revised 8.2.90

CATALINA 28 OWNER'S MANUAL

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

Batteries, 12 Volt Wet Cell
Headsail Furling Gear
Inboard Engine
Knotmeter
Galley Foot Pump, Fresh Water
Countertop Pump, Fresh Water
Running Lights
Marine Head
Self Contained Head
Winches
Galley Stove
Bilge Pump
Mainsail Flaking System
Cabin Light Fixtures
Pedestal Steering
Water Heater
Pressure Water Pump
Lazymate/Aeroluff Sails

they should have no slack, but no tension either. No lower shroud, when pushed, should deflect the mast more than any other shroud when pushed equally hard. If this cannot be achieved, the upper shrouds are too tight. Back off one half turn at a time of the upper shroud turnbuckles until the tension on the lower shrouds is brought into balance.

UNDER SAIL:

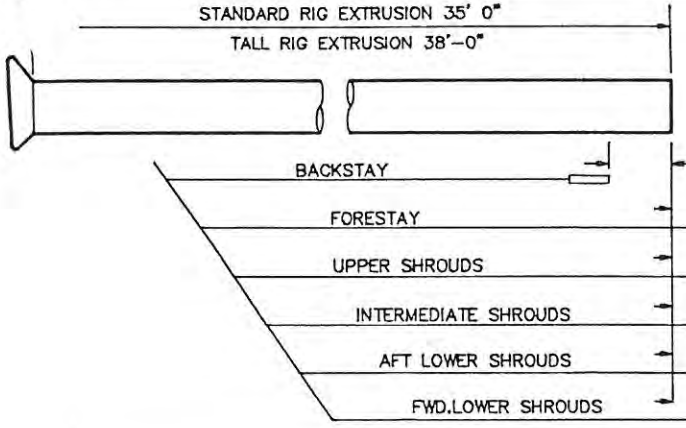
The object of fine tuning is to have the mast "in column" (not bent fore or aft or athwartships) when sailing in conditions typical for your area. This is accomplished through adjustments to the lower shroud turnbuckles. Here are some points to look for:

1. When sailing on port tack, sight up the mast from the base. If the middle (where the spreaders are) is sagging to leeward, take up equally on both port lower shrouds until the mast is "in column". Repeat this procedure on starboard tack.

2. If, when sighting up the mast while on port tack, the middle is bowed forward (but not to leeward), take up a turn on the port aft lower shroud and let out a turn on the port forward lower shroud turnbuckle. Reverse these adjustments if the middle of the mast is aft of the "in column" position.

3. If a perfectly straight mast is not obtained, the mast head (top) may be curved aft and to leeward. The mast head should never be "hooked" or bowed forward, nor to weather.

All rigging wire used on yachts has a tendency to stretch, especially on a new yacht, and after you have sailed in heavier wind than you are normally experienced for, therefore, you should periodically check the tension on the shrouds and stays, and tighten them, if it is required. Rigging, as well as tuning, becomes all too important when setting up the mast. A knowledgeable person should oversee the rigging and tuning so as to eliminate the possibility of an eccentric load, which might occur with an improperly loaded shroud. Special attention should be given to the initial stretch of the shrouds and a further gradual stretch of the wire over the first few hard outings.



over for turning into

STANDARD	TALL	TOP FITTING	BOTTOM FITTING
6'-1"	6'-4 3/4"	EYE 1/2" PIN	FORK 3/8"PIN
1'-6 7/8"	1'-6 5/8"	EYE 1/2" PIN	STUD 3/8"-24
1'-0"	0'-11 3/4"	EYE 1/2" PIN	STUD 3/8"-24
———	1'-1 3/8"	EYE 3/8" PIN	STUD 5/16"-24
1'-1 7/8"	1'-2 3/8"	EYE 3/8" PIN	STUD 5/16"-24
0'-10 1/4"	1'-0 1/8"	EYE 3/8" PIN	STUD 5/16"-24

RUNNING RIGGING

DESCRIPTION	MATERIAL	LENGTH	QTY.
TOPPING LIFT	3/32"WIRE 7x19	32' 0"	1
TOPPING LIFT TAIL	1/4" DACRON	55' 0"	1
REEFING LINE	5/16" LOW STR.	55' 0"	1
BOOM VANG LINE	3/8" DACRON	35' 0"	1
FOREGUY	3/8" DACRON	40' 0"	1
GENOA SHEET	3/8" DACRON	80' 0"	1
JIB SHEET	3/8" DACRON	70' 0"	1
TRAVELER CONTROL LINES	5/16" DACRON	23' 6"	2
SPINNAKER SHEET	3/8" DACRON	60' 0"	2
MAINSHEET	3/8" DACRON	75' 0"	1

STANDING RIGGING

DESCRIPTION	MATERIAL	LENGTH		QTY.
		STD.	TALL	
BACKSTAY	1/4" WIRE 1x19	29'-2 1/2"	31'-11 1/2"	1
FORESTAY	1/4" WIRE 1x19	36'-10"	39'-9 1/2"	1
UPPER SHROUDS	1/4" WIRE 1x19	34'-9 3/4"	37'-9"	2
INTERMEDIATE SHROUDS	3/16" WIRE 1x19	———	27'-9 3/4"	2
AFT LOWER SHROUDS	3/16" WIRE 1x19	18'-7 1/2"	14'-6"	2
FWD LOWER SHROUDS	3/16" WIRE 1x19	18'-4"	14'-3 1/2"	2
BACKSTAY BRIDLE	3/16" WIRE 1x19	10'-0"	10'-0"	2

HALYARDS

DESCRIPTION	MATERIAL	LENGTH		QTY.
		STD.	TALL	
MAINSAIL HALYARD	5/16"LOW STRETCH	81'-0"	87'-0"	1
JIB HALYARD	5/16"LOW STRETCH	81'-0"	87'-0"	2
SPINNAKER HALYARD	3/8" LOW STRETCH	81'-0"	87'-0"	1

NOTES: 1) TOLERANCES ±1/2"

2) MEASUREMENTS FROM CENTER OF EYE TO CENTER OF EYE OR END OF STUD

REV.Nº	DESCRIPTION	DATE
15	ADJUST DIM. AND ADD BRIDLES	2-7-92
14	ADD INTERMEDIATE SHROUDS	1-16-92
13	TALL AND STD. DIMENSIONS	1-8-92
12	ORIGINAL ISSUE	10-15-91

Catalina Yachts

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

SCALE: NONE

DATE: 10-15-91

APPROVED BY:

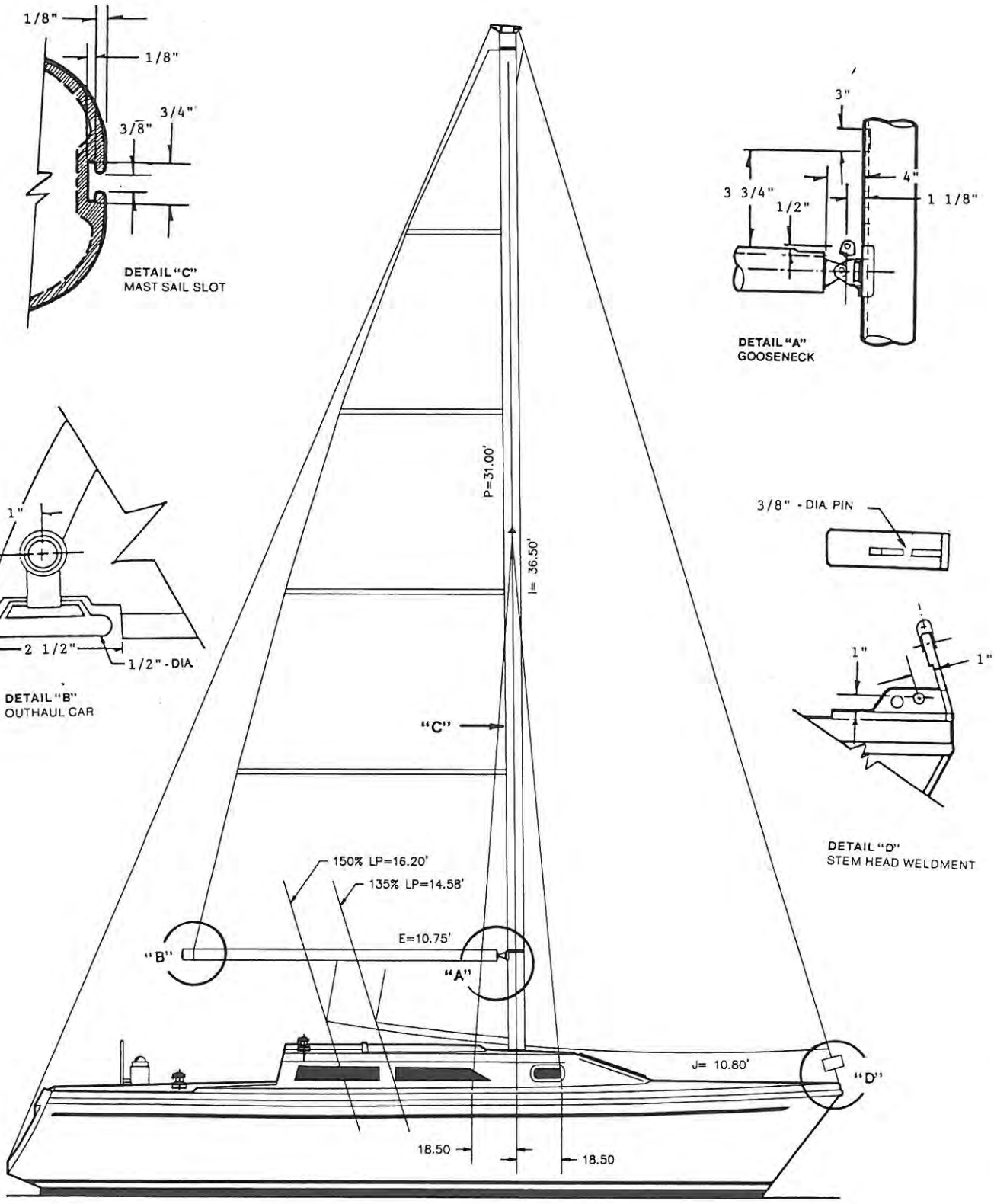
DRAWN BY: DANIEL CASAL

TITLE:

