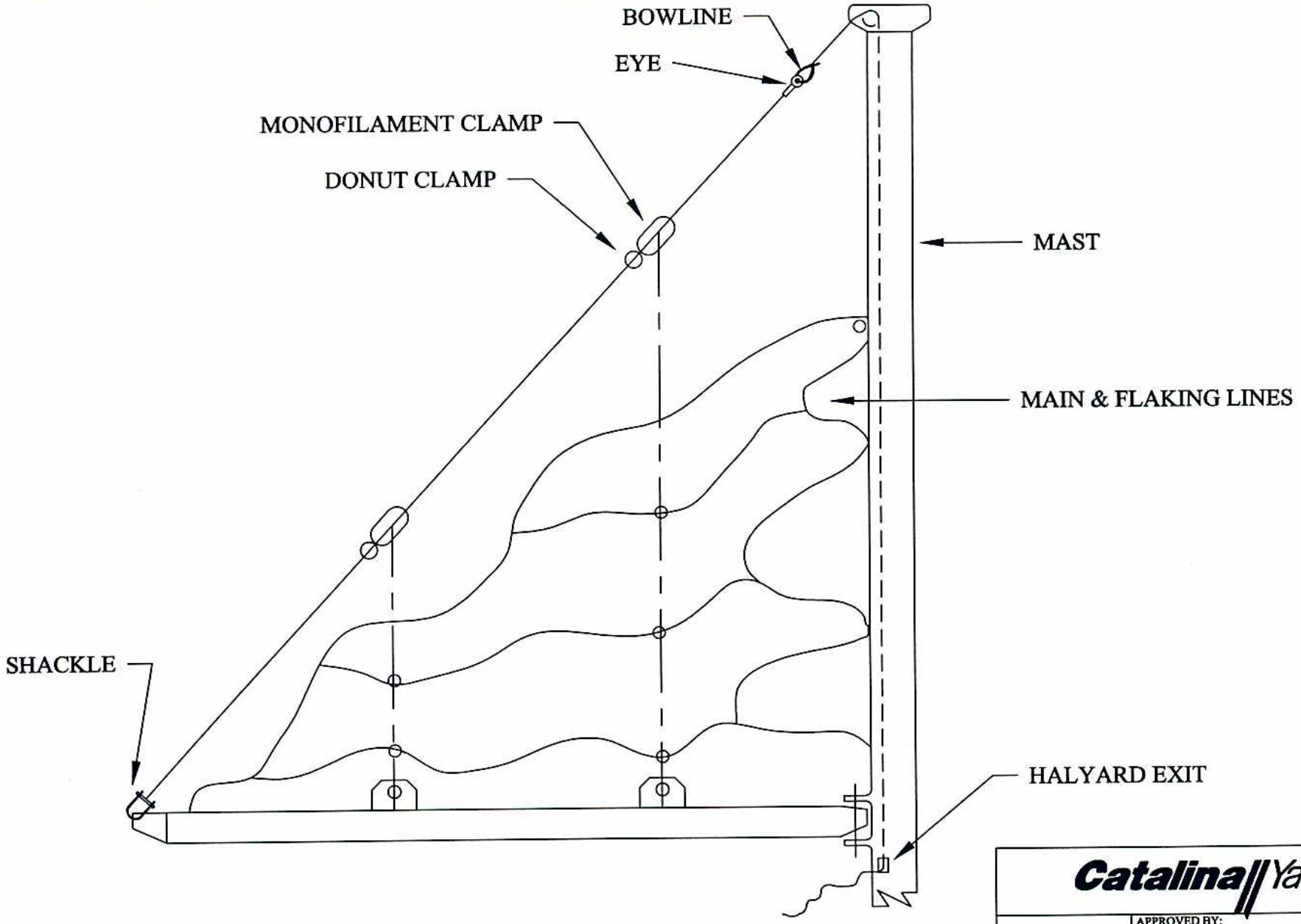
# OUTHAUL ASSEMBLY






UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

GENERAL TOLERANCES
ANGLES : ±0.5°
X.X : ±0.1
X.XX : ±0.01
X.XXX : ±0.005
SURFACE FINISH: 63
DO NOT SCALE DRAWING

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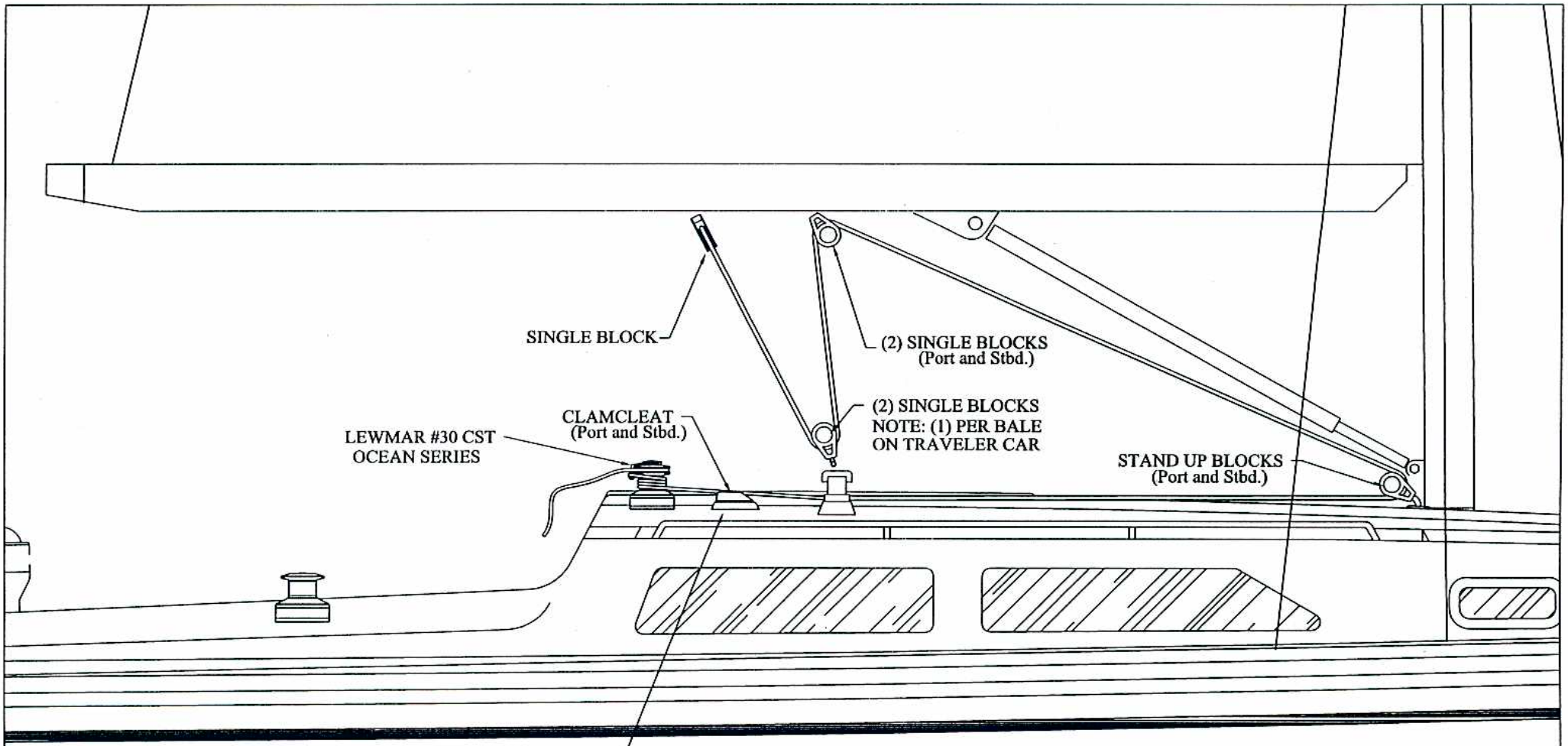
| | | |
|---|---|---|
| SCALE: NONE | APPROVED BY: | DRAWN BY E.W.S |
| DATE: 7/20/00 | | REVISED |

# TOPPING LIFT ARRGT. FOR DUTCHMAN FLAKING SYSTEM

| BOAT: | DRAWING NUMBER |
|---|---|
| CATALINA 320, 34 MKII, 42 MKII | 420-36005-2 |




NOTE: DO NOT LEAD MAINSHEET THROUGH LOCKOUT BAIL ON CAM CLEAT. THIS BAIL IS USED TO PREVENT THE MAINSHEET FROM ACCIDENTALLY ENGAGING IN CLEAT DURING NORMAL USE. USE CLEAT WHEN REEFING OR WHEN WINCH IS IN USE FOR MAIN HALYARD.

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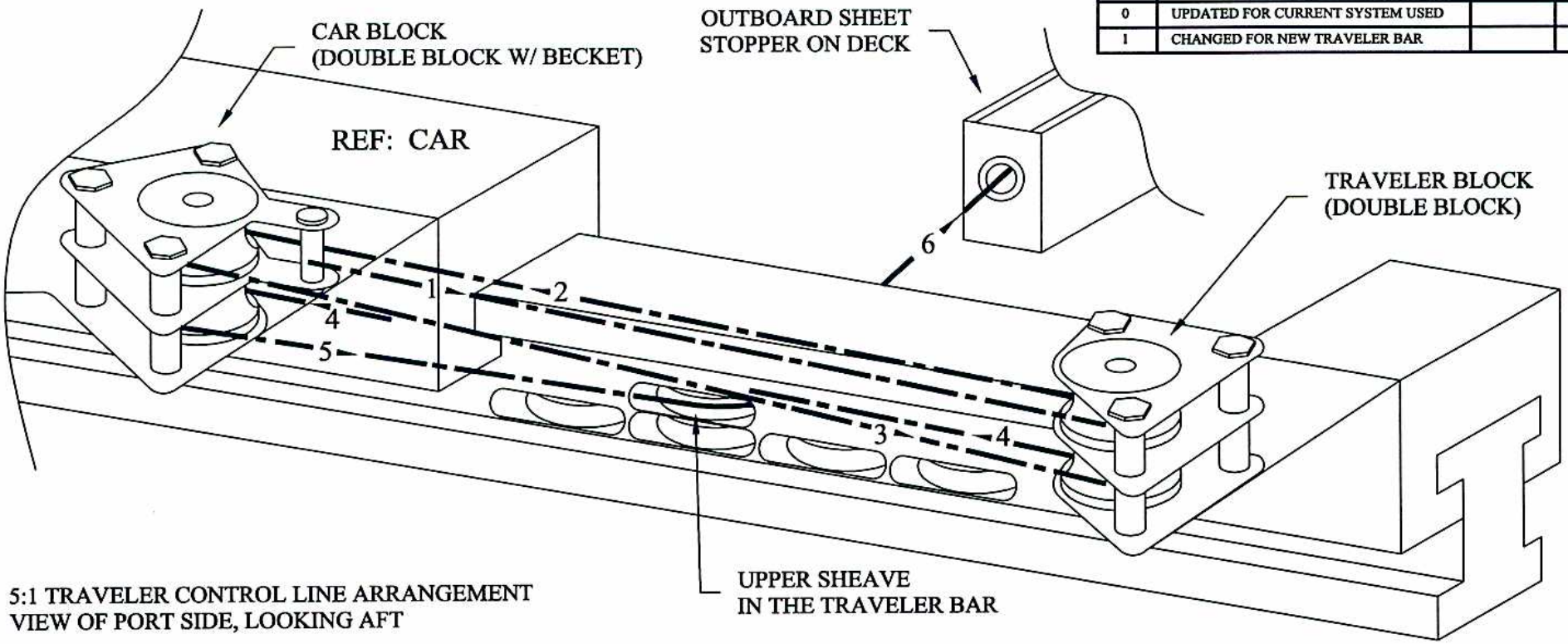
# C 34 & 36 MAINSHEET SYSTEM

| REV | DESCRIPTION | APPROVAL | DATE |
|---|---|---|---|
| 0 | UPDATED FOR CURRENT SYSTEM USED | | 4/22/02 |
| 1 | CHANGED FOR NEW TRAVELER BAR | | 9/30/02 |




5:1 TRAVELER CONTROL LINE ARRANGEMENT
VIEW OF PORT SIDE, LOOKING AFT

NOTE: ALL LINE LED THROUGH SHEAVES COUNTERCLOCKWISE ON PORT SIDE (CW ON STBD).

SEGMENT (1) LINE EYE PINNED TO CAR BLOCK & LED TO THE TOP SHEAVE ON TRAVELER BLOCK.

SEGMENT (2) LED FROM TOP SHEAVE ON TRAVELER BLOCK TO TOP SHEAVE ON CAR BLOCK.

SEGMENT (3) LED FROM TOP SHEAVE ON CAR BLOCK TO BOTTOM SHEAVE ON TRAVELER BLOCK.

SEGMENT (4) LED FROM BOTTOM SHEAVE ON TRAVELER BLOCK TO BOTTOM SHEAVE ON CAR BLOCK.

SEGMENT (5) LED FROM BOTTOM SHEAVE ON CAR BLOCK TO UPPER SHEAVE IN THE TRAVELER BAR.

SEGMENT (6) LED FORM UPPER SHEAVE IN TRAVELER BAR AFT THROUGH OUTBOARD SHEET STOPPER TO THE COCKPIT.



UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
GENERAL TOLERANCES
ANGLES : ±0.5°
X.X : ±0.1
X.XX : ±0.01
X.XXX : ±0.005
SURFACE FINISH: 63
DO NOT SCALE DRAWING

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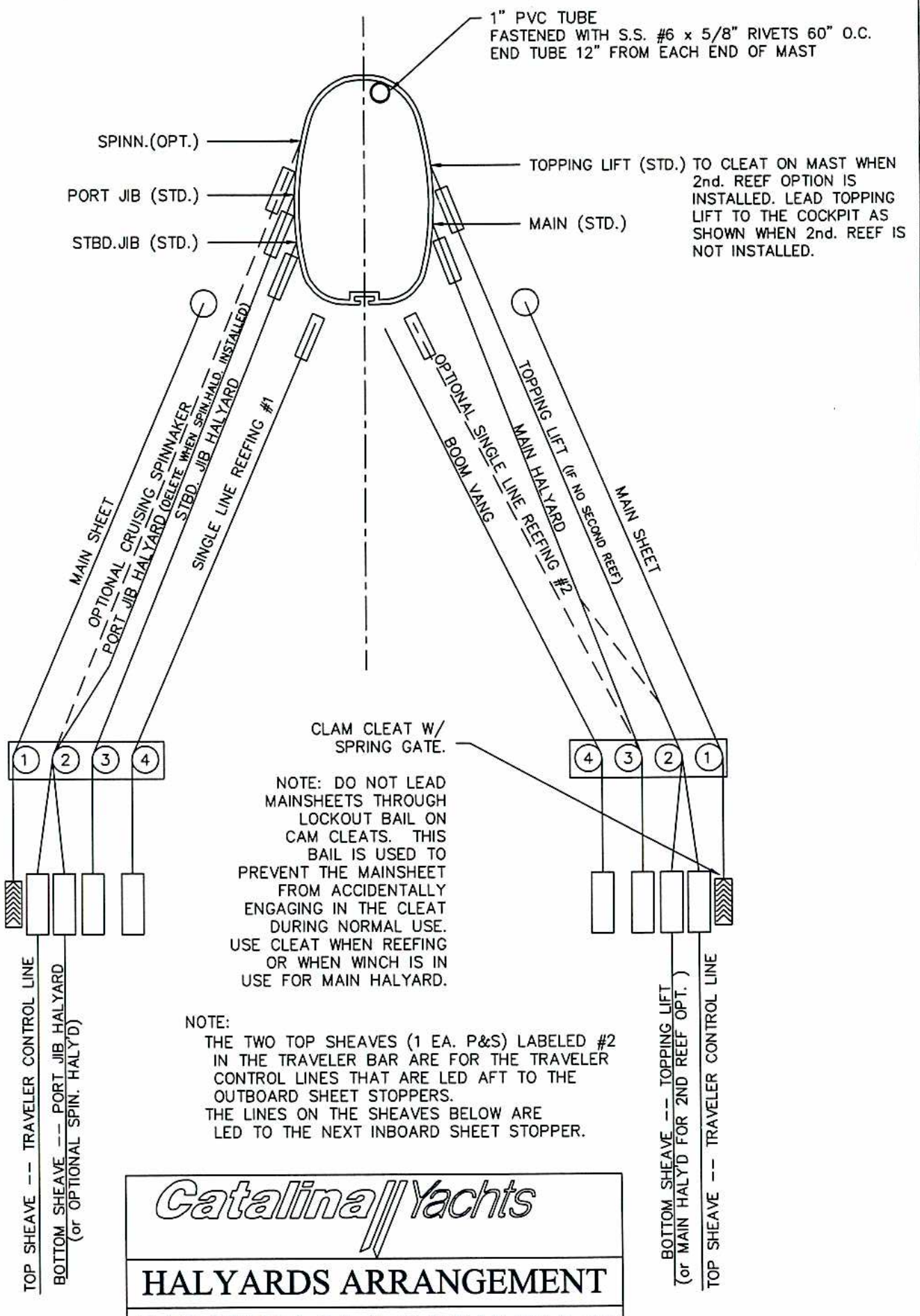
| SCALE: NONE | APPROVED BY: | DRAWN BY: K.W.N. |
|---|---|---|
| DATE: 4/22/02 | | REVISED 9/30/02 |

# TRAVELER SYSTEM

| BOAT: | DRAWING NUMBER |
|---|---|
| CATALINA 34 MK II | 340-38001-1 |

C 34 #1637 FIRST HULL W/ NEW TRAVELER ARRANGEMENT
C 36 #2144 FIRST HULL W/ NEW TRAVELER ARRANGEMENT




NOTE:
THE TWO TOP SHEAVES (1 EA. P&S) LABELED #2 IN THE TRAVELER BAR ARE FOR THE TRAVELER CONTROL LINES THAT ARE LED AFT TO THE OUTBOARD SHEET STOPPERS.
THE LINES ON THE SHEAVES BELOW ARE LED TO THE NEXT INBOARD SHEET STOPPER.

