

PDQ 32

Owner's Manual

PDQ Yachts Inc.
Whitby, Ontario
Canada

Introduction

This manual is the product of building some 18 PDQ 32's and 50 PDQ 36's. It reflects our experience of working with the boats and their owners, and includes a great variety of the ideas, improvements and, inevitably, solutions that we have shared. We hope that as you settle in to your new PDQ 32, you will share your ideas and experiences with us so they can benefit others as others' experiences have benefited you.

We update this manual continually, and we are confident that it covers your vessel accurately. With the many possibilities of options and layouts, however, we have never yet built two boats exactly alike, so there may be points of difference in equipment and options. We hope that any confusion that results will be minor.

In addition, we've expended a conscientious effort to make this manual as complete and error-free as possible. Nevertheless, there is always room for improvement, and we ask that you let us know of any errors, ambiguities or weak areas you find.

Disclaimer

Although PDQ Yachts Inc. has reviewed this manual, the company makes no warranty or representation, either express or implied, with respect to the accuracy of the contents of this manual. In no event will the company be liable for direct, indirect, special or consequential damages resulting from any defects or inaccuracy in this manual. No employee or agent of the company is authorized to make any modification or addition to this policy.

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Weights & measures - PDQ 32

Hull Identification Number

(located on the inboard, aft side of the starboard hull at the hull/deck joint):

Basic dimensions

	Standard	Metric
LOA	31' 7"	9.6 m
LWL	31' 0"	9.4 m
BOA	16' 0"	4.9 m
Beam (hull centres)	13' 0"	4.0 m
Beam (waterline)	3' 0"	0.9 m
Draft	3' 2"	1.0 m
Weight	7,200 lb.	3,273 kg
Height of masthead above water	45' 0"-49'	13.7 m

Sail area

Main	268 sq. ft.	24.9 m ²
Jib	175 sq. ft.	16.3 m ²
Spinnaker (cruising)	925 sq. ft.	85.9 m ²
Spinnaker (full size)	1,158 sq. ft.	107.6 m ²

Sail Measurements

I	40' 4"	12.4 m
J	12' 9"	3.9 m
P	35' 0"	10.7 m
E	13' 9"	4.2 m

Capacities

Fuel	27 US gal.	102 l.
Fresh water	47 US gal.	177 l.
Holding tank	30 US gal.	113 l.

Motor serial numbers
Yamaha 9.9 HP, model EXR

763253. KE4-389
763195 KE4-387

Electrical Systems:

AC	115 volts, 60 cycle, 30 amps
DC	12 volts

Location of safety equipment

Please complete this section as a quick reference for others on board this vessel. Canadian and US Coast Guard requirements are listed on page 19.

- Distress signals and fire extinguisher charges expire and must be replaced or recharged.

A strong bucket does double duty as a fire extinguisher and emergency bilge pump.

- Life jackets should be kept clean and dry; try them on periodically.

From time to time, try your skill at throwing your life ring or other throwable device at someone in the water.

Fire extinguishers:

Life Jackets:

Throwable device:

Visual distress signals:

Sound signalling devices:

Preparation for departure – checklist

- Open sea cocks as required (locations, page 48). – *Stansons Bow Locker*
- Switch on batteries (switch locations, page 17 and 48, battery locations, page 48).
- Switch on main electrical system and required circuit breakers at the main electrical panel in the navigation area.
- Open valve on propane tank, if required (location, page 21, illustration, page 48).
- Secure loose gear, above and below deck.
- Ensure that safety gear is aboard and correctly stowed.
- Instruct guests who are unfamiliar with the boat on safety procedures, location of safety gear and fitting of life jackets. Ensure that they are wearing or have brought appropriate clothes for anticipated and possible weather.
- Check sails and sail handling gear for correct operation.
- Check steering and motor controls for unencumbered operation. Please read the notes on starting the motors, page 15, and operating under power, page 30.
- Open the motor hatches on the Classic, and check the fuel and electrical connections to the motors. Make sure that the motor mounts are tight and ties on the mounting screws are secure. Check fuel levels (fuel types, page 16).
- Lower motors, ensuring that each motor lowering line is held by a stopper knot, taut but not tight, and well clear of the prop when the motor is down.
- Switch on the batteries (switch locations, page 17 and 48, battery locations, page 48) and start the motors, allowing them to warm up until they have throttled back to a slow idle (see page 15).
- Cast off dock lines and manoeuvre away from the dock.
- Stow dock lines and fenders.
- Find a clear patch of water to raise the sails in, then shut down and raise the motors (see precautions on raising motors, page 30).
- Enjoy yourself.

Return to harbour – checklist

- Switch on batteries (switch locations, page 17 and 48, battery locations, page 48).
- Lower motors, ensuring that each motor lowering line is held by a stopper knot, taut but not tight, and well clear of the prop when the motor is down.
- Start motors (see page 15).
- Lower sails in a clear patch of water.
- Remove dock lines, fenders and boat hook from lockers and place as required.
- Return to dock or mooring and secure.
- Shut down and raise motors.
- Close valve on propane tank if the boat will be left for a prolonged period (locations, page 47).
- Connect shore power and set required battery charging condition (page 17).
- Closing sea cocks when the boat is to be left for any length of time is recommended (locations, page 48).
- Switch off 12-volt power within the boat (page 17).

How to contact PDQ

The factory and head office are located at:

PDQ Yachts Inc.
1710 Charles Street
Whitby, Ontario
Canada, L1N 1C2
Tel: 905/430-2582
Fax: 905/430-8306

The USA sales and service office is:

PDQ Yachts USA
309 Third Street
Annapolis, Maryland 21403
Tel: 410/268-3700
Fax: 410/268-3544

Your warranty

Your PDQ 32 has a 12-month warranty on parts and labour, starting on the date of departure from the factory.

The warranty against blistering is extended to five years when the optional Interprotect 2000 epoxy undercoat has been specified.

This provides a sliding scale of coverage.

Year 1: 100% of costs to repair the affected area.

Year 2: 90%

Year 3: 80%

Year 4: 70%

Year 5: 60%

It is essential that you contact us before you start any work that you believe to be covered by the warranty. Prompt communication with us will speed your claim and ensure the best possible resolution, as we cannot consider any claim based on work already performed.

The equipment installed by PDQ Yachts is chosen because we believe it will give good and reliable service. The warranties for installed equipment are provided by the equipment manufacturer or distributor. Due to the nature of their products or the anticipated use, however, not all manufacturers provide the same warranty coverage. You should familiarize yourself with the warranty documentation relating to the equipment on your PDQ 32. Also, you should return any required registration cards as soon as possible after delivery to obtain the maximum coverage.

We cannot take any responsibility for equipment provided by you, whether installed by PDQ Yachts or not.

Should you encounter difficulties with any manufacturer's warranties, please contact us and we will assist you.

Your responsibilities

The yachts we build are a product of our experience, and of the thoughts and suggestions offered by people who have chosen and sailed our yachts. They are the boats we want to sail ourselves, and we believe that they are among the best multihulls built in the world. Our policy of continual improvement ensures that each is better than the last.

In the end, however, your enjoyment of your PDQ yacht and your success in its operation depends on the care and quality of effort you devote to knowledge of vessel operation and the care of the yacht itself.

Knowledge

Instruction in the safe operation of a large yacht cannot be taught in the confines of a manual. Parts can be taught in books and in classrooms, but much knowledge must be actively sought on the water by the conscientious sailor. Courses in navigation and seamanship are taught by:

Canadian Power & Sail Squadrons	US Power Squadrons
26 Golden Gate Court,	800/336-2628
Scarborough, Ontario,	In Va., 800/245-2628
M1P 3A5	
416/293-2438	

Advertisements with local contact addresses are frequently posted in yacht clubs, marine supply stores and marina bulletin boards. Boat owners in your area may have other suggestions.

These courses lay a firm foundation of knowledge in:

- Seamanship and boathandling, basic to advanced
- Regulations for prevention of collision, international and inland
- Navigation - basic to advanced
- Radio communication
- Safety at sea
- First aid
- Dealing with serious storms
- Distress communication
- Weather prediction
- Pollution control
- Respect for others on the water

Please note the U.S. Coast Guard boating information line
800/368-5647 or 202/267-0780

The Red Cross, St. John's Ambulance Corps and others offer courses in first aid and cardio-pulmonary resuscitation (CPR), which are reassuring to know when cruising far from home.

Statutory requirements

Depending on where you document or register your boat and where it is operated, you and the boat will be subject to a number of legal requirements. These requirements include, but are not limited to

- Complete and current documentation or registration certificates.
- Required safety equipment, in good condition (see page 19).
Operating understanding and licence for VHF radio.
- Charts for the boat's operating area.
- Knowledge of federal, state or provincial and local regulation respecting
 - safety;
 - discharge of wastes (grey water and sewage);
 - speed and wake;
 - noise.
- Knowledge of accident reporting requirements (copies of the U.S. Coast Guard form are included with this manual).
- Understanding of the obligation to render assistance to persons in distress.

The PDQ 32

General description

Your PDQ 32 is a cruising catamaran which combines comfortable accommodation, good performance and pleasing appearance. It is intended primarily for coastal cruising and island hopping, and is capable of offshore passages.

This is a strong, safe boat, built by experienced boatbuilders with best-quality materials to the design of a professional engineer who is also an experienced multihull cruiser. There are two watertight compartments forward. The fin keels have a sacrificial section to allow the boat to stand up to a grounding at relatively high speed.

With an unusual and perhaps unique combination of features, the PDQ 32 provides a marvellous sense of space for a boat of this size. The combination of the seahood and a broad opening hatch, augmented by a solid bimini over the cockpit, breaks down the borders between living space below and space on deck. Instead, there is a shelter/outdoors continuum that you can adjust according to your needs or mood.

The layout of the boat moves the day accommodation forward to provide maximum space below with a comfortable cockpit and a good working deck. This layout yields two double cabins aft, each large enough to use standard-sized bed linen.

A large open-plan saloon provides a galley on the port side and navigation station on the starboard side. A generous head is located in the starboard forward cabin.

Propulsion

Sails & rigging

The PDQ 32 is rigged as a masthead sloop with an anodized or painted aluminum mast and boom.

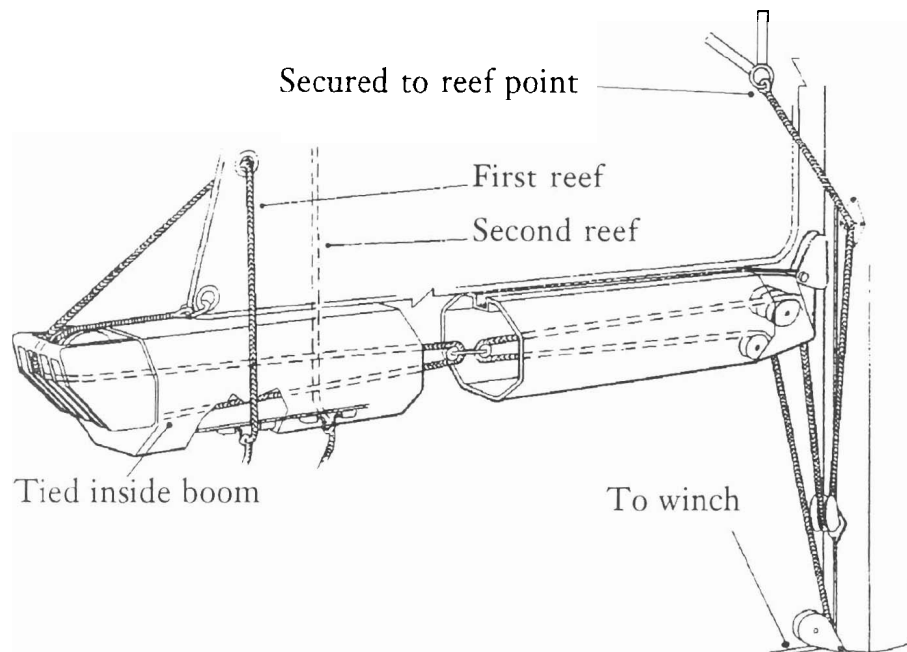
The mainsail and headsails are of Dacron, with covers to protect the sailcloth from unnecessary degradation by the sun. The mainsail is fully-battened, with lazyjacks and two single-line, slab reefing positions (see page 52 for a large-scale diagram of the reefing system). Roller furling is provided for the jib as an option. There is a choice of standard or pole-less spinnaker.

The standing rigging is 1 x 19 stainless in appropriate gauges, with swaged terminals and open turnbuckles. See page 35 for recommendations on preparations for offshore passages.

No lazy jacks

All halyards are of rope. Two main halyards are provided. The spare one is used as a topping lift.

- Maintenance suggestions are given on page 35.
- Running rigging specifications are given on page 35.



The single-line reefing system. This diagram, also showing possible outhaul variations, is reproduced at a larger size on page 52.

Rigging setup

PDQ sets up boats for deliveries and for our own use according to the following procedure.

- Take up most of the adjustment in the furling gear, so that the mast is raked aft. Hang a wrench or other heavy weight on the main halyard and adjust the rake so the halyard meets the deck about $14\frac{1}{2}$ inches (37 cm) aft of the mast.
- Take up the cap shrouds until an average man leaning hard on them can deflect them 4 inches (10 cm).
- Take up the diamond stays until there is $\frac{3}{4}$ inch (2 cm) prebend in the mast.
- Install locking pins all around.
- Check rigging tensions and locking pins after your first sail and regularly thereafter (suggested rig maintenance and schedules, pages 33 and 35).

Steering

The steering consists of a stainless steel chain, pulling two stainless cables connected to a quadrant in the starboard hull. A cross-tube with ball joints connects to the port rudder. The rudders are balanced spade-type, with 1½ inch diameter, seamless stocks of Schedule 40, 316 stainless steel. (See page 36 for maintenance recommendations.)

An emergency tiller is provided in case of steering failure. It can be used with either rudder by removing the deck plate located on the top step of each transom. We recommend that you try fitting and using this tiller while under sail and under power at the earliest opportunity.

Auxiliaries

The “Classic” auxiliary engines are Yamaha 9.9 HP outboards, specially developed for auxiliary use. They are located under the cockpit lockers, and are raised and lowered by ropes in the cockpit. All controls for starting, gear-shifting and motor speed are located at the helm. Emergency stop is provided at the controls by a plastic key on a red lanyard.

The engines are 4-cycle, and oil is *not* added to the gasoline. Oil is carried in the engine sump, and the level should be checked, topped up and changed as recommended in the motor manual.

The standard engines for the LRC are twin Yanmar 10 HP Diesels turning 12X9 two-bladed Michigan propellers. The optional engines are twin Yanmar 20 HP Diesels turning 16X13 two-bladed Michigan propellers.

Checklist for outboards

Please read the manuals provided by the manufacturer before using the motors and prior to carrying out any maintenance. The motors will work better and last longer. *Incorrect operation or failure to perform required maintenance may jeopardize the manufacturer's warranty.*

Before starting the motors, make sure that the mounts are tight, and that the mounting screws are securely tied off. Check the electrical and fuel connections.

When inserting the starter keys, make sure that each key goes into its correct ignition lock. (You may simplify this by colour-coding the port and starboard keys with red and green tape or a key tag.) Do not try to force the key, as this may damage the ignition lock.

Ensure that the Yamaha outboards' green oil pressure lights are *on* when they are running. If the oil pressure light goes out, stop the motor as quickly as possible. Correct operation of the cooling system is shown by the small jet of water at the back of the engine.

Disconnect the batteries before removing the motors or performing any major maintenance.

Checklist for LRC inboards

The Diesel's manual contains an excellent and concise summary entitled, *Basic rules...* Read this two-page section as a guide to other information you may need from the manual. Motors work better and last longer if you understand their needs. *Incorrect operation or failure to perform required maintenance may jeopardize the manufacturer's warranty.*

If the engine has been idle for more than a month, follow the manual's pre-start procedure for spreading lubricant through it.

When inserting the starter keys, make sure that each key goes into its correct ignition lock. (We suggest colour-coding the port and starboard keys with red and green tape or a key tag.) Do not try to force the key, as this may damage the lock.

Fuel tank

The fuel tank is located under the walkway hatch. The fuel gauge is energized when either ignition switch is *on*.

Fuel pumps are mounted on the outboard motors, and these are connected to the tank via flexible lines. If the motors have not been run recently, fuel may drain from the hose back to the tank. Squeeze the primer bulb to refill it.

The system is supplied with in-line filters on both fuel supply lines. On the PDQ 32, these are located in the fuel locker. Check the condition of the filter regularly, changing when required. Suggested change intervals are given in the manual.

- The Yamaha outboards use unleaded gasoline. Regular grade is sufficient, but you will notice better performance with higher octane gas. Note that you can use gasohol containing up to 10% ethanol, but that you should not use gasohol made with methanol. No oil should be added to the gas.
- The LRC inboard engines use Diesel fuel. A minimum grade is specified in the manual; this is not a concern in North America.

Ship's systems & safety

AC electrical system

A 30-amp, 115-volt shore power connection is located at the steering console. Outlets are provided in the galley, head and navigation area. These are protected by Ground Fault Interrupters (GFI). Ground Fault Interrupters are also fitted for major appliances, such as the refrigerator or microwave.

Circuit breakers located on the main electrical panel control the system and its components. All items have individual breakers for easy use without over-taxing the circuits or optional inverter.

