

## ENGINE OPERATING INSTRUCTIONS

The engine installed in your yacht has already been run and all systems tested before leaving the Cal plant.

We are not going to get into a great amount of detail in this area, for we believe the manual supplied by the engine manufacturer adequately covers the subject.

Study your engine owner's manual and get to know your engine. The knowledge could be of great assistance to you. Also, some manufacturers have clinics aimed at the customer; contact them for details.

It is advisable that you follow the engine manufacturer's procedures and recommendations on run-in and maintenance.

On yachts with propeller shafts, please use the following procedure:

### Alignment of Engine to Shaft

The engine must be properly and exactly aligned with the propeller shaft. No matter what material is used to build a boat, it will be found to be somewhat flexible, and when launched, the boat hull will change its shape to a greater extent than is usually realized. It is, therefore, very important to check the engine alignment at frequent intervals and to correct any errors when they appear.

Mis-alignment between the engine and the propeller shaft is the source of troubles which are often blamed on other causes. It will create excessive bearing wear, rapid shaft wear, or leakage of transmission oil through the rear seal. A bent propeller shaft will have exactly the same effect, and it is, therefore, necessary that the propeller shaft itself be perfectly straight.

## ENGINE OPERATING INSTRUCTIONS - Continued

The engine should be moved around on the bed and supported on the screw mounts until the two halves of the couplings can be brought together without using force and so that the flanges meet evenly all around.

Never attempt a final alignment with the boat on land. The boat should be in the water and have had an opportunity to assume its final water form. It is best to do the alignment with the fuel and water tank about half full and all the usual equipment on board and after the main mast has been stepped and final rigging has been accomplished.

Take plenty of time in making this alignment, and do not be satisfied with anything less than perfect results.

The alignment is correct when the shaft can be slipped backward and forward into the counterbore very easily and when a feeler gauge indicates that the flanges come exactly together at all points. The two halves of the coupling should be parallel within 0.003 inches.

In making the final check for alignment, the engine half coupling should be held in one position and the alignment with the propeller coupling checked in each of four positions, rotated  $90^{\circ}$  between each position. This test will also check whether the propeller half coupling is in exact alignment on its shaft. Then, keeping the propeller coupling in one position, the alignment should be checked, rotating the engine coupling as described above.

## ENGINE OPERATING INSTRUCTIONS - Continued

The engine alignment should be re-checked after the boat has been in service for one to three weeks and, if necessary, the alignment remade. It will usually be found that the engine is no longer in alignment. This is not because the work was improperly done at first, but because the boat has taken some time to take its final shape. It may even be necessary to re-align at a further period.

The coupling should always be opened up and the bolts removed, whenever the boat is hauled out or moved from the land to the water and during storage in a cradle. The flexibility of the boat often puts a very severe strain on the shaft or the coupling or both when it is being moved.

During the alignment procedure, check the set screws which hold the propeller half coupling to the shaft. These must be tight, in contact with the shaft, and safety wired.

### Stuffing Box

The stuffing box provides a seal for the propeller shaft at the inner end of the shaft log. It is connected to the shaft log with heavy wall hose, double clamped at each end. This flex hose allows the stuffing box to maintain alignment with the prop shaft without creating excessive wear of the packing, due to mis-alignment or vibration. The packing used is wax impregnated 3/16" x 3/16" square flax.

When the shaft is turning, it is normal to have a slight leakage at the seal, about **one drop** per 30 seconds. This acts as a coolant, as well as a lubricant, to protect the seal and shaft surface. Should **excessive** leakage be apparent, release the lock nut and **tighten the packing nut** slightly and re-tighten the lock

## ENGINE OPERATING INSTRUCTIONS - Continued

nut. Re-start engine and check again with shaft turning.

When it becomes necessary to replace the packing (boat should be hauled), loosen the lock nut, back off the packing gland nut, and slide it forward on the shaft. Remove all the old packing and replace it with three rings of new packing. Stagger the ends of each ring so as not to provide a path for water to leak through. Do not wind one continuous strip spirally around prop shaft to make a seal.

Slide the packing gland back and tighten enough to create a heavy drag on the shaft. This will seat and form the packing.

Back off the packing nut until the shaft feels free and re-set the lock nut. Re-check for proper leakage when boat is returned to the water. Be sure the lock nut is secure, as operating the boat in reverse could cause the packing gland to screw off the stuffing box, allowing water into the boat.

## FLOODING OF ENGINE WITH WATER

Your Cal Yacht is supplied with a water-lift (wave suppressor) type of muffler that under normal conditions, when the engine is not running, provides wave suppression and water storage to help keep water from flooding the engine.

NOTE: There is a direct path from the overboard exhaust port via the water-lift muffler to the engine and from the water pump to the muffler. Accidental conditions (sea) and operator error (prolonged starting attempts) can thus cause an excessive volume of water to fill the muffler and flood the engine.