RIGGING LENGTH

BOAT: CATALINA 28

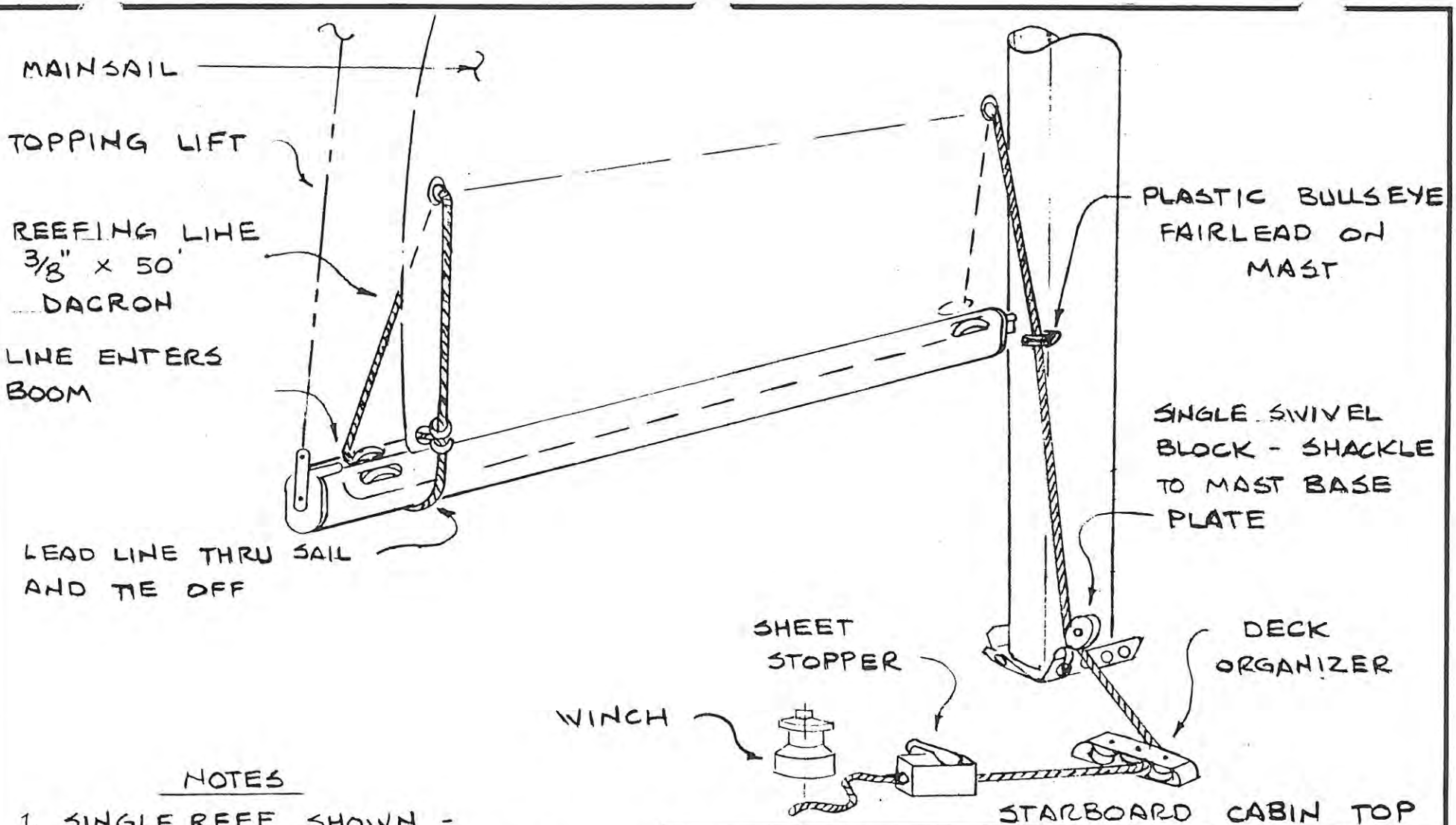
DRAWING NUMBER: 280-34001



STANDARD RIG SAIL PLAN					
SAIL	LUFF	LEACH	FOOT	RATED AREA	NOTES
MAIN	31.0'	32.51'	10.7'	166	
135% FRLG GEN	35.0'	32.85'	15.66'	255	LP = 14.58'
150% FRLG GEN	35.0'	33.14'	17.24'	283	LP = 16.18'
SPINNAKER	36.16'	MAX GIRTH = 19.44'		597	
	I = 36.5' J = 10.8' P = 31.0' E = 10.75'				

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

STANDARD RIG SAIL PLAN



NOTES

1. SINGLE REEF SHOWN - OPT. SECOND REEF OPPOSITE.

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SINGLE LINE REEF SYSTEM

C-28

DRAWING NUMBER 280-35009-1

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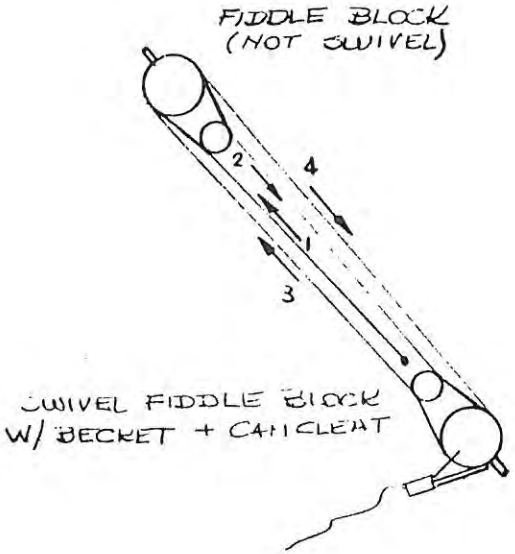
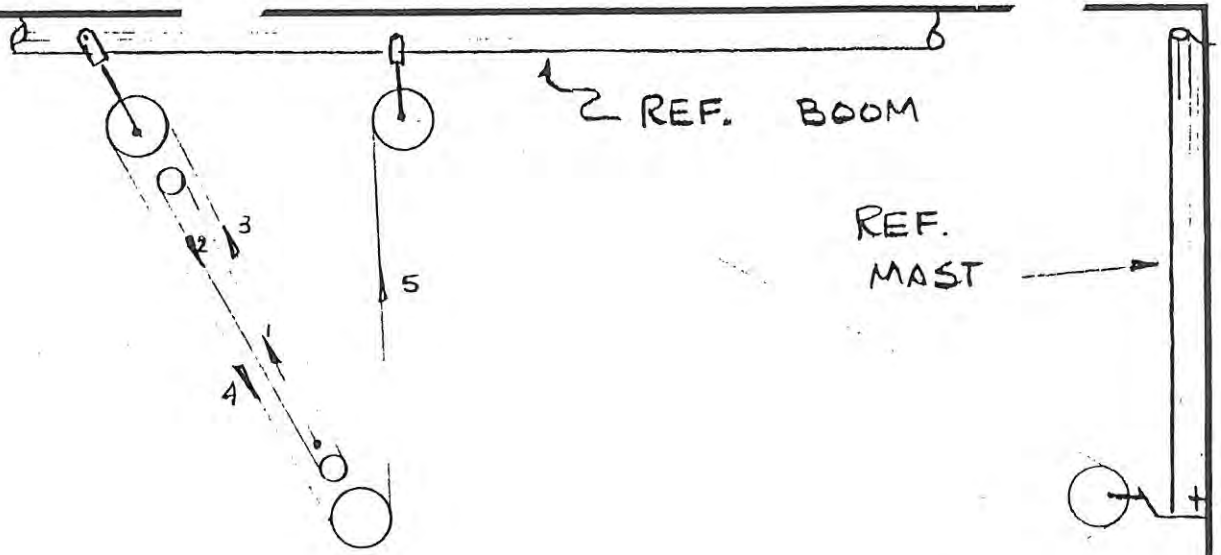


BOOM VANG



MAINSHEET

CATALINA YACHTS 21200 VICTORY BLVD. WOODLAND HILLS, CA		
SCALE: ~	APPROVED BY:	DRAWN BY DC
DATE: 10-13-84		REVISED
MAINSHEET AND VANG SCHEMATIC		
CATALINA 28		DRAWING NUMBER 280-35001 -0

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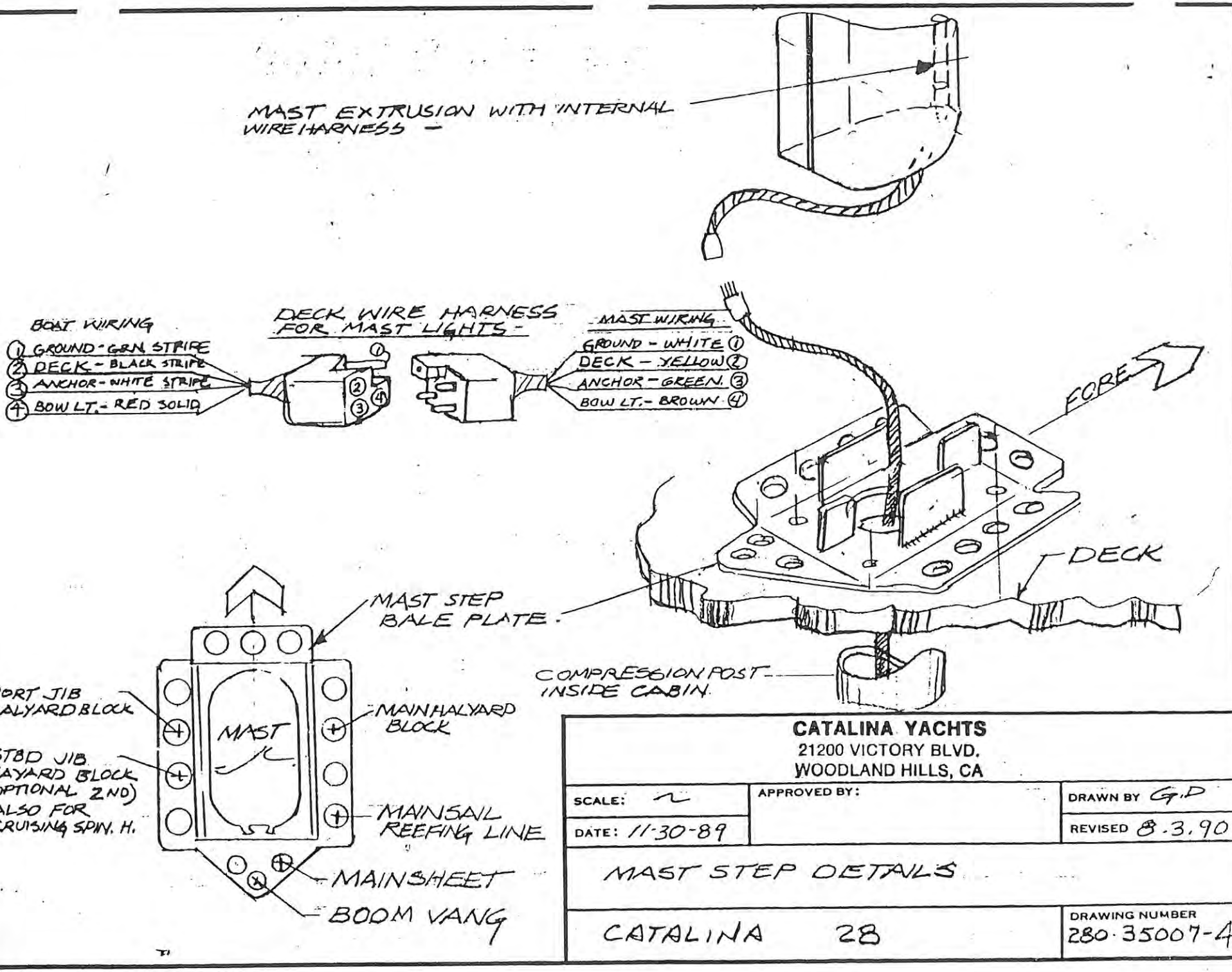

