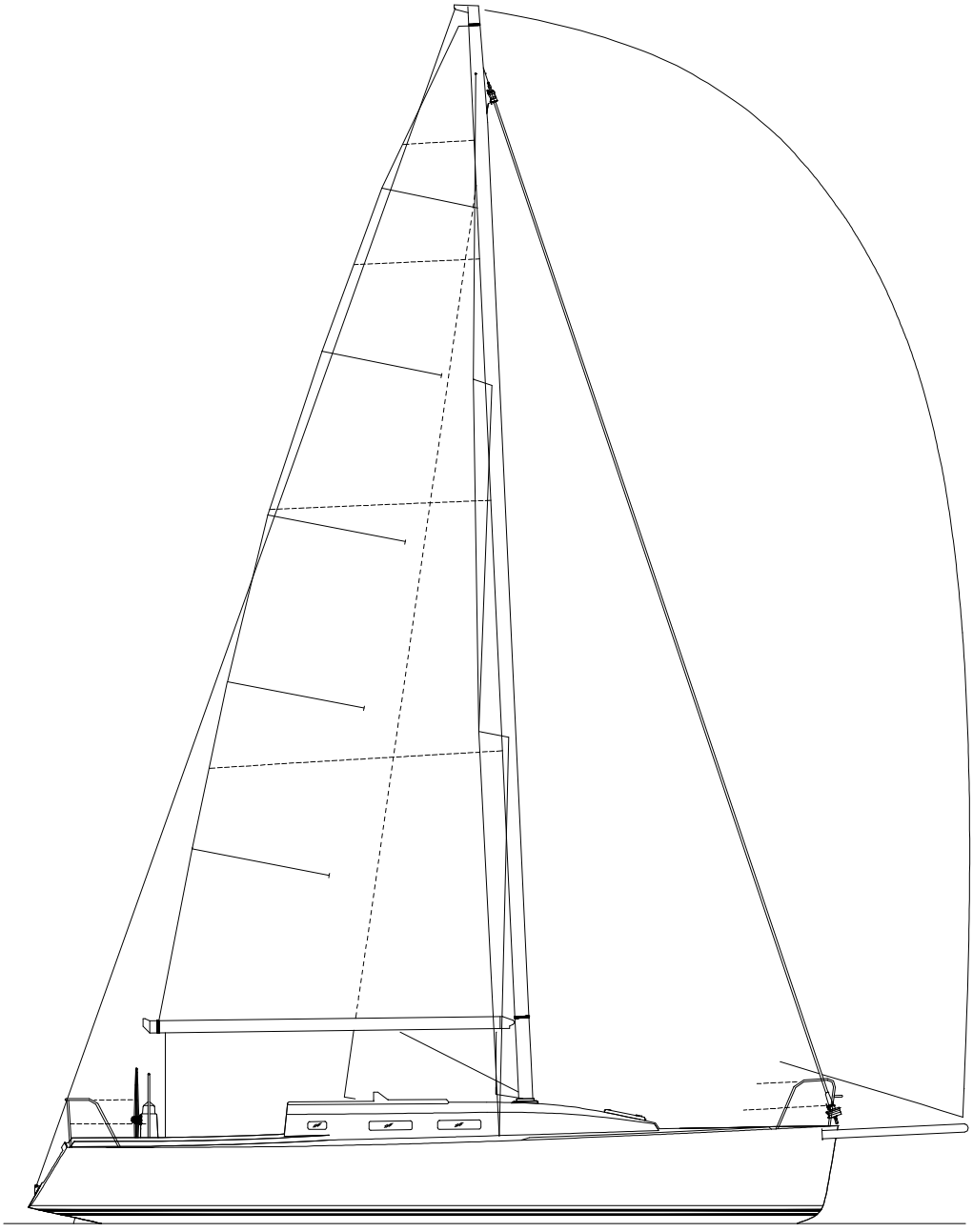
MURRAY
YACHT
SALES

J/109 Owner Guide



Yacht Name:……..

Owner Name:……

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Introduction

WELCOME ABOARD and welcome to the J/Boats family of owners. Your boat is designed and engineered to be the strongest, best performing, easiest-to-use, and most comfortable sailing boat of its type.

Sailing involves risk, most of which can be minimized with advance planning and proper seamanship. The J/109 owner should become proficient in all aspects of handling the vessel under sail and power, and be well versed with emergency procedures before undertaking any offshore passage. The owner is further responsible for any required state registration or federal documentation, accident reporting, outfitting the vessel with proper safety equipment, and the safe operation of the vessel. J/Boats is happy to refer the owner to Boating Safety Courses or other seminars available.

This guide is prepared to help owners understand proper rigging, tuning, and operation of the J/109. Please be sure to complete the enclosed warranty card and mail to TPI Composites, Inc.

This guide is furnished for your benefit, but shall in no way be construed as any sort of warranty or contract, express or implied, creating any obligation on the part of J/Boats, Inc., with respect to any fact or facts or any advice or opinions contained herein. The sole and exclusive warranty of the product is the TPI Composites, Inc. Warranty described in the appendix hereto and on the Warranty Card furnished with the yacht. J/BOATS, INC. HEREBY DISCLAIMS ANY AND ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY OF MERCHANTABILITY.

Specifications

LOA	35.25'
LWL	30.50'
Beam	11.50'
Draft	7.0' (std.), or 5.75' (opt.)
Ballast	3,900 lb. (std.), 4,300 lb. (opt.)
Ballast Type	Cast lead strengthened with antimony
Displacement (std boat)	10,900 lbs.
100% Sail Area	644 sq ft
I	46.50'
ISP	49.60’
J	13.30'
P	43.25'
E	15.50'
Headstay Pin to Pin Length	48.23’ (14700 mm)
Recommended Step Location	Center mast step slot around standard bolt location
Engine	Yanmar® 27HP 3GM30SD (3-cylinder Sail Drive)
Fuel Capacity	23 US gallons
Engine Alternator	Balmar 100 amp
Battery Capacity	210 amp hours (add'l 105 amp optional)
Battery Type	AGM Glass Mat Batteries
Water Capacity	35 US gallons (std.) plus 35 gal. (opt.)
Interior Cabin Headroom	6.15’ (6’2”)
Limit of Positive Stability	124 degrees
LPG Capacity	(1) 10 lb. Bottle
Hull & Deck Core Material	Baltek® AL-600 CK-57 End-Grained Balsa
Hull & Deck Molding Process	SCRIMP® Resin Infusion
Hull Blister Warranty	10 Years: Owner Transferable
Mast Height Above Water	53.50' (not including masthead instruments)
Displacement/Length Ratio	165
Sail-Area/Displacement Ratio	21
ISO Stability & Bouyancy (CE Mark)	Category A
Recommended PHRF Rating	72

Important Contacts

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Service: 401-247-1050
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Email: custserv@tpicomp.com

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Alimar, Inc.
116 Tupelo St.
Bristol, RI 02809
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Fax: 401-254-6150
Email: alimar94@aol.com

Spars/Rigging:
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3901 Pine Grove Circle
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Fax: 704-597-0961
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Canvas:
Thurston Sails (Neil Thurston)
Tupelo Street
Bristol, RI 02809
Phone: 401-254-0970
Fax: 401-253-7830

Commissioning Checklist

Pre-Launch

___ Read equipment owner manuals
___ Pre-rig mast and check installation of:

- halyards
- blocks
- electronics
- shrouds
- spreader chafe guards
- lifeline pins

___ Pre-rig boom
___ Bottom painted or touched up
___ Check propeller/zinc
___ De-winterize engine and check status of:

- engine oil/ filter
- coolant level
- transmission fluid level
- water intakes/filter
- fuel lines/filter

___ Check battery charge
___ Align prop vertically & mark shaft
___ Check all hose clamps, tighten as required
___ Close all seacocks

Loose Gear

___ Fenders and lines
___ Dock lines
___ Winch handles
___ Ignition keys
___ Bilge pump handles
___ Mast wedges/Spartite lubed
___ Double-check sling locations and mark

Launch

___ Check for leaks
___ Check seacocks
___ Check engine seal for leaks

Engine Start

___ Read engine owner's manual
___ Align engine and shaft
___ Start engine
___ Check exhaust for cooling water flow
___ Check oil press., water temp., charging gauges
___ Check transmission- forward/reverse
___ Check transmission leg seal

Step Mast

___ Install pre-molded Spartite wedge onto mast butt
___ Locate table and mast step wood trim pieces
___ Hoist spar and lower into boat
___ As mast butt lowers into interior, slide on wooden table trim and mast step trim pieces.
___ IMPORTANT!! Attach tie-rod from forward side of mast to padeye on under side of deck and tighten.
___ Attach furler to stemhead fitting
___ Attach hydraulic cylinder to backstay and SS extender
___ Attach all shrouds and hand tighten
___ Run a bead of clear silicone around mast collar at mast junction and collar junction.
___ Run and connect mast junction box wires

Rigging

___ Install boom
___ Lead all halyards to stoppers on cabin top
___ Rig reef lines
___ Install and connect boom vang
___ Rough tune spar per tuning guide

Systems Check

___ Fill water tank(s)- flush twice to eliminate anti-freeze
___ Check water pressure system, bleed air if necessary
___ Fill and check LPG system
___ Fill fuel tanks
___ Check operation of electrical systems and pumps
___ Check sailing electronics

Trial Sail

___ Raise and lower sails to check for fit
___ Monitor engine performance
___ Check bilge for leaks
___ Check sailing electronics
___ Mark locations in cockpit to install teak foot braces (shipped loose)

Getting Started With Your J/109

Generally, your dealer or commissioning yard will help you prepare your boat before launching. And in most instances they will undertake the entire commissioning job. They are experts in the field and are capable of completing most commissioning tasks.

Before Proceeding

Before you begin to assemble your new boat you should become familiar with the different sail control systems and associated hardware. All running rigging and loose deck hardware items are shipped from the factory in parts boxes complete with part inventory sheets. To help you properly install these items please refer to the rigging and hardware sections and diagrams in this guide.

The Commissioning Checklist: will help you double check that the J/109 is assembled properly and all systems and rigging are functioning properly. If a boatyard other than an authorized J/Boat dealer is performing the work, review this list with them to establish what needs to be done and by whom.

Topsides: wash off all dirt and grime accumulated from delivery. Use only non-abrasive cleansers on the gelcoat. Then apply a coat of high quality car or boat wax or use a synthetic poly-based coating. Either finish will prolong the life and sheen of the gelcoat.

Bottom: preparation is critical to long-lasting enjoyment. To ensure a professional finish, carefully review the paint manufacturer's recommendations for preparing the bottom and have your dealer roll it or spray it on. Be sure that there are a MINIMUM of 4 coats of epoxy primer covering the keel and rudder prior to final coating of bottom paint.

Chainplates: are machined of polished stainless steel. Each fitting is mounted to the deck and attached to a tie-rod that anchors directly into the structural grid of the boat in the main salon. These fittings are pre-tensioned at the factory. No changes or adjustments are to be made to these without specific authorization from TPI Composites. The backstay chainplate through-bolts directly to a reinforced area of the transom.

Stemhead Fitting: is a custom polished stainless fabrication with integrated genoa tack loop. The stem head fitting is designed to withstand all headstay loads, and is attached with bolts directly to the stem of the hull.

Mast Collar: is a cast aluminum fitting and incorporates stainless pins for halyard and reefing line turning blocks. A custom molded Spartite wedge fits between the mast and this collar. This wedge should be installed into the boat with silicone at the interface with the mast collar and with the mast. The rubber mast boot then fits over the flange of the collar to help seal the interior.

Foredeck Toe Rail: is molded into the deck on the J109 and extends from outboard of the mast forward to the bow pulpit.

Stanchions & Pulpits: are designed for proper offshore safety as well as to facilitate access to the boat. Included are two lifeline gates to port and starboard and a stern boarding gate. The bow pulpit is properly braced, houses the bow running lights under the mid-height bar across the front end. The stern push-pit is standard with an aft gate and stern running light. This is a convenient place to mount a man overboard module, outboard bracket, etc.. All stanchions are 1" diameter tapered stainless steel and are secured into their custom designed bases with machine set screws.

Lifelines: are SS wire in accordance with ORC safety regulations and are fastened at either end by stainless forks and turnbuckles. Each lifeline is clearly marked from the factory and is intended to fit a specific portion of the lifeline/stanchion system. The installation follows:

- Insert all lifeline gates/stanchions into the sockets provided along the edge of the deck. Secure each stanchion in place by tightening the two set screws in each base. We recommend that you dip the screws in blue Loctite or sealant before securing, so they don't work themselves loose over time.

- Install all lifelines without tightening the turnbuckles. Remove the eyes at the ends of the lifelines and thread them through in the stanchions. If the boat is equipped with the optional lifeline pads, thread the lifeline through these prior to attaching to stern rail. The longer lifeline pad will be sized for the upper lifeline and the shorter for the lower lifeline.

- Finish off the job by tightening the turnbuckles, adjusting the lifeline gate pendants for the proper length, and taping off the turnbuckle "split rings" (or cotter pins) for a finished appearance.

- ***Aft Lifeline Tip:*** To protect the hydraulic cylinder handle from the wire lifelines, get a piece of snap-on plastic lifeline coating from West Marine and cut two small 4" pieces and install one on the upper and the other on the lower lifeline centered about the handle.

Skylight Ventilation Hatches: are made of extruded anodized aluminum frames and scratch-resistant acrylic covers. Each hatch comes equipped with a ventilation position and 180 degree articulation and screens.

Ports and Opening Ports: are of painted aluminum frames with bronze colored acrylic and arrive "ready-to-use". The opening ports are specifically engineered and located to maximize cross-flow ventilation screens are also provided for each of the opening ports.

DO NOT PERMIT ACETONE OR OTHER HARSH CLEANSERS TO GET ON PORTS, OR HATCHES AS THEY MAY DAMAGE THE FINISH & CLARITY OF SOME DECK HARDWARE.

Deckhouse Handrails: Stainless handrails are standard for easy maintenance and ownership.

Winches: Standard winches are aluminum self-tailing models from Harken Yacht Equipment. The location of these winches facilitates sailing with one or two aboard. Each is geared to match the load requirements of the specific task.

J/109 Steering System

The steering system is carefully engineered to provide finger-tip control. This is achieved by utilizing Edson rudder bearings and steering system components. The pedestal is custom designed and incorporates molded foot-rests, a Ritchie compass and additional instrumentation space on the stainless wheel guard.

Wheel: is a 54" Edson "Diamond" series aluminum wheel with a leather cover. The wheel is mounted to the pedestal by through-bolting the hub to the stainless hub bracket. When installing, first center the rudder, then install the wheel with the name plate vertical. Then place a mark at the top of the rim or on the vertical spoke as a centerline reference point.

Rudder: is made of unidirectional glass, with two halves bonded together, and a highly reinforced fiberglass shaft that extends to 80% of the depth of the rudder. The rudder is engineered to withstand tremendous shear loads in ocean conditions. The high aspect shape helps reduce the "torque" tendency of most rudders, thereby reducing helmsman and auto-pilot fatigue.

Rudder Stock Stuffing Box: is located at the top of the fiberglass rudder tube beneath the decks. It is a simple design that prevents water from entering the hull. A stainless sleeve bearing surface surrounds the rudder shaft at the point where a rubber seal is forced against it to prevent water from rising up the tube.

Emergency Tiller: is operated by lifting off the access plate (amidships), and placing the base of the tiller over the head of the rudder stock. Rudder is rotated using the T-shaped handlebars. Fit the emergency tiller NOW to see how the system works BEFORE you get caught in a situation where you won't have the time!

J/109 Rigging

The running and standing rigging items supplied with your boat are designed for efficiency. A wealth of racing and cruising experience has gone into the deck layout to make sailing and boat handling safe and easy to handle by a couple and for a racing crew.

The most unique system on your J/109 is the bow sprit system for the asymmetric spinnaker. We believe this system is a major improvement over conventional systems and so let's start by explaining how it works.

- Carbon Fiber Bow Sprit: The carbon fiber bow sprit is custom made by Advanced Composites and is designed to withstand the loads associated with the asymmetric spinnaker without any additional support. The pole consists of a carbon tube finished with two molded end fittings. The forward end fitting has a "U" bolt which serves as the attachment point for the tackline block. The aft end fitting houses all hardware necessary for the adjuster line and shock cord retrieval system.

- Bow Sprit Launching Line: The control line to pull out the bowsprit is designed to be adjusted without leaving the cockpit. The line is dead-ended to the inboard pad eye on the forward most bulkhead in the forepeak. The line then leads through the thru-pole blocks on the aft end fitting of the carbon fiber pole (be sure the "U" bolt on the other end of the pole is up), forward through a block on the outboard padeye on the forepeak bulkhead, then through the stainless handrail in the main salon, through the head, and finally to a cam cleat mounted on the aft side of the cabin top to starboard.