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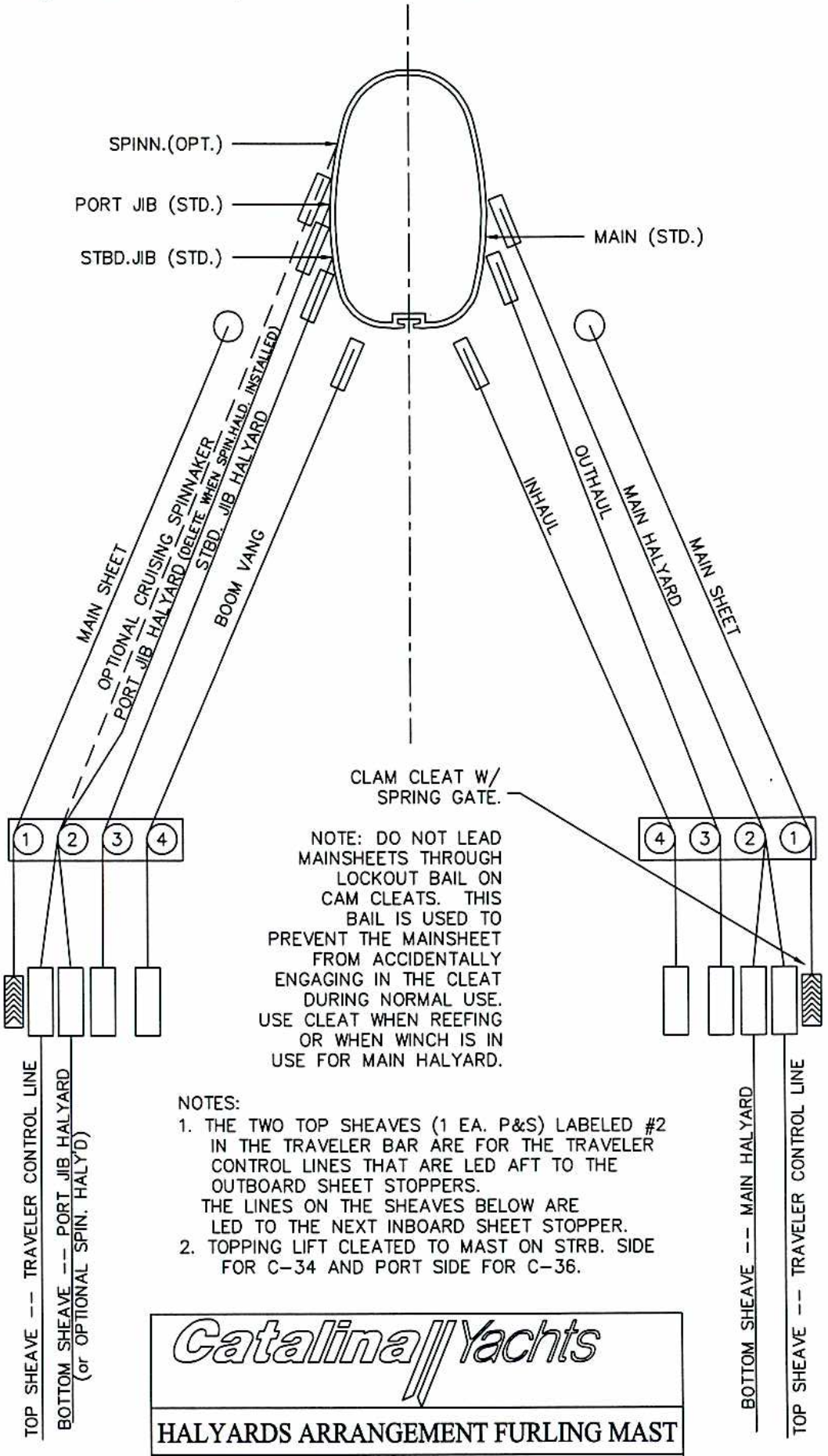
# HALYARDS ARRANGEMENT

# CATALINA 34 & CATALINA 36

C 34 #1637 FIRST HULL W/ NEW TRAVELER ARRANGEMENT
C 36 #2144 FIRST HULL W/ NEW TRAVELER ARRANGEMENT



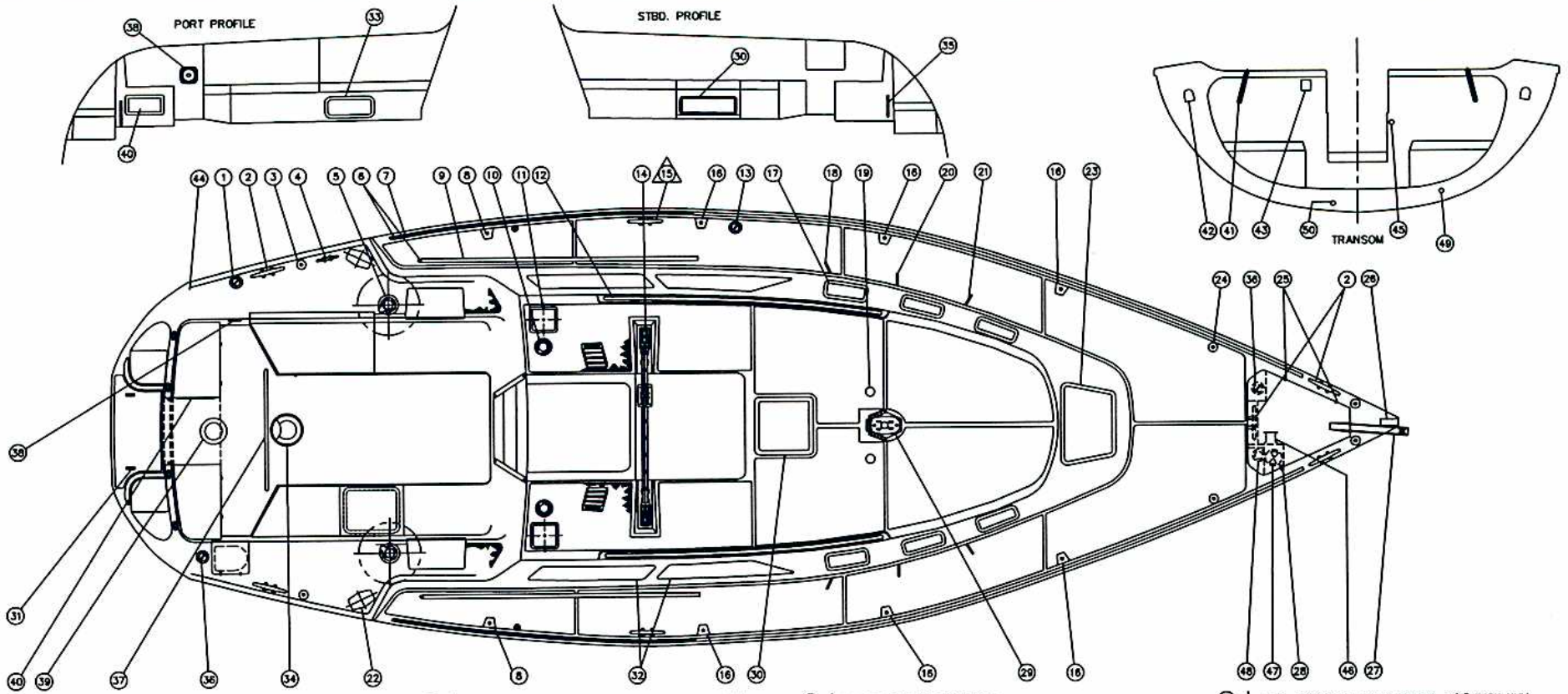

NOTE: DO NOT LEAD MAINSHEETS THROUGH LOCKOUT BAIL ON CAM CLEATS. THIS BAIL IS USED TO PREVENT THE MAINSHEET FROM ACCIDENTALLY ENGAGING IN THE CLEAT DURING NORMAL USE. USE CLEAT WHEN REEFING OR WHEN WINCH IS IN USE FOR MAIN HALYARD.

NOTES:
1. THE TWO TOP SHEAVES (1 EA. P&S) LABELED #2 IN THE TRAVELER BAR ARE FOR THE TRAVELER CONTROL LINES THAT ARE LED AFT TO THE OUTBOARD SHEET STOPPERS.
   THE LINES ON THE SHEAVES BELOW ARE LED TO THE NEXT INBOARD SHEET STOPPER.
2. TOPPING LIFT CLEATED TO MAST ON STRB. SIDE FOR C-34 AND PORT SIDE FOR C-36.

Catalina Yachts

# HALYARDS ARRANGEMENT FURLING MAST

## CATALINA 34 MK II & CATALINA 36 MK II

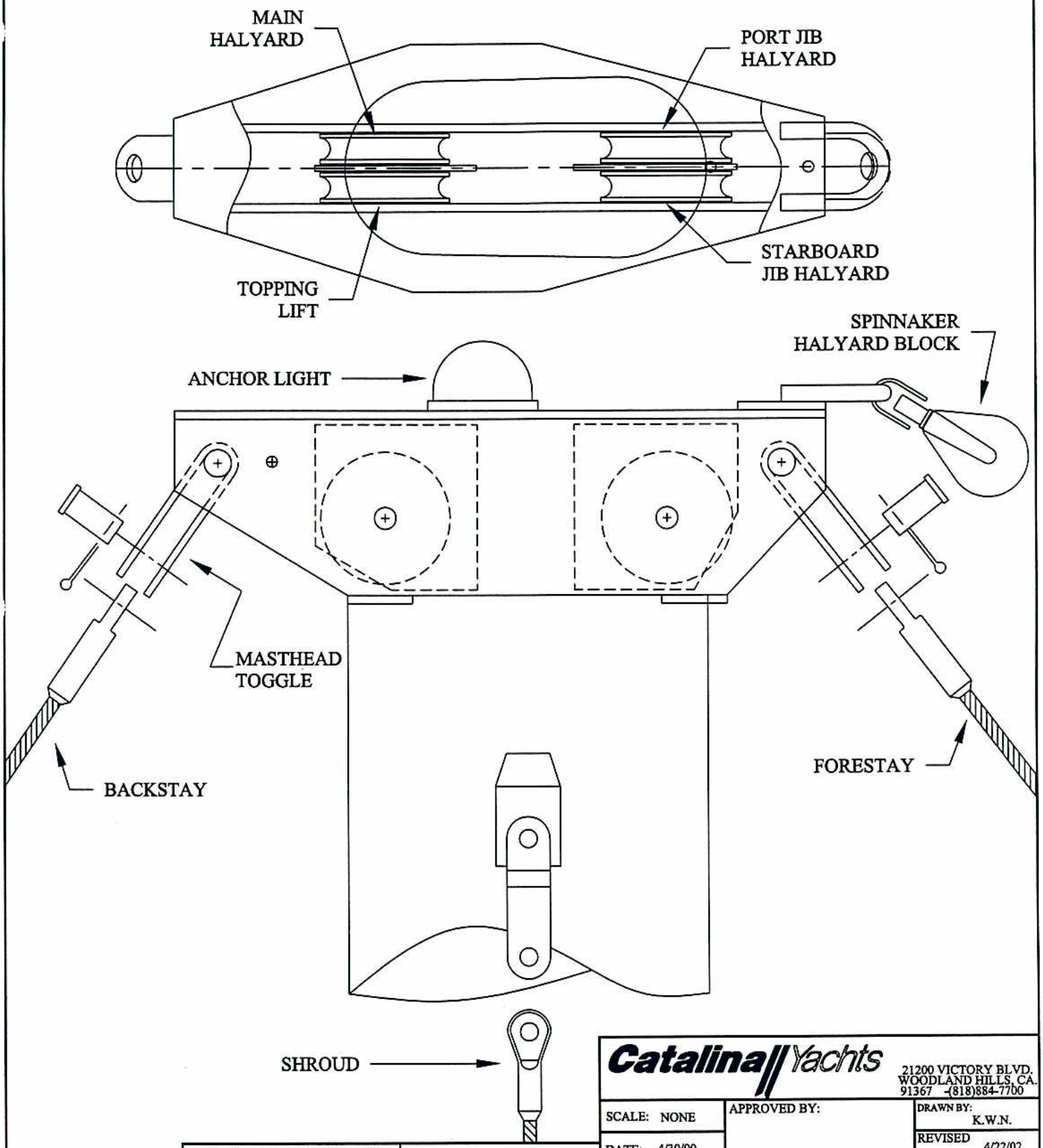



1. FUEL FILL
2. MOORING CLEAT 10" (Port & Stbd.)
3. STERN PULPIT BASE (Port & Stbd)
4. FURLING SYSTEM CLEAT 6.5"
5. PRIMARY WINCH LEWMAR 48CST (Port & Stbd.)
6. END STOP AFT
7. OUTBOARD GENOA 1 1/4" T-TRACK
8. GATE STANCHION
9. INBOARD GENOA 1 1/4" T-TRACK
10. HALYARD WINCH LEWMAR 30 CST (Port & Stbd.)
11. BOWMAR HATCH 1002-10A (Port and Stbd.)
12. STAINLESS STEEL HAND RAIL (Port & Stbd.)
13. WASTE DECK PLATE
14. TRAVELER w/CAR, CONTROL BLOCKS AND INTEGRAL QUAD DECK ORGANIZERS
15. MOORING CLEAT 10" (Port & Stbd.) OPTIONAL (EXPORT BOATS)
16. STRAIGHT STANCHION (Port & Stbd.)
17. LEWMAR OPENING PORT 8912 (Port(3) and Stbd.(3))
18. CHAINPLATE AFT LOWER SHROUD (Port & Stbd.)
19. MAINSHEET STAND UP BLOCKS-GARHAUER (Port and Stbd.)
20. CHAINPLATE UPPER SHROUDS (Port & Stbd.)
21. CHAINPLATE FWD. LOWER SHROUD (Port & Stbd.)
22. GENOA SHEET CHEEK BLOCKS (Port and Stbd.)
23. LEWMAR HATCH 39665070
24. BOW PULPIT BASE
25. ANCHOR LOCKER HINGES (2)
26. STEM FITTING
27. ANCHOR ROLLER WINDLINE CR2
28. ANCHOR LOCKER HASP
29. MAST STEP-COMPRESSION POST
30. LEWMAR HATCH 39549999
31. SWIM LADDER BRACKET (Port and Stbd)
32. PLEXIGLASS WINDOWS (Port & Stbd.)
33. LEWMAR OPENING PORT 8912
34. EDSON PEDESTAL w/GUARD, BRAKE,ENGINE PANEL AND COMPASS
35. GUIDES FOR PLEXIGLASS SLIDE GATE
36. WATER FILL
37. EDSON DESTROYER WHEEL
38. MANUAL BILGE PUMP
39. RUDDER POST DECK PLATE - BOWMAR GA36
40. STERN SHOWER - SSI 48500
41. BACKSTAY CHAINPLATE (Port & Stbd.)
42. PLASTIC VENT COVER (Port & Stbd.)
43. SHORE POWER PLUG
44. FUEL TANK VENT
45. PLASTIC VENT COVER
46. WINDLASS - MAXWELL VC 500
47. PLASTIC INSPECTION PORT
48. WINDLASS FOOT SWITCH
49. L.P.G. CONTAINER DRAIN FITTING, 3/4" THRU HULL
50. COCKPIT DRAIN FITTING, 3/4" THRU HULL

Catalina Yachts

# DECK PLAN

| REV | DESCRIPTION | APPROVAL | DATE |
|---|---|---|---|
| 0 | ORIGINAL RELEASE | | 4/30/90 |
| 1 | ADDED HALYARD LABELS | | 4/22/02 |






UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

GENERAL TOLERANCES
ANGLES : ±0.5°
X.X : ±0.1
X.XX : ±0.01
X.XXX : ±0.005
SURFACE FINISH: 63
DO NOT SCALE DRAWING

Catalina Yachts
21200 VICTORY BLVD.
WOODLAND HILLS, CA. 91367 -(818)884-7700

| SCALE: NONE | APPROVED BY: | DRAWN BY: K.W.N. |
|---|---|---|
| DATE: 4/30/90 | | REVISED 4/22/02 |

# INTERNAL HALYARD / MAST HEAD ASSEMBLY

| BOAT: | DRAWING NUMBER |
|---|---|
| CATALINA 34 MK II | 340-32002-1 |

## 4.2 ELECTRICAL:

### 4.2.1 BATTERIES:

The electrical system is powered by marine grade 12 volt, deep cycle batteries. Attention should be give to maintaining the proper level of distilled water. DO NOT overfill.

The batteries are provided with a hold down to prevent movement at extreme angles of heel. Be sure these hold downs are fastened securely.

With proper care, the batteries installed in Catalina boats will provide a long and reliable service. Proper care is not difficult if a few basic points are kept in mind.

The battery should be checked periodically for any cracks or breaks in the case or cover and any cracks in the sealing compound. If there is any damage, the battery should be repaired at once.

**WARNING:** The electrolyte in a battery is a solution of sulfuric acid. If any should enter the eyes, rinse immediately with large amounts of fresh water and seek medical attention. Electrolyte spilled on skin should be rinsed off with fresh water also. Even a small amount of electrolyte spilled on clothing will destroy the clothing.

**ELECTROLYTE LEVEL:**

The electrolyte level in a battery should never be allowed to fall low enough to expose the plates. The battery's capacity is less when not full and exposed plates cause hardening of the active material resulting in permanent capacity loss.

**CAUTION:** Only use pure distilled water to replenish electrolyte levels. The water from many city water supply systems is unsatisfactory for battery use.

**CHARGING THE BATTERY:**

Before adding water, a hydrometer reading of the battery should be taken. If the reading shows the battery to be above 1.225 specific gravity, the battery has a sufficient charge. If the reading is below 1.225, the battery should be removed for bench charge.

Once charged, the battery should have a specific gravity of at least 1.260. If this cannot be reached, a battery supplier should inspect the battery.

The batteries should be checked often to ensure that they do not run down. Check that all the battery cells keep an even fluid level and that the fluid is about 3/8" above top of the separators.

If one or two cells have lower fluid levels, it is a good indicator that something is wrong with the battery, and it should be checked.

**DISCHARGED STATE:**

Leaving a battery in a discharged state for any length of time can also result in a permanent loss of capacity for the battery. Since it will freeze at relatively low temperatures, leaving it in the cold weather can destroy the battery.

**CLEAN CONNECTIONS:**

Keep the battery connections clean and tight. A cupful of strong baking soda solution and toothbrush will clean, corrosion from the terminals and neutralize any spilled acid (DO NOT allow any of the solution to enter the battery cells). A coating of petroleum jelly on the battery terminals will inhibit corrosion.

### 4.2.2 MAIN BATTERY SWITCH:

The circulator battery switch has the markings 1, 2, and "ALL" as well as "OFF." You can selectively charge the battery with the engine alternator. Many experienced sailors use battery #1 for electrical lighting needs and keep #2 in reserve for starting the engine.

When the engine is running, NEVER pass through the "OFF" position to change from one battery to the other or the alternator diodes will be burned out.

If both batteries are of equal charge, keep the selector switch on "ALL" position, and use "ALL" to start the engine if both batteries are low.

### 4.2.3 ELECTRICAL SYSTEM:

The Catalina is equipped with a standard 12 Volt DC system and 110-115 Volt AC system. The wiring is run to prevent chaffing or contact with water, where possible, and is supported as needed. We recommend that you check all the connections at least once a year for corrosion, loose fittings, etc.

**DC – 12 VOLT SYSTEM:**

Deep cycle batteries power the DC system.

## MAIN DC CIRCUIT BREAKER:

Operating switches for lights and accessories are located on the main switch panel. The main circuit breaker will automatically trip to the OFF position in the event of an overload to the circuit. If the breaker trips to OFF, the cause should be determined and any necessary repairs should be made before repositioning the circuit breaker to ON.

Before purchasing any electrical accessories for your boat, ensure that they are compatible to a negative ground system.

The electrical panel is located above the chart desk on the port side.

**WARNING:** Be sure to disconnect the batteries and the AC shore power cord before opening the panel, or severe injuries may result.

All wires, terminals and connections should be checked periodically for loose connections or corrosion that could cause high resistance, electrical sparks or fires. The engine accessory wiring should also be checked at this time.

## NAVIGATION LIGHTS:

Navigation lights should be used in accordance with the rules and regulations of the waters in which you intend to sail.

Generally, navigation lights should be used from dusk to dawn in all weather conditions. It is advisable to use the navigation lights any time visibility is poor.

Your Catalina is equipped with the following navigation lights:

a) Red and Green 112.5° combination running lights mounted on the bow pulpit.
b) White 135° stern running light mounted on the stern pulpit.
c) White 225° steaming light mounted on the mast.
d) White 360° anchor light mounted on the masthead.

(a) and (b) are wired to the running light switch on the panel. (c) is wired to the steaming light switch, and (d) is wired to the anchor light switch. When underway by sail, the bow running light and stern running light must be used. When underway by power, the steaming light, bow and stern running lights must be on. At anchor, the anchor light should be on, the running, (a) and (b), and the steaming light should be off.

NOTE: Boats built for use outside the USA may have different navigation light arrangements.

## AC – 110-115 VOLT SYSTEM:

The 110V AC power system depends upon the boat being connected to 110V – 30-amp shore power connector.

## IMPORTANT: TO MINIMIZE SHOCK AND FIRE HAZARDS:

1. Turn off the boat's shore connection switch before connecting or disconnecting the shore power cable.

2. Connect the shore power cable at the boat first.

3. If the polarity-warning indicator is activated, disconnect the cable immediately.

4. Disconnect the shore power cable at the shore outlet first.

5. Close the shore power inlet cover tightly.

6. DO NOT ALTER THE SHORE POWER CABLE IN ANY WAY. SEVERE INJURY MAY OCCUR.

Care should be taken to support the shore power cable at both ends to allow sufficient slack to avoid pulling. Remember to allow for the tide.

The master breaker switch is a 30 amp, two-pole type (see 110V schematic). Be certain that all 100-volt appliances, other than lamps, have an adequate grounding connector. Wet feet or moist atmosphere increases the potential shock hazard.

There is a reverse polarity indicator on the panel. With the switches off, attach the power cable to the inlet. Next, attach the power cable to the dock outlet. If the reverse polarity light comes on DISCONNECT THE CORD IMMEDIATELY! This indicates a reverse polarity situation that is very dangerous.

**WARNING:** DO NOT open the electrical panel for any purpose with the shore power cable connected to the dock. 110 volt wiring is exposed when the panel is open. Contact with the 110-volt wiring can cause electrocution. Electricity is dangerous. Even when safety devices are present, handle with care and use reasonable caution.

## GROUND FAULT INTERRUPTER:

G.F.I. receptacles are designed to provide protection against electrical shock hazards due to line-to-ground faults. Although the G.F.I. receptacle does not limit the magnitude of the fault current and, therefore, cannot

prevent electrical shock, it does limit the duration of the shock to a period considered safe for normal healthy persons. G.F.I. receptacles will provide protection against ground faults only. They will not protect against overload or short circuits. There is no known device that will guard against the electric shock hazard resulting from contact with both the "hot" and "neutral" wires of the electrical circuit.

