

# HUNTER OWNER'S MANUAL

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- Other:

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# *Welcome to* **THE HUNTER MARINE FAMILY**

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Congratulations on your new sailing yacht manufactured by Hunter Marine. We have engineered and constructed your boat to be as fine a yacht as any afloat. In order to get the best performance and most enjoyment from your boat you should be familiar with its various elements and their functions. For your sailing pleasure and safety, please take time to study this manual.

We stand behind the quality of your boat with a warranty, which you should review. To insure the validity of your warranty, please complete the attached card and send it to us within ten (10) days of the purchase date. Section 15 of the U.S. Federal Boat Safety Act requires registration of a boat's first owner. The warranty data should also be recorded in the space below for your own reference.

This manual has been compiled to help you operate your craft with safety and pleasure. It contains details of the craft; equipment supplied

or fitted, systems, and information on operation and maintenance. Please read it carefully, and familiarize yourself with the craft before using it. If this is your first sailboat or you are changing to a type of craft you are not familiar with, please ensure that you obtain proper handling and operating experience before you assume command of the craft. Your dealer or national sailing federation or yacht club will be pleased to advise you of local sea schools or competent instructors.

**PLEASE KEEP THIS MANUAL IN A SAFE PLACE AND HAND IT OVER TO THE NEW OWNER IF YOU SELL THE CRAFT.**

You should also complete the warranty cards for your engine, stove, head, electric water pump and other accessories. These are enclosed in the manufacturers' manuals that are packaged with your owner's manual.

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## **OWNER INFORMATION CARD**

HULL IDENTIFICATION NUMBER IS ON THE STARBOARD AFT SIDE OF THE HULL OR TRANSOM.  
THIS NUMBER MUST BE GIVEN IN ALL NECESSARY CORRESPONDENCE.

*HULL NO.*

*DATE DELIVERED TO OWNER*

*YACHT NAME*

*OWNER NAME*

*STREET ADDRESS*

*CITY*

*STATE/COUNTRY*

*ZIP CODE*

*HOME PORT*

*ENGINE MODEL*

*SERIAL NO.*

*PROPELLER SIZE*

*DEALER*

*PHONE*

*STREET ADDRESS*

*CITY*

*STATE/COUNTRY*

*ZIP CODE*

# HUNTER MARINE LIMITED WARRANTY

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## LIMITED ONE-YEAR WARRANTY

Hunter Marine warrants to the first-use purchaser and any subsequent owner during the warranty period, that any part manufactured by Hunter will be free of defects caused by faulty workmanship or materials

for a period of twelve (12) months from the date of delivery to the first-use purchaser under normal use and service. During this period, Hunter will repair or replace any part judged to be defective by Hunter.

## LIMITED FIVE-YEAR HULL STRUCTURE AND BOTTOM BLISTER WARRANTY

Hunter warrants to the first-use purchaser and any subsequent owner during the warranty period that the hull of each boat will be free from structural defects in materials and workmanship for a period of five (5) years from the date of delivery to the first-use purchaser under normal use and service.

This limited warranty applies only to the structural integrity of the hull and supporting pan/grid or stringer system. Hulls, pan/grid or stringers modified in any way or powered with engines other than the type and size installed or specified by Hunter are not covered by this limited warranty. The obligation of Hunter under this limited warranty is restricted to the repair or replacement of hulls that are determined to be structurally defective.

Hunter also warrants to the first-use purchaser and any subsequent owner during the warranty period that the boat will be free from gel-coat blistering on underwater surfaces of the hull, excluding the keel and rudder, for a period of five (5) years from the date of delivery to the first-use purchaser

under normal use and service. During this period, Hunter will supply or reimburse an authorized Hunter dealer for all of the parts and labor required to repair a blistered underwater surface of the hull. The labor cost reimbursement will be based on the Labor Allowance Schedule established by Hunter. However, if a non-Hunter dealer performs the repair, the repair cost must be authorized by Hunter in advance and be based on a reasonable number of hours as determined by Hunter. Transportation, hauling, launching, bottom paint, storage, dockage, cradling rental, rigging and derigging, or other similar costs will not be paid by Hunter. We recommend that the repair be done during a seasonal haul out for service or storage.

The bottom blister warranty is **void** under the following circumstances:

- (1) If the gel-coat has been sanded, sandblasted, or subjected to abrasion or impact.
- (2) If the instructions provided in the Hunter Owner's manual regarding bottom preparation techniques are not followed.

## RESTRICTIONS APPLICABLE TO WARRANTIES

These limited warranties **do not cover** the following:

(1) Paint, window glass, gel-coat, upholstery, engines, engine parts, bilge pumps, stoves, blowers, pressure water pumps, propellers, shafts, rudders, controls, instruments, keels and equipment not manufactured by Hunter. Any warranty made by the manufacturer of such items will be, if possible, given on to the first-use purchaser.

(2) Problems caused by improper maintenance, storage, cradling, blocking,

normal wear and tear, misuse, neglect, accident, corrosion, electrolysis or improper operation.

**THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY AND ALL OTHER REMEDIES AND WARRANTIES EXPRESSED AND IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS. SOME STATES OR COUNTRIES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. THE PURCHASER**

# **HUNTER MARINE LIMITED WARRANTY**

ACKNOWLEDGES THAT NO OTHER REPRESENTATIONS WERE MADE TO HIM ANY CONSEQUENTIAL DAMAGES THAT MAY BE INCURRED ARE EXCLUDED AND JUDGED DEFECTIVE BY HUNTER. SOMESTATES OR COUNTRIES DO NOT ALLOW THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE

OR HER WITH RESPECT TO THE QUALITY AND FUNCTION OF THE BOAT. ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS THAT VARY FROM STATE TO STATE OR COUNTRY TO COUNTRY.

## **WARRANTY REGISTRATION**

These limited warranties shall not be effective unless the Hunter Warranty Registration Form and Pre-Delivery Service Record, which are furnished with each new boat, are filled out completely and returned to Hunter within fifteen (15) days of delivery. Responsibility for sending the completed Registration Form remains with the dealer.

It is critical that the Warranty Registration Form is signed by both the dealer and the owner and returned to Hunter. Warranty coverage cannot be initiated until Hunter receives the completed form. All repairs and/or

replacements will be made by an authorized Hunter dealer, or at the option of Hunter, at the Hunter plant. If the repairs are of such a nature that the warranty work must be performed at the Hunter plant, the owner shall pay transportation costs to and from the Hunter plant. The labor cost reimbursement will be based on a labor allowance schedule established by Hunter and where not applicable, on a reasonable number of hours as determined by Hunter. An authorized Hunter service representative must approve any repairs and replacements in advance.

## **TRANSFER OF LIMITED WARRANTIES**

Limited warranties will be transferred to a subsequent purchaser of the boat if:

(1) The subsequent purchaser gives Hunter written notice of transfer of ownership within thirty (30) days of the transfer.

(2) The notice shall include the name, address and telephone number of the

subsequent purchaser, the date of purchase, the hull number, and the name of the seller of the boat.

Hunter will mail notice of expiration dates of the limited warranties to the subsequent owner. The transfer of the ownership of the will not extend the expiration dates of the limited warranties.

## **EPOXY BARRIER COAT**

Should a customer wish to have an epoxy barrier applied to the hull, ( ex. Interlux Interprotect 1000/2000, West Systems, VC Tar), this will not void the five-year blister warranty. This refers to epoxy barrier coatings as mentioned above, not epoxy primer paints.

If an epoxy barrier coat is applied to a Hunter vessel, it must be registered with the Warranty Department **prior** to application of the product. If the dealer applies bottom paint only, sanding **will not** be allowed and the no sanding system must be used.

## **CUSTOMER SATISFACTION SURVEY**

During the first year of ownership, the first purchaser will receive two Customer Satisfaction Surveys: the first (CSS #1) will be received shortly after taking delivery and focuses on the customer's experience with the dealer and commissioning of the boat, and the owner's initial satisfaction. The

second survey (CSS #2) is given nine to ten months into ownership, and primarily gives the customer an opportunity to evaluate dealer service capability and the boat's functional systems and characteristics. Both surveys are contingent upon receipt of the first purchaser's Warranty Registration form.

## HUNTER MARINE'S OWNER AND FOUNDER

# WARREN R. LUHRS

### BRIEF BACKGROUND

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Warren Luhrs was born in East Orange, New Jersey in 1944 into a family with an established tradition in the maritime and transportation industries. His great-grandfather, Henry, was a railroad and clipper-shipping pioneer in America, while his great-uncle John helped build the famous St. Petersburg to Moscow railroad for Czar Alexander II.

Henry Luhrs owned shares in twenty-two different ocean-going vessels – barks, brigs, and schooners - and was the principal owner of the bark *Sophia R. Luhrs*, named for his wife. He was also a partner with Albert Sprout, who managed the shipyard where the *Sophia R. Luhrs* was built in Melbridge, Maine.

Warren Luhrs' father Henry worked at a small boat manufacturer in Morgan, New Jersey, and later started his own company, continuing the Luhrs' family sea tradition during the great depression. During World War II he repaired boats and installed ice sheathing on their bows for the Coast Guard.

After the War, Henry built 27-foot fishing boats and in 1948 began to construct custom-built pleasure craft. He then turned to skiffs and in 1952 incorporated as Henry Luhrs Sea Skiffs, where he constructed lapstrake sea skiffs using assembly-line techniques. Henry personally "shook down" his prototypes on family trips up the Hudson River to Lake Champlain.

The sea skiff is a class of boat that has been very popular, owing to its seaworthiness. It features a sharp bow, which reduces pounding in surf or

choppy seas, and a hull whose forward section is rounded below the waterline to increase stability in rough water or a following sea. Such skiffs can either be smooth sided or of a lapstrake construction.

Inspired by Henry Ford, Henry Luhrs' aimed to give the average man the opportunity to enjoy the luxury of boating by building an affordable and reliable boat. He was both designer and engineer, and his progressive new models exhibited his talent for innovation. He successfully changed the line of the bow from straight to curved at a time when the industry trend was a straight square effect, and he is believed to be the first designer-builder to popularize a small boat with a fly bridge.

In 1960, Luhrs acquired the Ulrichsen Boat Company of Marlboro, New Jersey. It was here that Luhrs' Alura fiberglass division was located. In 1965, Henry sold his company to Bangor Arrostock Railroad, which was to become the recreational conglomerate Bangor-Punta. It was also during this period that Silverton of Tom's River, New Jersey was purchased by John and Warren Luhrs.

Today, Warren R. Luhrs and his brother John own the Luhrs Group of marine manufacturers, which consists of Silverton Marine, Mainship Motor Yachts, and Luhrs Fishing Boats with its Alura division, as well as Hunter Marine, which exclusively manufactures sailboats.

In January of 1996, the Luhrs family transferred a portion of the Luhrs Group to its employees through an ESOP program.

# GLOSSARY OF SAILING TERMS

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## A

**Aback:** describes a sail when the wind strikes it on the lee side.

**Abaft:** towards the boat's stern.

**Abeam:** at right angles to the *center-line* of the boat.

**Aft:** at or near the stern.

**Amidships:** the center of the boat, *athwartships* and fore and aft.

**Anti-fouling:** a poisonous paint compound used to protect the underwater part of a hull from marine growths.

**Apparent wind:** The direction and speed of the wind felt by the crew. It is a combination of *true wind* and that created by the movement of the boat.

**Astern:** behind the boat; to go astern is to drive the boat in reverse.

**Athwartships:** at right angles to the fore and aft line of the boat.

## B

**Back:** when a wind backs, it shifts anticlockwise.

**Back a sail:** to sheet it to windward so that the wind fills on the side that is normally to *leeward*.

**Backstay:** a stay that supports the mast from aft and prevents its forward movement.

**Ballast:** extra weight, usually lead or iron, placed low in the boat or externally on the keel to provide stability.

**Ballast keel:** a mass of ballast bolted to the keel to increase stability and prevent a keel boat from capsizing.

**Batten:** a light, flexible strip fed into a batten pocket at the *leech* of the sail to support the *roach*.

**Beam:** 1, the maximum breadth of a boat; 2, a transverse member that supports the deck; 3, on the beam means that an object is at right angles to the centerline.

**Bear away:** to steer the boat away from the wind.

**Bearing:** the direction of an object from an observer, measured in degrees true or magnetic.

**Beat:** to sail a *zigzag course* towards the wind, *close-hauled* on alternate *tacks*.

**Delay:** to make fast a rope around a *cleat*, usually with a figure-of-eight knot.

**Bend:** 1, to secure a sail to a spar before hoisting; 2, to moor a boat; 3, a sleeping place on board.

**Bight:** a *bend* or loop in a rope.

**Bilge:** the lower, round part inside the hull where the water collects.

**Block:** a pulley in a wooden or plastic case, consisting of a *sheave* around which a rope runs. It is used to change the direction of pull.

**Boot-topping:** a narrow colored stripe painted between the bottom paint and the *topside* enamel.

**Bottlescrew:** see Rigging screw.

**Broach:** when a boat *running* downwind slews broadside to the wind and *heels* dangerously. It is caused by heavy following seas or helmsman's error.

**Broad reach:** the point of sailing between a beam *reach* and a *run*, when the wind blows over a quarter.

**Bulkhead:** a partition wall in a boat normally fitted *athwartships*

## C

**Caulk:** to make the seams between wooden planks watertight by filling with cotton, oakum or a compound.

**Cavitation:** the formation of a vacuum around a propeller, causing a loss in efficiency.

**Center-board:** a board lowered through a slot in the *keel* to reduce *leeway*.

**Center-line:** center of the boat in a fore and aft line.

**Center of effort (COE):** the point at which all the forces acting on the sails are concentrated.

**Center of lateral resistance (CLR):** the underwater center of pressure about which a boat pivots when changing *course*.

**Chain pawl:** a short lug which drops into a toothed rack to prevent the anchor chain running back.

**Chain plate:** a metal plate bolted to the boat to which the *shrouds* or *backstays* are attached.

**Chart datum:** reference level on a chart below which the tide is unlikely to fall. Soundings are given below

chart datum. The datum level varies according to country and area.

**Chine:** the line where the bottom of the hull meets the side at an angle.

**Cleat:** a wooden, metal or plastic fitting around which rope is secured.

**Clevis pin:** a locking pin through which a split ring is passed to prevent accidental withdraw.

**Clew:** the after, lower center of a sail where the foot and *leech* meet.

**Close-hauled:** the *point of sailing* closest to the wind; see also *beat*.

**Close reach:** the *point of sailing* between *close-hauled* and a beam reach, when the wind blows forward of the *beam*.

**Close-winded:** describes a boat able to sail very close to the wind.

**Coaming:** the raised structure surrounding a hatch, cockpit, etc., which prevents water entering.

**Cotter pin:** soft, metal pin folded back on itself to form an eye.

**Course:** the direction in which a vessel is steered, usually given in degrees; true, magnetic or compass.

**Cringle:** 1, a rope loop, found at either end of a line of reef points; 2, an eye in a sail.

## D

**Dead run:** running with the wind blowing exactly aft, in line with the *center-line*.

**Deviation:** the difference between the direction indicated by the compass needle and the magnetic *meridian*; caused by object aboard.

**Displacement:** 1, the weight of water displaced by a boat is equal to the weight of the boat; 2, a displacement hull is one that displaces its own weight in water and is only supported by buoyancy, as opposed to a planning hull which can exceed its hull, or displacement, speed.

**Downhaul:** a rope fitted to pull down a sail or spar.

**Draft:** the vertical distance from the waterline to the lowest point of the keel.

**Drag:** 1, an anchor drags when it fails to hold; 2, the force of wind on the sails, or water on the hull, which impedes the boat's progress.



# GLOSSARY OF SAILING TERMS

**Drift:** 1, to float with the current or wind; 2, US the speed of a current (rate UK); 3, UK: the distance a boat is carried by a current in a given time.

**Drogue:** a sea anchor put over the stern of a boat or life raft to retard *drift*.

**Drop keel:** a retractable *keel* which can be drawn into the hull, when entering shallow waters and recovering on to a trailer.

## E

**Eye of the wind:** direction from which the true wind blows.

## F

**Fair:** well-faired line or surface is smoother with no bumps, hollows or abrupt changes in directions.

**Fairlead:** a fitting through which a line is run to alter the lead of the line.

**Fathom:** the measurement used for depths of water and lengths or rope. 1 fathom = 6 ft. or 1.83m.

**Fid:** a tapered tool used for *splicing* heavy rope and for sail-making, often hollow.

**Fiddle:** a raised border for a cabin table, chart table etc., to prevent objects falling off when the boat *heels*.

**Fix:** the position of the vessel as plotted from two or more position lines.

**Forestay:** the foremost stay, running from the masthead to the stemhead, to which the headsail is hanked.

**Freeboard:** vertical distance between the *waterline* and the top of the deck.

## G

**Genoa:** a large headsail, in various sizes, which overlaps the mainsail and is hoisted in light to fresh winds on all points of *sailing*.

**Gimbals:** two concentric rings, pivoted at right angles, which keeps objects horizontal despite the boat's motion, e. g. compass and cooker.

**Go about:** to turn the boat through the *eye of the wind* to change tack.

**Gooseneck:** the fitting attaching the boom to the mast, allowing it to move in all directions.

**Goosewing:** to boom-out the headsail to windward on a run by using a

*whisker pole* to hold the sail on the opposite side to the mainsail.

**Ground tackle:** general term used for anchoring gear.

**Guard rail:** a metal rail fitted around the boat to prevent the crew falling overboard.

**Gudgeon:** a rudder fitting. It is the eye into which the *pintle* fits.

**Guy:** a steadying rope for a spar; a spinnaker guy controls the fore and aft position of the spinnaker pole; the foreguy holds the spinnaker pole forward and down.

**Gybe:** to change from one *tack* to another by turning the stern through the wind.

## H

**Halyard:** rope used to hoist and lower sails.

**Hank:** fitting used to attach the *luff* of a sail to a stay.

**Hatch:** an opening in the deck giving access to the interior.

**Hawes pipe:** see *Navel pipe*.

**Head-topwind:** when the bows are pointing right into the wind.

**Headfoil:** a streamlined surround to a *forestay*, with a groove into which a headsail *luff* slides.

**Heads:** the toilet.

**Headway:** the forward movement of a boat through the water.

**Heave-to:** to *back* the jib and lash the tiller to *leeward*; used in heavy weather to encourage the boat to lie quietly and to reduce *headway*.

**Heaving line:** a light line suitable for throwing ashore.

**Heel:** to lean over to one side.

## I

**Isobars:** lines on a weather map joining places of equal atmospheric pressure.

## J

**Jackstay:** a line running fore and aft, on both sides of the boat, to which safety harnesses are clipped.

**Jury:** a temporary device to replace lost or damaged gear.

## K

**Keel:** the main backbone of the boat to which a *ballast keel* is bolted or

through which the *centerboard* passes.

**Kicking strap:** a line used to pull the boom down, to keep it horizontal, particularly on a reach or run.

## L

**Lanyard:** a short line attached to one object, such as a knife, with which it is secured to another.

**Leech:** 1, the after edge of a triangle sail; 2, both side edges of a square sail.

**Leehelm:** the tendency of a boat to bear away from the wind.

**Lee shore:** a shore on to which the wind blows.

**Leeward:** away from the wind; the direction to which the wind blows.

**Leeway:** the sideways movement of a boat off its *course* as a result of the wind blowing on one side of the sails.

**Lifeline:** a wire or rope rigged around the deck to prevent the crew falling overboard.

**Limber holes:** gaps left at the lower end of frames above the *keel* to allow water to drain to the lowest point of the *bilges*.

**List:** a boat's more or less permanent lean to one side, owing to the improper distribution of weight, e.g., *ballast* or water.

**Log:** 1, an instrument for measuring a boat's speed and distance traveled through the water; 2, to record in a book the details of a voyage, usually distances covered and weather.

**Luff:** the forward edge of a sail. To luff up is to turn a boat's head right into the wind.

**Luff groove:** a groove in a wooden or metal spar into which the *luff* of a headsail is fed.

**Lurch:** the sudden roll of a boat.

## M

**Marlin spike:** a pointed steel or wooden spike used to open up the strands of rope or wire then splicing.

**Mast Step:** the socket in which the base of the mast is located.

**Measured mile:** a distance of one nautical mile measured between buoys or *transits/ranges* ashore, and marked on the chart.

# GLOSSARY OF SAILING TERMS

**Member:** a part of the skeleton of the hull, such as a *stringer* laminated into fiberglass hull to strengthen it.

**Meridian:** an imaginary line encircling the Earth that passes through the poles and cuts at right angles through the Equator. All lines of longitude are meridians.

**Mizzen:** 1, the shorter, after-mast on a *ketch* or *yawl*; 2, the fore and aft sail set on this mast.

## N

**Navel pipe:** a metal pipe in the foredeck through which the anchor chain passes to the locker below.

**Noon Sight:** a vessel's latitude can be found, using a sextant, when a heavenly body on the observer's *meridian* is at its greatest altitude. The sight of the sun at noon is the one most frequently taken.

## O

**Off the wind:** with the sheets slacked off, not *close-hauled*.

**On the wind:** *close-hauled*.

**Out haul:** a rope used to pull out the foot of a sail.

**Overall length (LOA):** the boat's extreme length, measured from the foremost part of the bow to the aftermost part of the stern, excluding bowsprit, self-steering gear etc.

## P

**Painter:** the bow line by which a dinghy, or *tender*, is towed or made fast.

**Pintle:** a rudder fitting with a long pin that fits into the *gudgeon* to form a hinged pivot for the rudder.

**Pitch:** 1, the up and down motion of the bows of a boat plunging over the waves; 2, the angle of the propeller blades.

**Point of sailing:** the different angles from which a boat may sail; the boat's *course* relative to the direction of the wind.

**Port:** the left-hand side of the boat, looking forward (opp. of *starboard*).

**Port tack:** a boat is on a port tack when the wind strikes the port side first and the mainsail is out to *starboard*. A boat on the port tack

gives way to a boat on a starboard tack.

**Position line/ Line of position:** a line drawn on a chart, as a result of taking a bearing, along which the boat's position must be i.e. Two position lines give a fix.

**Pulpit:** a metal *guard rail* fitted at the bows of a boat to provide safety for the crew.

**Pushpit:** a metal *guard rail* fitted at the stern.

## Q

**Quarter:** the portion of the boat midway between the stern and the beam; on the quarter means about 45 degrees *abaft* the beam.

## R

**Rake:** the fore and aft deviation from the perpendicular of a mast or other feature of a boat.

**Range:** 1, see *transit*; 2, of tides, the difference between the high and low water levels of a tide; 3, the distance at which a light can be seen.

**Rating:** a method of measuring certain dimensions of a yacht to enable it to take part in handicap races.

**Reach:** to sail with the wind approximately on the *beam*; all sailing points between running and *close-hauled*.

**Reef:** to reduce the sail area by folding or rolling surplus material on the boom or *forestay*.

**Reefing pennant:** strong line with which the *luff* or leech *cringle* is pulled down to the *boom* when reefing.

**Rhumb line:** a line cutting all *meridians* at the same angle; the *course* followed by a boat sailing in a fixed direction.

**Riding light to anchor light:** an all-around white light, usually hoisted on the *forestay*, to show that a boat under 50 ft. (15m.) is at anchor. It must be visible for 2 mls. (3 km.).

**Rigging screw:** a deck fitting with which the tensions of standing rigging, e.g. stays, shrouds, etc. are adjusted.

**Roach:** the curved part of the *leech* of a sail that extends beyond the direct line from head to *clew*.

**Run:** to run with the wind *aft* and with the *sheets* eased well out.

**Running rigging:** all the moving lines, such as *sheets* and *halyards*, used in the *setting* and *trimming* of sails.

## S

**Scope:** the length of rope or cable paid out when mooring or anchoring.

**Scuppers:** 1, holes in the toe rail that allow water to drain off the deck; 2, drain cockpit through hull.

**Seacock:** a valve that shuts off an underwater inlet or outlet passing through the hull.

**Seize:** to bind two ropes together, or a rope to a *spar*, with a light line.

**Serve:** to cover and protect a *splice* or part of a rope with twine bound tightly against the lay.

**Serving mallet:** tool with a grooved head, used when serving a rope to keep the twine at a constant and high tension.

**Set:** 1, to hoist a sail; 2, the way in which the sails fit; 3, the direction of tidal current or steam.

**Shackle:** a metal link with a removable bolt across the end; of various shapes: D, U.

**Sheave:** a grooved wheel in a *block* or *spar* for a rope to run on.

**Sheet:** the rope attached to the *clew* of a sail or to the boom, enabling it to be controlled or *trimmed*.

**Shrouds:** ropes or wires, usually in pairs, led from the mast to the *chain plates* at deck level to prevent the mast falling sideways; part of the standing rigging.

**Sloop:** a single-masted sailing boat with a mainsail and one head sail.

**Spar:** a general term for any wooden or metal pole, e.g., mast or boom, used to carry or give shape to sails.

**Spindrift:** spray blown along the surface of the sea.

**Spinnaker:** a large, light, balloon shaped sail set when *reaching* or *running*.

**Splice:** to join ropes or wire by unlaying the strands and interweaving them.

**Split pin:** see *cotter pin*.

# GLOSSARY OF SAILING TERMS

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**Spreaders:** horizontal struts attached to the mast, which extends to the *shrouds* and help to support the mast.

**Stall:** a sail stalls when the airflow over it breaks up, causing the boat to lose way.

**Stanchion:** upright metal post bolted to the deck to support guardrails or lifelines.

**Standing part:** the part of a line not used when making a knot; the part of a rope that is made fast, or around which the knot is tied.

**Standing rigging:** the shrouds and stays that are permanently set up and support the mast.

**Starboard:** right-hand side of a boat looking forward (opp. of *port*).

**Starboard tack:** a boat is the starboard tack when the wind strikes the starboard side first and the boom is out to the *port*.

**Stay:** wire or rope which supports the mast in a fore and aft direction; part of the *standing rigging*.

**Steerage way:** a boat has steerage way when it has sufficient speed to allow it to be steered, or to answer the helm.

**Stem:** the timber at the bow, from the keel upward, to which the planking is attached.

**Sternway:** the backward, stern-first movement of a boat.

**Stringer:** a fore and aft member, fitted to strengthen the frames.

## T

**Tack:** 1, the lower forward corner of a sail; 2, to turn the boat through the wind so that it blows on the opposite sides of the sails.

**Tacking:** working to windward by sailing *close-hauled* on alternate *courses* so that the wind is first on one side of the boat, then on the other.

**Tack pennant:** a length of wire with an eye in each end, used to raise the tack of a headsail some distance off the deck.

**Tackle:** a purchase system comprising of rope and *blocks* that is used to gain mechanical advantage.

**Tang:** a strong metal fitting by which *standing rigging* is attached to the mast or other *spar*.

**Tender of dinghy:** a small boat used to ferry stores and people to a yacht.

**Terminal fitting:** fitting at the end of a wire rope by which a *shroud* or stay can be attached to the mast, a *tang* or a *rigging screw/turnbuckle*.

**Tide:** the vertical rise and fall of the oceans caused by the gravitational attraction of the moon.

**Toe rail:** a low strip of metal or molding running around the edge of the deck.

**Topping lift:** a line from the masthead to a spar, normally the boom, which is used to raise it.

**Topsides:** the part of a boat's hull that is above the waterline.

**Track:** 1, the course a boat has made good; 2, a fitting on the mast or boom into which the slides on a sail fit; 3, a fitting along which a traveller runs, used to alter the angle of the sheets.

**Transit:** two fixed objects are in transit when seen in line; two transit give position fix.

**Traveller:** 1, a ring or hoop that can be hauled along a *spar*; 2, a fitting that slides in a *track* and is used to alter the angle of the *sheets*.

**Trim:** 1, to adjust the angle of the sails, by means of *sheets*, so that they work most efficiently; 2, to adjust the boat's load, and thus the fore and aft angle at which it floats.

**True wind:** the direction and speed of the wind felt when stationary, at anchor or on land.

**Turnbuckle:** see *Rigging screw*.

## U

**Under way:** a boat is under way when it is not made fast to shore, at anchor or aground.

**Uphaul:** a line used to raise something vertically, e.g., the spinnaker pole.

## V

**Veer:** 1, the wind veers when it shifts in clockwise direction; 2, to pay out anchor cable or rope in a gradual, controlled way.

## W

**Wake:** the disturbed water left *astern* of a boat.

**Waterline:** the line along the hull at which a boat floats.

**Waterline length (WL):** the length of a boat from *stem* to *stern* at the *waterline*. It governs the maximum speed of *displacement hull* and effects a boat's *rating*.

**Weather helm:** (opp. of *lee helm*).

**Weather side:** the side of a boat on which the wind is blowing.

**Wetted surface:** the area of the hull under water.

**Whisker pole:** a light pole used to hold out the *clew* of a headsail when *running*.

**Winch:** a mechanical device, consisting usually of a metal drum turned by a handle, around which a line is wound to give the crew more purchasing power when hauling taut a line, e.g. a *jib sheet*.

**Windage:** those parts of a boat that increase *drag*, e.g., rigging, spars, crew, etc.

**Windlass:** a *winch* with a horizontal shaft and a vertical handle, used to haul up the anchor chain.

**Windward:** the direction from which the wind blows; towards the wind (opp. of *leeward*).

## Y

**Yawl:** a two masted boat with a mizzen stepped aft of the rudder stock/ post.

## *EXPLANATION OF SAFETY PRECAUTIONS*

This manual contains safety precautions that must be observed when operating or servicing your boat.  
Review and understand these instructions.

### **DANGER**

Denotes an extreme intrinsic hazard exists which would result in high probability of death or irreparable injury if proper precautions are not taken

### **WARNING**

Denotes a hazard exists which can result in injury or death if proper precautions are not taken

### **CAUTION**

Denotes a reminder of safety practices or directs attention to unsafe practices which could result in personal injury or damage to the craft or components

# SAFE BOATING TIPS

## BE PREPARED

Take a safe boating course. In the U.S., contact your local Boating Industry for details.

Carry all safety equipment required by the laws that apply to your area. Requirements are generally available from the Coast Guard or your local boating industry.



### WARNING

**As the owner of the craft, obtaining and maintaining necessary safety equipment is your responsibility. For more information about equipment required, contact local boating authorities**

## MINIMUM RECOMMENDED SAFETY EQUIPMENT

- Required life saving equipment, including life vests and throwables
- Required fire extinguishing equipment
- First Aid kit
- Emergency Position Indicating Radio Beacon (EPIRB)
- Manual bailing device
- Anchor with sufficient line and/or chain
- Flashlight with good batteries
- Binoculars
- VHF radio
- Appropriate navigational charts
- Flares
- Fog bell
- Noise emitting device
- Radar reflector
- Sufficient food and water provisions
- Auxiliary starting battery
- Spare fuses and bulbs
- Sunglasses and block
- Blanket

The legally required on-board safety equipment may vary by region or body of water. Please check with local authorities prior to departure for a safety examination.

## LIFE JACKETS

A life jacket may save your life, but only if you wear it. Keep jackets in a readily accessible place – not in a closed compartment or stored under other gear. Remove them from any packaging, and keep throwable floatation devices ready for immediate use.



### WARNING

It is very important that children, handicapped people, and non-swimmers wear lifejackets at all times. Make sure all passengers are properly instructed in use of life saving gear

## FIRE EXTINGUISHERS

Approved fire extinguishers are required on most boats, local authorities can provide details. All passengers should know the location and operating procedure of each fire extinguisher. Fire extinguishers are normally classified according to fire type. Be familiar with the type of fire extinguishers you have on board.

**Your boat has been equipped with an Automatic Fire Extinguisher.** In the event of a fire in your engine compartment, this unit will automatically discharge. Please read your SEA-FIRE manual for operating instructions, maintenance and precautionary information.

# SAFE BOATING TIPS


## FLARES

Most boats operating on coastal waters are required to carry approved visual distress signals, therefore check with your local authorities as to which types are required.

 <b>WARNING</b>
<b>FIRE/EXPLOSION HAZARD;</b> Pyrotechnic signaling devices can cause injury and property damage if not handled properly. Follow manufacturer's directions regarding the proper use of signaling devices.

## DRUGS AND BOATING

Consumption of alcohol while boating is not recommended. The combination of noise, sun, wind, and motion act to produce fatigue on the water, and can exaggerate the effects of alcohol.


 <b>WARNING</b>
<b>IMPAIRED OPERATION HAZARD</b> Operating any boat while is intoxicated or under the influence of drugs is both dangerous and illegal. Impaired vision or judgment on the water can lead to accidents and personal injury

## BEFORE GETTING UNDERWAY

- Leave a float plan (example on p. 13)
- Perform a pre-departure checklist (example on p. 12)
- Check the weather. Do not venture out if the weather is, or will be, threatening.

## WHILE UNDERWAY

- Keep a good lookout. Keep a watch to the leeward under the headsail. Keep away from swimmers, divers, and skiers.
- Know and obey local boating laws.
- Respect bad weather, and be prepared for quickly changing conditions.

 <b>WARNING</b>
<b>COLLISION HAZARD</b> Use extra caution in shallow water or where underwater/floating objects may be present. Hitting an object at speed or severe angle can seriously injure people and damage your boat

## *PRE-DEPARTURE CHECKLIST*

- Check bilge for extra water
- Check weather conditions and tides
- Check food supply
- Foul weather gear
- Linen, sleeping bags
- Fuel
- Water
- Sunscreens and sunglasses
- Tools
- Docking and anchor gear
- Check radio operations
- Navigation charts and instruments
- Float plans to a friend or Coast Guard** (*see next page*)
- Fuel for stove
- Cooking and eating utensils
- Check battery water level
- Oil level, tight Vp-belts
- Check for loose electrical connections in engine compartment
- Secure tools or any loose equipment in engine compartment so as not to get fouled in engine
- AC systems off; electrical cord stowed
- Doors and drawers secured
- Check steering lock to lock
- Check mast for rigging irregularities and tightness
- Halyards and sheets are clear and ready to run
- No lines or other obstructions near propeller or bow
- Anchor ready to run
- Check lifelines for tightness
- Turn on fuel and waterlines
- Stow all loose gear
- Open engine cooling water intake thru-hull valve

# FLOAT PLAN

## 1. Name of person reporting and telephone number:

## 2. Description of boat

NAME	TYPE	
MAKE	LENGTH	REGISTRATION#
HULL COLOR	STRIPE COLOR	DECK COLOR
OTHER DISTINGUISHING MARKS		

## 3. Number of Persons aboard

NAME	AGE	PHONE #
ADDRESS		
NAME	AGE	PHONE #
ADDRESS		
NAME	AGE	PHONE #
ADDRESS		

## 4. Engine

TYPE	H.P.	FUEL CAPACITY
------	------	---------------

## 5. Safety equipment

PFDs	<input type="checkbox"/>	Flares	<input type="checkbox"/>	Mirror	<input type="checkbox"/>	Flashlight	<input type="checkbox"/>
Food	<input type="checkbox"/>	Water	<input type="checkbox"/>	EPIRB	<input type="checkbox"/>	Raft/Dinghy	<input type="checkbox"/>

## 6. Radio

TYPE	FREQUENCIES
------	-------------

## 7. Trip Expectations

DEPARTURE TIME	DATE	FROM
DESTINATION	RETURN DATE	NO LATER THAN

## 8. Automobile:

LICENSE #	STATE	MAKE
COLOR	PARKED AT	

## 9. If not returned by-

Contact the Coast Guard or-

CALL - \_\_\_\_\_ AT- \_\_\_\_\_



# AFTER SAILING CHECKLIST

When leaving your Hunter at the dock for more than a short time, it is a good idea to review the following checklist to make sure everything is in order. This

will help protect the various parts of your boat and add considerably to their attractiveness and usable life.

- Flake or furl mainsail and cover, or remove and bag.
- Remove and stow all portable deck hardware such as snatch blocks, winch handles, etc.
- Secure the boom to the topping lifts and set it firmly amidships with the main sheet purchase. (It is also a good idea to rig a line from the steering wheel or tiller to a convenience cleat to keep the rudder from swinging back and forth with the motion of the water or employ the wheel brake if so equipped.)
- Attach the shackle ends of all halyards to convenient fittings and take up slack. Find a location leading away from the mast to keep the halyard from slapping the mast.
- Coil and stow all lines in line lockers
- Cover the winches and steering pedestal when leaving the boat for several days or more
- Close all fuel lines and seacocks
- Switch off the electrical system
- Pump out the bilge
- Check air vents, secure ports and hatches, swab the deck, and clean deck stainless, particularly if you have operated in saltwater.
- Make a final check of mooring lines, chafing gear, fenders, etc.

# SAFE BOATING TIPS

## DOCKING

Docking your boat should be handled carefully to avoid potential damage. Under normal wind and water conditions, the following considerations should be made:

1. Whenever possible, your approach should be made against the prevailing wind and current to assist in stopping the boat. Where these conditions are contrary, the strongest should be used to determine approach.
2. Approaching the dock: dock lines should be at ready, loose gear stowed and decks cleared. Determine the direction of the wind and current and when you decide which side of the boat will be against the dock, rig dock lines and fenders on the appropriate side.

One dock line should be attached to the bow cleat, another to the stern cleat opposite the side that will lie against the dock. *NOTE: If the boat is to lie against a piling, rig a fender board across two or more pilings.*

3. Tying up: attach bow and stern lines to dock, hauling boat in with fenders against dock. Rig crossing spring lines to limit motion forward and aft. Be sure to allow some slack in all lines to compensate for tidal activity if present. Never use bow rail, stern rail, or stanchions to secure a vessel, even for brief periods. For other types of moorings, or for abnormal wind or water conditions, consult an approved boating guide.

## ANCHORING

Your Hunter comes with an on deck anchor well and a Danforth type anchor as standard equipment. The anchor is selected to suit the size and weight of your boat under normal anchoring conditions, and is most effective in muddy or sandy bottoms.

When anchoring, pay particular attention to the scope of your anchor rode (the relationship between of the water and the length of the rode). A good rule of thumb is to allow a scope of about 7:1 (a rode seven times as long as the vertical distance from the bow to the bottom). A helpful aid is to mark the rode every 20 feet or so with knots or other types of indicators. Before dropping anchor, make sure the bitter end is secured to the cleat in the anchor well. Also, be sure to consider wind direction, currents,

mean low tide depths and other local conditions when anchoring, as well as positions of any boats already anchored nearby.

To weigh anchor, motor or sail (under main only) forward slowly. When at a point directly above the anchor, a quick tug should free it from the bottom. Take care not to damage the topsides when hauling.



### WARNING


Anchoring in unusual water/ and or weather conditions will require additional precautions. Consult an approved guide for suggestions

# SAFE BOATING TIPS


## DIESEL ENGINE


An engine owner's manual is supplied with your boat and should be read thoroughly. It contains technical specifications, running instructions and a maintenance schedule on lubricants and fluids. For long engine life, follow routine maintenance schedules.

You should check engine oil, transmission fluid and coolant levels. Water, rust, scale and dirt will cause serious damage to the injectors on diesel engines. You should check your filters frequently and change when necessary. Check fuel line connections for proper tightness.


 <b>WARNING</b>
<b>EXPLOSION/FIRE HAZARD</b> – Fuel system connections that are too loose or too tight can leak, resulting in fuel loss, environmental pollution and explosion/fire hazard.

## FUELING YOUR DIESEL ENGINE

 <b>WARNING</b>
<b>EXPLOSION/FIRE HAZARD</b> <ul style="list-style-type: none"><li>•Store flammable material in safety-approved containers. Keep containers in a locker designed by the boat manufacturer for that purpose. Never store flammable material in a non-vented space.</li><li>•Observe “No-Smoking” while fueling.</li><li>•Run exhaust blower at least 4 minutes before starting engine. Check bilge and engine compartments for fumes.</li><li>•Keep ventilation system free of obstructions. Never modify the vent system.</li><li>•Fill less than the rated capacity of the tank. Allow for fuel expansion.</li><li>•If fuel enters bilge, do not start engine. Determine cause and severity. Contact a knowledgeable marine service to remove fuel. Do not pump overboard. Contact Coast Guard for additional advice (See Environmental Considerations Fuel &amp; Oil Spillage.)</li><li>• Inspect fuel system regularly for leaks.</li></ul>

 <b>DANGER</b>
<b>EXTREME HAZARD:</b> carbon monoxide gas (CO) is colorless, odorless and extremely dangerous. All engines and fuel burning appliances produce CO as exhaust. Direct and prolonged exposure to CO will cause BRAIN DAMAGE or DEATH. Signs of exposure to CO include nausea, dizziness and drowsiness. Refer to BOATING SAFETY for more information.

When you start your engine, run it a minimum of 15 minutes to bring it up to operating temperature. This insures that any condensation is evaporated. Your engine should “run out” at  $\frac{3}{4}$  throttle at least once a month to clean out carbon buildup and moisture.

 <b>CAUTION</b>
Follow engine manufacturer's recommendations for types of fuel and oil. Use of improper products can damage the engine and void the warranty.

Notice: Use fresh fuel. Fuel that has been in a tank too long can form gum and varnish, which may affect performance.

Inspect diesel fuel filters regularly. Diesel fuel must be kept as clean as possible. Keep fuel tank full.

# SAFE BOATING TIPS

## STARTING YOUR DIESEL ENGINE

1. Visually check engine compartment to see that the throttle linkage, shifting controls, electrical connections and fuel lines are properly secured.
2. **Before each start** check oil in engine and transmission.
3. Insure that the engine shut-off cable is properly secured and operating.
4. Place the shift lever in the neutral position. Pull out the button beside the shift lever to disengage the shift. On single lever controls, lift the collar under the shift lever knob and move the lever forward to advance the throttle for neutral warm-up.
5. Insert the starter key and turn to the "on" position.
6. Press the starter button and hold until engine starts, then release. The buzzer and/or light should then go off. **Press the starter button no longer than 5 seconds continuously.**
7. Allow cold engine to warm up a minimum of five minutes.
8. When warm-up is completed, return the hand lever to neutral position, and push

the button back to re-engage the shift. The shift is ready for shift and throttle operation.

9. Check that the lube oil pressure warning light and the charge lamp go off. If any of the warning lamps do not go off above 1,000 rpm, the engine is malfunctioning and should be stopped immediately. Consult your nearest engine dealer.

NOTE: The H386 and below are equipped with an "engine stop" pull lever. When pulled all the way out, this will stop the engine at any time.



### CAUTION

Follow engine manufacturer's recommendations for types of fuel and oil. Use of improper products can damage the engine and void the warranty.

## MOTERING YOUR DIESEL ENGINE

Before departure, remember to unplug the shore power. When the engine is warm, but prior to releasing the dock lines, move the shift lever to forward and to reverse to insure that it is working properly. To increase RPMs, push throttle lever forward and pull back to decrease RPMs. **IMPORTANT:** When sailing, it is best to start the engine before the sails are lowered. This way, it is possible to maneuver if the engine should not start.



### CAUTION

Your rigging will conduct electricity. Always check for overhead high tension wires before proceeding. Once clear, you may increase your speed in a reasonable and safe manner as desired.

## ELECTRICAL SYSTEM

Your Hunter is fitted with an electrical system designed for both AC and DC. While in port, you can operate any tool, appliance or other device designed to function on regular house current simply by plugging your dockside power cord into a convenient outlet on shore and turning your AC main breaker on.



### WARNING

**ELECTROCUTION HAZARD:** If polarity is reversed, **DO NOT** use the shore power source. Immediately turn off the power source and disconnect the shore power cord. Reversed polarity is a dangerous and potentially lethal condition that may cause shock, electrocution, or death.

# SAFE BOATING TIPS

## ELECTRICAL SYSTEM (continued)

To minimize shock hazard, connect and disconnect cable as follows:

1. Turn off the boat's shore power connection before connecting or disconnecting shore power cable.
2. Connect shore power cable at the boat first.
3. If polarity warning indicator is activated, immediately disconnect cable and have the fault corrected by a qualified electrician.
4. Disconnect shore power cable at shore outlet first.
5. Close inlet cover tightly.


**DO NOT ALTER SHORE POWER CABLE CONNECTORS.**

**Storage:** Your shore power cable set is intended for use outdoors. To prolong the life of the set, store indoors when not in use.

**General:** The metallic parts of your cable set are made to resist corrosion. In a salt-water environment, periodically wiping the exposed parts with fresh water, drying and spraying with a moisture repellent can increase life of the product.


A soiled cable can be cleaned with a grease cutting household detergent. A periodic application of vinyl protector to both ends will help to maintain cables original appearance.


In case of salt water immersion, rinse plug end and/or connector end thoroughly in fresh water, shake or blow out excess water and allow to dry. Spray with moisture repellent before re-use.

 <b>WARNING</b>
Do not allow your dockside power cord to come in contact with the water. Never operate any AC power tool or other electrical equipment while you or the device are in contact with the water, as this may cause electrocution resulting in shock or death.

When leaving port, disconnect the dockside power cord and turn the main DC breaker on. This allows you to use the ship's lights and other equipment designed to operate on direct current. Keep in mind that your DC power source is a 12-volt battery, just as with your automobile, and it must be charged regularly by operating the engine (or by running the battery charger, if you have that option installed). Unless a state of charge is maintained, there may not be enough power to operate the starter motor. Dangerous situations can result if the engine cannot be started when needed.

Make a regular visual check of batteries to insure proper water level and inspect terminals for signs of corrosion. If your boat sits for long periods without use, it is often a good idea to remove the batteries and attach them to a trickle charger to keep them fully charged and ready to use.

 <b>WARNING</b>
<b>EXPLOSION/FIRE HAZARD</b> – ensure adequate ventilation of battery to prevent buildup of gases, especially hydrogen.

 <b>WARNING</b>
<b>WHEN CHARGING THE BATTERY:</b> <ul style="list-style-type: none"><li>•Battery electrolyte contains sulfuric acid. Protect your eyes, skin and clothing. In case of contact, flush thoroughly with water and get prompt medical attention, especially if your eyes are affected.</li><li>•Batteries generate hydrogen gas that can be highly explosive. Do not smoke or allow flames or sparks near a battery, especially during charging.</li><li>•Charge the battery in a fully ventilated place.</li></ul>

# SAFE BOATING TIPS

## ELECTRICAL SYSTEM (continued)


Hunter Marine recommends that on all boats with either/both a house and start battery, the cables be disconnected during winter storage or any time the boat is out of the water for an extended period of time. Because of the continuous electrical drain placed on the 12 volt system by certain electrical components such as stereos and CO monitors you will be preserving your batteries life expectancies.

We recommend that owners who leave their boats in the water during the sailing season charge the boats internal batteries at least once every seven days during the sailing season (we do not recommend leaving power connected to

the boat if it is unattended). Completely depleting a batteries internal charge can drastically shorten its life span. This includes gel cell and glass mat batteries.

For owners who live aboard or wish to leave their boat battery switches in the on position while unattended (again, we do not recommend this) should consider installing a N20504W Nicro Solar vent to reduce the chances of the CO monitor's sounding. Only exchanging the air inside the boat on a regular basis or leaving the battery switches in the off position totally eliminates the false sounding of the monitors while 12-volt systems are operating.

## COOKING STOVE

 <b>WARNING</b>
<b>EXPLOSION/FIRE/ASPHYXIATION HAZARD</b>
<ul style="list-style-type: none"><li>•Open flame cooking appliances consume oxygen. This can cause asphyxiation or death.</li><li>•Maintain open ventilation.</li><li>•Liquid fuel may ignite, causing severe burns.</li><li>•Use fuel appropriate for type of stove.</li><li>•Turn off stove burner before filling.</li><li>•Do not use stove for comfort heating.</li><li>•Use special care with flames or high temperatures near urethane foam. Once ignited, it burns rapidly, producing extreme heat, releasing hazardous gasses and consuming a large amount of oxygen.</li></ul>

Carefully read and understand the manufacturer's instructions prior to operating your stove. Save the instructions for review, and also to pass on to any subsequent owners.

Use only the fuel recommended by the manufacturer, and store the fuel in an approved container.

Do not smoke while working with fuel.

Immediately clean up any spilled fuel.

# SAFE BOATING TIPS


## TOILET

**IMPORTANT:** When not in use, lever must be left in the “dry” position to prevent flooding.

Before using, place the lever in the “wet” position and pump slowly to partly fill and wet the inside of the bowl. Return to the “dry” position.


After using, return the lever to the “wet” position for flushing and pump until the bowl is thoroughly cleaned. Continue with several more full strokes to flush discharge lines. Return lever to “dry” position and pump slowly until bowl is empty.

- There is a possibility of being fined for having an operable direct overboard discharge of waste in some waters. Removing seacock handle, in closed position, or other means must be used to avoid fine.
- It is illegal for any vessel to dump plastic trash anywhere in the ocean or navigable waters of the United States.

 <b>CAUTION</b>
Do not place facial tissue, paper towels or sanitary napkins in head. Such material can damage the waste disposal system and the environment.

## OPENING HULL PORTS


If your boat is equipped with opening hull ports, they must remain closed and secured while under sail. Your boat could take on water when it heels, causing damage to the interior due to flooding or even possible sinking of your vessel.


 <b>CAUTION</b>
All hull ports must remain closed and secure while sailing.

## PUMPS

All pumps should be checked frequently to insure proper operation. This is an especially important regular maintenance item since a properly operating pump could save your vessel from serious damage.

Inspect all bilge pump hoses for chafing and dry rot. See that all hose clamps are tight. Check that the bilge pump impeller area is clean and free of obstructions. Inspect electrical wiring for corrosion. Ensure that the float switch functions properly.

 <b>CAUTION</b>
Run pump only as long as necessary to remove water. Dry running can damage the pump motor

 <b>WARNING</b>
<b>SINKING HAZARD</b> – Ensure proper bilge pump operation.


# SAFE BOATING TIPS

## WATER SYSTEM OPERATION

Fill fresh water tank at deck fill. The tank filler cap will be marked “water”. When tank is full, water will back up through the vent hose and exit through a vent located on the side of the hull. Use tank gauge for filling. D.C. main should be turned on first.

To activate the water system, turn on D.C. main, flip the “water pressure” switch on the electrical panel. This will start the pump and pressurize the system. When the pressure builds, the pump will shut off. With continued use of fresh water the pressure in the system is reduced, automatically restarting the pump. Make sure there is water in the system while pump is in operation to prevent damage to the motor. The pump will also run if a leak develops in the system.

NOTE: Intermittent operation of the freshwater pump while all faucets are closed usually indicates a leak somewhere in the lines. Trace the lines to locate the leak and repair.


 <b>CAUTION</b>
Run pump only as long as necessary to remove water. Dry running can damage the pump motor

The water heater operates either on 120 or 240 volts AC or when the engine is running. To obtain hot water from the engine, it must run a minimum of one-half hour.

Pressure water pumps are the demand type. Once the circuit breaker switch is on, opening the faucet will produce water flow.

To operate shower, turn on hot and cold faucets until desired temperature is reached, while the showerhead is retracted at sink. Pull the showerhead out and use. The faucets must be turned off to prevent system drainage.

Opening the faucet will allow the pump to empty the tank. Flushing the tank and lines will be necessary for winterization. Refer to Maintenance & Winterization section for more information.

 <b>WARNING</b>
<b>SINKING HAZARD</b> –To ensure the safety of your vessel, always disconnect shore water and power connections when leaving your boat unattended.

## WASTE DISCHARGE

The Hunter is equipped with a head waste holding tank, hose lines, and thru-fittings for either overboard discharge, using the standard equipped hand pump, deck pump out at dockside or Macerator Pump. Tank levels will be indicated on the gauge located below the main electrical panel. Familiarize


yourself with the locations of the deck pump out, overboard discharge thru-hull, and vent locations pictured in the Waste Water System section, as well as your local boating regulations concerning the overboard discharge of raw sewage.



# ENVIRONMENTAL CONSIDERATIONS

## FUEL AND OIL SPILLAGE

The spilling of fuel or oil into our waterways contaminates the environment and is dangerous to wildlife. Never discharge or dispose of fuel or oil into the water. It is dangerous and unlawful. Two common types of accidental discharge are overfilling the fuel tank and pumping contaminated bilge water into the sea.

 <b>WARNING</b>
<b>EXPLOSION/FIRE/POLLUTION HAZARD:</b> Fill fuel tank to less than rated capacity. Overfill forces fuel out the tank vents, which can cause explosion fire, or environmental pollution. Also allow for fuel expansion

## DISCHARGE AND DISPOSAL OF WASTE

Waste means all forms of garbage, plastics, recyclables, food wood, detergents, sewage, and even fish parts in certain waters. We recommend that you bring back everything you take out with you for proper disposal ashore.

Your marine holding tank (if so equipped) must, in many areas, be pumped out by an approved pump-out facility normally found at marinas.

## EXHAUST EMISSIONS

Hydrocarbon exhaust emissions pollute our water and air. Keep your engine

properly tuned to reduce emissions and improve performance and economy.

## ANTI-FOULING PAINTS

The use of anti-fouling paints is common for boats kept in water. Be aware of environmental regulations that may govern your paint choice. These regulations may affect which paint may be used, and also the application or removal. Contact your local boating authorities for more information

 <b>WARNING</b>
<b>EXPLOSION/FIRE/HAZARD:</b> Ventilate when painting or cleaning. Ingredients may be flammable and/or explosive.

## CLEANING CHEMICALS

Cleaning chemicals should be used sparingly and not discharged into waterways. Never mix cleaners and be sure to use plenty of ventilation in enclosed areas. Do not use products that contain phosphates, chlorine, solvents, non-biodegradable or petroleum-based products.

Common households cleaning agents may cause hazardous reactions. Fumes can last for hours, and chemical ingredients can attack people, property and the environment.

# INSTRUCTIONS FOR PREPARATION FOR BOTTOM PAINTING

## WARNING!

Do not use any sanding, sandblasting or other abrasive repair of the bottom, as this will

void your hull blistering warranty. See the warranty information at the beginning of this manual.

