

CATALINA 320 OWNER'S MANUAL
TABLE OF CONTENTS

Preface	1
Foreword	2
Table of Contents	3
Spar Assembly and Tuning Guide	6
Specifications	13
Rigging Length Check List	14
Mainsheet System	15
Mainsheet Traveler	16
Boom Vang	17
Halyards Arrangement	18
Rigging Details	19
Mainsail Single Line Reefing	20
A.B.Y.C. Lightning Grounding Recommendations	21
Instructions for Sanitizing Potable Water Systems	28
Head/ Holding Tank/ Mincerator Pump - Operation and Troubleshooting Instructions	29
Upholstery Fabric Contents/ Cleaning Instructions	33
Safety Package, Factory Option	36
Warning Label Ordering Information	37
Commissioning Checklist	40
Maintenance Guide	43

TABLE OF CONTENTS (cont'd)

General Engine Information	45
Shaft Packing Gland (stuffing Box)	46
Engine Shaft Alignment	46
Exhaust System Description and Maintenance	49
Engine Cooling System and Heat Exchanger	50
Anti- Siphon Valve	52
Engine Electrical Diagram	53
Mast Light Wiring/Intern'l Marine Masts	54
12 V.D.C. Power Distribution System	55
115 V.A.C. Wiring Diagram w/ Charger	56
Solar Panel Wiring Diagram	57
Solar Panel Installation	58
Battery (description and care)	60
Electrical Plan	64
Emergency Tiller Instructions	65
Sail Plan	66
Deck Layout	67
Plumbing plan	68
Thru-hulls maintenance	69

Literature and warranties for optional equipment which may be supplied with this manual.

Batteries, 12 Volt Wet Cell

Headsail Purling Gear

Inboard Engine

Factory Installed Electronics

Galley Foot Pump, Fresh Water

Countertop Pump, Fresh Water

Running Lights

Marine Head

Galley Stove

Bilge Pump

Pedestal Steering

Water Heater

Pressure Water Pump

Catalina 320
Spar Assembly Information
Supplement (ver 1.0)

Rigging

Headstay-The headstay is attached with a stemball eye/toggle. To install this remove cover plate from the masthead. Remove the clevis pin and toggle from the eye. Pass the eye through the opening in the seat and pull it down until the cup washer is all the way down in the seat. You may want to do this when you have the masthead cover off to install the masthead electrical wires.

Backstay-The upper end of the backstay has a swaged on stemball with a cup washer. Make sure the cup washer is on the backstay before leading it through the stemball seat in the backstay crane.

All shrouds except the forward lowers have cup washers on the swaged on stemballs at the upper end.

The upper shrouds lead down through the stemball seats in the masthead and then out the mast wall on the same side that the shroud entered the mast.

The forward lower shroud are fitted with "T" fittings on the upper end. These connect directly to the stainless steel backing plates in the mast.

Electrical

Anchor light -The wire for the anchor light is a two conductor, double insulated wire. The order that these are connected is not critical.

Steaming/Deck light-The wire for the steaming/deck is a three conductor, double insulated wire. The wire connections must be as follows. Black=ground, Red=steaming light, White=foredeck light

Spar Assembly & Tuning Guide

Work Area

When you start to work on the spar remember that with the spreaders on the mast you will need a wide work area. Allow enough room to work on the spar after the spreaders are installed. Leave enough room at the head to work on lights etc..

TOOLS

Simple hand tools, some vinyl tape and a knife are all that you will need to assemble your new mast.

UNWRAP

The spar will be wrapped in plastic and padding material. A simple way to remove the wrapping is to run a knife in the main luff groove. CAUTION- Be careful not to cut any messenger lines that are tied around the mast. Save some of the bulky wrapping for padding the saw horses under the mast. Double check all of the wrapping to make sure it was not protecting parts that are shipped un-installed.

MESSENGERS

Double check that all of the halyard and electrical messengers are secure at both ends. Make sure the messengers are not tied to each other, only to the mast. This will allow you to work with one messenger at a time.

MAST BOOT

If your mast is deck stepped and a deck collar "boot" has been supplied slide up the mast from the heel to above deck level.

ELECTRICAL

The electrical wiring will be coiled up in the base of the mast. If the wiring runs through an exit in the mast wall above the step pull the electrical wire and messengers out now. Install masthead instrument bases and wind indicator mounts on the masthead. Wait until the mast is stepped before installing instrument wands or wind indicators.

Spar Assembly & Tuning Guide continued..

Spreaders and Rigging

Most spars go together easiest if the following procedure is followed.

Bars

If your mast has spreader through bars install them now. Roll the mast onto its aft side, this will keep the halyards aft of the spreader bars. If you have spreader bases welded to the mast go to the next section.

DIAGONALS

Install the diagonal (lower) shrouds at the base of the lower spreaders. If your mast is a two or three spreader rig attach the diagonal shrouds at the spreader bases working towards the masthead. Make sure that all needed cup washers are on the stemballs before seating them in the bases or bars.

SPREADERS

Slide the spreader onto the bar or base. Welded bases use a single pin with a cotter ring. Spreader bars use two pins and rings. The second pin in the bars will be a tight fit. You may need a mallet to tap it through.

UPPER SHROUD TANGS

Masthead stemball seats- Insert the lower swage fitting of the upper shroud into the stemball seat in the masthead and then pull it out the slot on the same side of the mast as the seat, below the mast head.

"T" Fitting- Turn the "T" 90 deg. to the mast and insert it into the hole with the stainless steel backing plate. Align the shroud with the mast and insert the hard rubber retainer plug above the "T" fitting.

Backing Shells- Insert the upper end of the shroud with the backing shell into the tang hole. Turn the tang so that it is aligned with the mast and pull it out against the mast wall. This fitting does not need any fasteners to hold it in place.

Check lengths-

Pull the shrouds tight towards the heel of the mast. Confirm that the rigging is even from side to side. Check the information about your

Spar Assembly & Tuning Guide continued..

boat for lengths.

Check turnbuckles-

Adjust the turnbuckles all the way closed and then adjust them open as far as you can with full thread contact. This will assure that there are no burrs in the threads. Lubricate the turnbuckle threads.

TIPS

After the shrouds and spreaders are installed assemble the spreader tips. When assembling the tips use anti-seize compound on the screws. Before inserting the tip castings run the screws all the way in and then remove them. Make sure that the shrouds are arranged fore and aft in the spreader tip to match the chainplates in the boat.

PULL HALYARDS

Loosen the lower end of the halyard messengers and then re-tie them with some slack. Attach the upper end of the messenger to the bitter end of the appropriate halyard. Use three half hitches around the last 2 inches of the halyard and cover it with a layer of plastic tape. Pull the halyard through the mast and tie a stopper knot in the end when it comes through the exit.

INSTALL LIGHTS.

Make all wire connections to masthead, steaming and spreader lights. Use a 12 volt lantern battery check that each light works and is wired properly before mounting the light fixture. Use anti-seize compound on all screws used to attach the lights to the mast.

STEP

Make sure the step is securely bolted down in the boat or on the deck if yours is a deck stepped rig. If your electrical wiring runs through the step, make sure there is a clear run for the wire under the step. If the step location is adjustable start with it in the middle of its adjustment. Make sure the step is on the center line of the boat.

Spar Assembly & Tuning Guide continued..

STEPPING

The crane used to step the rig will be hooked up to the rig at about half way up the rig or at a set of spreaders a little higher. Leave the crane work up to the boat yard and use their line to lift the spar.

When the mast is lowered onto the step make sure the electrical wires are lead properly. The mast will sit with the lowest fitting on the mast about 3" above the deck if it is deck stepped to allow room for the collar.

Pin all of the shroud turnbuckles to the chainplates and get them hand tight. Connect the headstay and backstay with the turnbuckles 2/3 open. After the crane is clear adjust the headstay so the spar is vertical fore and aft or has up to 1 degree of rake. Take up the backstay turnbuckle hand tight.

TUNING

The goals of tuning the mast are-

1. Mast is in the center of the boat and strait athwartships.
2. Leeward shrouds loosen slightly as the boat heels 15 deg+.
3. Balanced helm or slight weather helm.

Center the mast.

Until the mast is strait do not use wrenches on the turnbuckles, hand tightened is fine.

Check that the mast is in the center of the boat

Pull a tape measure up to the masthead with the center forward hal-yard or a jib halyard. Measure the distance from the masthead to a reference point on the shear of the boat directly abeam of the mast. Check the other side and then adjust the upper shroud turnbuckles to get the measurements even, port and starboard, then remeasure.

Starting with the lower shrouds and then any intermediates get the mast strait. At this point you will only need to get them hand tight.

Spar Assembly & Tuning Guide continued..

Walk about three or four boat lengths away from the boat and sight down the center line of the boat, confirm that the rig is strait.

Using two adjustable wrenches tighten the lower shrouds. Match the number of turns from side to side. Keep checking the rig to make sure it stays strait. Get the lowers tight enough to keep the rig strait at the lower spreader when you deflect the shroud at about shoulder height. Sight up the luff groove while pulling on the shroud to check this.

Using the wrenches tighten the upper shrouds. These shrouds will end up about the same tension as the lower shrouds.

Tighten any intermediate shrouds using the same method as the lowers and the uppers. The intermediate shrouds should not be as tight as the lowers or uppers.

Go sailing in medium wind (8-12 knt) upwind and check the tune of the rig. This mast should remain strait regardless of how far over the boat heels. The leeward shrouds should begin to go slack at about 15 deg. heel.

Catalina 320
Spar Replacement Parts List

NGI Masthead

802055 Masthead cover plate
661215 60nun x 14xm sheave
661216 50mm x 14mm sheave
002605 Sheave axle
452915 Stemball eye with toggle

Spreader tip- BF3 continuous spreader tip kit.

000185 Spreader tip casting, Tip groove casting, Plastic spreader tip boot, Flag halyard eye. Screws for attachment

NGI Vang bracket parts

554309 Vang bracket casting
001081 Clevis pin
557231 Vang swivel

Step & Halyard blocks for F305

557412 Mast step
561159 Halyard block
663007 Stand-up spring
301118 Low profile block nut
558124 Aft "U" bolt

NB32 Boom parts

303217 Inboard end casting
661215 Sheave
002613 Sheave axle
206007 Stopper
002612 Stopper axle
000062 Mainsheet bale
156110 Outboard end casting
002613 Sheave axle
661216 Sheaves

Miscellaneous parts

451218 Masthead light
451214 Combo deck/steaming light
AM0263 Halyard exit guard

CATALINA 320 SPECIFICATIONS 11 -15-95

I. PRINCIPAL DIMENSIONS

L.O.A.	32'- 6"	
L.W.L.	28-- 0"	
Beam	11'-9"	
Draft	Fin Keel 6'- 0"	Wing Keel 4'- 3"
Ballast	Fin Keel 4,000 Lbs	Wing Keel 4,400 Lbs
Displacement	Fin Keel 11,300 Lbs	Wing Keel 11,700 Lbs
Distance - Waterline to Masthead	47'- 7"	
Headroom - Maximum	Main cabin 6'- 3"	

II. COMPARATIVE DATA

	Fin Keel	Wing Keel
Displacement/ Length	230.31	238.49
1 Sail Area / Displacement	16.55	16.18
Theoretical Hull Speed	7.0 Knots	

III. SAILS

	Weight	Area
Mainsail	7.0 Oz	1 = 43-- 7"
Genoa 135%	6.0 Oz	J=12'-4"
Genoa 150%	5.0 Oz	P = 38'- 0"
Spinnaker	1.5 Oz	E=13'-3"
Total W/100% Foretriangle		521

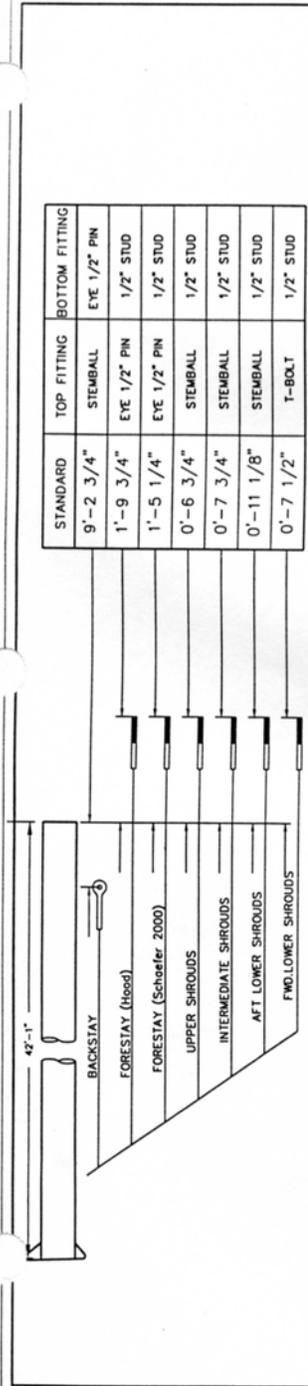
IV TANKAGE and CAPACITIES

Water	Aft 17.5 Gal, Fwd 26 Gal, Water Heater 6 Gal, Total 49.5 Gal
Fuel	20 Gal
Holding	19.5 Gal
Ice Box	5.8 cubic ft
Berths	3 Double & 1 Single

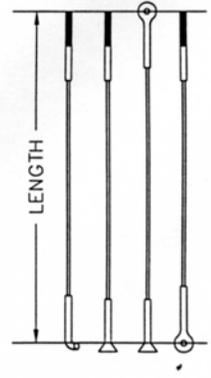
V. ENGINE and CONTROLS

Engine Yanmar	GM30 Diesel 27hp 3 Cyl. 58 C.I., Fresh Water Cooled
Fuel Consumption (est.)	0.5G.P.H.at2800R.P.M
Propeller	2 Blade 15 X 10 , 3 Blade 15X9
Pedestal Steering	Edson W/ 40" Destroyer Wheel
Compass	Richie

Specifications and equipment subject to change without notice at any time.



RUNNING RIGGING			
DESCRIPTION	MATERIAL	LENGTH	QTY.
TOPPING LIFT TAIL	5/16" DACRON	100' 0"	1
MAINSHEET	7/16" DACRON	100' 0"	1
GENOA SHEET	7/16" DACRON	50' 0"	2
TRAVELER CONTROL LINES	5/16" DACRON	30' 0"	2
SPINNAKER SHEETS	7/16" DACRON	60' 0"	2
VANG LINE	3/8" DACRON	25' 0"	1
FIRST REEF - FORWARD LINE	5/16" DACRON	54' 0"	1
FIRST REEF - AFT LINE	5/16" DACRON	20' 0"	1
SECOND REEF - SINGLE LINE	3/8" DACRON	65' 0"	1



REV.Nº	DESCRIPTION	DATE
8	ADD REEFING LINES	1-27-97
7	MAINSHEET FRM 75' TO 100'	2-01-96
6	ADD 1/2" TO SHROUDS AND BRIDLES	2-07-95
5	FORESTAY FOR SCHAEFER HAD 5/8" STUD	7-12-94
0	ORIGINAL ISSUE	1-13-93

STANDING RIGGING			
DESCRIPTION	MATERIAL	LENGTH	QTY.
BACKSTAY	1/4" WIRE 1x19	33'-0"	1
BACKSTAY BRIDLE **	1/4" WIRE 1x19	13'-3 1/2"	2
FORESTAY (Hood)	5/16" WIRE 1x19	43'-3 3/4"	1
FORESTAY (Schaefer 2000)	5/16" WIRE 1x19	42'-11 1/4"	1
UPPER SHROUDS	5/16" WIRE 1x19	42'-7 3/4"	2
INTERMEDIATE SHROUDS	1/4" WIRE 1x19	28'-8 3/4"	2
AFT LOWER SHROUDS	1/4" WIRE 1x19	14'-11 1/2"	2
FWD LOWER SHROUDS	1/4" WIRE 1x19	13'-11 5/8"	2

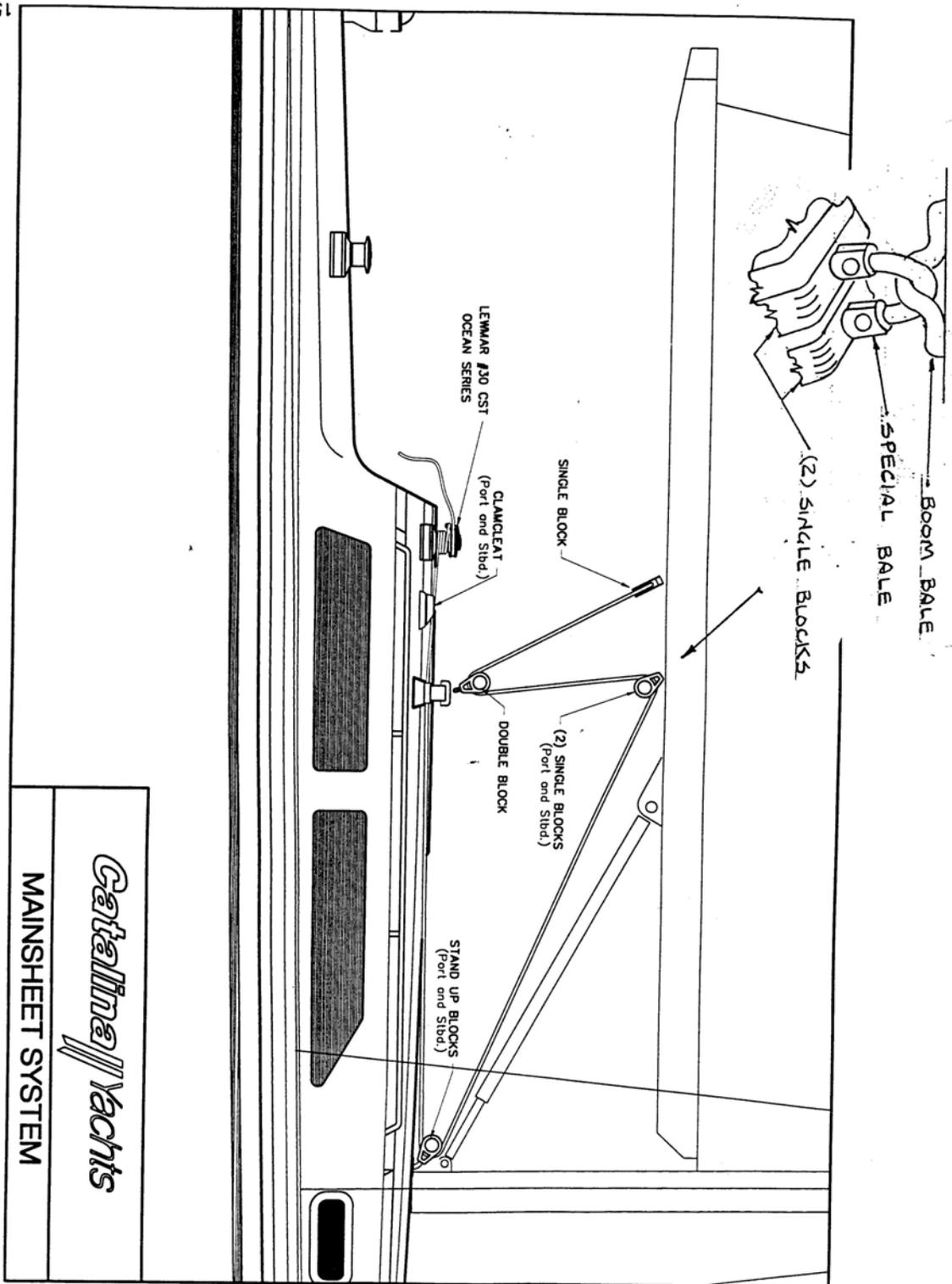
**Bridle to be EYE to 3/8" STUD

HALYARDS			
DESCRIPTION	MATERIAL	LENGTH	QTY.
MAINSAIL HALYARD	3/8" LOW STRETCH	115'-0"	1
JIB HALYARD	3/8" LOW STRETCH	115'-0"	2
SPINNAKER HALYARD	3/8" LOW STRETCH	115'-0"	1