The G.F.I. receptacle protects the 110V AC outlets in the Catalina. If there is a power failure that does not affect the fuse or breaker serving these outlets, unplug all cord-connected appliances from the protected outlets and restore power by pressing the red RESET button on the receptacle. Push the RESET back in and reconnect the appliances one at a time.

Any defective appliance will trip the button and should be repaired at once.

If the appliances are all disconnected, and the RESET button will not stay in, call a qualified electrician. If the RESET button does not pop out when the blue TEST button is pressed, PROTECTION IS LOST. DO NOT USE any of the outlets and determine the cause of the problem before using the system.

**IMPORTANT:** Your Ground Fault Interrupter Circuit should be tested regularly. Use the following steps:

1. Push the blue TEST button. The red RESET button should pop out. Power is now out at that out indicating that the circuit is operating properly.

2. If the button does not pop out when testing, do not use that outlet. Protection is lost and a qualified electrician should be called.

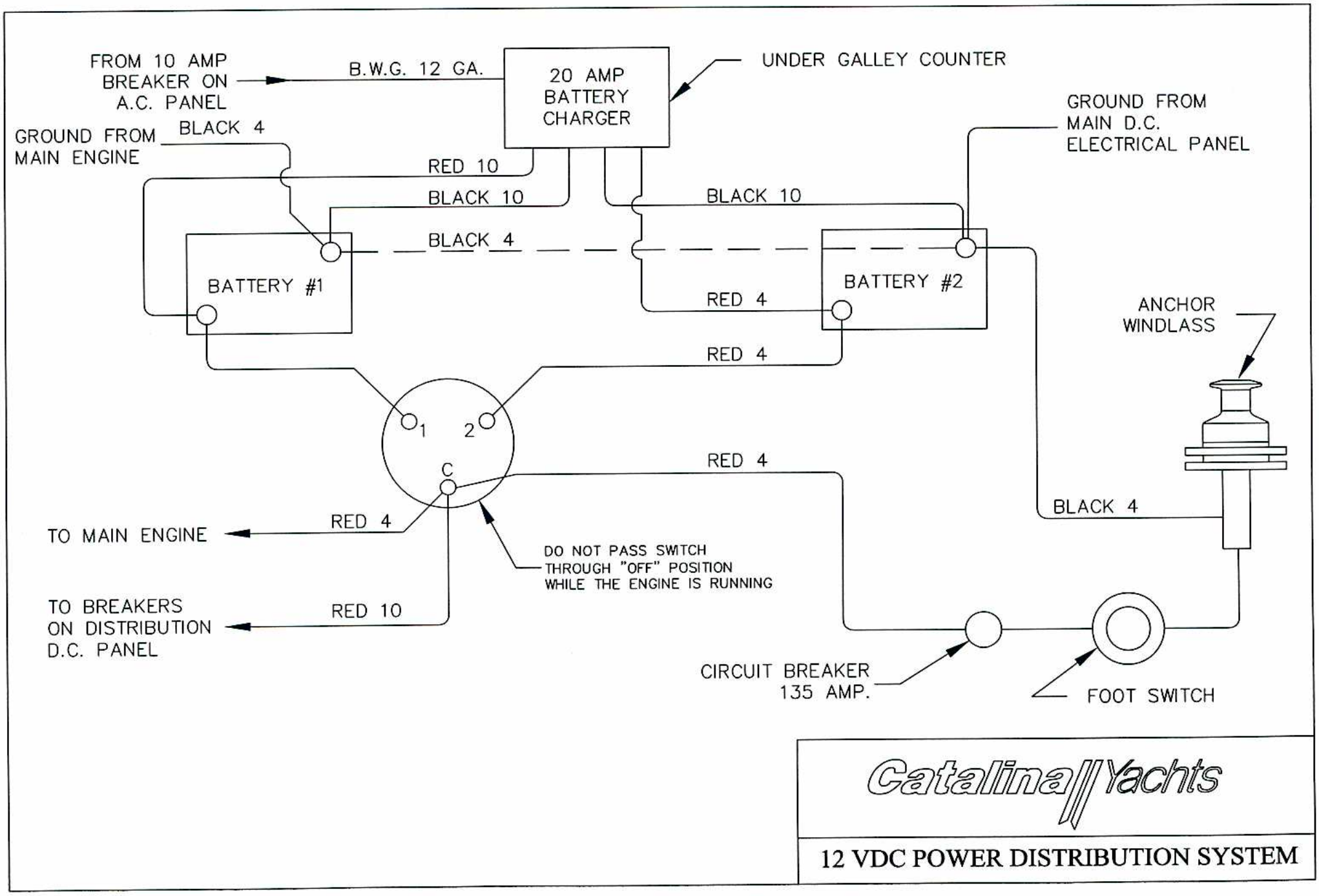
3. To restore power, push the RESET button.

**PREVENTATIVE MAINTENANCE:**

This consists of periodic inspection and protection against any damage created by the elements. Electrical systems are adversely affected by moisture and salt-air environment.

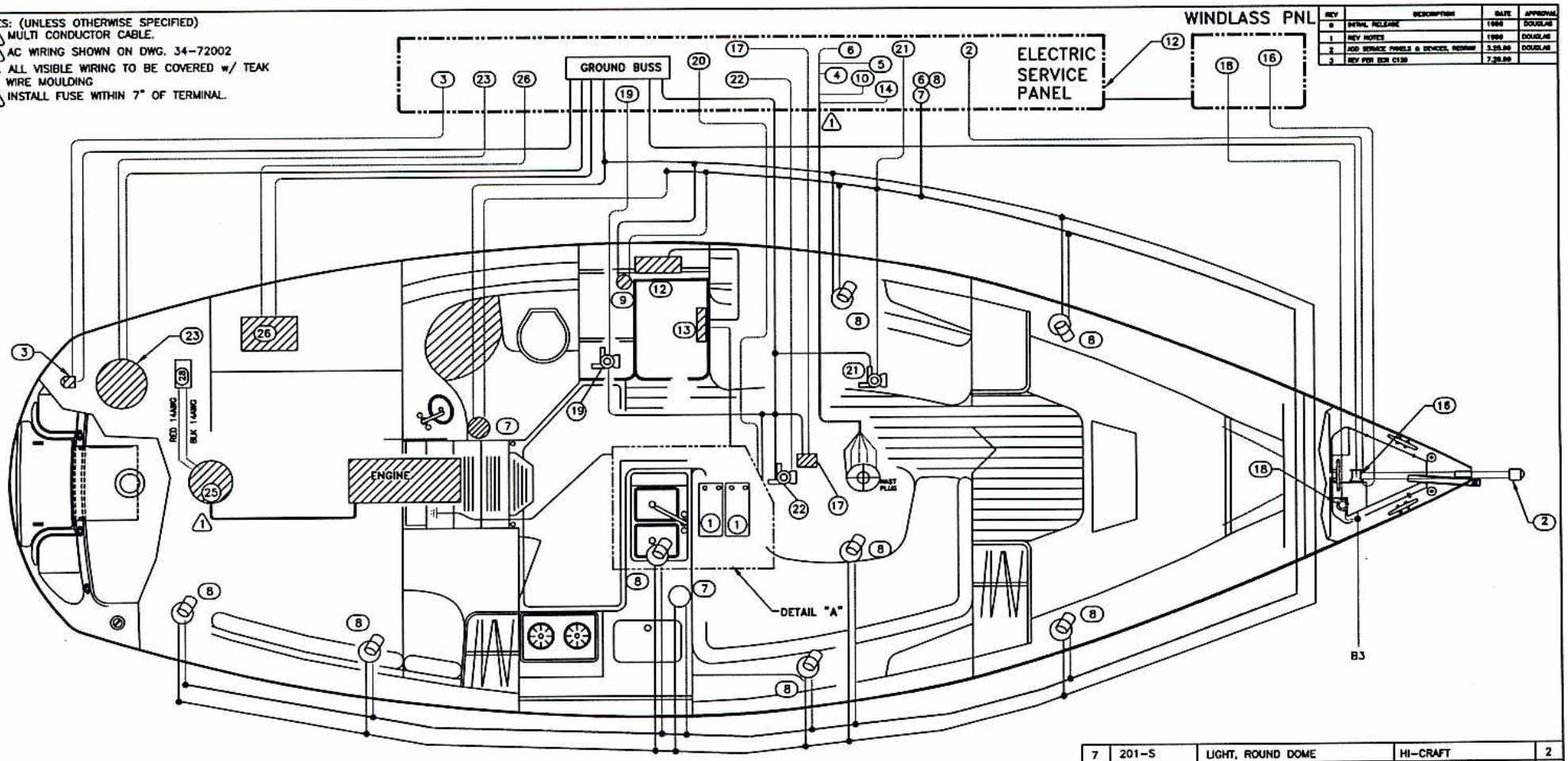
The system can be protected by the application of aerosol sprays such as WD-40 or CRC. All wire harnesses and connections should be checked periodically to ensure that fastenings are secured and everything is clean with no sign of damage or corrosion. It is extremely important that all connections be kept clean.

**WARNING:** DO NOT perform any maintenance or repair on a live circuit. DO NOT turn the main DC switch off while the engine is running. This could cause damage to the alternator.


FROM 10 AMP BREAKER ON A.C. PANEL
B.W.G. 12 GA.
20 AMP BATTERY CHARGER
UNDER GALLEY COUNTER
GROUND FROM MAIN ENGINE
BLACK 4
RED 10
BLACK 10
BLACK 10
GROUND FROM MAIN D.C. ELECTRICAL PANEL
BLACK 4
BATTERY #1
BATTERY #2
RED 4
ANCHOR WINDLASS
RED 4
1
2
C
RED 4
BLACK 4
TO MAIN ENGINE
RED 4
DO NOT PASS SWITCH THROUGH "OFF" POSITION WHILE THE ENGINE IS RUNNING
TO BREAKERS ON DISTRIBUTION D.C. PANEL
RED 10
CIRCUIT BREAKER 135 AMP.
FOOT SWITCH
Catalina Yachts
12 VDC POWER DISTRIBUTION SYSTEM

NOTES: (UNLESS OTHERWISE SPECIFIED)
1. MULTI CONDUCTOR CABLE.
2. AC WIRING SHOWN ON DWG. 34-72002
3. ALL VISIBLE WIRING TO BE COVERED w/ TEAK WIRE MOULDING
4. INSTALL FUSE WITHIN 7" OF TERMINAL.

| REV | DESCRIPTION | DATE | APPROVAL |
|---|---|---|---|
| 0 | INITIAL RELEASE | 1988 | DOUGLAS |
| 1 | REV NOTES | 1989 | DOUGLAS |
| 2 | ADD SERVICE PANELS & DEVICES, RENAME | 3.25.89 | DOUGLAS |
| 3 | REV PER ECR C139 | 7.28.89 | |




| ITEM | PART NO. | DESCRIPTION | VENDOR | QTY |
|---|---|---|---|---|
| 28 | | BLOWER | - | 1 |
| 27 | | INSTRUMENTS, NAVIGATION | (OPTIONAL) | 1 |
| 26 | 40072 | REFRIGERATION | ADLER BARBER, PB101V | 1 |
| 25 | | INSTRUMENT PANEL, HELM | EDSON | 1 |
| 24 | FLYBACK 20-3 | CHARGER, BATTERY | PROFESSIONAL MARINER | 1 |
| 23 | | SOLENOID, LPG | | 1 |
| 22 | 60099 | PUMP, BILGE | JABSCO 1750 | 1 |
| 21 | 18590-0000 | PUMP, MACERATOR | JABSCO | 1 |
| 20 | 60104 | PUMP, WATER PRESSURE | SHURFLO 2088-723-244 | 1- |
| 19 | | PUMP, SHOWER SUMP/ICE BOX | PAR MAX 3 | 1 |
| 18 | | SWITCH, WINDLASS | MAXWELL | 1 |

PARTS LIST

| ITEM | PART NO. | DESCRIPTION | VENDOR | QTY |
|---|---|---|---|---|
| 17 | - | SWITCH, FLOAT | SURE BAIL | 1 |
| 16 | | WINDLASS, FREEDOM | MAXWELL 800 | 1 |
| 15 | - | FUSE HOLDER, BUSSMAN-TRON-HEB | | 2 |
| 14 | | GROUND, MAST | CATALINA, 4-COND | 1 |
| 13 | PB3082 | SERVICE PANEL, BATTERY/WINDLASS | SEAWARD | 1 |
| 12 | PB3084 | SERVICE PANEL, AC/DC | SEAWARD | 1 |
| 11 | | FUSE, 20A, IN-LINE | BUSSMAN-TRON-HEB | 9 |
| 10 | | FUSE, 15A, IN-LINE | - | 1 |
| 9 | - | LIGHT, ADJUSTABLE, NAV. | - | 1 |
| 8 | 1833 | LIGHT, SWIVEL, PLASTIC | GUEST | 6 |

PARTS LIST

| ITEM | PART NO. | DESCRIPTION | VENDOR | QTY |
|---|---|---|---|---|
| 7 | 201-S | LIGHT, ROUND DOME | HI-CRAFT | 2 |
| 6 | | LIGHT, ANCHOR | AQUA SIGNAL 25 | 1 |
| 5 | 2LT 998 505001 | MAST LIGHT, DECK | HELLAMARINE | 1 |
| 4 | | MAST LIGHT, STEAMING | | |
| 3 | | LIGHT, STERN | AQUA SIGNAL | 1 |
| 2 | | LIGHT, COMBO BOW | AQUA SIGNAL | 1 |
| 1 | C9 | BATTERY, 205AH | EXIDE | 2 |

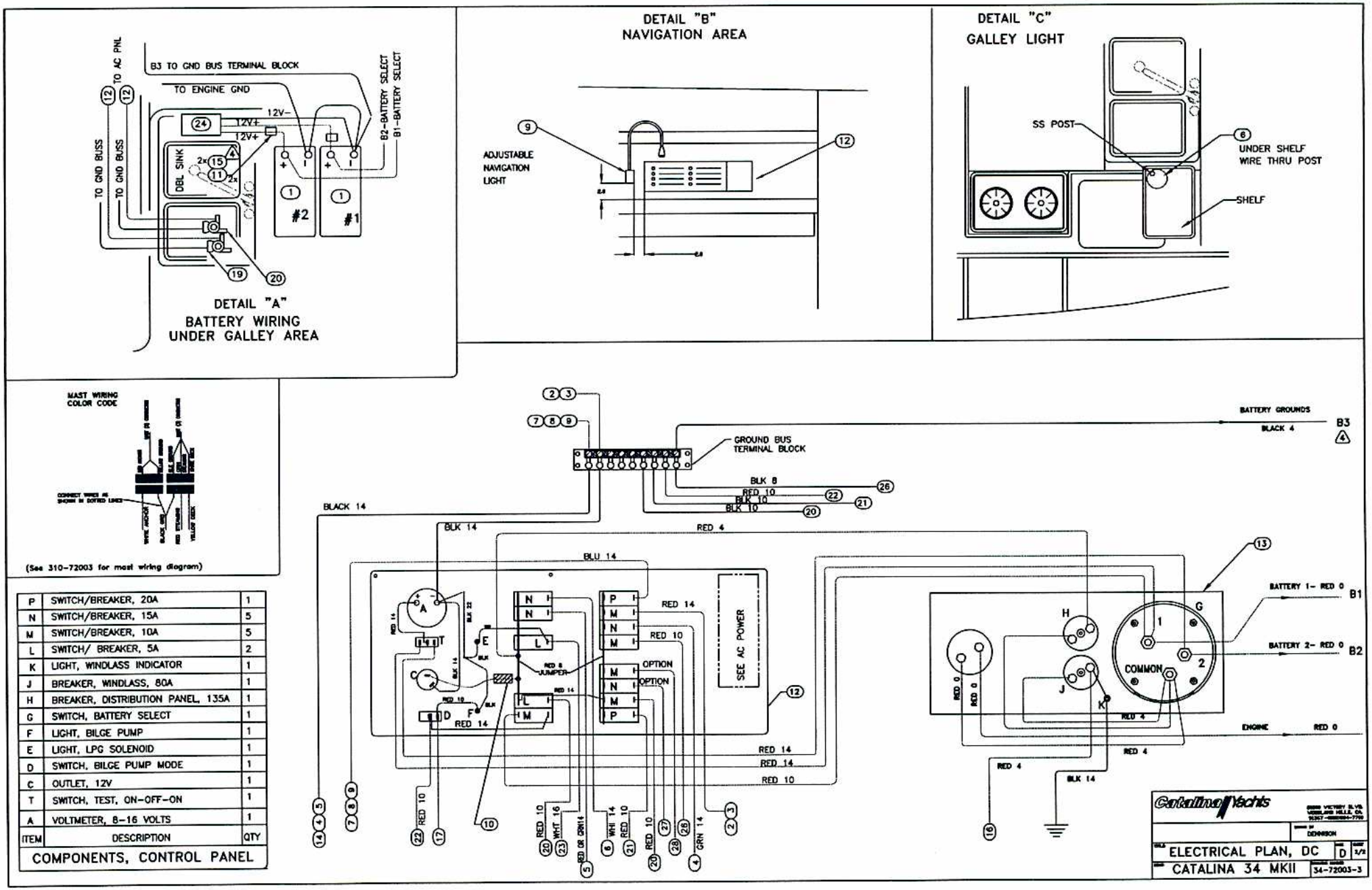
PARTS LIST



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
GENERAL TOLERANCES
ANGLES : ±0.5°
X.X : ±0.1
X.XX : ±0.01
X.XXX : ±0.005
SURFACE FINISH: 63
DO NOT SCALE DRAWING

Catalina Yachts
21200 VICTORY BLVD.
WOODLAND HILLS, CA.
91367-(818)884-7700

| | | | |
|---|---|---|---|
| SCALE NONE | APPROVED BY DOUGLAS | DRAWN BY DENNISON | |
| DATE 3.25.88 | FILE# 34720033 | | |
| TITLE ELECTRICAL PLAN, DC | | SIZE D | REV 1/2 |
| DWG CATALINA 34 MkII | | DRAWING NUMBER 34-72003-3 | |




| P | SWITCH/BREAKER, 20A | 1 |
|---|---|---|
| N | SWITCH/BREAKER, 15A | 5 |
| M | SWITCH/BREAKER, 10A | 5 |
| L | SWITCH/ BREAKER, 5A | 2 |
| K | LIGHT, WINDLASS INDICATOR | 1 |
| J | BREAKER, WINDLASS, 80A | 1 |
| H | BREAKER, DISTRIBUTION PANEL, 135A | 1 |
| G | SWITCH, BATTERY SELECT | 1 |
| F | LIGHT, BILGE PUMP | 1 |
| E | LIGHT, LPG SOLENOID | 1 |
| D | SWITCH, BILGE PUMP MODE | 1 |
| C | OUTLET, 12V | 1 |
| T | SWITCH, TEST, ON-OFF-ON | 1 |
| A | VOLTMETER, 8-16 VOLTS | 1 |
| ITEM | DESCRIPTION | QTY |

COMPONENTS, CONTROL PANEL

Catalina Yachts

ELECTRICAL PLAN, DC

CATALINA 34 MKII

34-72003-3

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. UNUSED POSITIVE TERMINALS MUST BE CONNECTED TO ACTIVE TERMINAL PER MANUFACTURER'S INSTRUCTIONS.
2. FUSE MUST MATCH CHARGER OUTPUT AND BE INSTALLED WITHIN 7" OF TERMINALS.