- Harken Headsail Furling: A standard Harken Furler is provided with the boat and requires assembly prior to installing the mast. A complete instruction manual is included with this hardware detailing the procedure. The pin-to-pin headstay length necessary to complete this task for the J/109 is 14700mm or 48'2-7/8".

- Mast: Rigging the J/109 mast is a common procedure, and best handled by a qualified marine rigger. All spreaders, shrouds, and halyards are installed and properly taped and secured. The masthead anchor light and the steaming light are shipped loose with the J/109 Sparcraft mast to prevent damage during shipping. Be sure these and all other mast related electronics and wind indicators are properly wired and installed prior to stepping the mast. After stepping the mast it is VERY IMPORTANT to install the wire fitting from the forward face of the mast in the interior up to the underside of the deck and tighten prior to going sailing. We also recommend that a small cord is tied and taped approx. 24" above each lower spreader between the intermediate shroud and upper shroud. Simply tie this line to each shroud (allowing for some slack) and tape ends over with rigging tape. This prevents the asymmetrical spinnaker (during a take down) from potentially dropping into the V that is formed at the lower spreader between these shrouds.

- Hydraulic Backstay: The J/109 is equipped with an integral hydraulic backstay to help you fine tune your rig and sails for optimum performance. This hydraulic unit is simple to operate, easy to maintain, and highly reliable. The cylinder is affixed at its lower end to a stainless backstay extension rod that attaches to the tang on the transom and at its upper end to the eye at the end of the backstay. In order to make the cylinder fit, you must release the hydraulic valve and pull out the SS shaft and fully extend it.

- Boom: Run the reef lines so the red line (port) is led through the port sheaves and the green line (starboard) is led through the starboard sheaves at both the outboard end and the gooseneck. The starboard reef doubles as the cunningham.

- Boom Vang: The Hall QuikVang is a mechanically operated spring loaded boom vang with a Harken block and tackle purchase system. This vang system allows for quick and easy adjustment and also acts as a boom topping lift. The vang is affixed to the vang plate welded underneath the boom and to the mast at the vang gooseneck located just above the mast collar. See the QuikVang operating instructions for how to adjust the internal spring for best results.

Sail Control Systems

After stepping the mast and connecting the boom, QuikVang, Harken furler, and integral backstay, rig all halyards and the remaining sail control systems.

- **Main Halyard:** exits the mast on the port side, runs through a turning block at the mast collar, through the inboard port organizer block and then aft through the port double stopper (inboard hole) and finally to the halyard winch. The tail end is stored in a supplied line bag to be mounted outboard and forward of the stopper.

- **Jib/Genoa Halyard:** exits the mast to port, leads through the forward mast base block, aft to the outboard sheave on the organizer block, through the outboard stopper hole, and store tail in line bag. (additional jib/genoa halyard option leads to starboard).

- **Spinnaker Halyard:** exits the mast to starboard and leads to the outboard sheave and stopper. (additional spinnaker halyard option leads to port).

- **Mainsheet Traveler:** is a Harken low friction system. The 4:1 purchase system on each side controls a Harken Car mounted on midrange track (see diagram).

- **Outhaul:** is adjusted at the cleat on the underside of the boom and comes pre-assembled.

- **Cunningham:** The cunningham doubles as the starboard reef line. To set it up as a cunningham simply tie a knot at the boom end tail of the reef line. The line leads forward to the sheave at the gooseneck, up to the cunningham block with S.S. hook back down through a bullseye on the mast, down to the mast base block and aft to the inboard stopper.(see diagram). To use the continuous reef system simply run the boom end tail through the clew reef grommet, back down around the boom and tie a bowline.

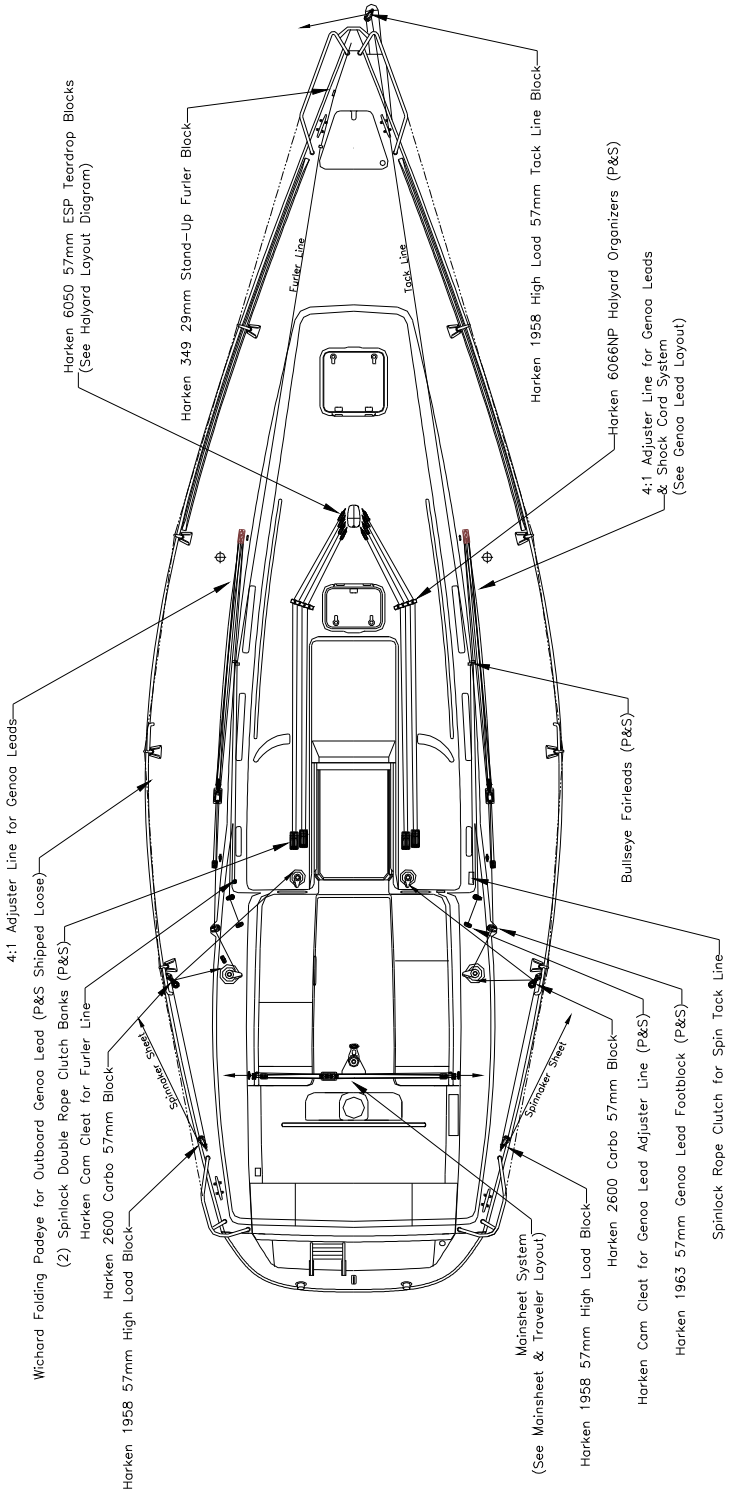
- **Mainsheet:** is a 24:1 system with a 6:1/4:1 set-up (see diagram). The system is designed to allow easy adjustments of the mainsheet. The location of the traveler also facilitates single-handed sailing and adjustments. The fixed centerline cleat base rotates to port and starboard for a proper lead. Be sure to put a "stopper knot" like a figure-eight at the end of the mainsheet.

- **Jib/Genoa Sheet:** attaches to the roller-furler headsail by a simple knot, leads to the jib/genoa block on the track, aft to the turning block on the cockpit coaming and then to the primary winch.

- **Spinnaker Sheets:** lead from the clew of the spinnaker aft outside the lifelines through the spinnaker sheet blocks turning forward to a fairlead block mounted on the padeye along the rail and then into the primary cockpit winches or secondary cabin top winches.