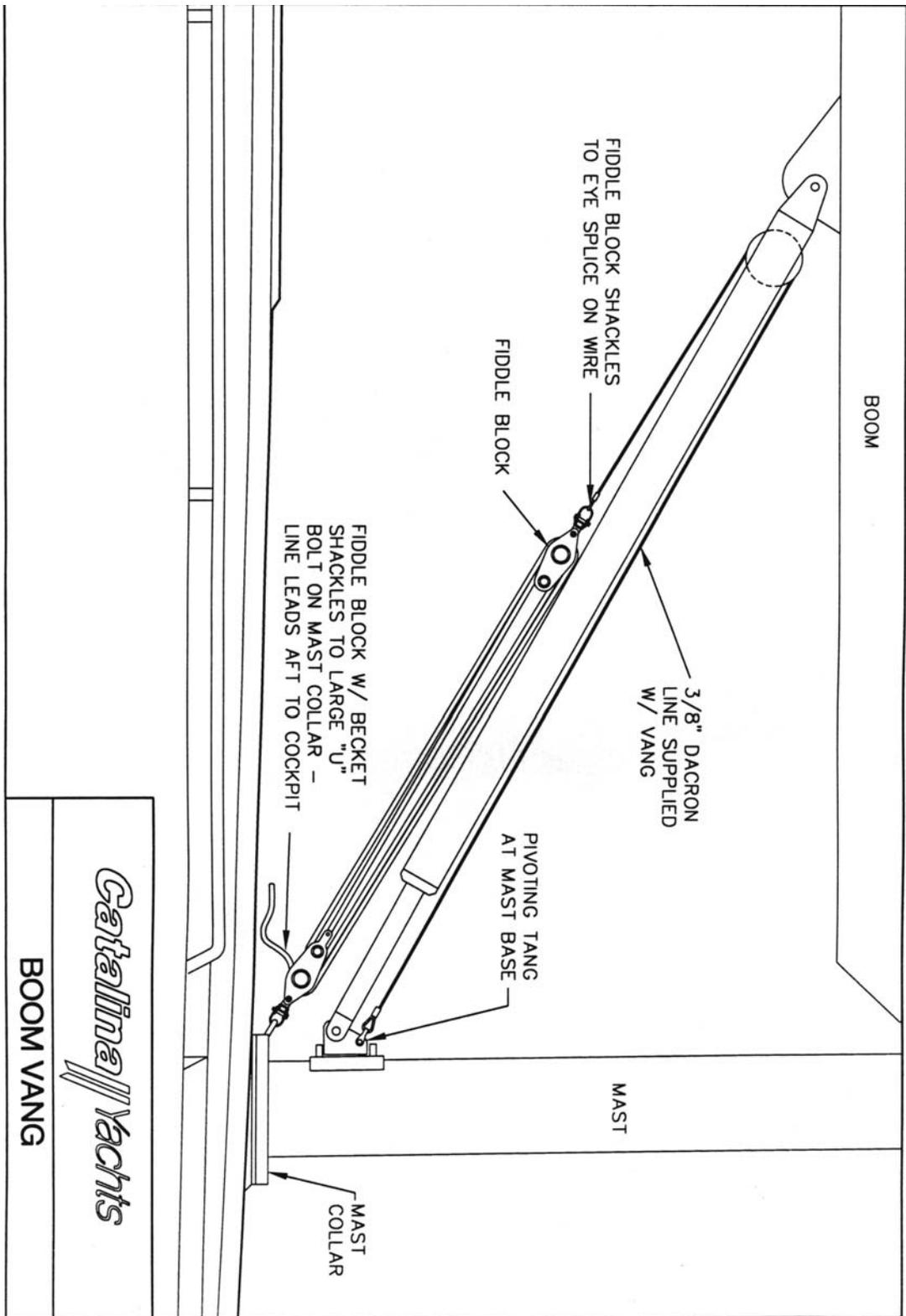
Catalina Yachts

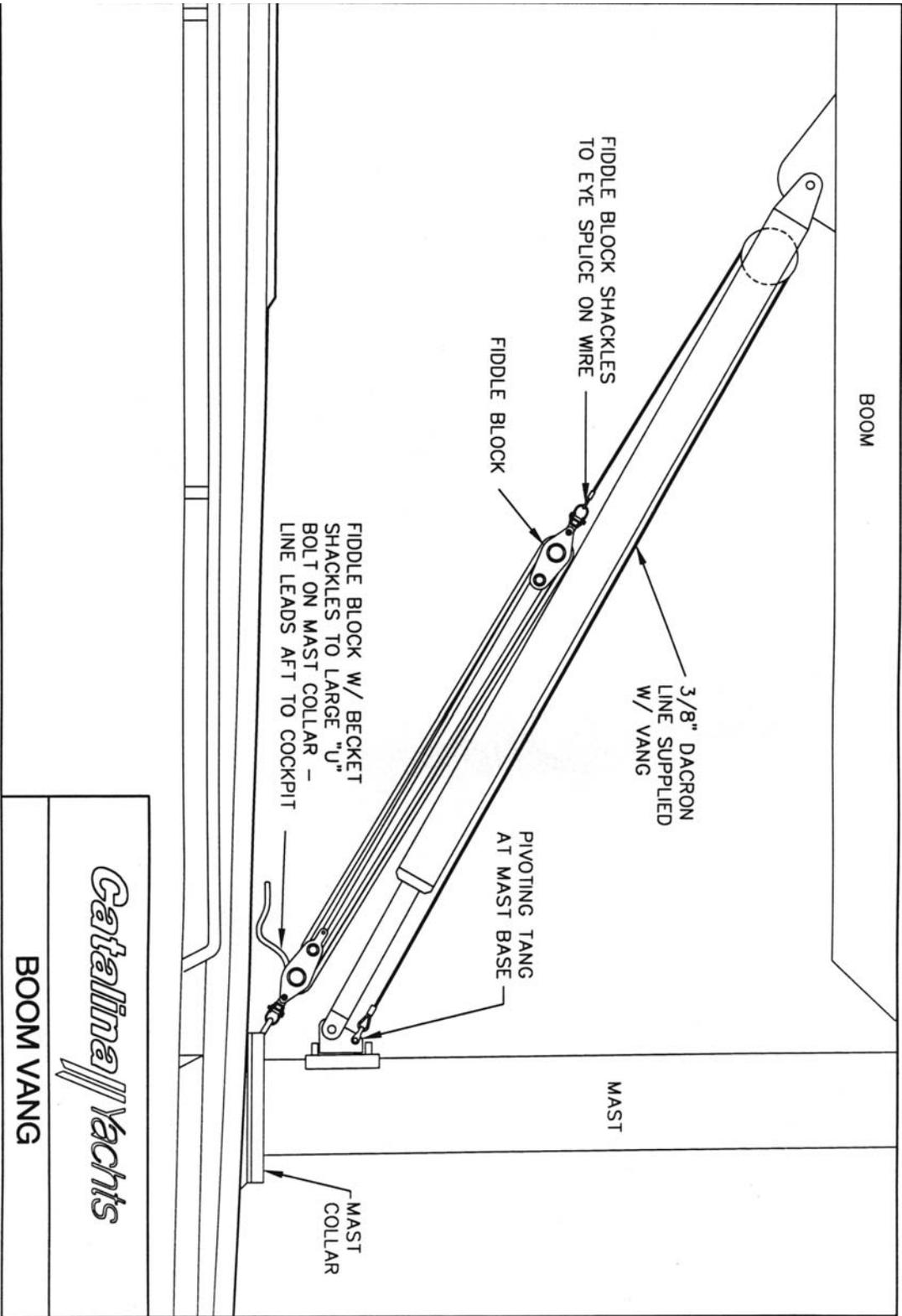
21200 VICTORY BLVD.
WOODLAND HILLS, CA.
91367-(818)884-7700

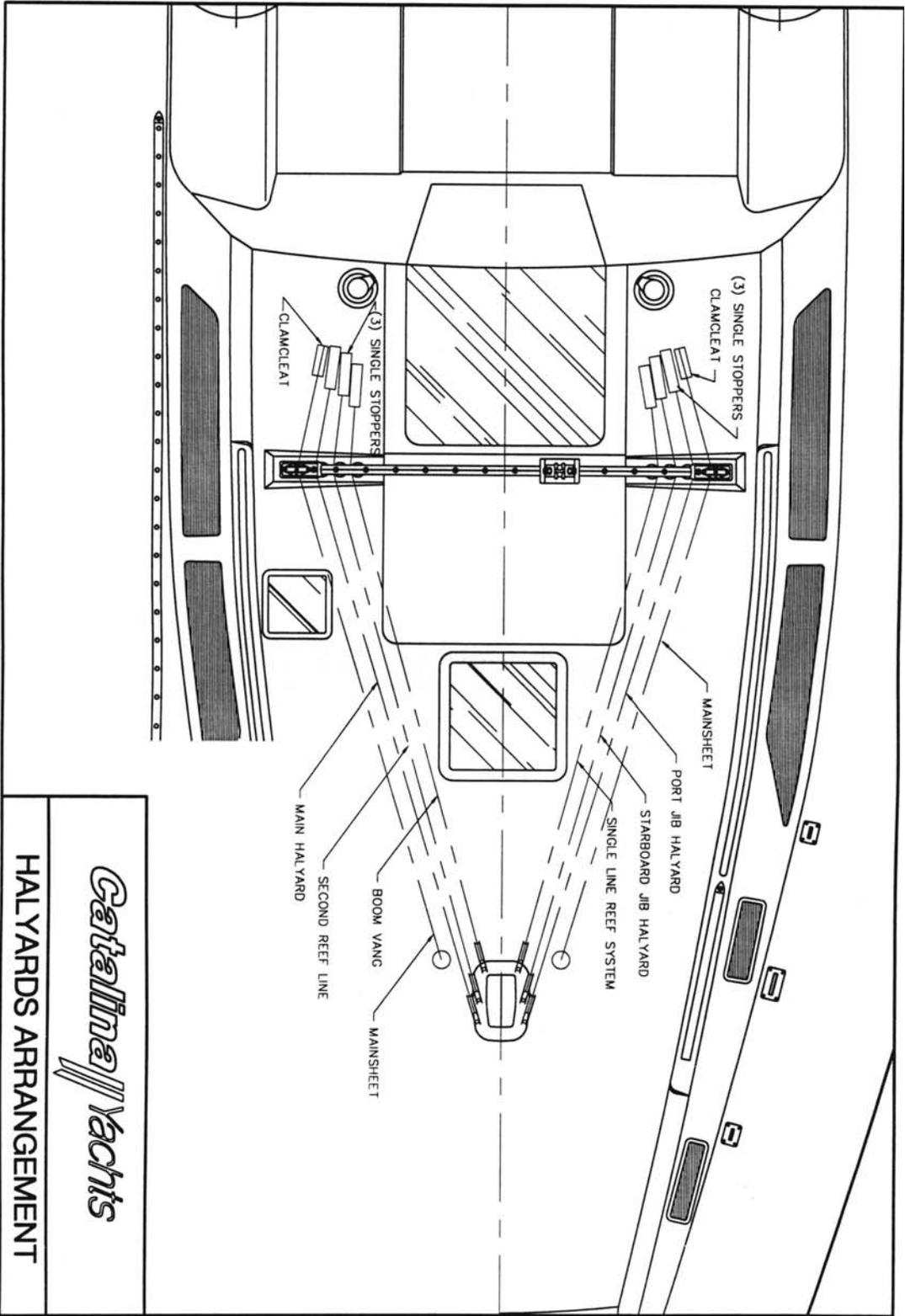
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DATE: 1-13-93	FILE: RIG
TITLE: RIGGING LENGTH	
BOAT: CATALINA 320	DRAWING NUMBER: 320-34001-8



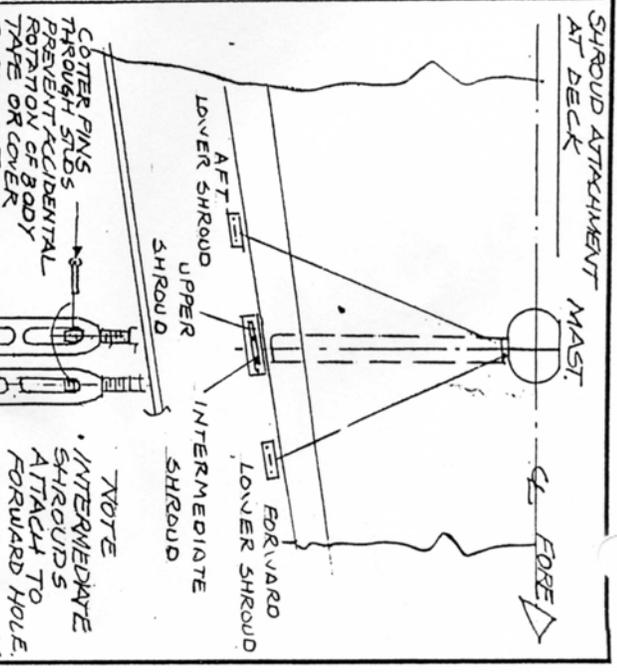
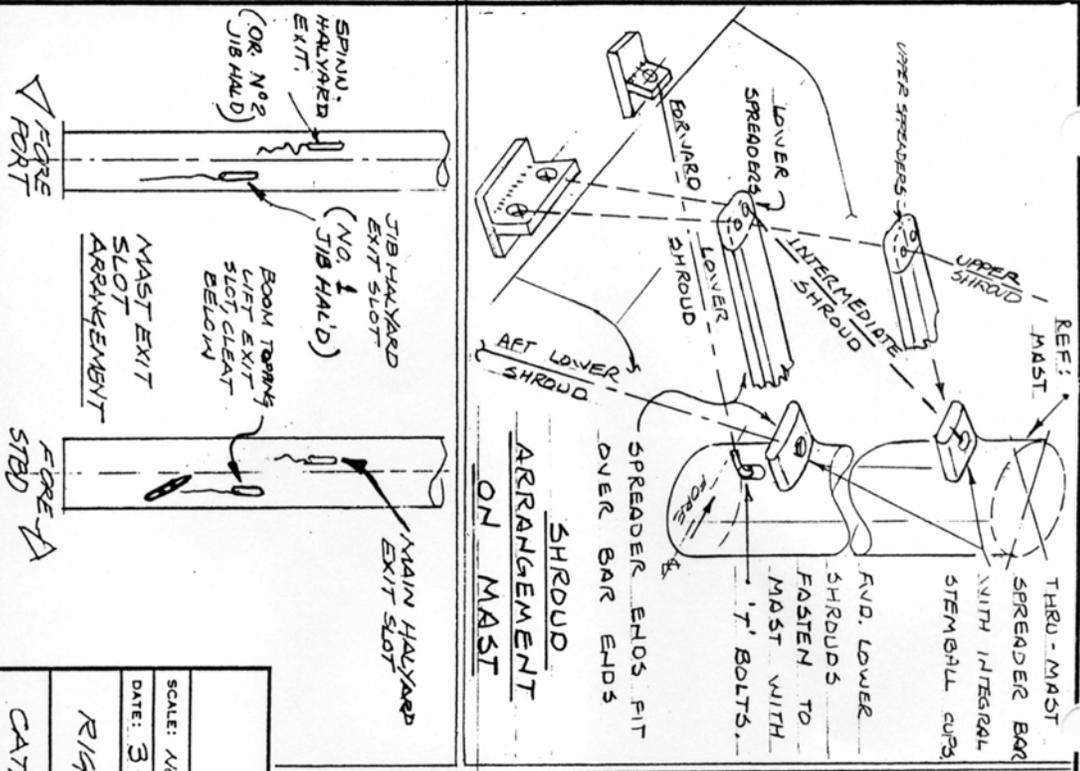
Gatellina Yachts
 MAINSHEET SYSTEM







Catellina Yachts
HALLYARDS ARRANGEMENT



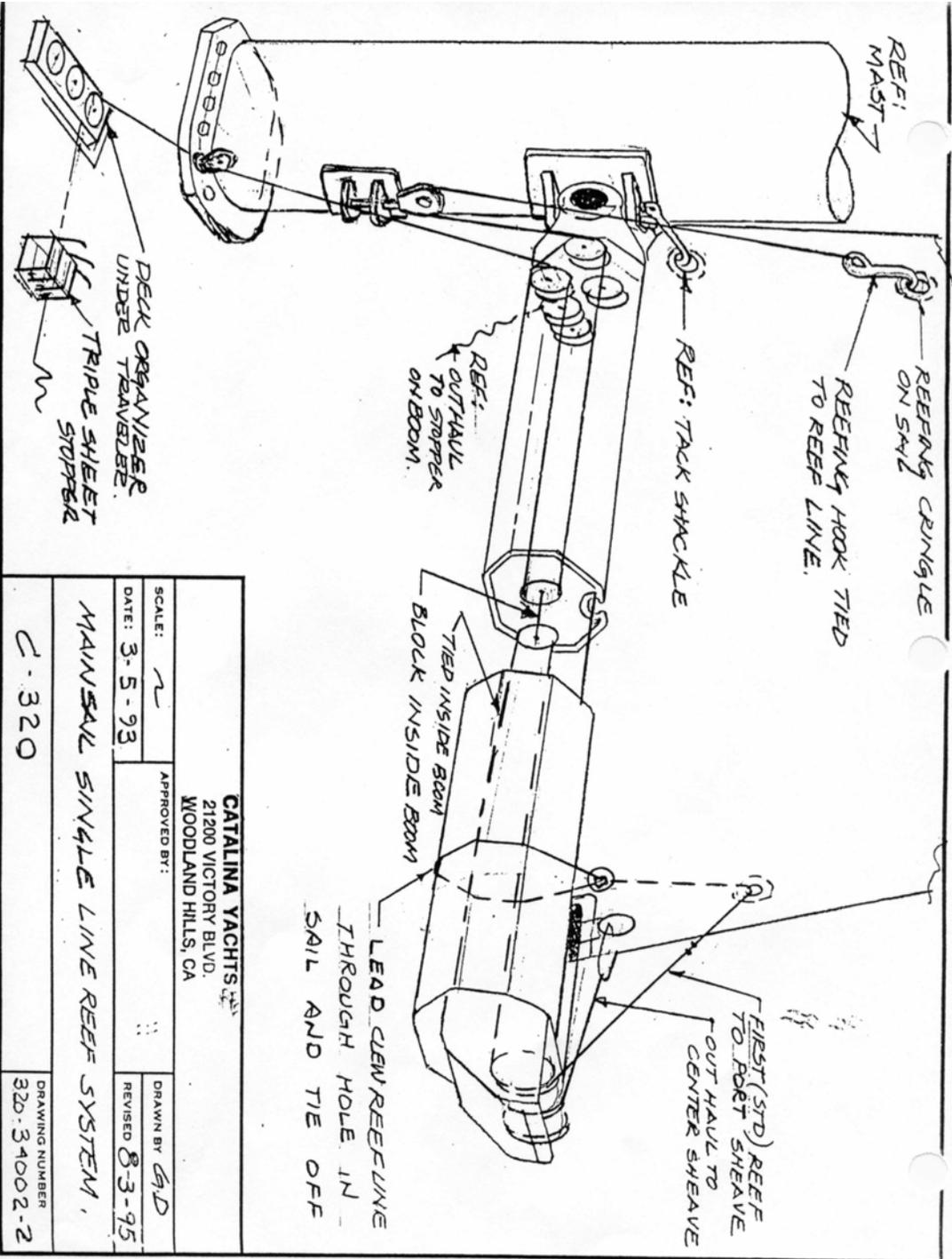
CATALINA YACHTS
 21200 VICTORY BLVD.
 WOODLAND HILLS, CA

SCALE: NONE
 DATE: 3-5-93
 APPROVED BY: [Signature]

DRAWN BY: G.D.
 REVISED: 8-3-95

RIGGING DETAILS
 CATALINA 320

DRAWING NUMBER
 320-34003-4



62X 11 PRINTED ON NO. 1000H CLEARPRINT •

<p>CATALINA YACHTS 21200 VICTORY BLVD. WOODLAND HILLS, CA</p>		<p>APPROVED BY: <i>[Signature]</i></p>
<p>SCALE: ~</p>	<p>DATE: 3-5-93</p>	<p>DRAWN BY: <i>[Signature]</i></p>
<p>MAINSAIL SINGLE LINE REEF SYSTEM,</p>		<p>REVISED 8-3-95</p>
<p>C-320</p>		<p>DRAWING NUMBER 320-34002-2</p>

LIGHTNING PRECAUTIONS:

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

- 1 There is not a procedure for lightning protection which 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 which you, the owner, may make to the yacht which could affect lightning protection systems.