UNDER SUCH ACCIDENTAL SEA AND/OR MISUSE CONDITIONS, ENGINE FLOODING MAY BE UNAVOIDABLE.

### Sea Flooding:

Your Cal exhaust system is designed and installed to the highest standards, and, as stated above, could still flood under certain heavy sea conditions. The only added safety precaution you could add would be to install a rubber flap to the overboard exhaust port. This would dramatically slow the surge effect of waves hitting the port.

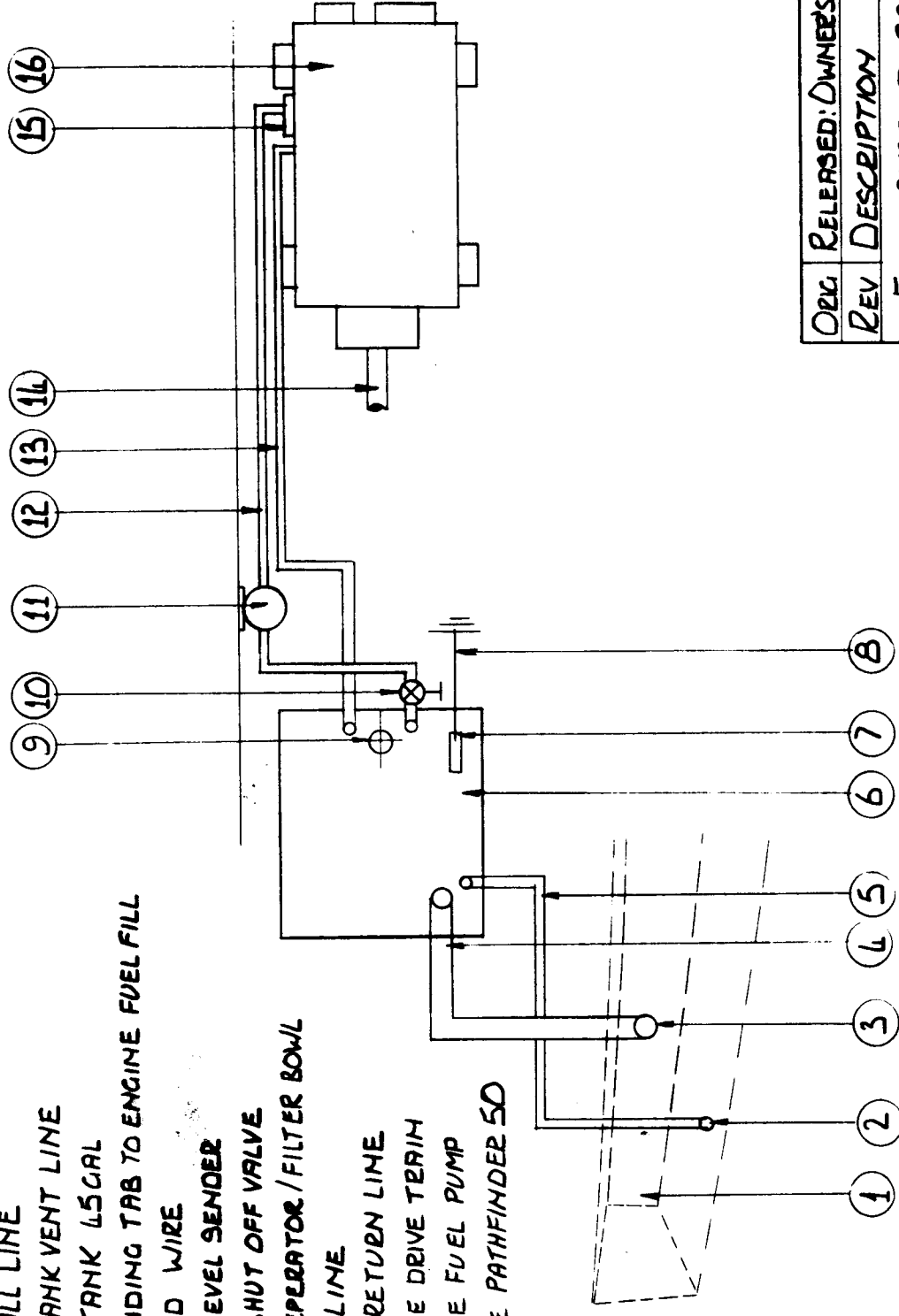
### Operator Error:

This is a nagging source of water-in-the-engine and occurs when an operator repeatedly attempts to start an engine; i.e., he "grinds" the starter - not 2 or 3 times - but continually.

The amount of cranking time varies from engine to engine, factors being the amount of each piston's displacement, the water pump's capacity, and whether the battery is cranking a full R.P.M.