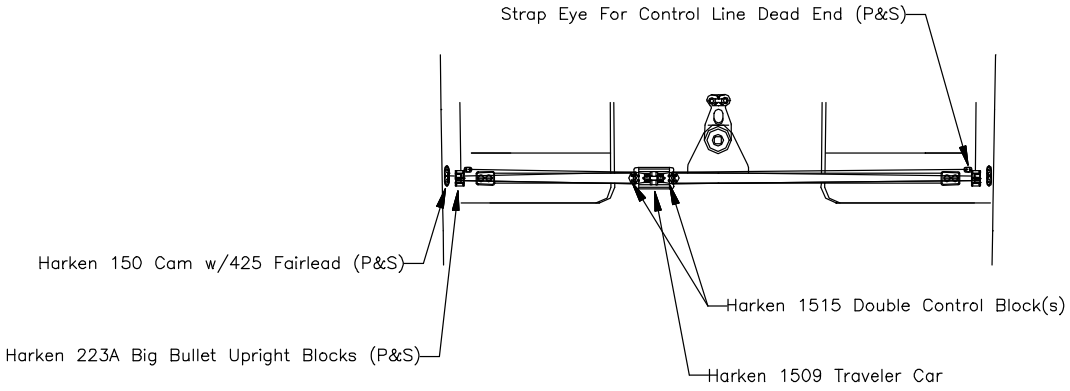
Diagrams, Layouts, & Schematics

Deck Hardware Layout

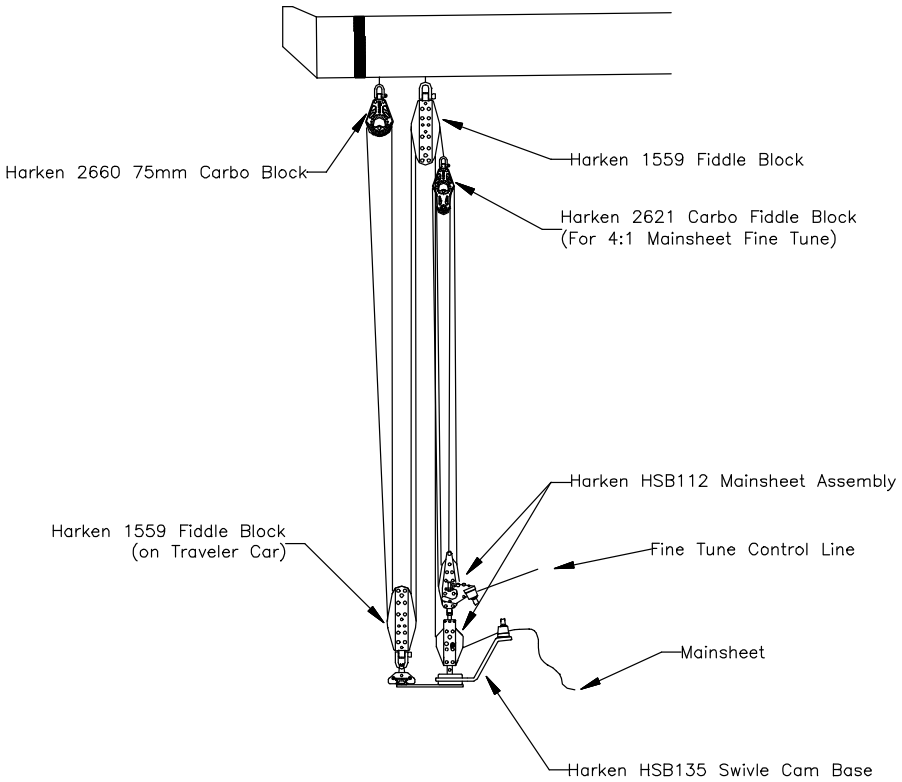


Mainsheet & Traveler Diagram

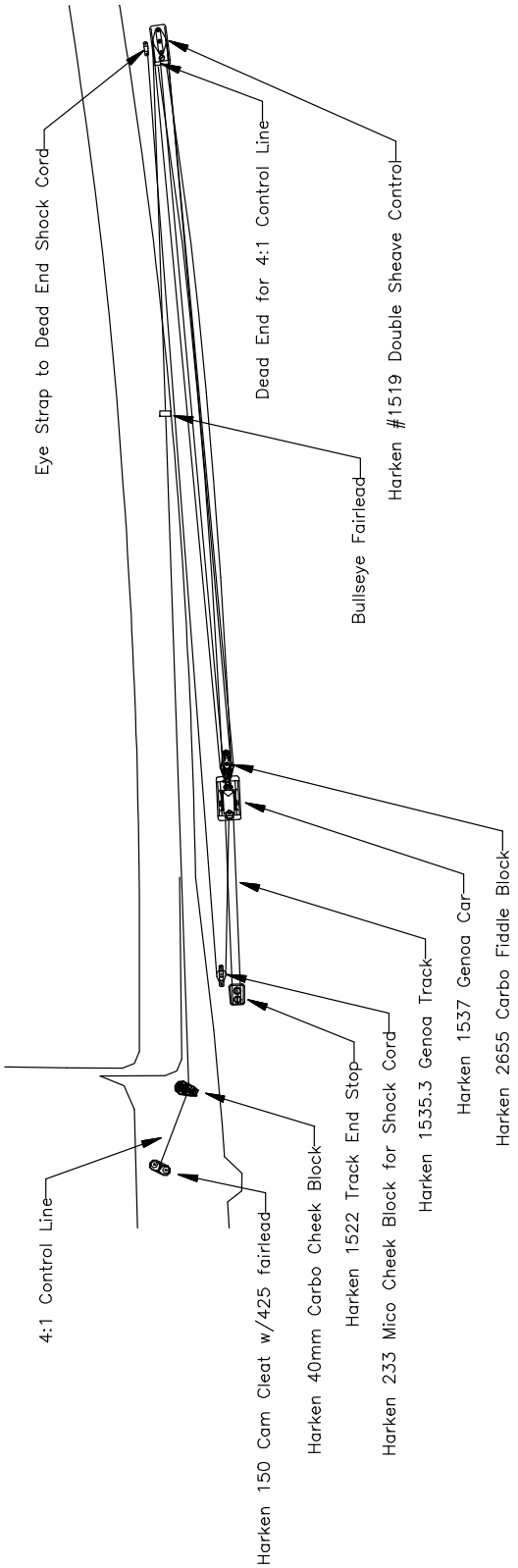
J/109 Traveler Control System



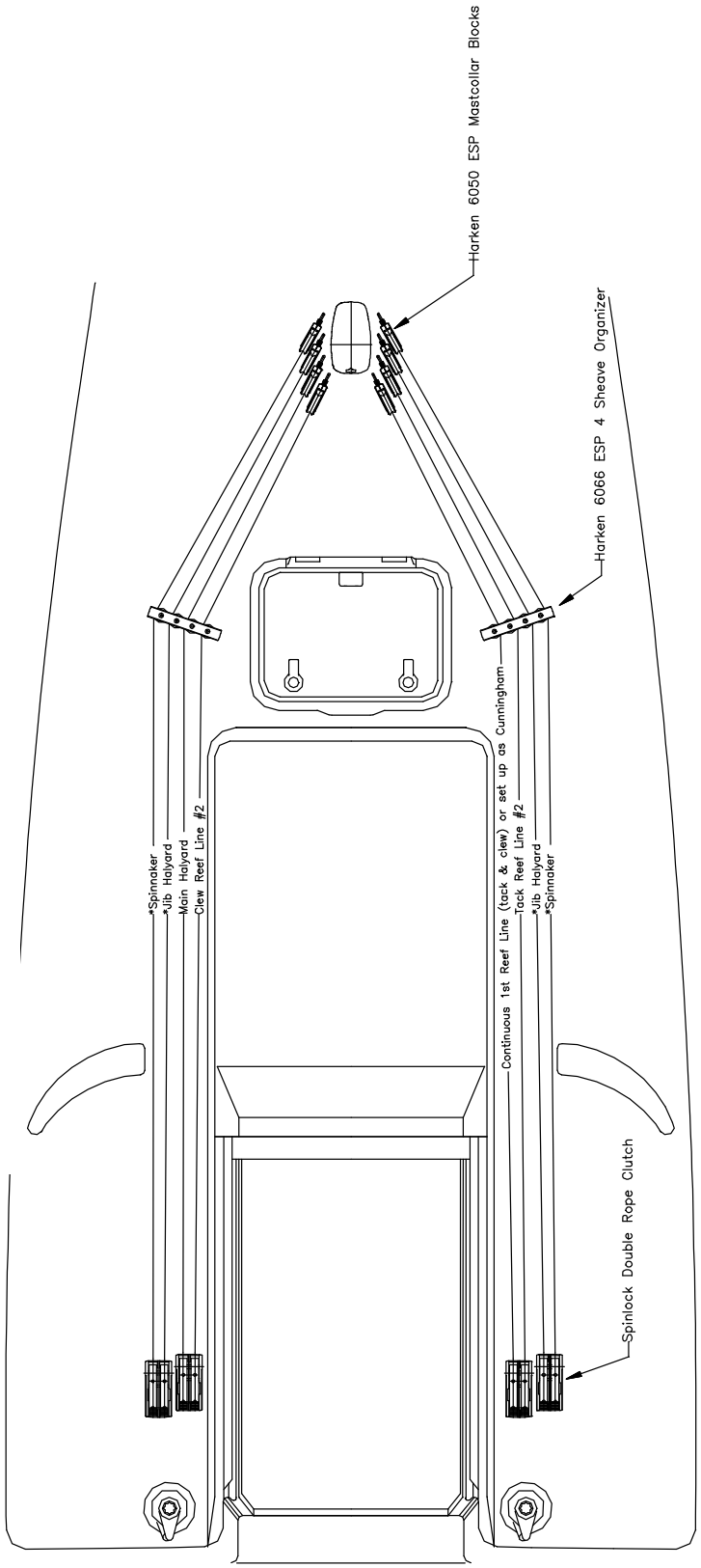
J/109 Mainsheet System



Adjustable Genoa Leads



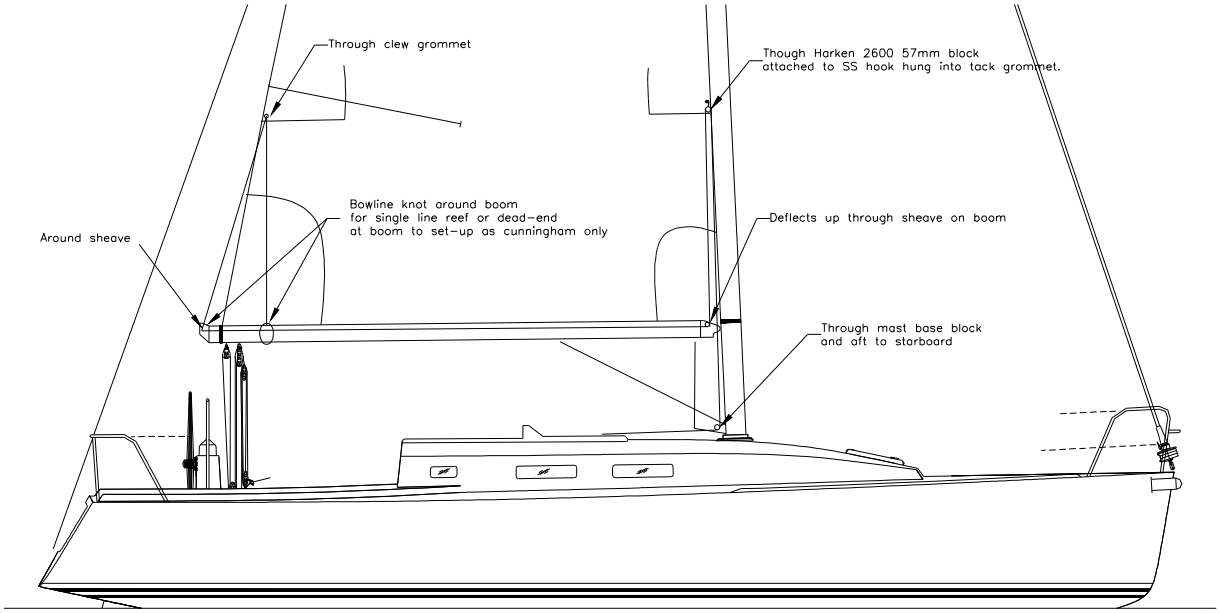
Halyard Layout



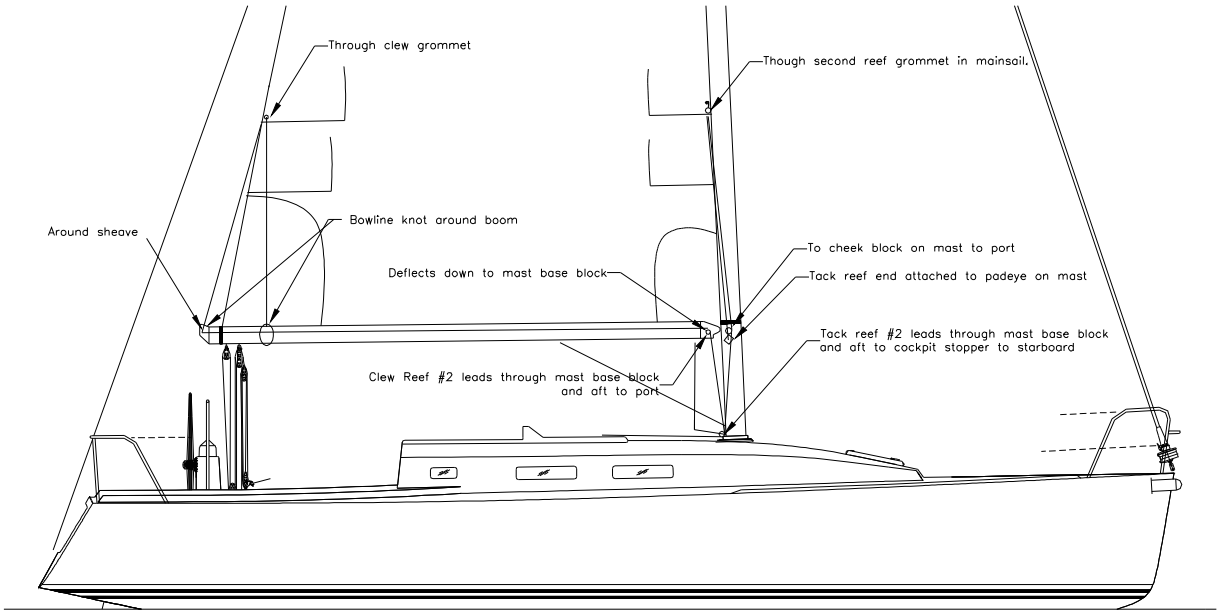
* The J/109 is equipped standard with one jib and one spinnaker halyard. All deck hardware is provided to accommodate a second jib and spinnaker halyard as standard. The mast is also equipped for the second jib and spinnaker halyards. It is the owner's discretion as to which side to lead the standard headsail halyards. J/Boats recommends that the standard spinnaker halyard is led to starboard and the standard jib halyard to port.

Reefing System Diagram

J/109 Single Line Reef/Cunningham System

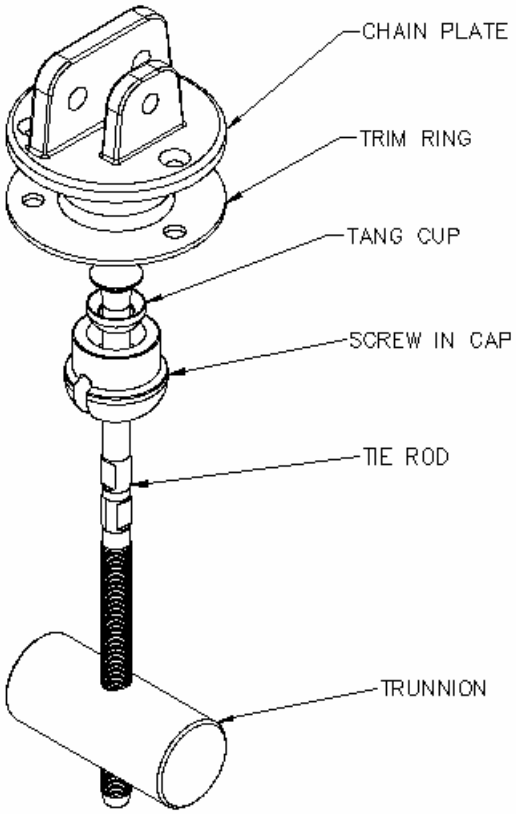


J/109 Second Reef System



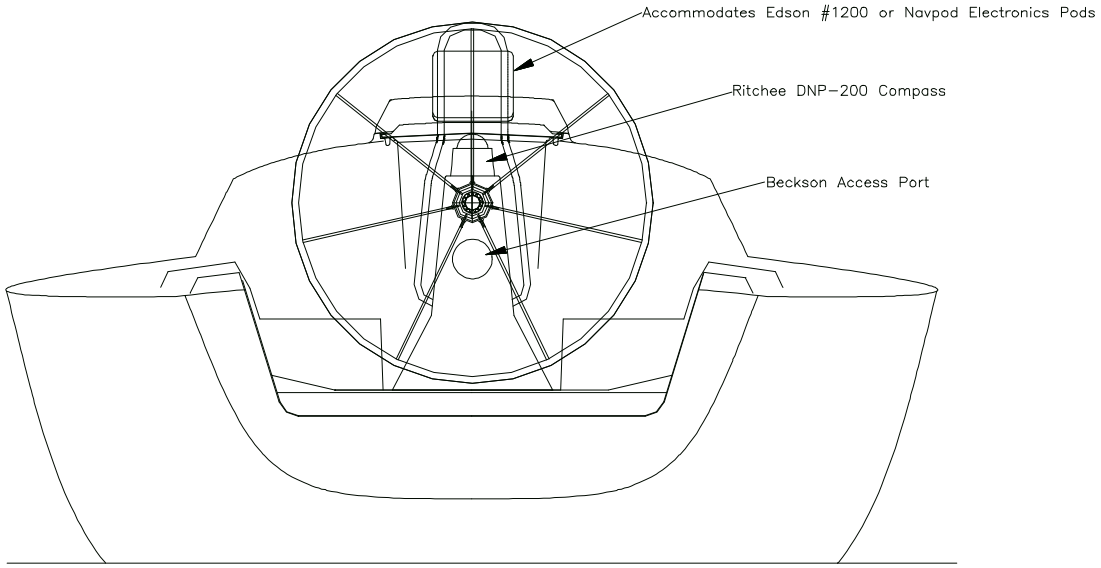
Chainplate Tie-Rod System

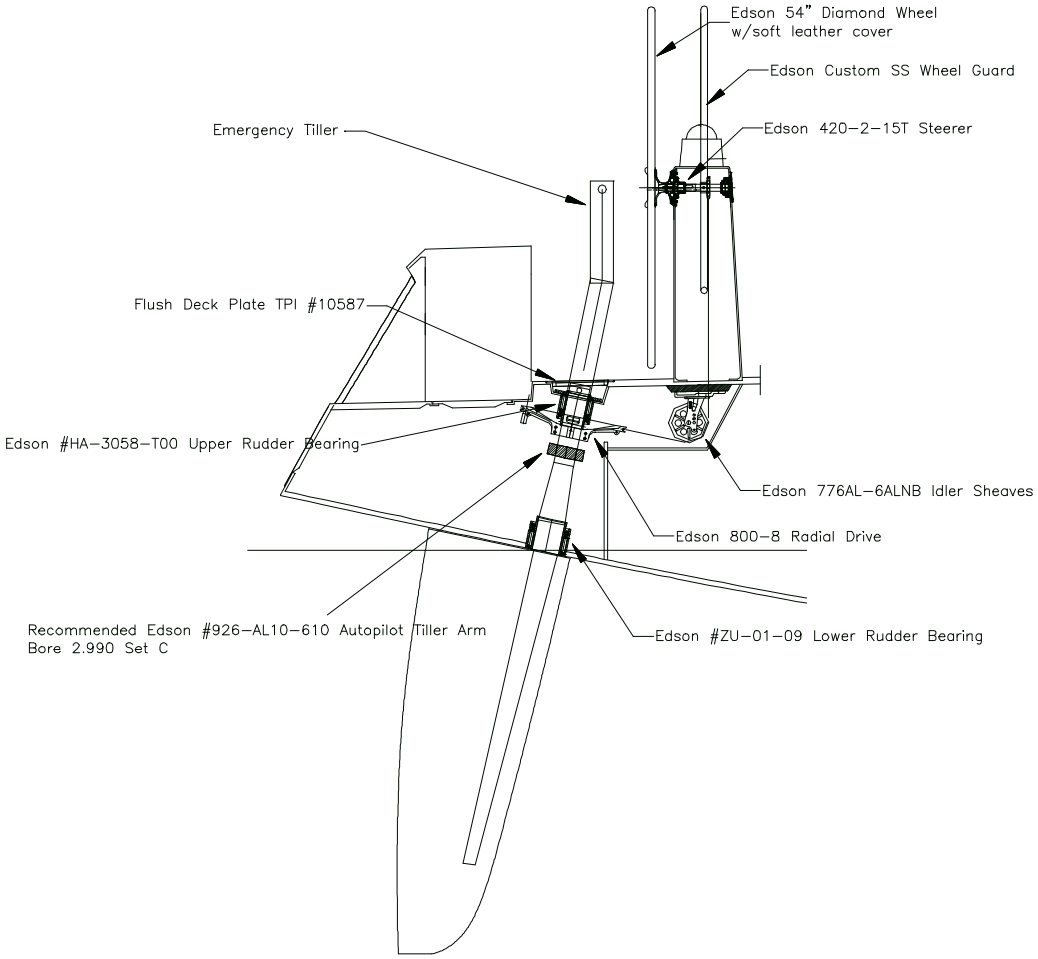
The J/109 Chainplate Tie-Rod system is installed at TPI Composites and shall not be tapered with unless specifically authorized by TPI (Phone 401-247-1050). The tie-rod itself is assembled into the Trunnion using a non-permanent Loctite and brought up to a factory specified torque setting. No additional adjustment should be needed as any further tension may deform or crack the deck. **The Tie Rod is not designed for and shall not be used to adjust rig tension or tuning.**



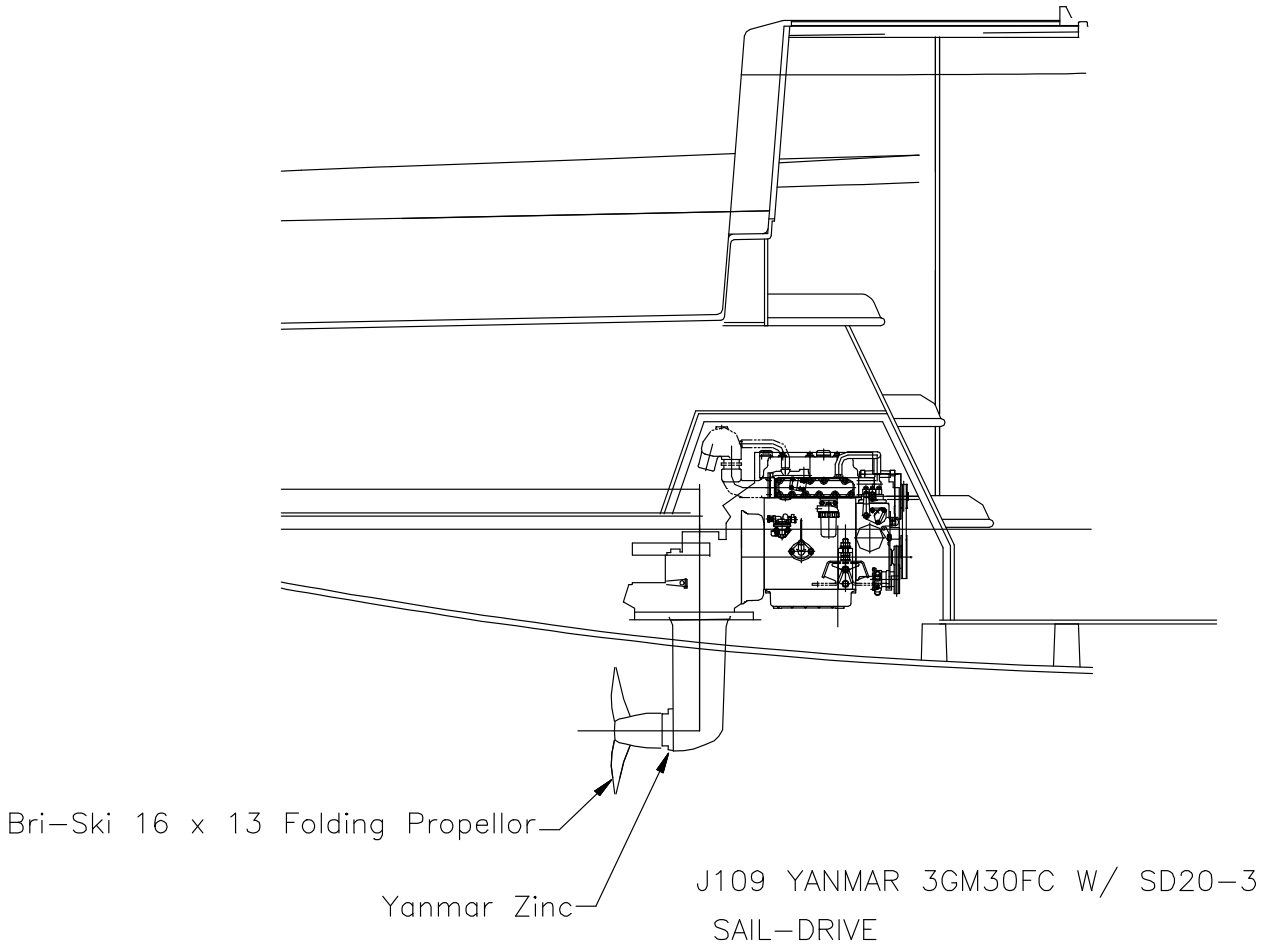
The illustration above is an exploded isometric view of the Tie Rod Assembly. The Tie Rod is not shown at its full length. When assembling the Screw In Cap to Chain Plate the same non-permanent Loctite is to be used.