The shore power system includes isolators to prevent galvanic erosion of underwater metal parts. The isolator is located in the locker under the helm.

Schematics of the electrical system and optional equipment are provided on page 53 and the following pages.

DC electrical system

The 12-volt DC system is controlled by circuit breakers on the main electrical panel in the navigation station. Most switches and protective circuit breakers for the various circuits are located here, and are clearly labelled.

The battery switch is located in the starboard aft cabin.

The standard battery installation consists of two 12-volt, Group 30 batteries located forward of the outboards in the cockpit lockers and charged by the motors through isolators. Battery isolators, located in the locker under the helm, permit charging from multiple sources while preventing a charged battery from discharging into an exhausted one. Either motor will charge all batteries, regardless of the setting of the battery switches.

If you impose a heavy demand on the battery bank for a long time, you will exhaust the battery power. You should therefore make a habit of using only one battery at a time. If one is exhausted, the other will always be available.

The electrical system uses a common ground. Where required, an optional Dynaplate is fitted for electronics and instruments. Schematics of the electrical system and optional equipment are provided on page 53 and the following pages.

AC/DC inverter

The optional Freedom 1000 or Freedom 2000 inverter converts DC battery power to AC power. Depending on which model is installed, the inverter will supply 1,000 or 2,000 watts of electrical power. This is a first-quality design, but by their nature, inverters are sensitive to improper operating conditions. Please read the manual carefully.

Both models sense the presence of shore power and will take up the load when shore power is unavailable. When this happens, you will see the AC indicator light on your electrical panel change from brightly lit to a dim glow.

Be alert for any condition that could cause shore power to cut out when appliances are in operation. A microwave oven drawing battery power from the inverter will exhaust a full set of batteries in a matter of minutes. Note the suggested precaution for protecting your battery power, in *DC electrical system*, above.

The inverters also provide three-stage automatic battery charging plus manual battery equalizing.

Fuse protection is provided between the batteries and inverter to protect both parts from surge damage. These are T-class fuses to guard against spike and sustained overloads. They are located under in the starboard aft cabin locker, above the battery switch.

Fuses:

Freedom 1000: 150 amp. fuse

Freedom 2000: 300 amp. fuse

Bilge pump

The PDQ 32 is supplied with a high-capacity manual bilge pump. The pump is operated from the cockpit by a removable handle stowed in the adjacent locker. This pump is connected to the bilges in each hull by means of a Y-valve in the stern seat locker, which selects one hull at a time.

Navigation & steaming lights

Your PDQ 32 is shipped with navigation lights as required by the governments of Canada and the United States and by international law.

- Masthead anchor light: 360 degree - white.
- Mast steaming light: 180 degree forward - white.
- Mast deck light: flood white.
- Port running light: 120 degree port/forward - red.

- Starboard running light: 120 degrees starboard/forward - green.
- Stern running light: 120 degrees aft - white.

This conforms with the international regulations for a sailing boat under 20 meters (65'7½") at the time of delivery. Note, however, the following points.

- You are responsible for ensuring that the vessel complies with regulations currently in force.
- If the navigation light regulations change, you must make the change unless the current arrangement is grandfathered.
- If you sail outside the United States or Canadian waters, you may encounter different safety requirements. You are responsible for meeting those requirements.
- This information is accurate at publication time. PDQ Yachts can take no responsibility for errors or omissions.

For safety information in the United States, contact
 US Department of Transportation
 U.S. Coast Guard information line
 800/368-5647

Alternatively, contact your local Coast Guard District or state boating agency and ask for the booklet, *Federal Requirements for Recreational Boats*. In Canada, ask for the Canadian Coast Guard's *Safe Boating Guide*. Keep an up-to-date copy on board. Remember, regulations may change from year to year, so a regular check is highly recommended.

Safety equipment (U.S. Regulations)

To assist you in managing your safety equipment, we have provided a section for you to complete, *Location of safety items*, on page 6.

Required safety equipment includes:

- Fire extinguishers: two US Coast Guard approved B-I portable or one US Coast Guard approved B-II portable. Check once a month that they are fully charged.
- Life jackets: one type I, II, III, or V for each person aboard and one type IV throwable device.
- Visual distress signals: minimum three pyrotechnical devices for day or night use, or three pyrotechnical day devices and three pyrotechnical night devices. These should be stowed in a water-tight container prominently marked *Distress Signals*. They should be tested regularly.
- Sound signalling devices: power whistle or power horn and a bell.

For more information see, *Federal Requirements For Recreational Boats*. Bear in mind that:

- Safety equipment is your responsibility.
- If you sail outside United States or Canadian waters, you may encounter different safety requirements. You are responsible for meeting those requirements.

Safety equipment (Canadian Regulations)

To assist you in managing your safety equipment, we have provided a section for you to complete, *Location of safety items*, on page 6.

Required safety equipment includes:

- Fire extinguishers: two Canadian Coast Guard approved. Check once a month that these are fully charged.
- Life jackets or PFDs: One Canadian Coast Guard approved for each person aboard. One Canadian Coast Guard approved throwable device.
- Visual distress signals: Minimum three pyrotechnical devices for day or night use, or three pyrotechnical day devices and three pyrotechnical night devices. These should be stowed in a water-tight container prominently marked *Distress Signals*. They should be tested regularly.
- Sound signalling devices: Power whistle or power horn and a bell.

For more information, contact the Canadian Coast Guard. Bear in mind that:

- Safety equipment is your responsibility.
- If you sail outside United States or Canadian waters, you may encounter different safety requirements. You are responsible for meeting those requirements.

Service systems

Propane system

The propane tanks are located in a locker on the port side of the forward day seat. In addition to its manual valve, the tank in use is provided with an electrically operated solenoid valve. Supply lines feed the stove, oven and refrigerator in the galley and the water heater in the starboard lazarette.

Before any propane appliance can be used, the manual valve must be opened fully. The solenoid may then be turned *on* at the panel.

Note that the solenoid is an electrical device and will open only when there is DC electrical power available from the batteries and both the main switch and the solenoid switch are *on*. The solenoid draws a small but significant amount of power when the valve is open. To minimize the draw on the battery and for safety, the propane switch should be *off* unless propane devices are in use.

The manual valve on the tank should be closed when the boat is unoccupied for any length of time.

Check propane tank connections to the propane system when you change tanks and throughout the system at least quarterly to ensure safe operation. Simple methods for both checks are described on page 38.

Oven & stove

The oven normally fitted is a Plastimo Caribbean 2000 propane unit. The oven conforms to the BS 5386 safety standard and will shut off the propane supply if the flame goes out.

The stovetop is a Princess 2273 with sealed burners. This stovetop also provides protection against flame failure.

Please read the manuals provided with the oven and stove before you use them.

The propane supply must be turned *on* before the oven and stove will light (see *Propane system*, above). If you have just changed a tank and there is air in the propane line, the burners may take a moment to light.

A propane build-up in the boat can be extremely dangerous, so ensure that burners are correctly lit before leaving stove or oven unattended. Check connections regularly to ensure they are tight. See the suggested methods for checking on page 38.

Refrigerator

The standard 4 cu. ft. refrigerator operates on propane or shore power. Control is electronic. In very warm weather, it may be necessary on some boats to improve airflow to the refrigerator by opening the forward hatch.

The refrigerator door should not be opened repeatedly or for long periods; think of what you will need for the next little while before you open the door.

Keep door seals clean and in good condition to retain cold air.

Please read the manuals provided with the refrigerator before you use it and before you attempt any work on it.

Water heater

When fitted, the water heater provides hot water on demand, at the sinks in the galley and the head, and in the shower. Different systems are provided as standard on the LRC and as an option on the Classic.

Classic: The optional propane water heater is located in the starboard bow locker.

For the heater to work, electrical power must be available for these circuits:

- main battery switch;
- main 12-volt circuit breaker;
- pressure water circuit breaker;
- heater circuit breaker;
- propane solenoid circuit breaker.

Water must be flowing for the water heater to come on. When it does, you will hear a soft 'pop'. The water then takes only a moment to heat up. Learn to recognize this 'pop', as it tells you the heater is working properly and its absence warns of a problem.

If hot water is not quickly available, shut down the system. Check that the heater is being supplied with electricity (page 17), propane (page 21) and water (page 23). If one of these is not available, see the relevant section of this manual and also Troubleshooting (page 43).

Important operating precautions:

DANGER: The vent on the deck must be open when the heater is set to operate. To avoid problems, it is best to keep it open at all times, closing it only in the most severe seas. Read the manual before using this water heater.

- Never put salt water through the water heater.
- If the boat is stored anywhere there is a chance of freezing temperatures, drain the water completely from the heater before cold weather sets in. These heaters are extremely susceptible to burst pipes in freezing conditions.

The heater has three safety features to prevent dangerous overheating when water is not flowing through the pipes: a gas solenoid, an overheat safety plug that will block the gas line if the unit overheats, and a water flow sensor. This sensor may become clogged in time, and the heater will refuse to work. The sensor cannot be repaired; it must be replaced. Do not try to defeat its purpose.

LRC: Water is heated by a heat exchanger that draws heat from the starboard Diesel's cooling systems. Heated water is held for later use in a six-gallon tank under the starboard berth. The temperature of water from this tank depends on whether the Diesels have been running long enough to heat water, or, if they are stopped, how recently they were run. You can expect hot water to last overnight. Water may also be heated by shore power.

Fresh water systems & tankage

Fresh water is provided under pressure in the galley and in the head. The pump starts automatically when any tap is opened and the appropriate circuit breaker is *on* (see page 17).

The water tank, pump and water filter are located forward of the saloon centre seat. The optional auxiliary tank, when fitted, is located under the saloon seat.

Water is drained from the shower by a sump pump.

- The sump pump depends on a circuit breaker at the electrical panel.

The shower sump's filter must be cleaned periodically.

Holding tank

The holding tank is located in the starboard bow locker and may be emptied to shore via a vacuum fitting on deck or pumped overboard, as selected by the Y-valve. Before emptying the holding tank overboard, check local regulations for discharge of waste.

Flushing water is drawn from the sea through a shut-off valve in the starboard forward locker.

Operation

Sailing

If you are new to multihulls or to cruising, learn as much as you possibly can, from books, courses or by sailing with experienced people. If you live in the USA or Canada, find your local Power Squadron, who offer excellent courses on every aspect of navigation and seamanship for sail and power (addresses, page 11). Your local community college or correspondence courses may be a good source of knowledge. We also suggest:

Multihulls Magazine
421 Hancock Street,
Quincy, MA, 02171,
Telephone: 617/328-8181
(Highly recommended)

The Cruising Catamaran Advantage
Rod Gibbons,
Island Educational Publishing,
Box 868,
Manchester, Washington, 98353
(Contains good information)

The Cruising Multihull
Chris White,
International Marine Publishing,
P.O. Box 220, Camden, ME, USA, 04843
(A most worthwhile recent addition)

In addition to the many multihull books, there are many books about cruising and sailing monohulls which are relevant to any cruiser. Find and read as many as you can since these notes are only intended to highlight a few important points. Best of all, sail with experienced sailors whenever you can.

Additional information on rig setup for your PDQ (which is different from monohull setup) is found on page 14.

Close-hauled

One of the myths of sailing is, "Multihulls won't point well to windward". It is true of some poorly designed and indifferently constructed multihulls, but it is not true of your PDQ 32.

Each PDQ 32 hull is a symmetrical "torpedo" with a long keel. The hulls track beautifully and cut through surface chop, so we are

not surprised to find that we can sail alongside well-crewed monohulls of the same length at 30-33 degrees apparent wind angle (in other words, *hard* on the wind). But, if the PDQ's crew wants to increase its VMG (velocity made good) upwind, they will bear off, ease the sails slightly and increase speed by a third. Of course, while you won't appear to be pointing well, you will be comfortably first to the weather mark! Remember, then, don't pinch your PDQ 32—the traveller should never be above the centreline, unless the wind is light and the sheet is eased to create twist. Relax, bear off, ease off and move!

You may also have heard that multihulls do not tack easily. Forget this myth, and tack when you feel like it—or need to.

Spinnakers

Spinnakers are generally not considered to be a cruising sail for a monohull because of the complexity caused by the pole and the high guy loads. On a catamaran, you can use one quite simply.

The gear is simple: turning blocks on the aft quarter of each hull and snatch blocks at each bow. Forget the pole. The sail is tacked to the guy (which is led from the windward bow) and sheeted to the opposite stern. The width of the boat makes control relatively easy. If you can, borrow a sail and try it. An asymmetric chute (often known as a “cruising chute”) with a sock or snuffer is ideal.

Safety for conditions

Although we all love to switch off and put our trust in a nice, safe rule every once in a while, relying on rules is self-defeating on the water. It is, pardon the expression, too fluid out there, and there are too many variables.

Catamarans are inherently more sensitive both to weight and to weight distribution. The PDQ 32 is designed to carry a load of people, their food and baggage of approximately 2,000 lb., evenly distributed through the vessel. Heavy engine options along with large quantities of personal effects and stores can seriously affect the gross weight. This is of little consequence while at the dock or while making a Sunday afternoon trip around the harbour with a group on board. For longer passages, you should exercise good seamanship by balancing weather conditions, crew experience and skill against the vessel's load. In other words, safe loading is a relative condition which depends on variables that only you are in a position to evaluate and decide upon.

Sailing fast and safe

With their small displacement-to-length ratios, catamarans can achieve quite high speeds, even with displacement hulls. For the PDQ 32, various references predict top speeds in the 15-knot range.

This speed potential leads new converts to multihulls into unreasonable expectations of cruising performance. To put things into perspective, note that the racing trimaran *Steinlager* has a maximum speed capability in the 30-knot range, yet she won the tough 1988 Around Australia race at an average speed of 9 knots. The fastest monohull of comparable length averaged 6 knots. Perhaps then, for planning cruises, it is best to expect an average for your PDQ no more than $\frac{1}{3}$ faster than an equivalent monohull.

While high speeds are possible under ideal conditions, such as an offshore wind with no waves, we consider this to be a stunt, and not necessarily good cruising seamanship. You should consider your PDQ 32 to be a good “9-knot boat”. When the knotmeter goes to 10 knots, it’s time to think about reducing sail. Above all, think about the quality of the crew’s collective seamanship. Proceeding at a comfortable, safe and efficient pace with a happy crew is good seamanship; scaring your crew or pounding the boat is not.

Sailing in strong winds

Sailing in strong winds in a well-built, well-equipped boat is one of life’s greatest pleasures. There is, however, a point when strong winds become excessive. A major part of good seamanship is knowing when enough is enough.

It is not possible to be precise about when certain evolutions should be carried through; crew skill and attitude, the stability of the wind and the state of the sea will all affect your boathandling decisions. In dealing with a high or rapidly rising wind, the goal is to reduce the wind’s power on your boat and, by responding to changes quickly and smoothly, maintain everyone’s confidence in your collective ability to deal with the weather.

Changes should begin to happen early in a rising wind, and should be seen as a progressive response to the wind’s greater force. If changes are made in good time, no one becomes spooked, their confidence remains high and they cope better.

- De-power the main by flattening it with the outhaul.
- Raise the traveller and ease the sheet, so the main’s upper section twists off to leeward.

When do you reef? An old rule of thumb that's still worth remembering says, "reef when it first occurs to you." Do it before people start getting worried and do it before it becomes a struggle.

As an *indication*, we have found that the boat is more comfortable when the first reef is taken at 20 knots true wind in flat water. When reaching, the reef can be put off until true wind speed is 25 knots.

As the wind rises:

- Take the first reef.
- Limit your boatspeed.
- Place a crew member on the traveller, ready to ease the main in gusts.

Reef again to suit the gusts. (Sail loading rises with the square of the wind speed, so a 10-knot gust on top of a 25-knot wind will *double* the wind pressure.)

- Put a crew member on the jib sheet.
- Reduce sail to the absolute minimum.

We have found that this reefing combination maintains good balance.

- At 20 knots true wind: first reef in the main.
At 25 knots true wind: second reef in the main.
Over 40 knots: run off at 120° to 140° apparent wind angle under jib alone.

Be specially careful when travelling fast downwind as the boat speed can reduce a 30-knot blow to an apparently reasonable 18-knot breeze. If you are caught in squall while travelling downwind, use the main to blanket the foresails and get them down before rounding onto a reach. Speed is also discussed in the heavy-weather section, below.

Heavy weather & offshore safety

One of the key factors to surviving bad conditions offshore is to keep your boatspeed down. In a monohull, this is generally done by lying ahull or heaving to. Neither of these techniques is recommended for the catamaran. With no heel angle to reduce the weight of wind on the mast and rigging and to reduce the lateral resistance of the hull and keels, the full force of the storm bears on the boat. This puts unreasonable stresses on the boat and increases the likelihood of damage or capsize.

If sea room is available, running before the storm is appealing, providing speed can be controlled and the crew is not too tired.

The problem is that in extreme conditions, even with no sails up, the surfing speed down larger waves may increase to dangerous levels. This is the time to use a drogue deployed on 300 feet of line from the stern, balanced with a small amount of sail to give a steady speed for control. The article, *Drogues and Sea Anchors* by Ian Johnston and Cathy Hawkins (*Multihulls*, May-June 1989) provides more detail. If a drogue is not available, you can also trail the anchor line between the hulls, with the bight streaming aft in a huge U.