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MAST STEP DETAILS

CATALINA 28

DRAWING NUMBER 280-35007-4

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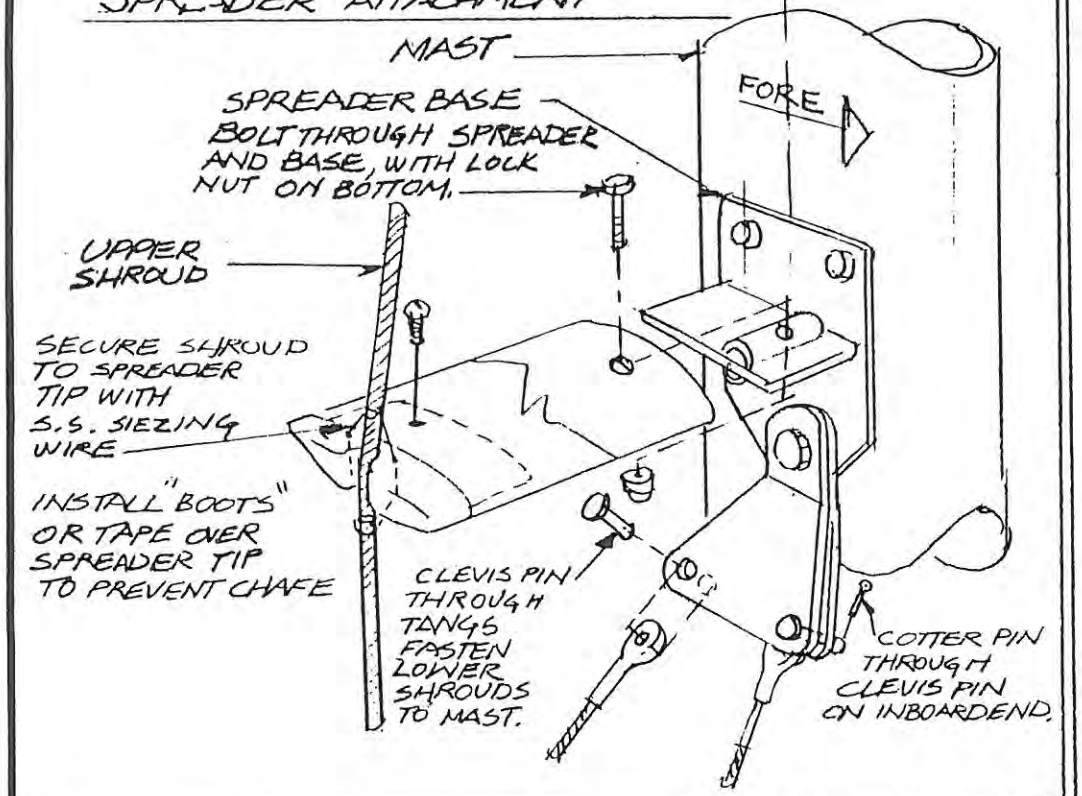
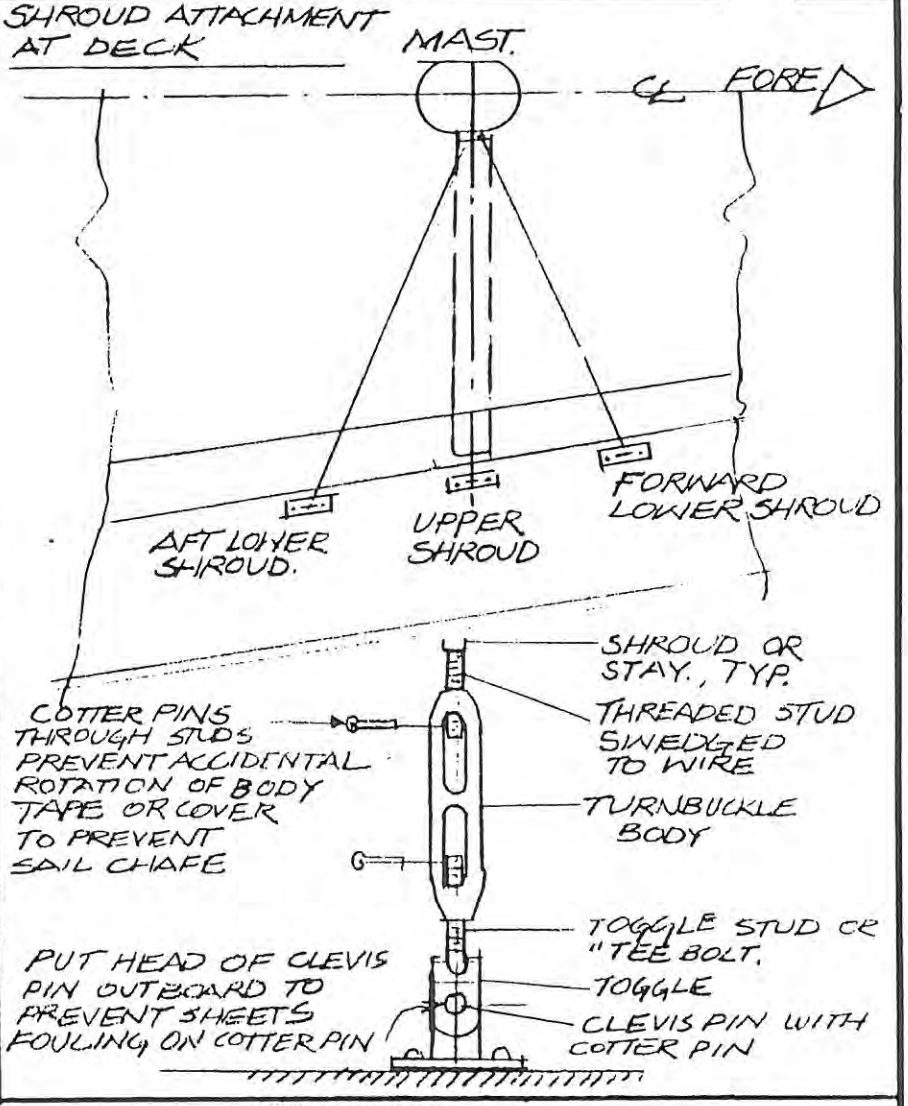
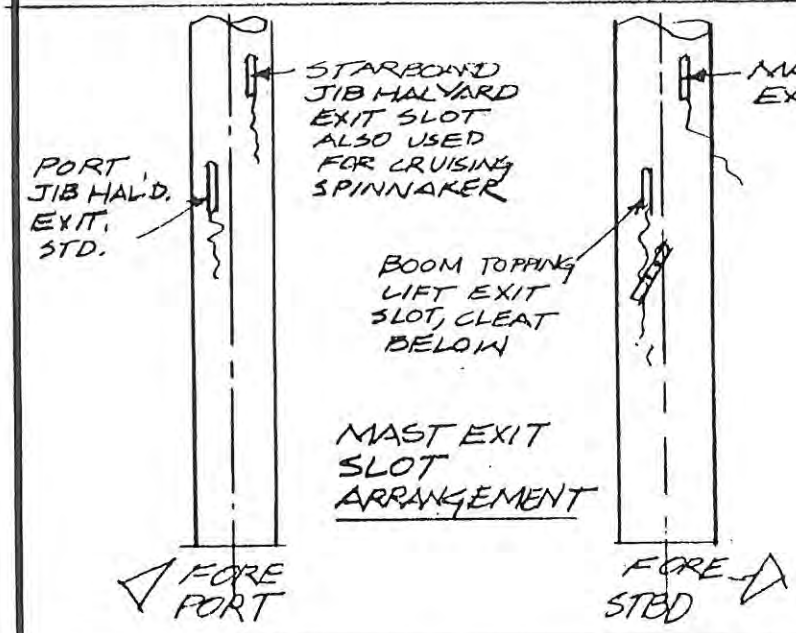
SPREADER ATTACHMENT



SHROUD ATTACHMENT AT DECK





MAST EXIT SLOT ARRANGEMENT

CATALINA YACHTS
21200 Victory Blvd.
Woodland Hills, CA 91367

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RIGGING DETAILS

CATALINA 28, HULL NO. 100 +

DRAWING NUMBER 28O-35OOG-1

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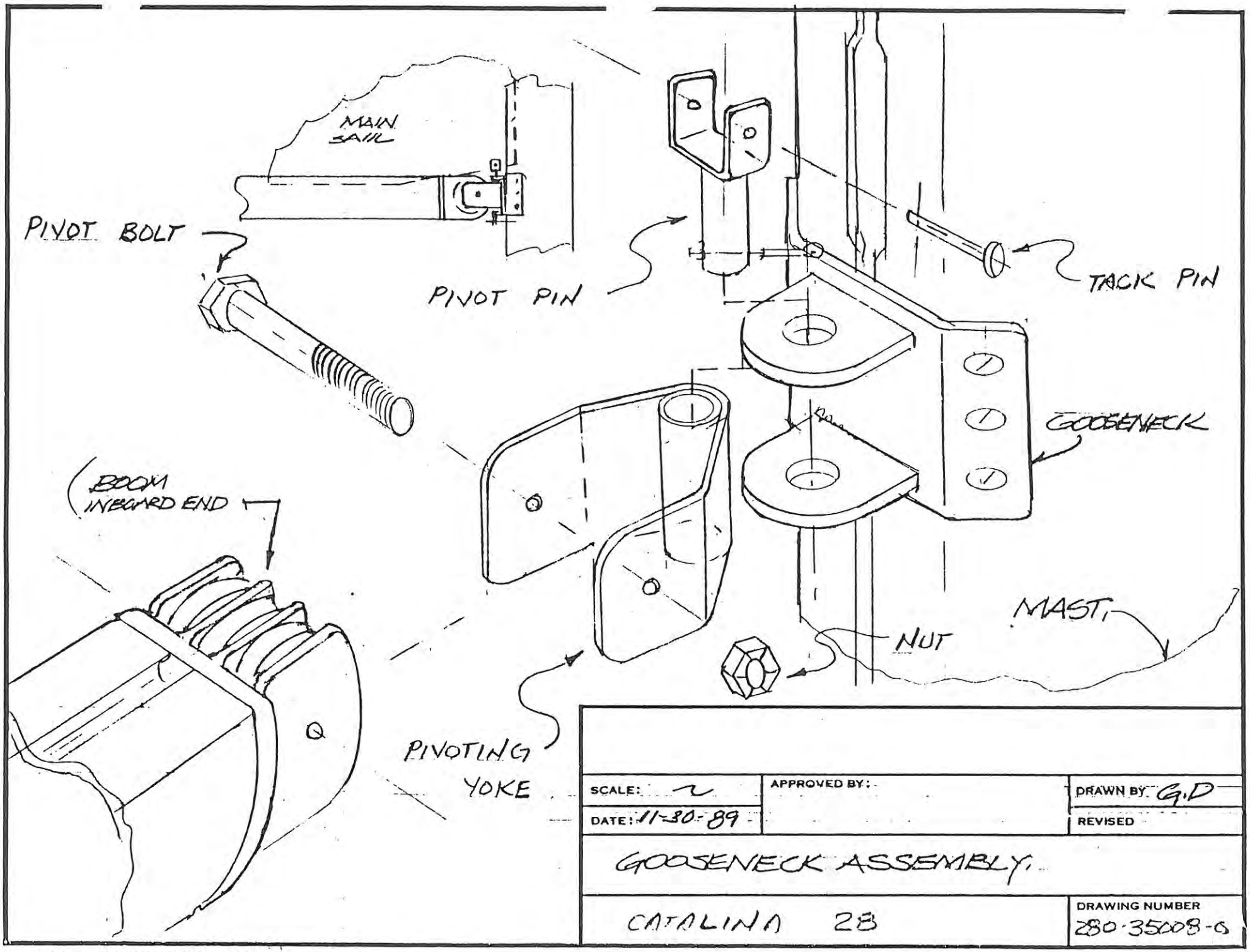

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GOOSENECK ASSEMBLY.

CATALINA 28

DRAWING NUMBER 280-35008-0

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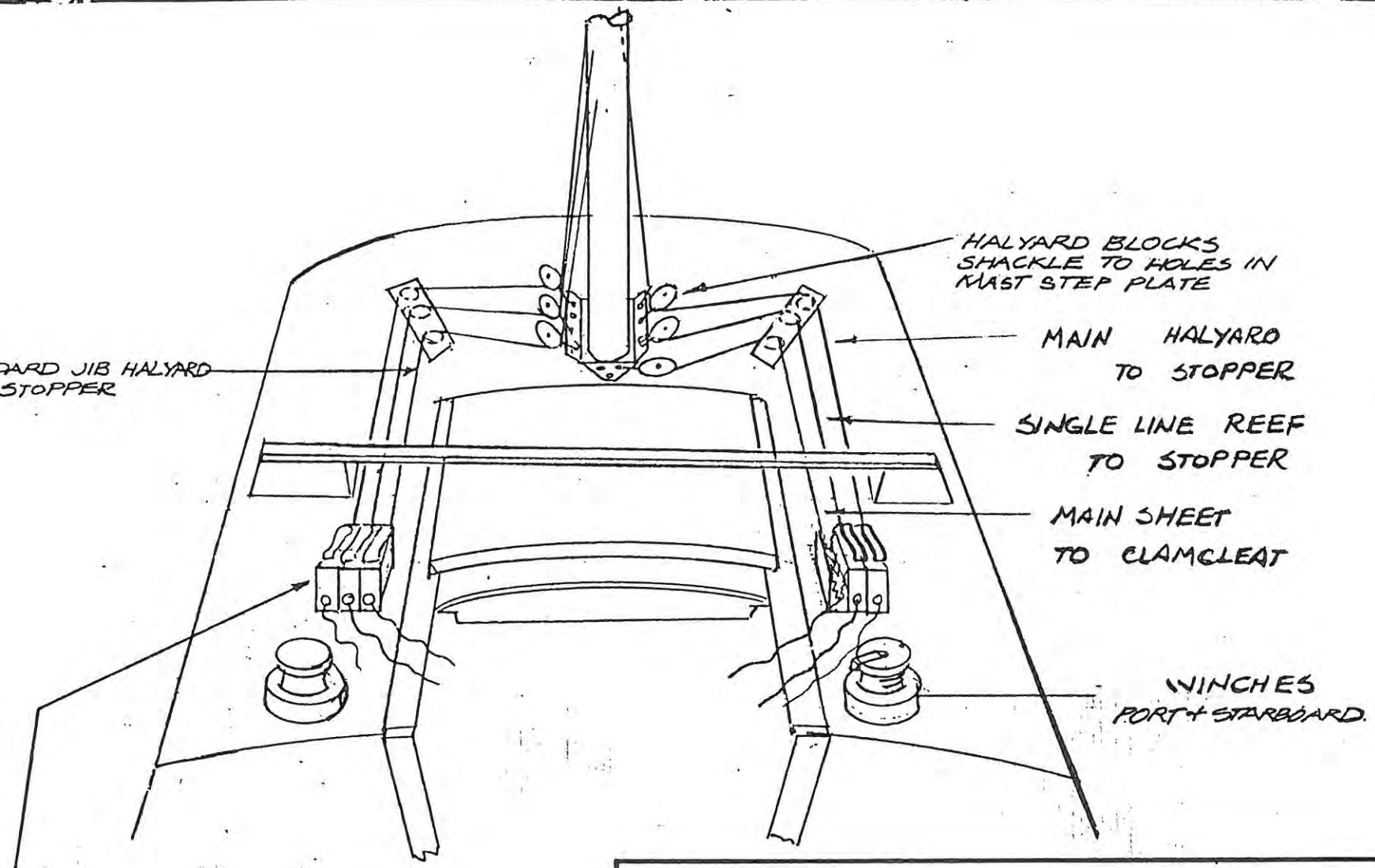

STOPPER - (SINGLE, STD. JIB HALYARD STD.)
(DOUBLE, STD. JIB AND
SECOND JIB OR SPINN. HALYARD, OPT.)
(TRIPLE, STD. JIB AND
SECOND JIB AND SPINN. HALYARD, OPT.)