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. For your guidance, a copy of the ABYC recommendations is attached. The following suggestions and comments are also offered:

- A. ABYC recommends straight-line wire runs. This 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 is not a permanent installation and may not be in place when an unexpected lightning strike occurs.
 - B. Use only top quality materials and go oversize wherever possible.
 - C. Keep all permanent attachment points and connections where they are readily available for inspection, yet protected from damage or inadvertent disconnection.
- 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, which is reprinted herein.

Recommended Practices and Standards Covering 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.

E-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 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.

E-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.

E-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.

E-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 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.

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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 a direct lightning strike is substantially reduced. See Appendix 1.

E-4.5 REQUIREMENTS - IN GENERAL

E-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

E-4.5.1.1 be essentially vertical, and

E-4.5.1.2 be essentially straight, and

E-4.5.1.3 have a conductivity not less than that of a #4 AWG (21.2mm²) copper conductor, and

E-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 (21.2mm²) copper conductor.

E-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 (13.3mm²).

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

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

E-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 (13.3mm²) 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, Ap. Figure 1.

E-4.6 REQUIREMENTS - MATERIALS

E-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.

E-4.6.2 Wire Conductors

E-4.6.2.1 Wire conductors shall be stranded copper.

E-4.6.2.2 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.

E-4.6.3 Other Conductive Means

E-4.6.3.1 Conductivity shall be equal to, or greater than, #6 AWG (13.3mm²) copper wire.

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

E-4.6.3.3. Copper braid shall not be used.

E-4.7 REQUIREMENTS - INSTALLATIONS

E-4.7.1 To minimize side flashes, and the induction of high voltage to the boat's wiring, lightning conductors in proximity to

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the boat's wiring shall not be routed in parallel to the boat's wiring.

EXCEPTION: The primary lightning conductor.

E-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

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

E4.8 LIGHTNING PROTECTIVE MAST

E-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.

E-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.

E-4.8.3 Lightning Protective Mast Alternatives

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

E-4.8.3.1.1 be essentially straight, and

E-4.8.3.1.2 be securely fastened to the mast, and

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

E-4.8.3.1.4 terminate in an air terminal, and

E-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.

E-4.8.3.2 An outrigger that serves as a lightning protective mast shall have conductivity equivalent to #4 AWG (21.2mm²) copper.

E-4.9 LIGHTNING GROUND

E-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 (0.1m²) and consist of at least one of the following methods.

E-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.

E-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.

E-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 (5mm), and a minimum width of 3/4 inch (19mm).

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 (250mm) wide, and 12 feet (3.7m) 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.

E-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.

E-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

E-4.9.2.1 the underwater grounding strip, or

E-4.9.2.2 the lightning ground plate, or

E-4.9.2.3 the internal equalization bus.

f

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

E-4.10 REQUIREMENTS - VESSELS WITH METAL HULLS

E-4.10.1 If there is electrical continuity between metal hulls and masts, or other metallic superstructures of adequate height in accordance with E-4.8, then no further protection against lightning is necessary.

E-4.11 REQUIREMENTS - SMALL BOATS

E-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.

E-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 is plugged in.

E-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.

E-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.

E-4.11.1.4 The temporary lightning protective mast shall be all metal, or other material if provided with a conductor, with a conductivity at least equal to a #4 AWG (21.2mm²) conductor.

NOTE: A solid stainless steel whip antenna or equivalent, that has a conductivity less than a #4 AWG (21.2mm²) conductor, may be used, because of its higher melting temperature, but it will not provide as low a resistance path for the lightning.

E-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 m²) in area.

E-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.

E-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.

E-4.11.2.2 The tiller, or other connections to metallic rudders that the operator will contact, shall be non-conductive materials.

E-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 m²) 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 (ISM) ABOVE THE WATER

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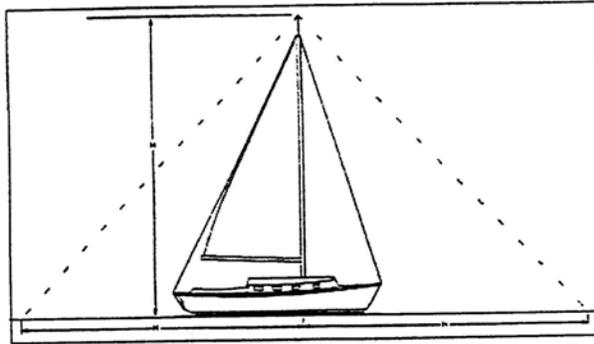


FIGURE 2 - BOAT WITH MAST NOT EXCEEDING 50 FEET (15M) ABOVE THE WATER

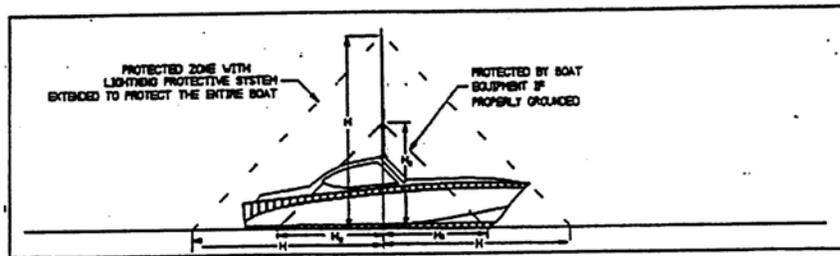
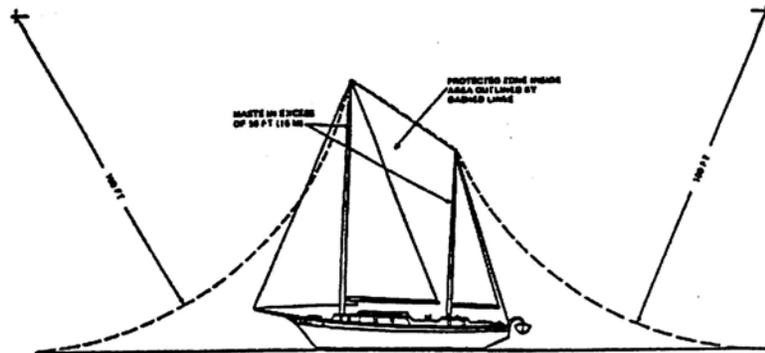


FIGURE 3 - BOAT WITH MASTS IN EXCESS OF 50 FEET (15M) ABOVE THE WATER - PROTECTION BASED ON LIGHTNING STRIKING DISTANCE OF 100 FEET (30M)



APPENDIX - LIGHTNING PROTECTION

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

E-4.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

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a radius that is related to the height of the top of the conductor or lightning protective mast.

E-4.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.

E-4.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.

E-4.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.

E-4.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.

E-4.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.

E-4.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.

E-4.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.

E-4Ap.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:

E-4.Ap.3.1 Personnel should remain inside a closed boat, as far as practical.

E-4.Ap.3-2 Arms and legs should NOT be dangled in the water.

E-4.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.

E-4.Ap.3.4 Personnel should NOT be in the water.

E-4.Ap.3-5 Personnel should avoid contact with metal parts of a sailboat's rigging, spars, fittings, and railings.

E-4.Ap.4 For mast heights in excess of 50 feet (15m), the zone of protection is based on the striking distance of the 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 (30m). Accordingly, the zone based on a striking distance of 100 feet (30m) 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.

E-4.Ap.5 Materials

E-4.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.

E-4.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

cooper 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 95 percent conductivity when annealed.

E-4.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 m²) area. The plate should be located as nearly as possible directly below the lightning protection mast. The boat's 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 the 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.

E-4.Ap.6.1 Boats that use a lightning grounding plate instead of the 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.

E-4.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 (4.8mm), and a minimum width of 3/4 inch (20mm). Stainless steel should have a minimum thickness of 1/8 inch (3.2mm). 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 (1.22m). 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 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 operating 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 the 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, an equalization bus can be installed.

E-4.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.

E-4.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 (8.39mm²) conductor. Surge suppression devices should be installed on all wiring entering or leaving electronic equipment.

E-4.Ap.8-1 The grounding of metal rod type radio antennas provides some protection for boats without masts and spars provided that

E-4.Ap.8.1.1 conductors in the grounding circuit of the antenna have a conductivity equivalent to #4 AWG (21.2mm²) copper in accordance with E-4.5, and

E-4.Ap.8-L2 the top of the antenna is not more than 50 feet (15m) above the water, and

E-4.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

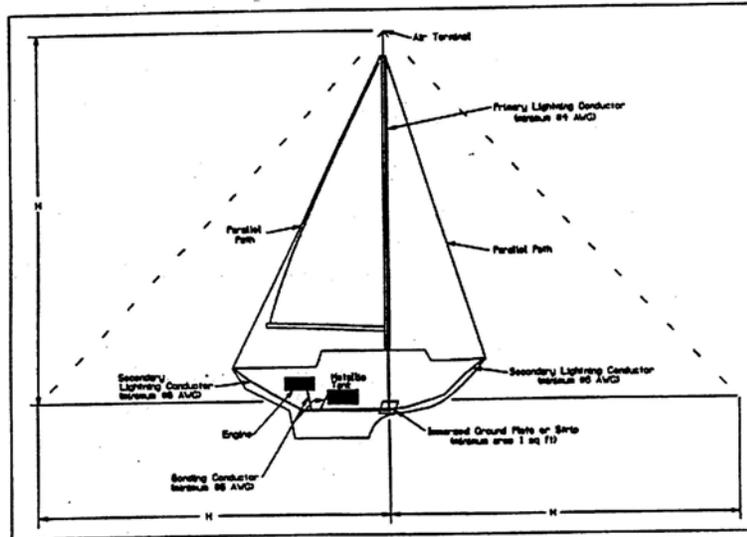
E-4.Ap.8.1.4 the antenna loading coil is provided with a suitable protective device for bypassing the lightning current.
NOTES: 1. Because a loading coil presents a high impedance to the flow of lightning current, the portion of an antenna above the bottom of a loading coil is not as effective as a lightning protective mast.

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

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- E-4.Ap.8.2 In order to protect the radio transmitter, antenna feed lines shall be
- E-4.Ap.8.2.1 equipped with a means for grounding during electrical storms, or
- E-4.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 feet (1.8m) of a lightning conductor shall be connected to the lightning protection system with a minimum #6 AWG (13.3mm²) 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.

INSTRUCTIONS FOR SANITIZING POTABLE WATER SYSTEMS

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 $\frac{1}{8}$ cup of Chlorox or Purex household bleach (5% sodium hypochlorite 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 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 vehicle 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.

HEAD, HOLDING TANK AND MACERATOR PUMP OPERATION INSTRUCTIONS AND TROUBLESHOOTING GUIDE

12-20-82

A. USING THE HEAD

1. Read the instructions for operation of the toilet supplied with the marine head. 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. This will prevent 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 necessary for each flush should be used in order to take best advantage of the tanks capacity between pump-outs.

B. EMPTYING THE TANK THRU THE DECK DISCHARGE PLATE

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

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 tank is being emptied.

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

B. CONTINUED

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

C. 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 thru 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.

TROUBLE-SHOOTING THE SYSTEM

PROBLEM 1; THE MACERATOR PUMP MOTOR STARTS THEN STOPS.

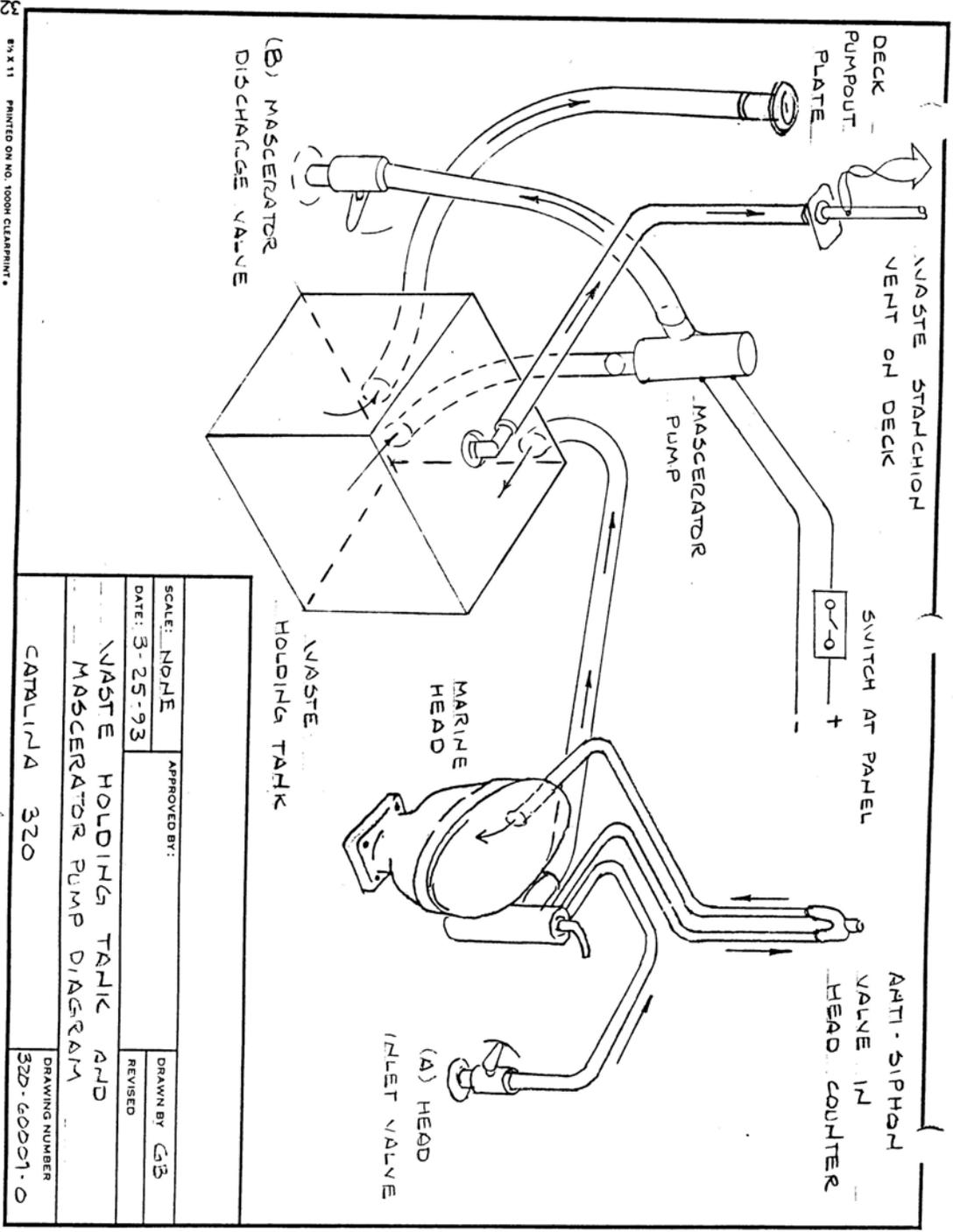
- A. Check the fuse; it should be 20 amp.
- B. Check the valves; 'B' valve must be open.
- C. Check the vent line; if the boat has been sailed at extreme angles of heel, fluid may be clogging the vent line. Disconnect the vent at the tank and empty the hose into a disposable container.
- D. Sludge may 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 BACK PRESSURE AND WILL NOT EVACUATE THE BOWL.

- 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 thru the deck plate preventing a prime, check seal at deck plate marked waste, and lubricate threads.



SCALE: NONE	APPROVED BY:
DATE: 3-25-93	DRAWN BY: GIB
	REVISED
CATALINA 320	
DRAWING NUMBER 320-60001-0	

10/16/92

Catalina Yachts

FABRIC CONTENTS

Galileo Wedgewood 50% cotton
cleaning code: S 50% polyester

Tanner (Aspen, Admiral, Smokewood) 100% polyester
cleaning code: SW

Gulfstream (691-3) 100% acrylic
cleaning code: SEE CHART

Mystic Lt. Blue 100% cotton
cleaning code: SW

Cashmere (Blue, Green, Mauve) 100% polyester
cleaning code: SW

Buckskin SAME AS TANNER
SAME AS TANNER

UPHOLSTERY
CLEANABILITY CODES

W Clean only with water based shampoo or foam upholstery cleaner. Do not over wet. Do not use solvents to spot or clean. Pile fabrics may require brushing to restore appearance. Cushion covers should not be removed and laundered.

S Clean only with dry cleaning solvent. Do not saturate. Do not use water. Pile fabrics may require brushing to restore appearance. Cushion covers should not be removed and drycleaned.

WS Clean with shampoo, foam or dry cleaning solvents as desired. Do not saturate with any liquid. Pile fabrics may require brushing to restore appearance. Cushion covers should not be removed and laundered or dry-cleaned.

NOTE: W based on colorfastness to water and dimensional stability to wet treatment tests

S based on colorfastness to solvent and solvent treatment tests

WS based on acceptable performance in the color-fastness to water/solvent, dimensional stability to wet treatment and solvent treatment tests.

10/92

100 acrylic: Gulfstream (691-3)

LISTED ARE SOME OF THE MOST COMMON STAINS AND SUGGESTED CLEANING SOLUTIONS.