## BOTTOM PAINTING

Choose a bottom paint system that suits the environment in your area. Follow the procedure recommended by the manufacturer of the paint, while making sure not to void the Hunter Hull Blistering Warranty. The

procedure for preparing and painting the bottom varies between paint manufacturers, but should always include dewaxing, etching and sometimes priming of the surface.

## EPOXY BARRIER COAT

Sanding of the gel coat bottom surface will be permitted should a customer wish to have an epoxy barrier coat applied to the hull, (example Interlux Interprotect 1000, 2000, West System or VCTar). This will not void the Five-Year Blister Warranty.

Hunter Marine refers to epoxy barrier coatings as mentioned above, not epoxy primer paints.

If an epoxy barrier coat is applied to a Hunter vessel, it must be registered with the Warranty

Department prior to application of the product. If the dealer applies bottom paint only, sanding **will not** be allowed and the no sanding system must be used.

 <b>WARNING</b>
Cleaning agents and paint ingredients may be flammable and/or explosive, or dangerous to inhale. Be sure to use adequate ventilation, and appropriate safety clothing. (gloves, safety glasses, respiration, etc)

# ENGINE, TRANSMISSION & DRIVETRAIN

## ENGINE

Follow the fuel and lubrication requirements in the Engine Manual. Check the engine oil level before and after operation and use a quality motor oil (refer to Engine Manual). Be certain the proper amount of oils is in the crankcase at all times

**Engine Alignment:** the engine should be aligned by experienced marine service personnel. Final alignment should be done after launching, with all normal gear aboard. A description of the procedure follows:

The coupling flanges must come together evenly at all points, a feeler gauge is used to check the gap. If adjustment is necessary, the engine is tilted up or down and/or side-to-side until the flanges meet evenly. Severe vibration will result from misalignment and can cause strut bearing and shaft damage. Alignment should be checked again after several weeks of use. Routine checks of coupling bolts are a must to ensure they are tight.

**Shaft Alignment:**

1. Separate the coupling, move the shaft end back to clear the pilot in the center.

2. Establish the shaft in the center of the shaft log by raising the shaft until it touches the top of the log – note position – lower the shaft until it touches the bottom of the log – note position – repeat sideways and locate shaft in the center; block shaft in this position, using a block of wood under the shaft packing gland.

3. Now, adjust the engine mounts to allow the pilot on the coupling halves to slip together without moving shaft up down or sideways.

4. Adjust the engine mounts as necessary until a .004" feeler gauge will not enter anywhere along the edge of the flange between the faces.

5. Tighten the locks on the adjustable mounts

6. Recheck coupling with feeler, readjust if necessary.

7. Check stuffing box (allow to drip 3 to 5 drops per minute).

Any questions or problems concerning the engine, please contact the U.S. distributor, Mastery Marine at (727) 522-9471, or your local Yanmar service agent.

## TRANSMISSION

Follow the lubrication requirements of the engine manual. The oil level should be

checked immediately after operation.

## STUFFING BOX

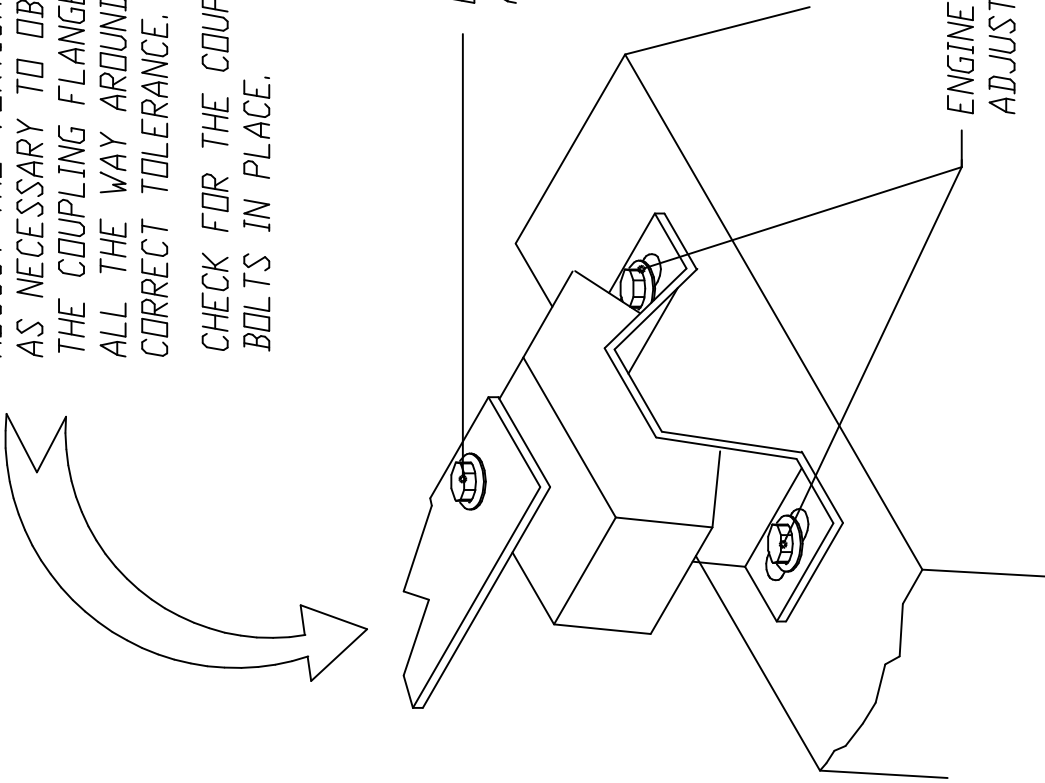
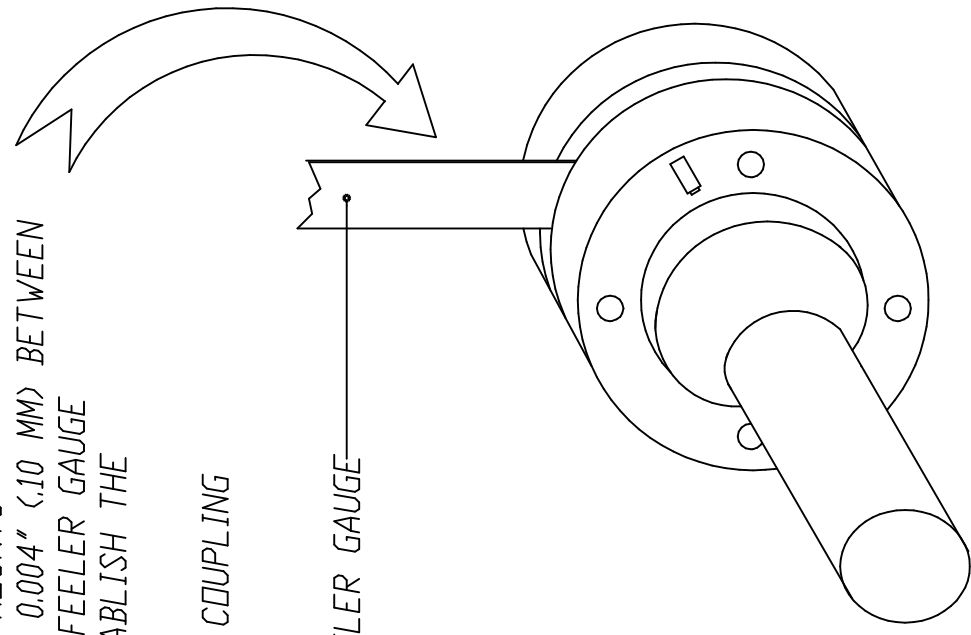
The stuffing box is held to the stern bearing by a rubber hose secured with hose clamps. (See the Shaft and Propeller section). The clamps should be tight and no water should leak from this location. While underway a slight drip from the stuffing box at the shaft exit is necessary (three to five drops a minute) and is normal. To adjust, loosen the locknut, tighten the gland nut one-quarter

turn, a retighten the locknut. If excessive water flow persists after adjustment, replace the packing with 3/16" (or 5mm) square flax packing and then adjust as above.

**NOTE: Some models use a packless sealing system. Page 56 or Pages 56A, B, C, reflects the type of stuffing box used on this model.**

ADJUST THE VERTICAL & HORIZONTAL ENGINE MOUNTS AS NECESSARY TO OBTAIN A MAXIMUM GAP OF 0.004" (.10 MM) BETWEEN THE COUPLING FLANGE FACES. USE A 0.004" FEELER GAUGE ALL THE WAY AROUND THE COUPLING TO ESTABLISH THE CORRECT TOLERANCE.

CHECK FOR THE COUPLING GAP WITHOUT THE COUPLING BOLTS IN PLACE.



# MAINTENANCE

## COMPASSES


A boat compass rarely exists in an environment that is completely free from magnetic materials or influences.

The compass on your boat should be adjusted by a certified compass adjuster and have a deviation table made for it.

If you must depend solely on your compass for navigation, make a quick check for any objects near the compass that may cause additional, unmeasured deviation. Typical objects that may fall in this category include: knives, small radios, flashlights or other tools.

## STEERING

Refer to the manufacturer's instruction for maintaining pedestal steering system. Routinely inspect steering system components.


 <b>WARNING</b>
<b>CONTROL HAZARD</b> – Inspect and maintain steering system regularly. An improperly maintained system may fail, causing sudden loss of steering control, resulting in personal injury and property damage.

## ELECTRICAL SYSTEMS

The electrical system is a 12-volt, negative ground installation, plus a shore power system of either 120v or 220v. The owner should inspect batteries, terminals and cables weekly for signs of corrosion, cracks, and electrolyte leakage. Battery terminals are to be kept clean and greased. Refer to separate instructions on batteries, wiring diagram, and electronics.

 <b>WARNING</b>
<b>SHOCK/FIRE HAZARD</b> Replace breaker or fuse with the same amperage device. Never alter over current protection.

 <b>WARNING</b>
<b>SHOCK/FIRE HAZARD</b> <ul style="list-style-type: none"><li>•Disconnect electrical system from its power source before performing maintenance. Never work on the electrical system while it is energized.</li><li>•Electrical appliances must be within the rated amperage of the boats circuits.</li><li>•Observe boat carefully while the electrical components that can be left unattended are the automatic bilge pump, fire protection and alarm circuits.</li><li>•Only a qualified marine electrical technician may service the boat's electrical system.</li></ul>

 <b>CAUTION</b>
<ul style="list-style-type: none"><li>•Turn off engine before inspecting or servicing battery.</li><li>•Disconnect battery cables before working on electrical system to prevent arcing or damage to alternator.</li></ul>

# MAINTENANCE

## PLUMBING SYSTEMS

All pumps should be checked frequently to insure proper operation. This is an especially important regular maintenance item since proper functioning of a pump could save your vessel from serious damage in the future.

Inspect all hoses for chafing and deterioration. See that hose clamps are tight. Check that the pump impeller area is clean and free of obstructions.

Inspect electrical wiring for corrosion. Make sure float switches move freely and are making an electrical connection.

The owner should become familiar with the layout of the water and waste

systems by walking through the boat with the diagrams provided in this manual. It is especially important that the owner knows all the thru-hull valve locations and inspects for leaks frequently. Refer to plumbing diagrams in Specifications and Technical section of this manual.

General Thru-hull Lists (varies from boat to boat---see diagrams in Systems and Circuits section).

- 1) Engine cooling system
- 2) Galley sink
- 3) Head sink
- 4) Head toilet (water intake)
- 5) Holding tank discharge
- 6) Scupper drains

## FUEL SYSTEMS

The owner should inspect the condition of fuel lines for cracks or leaks. A primary source of fuel-related problems is water in the system. The owner should use only well maintained fueling facilities and make sure fuel fill caps are tightly secured after filling. Check and maintain fuel filters periodically. Refer to

your Engine Manual for additional information. Periodically, add biocide to prevent bacteria and fungi from contaminating diesel fuel that may contain some water. Carefully follow manufacturer's instructions and clean filter regularly.

# MAINTENANCE

## CLEANING FIBERGLASS SURFACES

Fiberglass surfaces should be cleaned regularly. Normal accumulations of surface dirt can be removed simply by occasional rinsings with water. If you operate your boat in salt water, more frequent rinsing will be required. To remove stubborn dirt, grease or oil, use a mild detergent and a soft brush. Rinse with fresh clean water. Avoid the plexiglass companionway slider, windshield, deck hatches and fixed ports when using a deck brush, since these surfaces can scratch.

It is a good idea to wax the fiberglass once or twice a year to maintain a deep, glossy appearance. Your local marine supply should be able to provide an appropriate wax.



### WARNING

#### EXPLOSION/FIRE HAZARD

Cleaning agents and paint ingredients may be flammable and/or explosive, and dangerous to inhale. Be sure to use adequate ventilation, and appropriate safety clothing (gloves, safety glasses, respirator, etc.)

## CLEANING ACRYLIC

Use only mild soap and water to clean acrylics. Do not use products containing solvents such as ammonia, which is found in many window cleaners.



### CAUTION

*Use care when cleaning acrylic. Dry cloth and many glass cleaners will scratch. Solvents will attack the surface.*

## SAIL CARE

Sunlight is a sail's worst enemy, so **cover the mainsail when not in use.** An ultraviolet guard, fitted down the leech of a roller headsail will protect the exposed part from the weathering effect of the sun and from dirt and grit.

Mildew, can be prevented by storing sails dry and by hand washing twice a season. Check all sails regularly for chafe, particularly where they chafe on deck fittings

or rigging, at reef points, batten sleeves and the foot of the headsail. Sail batten pockets should be inspected on a regular basis.

To stow the mainsail, start at the leech and flake it onto the boom, left and right, in about 18-in. (46 cm) folds, while pulling the leech aft. Secure with a sail tie and continue to the luff. Lash to the boom with sail ties or shock cord.

## GENERAL HARDWARE MAINTENANCE

Check all fittings regularly to be sure screws are tight. Occasionally lubricate (use silicone lubricants) all moving parts on such fittings as blocks, turnbuckles and cam cleats, as well as the locking pins of snatch blocks, track slides, spinnaker poles, etc. Inspect cleat and fairleads for roughness and smooth with

fine-grained emery paper if necessary. Also, replace any missing or damaged cotter pins in turnbuckles and shackles, and either tape them or use them or use protective covers manufactured for that purpose. Grease winches a minimum of once yearly.

## WINCH MAINTENANCE

Follow the maintenance instructions prescribed by winch manufacturer.

We recommend a minimum of an annual cleaning and light greasing.

# VINYL CARE

These patterns, like all upholstery fabrics and vinyl, require a regularly scheduled cleaning program. A thorough cleaning should be administered on a daily, weekly or monthly basis depending on use and exposure to dirt and/or staining agents. It is important to begin treatment of a stain as soon as possible after a spill. It is important that efforts begin immediately after a spill to remove any potential staining agent. It is advisable to clean these products as soon as the first signs of dinginess occur, otherwise, delaying clean up will require a much greater effort to restore the product to its original appearance.

Regular cleaning requires the use of a mild cleaner such as Murphy's Oil soap and water. In situations where the vinyl has not been washed regularly and there is a build up of dirt, stronger vinyl cleaners such as Simonize's Tuff Stuff or Turtle Wax's vinyl/fabric cleaner are recommended. We do not recommended the use of any other cleaners. The use of cleaners other than

those recommended may result in irreparable damage to the product.

In order for the above listed cleaning solutions to work effectively on stubborn stains, please allow time for the cleaning solution to soak in thoroughly. Be sure to remove the cleaning solution before it has time to dry. Regardless of the type of cleaner used, it is necessary to finish up with a thorough rinse using fresh water on a clean sponge or rag. A soft bristled nylon or natural fiber brush can be used to remove built-up dirt and staining agents.

Finally, please remember that all our fabric grain vinyls require a greater cleaning effort to maintain than comparable smooth grain vinyls. These products will provide an attractive and durable alternative to conventional fabrics and vinyls if properly maintained. One must realize that the proper installation and use of our fabric grain vinyls require additional attention to the establishment and maintenance of a well thought out cleaning program.

## CAUTION

***Do not use acetone or other harsh cleaners on the vinyl soft headliner. Use soapy water or other mild detergent to avoid damage to the vinyl.***

## FABRIC CARE

**Vinyl:** Clean with mild soap and water. Wipe with vinyl or upholstery cleaner monthly, and especially before and after storage.

**Leather:** Mild soap water. Blot dry. Do not scrub as this will stretch and scratch. Wipe with leather cleaner/oil to preserve and help prevent cracks before and after storage.

**Fabric:** Blot dry. Do not machine wash. Use only mild soap and water. Wipe with a clean white cloth. If stain persists, dry clean. Be sure to treat cleaned surfaces with scotch guard. Stretched or loose covers may be

steam cleaned. If foam is removed, it will restuff more easily if wrapped with thin plastic.

**Storage:** Cover with airflow fabric to reduce dust build up. Do not use plastic, as this will cause cushions to sweat and mildew.

**Cushions:** If wet, prop cushions vertically to promote airflow around each cushion. Cushions can be cleaned by most dry cleaners. **Dry clean only.**

## REPAIR OF POLYURETHANE (MINWAX) FLOORS

**Surface Scratches:** Sand floor with 220 grit sandpaper. Remove all dust with clean cotton cloth or blow off with air. Apply one coat of minwax evenly over sanded floor. Let dry completely, at least 24 hours

**Deep Scratches:** Remove all blemishes by sanding floor with 220, until all minwax is removed and you have a raw floor. Remove all dust with clean cloth or blow off with air. Apply one coat evenly over floor. Let dry four to six hours. Repeat steps one and four. Apply third coat of minwax only if needed by repeating steps one and four.) After final coat, let floor dry completely at least one day.



# ELECTROLYSIS AND GALVANIC PROTECTION

Salt water allows electric current to flow from anodic to cathodic material. For any two metals from two components, their relative positions in the galvanic rating table, will determine which loses material (the anode) and which remains largely undisturbed (the cathode). The distance between the two metals on the galvanic table determines the rate of wear. Thus a sacrificial zinc anode is often fitted to the underwater area of a boat to attract any destructive currents away from bronze or steel propeller shafts, for example. It is not enough to know that your boat does not suffer from electrolysis; a newcomer in the adjacent marina berth may start a too-

friendly association with metal components on it. An easy place to fit an anode is on the propeller shaft, or covering the propeller nut. The anode should not be painted; this would render it ineffective.

To prevent electrolysis in seawater, the difference between the voltages of the two adjacent metals should not exceed 0.20 V. For example, zinc and carbon steel used together risk corrosion, while lead and active stainless steel are compatible. Metals with a high voltage corrode faster and need a larger area to diffuse the electrochemical reaction.

## *TEAK CARE (240,260,and 270 ONLY)*

Teak wood is a high quality, extremely durable wood with high oil content. In order to help you protect the original beauty of your teak interior, we have sealed the wood with a 3 to 4 coat system of high quality Seafin Teak Oil, manufactured by Dalys. This material is penetrating oil that dries to a low sheen to seal and protect the wood from

moisture and weathering. It creates a durable, nonslip surface to repel water and resist wear. It won't chip, peel or blister. It reduces work and maintenance cost because it is easy to repair and maintain and repair. With proper maintenance it will outlive urethane varnish on interior and even exterior surfaces

## *MAINTENENCE*

When oiled surfaces require renewing, simply wipe the surface area free of loose dirt, dust or other contaminants. Dampen a cloth with the Seafin Teal Oil and wipe on. Let

stand for 5-15 minutes, then polish dry. If your dinette table has an epoxy finish, clean with furniture polish

## *REPAIRS*

When woodwork is damaged from scrapes or abrasions that go into or thru the finish, take the following steps:

1. Take 180 to 200 grit wet/dry sand paper to smooth out rough spots.
2. Wipe clean of dust and dirt with a clean rag. Note: before applying oil, wood surface must be dry.
3. Wipe or brush on oil, allow to penetrate 5-15 minutes while surface is still wet.
4. Sand until smooth with 400A wet/dry sandpaper.
5. Wipe dry with a clean rag. Allow 8-12 hours drying time.

6. Apply second coat, sand, and repeat procedure.

This procedure may be repeated as many times as needed to bring damaged area back to its original finish. If you have trouble with getting the same sheen, you may use a soaked and wrung out cloth to apply a very light coat to get an even sheen.

For more information about the product contact:

Dalys  
3525 Stoneway North  
Seattle, WA 98103  
(206) 633-4200

## ***INTERIOR FURNITURE & BULKHEAD SPRAY FINISH***

### **TEAK CARE**

Teak wood is a high quality, extremely durable wood with a high oil content. In order to help you protect the original beauty of your teak, we have sealed the interior with a (3 to 4) spray coat finish, using sealer and varnish for marine cabinets. The materials are

manufactured by "Chemcraft International Inc". This material will seal and protect the wood from moisture and weathering. It is easy to maintain and reduces work and maintenance costs.

### **REPAIRS**

When woodwork is damaged from scrapes or abrasions (that go into or through the finish), take the following steps:

- 1) Sanding with the grain, take 320 grit sand paper to smooth out rough spots. If the spot is down to the raw wood, rag (100% cotton) wipe the spot with acetone and allow to dry. (Note: acetone only needs to be applied to the raw teak).
- 2) Reseal raw wood with Mohawk Spray Sealer (aerosol can) and allow to dry.
- 3) Lightly sand with 320 grit, sanding larger than original spot.
- 4) Wipe clean of dust and dirt with a clean rag.
- 5) Using Mohawk touch up and repair supplies, use clear lacquer spray (aerosol can). Apply (1) coat on the spot evenly and allow to dry.
- 6) This process (steps 3 – 5) may be repeated as many times needed to bring damaged area back up to its original finish. On your final spraying, be sure to feather into existing finish.

### **SOP FOR POLYURETHANE (MINWAX) FLOORS**

#### **SURFACE SCRATCHES**

- 1) Sand floor with 220 grit sandpaper until all scratches are removed.
- 2) Remove all dust with a clean cotton cloth or blow off with an air gun, then wipe down with a tack cloth.
- 3) Apply one coat of minwax evenly over the sanded area.
- 4) Let the minwax dry completely (at least one day)

#### **DEEP SCRATCHES**

- 1) Sand floor with 220 grit sandpaper until all the minwax is removed and down to raw wood, removing all blemishes.
- 2) Remove all dust with a clean cotton cloth or blow off with an air gun then wipe down with a tack cloth.
- 3) Apply one coat of minwax evenly over the floor.
- 4) Let minwax dry 4-6 hours
- 5) Repeat steps 1-4, light sand
- 6) Apply a 3<sup>rd</sup> coat if needed by repeating steps 1-4.
- 7) Let the minwax dry completely (at least one day)

#### **Chemcraft International**

Telephone: 910-723-1846

U.S. Watts: 1-800-334-8556

#### **Mohawk Finishing Products, Inc.**

U.S. Watts: 1-800-545-0047

# STORAGE/WINTERIZATION

## IMPORTANT

**Winter storage is recommended to be done in one of the following three ways, either: 1) by blocking the boat via a cradle 2) with chained stands on level ground; or 3) by storing the boat in the water with a bubbler system to prevent icing. Damage to your boat, including engine misalignment caused by twisting, is not covered by the warranty.**

### **SAILS**

Sails should be properly folded and stowed in a dry, well-ventilated place. Many sailboat owners send their sails back to the sail manufacturer at the end of each season. The sailmaker will check the stitching and sailcloth for wear and store the sails until the start of the next season.

### **ELECTRICAL**

Remove battery from boat (Refer to Engine Manual) and charge. It is a good idea to also remove the electronics (radio, radar, etc) and store in a safe place.

### **CUSHIONS**

Cushions should be removed and stored at home if possible. If not, prop them vertically to promote air flow around each cushion. *Dry clean only!*

### **HATCHES**

Tenting the deck during storage will help prevent ice from forming and damaging hatches and deck fittings. The installation of a passive vent will help with ventilation while the boat is in storage.

### **WATER SYSTEM**

Open a faucet and allow the pump to empty the tank. Then add approximately two gallons (7.6L) of non-toxic antifreeze solution to the tank and repeat the pumping out procedure.

A second method is to disconnect the hoses at the pump, allowing

them to drain. Find the lowest point in the system and disconnect the fitting. Open all faucets to allow the lines to drain. If possible, use a short section of hose on the faucet to blow through the lines to clear all water. A diluted solution with baking soda will help freshen the system.

### **WATER SYSTEM**

Open valve and drain fully leave valve open during lay-up time.

### **TOILET AND HOLDING TANK**

Drain and flush toilet. Using non toxic antifreeze in a 50/50 mixture with water, pump through toilet and into holding tank.

### **OUTBOARD ENGINE**

Take it home and store it in a safe place. Be very careful storing the gas tank as the gasoline is very flammable. Refer to Engine Manual for specific maintenance schedule.

### **INBOARD ENGINE**

#### **Winterizing Fresh Water Cooled Diesel Engines**

1. Drain crankcase and transmission and refill with fresh lubricant as specified in Engine Manual.
2. Drain and clean all fuel filters and change elements, gaskets, and seals. Bleed all air from fuel systems.
3. Start engine and bring up to operating temperature.
4. Close the sea cock, remove the raw water pickup hose from the raw water pump and immerse one end into a 5-gallon (19L) bucket of

# STORAGE/WINTERIZATION

antifreeze solution. Start engine and run until antifreeze solution comes out exhaust stack or until bucket is empty. Attach the raw water pickup hose to the raw water pump. Tighten all clamps. **NOTE: This procedure bypasses the sea strainer to prevent antifreeze from crystallizing in sea strainer, which warranty will not cover.**

5. Loosen water pump and alternator belts to lessen tension on belts during winter.

6. For engines equipped with a hand crank: pull compression release levers and turn engine slowly with the hand crank. Slowly pour about 2 ounces of engine oil into the intake pipe or manifold while hand cranking the engine. This will allow for a thin coat of oil on the valves and upper cylinder. **DO NOT USE** starter to turn engine or serious engine damage may result.

7. Tape the openings of the intake and exhaust manifolds with duct tape to help prevent corrosion of the upper cylinder during layup.

8. Scrape all rust or corrosion from exposed metal parts and surfaces. Scrub all metal surfaces with detergent and rinse thoroughly. Paint any bare metal.

9. Place a dust cover over engine. Do not leave the engine exposed to rain and sea breeze.

10. Disconnect the battery cables; remove the battery from the boat. Clean the terminal ends and battery with a solution of baking soda and water, and then rinse thoroughly with clean water. Apply a light coat of grease on the terminal end of the battery and cables. Store the battery in a cool dry place. Use a trickle charger to keep battery charged. Do

not charge battery near any open flame or a confined area.

**CAUTION: Wear safety goggles and rubber gloves to protect your skin.**

## Winterizing Raw Water Cooled Diesel Engines

1. Drain crankcase and transmission and refill with fresh oil as specified in the engine manual. Change oil filters.

2. Close seacock, remove raw water pickup hose from water pump, attach 4-foot (1.2m) length of hose to water pump and immerse in a 5 gallon(19L) bucket of anti freeze solution. Remove hose from engine or manifold that leads to exhaust elbow. Attach about a 4-foot length of hose and immerse one end in the bucket of antifreeze solution. Start engine and run until water begins to warm up (about 3-5 min.) and the thermostat opens. Stop engine. Replace hose that leads to exhaust elbow. Start engine and let run till water comes out exhaust pipe. Stop engine, remove hose from water pump to bucket, attach hose from seacock to water pump and tighten all hose clamps. **NOTE: this procedure bypasses the sea strainer to prevent antifreeze from crystallizing sea strainer, which warranty will not cover.**

3. Loosen water pump and alternator to lessen tensions on belts during winter.

4. Drain and clean all fuel filters and change elements, gaskets and seals. Bleed all air from fuel systems.

5. Pull compression release lever and turn engine slowly with hand crank. Slowly pour about 2 ounces of

# STORAGE/WINTERIZATION

engine oil into the intake pipe or manifold while engine is turning.

**DO NOT USE** the starter to turn engine or serious engine damage may result.

6. Tape the openings of the intake and exhaust manifolds with duct tape to help prevent corrosion of the upper cylinder during lay-up.

7. Scrape all rust or corrosion from exposed metal parts and surfaces. Scrub all metal surfaces with detergent and rinse thoroughly. Paint any bare metal.

8. Place a dust cover over engine. Do not leave engine exposed to rain and sea breeze.

9. Disconnect the battery cables; remove the battery from the boat.

Clean the terminal ends and battery with a solution of baking soda and water and rinse thoroughly with clean water. Apply a light coat of grease on the terminal end of the battery and cables. Store the battery in a cool dry place. Use a trickle charger to keep battery charged. Do not charge battery near any open flame or in a confined area.

**CAUTION: Wear safety goggles and rubber gloves to protect your eyes and skin.**

## DEPARTURE FROM THE BOAT

The check list for leaving a boat unattended is very important because items overlooked often will not be remembered until you are far from the boat and corrective actions are impractical or impossible.

Primary choices for this list are items relating to the safety and security of the unattended craft: turning off fuel valves, properly setting electrical switches, pumping out bilge and leaving the switch on automatic (or arrange for periodic pumping out). **It is recommended that the power be turned off when leaving the boat.** Other departure checklist items are securing ports, windows, hatches and doors.

## ROUTINE MAINTENANCE

Routine maintenance checklists should include items based on how much the boat is used (usually in terms of engine hours) and on calendar dates (weekly, monthly or seasonal checks). Typical of the former are oil level checks and changes, and oil and fuel filter changes.

On a calendar basis the lists should note such matters as electrolyte levels in storage batteries, pressure gauges on dry chemical fire extinguishers, and all navigation lights. Check the operation of automatic bilge alarms or pump switches by running water into the boat. Periodically close and open sea cocks several times to ensure their free and easy operation in case they are needed in an emergency. Equipment and supplies carried on board for emergencies should be inspected for any signs of deterioration.

## CE CERTIFIED

Your Hunter has been manufactured in the United States and has been certified by the IMCI to be in compliance with the relevant parts of the Recreational Craft Directive 94/25/EC from the European Parliament. The CE mark means your craft meets or exceeds all current International Organization for Standardization (ISO) standards and directives in effect at time of manufacture. The builder's plate (copy provided on page 35 of this manual), affixed to your boat, describes various parameters involved in the design of your boat. Please refer to it regularly when operating your boat. Following are the Design Categories, established by the Recreation Craft Directive, which is to be considered a guideline of use application as per the Directive's criteria. Hunter Marine Corporation does NOT establish these criteria, and the category indicated is only a reference to the assigned category. The safety of the captain and crew of any vessel is not measurable by such categories, and you should not interpret these categories as an indication of your safety in such condition. The skill of your captain and crew, together with proper preparation, appropriate safety equipment for the given conditions and a well maintained vessel are critical to safe sailing.

### CE CRAFT DESIGN CATEGORIES

Category A – “Ocean”: Craft designed for extended voyages where conditions may exceed wind force 8 (Beaufort Scale) and include significant wave heights of 4m, for vessels that are largely self-sufficient.

Category B - “Offshore”: Craft designed for offshore voyages where conditions include winds up to and including wind force 8 and significant wave heights up to and including 4m may be experienced.

Category C – “Inshore”: Craft designed for voyages in coastal waters, large bays, estuaries, lakes and rivers, where conditions up to and including wind force 6 and significant wave heights up to and including 4m may be experienced.

Category D – “Sheltered Waves”: Craft designed for voyages on small lakes, rivers and canals, where conditions up to and including wind force 4 and significant wave heights up to and including 0.5m may be experienced.

*For additional information, contact*

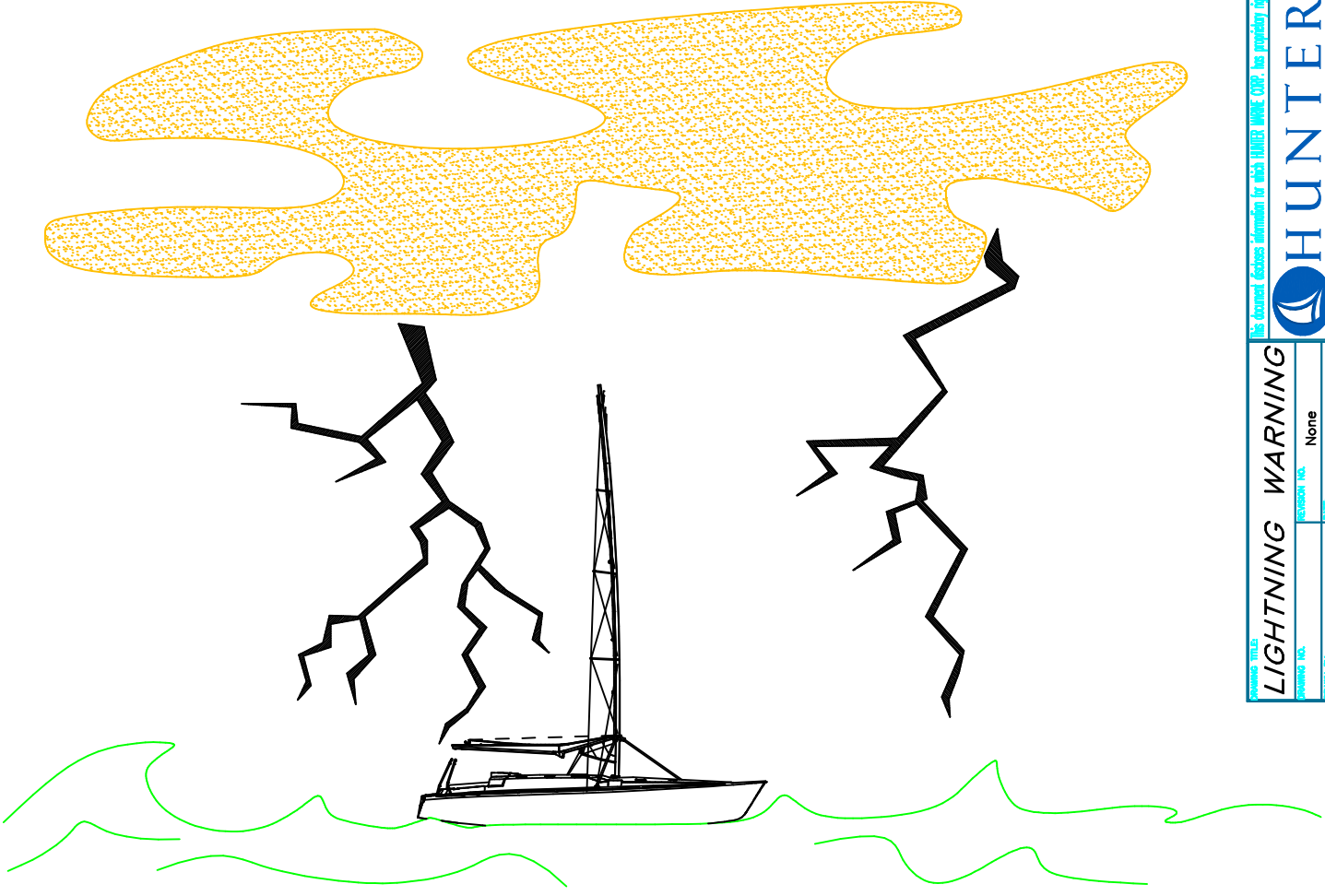
International Marine Certification Institute (IMCI)  
Treves Centre, rue de Treves 45  
1040 Brussels, Belgium  
FX: (32) 2238-7700

## NMMA CERTIFIED

Your Hunter has been judged by the National Marine Manufacturers Association (NMMA) to be in compliance with the applicable federal regulations and American Boat and Yacht Council (ABYC) standard and recommended practices in effect at the time of manufacture.

*For additional information, contact:*

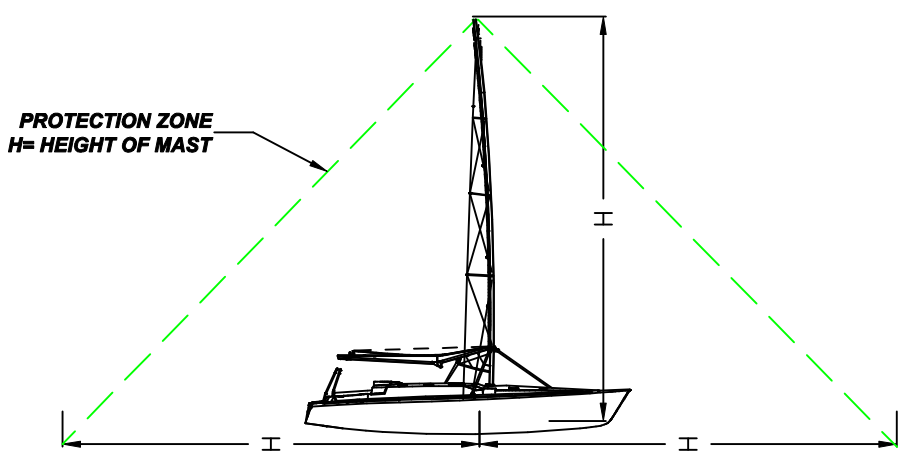
National Marine Manufacturers Association  
200 E. Randolph Dr., Suite 5100  
Chicago, IL 60611  
PH: (1) 312-946-6200 FX: (1) 312-946-0388

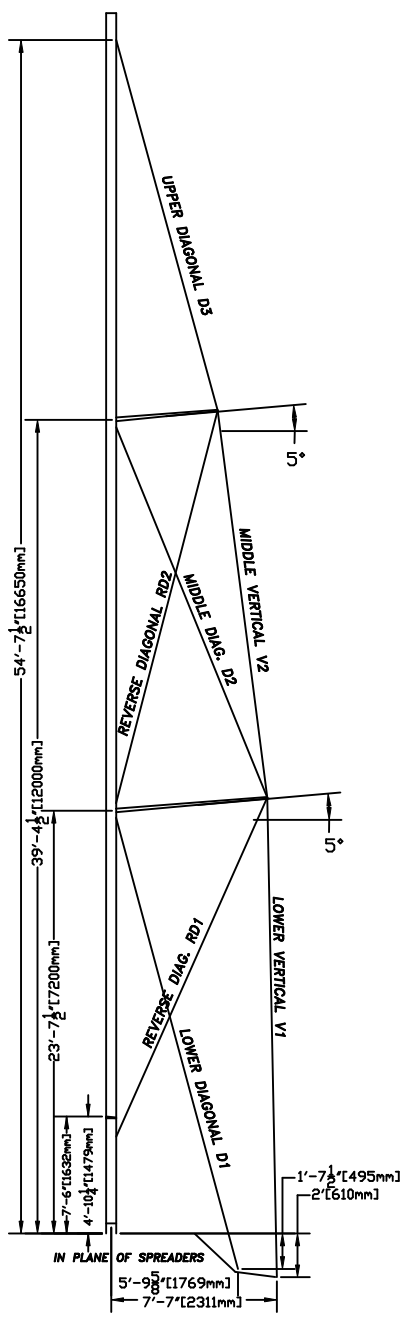


**LIGHTNING STORM WARNING:**

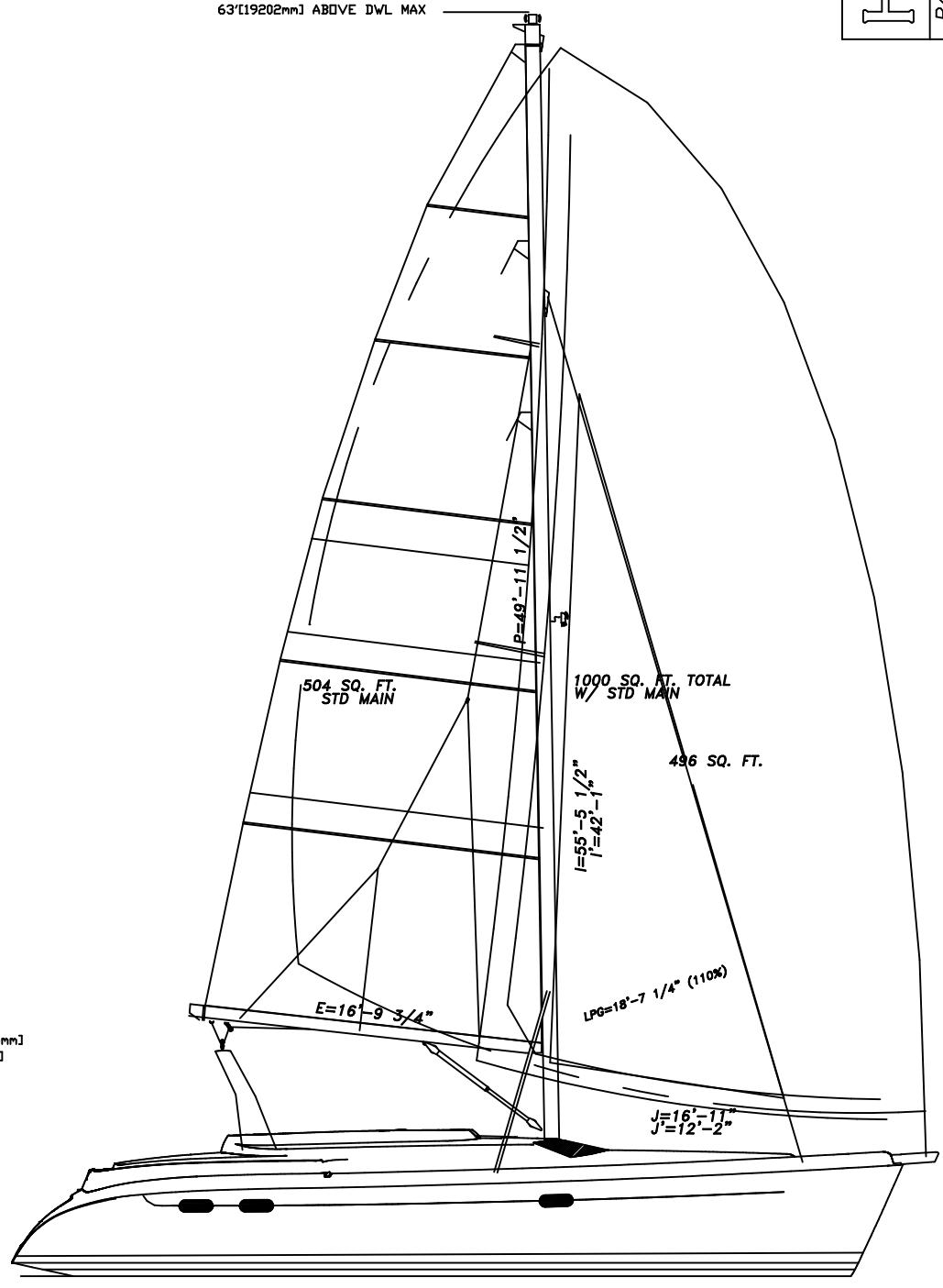
- 1. ALL WHIP ANTENNAS SHOULD BE TIED DURING STORM, UNLESS PART OF THE LIGHTNING PROTECTION SYSTEM.**
- 2. PRECAUTIONS: DURING LIGHTNING STORMS: A. THE SHIPS OCCUPANTS SHOULD TAKE SHELTER INSIDE A CLOSED AREA OF THE BOAT. EXAMPLE: BELOW DECK. B. OCCUPANTS SHOULD NOT HAVE ANY BODY PARTS IN THE WATER. C. AVOID CONTACT WITH ANY COMPONENTS OF THE L.P.S. AND D. AVOID ALL CONTACT WITH ANY METAL OBJECTS.**
- 3. SEE DIAGRAM BELOW FOR INFORMATION ON THE LIGHTNING PROTECTION ZONE.**
- 4. IF LIGHTNING SHOULD STRIKE THE SHIP, INSPECT ALL ELECTRONICS, ELECTRIC GEAR, COMPASS AND L.P.S. SYSTEM FOR POSSIBLE DAMAGE. RECALIBRATE AS NECESSARY. NOTE: BEGIN CHECKING ELECTRONICS AFTER THE THREAT OF LIGHTNING HAS PASSED.**

**FAILURE TO FOLLOW PRECAUTIONS MAY RESULT IN SEVERE INJURY OR DEATH**

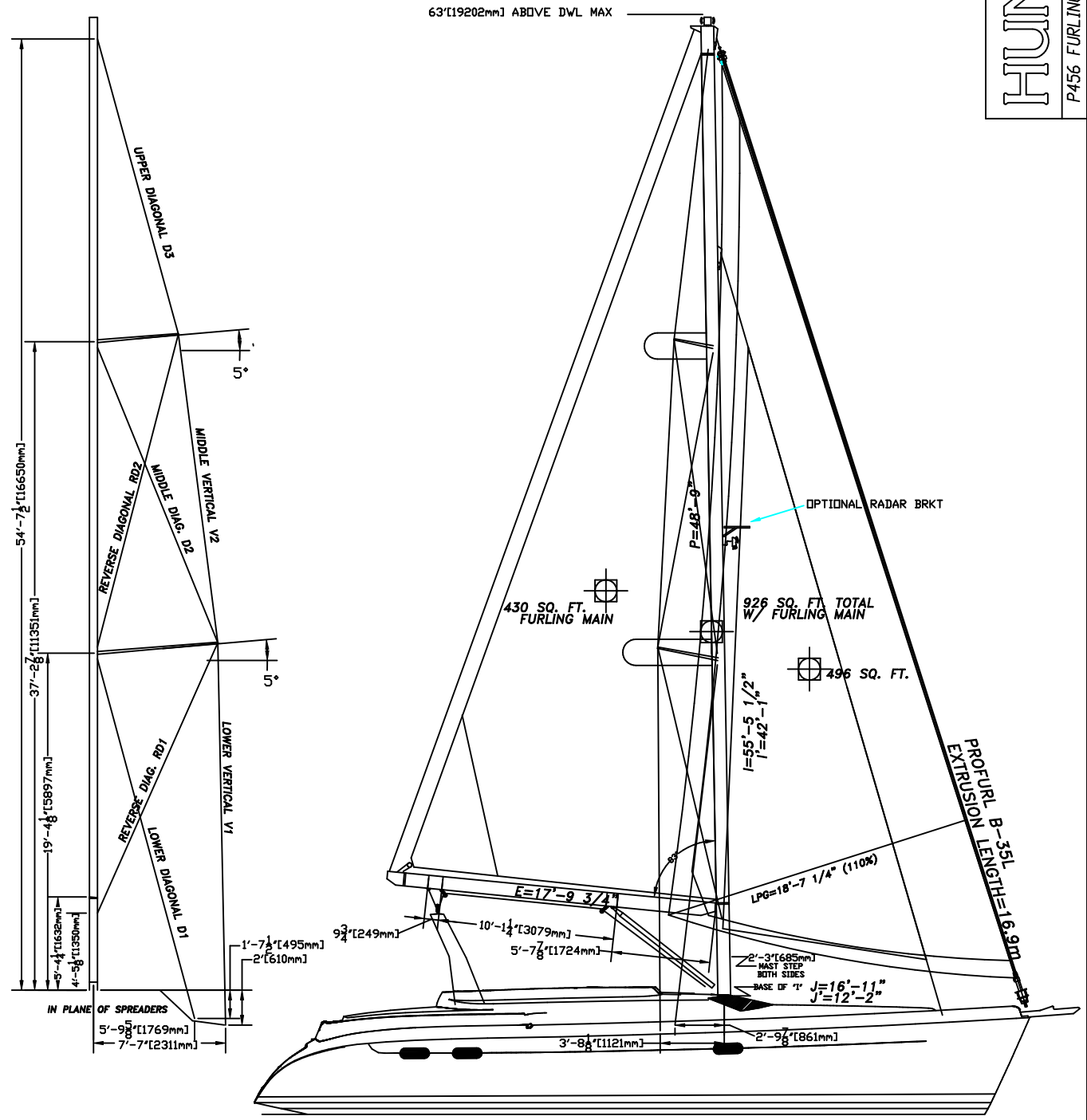




63' [19202mm] ABOVE DWL MAX



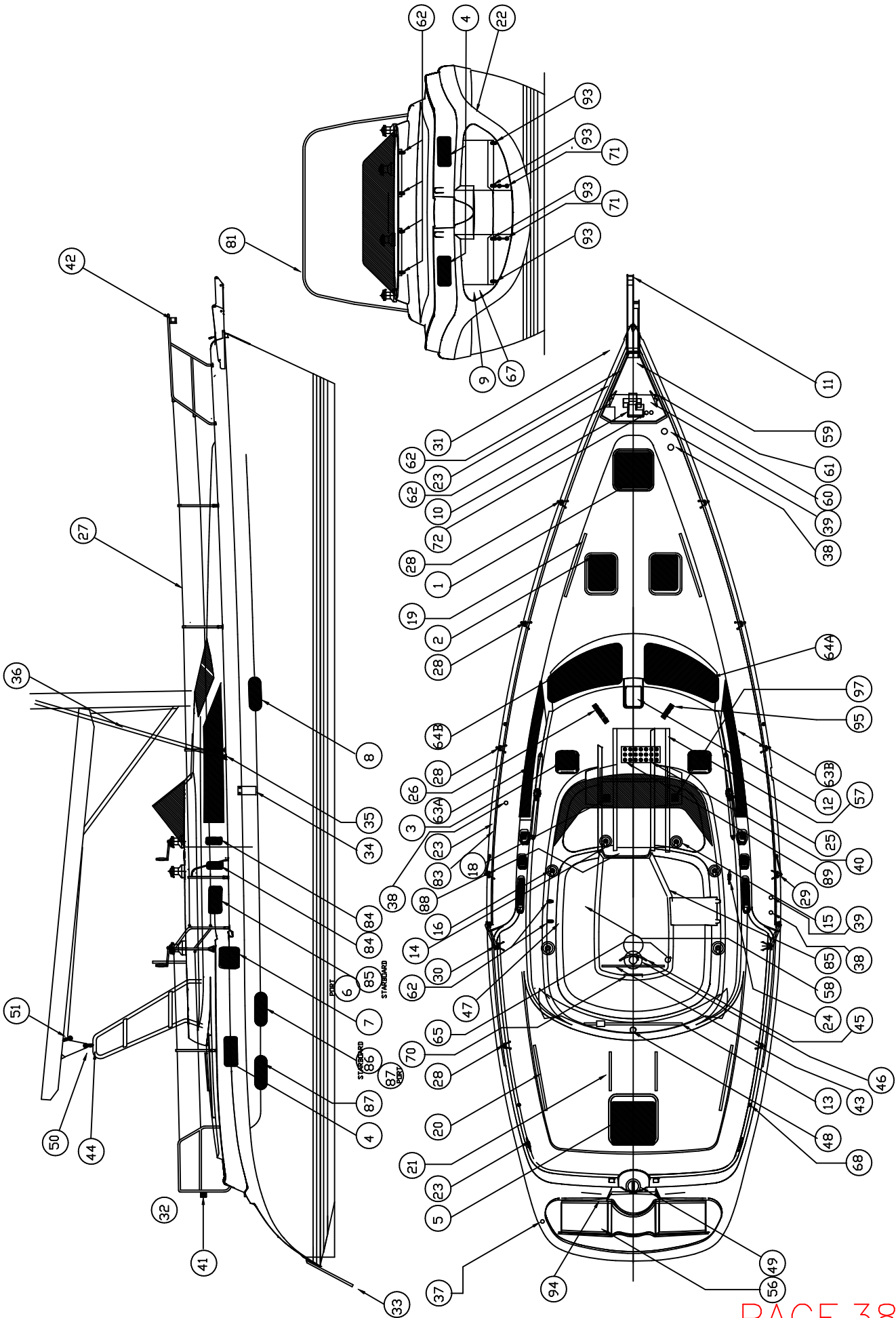




## DIMENSIONS, CAPACITIES, ETC.

### HUNTER 456

LENGTH OVERALL (LOA).....	44'3"	13.49m
LENGTH INCLUDING BOW ROLLER.....	46'1"	14.05m
LENGTH OF WATERLINE (LWL).....	39'3"	11.96m
BEAM (MAX).....	14'0"	4.27m
DRAFT .....	5'6"	1.68m
DISPLACEMENT.....	24,992 lbs.	11,360 kg
BALLAST .....	9,500 lbs.	4,309 kg
SAIL AREA (100% TRIANGLES).....	889 sq. ft.	82.7 sq.m
SAIL AREA (ACTUAL W/STANDARD SAILS).....	1000 sq. ft.	93.0 sq.m
I.....	55'5 1/2"	16.91m
J .....	16'11"	5.16m
P.....	49'11 1/2"	15.23m
E.....	16'9 3/4"	5.13m
MAST HEIGHT (FROM WATERLINE).....	63'0"	19.21m
HEADROOM.....	6'10"	2.08m
WATER CAPACITY.....	200 U.S. gal.	757 liters
HOLDING TANK CAPACITY.....	50 U S gal.	189 liters
FUEL TANK CAPACITY.....	100 US gal.	378 liters
LPG TANK CAPACITY.....	10 lbs.	4.54 kg
BATTERY CAPACITY.....	85 amp (1) 235 amp (2)	STARTER BATTERY HOUSE BATTERIES
ELECTRICAL VOLTAGES.....	SEE ELECTRICAL DRAWINGS	
INBOARD ENGINES.....	76 hp	58 kw
MAXIMUM LOADING.....	10 PEOPLE	2460 kg (INCLUDING LUGGAGE)
LIFTING POINTS.....	INDICATED BY "SLING" LABELS ON HULL	



**HUNTER**

**P456 DECK HARDWARE LAYOUT**

REVISED NO. 4568038 DATE 11/5/97

DESIGNED BY NONE

ENGINEERING DEPT.