SCALE: ~	APPROVED BY:	DRAWN BY G.D
DATE: 11-22-89		REVISED 2-8-91

CABIN TOP CONTROL ARRANGEMENT

CATALINA 28

DRAWING NUMBER 280-35002-1

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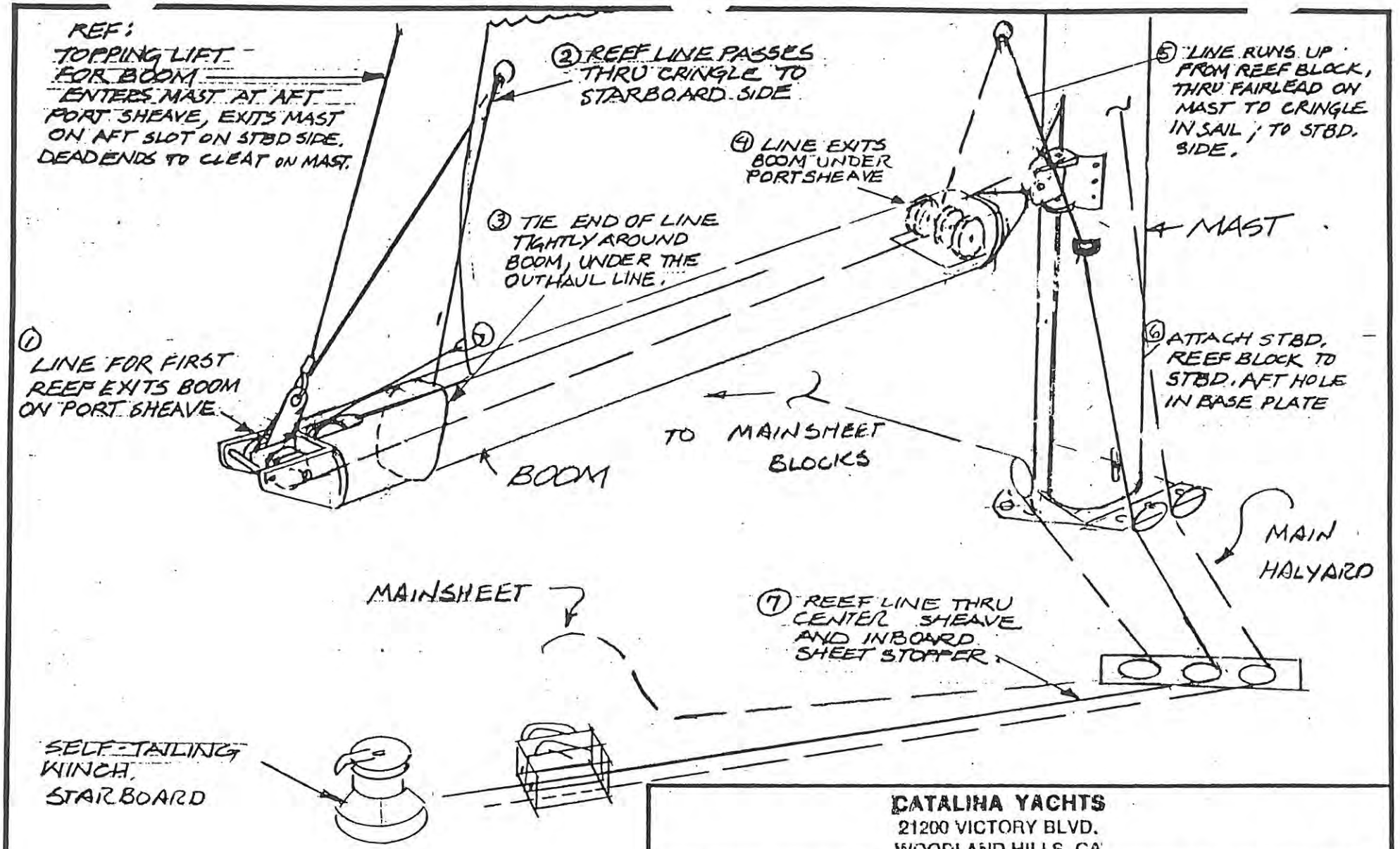

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21200 VICTORY BLVD.
WOODLAND HILLS, CA

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DATE: 11-28-89		REVISED

SINGLE LINE MAINSAIL REEFING

CATALINA 28

DRAWING NUMBER 28035.03-0.

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RECOMMENDED PRACTICES AND STANDARDS COVERING LIGHTNING PROTECTION

ABYC E–4–85

PROJECT E–4

Based on ABYC's assessment of the state of existing technology and the problems associated with achieving the requirements of this standard, ABYC recommends compliance with this standard by August 1, 1985.

E–4.1 *PURPOSE*

These recommended practices and standards establish requirements for the design, construction and installation of lightning protection equipment on boats.

E–4.2. *SCOPE*

These recommended practices and standards apply to power and sailboats as indicated.

NOTE: 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.

E–4.3. *DEFINITIONS*

a. *Air Terminal* – A metal rod that terminates in a sharp point.

b. *Lightning Ground Plate* – A means to conduct the electrical current from a boat's conductive elements to the water in which the boat floats. A separate lightning ground plate may be used or it may also serve other purposes. (See ABYC E–4.6.g.)

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

d. *Zone of Protection* – An essentially cone shaped space below a grounded air terminal or mast or overhead ground wire which is substantially immune to direct strokes of lightning. (See Appendix)

E–4.4. *REQUIREMENTS – IN GENERAL*

Successful protection of persons and watercraft from lightning is dependent upon 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, specific recommendations cannot be made to cover all cases.

– Design is covered in this and the following sections of this standard.

– Maintenance of equipment is covered in the Appendix.

– Personnel behavior is covered in the Appendix.

a. To provide an adequately grounded conductor or lightning protective mast, the entire circuit from the top of the mast to the ground shall have a conductivity not less than that of an 8 AWG copper conductor and the path to ground followed by the conductor shall be essentially straight.

b. If there are large metal objects such as tanks, engines deck winches, stoves, etc. in proximity to the grounding conductor, there will be a strong tendency for sparks or sideflashes to jump from the grounding conductor to the metal object at the closest point. To prevent damage from such sideflashes, an interconnecting conductor at least equal to 8 AWG copper shall be provided at all places where they are likely to occur.

c. Large metallic objects which are not part of the electrical system of the boat and which are not already grounded due to their own functional or other requirements may be grounded directly to the ground plate, provided that it is not practical to interconnect with the lightning conductor or bonding systems. (See ABYC E–4.6.d.)

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E–4.5. *REQUIREMENTS – MATERIALS*

a. *Corrosion* – The material used in a lightning protective system shall be resistant to corrosion. If, as in certain installations, it is impractical to avoid a junction of dissimilar metals, the corrosion effects can be reduced by the use of suitable platings or special connectors which are available for such purposes.

b. *Wire Conductors* –

(1) Wire conductors shall be stranded copper not less than 8 AWG.

(2) The size of any strand of a bare copper wire shall be not less than 17 AWG. Stranding of insulated copper wire shall be Type II stranding per ABYC E–8, "AC Electrical Systems" or ABYC E–9, "DC Electrical Systems Under 50 Volts".

c. *Other Conductive Means* –

(1) Conductivity shall be equal to or greater than 8 AWG copper wire.

(2) The thickness of metal ribbon or strip shall be at least 1/32 inches.

E–4.6. *REQUIREMENTS – INSTALLATIONS*

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

b. *Lightning Protective Mast Height* – A lightning protective mast shall be of a height to provide the desired zone of protection in accordance with the following:

(1) For a mast height not exceeding 50 feet (15m) above the water, the base radius is approximately equal to the mast height. (See Figures 1 and 2)

(2) 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 grounded object within the striking distance of the point from which final breakdown to ground occurs, the zone of protection is defined by a circular arc. (See Figure 3) The radius of the arc is the striking distance (100 feet (30m)). The arc passes through the tip of the mast and is tangent to the water. If more than one mast is used, the zone of protection is defined by arcs to all masts.

(3) 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.

c. *Lightning Protective Mast Alternatives* –

(1) If the mast is of non-conducting material, the associated lightning or grounding conductor shall:

(a) be essentially straight,

(b) be securely fastened to the mast,

(c) extend at least 6 inches (150mm) above the mast,

(d) terminate in an air terminal, and

(e) be led as directly as practicable to the grounding connection. (See ABYC E–4.g.)

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(E–4.6.c.)

(2) A radio antenna or outrigger may serve as a lightning protective mast provided it has conductivity equivalent to 8 AWG copper and is equipped with:

(a) lightning arresters.

(b) lightning protective gaps, or

(c) means for grounding during electrical storms.

NOTE: Non-conducting antenna masts with spirally wrapped conductors are not considered suitable for lightning protection purposes.

(3) The grounding of metal rod type radio antennas provides some protection for boats without masts and spars, provided:

(a) Conductors in the grounding circuit of the antenna have a conductivity equivalent to 8 AWG copper in accordance with ABYC E–4.5.b.

(b) The top of the antenna is not more than 50 ft. (15m) above the water, and 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 ABYC E–4.6.b.)

(c) The antenna loading coil is provided with a suitable protective device for bypassing the lightning current.

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

d. *Interconnection of Metallic Masses* – Metallic masses aboard boats which are a permanent part of the boat or are permanently installed within or about the boat, and whose function would not be seriously affected by grounding, shall be made a part of the lightning-conductor system by interconnection with it. (See ABYC E–4.6.f.)

EXCEPTION: Comparatively small size metallic masses.

NOTES: 1. The object of interconnecting the metal parts of a boat with the conductor is to prevent damage from sideflashes, especially in the case of rather extensive metal objects that are nearby. The main principle to be observed in the prevention of such damage is to identify on a boat the places where sideflashes are most likely to occur and to provide metallic paths for them.

2. 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 conductor.

e. *Exterior Bodies of Metal* – Metal situated wholly on the exterior of boats shall be electrically connected to the grounding conductor.

NOTE: Exterior metal bodies on boats include any large masses such as horizontal guardrails, handrails on cabin tops, smokestacks from galley stoves, electric winches, davits, metal signal masts, and metallic hatches.

f. *Interior Bodies of Metal* – Metal situated wholly in the interior of boats and which at any point comes within 6 ft. (1.8m) of a lightning conductor shall be electrically interconnected with this lightning conductor.

NOTE: Interior bodies of metal include engines, water and fuel tanks, and control rods for steering gear or reversing gear. 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.

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(E–4.6.f.)

(1) Metal which projects through cabin tops, decks or sides of boats above the sheer shall be bonded to the nearest lightning conductor at the point where the metal emerges from the boat and shall be grounded at its lower or extreme end within the boat.

(2) In order to protect the radio transmitter, antenna feedlines shall be:

(a) equipped with means for grounding during electrical storms, or

(b) protected by lightning arresters or lightning protective gaps.

g. *Lightning Ground Connection* – A lightning ground connection for a boat may consist of any metal surface which is submerged in the water and which has an area of at least 1 sq. ft. (0.093m^2).

(1) Metallic rudder surfaces, metal centerboards and keels, or the ground plate for radio transmitters may be used for this purpose.

(2) A metal hull itself constitutes an adequate lightning ground plate.

E–4.7. *REQUIREMENTS – VESSELS WITH METAL HULLS*

If there is electrical continuity between metal hulls and masts or other metallic superstructure of adequate height in accordance with ABYC E–4.6., then no further protection against lightning is necessary.

E–4.8. *REQUIREMENTS – SAILBOATS WITH NON–METALLIC HULLS*

a. Sailboats with metallic standing rigging will be adequately protected provided that all rigging is grounded so that the mast and rigging meet the requirements of ABYC E–4.5. and E–4.6.

b. Sailboats will be adequately protected if all shrouds, back stays, preventers and continuous metallic track on the mast and boom are grounded. These shall be electrically connected at the lower or forward end and grounded to a metal plate on the hull or to a metal rudder, centerboard or keel.

c. All stays and sail tracks shall be grounded.

d. Grounding of other objects on sailboats shall be in accordance with ABYC E–4.6.

e. Multihull boats shall provide a lightning ground connection in accordance with ABYC E–4.6.g. for each hull that has items to be grounded, attached, or fitted to it.