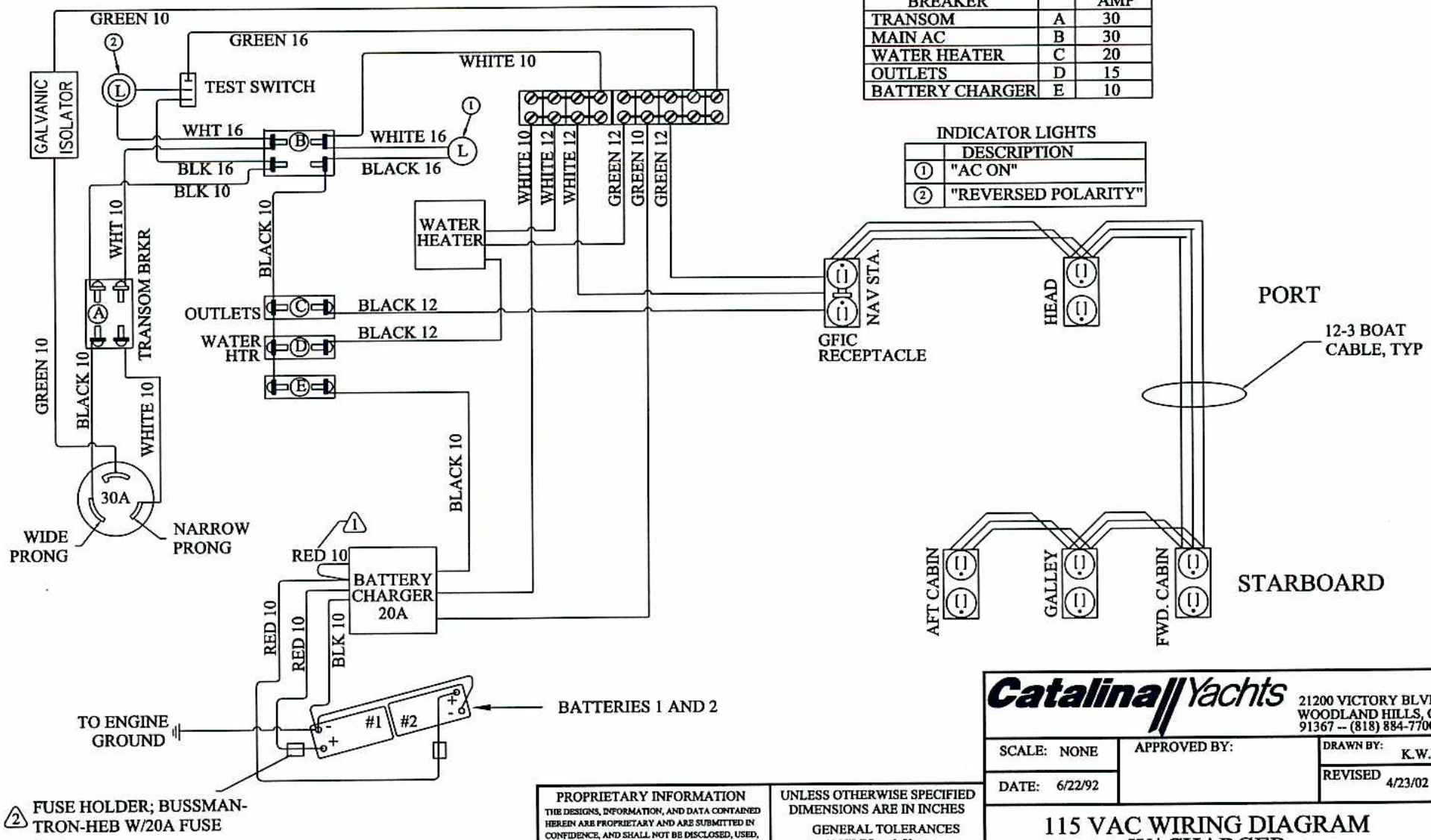
| REV | DESCRIPTION | APRVL | DATE |
|---|---|---|---|
| 0 | ORIGINAL RELEASE | | 6/22/92 |
| 1 | ADD TRANSOM ISOLATOR | | 9/19/98 |
| 2 | ADD BATT. FUSES, TRANSOM BREAKER, 10AWG WIRE TO BATT. | | 2/19/99 |
| 4 | WIRE TO BATTERY FROM CHARLES BATT. CHARGER 10 AWG | | 4/23/02 |

BREAKER SCHEDULE

| BREAKER | | AMP |
|---|---|---|
| TRANSOM | A | 30 |
| MAIN AC | B | 30 |
| WATER HEATER | C | 20 |
| OUTLETS | D | 15 |
| BATTERY CHARGER | E | 10 |

INDICATOR LIGHTS

| | DESCRIPTION |
|---|---|
| 1 | "AC ON" |
| 2 | "REVERSED POLARITY" |






UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

GENERAL TOLERANCES
ANGLES : ±0.5°
X.X : ±0.1
X.XX : ±0.01
X.XXX : ±0.005
SURFACE FINISH: 63

DO NOT SCALE DRAWING


Catalina Yachts
21200 VICTORY BLVD.
WOODLAND HILLS, CA.
91367 -- (818) 884-7700


| SCALE: NONE | APPROVED BY: | DRAWN BY: K.W.N. |
|---|---|---|
| DATE: 6/22/92 | | REVISED 4/23/02 |

# 115 VAC WIRING DIAGRAM W/ CHARGER

| BOAT: | DRAWING NUMBER |
|---|---|
| CATALINA 34 MK II | 340-73004-4 |

## 4.3 PLUMBING:

### 4.3.1 MARINE TOILET OPERATION:

#### USING THE HEAD:

1. Read the instructions supplied by the toilet manufacturer for operating your marine toilet. These instructions are also printed on the toilet pump housing. Be sure everyone who will be using the head is familiar with these instructions.

2. Immediately before using the head, the inlet valve, 'A', must be opened. This provides flushing water to the toilet. The valve should be kept closed when the head is not in use, preventing water from flooding the boat if the valve in the toilet pump should fail.

3. Waste will be pumped directly into the holding tank when the bowl is emptied. A minimum amount of water for every flush should be used in order to take best advantage of the tanks capacity between pump-outs.

4. The condition of the holding tank should be checked from time to time. Overfilling can cause the tank to burst.

5. Use hot water and soap to clean the head. High strength cleaners may cause damage to the valves and seals in your pump system. If there is any problem with the head, it should be corrected immediately.

#### EMPTYING THE TANK THROUGH THE DECK DISCHARGE PLATE:

1. The holding tank should be emptied via the deck discharge plate only when at an approved shore based pump-out station.

2. Remove the cap from the deck discharge plate. The threads on the plate cap should be periodically coated with silicone spray or petroleum jelly to insure a good seal.

3. The pump-out station suction hose should form a seal at the deck plate.

4. Be sure inlet valve, 'A', is closed when the tank is being emptied.

5. After the tank is empty, you may wish to open the inlet valve, 'A', and pump water through the toilet and into the tank to dilute residual sludge and rinse the tank and lines.

6. Close all valves after the tank is emptied and re-cap the deck plate.

## EMPTYING THE TANK USING THE MACERATOR PUMP:

1. Read the macerator pump operating instructions supplied by the pump manufacturer.

2. Close the inlet valve, "A".

3. Open the through hull valve, "B".

4. Turn on the pump with the switch on the 12-volt panel.

5. The pump will change tone after it becomes primed; it will resume the higher pitched tone after the tank is emptied.

6. You may wish to rinse the tank, hose lines, and macerator pump by pumping clear water through the head, then repeating the procedure for emptying the tank.

7. Close valve "B" immediately after emptying the holding tank.

### 4.3.2 MACERATOR PUMP AND TROUBLESHOOTING:

**PROBLEM 1:** The macerator pump motor starts then stops.

A. Check the breaker: it should be "IN" or "ON".

B. Check the valves: "B" valve must be open.

C. Check the vent line. If the boat has been sailed at extreme angles of heel, fluid may be clogging the vent line. Disconnect the vent at the tank and empty the hose into a disposable container.

D. Sludge may have formed in the bottom of the tank. This should be diluted as much as possible. The tank should be emptied regularly to prevent sludge build-up.

**PROBLEM 2:** The head toilet pump has excessive backpressure and will not evacuate.

A. Refer to the toilet manufacturer's specifications and operation instructions.

B. Check the holding tank; if it appears to bulge each time the pump handle is depressed, the tank is overfilled, or the vent is clogged.

**PROBLEM 3:** The macerator pump, when on, makes a high-pitched sound but does not empty the tank.

A. Impeller in macerator pump is faulty and must be replaced.

B. The vent is clogged and the pump cannot pull a prime against the vacuum in the tank.

C. The hose into the pump may be clogged.

D. The pump may be drawing air through the deck plate preventing a prime. Check the seal at the deck plate marked waste and lubricate threads.

### 4.3.3 INSTRUCTION FOR SANITIZING POTABLE WATER SYSTEM:

To assure complete sanitation of your potable water system, it is recommended that the following procedures be used. This applies if it is a new system, one that has not been used for a period of time, or one that may have become contaminated.

1. Prepare a chlorine solution using one gallon of water and ¼ cup of Clorox or Purex household bleach (5% hyper chlorite solution). With tank empty, pour chlorine solution into tank. Use one gallon of solution for each 15 gallons of tank capacity.

2. Complete filling of tank with fresh water. Open each faucet and drain cock until all air has been released and entire system is filled.

3. Allow to stand for three (3) hours.

4. Drain and flush with potable fresh water. (IMPORTANT)

5. To remove excessive chlorine taste or odor which might remain, prepare a solution of one quart vinegar to five gallons water and allow this solution to agitate in tank for several days by vessel motion.

6. Drain tank and again flush with potable water. (IMPORTANT)

The above recommendations conform to Section 10.8 in the A119.2 code covering electrical, plumbing, and heating of a recreational vehicle. The solution is approved and recommended by competent health officials.

### 4.3.4 MANUAL BILGE PUMP:

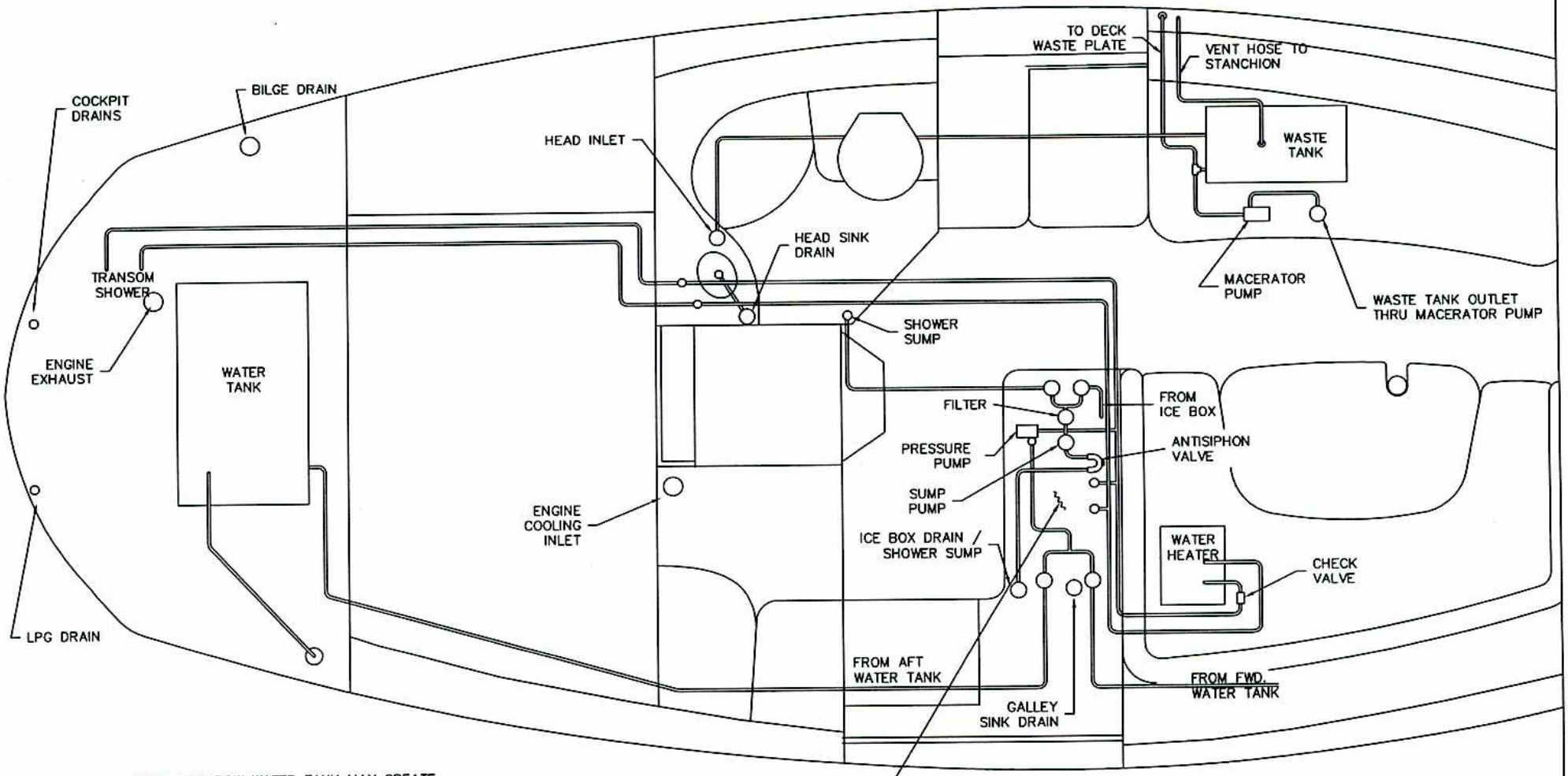
The manual bilge pump is located in the cockpit. Insert the handle through the watertight fitting in the cockpit to operate the pump. The pump intake hose is in the keel stub under the main cabin sole.

### 4.3.5 SEACOCKS:

All underwater through hull fittings are equipped with seacock ¼ turn valves. It is good practice to close all seacock valves when leaving the boat, especially for long periods of time.

To close seacock valves, turn handle perpendicular to flow. To open, turn handle ¼ turn to parallel.

It is good practice to operate the seacock valves at least once a month to keep the seals lubricated.

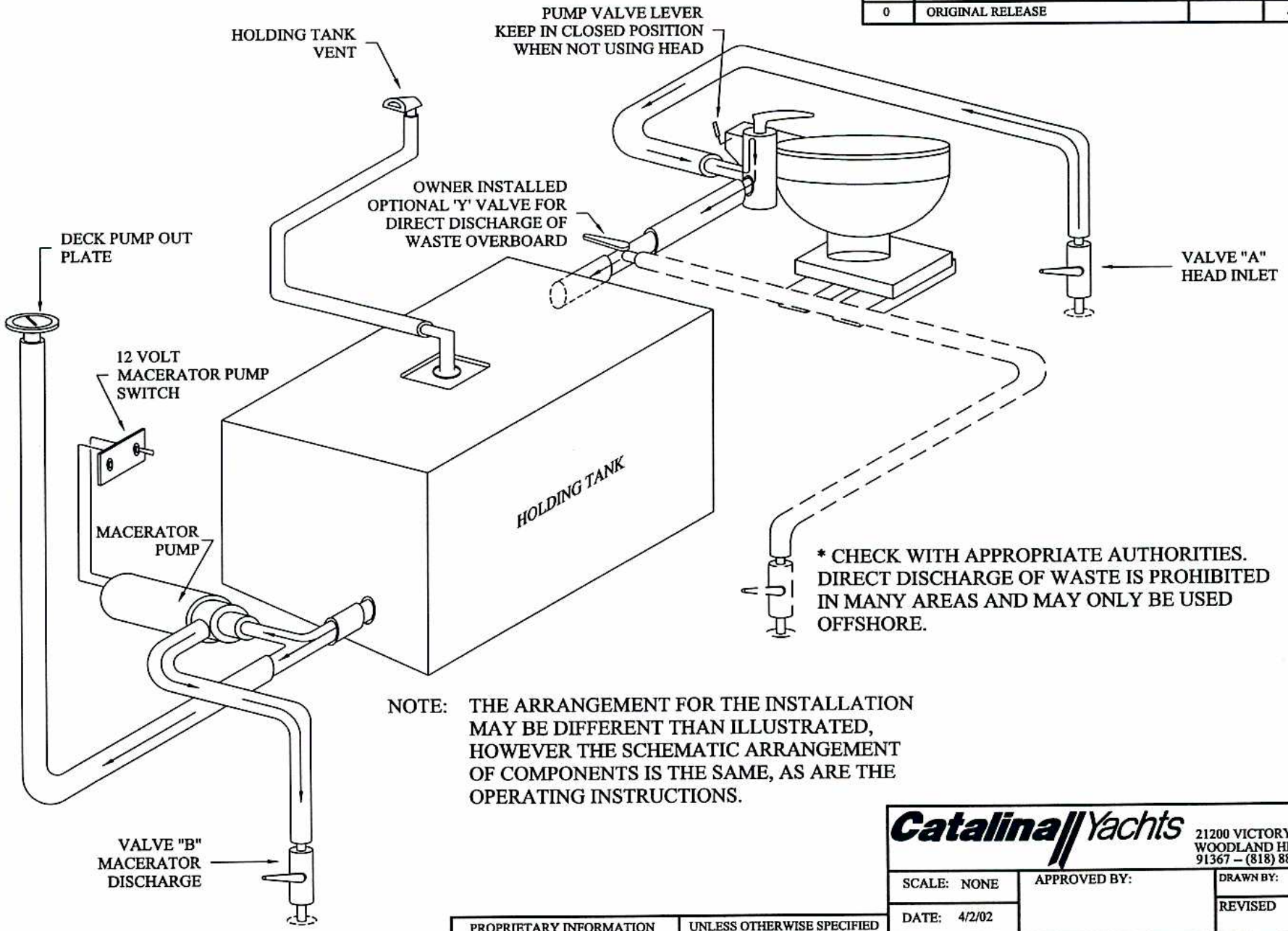



NOTE: THE BOW WATER TANK MAY CREATE A "BOW DOWN" TRIM WHEN FULL, IN SOME CONDITIONS, AND SHOULD BE USED AS THE "CRUISING" OR SECONDARY TANK

Catalina Yachts

# PLUMBING PLAN

| REV | DESCRIPTION | APPROVAL | DATE |
|---|---|---|---|
| 0 | ORIGINAL RELEASE | | 4/2/02 |




* CHECK WITH APPROPRIATE AUTHORITIES. DIRECT DISCHARGE OF WASTE IS PROHIBITED IN MANY AREAS AND MAY ONLY BE USED OFFSHORE.

NOTE: THE ARRANGEMENT FOR THE INSTALLATION MAY BE DIFFERENT THAN ILLUSTRATED, HOWEVER THE SCHEMATIC ARRANGEMENT OF COMPONENTS IS THE SAME, AS ARE THE OPERATING INSTRUCTIONS.



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X.X : ±0.1
X.XX : ±0.01
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SURFACE FINISH: 63
DO NOT SCALE DRAWING

Catalina Yachts
21200 VICTORY BLVD.
WOODLAND HILLS, CA.
91367 – (818) 884-7700

| SCALE: NONE | APPROVED BY: | DRAWN BY: K.W.N. |
|---|---|---|
| DATE: 4/2/02 | | REVISED |

# HOLDING TANK AND MACERATOR SCHEMATIC

| BOAT: | DRAWING NUMBER |
|---|---|
| CATALINA 320 | 320-60003-0 |

## 4.4 AUXILIARY POWER:

### 4.4.1 GENERAL ENGINE INFORMATION:

**WARNING:** DO NOT open engine compartment doors when engine is running. Contact with hot or moving engine parts can cause serious injury.

For a complete description of your engine, please consult the guide supplied by the engine manufacturer. This can be found in your owner's packet.

Two points are worth special attention. Firstly, marine engines work under conditions tougher than those conditions of automotive engines. Your marine engine faces constant torquing not encountered on the highway. For this reason, you must change your engine's crank oil as recommended in the engine manufacturer's guide. Secondly, before using your engine, the shaft coupling must be adjusted within a tolerance of 0.003 of an inch after launching. This is done during commissioning of the yacht. Be sure that your dealer has made this adjustment before using the engine.

Change the oil in accordance with manufacturer's recommendations. Keep spare filters and alternator belts on hand. Keep your fuel tank full whenever possible to prevent water condensation in your fuel tank.

To retard electrolysis, we recommend installing a zinc collar immediately on the propeller shaft and additional zinc as may be required in your mooring area.

### 4.4.2 SHAFT PACKING BOX (STUFFING BOX):

The packing gland is located aft of the engine under the aft berth.

A properly adjusted shaft-packing gland should drip slightly with the engine off. Too loose of an adjustment will allow too much water into the bilge and engine operation will spray water from the shaft. Too tight of an adjustment will rob the engine of power, and the lack of water lubrication in the packing gland can generate enough heat to damage the gland and/or score the propeller shaft.

**ADJUSTMENT:**

1. While holding the packing nut with one wrench, use a second wrench to loosen the lock nut. Turn the lock nut far enough to keep it from interfering with the next adjustment (2 or 3 turns).