STAIN	SOLUTION
Beer	Liquid detergent. white vinegar
Berry	Liquid detergent/ammonia (3-6%) water
Blood (dried)	Warm detergent/ammonia (3-6%) water
Butter.....	Volatile solvent (acetone)
Charcoal, pencil marks	Vacuum, then liquid detergent
Catsup or mustard	Liquid detergent
Chewing gum	Volatile solvent (acetone)
Chocolate	Liquid detergent. ammonia, water
Coffee	Detergent, white vinegar, volatile solvent (acetone)
Cola.....	Liquid detergent
Crayon	Paint, oil or grease remover
Egg (raw)	Liquid detergent
Grape juice	Liquid detergent, water
Gravy	Liquid detergent
Grease (car)	Volatile solvent (acetone)
Ink (permanent/India/ballpoint)...	Paint remover, volatile solvent acetone) detergent
Iron rust	Oxalic or citric acids, water
Lipstick	Paint, oil or grease remover
Mascara	Paint remover, volatile solvent (acetone), detergent, water
Milk	Liquid detergent
Nail polish	Volatile- solvent (acetone)
Oil ,.....	Volatile solvent (acetone)
Orange drink	Liquid detergent, water
Paint (latex) wet	Liquid detergent, water
Paint(latex) dried	Paint, oil or grease remover
Paint (oil or lacquer)	Paint, oil or grease remover
Shoe polish (liquid).....	.Volatile solvent (acetone)
Shoe polish (wax)	Healed iron into towel. volatile solvent (acetone)
Suntan Lotion	Pine Power1 or pine oil detergent
Tea.....	Liquid detergent
Tomato juice	Liquid detergent
Urine ..	Liquid detergent. white vinegar
Vomit ..	Warm detergent. water, white vinegar
Water Color.....	Liquid detergent. water. white vinegar
Wax candle.....	heated iron into towel volatile solvent (acetone)
Wine	Liquid detergent/ammonia (3-6%) water, white vinegar

SAFETY PACKAGE, FACTORY OPTION:

PACKAGE INCLUDES	DESCRIPTION
1 each	West Marine TR-22 anchor
1 each	Acco 5/16" x 20 ft. Galv.PC Chain
1 each	New England 5/8" X 250 ft. Anchor Line
2 each	3/8" Galvanized Anchor Shackle
2 each	Taylor 8" X 20" Big B Fender
14 feet	New England 3/8" Fender Line (2X7')
1 each	Sterns C.G. app. white throwable cushion
1 each	Aluminum folding radar reflector
1 each	Skyblazer meteor flare-3
1 each	Skyblazer handheld flare-3
1 each	Tempo "Nature Safe" signal horn
2 each	Kidde 10BC fire extinguisher
1 each	Healer 10210 small boat first aid kit
1 each	Eveready halogen flashlight w/batteries
4 each	Kent USCG app. Type II foam life vest
1 each	Chapman's Piloting, Seamanship, Small Boat
Handling	
4 each	New England 5/8" X 25 ft Dock Lines
1 each	Brass bell 6"
1 each	Beckson yacht log book

Warning Labels

These warning labels were applied to your boat at the factory and contain information important for the safe operation of your boat. If any of these labels are missing, or you require replacement or additional labels, please contact the Catalina Yachts parts department.
(818) 884-7700



PART # WS1 BELOW ENGINE INSTRUMENT PANEL



PART # WS2 ON FORWARD SIDE OF MAST 1'-0" FROM BOTTOM

WARNING

DO NOT OPEN
WHEN ENGINE IS RUNNING
CONTACT WITH HOT OR
MOVING ENGINE PARTS CAN
CAUSE SERIOUS INJURY

PART # WS4 ON ALL ENGINE ACCESS
DOORS AND PANELS

IMPORTANT

READ THE OWNERS MANUAL BEFORE
USING THIS VESSEL, ADDITIONAL
COPIES OF THE OWNERS MANUAL ARE
AVAILABLE FROM:

Catalina // *Yachts*

21200 VICTORY BLVD., WOODLAND HILLS, CA 91367

PART # WS5 IN THE COCKPIT ON DECK

CAUTION

KEEP CURTAINS
AWAY FROM STOVE

PART # WS6 ON OVERHEAD
ABOVE STOVE AREA

IMPORTANT! IMPORTANT!
Close through hull valves
each time the head is used.

PART # WS7 IN HEAD ON ACCESS
DOOR TO VALVES

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 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.

PART # WS8 IN AFT COCKPIT SEAT

It is illegal for any vessel to dump plastic trash anywhere in the ocean or navigable waters of 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.

	3 to 12 miles	12 to 25 miles	Outside 25 miles
U.S. Lakes, Rivers, Bays, Sounds and 3 miles from shore ILLEGAL TO DUMP Plastic & Garbage Paper Metal Rags Crockery Glass Dunnage Food	ILLEGAL TO DUMP Plastic Dunnage, lining & packing materials that float, also if not ground to less than one inch: Paper Crockery Rags Metal Glass Food	ILLEGAL TO DUMP Plastic Dunnage, lining & packing materials that float.	ILLEGAL TO DUMP Plastic
State and local regulations may further restrict the disposal of garbage.			

PART # WS9 ON CABIN BULKHEAD, AFT

COMMISSIONING CHECK LIST

1 PRE-LAUNCH CHECK:

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 exhaust line OK.
5. Bottom clean, paint OK.
6. Hull sides clean, gel coat OK.
7. Decks clean, gel coat OK.
8. Interior varnish OK.-
9. Cushions, carpeting, Curtains, clean and in place.
10. Forward :.berth conversion fits OK.
11. Hatch lids present and fit OK.
12. Lifelines and pulpits rigged and OK.
13. Spreaders taped and drilled at base end, upper and intermediate shrouds wired to tip end and topped or boots installed.
14. Standing rigging pinned to mast.
15. Rigging lengths verified with check list in kit.
16. Mast and boom inspected: cotter pins, sheaves, tangs, spreaders OK.

17. Mast lights checked before mast stepped.
18. Check over head for electrical wires which 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. Masthead sheaves lubricated and rotate freely.

2.1 ELECTRICAL:

1. ___ Electrical equipment operational:
 ___ Running ___ Cabin ___ Bow ___ Anchor
 ___ Spreaders ___ Pressure water
 ___ Macerator pump ___ Master
2. ___ Shore power outlet OK.
3. ___ Check battery switch #1 ___ #2 ___ OK.
4. ___ Check battery fluid level.
5. ___ Check battery terminal for tightness.
6. ___ Check battery tie-down straps.

2.2 PLUMBING:

1. ___ No leaks at through hull fittings with seacocks open.
2. ___ Fill all water tank's.
3. ___ Check all'water tanks at fittings, and vent for leaks.
4. ___ Test all faucets and foot pumps for leaks.

COMMISSIONING CHECK LIST - Continued

5. __ Check for leaks at sink drain fittings, sink drains OK.
6. __ Put water in ice box and check for proper drainage.
7. __ Check bilge pump operation, handle present.
8. __ Check head by flushing and pumping.
9. __ Check shower sump drain line.
10. __ Check holding tank, pump vent and fitting.
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 locker drains OK, no 'leaks
15. __ Stove operates OK: Check tank, fuel line, burner and oven.

2.3 RIGGING AND HARDWARE:

1. __ Mast stepped.
2. __ Pin, tape and tune standing rigging.
3. __ Backstay adjuster, whisker pole, spinnaker gear, boom vang, OK.
4. __ Blocks, cars, cleats rigged OK.
5. __ Test all winches, winch handles present.

2.4 ENGINE:

1. No leaks: shaft, rudder, stuffing box, or shaft log.
2. Propeller shaft coupling bolts lock wired and coupling is secured.
3. With fuel tanks full, no leaks at fill pipes, overflow vent, or any fuel line connections.
4. With coupling disconnected, engine and shaft alignment OK,-- Recheck alignment after rigging tuned.
5. Transmission oil level OK.
6. Crank case oil level OK.
7. Fuel valves open, bleed and prime lines for diesel engine.
8. Check that shaft is coupled and aligned to .003 maxim tolerance.
9. Engine wiring OK, connections tight.
10. Throttle control cable travel and brackets OK.
11. Clutch control cable travel and brackets OK.
12. Start engine.
13. Exhaust water flow OK.
14. No leaks in fuel lines at fittings, fuel filter, fuel pump or injectors.
15. No engine or oil leaks.
16. Idling speed set __R.P.M.'s.
17. Shutoff cable for diesel engine OK.
18. Check forward and reverse shifting lever friction OK.
19. Check engine instruments for operation, tachometer for calibration.
20. Run in gear for ten (10) minutes minimum.
21. Recheck packing gland after engine stops for proper lubrication.

COMMISSIONING CHECK, LIST – CONTINUED

- 22. ___ Bilge blower and vent system OK.
- 23. ___ Exhaust system, check for leaks, insulation in place.

3. OPERATION CHECK LIST:

- 1. ___ Emergency tiller trial fitted and operational.
- 2. ___ Pedestal steering operation OK, Compass OK.
- 3. ___ Sails and halyards OK. •
- 4. ___ Boat performance under power and sail OK.

1 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.

MAINTENANCE.–GUIDE

1 PRE-USE MAINTENANCE:

RIGGING:

1. Inspect turnbuckles - tighten if necessary, inspect safety wires.
2. Inspect clevis pins and cotter pins.
3. Visually inspect spreader tips and other areas where sails may chafe during sailing, replace tape as necessary.
4. Halyards free and not tangled.
5. Inspect mast hardware attachment bolts, tighten as required.
6. Check and tension underdeck tie rods as required. Verify installation of cotter pin through the end of the tie rod.

HULL AND DECK INSPECTION:

1. Tiller moves freely, pedestal steering OK, rudder post packing gland.
2. Bilges and compartments are dry.
3. Through hull valves, hoses, and clamps, OK.
4. 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.
4. Blower system OK.
5. Check bilge areas for fuel before starting engine.

2 MONTHLY MAINTENANCE:

RIGGING:

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

HULL AND DECK:

1. Check cockpit drains, clear debris.
2. Inspect-hull valves, open and close freely.
3. Winches turn freely, lubricate as per manufacturer's recommendations.
4. Clean and oil exterior teak as necessary.
5. Clean and wax gel coat surfaces as necessary.

ENGINE:

1. Check oil and fluid levels.
2. Battery: Check fluid levels and tie-downs.
3. Tighten all bolts and nut? to proper torque.

MAINTENANCE GUIDE - CONTINUED

4. Check fuel tank fittings, and hose clamps.
5. Disassemble and inspect cooling system anti-siphon
6. Check bolts.
7. Check filters.

3 SEASONAL MAINTENANCE:

RIGGING:

1. Mast head pins and sheaves turn freely.
2. Halyards and fittings are in good condition.
3. Spreader tips and bases, and mast fittings, OK.
4. All shroud terminations and swaged fittings, check for cracks or corrosion.
5. Gooseneck assembly and boom assembly.
6. Mast, boom, and spreaders cleaned and waxed.
7. Lifelines and stanchions all OK. All pins and fittings are secure, cotter rings taped. Turnbuckles, pelican hooks and connector loops OK. Screw fittings checked for thread wear.

HULL, DECK AND CABIN:

1. All chainplates and through bolts tight.
2. Disassemble winches and lubricate bearings and pawls.
3. Inspect and coat electrical system connections, battery tie downs and terminal connectors to prevent corrosion".
4. Drain and flush fresh water system.
5. Check head and anti-siphon valve in toilet.
6. Hatch gaskets, and hold-down fasteners.
7. Bottom, keel, and rudder condition of anti-fouling paint.
- .8. Lifelines, stanchions, and pelican hooks.

ENGINE:

1. Check shaft alignment, repack stuffing box if necessary.
2. Clean motor thoroughly.
3. Inspect fuel system.
4. Tune engine as per manufacturers recommendations.
5. Exhaust system, check for-leaks or deterioration, insulation in place.

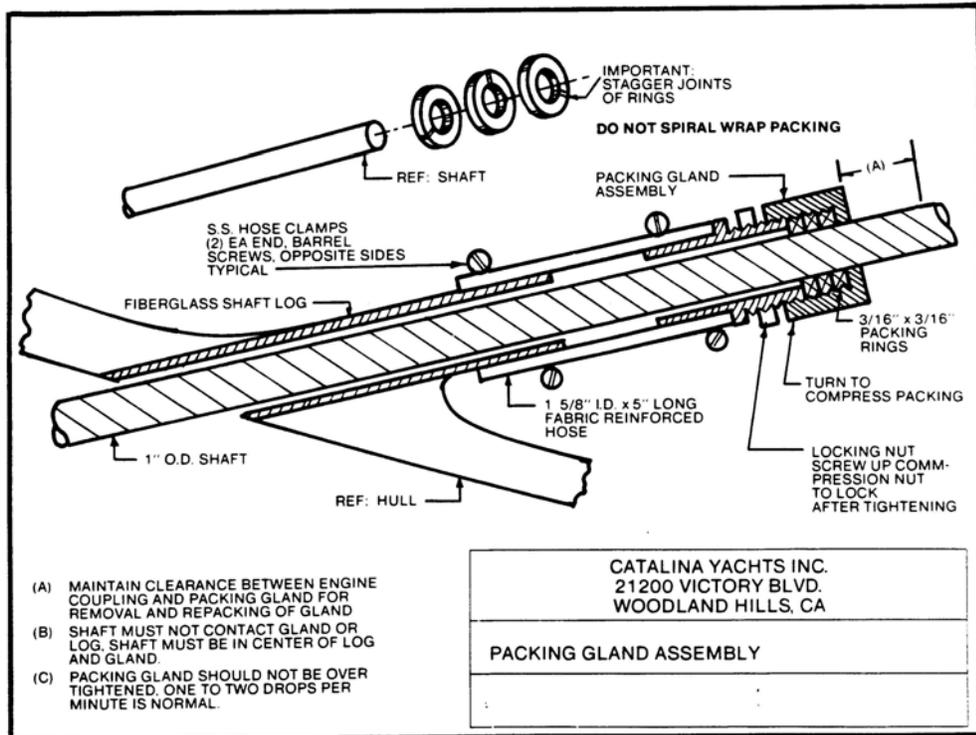
GENERAL ENGINE INFORMATION:

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

Two points are worth special attention. Firstly, marine engines work under conditions tougher than those of automotive engines. Your marine engine faces constant torquing not encountered in other applications. 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 .003 (thousandths of an inch) T.I.R. after launching. This is done during commissioning of the yacht. Be sure that your dealer has made this adjustment before using your engine.

Change the oil regularly. Keep spare parts and alternator belts on hand and use only 3/4 throttle on long passages. 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 when the boat is to be used in salt water.



SHAFT PACKING GLAND (STUFFING BOX):

The packing gland is located under the aft berth on the center line.

A properly adjusted shaft packing gland should drip slightly (from 1 to 2 drops per minute) with the engine off. Too loose an adjustment will allow too much water in the bilge and engine operation will spray water from the shaft. Too tight 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. Hold 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 4 to 15 drops per minute. Hand tightening of the packing nut is often sufficient to obtain this adjustment. If this is not the case, an additional 1/4 to 1/2 turn with the wrench should produce the desired results.
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 drop.

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 rig is tuned.

1. The propeller shaft has been dimpled (1/8" deep)

SHAFT PACKING GLAND (STUFFING BOX) continued

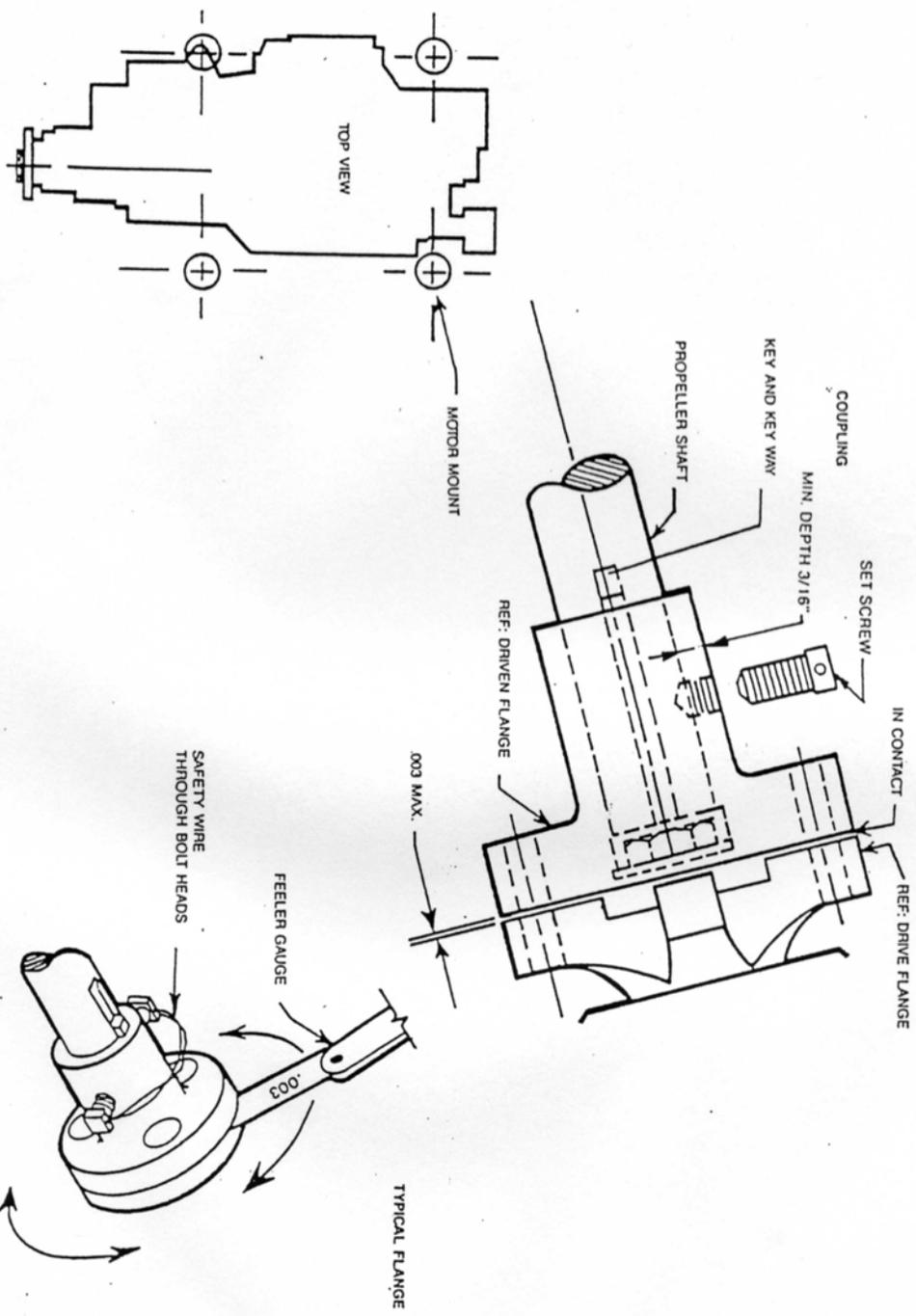
for two (2) coupling set screws. The set screws are safety wired, using stainless steel wire, as illustrated. Check key in keyway, as it must be in place between shaft and coupler.