E–4.9. *REQUIREMENTS – POWER BOATS WITH NON–METALLIC HULLS*

a. Power boats may be adequately protected by a grounded radio antenna, outrigger, or other grounded lightning protective mast in compliance with ABYC E–4.6., provided the height of the mast conforms to that described for the zone of protection.

b. Interconnection and grounding of metallic masses shall be in accordance with ABYC E–4.6.

E–4.10 *REQUIREMENTS – SMALL BOATS*

a. Small boats may be protected by means of a temporary lightning protective mast which may be erected when lightning conditions are observed in the distance.

b. Grounding provisions may be made by means of a flexible copper wire and a submerged ground plate of at least 1 square foot (0.093m^2) in area.

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FIGURE 1 – BOAT WITH MAST NOT EXCEEDING 50 ft. (15m) ABOVE THE WATER

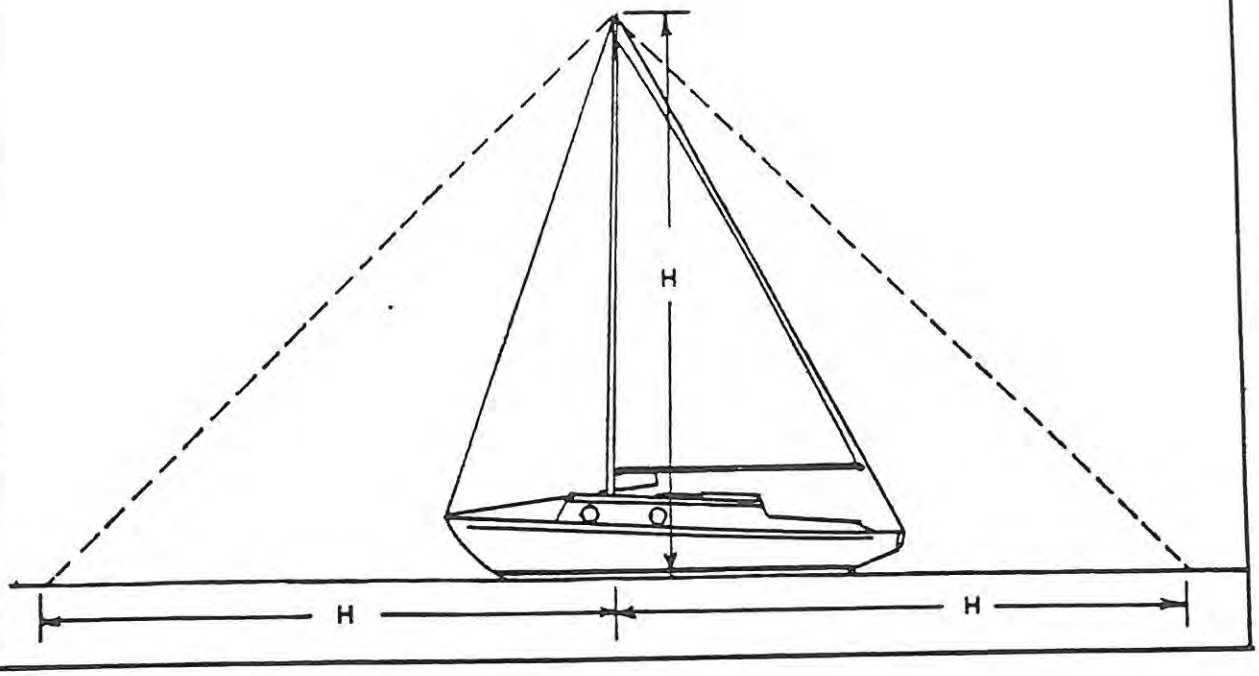
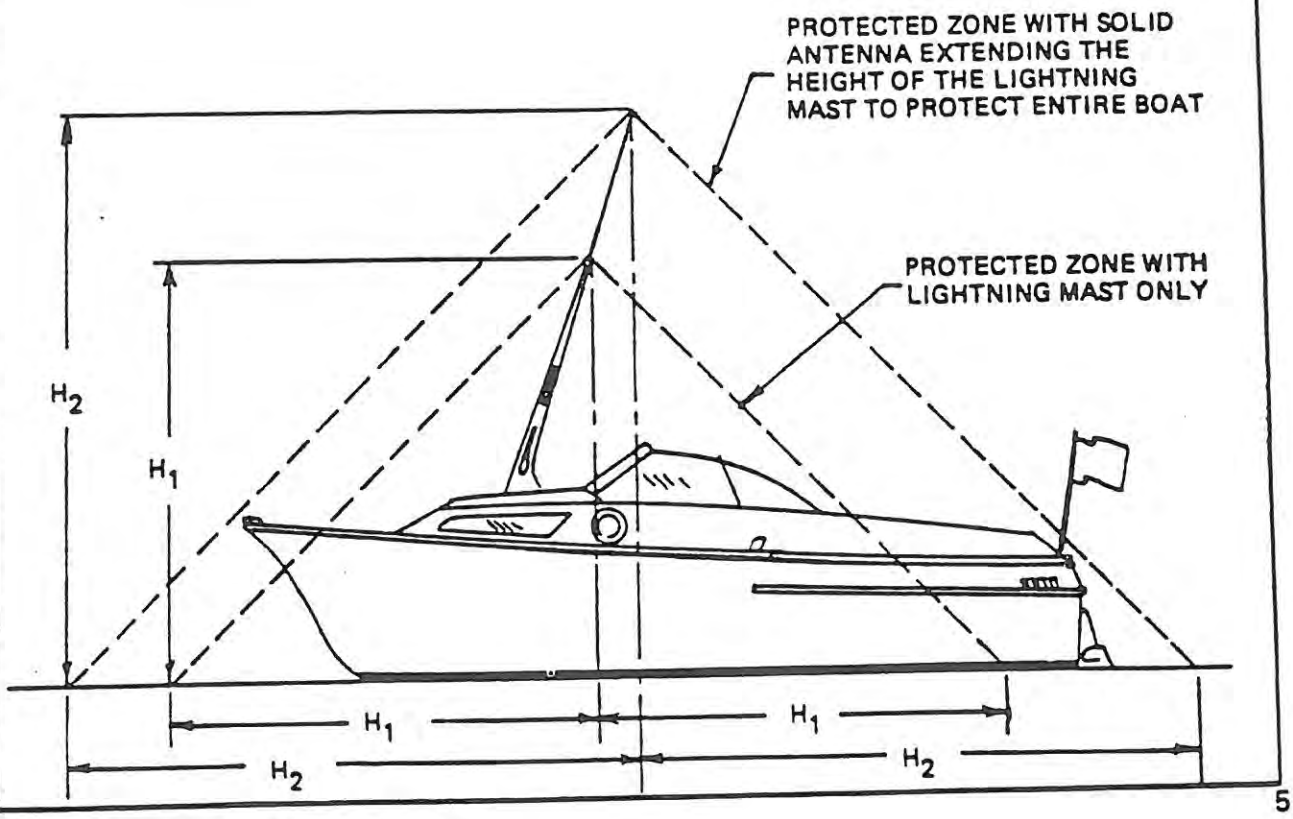


FIGURE 2 – BOAT WITH MAST NOT EXCEEDING 50 ft. (15m) ABOVE THE WATER



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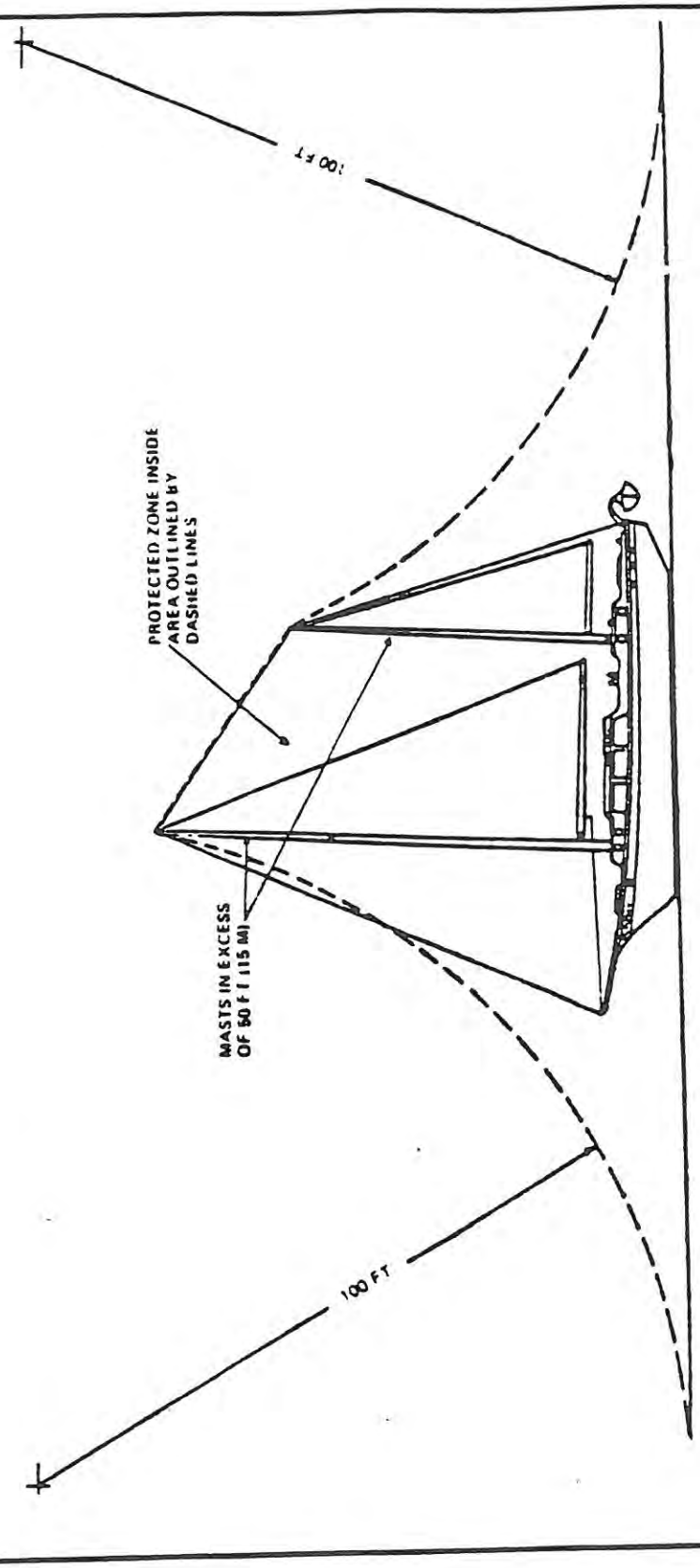

FIGURE 3 – BOAT WITH MASTS IN EXCESS OF 50 ft. (15m) ABOVE THE WATER – PROTECTION IS BASED ON LIGHTNING STRIKING DISTANCE OF 100 ft (30m)

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APPENDIX – LIGHTNING PROTECTION

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

E–4.Ap.1. *Zone of Protection* – A grounded conductor, or lightning protective mast, will generally divert to itself direct hits which might otherwise fall within a cone-shaped space, the apex of which is the top of the conductor of lightning protective mast and the base a circle at the surface of the water having a radius which is related to the height of the top of the conductor or lightning protective mast.

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

b. 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.

c. Whip-type radio antennas shall 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 quite likely to receive scant attention after installation, and therefore their composition and assembly shall be strong and materials used shall be highly resistant to corrosion.

a. Grounding of metallic objects for lightning protection may increase the possibility of harmful galvanic corrosion. (See ABYC E–2, "Cathodic Protection")

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

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

E–4.Ap.3. *Precautions for Personnel* – The basic purpose of protection against lightning is to ensure the safety of personnel. It is therefore appropriate that the following precautions be taken:

a. personnel shall remain inside a closed boat, as far as practical, during a lightning storm,

b. arms and legs shall NOT be dangled in the water,

c. consistent with safe handling and navigation of the boat during a lightning storm, personnel shall avoid making contact with any items connected to a lightning protection system and especially in such a way as to 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,

d. personnel shall NOT be in the water during a lightning storm, and

e. personnel shall avoid contact with metal parts of a sailboat's rigging, spars, fittings and railings.