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## HUNTER P456 DECK HARDWARE LIST CONT:

REVISION #	8/28/1996						
<b>HUNTER P456 DECK HARDWARE</b>							
	<b>GEN.DESCR.</b>	<b>LOC. &amp; TYPE</b>	<b>VENDOR</b>	<b>MDL/NAME/#</b>	<b>#REQ.</b>	<b>H.P #</b>	<b>DWG #</b>
1	HATCH	FWD.HEAD	LEWMAR	COAST S-60	1	PR4580	
2	HATCH	FWD.S/R CABIN TOP	LEWMAR	COAST S-50	2	HW0086	
3	HATCH	MAIN SALOON	LEWMAR	COAST S-10	2	HW0014	
4	HATCH	AFT S/R (AFT END)	LEWMAR	COAST41	4	PR4527	
5	HATCH	AFT S/R (AFT END)	LEWMAR	COAST S-70	1	HW0087	
6	HATCH	HOUSE SIDE	LEWMAR	PORTLIGHT 05	2	HW0008	
7	HATCH	HOUSE SIDE	LEWMAR	SIZE 03	1	HW0013	
8	PORTLIGHT	HULL SIDE			2	PX0298	
9	BIN DOOR	PORT SIDE ABOVE SEAT			1	PLO189	
10	WINDLASS	ANCHOR LKR.	HORIZON	1500GD	1	PR4532	
11	BOW ROLLER	BOW			1	P4634	4462044A
12	MAST STEP	MID DECK	Z SPAR		1	R10554	
13	MAINSHEET TRAV BAR	ON ARCH	HARKEN		1	HW0351	
	END CAPS	" "	" "	631NP	2	HW0343	
	TRAVELER CAR	" "	" "		1	HW0340	
	TRAV. CAR BLOCK	" "	" "	504-A	1	HW0344	
	BOOM BLOCK	" "	" "	1586	1	HW0345	
	CONTROL BLOCKS	" "	" "	566	2	HW0053	
	STAND UP SHEAVES	" "	SCHAEFFER	506-40	4	PR5108	
	CAM CLEATS	" "	HARKEN	365	2	HW0353	
14	WINCH	HALYARD	LEWMAR	COAST STD.44ST	1	HN2521	
15	WINCH	HALYARD-ELEC.	LEWMAR	COAST 48EST	1	HN2573	
16	WINCH	COCKPIT / JIB SHEET	LEWMAR	COAST 48EST	2	HN2573	
18	SHEETSTOPPER	PORT (QUAD)	SPINNLOCK	QUAD XT/4	1		
19	GRAB RAIL	FWD. TRUNK	75"		2	HW1700	
20	GRAB RAIL	AFT TRUNK	48"		2	HW2440	
21	GRAB RAIL	AFT TRUNK	24"		2	HW2445	
22	SHORE PWR.	TRANSOM			1	LGO100	
23	CLEAT	AFT/MID/FWD RAIL /ANC. W	10"		6	HW0977	
24	CLEAT (FURL)	COCKPIT AREA	4"		1		
25	JIB TRACK	MID TRUNK					
26	DK. ORGANIZER (QUAD)	MID TRUNK (PORT)	HARKEN	1590	1		
27	LIFE LINES	ABOVE GUNNELS					
28	STANCHION	ALONG GUNNELS			8	PR4522	N/A
29	FWD GATE STANCH	PORT AND STARBOARD			2	PR4523	4462022A
30	AFT GATE STANCH	PORT AND STARBOARD			2	PR4570	4462023A
31	BOW RAIL				1	PR4571	4462024A
32	STERN RAIL				2	PR4572	4462041A
33	SWIM LADDER	STERN	WINDLINE	TLD-3X	1	PR4560	4462015A
34	CHAIN PLATE	UPPER SHROUD			2		
35	CHAIN PLATE	LOWER SHROUD			2	PR4566	4462020A
36	STRUTS	MAST			2	PR4567	4462034A
37	FILL PLATE	DIESEL			1	PL1126	4462037A
38	FILL PLATE	WATER			3	PL1130	
39	FILL PLATE	WASTE			2	PL1140	
40	SOLAR PANEL	ON SEA HOOD			1	EL1180	
41	STERN LIGHT				1	ELO390	
42	BOW LIGHT				1	ELO380	
43	WHEEL	WHITLOCK	36"		1	HW3278	
44	SPEAKERS	ON ARCH IN POD			2	EL 0101-A	
45	PEDESTAL	PEDESTAL	WHITLOCK		1		
46	SHIFT CONTROL	PEDESTAL			1	HW3572	N/A
47	ENGINE PANEL	IN COAMING			1		
48	LIGHT ON ARCH				1	ELO250	4465007A
49	EMERG.TILL ACCESS	TRANSOM			1	VC010004	
50	TRAVELER BLOCK	ARCH	HARKEN	504A	1		

## HUNTER P456 DECK HARDWARE LIST CONT:

51	MAINSHEET BLOCK	AFT END BOOM	HARKEN 1586				
53	VANG BLOCK		SCHAEFER	10-05-UC	1	HW0231	
54	VANG BLOCK		SCHAEFER	705-15	1	HW0296	
55	VANG BLOCK		SCHAEFER	10--55	1	HW0223	
56	TRANSOM LAZERETTE LID				2		
57	SEA HOOD	FORWARD OF COMPANIONWAY			1		N/A
58	COCKPIT LAZERETTE	PORT SIDE			1		N/A
59	ANCHOR HATCH	BOW			1	GLASS	N/A
60	ANCHOR LATCH	BOW			1	HW4481	N/A
61	STRIKER PLATE	ANCHOR LOCKER			1		
62	HINGE				8	HW4172	4462026A
63	CABIN SIDE WINDOW				2		
64	CABIN WINDSHIELD				2	PR4470	N/A
65	BILGE PUMP				1	PLO371	N/A
67	SHORE WATER				1	PL1175	
68	PADEYE		SCHAEFER	78-99	2		
70	DRAIN	AFT COCKPIT FLOOR			1	PR4520	
71	SWIM GRAB HANDLE	STERN			2	HN2404	N/A
72	WINDLASS CONTROLS	BOW UP			1	HW3206-C	
81	ARCH	ABOVE COCKPIT			1		
82	WIND SHIELD	ON DECK FWD OF COCKPIT			1		N/A
83	SPRING CLEAT GARD				2	HW2126	N/A
84	HATCH	CABIN SIDE	LEWMAR	PX0375	4	HW0043	
85	HATCH	COCKPIT	LEWMAR	PORTLIGHT 05	2	HW0008	
86	PORTLIGH	HULL SIDE	LEWMAR		1	PX0297	
87	HATCH	HULL SIDE	LEWMAR		3	HW0074	
88	COMPANIONWAY TRACK						
89	SOLAR PANEL MOUNTING PLATE		ON SEA HOOD				4462027A
91	WINDSHIELD GRAB RAIL						
93	HINGE (TRANSOM LOCKER)	TRANSOM			4	119801	N/A
94	TRANSOM HATCH LATCH	TRANSOM			2	624735	
95	DK ORGANIZER (TRI)	STARBOARD	HARKEN	1501	1		
97	SHEET STOPPER	STARBOARD (TRI)	SPINLOCK	TRI XT/3	1		
	<b>OPTIONAL GEAR</b>						
17	WINCH	COCKPIT / SPINN.SHEET	LEWMAR	COAST STD.50ST	2	HW2553	
18	SHEET STOPPER (QUAD)	STARBOARD	SPINLOCK	QUAD(XT/4)	1		
		REPLACES ITEM # 97					
66	INNER FORESTAY BASE		ABI	2140CH	1		
	INNER FORESTAY MOUNTING	HDWR.					
69	FENDER HOLDER				2		
	<b>SPIN OPTION</b>						
75	SNATCH BLOCK	MID RAIL	SCHAEFER	11--99	2		
74	SPIN BLOCK	AFT RAIL	SCHAEFER	10--15	2		
90	SPIN. MAST BLOCK		Z-SPAR	PN294	1		
	<b>STAYSAIL OPTION</b>						
90	STAYSAIL MAST BLOCK		Z-SPAR	PN294	1		
96	DK ORGANIZER (SIX)	STARBOARD	HARKEN	1503	1		
		REPLACES ITEM# 95					



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**P456 ACCOMMODATION PLAN**

DESIGN NO.	4508041A	REVISION NO.	NONE
DATE	1/18/00	ENGINEERING DEPT.	

**HUNTER**

**TABLE INSTRUCTIONS**

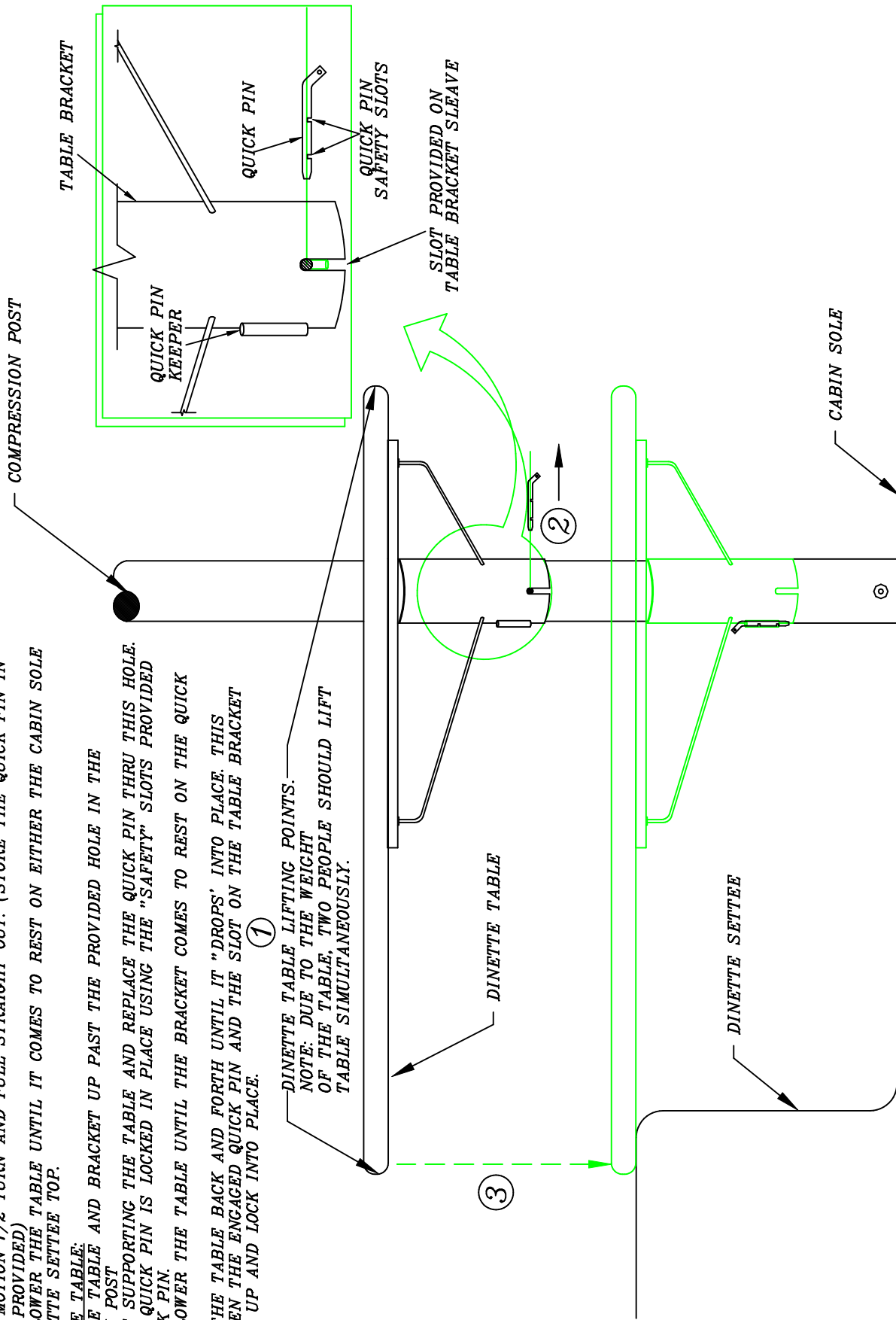
**TO LOWER THE TABLE:**

1. LIFT UP ON THE TABLE TO RELIEVE PRESSURE ON THE QUICK PIN SUPPORTING THE TABLE BRACKET.
  2. CONTINUE SUPPORTING THE TABLE AND REMOVE THE QUICK PIN BY TURNING IT IN A CLOCKWISE MOTION 1/2 TURN AND PULL STRAIGHT OUT. (STORE THE QUICK PIN IN THE KEEPER PROVIDED)
  3. SLOWLY LOWER THE TABLE UNTIL IT COMES TO REST ON EITHER THE CABIN SOLE OR THE DINETTE SETTEE TOP.
- TO RAISE THE TABLE:**
1. RAISE THE TABLE AND BRACKET UP PAST THE PROVIDED HOLE IN THE COMPRESSION POST
  2. CONTINUE SUPPORTING THE TABLE AND REPLACE THE QUICK PIN THRU THIS HOLE. ENSURE THE QUICK PIN IS LOCKED IN PLACE USING THE "SAFETY" SLOTS PROVIDED ON THE QUICK PIN.
  3. SLOWLY LOWER THE TABLE UNTIL THE BRACKET COMES TO REST ON THE QUICK PIN.
  4. ROTATE THE TABLE BACK AND FORTH UNTIL IT "DROPS" INTO PLACE. THIS HAPPENS WHEN THE ENGAGED QUICK PIN AND THE SLOT ON THE TABLE BRACKET SLEAVE LINE UP AND LOCK INTO PLACE.

①

DINETTE TABLE LIFTING POINTS.

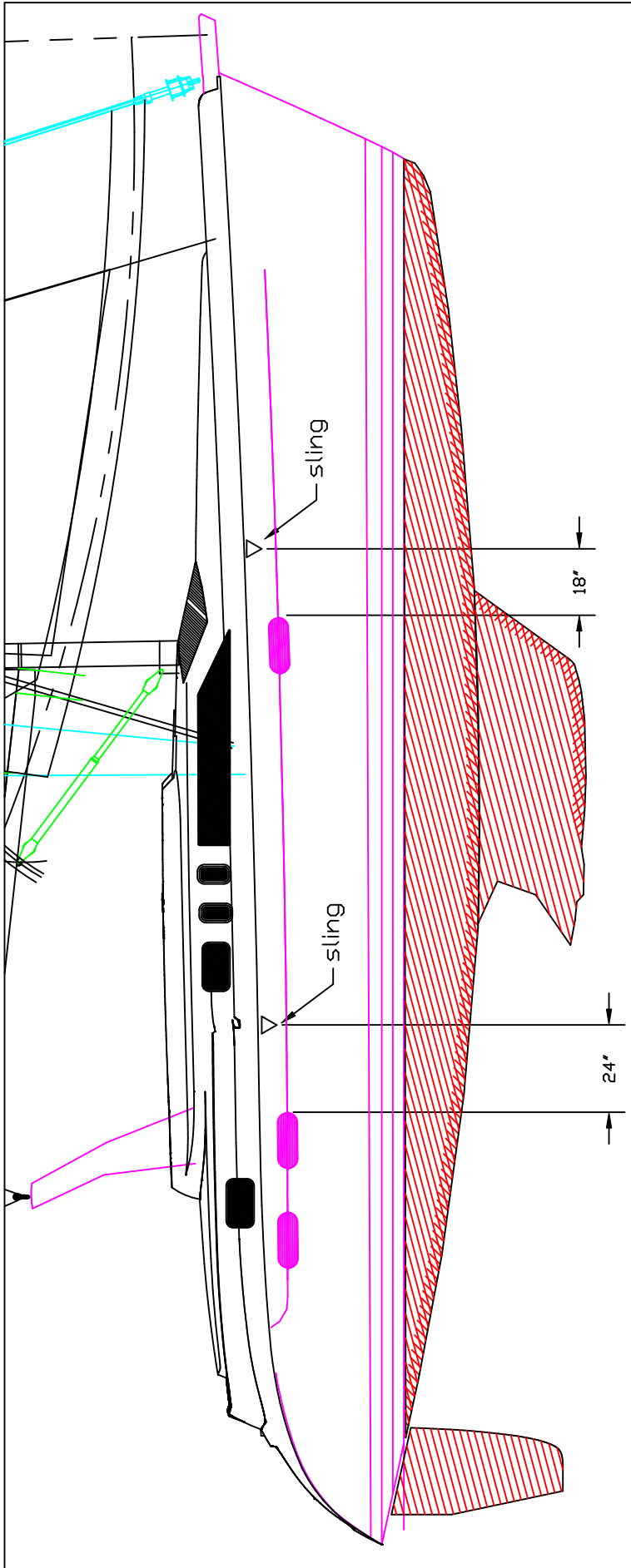
NOTE: DUE TO THE WEIGHT OF THE TABLE, TWO PEOPLE SHOULD LIFT TABLE SIMULTANEOUSLY.



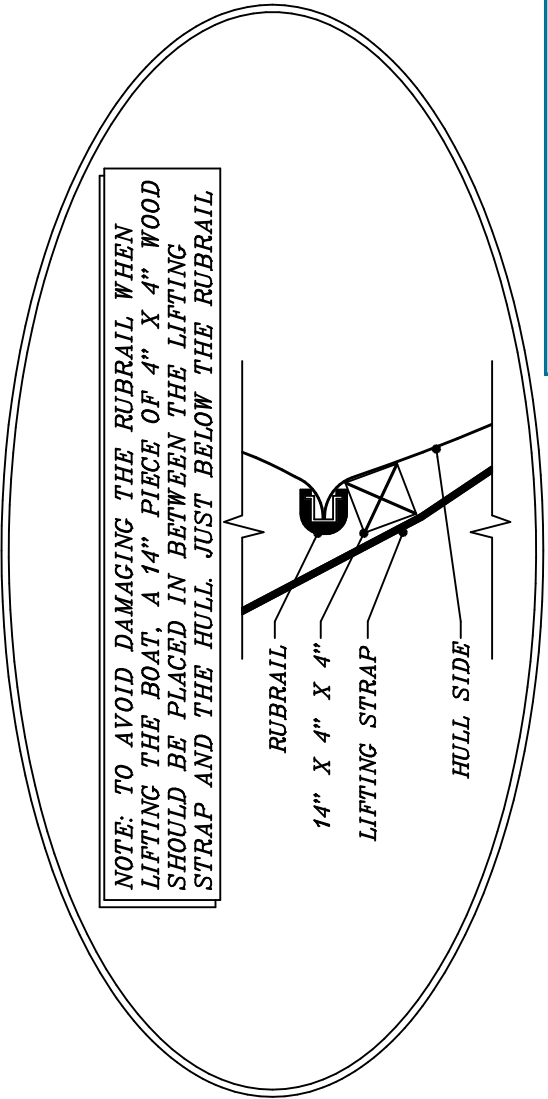
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<b>P456 DINETTE TABLE OPERATION</b>	
REVISED NO.	4508041C
DATE	10/27/98
ENGINEERING DEPT.	



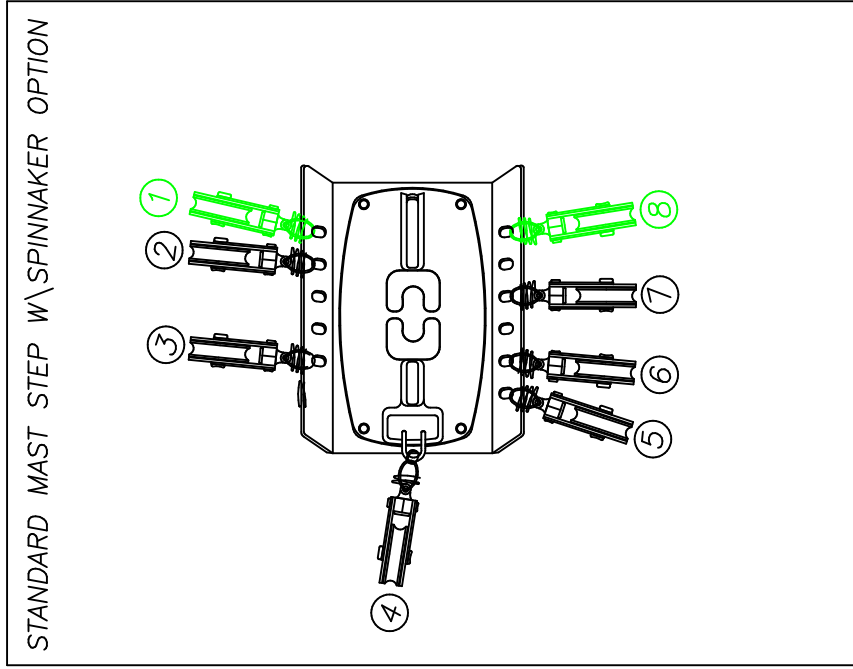
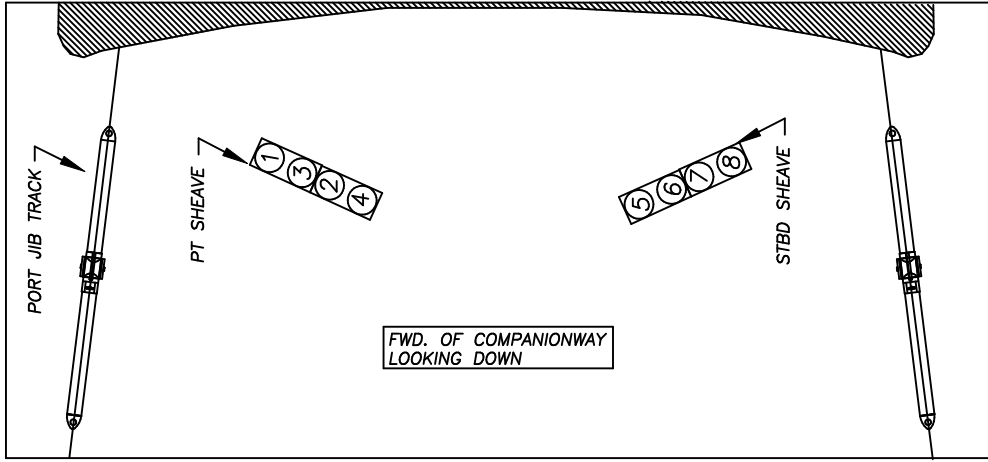
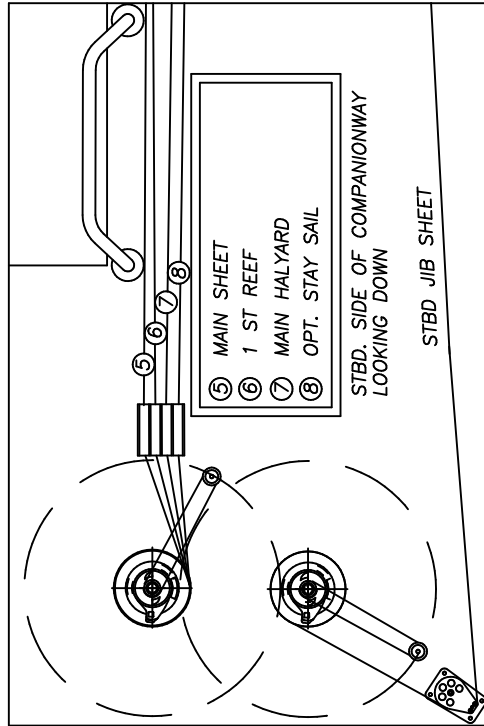
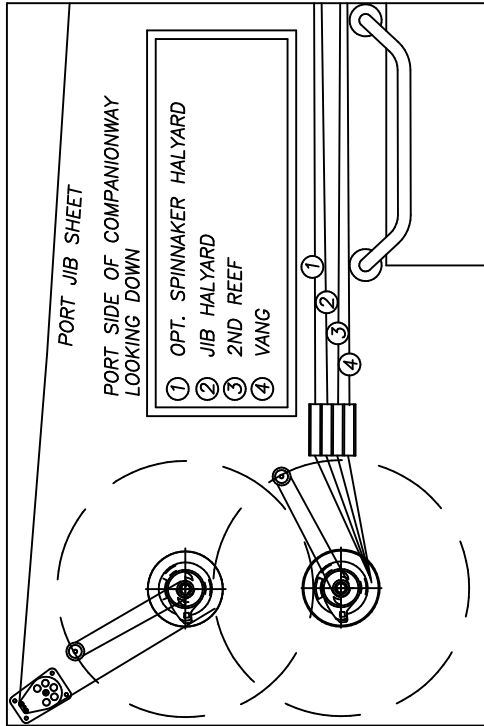


**NOTE: TO AVOID DAMAGING THE RUBRAIL WHEN LIFTING THE BOAT, A 14" X 4" PIECE OF 4" X 4" WOOD SHOULD BE PLACED IN BETWEEN THE LIFTING STRAP AND THE HULL. JUST BELOW THE RUBRAIL**





# SELDEN MAST STEP ARRANGEMENT STANDARD

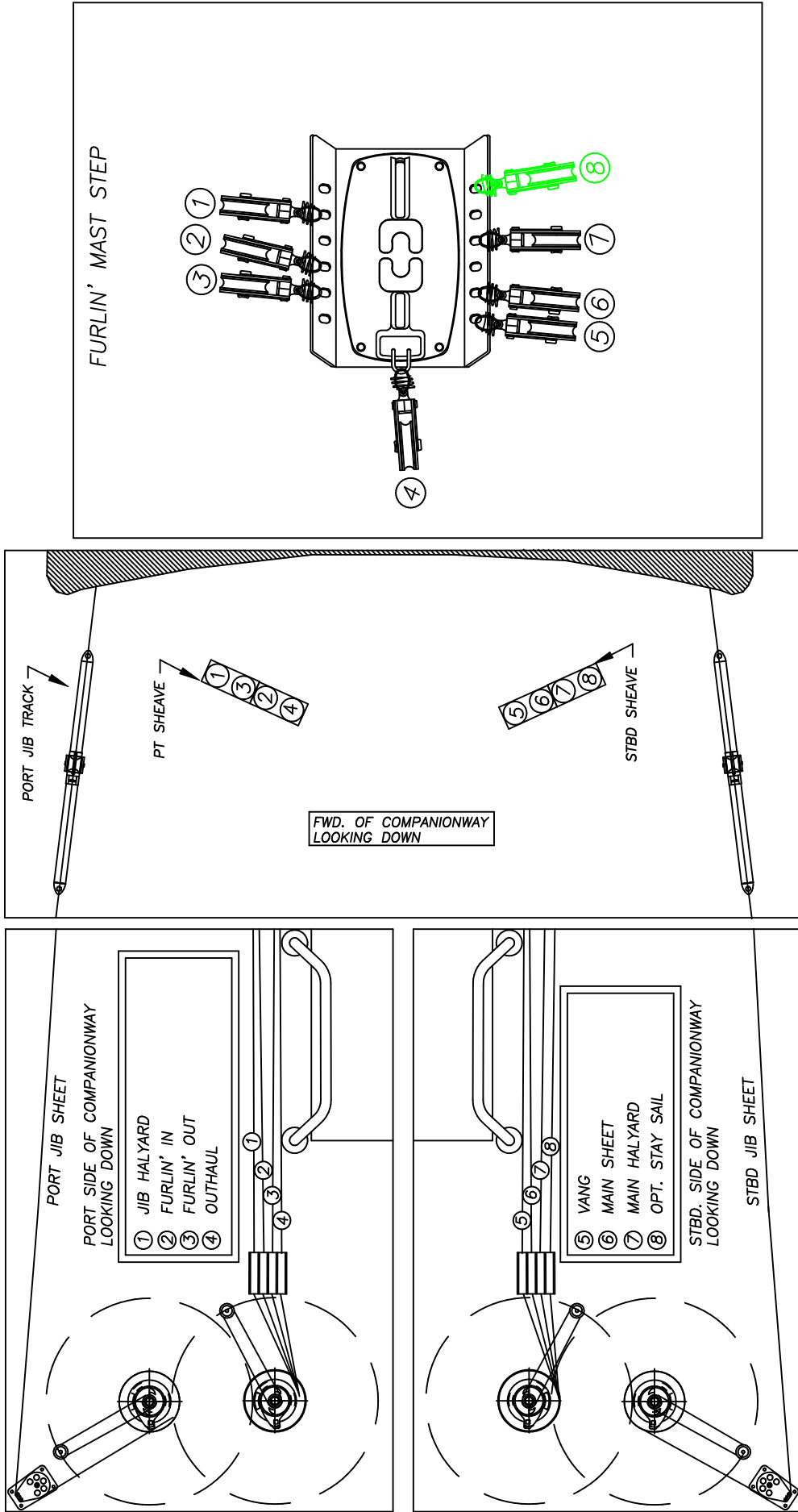


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P456 STD. RUN. RIG & MAST STEP DETAIL	
DESIGN NO.	NONE
REVISED NO.	4508042A
DATE	2/11/98
ENGINEERING DEPT.	

# SELDEN MAST STEP ARRANGEMENT (FURLIN')



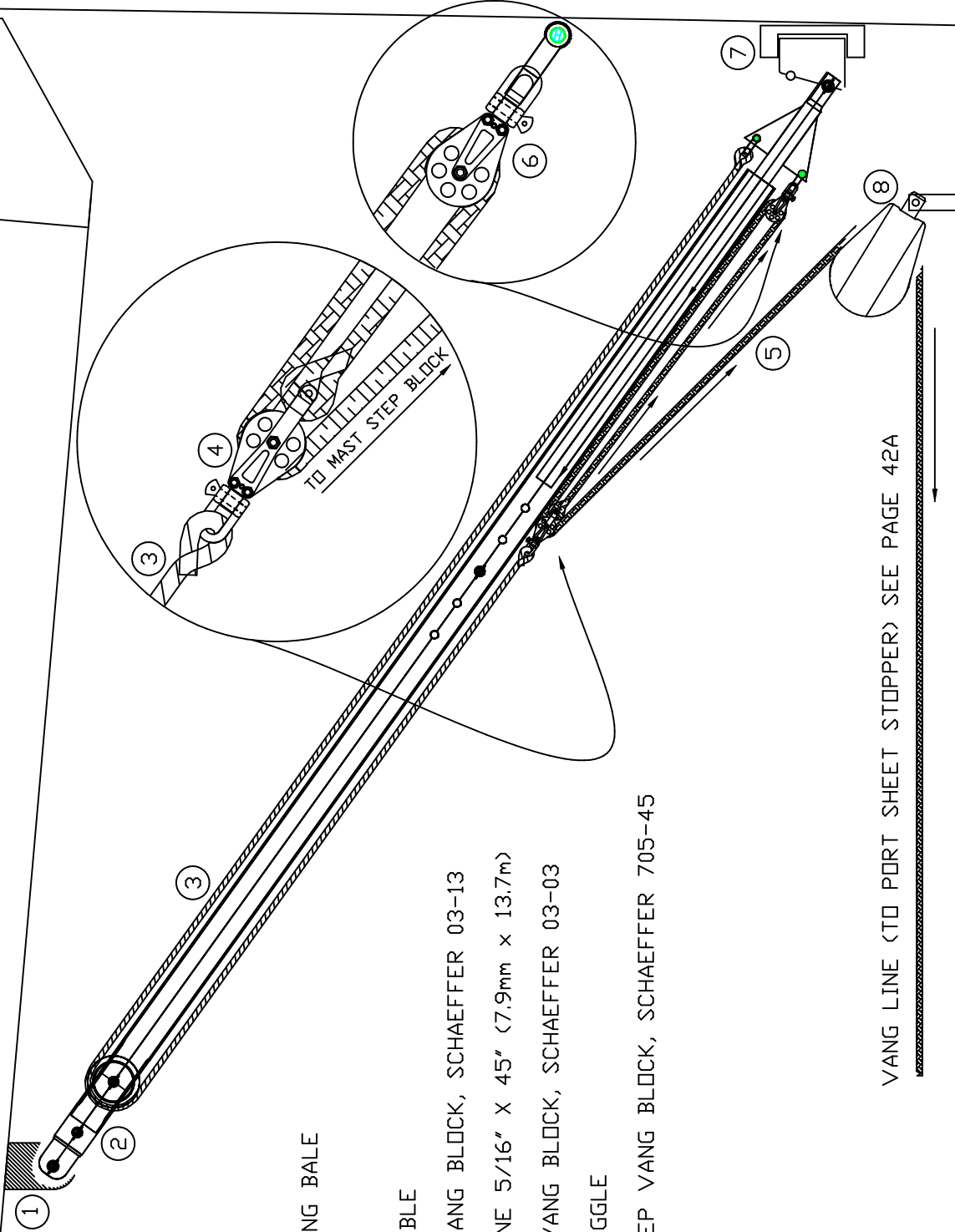
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<b>P456 (FURLIN') RUN. RIG &amp; MAST STEP DETAIL</b>	
DESIGN NO. 4508042B	NONE
DATE 2/11/98	ENGINEERING DEPT.

HUNTER

MAST

BOOM



- ① BOOM VANG BALE
- ② VANG
- ③ VANG CABLE
- ④ UPPER VANG BLOCK, SCHAEFFER 03-13
- ⑤ VANG LINE 5/16" X 45" (7.9mm x 13.7m)
- ⑥ LOWER VANG BLOCK, SCHAEFFER 03-03
- ⑦ VANG TOGGLE
- ⑧ MAST STEP VANG BLOCK, SCHAEFFER 705-45

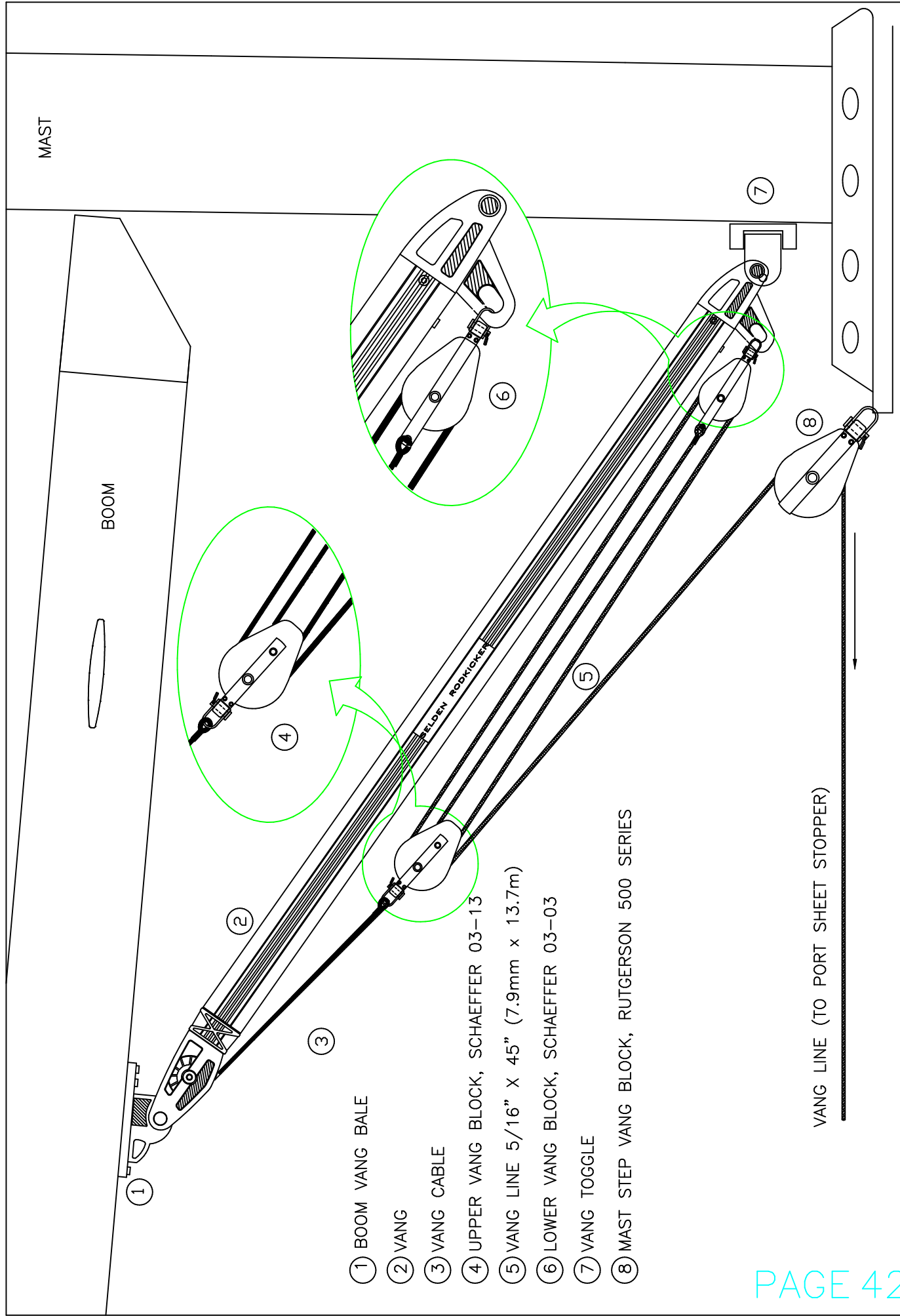
VANG LINE (TO PORT SHEET STOPPER) SEE PAGE 42A

FOR MORE FILES  
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**P456 RIGID VANG DETAILS**

<small>DESIGN NO.</small> 4468042C	<small>REVISION NO.</small> NONE
<small>ENGINEERING DEPT.</small> ENGINEERING DEPT.	<small>DATE</small> 11/13/97

**HUNTER**



- ① BOOM VANG BALE
- ② VANG
- ③ VANG CABLE
- ④ UPPER VANG BLOCK, SCHAEFFER 03-13
- ⑤ VANG LINE 5/16" X 45" (7.9mm x 13.7m)
- ⑥ LOWER VANG BLOCK, SCHAEFFER 03-03
- ⑦ VANG TOGGLE
- ⑧ MAST STEP VANG BLOCK, RUTGERSON 500 SERIES

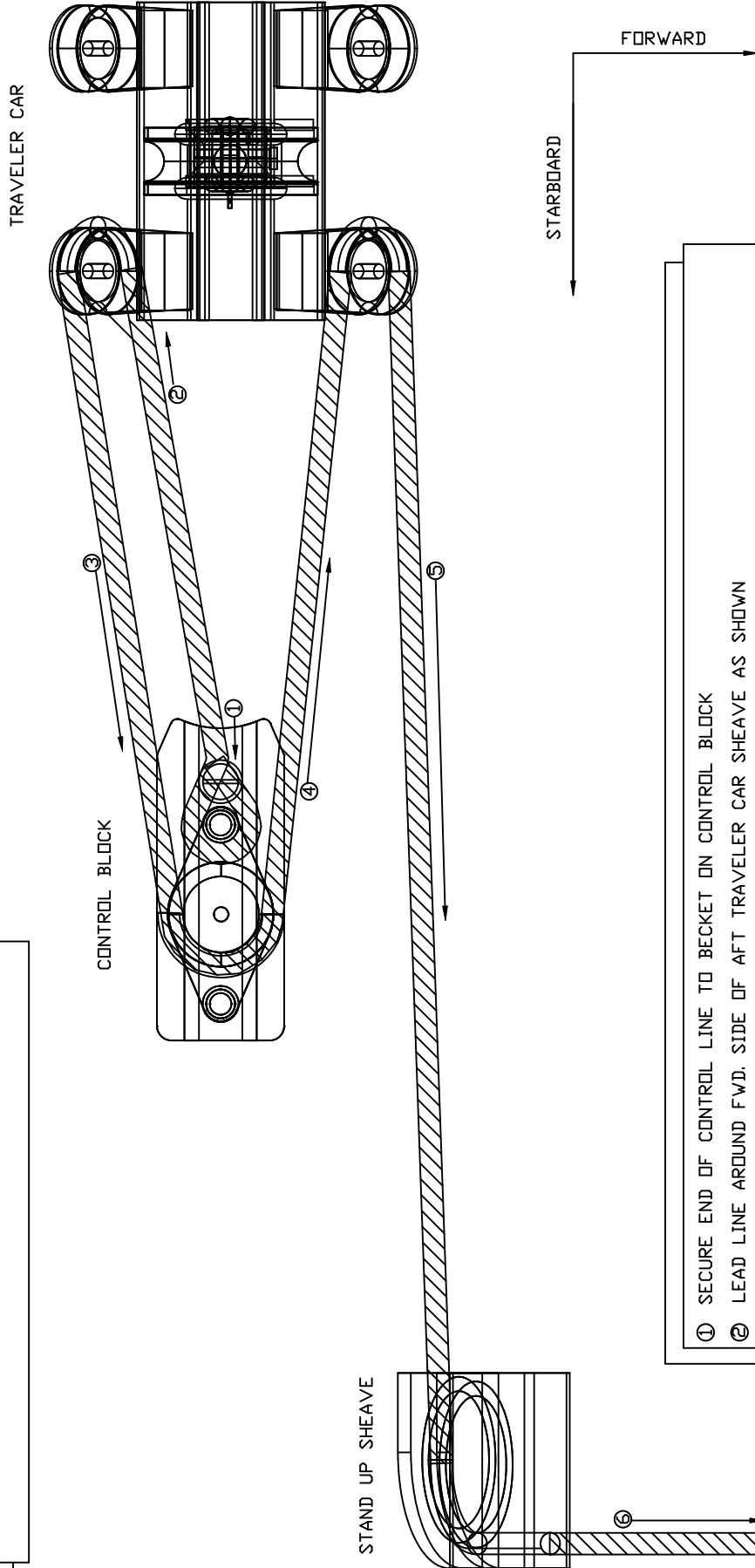
VANG LINE (TO PORT SHEET STOPPER)

FOR VANG DETAILS SEE FOLOWING PAGES

[View Document](#) [Request Information](#) for **HUNTER MARINE CORP.** has prepared **42D**  
**P456 RIGID VANG DETAILS (FURLING/OPT.)**  
 DRAWING NO. 4508042D NONE  
 DATE 10/3/98  
 ENGINEERING DEPT.



NOTE: ARCH & TRAVELER BAR NOT SHOWN FOR CLARITY. STARBOARD SIDE SHOWN, PORT SIDE IS MIRROR IMAGE SEE FOLLOWING PAGE FOR MORE DETAILS



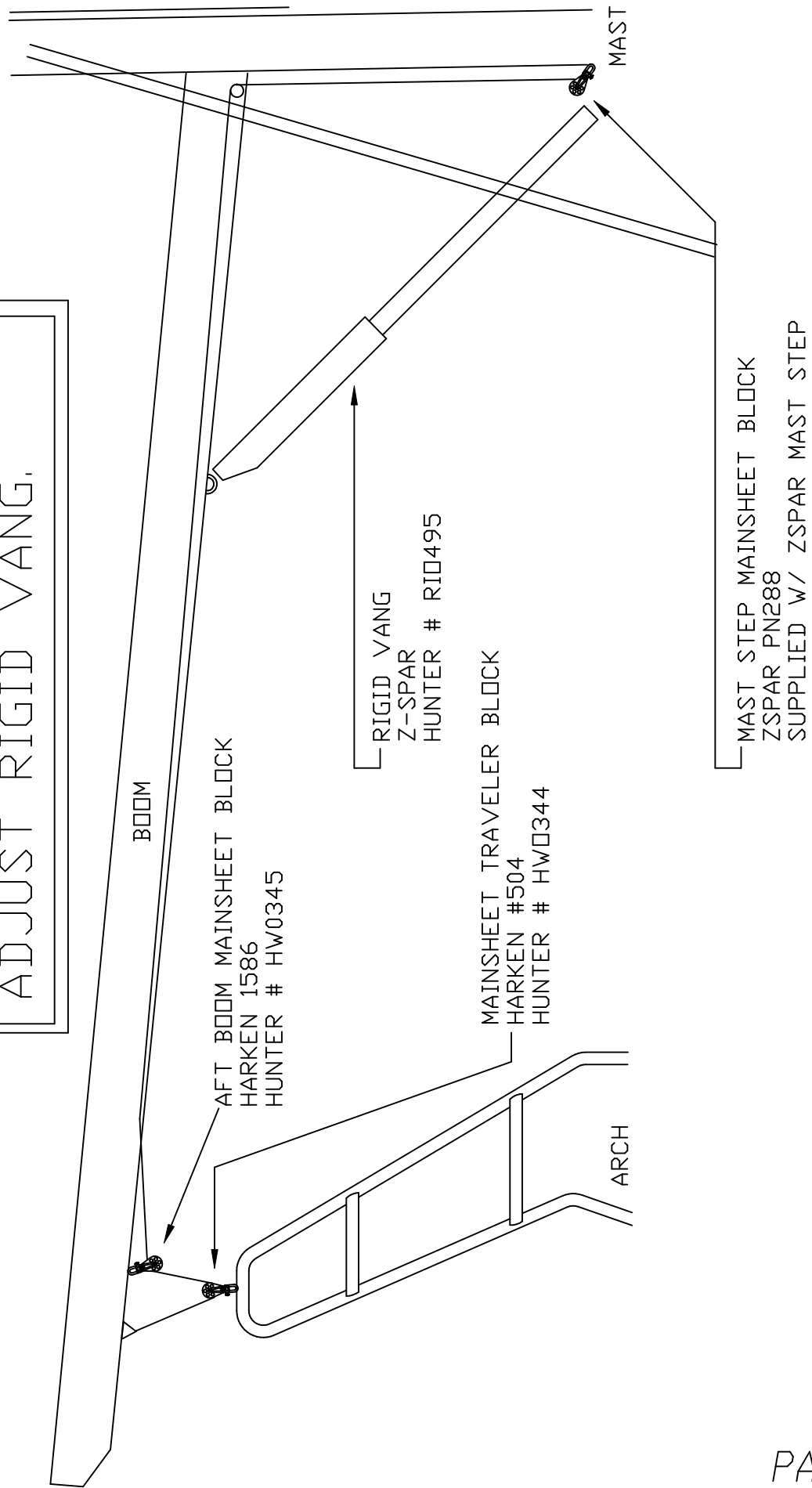
- ① SECURE END OF CONTROL LINE TO BECKET ON CONTROL BLOCK
- ② LEAD LINE AROUND FWD. SIDE OF AFT TRAVELER CAR SHEAVE AS SHOWN
- ③ LEAD LINE FROM AFT SIDE OF AFT TRAVELER CAR SHEAVE TO AFT SIDE OF CONTROL BLOCK SHEAVE
- ④ LEAD LINE FROM FWD. SIDE OF CONTROL BLOCK SHEAVE TO AFT SIDE OF FWD. TRAVELER CAR SHEAVE
- ⑤ LEAD LINE FROM FWD. SIDE OF FWD. TRAVELER CAR SHEAVE TO STAND UP SHEAVE
- ⑥ LEAD LINE AROUND STAND UP SHEAVE THEN DOWN THRU ARCH AND AROUND LOWER SHEAVE TO CAM CLEAT

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<b>456 OPTIONAL TRAVELER LAYOUT</b>			
REVISED NO.	4508043A	DESIGN NO.	NONE
DATE	10/31/97	ENGINEERING DEPT.	

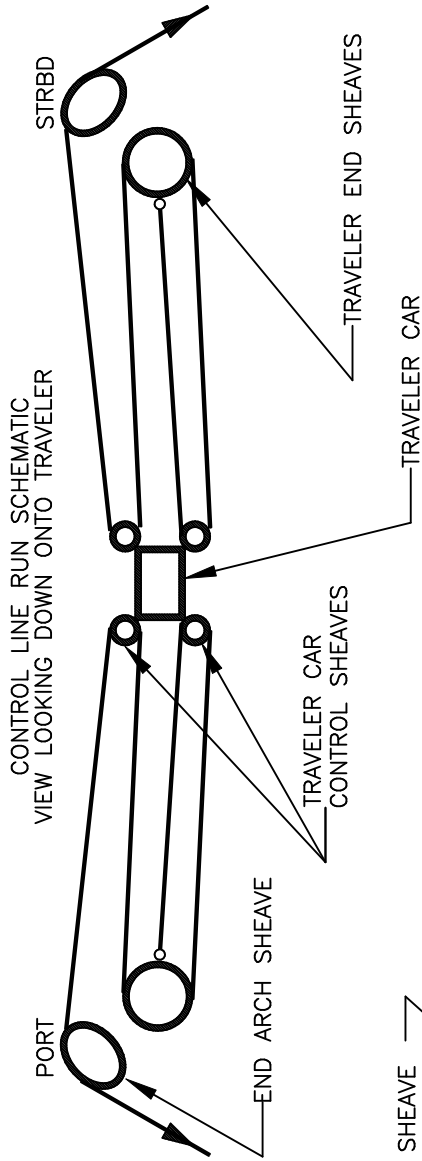
WARNING! ...DO NOT USE  
 ELEC. HALYARD WINCH TO  
 ADJUST RIGID VANG.



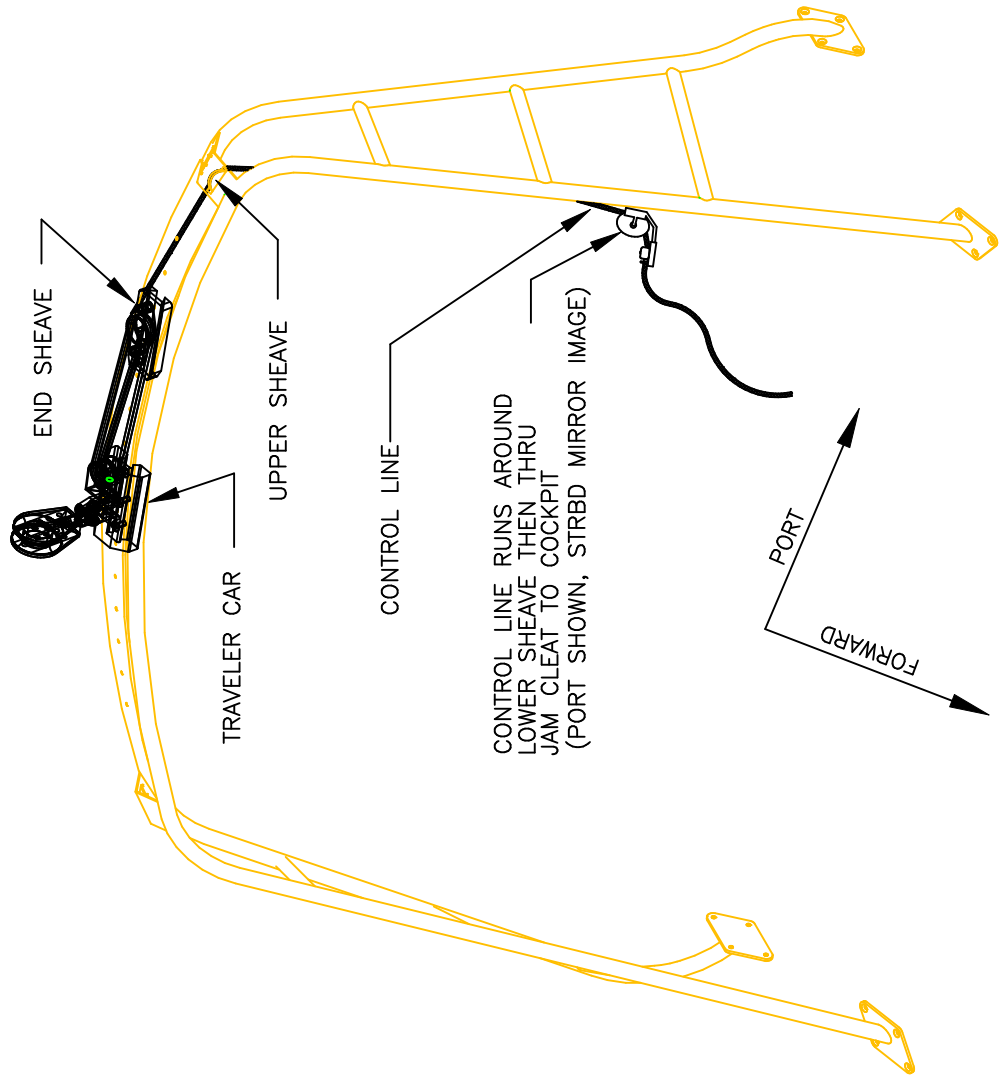
MAINSHEET PURCHASE

HUNTER

P456 MAINSHEET PURCHASE 4508043B



SEE PAGE 43A FOR  
MAIN SHEET LINE RUNS



**P456 TRAV. CONTROL LINE DETAILS**

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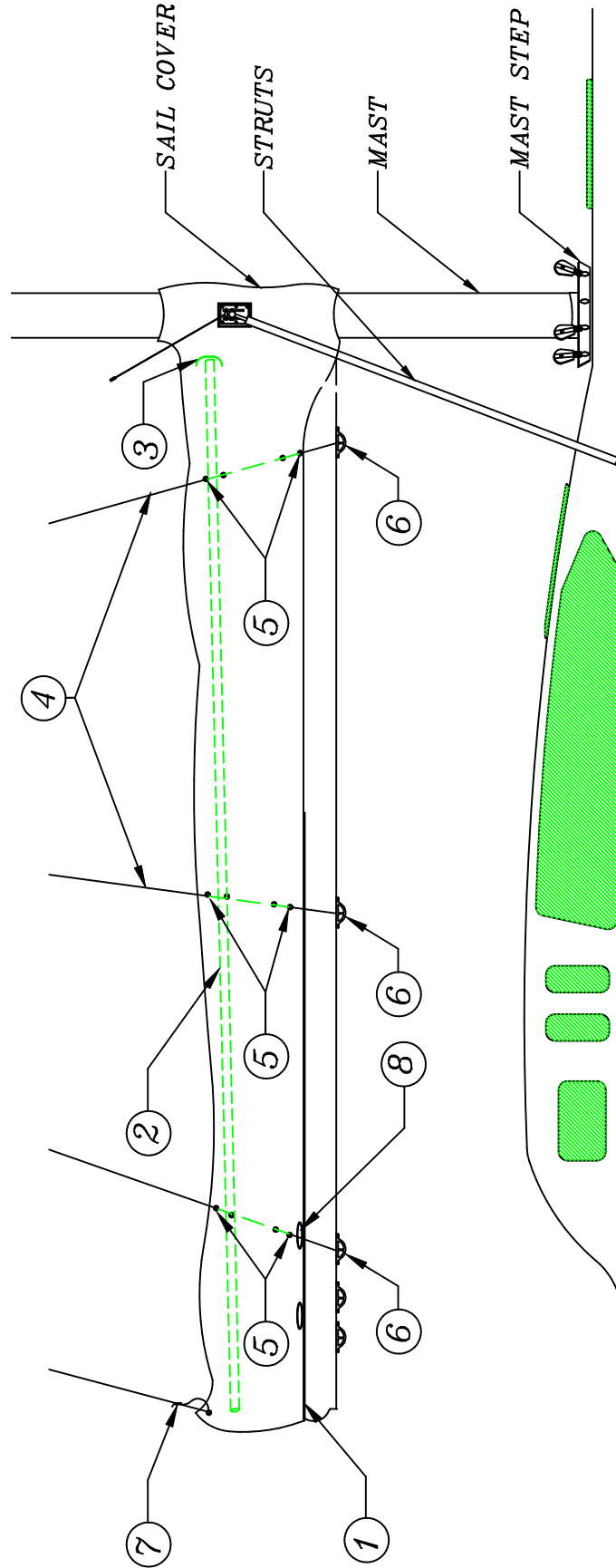
PROJECT NO.	4208043B	REVISION NO.	NONE
ENGINEERING DEPT.		DATE	2/12/98

SLIDE THE BOLTROPE ON THE TWO HALVES OF THE COVER INTO THE BOLTROPE TRACKS (1) ON BOTH SIDES OF THE BOOM. START FROM THE AFT END AND MAKE YOUR WAY FORWARD.