2. Remove coupling flange bolts and check propeller shaft for clearance. Adjust stuffing box so that excessive seepage is prevented, yet the shaft is allowed to spin freely.
3. Slide shaft away from engine and check coupling mating surfaces. These must be clean.
4. Slide shaft forward to connect coupling surfaces. Pilot on transmission flange must align with recess in shaft coupling flange. This is an indication of correct axial alignment.
5. With coupling flanges in contact, measure gap around edge of coupling flanges with .003 feeler gauge. Maximum allowable gap at any point is three thousandths of an inch. Take this measurement several times...rotating shaft 1/4 turn each time. Any gap in excess of .003 must be corrected by changing engine position, especially fore/aft tilt.

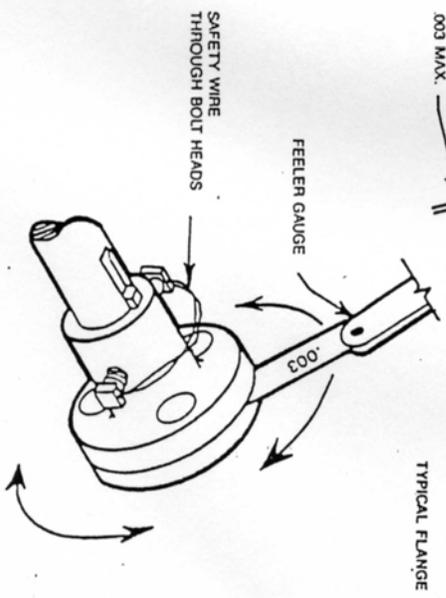
For example, excessive gap at the bottom of the coupling (see drawing) indicates engine is tilted too far aft (front too high). Using a 15/16 end wrench, loosen lock nuts on forward motor mount(s)» Lower front of engine by clockwise rotation of motor mount nuts. Re-measure gap at coupling. A gap at the top of the coupling would require the exact reverse procedure.

6. Pull shaft aft as in step 3. Again slide shaft forward, rechecking axial alignment as in step 4. •
7. Repeat steps 5 and 6 until alignment within tolerance is achieved.
8. Tighten motor mount lock nuts and install coupling.

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



MEASURE GAP BETWEEN MATING FACES OF COUPLING FLANGES. MAXIMUM ALLOWABLE GAP AT ANY POINT IS .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



EXHAUST SYSTEM MAINTENANCE:

In-board engine installations on sailboats differ from the engine installations on power boats. The primary difference is that the engine is usually 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 effect 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 back pressure on the engine and prevent sea water 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 the Catalina 320 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 gas and water to cool the gas and lower exhaust line temperature.
2. It baffles and deadens engine exhaust noise.
3. It creates pressure required to lift and expell 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 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 Catalina. -s are equipped with anti-siphon valves as an additional precaution to prevent cooling water from entering the engine.

2-3-93

ENGINE COOLING SYSTEM continued

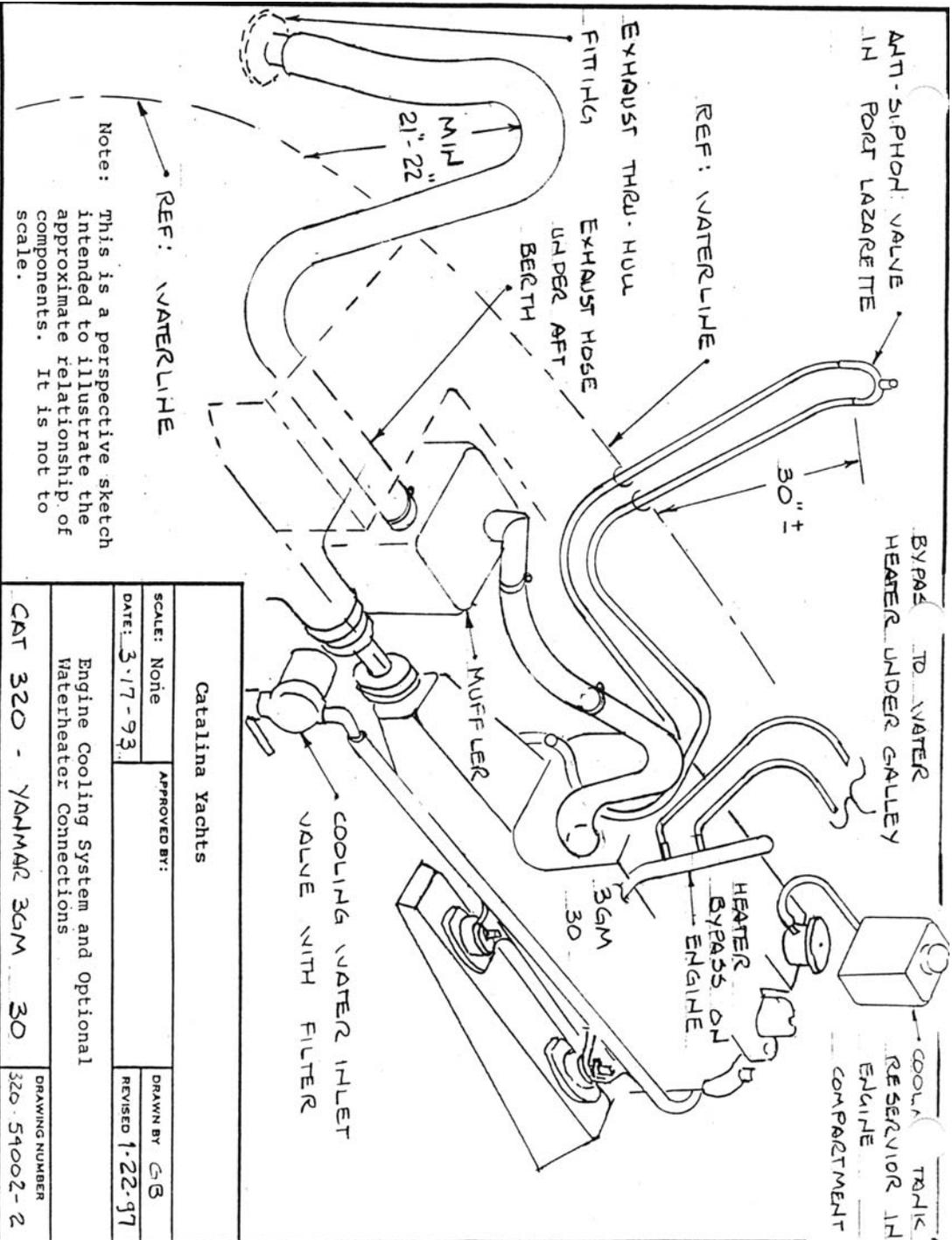
The engine cooling system consists of a sea water side and a recirculating side; each has a separate pump mounted on the engine.

The sea water side draws water in through a through hull valve with filter, to the pump. The water is then pushed through the anti-siphon valve and through the heat exchanger/ expansion tank, located on the upper port side of the engine, with replenishment cap on top. In the heat exchanger, the coolant mixture in the closed, recirculating side transmits heat to the sea water. The sea water then exits the heat exchanger through a hose and is discharged into the engine exhaust line and the aqua-lift muffler, which is described elsewhere in this text.

The closed, or recirculating side of the system contains a 50:50 mixture of anti-freeze and water. The coolant is circulated through the system by a water pump mounted on the front of the engine. The coolant is circulated through the engine block and heat exchanger.

In boats equipped with hot and cold pressure water the recirculating coolant system is interrupted between the water pump and the block and routed through the water heater, to heat the water in the fresh water system when the engine is running. The closed side of the system must be purged of air bubbles to prevent overheating. Run the engine at approximately 2000 RPM until the engine is at operating temperature (apx. 160 deg.+).

It is recommended that you replenish the coolant in system from the reservoir. Do not open the coolant cap on the engine after the engine is warmed up, as the coolant is hot and under pressure.



Note: This is a perspective sketch intended to illustrate the approximate relationship of components. It is not to scale.

Catalina Yachts	
SCALE: None	APPROVED BY: GB
DATE: 3-17-93	DRAWN BY: GB
Engine Cooling System and Optional Waterheater Connections	
CAT 320 - YANMAR 3GM 30	DRAWING NUMBER 320-54002-2

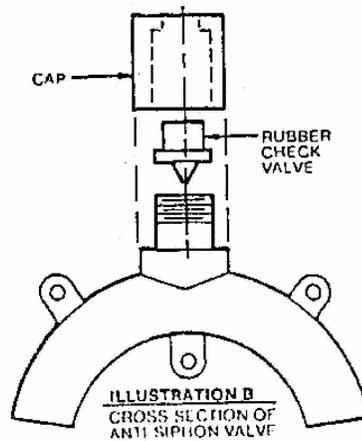
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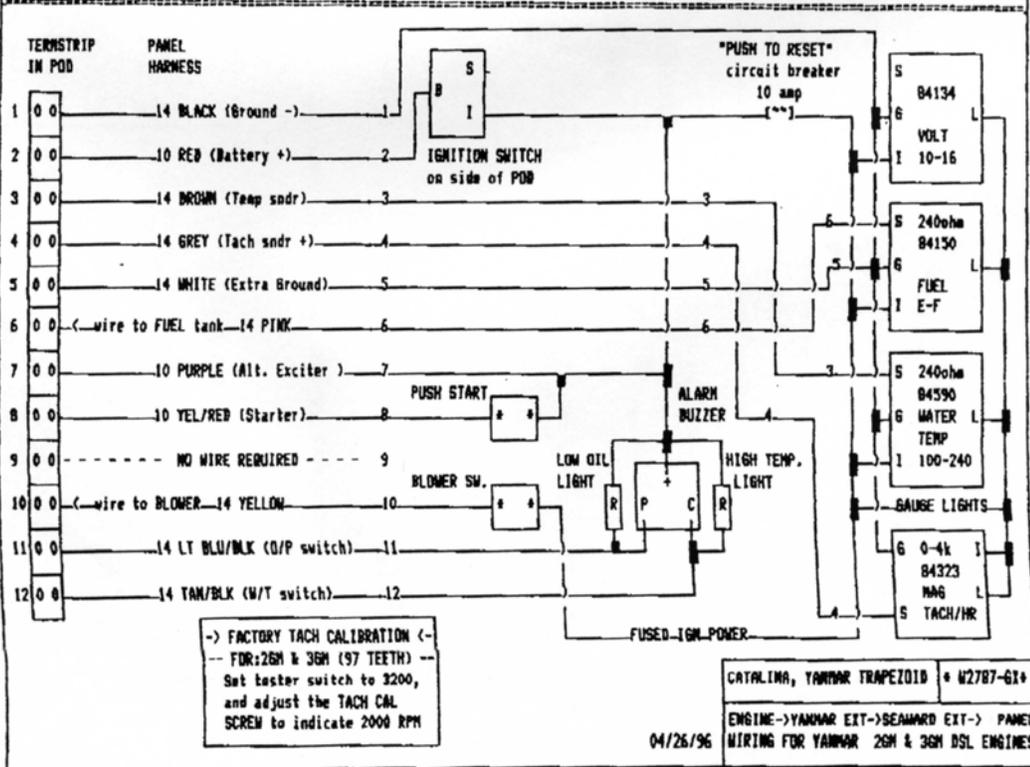
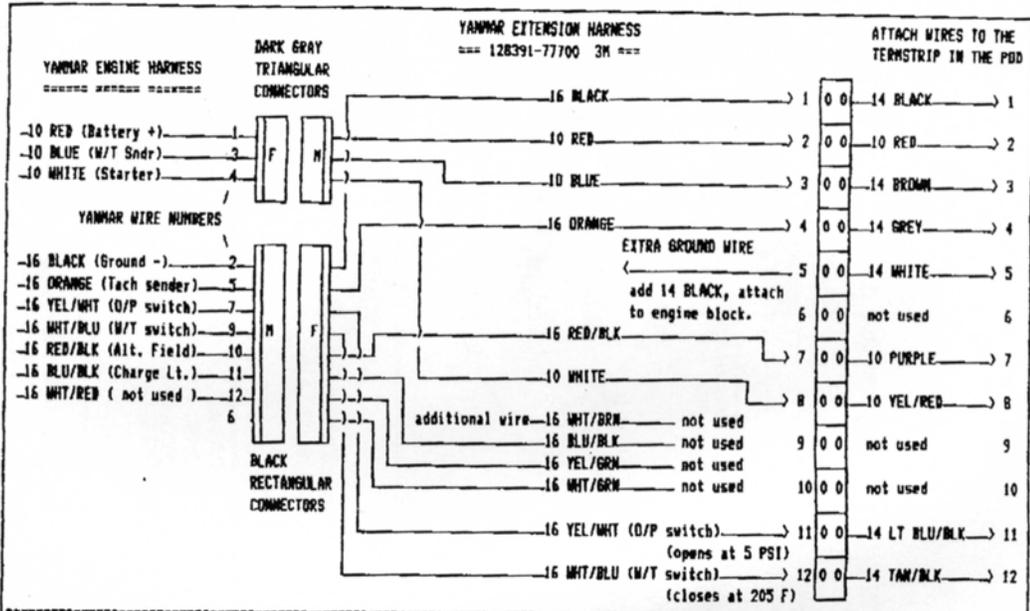
The function of the anti-siphon valve is to prevent cooling water from being siphoned through the through hull valve, through the engine cooling system and into the Aqua-lift muffler when the engine is not operating.

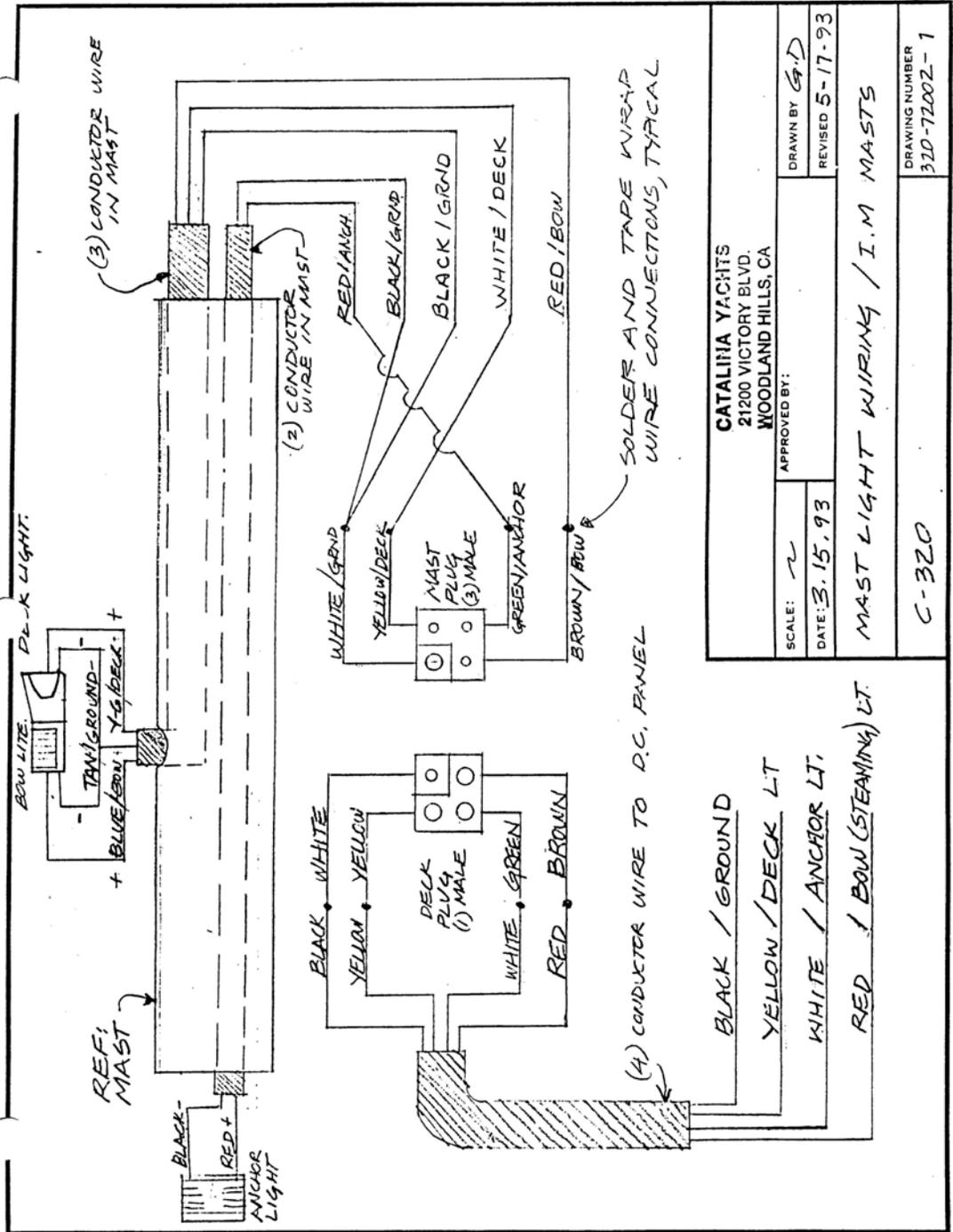
If the muffler were to fill completely with water, water would travel up the inlet tube and enter the engine block.