# LEGEND

- ① STARBOARD COCKPIT CORNING
- ② FUEL TANK VENT
- ③ FUEL FILL
- ④ FUEL FILL LINE
- ⑤ FUEL TANK VENT LINE
- ⑥ FUEL TANK 15 GAL
- ⑦ GROUNDING TAB TO ENGINE FUEL FILL
- ⑧ GROUND WIRE
- ⑨ FUEL LEVEL SENDER
- ⑩ FUEL SHUT OFF VALVE
- ⑪ FUEL SEPERATOR / FILTER BOWL
- ⑫ FUEL LINE
- ⑬ FUEL RETURN LINE
- ⑭ ENGINE DRIVE TERNIN
- ⑮ ENGINE FUEL PUMP
- ⑯ ENGINE PATHFINDER SD



## NOTE

ALL FUEL HOSES CONFORM TO NFPA STANDARDS  
FOR MARINE FUEL SYSTEMS INSTALLATIONS.

ORG	RELEASED: OWNER'S MANUAL	7-18-80
REV	DESCRIPTION	DATE
FUEL SYSTEM SCHEMATIC		
CAL 39 MK III		
DRAWN: ROBIN BRADSHAW		
BANGOR PUNTA MARINE		
DWG. #0326		

## FUELING PROCEDURE

When preparing to fuel your boat, the following procedures should be followed to assure safety:

- A. Properly secure the boat to the dock.
- B. Turn off the engine, stove, heater, radio, lights, etc.
- C. Turn battery switch to OFF.
- D. Close all hatches, ports, etc., to prevent entry of fumes.
- E. Maintain continuous contact between the nozzle and deck plate to prevent a static charge.
- F. Fill tank to a maximum 95% of capacity to allow for expansion.
- G. Clean any spills after replacing and tightening fuel-fill cap.
- H. Before operating the engine or turning battery switch to ON, open all hatches and check for fuel leaks. On gasoline engine, check for fumes and run the blower for 5 minutes before starting the engine.

Always be sure the fuel-fill cap is tight, to prevent water and dirt from getting into the fuel tank. Periodically check the fuel filter and water separator. Those should be drained and cleaned, as needed. The filter elements should be replaced annually.

## STEERING GEAR

Cal 31, 35, and 39

Pedestal Steering. Steering gear on your boat has been selected and installed to give you smooth and reliable steering action. A basic familiarity with the steering system will help you avoid trouble. Heavy duty linked chain and sprockets in the steering pedestal control the steering cables. The cables run to a metal sheave box located under the cockpit sole and then to a steering quadrant bolted to the rudder post. Access is via the cockpit seat hatch.

Service. It is imperative that the steering system be inspected and lubricated at regular intervals. All sheaves in the system should be inspected for wear and alignment. The rudder post bearings should be lubricated with a heavy marine grease at frequent intervals. A grease fitting is provided in the rudder post assembly. The steering cable tension may be adjusted on the steering quadrant. Cable tension should be as tight as possible without causing excessive system friction. If in doubt, have a competent mechanic inspect and adjust the system. Cable tension should be checked periodically because stainless cable will stretch.

Emergency Steering Gear. The emergency tiller should be stored in a convenient and accessible place. A deck plate in the cockpit provides access to the rudder post. The emergency tiller is slotted to match the cross pin in the rudder post. It is recommended that you practice the installation procedure before an emergency arises.



Tiller Steering. If your boat comes equipped with a tiller, it is important to check the rudder head and tiller bolts regularly. The rudder post should be lubricated with a heavy marine grease at regular intervals, depending on use.

## ELECTRICAL

Master AC and DC Control Panels. The master electrical control panels are located on the aft bulkhead, behind the companionway stairs. The AC master panel includes circuits for a battery charger, the water heater, and the port and starboard electrical outlets. The DC master and accessory panels handle all other electrical systems.

Circuit Breakers. Accessory loads may be selected as desired by turning on the master-control panel circuit breakers. The circuit breakers will automatically open the circuit by switching themselves to "OFF" in the event of an overload on a particular circuit. Always investigate the cause of the overload and correct any deficiencies before re-positioning the circuit breaker to "ON".

ALL WIRES, CONNECTIONS, AND TERMINALS SHOULD BE INSPECTED REGULARLY FOR LOOSE CONNECTIONS WHICH MAY CAUSE ELECTRICAL SPARKS, HIGH RESISTANCE, OR FIRES. THIS IS ESPECIALLY IMPORTANT FOR ENGINE ACCESSORY WIRING.

### Battery Selector Switch

Before leaving ~~our boat~~, always turn the master-battery switch to the "OFF" position to prevent power drainage. DO THIS ONLY AFTER YOU HAVE SHUT DOWN THE ENGINE, for you may burn out the alternator diodes.

### CAUTION!

You may switch from one battery to another for charging, but DO NOT pass through the "OFF" position while the engine is running. This may burn out the alternator diodes. Keep the engine RPM as low as possible, when switching batteries.

Shore-Power System. The shore-power system accepts 110V AC through a three-prong male connection located in the cockpit. There are two current carrying conductors, positive and negative, as well as a grounded non-current carrying conductor. WARNING:  
NEVER USE AN ADAPTER THAT ELIMINATES THE GROUNDING CONDUCTOR.  
SEVERE SHOCK, INJURY, OR DEATH MAY RESULT.