INSTALL THE PVC BATTENS (2) INTO EACH HALF OF THE SAIL COVER. THERE ARE POCKETS (3) THAT OPEN TOWARDS THE FRONT, ON THE INSIDE OF THE COVER. SLIDE THE BATTENS INTO PLACE FROM THE FRONT, AND ROLL THE INSIDE LIP OF THE POCKET BACK IN ORDER TO HOLD THE BATTENS STATIONARY.

FEED THE LAZYJACK LINES (4) DOWN THROUGH THE GROMMETS/RINGS (5) IN THE SAIL COVER, STARTING AT THE TOP AND COMING OUT AT THE BOTTOM OF THE COVER. DEAD END THE LINES TO THE BAILS ON THE UNDERSIDE OF THE BOOM (6).

TIE THE AFT END OF THE SAIL COVER UP TO THE TOPPING LIFT LINE USING THE PIECE OF STRING PROVIDED (7). USE HALF HITCH KNOTS TO SECURE THE COVER IN PLACE AT THE OUTER END OF THE BOOM. THE REEF LINES RUN OUT THROUGH THE COVER SLOTS (8) AND TIE OFF.



SAIL COVER ONLY OFFERED ON STANDARD MAST BOATS

Part No. FILE: P456 HUNTER LAZYJACK SAIL COVER

Part No. 4508043D SCALE NONE

Part No. ENGINEERING DEPT DATE 3/11/99

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HUNTER



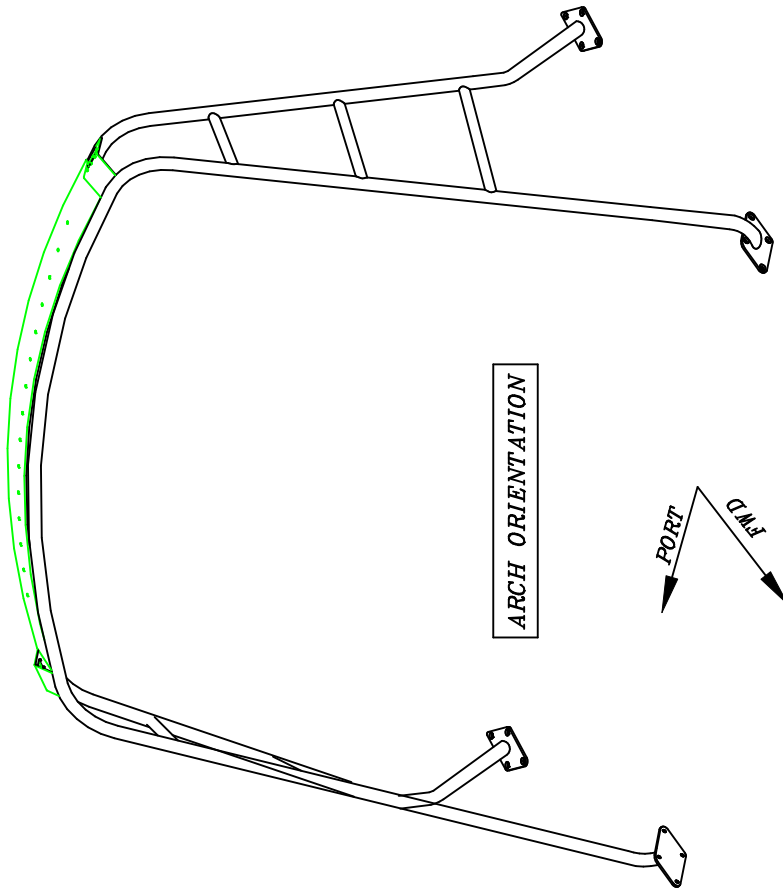
ARCH INSTALLATION: NOTES AND TOOL LIST

NOTES:

1. **IMPORTANT: COMPLETELY READ ALL OF THE INSTALLATION INSTRUCTIONS BEFORE BEGINNING.**
2. **THIS JOB REQUIRES THREE PEOPLE. IT IS IMPORTANT THAT THE ARCH CONTINUE BEING SUPPORTED ONCE IT HAS BEEN SET IN PLACE, UNTIL BEING FULLY SECURED TO THE DECK.**
3. **WHEN INSTALLING ARCH: TO AVOID POSSIBLE INJURY, ORIENT THE DIRECTION OF THE ARCH (LEANING AFT) PRIOR TO BEGINNING THE INSTALLATION PROCESS.**
4. **SEE BELOW FOR A LIST OF TOOLS SUGGESTED FOR THE INSTALLATION PROCESS**
5. **IMPORTANT: REMEMBER TO CHECK ALL THE ARCH BOLTS / NUTS AFTER THE INITIAL SEA TRIAL AND RETIGHTEN AS NECESSARY**

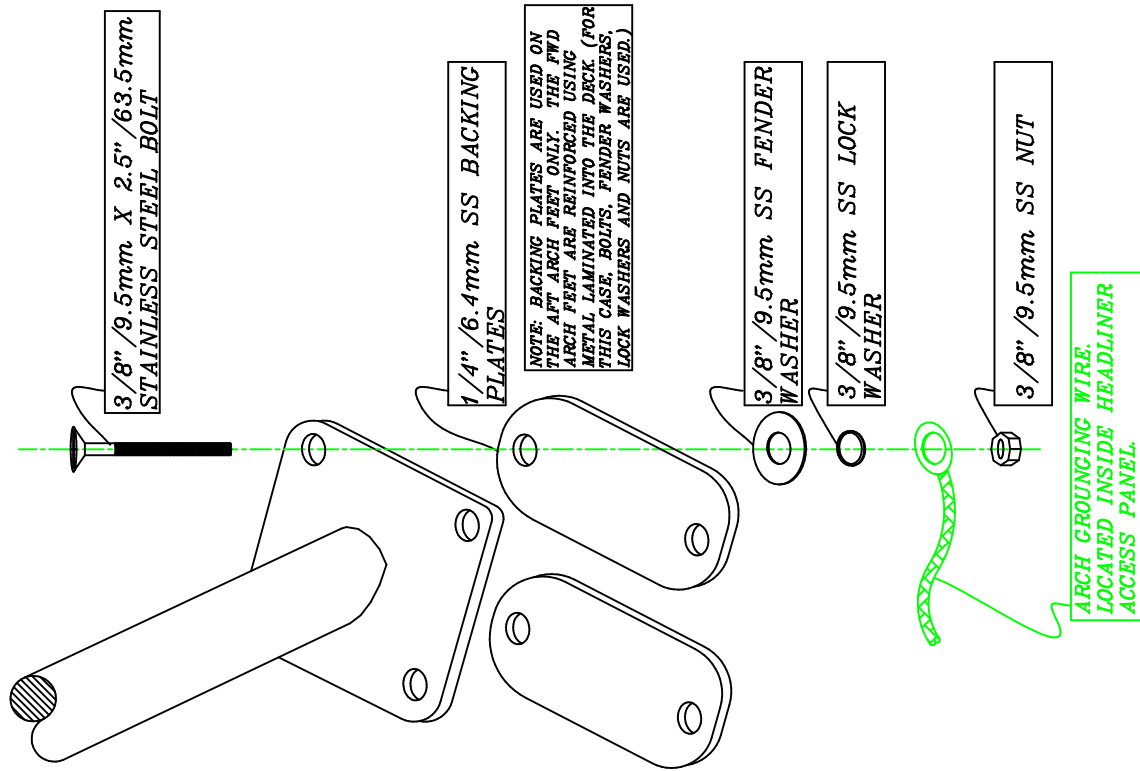
SUGGESTED TOOL LIST:

- 3/8" DRIVE RATCHET
- 6" EXTENSION
- 9/16" DEEP & REGULAR SOCKET
- 9/16" WRENCH
- SCREW DRIVER-- PHILLIPS HEAD
- RATCHET STRAP
- CAULK GUN
- TUBE OF SEALANT (3M 5200)
- NEVER SEIZE (BOLT LUBE)
- RAZOR KNIFE
- RAGS
- ALCOHOL / CLEAN UP



1. REMOVE ALL ACCESSORIES STOWED IN THE COCKPIT LOCKERS. THIS WILL ALLOW EASIER ACCESS TO FASTEN THE ARCH BOLTS.
2. REMOVE ANY SEALANT IN THE ARCH PRE DRILLED HOLES.
3. CLEAN AROUND THE MOUNTING HOLES USING ALCOHOL.
4. APPLY A GENEROUS AMOUNT OF 3M 5200 SEALANT AT THE ARCH MOUNTING FOOT DECK MOUNTING HOLE LOCATIONS.
5. TO AVOID POSSIBLE INJURY, ORIENT THE ARCH (LEANING AFT) PRIOR TO PLACING IT ON THE BOAT.
6. PLACE THE ARCH ON THE DECK OF THE BOAT. ALIGN THE FORWARD MOST ARCH FOOT HOLE WITH THE MATCHING PRE DRILLED FWD MOST DECK COAMING HOLE.
7. INSERT A (2.5"(63.5mm)) STAINLESS STEEL BOLT THRU THE FWD MOST ARCH FOOT INTO THE COAMING.
8. ACCESS THE UNDERSIDES OF THE DECK AT THE ARCH FOOT LOCATIONS AS FOLLOWS:  
STBD AFT: THRU ACCESS PANEL IN THE STBD SIDE AFT STATEROOM HEADLINER.  
PORT AFT: THRU ACCESS PANEX IN THE PORT SIDE AFT STATEROOM HEADLINER.  
STBD FWD: THRU STBD. SIDE COAMING LOCKER  
PORT FWD: THRU PORT. SIDE COAMING LOCKER
9. INSTALL THE (1/4" (6.4mm)) BACKING PLATE ON THE INSIDE OF THE COAMING. THEN INSTALL THE S.S. WASHER, LOCK WASHER AND THE S.S. NUT AS WELL. (NOTE: THERE EXISTS CASES WHERE A BACKING PLATE IS NOT ABLE TO BE INSTALLED. IF THIS IS ENCOUNTERED, USE (1/4" 6.4mm)) S.S. FENDER WASHERS INSTEAD. (IT IS IMPORTANT TO APPLY A SMALL AMOUNT OF NEVER SEIZE TO THE BOLT TO PREVENT "GAULING" OF THE THREADS.)
10. COMPLETELY TIGHTEN THE FORWARD MOST BOLT.
11. REPEAT THIS PROCEDURE FOR THE REMAINING THREE FEET. INSERTING ONLY ONE BOLT AT FIRST AND COMPLETELY TIGHTENING IT DOWN STARTING WITH THE ARCH FOOT DIRECTLY ACROSS FROM THE BOLT ALREADY INSTALLED. REPEAT THIS FOR THE NEXT TWO.
12. NOTE: IT MAY BE NECESSARY TO USE A RATCHET STRAP TO "PULL" THE ARCH INTO ALIGNMENT WITH THE REMAINING MOUNTING HOLES.
13. INSERT THE REST OF THE S.S. FASTENERS INTO THE MOUNTING HOLES. INSTALL ALL THE S.S. BACKING PLATES, WASHERS AND NUTS FROM THE UNDERSIDE OF THE DECK (AT THIS TIME, BE SURE TO INSTALL THE ARCH GROUNDING WIRE, LOCATED IN THE HEADLINER ACCESS PANEL. SEE DIAGRAM FOR INSTALLATION DETAILS.)
14. RECHECK THE ARCH FIT ONTO THE DECK.
15. SECURELY TIGHTEN ALL THE NUTS AND BOLTS USING A CROSS TIGHTENING PATTERN. (DO NOT FORGET TO USE A SMALL AMOUNT OF LUBRICANT FOR THE BOLTS).
16. CLEAN OFF THE EXCESS SEALANT AROUND THE ARCH FEET AND COAMING AREAS USING ALCOHOL.
17. RECHECK THE BOLTS AFTER THE INITIAL SEA TRIAL AND TIGHTEN AS NECESSARY.
18. SEE FOLLOWING PAGE FOR INFO ON CONNECTING THE ARCH SPEAKER POD WIRING. (NOTE: REMEMBER TO CAULK AROUND THE ARCH SPEAKER WIRE EXIT HOLE IN THE DECK.

TYPICAL ARCH FOOT



3/8" / 9.5mm X 2.5" / 63.5mm  
STAINLESS STEEL BOLT

1/4" / 6.4mm SS BACKING  
PLATES

NOTE: BACKING PLATES ARE USED ON THE AFT ARCH FEET ONLY. THE FWD ARCH FEET ARE REINFORCED USING METAL LAMINATED INTO THE DECK. (FOR THIS CASE, BOLTS, FENDER WASHERS, LOCK WASHERS AND NUTS ARE USED.)

3/8" / 9.5mm SS FENDER  
WASHER

3/8" / 9.5mm SS LOCK  
WASHER

3/8" / 9.5mm SS NUT

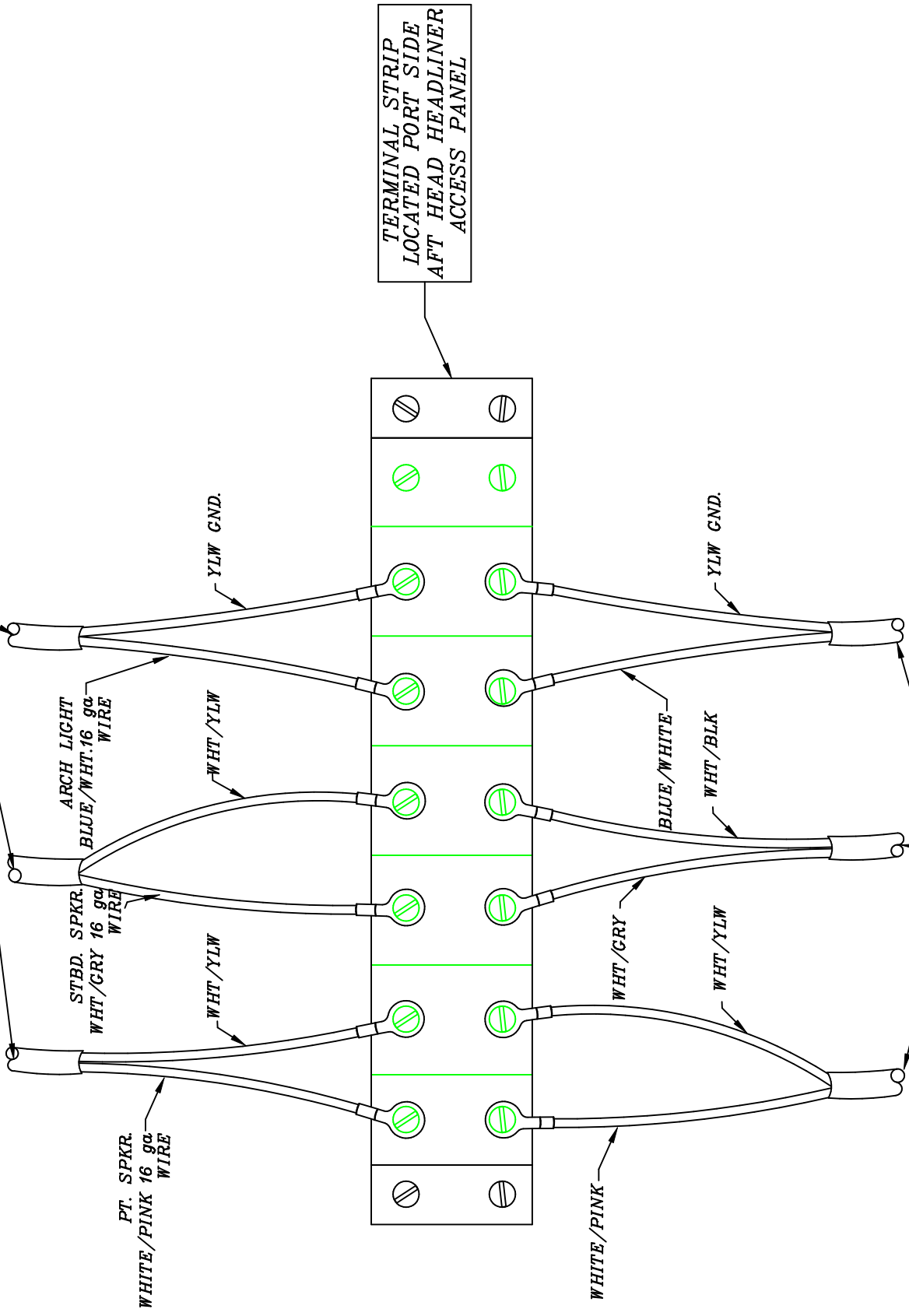
ARCH GROUNDING WIRE,  
LOCATED INSIDE HEADLINER  
ACCESS PANEL.

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HUNTER

<b>P456 ARCH INSTALLATION INSTRUCTIONS CONT</b>	
REVISED NO.	NONE
DRAWING NO.	P4508043F
ENGINEERING DEPT.	1/28/00

WIRES TO ARCH SPEAKERS  
AND ARCH LIGHT



TERMINAL STRIP  
LOCATED PORT SIDE  
AFT HEAD HEADLINER  
ACCESS PANEL

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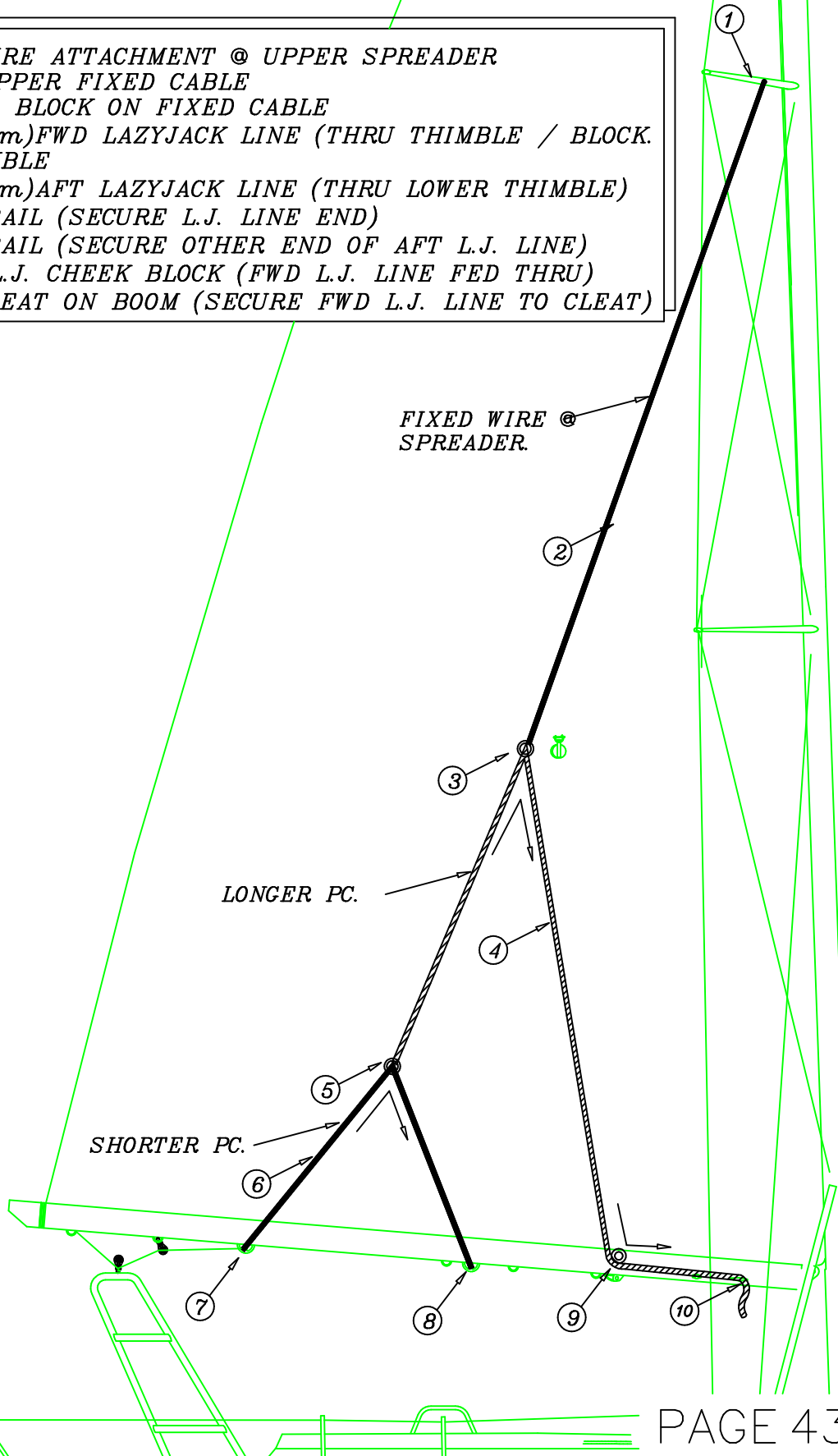
**HUNTER**

PROJECT FILE: P456 ARCH WIRING TERMINAL STRIP SCHEMATIC

REVISED NO.	4508043G	SCALE	NONE
DATE	1/28/00	DESIGNER	
ENGINEERING DEPT			

# P456

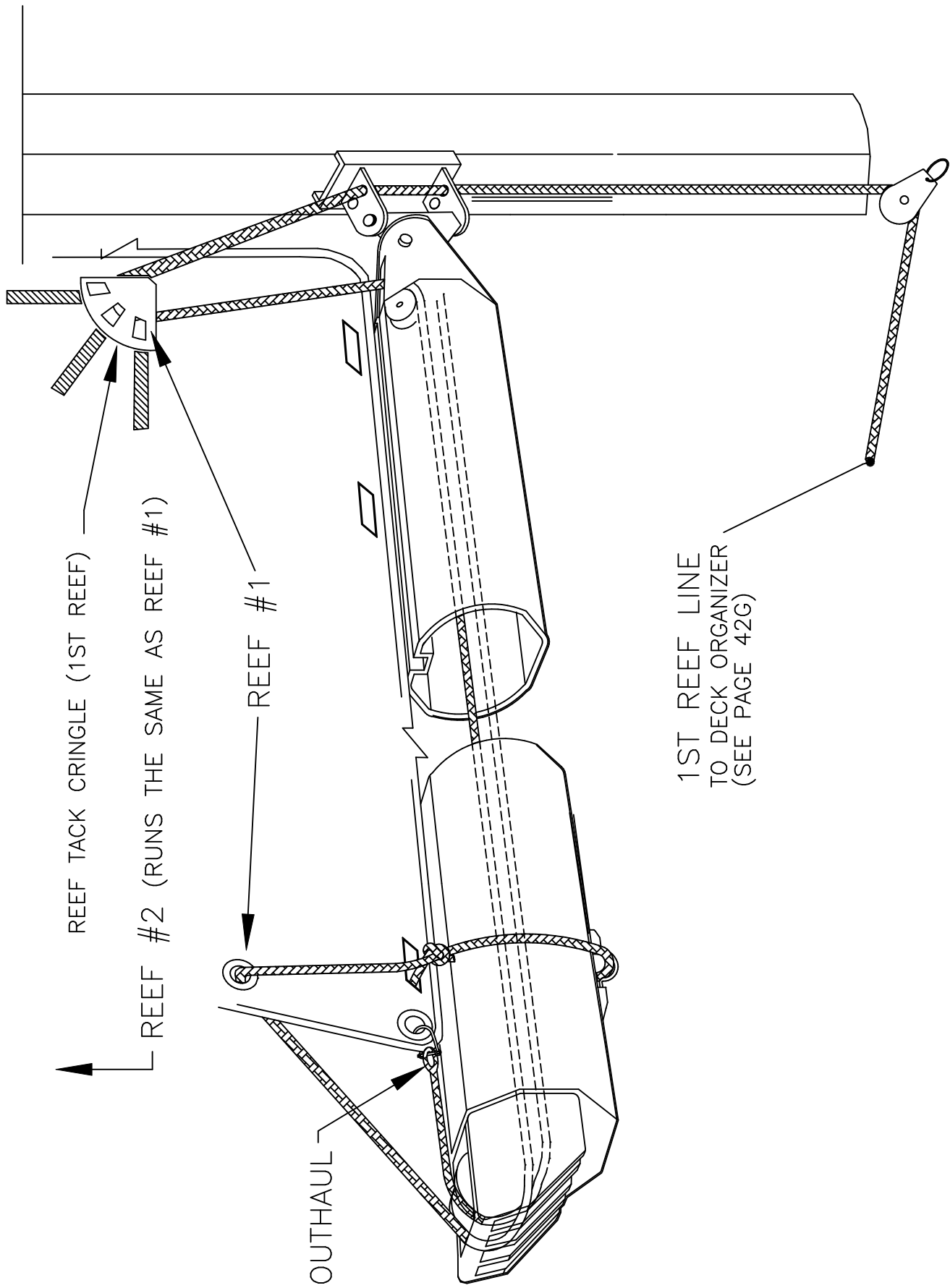
1. LAZYJACK WIRE ATTACHMENT @ UPPER SPREADER
2. LAZYJACK UPPER FIXED CABLE
3. THIMBLE OR BLOCK ON FIXED CABLE
4. 5/16" (7.9mm) FWD LAZYJACK LINE (THRU THIMBLE / BLOCK)
5. LOWER THIMBLE
6. 5/16" (7.9mm) AFT LAZYJACK LINE (THRU LOWER THIMBLE)
7. AFT BOOM BAIL (SECURE L.J. LINE END)
8. MID BOOM BAIL (SECURE OTHER END OF AFT L.J. LINE)
9. FWD BOOM L.J. CHEEK BLOCK (FWD L.J. LINE FED THRU)
10. LAZYJACK CLEAT ON BOOM (SECURE FWD L.J. LINE TO CLEAT)



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# HUNTERWARE

P456 LAZY JACKS INSTALLATION INSTRUCTIONS	
SCALE	NONE
DRAWING NO.	4508043H
DATE	5/14/99
ENGINEERING DEPT	



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**P456 BOOM AND REEF LAYOUT**

PROJECT NO.	4508044	REVISION NO.	NONE
DATE		DATE	12/17/98
ENGINEERING DEPT.			

## REEFING

1. *Release tension on vang.*
2. *Ease main sheet out a couple of feet.*
3. *Wrap main halyard on winch.*
4. *Open main halyard clutch.*
5. *Ease main halyard down while simultaneously pulling in on both reef lines.*
6. *When desired reef tack is about a foot above the boom, lock off the main halyard.*
7. *Put desired reef line on the winch and tension until the tack and clew are in the positions shown in the photos below.*
8. *Tension main halyard until horizontal wrinkles are gone from the luff of the sail.*
9. *Adjust main sheet and vang to suit your desired course.*
10. *Pull in extra line from the reef you are not using just to straighten up.*

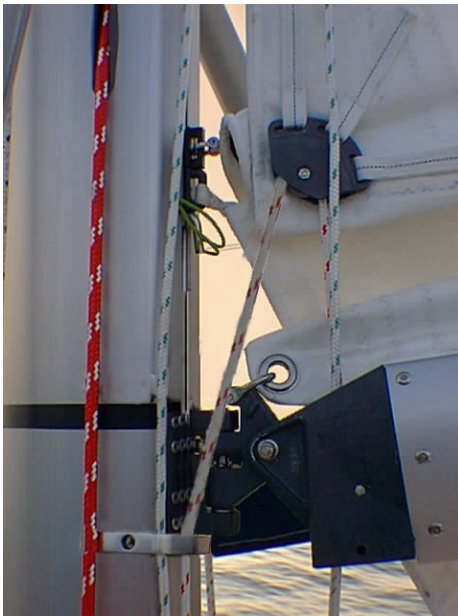


Figure 1 Reef 1 Tack Fitting



Figure 2 Reef 1 Clew Fitting

## UN-REEFING

1. *Ease tension on vang and mainsheet.*
2. *Release reef line clutches.*
3. *Wrap main halyard on winch and tension until reef is removed.*
4. *Readjust mainsheet and vang to suit course.*

RUNNING RIGGING SPECIFICATIONS									
Boat: HUNTER 456 CONV.					Selden Mast # RRG-2617X				
					Date: 10/17/03				
OPT/STD	ITEM	QTY	Line Size	Line Type	Color	End 1	Length	End 2	
1 STD	MAIN HALYARD	1	12mm (1/2")	32/3 pl	BLUE	307-021 SHACKLE / Knot	39 m	128ft	BARE
2 STD	JIB HALYARD	1	12mm (1/2")	32/3 pl	RED	307-047 SHACKLE / KNOT	40.1 m	132ft	BARE
3 STD	MAIN TRAVELER LINE	2	8mm (5/16")	16/16 pl	WHITE	EYE	9 m	30ft	BARE
4 STD	MAINSHEET	1	12mm (1/2")	16/16 pl	BLUE	EYE	22.8 m	75ft	BARE
5 STD	REEFING LINE #1	1	12mm (1/2")	16/16 pl	GREEN	BARE	24.8 m	81ft	BARE
6 STD	REEFING LINE #2	1	12mm (1/2")	16/16 pl	RED	BARE	35.2 m	115ft	BARE
7 STD	JIB SHEET	2	12mm (1/2")	16/16 pl	RED	BARE	15.2 m	50ft	BARE
8 OPT	CRUISING SPINN. SHEET	2	12mm (1/2")	16/16 pl	BLACK	BARE	30.5 m	100ft	BARE
9 OPT	SPINNER HALYARD	1	12mm (1/2")	16/16 pl	BLACK	307-338 Shackle / Knot	40.3 m	132ft	BARE
11 OPT	RODKICKER TACKLE	1	12mm (1/2")	16/16 pl	WHITE	EYE	9 m	30ft	BARE
13 STD	LAZY JACK WIRE	2	4 mm (5/32")	Plastic Covered 7x19	WHITE	307-015 SHACKLE/THIMBLE	9.8 m	32ft	RONSTAN BLOCK, THIMBLE
14 STD	FIXED LAZY JACK LINE	2	10mm (3/8")	16/16 pl	WHITE	BARE	7.1 m	24ft	BARE
15 STD	BOOM TOPPING LIFT	1	10mm (3/8")	16/16 pl	WHITE	307-013 SHACKLE/EYE	33 m	108ft	BARE
16 STD	ADJUSTABLE LAZY JACK LINE	2	10mm (3/8")	16/16 pl	WHITE	THIMBLE/EYE	12.2 m	40ft	BARE
17 OPT	STAYSAIL HALYARD	1	12mm (1/2")	16/16 pl	YELLOW	307-338 Shackle / Knot	32.7 m	107ft	BARE
18 OPT	STAYSAIL SHEETS	2	12mm (1/2")	16/16 pl	YELLOW	BARE	12.2 m	40ft	BARE

**RUNNING RIGGING SPECIFICATIONS**

**Boat: HUNTER 456 FURL**      **Selden Mast # RRIG-2587**      **Date: 10/17/03**

OPT/STD	ITEM	QTY	Line Size	Line Type	Color	End 1	Length	End 2
1 STD	MAIN HALYARD	1	10mm (3/8")	Dyneema	WHITE	307-020 SHACKLE/EYE	39 m 128ft	BARE
2 STD	JIB HALYARD	1	12mm (1/2")	32/3 pl	RED	307-047 SHACKLE/Knot	40.1 m 131ft	BARE
3 STD	MAIN TRAVELER LINE	2	8mm (5/16")	16/16 pl	WHITE	EYE	15.8 52ft	BARE
4 STD	MAINSHEET	1	12mm (1/2")	16/16 pl	BLUE	EYE	22.8 m 75ft	BARE
5 STD	JIB SHEET	2	12mm (1/2")	16/16 pl	RED	BARE	30.4 m 100ft	BARE
6 OPT	CRUISING SPINN. SHEET	2	12mm (1/2")	16/16 pl	BLACK	BARE	30.5 m 100ft	BARE
7 OPT	SPINNER HALYARD	1	12mm (1/2")	16/16 pl	BLACK	307-338 Shackle / Knot	40.3 m 132ft	BARE
8 STD	RODKICKER TACKLE	1	12mm (1/2")	16/16 pl	WHITE	EYE	9 m 30ft	BARE
9 STD	BOOM TOPPING LIFT	1	10mm (3/8")	16/16 pl	WHITE	<sup>307-046</sup> EYE	33 m 108ft	BARE
10 OPT	STAYSAIL HALYARD	1	12mm (1/2")	16/16 pl	YELLOW	307-338 Shackle / Knot	32.7 m 107ft	BARE
11 OPT	STAYSAIL SHEETS	2	12mm (1/2")	16/16 pl	YELLOW	BARE	12.2 m 40ft	BARE
12 STD	MAINSAIL OUTHAUL	1	10mm (3/8")	16/16 pl	WHITE	EYE	16 m 52ft	BARE
13 STD	MAINSAIL FURLING LINE	1	10mm (3/8")	16/16 pl	YELLOW	BARE	12.3 m 40ft	BARE



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## P456 B&R RIG WITH STRUTS DESCRIPTION

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The B&R rig, utilized on the Hunter 456, eliminates the need for a backstay to allow for a more efficient mainsail shape. Fixed backstays are commonly being designed out of today's performance-oriented boats to allow the mainsail to incorporate a full roach design - a more aerodynamic shape both for racing and cruising performance.

To accomplish this, the B&R rig has 30 degree swept spreaders, creating 120 degrees between each rigging point. This tri-pod arrangement has excellent strength for sailboat rigs, and has been used for years to support huge radio towers.

The latest advancement to the B&R rig is the addition of mast struts. These struts stabilize the lower section of the mast, allowing compression loads to be spread, reducing the point loading at the mast base. They also create a strong point for the boom and spinnaker pole loadings. The struts function also allow us to use a smaller mast section reducing weight aloft to decrease the heeling and pitching moments, making for a more comfortable ride. Additionally, they provide a secure handhold when going forward.

The struts perform an important structural function, **therefore never sail your boat without the struts properly fitted.** If your 456 is equipped with the in-mast furling option, the mast is a larger section size and the struts are not utilized.

Additional support is given to the B&R rig (and is unique to it) with the addition of reverse diagonal rigging. For example, the diagonals that you see beginning by the top of the mast strut, ending at the tip of the spreader, supports and stabilizes the upper

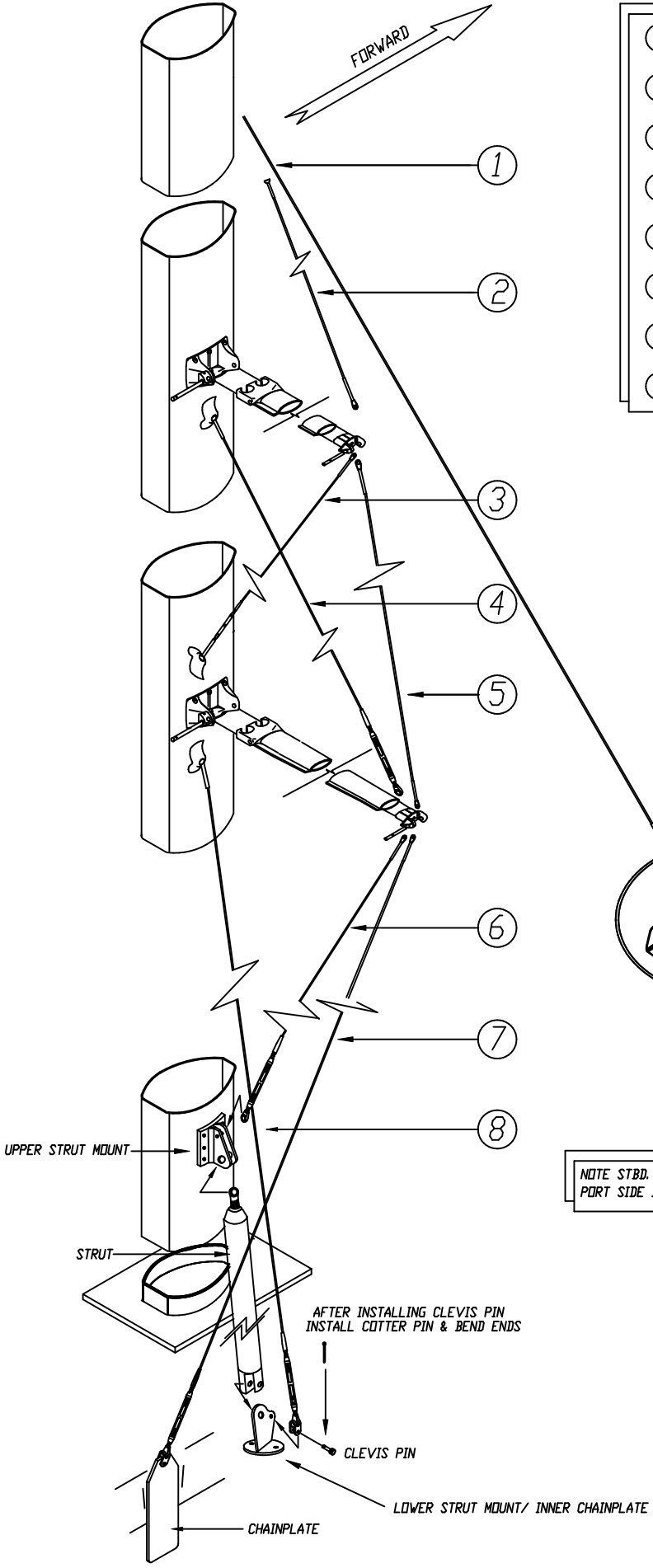
section of the mast as it creates a triangle with the upper shroud.

The B&R rig is designed to be pre-bent to further add rigidity to the mast section and eliminate the need for adjustable rigging (like backstay adjusters). This design should prove more reliable than a rig with adjustable backstays or runners, as there is less chance for error.

The large main, small jib, sail plan on the 456 also eliminates the need for large overlapping headsails (genoa's), as the driving power comes from the much improved shape and size of the mainsail. This allows for an easier tacking small jib, creating good performance and more comfortable sailing, as it is less work for the crew.

As the large main is creating additional mainsheet and leech loading, Hunter has included a cockpit arch whereby the mainsheet and leech loads are directed to the strong part of the boom (the outboard end) and is located at the heaviest loading point of the mainsail. The cockpit arch serves addition safety and comfort functions as handholds and cockpit canvas attachment points.

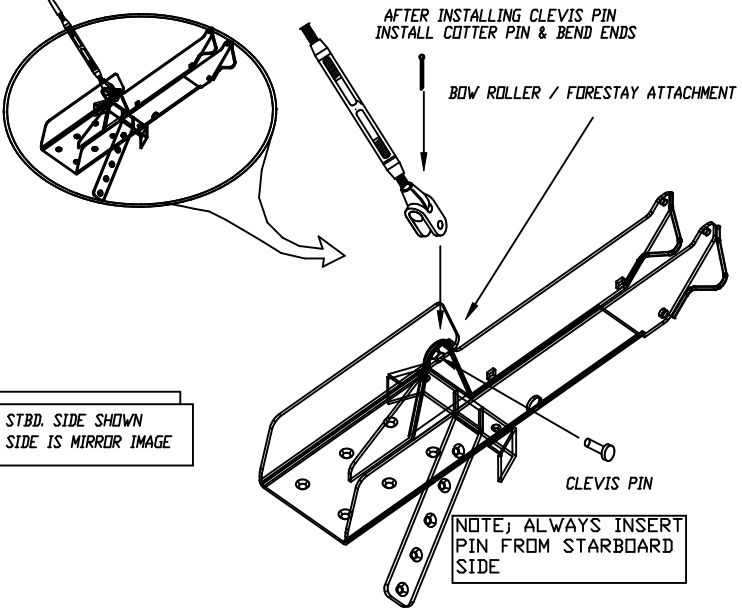
B&R rigs have been used on thousands of sailboats, and we are proud to incorporate this successful design on your new Hunter.



- ① FORESTAY 3/8 (9.5mm) 1 X 19
- ② D3 3/8 (9.5mm) 1 X 19
- ③ RD2 1/4" (6.4mm) 1 X 19
- ④ D2 5/16" (7.9mm) 1 X 19
- ⑤ V2 3/8 (9.5mm) 1 X 19
- ⑥ RD1 1/4" (6.4mm) 1 X 19
- ⑦ V1 3/8 (9.5mm) 1 X 19 DYFORM
- ⑧ D1 3/8 (9.5mm) 1 X 19 DYFORM

NOTE: SEE PAGES 49A-D FOR SPREADER & SPREADER TIP DETAILS.  
 SEE PAGE 50A FOR STANDARD RIG STANDING RIG LENGTHS.

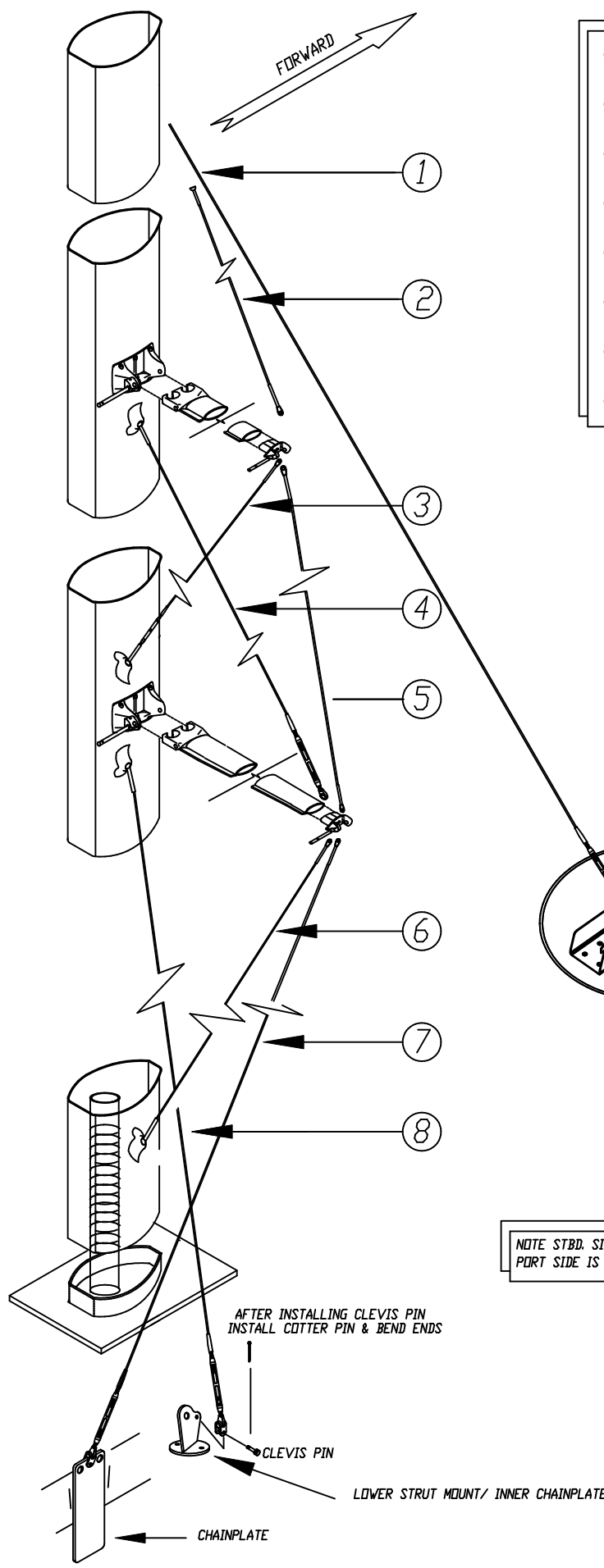
NOTE STBD. SIDE SHOWN  
 PORT SIDE IS MIRROR IMAGE



NOTE; ALWAYS INSERT  
 PIN FROM STARBOARD  
 SIDE

NOTE: NEVER TRY TO SAIL  
 THE VESSEL WITHOUT  
 THE STRUTS IN PLACE  
 AND PROPERLY FASTENED  
 (SEE PAGE 48B)

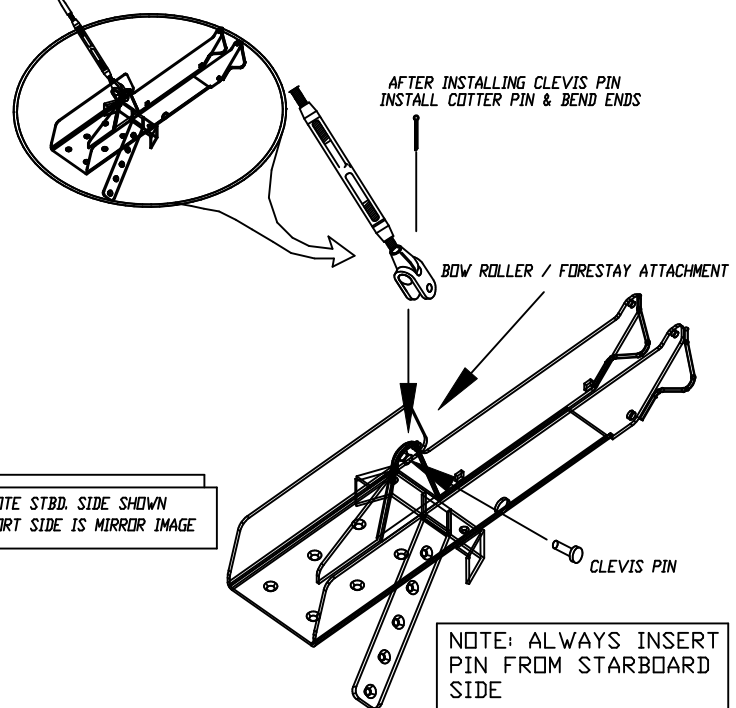
NOTE: IN-MAST FURLING OPTION  
 USES A LARGER MAST SECTION  
 AND THE STRUTS ARE NOT  
 UTILIZED. SEE FOLLOWING PAGE



- ① FORESTAY 3/8 (9.5mm) 1 X 19
- ② D3 3/8 (9.5mm) 1 X 19
- ③ RD2 1/4" (6.4mm) 1 X 19
- ④ D2 5/16" (7.9mm) 1 X 19
- ⑤ V2 3/8 (9.5mm) 1 X 19
- ⑥ RD1 1/4" (6.4mm) 1 X 19
- ⑦ V1 3/8 (9.5mm) 1 X 19 DYFORM
- ⑧ D1 3/8 (9.5mm) 1 X 19 DYFORM

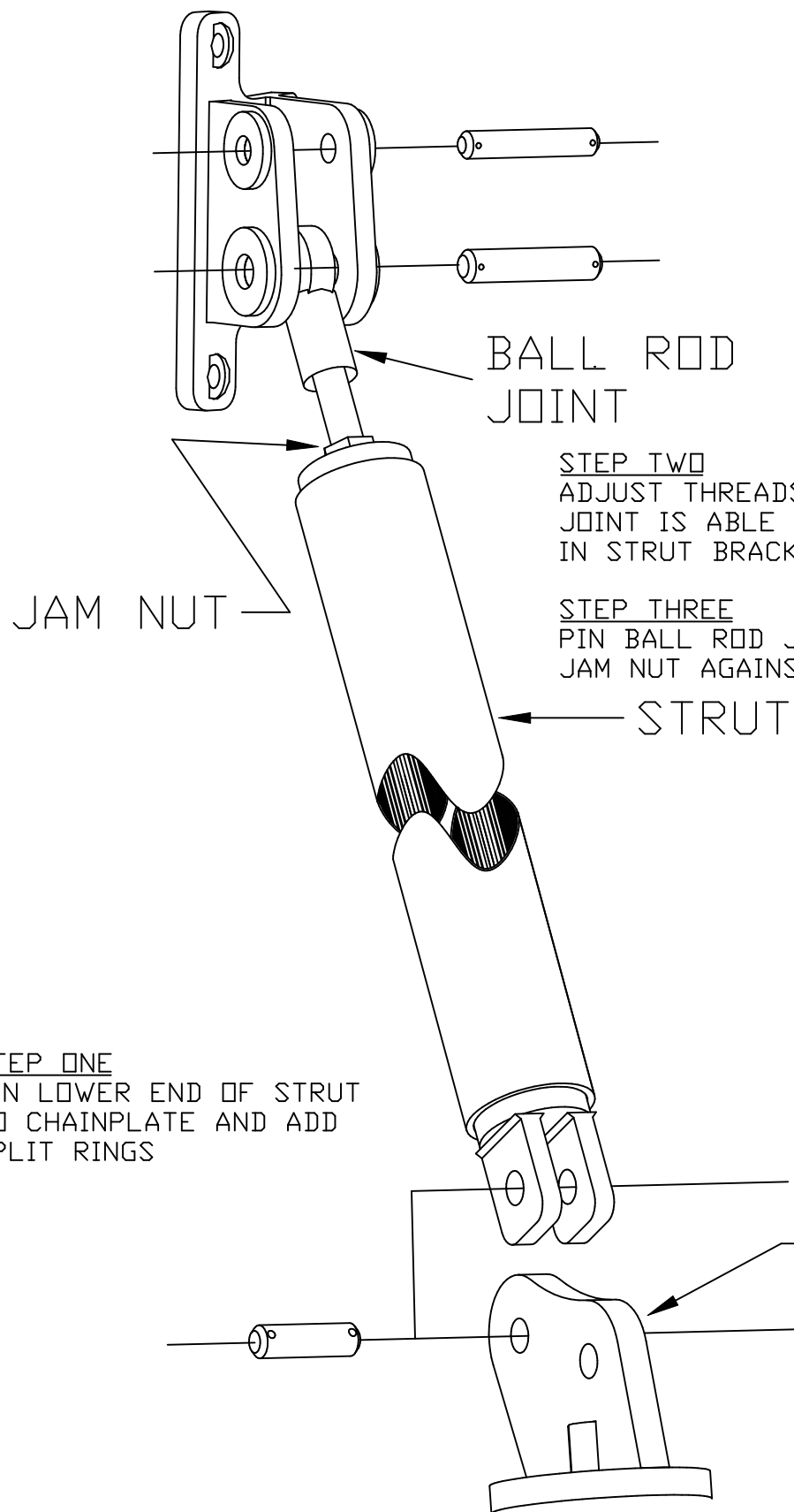
NOTE: SEE PAGES 49A-D FOR SPREADER & SPREADER TIP DETAILS.  
SEE PAGE 50B FOR FURLING RIG LENGTHS.

NOTE STBD. SIDE SHOWN  
PORT SIDE IS MIRROR IMAGE



NOTE: ALWAYS INSERT PIN FROM STARBOARD SIDE

NOTE: IN-MAST FURLING OPTION USES A LARGER MAST SECTION AND THE STRUTS ARE NOT UTILIZED.