The ultimate choice for surviving the worst is the parachute sea anchor. This is deployed on a bridle from the bow. If you are considering a trip offshore, please read, *The Parachute Anchoring System*, published by Chiodi Advertising and Publishing Inc., Boston, MA, USA, and follow Charles Chiodi's advice—"Get the system and don't leave the dock without it."

All this talk of heavy weather and survival sounds alarming. Remember that all accounts show that yachts of any type are almost always tougher than the crew. Many have been abandoned by their crews, often with fatal results, and the yachts have been found later, afloat and intact. The infamous 1979 Fastnet Race was a good example of this phenomenon. Learn to trust your boat, and if the unthinkable happens, stay with it.

The capsized canard

"They do turn over, don't they?" is frequently heard from sailors with no experience of multihulls.

In his book, Rod Gibbons tells us that Lloyd's of London rates are the same for production boats, monohull or multihull. He also reports that the Catfisher (70 produced in ten years) has a 100% safety record. Catalac and Prout also have superb safety records.

The similarity of insurance rates authoritatively tells us that the wrong combination of wind and sea can visit trouble on any sailboat. Beyond the numbers, it's important to compare the experiences of people who suffer capsized in a cruising sailboat. A monohull's ballast may right it, but it must do so quickly or that ballast will take the boat to the bottom.

Once a multihull is over, it tends to stay that way. This sounds dreadful until you note that the crew can live on the overturned boat for weeks. We've all seen the news photos of a crew waving from their upturned multihull—certainly these make better news than a comparable calamity with a monohull. With the monohull,

there is nothing left to photograph, whereas the multihull is often recovered to sail again.

Moreover, these photos often turn out to be racing superstars participating in a prestigious race, and that's a clue to the problem. Driven hard in steep seas, the boat stuffs its bows into a wave ahead and pitchpoles end-over-end.

The probability of capsizing, then, is determined not only by weather, but by the crew's management of the boat. In flat water, wind can capsize a catamaran, but achieving this in a PDQ would require serious negligence or foolhardiness by the crew. The theoretical danger level for the PDQ 32 is about 28 knots of wind on the beam with full sail sheeted fore and aft. Failure to notice the risk would require an absurd level of inattention and the sails would probably rip before the boat went over.

Chris White's *The Cruising Multihull* provides a good discussion of risky situations. Waves play a substantial part in the capsizing of boats, particularly if any combination of shallow water or current combines with winds of gale force and above to produce breaking waves. Such conditions are dangerous, but a sensible crew can deal with them, as described above.

If a capsizing should occur, however, there is one rule and one rule only: stay with the boat. With its combination of light weight, lack of ballast, closed cell foam hull sandwich and flotation compartments, the PDQ 32 resists sinking even when full of water. Crews that have been living on an upturned boat are not normally very happy with their situation, but they are often in reasonable health, having had access to food and water from the boat's stores. Compare that with the various fates meted out to monohull crews...

The closest encounter with capsizing experienced by a PDQ crew occurred when a PDQ 36 was running at 22 knots under spinnaker in 30 knots of wind. The boat was dancing on its bows when the crew cut the sheet. This should not be regarded as conventional cruising behaviour and the company will not celebrate your attempts to produce a more lively anecdote.

Under Power

The standard engine configuration for your PDQ 32 is twin Yamaha 9.9 horsepower four-stroke gas engines. Be sure to follow the maintenance schedule laid down in the motor handbook. This will help with fuel efficiency and increase the lifespan of the engine.

These motors can and should be tilted up any time the boat is not under power. Retraction while sailing significantly reduces drag and strain on the motor mounts. Tilting up at the dock reduces corrosion and clogging of the engine's cooling water passages by marine life.

You can raise a motor without opening the cover by pulling an unlocking line, then on a lifting line that runs through the side of the motor well to the lower drive leg. (This line should always be held by a knot to prevent it slipping down and fouling the prop.)

To raise a motor while sailing in excess of 3 knots, pull the unlocking line while the motor is running in forward gear. This eases the pressure on the unlocking lever, enabling it to operate smoothly. Alternatively, open the cover and press down hard on the motor while releasing it. If you try to release a motor without doing either, you risk damaging the locking lever.

The lock is fitted to prevent the motor from kicking up when reverse gear is engaged. When you lower the motor, you should hear this lock engage with a click.

Starting

Before starting, check that the motor mounts are tight and make sure that the fuel, electrical and throttle connections are secure.

There are two controls for the motors, the key and a combined gear lever/throttle. The key operates the ignition and the electric starter. Its operation is identical to a car's—the first position switches the ignition *on* and the second, spring-loaded position engages the starter. A safety interlock allows you to start the engine only when the gear lever is in neutral.

Be careful—engaging the starter on a running motor can cause damage and an idling motor is almost silent. Before you turn that key again, look at the green light below the key—if it's lit, the motor is running.

With the lever in the centre position, the motor is in neutral and is running at idle speed. When you push the lever forward, forward gear is selected. As you continue to push the lever forward, the

speed and power of the motor increase. When you pull the lever aft, reverse gear is selected. Again, speed and power increase as the lever is moved aft.

Manoeuvring under power

Once you have read the above and the engine manual, you are ready to go. Check the gas level, lower the motors, set the gearshift in neutral, with a little throttle if the motors are cold, and start up. If you have ever handled a twin-screw power boat, the rest will be familiar—and if you’ve ever watched in frustration as they manoeuvre in a space that you wouldn’t dare enter with a sailboat, it’s your chance to turn faces green with envy—now you can rotate your boat under power without touching the wheel!

Away from the dock, put one motor in reverse gear and one ahead, both at low speed. The boat will rotate around a point just forward of the helm. After some practice, you will be able to impress all onlookers with docking manoeuvres. The boat will spin in its own length and you can back into slips against wind and tide with ease.

Cruising under power

For relaxed cruising under power, you will find that a single motor (it doesn’t matter which one) is adequate and very economical. The single motor will carry you along at about 5 to 6 knots, depending on the boat’s loading and the state of its bottom. Two motors will push a lightly laden PDQ 32 at just over 7 knots in calm conditions. Forty knots of wind on the bow will slow progress to 3 to 4 knots over the ground. Fuel consumption should average 0.57 gallons of gasoline per engine hour.

If the motors are running at speeds that are close to one another, you will hear a resonant “beat” to the motor noise. Slowly adjust the speed of one motor upward or downward until the speeds match and the beat disappears.

Anchoring

Anchors are very much an item of individual preference and your choice will be profoundly swayed by the nature of the bottom you normally anchor over. Here we offer general recommendations, not hard-and-fast rules.

Several of our owners have had great success with the 12 or 19 lb. Fortress as an everyday anchor with 20 to 30 feet of $\frac{5}{16}$ inch chain. For heavier work, a 25 lb. CQR has been used successfully with 25 feet of $\frac{5}{16}$ inch chain.

All anchoring involve the use of a bridle system. To use the bridle, pay out anchor rode to the required scope. Using a spare length of $\frac{1}{2}$ inch line, tie a rolling hitch around the anchor rode, then take the bitter end of this bridle line through the fairlead on the opposite bow. Tighten the bridle line until the anchor rode and bridle line intersect amidships. Alternatively, secure the bridle line and pay out the anchor rode.

Tying up

A catamaran at a dock can use its wide beam to tie up effectively. The secret is to tie the bow and stern lines to the hull furthest from the dock. The resulting length of line allows the cat to rise and fall freely to waves or tide without snubbing. Spring lines also must be made as long as possible (illustration on page 49).

When docking with pilings, bow or stern-to, the same principle can be used (illustration on page 50).

Handling, storing and transport on shore

The hoisting diagram on page 51 shows the preferred locations for nylon slings, for lifting with a single crane hook or travel lift. Secure the slings to cleats or the toe rail to prevent slippage.

Make sure that the slings are clear of hull obstructions such as:

- speed sensor;
- rudders and skegs;
- propeller shafts (when fitted).

The PDQ 32 can be set on its keels for a few days. The ground must be level and some protective material must be placed under the keels (soft wood, rubber, carpet, or similar). Secondary support should be placed under the hulls at the aft beam.

If the boat is to be ashore for more than a few days, it should be supported under the keels and under the bridge deck in two places, as shown in the cradle diagram, page 51. Padding must be used on top of the supports, to spread the load and prevent scoring of the gelcoat. Suitable materials are foam, rubber or thick carpet.

The PDQ 32 fits easily on a standard fifth-wheel boat transport trailer, 8 feet wide and 40 feet long. Supports are required at three places, as show in the cradle diagram, page 51. These should be sufficiently high to permit placement of two substantial cross-beams of wood or steel across the trailer bed and under the keels. The rudders should be removed to protect them from road debris.

Maintenance & repair

The importance of preventive maintenance

Your boat lives in a very harsh environment, comprising air (oxygen), salt water, and sunshine (heat, ultra-violet light). Some of the wear-and-tear occurs whether the boat is in use or not, while other wear depends on the frequency of use, and how hard the boat is used.

The presence of so many variables makes for unpredictable maintenance forecasting. The following list has been compiled as a guide, to be used in conjunction with the data provided by the manufacturers of engines and other mechanical and electrical apparatus. As always, there is no substitute for a sound knowledge of your boat, common sense and an observant eye.

Suggested schedules

This overall schedule should be combined with equipment manufacturers' recommendations. Maintenance for the auxiliaries is based on a combination of use and elapsed time, rather than on a rigid schedule, so you should develop a plan based on their manuals and the way you use your boat. Note particularly any checks or maintenance required for the break-in period.

Weekly:

- Check all fasteners on lifelines and nets. Replace any damaged items. Check that lifelines are tight (see page 38).
- Check running rigging as you use it for excessive wear (see page 35).
- Flush rope clutches, blocks etc. with fresh water (see page 35).
- Check batteries. Ensure that the electrolyte is topped up that and all connections are tight (see page 37).
- Check fuel, motor control and exhaust (LRC) systems (see page 36).
- Check that outboard motor mounts are tight and correctly tie-wrapped.

Quarterly

- Check running rigging for wear.
- Clean rope clutches and winches with fresh water and re-grease where required (see page 35).
- Check lifelines for corrosion and tighten or replace as required (see page 38). Check the net for chafe.
- Check standing rigging, looking carefully for damaged or bent

wire, and cracked swages or bent turnbuckles. Check and reset tensions as required (see page 35). Clean turnbuckle threads and oil lightly.

- Check steering cable tensions (particularly after the first two months, quarterly thereafter) and adjust if required. Check steering fasteners (see page 36).
- Check propane supply lines, connections and fittings for leaks (see page 38). Make sure all fittings are tight and in good physical condition.
- Check that fresh water hose connections are not leaking. Check for signs of corrosion in hose clamps and fasteners. Clear foreign matter that could cause blockages (page 38).
- Check tightness of window fasteners. The screws should be snug, but do not over-tighten them (see page 39).
- Check all watertight compartments for signs of water entry. Move loose gear as required to get a clear view.
- Check operation of all sea cocks—open and shut them several times to ensure smooth operation (see page 38).

Annually

- Overhaul steering cables (see page 36) and reset cable tensions. Check that all joints are secure. Inspect for corrosion and check for free running of all cables.
- Check rudder alignment. Make sure rudders are correctly positioned. Ensure that rudders are operating smoothly.
- Check Diesel mounting bolts and shaft alignment.
- Check and lubricate turnbuckles. Replace any defective or corroded parts. Renew all tape over cotter pins.
- Check electrical wiring for loose connections and corrosion (see page 37). Check all fuses and their terminals for corrosion and signs of heat damage.
- Clean seacocks. After clearing all seacocks, open and close them ten times to prove smooth operation (see page 38).
- Check the auxiliaries' shaft struts and shaft bearings. Check the propellers for nicks and tightness.
- Check the corrosion-protection zinc anodes on underwater parts of the auxiliaries. Replace if pitted.

Rigging, deck hardware & steering

Sails

You can extend the life of the sails by doing the following:

- Protect them from the sun when not in use. The jib has a cover built in. Use the sail cover for the main sail.
- Dry them before storing them for more than a few days.

- Do not allow them to flap or flog unnecessarily, when drying them or when becalmed. This fatigues the fabric and wears out the stitching, rapidly ruining your sails' effectiveness.

Standing rigging

At the beginning of the season or quarterly, all turnbuckles should be cleaned and checked for stress cracks. Oil them lightly with a fine machine oil. Make sure all turnbuckles are pinned. All cotter pins should be in place, bent back and properly taped. Cotter pins should not be re-used; replace them with new ones.

All swages should be inspected quarterly. To prepare for any voyage offshore, have the swages X-rayed or replaced with Norseman fittings.

Running rigging

The PDQ 32 is supplied with the following lengths of line for sheets, halyards and other functions. We use a top-quality line in lengths that we have found correct for a variety of situations. These lengths may give you a long tail in everyday conditions, but we recommend that you keep these lengths when replacement is required.

When lines show signs of wear, remove them from their hardware and turn them end-for-end. This shifts the wear point to a different part of the line and it will last longer.

Whenever a line shows signs of wear, inspect its hardware to ensure that there is not a rough spot or a jammed sheave.

Replace any line that shows obviously broken strands.

<i>Function</i>	<i>Diameter (in.)</i>	<i>Length (ft.)</i>
Main halyard	1/2	85
Jib halyard	1/2	85
Main sheet	3/8	55
Jib sheet	3/8	45
Main traveller	3/8	35
Topping lift	3/8	85
Dock lines (nylon)	1/2	40

(Dacron except as noted)

Line handling gear

The mainsheet gear and travellers should be flushed with water weekly.

The winches require maintenance at quarterly intervals or they will become difficult to use and may corrode.

- Strip the winch and de-grease it with a mild de-greasing agent (available from any auto supply store).
- Re-grease the bearings with a small amount of Teflon-based marine gel lubricant. Do not over-grease; the spaces in bearing races should be full of grease, but non-bearing areas should be clean.
- Make sure that the grease is fully worked into the bearing surfaces. Remove any excess grease after working in.

The clutches and line organisers do not require service as such, but should be kept clean. In salt water, hose them down thoroughly with fresh water weekly.

Approximately quarterly, lightly grease the cam and sheave bearings with a Teflon-based marine gel lubricant. Make sure the gel is fully worked into the working parts. Remove any excess.

Steering

Inspect the steering system periodically for loosened locknuts and cables. Pay particular attention to the rod ends connecting the tiller arms to the rudder bar. Motor vibration tends to loosen fasteners, so the more you travel under power, the more frequently you should inspect this area.

Every year:

- Grease the ball joints with a small amount of Teflon-based gel lubricant.
- Remove the pull-pull cables, degrease them with a cleaning agent (available from any auto supply store), inspect them for chafe and splintered strands, re-grease them with a Teflon-based marine gel lubricant, replace and readjust them. You can also accomplish the same end by pouring small quantities of SAE 90 oil on the cable at the sheaves on the floor of the helm locker. The oil will simply migrate down the cable.

Auxiliaries

Many sailors tend to treat auxiliaries rather like Bic lighters—they just use them until they stop working. However, if you give your auxiliaries the attention worthy of a complex (and expensive) device, they will give a long and reliable life. Whether you have outboards and Diesels, whether you do the work yourself or have it done (by a qualified mechanic), follow the maintenance

recommendations in the manuals. Pay particular attention to break-in requirements.

Outboards:

- Change the oil and clean the oil filters after 10 hours of break-in, then every 100 hours thereafter. You can change the oil in the outboards on the water by holding a 2-quart milk carton under the drain hole to catch the oil. The fuel supply line has its own filter, so the motor's internal fuel filter will last well, but check it when you do oil changes.
- Flush the outboard's cooling systems periodically with fresh water. Hose attachments to supply fresh water to the intake are available at most marine supply stores.
- Do not be alarmed if the engines appear to idle at slightly different speeds. Resetting of the idle speed is a simple adjustment, covered completely in the engine manual.

Diesels:

- The Diesels have a closed-circuit cooling system that prevents sea water from contacting the engine proper. Check the coolant level periodically and replace it annually. Also check the cooling water seacocks. They should operate freely and be clear of fouling.
- Check oil levels in the gear cases and the engine sump. Dipstick locations are shown in the manual. Change the oil and filter according to the schedule in the manual.

Service systems

Electrical systems

Although it may seem that there is little maintenance to be done on an electrical system, many electrical problems emanate from simple loose connections. You can therefore stave off many problems by developing the habit of checking connections whenever you enter a space where they are visible or reachable, then tightening any that are loose.

All wiring is tin-plated copper and therefore will be very resistant to corrosion. However, all wires should be checked periodically for corrosion and chafing and replaced if necessary. Preventive care consists of making sure that gear is not allowed to rest on or rub against any electrical wiring, and preventing the exposure of wires to any unnecessary wetness.

If an electrical device is performing poorly or seems hot, check its connections. If connections or fasteners are tight, check the wire

with a multimeter or call an electrician. If a device's circuit breaker trips repeatedly, inspect the wiring for an obvious short or have the unit inspected by a repair facility. Do not try to defeat the purpose of the circuit breaker or you could create a hazard.

Periodically, check the batteries' electrolyte and top it up with water—more often if you find yourself adding significant amounts. Use distilled water; tap water may contain minerals that shorten a battery's life. Disconnect the batteries, clean their terminals, coat the mating surfaces with vaseline and reconnect them.

If any modifications or additions are required, we suggest calling the factory or consulting an experienced marine electrician. If you are considering any changes, even if you do not intend to do the work yourself, we recommend reading a book on marine electrical systems, so you understand what's involved.