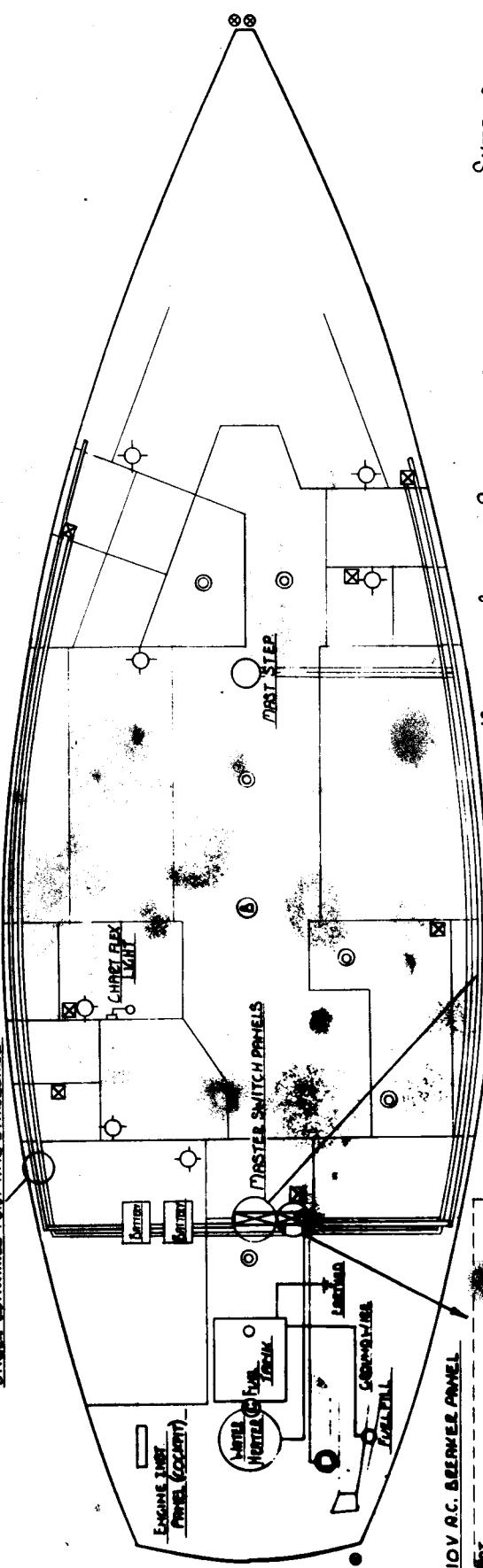
A master-circuit breaker is provided for the shore-power system. To activate shore power, throw the circuit-breaker switch after the shore-power line is connected to dock power.

In addition, there are both audible (buzzer) and visual (yellow light on panel) reverse polarity indicators. With all switches off, attach the power cable to the inlet. Next, attach the power cable to the dockside outlet. WARNING: IF THE POLARITY INDICATOR LIGHTS AND/OR SOUNDS, DISCONNECT THE CORD IMMEDIATELY! THIS INDICATES A REVERSE POLARITY SITUATION, WHICH IS DANGEROUS. SEVERE SHOCK, INJURY, OR DEATH MAY RESULT. DIAGNOSE AND CORRECT THE PROBLEM BEFORE PROCEEDING.

If the polarity is correct, switch on the breaker for the outlets and/or hot-water tank as desired. Be sure the hot-water tank is full before turning on the circuit, or you will damage the heating element (see plumbing and commissioning sections).

It is recommended that all appliances or lights be wired with three-prong grounded plugs.