BALL ROD  
JOINT

JAM NUT

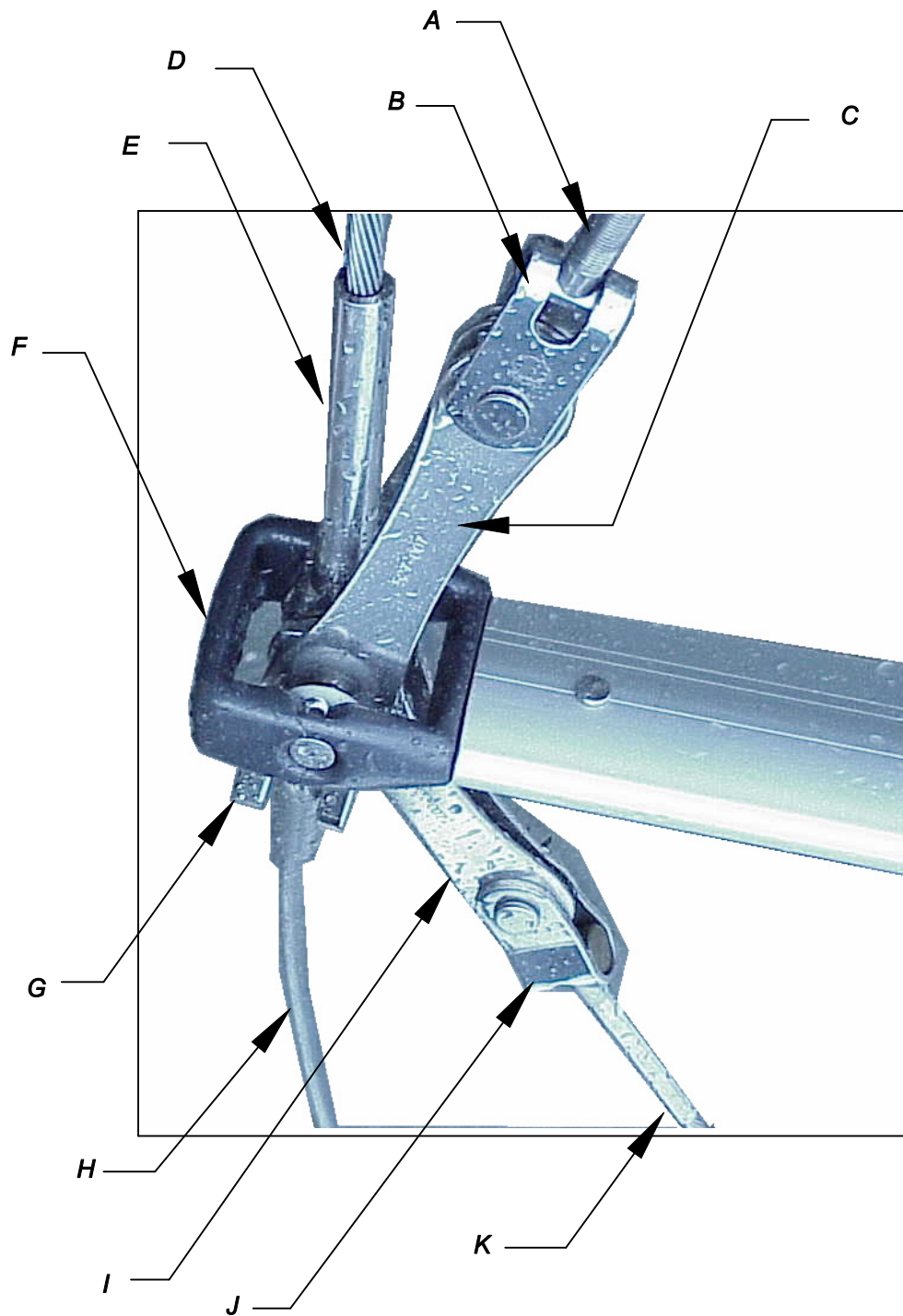
STEP TWO  
ADJUST THREADS UNTIL BALL ROD  
JOINT IS ABLE TO BE EASILY PINNED  
IN STRUT BRACKET

STEP THREE  
PIN BALL ROD JOINT AND TIGHTEN  
JAM NUT AGAINST END OF STRUT

STRUT

STEP ONE  
PIN LOWER END OF STRUT  
TO CHAINPLATE AND ADD  
SPLIT RINGS

LOWERS  
CHAINPLATE



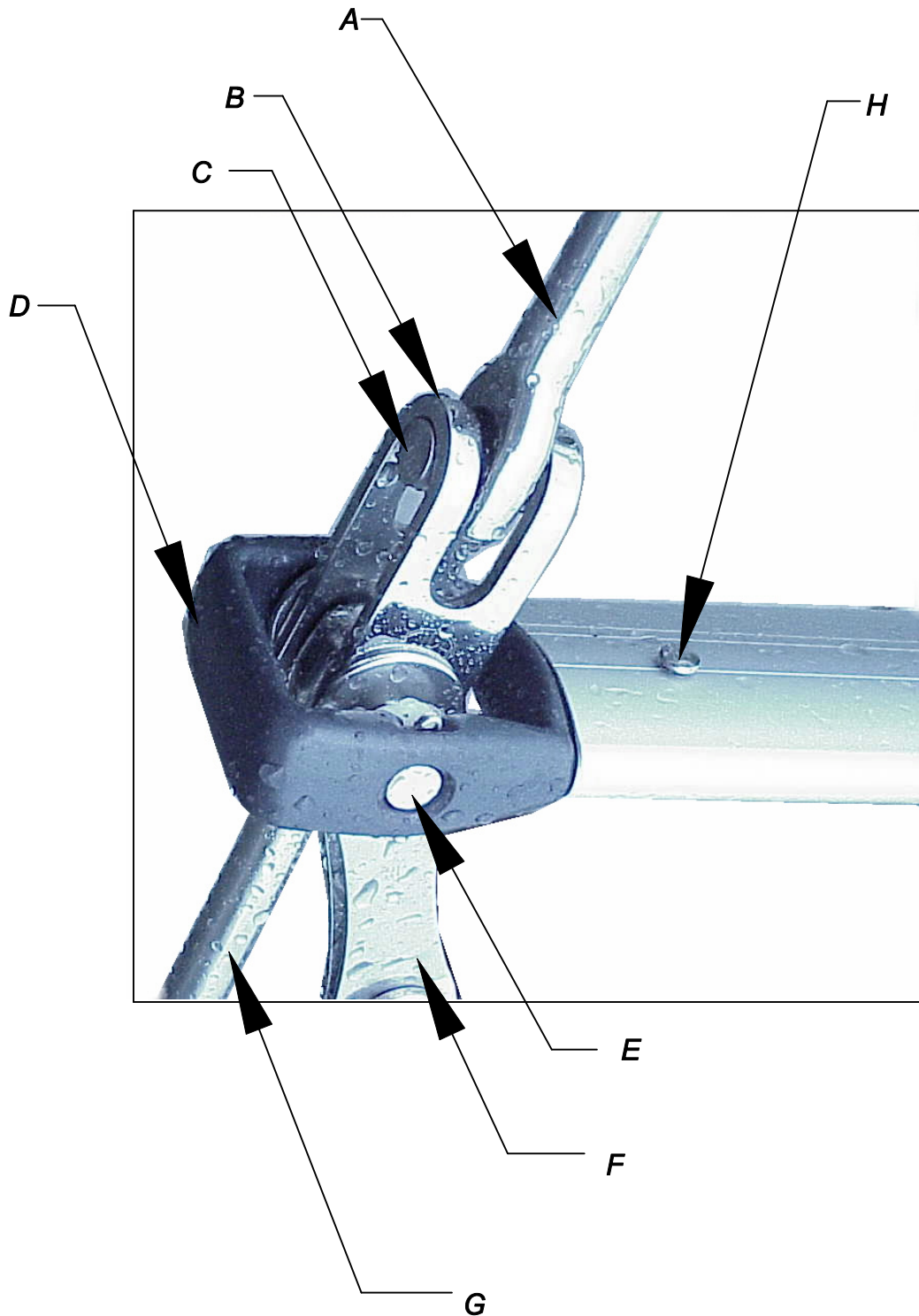
<b>A</b>	<b>D2 stem T</b>	<b>G</b>	<b>jaw toggle</b>
<b>B</b>	<b>jaw toggle</b>	<b>H</b>	<b>V1</b>
<b>C</b>	<b>link plates</b>	<b>I</b>	<b>link plates</b>
<b>D</b>	<b>V2</b>	<b>J</b>	<b>jaw toggle</b>
<b>E</b>	<b>marine eye</b>	<b>K</b>	<b>RD1 stem T</b>
<b>F</b>	<b>spreader tip casting</b>		

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**SELDEN LOWER SPREADER TIP**

DRAWING TITLE	SELDEN LOWER SPREADER TIP
DESIGNING NO.	4508049A
DATE	7/13/01
REVISION NO.	NONE
COMPILED BY	MG



- |          |                             |          |                                      |
|----------|-----------------------------|----------|--------------------------------------|
| <b>A</b> | <i>D3 marine eye</i>        | <b>E</b> | <i>3/8" (.95cm) pin</i>              |
| <b>B</b> | <i>jaw toggle</i>           | <b>F</b> | <i>link plates</i>                   |
| <b>C</b> | <i>1/2" (1.27cm) pin</i>    | <b>G</b> | <i>marine eye stem</i>               |
| <b>D</b> | <i>spreader tip casting</i> | <b>H</b> | <i>spreader tip casting fastener</i> |

## HUNTER 456 CONV. STANDING RIGGING

	ITEM	QTY	WIRE SIZE		FITTINGS	OVERALL LENGTH	
1	D3	2	3/8"	10 mm	EYE 308-365 FORK 308-318-01	14ft 6"	4420 mm
2	V2	2	3/8"	10 mm	EYE 308-365 EYE 308-365	15ft 9"	4800 mm
3	D2	2	5/16"	8 mm	T-TERMINAL 308-326 STD/FORK TB 174-325-56	15ft 3"1/2	4660 mm
4	RD2	2	1/4"	6 mm	FORK 308-314-01 STD/T TB 174-474-21	15ft 7"3/4	4770 mm
5	V1	2	3/8"	10 mm	FORK 308-318-01 STD/TGLE TB 174-326-60	25ft 5"1/2	7760 mm
6	D1	2	3/8"	10 mm	EYE 308-365 STD/TGLE TB 174-326-60	24ft 7"1/4	7500 mm
7	RD1	2	1/4"	6 mm	FORK 308-314-01 STD/TGLE TB 174-324-59	17ft 4"1/4	5290 mm
8	FORESTAY	1	5/16"	8 mm	FURLEX 308-17+ 039-027-62	58ft 6"3/8	17840 mm
<b>SRIG-2617H</b>							

1. ALL ADJUSTABLE RIGGING IS DIMESIONED WITH TURNBUCKLES 2/3 OPEN.
2. LENGTHS DO NOT INCLUDE SPREADER TIP LINKAGE.

## HUNTER 456 FURL STANDING RIGGING

	ITEM	QTY	WIRE SIZE		FITTINGS	OVERALL LENGTH	
1	D3	2	3/8"	10 mm	EYE 308-365 FORK 308-318-01	16 ft. 2"	4930 mm
2	V2	2	3/8"	10 mm	EYE 308-365 EYE 308-365	17 ft. 9 3/4"	5430 mm
3	D2	2	5/16"	8 mm	T-TERMINAL 308-326 STD/FORK TB 174-325-56	17 ft. 2 5/8"	5250 mm
4	RD2	2	1/4"	6 mm	FORK 308-314-01 STD/T TB 174-474-21	17 ft. 10 7/8"	5460 mm
5	V1	2	3/8"	10 mm	FORK 308-318-01 STD/TGLE TB 174-326-60	21 ft. 4 5/8"	6520 mm
6	D1	2	3/8"	10 mm	EYE 308-365 STD/TGLE TB 174-326-60	20 ft. 9 7/8"	6345 mm
7	RD1	2	1/4"	6 mm	FORK 308-314-01 STD/T TB 174-474-21	16 ft. 5 5/8"	5020 mm
8	FORESTAY	1	5/16"	8 mm	FURLEX 308-17+ 039-027-62	58 ft. 6 3/8"	17840 mm
<b>SRIG-2587H</b>							

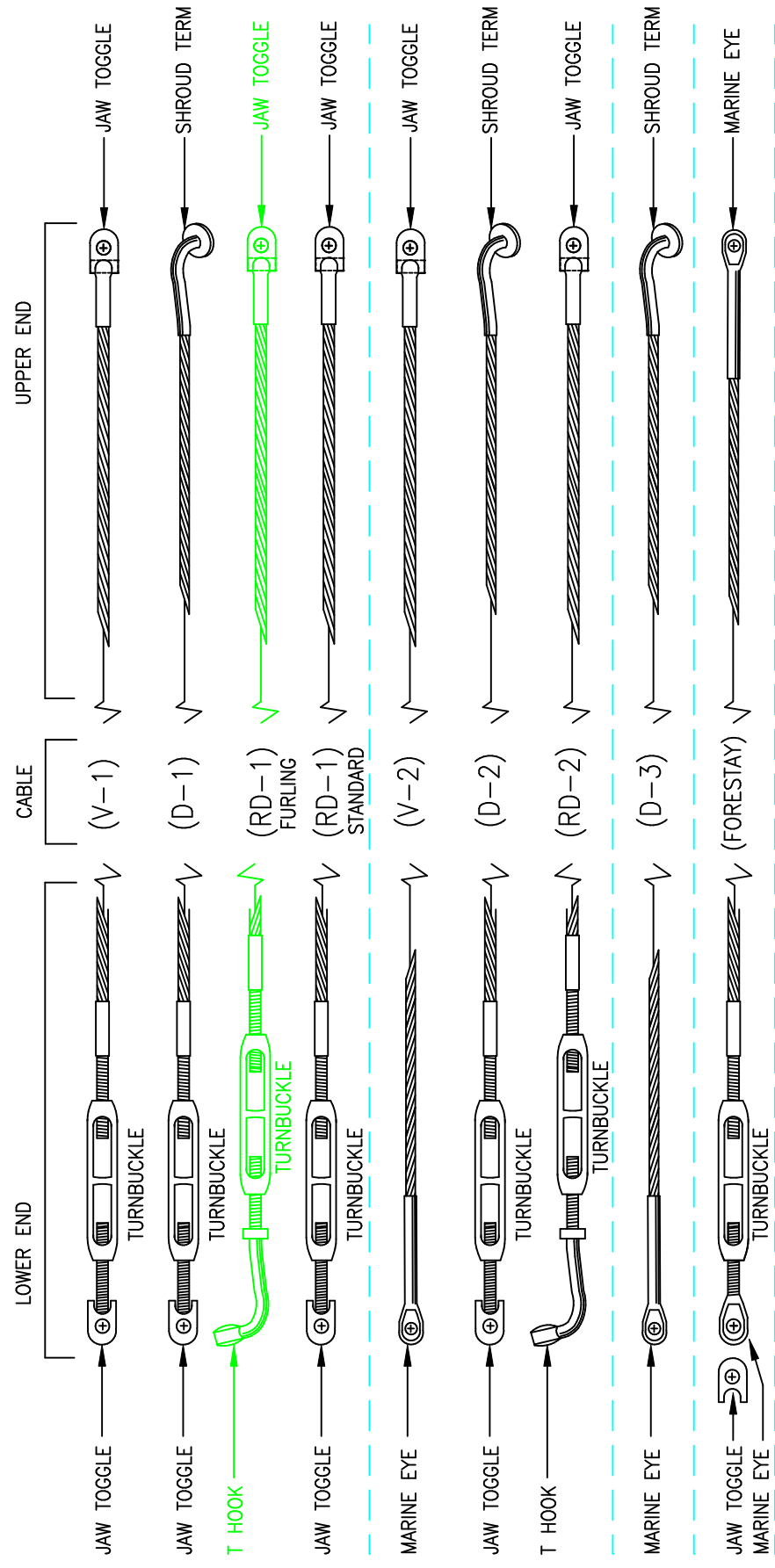
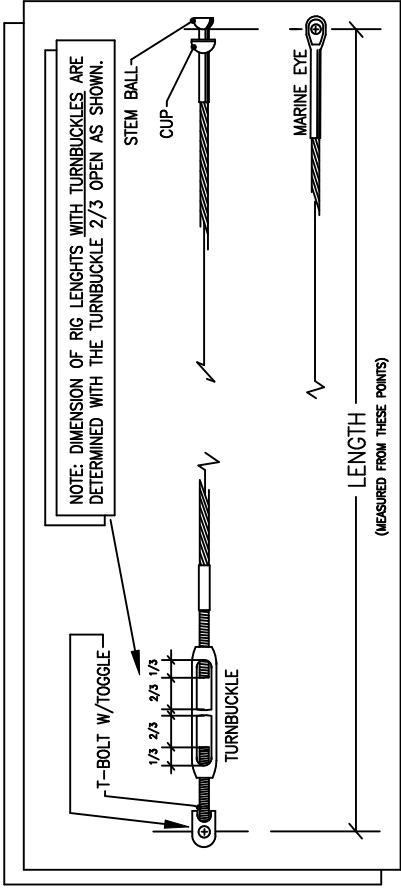
1. ALL ADJUSTABLE RIGGING IS DIMESIONED WITH TURNBUCKLES 2/3 OPEN.
2. LENGTHS DO NOT INCLUDE SPREADER TIP LINKAGE.



V = VERTICAL  
 D = DIAGONAL  
 RD = REVERSE DIAGONAL

1 = LOWER  
 2 = INTER.  
 3 = UPPER

NOTE: SEE PAGES 50A & 50B FOR ACTUAL RIG LENGTHS.



# TUNING THE P456 B&R RIG

---

The easiest method for tuning the B&R rig is to perform step one as follows before the mast is stepped, with it lying aft side down on two sawhorses. Begin with all rigging slack. If the mast is already stepped, loosen all the rigging, and then proceed to step one.

1. Start with all the rigging slack. Then induce the mast bend by tightening the reverse diagonals (diamonds). Measure the bend by tensioning a line or the main halyard between the masthead and the gooseneck. The maximum amount of bend should be no more than 10" (203 mm) for the standard rig and no more than 3" (50 mm) for the furling mast measured perpendicular from the aft face of the mast to the halyard at the deepest part of the bend. It can be less than that based on the sail shape and your own preference. The bend should also be evenly distributed along the mast to give a smooth shape. Keep in mind that bending a furling mast may make it more difficult to furl and will not do much to flatten the sail as in a standard rig. It is very important that the mast also be straight from side to side at this time. Tighten or loosen the diagonals or reverse diagonals to achieve this.
2. Step the mast with all shrouds attached but with the turnbuckles completely loosened (if the mast was not already stepped).
3. Attach the jib halyard to a cleat on the bow to support the mast in a raked position (the masthead should be about 2-1/2' behind the step). Attach the verticals and tighten them until you can just see the hole for the cotter pin in the turnbuckle. Tighten the jib halyard until you can attach the forestay. At this point the masthead should be raked so that a weight hung on the main halyard hangs about 1' behind the mast step.
4. Use the main halyard to check that the mast is centered from side to side. Pull it tight and mark the halyard next to the verticals chainplate. Now do the same to the other side to see if the marks line up. If not, tighten and/or loosen the verticals until the marks line up. Once the masthead is centered, begin tightening the verticals until the turnbuckles are approximately half closed. While tightening the verticals you may notice the bend in the mast increasing. Now you can tighten the lowers which will tend to straighten the lower part of the mast. Be sure to tighten port and starboard sides evenly.
5. Now you should tighten the headstay until it is approximately half closed as well. This should induce the appropriate amount of headstay tension. *Never* use anything more than a 12" adjustable wrench (or equiv.) to tighten your rigging. If you use an extended piece of pipe on the handle of a wrench you can over tighten the rigging and do damage to the mast or rigging.
6. On the Hunter 456 it is necessary to go up the mast in a bosun's chair to tighten the number 2 diagonal shroud (D2 or intermediate shroud). Always use caution when "going aloft". You should always use a mountain climbing harness or Bosun's Chair intended for this use. Always tie into the harness with the halyard using a bowline and then secure the shackle as a back up as the knot is more reliable than a mechanical fastener. The person hoisting you aloft should keep the halyard stopper closed to prevent falls. Good communication between the two of you is also important. Tighten the D2 until it has just become tight and then add two complete turns. While at the first spreader, look up the back of the mast to see if it is straight (rather than bent from side to side). If it is not straight, then adjust the appropriate D2 to straighten it.
7. Have the person on deck carefully lower you. They should keep the halyard wrapped at least twice around the winch and should always have one hand able to stop the halyard from running free. Once on deck look up the back of the mast and see if it is straight (rather than bent from side to side). If it is not bent, then adjust the lowers (D1) until it is.
8. If you have the standard rig you need to attach the struts at this time. Attach the lower end of the strut to the smaller hole in

# TUNING THE P456 B&R RIG

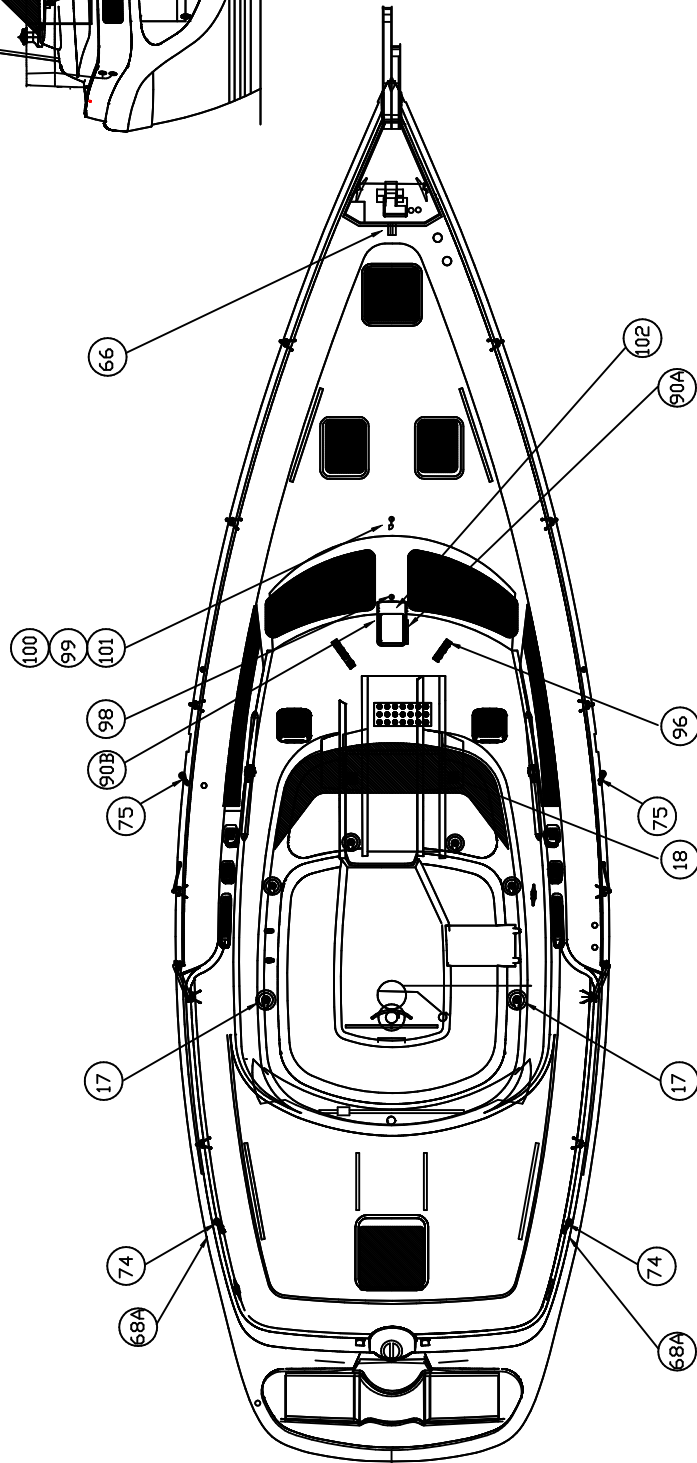
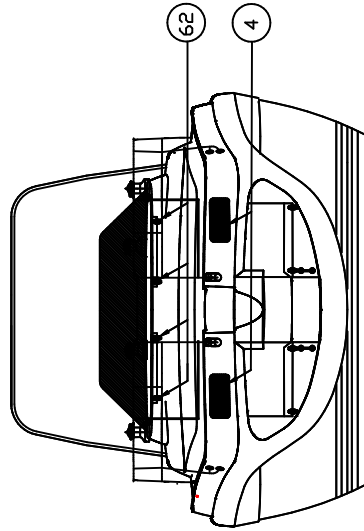
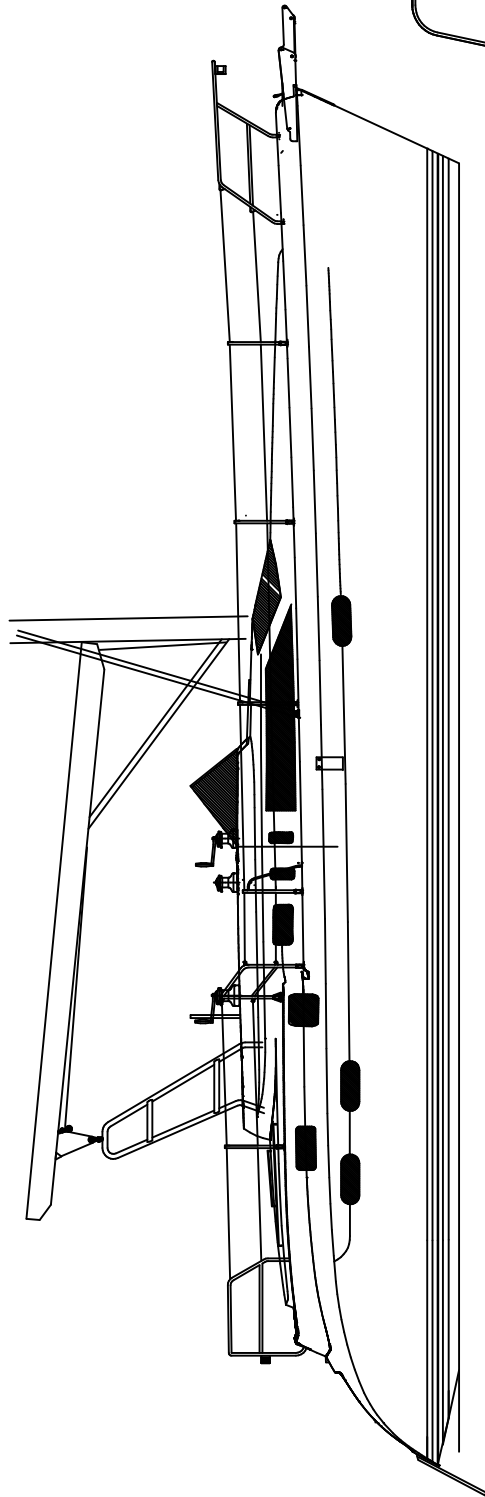
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the chainplate. Adjust the length by turning the ball joint bearing in the upper end of the strut until the holes in the pin can be attached. It is normal to have some play between the strut and the chainplate and strut bracket

compared to every 10 for the great lakes. You should consult a professional rigger for advice.

9. The final test is to go sailing in 10-15 knots of wind. If when sailing upwind, the shrouds on the leeward side are slack then tighten them to remove about half the slack keeping note of the number of turns. Then tack and do the same to the other side. Do this until you are happy with the tension and the leeward side does not get loose when the boat is heeled. Now sight up the mast to be sure it is still relatively straight from side to side. If it is not then adjust to appropriate rigging to correct it. For example: if the mast is straight until the upper spreader and then hooks to the windward side then you will have to revisit steps 6 and 7 above. Remember to always tighten the leeward shroud, tack and tighten the new leeward shroud the same amount. This prevents damage to the turnbuckles and is also much easier to do. Keep in mind it is also possible to have something too tight such as a diagonal shroud.
10. At this point you should have adequate headstay tension. The sails are built for about 14" of headstay sag, the bend in the standard mast should be about 1' and 4" in the furling mast and it should be nearly straight from side to side when sailing upwind. If any of these are not true then revisit the appropriate step above to correct it. If the sag in the headstay is too much then adding tension to the verticals will fix it.
11. Once the rig is tuned you should make sure to add the cotter pins to all the rigging bending back the ends and taping them to prevent snagged lines, sails and fingers.

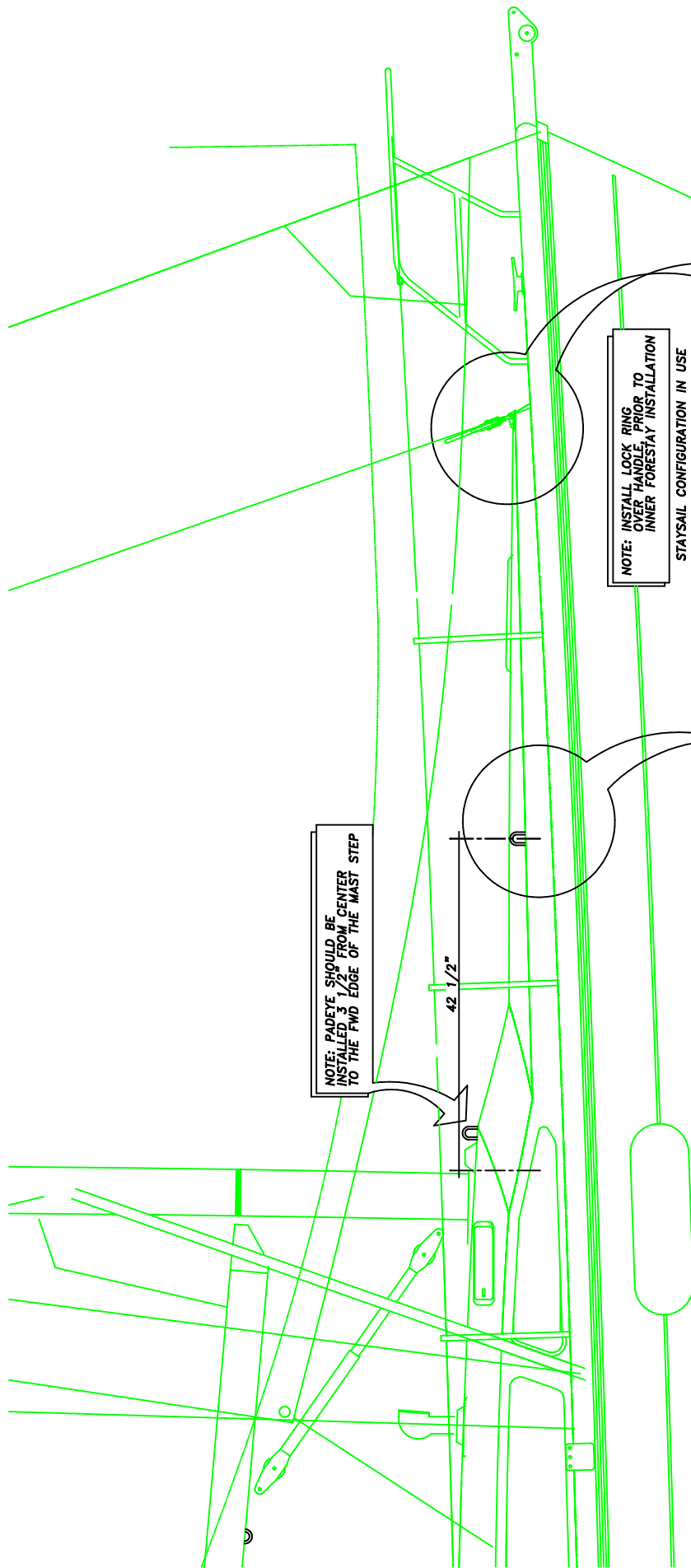
Remember that rigging, like everything else, can age. As it gets older it may need to be replaced. The frequency for which this becomes necessary depends on the climate and conditions in which the boat is sailed. For example: if you sail in the Caribbean it should be replaced every 2-3 years



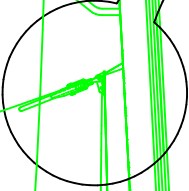
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<b>456 OPTIONAL DECK HARDWARE</b>	
REVISED NO.	4508054A
EXTENSION NO.	NONE
DATE	11/13/98
DESIGNED BY	ENGINEERING DEPT

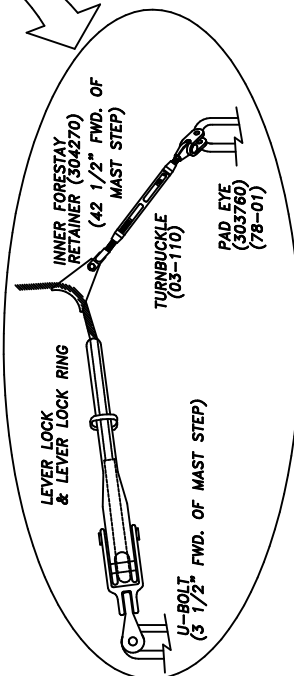
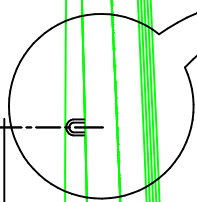
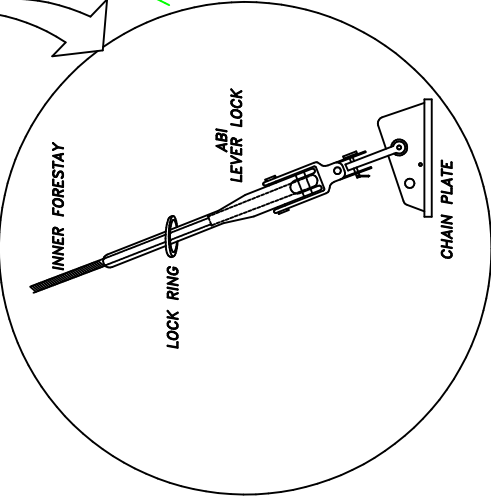


NOTE: PADEYE SHOULD BE INSTALLED 3 1/2" FROM CENTER TO THE FWD EDGE OF THE MAST STEP



NOTE: INSTALL LOCK RING OVER HANDLE, PRIOR TO INNER FORESTAY INSTALLATION

STAYSAIL CONFIGURATION IN USE



CONFIGURATION WHEN NOT IN USE

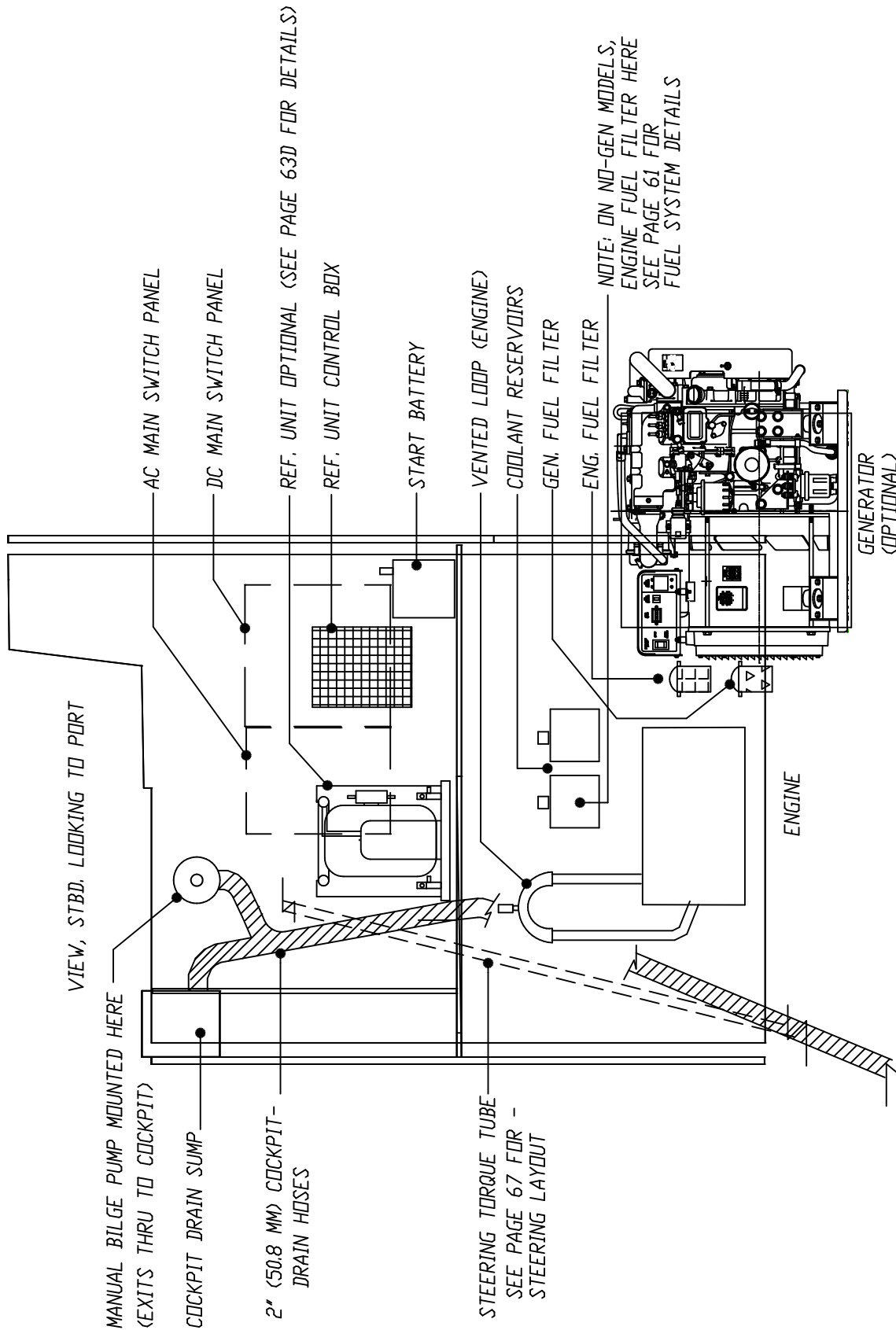
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**HUNTER**

<b>P456 OPTIONAL STAYSAIL LAYOUT</b>			
DESIGN NO.	4508054B	REVISION NO.	NONE
DATE	11/13/98	ENGINEERING DEPT	

HUNTER P456 OPT. DECK HARDWARE LIST

OPTIONAL GEAR				
	<b>SPIN WINCH OPTION</b>			
17	WINCH	LEWMAR	COAST STD.50ST	2 HW2553
75	SNATCH BLOCK	SCHAEFER	11--99	2
	<b>SPIN OPTION</b>			
74	SPIN BLOCK	SCHAEFER	10--15	2
90A	SPIN. MAST BLOCK	Z-SPAR	PN294	1
	SPIN. MAST HEAD BLOCK	HARKEN	1540	1
	CRUSING SPIN. SHEET			2 R10905-09
	SPIN. HALYARD			1 R10905-10
	<b>CRUISING SPIN. OPTION</b>			
68A	PAD EYE	SCHAEFER 78-99		2 HW0841
	<b>STAYSAIL OPTION</b>			
98	U BOLT	EPCO		1 HW5512
101	PADEYE	SCHAEFER	78-01	1 HW0850
100	TURNBUCKLE	JOHNSON	03-110	1 RIO124
99	INNER FORSTAY RETAINER			1 RIO122
66	INNER FORESTAY BASE	ABI	2140CH	1 HW1617
	INNER FORESTAY MOUNTING HDWR.			
90B	STAYSAIL MAST BLOCK	Z-SPAR	PN288	1
96	DK ORGANIZER (SIX)	HARKEN	1503	2 HW0384
18	SHEET STOPPER (QUAD)	SPINLOCK	QUAD(XT/4)	1 HW1283
	STAYSAIL HALYARD			1 R10905-11
	STAYSAIL SHEETS			2 R10905-12
	<b>FURLING OPTION</b>			
102	FURLING MAST STEP	Z-SPAR		1 RIO499



NOTE: ON NO-GEN MODELS,  
ENGINE FUEL FILTER HERE  
SEE PAGE 61 FOR  
FUEL SYSTEM DETAILS

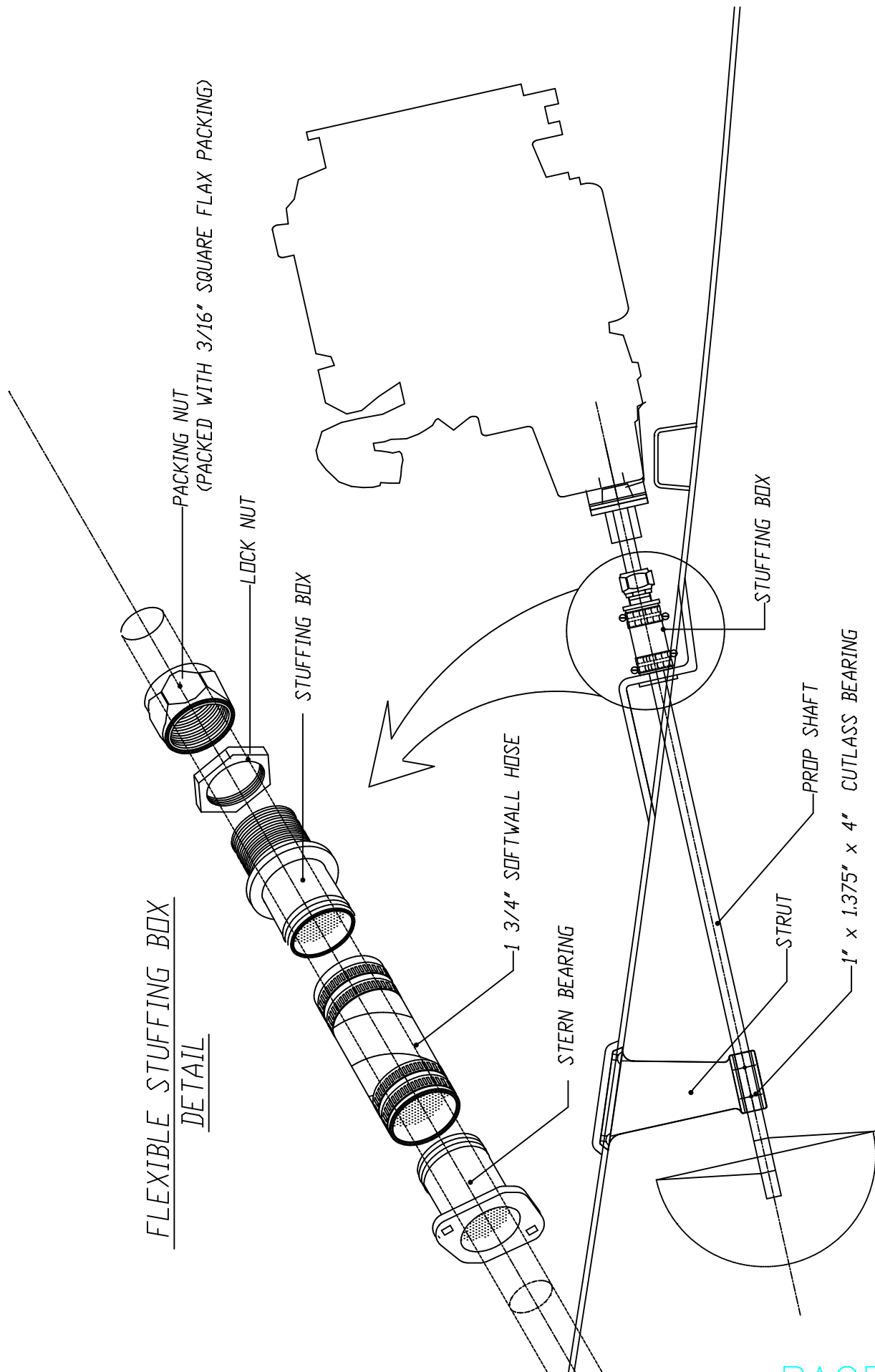
ENGINE ROOM LAYOUT

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**HUNTER**

<b>456 ENGINE ROOM LAYOUT</b>	
REV. NO.	4508055
DATE	NONE
ENGINEERING DEPT.	2/17/98

FLEXIBLE STUFFING BOX  
DETAIL



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P456 PROP SHAFT & STUFFING BOX DETAIL			
DESIGN NO.	4508056A	REVISION NO.	NONE
DATE		DATE	3/2/00
ENGINEERING DEPT.			



## ENGINE OPERATING INSTRUCTIONS:

- ① FILL DIESEL TANK WITH DIESEL FUEL
- ② CHECK ENGINE OIL LEVEL <SEE YANMAR MANUAL>
- ③ OPEN ENGINE RAW WATER PICKUP SEACOCK <SEE PAGE 60>
- ④ TURN ON "START BATTERY SELECTOR SWITCH" <LOCATED AT ENGINE COMPARTMENT DOOR>
- ⑤ TURN KEY TO START POSITION, PRESS START BUTTON AND RELEASE WHEN ENGINE STARTS. NOTE\* IF ENGINE APPEARS TO HAVE TROUBLE STARTING, SEE YANMAR MANUAL
- ⑥ TO SHUT ENGINE DOWN: PUSH RED BUTTON AT KEY SWITCH PANEL UNTIL ENGINE STOPS RUNNING THEN TURN KEY TO OFF POSITION.

WARNING: DO NOT LEAVE AFT HATCHES OPEN WHILE ENGINE IS RUNNING. THERE EXISTS A POSSIBILITY OF EXHAUST POISONING, OR EVEN DEATH.

OWNER FILE  
**456 ENGINE OPER. INST**

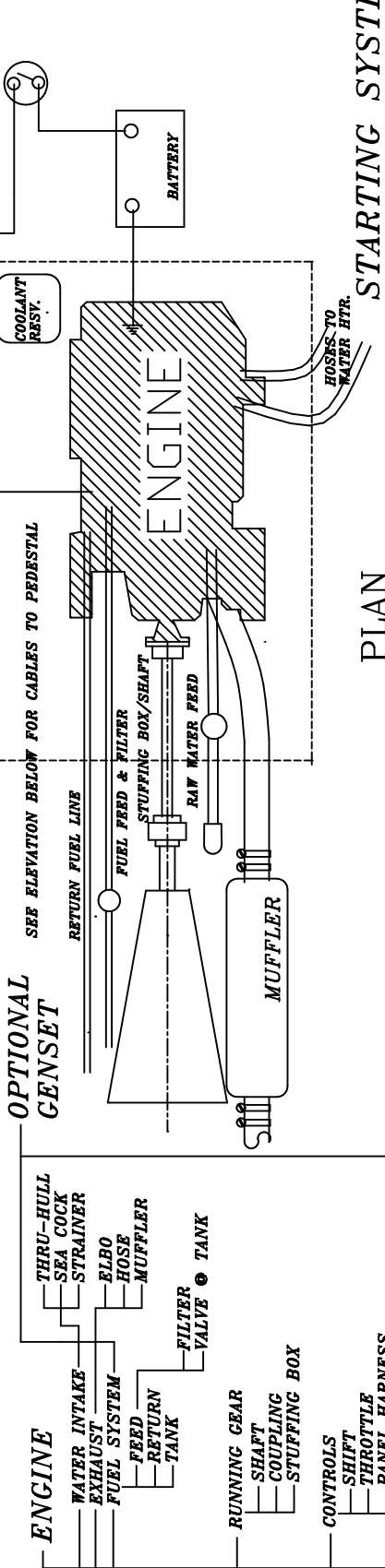
<small>ISSUANCE NO.</small>	4508056B	<small>ISSUANCE NO.</small>	NONE
<small>ISSUANCE DATE</small>		<small>DATE</small>	7/26/97

ENGINEERING DEPT.

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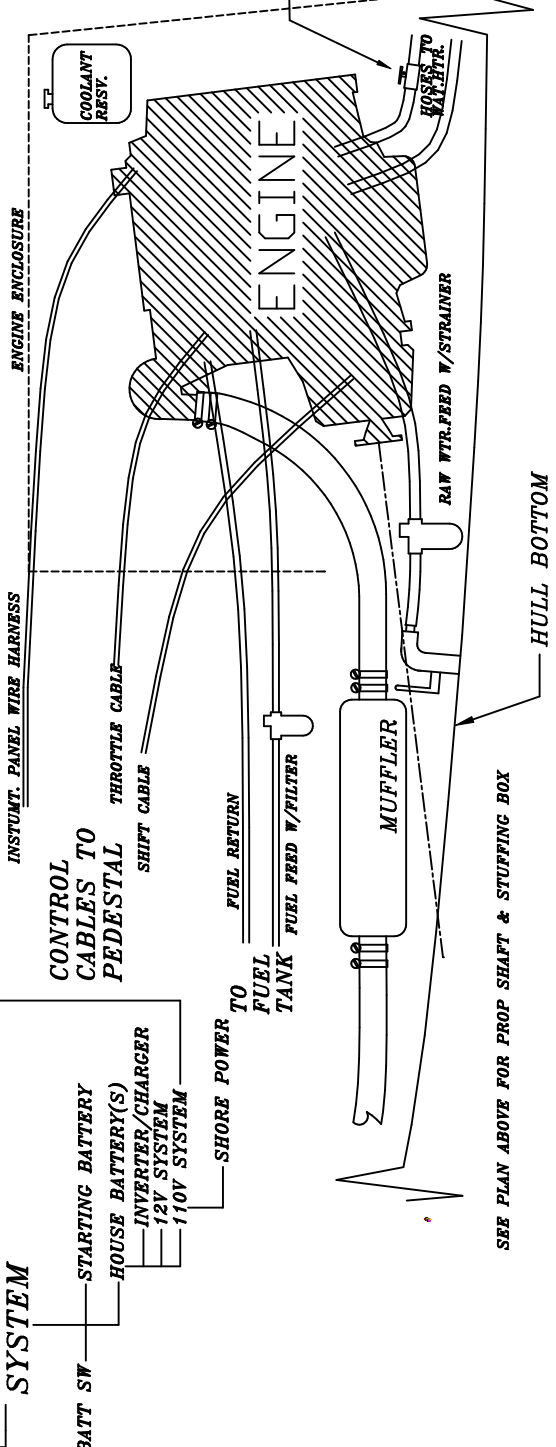
# HUNTER

# SYSTEMS SCHEMATIC



PLAN

STARTING SYSTEM



ELEVATION

NOTE: THIS DWG. IS SCHEMATIC FORM SEE SPECIFIC SYSTEM DWGS. FOR BATTERIES, SWITCHES/ CHARGER ETC. LOCATIONS AND WIRE RUNS.

NOTE: SEE YANMAR ENGINE MANUAL FOR OPERATING & MAINTENANCE PROCEDURES

456 ENGINE LAYOUT

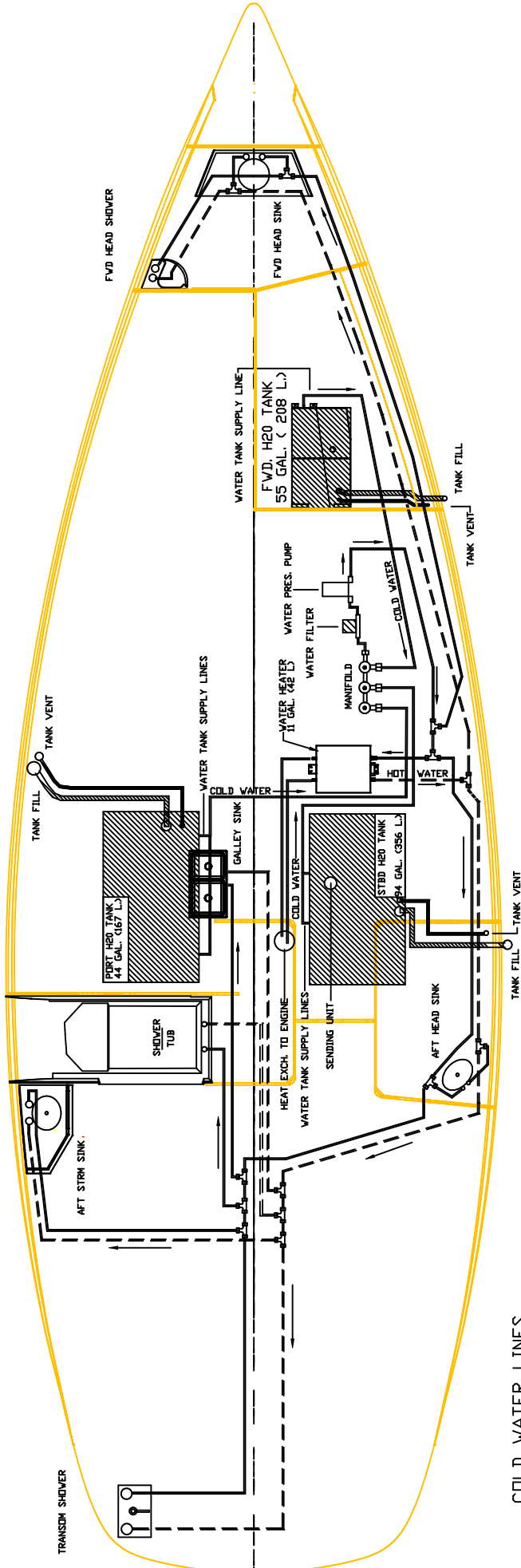
4508056C

6/30/97

ENGINEERING DEPT.

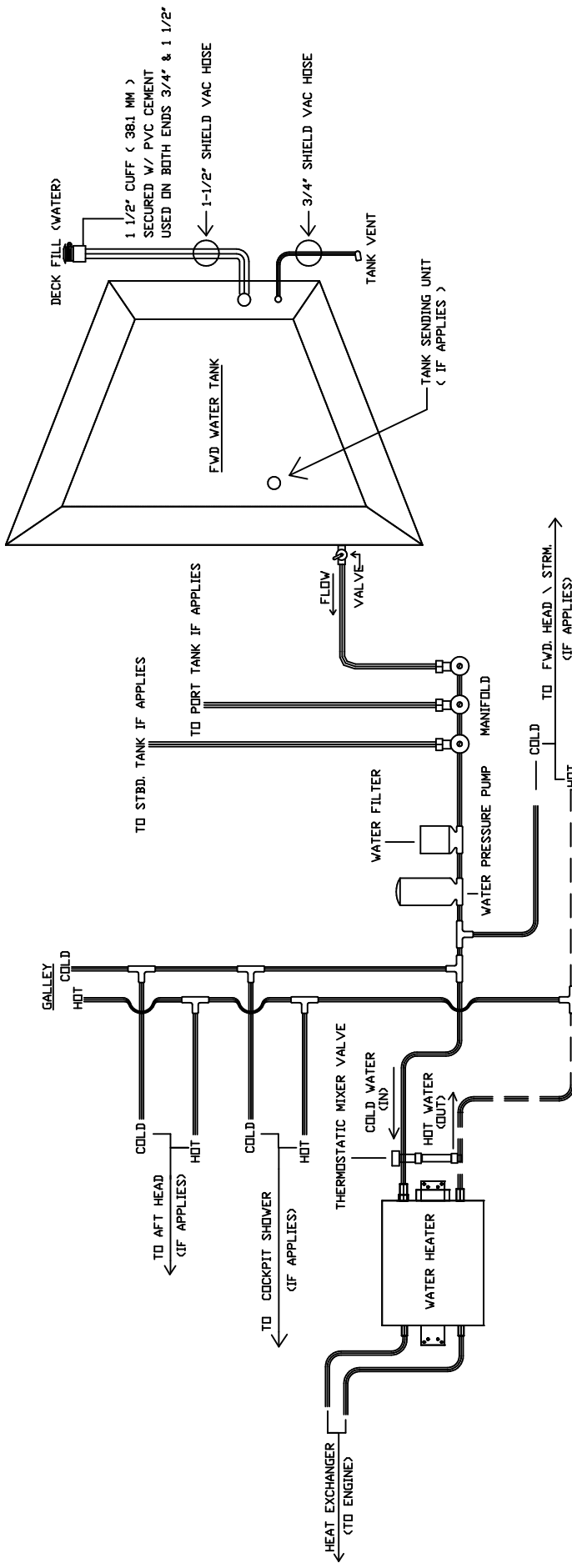
HUNTERA

WATER SYSTEM LAYOUT



COLD WATER LINES —————  
 HOT WATER LINES - - - - -  
 ———→ = FLOW DIRECTION

**NOTE:**  
 SEE PAGE 60 FOR SPECIFIC-  
 SEACOCK / THRUHULL / DECK FITTING LOCATIONS  
 SEE PAGE 60A FOR SPECIFIC-  
 SEACOCK / THRUHULL / DECK FITTING ASSEMBLY  
 SEE PAGE 64 FOR SPECIFIC-  
 SENDING UNITS / MACERATOR-  
 WIRING LAYOUTS



STD. FRESH WATER SUPPLY LAYOUT

FRESH WATER SYSTEM OPERATION:

- ① FILL TANK/S WITH FRESH WATER (SEE PAGE 60A FOR FILL LOCATIONS)
- ② OPEN DESIRED MANIFOLD VALVE/S (SEE PAGE 57A FOR MANIFOLD LOCATION)
- ③ TURN ON HOUSE BATTERY SELECTOR SWITCH (SEE PAGE 63A-8 FOR SWITCH LOCATION)

NOTE: SOME MODELS REQUIRE A START BATTERY ONLY, IF THIS APPLIES TO YOUR MODEL, TURN THIS SWITCH ON.