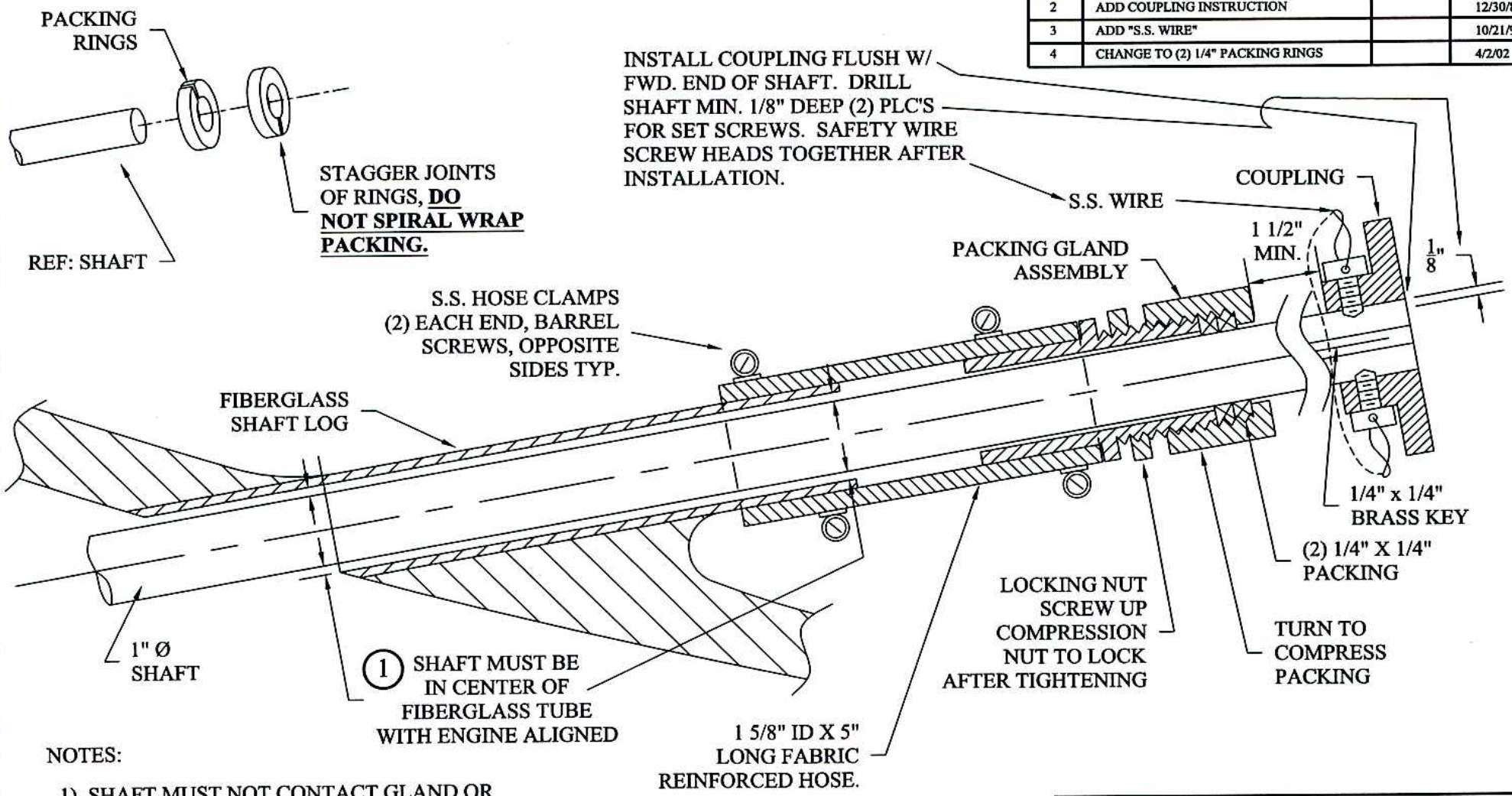
2. Tighten the packing nut to obtain 2 to 3 drops per minute. Hand tightening of the packing nut is often sufficient to obtain this

adjustment. If this is not the case, an additional ¼ to ½ turn with the wrench should produce the desired result.

3. Hold the packing nut in place with one wrench, and use the second wrench to bring the locking nut securely against the packing nut. Make certain that the locking nut is tight. Failure to do this could allow the packing nut to back off when the engine is operating.

4. Operate the engine at slow speeds in forward and reverse and use a light to check for excessive water at the packing nut. Shut off the engine and recheck packing for proper drip.

| REV | DESCRIPTION | APPROVAL | DATE |
|---|---|---|---|
| 0 | ORIGINAL RELEASE | | 3/25/86 |
| 1 | SHAFT ALIGNMENT NOTE (1) | | 12/5/86 |
| 2 | ADD COUPLING INSTRUCTION | | 12/30/88 |
| 3 | ADD "S.S. WIRE" | | 10/21/94 |
| 4 | CHANGE TO (2) 1/4" PACKING RINGS | | 4/2/02 |




NOTES:

1) SHAFT MUST NOT CONTACT GLAND OR LOG, SHAFT MUST BE IN CENTER OF LOG AND GLAND.
2) MAINTAIN CLEARANCE BETWEEN ENGINE COUPLING AND PACKING GLAND FOR REMOVAL AND REPACKING OF GLAND.
3) PACKING GLAND SHOULD NOT BE OVER TIGHTENED. ONE OR TWO DROPS PER MINUTE IS NORMAL.



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
GENERAL TOLERANCES
ANGLES : ±0.5°
X.X : ±0.1
X.XX : ±0.01
X.XXX : ±0.005
SURFACE FINISH: 63
DO NOT SCALE DRAWING

Catalina Yachts
21200 VICTORY BLVD.
WOODLAND HILLS, CA.
91367 -- (818) 884-7700

| SCALE: NONE | APPROVED BY: | DRAWN BY: K.W.N. |
|---|---|---|
| DATE: 3/25/86 | | REVISED 4/2/02 |

# PACKING GLAND / COUPLING ASSEMBLY

| BOAT: | DRAWING NUMBER |
|---|---|
| INBOARD MODELS | 250-50006-4 |

### 4.4.4 SHAFT ALIGNMENT:

For proper operation of the engine, the propeller shaft and engine must be aligned.

Alignment is gauged at the engine and shaft coupling. Alignment procedures must be done with the boat in the water after the mast is stepped and the rigging is tuned.

1. Remove coupling flange bolts and check propeller shaft for clearance. Adjust stuffing box so that excessive seepage is prevented, while allowing the shaft to spin freely.

2. Slide shaft away from engine and check coupling mating surfaces. The surfaces must be clean.

3. Slide shaft forward to connect the coupling surfaces. Pilot on transmission flange must align with recess in shaft coupling flange. This is an indication of correct axial alignment.

4. With the coupling flanges in contact, measure the gap around edge of coupling with a 0.003" feeler gauge. The maximum allowable gap at any point is three thousandths of an inch. Take this measurement several times rotating shaft ¼ turn each time. Any gap in excess of 0.003" must be corrected by changing the engine position, especially fore/aft tilt. For example, excessive gat at the bottom of the coupling (see drawing) indicates engine is tilted too far aft (front too high). Using a 15/16" open-end wrench, loosen lock nuts on forward motor mount(s). Lower the front of engine by clockwise rotation of the motor mount nuts. Remeasure gap at coupling. A gap at the top of the coupling would require the raising the front of the engine (counterclockwise rotation of motor mount nuts).

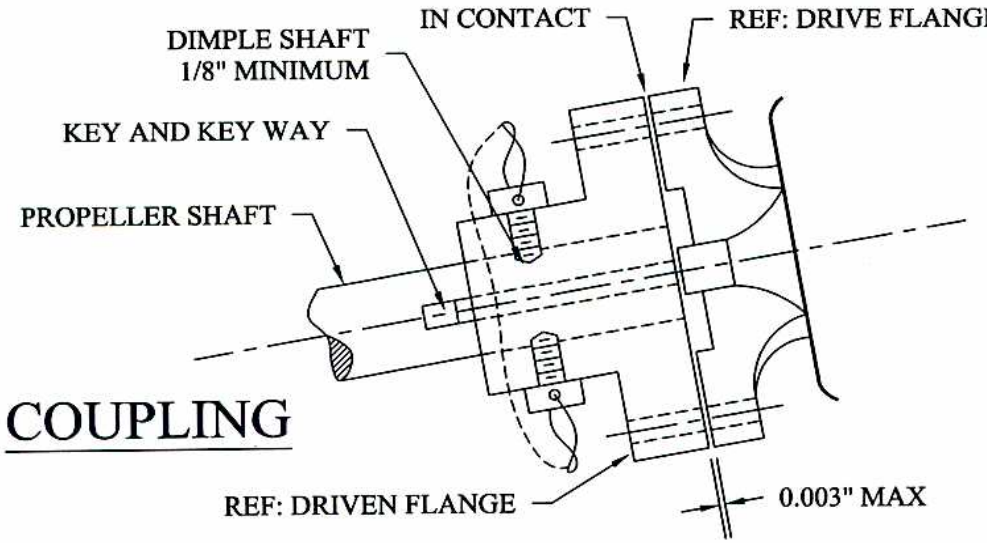
5. Pull shaft backwards as in step (2). Again slide shaft forward, rechecking axial alignment as in step (3).

6. Repeat steps (4) and (5) until alignment within tolerance is achieved.

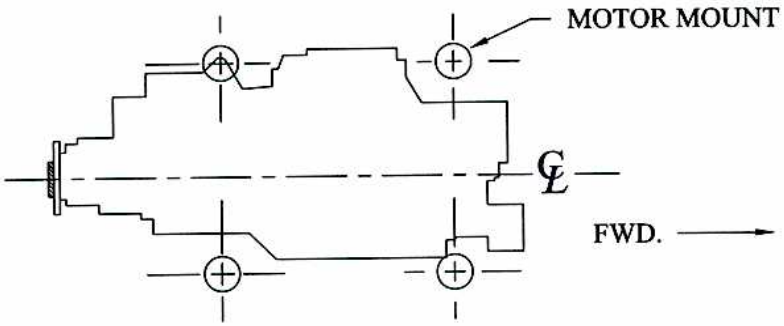
7. Tighten motor mount lock nuts and install coupling bolts.

NOTE: Alignment should be checked yearly, or whenever any excess vibration is noticed. The alignment can also be affected by changes in rigging tension.

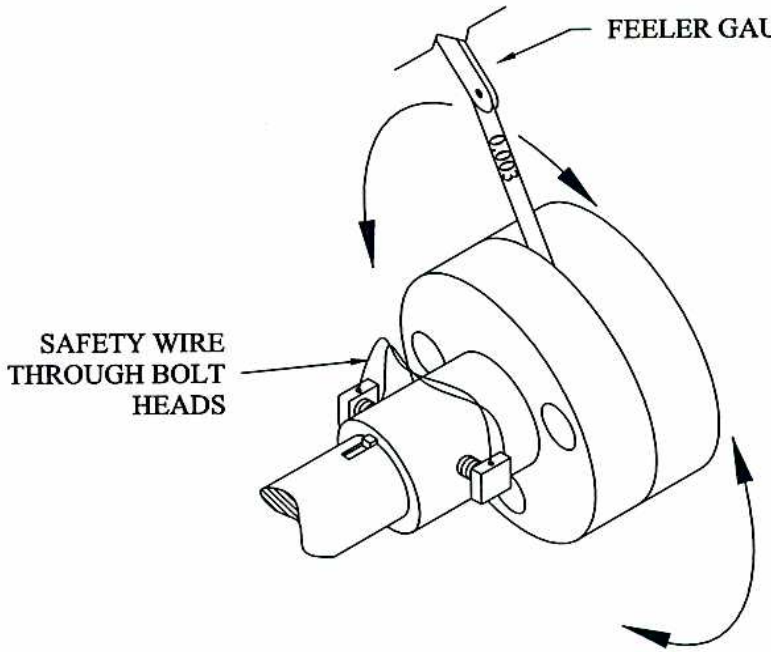
| REV | DESCRIPTION | APPROVAL | DATE |
|---|---|---|---|
| 0 | ORIGINAL RELEASE | | 4/4/02 |




## COUPLING




## ENGINE PLAN VIEW




## TYPICAL FLANGE

NOTES:

1) CHECK CONCENTRICITY OF SHAFT AND THE FIBERGLASS LOG BEFORE ALIGNING THE ENGINE TO THE SHAFT COUPLING.

2) MEASURE GAP BETWEEN MATING FACES OF COUPLING FLANGES. MAXIMUM ALLOWABLE GAP AT ANY POINT IS 0.003" WHEN ANY POINT OF COUPLING FACES ARE IN CONTACT. TAKE THIS MEASUREMENT SEVERAL TIMES, ROTATING SHAFT 1/4 TURN EACH TIME. THIS MEASUREMENT MUST BE MADE WITH COUPLING BOLTS REMOVED.



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|---|---|---|
| DATE: 4/4/02 | | REVISED |

# SHAFT ALIGNMENT ILLUSTRATION

| BOAT: | DRAWING NUMBER |
|---|---|
| INBOARD MODELS | 270-58001-0 |

### 4.4.6 FUELING:

The fuel system of a Catalina consists of an aluminum fuel tank, fuel feed and return lines, a secondary fuel filter (on engine), an electric fuel pump (on engine) controlled by the engine key switch, a deck fill plate, and an overboard vent through the transom (see schematic).

Refer to the engine manual provided for recommended fuel type. A diesel engine does not require and ignition system and is superior to a gasoline engine in dependency.

Diesel engines depend on a clean supply of fuel because of the close tolerances required by the engine's fuel delivery system, which is intolerant of dirt or water contamination. The engine is supplied with primary and secondary filters that prevent contaminants from reaching the engine where they could cause damage. A fuel and water separator is installed before the engine filter. Check the clear bowl in the water separator filter because, it too, can stop the flow of fuel to the engine causing it to stop. Keeping the filters free of dirt and water is critical.

**BEFORE FUELING:**

1. Extinguishing all smoking materials and check around the fueling area for other sources of spark or flame. Remove any that are found.

2. Shut off the engine and any electrical accessories or devices.

3. De-energize all electrical equipment by turning the selector switch to the OFF position.

4. Close all hatches and ports.

5. Make sure that a fire extinguisher is readily available.

6. Insure that the proper (diesel, not gasoline) hose is about to be used.

**WARNING:** Do not fuel during an electrical storm. Besides the obvious hazard of lightning, the possibility of static discharge is greatly increased along with the potential for contaminating the fuel.

**FUELING PROCEDURE:**

1. Remove the fill pipe cover using a proper tool.

2. Place nozzle of fuel hose in the fill pipe. Keep the nozzle in contact with the deck plate rim during fueling to avoid the possibility of a static spark.

3. Fill slowly. DO NOT overfill. If it is not possible to see the meter on the fuel pump, the attendant or crewmember should call out the gallonage from the fuel dock. Filling the tank to only 95% of capacity will avoid overflow problems on a hot day.

4. Replace cover and clean up any spilled fuel. If any rags, etc., were used for this purpose, dispose of them ashore.

5. Check below decks for presence of fumes or fuel leakage. Check bilge, engine space, and main cabin. If fumes or evidence of leakage are found, determine the cause, correct it, and clean up any spillage before proceeding.

6. Open all hatches and ports to ventilate the boat.

7. Switch on battery.

8. The engine should be started only when it is certain that no potentially hazardous conditions exist.

### 4.4.7 FUEL SANITATION:

**BACTERIAL CONATMINATION:**

Bacterial contamination of the diesel fuel can cause problems. The bacteria need both water and fuel to exist, and thrive at the fuel/water interface in the fuel tank. As they multiply, they form more water and a filter choking brown slime. Their presence will not be known until rough weather churns up the fuel tank causing clogged filters at the worst possible time. Keeping water out of the fuel will prevent the problem entirely. However, a certain amount of water, due to normal condensation in the tank, is to be expected. Large particulate contamination of the fuel may cause clogging of the screen at the end of the pick-up tube inside the fuel tank. To clean the screen is remove the plate at the pick-up tube (attached to the petcock) on top of the tank and withdrawing the tube.

**FUEL ADDITIVES:**

Fuel additives or fungicides provide another means of combating contamination. Additives break the water down to a molecular level, dispersing it throughout the fuel and allowing it to pass harmlessly through the fuel system. Several brands of this product are available at marine stores.

### 4.4.8 EXHAUST SYSTEM MAINTENANCE:

In-board engine installations on sailboats differ from engine installations on powerboats. The primary difference is that the engine is installed below the waterline of the vessel.

The benefits of these locations are that the weight of the engine is where it will not adversely affect trim and that the shaft is at an efficient angle for powering and minimum drag when sailing.

Engine installations below the waterline require special attention to the design of the exhaust system. The discharged cooling water must be exhausted above the waterline to avoid excessive backpressure on the engine and prevent seawater from traveling up the exhaust line and entering the engine.

To exhaust the engine above the waterline, the discharged cooling water and exhaust gas must be "lifted" to a level above the through hull fitting on the transom.

In a Catalina, the exhaust cooling water and exhaust gas are lifted above the waterline by an "aqua-lift" type muffler. The aqua-lift muffler performs three jobs:

1. It mixes engine exhaust and water to cool the gas and lower exhaust line temperature.

2. It baffles and deadens engine exhaust noise.

3. It creates the pressure required to lift and expel cooling water.

As shown in the illustration, the inlet tube into the aqua-lift is short and the outlet tube is long, near the bottom of the tank.

As water accumulates in the bottom of the tank, exhaust gas pressure builds in the top of the tank. This forces the cooling water up the exit tube and through the exhaust line overboard.

The system requires exhaust pressure in the tank to function. When the starter motor is turning over, before the engine fires, water is being pumped through the cooling system by the belt driven cooling water pump. It is very IMPORTANT not to operate the starter motor for more than 30 seconds if the engine does not fire. Should it be necessary to operate the starter motor more than 30 seconds, water must be drained from the aqua-lift by opening the drain at the base of the aqua-lift. The drain valve may be opened until the engine fires, if desired.

All Catalinas are equipped with anti-siphon valves as an additional precaution to prevent cooling water from entering the engine. Refer to illustration "B" for a detail drawing of the anti-siphon valve. The anti-siphon valve prevents cooling water from being siphoned through the through-hull valve and engine cooling system and into the aqua-lift muffler when the engine is not operating.

**WARNING:** If the muffler were to fill completely with water, the water would travel up to the inlet tube and enter the engine block.

The Catalina exhaust system is basically simple and will provide trouble free service if you perform regular maintenance and inspection. The important points to remember are:

1. Close the engine cooling water through hull valve when you are not operating the engine.

2. DO NOT operate the starter motor for more than 30 seconds without draining the aqua-lift muffler.

3. Periodically disassemble the anti-siphon valve. Be sure the valve is not fouled with salt deposits and that it opens freely under cap.

4. Check the operation by removing the valve and:
    A. Put a finger over one large hole and blow through the other. Air should not escape through the cap.
    B. If you such through one large hole with a finger over the other, air should enter the valve through the cap.

| REV | DESCRIPTION | APPROVAL | DATE |
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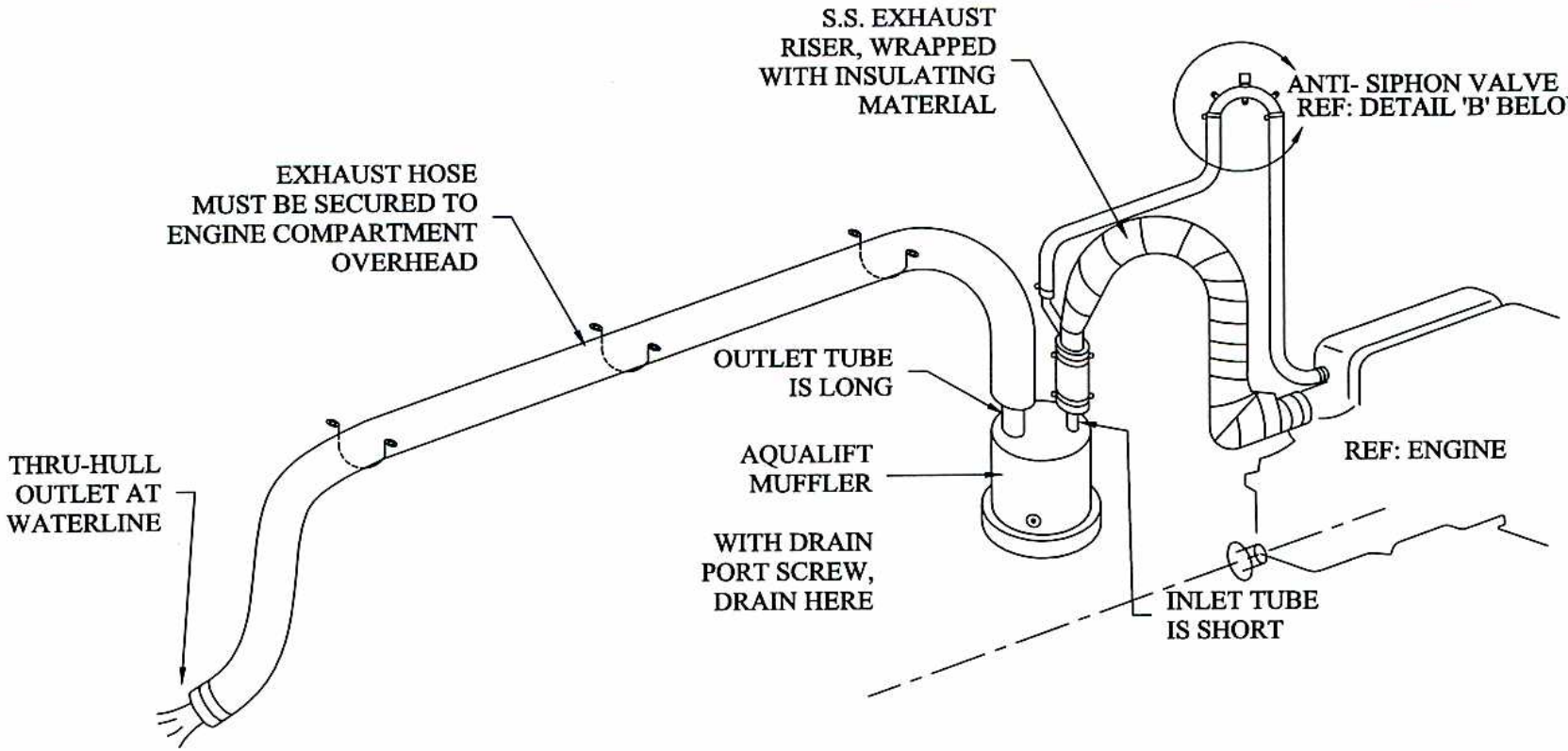


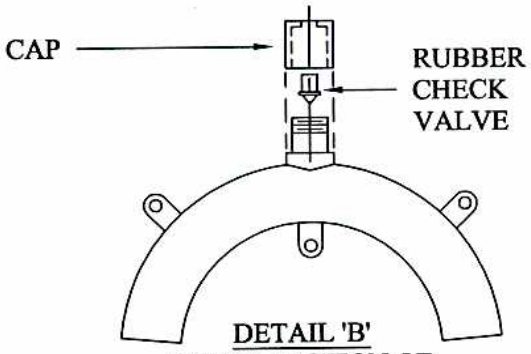


DETAIL 'B'
CROSS-SECTION OF ANTI-SIPHON VALVE

NOTE: THIS IS A PERSPECTIVE SKETCH INTENDED TO ILLUSTRATE THE APPROXIMATE RELATIONSHIP OF COMPONENTS. IT IS NOT TO SCALE.