Water & propane systems

Check the hose connections of the fresh water system quarterly. Hose clamps should be tight, but not so tight that the hose material appears crushed.

We recommend that you close seacocks any time you leave the boat. If you choose not to do this, the through-hull seacocks should be opened and closed at least quarterly, to ensure they will close if necessary. Annually, or whenever the boat is out of the water, you should inspect the seacocks for growths or blockages, then lubricate them with a Teflon lubricant or vegetable oil.

Connections in the propane lines should be checked when changing tanks, and at least quarterly, to ensure they do not leak. You can do this easily by turning off all appliances, then turning on the tank and solenoid valve. Apply a little soapy water to each connection. If the connection is leaking, bubbles will form.

To use a pressure gauge to check the line, connect a full tank to the line. Turn on the manual valve and the propane solenoid, then turn off the manual valve. After 10 minutes, the line pressure should be within a few pounds of the original pressure.

Hull & deck

Lifelines, stanchions & nets

Inspect all lifelines weekly to ensure that turnbuckles, pelican hooks, stanchion bases, locknuts and other parts are tight and secure. Motor vibration tends to loosen fasteners, so the more you travel under power, the more frequently you should check.

Every three months, inspect the lifelines for abrasion and corrosion. Watch out for the start of corrosion under plastic coverings. This may show initially as a swelling of the cover.

Check the forward nets weekly to ensure that securing bolts and rigging lines are firmly tightened. Check the net's stitching for chafe every quarter.

Antifouling paint

Our standard antifouling paint is Pettit Trinidad. This is an exfoliation-style anti-fouling paint that will lose its effectiveness with exposure.

We strongly recommend that you remove the majority of the paint with a sander before you repaint. Do this carefully with an orbital sander, never a disc sander. If you sand through or otherwise damage the optional Interprotect 2000 epoxy undercoat, the extended warranty becomes void.

Protect yourself when sanding and painting by wearing protective clothing, safety glasses and a breathing mask. Please dispose of toxic dust and leftover paint correctly.

Topsides & deck

The topsides and deck should be washed with non-abrasive cleaners. A small amount of ordinary dish soap in a pail of water is sufficient for normal use. If there are scuff marks on the hull or deck, these can often be removed with acetone. Acetone will attack the windows and plastics, so use it cautiously—apply it and wipe it away. Never allow puddles of acetone to form.

To clean windows, use Windex (or similar mild glass cleaner) and a soft cloth. Never use Soft Scrub, Scrub'n'Shine or similar products on the windows. These cleaners contain fine abrasives and chlorine bleach, which break down the outer layer of the plastic and make the windows permanently foggy. Marine stores have specialized cleaners that contain UV filters.

A NATO pilot once told us that they use aerosol shaving soap (such as Gillette Foamy) on their cockpit canopies because it is fine-milled soap that can't scratch and that leaves no residue. His windows (both plexiglass and the folding plastic on his dodger) were very clear.

Window fasteners should be checked quarterly. They should be snug, but be careful not to make them so tight that the material is distorted; this will cause leaks.

Hatches

Check that all hatches are working correctly. Make sure that the hinges are still tight, allowing the hatch to remain open, and adjust them if needed. Examine the seals for any sign of damage.

To clean hatches, follow the suggestions given for the windows, above. Clean gaskets only with mild soap and water, and be sure the soap is completely removed.

Graphics striping

All the strips are a 3M vinyl product that can be serviced at any of the 3M franchises called Trim-line. These are an automotive supply company, but they are willing to help with any problem. A data sheet is provided with this manual.

Interior

The woodwork is finished with three coats of hand-rubbed Varathane and can be kept lustrous with occasional applications of any good floor wax.

The interior fibreglass surfaces can be washed and waxed in the same way as a car body. Scratches can be removed by buffing with automotive buffing compound.

The headliner is a tough vinyl product. It can be cleaned like the plastic inside a car, using Armor-All, Windex or similar products. Tears or other damage can often be repaired by automotive vinyl specialists.

The melded fabric can be cleaned like carpeting by brushing, vacuuming or steam-cleaning. Household spot removers can be used on stains. Test the cleaner on an inconspicuous area and follow the directions.

Upholstery can be kept tidy with frequent brushing or vacuuming. Stains can be removed with household spot removers. Test the cleaner on an inconspicuous area and follow the directions.

Note the products to avoid or use with care, as described under *Topsides and deck*, above. Be very careful when using cleaners that contain bleach. Surfaces like countertops are unaffected by bleach, but many flexible or clear plastics are ruined by concentrations as small as two or three capfuls in a pail of water.

Recommended spare parts

The following items should be considered a bare minimum of spares for running repairs. You will find more comprehensive lists in the books listed on page 24 and in many other cruising books.

- cotter pins
- crimp connectors, butt and terminal type, 12 & 14 gauge wire
- drive belts for Diesels
- fresh water flushing attachment for outboards
- fuel filters
- gasket compound
- heat-shrink tubing
- impellers for motor water pump
- miscellaneous fasteners
- miscellaneous line
- miscellaneous wire
- needle, sailmaker's palm and whipping twine
- penetrating oil
- sail tape
- shackles
- silicone sealant
- spare fuel can and funnel
- spark plugs, oil
- Teflon-based marine gel lubricant

Recommended tools

We recommend that you buy good-quality tools such as Sears or a similar reputable name brand. "Bargain" tools are prone to damaging the material you are working on, or breaking when you most need them.

<i>Tool</i>		<i>Sears Part No.</i>	<i>Use</i>
Screwdrivers	Phillips - large	32216	lights
	Phillips - #1		
	Phillips - #2	32229	
	Robertson #1	32247	
	Robertson #2	32248	
	Standard flat	32168	
	Jeweller's flat	32283 (set)	
Jeweller's Phillips			
Vice Grips®	10"		
Crescent wrench	8"	40133	
	12"	40135	

<i>Tool</i>	<i>Sears Part No.</i>	<i>Use</i>
Wrenches	17mm	41310 steering
	12mm	41306 motor
	10mm	41304 motor
	8mm	41302 motor
	3/4"	steering
	9/16"	
	1/2"	40727 (set)
	7/16"	
	3/8"	
	5/16"	40602 hose clamp
Hacksaw, blade holder	90337	
Scissors	22297	
Allen key set	metric	4193
	standard	40193
Feeler gauges		motor
Multi-meter		electrical
Electrical repair kit (wire strippers, crimpers)		electrical

Troubleshooting

Boats, like the weather, are the nexus of many forces and possibilities, and as with forecasting the weather, troubleshooting a boat's ills may be as much art as science. This section is not a comprehensive guide to every difficulty you may encounter on or near the water. It deals only with some problems that have vexed other PDQ owners.

Motor won't start.

- Won't turn over.

Safety interlock engaged. Move the shift quadrant to neutral and re-try.

Battery power is off or insufficient. Check the battery switches. Change to another battery or use jumper cables to connect the house batteries to the motor battery (battery locations, page 48; electrical information, page 17).

Consult the more extensive troubleshooting sections of the motor manual.

- Turns over, won't run.

Check the fuel levels and fuel connections. Ensure that the fuel filter is not blocked.

Consult the more extensive troubleshooting sections of the motor manual.

Motor stops suddenly.

Turn off ignition. Raise motor and check prop for obstructions. The most common causes are crab-trap or other fishing lines, or a loose motor-raising line that has fouled the prop.

Difficulty in raising or lowering sails.

Check that the luff groove is not blocked and that the luff is not encrusted with dirt or salt. Clear it by hosing with fresh water.

Ensure that the halyard lead is fair (not around another halyard or a deck fitting).

Ensure that the sail is feeding correctly and has not pulled out of its luff groove or had a slide fitted upside down.

Run the halyard up and down with a light load (for instance, with a light load on a retrieval line) to ensure the masthead sheave is turning freely. If it is not, do not attempt to raise the sail; you may damage the halyard or further damage the sheave.

	<p>Return to your mooring and hoist someone to the masthead to clear the problem.</p> <p>If the problem is persistent and minor, consider the use of a luff groove lubricant.</p>
Jib won't unfurl completely.	<p>A roller-furling headsail most often fails to unfurl because the furling line is jammed at the bottom of the furling drum. Keep a light tension on the furling line when you unfurl; the line will then wind smoothly onto the drum and the sail will unfurl completely.</p>
Can't get rigging sorted out.	<p>The procedure for setting up the standing rigging is described on page 14. A diagram of the reefing system is located on page 52.</p>
Steering is heavy.	<p>Make sure the autopilot is completely disengaged. Check the rudders to be sure you haven't picked up some obstruction, and the operation of the rudder for stiffness in the stocks.</p> <p>Make sure that objects are not resting on the steering cables, that the cable sheaves turn freely and that nothing is blocking the steering quadrant or the quadrant connecting rod. Any object that could conceivably cause a problem should be firmly secured or removed from the space.</p> <p>Lubricate sheaves and cables (see pages 15 and 36).</p>
Can't get water out of the boat.	<p>The manual pump is connected to intakes in each hull via a Y-valve. Make sure the Y-valve is set to pump the correct hull (description page 18, location, page 47).</p>
No electricity. - no DC power	<p>Check the main breaker for DC power at the electrical panel. Indicator light should be glowing brightly. If this light is not on, check the battery switch (location, page 48). Turn one or more batteries on.</p> <p>Check battery levels at electrical panel.</p> <p>If you are at the dock and plugged into shore power, check your connections. A heavy load on the batteries can quickly exhaust them. Also, if</p>

the shore power fails, the optional inverter will take over supply of AC power by drawing from the batteries. This will quickly exhaust any battery. See battery precautions, page 17.

- no AC power (shore power)

Check the AC power switch at the main electrical panel. The AC indicator light should be brightly lit. If the light is dim, the shore power has failed or you are drawing AC power from the batteries via the optional inverter. Turn off AC devices and re-establish shore power or you will quickly exhaust your batteries.

Check connections at the vessel and shore ends. Plugs should be in and locked at both.

Check on/off switch or indicator lights (if any) at shore supply. If shore supply is a Ground Fault Interruptor (GFI), press the Test button. If the Reset button does not pop out, press the Reset button and try Test again. If this does not cause the Reset button to pop, there is no power available. Speak to the dock manager.

If there is power coming to the boat, and the circuit breakers are on, but there is no supply on board, check the circuits with a multimeter, or consult a competent electrician.

Switch on the electrical panel (circuit breaker) won't stay on.

Switches on the electrical panel are circuit breakers and are intended to trip (turn off) when there is a fault in the circuit. Don't defeat or circumvent them.

If a breaker trips only when one light or device is turned on, there is an electrical fault in that light or device. Have it repaired or replaced.

If a breaker trips continually, and particularly if it trips when lights and appliances on that circuit are turned off, the problem is probably a shorted wire. Have it inspected by a good electrician.

Lights don't work.

If this is the only light that doesn't work, the bulb, the switch or the wiring may be faulty (in that order of probability).

If other lights also refuse to work, check the

breaker for the lights and for DC power at the electrical panel in the navigation station. Indicator lights should be glowing brightly (see *No electricity - no DC power* in this section).

Water won't heat up.

You may not have a water heater (it's an option). If you do, and your boat is a Classic, see *Stove/oven won't light*, above, to be sure gas is available. Check the main electrical panel in the navigation station to be sure the water heater's power is turned on. If the switch is on, check DC power (see *No electricity - no DC power* in this section). Consult the water heater manual for further recommendations. If gas and electricity are available, the most common cause of refusal to operate is a blocked flow sensor. This item cannot be repaired; it can only be replaced (see page 22). If your boat is an LRC, the temperature of the water depends on whether the starboard Diesel has been running long enough to heat water, or if stopped, how recently it was run (see page 23).

Fridge won't stay cold.

Check the supply of electricity and propane; both must be present for the refrigerator to work. If it is very warm, you can improve the ventilation and efficiency of the refrigerator's cooling unit by opening the forward hatch.

Shower fills with water.

The main power switch and circuit breaker for the sump pump must be switched on (see page 23). The shower sump's filter must be cleaned from time to time (see page 23).

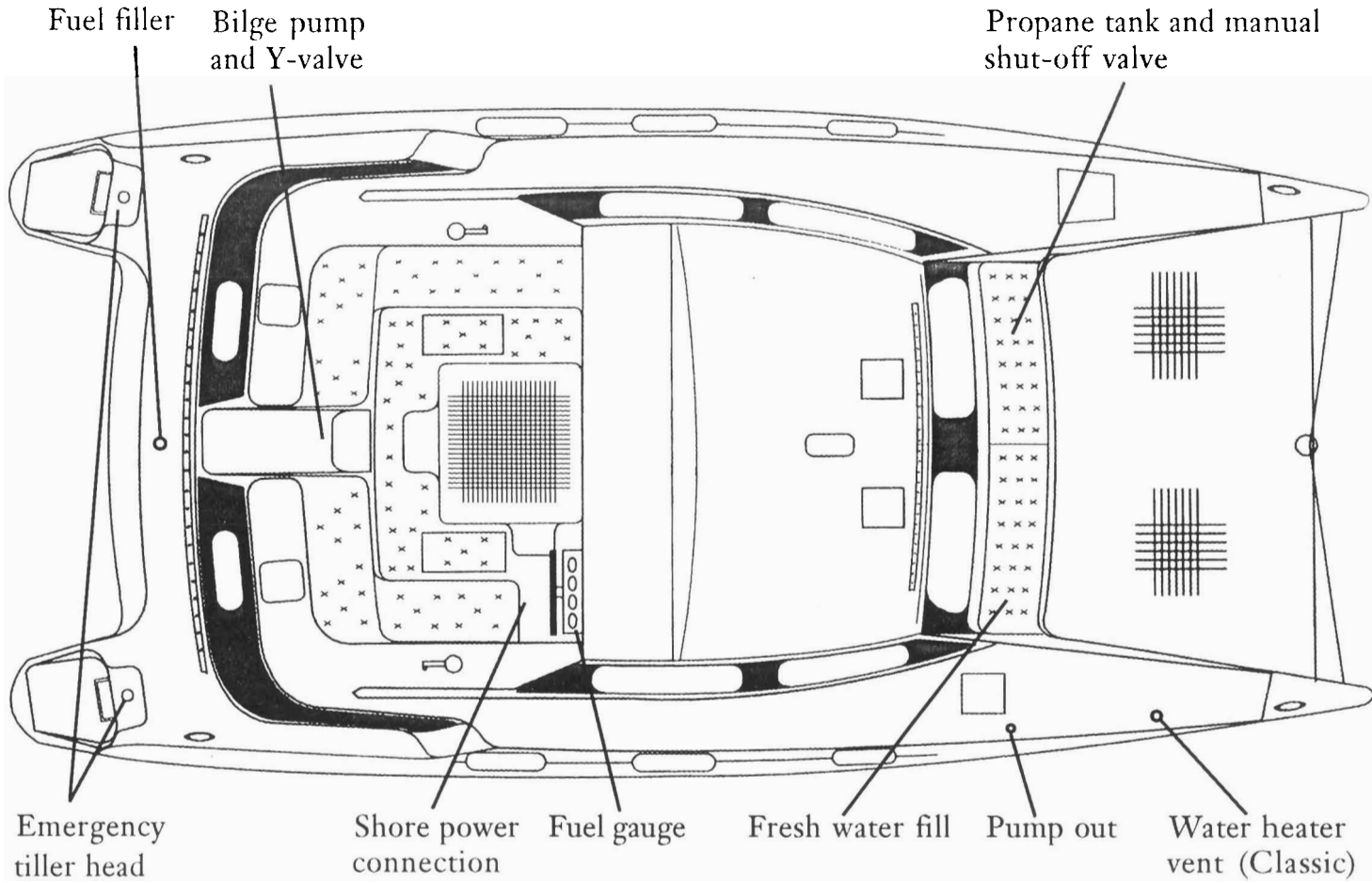
VHF is on but does not transmit.

Check connections at the base of the mast.