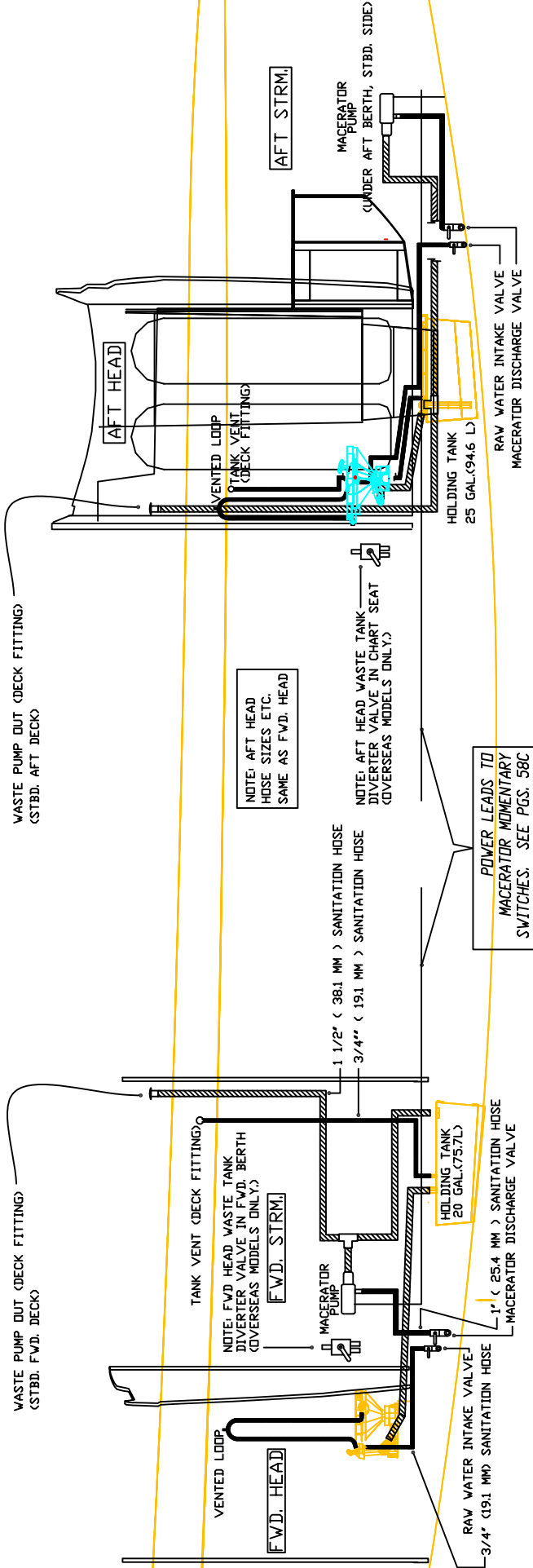
- ④ TURN ON "D.C. MAIN" BREAKER ON MAIN BREAKER PANEL
- ⑤ TURN ON "WATER PRESSURE" BREAKER ON MAIN BREAKER PANEL
- ⑥ "HOT WATER" IS ATTAINABLE BASICALLY IN TWO WAYS...
  - Ⓐ BY HEATING THE WATER THRU THE DIESEL ENGINE
  - Ⓑ BY SUPPLYING 110V.A.C. BY "DOCKSIDE SHORE POWER" OR GENERATOR POWER.
- ⑦ TO HEAT BY "ENGINE" SEE PAGE 56D FOR ENGINE OPERATING INST.

NOTE: WHEN COOLANT IS INSTALLED, BLEED AIR FROM HEAT EXCHANGER LINES TO WATER HEATER. CRANK ENGINE, OPEN BLEEDER VALVE (SEE PAGE 56E) UNTIL AIR IS GONE FROM LINES

- ⑧ TO HEAT BY "SHORE POWER"
  - Ⓐ HOOK UP SHORE POWER CABLE/S
  - Ⓑ TURN ON A.C. MAIN BREAKER ON MAIN BREAKER PANEL
  - Ⓒ TURN ON "WATER HEATER BREAKER" ON MAIN BREAKER PANEL
- ⑨ TO HEAT BY "GENERATOR POWER"... SEE PAGE 63F-1 FOR GEN. OPER. INST. THEN FOLLOW STEPS #8 B & C UNDER "TO HEAT BY SHORE POWER"

NOTE: AS WITH ALL WATER HEATERS, BE SURE WATER TANK IS FULL BEFORE APPLYING POWER TO UNIT, TO AVOID DAMAGE TO HEATING ELEMENT  
GENERATOR MAY BE OPTIONAL

NOTE:  
 SEE PAGE 60A FOR SPECIFIC -  
 SEACOCK / THRUHULL / DECK FITTING LOCATIONS  
 SEE PAGE 60B FOR SPECIFIC -  
 SEACOCK / THRUHULL / DECK FITTING ASSEMBLY  
 SEE PAGE 64E FOR  
 SENDING UNITS / MACERATOR -  
 WIRING LAYOUTS

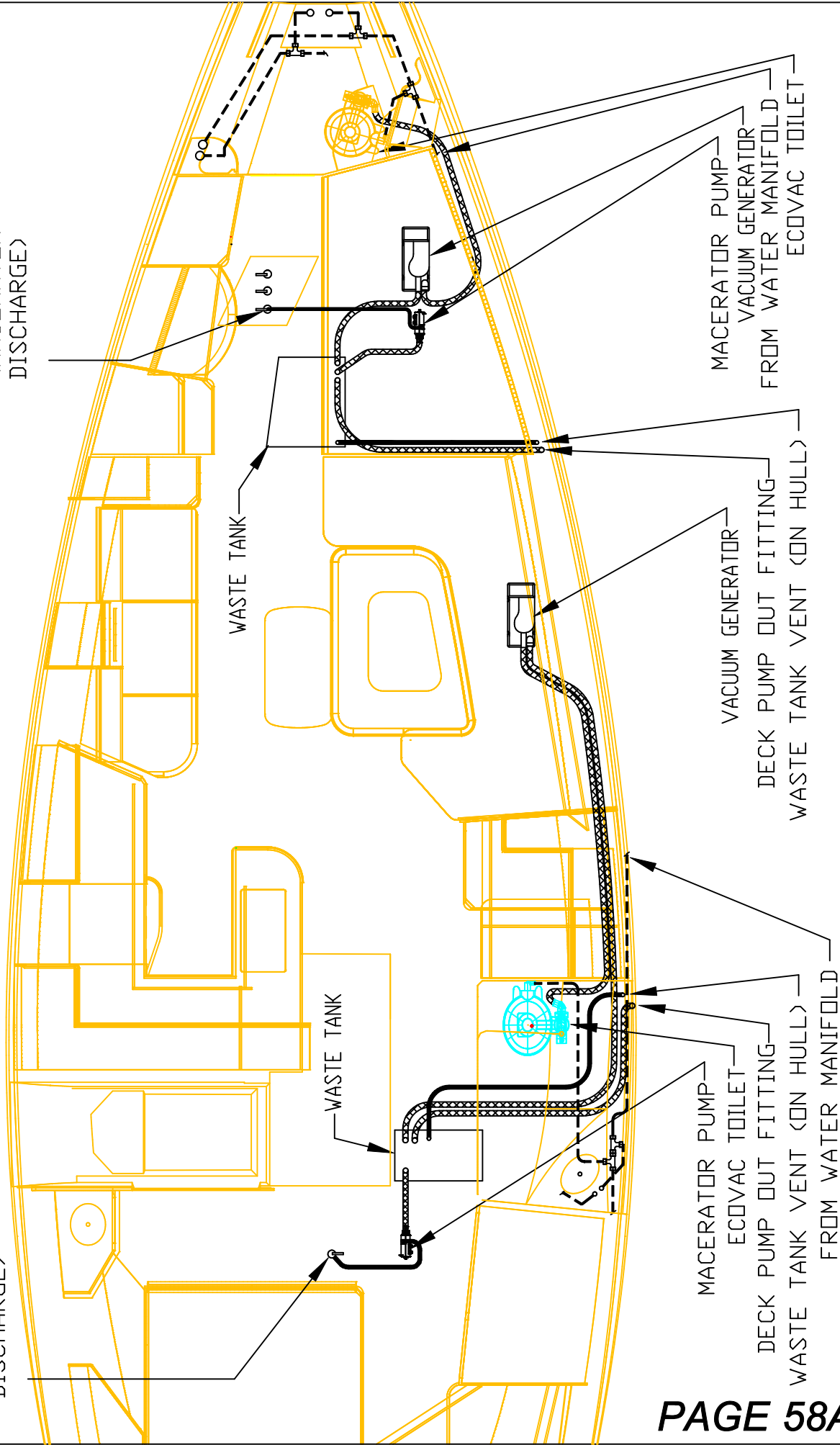


WASTE SYSTEMS LAYOUT

1" (2.54cm) THRU-HULL WITH BALL VALVE (MACERATOR DISCHARGE)

1 1/2" (3.8cm) HOSE  
 1" (2.54cm) HOSE  
 15mm FRESH WATER SUPPLY LINE

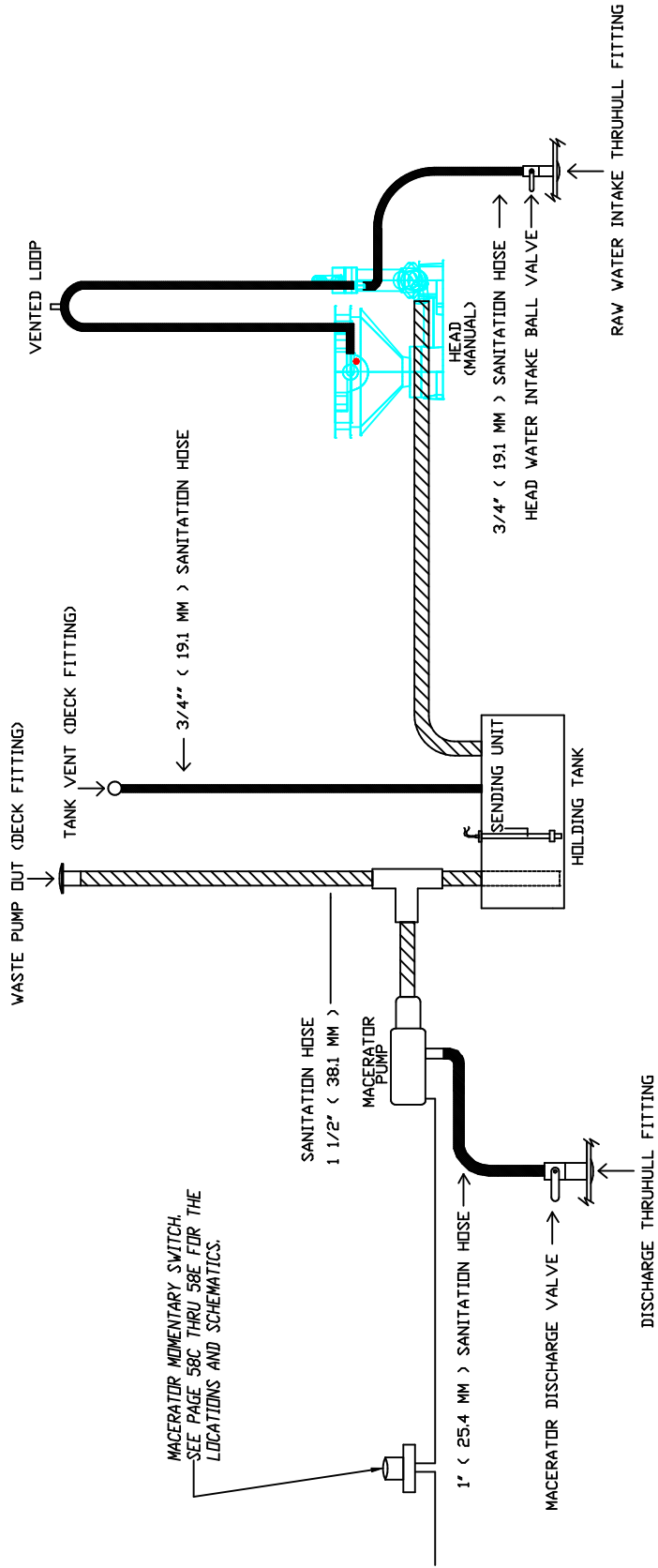
1" (2.54cm) THRU-HULL WITH BALL VALVE (MACERATOR DISCHARGE)



POWER PULS  
**OPTIONAL VACCU FLUSH LAYOUT**  
DESIGNER NO. 4568058A-2  
DATE 09/10/02  
ENGINEER ENG  
NOTES None  
FOR MORE INFORMATION CONTACT HUNTER MARINE CORP. 800-942-2663

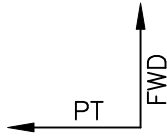


STANDARD WASTE SYSTEM LAYOUT (NON ELECTRIC HEAD MODELS)

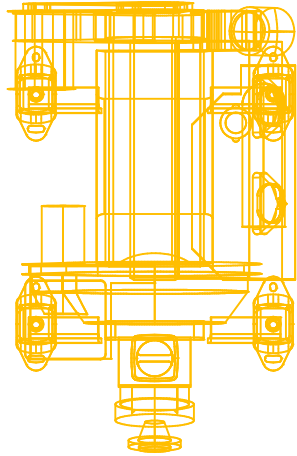


STD. WASTE SYSTEM LAYOUT



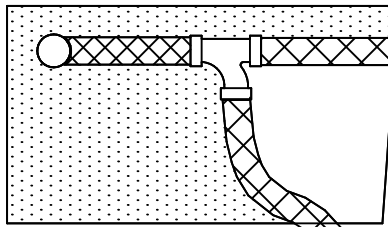


ENGINE ROOM



MOMENTARY SWITCH LOCATION  
SEE PAGE 58E FOR DETAILS.

TO DECK PUMPOUT



ST. AFT STRM.  
SEACOCK COMP.

MACERATOR  
DISCHARGE  
SEACOCK

AFT BERTH OUTLINE

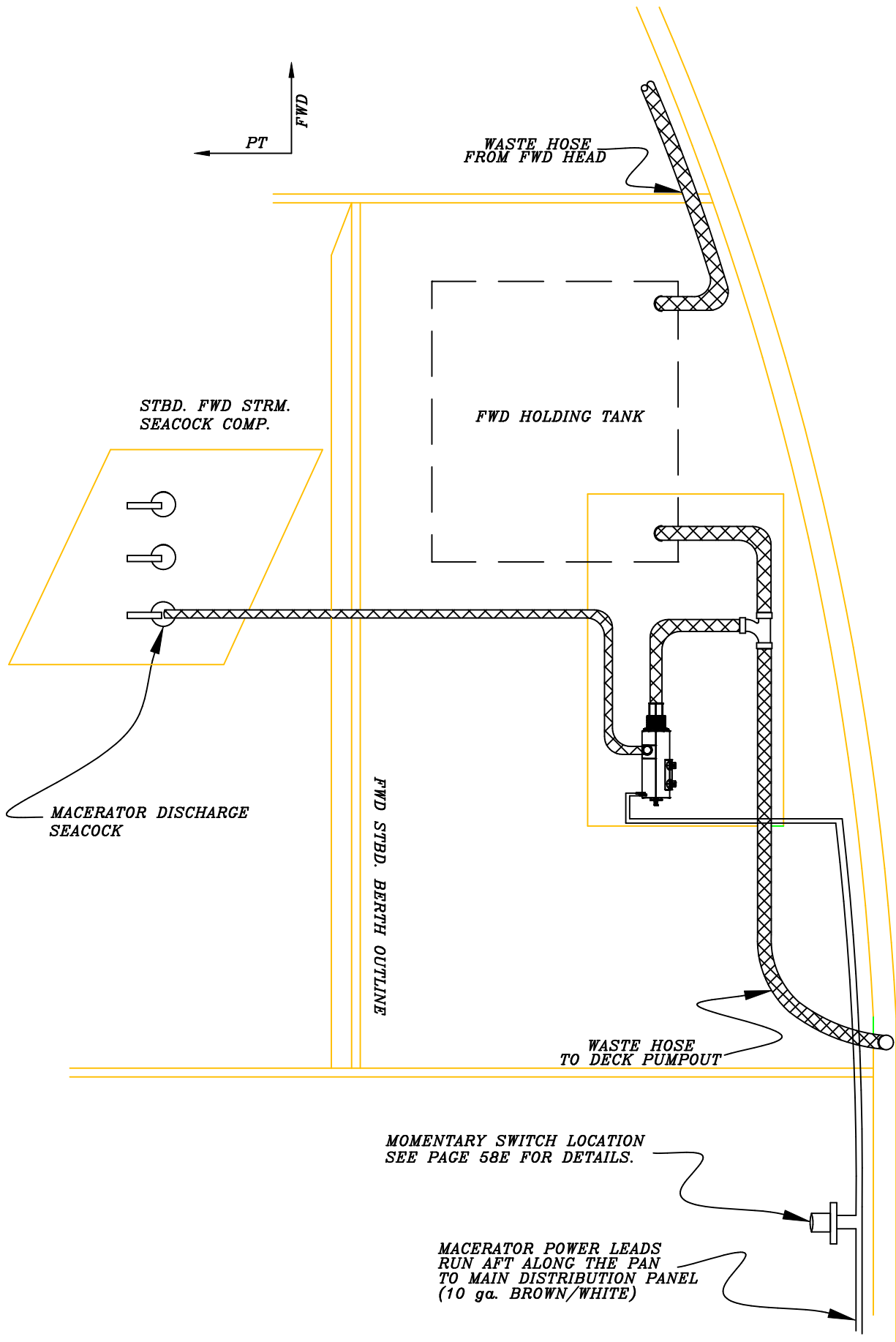
PAN OUTLINE

MACERATOR POWER LEADS  
RUN FWD THRU PAN BEAM  
TO MAIN DISTRIBUTION PANEL  
(10 ga. BROWN/WHITE)

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<b>P456 AFT MACERATOR LAYOUT</b>	
DESIGN NO.	4508058C
REVISION NO.	NONE
DATE	6/17/98
ENGINEERING DEPT	

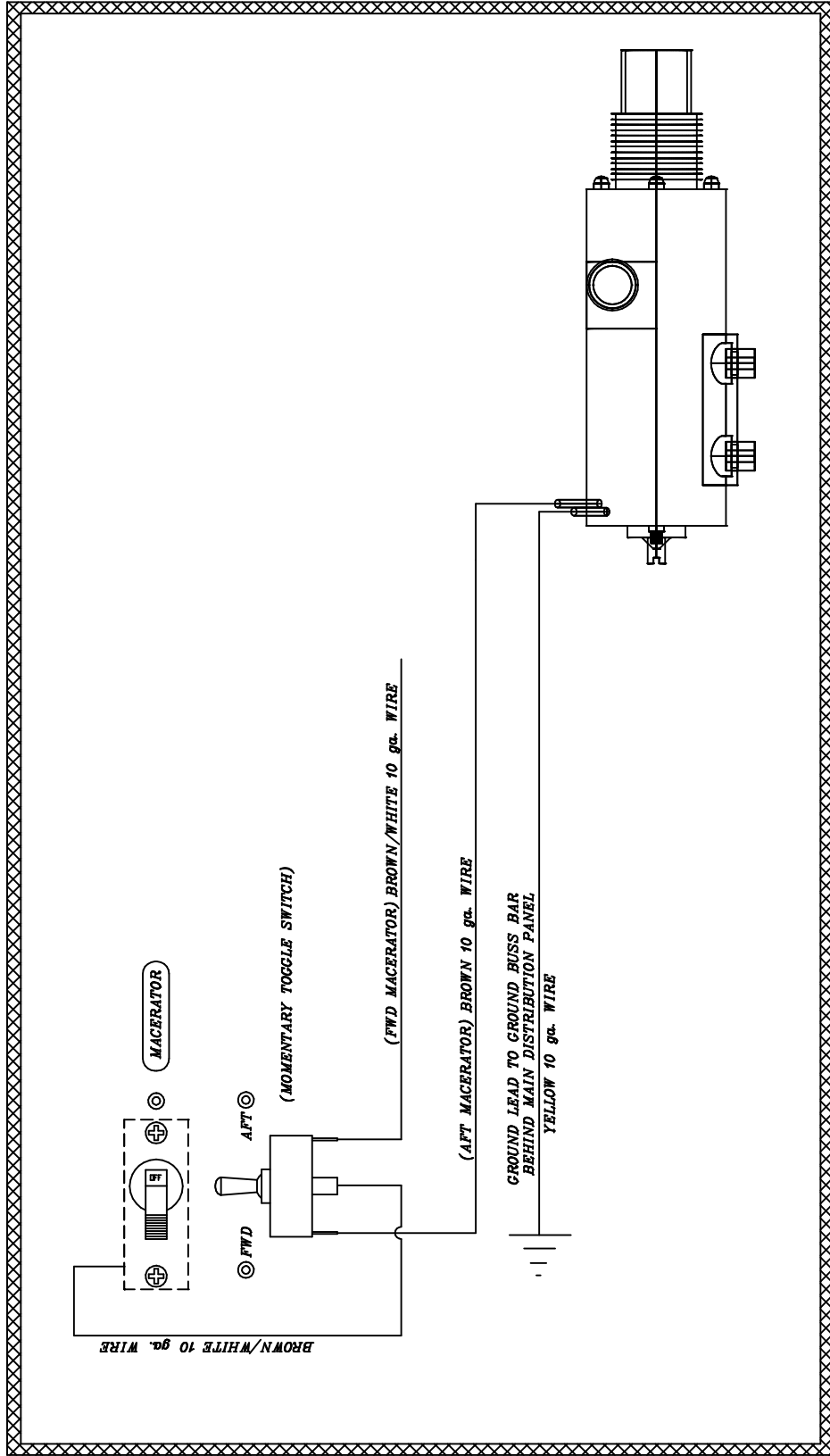


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<b>P456 FWD MACERATOR LAYOUT</b>			
DESIGN NO.	4508058D	REVISION NO.	NONE
DATE	12/1/98	ENGINEERING DEPT	

THE MACERATOR MOMENTARY SWITCH IS PROVIDED TO PROHIBIT THE "DRY RUNNING" OF THE MACERATOR. TO OPERATE THE MACERATOR, TURN THE MACERATOR BREAKER TO THE "ON" POSITION. WHILE EITHER WATCHING THE WASTE TANK LEVEL INDICATOR, OR LISTENING TO THE PITCH OF THE PUMP, HOLD THE MOMENTARY SWITCH FORWARD OR AFT. THIS WILL ACTIVATE THE MACERATOR. ONCE THE TANK LEVEL INDICATOR REACHES "EMPTY", OR THE PITCH CHANGES NOTICEABLY, RELEASE THE MOMENTARY SWITCH AND TURN THE BREAKER TO THE "OFF" POSITION. NOTE: THE TANK MONITOR UPDATES SLOWLY, THEREFORE IT IS MORE AFFECTIVE AND SAFER FOR THE PUMP IF THE OPERATOR USES THE "LISTENING" METHOD TO DETERMINE IF THE TANK HAS BEEN EMPTIED.



MACERATOR SCHEMATIC  
TYPICAL

MOMENTARY SWITCH LOCATION

PROJECT FILE: H456 BASIC MACERATOR WIRING SCHEMATIC

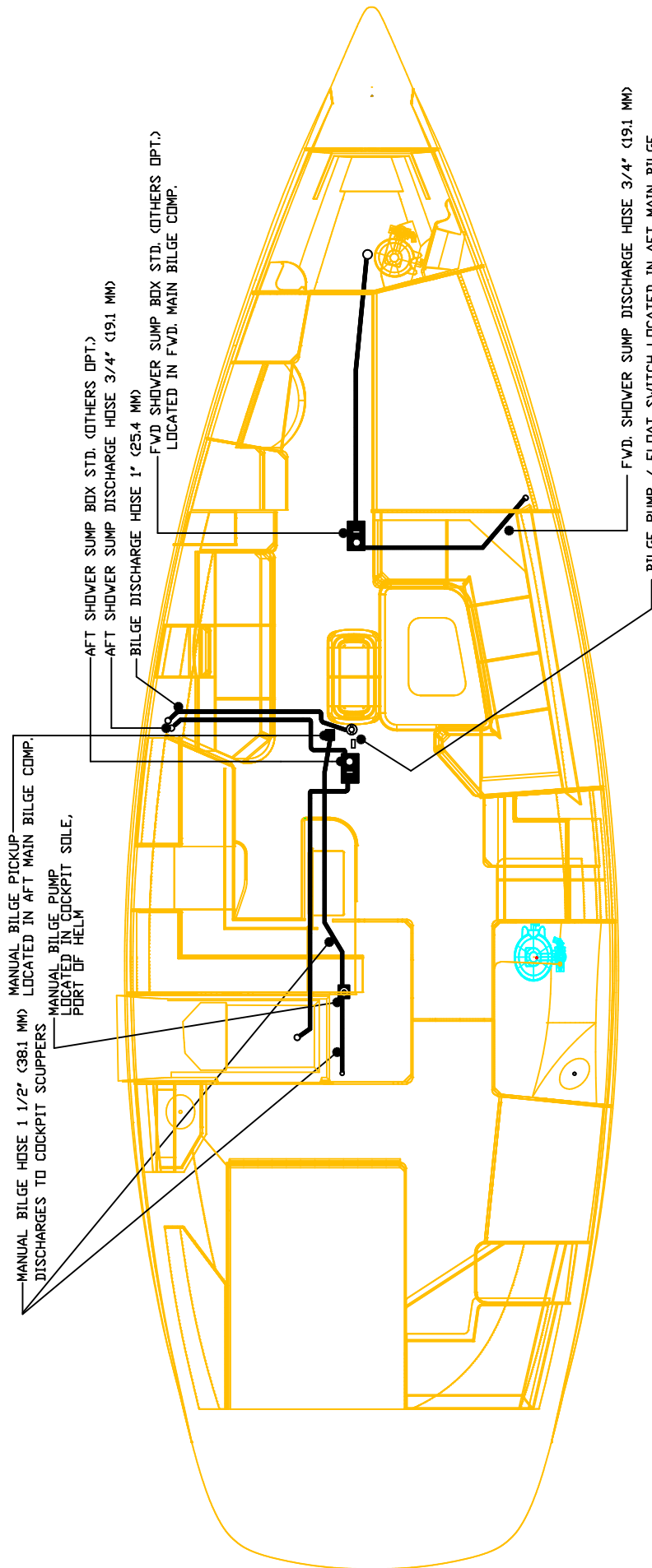
ISSUANCE NO. 4568058E

ENGINEERING DEPT

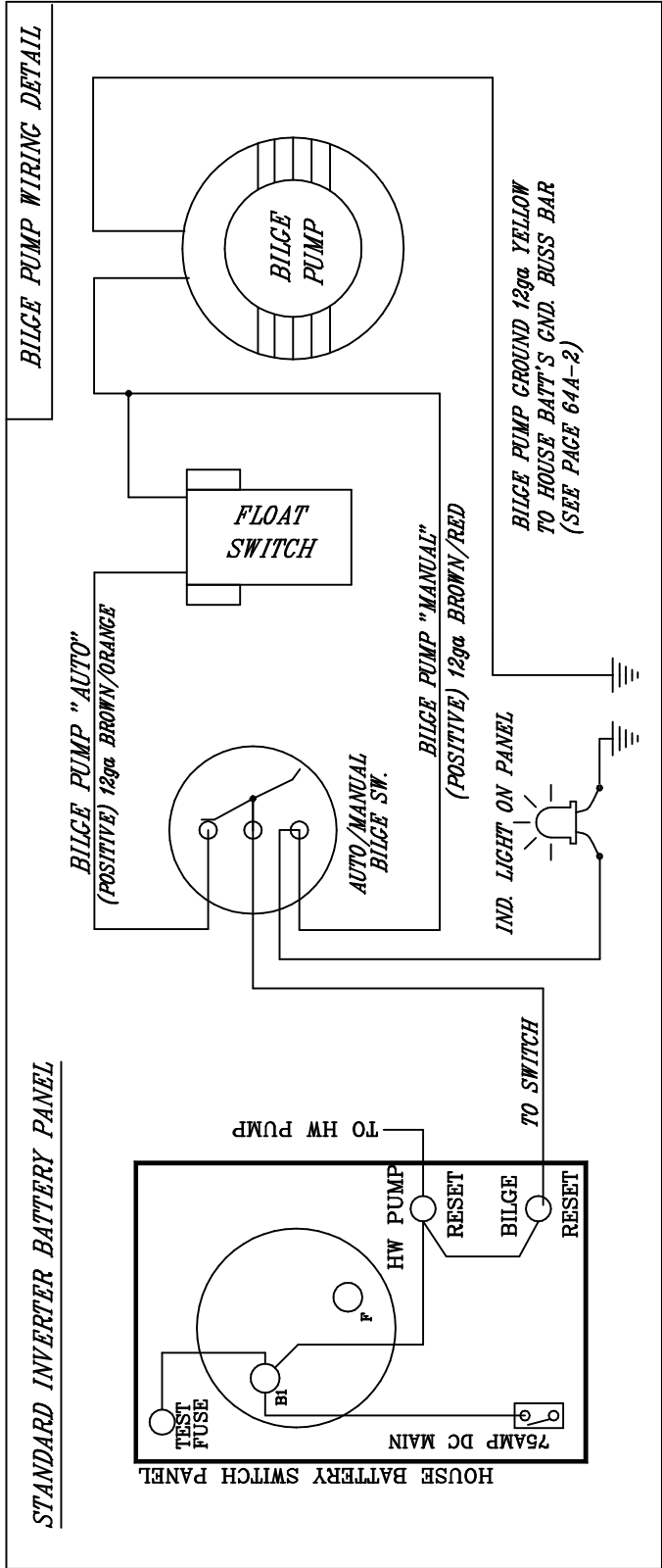
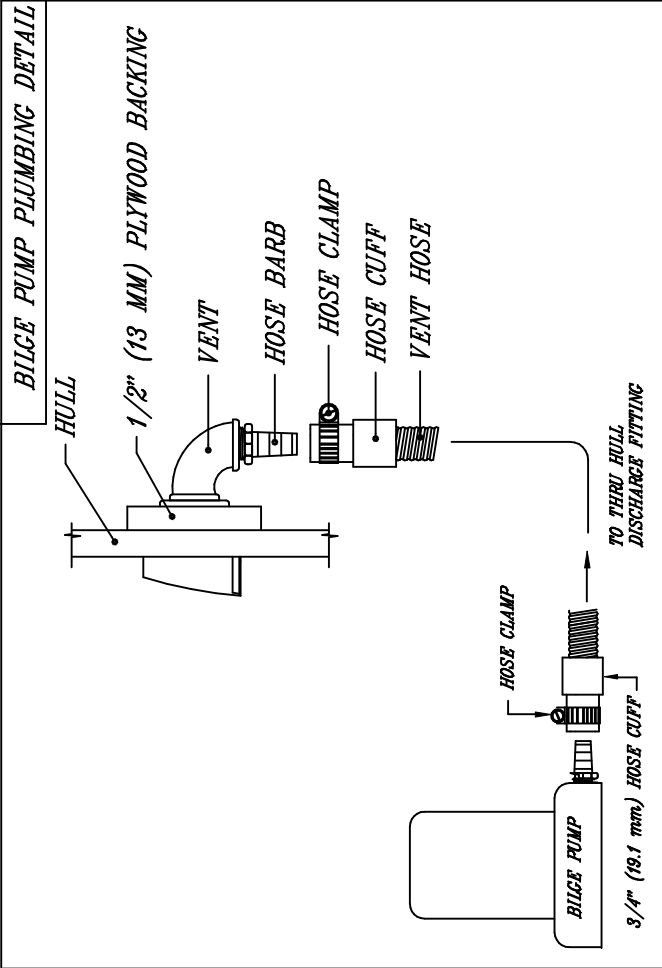
DATE 1/20/99



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NOTE:  
 ALL POWER LEADS FROM PUMPS ARE RUN THROUGH BILGE TO MAIN BREAKER PANEL  
 SEE PAGE 65C FOR COLOR CODES



POWER FILE

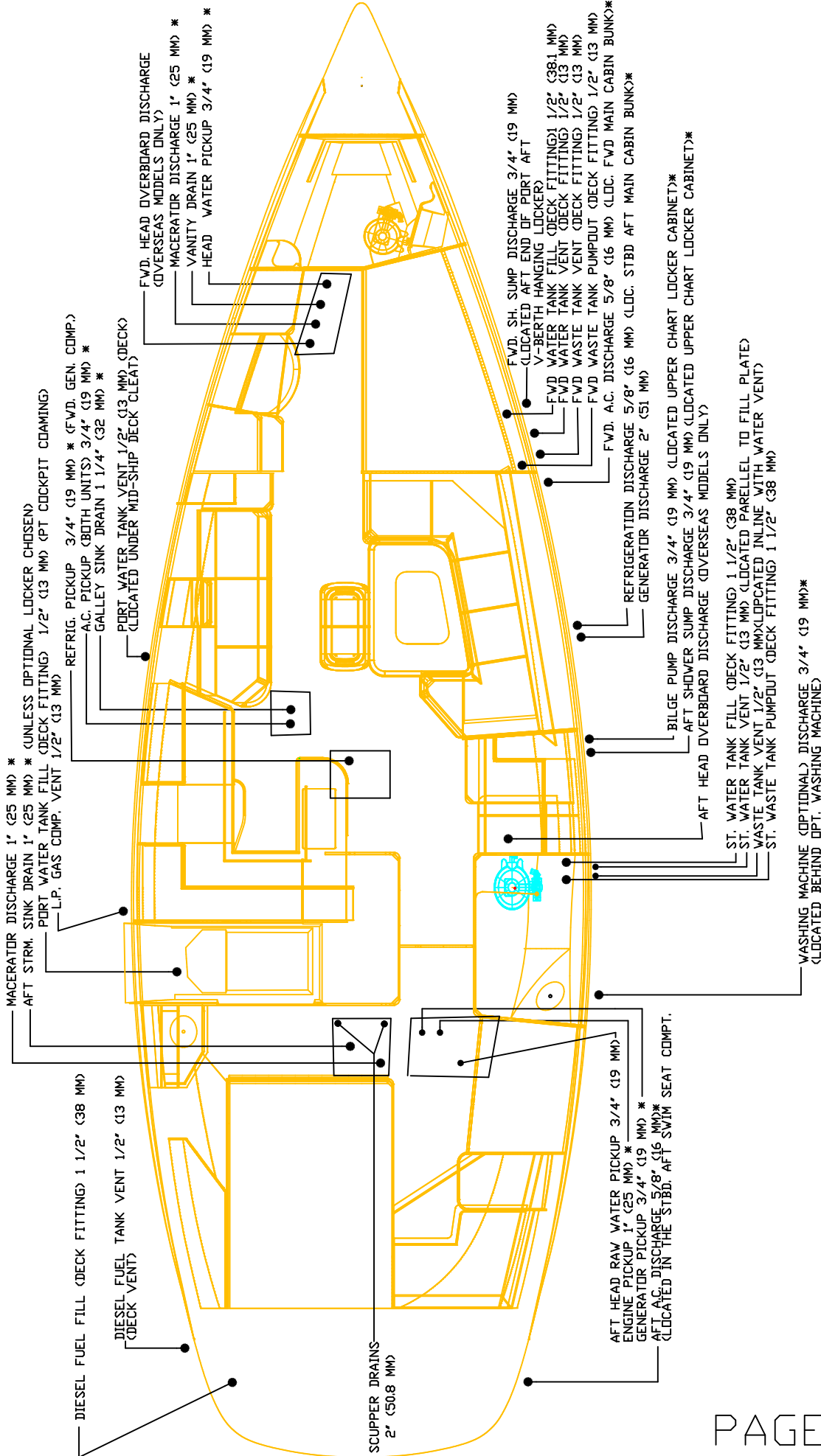
**456 BILGE SYSTEM DETAILS**

DESIGN NO.	4608059B	REVISION NO.	NONE
DATE	1/21/99	ENGINEERING DEPT.	

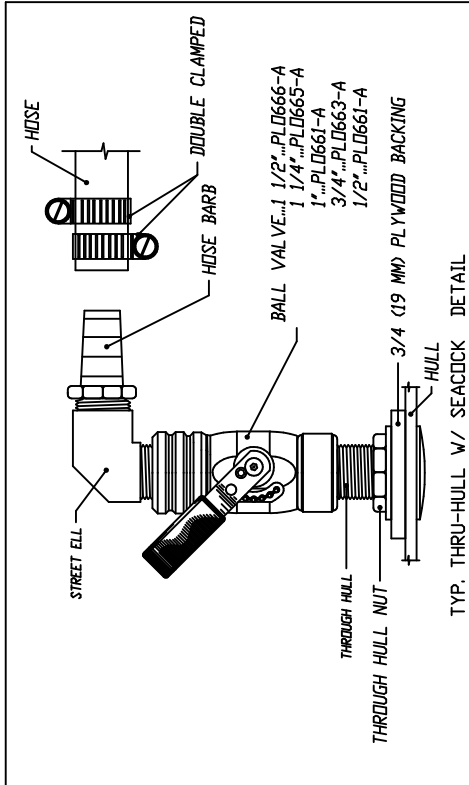
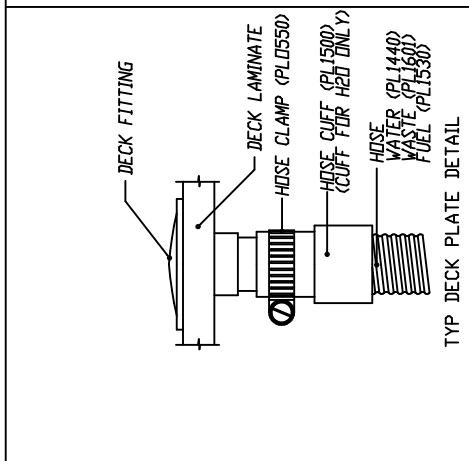
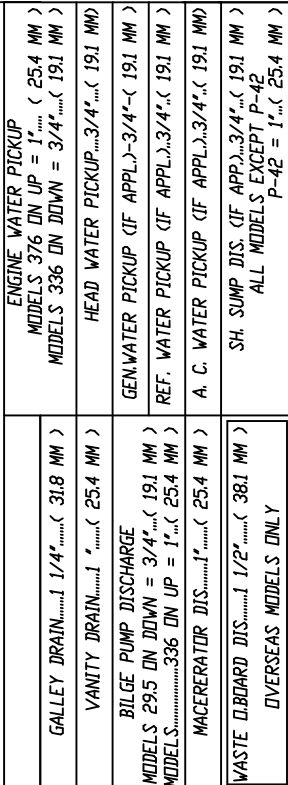
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**HUNTER**

NOTE: AIR CONDITIONING & GENERATOR COMPONENTS OPTIONAL  
 STD. CABIN VERSION SHOWN, TRI CABIN LOCATIONS ARE THE SAME

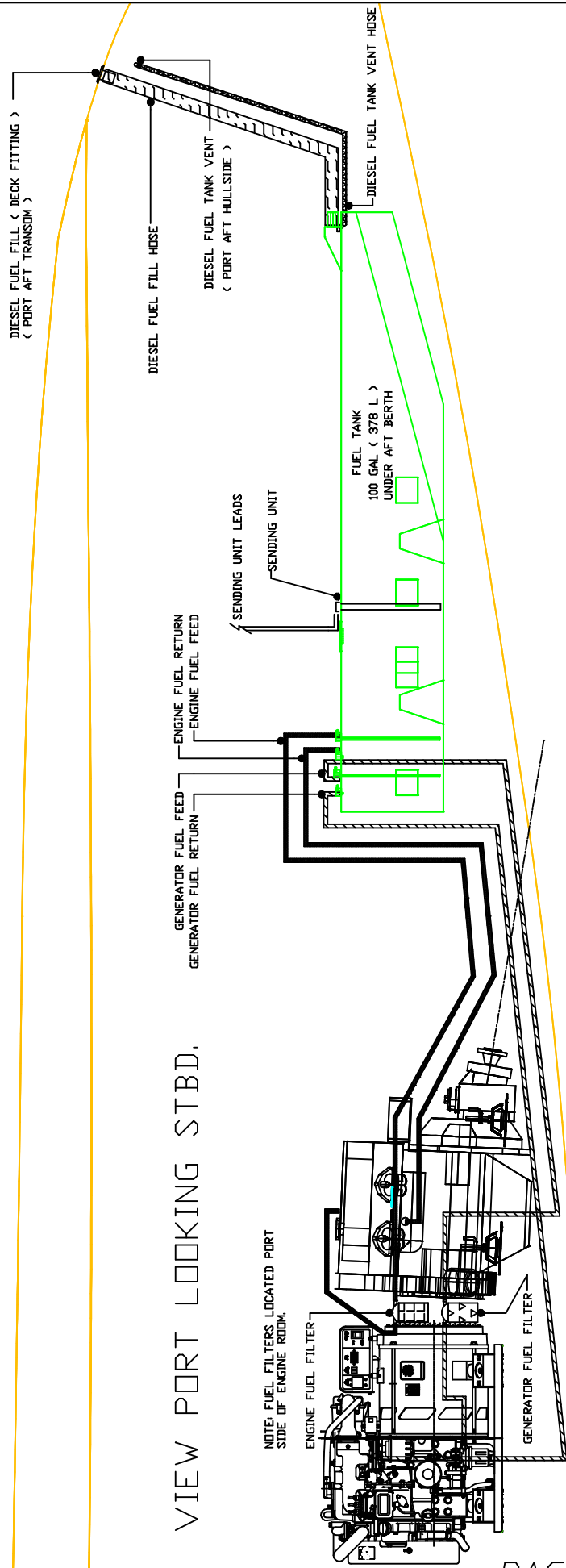


THRUHULL/DECK, SEACOCK, VENT, LOC.  
 ( \* = SEACOCKS )

 <p>VENT (PLD520)  VENT HOSE (PLI450)  HOSE CUFF (PLI480)  HOSE CLAMP (PLD540)  HOSE BARB  WATER (PLD887)  WASTE (PLD887)  L.P. (PLD887)  FUEL (PLD881)  1/2" (13 MM) PLYWOOD BACKING  HULL</p> <p>TYP. VENT DETAIL</p>	 <p>DECK FITTING  DECK LAMINATE  HOSE CLAMP (PLD550)  HOSE CUFF (PL1500)  HOSE (PL1440)  WATER (PL1500)  FUEL (PL1530)</p> <p>TYP. DECK PLATE DETAIL</p>	<p>TYP. VENT DETAIL</p> <p>WATER TANK VENT...1/2" (12.7 MM )  WASTE TANK VENT...1/2" (12.7 MM )  DIESEL TANK VENT...1/2" (12.7 MM )  L.P. TANK VENT...1/2" (12.7 MM )</p> <p>VENT HOSE SIZES AS FOLLOWS:  H<sub>2</sub>O/WASTE/L.P. HOSE = 3/4" (19.1 MM )  FUEL HOSE...5/8" (15.9 MM )</p> <p>TYP. VENT SIZES (REFLECTS HOSE SIZE)</p>
 <p>STREET ELL  HOSE  HOSE BARB  DOUBLE CLAMPED  BALL VALVE...1/2" PLD666-A  1/4" PLD665-A  1" PLD661-A  3/4" PLD663-A  1/2" PLD661-A  3/4 (19 MM) PLYWOOD BACKING  THROUGH HULL NUT  THROUGH HULL  HULL</p> <p>TYP. THRU-HULL W/ SEACOCK DETAIL</p>	<p>TYP. THRU-HULL W/ SEACOCK DETAIL</p> <p>GALLEY DRAIN...1 1/4" (31.8 MM )  VANITY DRAIN...1" (25.4 MM )  BILGE PUMP DISCHARGE  MODELS 295 ON DOWN = 3/4" (19.1 MM )  MODELS...336 ON UP = 1" (25.4 MM )  MACERATOR DIS...1" (25.4 MM )  WASTE BOARD DIS...1 1/2" (38.1 MM )  OVERSEAS MODELS ONLY</p>	<p>TYP. THRU-HULL W/ SEACOCK DETAIL</p> <p>ENGINE WATER PICKUP  MODELS 376 ON UP = 1" (25.4 MM )  MODELS 336 ON DOWN = 3/4" (19.1 MM )  HEAD WATER PICKUP...3/4" (19.1 MM )  GEN.WATER PICKUP (IF APPL.)...3/4" (19.1 MM )  REF. WATER PICKUP (IF APPL.)...3/4" (19.1 MM )  A. C. WATER PICKUP (IF APPL.)...3/4" (19.1 MM )  SH. SUMP DIS. (IF APPL.)...3/4" (19.1 MM )  ALL MODELS EXCEPT P-42  P-42 = 1" (25.4 MM )</p> <p>TYP. THRU-HULL/SEACOCK SIZES (REFLECTS HOSE SIZE)</p>

THRUHULL/DECK,SEACOCK,VENT, DETAILS

DESCRIPTION	HUNTER PART #
ENGINE FUEL FILTER	PLD430
GENER. FUEL FILTER	PLD430
ENGINE FUEL FEED / RETURN HOSE 5/16" < 7.9 MM >	PLI370
GENER. FUEL HOSE FEED / RETURN 1/4" < 6.4 MM >	PLI415
DIESEL FILL FITTING	PLI126
TANK VENT FITTING	PL0520
DIESEL FILL HOSE 1 1/2" < 38.1 MM >	1004517
TANK VENT HOSE 5/8" < 15.9 MM >	1004459

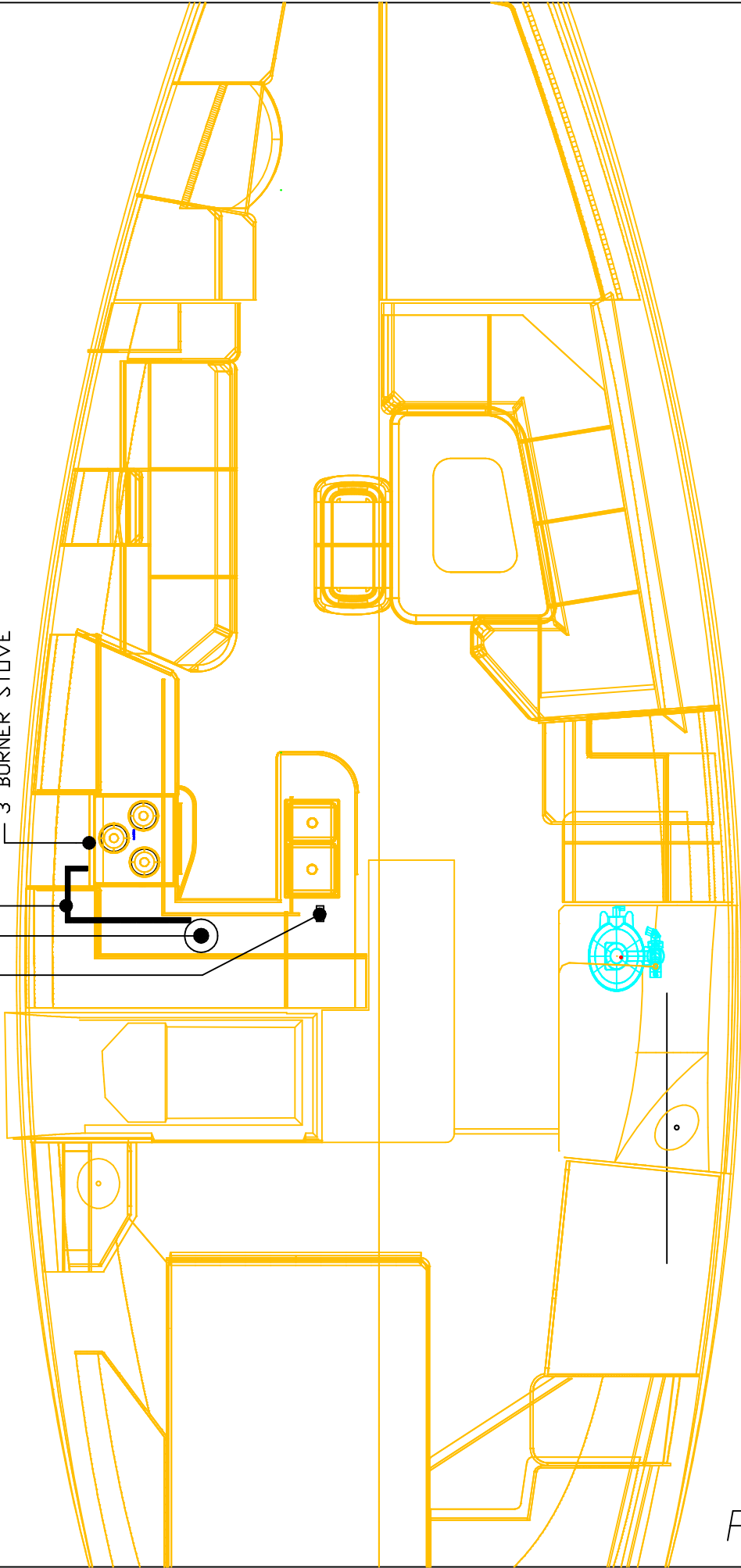


VIEW PORT LOOKING STBD.

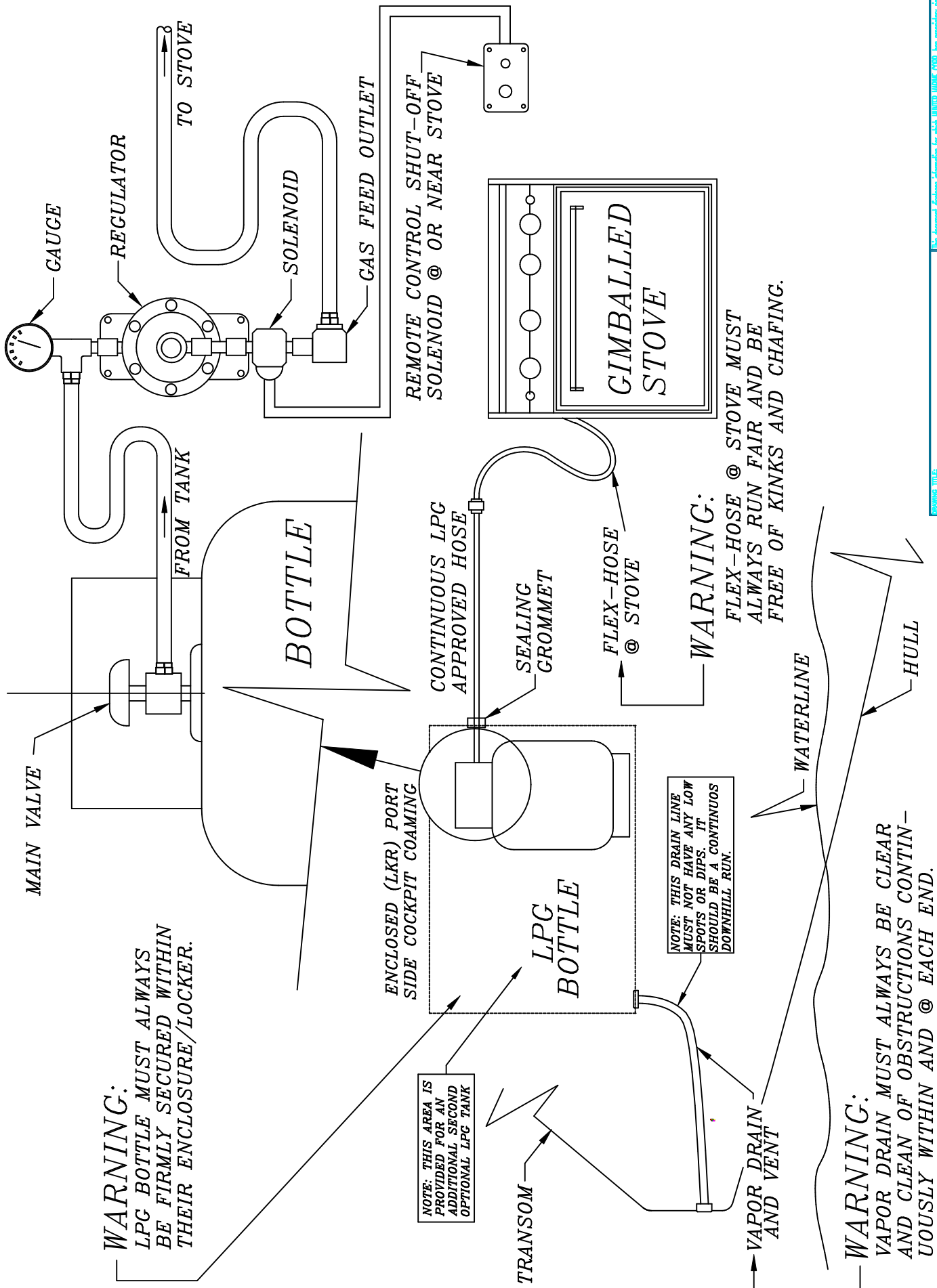
NOTE: FUEL FILTERS LOCATED PORT SIDE OF ENGINE ROOM.