* * * * * *

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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 manufacturers 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.

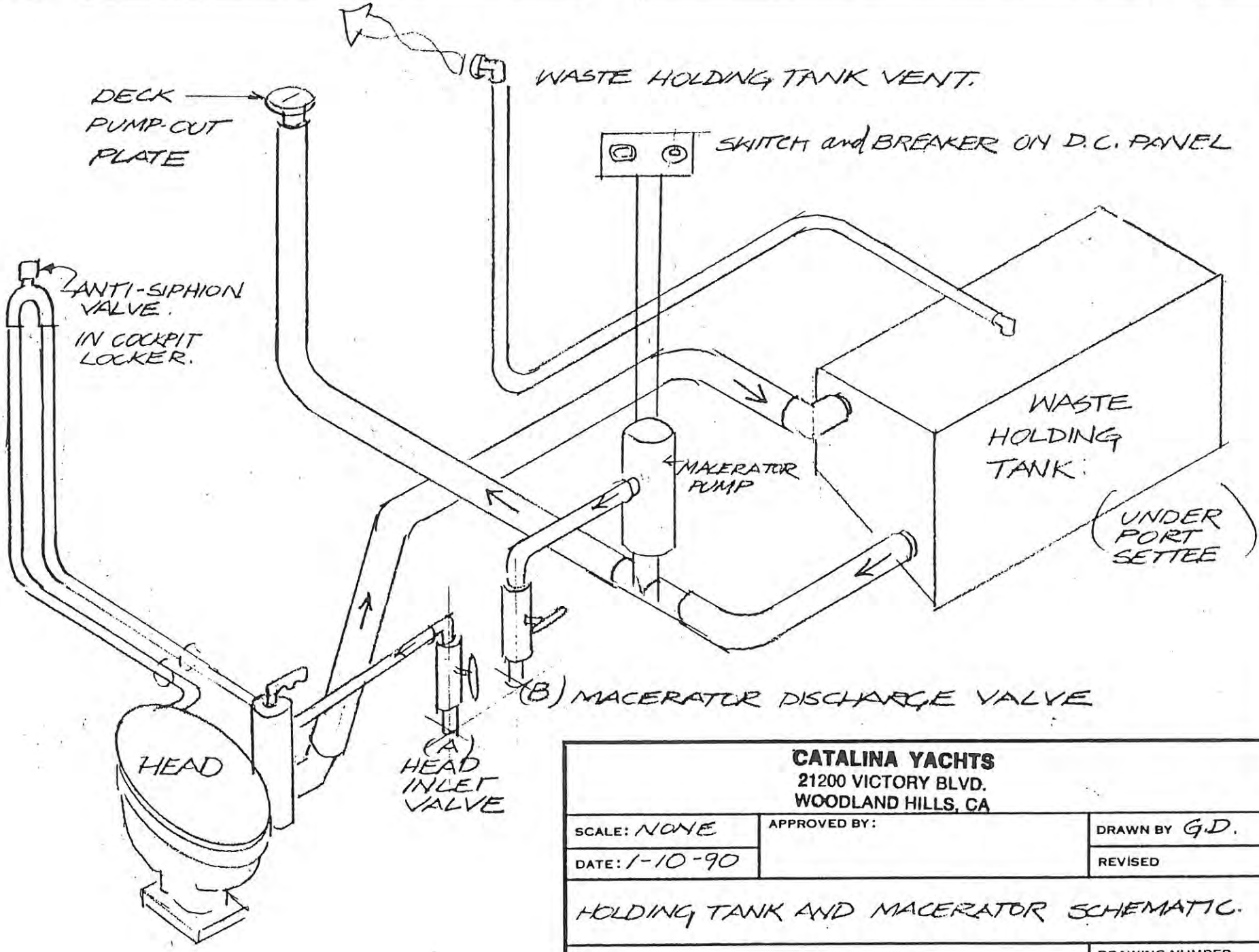
PROBLEM 3: THE MACERATOR PUMP, WHEN ON, MAKES A HIGH PITCHED SOUND BUT DOES NOT EMPTY THE TANK.

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, lubricate threads.

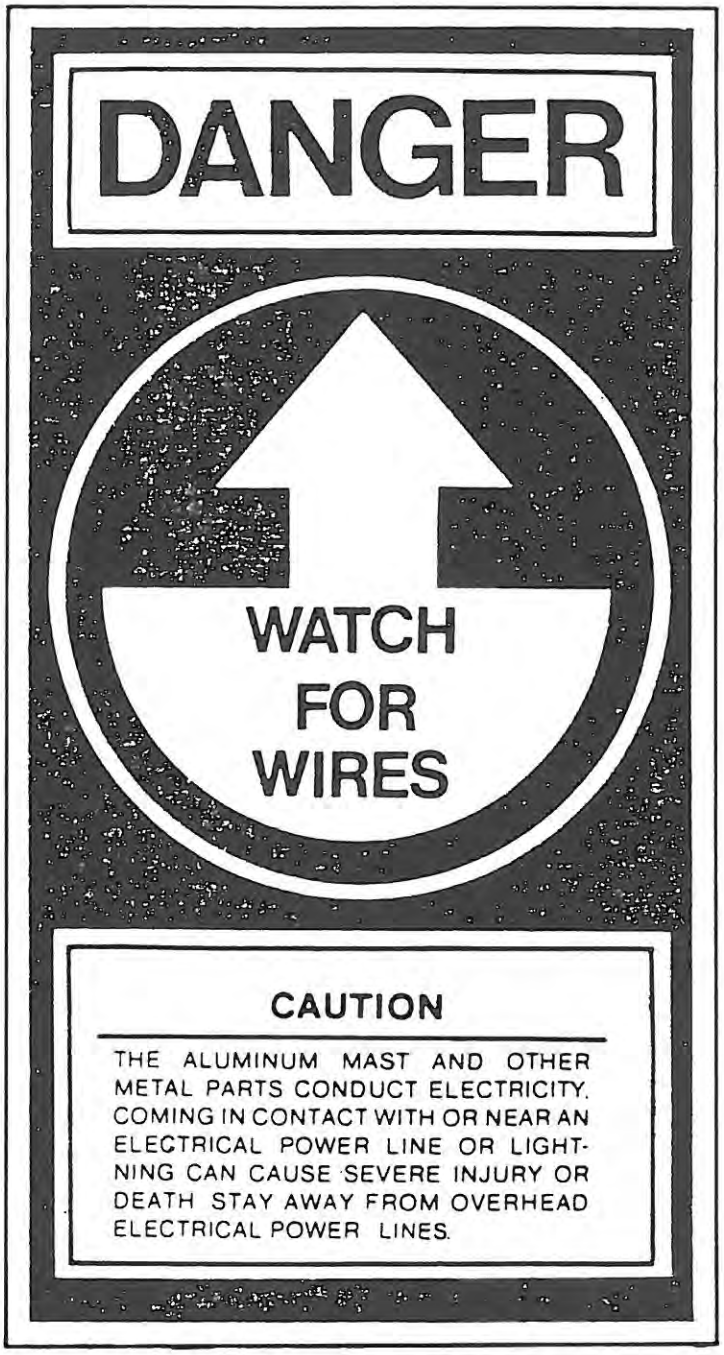


CATALINA YACHTS 21200 VICTORY BLVD. WOODLAND HILLS, CA		
SCALE: NONE	APPROVED BY:	DRAWN BY G.D.
DATE: 1-10-90		REVISED
HOLDING TANK AND MACERATOR SCHEMATIC.		
C-28		DRAWING NUMBER 280-60002 -0

8½ X 11 PRINTED ON NO. 1000H CLEARPRINT ●

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

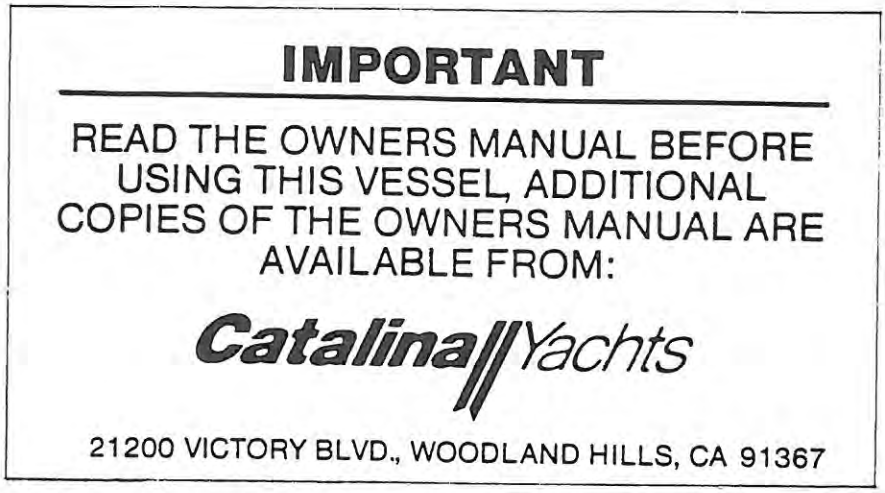


PART # WS2 ON FORWARD SIDE OF MAST 1'-0" FROM BOTTOM

PART # WS1 BELOW ENGINE INSTRUMENT PANEL

PART # WS3 BELOW ENGINE INSTRUMENT PANEL

PART # WS4 ON ALL ENGINE ACCESS DOORS AND PANELS



PART # WS5 IN THE COCKPIT ON DECK

PART # WS6 ON OVERHEAD ABOVE STOVE AREA

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.

U.S. Lakes, Rivers, Bays, Sounds and 3 miles from shore	3 to 12 miles	12 to 25 miles	Outside 25 miles
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 GALLEY FRONT FACE

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.___ Teak cleaned and oiled.
9.___ Interior finished, oiled, clean.
10.___ Cushions, carpeting, curtains, clean and in place.
11.___ Table converts to berth OK, dinette, traditional table stows OK.
12.___ Hatch lids present and fit OK.
13.___ Lifelines and pulpits rigged and OK.
14.___ Spreaders taped and drilled at base end, upper shroud wired to tip end and taped or boots installed.
15.___ Standing rigging pinned to mast.
16.___ Rigging lengths verified with check list in kit.
17.___ Mast and boom inspected: cotter pins, sheaves, tangs, spreaders OK.
18.___ Mast lights checked before mast stepped.
19.___ 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.
20.___ Masthead sheaves lubricated and rotate freely.

2 IN WATER CHECK:

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 tanks.
3.___ Check all water tanks at fittings, and vent for leaks.
4.___ Test all faucets and foot pumps for leaks.

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 at bow lights.
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 lockwired 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 alighment 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.

M A I N T E N A N C E G U I D E

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.

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 nuts to proper torque.
4. Check fuel tank fittings, and hose clamps.
5. Disassemble and inspect cooling system anti-siphon (located under galley counter near sink).
6. Check bolts.
7. Check filters.

MAINTENANCE GUIDE - CONTINUED

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 swedged 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.

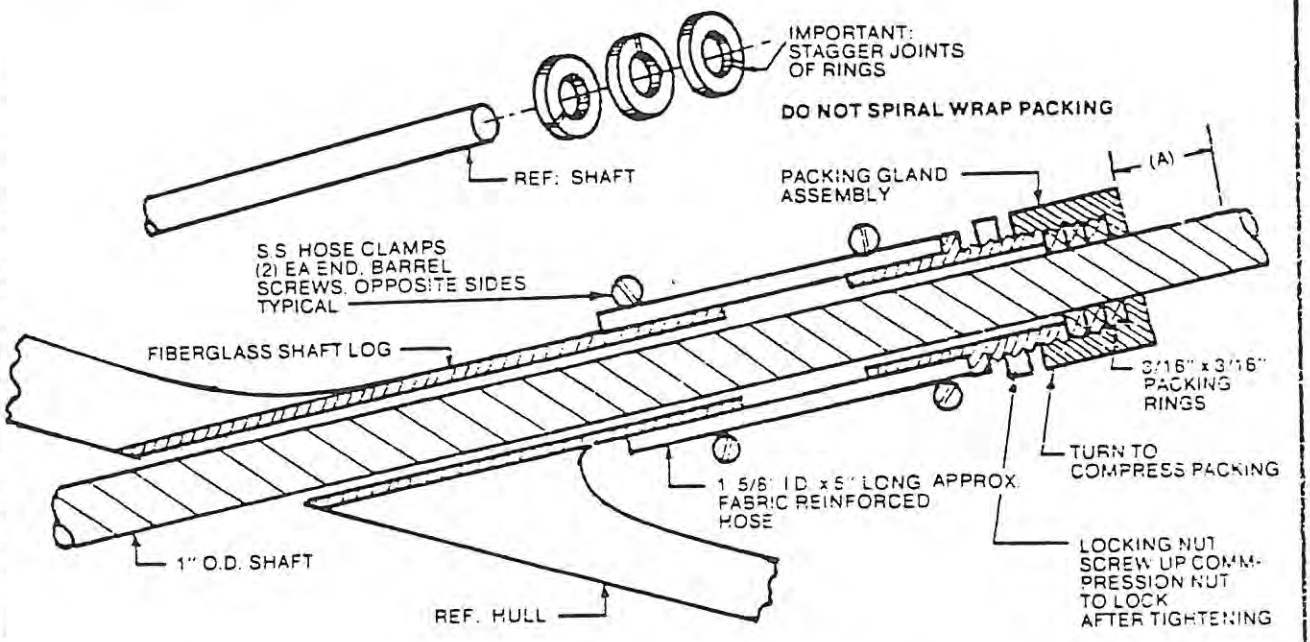
GENERAL ENGINE INFORMATION:

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, or contact Universal Motors at (414) 231-4100 and request a duplicate if Universal engine has been fitted..