Steering System

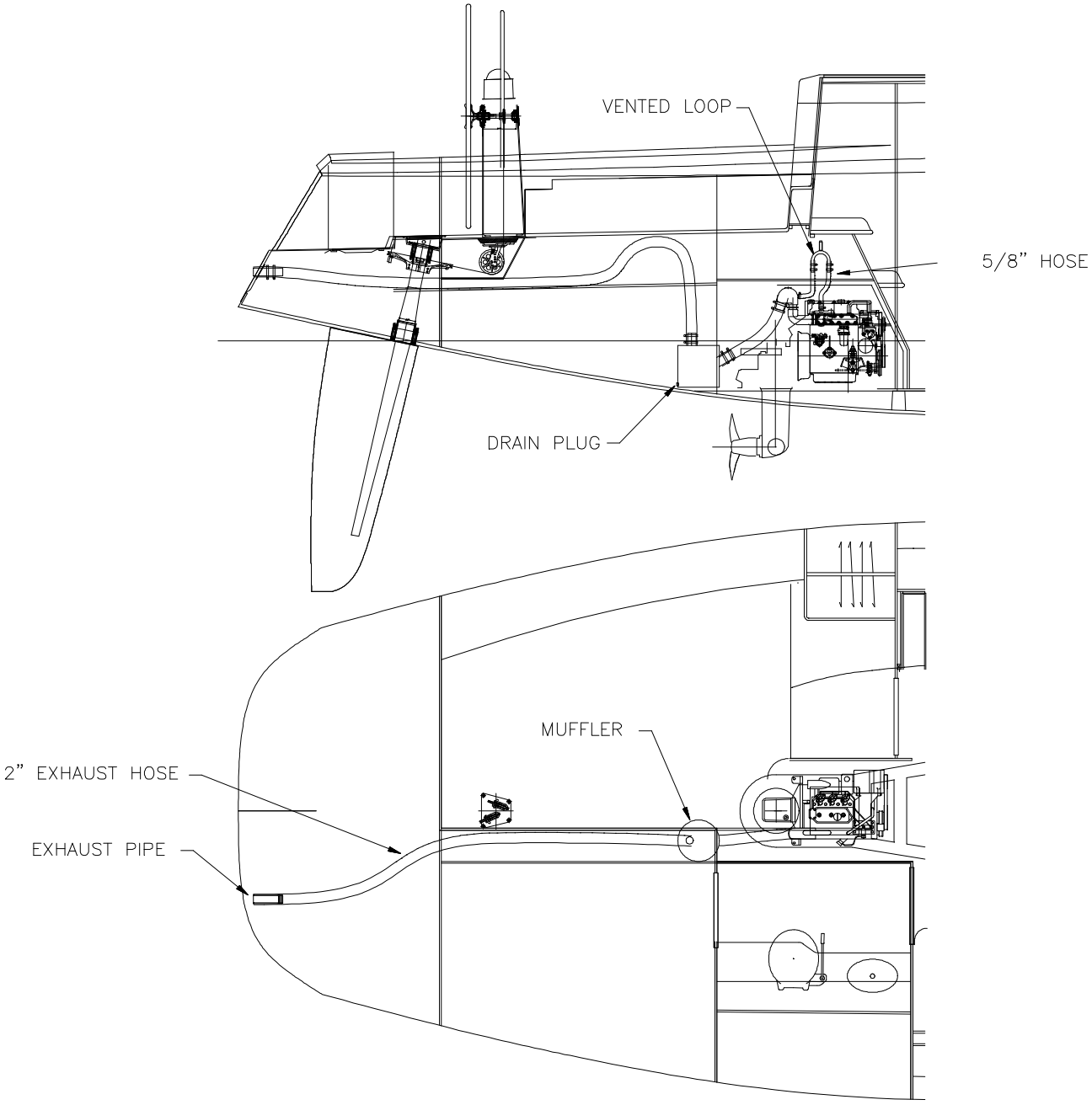




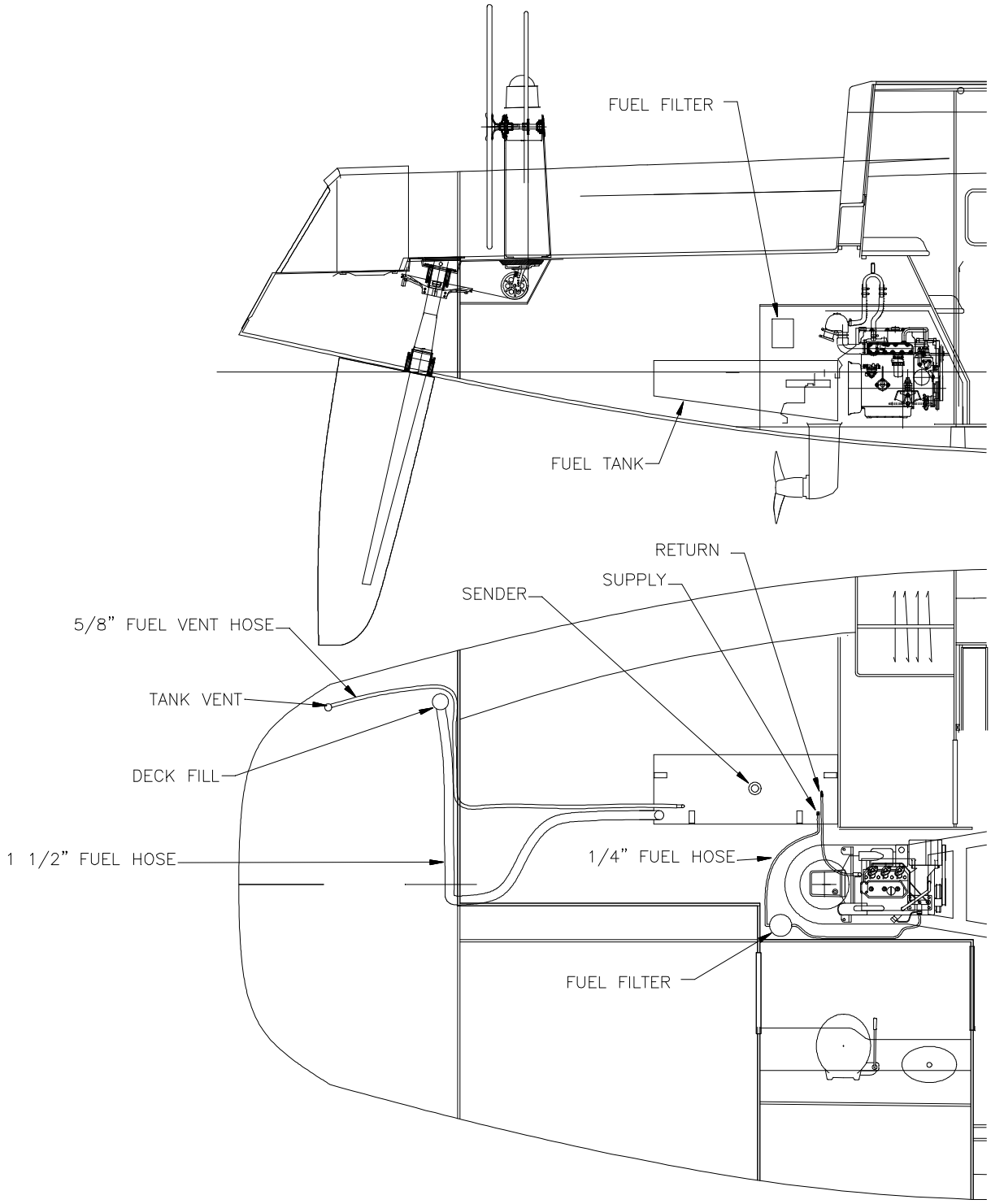
Engine Layout



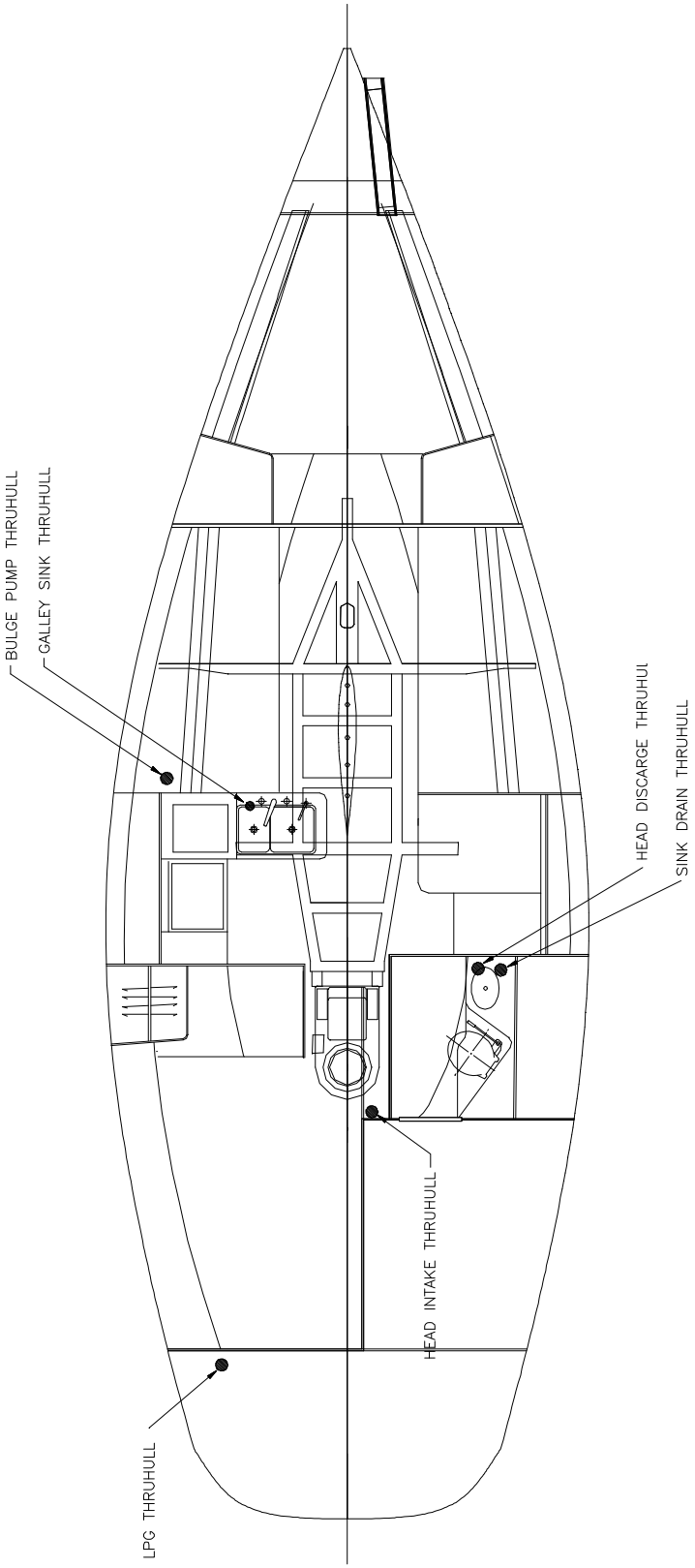
Exhaust System Layout



Fuel System Layout

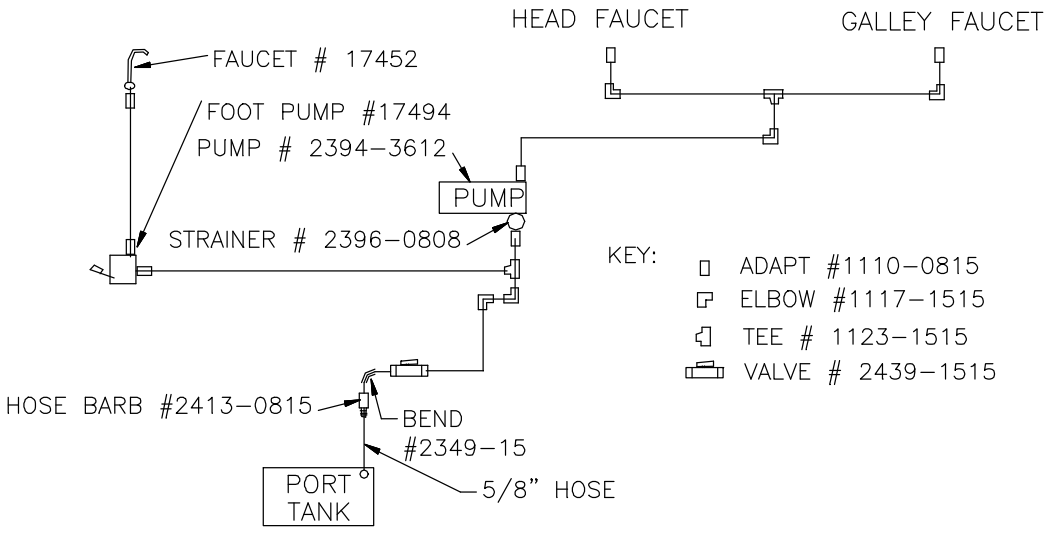


Thru-Hull Locations

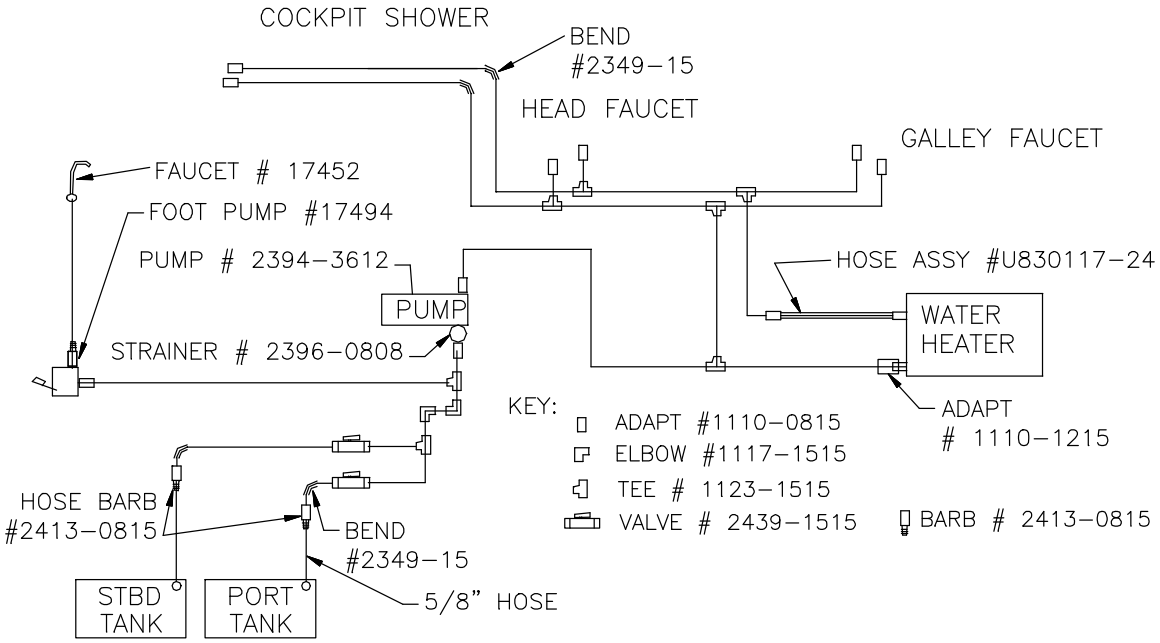


Fresh Water System Layout

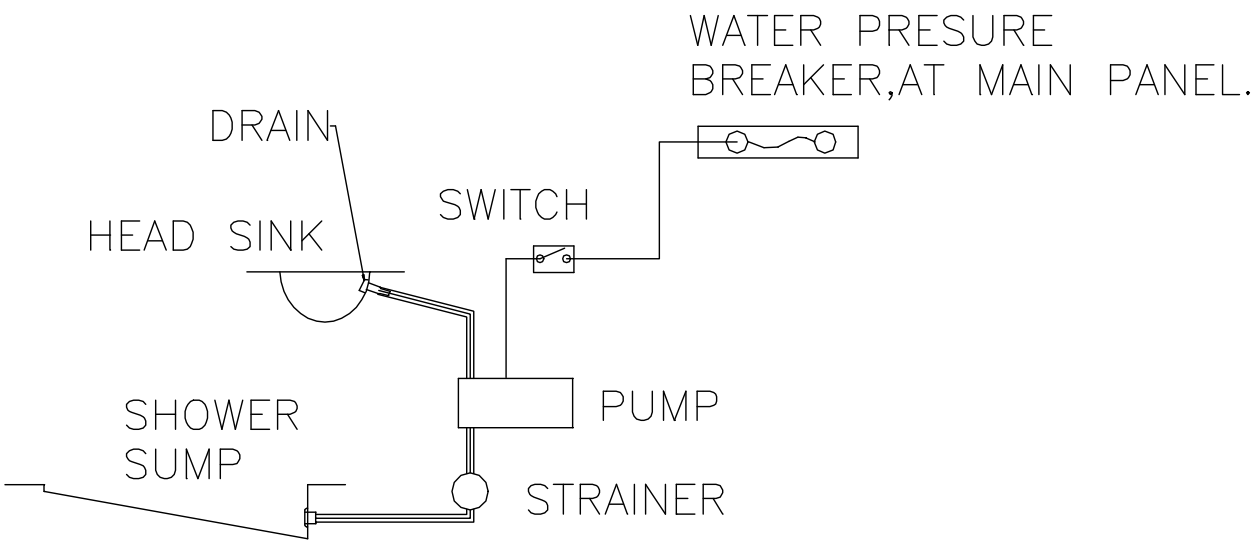