NOTES:

1) INSPECT AND CLEAN ANTI-SIPHON VALVE MONTHLY.



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|---|---|---|
| DATE: 4/9/02 | | REVISED |

# EXHAUST SYSTEM ILLUSTRATION

| BOAT: | DRAWING NUMBER |
|---|---|
| INBOARD MODELS | 270-59001-0 |

## 4.5 STEERING:

### 4.5.1 EMERGENCY TILLER:

It is recommended that the skipper and crew become familiar with the emergency tiller and its use.

The emergency tiller should be stored in a convenient location, known to everyone operating the boat.

A dry run of the system will minimize confusion in an emergency:

1. Locate the emergency tiller.
2. Remove the wheel. Keeping a wrench handy for this purpose is a good idea.
3. Insert the emergency steering tiller in the rudder post cap.

NOTE: The emergency steering tiller moves the whole steering, including cables and quadrant. These elements must be free to move in order to steer the boat.

### 4.5.2 MARLINE RUDDER BEARINGS AND PACKING GLAND:

The non-metallic bearing system is designed to operate with no lubrication other than water.

- Specifically, no lubricants such as: petroleum grease, WD-40, aerosol, or paste, silicon gel, Teflon gel, or lanolin paste. ONLY WATER.

In the event that leakage occurs around the rudder shaft at the packing gland, it is time to take-up on the packing. Observe the following procedures:

1. Over-tightening the take-up will result in stiffening the steering system.
2. The take-up must be equal at the bolt locations around the shaft. If not, stiffening will occur.
3. The proper amount of take-up should permit an occasional drop or two to weep out when the shaft is being turned.

### 4.5.3 PEDESTAL STEERING ASSEMBLY AND MAINTENANCE:

See the two (2) pages supplied by Edson International in the owners packet.

1. PEDESTAL STEERING ASSEMBLY (pg. 1)
2. PEDESTAL STEERING MAINTENANCE (pg. 2)

## 4.6 ACCOMMODATION:

### 4.6.1 GALLEY STOVE:

There is a provision for a gimbaled stove with oven in the galley area. A two burner LPG stove with oven is a factory standard installation. It comes with an operation and maintenance booklet provided by the stove manufacturer. The standard LPG gas bottle is located in a vapor-tight container. The container is fitted with a drain and vent fitting on the transom. Keep these clear at all times.

A few additional points of operation for the standard LPG stove are below:

It is recommended that every time the LPG tank valve is opened for use, the operator close the valve and watch that the gauge needle remains constant. The gauge should read approximately 110 PSI. If you detect the pressure falling over a 15 minute period of time, there is a leak. LEAKS CAN BE DANGEROUS.

In the event of a leak:

a. If a leak occurs, check all appliance burners to see if they are in the "OFF" position.
b. Make sure the oven is in the "OFF" position.
c. Check all fittings with a soap and water solution.
NEVER USE A FLAME TO CHECK FOR LEAKS.

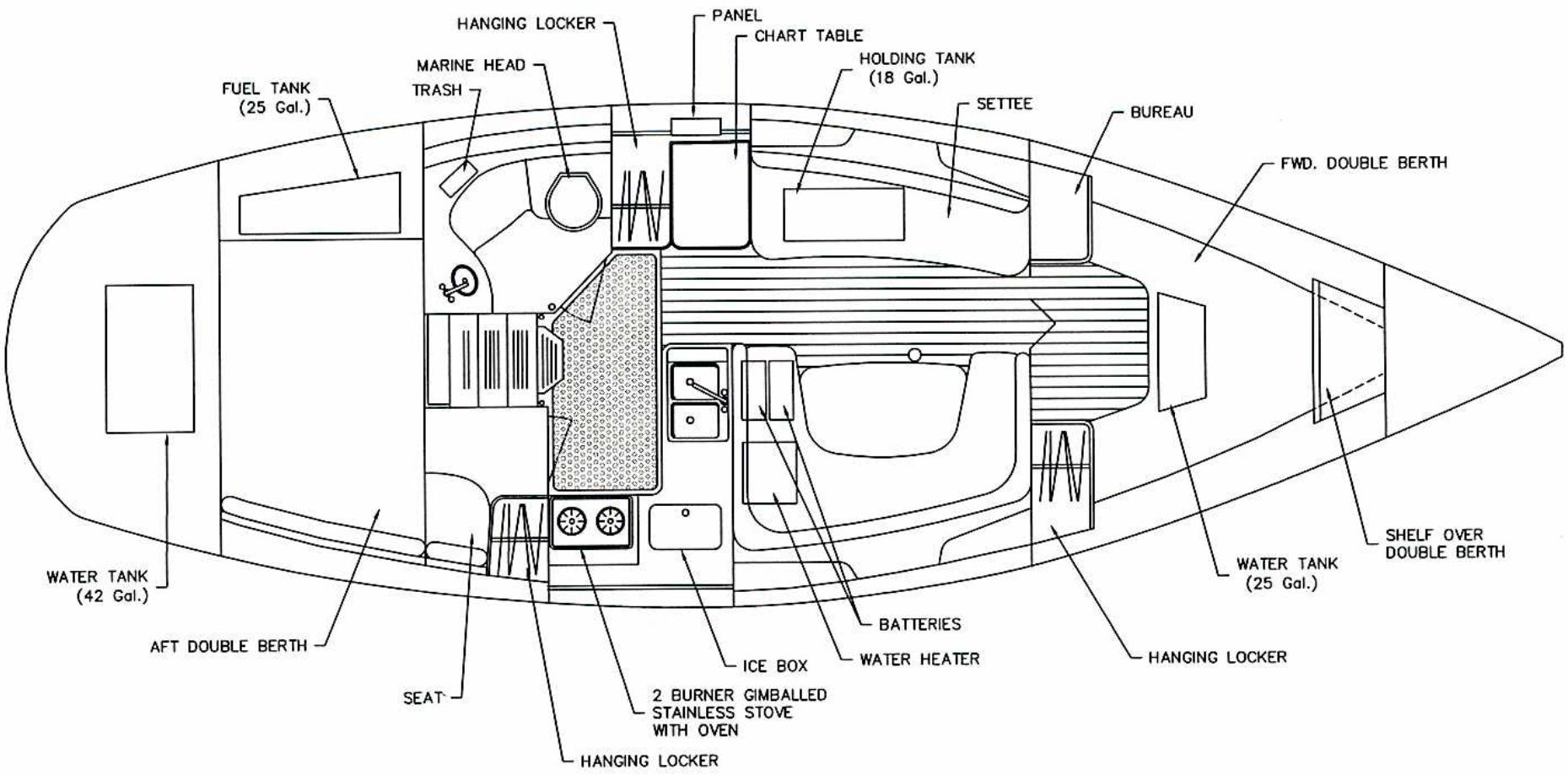
If you cannot find the leak, contact the stove manufacturer promptly.

To light the oven: light the right front burner to bleed air from the system for at least one (1) minute. Turn the temperature control knob from the "OFF" position to the "PILOT ON" position. After this has been done, light the pilot in the oven (constant pilot).

After the oven is lit, turn the oven temperature control knob to desired temperature.

Notes on Solenoid: The solenoid must be turned on to test gauge for leaks. Both the solenoid and the tank valve must be turned on to receive fuel. The solenoid is an electrical device for turning on or off the fuel from inside the cabin at the electrical panel.

Points to remember: All stoves have been safety tested, however, it is wise to remember to never leave the boat when oven or burners are on. Turn off the tank when you leave the boat for more than one or two days. Always blow out the pilot light when you will be away from the boat for more than two days and check for leaks when you open the tank.




Catalina Yachts

# ACCOMMODATION PLAN

## 5.0 DECOMMISSIONING:

### 5.1 WINTERIZING YOUR ENGINE:

#### LAYING UP:

In cold climates where yachts are decommissioned during the winter, you Catalina may be safely stored in the water, provided adequate measures are taken to prevent ice damaged to the hull. Check with your yard to determine the feasibility of storing in the water.

When the boat is to be stored on land, the mast may be left stepped on the deck. However, it is recommended that the mast be removed at the time of hauling for a thorough inspection and preparation for the next season.

This allows plenty of time over the winter months to order and replace the shrouds or rigging parts needed, avoiding any delays in spring commissioning.

#### AFTER HAULING:

1. Wash bottom, removing growth (where permitted by environmental regulation).

2. Wash topsides, deck, and all other exterior fiberglass surfaces. Was all except the nonskid surfaces.

3. Remove all sails. Follow sail maker's instructions, in regard to cleaning. Schedule any repairs required and store in a dry place.

4. Remove all sheets and lines; clean and store in a dry place.

5. If the mast has been removed from the yacht, remove all stays and shrouds from the mast. Wash the entire stay or shroud assembly, using fresh water and a stiff brush. Dry thoroughly, and coil into large non-kinking coils, and put in a dark colored plastic bag to protect them from sunlight if storing outdoors. Lash them to the mast. Store the mast either inside or outside with adequate support along its length.

6. If the mast is to be left in place, remove the boom, clean and store as described before. Clean shroud/stay end fittings, toggles, etc using fresh water and a stiff brush. Apply a light coat of silicone grease, paying particular attention to the end fittings where they connect to the stays and shrouds.

7. Clean and lubricate all deck hardware that contains moveable parts. Follow manufacturer's instructions on winches.

8. Remove all gear such as books, documents, bedding, PFD's, and anything moveable that is subject to rust, corrosion, or mildew.

9. Remove all food supplies from lockers or ice chest. Wash out ice chest interior with a weak solution of Clorox. Leave ice chest lid open.

10. Stored batteries should be fully charged, and both positive and negative terminals should be disconnected. The batteries may be either left aboard or stored in a cool, dry place. Sub zero temperatures will not harm a fully charged battery. A bilge pump should be provided power if wintering in the water.

11. Close all manual shutoffs for the stove fuel system.

12. Winterize the head system in accordance with the manufacturer's instructions.

    A. Empty the holding tank and flush it out with fresh water several times. Add a holding tank chemical.
    B. Pump all the water out of the head.
    C. Shut off the head intake through-hull.
    D. Remove the head intake line from the through-hull. Put it in a container of potable water and pump it through the head. (Do not use ordinary anti-freeze.)
    E. Reconnect the intake line to the through-hull.
    F. Shut the discharge through-hull (if applicable).

    **IMPORTANT:** Always follow the manufacturer's instructions whenever possible for winterizing the head system.

13. Hot and cold water system:

    A. Empty the water tanks as much as possible. (There will always be a small amount of water left.)
    B. Add a potable water anti-freeze, sold in marine and RV stores (DO NOT use ordinary anti-freeze, it is toxic), to water tank and a small amount of water. Pump this water/anti-freeze through the water lines to all faucets. DO NOT forget to pump some from both tanks, if the boat has two. Also drain the pumps.
    C. Close the sink drain through-hulls, or plug the sink, if the through hull is above the waterline.

    **IMPORTANT:** Always follow the manufacturer's instructions whenever possible for winterizing the hot and cold water system.

14. Remove all electronic gear that may require servicing during the winter.

15. Remove fire extinguishers fro weighing, checking, and any necessary recharging. If an automatic fire extinguisher system is installed, return the cylinders to the yacht and reinstall as soon as possible.

16. If cushions are left aboard, bring cockpit cushions below and place all cushions on edge to encourage ventilation.

17. Leave all interior lockers open to encourage ventilation.

18. Insure that cockpit and deck scuppers are open and free.

19. If the boat is to be covered, insure that cover is installed in such a way as to provide adequate ventilation and that the cover is not permitted to chafe against the hull or deck.

20. If the boat is not covered, ensure that mechanisms, such as winches and steering pedestals, are provided with adequate covers.

21. If the mast is to remain stepped, snug all shrouds and halyards to minimize noise and wear.

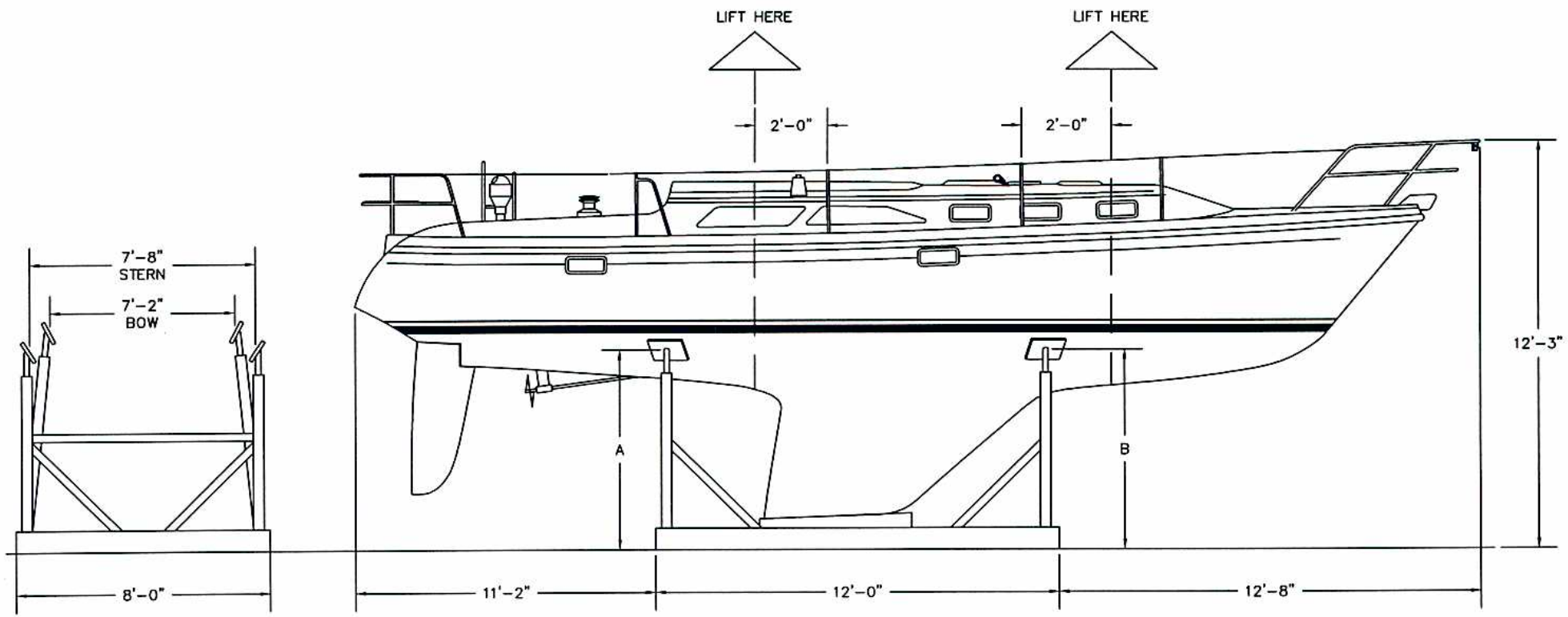
**GENERAL NOTES:**

We recommend the following procedures be followed when storing the yacht for prolonged winter months. Begin by consulting your authorized dealer about storing the boat in or out of water in freezing climates. If at all possible, the manufacturer recommends keeping the yacht in dry storage for severe winters.

All through-hull fittings should be drained and closed off. Water in the sanitation system and other tanks should be pumped out. Fill the lines and fittings with anti-freeze to prevent water from running in and freezing or expanding and cracking the lines and fittings.

For diesel engines, consult the manufacturer's manual for special instructions.

Unless the manufacturer's manual states otherwise, drain the block, disconnect the water hose from the through-hull fittings, attach an additional length of hose, and place the end of this hose in a bucket of anti-freeze. Run the engine until straight anti-freeze comes out of the exhaust line. Stop the engine at this point, plug or cap the exhaust line, and remove the additional hose and bucket.




| | WING | FIN |
|---|---|---|
| A | 3'-10" | 5'-2" |
| B | 4'-3" | 5'- 7" |

NOTES:

1. STANDARD DRAFT BOAT SHOWN
2. BE CAREFUL NOT TO PUT LIFTING SLING OVER SHAFT. THIS WILL BEND SHAFT AND DAMAGE DRIVE ASSEMBLY

NOTE: ALL MEASUREMENTS ARE APPROXIMATE

Catalina Yachts

# LIFTING RECOMMENDATIONS

## 6.0 OWNER – USER RESPONSIBILITY

### 6.1 GENERAL SAFETY TIPS:

1. DO NOT venture out when the weather conditions are unfavorable or are predicted to become so. Listen to weather forecasts, check with your Harbor Patrol office, and look out for small craft warnings.

2. Be especially careful in areas where there may be commercial shipping traffic. Keep well away from shipping channels. Keep a sharp lookout when crossing the shipping channels.

3. Learn to follow the rules of the road. All other sailors will expect that y ou know them and abide by them. The U.S. Coast Guard (BBE-2), 400 S. Eleventh Street, SW, Washington, DC 20590, will supply free literature on this. Your local branch or Harbor Patrol office may have it available too.

4. If your boat has a Genoa sail that obscures the helmsman's vision, have a dependable person in the crew keep a sharp lookout under the Genoa sail for traffic.

5. When sailing at night or in heavy weather, provide safety harnesses for yourself and your crew, and tie these lines to the boat. Use approved harnesses.

6. Purchase all Coast Guard required safety equipment and learn how to use it.

7. Enroll in a Coast Guard class or other certified boating and sailing class. You will learn a lot and enjoy sailing even more.

8. Do not take more than a safe number of persons aboard your boat when sailing.

9. Marine insurance is worth every penny you pay for it. Take out insurance from the start. See your dealer for a recommended marine agent if you do not have one.

10. Keep all seat hatches and main hatch closed during rough weather or gusty winds that could unexpectedly strike the boat and cause a knock down.

**CAUTION:** The aluminum mast and the metal parts conduct electricity. Coming in contact with or approaching an electrical power line can be fatal. Stay away from overhead power lines and wires of any kind when launching, underway, or when stationary.

## 6.2 REQUIRED SAFETY EQUIPMENT:

### FIRE EXTINGUISHER:

It is wise to locate a minimum of three, approved for marine use, fire extinguishers, one for forward of the galley, one behind the galley, and one below the cockpit hatch. Should a stove or engine fire start, you can always reach a fire extinguisher.

For example, you do not want to locate your extinguishers in the bow area because if you were located in the cockpit, you would have to get by the danger area to reach them.