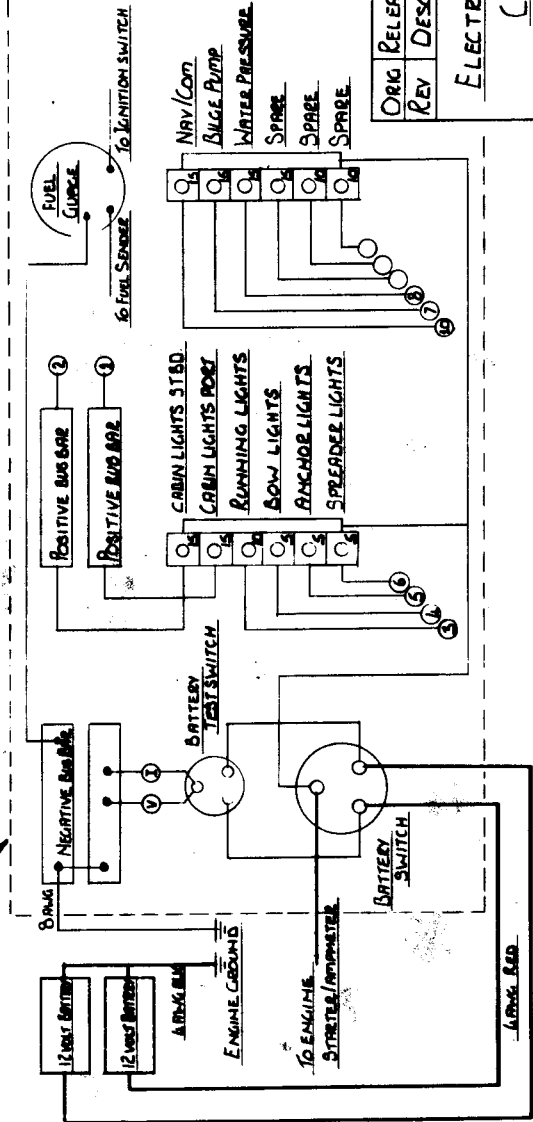
AC/D.C. WIRING CONDUITS (SEPARATE)  
UNDER CUNNINGHAM PORT AND STARBORD



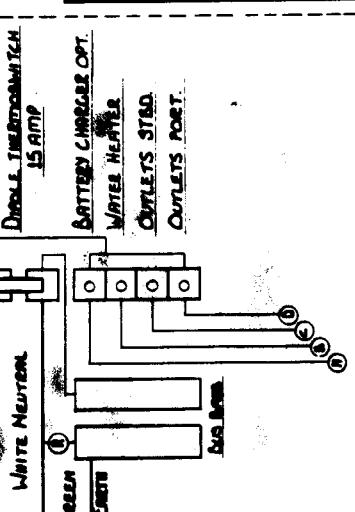
SYMBOLS

- ⊗ RUNNING LIGHTS
- ⊙ CABIN SWIVEL LIGHTS
- ⊙ CABIN DOME LIGHTS
- ⊗ AC OUTLETS 110 VOLT
- AC INLET FROM DOCK
- ⊙ COMPASS
- ⊙ INDICATOR LIGHT
- ⊙ VOLT METER
- ⊙ BILGE PUMP
- ⊙ POLARITY INDICATOR

12 VOLT D.C. BREAKER PANEL



110V A.C. BREAKER PANEL



NOTES

- 1) ALL WIRING FROM SWITCH PANEL DC 11/2 AWG
- 2) SEE ENGINE MANUAL FOR INST PANEL WIRING
- 3) ALL CIRCUIT BREAKERS THERMO TYPE
- 4) BATTERY CHARGER/SPREADER LIGHTS NON-FRATORY INSTALLED OPTIONS
- 5) ALL A.C. WIRING 12 A.W.G.

REV	DESCRIPTION	DATE
7-21-80	ORIGINAL OWNERS	7-21-80
ELECTRICAL SCHEMATIC		
CAL 39 MK III		
DRAWN BOBIN BRADSHAW		
BANCOR PUNTA MARINE		
DWG NO AO 331		

## LIGHTNING GROUND

The spars and standing rigging on all Cal Yachts are grounded, in compliance with the American Boat and Yacht Council Project E-4, to attempt to minimize damage resulting from lightning and provide a measure of safety for personnel.

Each chainplate, the mast step, and all thru-hulls are attached by means of a #8 AWG solid copper wire to the engine and/or strut. In the event lightning strikes the spar, the system is designed to carry the charge by the wire to ground.

WARNING: IN AN ELECTRICAL STORM, DO NOT TOUCH THE MAST, BOOM, OR ANY STANDING RIGGING. THESE ARE ALL ELECTRICAL CONDUCTORS, WHICH WILL CARRY HIGH VOLTAGE AND CAUSE SEVERE SHOCK, INJURY, OR DEATH. IN THE EVENT OF AN ELECTRICAL STORM, THE FOLLOWING PRECAUTIONS ARE RECOMMENDED:

1. As much as possible, stay below with the hatches closed.
2. Avoid contact with any items making contact with the electrical system and with any other metallic parts of the boat.
3. Stay out of the water.
4. If the boat is struck by lightning, compasses and electrical equipment should be checked to determine that no damage or change in calibration has occurred.

NOTE: WHILE THE GROUNDING SYSTEM SPECIFIED IN THE AMERICAN BOAT AND YACHT COUNCIL PROJECT E-4 IS THE MOST WIDELY USED LIGHTNING PROTECTION SYSTEM KNOWN TO US, WE URGE YOU TO AVOID EXPOSING YOURSELF TO LIGHTNING, SINCE NO SYSTEM WILL PROVIDE COMPLETE PROTECTION TO BOAT OR OCCUPANTS IN ALL CIRCUMSTANCES.

## NAVIGATION LIGHTS

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

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

Your Cal Yacht is equipped with the following navigation lights:

- A) Red and green 10 point side lights mounted near the bow.
- B) White 12 point stern light.
- C) White 20 point bow light mounted on the mast. *STEAMING LT.*
- D) White 32 point masthead light mounted on top of *Anchor LT.* the spar.