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 (thousandth: 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.



(A) MAINTAIN CLEARANCE BETWEEN ENGINE COUPLING AND PACKING GLAND FOR REMOVAL AND REPACKING OF GLAND

(B) SHAFT MUST NOT CONTACT GLAND OR LOG. SHAFT MUST BE IN CENTER OF LOG AND GLAND

(C) PACKING GLAND SHOULD NOT BE OVER TIGHTENED. ONE TO TWO DROPS PER MINUTE IS NORMAL

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

PACKING GLAND ASSEMBLY

SHAFT PACKING GLAND (STUFFING BOX):

The packing gland is located under the cabin sole at the base of the companion way ladder.

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 interferring 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 drip.

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 procedure must be done with the boat in the water after the mast is stepped and the rig is tuned.

1. The propeller shaft must be dimpled (1/8" deep) for two (2) coupling set screws. The set screws must be safety wired, using the stainless steel wire provided, 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.

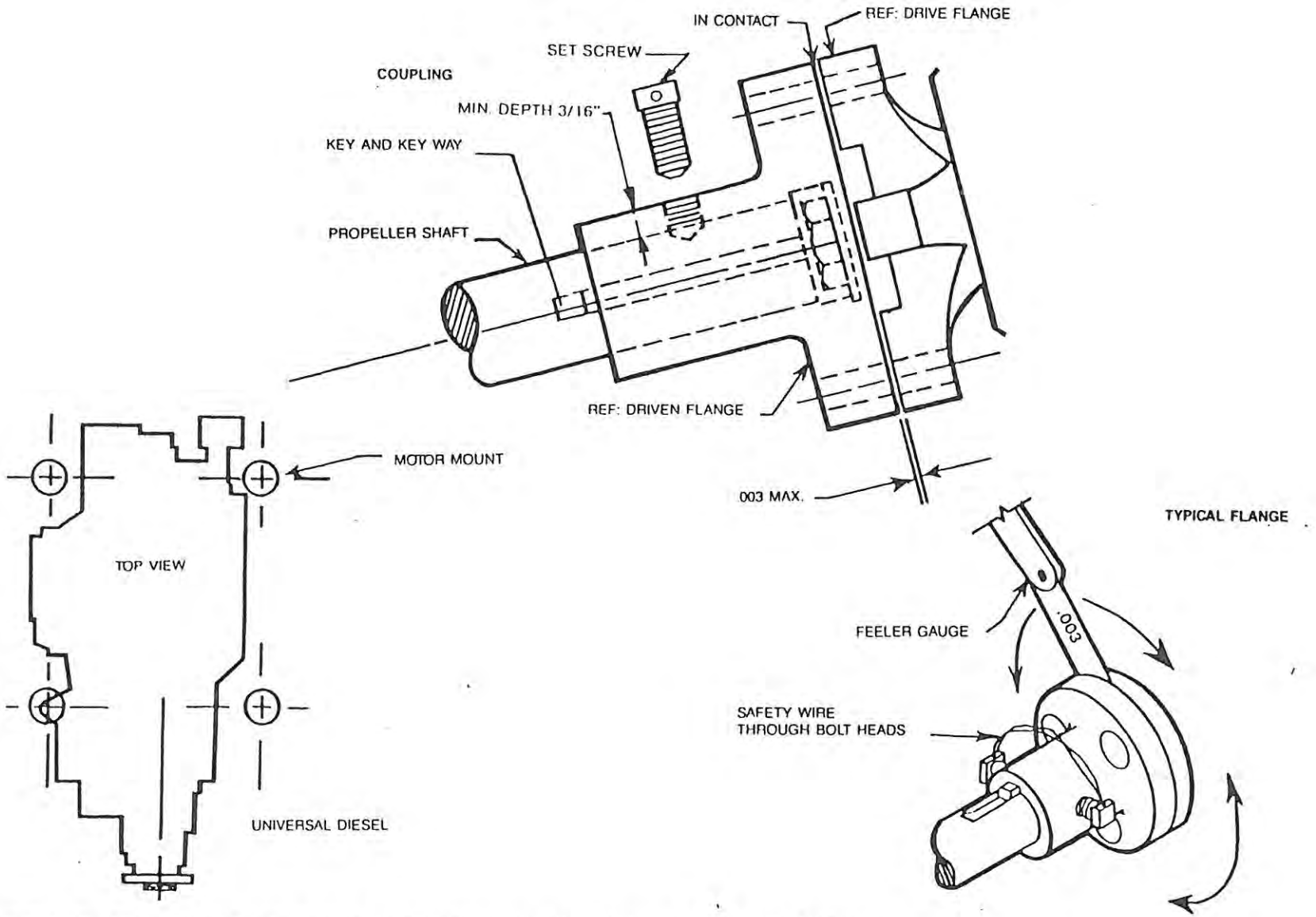
   For example, excessive gap at the bottom of the coupling (see drawing) indicates engine is tilted too far aft (front too high). Using a 15/16 end wrench, loosen lock nuts on forward motor mount(s). Lower front of engine by clockwise rotation of motor mount nuts. Remeasure gap at coupling. A gap at the 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 ¼ 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 28, 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 28's are equipped with anti-siphon valves as an additional precaution to prevent cooling water from entering the engine.

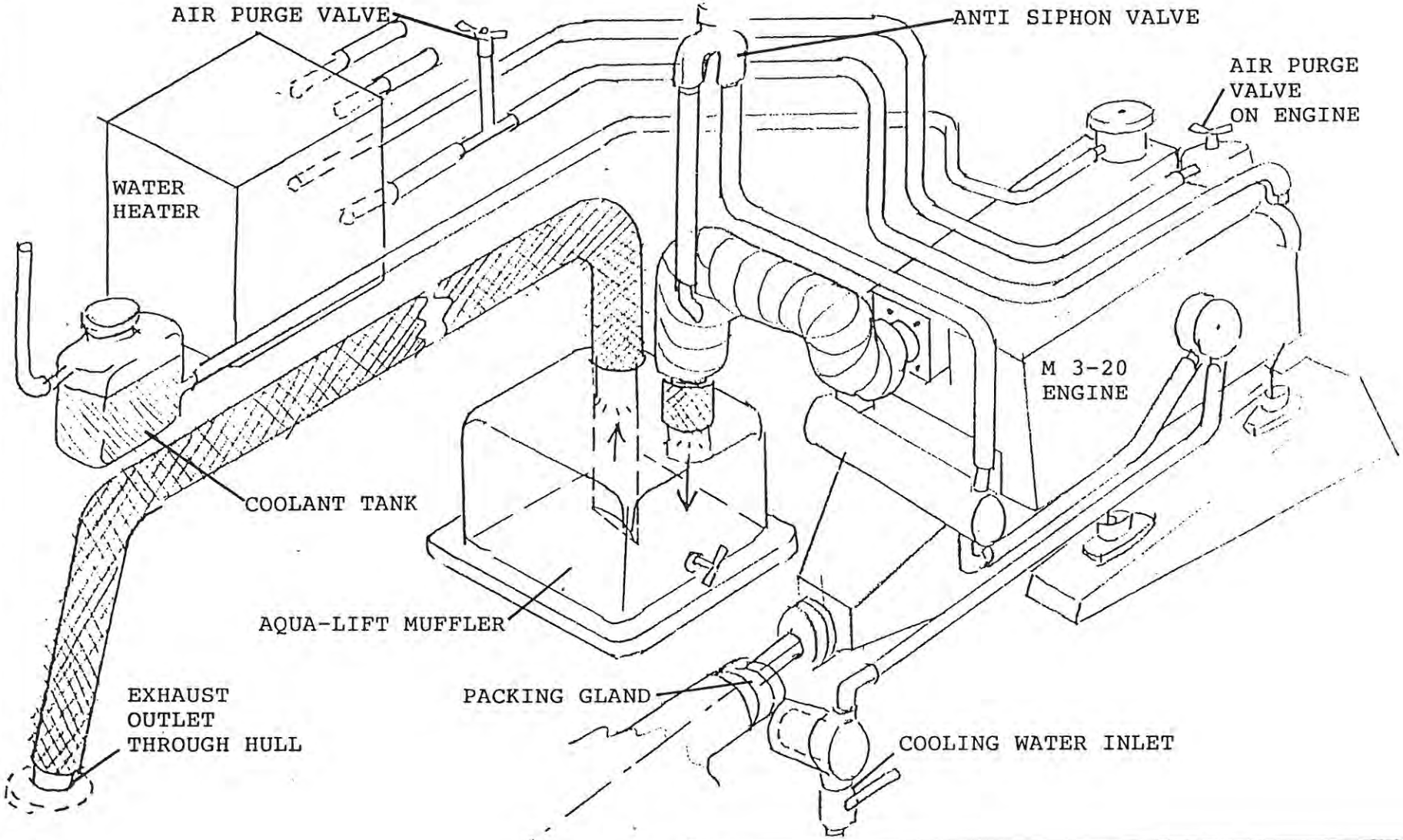
The engine cooling system consists of a sea water side and a recirculating side, each has a separate pump mounted on the engine.

The sea water side draws water in through a through hull valve with filter, to the pump. The water is then pushed through the cylindrical heat exchanger mounted above the bell housing at the rear of the engine. In the heat exchanger the water in the closed, recirculating side transmits heat to the sea water. The sea water then exits the heat exchanger through a hose to the anti-siphon valve and is then discharged into the engine exhaust line and the aqualift 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 the 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 thesystem must be purged of air bubbles to prevent overheating. Run the engine at approximately 2000 RPM. Open the bleed valve next to the water heater until a solid flow of coolant flows out.

Always replenish coolant in the system from the reservoir in the cockpit locker. Do not open the coolant cap on the engine after the coolant system has been purged of air.



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

CATALINA YACHTS		
SCALE: NONE	APPROVED BY:	DRAWN BY G.D.
DATE: 2-22-90		REVISED
ENGINE COOLING SYSTEM AND HEAT EXCHANGER		
CATALINA 28		DRAWING NUMBER - 0

8½ X 11 PRINTED ON NO. 1000H CLEARPRINT ·

ANTI SIPHON VALVE

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 28 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.

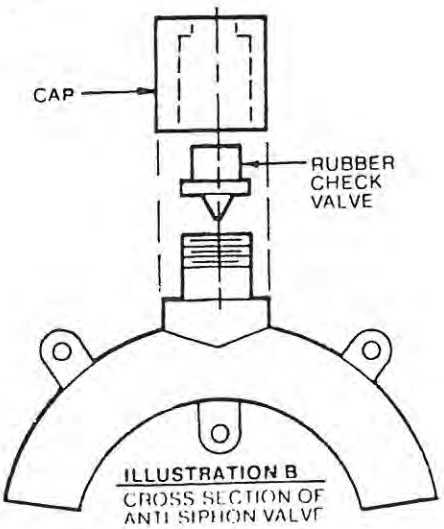


ILLUSTRATION B
CROSS SECTION OF
ANTI SIPHON VALVE

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 labled "Emergency Tiller".