Dry chemicals extinguishers should be inverted occasionally to prevent the contents from packing. Extinguishers should be recharged yearly or after each use, according to manufacturer's recommendations.

### LIFE VESTS:

Keep a Coast Guard approved life vest aboard for each crewmember. Wear them during rough weather and night sailing. Children should wear vests at all times no matter how much they may object.

### HORN:

Your yacht should be equipped with a horn capable of producing a blast that can be heard for a distance of one mile.

### FLARES:

The law requires that your yacht be equipped with a minimum of 3 day/night flares.

## 6.3 SUGGESTED SAFETY EQUIPMENT AND SAFETY PACKAGE:

### MEDICAL KIT:

A basic medical kit is a wise investment for any boat owner. Suggested items include: Motion sickness pills, aspirin, bandages, etc. We recommend that you personalize your medical kit with supplies for you and your crew's specific needs.

### TOOL KIT:

A varied arrangement of tools is, again, a wise investment to have on your boat. Tailor your toolbox for the conditions in which you sail. For local sailing, with professional help just a phone call away, you only need a small array of tools. However, for long range cruising, a more extensive supply of tools will be needed.

## 6.4 SAFETY PACKAGE, FACTORY OPTION:

| Package Includes | Description |
|---|---|
| 1 EA | West Marine TR-22 Anchor |
| 20 Ft. | Acco 5/16" Galvanized Hi-test Chain |
| 1 EA | New England 5/8" x 250' Anchor Line |
| 2 EA | 3/8" Galvanized Anchor Shackle |
| 2 EA | Taylor 8" x 20" Big B Fender |
| 14 FT | New England 3/8" Fender Line (2 x 7') |
| 1 EA | Sterns USCG app. White Throwable Cushion |
| 1 EA | Aluminum Folding Radar Reflector |
| 1 EA | Orion Star Tracer Meteor Flare Kit |
| 1 EA | Orion Red HH Flare – 3 pack |
| 1 EA | Tempo "Nature Safe" Signal Horn |
| 2 EA | Kidde 10BC Fire Extinguisher |
| 1 EA | First Aid Kit |
| 1 EA | Halogen Flashlight w/ Batteries |
| 6 EA | Kent USCG app. Type I Foam Life Vest |
| 1 EA | Chapman's Piloting & Small Boat Handling |
| 4 EA | New England 5/8" x 25' Dock Line |
| 1 EA | Beckson Yacht Log Book |

(Contents, manufacturer, and model are subject to change at any time, without notice)

## 6.5 ANCHORS, ANCHORING, AND MOORING:

The manufacturer suggests an anchor in the 22-pound range to be used as a bow anchor in ordinary conditions. Under adverse weather conditions, a heavier bow anchor could prove necessary. The Neilsen Maxwell windlass installed on your Catalina 34 is designed for ACCO 5/16" high tensile chain spliced to 5/8" three strand nylon line. Inquire in your local area about anchoring procedures relative to the place you plan to visit. Get the opinions of several experienced people and always play it on the safe side in "making up" your anchor and in using it. DO NOT forget to wire all shackle pins so they cannot come loose under water.

**REMEMBER:** Lighter anchors are made more effective by increasing the scope, i.e., the ratio of length of line and chain to depth of water. A 7:1 ratio is recommended. This means using 7 feet of anchor line for each foot of water depth.

## 6.6 LIGHTNING PRECAUTIONS:

Your yacht was not provided with a lightning protections system during construction. The reasons are as follows:

1. There is not a procedure for lightning protection that has proven reliable under all conditions. Yachts with elaborate lightning protection systems have sustained serious damage from a direct lightning strike.

2. If the builder were to assert that the yacht was lightning protected, it could instill a false sense of security in the owner or operator, leading to less-than-prudent actions when lightning threatens.

3. Lightning systems are "out of sight, out of mind," except when lightning threatens. Generally, they are not checked and maintained on a regular basis. A defect in the system (i.e., a break in a ground line) could – in some cases – increase the risk of personal harm, as well as damage to the yacht, as compared to a yacht with no protection. The reason for this is that many lightning protection systems distribute the high voltage throughout the yacht before allowing it to exit through the ground.

4. It is impossible for Catalina Yachts to control changes that you, the owner, may make to the yacht, which could affect the lightning protection system.

You, the owner, must decide whether or not you wish to equip your yacht with lightning protection and, if so, the method of doing it. The following suggestions and comments are also offered:

A. Keep the system as simple as possible. This will facilitate both installation and inspection/maintenance. Perhaps a single over-size ground (battery cable) from the mast to the engine, coupled with external shroud grounds (see (B) below), will maximize reliability.

B. The American Boat & Yacht Council (ABYC) recommends straight-line wire runs, which is virtually impossible within the yacht. For grounding the shrouds: A battery cable, which clips to each shroud and extends outside the yacht to the water, can minimize the number of bends required. This method has the added advantage of keeping the power surge outside the boat and allowing easy, routine inspection. The obvious disadvantage is that the clip-on cables are not a permanent installation and may not be in place when an unexpected lightning strike occurs.

C. Use only top quality materials and go oversize whenever possible.

D. Keep all permanent attachment points and connections where they are readily available for inspection, yet protected from damage or inadvertent disconnection.

Factory installed metal tanks, 12 volt systems, and major components are grounded to the engine. The engine is grounded via the shaft and propeller to the water. The

purpose of internal grounding is for static charge control and accidental shorts in the internal systems – not to provide lightning protection. However, you can incorporate the ground lines present into a lightning protection system you may wish to add.

By far, the most important consideration regarding lightning is observing common sense safety precautions when lightning threatens. The key considerations are listed in the American Boat and Yacht Council (ABYC) publication Section E-4, which is printed herein.

# *E-4 LIGHTNING PROTECTION*

*Based on ABYC's assessment of the existing technology, and the problems associated with achieving the goals of this standard, ABYC recommends compliance with this standard for all systems and associated equipment manufactured and/or installed after July 31, 1998.*

## *4.1 PURPOSE*

These standards and recommended practices are guides for the design, construction, and installation of lightning protection systems on boats.

***NOTE: The probability of a lightning strike varies with geographic location and the time of the year, but, when the conditions that create and electrical charge between clouds and the earth exist, there is nothing that can be done to prevent the lightning discharge. A boat can be struck in open water or while tied to the dock.***

## *4.2 SCOPE*

These standards and recommended practices apply to powerboats and sailboats if a lightning protection system is installed.

***NOTES: 1. Complete protection from equipment damage or personal injury is not implied.***

***2. A lightning protection system offers no protection when the boat is out of water, and is not intended to afford protection if any part of the boat comes in contact with power lines while afloat or ashore.***

***3. Protection of persons and small craft from lightning is dependent on a combination of design and maintenance of equipment, and on personnel behavior. The basic guides contained in this standard shall be considered and used in designing and installing a lightning protection system. However, in view of the wide variation in structural design of boats, and the unpredictable nature of lightning, specific recommendations cannot be made to cover all cases.***

## *4.3 REFERENCED ORGANIZATIONS*

*ABYC* – American Boat and Yacht Council, 3069 Solomon's Island Road, Edgewater, MD 21037-1416. 410-956-1050

*NFPA* – National Fire Protection Association, 1 Batterymarch Park, PO Box 9101, Quincy, MA 02269-9101. 617-770-3000

## 4.4 DEFINITIONS

*Air terminal* – A device at the upper most point of the lightning protection system to dissipate the charge or start the lightning ground process.

*Equalization bus* – A metallic strap, which may be installed on the interior of a boat, substantially parallel to the exterior lightning ground plate, and connected to the lightning ground plate, and connected to the lightning ground plate at both ends. Secondary lightning conductors can be connected to the equalization bus. The equalization bus provides a low resistance path to the lightning ground plate.

*Lightning bonding conductor* – A conductor intended to be used for potential equalization between metal bodies, and the lightning protection system to eliminate the potential for side flashes.

*Lightning ground plate (or strip)* – A metallic plate, or strip on the hull exterior below the waterline, that serves to efficiently transfer the lightning current from the system of down conductors to the water.

*Lightning protective gap (air gap)* – A form of lightning arrester wherein a small air space is provided between two metallic plates, with one connected directly to the vessel grounding plate or strip, and the other to an operating electrical system, such as a radio transmitter or receiver.

*Lightning protective mast* – A conductive structure, or if non-conductive, equipped with a conductive means, and an air terminal.

*Parallel path* – A path to ground that may be followed by a lightning strike. This path is separate from the path formed by the primary lightning conductor.

*Primary lightning conductor* – The main vertical electrical path in a lightning protection system formed by a metallic mast, metallic structure, electrical conductors, or other conducting means, to a ground plate, ground strip, or a metallic hull.

*Secondary lightning conductor* – A conductor used to connect potential parallel paths, such as the rigging on a sailboat, to the primary lightning conductor, or to the lightning ground plate, strip or equalization bus.

*Side flash* – An arc-over discharge that occurs from the lightning system to any metallic object.

*Zone of protection* – An essentially cone shaped space below a grounded air terminal, mast, or overhead ground wire, wherein the risk of direct lightning strike is substantially reduced. See Appendix 1

## *4.5 REQUIREMENTS – IN GENERAL*

4.5.1 To provide a conductive path for the adequate discharge of lightning currents, from the air terminal at the top of a lightning mast to the water (ground), the system shall

4.5.1.1 be essentially vertical, and

4.5.1.2 be essentially straight, and

4.5.1.3 have a conductivity not less than that of a #4 AWG (21.2 $mm^2$) copper conductor, and

4.5.1.3.1 where the system consists of multiple shrouds, stays and mast, they shall have an aggregate conductivity not less than a #4 AWG (22.2 $mm^2$) copper conductor.

4.5.2 Every metallic shroud and stay shall be connected from the chain plate directly to the ground plate or ground strip with a conductor at least #6 AWG (13.3 $mm^2$).

4.5.3 No bend of a conductor shall form an included angle of less than 90°, nor

4.5.3.1 shall it have a radius of bend less than eight inches (203mm).

4.5.4 Large metal objects such as tanks, engines, deck winches, stoves, etc., within six feet (1.8m) of any lightning conductor shall be interconnected by means of a lightning bonding conductor at least equal to #6 AWG (13.3 $mm^2$) copper.

***NOTES: 1. To minimize flow of lightning discharge current through engine bearings, it may be preferable to bond engine blocks directly to the ground plate rather than to an intermediate point on the lightning protection system.***

***2. Large metal bodies on boats include any large masses such as bow and stern pulpits, steering pedestals, horizontal guardrails, handrails on cabin tops, smokestacks from galley stoves, electric winches, davits, metallic hatches, metallic arches, towers, engines, water and fuel tanks, and control rods for steering gear or reversing gear.***

***3. It is not intended that small metal objects such as compasses, clocks, galley stoves, medicine chests, and other parts of the boat's hardware be grounded.***

***4. For illustration purposes see Appendix, Figure 1.***

## *4.6 REQUIREMENTS – MATERIALS*

4.6.1 Corrosion – The material used in a lightning protective system shall be resistant to corrosion.

***NOTE: Where it is necessary to join dissimilar metals, the corrosion effects can be reduced by the use of suitable plating or by installing a metal fitting between the two dissimilar metals that is galvanically compatible with both metals.***

4.6.2 Wire Conductors

4.6.2.1 Wire conductors shall be stranded copper.

4.6.2.1 Stranding of copper wire shall be Type II stranding in accordance with ABYC E-8, *AC Electrical Systems on Boats*, and/or ABYC E-9, *DC Electrical Systems under 50 Volts.*

4.6.3 Other Conductive Means

4.6.3.1 Conductivity shall be equal to , or greater than, #6 AWG (13.3 $mm^2$) copper wire.

4.6.3.2 The thickness of metal ribbon or strip shall be at least 1/32 inch (0.8 mm).

4.6.3.3 Copper braid shall not be used.

## *4.7 REQUIREMENTS – INSTALLATIONS*

4.7.1 To minimize side flashes, and the induction of high voltage to the boat's wiring, lightning conductors in proximity to the boat's wiring shall not be routed in parallel to the boat's wiring.

***EXCEPTION: The primary lightning conductor.***

4.7.2 Conductive Joints – Conductive joints shall be made and supported in accordance with ABYC E-9, *DC Electrical Systems Under 50 Volts*, and

4.7.2.1 shall have an electrical resistance not in excess of that of two feet (0.6m) of the smaller diameter conductor.

## *4.8 LIGHTNING PROTECTIVE MAST*

4.8.1 The lightning protective mast shall be located so that the cone of protection will cover the entire boat. See Figure 1 and Figure 2.

4.8.2 Additional lightning protective means shall be erected to form overlapping zones of protection, to protect a boat of the size that renders the use of a single mast impracticable.

***NOTE: The zone of protection afforded by any configuration of masts, or other elevated, conductive, grounded objects, can readily be determined graphically. Increasing the height of a mast above the striking distance will not increase the zone of protection.***

4.8.3 Lightning Protective Mast Alternatives

4.8.3.1 If the mast is composed of non-metallic material, the associated lightning or grounding conductor shall

4.8.3.1.1 be essentially straight, and

4.8.3.1.2 be essentially fastened to the mast, and

4.8.3.1.3 extend at least six inches (150 mm) above the mast, and

4.8.3.1.4 terminate in an air terminal, and

4.8.3.1.5 be led as directly as practicable to the grounding connection. See E-4.5.1.

***NOTE: Although partially conductive, carbon fiber materials are regarded as non-conductive (non-metallic) for the purpose of this standard.***

4.8.3.2 An outrigger that serves as a lightning protective mast shall have conductivity equivalent to #4 AWG ($21.2mm^2$) copper.

## *4.9 LIGHTNING GROUND*

4.9.1 Primary and Secondary Lightning Ground – A lightning ground for a boat shall consist of any metal surface which is submerged in the water having an area of at least 1 square foot ($0.1\ m^2$) and consist of at least one of the following methods.

4.9.1.1 External Ground Plate or Equivalent – The external ground plate shall be located as close to the base of the primary conductor as possible to minimize any horizontal runs in the primary conductor.

***NOTE: The boat's rudders, struts, external ballast keel, or other external metallic surfaces may provide an external ground plate equivalent.***

4.9.1.1.1 If the rudder(s) is used as an external ground plate equivalent, the lightning conductor shall be connected directly to the rudder shaft.

4.9.1.2 Grounding strip – An external grounding strip of copper, copper alloy, stainless steel, or aluminum, shall be installed under water to be used as an earth ground connection for the lightning system. This strip shall have a minimum thickness of 3/16 inch (5 mm), and a minimum width of ¾ inch (19 mm).

***NOTES: 1. The edges of the external ground plate or grounding strip need to be sharp, exposed, and not caulked or faired into the adjoining area.***

***2. A strip approximately one inch (250 mm) wide, and 12 feet (3.7 m) long, has nearly six times the amount of edge area exposed to the water, which, compared to the ground plates, will improve the dissipation of charges.***

4.9.1.2.1 The grounding strip, if used, shall extend from a point directly below the lightning protection mast, towards the aft end of the boat, where a direct connection can be made to the boat's engine.

***NOTES: 1. The use of two thru-bolts at each end of the strip will help to prevent the strip from twisting.***

***2. An equalization bus on the inside of the boat, paralleling the grounding strip on the outside of the boat, may be used as the lightning ground conductor.***

4.9.2 Seacocks and Thru-Hull Fittings – Seacocks and thru-hull fittings, if connected to the lightning ground system, shall not be connected to the main down conductor. They shall be connected to

4.9.2.1 the underwater grounding strip, or

4.9.2.2 the lightning ground plate, or

4.9.2.3 the internal equalization bus.

4.9.3 Multihull boats shall provide a lightning ground connection in accordance with 4.9.1 for each hull that has items to be grounded, attached, or fitted to it.

## *4.10 REQUIREMENTS – VESSELS WITH METAL HULLS*

4.10.1 If there is electrical continuity between metal hulls and masts, or other metallic superstructures of adequate height in accordance with E4.8, then no further protection against lightning is necessary.

## *4.11 REQUIREMENTS – SMALL BOATS*

4.11.1 Small boats without a permanent mast shall be protected by means of a temporary lightning protective mast that may be erected when lightning conditions are observed.

4.11.1.1 The base of the temporary lightning protective mast shall be located as close to the geometric center of the boat as possible, but, if necessary, can be offset, providing the cone of protection will cover the entire boat when the mast in plugged in.

4.11.1.2 The location of the mast base shall be such that persons on the boat can avoid physical contact with the mast or the base.

4.11.1.3 The base should extend as high as possible, and provision shall be made to plug in the upper section of the lightning mast so that it will not be displaced by the rolling and pitching of the boat in rough water.

4.11.1.4 The temporary lightning protective mast shall be all metal, other material if provided with a conductor, with a conductivity at least equal to a #4 AWG (21.2 $mm^2$) conductor.

***NOTE: A solid stainless steel whip antenna or equivalent, that has a conductivity less than a #4 AWG (21.2 $mm^2$) conductor, may be used, because of its higher melting temperature, but it will not provide as low a resistance path for the lightning.***

4.11.1.5 The temporary lightning protective mast shall be connected to a submerged ground plate of at least one square foot (0.1 $m^2$) in area.

4.11.2 Open Daysailers – As stainless steel rigging may not provide an adequate conductive path for the discharge of lightning currents, protection will depend on the grounding of all rigging as well as the metal masts, or the continuous metallic tracks on nonmetallic masts. These shall be connected at the lower ends to a lightning grounding plate, or a lightning grounding strip located directly below the mast.

4.11.2.1 Metallic rudders at the aft end of the boat shall not be used as the lightning ground for the mast because of the need for a long horizontal conductor to the aft end of the boat.

4.11.2.2 The tiller, or other connections to metallic rudders that the operator will contact, shall be nonconductive materials.

4.11.2.3 Metallic keels or centerboards shall be directly connected to the lightning grounding plate or strip, and may serve as the lightning grounding means if they have the required one square foot (0.1 $m^2$) area in contact with the water. If a centerboard is used as the lightning grounding means, a warning sign shall be provided that clearly states that the centerboard must be in the down position to function as a lightning ground.

**FIGURE 1 – BOAT WITH MAST NOT EXCEEDING 50 FEET (15M) ABOVE THE WATER**

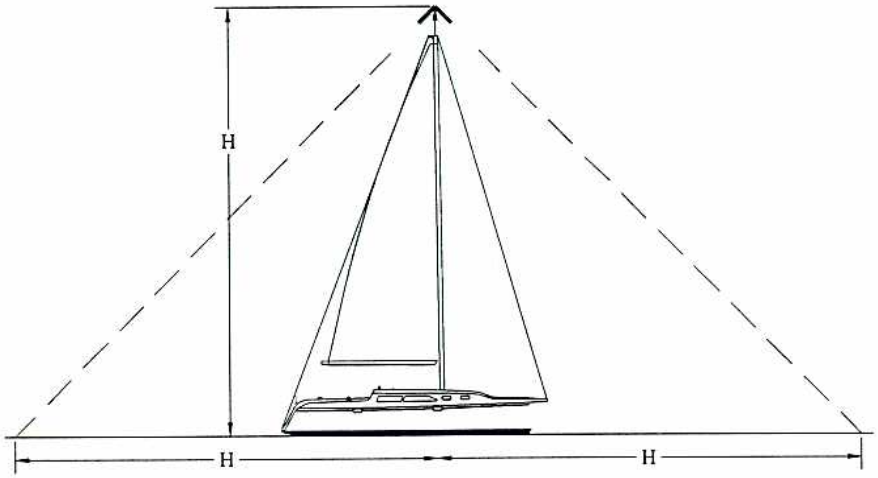



**FIGURE 2 – BOAT WITH MAST NOT EXCEEDING 50 FEET (15M) ABOVE THE WATER**

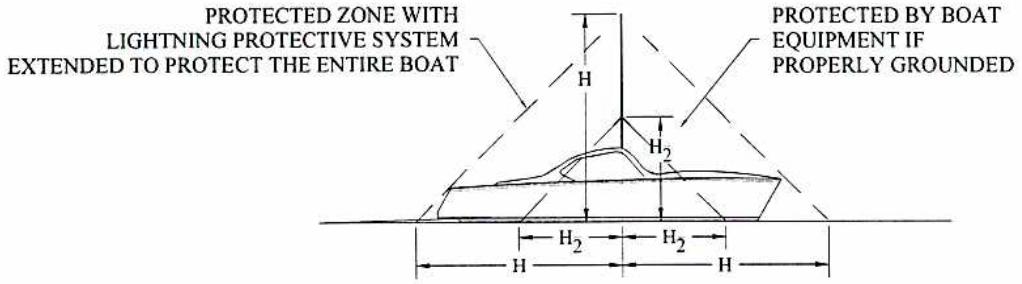
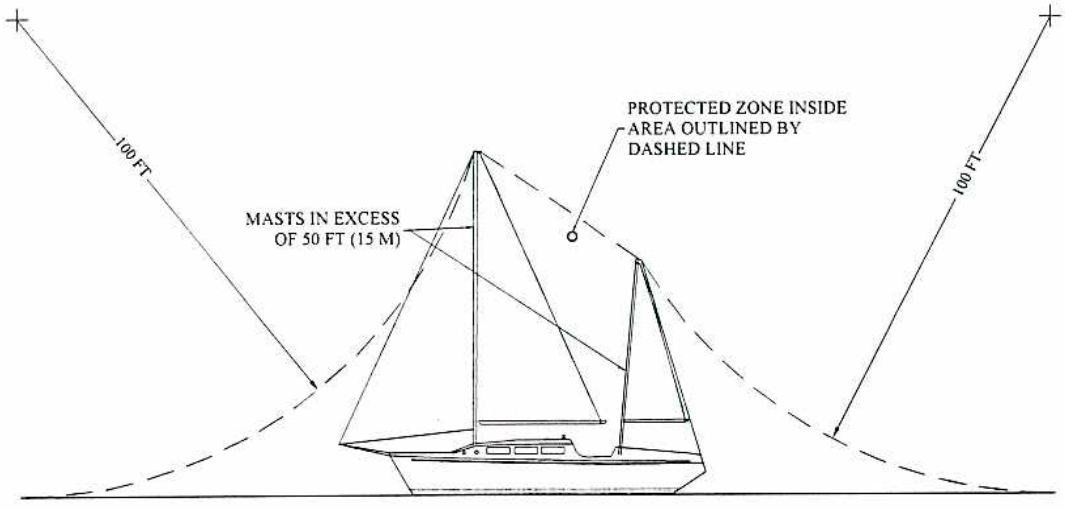



**FIGURE 3 – BOAT WITH MASTS IN EXCESS OF 50 FEET (15M) ABOVE THE WATER – PROTECTION BASED ON LIGHTNING STRIKING DISTANCE OF 100 FEET (30M)**



## *APPENDIX – LIGHTNING PROTECTION*

This appendix contains additional descriptive information and recommendations pertaining to system maintenance and behavior of personnel.