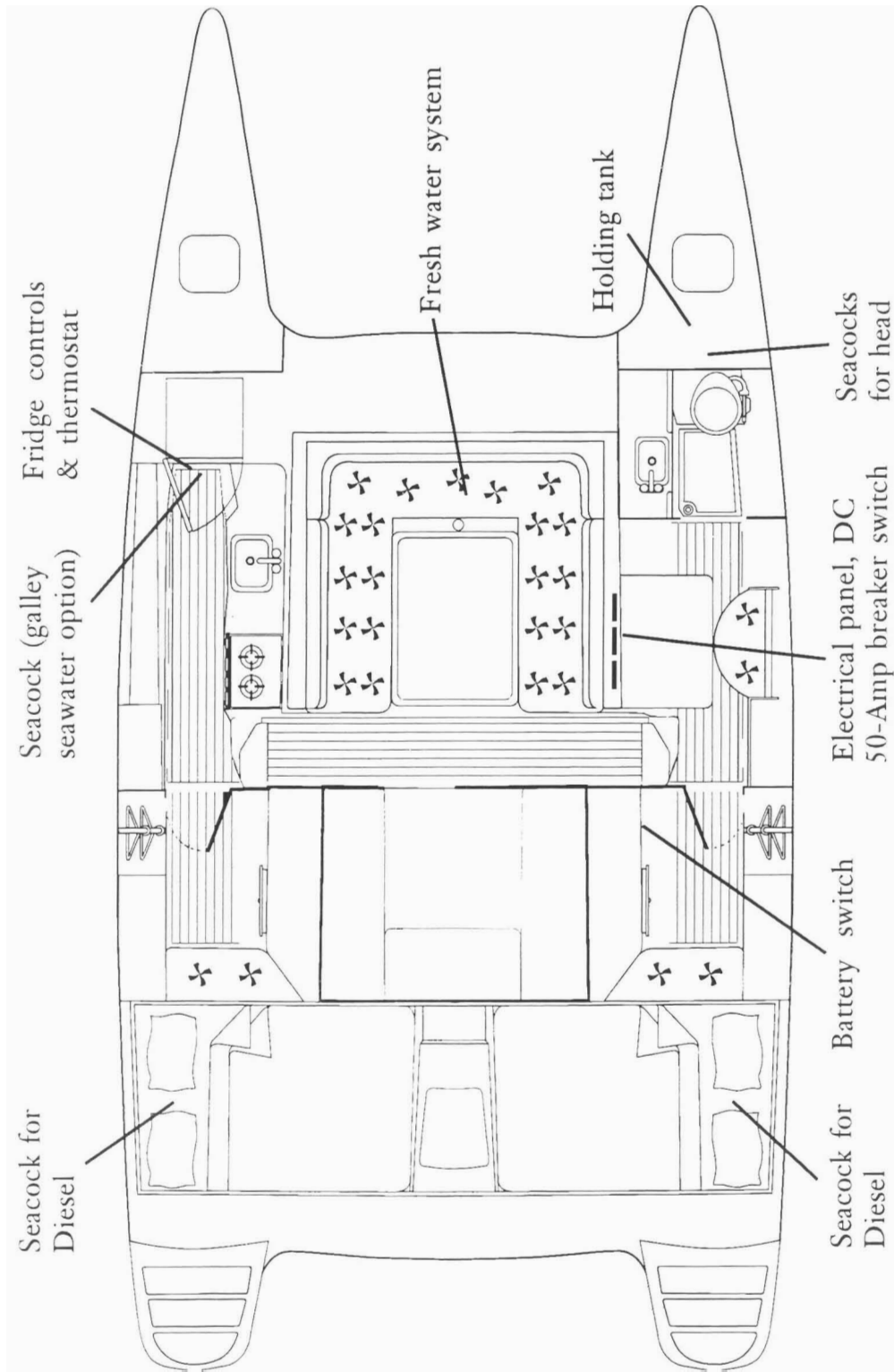
Wind instruments are on but don't give a reading

Check connections at the base of the mast.

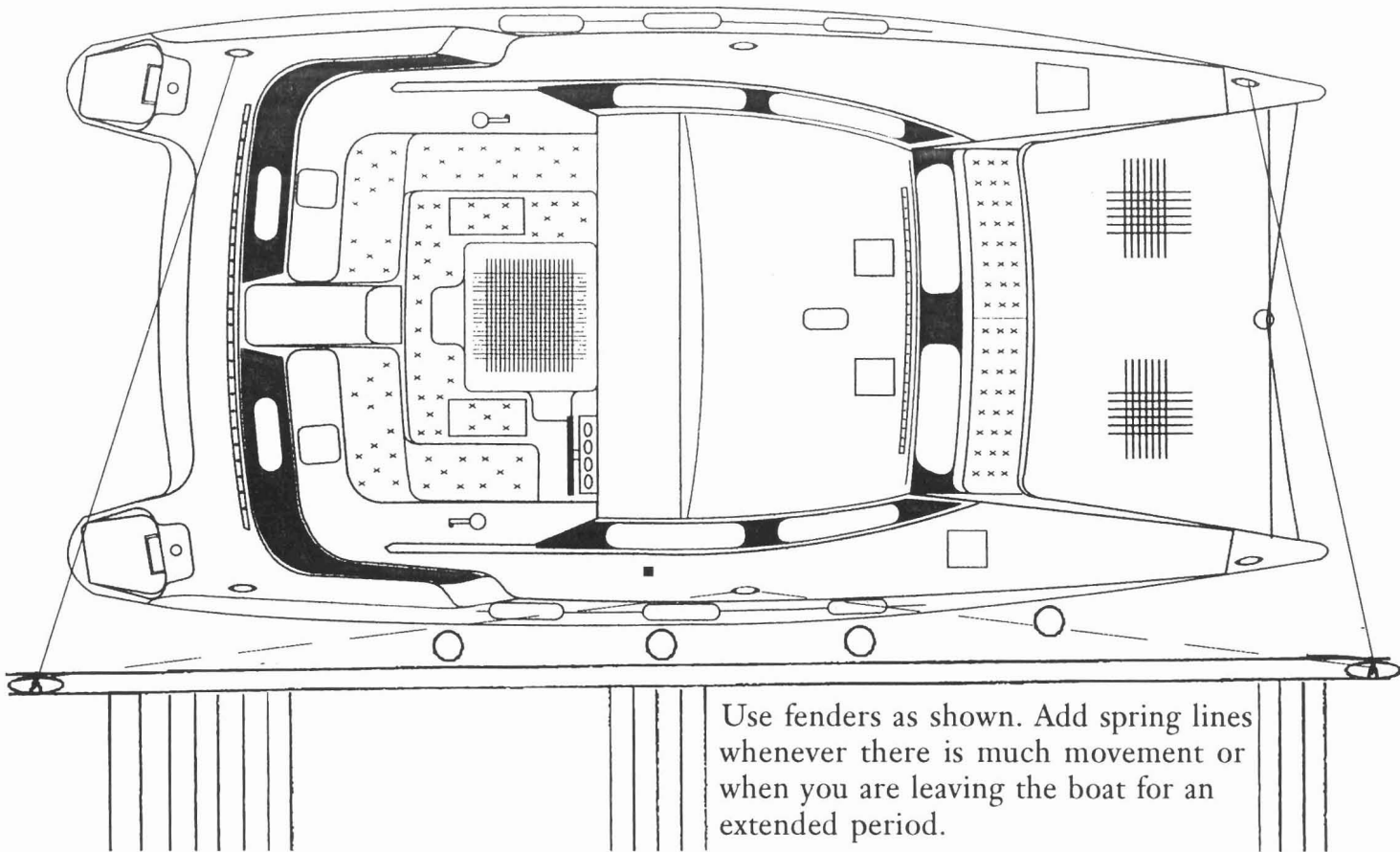
Service locations on deck



Service locations below decks

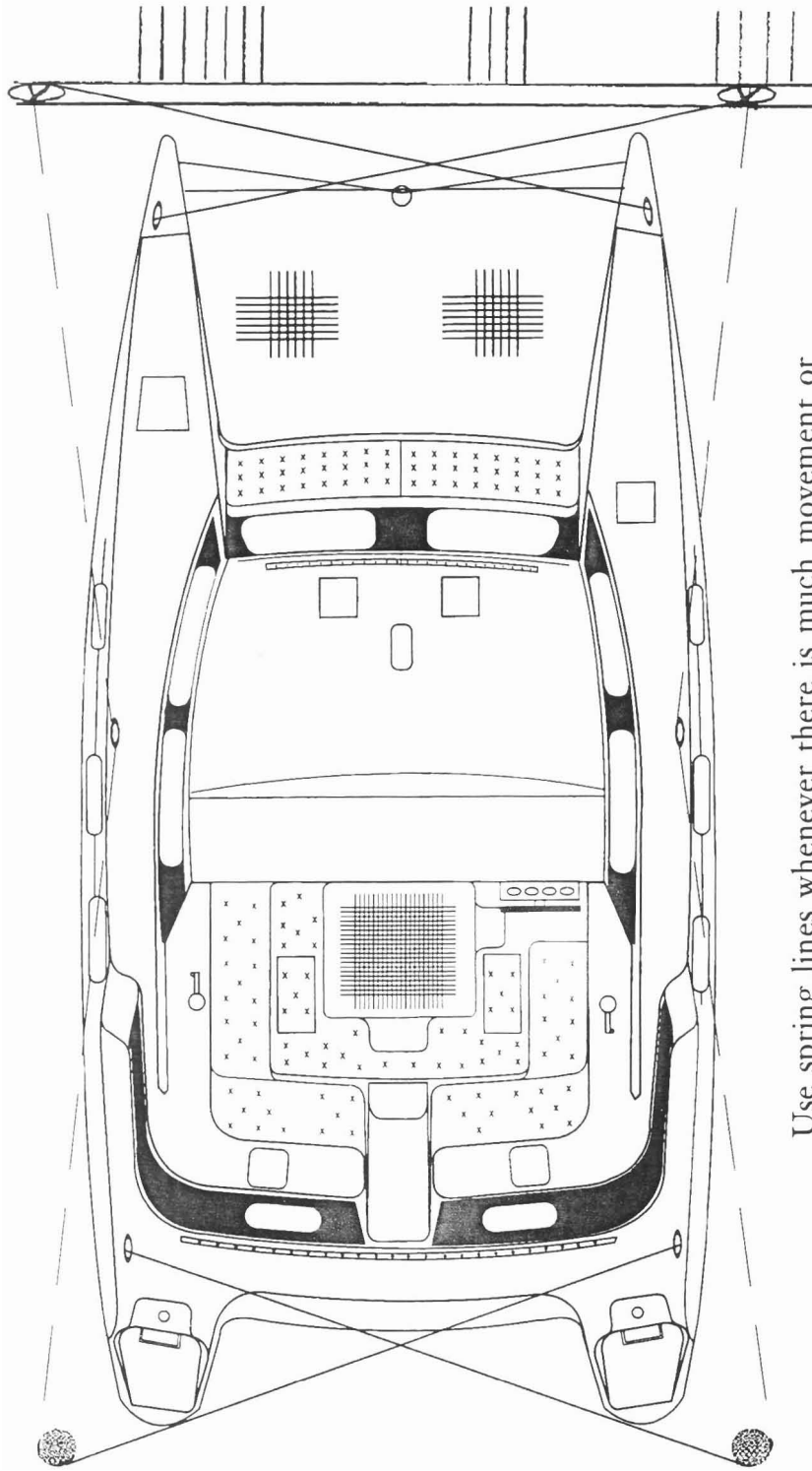


Tying up alongside



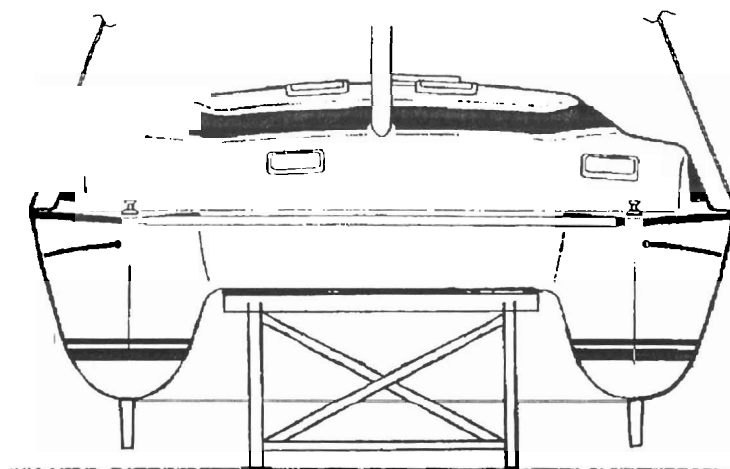
Use fenders as shown. Add spring lines whenever there is much movement or when you are leaving the boat for an extended period.

Tying up fore-and-aft



Use spring lines whenever there is much movement or whenever you leave the boat for a considerable period.

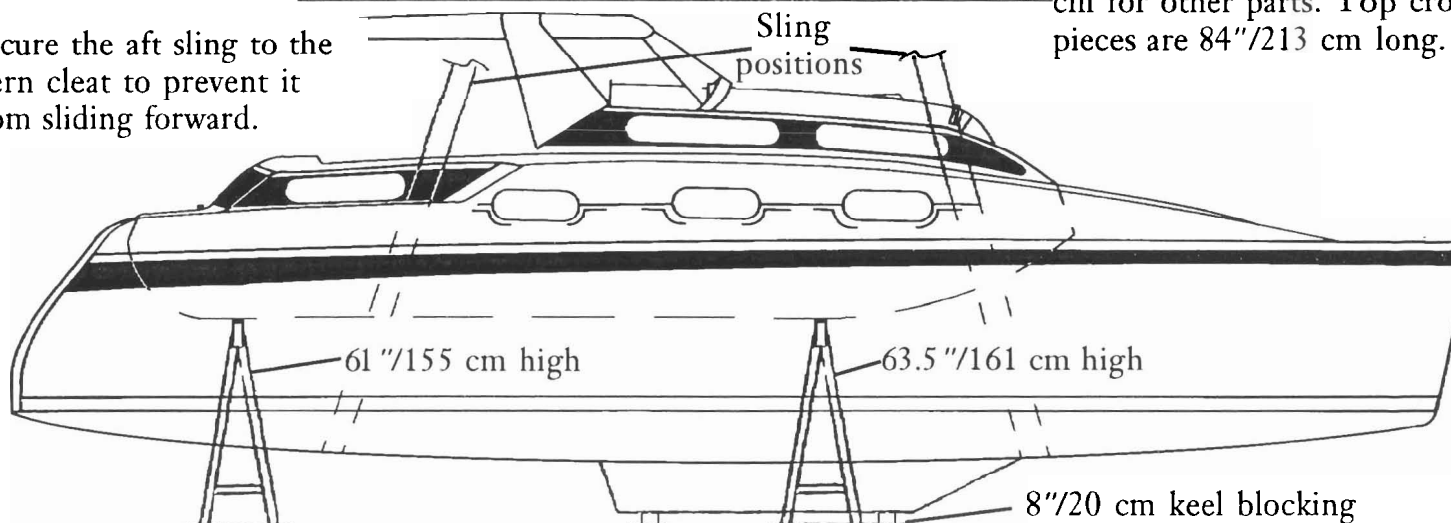
Lifting and storage on shore



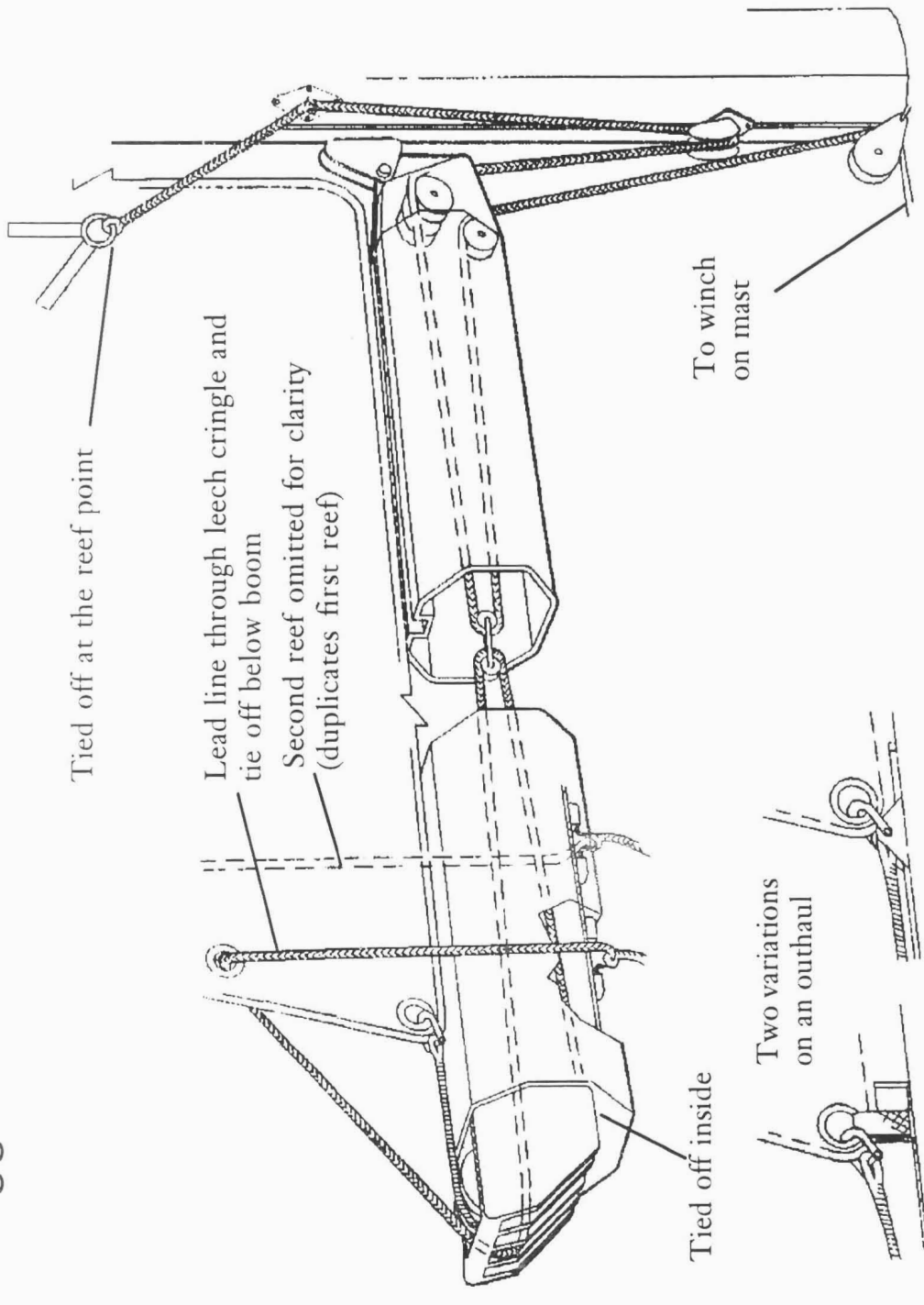
Position the forward frame 12"/30 cm aft of the forward edge of the non-skid pattern and the aft frame at the aft edge of the pattern. Protect the gelcoat at the contact point with padding.