LPG ON/OFF SWITCH (ON BULK. AFT OF SINK)  
LPG TANK \ SOLENOID \ REGULATOR (IN COCKPIT LOCKER)  
LPG SUPPLY HOSE 5/8" (16 MM)  
3 BURNER STOVE



LPG SYSTEM LAYOUT



**WARNING:**  
LPG BOTTLE MUST ALWAYS BE FIRMLY SECURED WITHIN THEIR ENCLOSURE/LOCKER.

NOTE: THIS AREA IS PROVIDED FOR AN ADDITIONAL SECOND OPTIONAL LPG TANK

NOTE: THIS DRAIN LINE MUST NOT HAVE ANY LOW SPOTS OR DIPS. IT SHOULD BE A CONTINUOUS DOWNHILL RUN.

**WARNING:**  
FLEX-HOSE @ STOVE MUST ALWAYS RUN FAIR AND BE FREE OF KINKS AND CHAFING.

**WARNING:**  
VAPOR DRAIN MUST ALWAYS BE CLEAR AND CLEAN OF OBSTRUCTIONS CONTINUOUSLY WITHIN AND @ EACH END.

OWNER FILE  
**P456 L.P.G. SYSTEM LAYOUT**  
ISSUANCE NO. 4508062B  
DESIGN NO. NONE  
DATE 11/11/99  
ENGINEERING DEPT.



# P456 ELECTRICAL SYSTEMS

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## 456 POWER SYSTEMS OPERATIONS PROCEDURES

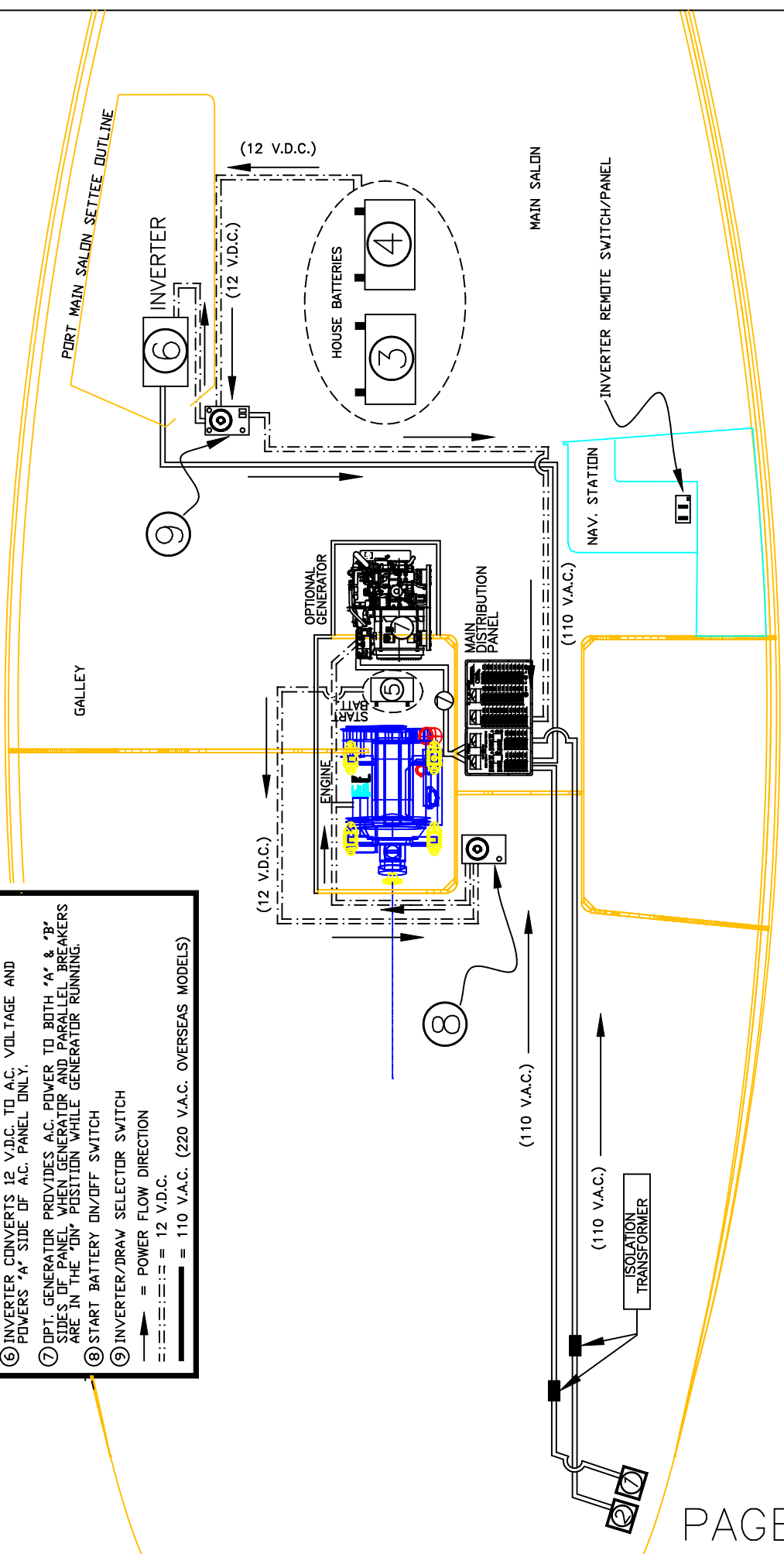
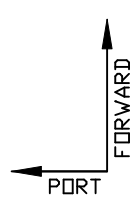
POWER SOURCE:	TO OPERATE:
<b>"D.C. MAIN"</b>	<p>TURN ON "D.C. MAIN" BRKR. ON D.C. SIDE OF MAIN DISTRIBUTION PANEL. IT IS NOT NECESSARY TO TURN ON THE INVERTER/DRAW SEL. SW. TO EITHER THE #1, #2, OR BOTH POSITION, <b>THIS PORTION OF THE INV/DRAW SEL. SW. IS FOR THE CHARGING/INVERTING SYSTEM (AND ISOLATION OF) ONLY. IT IS NECES. HOWEVER TO TURN ON EITHER THE "PANEL #1", OR "PANEL #2", BREAKER/S LOCATED ON THE BOTTOM OF THE INV/DRAW SEL. SW. PANEL TO PROVIDE POWER TO D.C. PANEL FROM EITHER THE HOUSE BATT. #1 OR HOUSE BATT. #2. (PANEL #1 "BREAKER" = HOUSE BATTERY #1) (PANEL #2 "BREAKER" = HOUSE BATTERY #2) IF NO POWER: CHECK 300 amp IN LINE FUSE AT EACH HOUSE BATTERY IN HOUSE BATTERY COMPARTMENT, AND/OR BATTERY CONNECTIONS IF NECESSARY.</b></p>
<b>SHORE POWER "A"</b>	<p>1. CONNECT SHORE POWER CABLE #1, TO SUPPLY POWER TO "A" SIDE OF A.C. POWER MAIN DISTRIBUTION PANEL                  2. TURN ON MAIN BREAKER ON SHORE POWER "A" SIDE OF PANEL                  3. "A" SIDE OF A.C. POWER MAIN DISTRIBUTION PANEL SHOULD NOW BE OPERABLE (NOTE: INVERTER CAUSES APPROX. 15 SECOND DELAY)  <b>IF NO POWER TO "A" SIDE OF PANEL CHECK THE FOLLOWING:</b>                  1. BREAKER AT DOCKSIDE POWER SUPPLY BOX                  2. BREAKER #1 LOCATED IN HEADLINER STBD. AFT STRM. (ON 220V.A.C. MODELS IN STBD. AFT SWIMSEAT LOCKER.)</p>
<b>SHORE POWER "B"</b>	<p>1. CONNECT SHORE POWER CABLE #2, TO SUPPLY POWER TO "B" SIDE OF A.C. POWER MAIN DISTRIBUTION PANEL                  2. TURN ON MAIN BREAKER ON SHORE POWER "B" SIDE OF PANEL                  3. "B" SIDE OF A.C. POWER MAIN DISTRIBUTION PANEL SHOULD NOW BE OPERABLE  <b>IF NO POWER TO "B" SIDE OF PANEL CHECK THE FOLLOWING:</b>                  1. BREAKER AT DOCKSIDE POWER SUPPLY BOX                  2. BREAKER #2 LOCATED IN HEADLINER STBD. AFT STRM. (ON 220V.A.C. MODELS IN STBD. AFT SWIMSEAT LOCKER.)</p>
<b>" INVERTER " WHEN IN INVERT MODE (CONVERTS 12V.D.C. TO 110V.A.C.)</b>	<p>1 CHOOSE HOUSE BATTERY/S TO DRAW POWER FROM BY TURNING INV/DRAW (HOUSE BATT'S) SEL. SWITCH TO 1,2, OR BOTH POSITION; LOCATED AFT END PORT SETTEE MAIN CABIN (THIS SW. PROVIDES <b>ISOLATION CAPABILITY</b> IN THE EVENT OF A BAD BATTERY. FOR EX. A DEAD CELL)                  2. TURN THE INVERTER REMOTE SWITCH (LOCATED AT NAV. STATION) TO THE "ON" POSITION, LOCATED AFT END PORT SETTEE IN MAIN CABIN.                  3. TURN ON DESIRED BREAKER (EX. OUTLETS) ON "A" SIDE OF A.C. MAIN DISTRIBUTION PANEL                  NOTE: IT TAKES 10D.C. AMPS TO CREATE 1 A.C. AMP, IF THE BATTERY VOLTAGE DROPS BELOW 10.5V. THE INVERTER WILL AUTOMATICALLY SHUT DOWN. (SEE "BATT. SEL. SW" &amp; "METERS" ON PAGE 63A-6) <b>NOTE: THE INVERTER WILL NOT POWER THE WATER HEATER OR AIR COND. SYSTEM. THE WATER HEATER IS POWERED BY "SHORE POWER A" CABLE OR OPT. GENERATOR. THE AIR COND'S ARE POWERED BY THE "SHORE POWER B" CABLE OR THE OPT. GENERATOR. NOTE: IF ANY OTHER APPLIANCES ARE TO BE USED WITH AIR COND/S RUNNING WHEN ON SHORE POWER BOTH "SHORE POWER A" AND "SHORE POWER B" CABLES MUST BE CONNECTED.</b></p>
<b>POWERS "A" SIDE OF A.C. PANEL ONLY WHEN INVERTING</b>	<p><b>TO POWER D.C. SIDE OF PANEL AND "A" SIDE OF A.C. PANEL SIMULTANEOUSLY USING INVERTER:</b>                  1. TURN ON D.C. MAIN BREAKER ON D.C. SIDE OF MAIN DISTRIBUTION PANEL                  2. TURN THE INV/DRAW (HOUSE BATT'S) SELECTOR SWITCH TO THE #2 POSITION                  3. TURN THE #1 BREAKER LOCATED AT THE BOTTOM OF THE INV/DRAW SEL. SWITCH PANEL TO THE "ON" POSITION, AND TURN THE #2 BREAKER TO THE "OFF" POSITION.                  4. TURN INVERTER REMOTE SWITCH TO THE "ON" POSITION                  THIS PROCEDURE ALLOWS INVERTER TO SUPPLY 110V.A.C. POWER TO "A" SIDE OF A.C. PANEL BY DRAWING POWER FROM HOUSE BATTERY #2, WHILE D.C. SIDE OF PANEL DRAWS POWER FROM HOUSE BATTERY #1. THIS ISOLATION PROCEDURE COMES IN HANDY FOR EXAMPLE WHEN USING A HIGHER AMPERAGE APPLIANCE OFF OF THE INVERTER THAT MIGHT CAUSE A MOMENTARY VOLTAGE DROP THAT COULD EFFECT EQUIP. (SUCH AS THE OPT. AUTOPILOT) THAT IS VOLTAGE SENSITIVE CAUSING THE UNIT TO TURN OFF. (THIS APPLIES WHEN THERE IS NO SHORE OR GENERATOR POWER BEING SUPPLIED TO PANEL) THE INVERTER AUTOMATICALLY TRANSFERS SHORE POWER TO THE A.C. PANEL WHEN "SHORE POWER A" CABLE CONNECTED AND DOCKSIDE POWER PRESENT AT A.C. PANEL, <b>BYPASSING THE INVERT MODE CAPABILITIES.</b></p>
<b>BUILT IN INVERTER- TRANSFER SWITCH.</b>	<p>1. TURN (START) BATTERY SWITCH TO THE "ON" POSITION                  2. CHECK SEA STRAINER AND OPEN RAW WATER SEACOCK, SEE PAGE 60 FOR LOCATIONS                  3. START GENERATOR (FOLLOW STARTING INSTRUCTIONS PROVIDED IN THE "GENERATOR MANUAL")                  3. RAISE SLIDE BAR ON "A" SIDE OF A.C. PANEL AND TURN GENERATOR BREAKER TO THE "ON" POSITION TO POWER "A" SIDE OF A.C. PANEL AND TURN PARALLEL BREAKER TO THE "ON" POSITION                  4. TO POWER "B" SIDE OF A.C. PANEL (TO USE AIR COND'S) RAISE SLIDE BAR ON "B" SIDE OF A.C. PANEL AND TURN PARALLEL BREAKER TO THE "ON" POSITION</p>
<b>OPTIONAL GENERATOR</b>	<p>1. TURN (START) BATTERY SWITCH TO THE "ON" POSITION                  2. CHECK SEA STRAINER AND OPEN RAW WATER SEACOCK, SEE PAGE 60 FOR LOCATIONS                  3. START GENERATOR (FOLLOW STARTING INSTRUCTIONS PROVIDED IN THE "GENERATOR MANUAL")                  3. RAISE SLIDE BAR ON "A" SIDE OF A.C. PANEL AND TURN GENERATOR BREAKER TO THE "ON" POSITION TO POWER "A" SIDE OF A.C. PANEL AND TURN PARALLEL BREAKER TO THE "ON" POSITION                  4. TO POWER "B" SIDE OF A.C. PANEL (TO USE AIR COND'S) RAISE SLIDE BAR ON "B" SIDE OF A.C. PANEL AND TURN PARALLEL BREAKER TO THE "ON" POSITION</p>

# 456 POWER SYSTEMS OPERATIONS PROCEDURES

<b>ENGINE ALTERNATOR</b>	<ol style="list-style-type: none"> <li>1. TURN (START) BATTERY SELECTOR SWITCH TO THE "ON" POSITION, LOCATED ON STBD. AFT ENGINE ROOM BULK. IN AFT STRM.</li> <li>2. CHECK SEA STRAINER &amp; OPEN RAW WATER SEACOCK, SEE PAGE 60 FOR LOCATIONS</li> <li>3. START SHIP'S ENGINE (<b>FOLLOW STARTING INSTRUCTIONS IN THE "ENGINE MANUAL"</b>)</li> <li>4. TURN "INV/DRAW" (HOUSE) BATTERY SWITCH TO THE "BOTH" POSITION</li> </ol>
<b>INVERTER</b> INVERTER HAS A BUILT IN AUTO. CHARGING SYSTEM	<ol style="list-style-type: none"> <li>1. CONNECT SHORE POWER CABLE #1 TO POWER "A" SIDE OF A.C. POWER MAIN DISTRIBUTION PANEL AND TURN ON "SHORE POWER A" MAIN BREAKER</li> <li>2. TURN INVERTER REMOTE SWITCH (LOCATED AT NAV. STATION) TO THE "OFF" POSITION</li> <li>3. TURN INVERTER/DRAW (HOUSE BATT'S) SELECTOR SWITCH TO THE "BOTH" POSITION, LOCATED AFT END PORT SETTEE MAIN CABIN. NOTE: <b>IT IS NOT NECESSARY</b> TO TURN ON THE "START" BATTERY SWITCH TO PROVIDE CHARGING POWER TO THE START BATTERY. NOTES: <b>WHEN LEAVING BOAT UNATTENDED, BE SURE INVERTER REMOTE SWITCH IS IN THE "OFF" POSITION</b>, THIS WAY IF SHORE POWER IS LOST FOR ANY REASON, THIS WILL PREVENT THE INVERTER FROM CONVERTING 12V.D.C. TO A.C. VOLTAGE CAUSING HOUSE BATTERIES TO BE DRAINED. WHEN THE INVERTER REMOTE SWITCH IS IN THE "OFF" POSITION THE INVERTER AUTOMATICALLY GOES INTO CHARGE MODE</li> </ol> <p style="margin-left: 20px;">INVERTER CHARGE MODE WORKS ONLY WHEN THERE IS POWER TO THE "A" SIDE OF THE A.C. PANEL</p>
<b>OPTIONAL GENERATOR</b>	<ol style="list-style-type: none"> <li>1. TURN (START) BATTERY SWITCH TO THE "ON" POSITION, LOCATED ON STBD. AFT ENGINE ROOM BULK. IN AFT STRM.</li> <li>2. CHECK SEA STRAINER &amp; OPEN RAW WATER SEACOCK, SEE PAGE 60 FOR LOCATIONS</li> <li>2. START GENERATOR (<b>FOLLOW STARTING INSTRUCTIONS IN THE "GENERATOR MANUAL"</b>)</li> <li>4. TURN THE INVERTER REMOTE SWITCH TO THE "OFF" POSITION</li> <li>5. TURN THE INV/DRAW SELECTOR SWITCH TO THE "BOTH" POSITION</li> </ol>

**POWER SYSTEM OPERATION**

- ① SHORE POWER 'A' POWERS 'A' SIDE OF AC. PANEL.
  - ② SHORE POWER 'B' POWERS 'B' SIDE OF AC. PANEL.
  - ③ & ④ HOUSE BATTERIES PROVIDE 12V.D.C. VOLTAGE TO D.C. SIDE OF DISTRIBUTION PANEL AND INVERTER.
  - ⑤ START BATTERY PROVIDES 12 V.D.C. POWER TO ENGINE & GEN. STARTERS. (NOTE: ISOLATOR PREVENTS INVERTER FROM DRAWING POWER FROM START BATTERY.)
  - ⑥ INVERTER CONVERTS 12 V.D.C. TO AC. VOLTAGE AND POWERS 'A' SIDE OF AC. PANEL ONLY.
  - ⑦ OPT. GENERATOR PROVIDES AC. POWER TO BOTH 'A' & 'B' SIDES OF PANEL WHEN GENERATOR AND PARALLEL BREAKERS ARE IN THE 'ON' POSITION WHILE GENERATOR RUNNING.
  - ⑧ START BATTERY ON/OFF SWITCH
  - ⑨ INVERTER/DRAW SELECTOR SWITCH
- = POWER FLOW DIRECTION  
 - - - - - = 12 V.D.C.  
 ————— = 110 V.A.C. (220 V.A.C. OVERSEAS MODELS)



(NOTE: OVERSEAS MODELS ARE 220V.A.C. INSTEAD OF 110V.A.C.)  
 WIRE RUNS SHOWN IN SCHEMATIC FORM FOR CLARITY  
 SEE DISTRIBUTION PANEL FOLLOWING PAGE

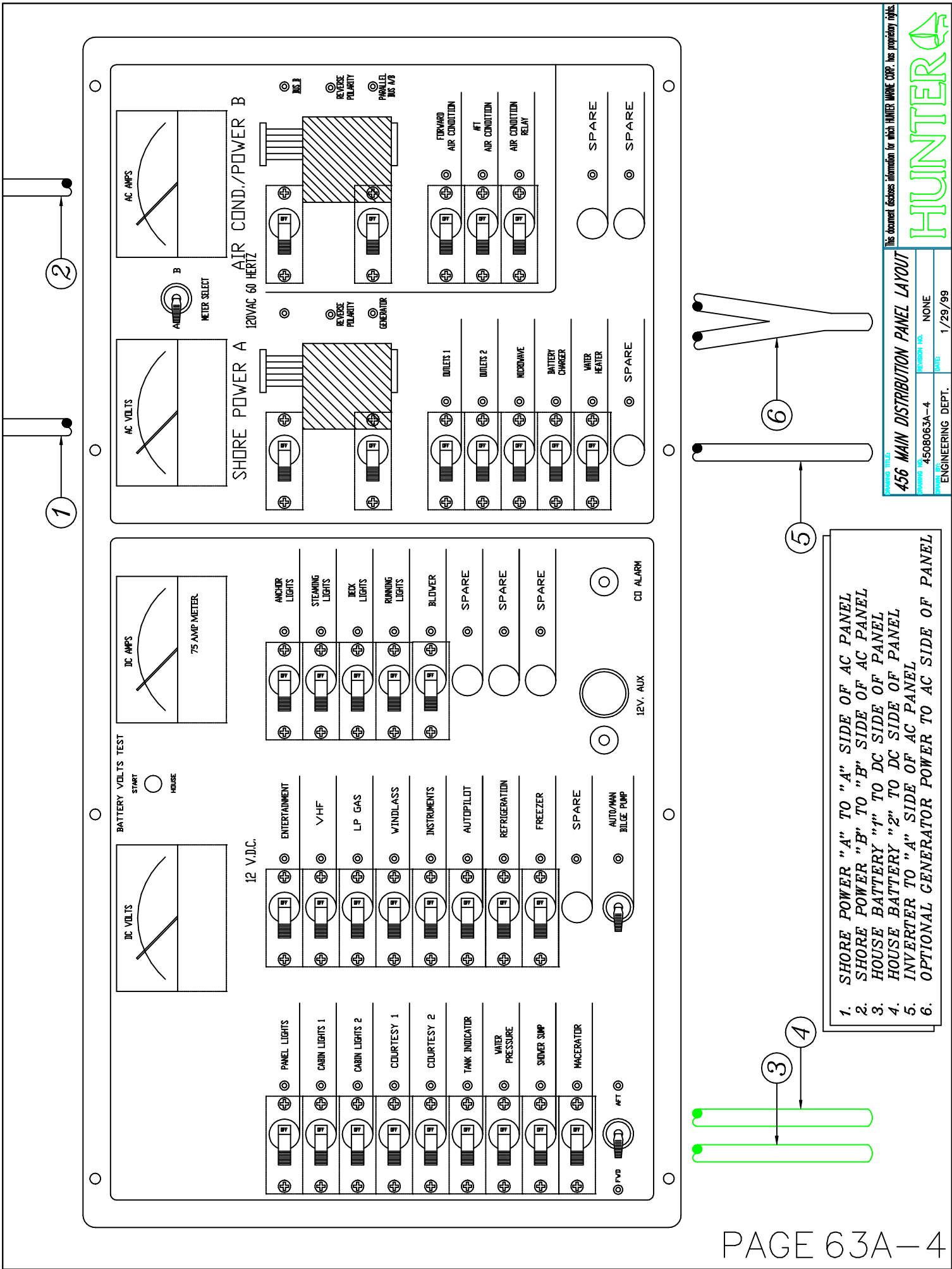
NOTE: THIS LAYOUT IS INTENDED TO PROVIDE A BASIC UNDERSTANDING OF THE VARIOUS POWER SYSTEMS ONLY, IT IS NOT A SCHEMATIC! SEE FOLLOWING PAGES FOR MORE DETAILED INFO. SCHEMATICS, ETC.

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**P456 BASIC POWER SYSTEM LAYOUT**

PROJECT NO.	4508063A-3	DESIGN NO.	NONE
ENGINEERING DEPT.		DATE	1/22/98

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1. SHORE POWER "A" TO "A" SIDE OF AC PANEL
2. SHORE POWER "B" TO "B" SIDE OF AC PANEL
3. HOUSE BATTERY "1" TO DC SIDE OF PANEL
4. HOUSE BATTERY "2" TO DC SIDE OF PANEL
5. INVERTER TO "A" SIDE OF AC PANEL
6. OPTIONAL GENERATOR POWER TO AC SIDE OF PANEL

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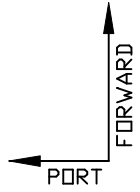
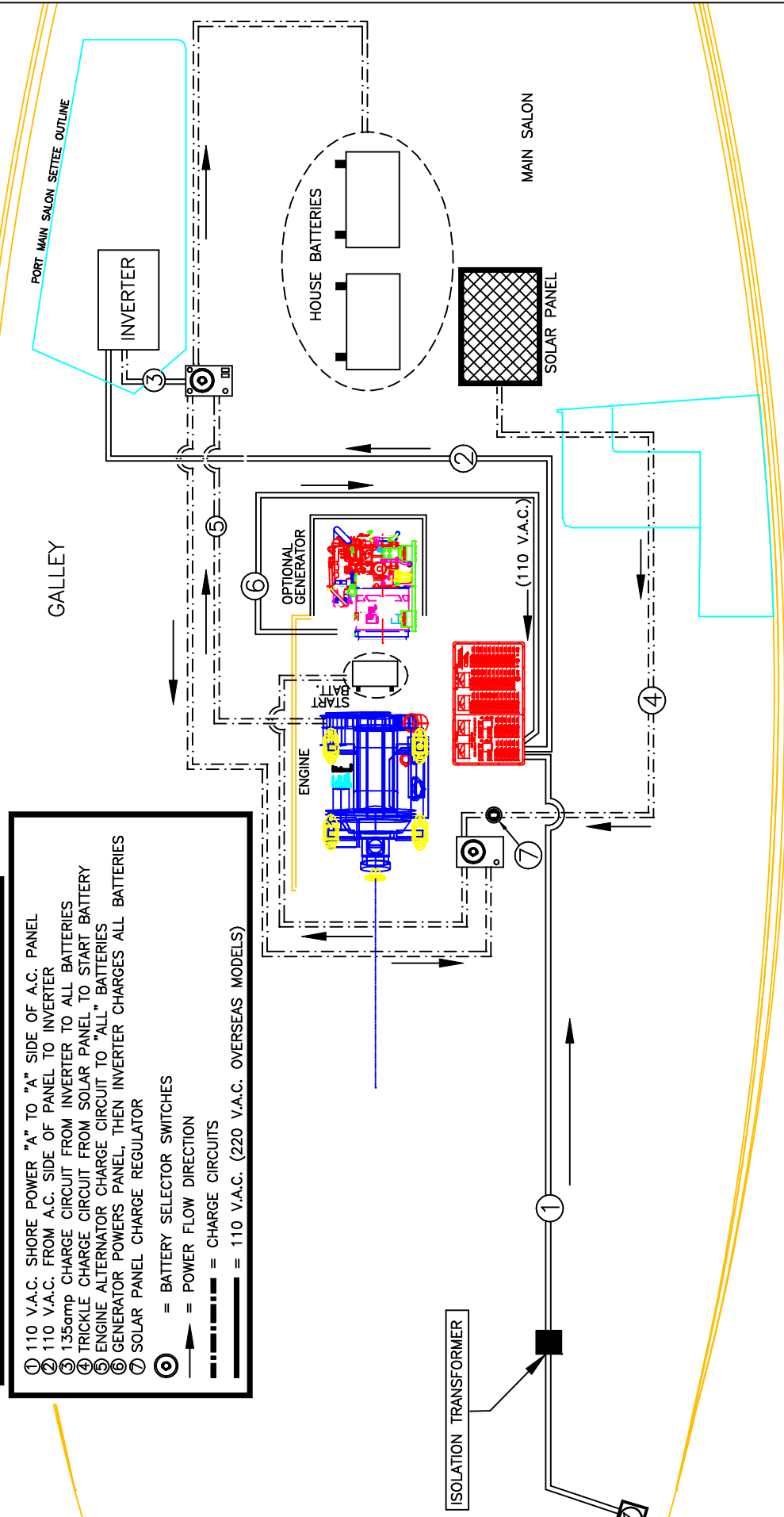
<b>456 MAIN DISTRIBUTION PANEL LAYOUT</b>	
DRAWING NO. 4508063A-4	REVISION NO. NONE
ENGINEERING DEPT.	DATE 1/29/99

**BASIC OPERATION:**

INVERTER CHARGES ALL BATTERIES WHEN INVERTER IS IN CHARGE MODE. INVERTER AUTOMATICALLY SWITCHES OVER TO CHARGE MODE WHEN IT IS NOT CONVERTING D.C. VOLTAGE TO A.C. VOLTAGE AND SHORE POWER 'A' IS CONNECTED AND THE INV/DRAW (HOUSE BATTERY) SELECTOR IS IN THE 'BOTH' POSITION. ENGINE ALTERNATOR PROVIDES CHARGING POWER TO ALL BATTERIES WHEN ENGINE IS RUNNING AND THE INV/DRAW (HOUSE BATTERY) SELECTOR SWITCH IS IN THE 'ON' POSITION. THE OPT. GENERATOR PROVIDES POWER TO THE MAIN DISTRIBUTION PANEL, ALLOWING THE INVERTER/CHARGER TO CHARGE BATTERIES AS MENTIONED ABOVE.

- ① 110 V.A.C. SHORE POWER "A" TO "A" SIDE OF A.C. PANEL
- ② 110 V.A.C. FROM A.C. SIDE OF PANEL TO INVERTER
- ③ 15amp CHARGE CIRCUIT FROM INVERTER TO ALL BATTERIES
- ④ TRICKLE CHARGE CIRCUIT FROM SOLAR PANEL TO START BATTERY
- ⑤ ENGINE ALTERNATOR CHARGE CIRCUIT TO "ALL" BATTERIES
- ⑥ GENERATOR POWERS PANEL, THEN INVERTER CHARGES ALL BATTERIES
- ⑦ SOLAR PANEL CHARGE REGULATOR

⊙ = BATTERY SELECTOR SWITCH  
 → = POWER FLOW DIRECTION  
 - - - = CHARGE CIRCUITS  
 ——— = 110 V.A.C. (220 V.A.C. OVERSEAS MODELS)



NOTE: THIS LAYOUT IS INTENDED TO PROVIDE A BASIC UNDERSTANDING OF THE CHARGING SYSTEM ONLY. IT IS NOT A SCHEMATIC! SEE FOLLOWING PAGES FOR MORE DETAILED INFO. SCHEMATICS, ETC.

PART NO. FILE <b>P456 CHARGING SYSTEM LAYOUT W/ OPT. GENERATOR</b>		THIS DOCUMENT DESCRIBES INFORMATION FOR WHICH HUNTER MARINE CORP. HAS PROPRIETARY RIGHTS.	
REVISION NO. 4508063A-5	NONE	DATE 4/12/00	ENGINEERING DEPT.





**12 V.D.C. DISTRIBUTION PANEL**

<b>BREAKER</b>	<b>DESCRIPTION</b>
PANEL LIGHTS	ILLUMINATES BOTH A.C. & D.C. SIDES OF THIS PANEL FOR NIGHT USE
CABIN LIGHTS 1	SUPPLIES POWER TO CABIN LIGHTS FORWARD OF THE GALLEY AND NAVIGATION STATION
CABIN LIGHTS 2	SUPPLIES POWER TO CABIN LIGHTS AFT OF THE GALLEY AND NAVIGATION STATION
COURTESY 1	SUPPLIES POWER TO <b>SWITCHED CTSY. LIGHTS</b> , THESE ARE THE FRIDGE/FREEZER, BILGE COMPTS. AND COCKPIT
COURTESY 2	SUPPLIES POWER TO ALL CABIN SOLE LIGHTS LOCATED AT THE GALLEY, NAV. STA., AFT STRM. FWD STRM
COCKPIT LIGHTS	SUPPLIES POWER TO COCKPIT LIGHTS IN THE ARCH
WATER PUMP	SUPPLIES POWER TO FRESH WATER PUMP TO PRESSURIZE H2O SYSTEM.
SUMP PUMP	SUPPLIES POWER TO BOTH FWD. AND AFT SHOWER SUMP BOXES. (SELF CONTAINED FLOAT SWITCH IN EACH SUMP ACTIVATES PUMP INSIDE EACH SUMP BOX. (SEE PAGE 59A FOR SUMP LOCATIONS)
ENTERTAINMENT	SUPPLIES POWER TO OPTIONAL STEREOS.
ANCHOR LIGHT	SUPPLIES POWER TO 360 DEGREE LIGHT AT TOP OF MAST, USE WHEN ANCHORED AT NIGHT.
STEAMING LIGHT	SUPPLIES POWER TO STEAMING LIGHT LOCATED ON FWD. SIDE OF MAST APPROXIMATELY AT THE HEIGHT OF THE LOWER SPREADERS. USE AT NIGHT WHEN VESSEL UNDERWAY BY ENGINE POWER. (ALONG W/RUNNING LTS.)
DECK LIGHT	SUPPLIES POWER TO DECK LIGHT (IS COMBINATION WITH STEAMING LIGHT) PROVIDES LIGHT TO DECK BELOW.
RUNNING LIGHTS	SUPPLIES POWER TO THE BOW, STERN, & COMPASS LIGHT. USE AT NIGHT UNDER SAIL AND/OR ENGINE POWER.
INSTRUMENTS	SUPPLIES POWER TO KNOT, DEPTH, & SPEED REPEATERS LOCATED ON HELM CONSOLE.
VHF	SUPPLIES POWER TO THE VHF RADIO LOCATED INSIDE COMPANIONWAY OPENING
WINDLASS	SUPPLIES POWER TO UP/DOWN CONTROLS AT ANCHOR WELL. <b>NOTE: BECAUSE THE WINDLASS DRAWS IT'S POWER FROM THE START BATTERY, IT IS GOOD PRACTICE TO START THE SHIPS ENGINE PRIOR TO OPERATING WINDLASS TO PREVENT BATTERY DRAIN. ( IF NO POWER, CHECK RESET ON REMOTE PANEL)</b>
AUTOPILOT	THIS BREAKER PROVIDED FOR AN OPTIONAL AUTOPILOT SYSTEM.
REFRIGERATION	SUPPLIES POWER TO REFRIGERTOR COMPRESSOR.
FREEZER	SUPPLIES POWER TO FREEZER COMPRESSOR.
MACERATOR	SUPPLIES POWER TO THE MACERATOR TOGGLE SWITCH.
	<b>NOTE: THESE DEVICES ARE USED FOR DIRECT OVERBOARD DISCHARGE OF RAW SEWAGE, BE AWARE OF YOUR LOCAL BOATING REG. BEFORE USING.</b>
L. P. GAS	SUPPLIES POWER TO L.P. GAS SWITCH AT GALLEY. SEE "STOVE MANUAL" FOR OPER. & SAFETY INST.
BLOWER	SUPPLIES POWER TO ENGINE ROOM EXHAUST FAN.
TANK INDICATOR	SUPPLIES POWER TO TANK MONITOR.
BILGE PUMP	TOGGLE SWITCH STAYS IN THE "AUTO" POSITION, THIS ALWAYS FEEDS POWER TO THE FLOAT SWITCH (AS LONG AS BATTERIES ARE CONNECTED AND HAVE AMPLE CHARGE) FOR MANUAL USE, PUSH SWITCH TO "MANUAL" ILLUMINATED L.E.D. INDICATES POWER TO PUMP AND PUMP SHOULD BE RUNNING. PRIOR TO LEAVING VESSEL "MANUALLY" TEST PUMP AND CHECK BATTERY LEVEL. SEE BATTERY SELECT SWITCH BELOW.
BATT. VOLTS SEL. SW.	USE TO REVIEW STATUS OF THE START AND HOUSE BATTERIES.
METERS	D.C. VOLTS DISPLAYS <b>AVAILABLE VOLTAGE</b> FROM SELECTED BATTERY D.C. AMPS DISPLAYS <b>AMPERAGE BEING DRAWN</b> FROM HOUSE BATTERY BANK.
YELLOW L.E.D.'S	LIGHT EMITTING DIODES ILLUMINATE WHEN 12 V.D.C. POWER PRESENT.
NOTE:	IF THE OPTIONAL AUTOPILOT WAS INSTALLED AT THE FACTORY, THE "INSTRUMENTS" POWER LEADS ARE WIRED TO THE AUTOPILOT BREAKER. THIS ALLOWS THESE UNITS TO WORK SIMULTANEOUSLY OFF THE AUTOPILOT BREAKER.

## 110V.A.C. (220 OVERSEAS MODELS) DISTRIBUTION PANEL

### BREAKERS

### DESCRIPTION

#### "A" SIDE OF A.C. PANEL

SHORE POWER "A"	PROVIDES A.C. VOLTAGE TO "A" SIDE OF MAIN DISTRIBUTION PANEL WHEN SHORE POWER CORD "A" IS CONNECTED TO OUTLET AT DOCKING FACILITY.
GENERATOR	SUPPLIES POWER <b>FROM</b> GENERATOR TO SHORE POWER "A" (AND SHORE POWER "B" IF DESIRED) PANEL. NOTE: TO PROVIDE POWER TO SHORE POWER "B" SIDE OF PANEL MOVE SLIDE BAR UP AND TURN ON THE PARALLEL BREAKER ON THE SHORE POWER "B" SIDE OF PANEL.
OUTLETS 1	PROVIDES A.C. POWER TO THE OUTLETS ON THE PORT SIDE OF BOAT.
OUTLETS 2	PROVIDES A.C. POWER TO THE OUTLETS ON THE STBD. SIDE OF BOAT.
MICROWAVE	SUPPLIES POWER TO OUTLET BEHIND MICRO. IN WHICH MICROWAVE IS PLUGGED INTO.
WATER HEATER	SUPPLIES POWER TO WATER HEATER. <b>BE SURE TANK IS FULL AND SYSTEM IS FREE FROM AIR BEFORE APPLYING POWER TO HEATER TO PREVENT ELEMENT BURNOUT.</b>

#### "B" SIDE OF PANEL

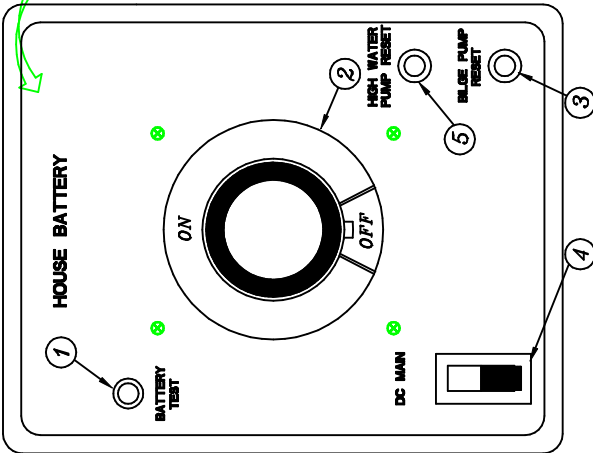
SHORE POWER "B"	PROVIDES A.C. VOLTAGE TO THIS SIDE OF PANEL WHEN SHORE POWER CORD "B" IS CONNECTED TO OUTLET AT DOCKING FACILITY.
PARALLEL	PROVIDES POWER FROM GENERATOR TO THIS SIDE OF PANEL.(MOVE SLIDE BAR UP TO TURN BREAKER ON.)
FWD/AFT AIR COND.	PROVIDES POWER TO EITHER FWD. OR AFT AIR COND. UNITS (SEE "MARINE AIR MANUAL" FOR OPER. INSTRUCTIONS.
AIR COND. RELAY	PROVIDES POWER TO RAW WATER CIRCULATION PUMP USED TO COOL AIR COND. COMPRESSORS UNITS, THIS BREAKER <b>MUST BE ON WHEN OPERATING AIR COND. UNIT/S.</b>

#### MISC. INFO

RED L.E.D.'S	ILLUMINATE WHEN A.C. POWER PRESENT.
METER SEL. SWITCH	ALLOWS VOLTAGE BEING SUPPLIED AND AMPERAGE BEING DRAWN TO BE DISPLAYED ON VOLT & AMP METERS SWITCH POSITION "A" = "A" SIDE OF PANEL. SWITCH POSITION "B" = "B" SIDE OF PANEL.
REV. POLARITY	IF REVERSED POLARITY L.E.D./S ILLUMINATE AFTER CONNECTING SHORE POWER HAVE DOCKSIDE POWER CHECKED BY QUALIFIED PERSONELL.

**NOTE: A PRUDENT MARINER REALIZES THAT THE RESOURCES TO POWER A VESSEL ARE LIMITED. WHEN USING THE INVERTER OR GENERATOR ONE SHOULD BE CONSERVATIVE AND AWARE OF THE AMOUNT OF POWER BEING SUPPLIED VERSES POWER BEING DRAWN. THIS IS ESPECIALLY IMPORTANT WHEN USING OPTIONAL INVERTER POWER. CONSULT THE "INVERTER MANUAL" FOR POWER OUTPUT CAPABILITIES.**

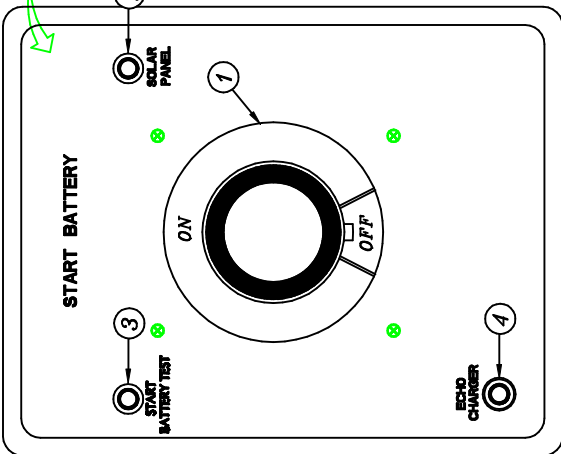
**INVERTER/DRAW (HOUSE BATTERY) SELECTOR SWITCH**



1. IN LINE FUSE FROM HOUSE BATTERY BANK (TEST CIRCUIT) USED TO DISPLAY AVAILABLE VOLTAGE FROM HOUSE BATTERIES. SEE BATTERY SELECTOR SWITCH & METERS PAGE 63A-6.
2. HOUSE BATTERY SWITCH SUPPLIES POWER TO INVERTER.
3. BILGE PUMP RESET. PUSH TO RESTORE POWER TO BILGE PUMP.
4. HOUSE BATTERY BREAKER SUPPLY POWER FROM HOUSE BATTERY BANK TO MAIN DC PANEL.
5. HIGH WATER PUMP RESET. PUSH TO RESTORE POWER TO PUMP.

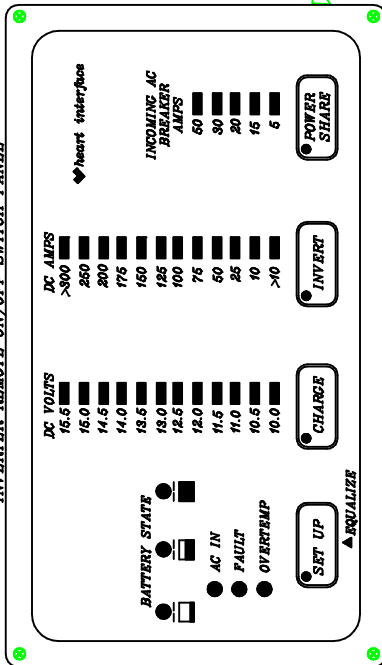
SEE PAGE 63A-2 "INVERTER" FOR OPERATING DETAILS

**START BATTERY ON/OFF SAFETY SWITCH PANEL**



1. ON/OFF SWITCH SUPPLIES POWER FROM START BATTERY TO ENGINE AND OPTIONAL GENERATOR STARTER(S)
2. SOLAR PANEL CHARGE CIRCUIT FUSE.
3. FUSE FOR START BATTERY VOLTS TEST SWITCH.
4. FUSE FOR ECHO CHARGER USED WITH 120V INVERTER ONLY.

**INVERTER REMOTE ON/OFF SWITCH PANEL**

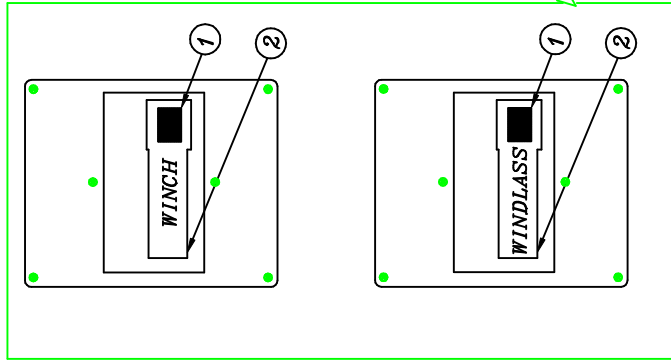


1. INVERTER STATUS DISPLAY
2. INVERTER ON/OFF SWITCH

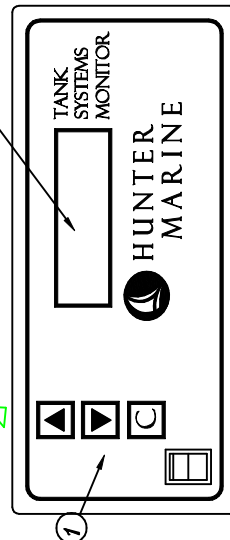
1. (TEST) ON/OFF BUTTON. PUSH TO TRIP RESET
2. "RESET" PUSH UP TO RESTORE POWER.

NOTE: WINDLASS PANEL SUPPLIES POWER TO THE WINDLASS MOTOR. THE "WINDLASS BREAKER" ON THE DC MAIN DISTRIBUTION PANEL, SUPPLIES POWER TO THE UP/DOWN CONTROLS IN THE ANCHORWELL LOCKER.

THE HALLYARD WINCH PANEL SUPPLIES POWER TO THE SWITCH.(LOCATED ON STBD SIDE BLKED OF COMPANIONWAY OPENING) WHICH SUPPLIES POWER TO THE WINCH. WINDLASS IS OPTIONAL. ELECTRIC HALLYARD IS STD. (EXCEPT ON FURLING MASTS)



1. TANK SELECTOR SWITCHES
2. TANK SELECTION DISPLAYS



## 12V.D.C. SYSTEM TROUBLESHOOTING GUIDE

TO POWER PANEL: TURN ON "D.C. MAIN" BREAKER ON HOUSE BATTERY SWITCH PANEL, IT IS NOT NECESSARY TO TURN HOUSE BATTERY SWITCH ON.  
IF NO POWER TO PANEL, CHECK 300 AMP IN-FUSE AT THE HOUSE BATTERIES.

COMPONENT	SYMPTOM	POSSIBLE SOLUTION/S
PANEL LIGHTS	PANEL WON'T ILLUMINATE	SEE "TO POWER PANEL" ABOVE BATTERY TERMINALS CLEAN? SEEK QUALIFIED PERSONELL
CABIN LIGHTS	WON'T ILLUMINATE	SEE "TO POWER PANEL" ABOVE BULB/S NEED REPLACING?
COURTESY LIGHTS	WON'T ILLUMINATE	SEE "TO POWER PANEL" ABOVE BULBS/S NEED REPLACING?
COCKPIT LIGHTS	WON'T ILLUMINATE	SEE "TO POWER PANEL" ABOVE BULBS/S NEED REPLACING?
WATER PUMP	NO POWER CYCLES ON/OFF EXCESSIVELY	SEE "TO POWER PANEL" ABOVE FAUCETS OFF? LEAK IN SYSTEM SEE PAGEC 57A FOR CONNECTION LOC.
SUMP PUMP	WON'T PUMP WHEN SUMP BOX FILLED (PUMP WON,T QUIT RUNNING) PUMP MAKES NOISE, DOESN'T PUMP PUMP RUNS BUT DOESN'T PUMP	SEE "TO POWER PANEL" ABOVE IS FLOAT SWITCH STUCK? DEBRIS IN PUMP IMPELLER? DISCHARGE HOSE CLOGGED?
STEREO	WON'T TURN ON	SEE "TO POWER PANEL" ABOVE CHECK INLINE FUSE BEHIND STEREO.
ANC., ST., DECK, & RUNNING. LIGHTS	WON'T ILLUMINATE	SEE "TO POWER PANEL" ABOVE CHECK CONNECTIONS IN ACCESS PANEL AT TOP OF COMPRESSION POST BULBS NEED REPLACING?
INSTRUMENTS	REPEATERS DON'T OPERATE	SEE "TO POWER PANEL" ABOVE DO TRANSDUCERS NEED CLEANING? SEE "INSTRUMENTS" MANUAL
V.H.F. RADIO	WON'T OPERATE  TURNS ON WON'T TRANSMIT/RECEIVE	SEE "TO POWER PANEL" ABOVE RADIO TURNED ON? ANTENNA CONNECTED PROPERLY?
WINDLASS	UP/DOWN CONTROLS DON'T OPERATE WINDLASS	SEE "TO POWER PANEL" ABOVE IS RESET "TRIPPED" ON WINDLASS RESET PANEL?
OPT. AUTO PILOT	WON'T OPERATE WON,T HOLD STEADY COURSE  CONSTANTLY ADJUSTING HELM	SEE "TO POWER PANEL" ABOVE IS THERE ANY METAL OBJECTS NEAR THE FLUX GATE COMPASS LOCATED IN THE CENTER BILGE COMPARTMENT? SENSITIVITY SETTING SET TO HIGH, SEE "AUTO PILOT MANUAL" FOR SENS. ADJ.
MACERATOR/S	WON'T TURN ON RUNS BUT DOESN'T DISCHARGE  PUMP MAKES NOISE, DOESN'T PUMP	SEE "TO POWER PANEL" IS DISCHARGE SEACOCK OPEN? IS WASTE DECK FITTING SECURE, IS IT PULLING AIR THRU? IF SO, TIGHTEN CAP OR REPLACE O- RING ON CAP. IS TANK VENT (HULL FITTING) CLOGGED? SEE PAGE 60 FOR LOCATIONS LODGED DEBRIS, <b>TURN OFF POWER</b> TO PUMP, INSERT SCREWDRIVER INTO PUMP ARMATURE AT END OF PUMP AND TURN TO DISLodge DEBRIS

NOTE: COMPONENT/S FAILURE COULD ALSO BE THE RESULT OF A POOR "GROUND" CONNECTION. SEE GROUND SYSTEM LAYOUT. DUE TO VIBRATION, WEATHER CONDITIONS, ECT. OCCASIONAL INSPECTION, CLEANING AND TIGHTENING OF THESE TERMINALS (BY QUALIFIED PERSONELL) MAY BE NECESSARY.

**12V. D.C. SYSTEM TROUBLESHOOTING GUIDE CONT:**

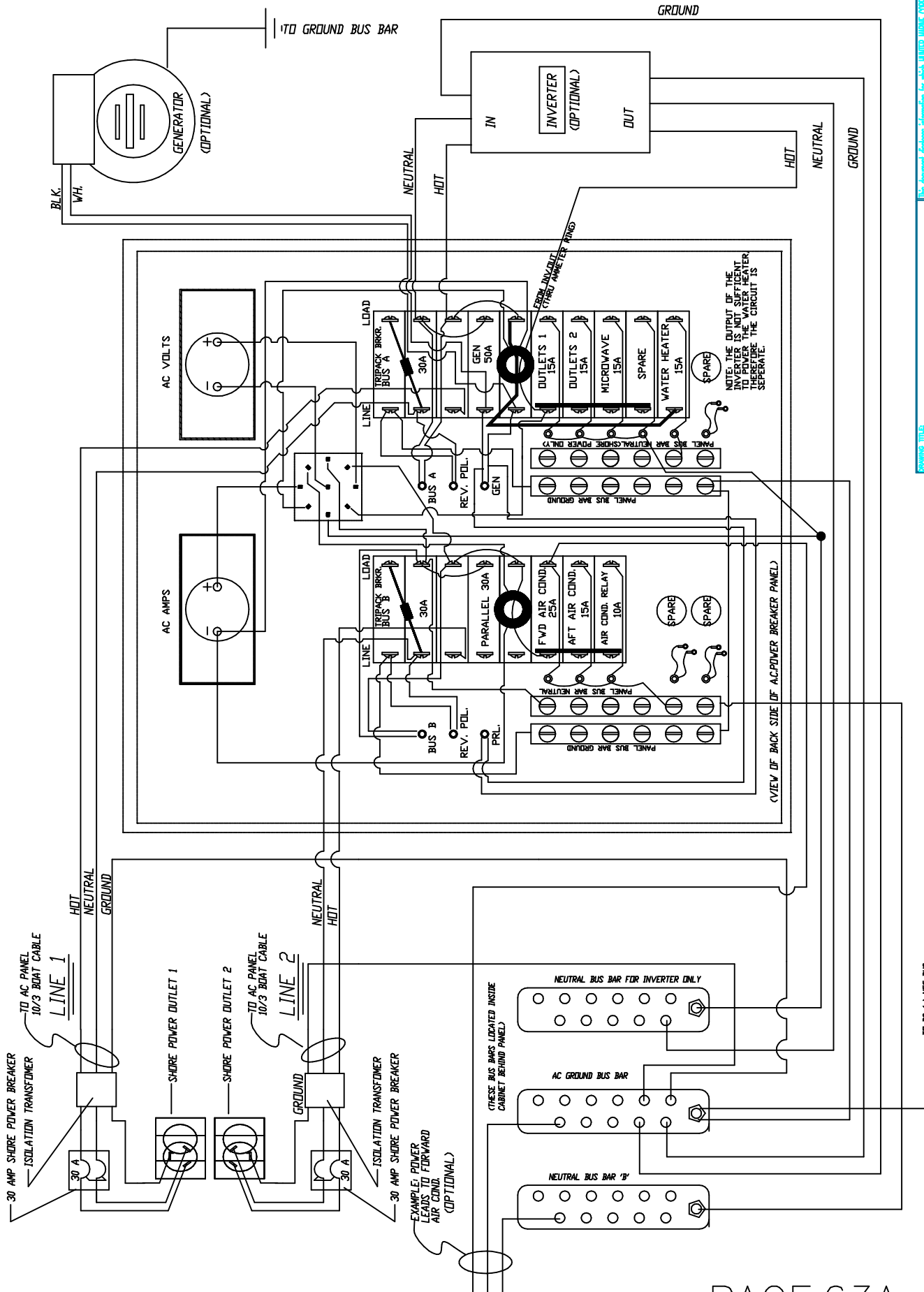
COMPONENT	SYMPTOM	POSSIBLE SOLUTION/S
L.P. GAS	NO POWER TO SWITCH AT GALLEY SYSTEM TURNS ON, NO GAS PRESENT	SEE "TO POWER PANEL" PREV. PAGE IS TANK VALVE OPEN? IS TANK EMPTY? SEE "STOVE/OVEN" MANUAL
BLOWER	WON'T TURN ON	SEE "TO POWER PANEL" PREV. PAGE DID YOUR AUTOMATIC FIRE EXTINGUISHING SYSTEM LOSE PRESSURE?
BILGE PUMP	WON'T OPERATE AUTO OR MANUAL  PUMP MAKES NOISE, DOESN'T PUMP PUMP RUNS BUT DOESN'T DISCHARGE	BATTERY LEVEL O.K.? SEE VOLT METER CHECK BILGE RESET ON HOUSE BATTERY SWITCH PANEL. BATTERY CONNECTIONS GOOD? DEBRIS IN PUMP IMPELLER? DISCHARGE HOSE CLOGGED?
VOLT METER	NO VOLTAGE DISPLAYED	SEE "TO POWER PANEL" PREV. PAGE CK. FUSES ON HOUSE BATTERY SW. PANEL ARE BATTERY CONNECTIONS GOOD? HAVE BATTERIES CHECKED HAVE METER CHECKED BY QUALIFIED PERSONNEL.
AMP METER	NO AMPERAGE DISPLAYED	IS D.C. MAIN ON? IS ANYTHING IN THE 12V. SYSTEM TURNED ON & RUNNING? HAVE METER CHECKED BY QUALIFIED PERSONNEL.
SOLAR PANEL	NO OUTPUT TO BATTERY/S	CK. FUSE ON START BATTERY ON/OFF SWITCH PANEL.