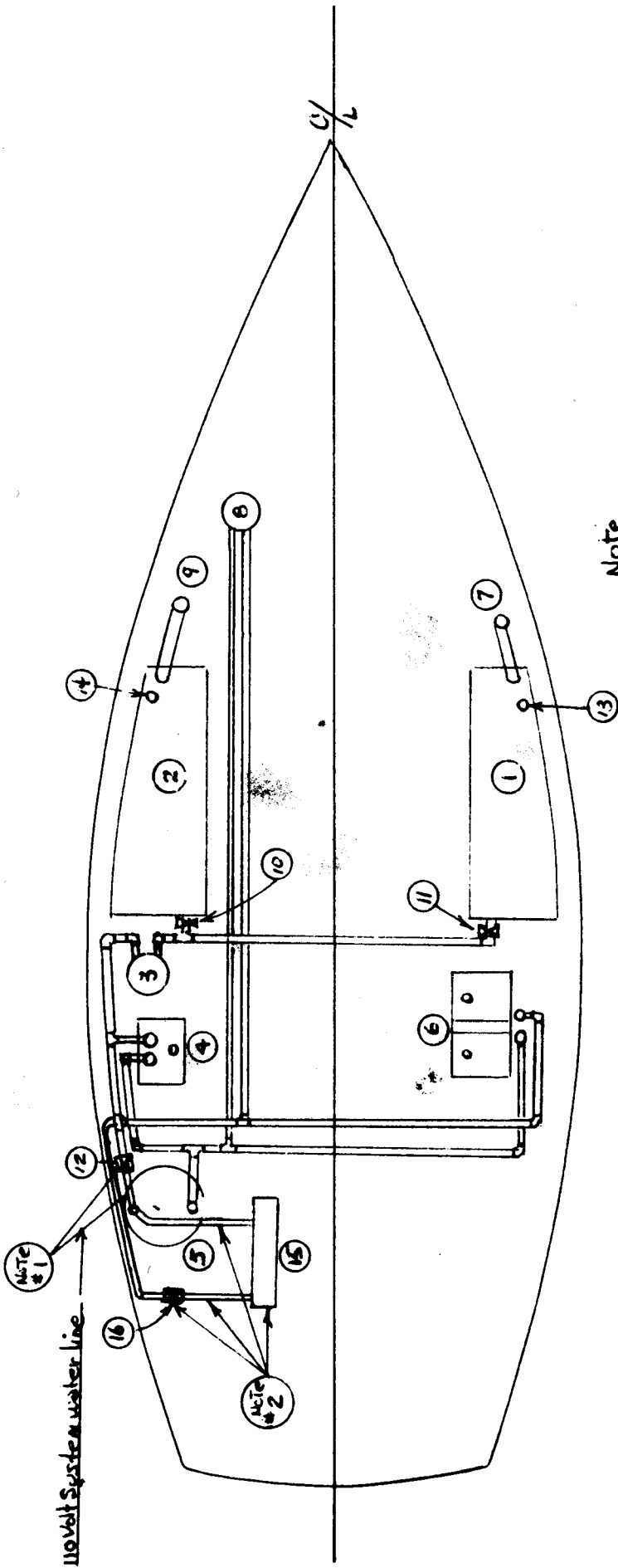
A & B are wired to the "running lights" switch on the DC panel.

C is wired to the "bow light" switch.

D is wired to the "masthead light" switch.

We recommend:

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



### Note

- # 1. 12 Check Valve on hot water system with 110 Volt water heater boats with out engine only. Boats may also have only one tank
- # 2. Boats with engine have water from pressure pump through engine heat exchanger to hot water heater #12 is moved to #16 position and water supply is rerouted through heat exchanger illuminating 110V system water line. 110 System then receives its water supply through heat exchanger line

(This Drawing is not for System Location)

Orig	Released	Owners manual	Date
Rev		Description	11/15/80
Typical Pressure water System Cal Boats			
34-6 25			
CAL-35-2 27			
31			
Drawn By Ed. Edgar Rtd			
Bangor Punta marine			
Dwg #	Sht 1 of 4		

1 #1 water Tank	9 #2 water fill
2 #2 water Tank	10 Shut off valve
3 Pressure Pump	11 Shut off Valve
4 Head Sink	12 Check Valve one way
5 water Heater	13 Vent
6 Galley Sink	14 Vent
7 water fill	15 Engine Heat exchanger
8 Shower mixer	16 Check Valve one way

## COOKING STOVES

### PROPANE STOVES

The propane stove in your Cal yacht has been pressure tested at every joint with a special fluid at the plant prior to shipping, but we recommend that you have it checked by your own dealer after it has been launched, as boats go through some fairly heavy jars during overland travel. Details on the operation of the propane stove will be found in the manufacturer's instruction manual, which should be carefully reviewed.