Ap. 1 Zone of Protection – A grounded conductor, or lightning protective mast, will generally divert to itself a direct strike that might otherwise fall within a cone-shaped space, the apex of which is the top of the conductor of a lightning protective mast, and the base of a circle at the surface of the water having a radius that is related to the height of the top of the conductor or lightning protective mast.

Ap. 1.2 Boats with ungrounded or non-conductive objects projecting above the metal masts or superstructure may have these objects protected by a lightning ground conductor terminating in an air terminal above the object.

Ap. 1.3 Whip type radio antennas should not be tied down during a lightning storm if they have been designed as a part of the lightning protection system.

Ap. 2 Maintenance – Lightning protection provisions are likely to receive scant attention after installation. Therefore, their composition and assembly should be strong, and materials used should be highly resistant to corrosion.

Ap. 2.1 Grounding of metallic objects for lightning protection may increase the possibility of harmful galvanic corrosion. See ABYC E-2, *Cathodic Protection of Boats*.

Ap. 2.2 If a boat has been struck by lightning, compasses, electrical, and electronic gear should be checked to determine whether damage or changes in calibration have taken place.

Ap. 2.3 If a boat has been struck by lightning, the lightning protection system should be inspected for physical damage, system integrity, and continuity to ground.

Ap. 2.4 If a boat has been struck by lightning, it should be hauled for inspection of the hull, underwater structures and thru-hull fittings. Lightning can exit from one or numerous locations below the waterline. Subsequent flooding, sinking, or long term hull damage can result from undetected lightning damage.

Ap. 3 Precautions for Personnel – The basic purpose of protection against lightning is to ensure the safety of personnel. It is therefore appropriate that during a lightning storm the following precautions be taken:

Ap. 3.1 Personnel should remain inside a closed boat, as far as practical.

Ap. 3.2 Arms and legs should NOT be dangled in the water.

Ap. 3.3 Consistent with safe handling and navigation of the boat, personnel should avoid making contact with any items connected to a lightning protection system, and especially in such a way as to form a bridge between these items. For example, it is undesirable that an operator be in contact with reversing gear levers and a spotlight control handle at the same time.

Ap. 3.4 Personnel should NOT be in the water.

Ap. 3.5 Personnel should avoid contact with metal parts of a sailboat's rigging, spars, fittings, and railings.

Ap. 4 For mast heights in excess of 50 feet (15 m), the zone of protection is based on the striking distance of lightning stroke. Since the lightning stroke may strike any object within the striking distance of the point from which final breakdown to earth ground (the water) occurs, the zone of protection is defined by a circular arc, concave upward. See Figure 2. The radius of the arc is the striking distance, and the arc passes through the tip of the mast and is tangent to the water. Where more than one mast is used the arc passes through the tips of adjacent masts. See figure 3.

The striking distance is related to the peak stroke current, and thus to the severity of the lightning stroke. The greater the severity of the stroke, the greater the striking distance. In the vast majority of cases, the striking distance exceeds 100 feet (30 m). Accordingly, the zone based on a striking distance of 100 feet (30 m) is considered to be adequately protected.

The zone of protection afforded by any configuration of masts, or other elevated conductive grounded objects, can readily be determined graphically. Increasing the height of a mast above the striking distance will not increase the zone of protection.

Ap. 5 Materials

Ap. 5.1 The materials used in the lightning protection system should be resistant to corrosion. The use of combinations of metals that form detrimental galvanic couples should be avoided.

Ap. 5.2 In those cases where it is impractical to avoid a junction of dissimilar metals, the corrosion effect can be reduced by the use of suitable plating or special connectors, such as stainless steel connectors used between aluminum and copper alloys. Except for the use of conducting materials that are part of the structure of the boat, such as aluminum masts, only copper should be used

as a lightning conductor system. Where copper is used, it should be of the grade ordinarily required for commercial electrical work, generally designated as being of the 95 percent conductivity when annealed.

Ap. 6 External Ground Plate – An exterior grounding plate of copper, copper alloys, stainless steel or aluminum may be provided by means of a plate which has an area of at least one square foot (0.1 $m^2$) area. The plate should be located as nearly as possible directly below the lightning protection mast. The boats propeller(s), shaft(s), metallic rudder(s), and other metallic surfaces that have the required area, can be effectively used on small boats only where the lightning protective mast is located at thee stern, above the in-water metallic objects to be used as the lightning system ground. The stern mast must be tall enough to provide a cone of protection that extends to the bow of the boat.

Ap 6.1 Boats that use lightning grounding plate instead of lightning grounding strip should ground backstays, or other objects aft, to the engine negative terminal, a metallic rudder, or other external ground at the aft end of the boat. The lightning ground shall not be routed through the boat to the lightning grounding plate forward under the lightning mast.

Ap. 7 Grounding Strip – An external grounding strip of copper, copper alloys, stainless steel, or aluminum, installed under the boat in a fore and aft direction, may be used as the earth ground connection for the lightning system. Except for stainless steel, the strip should have a minimum thickness of 3/16 inch (4.8 m), and a minimum width of ¾ inch (20 mm). Stainless steel should have a minimum thickness of 1/8 inch (3.2 mm). The length of the strip should extend from a point directly below the lightning protection mast, to the aft end of the boat, where a direct connection can be made to the boat's engine, but the total length of the strip shall not be less than four feet (1.22 m). In a sailing vessel, the backstay and engine should be connected to the aft end of the strip. The strip should be secured to the hull with one, or preferably two, galvanically compatible through bolts at each end. The use of the two bolts at each end, spaced one or two inches apart, will help prevent any tendency for the strip to rotate when the electrical connections are made inside the hull. The strip must be located so that the external strip is submerged under all operation conditions. If the strip is not located so as to be submerged when a sailboat is heeled to port or starboard, then a strip will be required on both port and starboard, sides. All connections to the strip should be as short and direct as possible. Additional thru-hull bolts may be located along the length of the strip for additional connections, such as on a two masted sailboat. Because of the possibility of stray current corrosion of the securing bolts, the number of thru-hull bolts should be kept to a minimum. To minimize the number of thru-hull bolt connections, and equalization bus can be installed.

Ap. 7.1 The aft end of the lightning grounding strip should be connected directly to the engine negative terminal. This will provide a path inside the hull for any DC stray currents that might be imposed on the thru-hull bolts that attach the lightning grounding strip where those bolts contact bilge water.

Ap. 8 Protection of Equipment – Wherever possible, electronic equipment should be enclosed in metal cabinets that are connected to the lightning grounding system with a minimum #8 AWG (8.39 $mm^2$) conductor. Surge suppression devices should be installed on all wiring entering or leaving electronic equipment.

Ap. 8.1 The grounding of metal rod type radio antennas provides some protection for boats without masts and spars provided that

Ap. 8.1.1 conductors in the grounding circuit of the antenna have a conductivity equivalent to #4 AWG (21.2$mm^2$) copper in accordance with E-4.5, and

Ap. 8.1.2 the top of the antenna is not more than 50 feet (15 m) above the water, and

Ap. 8.1.3 a line drawn from the top of the antenna downward toward the water at an angle of 45 degrees to the vertical does not intercept any part of the boat (see E-4.8), and

Ap. 8.1.4 the antenna loading coil is provided with a suitable protective device for bypassing the lightning current.

***NOTES: 1. Because a loading coil presents a high impedance to the flow of lightning current, the portion of an antenna above the bottom of a loading coil is not as effective as a lightning protective mast.***

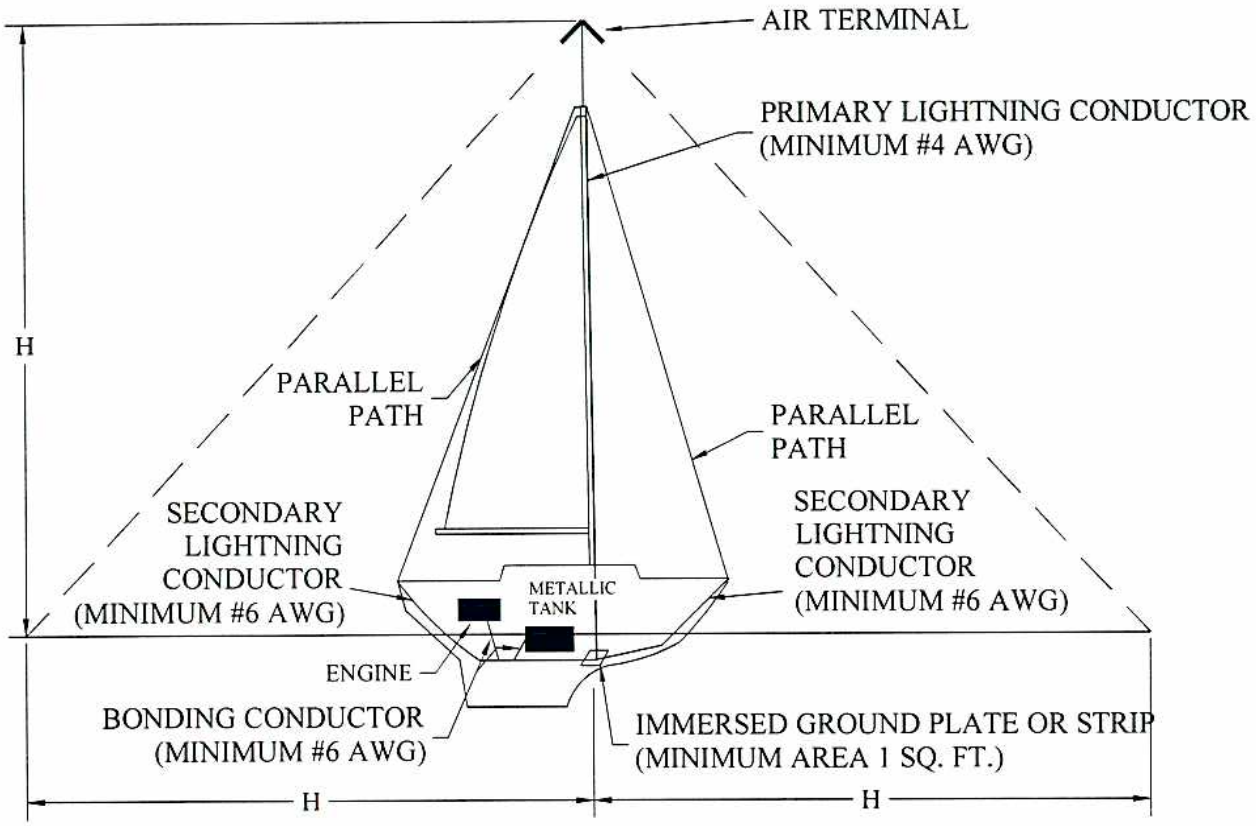
***2. Non-conduction antenna masts with spiral wrapped conductors are not considered suitable for lightning protection purposes.***

Ap. 8.2 In order to protect the radio transmitter, antenna feed lines shall be

Ap. 8.2.1 equipped with a means for grounding during electrical storms, or

Ap. 8.2.2 protected by lightning arresters or lightning protective gaps.

**AP. FIGURE 1 – LIGHTNING PROTECTION SYSTEM**




***NOTES:*** *1. An equalization bus is used on the interior of the hull as the termination for secondary conductors and bonding conductors. The primary conductor is connected directly to the immersed ground plate or strip. See E-4.9.*

*2. All otherwise isolated bare metal objects within six fee (1.8 m) of a lightning conductor shall be connected to the lightning protection system with a minimum #6 AWG (13.3 mm²) bonding conductor.*

*3. The probability of a lightning strike varies with geographic location and the time of the year. When the conditions that create an electrical charge between clouds and the earth exist, there is nothing that can be done to prevent the lightning discharge. A boat can be struck in open water or while tied to the dock.*

* * * * *

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***The American Boat and Yacht Council assumes no responsibility whatsoever for the use of, or failure to use, standards and recommended practices or technical information reports promulgated by it, their adaptation to any processes of a user, or any consequences flowing therefrom.***

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***The American Boat and Yacht Council standards and recommended practices are guides to achieving a specific level of design or performance, and are not intended to preclude attainment of desired results by other means.***

# Warning Labels

**Some, or all of these warning labels were applied to your boat at the factory. If any of these labels are missing, or you require replacement or additional labels, please contact the Catalina Yachts parts department at (818) 884-7700 ext.253.**

*Catalina Yachts reminds you that is illegal for any vessel to dump plastic trash anywhere in the navigable waters or the United States, Annex V of the Marpol Treaty is an International Law for a cleaner, safer marine environment. Violation of these requirements may result in civil penalty up to $25,000. fine and imprisonment.*

*IT IS ILLEGAL TO DUMP THE FOLLOWING:*

| *U.S. Lakes, Rivers, Bays, Sounds, and 3 Miles From Shore* | *3 to 12 Miles* | *12 to 25 Miles* | *Outside 25 Miles* |
|---|---|---|---|
| *Plastics Garbage Paper Metal Rags Crockery Glass Dunnage Food* | *Plastic, Dunnage, Linning and Packing Materials That Float, Also If Not Ground to Less Than One Inch: Paper Crockery Rags Metal Glass Food* | *Plastic, Dunnage, Linning and Packing Materials That Float.* | *Plastic* |

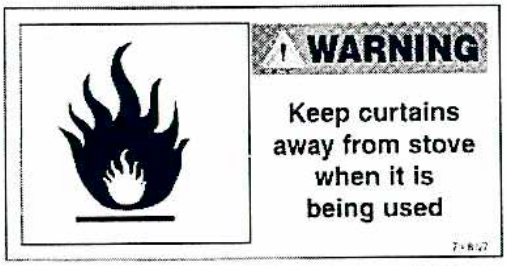
*State and Local Regulations May Further Restrict the Disposal of Garbage.*

#Lbl-1

## DISCHARGE OF OIL PROHIBITED

THE FEDERAL WATER POLLUTION CONTROL ACT PROHIBITS THE DISCHARGE OF OIL OR OILY WASTE INTO OR UPON THE NAVIGABLE WATERS AND CONTIGUOUS ZONE OF THE UNITED STATES, IF SUCH A DISCHARGE CAUSES A FILM OR SHEEN UPON, OR DISCOLORATION OF, THE SURFACE OF THE WATER, OR CAUSES A SLUDGE OR EMULSION BENEATH THE SURFACE OF THE WATER. VIOLATORS ARE SUBJECT TO A PENALTY OF $5,000.

#Lbl-2




#Lbl-3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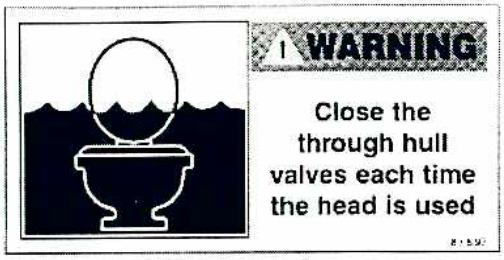


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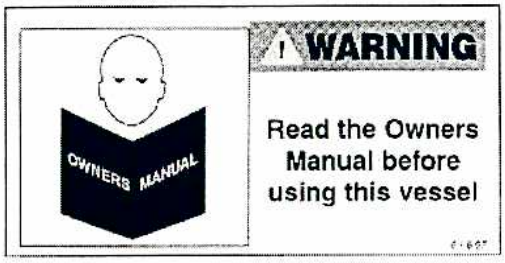


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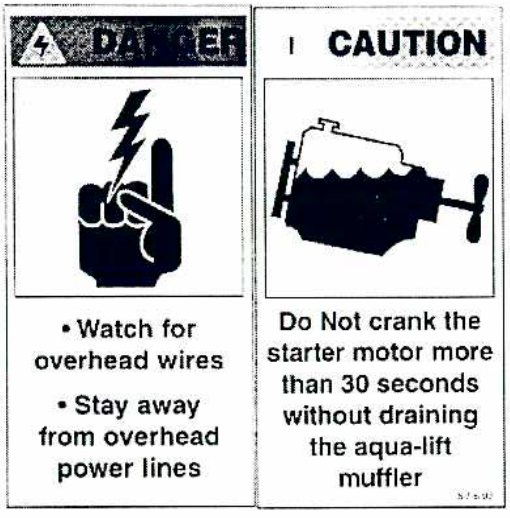


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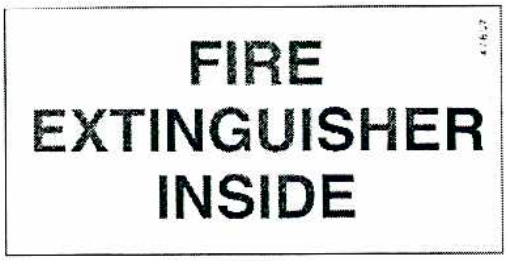


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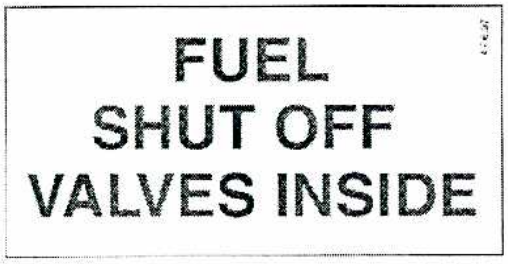


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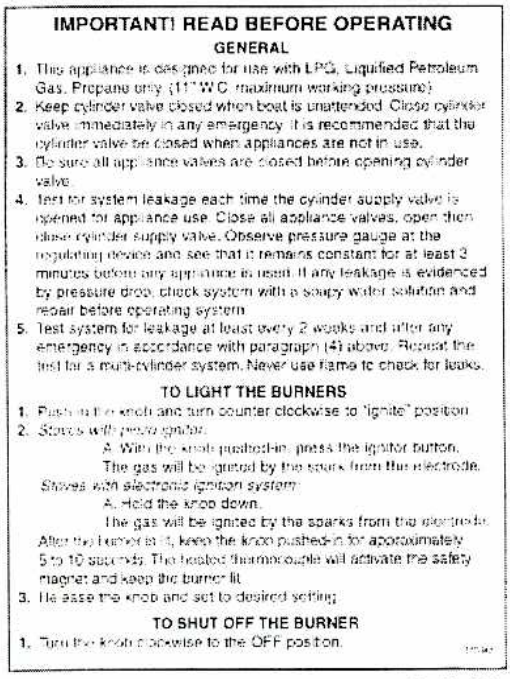
#Lbl-12




#Lbl-13