Standard Cold Pressure Water System



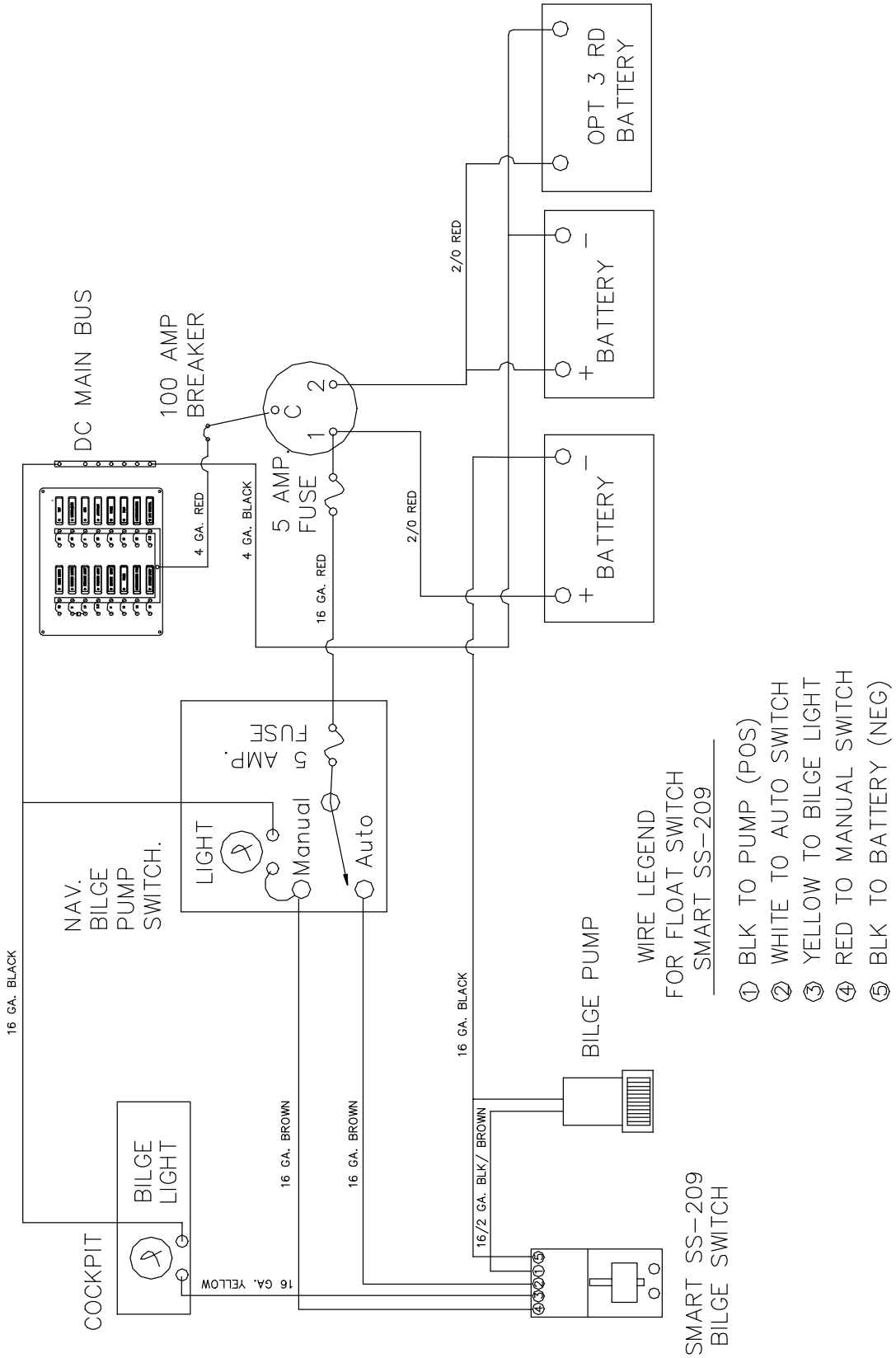
Optional Hot & Cold Pressure Water System



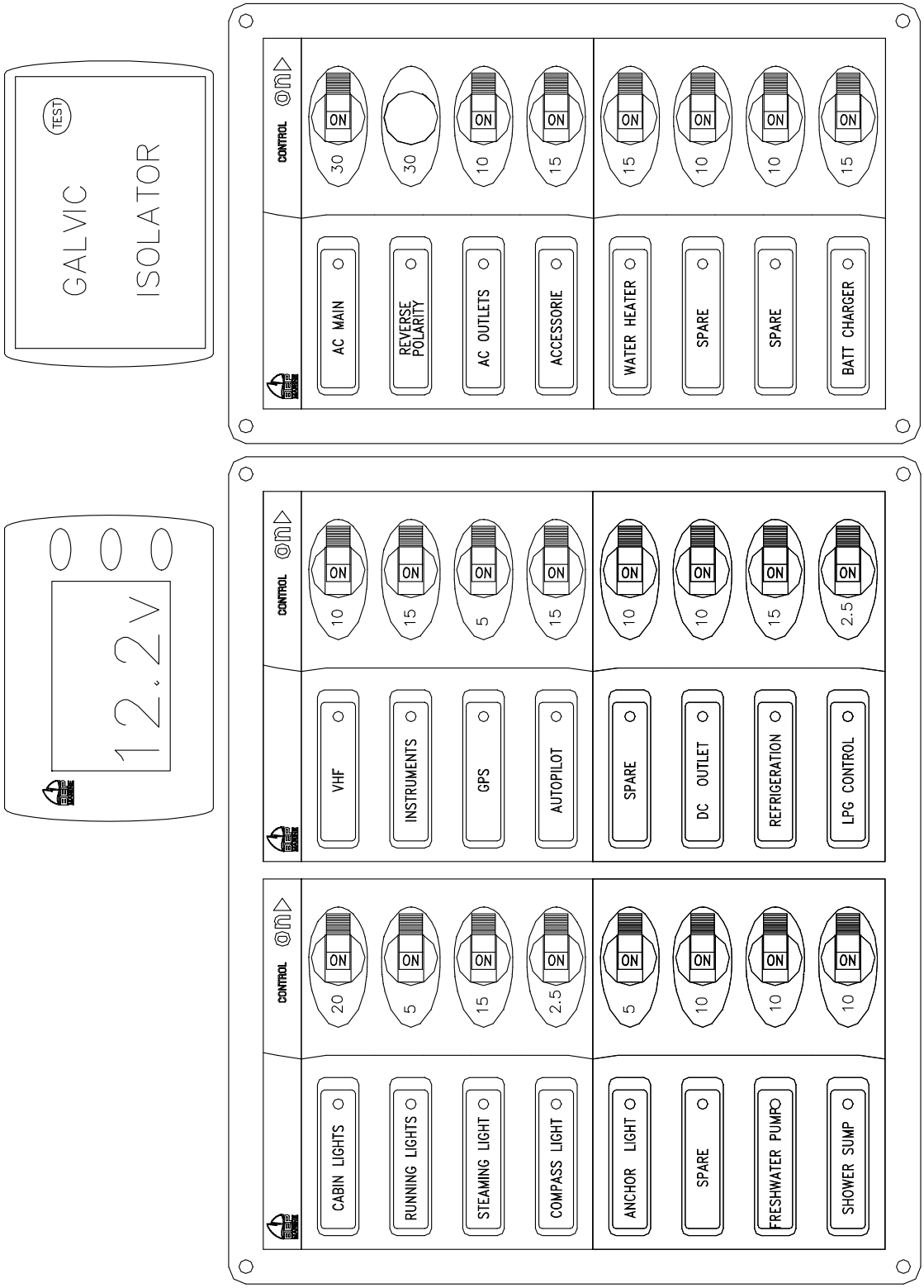
Head/Shower Sump Layout



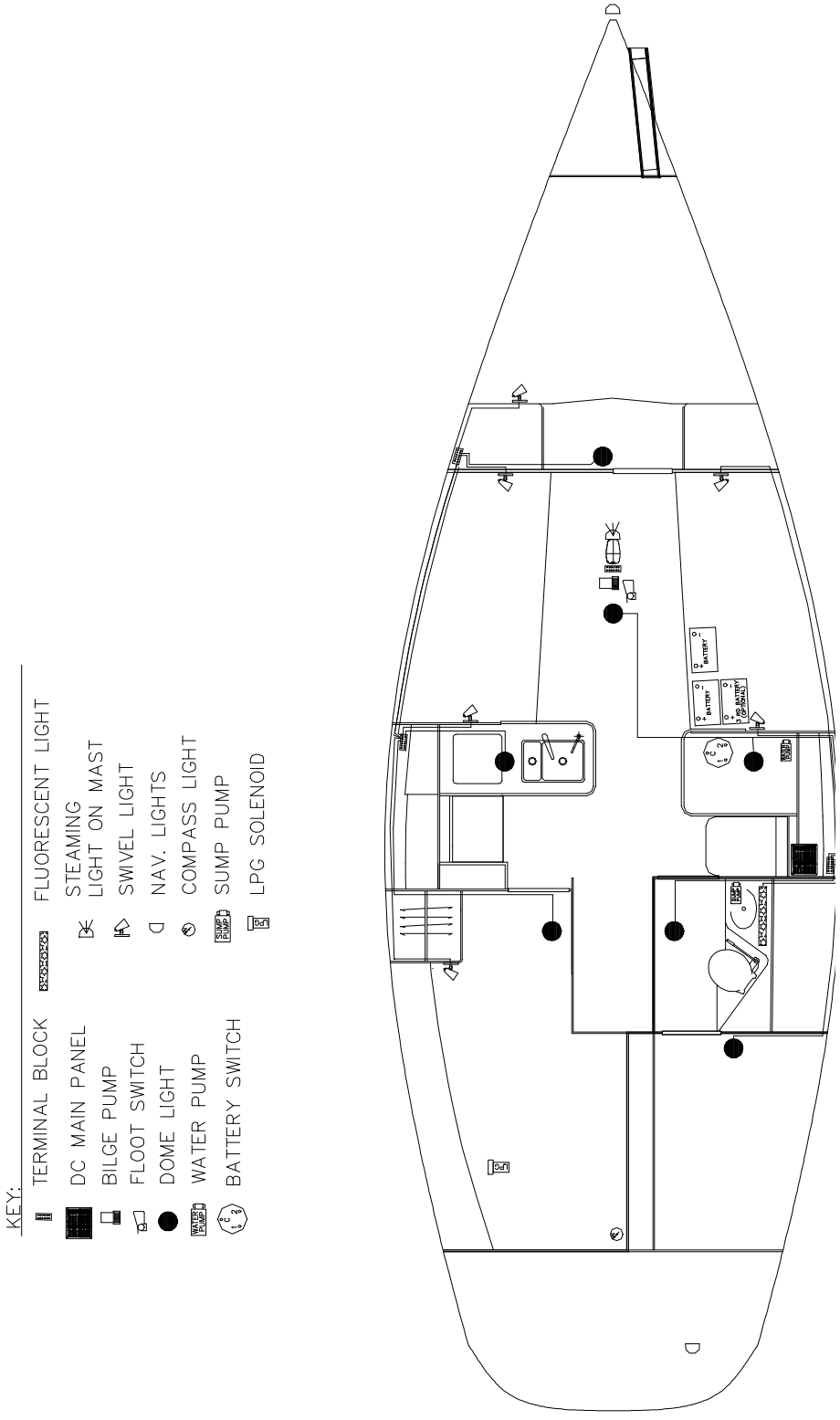
Bilge Pump Schematic



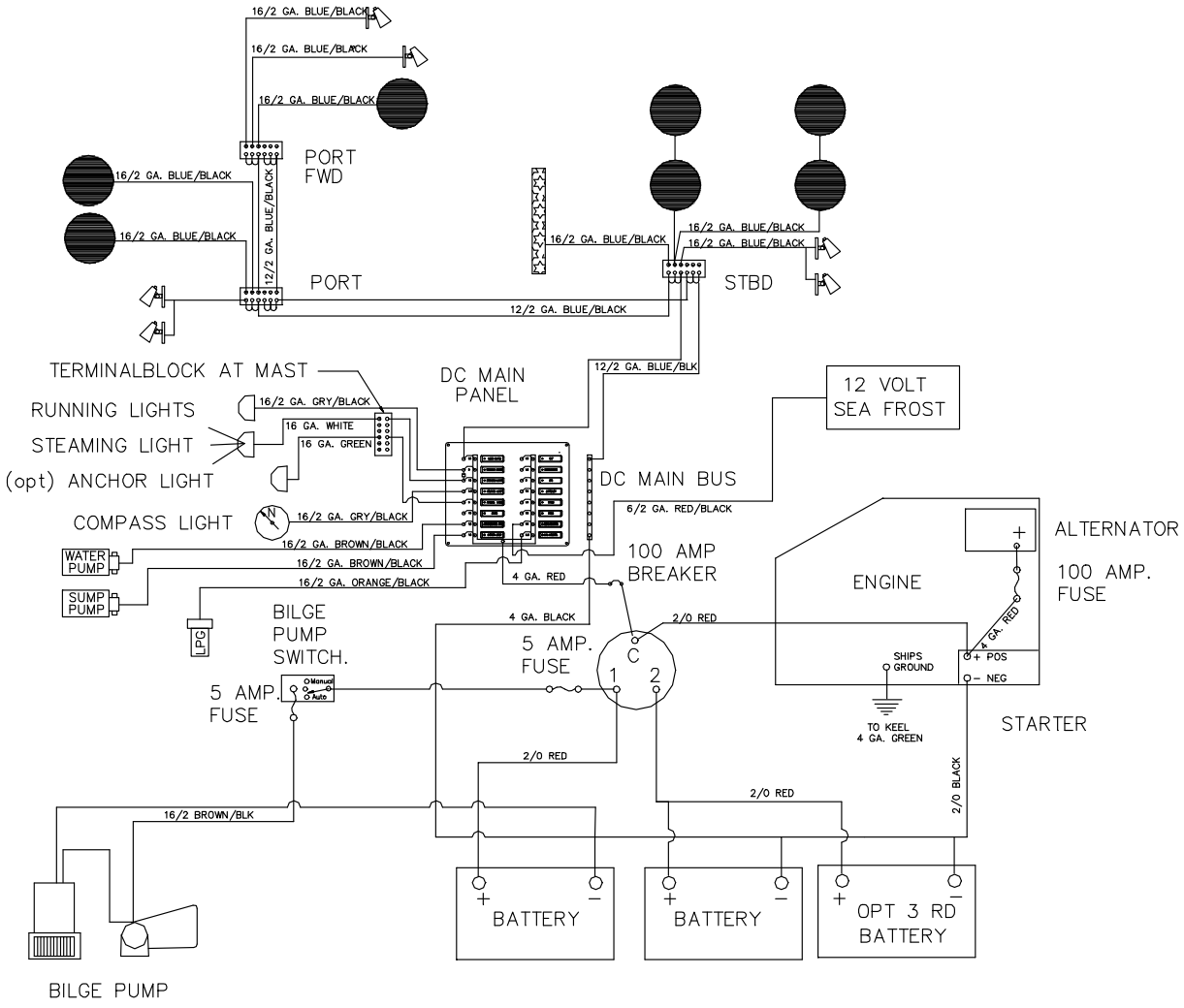
Distribution Panels (Including AC Option)