#### To Operate:

1. Be sure the burner valves are in the OFF position.
2. Be sure the electric safety switch over the stove is in the OFF position.
3. Turn the valve on at tank.
4. Move the electric safety switch into the ON position.
  - a. This switch controls a Solenoid mounted between the propane tanks. In the OFF position there is no pressure anywhere inside the boat. Please refer to Marinetics Corp., Document #609.
5. Turn on the burner valve you desire and light. If the system is new, or the tanks have just been replaced, there could be a quantity of air in the supply line.  
WARNING: YOU MAY GO THROUGH MORE THAN ONE MATCH, BUT DO NOT LEAVE BURNER VALVE ON WHILE GETTING ANOTHER MATCH LIT. THE GAS COULD BE COMING OUT WHILE YOU'RE GETTING THE NEXT MATCH LIT. THIS COULD CAUSE AN EXPLOSION.

When cooking has been completed, turn off the electric safety switch; and after the burner goes out, close the burner valve. This will indicate that the electric safety valve is working and will also remove pressure from the feed line inside the boat. For added safety, the manual shut-off valve at the tanks may be closed when boat is left unattended, or overnight.

The entire system should be checked out at least once a year. Pay particular attention to corroded or cracked fittings and supply lines.



## ALCOHOL STOVES

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

### WARNING:

1. THE FLAME DURING AN ALCOHOL FIRE IS QUITE OFTEN INVISIBLE.
2. DO NOT MOUNT THE FIRE EXTINGUISHER NEAR THE STOVE. DURING A FIRE, YOU MAY NOT BE ABLE TO GET TO IT.
3. WATER IS ONE OF THE BEST EXTINGUISHERS FOR ALCOHOL FIRES.

## Plumbing

Heads - Cal 9.2, Cal 31, Cal 35, & Cal 39

Cal has passed along the manuals which cover the operation and maintenance of the toilets installed in your yacht. You should read these and familiarize yourself and crew with their details.

The standard head is a marine toilet, connected to a collapsible rubber holding tank. This tank is discharged through a line running to a deck outlet. To empty the tank, open the deck outlet and insert a dockside pump.

The optional head installation allows the holding tank to be discharged overboard or at dockside. The choice of method is controlled by a valve system on the discharge side of the holding tank. For dockside discharge, open the dockside line and deck fitting and insert the dockside pump. For overboard discharge, close the dockside line and open the overboard line and thru-hull seacock. In the discharge line is a diaphragm pump. This will discharge the holding tank through the thru-hull. FEDERAL AND STATE LAWS AND USCG REGULATIONS SHOULD BE CONSULTED REGARDING THE DISCHARGE OF HEADS IN CONTROLLED WATERS.

When not discharging the tank, both the dockside and overboard lines should be closed. Also, be sure to close the thru-hull seacock, when not in use. It is recommended that a chemical additive, such as is used in chemical heads, be pumped into the holding tank to prevent odor permeation of the tank and plumbing.

Refer to the **manufacturer's** instructions for maintenance and operation of the **toilet**.

## Plumbing

### Fresh-Water System

Cal 31, 35, 39

#### Water Tanks

There are two fresh-water tanks, located under the main cabin settees. Each tank is filled through a separate deck plate. The tanks are connected, through selector valves, to a self-priming pressure pump. The valves are located under the companion way steps in the Cal 31 and 35, and under the galley sinks in the Cal 39. The Cal 31 and 35 tanks are plastic; the Cal 39 tanks are stainless steel.

When filling the tanks, do not fill to more than 90% of capacity, to allow for expansion. The tanks may be cleaned by flushing with a vinegar and water solution (1 pint vinegar to 5 gallons of water).