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





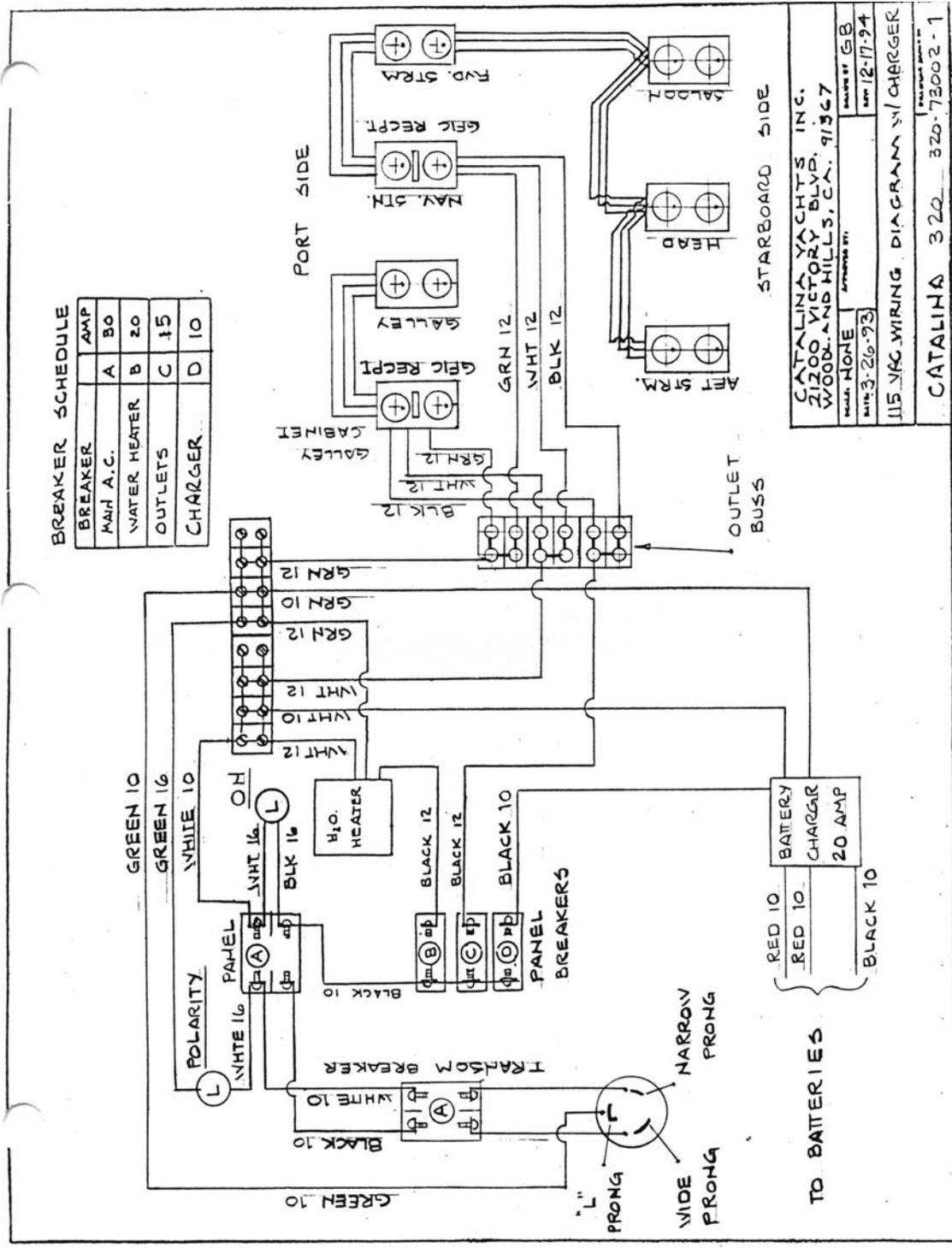


CATALINA YACHTS
21200 VICTORY BLVD.
WOODLAND HILLS, CA

SCALE: ~
DATE: 3.15.93
DRAWN BY: G.D.
REVISED 5-17-93

MAST LIGHT WIRING / I.M MASTS

C-320
DRAWING NUMBER
320-71002-1



STARBOARD SIDE

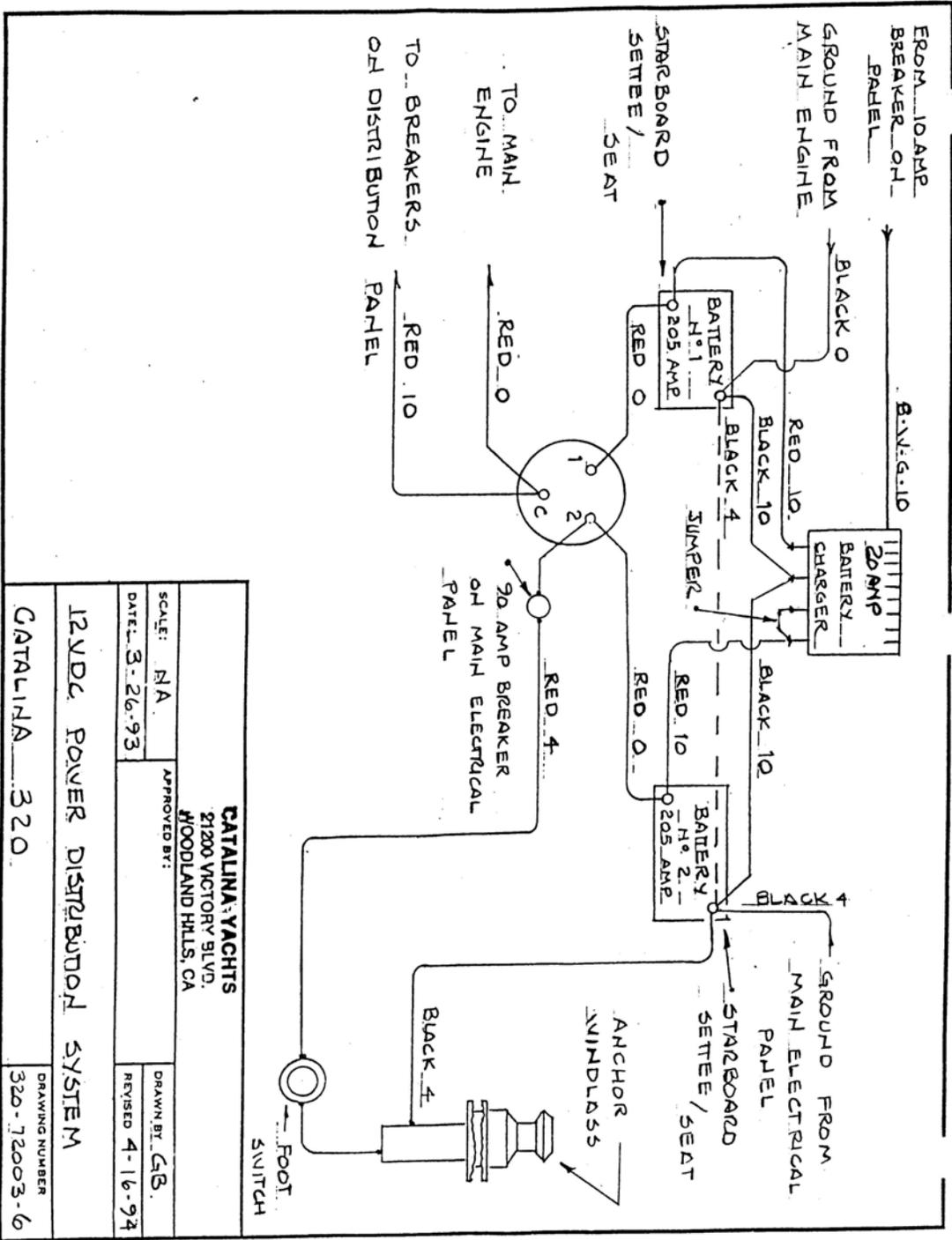
CATALINA YACHTS INC.
 21200 VICTORY BLVD.
 WOODLAND HILLS, CA. 91367

MADE IN HONOLULU
 DATE 3-26-93
 DRAWN BY G.B.
 DATE 12-17-94

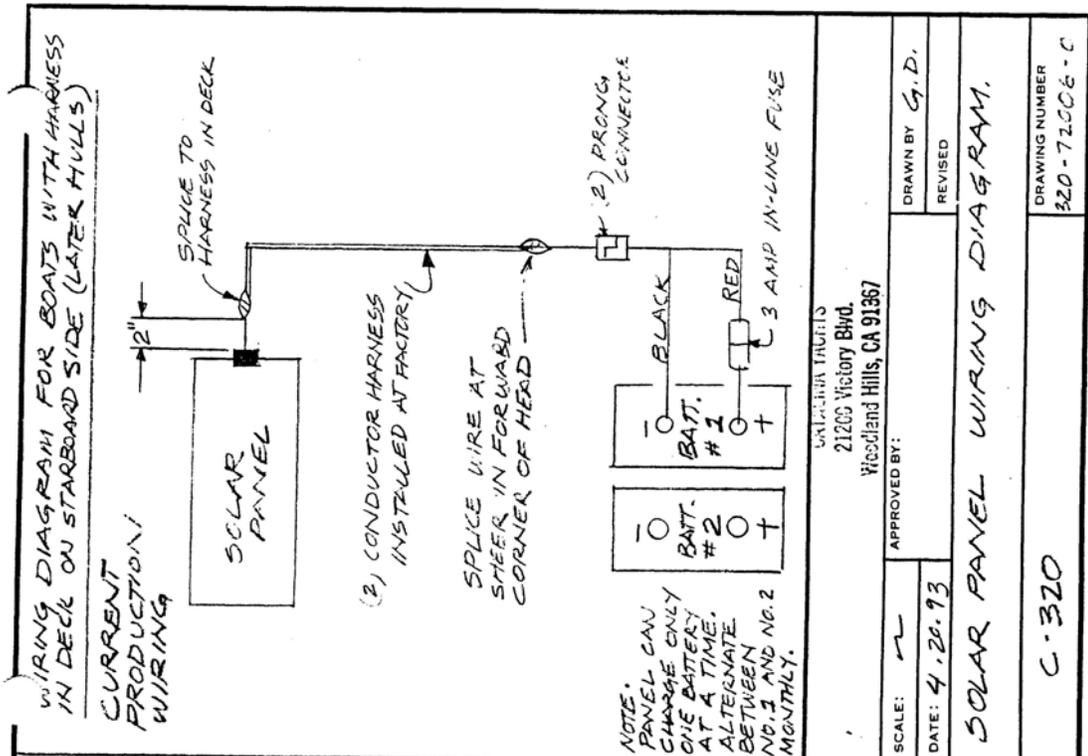
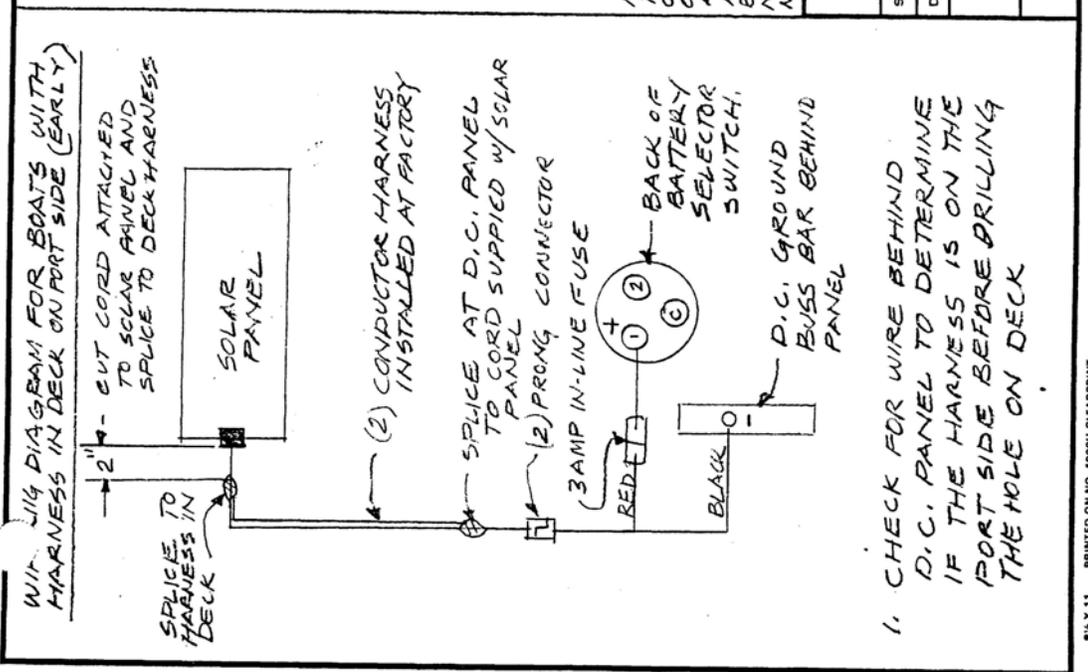
115 VAC WIRING DIAGRAM 320 CHARGER

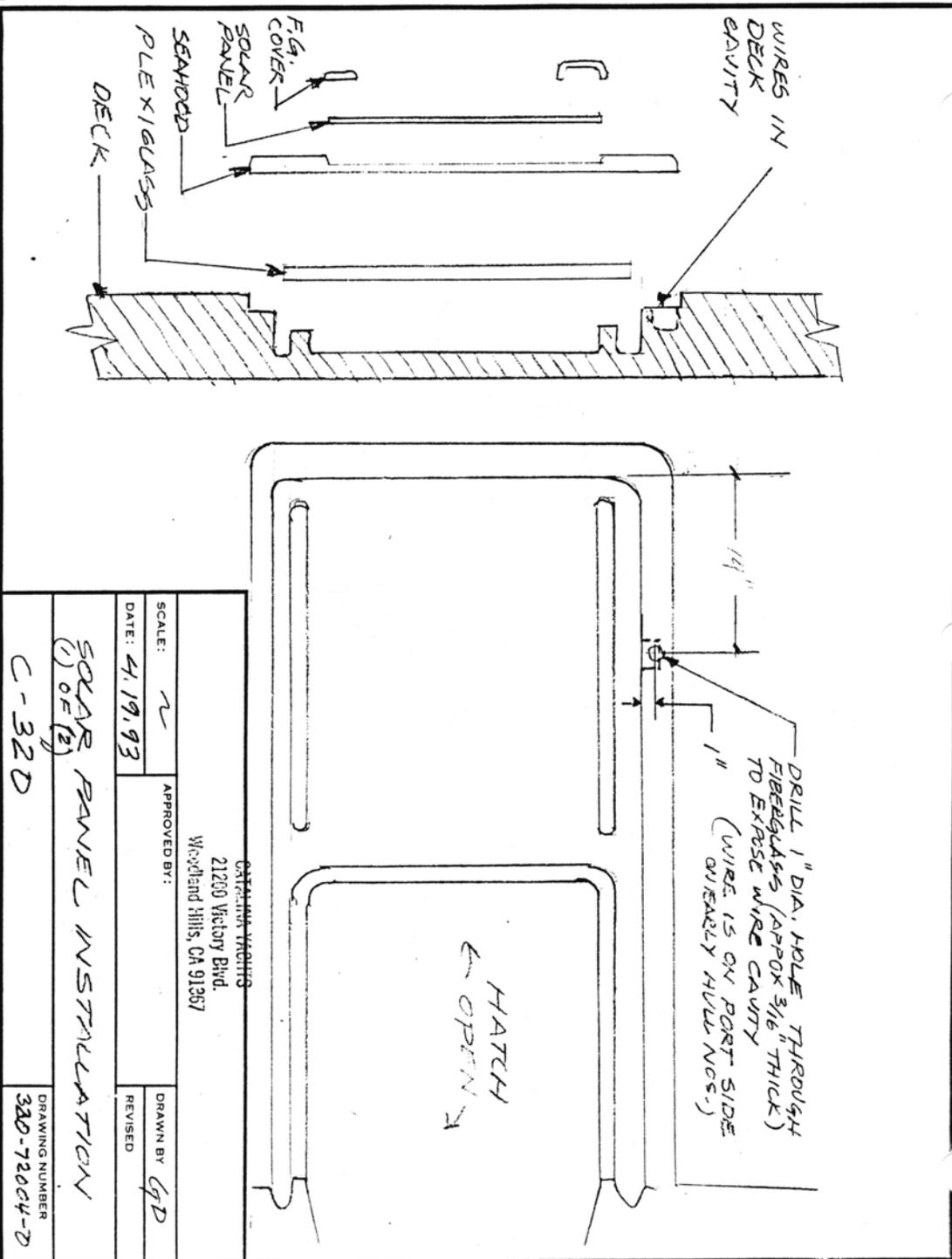
CATALINA 320 320-73002-1

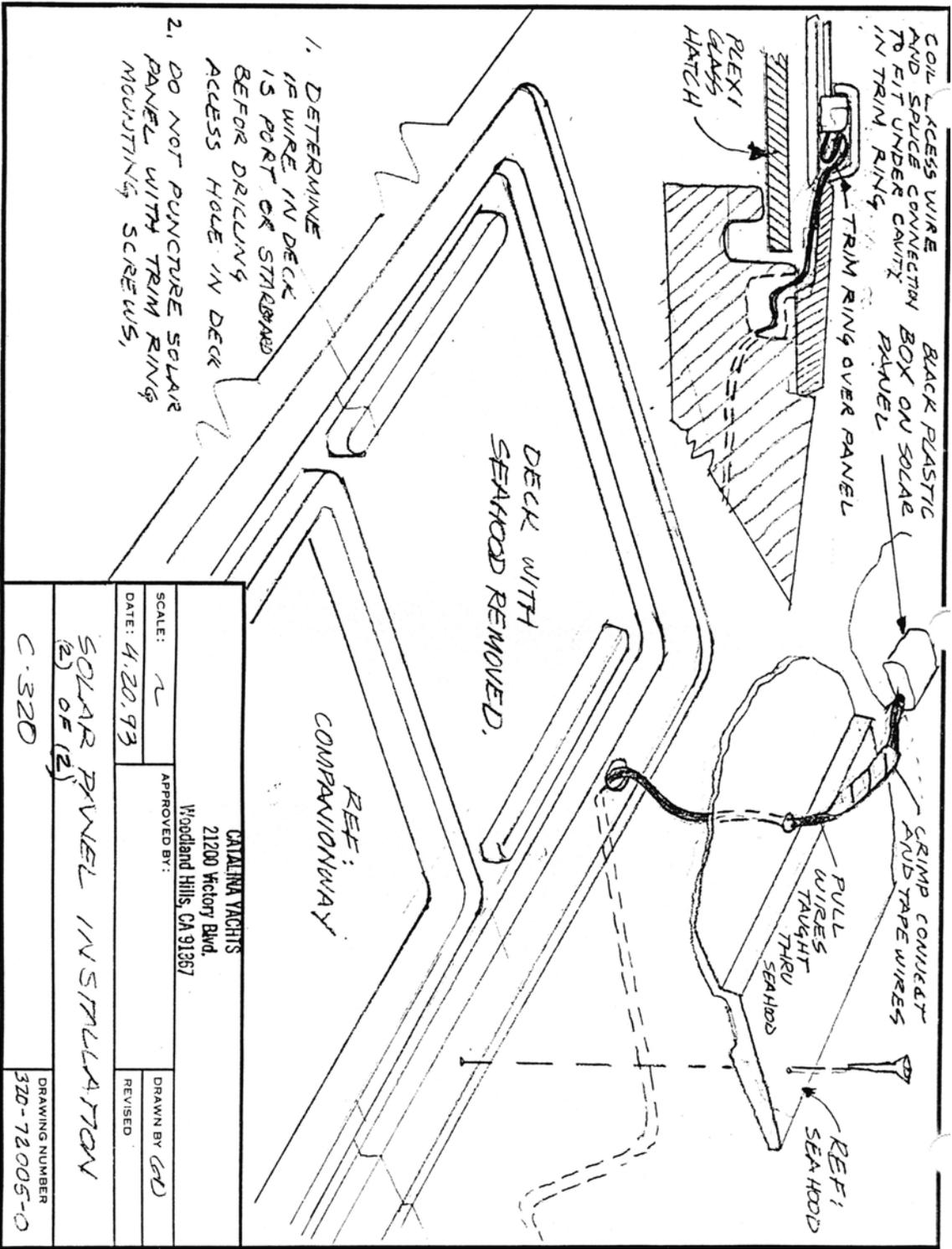
8 1/2 X 11 PRINTED ON NO. 1000W CLEARFILM



<p>CATALINA YACHTS 21200 VICTORY BLVD. WOODLAND HILLS, CA</p>	
<p>SCALE: NA</p>	<p>APPROVED BY:</p>
<p>DATE: 3-26-93</p>	<p>DRAWN BY: GB.</p>
<p>12VDC POWER DISTRIBUTION SYSTEM</p>	
<p>CATALINA 320</p>	<p>DRAWING NUMBER 320-12003-6</p>
<p>REVISED 4-16-94</p>	







1. DETERMINE IF WIRE IN DECK IS PORT OR STARBOARD BEFORE DRILLING ACCESS HOLE IN DECK
2. DO NOT PUNCTURE SOLAR PANEL WITH TRIM RING MOUNTING SCREWS,

SCALE: <i>1/2</i> DATE: 4.20.93		APPROVED BY: CATALINA YACHTS 21200 Victory Blvd. Woodland Hills, CA 91367	
SOLAR PANEL INSTALLATION (2) OF (2)		DRAWN BY: <i>GND</i> REVISED:	
C-320		DRAWING NUMBER 320-72005-0	

1. WHAT ARE SOME OF THE CHARACTERISTICS OF A MARINE BATTERY THAT MAKE IT DIFFERENT THAN AN AUTOMOBILE BATTERY?

Deep cycle batteries typically feature thick plates with a high density active material released during a typical slow discharge such as trolling or electronic instrument usage.