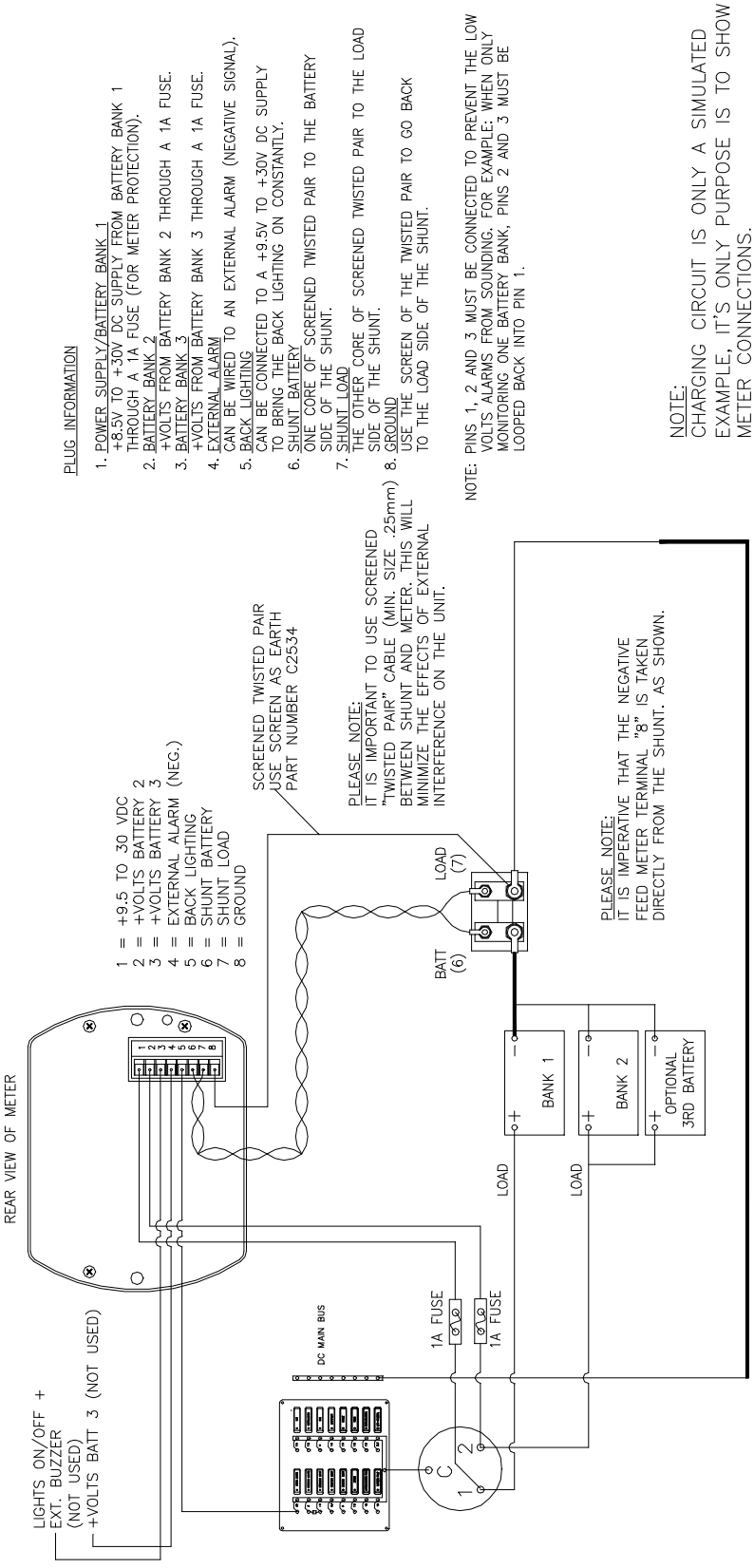
DC Component Layout



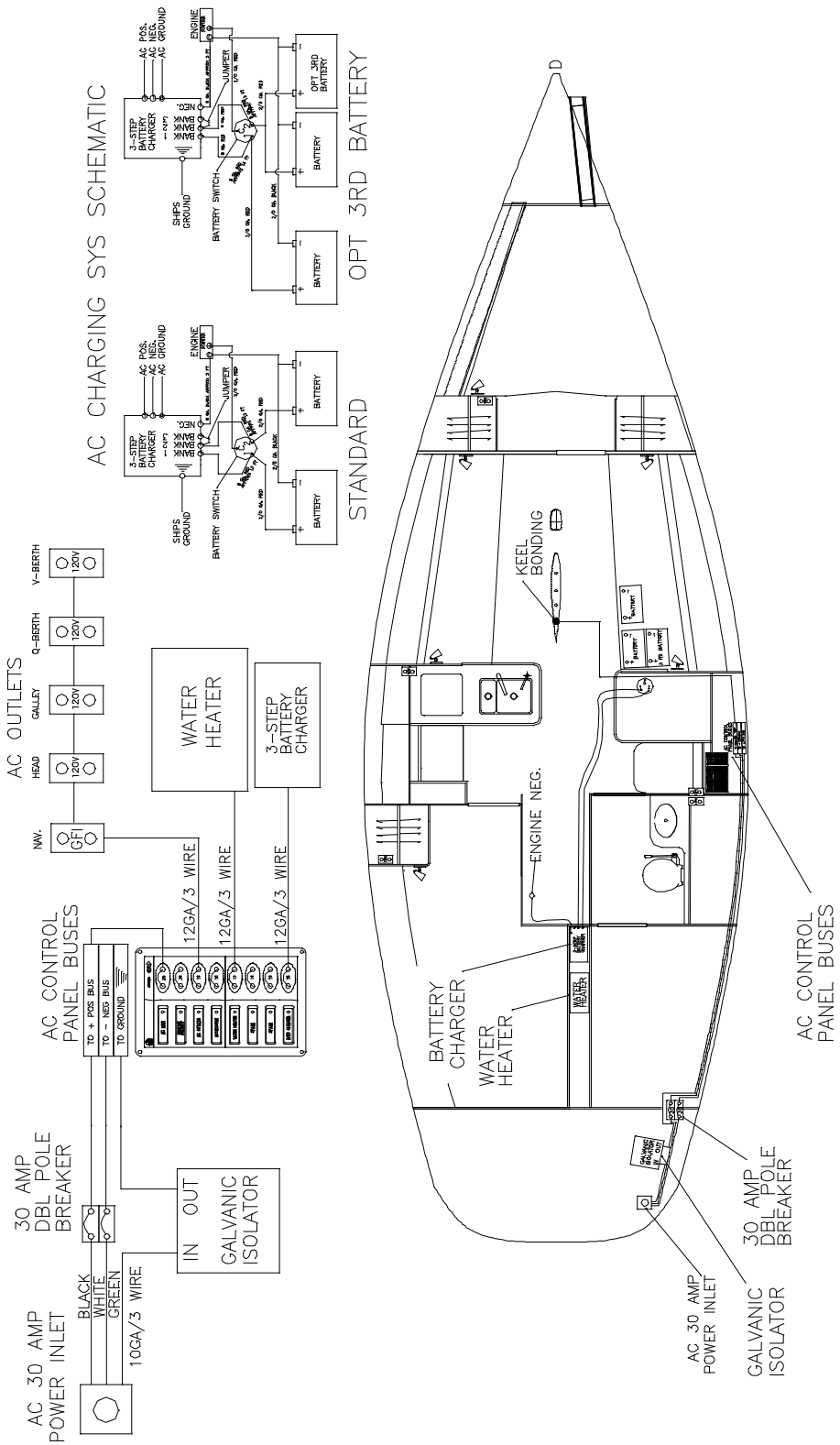
Standard DC Wiring Schematic



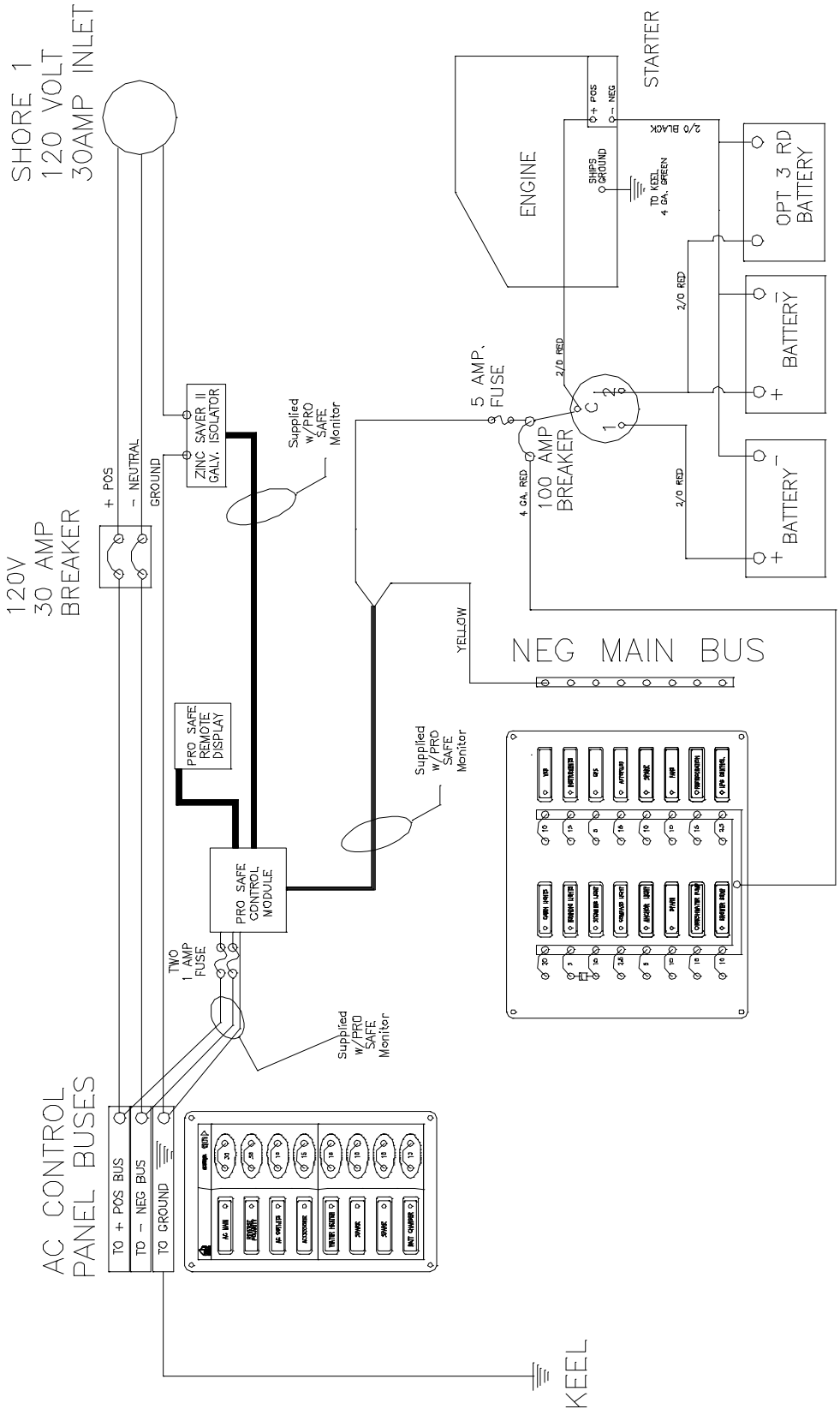
DC Battery Monitor



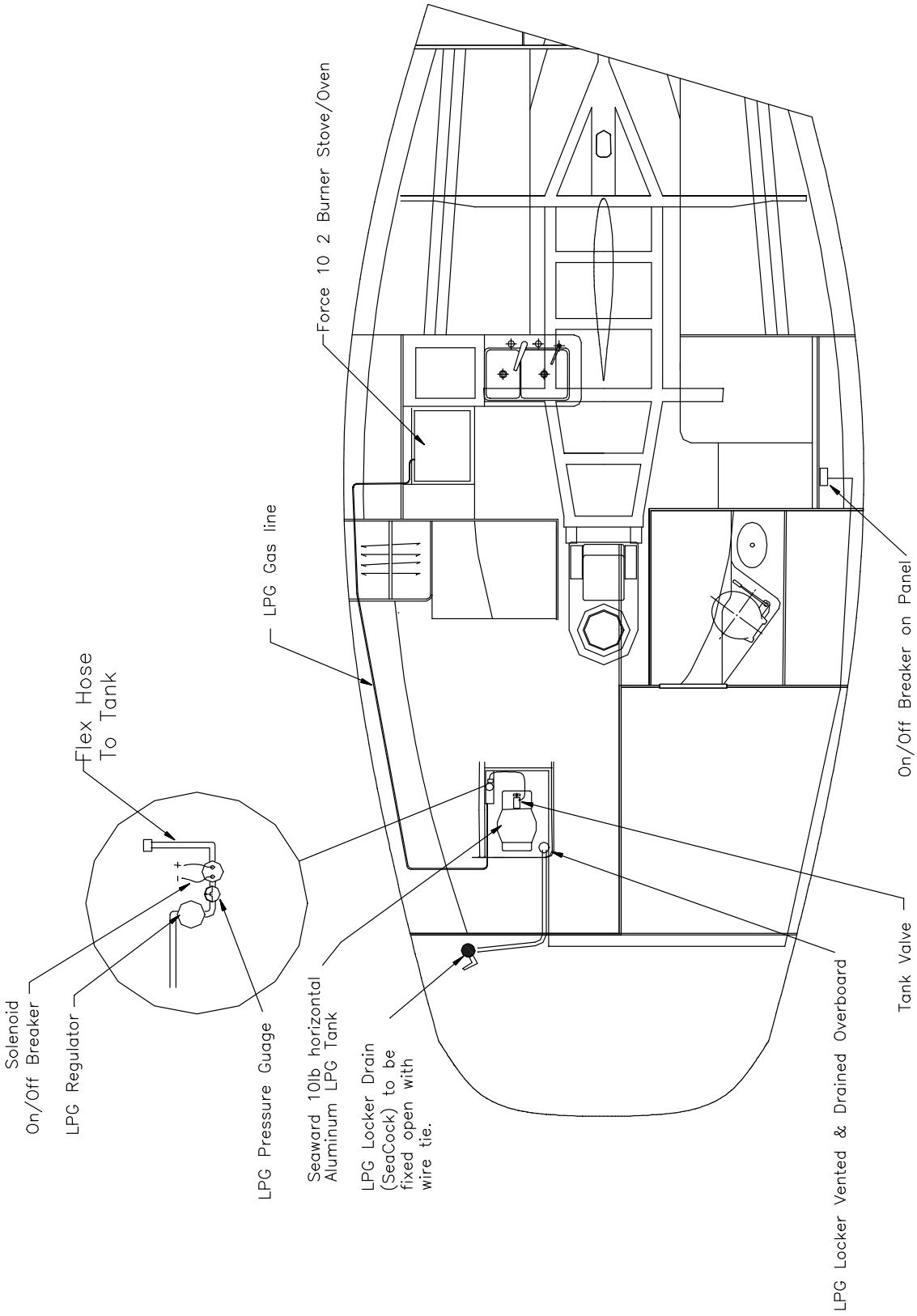
AC Component Layout



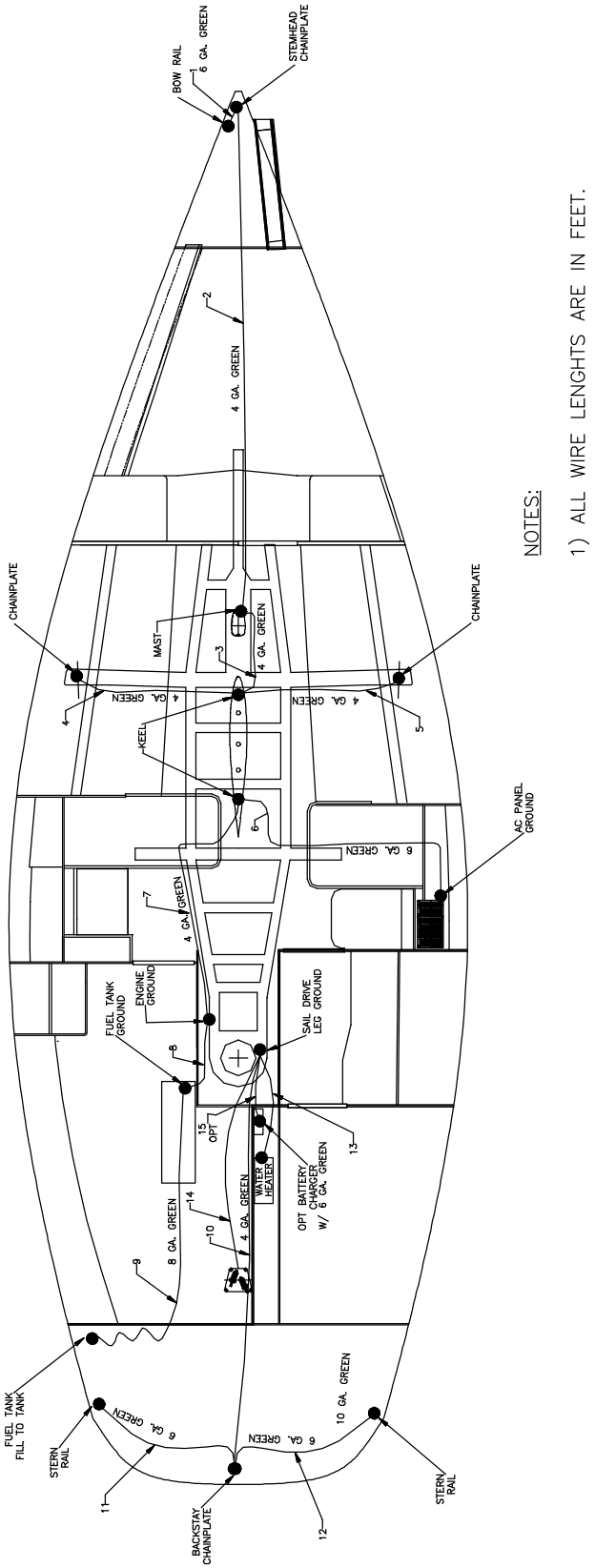
Galvanic Isolator



Propane System Layout



Bonding System



Tuning The Rig

Tuning the Mast

Following is a general guide to tuning your J/109 mast. Please consult your sailmaker for "fine-tuning" the mast to match the sails.