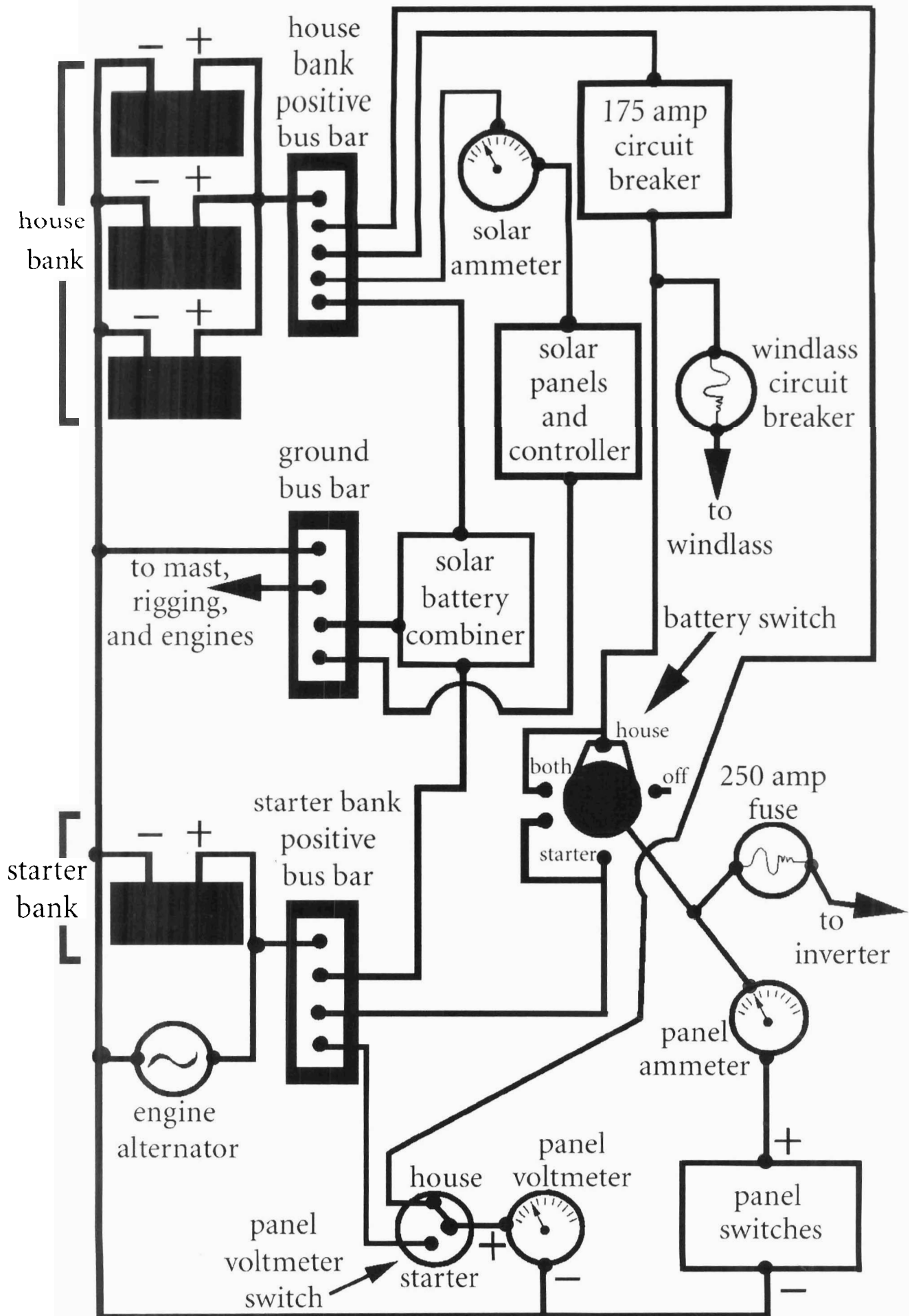
Supporting frames should be good-quality lumber, 2" x 8"/5 x 20 cm for the upper cross-members and 2" x 4"/5 x 10 cm for other parts. Top cross-pieces are 84"/213 cm long.

Secure the aft sling to the stern cleat to prevent it from sliding forward.



Reefing gear





9-6 ELECTRICAL

➔ Any time you disconnect the battery cables, it is recommended that you disconnect the negative (⚡) battery cable first. This will prevent you from accidentally grounding the positive (+) terminal when disconnecting it, thereby preventing damage to the electrical system.

Before you disconnect the cable(s), first turn the ignition to the **OFF** position. This will prevent a draw on the battery which could cause arcing. When the battery cable(s) are reconnected (negative cable last), be sure to check all electrical accessories are all working correctly.

STORAGE

If the boat is to be laid up for the winter or for more than a few weeks, special attention must be given to the battery to prevent complete discharge or possible damage to the terminals and wiring. Before putting the boat in storage, discon-

nect and remove the batteries. Clean them thoroughly of any dirt or corrosion, and then charge them to full specific gravity reading. After they are fully charged, store them in a clean cool dry place where they will not be damaged or knocked over, preferably on a couple blocks of wood. Storing the battery up off the deck, will permit air to circulate freely around and under the battery and will help to prevent condensation.

Never store the battery with anything on top of it or cover the battery in such a manner as to prevent air from circulating around the fillercaps. All batteries, both new and old, will discharge during periods of storage, more so if they are hot than if they remain cool. Therefore, the electrolyte level and the specific gravity should be checked at regular intervals. A drop in the specific gravity reading is cause to charge them back to a full reading.

In cold climates, care should be exercised in selecting the battery storage area. A fully-charged battery will freeze at about 60 degrees below zero. A discharged battery, almost dead, will have ice forming at about 19 degrees above zero.

CHARGING CIRCUIT

▶ See Figures 9, 10 and 11

For many years, single-phase, full-wave charging systems were the dominant design. Most manufacturers used single-phase systems because they were simple and reliable. The drawback to these systems is low output. A typical single-phase lighting coil system is capable of only 10 to 15 amps. On many larger

rigs, the electrical demand is more than 15 amps. New electronic and electrical devices are arriving on the market every day, so the demand for higher amperage output continues to rise.

In response to higher electrical demands, three-phase systems were introduced on the larger Yamaha outboards in 1990. These systems produce 25 to 35 amps. At the heart of a three-phase charging system is an interconnected

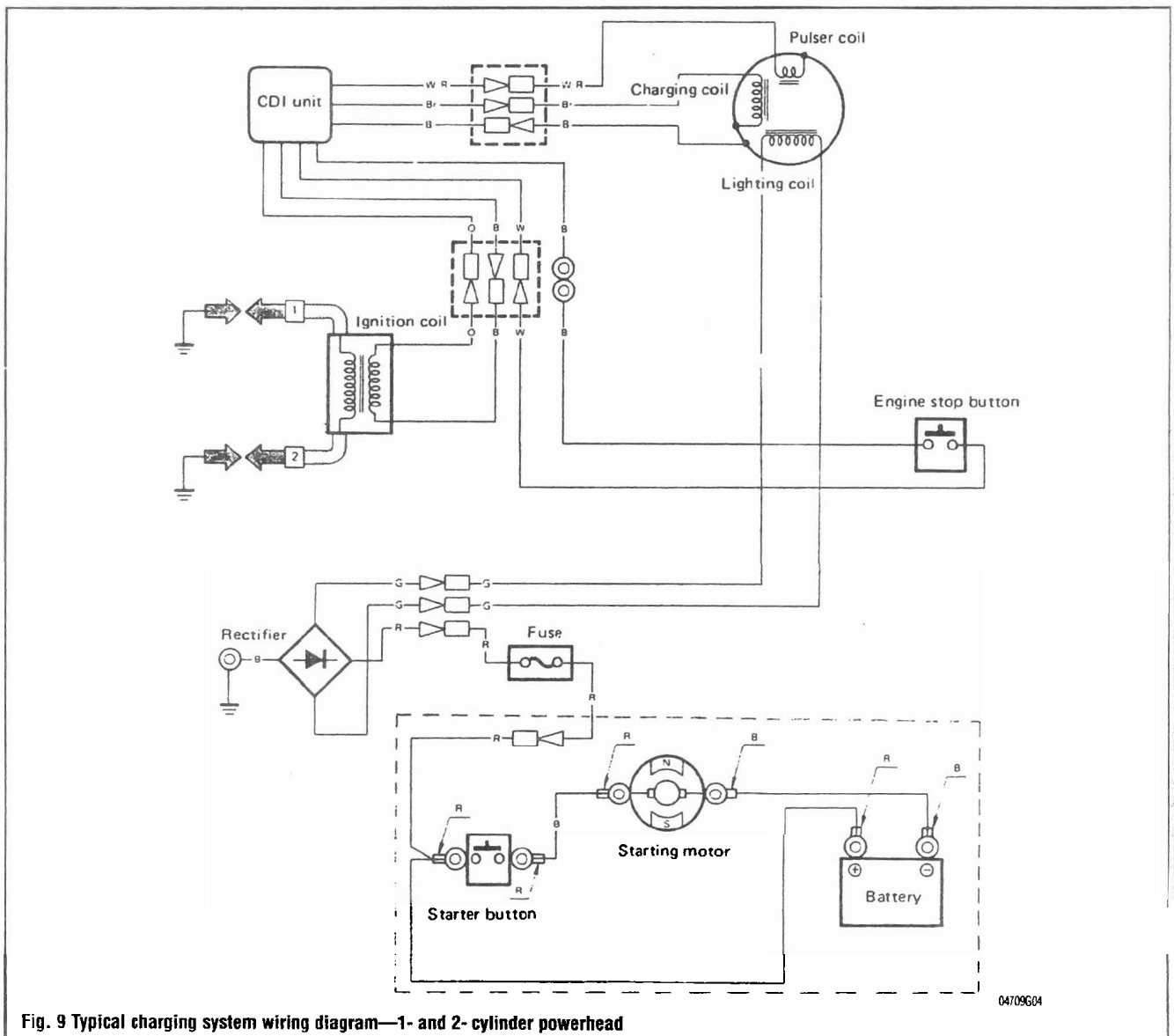
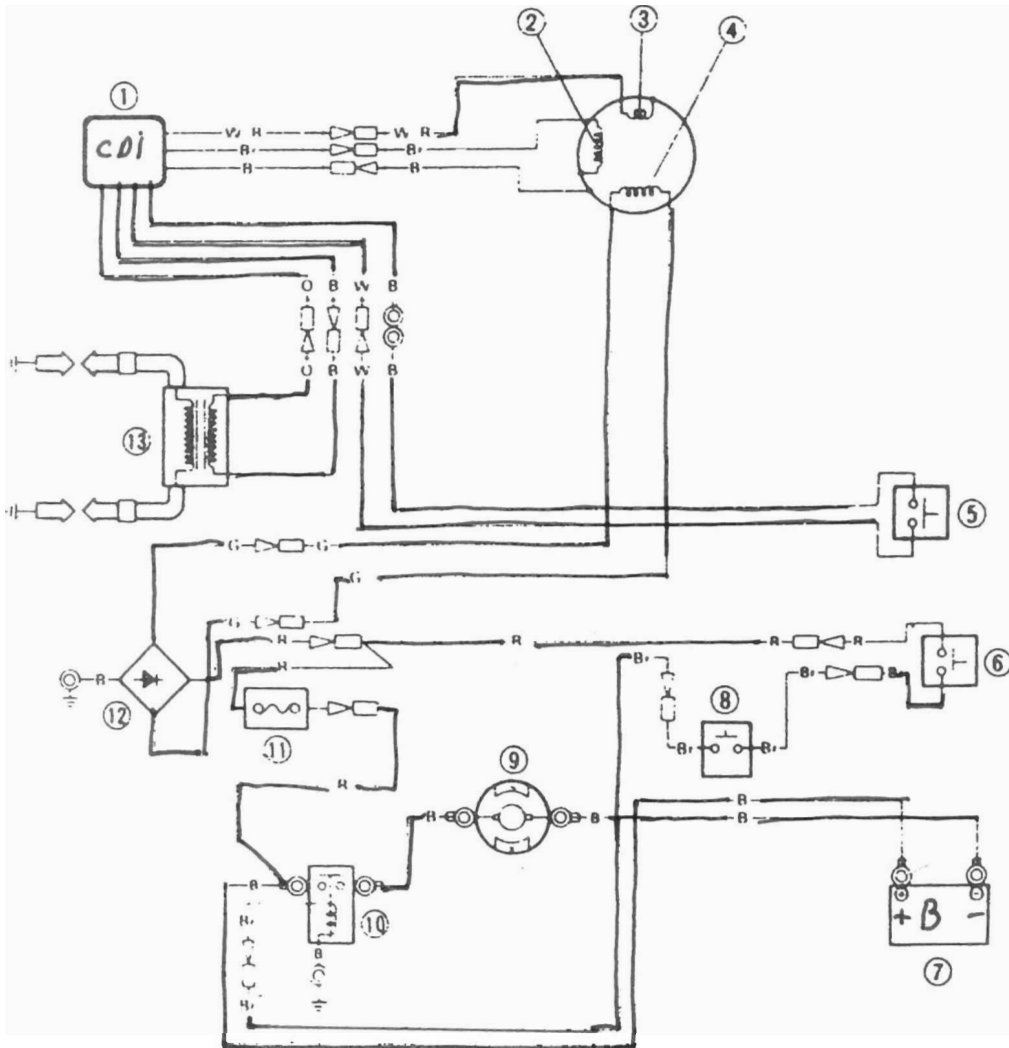


Fig. 9 Typical charging system wiring diagram—1- and 2- cylinder powerhead

04709G04

Fig. 18 System wiring diagram—6hp and 8hp engines



hite

d

'09W05

- ① C.D.I. unit
- ② Charge coil
- ③ Pulser coil
- ④ Lighting coil
- ⑤ Engine stop switch
- ⑥ Starter switch
- ⑦ Battery

- ⑧ Neutral switch
- ⑨ Starting motor
- ⑩ Starter relay
- ⑪ Fuse
- ⑫ Rectifier
- ⑬ Ignition coil

- B : Black
- Br : Brown
- G : Green
- G/W : Green/White
- O : Orange
- R : Red
- W : White
- W/R : White/Red

04709W06

Fig. 20 System wiring diagram

9.9 HP - 15 HP.

Test Chart

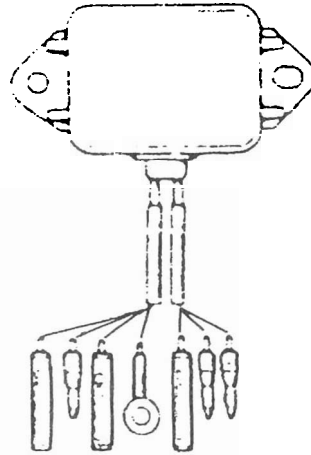
Earth	B	3.2 ~ 4.8	3.2 ~ 4.8	∞	9.6 ~ 14.4	/	∞ *
Ignition	B/W	∞	∞	∞	∞	∞	/

∞ : No continuity
 * : Needle swings once and returns to home position

04706C03

- O : Orange
- W : Red/White
- G/W : Green/White
- Br : Brown
- W : White
- : Black

6-15 HP CDI Unit Test Chart



- Digital tester can not be used for this inspection. Use analogue tester.
- C.D.I. resistance values will vary from meter to meter, especially with electronic digital meters. For some testers, polarity of leads is reversed.

- B : Black
- Br : Brown
- G : Green
- O : Orange
- W : White
- W/R : White/Red

Unit: kΩ

	Ground	Ignition
W	B	O
5	∞	∞ *
5	∞	∞ *
5	9	∞
	12	∞
2	/	∞ *
	∞	/

Unit: KΩ

⊖ ⊕	W	B	Br	W/R	O
W	/	∞	∞	∞	∞
B	∞	/	7.5 ~ 11.3	∞	.
Br	∞	63.2 ~ 94.8	/	∞	.
W/R	8.8 ~ 13.2	14.4 ~ 21.6	30.4 ~ 45.6	/	.
O	∞	∞	∞	∞	/

∞ : Needle swings once and returns to home position.
 ∞ : Discontinuity

04706C04

home position

04706C02

9-10 ELECTRICAL

→When making the DC amperage output check, do not use a fully charged battery! A fully charged battery will not receive full system output. It may only show half the expected amperage output. Reduce the battery state of charge by operating the trim/tilt motor through several cycles. This reduces the charge on the battery and permits higher alternator output.

DC Voltage Check

1. The DC voltage check begins just like the DC amperage check. Begin the DC voltage check by establishing the condition of the battery and by checking for any key-off amperage draw.

2. Verify that you have 12 volts through the fuse and Red wire. Reading voltage through the fuse establishes continuity and fuse condition.

3. Check the system carefully for good grounds at all the ground points for the Black wires. Remember that there are several splices within the harness that can corrode and create high resistance.

4. At this point move to the lighting coil Green wires and disconnect the connector. Crank the engine and check the AC voltage output among the three wires. The voltage should be above battery voltage at idle and rise with engine rpm. Check each leg to ground. The AC reading should be nearly the same from

each leg to ground. If not, shut off the engine, switch the meter to ohms and look for a coil leg that is open or shorted to ground.