The high density active material remains within the plate/grid structure longer resisting the normal degradation found in cycling conditions. Automotive batteries are designed to release a large amount of energy within a few seconds to provide engine starting. The low density active material plates are easily shed away when exposed to deep cycling conditions.

2. WHAT ARE SOME OF THE COMMON MISTAKES PEOPLE MAKE WITH REGARDS TO MARINE BATTERY CARE?

The ultimate service life and capacity your batteries will deliver is in direct relationship to how and when you recharge your battery. First, prior to recharge, check the electrolyte levels in each cell. Carefully remove the vent caps and insure that the level is approximately 1/4" +/- 1/8" below the filler tube on the inside of the cover. Too low of a level may lead to the spilling of electrolyte through the vent caps. If you need to add water to the battery, distilled water is your best choice. You may get by with tap water, but the impurities such as iron, chlorine, etc. may reduce the service life substantially.

Charging the battery can be performed using a wide variety of 12 volt chargers, but generally a charger with a 10 or 12 Amp rating will allow you to recharge the battery overnight. Also, a charger with a deep cycle charge mode switch will allow you to increase the voltage slightly providing a more complete recharge. Charging the totally sealed maintenance free type batteries can be a bit complex.

The manufactures of these sealed batteries usually provide their own tailored method of recharging and recommend the chargers best suited for the job.

Recharging should only be performed in a well ventilated area since lead acid is especially prevalent during the recharge period.

Recharge your battery as soon as possible after you are through using it. The most detrimental time for the internal components of the battery is when the weaker electrolyte is exposed to the battery's plates. The corrosive effect of the electrolyte is much greater on the battery components at this state-of-charge.

3. HOW DO YOU DETERMINE THE CONDITION OR STATE-OF-CHARGE OF YOUR DEEP CYCLE BATTERY?

Prior to using or storing your deep cycle battery, the available capacity or state-of-charge should be checked.

There are two methods of determining state-of-charge.

The best method is by using a hydrometer. The hydrometer will show you the level of capacity better than any method short of a controlled laboratory time vs. discharge current test. A fully charged flooded electrolyte deep cycle battery will have a specific gravity range of 1.265 to 1.280.

Hydrometers are available in various configurations, but the graduated float models provide the most accurate readings. The other method of determining state-of-charge is with a voltmeter. A fully charged lead-acid battery will have a voltage of 12.6 volts across the terminals. This voltage value is based on there being no discharge drain on the battery or leftover surface charge. If the battery is being discharged during the voltage check, chances are that you will read a much lower voltage than is actually available. On the other hand, during charging or up to 24 hours after charging, the surface charge effect will provide much higher voltage readings than the full charge volts of 12.6. If you are checking a sealed battery, you obviously will have to accept the voltage as your only indicator for state-of-charge.

The use of a voltmeter along with a hydrometer will provide you with all the information you should ever need about your battery's state-of-charge.

4. HOW LONG SHOULD A CONSUMER EXPECT TO RECEIVE MAXIMUM PERFORMANCE OUT OF DEEP CYCLE BATTERY?

The maximum performance and service life will be determined by maintenance, recharging and obviously the amount of usage. Batteries that are rated in cycle life should deliver that number of cycles. Cycles are defined, as one complete discharge and recharge. If your daily usage requirements are met by the capacity of the battery, you can assume you will get one day of use for each cycle the battery is rated at. This may not apply if the battery is stored for a long period of time or not properly maintained.

5. WHAT SPECIAL FEATURES SHOULD A BUYER LOOK FOR WHEN PURCHASING A DEEP CYCLE BATTERY?

Obviously, you should look for a battery with sufficient capacity to operate all your electrical equipment. Most manufacturers of trilling motors and electronics will post an amp requirement to operate these items. Add up the amps required along with the approximate usage time to determine your battery needs. Larger boats usually have more than one battery and almost all these manufacturers recommend your battery capacity requirements.

6. SHOULD A BUYER BE CAUTIONS WHEN PURCHASING A DEEP CYCLE BATTERY AND IF SO, WHAT SPECIFICALLY SHOULD HE OR SHE WATCH OUT FOR?

Look for batteries with brands you are familiar with and make sure you are getting a true deep cycle and not an automotive battery. This can be difficult to determine, but a smart consumer will generally ask for a recommendation from a reputable dealer or manufacturer.

7. WHAT HAPPENS WHEN YOU "OVER-CHARGE" A DEEP CYCLE BATTERY?

Overcharging a battery occurs when the total capacity removed has been replaced by recharging and the battery remains on charge. This overcharging creates excessive heat which can cause the plates within the cells to buckle and shed their active material. Also, the battery will react to the overcharge by producing an excessive amount of hydrogen and oxygen gas. These gasses are the result of the breakdown of the water molecules within the electrolyte. The water that has been displayed by overcharging can be replaced in a serviceable (non-sealed) battery but in the maintenance free sealed batteries permanent capacity loss will result.

8. WHAT ARE YOUR RECOMMENDATIONS FOR BATTERY STORAGE OVER THE WINTER?

When storing the battery for any length of time, insure that it is at a full state-of-charge with the electrolyte levels properly adjusted. Store the battery in a cool place out of the reach of children and pets. A battery box is ideal for storage.

9. DEEP CYCLE BATTERIES ARE DIFFERENT THAN AUTOMOTIVE TYPE BATTERIES.

Deep Cycle Batteries are used to power trolling motors or lights in a camper or a stereo in a van, and are designed differently than the battery you use to start your car.

That Automotive battery in your car is only asked to deliver short bursts of energy and then the alternator takes over, providing the electricity to run the car and recharge the slightly discharged battery.

A marine battery/RV deep cycle, on the other hand, is asked to go through many deep discharges. Often, the battery is drained to nearly zero before it is recharged. This is called "deep cycling".

Deep cycle batteries are specially designed to withstand hundreds of deep discharges. Even the best automotive type batteries won't last for more than about 75 deep cycles and of those, only the first 15 or so will recharge to a full 100.

A marine starting battery functions in a manner similar to an automotive battery however it is specially engineered to stand up to wave pounding and engine vibration.

A thermal bond is used to seal the cover to the container for virtually leak-proof safety performance.

EMERGENCY TILLER:

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

The emergency tiller is stored in a red bag labeled "Emergency Tiller".

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

1. Locate the emergency tiller.
2. Remove inspection port cover in the cockpit sole aft of the wheel.
3. Assemble emergency tiller.
4. Remove steering wheel with wooden wrench provided.
5. Insert the emergency steering tiller in the top of the rudder post.

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

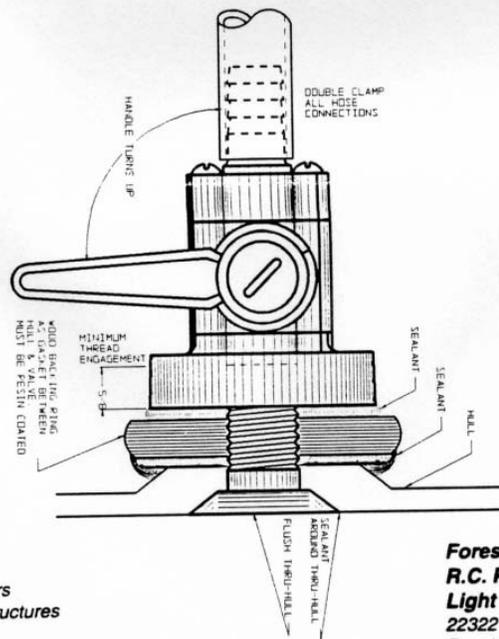
MAINTENANCE OF THRU-HULLS / SEAVALVES

The Thru-hull/Seavalve system in this boat are made from Marelon® glass reinforced nylon composite. They have been tested by, and exceed standards set UL Marine, American Boat and Yacht Council, American Bureau of Shipping, and Lloyd's Registry. They are non conductive and non-corrosive.

Each valve assembly is a complete system including a thru-hull fitting, valve body and hose connector.

The best maintenance for these valves is regular operation of the handle. This should be done once a month or more often if possible. If convenient, a small amount of water proof such as Superlube Teflon Gel, may be applied to the internal ball either through the thru-hull fitting or through the hose connector as an annual servicing.

DO NOT DISASSEMBLE THE VALVE BODY TO SERVICE OR INSPECT.



Products That Perform

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ITEM	DESCRIPTION	QTY
1	WATER/WATER PRESSURE	1
2	WATER/WATER PRESSURE	1
3	WATER/WATER PRESSURE	1
4	WATER/WATER PRESSURE	1
5	WATER/WATER PRESSURE	1
6	WATER/WATER PRESSURE	1
7	WATER/WATER PRESSURE	1
8	WATER/WATER PRESSURE	1
9	WATER/WATER PRESSURE	1
10	WATER/WATER PRESSURE	1
11	WATER/WATER PRESSURE	1
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28	WATER/WATER PRESSURE	1
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30	WATER/WATER PRESSURE	1

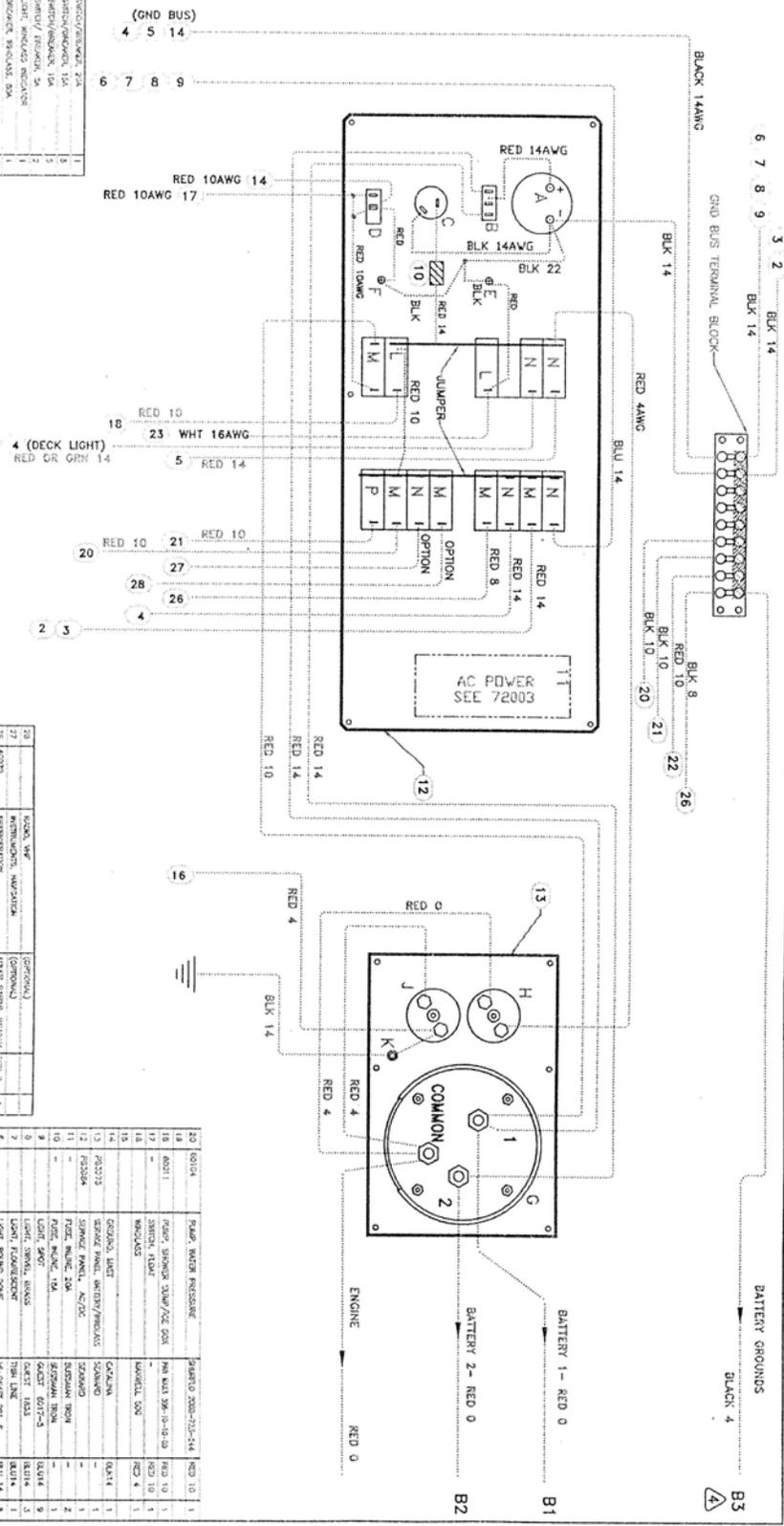
ITEM	DESCRIPTION	QTY
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2	WATER/WATER PRESSURE	1
3	WATER/WATER PRESSURE	1
4	WATER/WATER PRESSURE	1
5	WATER/WATER PRESSURE	1
6	WATER/WATER PRESSURE	1
7	WATER/WATER PRESSURE	1
8	WATER/WATER PRESSURE	1
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28	WATER/WATER PRESSURE	1
29	WATER/WATER PRESSURE	1
30	WATER/WATER PRESSURE	1

ITEM	DESCRIPTION	QTY
1	WATER/WATER PRESSURE	1
2	WATER/WATER PRESSURE	1
3	WATER/WATER PRESSURE	1
4	WATER/WATER PRESSURE	1
5	WATER/WATER PRESSURE	1
6	WATER/WATER PRESSURE	1
7	WATER/WATER PRESSURE	1
8	WATER/WATER PRESSURE	1
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27	WATER/WATER PRESSURE	1
28	WATER/WATER PRESSURE	1
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30	WATER/WATER PRESSURE	1

ITEM	DESCRIPTION	QTY
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2	WATER/WATER PRESSURE	1
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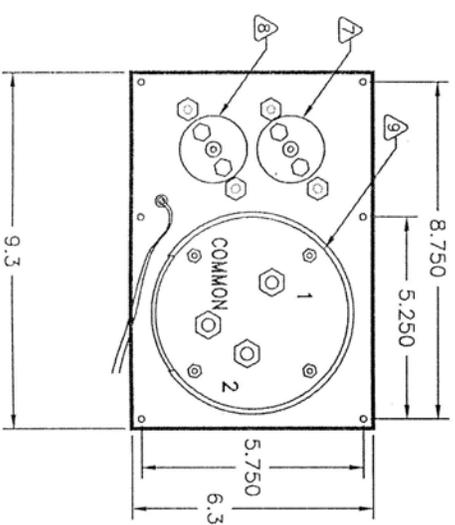
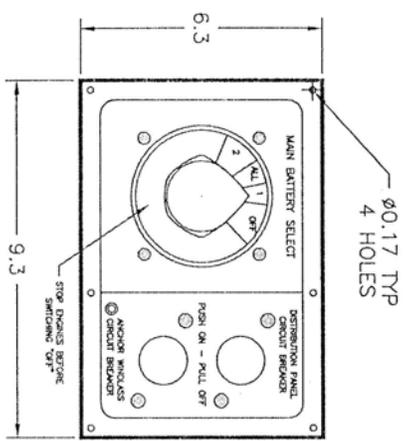
ITEM	DESCRIPTION	QTY
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24	WATER/WATER PRESSURE	1
25	WATER/WATER PRESSURE	1
26	WATER/WATER PRESSURE	1
27	WATER/WATER PRESSURE	1
28	WATER/WATER PRESSURE	1
29	WATER/WATER PRESSURE	1
30	WATER/WATER PRESSURE	1

Electrical Parts
 ELECTRICAL PLAN, DC B2
 CATANIA 570



REVISIONS		
NO.	DESCRIPTION	DATE
0	INITIAL RELEASE	12/9/98
		APPROVAL

- NOTES: (UNLESS OTHERWISE SPECIFIED).
- 1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-STD-100 AND ANSI-Y14.5M-1982.
 - 2. MATERIAL: .185" POLYCARBONATE, BLACK
 - 3. COLOR: ALL PRINTING IN WHITE.
 - 4. GENERAL TOLERANCE: ±1/64 INCH
 - 5. PART SHOWN FOR IDENTIFICATION PURPOSES ONLY.
 - 6. LEAD LENGTH = 6.0"
 - 7. KLIXON #6766-19-135, 135AMP BREAKER OR EQUIVALENT.
 - 8. KLIXON #6766-19-80, 80AMP BREAKER OR EQUIVALENT.
 - 9. PERKO #ISO 8846 MARINE OR EQUIVALENT.
 - 10. BAG AND TAG PER MIL-STD-130.