With the standard length J/109 headstay and the mast step situated in the middle, the mast rake (as measured from the back of the mast at deck level to a plumb on the main halyard) should be approximately 20 inches.

The upper shrouds are attached to the outer chainplate hole. The lowers are connected to the inner hole. The intermediates are secured in the forward hole. Begin by hand tightening the shrouds, being careful to keep the mast centered aloft. Check alignment by hoisting a tape measure up the main halyard and comparing measurements to the port and starboard chainplates. When the top of the mast is centered, sight up the mast track to check for alignment of the lower part of the mast. Adjust the shrouds by hand as necessary to center the mast.

After the rig is centered and hand tight, we recommend additionally tightening the shrouds the following number of turns:

Upper Shrouds: +11 turns
Lower Shrouds: + 8 turns
Intermediates: + 7 turns

You'll find it easiest to tighten the upper shrouds if you pump the backstay down 2-3 inches first to relieve load. Under sail, it is easiest to adjust the leeward shrouds, then tack to adjust the other side.

Once you have initially tuned your J/109, make sure your tie-rod (wire fitting that attaches the underside of the deck to the forward face of the mast) is properly installed and then go sailing in a brisk breeze, spending equal time on both tacks. Even though rod rigging is a very low stretch material, you'll still see a little loosening after the initial breaking in period. Be sure to sight up the mast while it is under load to see if the mast remains in column.

Rigging The Boom

Run the single line 1st clew/tack reef from the clew to the forward end of the boom, up through a sheave on the boom, to an individual turning block attached to a SS hook (this hooks into tack reef grommet in sail). This line then leads down to a cheek block on the side of the mast down to the turning block at the mast collar, through the organizer and aft to a rope clutch. The 2nd clew reef line leads in a similar fashion but exits the boom down to the mast collar block then aft.

- Attach boom gooseneck to lug on mast.
- Attach QuikVang to mast lug at deck and then boom lug (hoist end of boom with main halyard if necessary).
- Install mainsheet blocks.
- Rig mainsheet per rigging diagram.

Engine System

The engine and fuel system is engineered to be conveniently accessible for repairs and general maintenance. Located aft of the companionway ladder, there is access to the front, sides and back of the engine from which all important functions can be reached; including water strainer, fuel injectors, fuel filter, fuel primer, expansion chamber, and alternator.

Before starting the engine read the engine manufacturer's owner's manual for proper break-in and operating procedures. Once the engine is running, inspect it for any discrepancies, like oil leaking, excessive water leaks, or anything out of the ordinary.

- **Engine Control Panel:** is mounted aft of the port side of the helmsman's cockpit. It contains the starter, kill switch, warning lights, and gauges. The combination throttle/gearshift are mounted on the steering pedestal. Double-check all mechanical connections between engine and on-deck equipment.

- **Engine Bed:** is constructed of heavily reinforced fiberglass. This provides a superior mount over wood and is also rot-proof. The engine sits on Yanmar "soft" rubber shock mounts to help isolate the engine vibration from the boat. Check to see that the engine is sitting correctly on them and the bolts tightly secured.

Sail Drive

The J/109 is equipped with the Yanmar Saildrive SD-20. This system provides a clean quiet alternative to conventional yacht drive trains. We recommend that you follow all Yanmar guidelines included with the boat for maintenance and service of this system.

- **Transmission:** is attached to the aft end of the engine and houses the reduction and reverse gears. These gears generally need little maintenance, but the oil level should be checked periodically.

Fuel System

- **Fuel Tank & Hoses:** The J/109 is equipped with one 23 gallon fuel tank located under the port aft cabin berth. Fuel lines run from the tank to the fuel primer pump. From there fuel flows into the injectors on the engine. The tank itself is aluminum and baffled to prevent fuel slosh. For a layout, please see the Fuel System diagram.

- **Fuel Gauge:** is located on the forward face of the engine panel recess in the cockpit. The *gauge reflects level (height) of fuel in the primary tank, not the quantity*. Try to maintain a minimum level of 1/3 to 1/2 tank filled at all times.

- **Fuel Line Shut-Off Valve:** also sits atop the tank at its forward end. Since diesel engines require bleeding after they have been deprived of fuel, it's important that the shut-off valve be in the "ON" position (lever parallel to piping) anytime the engine is started.

- **Fuel Tank Access Plate:** is atop the fuel tank and provides access inside to clean the tank or check the fuel gauge.

Engine Cooling System

The J/109's engine utilizes both a "closed" cooling system, in which a mixture of fresh water and antifreeze is circulated within the engine, and a "raw water" system, in which a heat exchanger supplies a constant flow of outside water, pumped in through the raw-water intake, to cool the coolant mixture.

Coolant system. The filler cap (it looks like a radiator cap) for the freshwater-and-antifreeze cooling system is located on top of the engine manifold. Check the coolant level of the manifold and the coolant subtank aft of the engine, on the port side of the compartment (check when the engine is cool). When adding coolant, follow the engine manufacturer's recommendations for the proper fresh water/antifreeze ratio. In climates where freezing may occur in winter, test the coolant mixture for freezing point. Add coolant as needed if the system is not drained for winter storage.

Raw-water system. Located furthest aft in the engine compartment, the J/109's raw-water strainer helps prevent clogging of the raw-water cooling system and overheating of the engine. Check the strainer basket often to insure that the flow of cooling water is unimpeded. Unscrew the strainer basket lid, remove the strainer and clean it, and be sure that the basket is seated properly in the bowl before screwing the lid on hand-tight.

Exhaust System

The J/109 is equipped with a water-injected water-lift exhaust system that dissipates exhaust heat and acts as the exhaust muffler. Cooling water can accumulate in the bottom of the water-lock muffler; when de-commissioning your boat for the season, the muffler either should be drained by unscrewing the drain plug on the bottom of the muffler, or antifreeze should be added so that residual water doesn't freeze. The water-lock muffler can be accessed via the starboard-side cockpit locker in the chaseway under the cockpit.

General Hints To Avoid Problems

- Monitor brightness of cabin lighting and charge batteries as required by running engine. Batteries are charged by either the AC battery charger or by running the engine.
- Stop engine with throttle fuel cut-off, then turn ignition key "off".
- NEVER turn engine battery switch to OFF position while engine is running.
- For best efficiency and fuel economy a cruising R.P.M. of 2,600 - 2,800 works well. Vary RPM levels periodically when cruising under power for a long distance. Be sure to thoroughly read and follow the manufacturer's manual for proper break-in procedure for the standard turbo charged Yanmar Diesel engine. When not underway, battery charging and refrigeration cooling should be handled via shore power or an auxiliary generator.
- Do not run engine at full throttle (3600 RPM) for sustained periods, as breakdown may occur. Most importantly, find an RPM that runs smoothly and follow the Yanmar guide. Avoid "vibrating" RPM speeds when possible.
- Keep engine gear shift lever in "REVERSE" position while sailing to prevent possible "free-wheeling" of prop
- CAUTION: The J/109 engine is very quiet, and it is possible to forget that it is running. Before shifting the gear shift lever into REVERSE when sailing, double check that the engine is turned off.

Engine Safety Precautions

Due to high temperatures it is recommended that after running the diesel for more than two hours you reduce speed to idle and allow excess heat to dissipate for five to ten minutes.

The most common cause of trouble is contaminated or dirty fuel. Your boat is equipped with a Racor fuel filter located in the engine compartment and a secondary filter on the engine. The wise skipper carries

replacement filter cartridges. The dual filter is designed so that one filter is in operation while the other is a spare. This way you can switch the fuel flow through the spare filter, if you need to change out the first one.

Familiarize yourself with the bleeding procedure for the engine and try bleeding it yourself. The procedure only takes a few minutes after you are acquainted with it, but can be exasperating to the uninitiated.

Starting Up The Engine

1) Turn the battery selector switch to ALL. Turn off all electronic instruments to avoid a voltage spike to the instruments while cranking the engine.

2) Make sure that throttle control is in neutral

3) Turn the ignition key to the ON position. The engine-alarm buzzer will sound and the warning lights for low oil pressure and charging will light up. (The alarm and warning lights will continue until the engine starts or the key is turned off.) If the alarm does not sound, use the engine-alarm test switch on the engine instrument panel to verify that the engine alarm is working.

4) If the engine-alarm is working correctly, press the START button. Release the button immediately when the engine starts. If the engine does not start in 10 seconds, turn off the key. Advance the throttle slightly, wait 10 seconds, and repeat steps 3 and 4.

5) When the engine starts, the oil-pressure and charging warning light will go out and the engine-alarm buzzer will stop. If they do not, stop the engine immediately.

6) Once the engine starts, set the throttle at about 1,000 RPM. If all engine indications are normal, warm up the engine for 10 minutes.

7) Test the operation of FORWARD and REVERSE gears at the dock with the docklines in place.

CAUTION: If the engine does not start after a pro-longed period (do not exceed 10 seconds at a time) of cranking, be sure to drain the water-lock muffler and exhaust loop. Accumulated water may flow back into the engine manifold and damage the engine.

IMPORTANT: Check that a flow of raw-water cooling water is exiting from the transom. If cooling water is not being discharged, the engine will burn up: shut down the engine immediately. Check that the raw-water strainer basket is free of blockage. Check that the raw-water engine-intake valve is open on the Saildrive leg. If necessary, check underneath the hull to make sure that the raw-water intake on the Saildrive is not blocked.

Shuting Down The Engine

1) Move the throttle to the IDLE (vertical) position.

2) Run the engine at IDLE long enough to allow the engine to cool down.

3) Pull fuel shut-off knob next to engine instrument panel until engine stops.

4) When the engine-alarm sounds, turn the key OFF.

IMPORTANT: Do not use the ignition key to shut down the engine. Do not stop the engine with the decompression levers except in an extreme emergency. If decompression lever is used to shut down the engine, fuel will spray out and accumulate on top of pistons, creating a danger of explosion the next time engine is started.

Fueling

When taking on fuel, follow these safety precautions:

1) Secure your boat to the dock using bow, stern, and spring lines.

2) Turn OFF all mechanical and electrical equipment, including the engine, battery selector switch, cabin lights, and electronics.

3) Remove the fuel-fill deckplate plug; clean the threads of both the plug and deckplate so that no dirt falls into the filler opening. Place the fuel hose nozzle into the fill pipe.

4) Fill the fuel tank slowly. Do not overfill the tank. Because marine fuel expands with an increase in temperature, fill the 27-gallon tank you are taking on, to only 95% of its capacity. If you cannot see the fuel pump, ask the attendant or a crewmember to call out the total gallons.

IMPORTANT: If the fuel tank is overfilled, fuel will spill out of the tank (vent is located on the port side of the transom). Be ready to contain and clean up any spillage immediately.

5) After fueling, replace the fuel-fill deckplate and clean any spillage. Check belowdeck for fumes and check the bilge for fuel leakage. If fumes or liquid fuel are present, correct the situation before proceeding. Open all hatches and ports to ventilate the boat.

IMPORTANT: In the event of a serious fuel spillage, STOP FUELING IMMEDIATELY. Replace the fuel-fill deckplate and notify the attendant. Wash all traces of fuel or source of fumes; ventilate the boat. Leave the fuel dock only when you are completely certain that a potentially dangerous condition does not exist.

When preparing to take on fuel, the following safety precautions should be followed at all times: Properly secure the boat to the dock using bow, stern and spring lines.

Engine Maintenance

Check the engine, batteries, and engine mounts once a month. Ensure the engine is fastened securely to the engine mount frames and look for any problems, such as fuel or oil spillage. If you need help, consult a professional marine mechanic or a Yanmar licensed repair mechanic.

Run the engine frequently and at occasional high speeds, even if it is not in gear. One reason why sailboat engines may burn out within a few years is that they are run infrequently and lubricating oil is not thoroughly and evenly distributed on all moving parts. Be sure to check oil and coolant levels often. If you have any doubts about the purity of the fuel you are buying, use a strainer to filter out water and dirt.

Plumbing Systems

General

The plumbing systems in your J/109 consist of fresh water, manual and electrical pumps, and the head (toilet). This section will describe their locations and how they operate.

Fresh Water System

Water Tanks: are flexible tanks. Connected to them are the following hoses: a) fill hose- is located on the tank top and connects to the deck water fill pipe; b) feed hose- located along the tank bottom connects to the water system at the water selection Y valve

Water Fills: are located on deck. Be sure the water cap threads are cleansed of dirt for a better seal. The water may develop a "taste" after a long period of time. Instead of flushing it out you can add a commercial water preservation agent, such as Sudbury Aqua Fresh crystals, to greatly improve the taste.

Optional Water Tank Selection Y-Valve: is located on centerline below the cabin sole. After the tank is changed, open a water faucet to allow air to escape. When the water trickles out, close the faucet momentarily to allow the pump to build up pressure (check that it's turned on at the panel); then open the faucet until a steady stream flows. It may be necessary to repeat the process several times to bleed all the air from the system.

Water Pressure Pump: is located under the nav station. The pump operates off the DC electrical system and pressurizes the entire water system. Should any problems arise, read its manual. If the system is not pressurizing, first check that the pump is pumping water. Secondly, check that all hoses are securely connected to their fittings. Thirdly, ensure all air pockets are eliminated as outlined above. If there is still a problem, consult your dealer.

Water Heater: is located in the chaseway under the cockpit in the starboard cockpit locker. Water is heated by either the engine or shore power. If the water heater is on shore power, be sure a continuous supply of water is available to it, otherwise the electrical element within it will burn out. Due to this potential risk, water heater elements are excluded from warranty. Thus, be certain the water pressure pump is always on and there is adequate water supply while hooked up to shore power.

Thru-Hulls

All thru-hull fittings are of glass reinforced nylon or bronze. For safety reasons, we recommend that you tape a soft wooden plug adjacent to all thru-hull fittings in the event of a hose or valve failure. These fittings each have valve-handles. To reduce confusion, remember the **long end of the handle indicates the direction of flow.**

Pump Systems

Pumps are easy to maintain and just as easily forgotten...they always happen to seize up when you need them most. Consequently, take care to keep their screens clean and rubber gaskets/bellows working correctly. Before taking a long trip, order replacement parts for all pumps.

- **Sink Drain** empties directly overboard through a thru-hull fitting beneath the sink.
- **Shower Sump Pump** is locally operated in the head and drains into the head sink.
- **Icebox Drain** valve is located under the bilge board and should be closed to keep in the cold air except when draining.

- **Bilge Pumps** There is one electrical and one manual bilge pump installed on the J/109. Two pump intakes are located in the keel sump under the main cabin floorboard.
  - The **Manual** pump is operated from the cockpit.
  - **Electrical Bilge Pump** is wired to an independent switch on it's own panel adjacent to the nav station.

Head System

The J/109 is equipped with one certified marine head which is capable of discharging effluents into a holding tank or overboard. Both systems are easy to operate and with correct usage and proper maintenance, will provide many years of use.

Before operating the **HEAD**, ensure you have read its manual thoroughly and understand the proper procedures. Silly mistakes can cause severe "head" aches at the worst possible time!. And a word to the wise

PLEASE TRAIN YOUR GUESTS ON HEAD OPERATION. NEVER, NEVER ASSUME THEY KNOW HOW TO USE IT.

The head is a large pump which takes in seawater and flushes waste into the holding tank or overboard. The salt-water intake thru-hull is underneath the head sink and the discharge is in the starboard aft locker. Remember open/closed positions on these thru-hulls. It is good seamanship to close the intake and discharge seacock for the head when not in use.

When seawater and effluent are pumped through the head, they're pumped into the holding tank by the action of pumping the toilet handle. The waste discharge fitting on deck is provided so a shoreside pump-out station can empty the tank. Care should be taken not to overfill the holding tank as effluent can block the vent hose and may damage the tank... or worse, burst the hose. If the toilet is difficult to pump, check to see if the holding tank is overfilled. "When in doubt, pump it out!"

The holding tank must be pumped out before winter storage. Dumping a quart of anti-freeze through the heads will prevent the seals and equipment from cracking. The following hoses are connected to the tank.

- Waste Discharge Hose from the head
- Pump-out Hose leading to the deck fitting
- Vent Hose to vent the tank overboard.

Electrical System

The following section describes the electrical systems aboard the boat, how they operate, where they lead, and how to avoid trouble. Please read this section over more than once. For wiring code information please refer to the color code diagram.