5. The rectifier/regulator is purposely left for last. In reality, these checks aren't usually necessary. By the process of elimination you can decide if the rectifier is bad. If the stator, battery and fuse are all good, and if the Red and Black wires are OK, the only thing left is the rectifier/regulator assembly. Since you can't disassemble the unit to fix it, replace it.

Charging System Checks

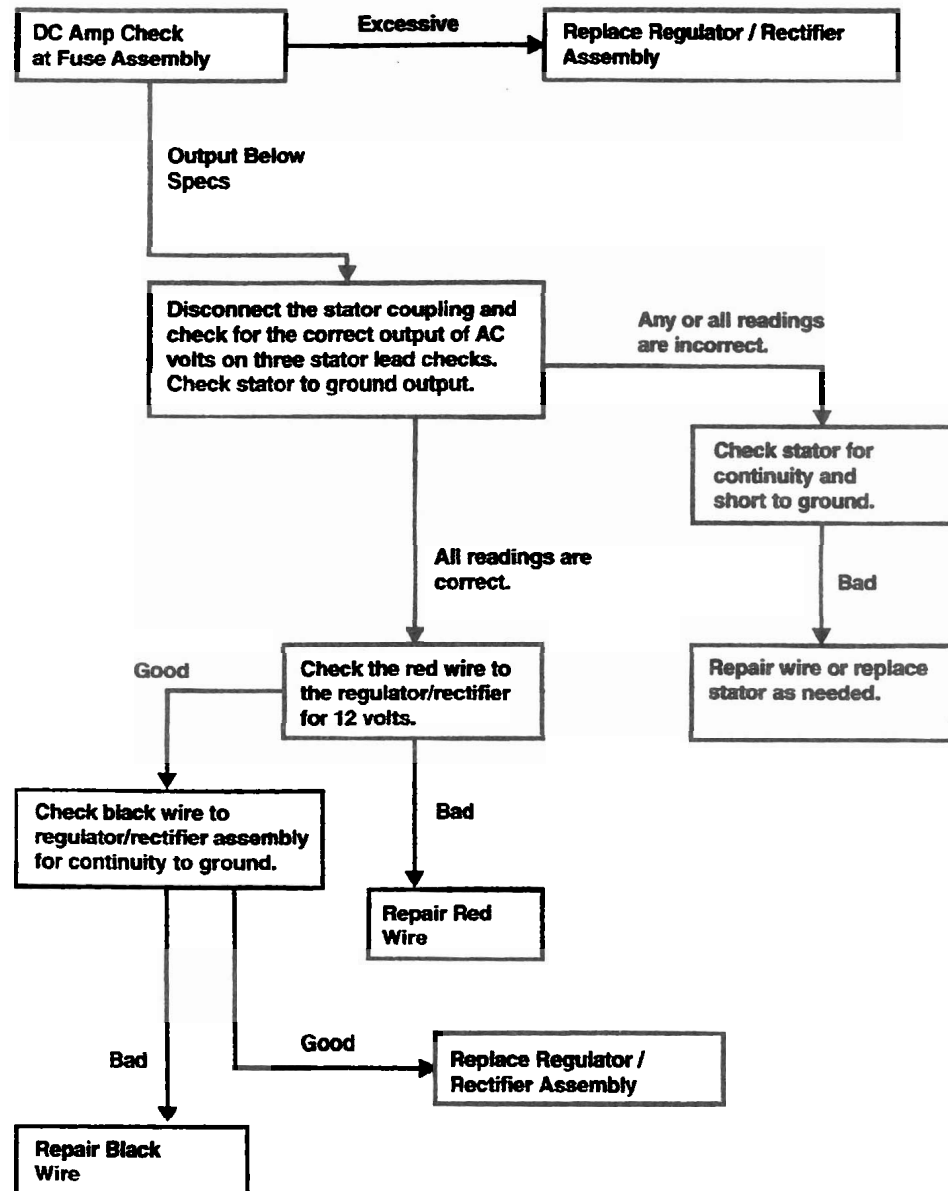
EXCESSIVE CHARGING

There is really only one cause for this type of failure, the regulator is not working. It isn't controlling charging output to the battery. Since there is no repair of this part, replace it.

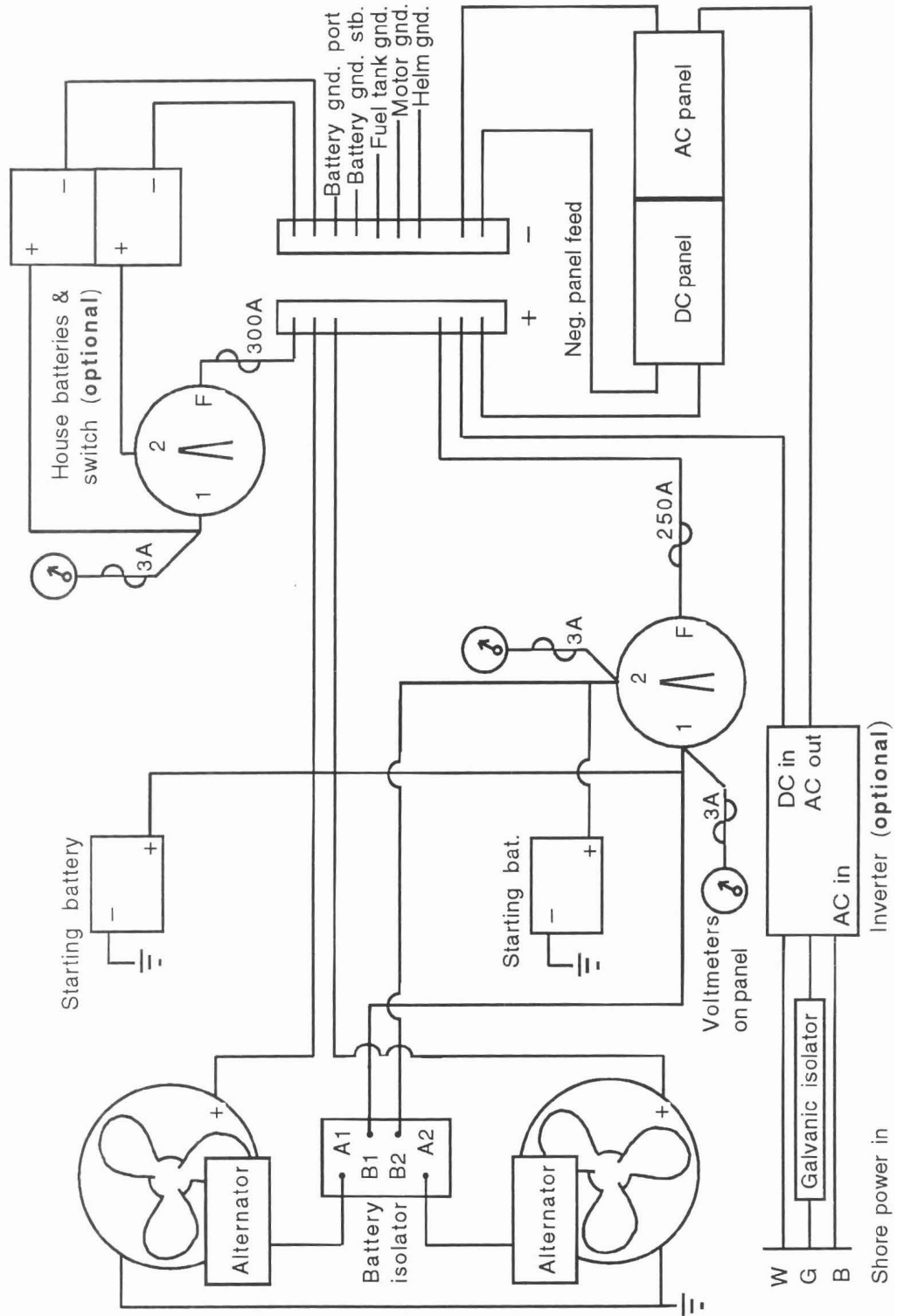
UNDERCHARGING

If there is an undercharge condition after running the DC amperage check at the fuse assembly, then disconnect the stator coupling from the harness and perform AC voltage checks between the three stator leads. Check between two stator leads at a time. There are three volt checks done to cover all possible combinations.

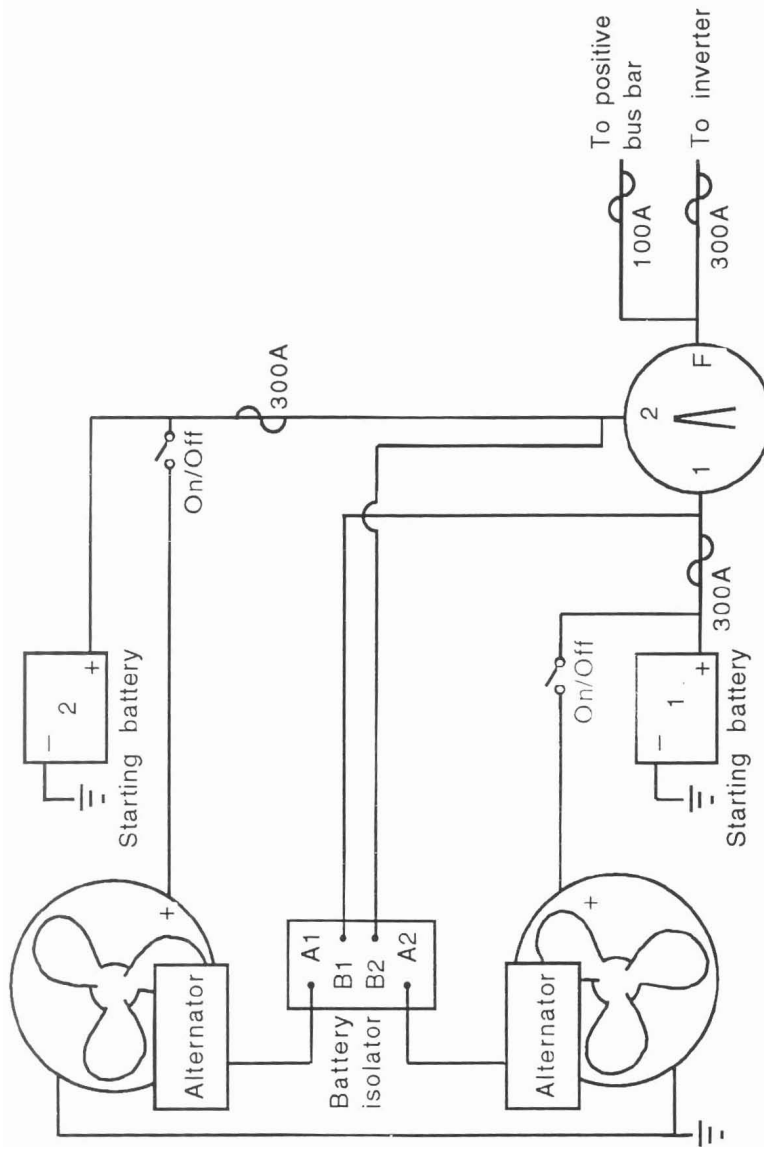
CHARGING SYSTEM CHECKS



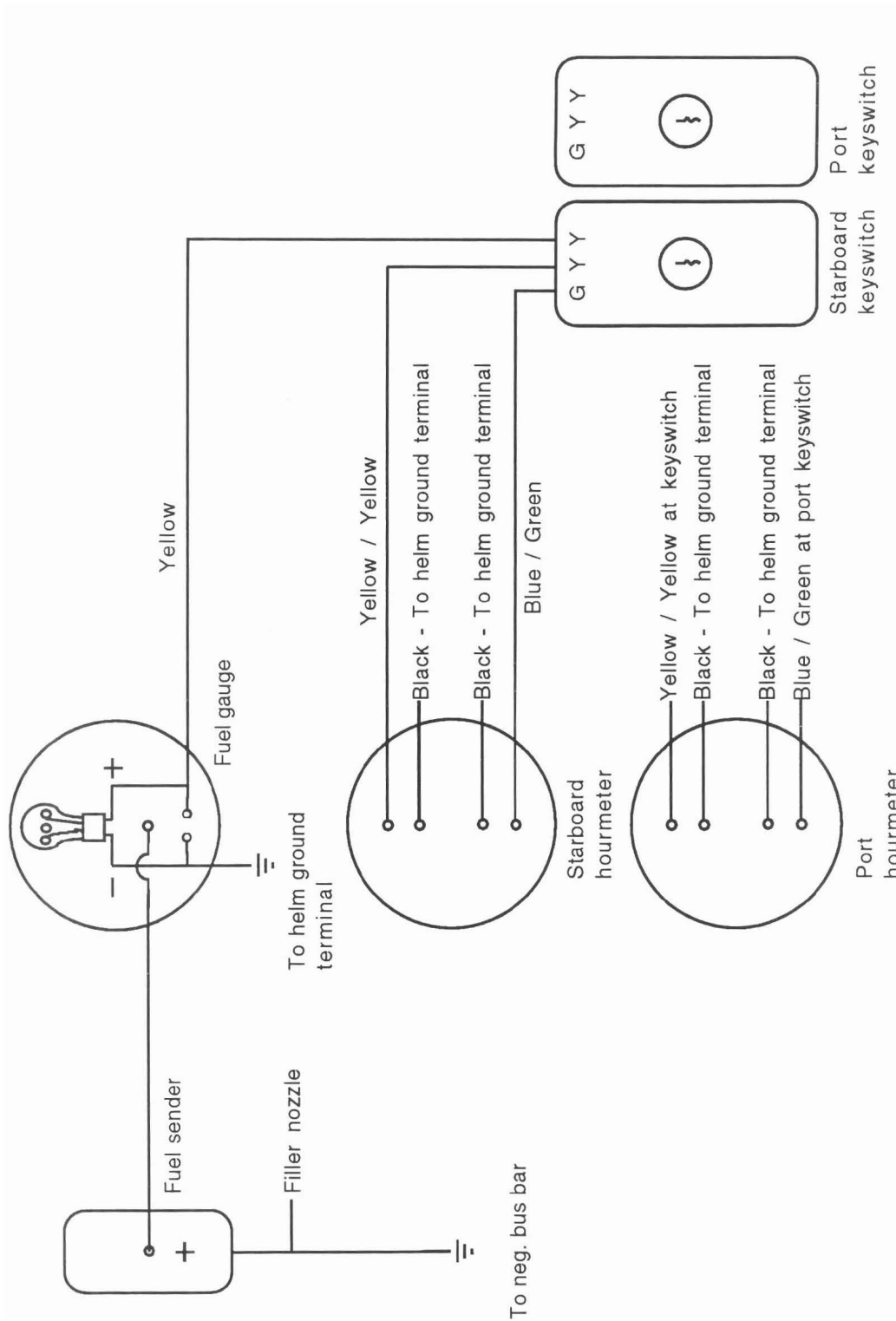
Electrical wiring – outboards



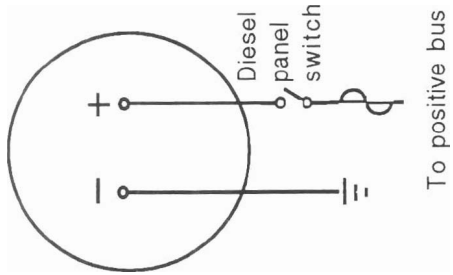
Electrical wiring – Diesels



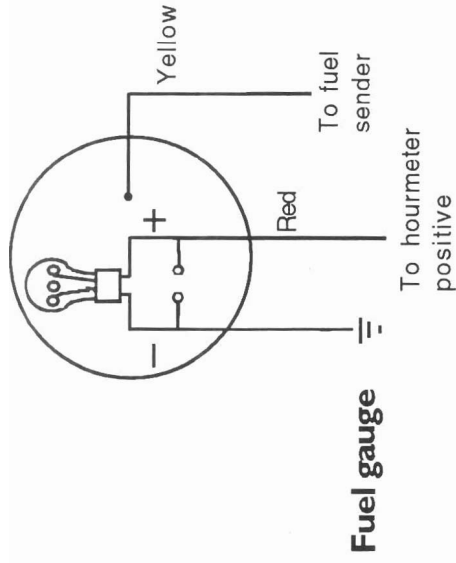
Electrical wiring – outboard controls & gauges



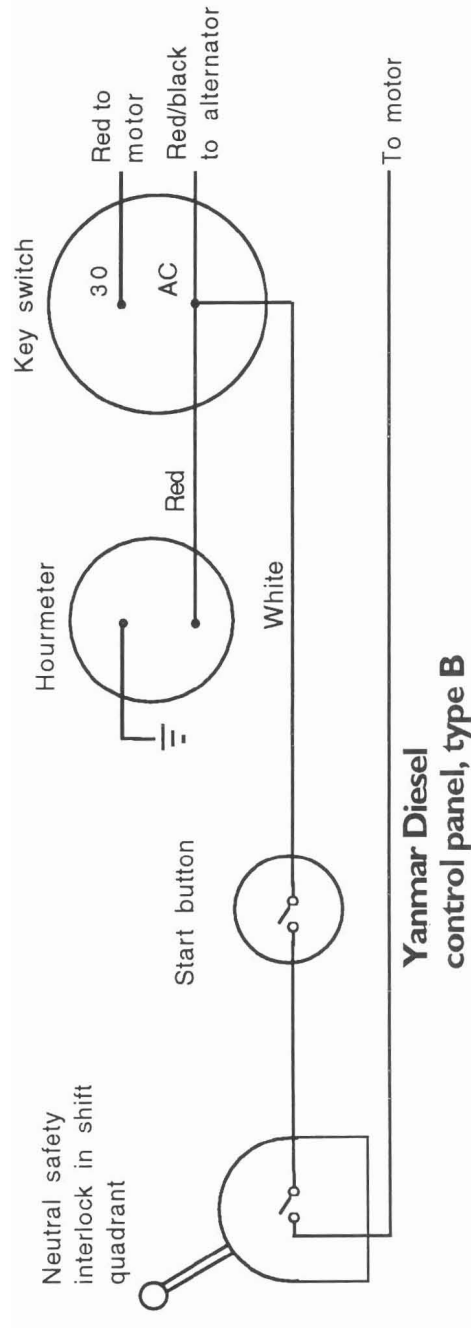
Electrical wiring – Diesel controls & gauges