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

1. Locate the emergency tiller.

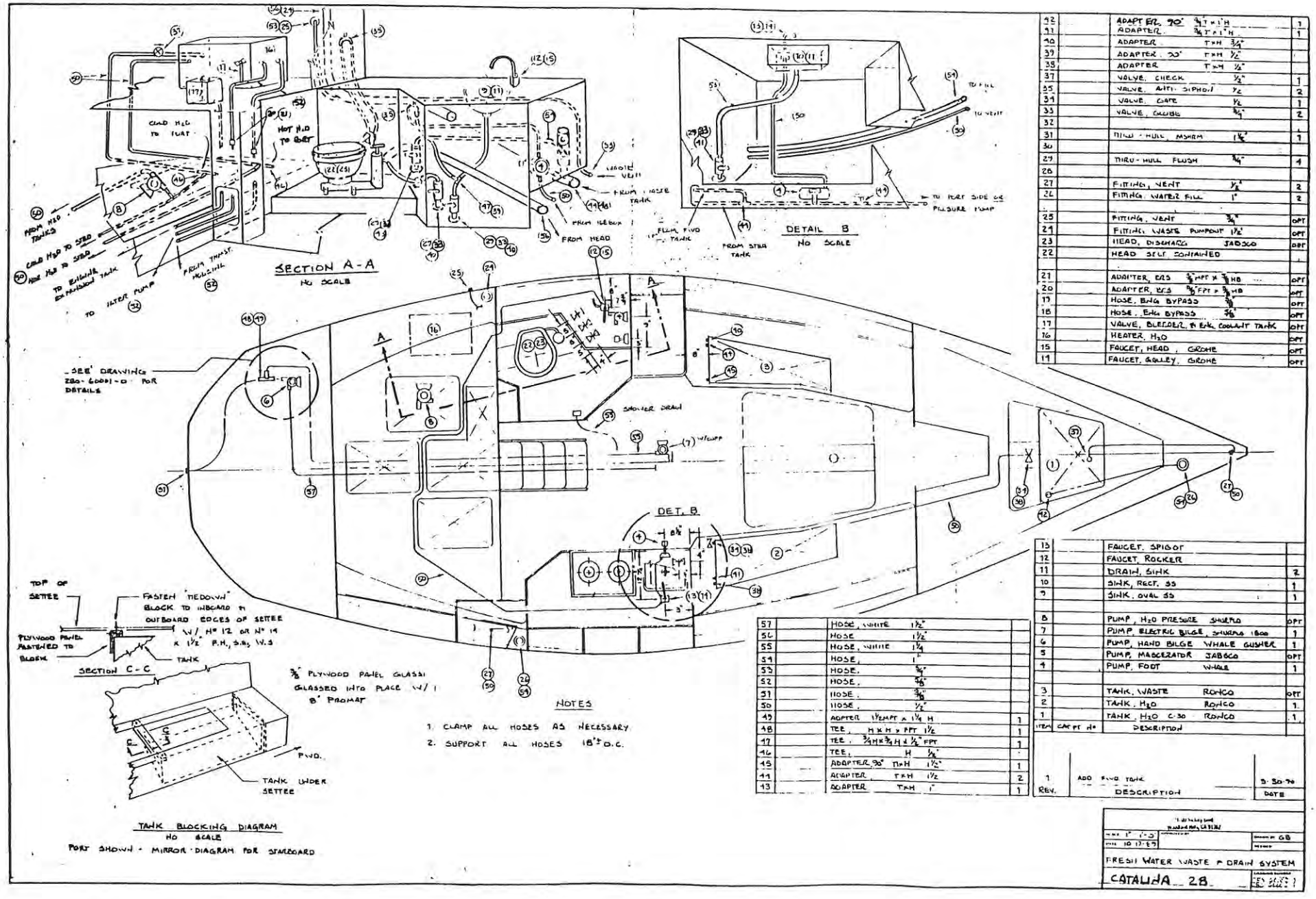
2. Remove inspection port cover in the cockpit sole aft of the wheel.

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.



42		ADAPTER, 90° ¾" T x 1" H	1
41		ADAPTER ¾" T x 1" H	1
40		ADAPTER T x H ¾"	
39		ADAPTER, 90° T x H ½"	
38		ADAPTER T x H ½"	
37		VALVE, CHECK ½"	1
35		VALVE, ANTI-SIPHON ½"	2
34		VALVE, GATE ½"	1
33		VALVE, GLOBE ¾"	2
32			
31		THRU-HULL, MSHRM 1½"	1
30			
29		THRU-HULL FLUSH ¾"	4
28			
27		FITTING, VENT ½"	2
26		FITTING, WATER FILL 1"	2
25		FITTING, VENT ¾"	OPT
24		FITTING, WASTE PUMPOUT 1½"	OPT
23		HEAD, DISCHARGE JABSCO	OPT
22		HEAD SELF CONTAINED	1
21		ADAPTER, ELS ¾" FPT x ¾" HB	OPT
20		ADAPTER, ELS ¾" FPT x ¾" HB	OPT
19		HOSE, ENG BYPASS ¾"	OPT
18		HOSE, ENG BYPASS ¾"	OPT
17		VALVE, BLEEDER, IN ENG COOLANT TANK	OPT
16		HEATER, H_2O	OPT
15		FAUCET, HEAD, CHROME	OPT
14		FAUCET, GALLEY, CHROME	OPT
13		FAUCET, SPIGOT	
12		FAUCET, ROCKER	
11		DRAIN, SINK	2
10		SINK, RECT. SS	1
9		SINK, OVAL SS	1
8		PUMP, H_2O PRESSURE SHURFLO	OPT
7		PUMP, ELECTRIC BILGE, SHURFLO 1800	1
6		PUMP, HAND BILGE WHALE GUSHER	1
5		PUMP, MACCERATOR JABSCO	OPT
4		PUMP, FOOT WHALE	1
3		TANK, WASTE RONCO	OPT
2		TANK, H_2O RONCO	1
1		TANK, H_2O C-30 RONCO	1

ITEM	CAT PT #	DESCRIPTION

57		HOSE, WHITE 1½"	
56		HOSE 1½"	
55		HOSE, WHITE 1¼"	
54		HOSE, 1"	
53		HOSE, ¾"	
52		HOSE, ⅝"	
51		HOSE, ⅜"	
50		HOSE, ½"	
49		ADPTER 1½" MPT x 1¼" H	1
48		TEE, H x H x FPT 1½"	1
47		TEE, ¾" H x ¾" H x ½" FPT	1
46		TEE, H ½"	
45		ADAPTER, 90° T x H 1½"	1
44		ADAPTER T x H 1½"	2
43		ADAPTER T x H 1"	1

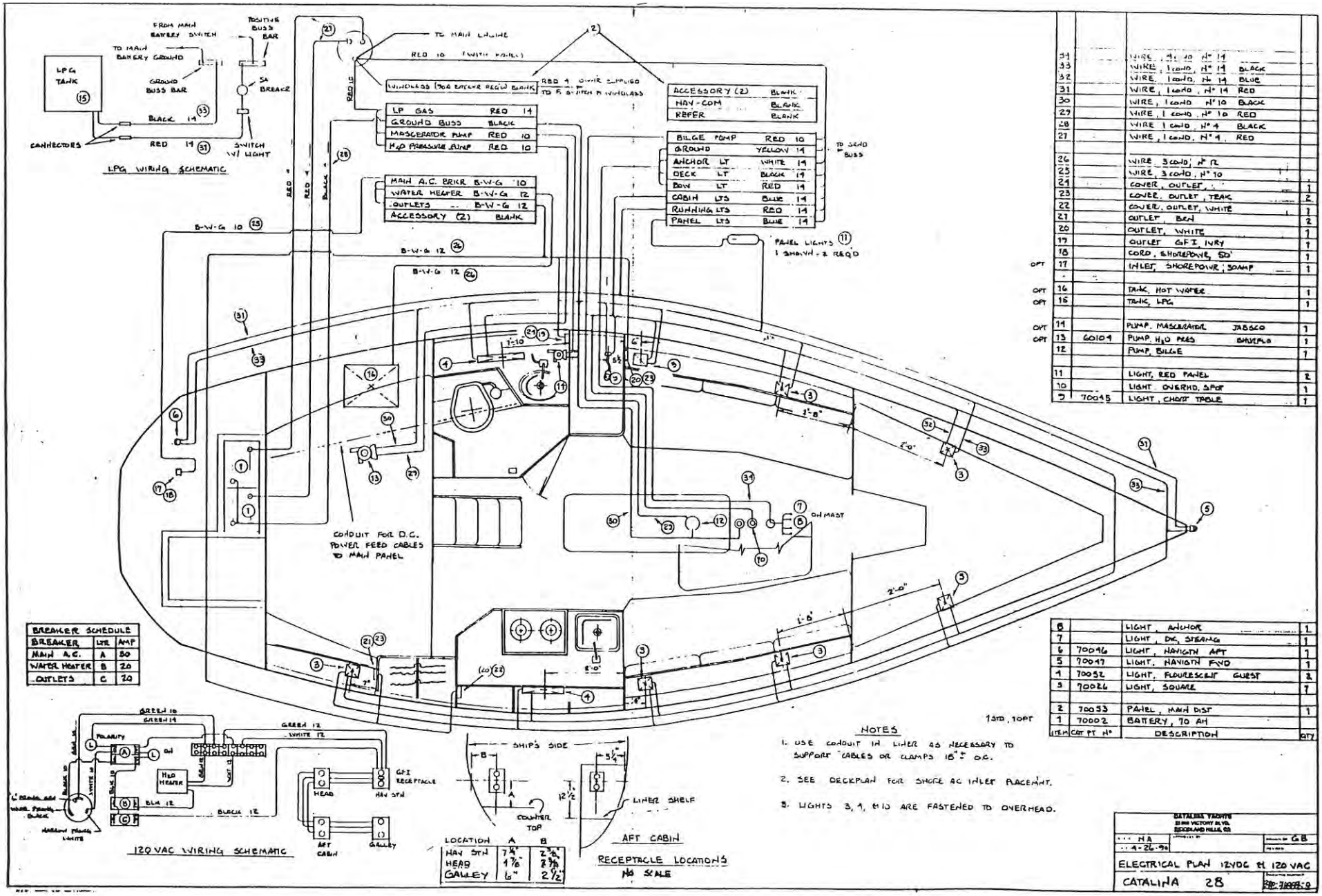
NOTES

1. CLAMP ALL HOSES AS NECESSARY
2. SUPPORT ALL HOSES 18"± O.C.

REV.		DESCRIPTION	DATE
1		ADD FWD TANK	5-30-79

FRESH WATER WASTE & DRAIN SYSTEM

CATALINA 28



34		WIRE, 4 COND. N° 14	
33		WIRE, 1 COND, N° 14 BLACK	
32		WIRE, 1 COND, N° 14 BLUE	
31		WIRE, 1 COND, N° 14 RED	
30		WIRE, 1 COND N° 10 BLACK	
29		WIRE, 1 COND. N° 10 RED	
28		WIRE 1 COND. N° 4 BLACK	
27		WIRE, 1 COND. N° 4 RED	
26		WIRE 3 COND, N° 12	
25		WIRE, 3 COND. N° 10	
24		COVER, OUTLET,	1
23		COVER. OUTLET, TEAK	2
22		COVER, OUTLET, WHITE	1
21		OUTLET, BRN	2
20		OUTLET, WHITE	1
19		OUTLET GFI, IVRY	1
18		CORD, SHOREPOWER, 50'	1
OPT 17		INLET, SHOREPOWER, 30AMP	1
OPT 16		TANK, HOT WATER	1
OPT 15		TANK, LPG	1
OPT 14		PUMP, MASCERATOR JABSCO	1
OPT 13	60109	PUMP, H2O PRES SHURFLO	1
12		PUMP, BILGE	1
11		LIGHT, RED PANEL	2
10		LIGHT, OVERHD, SPOT	1
9	70095	LIGHT, CHART TABLE	1
8		LIGHT, ANCHOR	1
7		LIGHT, DK, STEAMG	1
6	70096	LIGHT, NAVIGTN AFT	1
5	70097	LIGHT, NAVIGTN FWD	1
4	70092	LIGHT, FLOURESCENT GUEST	2
3	70026	LIGHT, SQUARE	7
2	70093	PANEL, MAIN DIST	1
1	70002	BATTERY, 70 AH	
ITEM	CAT PT N°	DESCRIPTION	QTY

NOTES

1. USE CONDUIT IN LINER AS NECESSARY TO SUPPORT CABLES OR CLAMPS 18" ± O.C.
2. SEE DECKPLAN FOR SHORE AC INLET PLACEMENT.
3. LIGHTS 3, 4, 5 & 10 ARE FASTENED TO OVERHEAD.

CATALINA YACHTS
21200 VICTORY BLVD.
WOODLAND HILLS, CA

NA	GB
4-26-90	

ELECTRICAL PLAN 12VDC & 120 VAC

CATALINA 28