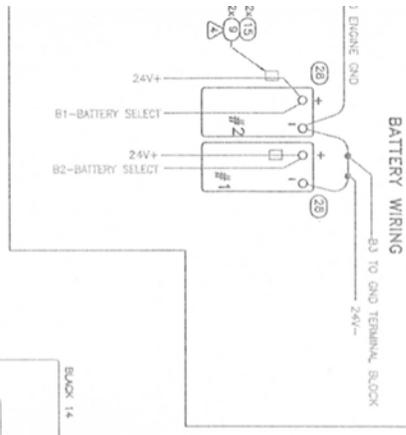
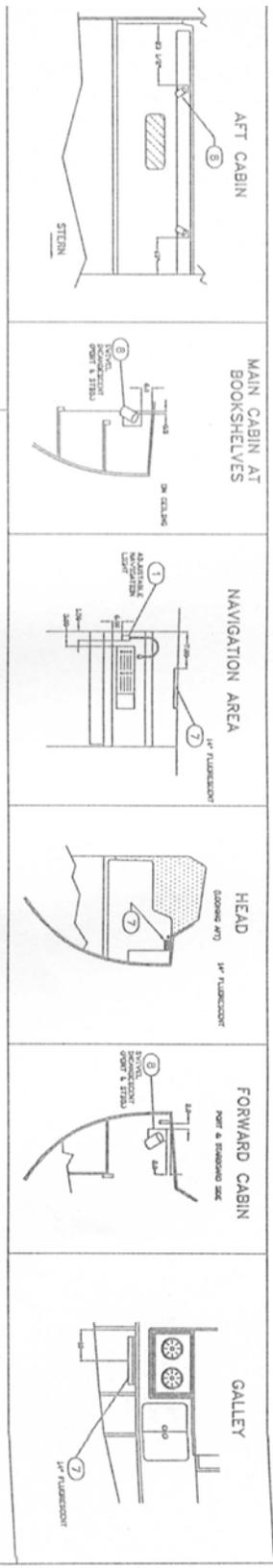
SUGGESTED SOURCE(S) OF SUPPLY		
PART NO.	VENDOR & ADDRESS	VENDOR'S PART NO
320-75001	SEAWARD CORP (562) 699-7997	PB3073

SPECIFICATION CONTROL DRAWING

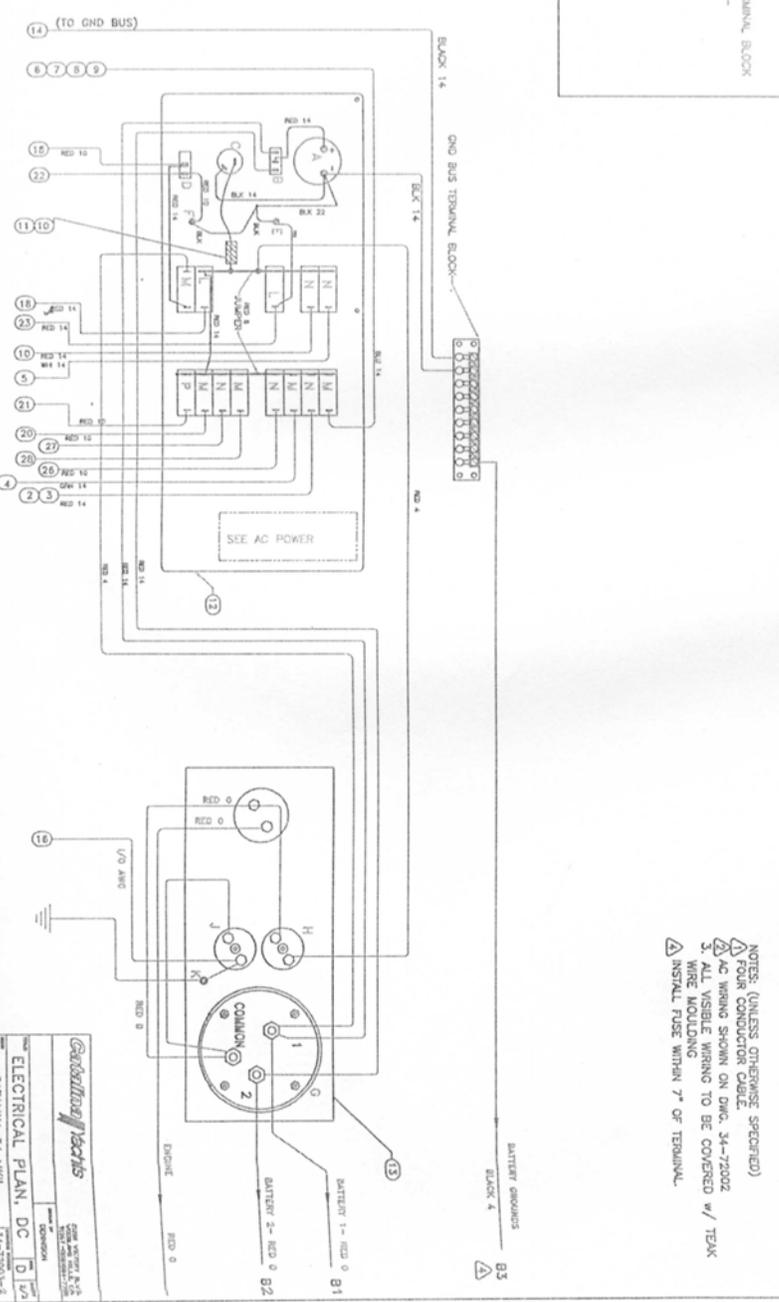
Catalina Yachts

21300 VICTORY BLVD.
WOODLAND HILLS, CA
91367-(818)254-2700

SCALE: NONE	APPROVED BY:	DATE: 12/9/1998	FILE: 32011241	DRAWN BY:	DATE:
TITLE: PANEL, BATTERY SELECT		PART NO: CATALINA 32		SCALE: B	DATE: 1/1
PART: CATALINA 32				QUANTITY: 320-75001-0	

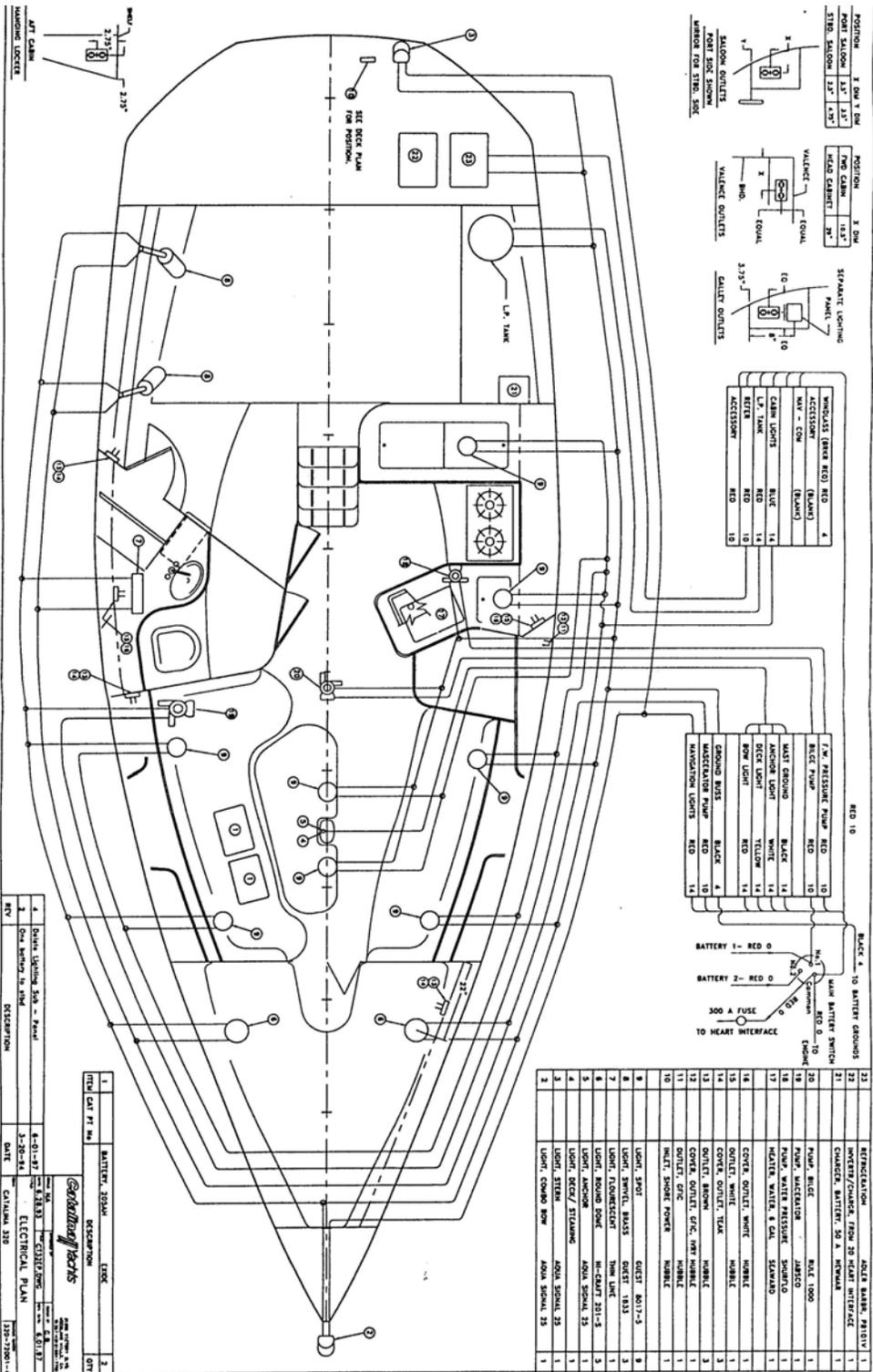


LETTER	DESCRIPTION	QTY
P	SWITCH/BREAKER, 20A	1
N	SWITCH/BREAKER, 15A	5
M	SWITCH/BREAKER, 10A	5
L	SWITCH/BREAKER, 5A	2
K	LIGHT, WINDLASS INDICATOR	1
J	BREAKER, WINDLASS, 60A	1
H	BREAKER, DISTRIBUTION PANEL, 150A	1
G	SWITCH, BATTERY SELECT	1
F	LIGHT, BLUE PUMP	1
E	LIGHT, LUG SOLENOID	1
D	SWITCH, BLUE PUMP, MODE	1
C	OUTLET, 12V	1
B	SWITCH, TEST, ON-OFF-ON	1
A	WATERHEATER, 8-16 WATTS	1
TM	DESCRIPTION	QTY



NOTES: (UNLESS OTHERWISE SPECIFIED)
 ▲ FOUR CONDUCTOR CABLE
 ▲ AC WIRING SHOWN ON DWG. 34-72002
 ▲ ALL VISIBLE WIRING TO BE COVERED w/ TEAK WIRE MOLDING
 ▲ INSTALL FUSE WITHIN 7" OF TERMINAL

Catalina Yachts
 ELECTRICAL PLAN, DC 0 1/2
 CATALINA 34 MKII 34-72002-5



- POSITION 3 DIM X DIM
PORT SALOON 3.17 X 3.17
STR. SALOON 2.27 X 2.27
- POSITION 3 DIM
FRS CABIN 1.13 X 1.13
HEAD CABINET 2.7 X 2.7
- SEPARATE LIGHTING PANEL 7.10 X 8.10
3.17 X 2.27
- VALANCE OUTLETS
VALANCE OUTLETS
- SALOON OUTLETS
PORT SIDE SHOWN
STARBOARD FOR STR. SIDE

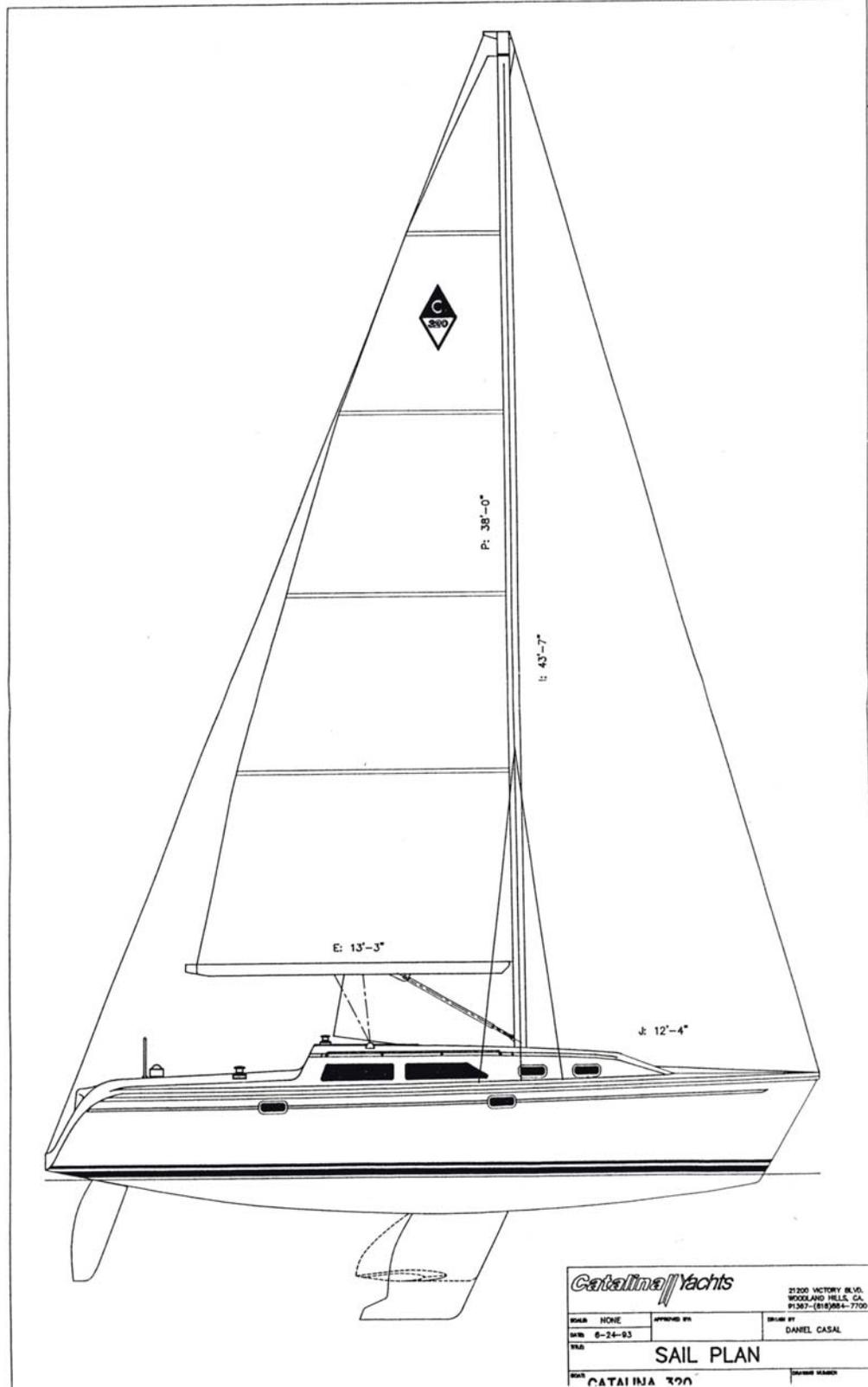
- PHOSPHOR (BANK RED) RED 4
ACCESSORY
CAM LIGHTS BLUE 14
L.P. TANK RED 10
ICE LIGHT RED 10
ANCHOR LIGHT RED 10
DECK LIGHT RED 10
BOW LIGHT RED 10
MAGNETIC PUMP RED 10
NAVIGATION LIGHTS RED 10

- F.W. PRESSURE PUMP RED 10
BLACK PUMP RED 10
MULTI COORDINATE (BLACK) RED 14
ANCHOR LIGHT WHITE 14
DECK LIGHT YELLOW 14
BOW LIGHT RED 14
MAGNETIC PUMP RED 10
NAVIGATION LIGHTS RED 14

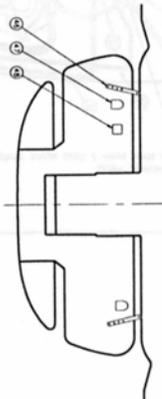
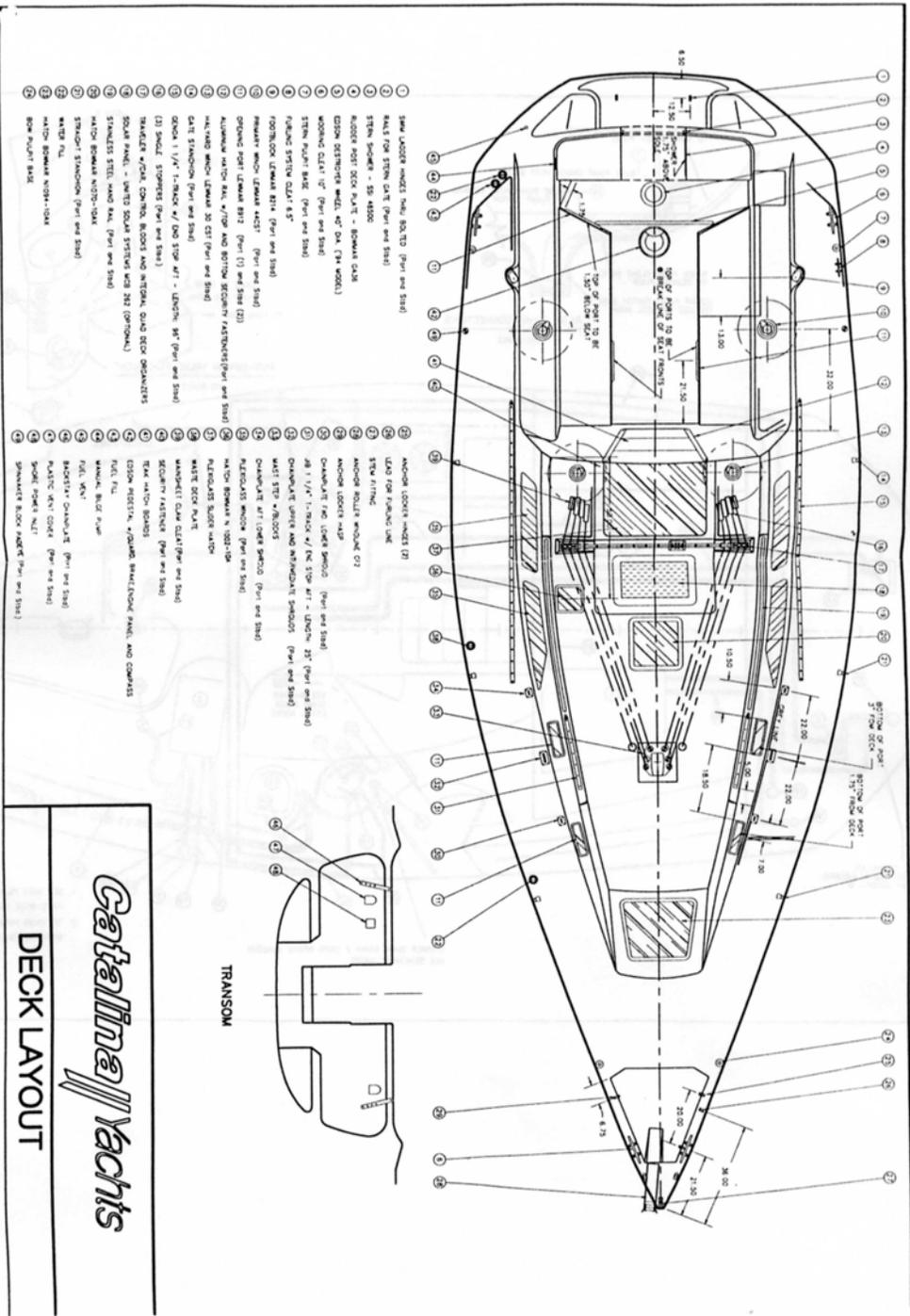
BATTERY 1 - RED 0
BATTERY 2 - RED 0
300 A FUSE
TO HEART INTERFACE

REF.	DESCRIPTION	QTY	REMARKS
1	ADLER BATTERY #210V 1	1	
2	INVERTER/CHARGER, FROM 20 HEART INTERFACE	1	
3	CHARGER, BATTERY, 50 A, HEART	1	
4	PUMP, BLACK	1	BLK 1000
5	PUMP, WATER PRESSURE, JAMESCO	1	
6	HEADLITE, WHITE & GEL, STARBOARD	1	
7	HEADLITE, WHITE & GEL, STARBOARD	1	
8	COVER, OUTLET, WHITE	1	
9	COVER, OUTLET, WHITE	1	
10	COVER, OUTLET, TANK	1	
11	COVER, OUTLET, TANK	1	
12	COVER, OUTLET, TANK	1	
13	COVER, OUTLET, TANK	1	
14	COVER, OUTLET, TANK	1	
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ITEM	QTY	DESCRIPTION	DATE
1	1	BATTERY, 200AH	LOOK
2	1	COVER, OUTLET, TANK	LOOK
3	1	COVER, OUTLET, TANK	LOOK
4	1	COVER, OUTLET, TANK	LOOK
5	1	COVER, OUTLET, TANK	LOOK
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98	1	COVER, OUTLET, TANK	LOOK
99	1	COVER, OUTLET, TANK	LOOK
100	1	COVER, OUTLET, TANK	LOOK



<i>Catalina Yachts</i>			21200 VICTORY BLVD. WOODLAND HILLS, CA 91367-(818)884-7700
SCALE: NONE	APPROVED BY:	DRAWN BY: DANIEL CASAL	
DATE: 6-24-93			
SAIL PLAN			
BOAT: CATALINA 320			DESIGN NUMBER:



Catallina Yachts

DECK LAYOUT