DC Electrical System

A 12 Volt DC electrical system is used throughout the J/109 for lighting and operation of pumps and various accessories. The J/109 is standard with two 105 Amp Glass Mat batteries located under the starboard settee berth. An optional 105 amp AGM is available.

- **Electrical Panel:** controls electric distribution with circuit breakers and switches. The main wiring harness runs from the back of this panel.

- **Battery Monitoring System:** a small panel located above the DC Panel on the J/109 tests the condition of the batteries and DC circuits. Please refer to the instruction manual provided with the boat for more information.
- **Mast Wiring Terminal Box:** is located forward of the main bulkhead. A wiring harness exits the mast and leads above the headliner on centerline (under the wood trim) of the headliner through the bulkhead to the junction box, this is wired directly into the D.C. system through a terminal strip. Once this wiring is installed, test each function to insure proper operation.
- **Battery Switch:** The battery switch is located under the navigation table. It is a three-position switch that turns on either standard battery (1 or 2) or combines the power of both batteries in the "Both" position. With the addition of the optional 3rd battery, two batteries are combined as a single bank on the "2" position of the switch.
- The **100 Amp Balmar Alternator** is attached to the engine and creates a charging current for the batteries only when the engine is running. The status of the battery switch (1, 2, or Both) determines which batteries are being charged.
- **Accessories:** such as navigation instruments, stereo, radar, GPS, etc… can be added to the electrical panel and the 12 VDC system. Extreme care and forethought is necessary for installation as these are sensitive instruments and require some measure of protection. We recommend that owners hire a qualified marine electrician to complete these tasks. Be sure all sensitive accessories are not only grounded properly but that "fast blow" fuses are run off the panel for extra insurance against damage to their components.

110 VAC Shorepower System

The 110 Volt AC shore power system is functional only when the boat is plugged into suitable power from shore. The cord provided as part of the option has the standard end for 30 amperage service. Ensure the plug prongs match those on the dock inlet, insert and twist to lock it. Then screw down the outer ring to seal the cord from water and to prevent it from pulling out. The AC panel for shore power is located in the nav station next to the primary DC panel. Due to the length of the wire run from the inlet to the electrical panel, there is a circuit breaker located high on a bulkhead in the starboard storage locker. This switch needs to be on in order for shore power to reach the panel.

- **AC Main Power Switch**: Located on the panel, to activate AC power panel, use this switch.
- **AC Panel:** indicates line voltage being received from the shore circuit with an indicator light. The line voltage will vary with the number of appliances operating on the same circuit. In large marinas there may be a large number of boats on the same circuit, causing fluctuations.
- **AC Normal/AC Reverse Polarity Light**: The AC panel has a red light to show when the polarity is reversed. Care should be taken not to operate 110 AC systems on board with reversed polarity. Double-check shore connections. If problems still persist, then notify dock master to repair the shore plug. NOTE- Even though the switches are in the appropriate position, the shore power system in no way assures personal safety using electrical apparatus.
- **Gavlanic Isolator**: This device indicates and isolates any low voltage stray current on the AC circuit. There is a small panel mounted above the AC Power Panel in the nav station with indicator lights and self-test button. Please refer to the specific manual included with the boat for more information.
- **Water Heater:** switch supplies power to the water heater 110 AC element for hot water while dockside. Note the precautions regarding the use of electrical power to heat water are contained in the plumbing section of this manual.
- **Outlets:** located throughout the cabin supply power for 110 AC accessories. The entire system has "ground fault" protection.
- **Ground Fault Systems:** There is a single ground fault systems on the J/109 that protects all AC outlets.

Galley Stove LPG System

Liquid Propane Gas (LPG) is the most common fuel used for boating and is available at most marinas in the U.S. The standard Force 10 stove/oven is of very high quality and is engineered for the marine environment in high-grade stainless steel. It is comparable to a home range.

The biggest difference is safety. While the home gas stove utilizes a petroleum gas which is lighter than air (it disperses easily if there is a leak), the propane stove utilizes a gas which is heavier than air, and thus, sinks to the bottom of enclosed compartments. All J/Boats equipped with LPG stoves utilize a safety system prescribed by ABYC and USCG guidelines. This includes an independently vented and sealed compartment for the tank, an electronic solenoid shut-off valve, a regulator, and approved LPG hose.

- **Propane Tank:** The 10 lb capacity LPG tank is located in a specially designed compartment located under the aft portion of the port cockpit seat in the J/109. This box is sealed and ventilates and drains over the side to specifically eliminate the accumulation of dangerous gases.
- **LPG Gauge:** installed within the propane locker measures the amount of pressure left in the tank.
- **Solenoid Cap Valve:** is located on the hose in the propane compartment. It electronically shuts-off the flow of gas at the tank. This valve is a “normally closed” valve; therefore electrical power must be provided through the breaker switch at the panel so that gas can flow to the stove.
- **Regulator:** is located on the hose in the propane compartment. It is a screw down valve that regulates the flow of propane into the system.

Stove Operation

- Check that all burner (including oven) knobs are off.
- Check manual valve on tank and open.
- Ensure battery switch is on and 12 volt power available.
- Turn on solenoid valve breaker on the electrical panel.
- Open burner valve on stove slightly and light burner. Always apply flame or sparker to burner before opening valve.

When Cooking Is Complete

- Turn off solenoid valve switch on electrical panel first to shut-off supply of gas at the tank.
- After flame of burner goes out, turn off knob for burner (this purges gas from lines).
- Firmly close manual valve on tank—DO THIS EVERY TIME!!

Safety

Lightning Protection

The J/109 is completely grounded in accordance with industry practice. The mast, shroud chainplates, stemhead fitting, backstay fitting, stanchion bases, engine, and electrical system are grounded to the keel. In spite of this grounding, there can be no assurance that personnel or the boat will not suffer injury if the boat is hit by lightning. The following are suggestions only and in no way guarantee safety in the event of a lightning strike.

- If possible, remain inside a closed boat during a lightning storm. Do not contact any metallic objects inside or outside the boat.
- Avoid contact with any items connected to the lightning conductive system (mast, shrouds, etc) and especially in a manner to act as a bridge between them (mast to shroud, etc).
- Avoid swimming during a lightning storm.
- If the boat is mildly struck by lightning, check all compasses and electrical gear to determine that no damage or change in calibration has taken place.
- Check all thru-hull fittings, keel bolts, engine rubber gasket membrane, for leakage (water).

Safety Equipment

You can never be prepared enough for emergencies that may arise at sea. During commissioning of your J/109, triple check that you have all required safety gear and adequate spares aboard. Make it a policy to thoroughly brief any first time crew-members with emergency procedures including man-over-board, fire, and sinking. Please contact your local U.S. Coast Guard office for up to date USCG safety requirements.

IT IS THE OWNER'S RESPONSIBILITY TO COMPLY WITH ALL FEDERAL AND STATE REGULATIONS WITH RESPECT TO SAFETY EQUIPMENT; OPERATION OF THEIR VESSEL; AND SAFETY OF ALL PASSENGERS

Maintenance Tips

Even though modern construction has helped reduce upkeep, regular attention should be given to the maintenance of your boat. This includes the fiberglass exterior surfaces, the interior wood surfaces, and the mechanical and electrical systems.

A well-maintained boat will not only bring you years of enjoyment, but most importantly, will bring you greater personal pride and joy.

Fiberglass/Gelcoat

Apply a marine wax at least twice annually to preserve the "factory fresh" appearance for many years. Be sure fiberglass surfaces are clean and free of salt before waxing. Abrasive cleansers should never be used for general cleaning as they can severely mar the shiny gelcoat finish.

Bottom Paint

Keeping your bottom clean is of paramount importance as it not only keeps off bottom growth, but maintains passage-making speed. Even though you have applied anti-fouling paint, take a swim once a month or so (or hire a diver) and scrub the bottom and propeller with a scrub brush or abrasive sponge pad.

Zincs

The prop zinc should be inspected for electrolysis regularly. If it is severely pitted, replace it. Remember, it is a sacrificial anode to protect the propeller and saildrive from electrolysis. It can deteriorate quickly, so inspect it frequently.

Deck Hardware/Running Rigging

Wash deck hardware frequently with fresh water to remove accumulated salt and grime. Wash down the jib sheets, spinnaker sheets, and other lines in fresh water. Check for chafe and turn sheets end-for-end once every year to more equally distribute wear.

Check all deck blocks and also wash them with fresh water. Most ball-bearing blocks need only hot water to cleanse them, then spray with a dry Teflon lubricant. On conventional sheave/pin blocks, wash off, disassemble, clean, rub a light waterproof lubricant on the center pin, then reassemble.

Furthermore, check and lubricate the sheaves and blocks on the mast. Also, ensure the turnbuckles are clean and well lubricated. Without proper care they can "freeze up".

In general, it is handy to keep a spray can of a light lubricant in your tool kit for frequent squirts of blocks, shackles, mainsheet travelers, and other moving fittings.

Winches

Read the manufacturer's manuals on winch repair and maintenance. Winches are fine pieces of machinery that take little effort to maintain. However, all too frequently, they suffer neglect because no one can see how much they wear down or get dirty.

Clean And Lubricate Them! It takes little time to disassemble and put back together. Note that the gears and bearings are lubricated with special winch grease and pawls. Pawl springs need only a light oil. Keep spare pawls and springs in a kit for replacement.

Deck Hatches

Hatches need lubrication of their hinges with a silicone grease once a year. Also check the seals to see they are not unduly cracked, or are losing their ability to seal correctly. To increase traction on the plastic hatch covers, apply a non-skid tape fore and aft.

Cabin Ports

The ports are made of acrylic and are highly impact resistant. However, avoid highly abrasive cleansers which can scratch them. Instead, use mild soap and water to clean ports. Avoid chemical solvents, notably acetone, which can "melt" the ports...i.e. smear their smooth finish.

Stainless/Chrome

Hardware like the pedestal guard, stanchions, handrails, bow/stern pulpits, and winches can be treated with Never-dull® or other light abrasive cleansers, even toothpaste works well. After applying cleanser, polish to a gleam with a clean cotton rag.

Steering System

Check the system regularly. Examine and lubricate the sheaves. Periodically flush bearings with fresh **hot** water to eliminate leftover residue from marine life or saltwater. A small dose of "dry" silicone lubricant is helpful to maintain the "lubricity" of the bearing. Thoroughly rinse the upper and lower rudder bearings with fresh water when.

Fiberglass/Gelcoat/Formica

Interior gelcoat surfaces should be cleaned periodically with non-abrasive cleansers and smooth areas should be waxed. Formica should be cleaned with non-abrasive cleaners.

Wood

Most surfaces have been varnished prior to delivery or during commissioning. When making plans to re-varnish, remember these few pointers:

- Allow adequate time for the varnish job. This could be anywhere from 1-4 weeks.
- Do not plan on other interior work during this time. Allow uninterrupted access to the boat by those doing the job.
- Assist by locating the boat in as "dust-free" a spot as possible. This usually means outside, and away from parking lots, working shipyards, and other dirt or dust producing areas.

Bilges

Bilges are painted with air-dry gelcoat to prevent water permeation and accumulation of mildew. They should be washed regularly with strong solvents to keep them smelling clean and to prevent the fouling of bilge pumps.

Annual Maintenance Checklist

Running Rigging

___ Check running rigging lines for wear at splice, turning blocks, etc.

___ Inspect blocks and shackles for wear . Clean and lubricate or replace as necessary.

___ Service winches, check for free spinning operation(bearings) and ratchet stop action(pawls).

Deck Hardware

___ Check lifeline integrity, stanchion, and rail attachment to deck.

___ Check all cleats for signs of fatigue. Tighten fasteners or replace as required.

Steering System

___ Consult Edson maintenance guide.

___ Check rudder for impact damage or cracks.

___ Check rudder post play in bearing tube.

Thru Hull And Seacocks

___ Check seacock integrity, operation, and watertightness. Replace, reassemble, and lubricate as required.

___ Check hose attachment and clamps.

Electrical

___ Disconnect power source when making repairs or adjustments to electrical systems.

___ Check battery charge, terminal connections.

___ Check electrical panel, breakers, and switch condition and operation; tightness of wire connections.

___ Check running light operation.

___ Check ground wire attachment to keel, mast step, thru hulls, and engine.

___ Check seal of electrical solenoid valve and ensure it closes when switched to “OFF” position.

Mechanical Systems

___ Check stove fuel system, hoses, clamps, and shut-offs.

Engine & Drive Train System

___ Read engine owner’s manual maintenance guide.

___ Check engine fluid levels and systems for leaks- shut-off controls.

___ Check throttle action- start and stop controls, cable clamps, and locknut.

___ Check exhaust system soundness, hose clamps.

___ Check coolant system, hose clamps, intake, and filters.

___ Check transmission shift lever action, control cables, clamps and locknut; fluid level and alignment.

___ Check prop attachment, zinc, and Saildrive.

___ Check all engine wire connections.

Fuel System

___ Check fuel tanks and gauges, hoses, clamps.

___ Check fuel fill hoses and connections.

___ Check fuel filters.

Keel

___ Check keel bolt nuts for tightness. Do not arbitrarily tighten bolts unless you’ve experienced a severe grounding. If there is concern for leakage, consult your dealer or professional yard.

Plumbing

___ Check bilge pump function, electrical wiring, hose clamps, and strainer. Clean, disassemble, lubricate as required.

___ Check head and holding tank hoses, clamps, connections, and valves.

Water System

___ Check water tank hoses, clamps, valves, connections.

___ Check water heater hoses, clamps, electrical wiring.

___ Check water filters.

Storage Tips

Many of the maintenance problems surrounding boats can be pinpointed during the end-of-season haul-out. This is the time when a careful inspection will reveal the ravages of a long summer. If you live in colder climates, it is also the time to prepare the boat for what might be an even more brutal winter ashore.

First, clean your boat as thoroughly as possible. Get the yard to use a high-powered hose to clean off most of the growth before it dries onto the bottom paint. You may have to use a scrub brush and putty knife for heavy growth, like barnacles, and for areas around the propeller and shaft and underneath the keel.

Rigging

Sails and lines should be removed at the end of each season, rinsed thoroughly in fresh water and stored in a warm, dry place. This will prolong their useful life as mildew can affect even today's synthetic materials. Most sail lofts offer a cleaning/storage service.

Engine

Check the engine owner's manual for maintenance guidance during the season and for the specific haul out procedures necessary to winterize the engine. Fill fuel tank to minimize condensation and add an anti-bacterial agent. In the exhaust system, water can accumulate in the bottom of the muffler. This should be drained using the drain plug, or anti-freeze added so residual water doesn't freeze.

Batteries

It is preferable to remove the batteries and store in a heated area, recharging periodically to maintain full charge status. If you are in warmer climates, it is possible to leave the batteries aboard. Simply check them once a month to ensure they remain charged.

Head

Read the owner's manual for specific maintenance procedures. Generally, you will want to drain all water and replace with an anti-freeze agent. To maintain the lubrication of its internal seals, flush through a light oil. Again, follow the manufacturer's recommendations for winter maintenance.

Water System

Drain all tanks and ensure it is also drained from between the heater and the check valve installed in the supply line. Add an anti-freeze solution specifically designed for marine potable water systems to the residual water in the water tanks, and pump with manual and pressure pumps until all lines are full of anti-freeze solution.

DO NOT use automotive radiator-type anti-freeze, as most are poisonous and may damage the plumbing.

Bilges

Pump bilges completely dry and use a strong cleaning solvent to eliminate odors and bacteria.

Electronics

Remove as many as possible to avoid condensation caused by the extreme rise and fall of temperature and humidity that come with winter.

Interior & Ventilation

Clean the cabin thoroughly with a damp rag, for any salt left behind will breed mildew. Clean out the head and sinks. Any paper items- books, toilet paper, notepads- should be taken off so they don't mildew and rot.

If a winter cover is used, it is good to leave the hatches cracked open to enhance air circulation. This helps prevent mildew. Also, remove boat cushions and store indoors.

Exterior

If storing outdoors, a winter cover is recommended. It can be a simple piece of canvas forming a tent over the entire boat or heat-shrunk plastic. In either case, a tent-like support structure is necessary to prevent pools of water and to assure proper air circulation.

Ensure the entire deck is covered to prevent uneven discoloration of the gelcoat.

Cradle

It is critical the boat is adequately supported. The keel must rest solidly on the main beam and the vertical risers merely stabilize the boat. If it appears that the boat is supported too much by the vertical risers, correct the problem…. as this could structurally damage the hull.

Mast Storage

Store masts on well-padded supports and do not place any weights on them. Avoid tape on the mast surface as it leaves a difficult to remove residue. Wash all surfaces, sheaves, standing rigging with fresh water. If possible, remove all standing rigging, halyards and mast instruments and store indoors. For painted masts, it is usually NOT advisable to wrap the mast in plastic, as moisture can become trapped, and lead to premature paint blistering.