#### Hot-Water Heater (Standard on Cal 35 and 39; optional on Cal 31)

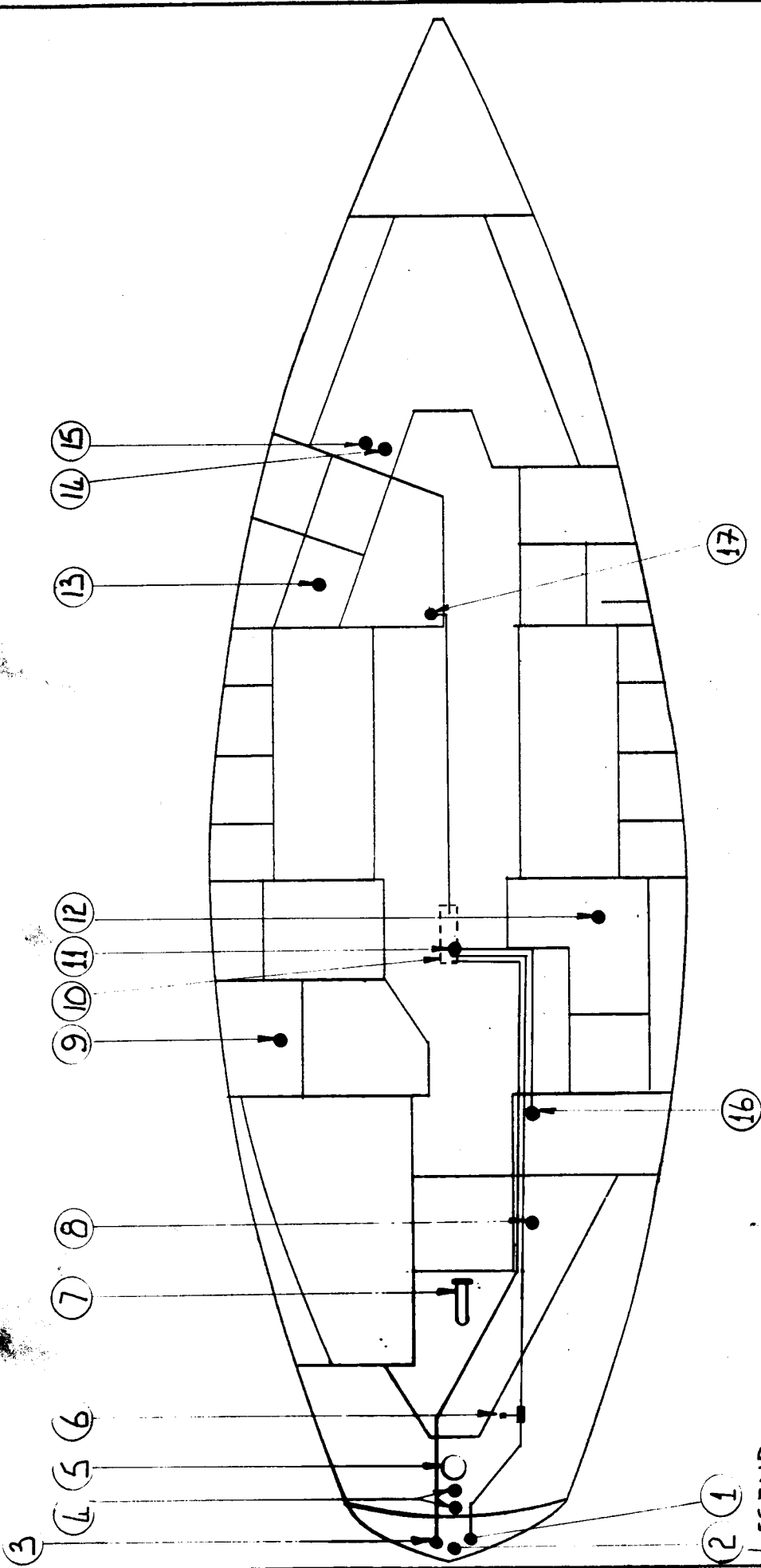
The 6 gallon hot-water heater is located in the engine compartment. It is connected to the pressure-water system by way of the pressure pump. The tank is installed to heat water through the 110 Volt AC system and through a heat exchange coil connected to the engine cooling water system.

Before operating the hot-water tank, open the inlet valve in the supply line, open the hot-water faucets and let them run until a steady stream of water flows at the galley and head. With the tank full, you may switch on the 110 volt AC breaker labeled "Water Heater". DO NOT TURN THE 110V SYSTEM WATER-HEATER BREAKER ON UNTIL THE WATER HEATER IS FULL, OR THE ELECTRIC HEATING COIL WILL BE DAMAGED.

## Hot-Water Heater - Continued

To heat water off the engine, simply start the engine and let it run. Engine cooling water will automatically circulate through the water-heater coil and heat the water in the tank.

Bilge Pumps - The manual pump is located at the aft end of the cockpit. It is a flush-mount design with a socket that accepts the handle provided. The electric pump is located in the bilge sump over the keel and is activated by a switch on the master-control panel. The exhaust hoses for both pumps are plumbed to above waterline thru-hulls in the transom.



# LEGEND

- ① HAND BILGE PUMP THRU-HULL.
- ② EXHAUST OUTLET.
- ③ ELECTRIC BILGE PUMP THRU-HULL.
- ④ COCKPIT SCUPPERS
- ⑤ RUDDER STOCK
- ⑥ HAND BILGE PUMP (COCKPIT)
- ⑦ PROP SHAFT STUFFING BOX
- ⑧ ENGINE COOLANT INTAKE (VALVED)
- ⑨ OWNERS VANITY DRAIN (VALVED)
- ⑩ BILGE SUMP

- ⑪ ELECTRIC BILGE PUMP
- ⑫ GALLEY DRAIN (VALVED)
- ⑬ FWD. VANITY DRAIN (VALVED)
- ⑭ HEAD SYSTEM INLET (VALVED)
- ⑮ " " OUTLET ( " )
- ⑯ ICE BOX DRAIN INTO BILGE SUMP
- ⑰ SHOWER DRAIN INTO BILGE SUMP

ORIG	RELEASED: OWNER'S MANUAL	7-18-80
REV	DESCRIPTION	DATE
THRU-HULL LOCATIONS		
CAL 39 MK III		
DRAWN ROBIN BERSHAW		
BANGOR PUNTA MARINE		
DRAWING NO. 323		