**Blower switch
(Diesel only)**

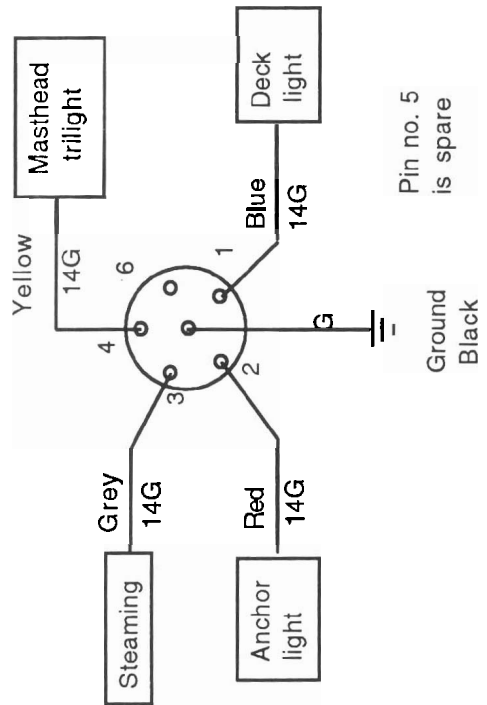


Fuel gauge

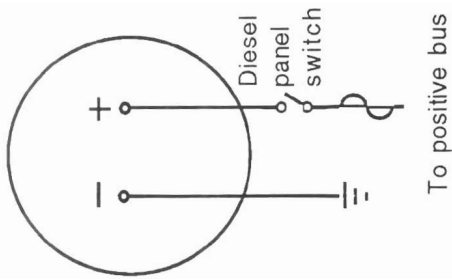


**Yanmar Diesel
control panel, type B**

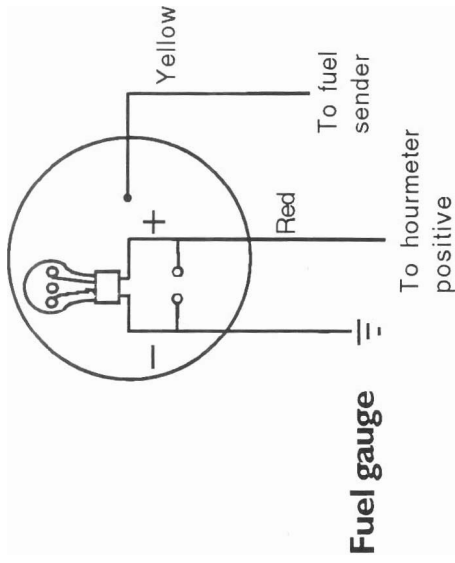
Electrical wiring – mast



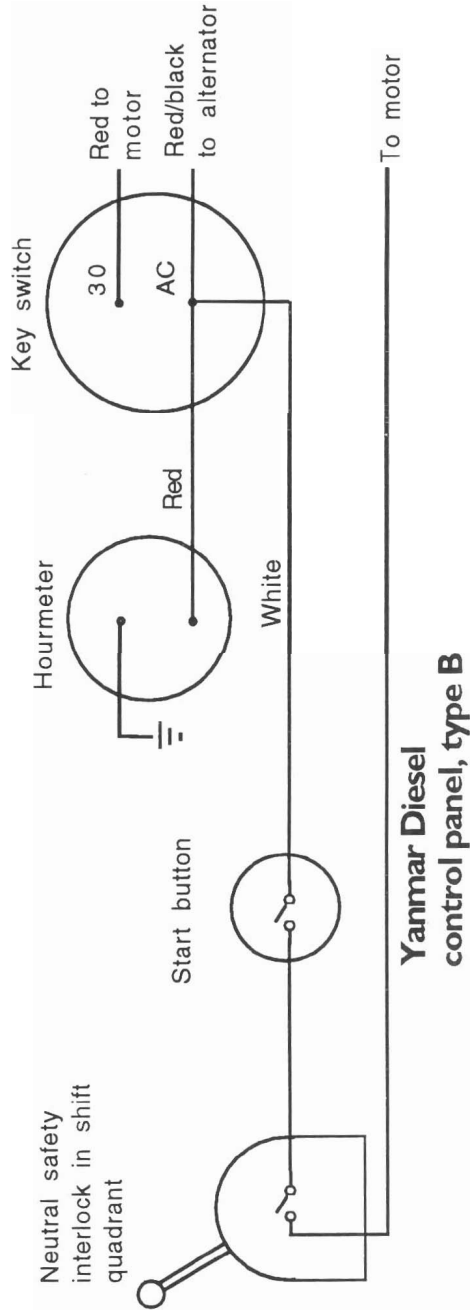
Electrical wiring – Diesel controls & gauges



**Blower switch
(Diesel only)**

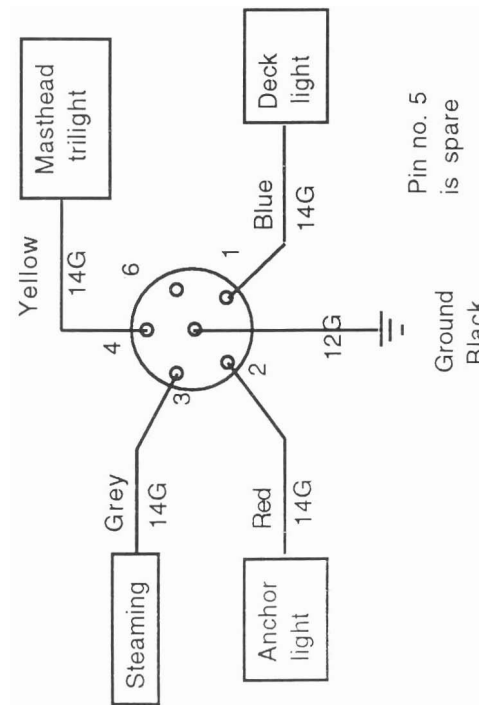


Fuel gauge

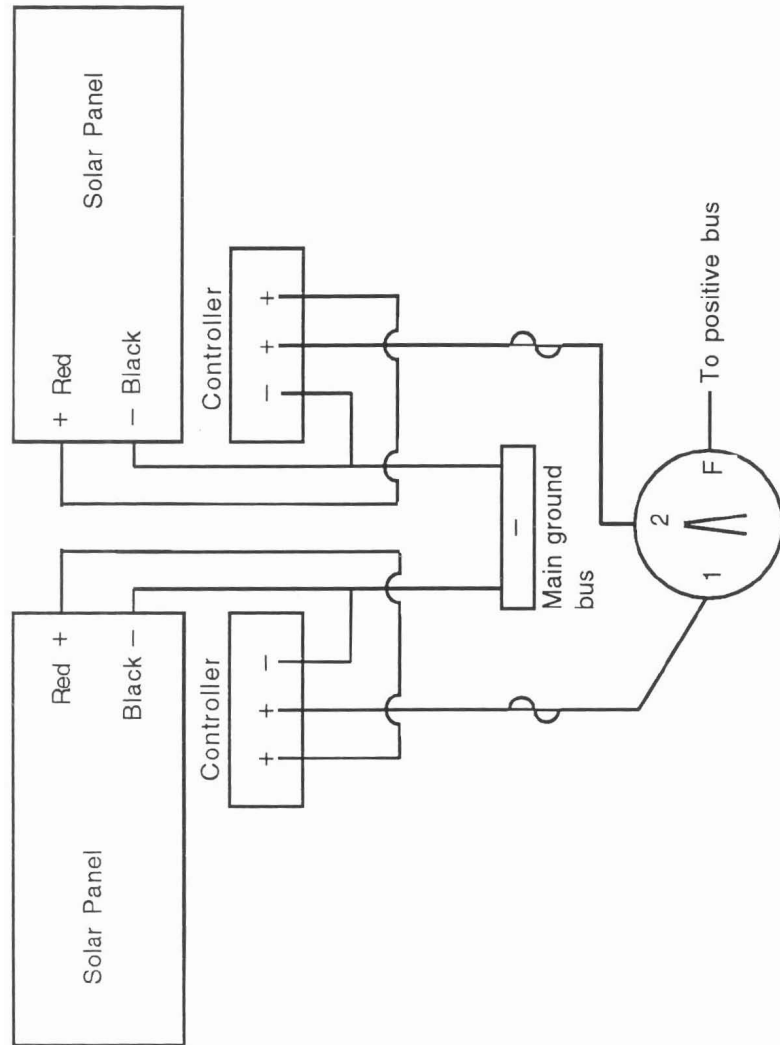


**Yanmar Diesel
control panel, type B**

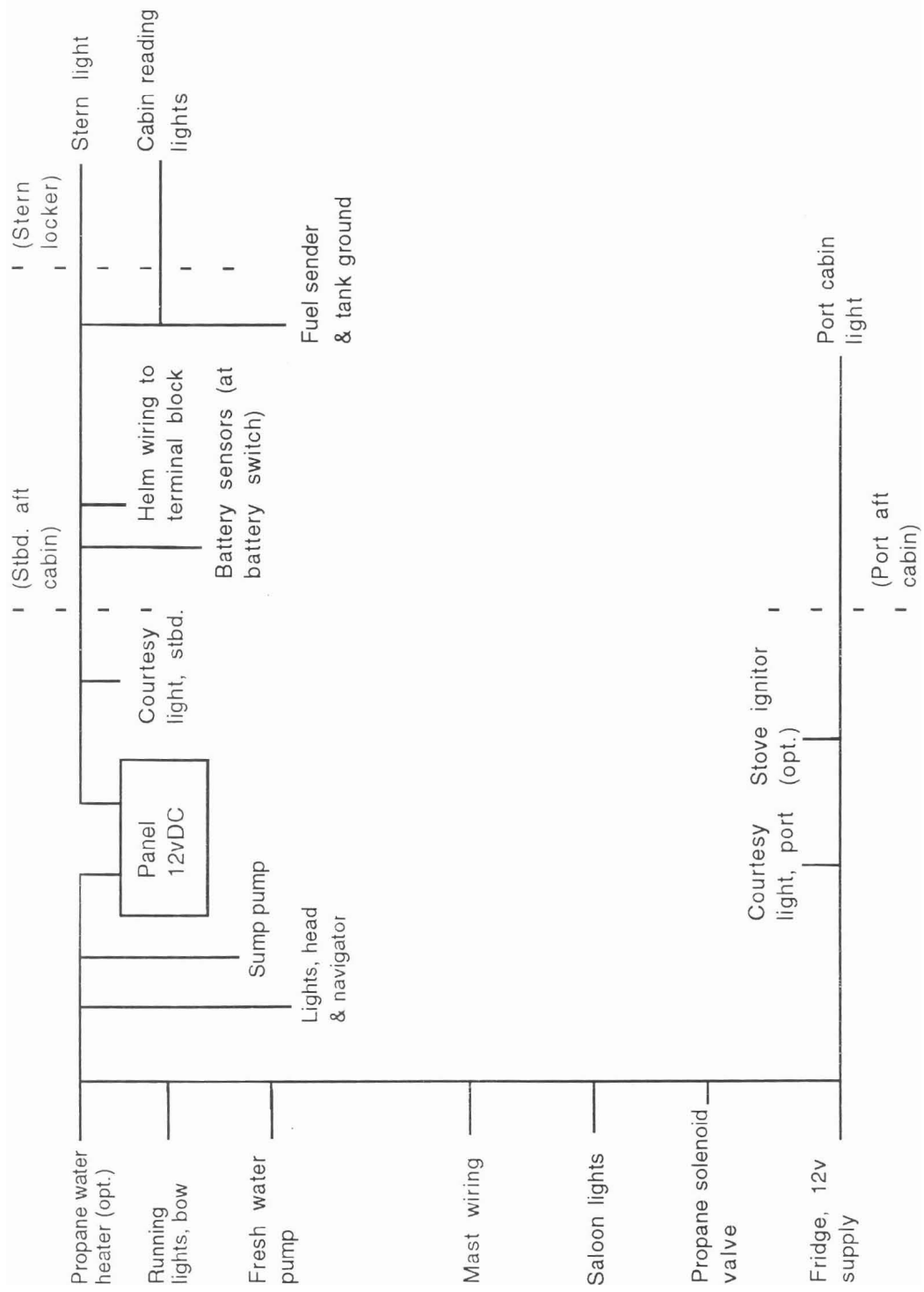
Electrical wiring – mast



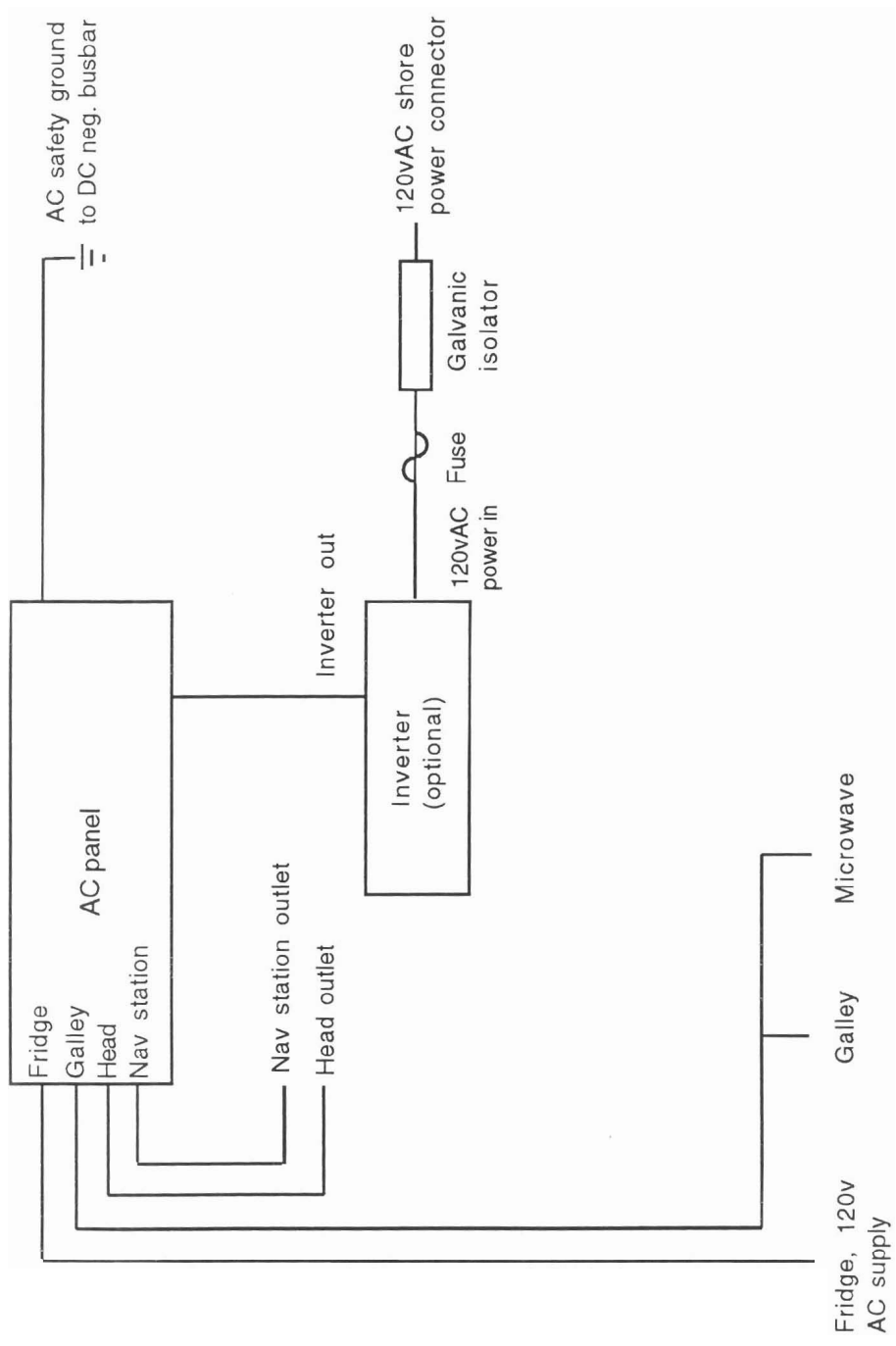
Electrical wiring – solar panels



Electrical wiring – 12vDC harness layout



Electrical wiring – 120vAC harness layout



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Colophon

This manual has been set using Gill Sans for the headings and Janson Text for the body. It was written, with the patient and generous help of many at PDQ Yachts in Whitby and Annapolis, by:

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