**120V.A.C. (230V. OVERSEAS MODELS) SYSTEM TROUBLESHOOTING GUIDE**

<b>COMPONENT</b>	<b>SYMPTOM</b>	<b>POSSIBLE SOLUTION/S</b>
SHORE POWER "A"	NO POWER TO PANEL	SEE "POWER SYSTEM OPERATIONS" PAGE 63A-2 CHECK DOCKSIDE BREAKER AND/OR BREAKER LOCATED INSIDE STARBOARD AFT STATEROOM HEADLINER (230V. MODELS INSIDE STB. SWIMSEAT LOCKER) CHECK RESET/S ON INVERTER. SEE "INV MANUAL" FOR LOCATION OF RESETS
OUTLETS #1 & 2	NO POWER	SEE "POWER SYSTEM OPERATIONS" PAGE 63A-2 IS OUTLET BREAKER/S ON? CHECK RESET ON G.F.I. OUTLETS AT GALLEY & AT NAV. STATION. CHECK INPUT/OUTPUT RESETS ON OPT. INVERTER MODELS SEE "INV MANUAL" FOR LOCATION OF RESETS.
MICROWAVE	NO POWER	IS BREAKER ON? SEE "POWER SYSTEM OPERATIONS" PAGE 63A-2 IS MICROWAVE ON? SEE "MICRO MANUAL"
WATER HEATER	NO POWER  WON'T HEAT WATER  WATER TO COLD/HOT	IS BREAKER ON? SEE "POWER SYSTEM OPERATIONS" PAGE 63A-2 CHECK "RESET" ON WATER HEATER SEE "WATER HEATER MANUAL" FOR LOCATION. SEE "WATER HEATER MANUAL" FOR THERMOSTAT ADJUSTMENT AND/OR ELEMENT REPLACEMENT, SEEK QUALIFIED PERSONELL.
INVERTER/BATT. CHARGER	INV. NOT SUPPLYING A.C.POWER  INV. ON BUT UNABLE TO OPERATE DESIRED APPLIANCE/S	IS INVERTER REMOTE SWITCH AT NAV. STATION ON? IS DESIRED APPLIANCE BREAKER ON? IS BATTERY VOLTAGE LOW? SEE VOLTAGE DISPLAY ON INVERTER REMOTE PANEL, SELECT OTHER BATTERY ON INVERTER/DRAW SELECTOR SWITCH PANEL IN AFT STRM. ARE YOU ASKING THE INVERTER TO POWER MORE THAN IT IS CAPABLE? SEE "INVERTER MANUAL" FOR INFORMATION REGARDING POWER OUTPUT CAPABILITIES.
INVERTER/BATT. CHARGER	NOT CHARGING BATTERY/S	IS SHORE POWER "A".ON? SEE "POWER SYSTEM OPERATIONS" PAGE 63A-2 IS HOUSE BATTERY SWITCH IN THE "ON" POSITION? CHECK IN-LINE FUSE AT BATTERY/S ARE BATTERY CONNECTIONS GOOD? INVERTER REMOTE SWITCH SHOULD BE IN THE "OFF" POSITION. (THIS IS NECESSARY IN THE EVENT YOU "LOSE" SHORE POWER, THE INVERTER DOESN'T GO INTO INVERT MODE CAUSING BATT./S TO DRAIN IF YOU LEFT AN A.C. APPLIANCE ON..
BATTERY CHARGER	NOT CHARGING BATTERY/S	IS SHORE POWER "A".ON? CHECK RESETS ON HOUSE BATTERY SWITCH PANEL. CHECK IN-LINE FUSE AT BATTERY/S ARE BATTERY CONNECTIONS GOOD?

**120V.A.C. (230V. OVERSEAS MODELS) SYSTEM TROUBLESHOOTING GUIDE CONT:**

COMPONENT	SYMPTOM	POSSIBLE SOLUTIONS
SHORE POWER "B"	NO POWER TO PANEL	IS SHORE POWER "B" BREAKER ON? CHECK DOCKSIDE BREAKER CHECK SHORE POWER BREAKER LOCATED IN HEADLINER STBD. AFT STRM. (ON 230V.A.C. MODELS IN STBD. AFT SWIMSEAT LOCKER.)
AIR COND. FWD/AFT	WON'T TURN ON  TURNS ON THEN SHUTS DOWN  OTHER	ARE APPROPRIATE BREAKER/S ON? SEE "POWER SYSTEMS OPERATION" PAGE 63A-2 SEE "MARINE AIR" MANUAL IS AIR COND. RELAY "ON" ? IS AIR COND. RAW WATER SEACOCK OPEN? IF SO, IS WATER CIRCULATING? SEE PAGE 60 FOR AIR COND. DISCHARGE THRUHULL LOCATION, IF NOT IS AIR COND. PICKUP BEING RESTRICTED BY DEBRIS? SEE "MARINE AIR" MANUAL
<b>OPTIONAL GENERATOR (APPLIES TO BOTH "A" &amp; "B" SIDES OF A.C. PANEL)</b>		
GENERATOR	NO POWER TO STARTER RUNNING, BUT NO POWER AT PANEL.  WON'T START  GEN. STARTS THEN SHUTS DOWN	IS START BATT. SELECTOR SWITCH ON? IS "GENERATOR BREAKER" ON "A" SIDE OF PANEL ON? (MOVE SLIDE BAR UP TO TURN THIS BREAKER ON). IS "PARALLEL BREAKER" ON "B" SIDE OF PANEL ON? (TO POWER "B" SIDE OF A.C. PANEL) SEE GENERATOR MANUAL DID YOU FOLLOW PROPER STARTING PROCEDURE AS DESCRIBED IN THE "GENERATOR MANUAL"? DO YOU HAVE AN AMPLE AMOUNT OF DIESEL FUEL? REMEMBER THE GENERATOR FUEL PICKUP TUBE IS SHORTER THAN THE PICKUP TUBE FOR THE ENGINE, THIS PREVENTS GENERATOR FROM DRAINING TANK SINCE ENGINE POWER IS MORE IMPORTANT THAN GENERATOR POWER. REFER TO GENERATOR MANUAL FOR POSSIBLE FUSE OR RESET ON GENERATOR. HAS THE AUTOMATIC FIRE EXTINGUISHER SYSTEM LOSE PRESSURE? IS RAW WATER PICKUP SEACOCK OPEN? IS RAW WATER PICKUP BEING RESTRICTED BY DEBRIS?



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**STANDARD A.C. PANEL SCHEMATIC W/OPTIONAL GEN. & INVERTER**

DESIGN NO.	4508063A-13	REVISION NO.	NONE
DATE	7/22/97	ENGINEER	ENG



# 456 WATTAGE DEMAND FOR ELECTRICAL EQUIPMENT AND APPLIANCES

NOTE: A PRUDENT MARINER REALIZES THAT THE RESOURCES TO POWER A VESSEL ARE LIMITED. WHEN USING THE ALTERNATE POWER SOURCES ONE SHOULD BE CONSERVATIVE AND AWARE OF THE AMOUNT OF POWER BEING SUPPLIED VERSES POWER BEING DRAWN THIS IS ESPECIALLY IMPORTANT WHEN USING THE INVERTER POWER. CONSULT THE "INVERTER MANUAL" FOR POWER OUTPUT CAPABILITIES.

## **FIXED APPLIANCES:**

SEE MANUALS AND/OR SPECIFICATION SHEETS IN YOUR OWNER'S PACK

## **PORTABLE APPLIANCES:**

BELOW ARE APPROXIMATE EXAMPLES OF THE AMPERAGE DRAW ASSOCIATED WITH CERTAIN ITEMS.

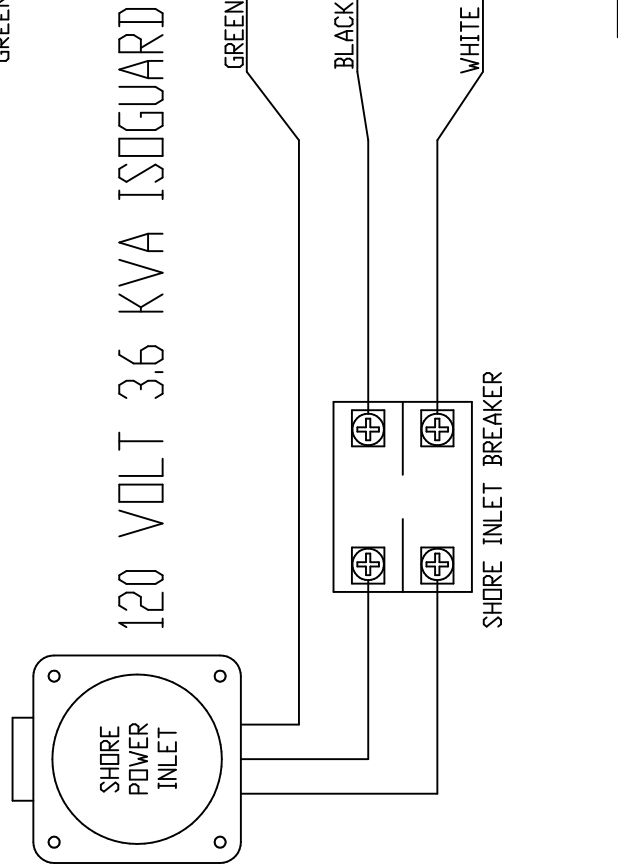
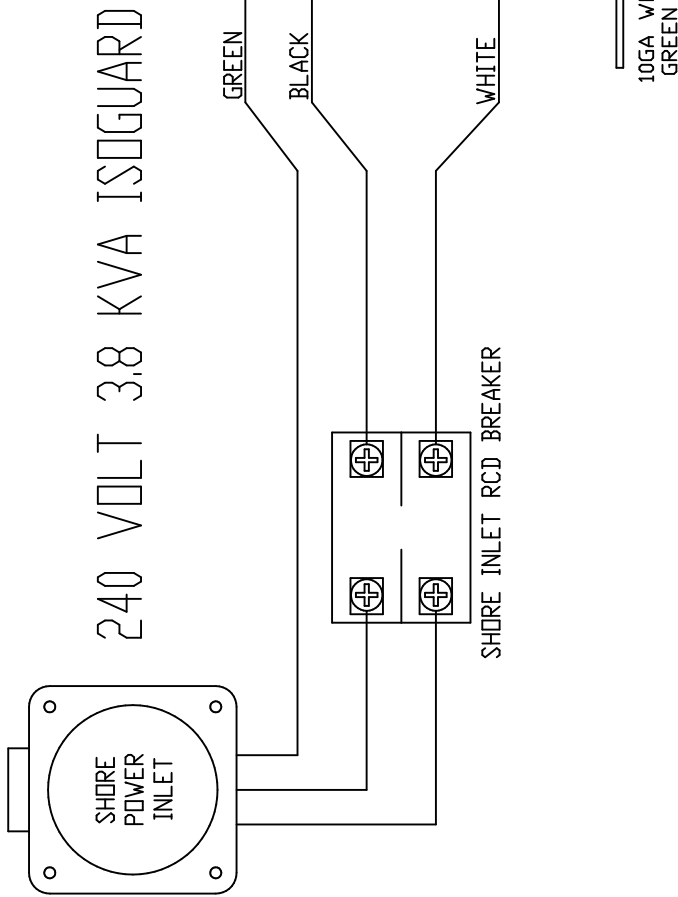
### **APPLIANCES: / WATTS:**

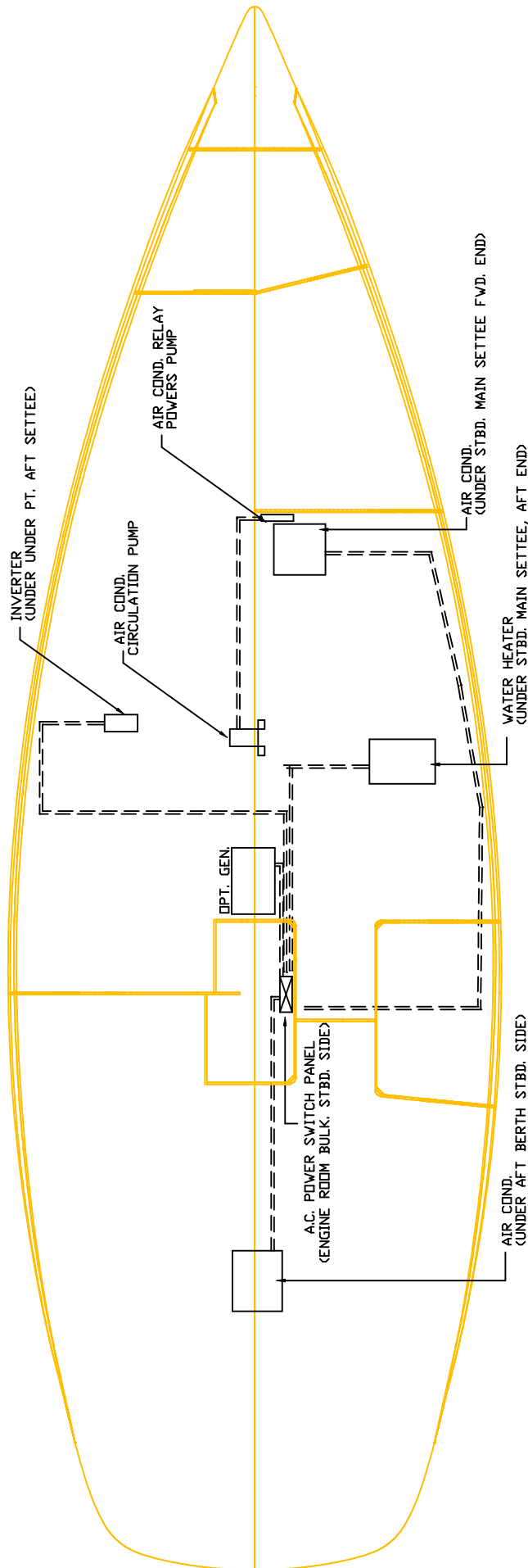
COFFEE MAKER.....	800 - 1,000 WATTS
FRYING PAN.....	1,000 - 2,500 WATTS
TOASTER.....	800 - 1,000 WATTS
FAN.....	75 - 300 WATTS
RADIO.....	60 - 150 WATTS
TV.....	250 - 600 WATTS
HOT PLATE.....	800 - 1,200 WATTS
HAIR DRYER.....	700 - 1,100 WATTS
SHAVER.....	50 - 100 WATTS
CLOCK.....	25 - 50 WATTS
BLENDER.....	250 - 350 WATTS
TOASTER OVEN.....	1,250 - 1,700 WATTS

### **ALTERNATE POWER SOURCES: / PROVIDED WATTS:**

SMALLER MODEL INVERTER.....	1,000 WATTS
LARGER MODEL INVERTER.....	2,500 WATTS (THIS MODEL ON YOUR BOAT)
SMALLER MODEL GENERATOR.....	6,000 WATTS (5,000 WATTS FOR 50 Hz)
LARGER MODEL GENERATOR.....	8,000 WATTS (6,600 WATTS FOR 50 Hz)
SHORE POWER (PER INLET).....	3,600 WATTS

EXAMPLE: TV (250-600)+ TOASTER (800-1,000)+ HAIR DRYER (700-1,100) = TOTAL (1,750-2,700)  
THUS, IF THE WATTS BEING USED EXCEEDS THE WATTS BEING PRODUCED, THEN SOME OF THE ITEMS IN USE WILL NOT BE FUNCTIONAL. AGAIN, IT IS IMPORTANT TO BE AWARE OF THE AMPERAGE DRAW VERSUS THE AMPERAGE OUTPUT AT ALL TIMES.



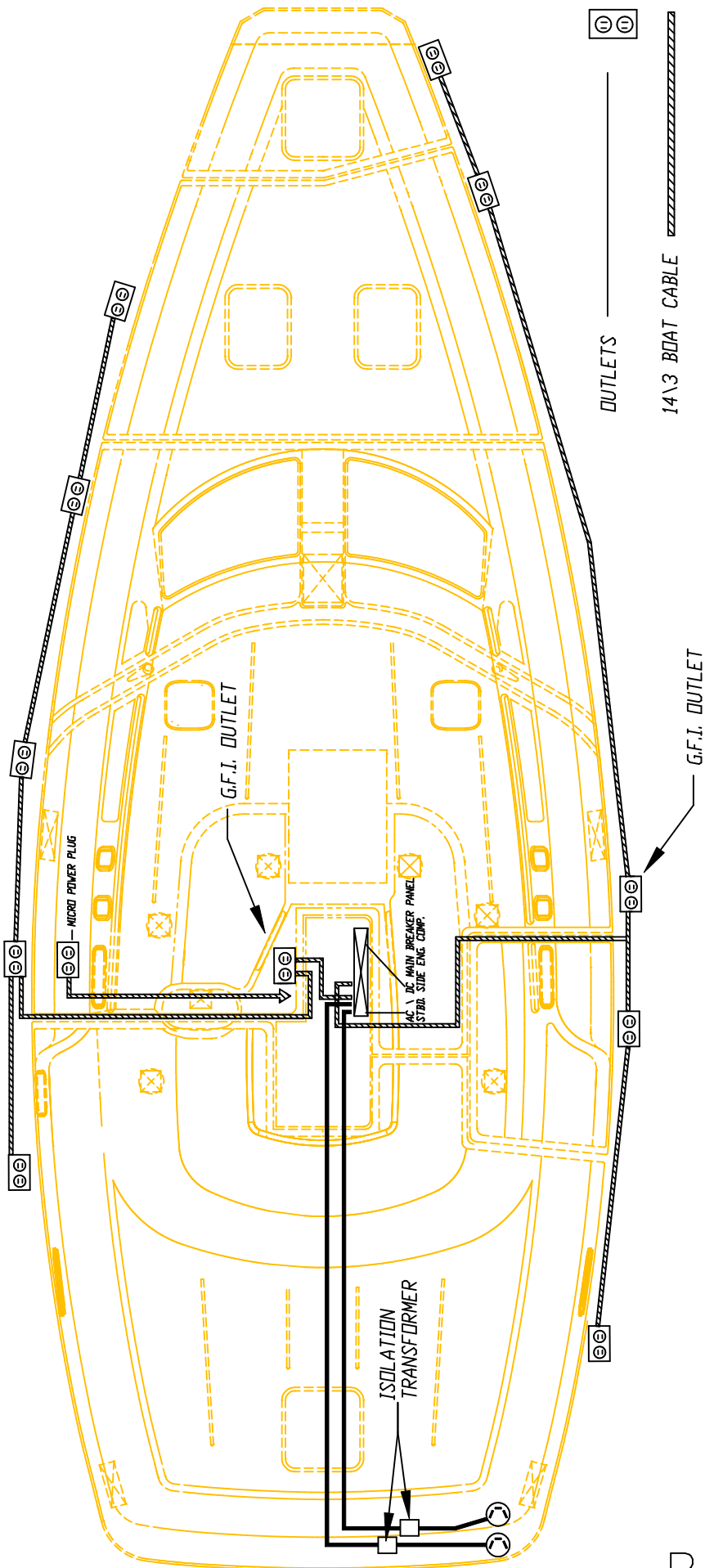


POWER LEAD RUNS =====  
 (SEE PAGE 65B FOR SPECIFIC WIRE SIZES)

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ENGINEERING DEPT.	



- OUTLETS ———— (⊕⊕)
- 14\3 BOAT CABLE - - - - -
- SHORE POWER 10/3 BOAT CABLE ————
- SHORE POWER INLET ———— (⊕⊕⊕)

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SECTION 63D...OPTIONAL AIR COND. SYSTEMS

BASIC OPERATING INSTRUCTIONS:

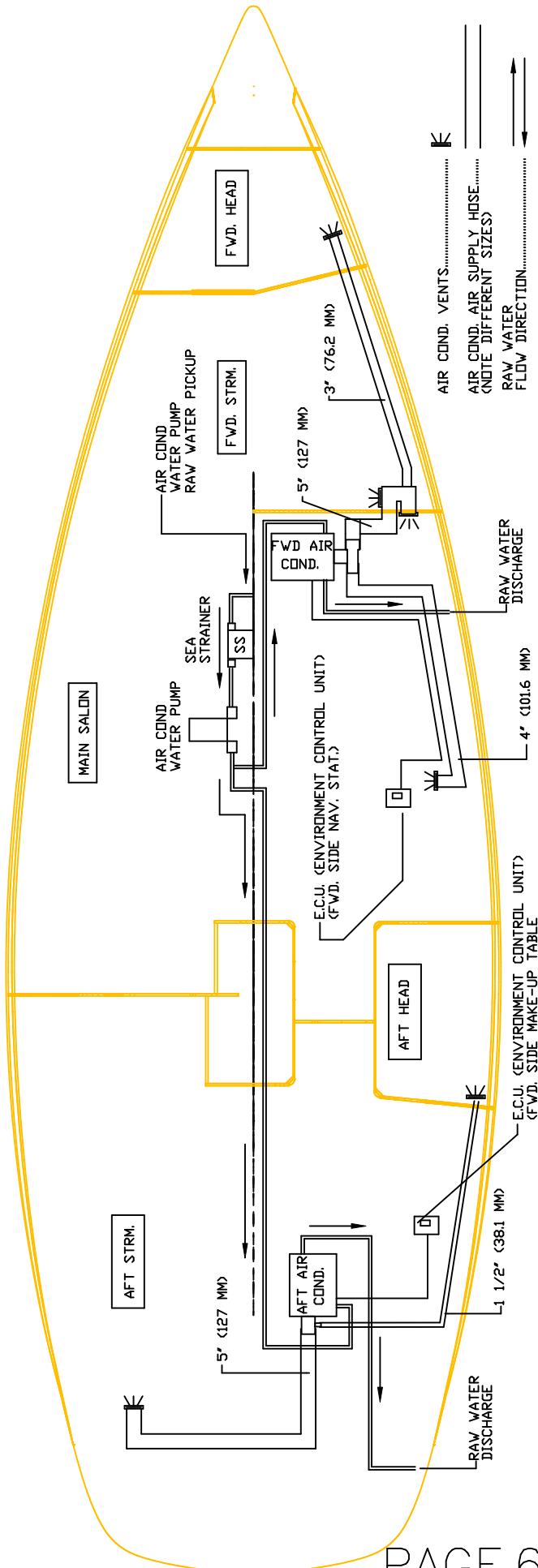
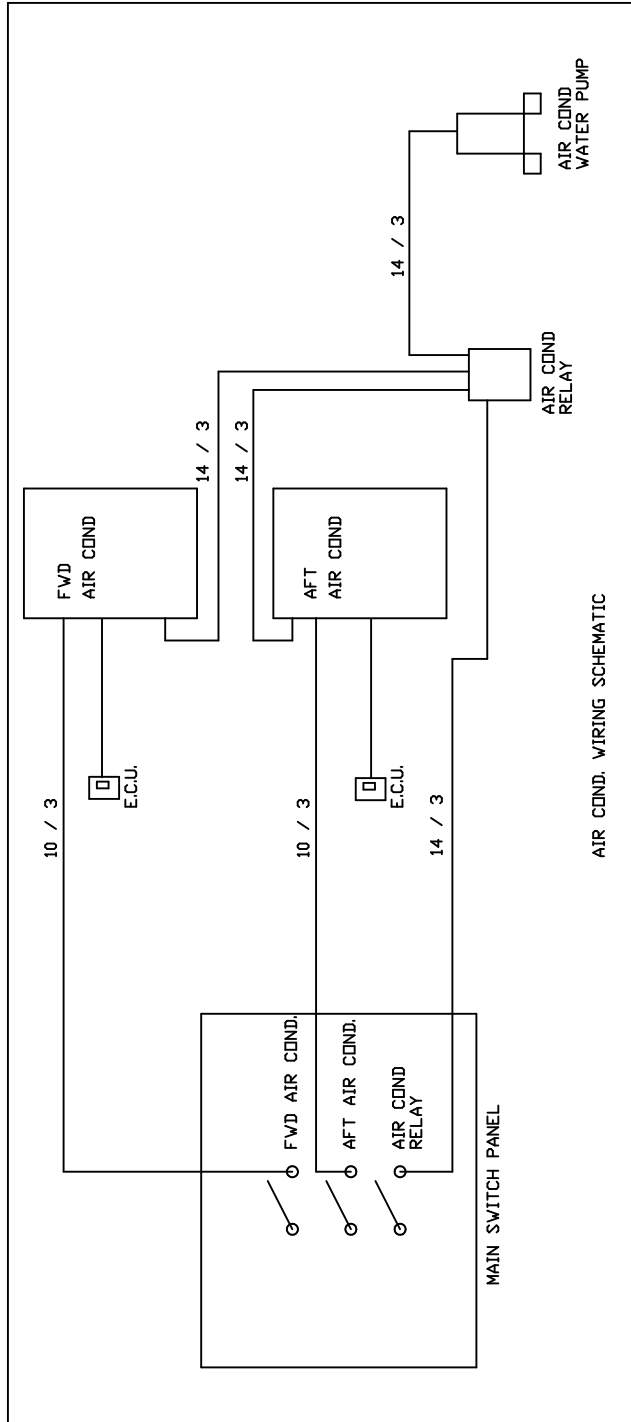
- ① CHOOSE POWER SOURCE (SHORE POWER OR GENERATOR) SEE PAGES 63A-2
- ② CHECK AIR COND. SEA STRAINER, (SEE PAGE 60 FOR LOCATION) CLEAN IF NECESSARY
- ③ OPEN RAW WATER PICKUP SEACOCK (SEE PAGE 60 FOR LOCATION)
- ④ ENSURE THE DISCHARGE SEACOCK IS OPEN (SEE PAGE 60 FOR LOCATION)
- ⑤ TURN ON A.C. MAIN (BUS "B") BREAKER ON MAIN A.C. PANEL
- ⑥ TURN ON RELAY BREAKER UNDER AIR COND. BREAKERS
- ⑦ TURN ON DESIRED AIR COND. BREAKER/S
- ⑧ TURN ON UNIT/S AT THERMOSTAT DISPLAY PANEL AND SET TEMP.

NOTE:

IF ANY OTHER APPLIANCES ARE TO BE USED WHEN AIR CONDITIONERS ARE RUNNING WHEN ON SHORE POWER, BOTH "SHORE POWER A" AND "SHORE POWER B" CABLES MUST BE CONNECTED.

IF THERE IS NO POWER AT PANEL WHEN CONNECTED TO SHORE POWER, SEE TROUBLESHOOTING GUIDE PAGE 63A-12

SEE MARINE AIR MANUAL FOR DETAILED OPERATING PROGRAMMING/TROUBLESHOOTING INSTRUCTIONS

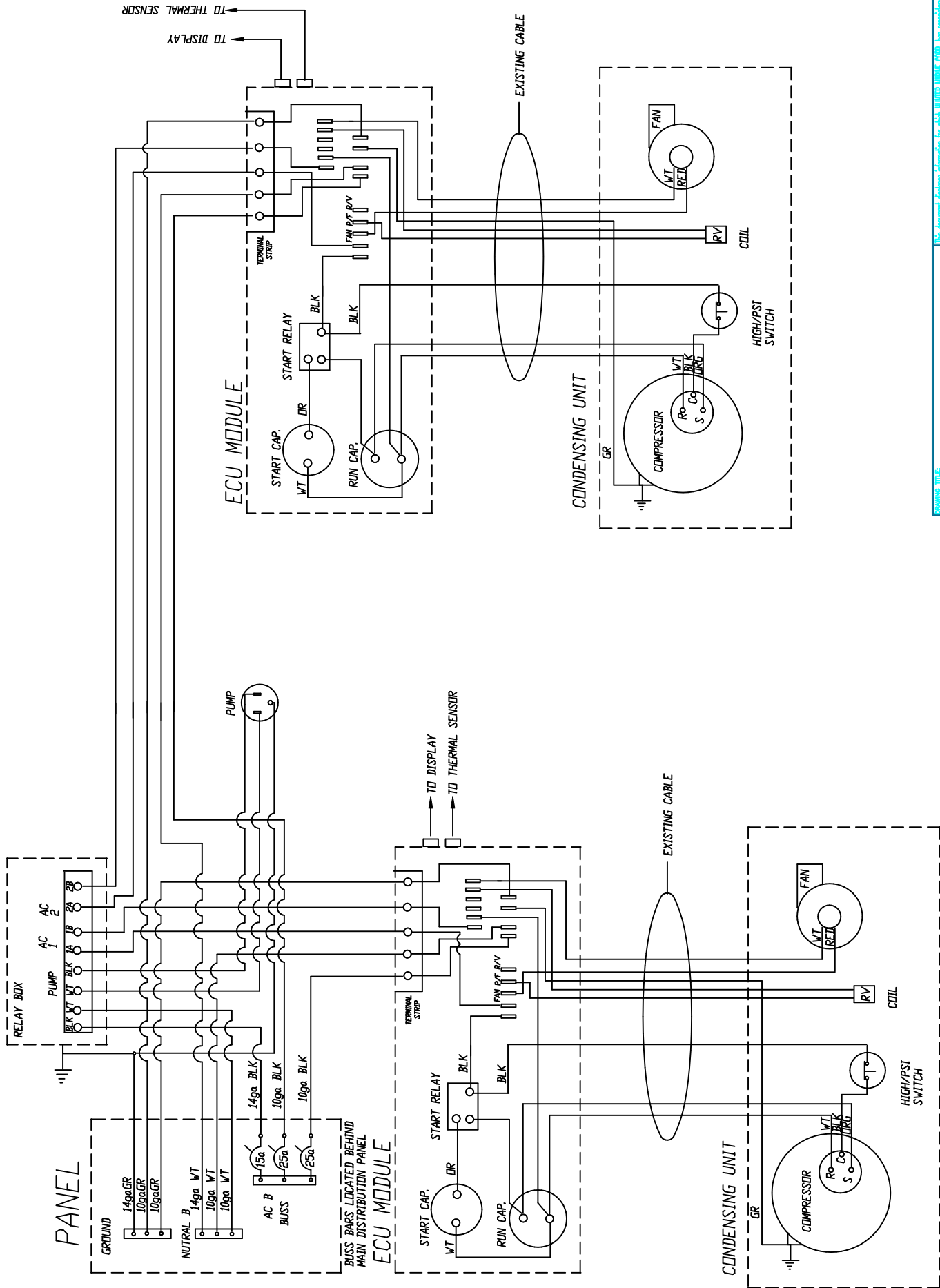


AIR COND. VENTS.....  
 AIR COND. AIR SUPPLY HOSE.....  
 (NOTE DIFFERENT SIZES)  
 RAW WATER FLOW DIRECTION.....

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<b>P456 AIR COND. SYSTEM LAYOUT</b>	
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SECTION 63E...REFRIGERATION SYSTEM

BASIC OPERATING INSTRUCTIONS:

- ① TURN ON REFRIGERATOR AND FREEZER BREAKERS.
- ② SET THERMOSTATS TO DESIRED TEMP.

THE AC MAIN MAY BE TURNED ON ALONG WITH THE CHARGE BUTTON ON THE INVERTER REMOTE TO MAINTAIN BATTERY VOLTAGE.

NOTE: IF LEAVING UNIT ON WHEN AWAY FROM BOAT (THIS IS NOT RECOMMENDED), BE SURE SHORE POWER CABLE "A" IS CONNECTED AND INVERTER REMOTE IS IN THE "OFF" POSITION OTHERWISE INVERTER WILL DRAIN BATTERIES.



FREEZER VD-171 EVAPORATOR

REFRIGERATOR VD-170 EVAPORATOR

REFRIGERATION UNIT

FREEZER UNIT

SEE REFRIGERATION MANUAL FOR ELECTRICAL SCHEMATIC.

OPTIONAL 8 KW GENERATOR SYSTEM...

BASIC OPERATING INSTRUCTIONS: (NOTE: READ GENERATOR MANUAL BEFORE OPERATING GEN.)


- ① CHECK DIESEL FUEL LEVEL
- ② CHECK OIL LEVEL IN GENERATOR (SEE GEN. MANUAL FOR INST.)
- ③ TURN ON START BATTERY SELECTOR SWITCH (ON ENG. ROOM BULK, AFT STRM.)
- ④ CHECK SEA STRAINER (UNDER SOLE AFT OF AFT STRM. DOOR)
- ⑤ OPEN RAW WATER SEACOCK (LOCATED W/STRAINER)
- ⑥ START GENERATOR USING START PROCEDURE IN "GENERATOR MANUAL" !!!
- ⑦ TURN ON "GENERATOR" BRKR. ON "A" SIDE OF A.C. PANEL TO POWER "A" SIDE AND (IF DESIRED) TO POWER "B" SIDE OF PANEL, RAISE SLIDE BAR ON "B" SIDE OF A.C. PANEL AND TURN "PARALLEL" BREAKER TO THE "ON" POSITION
- ⑧ TURN ON DESIRED APPLIANCE BREAKER (FOR EXAMPLE "OUTLETS")
- ⑨ TO SHUT GEN. DOWN PUSH STOP SWITCH UNTIL GEN STOPS.

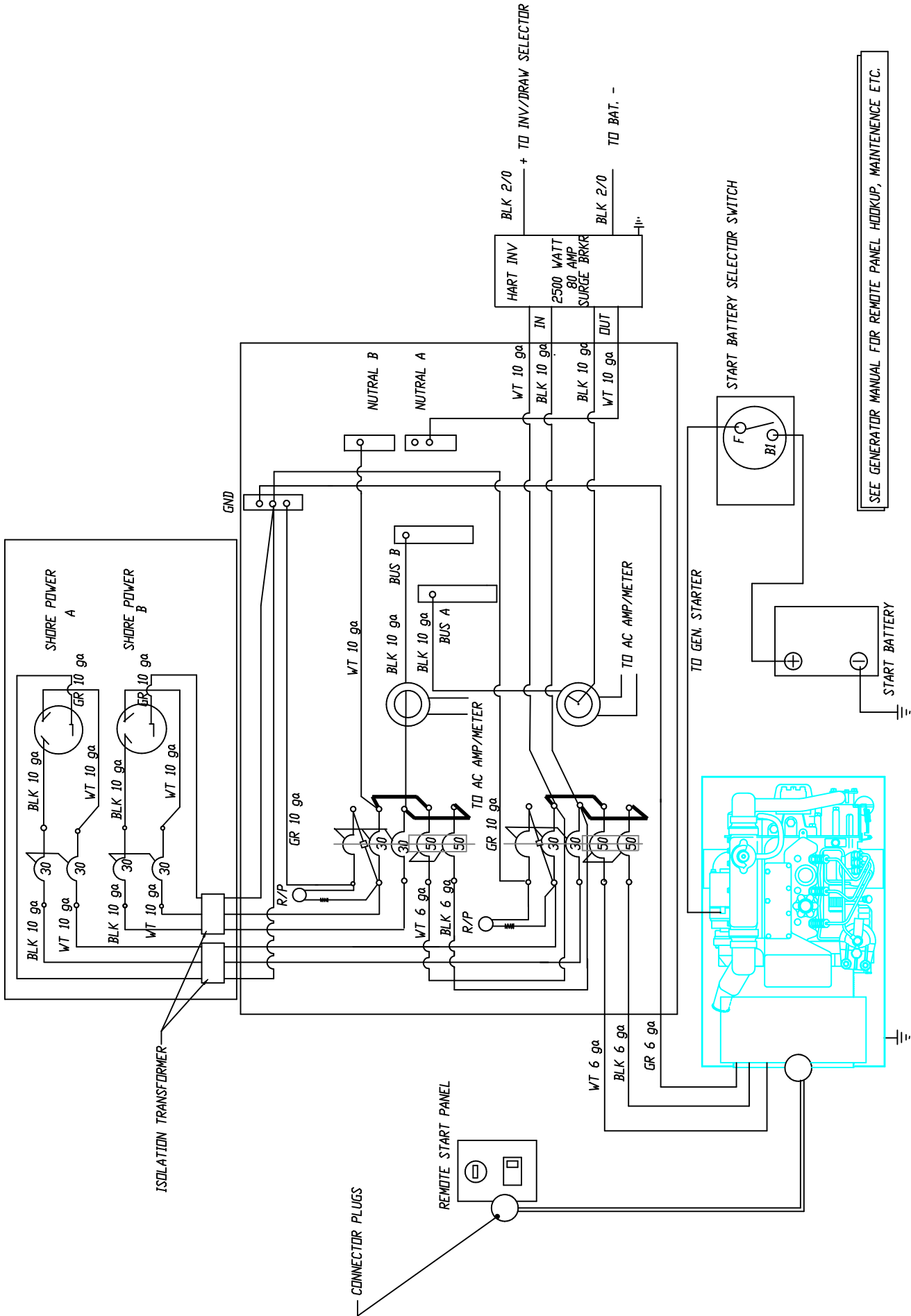
NOTE: SEE GENERATOR MANUAL FOR PROPER MAINTENANCE, TROUBLESHOOTING, ETC.

PROPERTY FILE  
**P456 OPT. GENERATOR OPER. INST.**

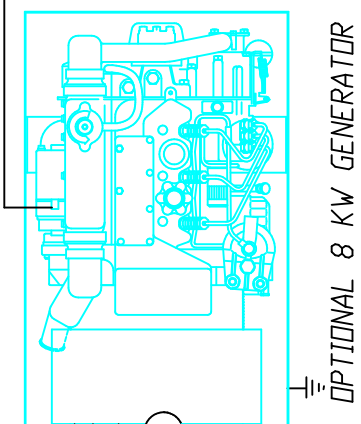
<small>ISSUANCE NO.</small> 4508063F-1	<small>REVISION NO.</small> NONE
<small>ISSUANCE DATE</small> ENGINEERING DEPT.	<small>DATE</small> 1/26/98

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SEE GENERATOR MANUAL FOR REMOTE PANEL HOOKUP, MAINTENANCE ETC.



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SECTION 63F.....INVERTER SYSTEM

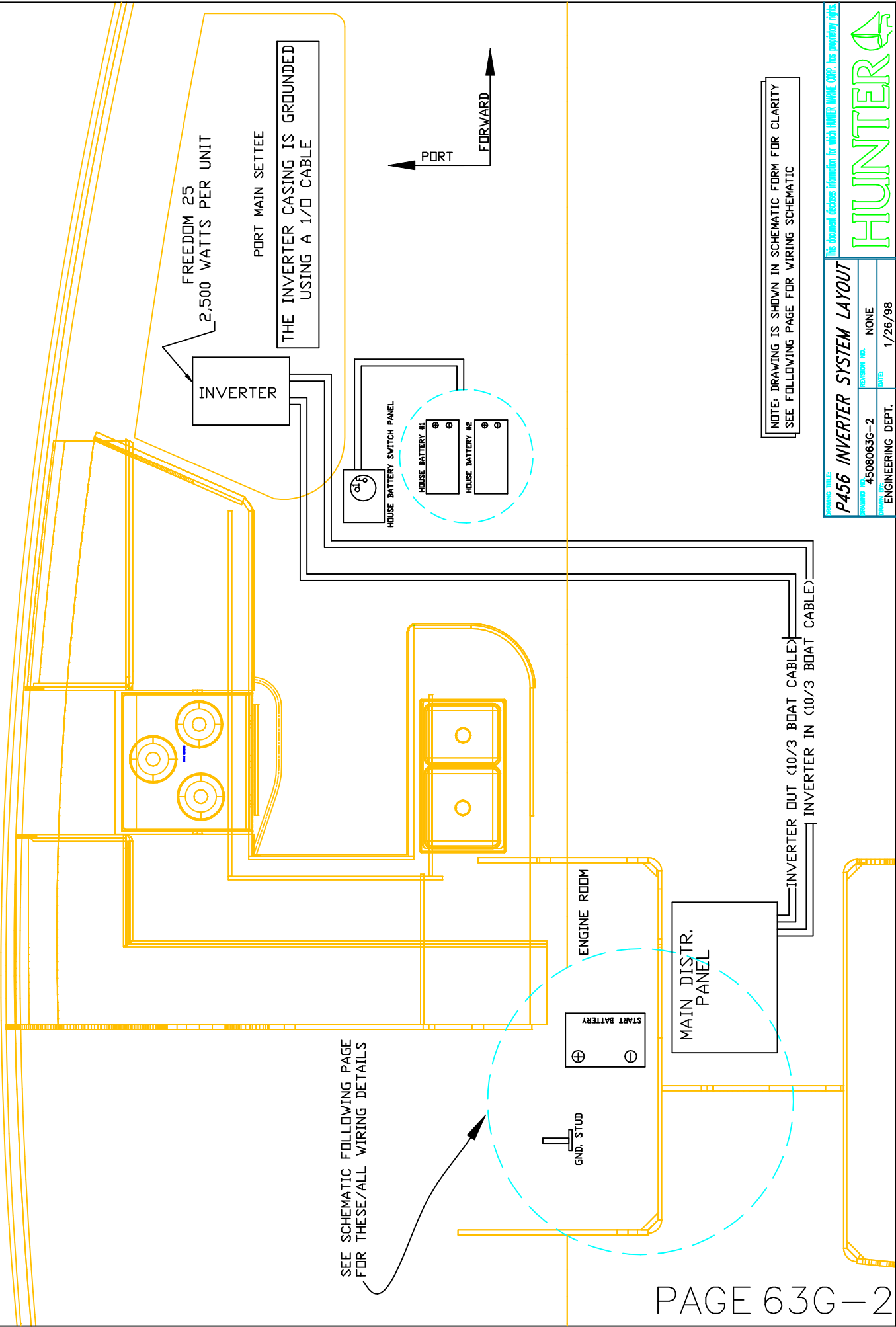
BASIC OPERATING INSTRUCTIONS: (FOR INVERTING D.C. POWER TO A.C. POWER)

- ① TURN THE HOUSE BATTERY SWITCH TO THE "ON" POSITION.
- ② TURN ON INVERTER REMOTE PANEL AT THE NAVIGATION STATION.
- ③ TURN ON APPROPRIATE APPLIANCE BREAKER ON A.C. SIDE OF PANEL.

NOTE:

READ "INVERTER" SECTION ON PAGE 63A-2 FOR INVERTER SYSTEM DETAILS

SEE INVERTER MANUAL FOR TECHNICAL DATA, TROUBLESHOOTING, ETC.  
OPERATING/PROGRAMMING INSTRUCTIONS



NOTE: DRAWING IS SHOWN IN SCHEMATIC FORM FOR CLARITY  
SEE FOLLOWING PAGE FOR WIRING SCHEMATIC

SEE SCHEMATIC FOLLOWING PAGE  
FOR THESE/ALL WIRING DETAILS

FREEDOM 25  
2,500 WATTS PER UNIT

PORT MAIN SETTEE

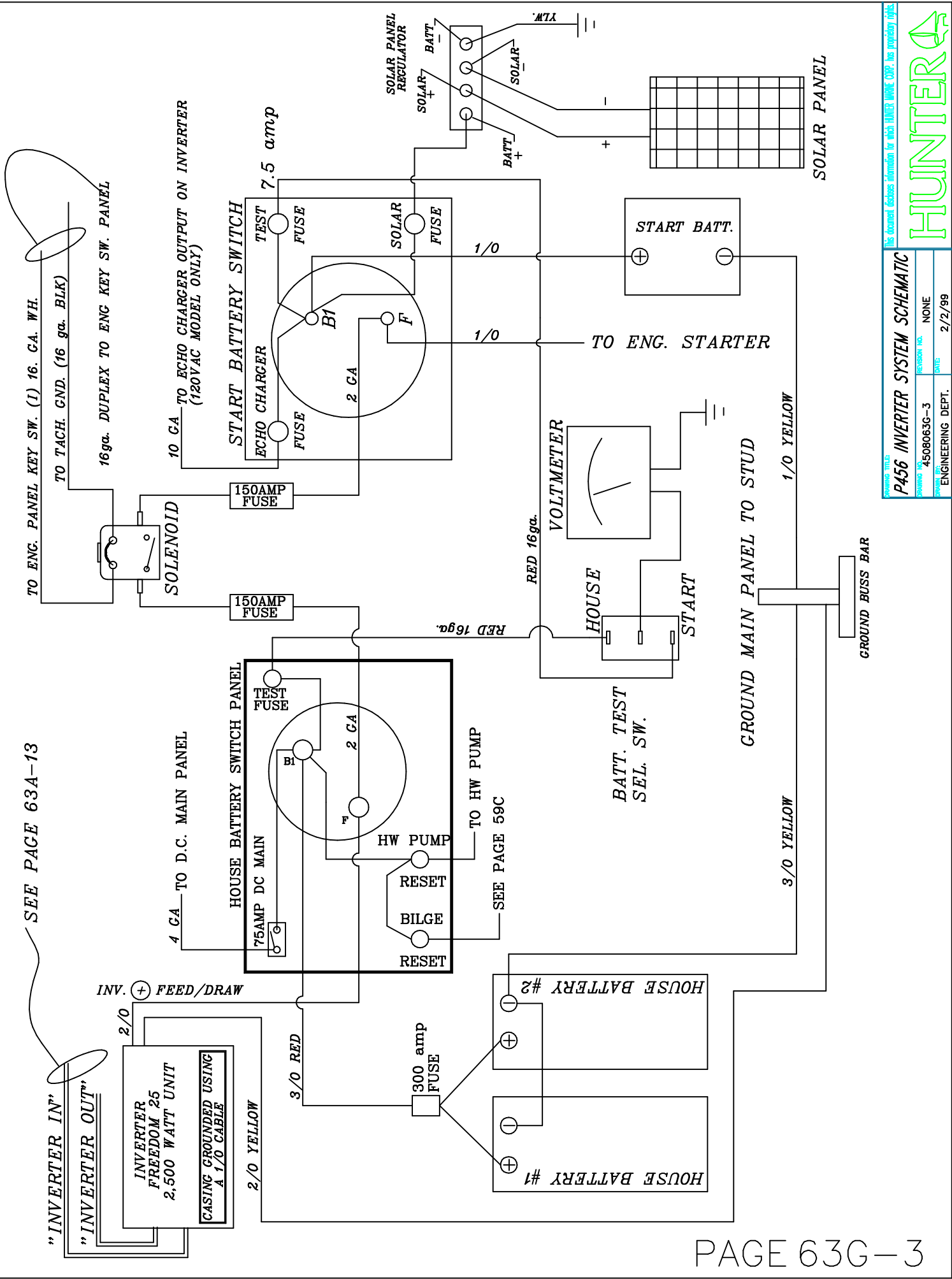
THE INVERTER CASING IS GROUNDED  
USING A 1/0 CABLE

PORT FORWARD

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**P456 INVERTER SYSTEM LAYOUT**  
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SEE PAGE 63A-13



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**P456 INVERTER SYSTEM SCHEMATIC**  
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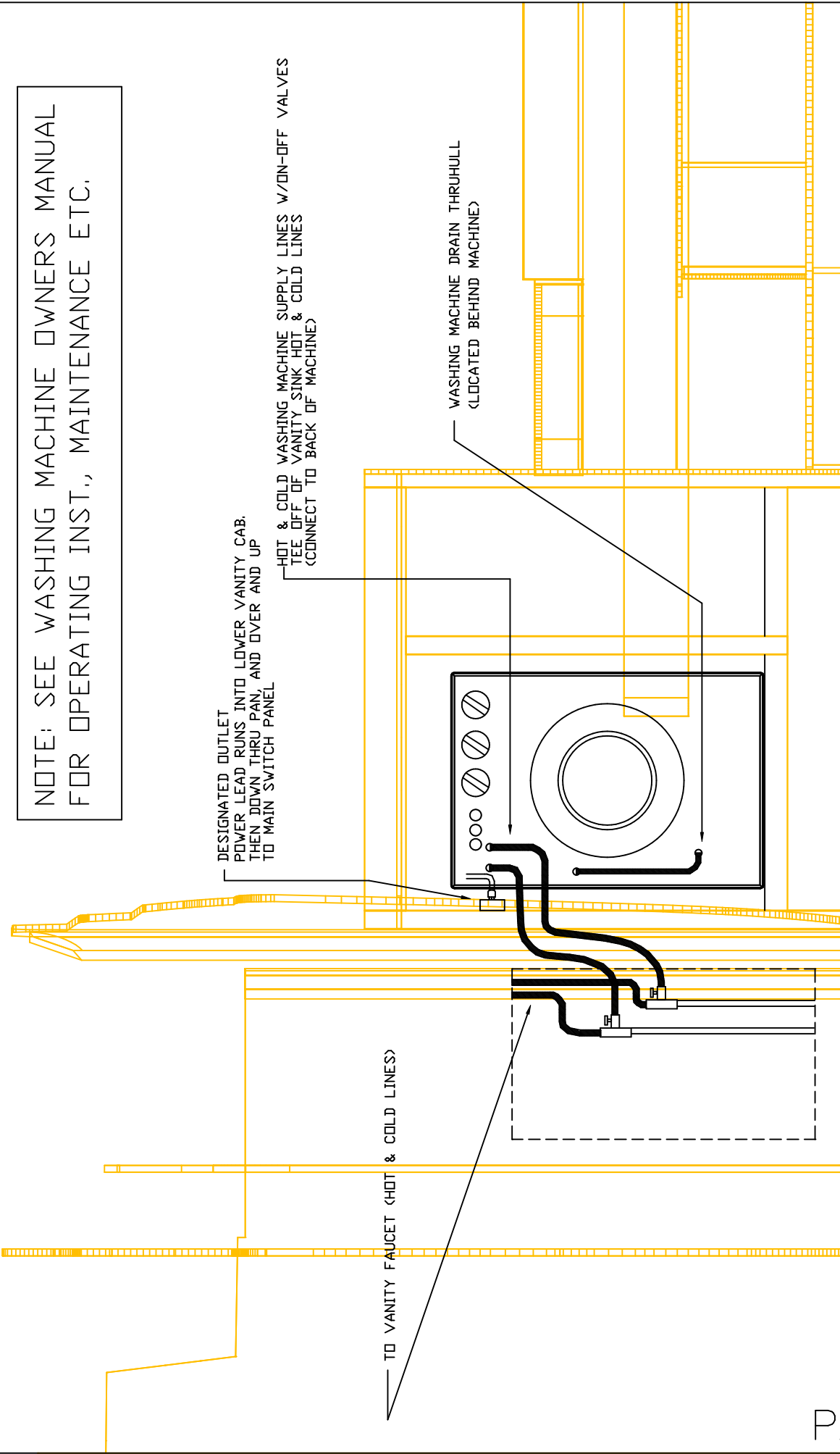
NOTE: SEE WASHING MACHINE OWNERS MANUAL FOR OPERATING INST., MAINTENANCE ETC.

DESIGNATED OUTLET POWER LEAD RUNS INTO LOWER VANITY CAB. THEN DOWN, THRU PAN, AND OVER AND UP TO MAIN SWITCH PANEL

HOT & COLD WASHING MACHINE SUPPLY LINES W/DN-OFF VALVES TEE OFF OF VANITY SINK HOT & COLD LINES (CONNECT TO BACK OF MACHINE)

WASHING MACHINE DRAIN THRUHULL (LOCATED BEHIND MACHINE)

TO VANITY FAUCET (HOT & COLD LINES)



LOWER VANITY COMP. AFT STRM. STBD. HANGING LOCKER

VIEW: PORT LOOKING STBD.

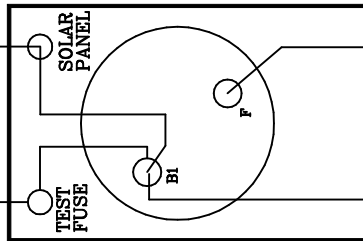
VIEW: PORT LOOKING STBD.

P456 OPT. WASHING MACHINE LAYOUT

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ENGINEERING DEPT.		DATE	1/26/98

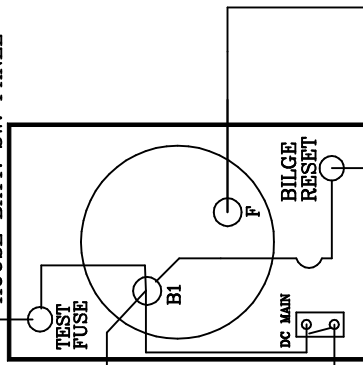


FROM SOLAR PANEL POS.



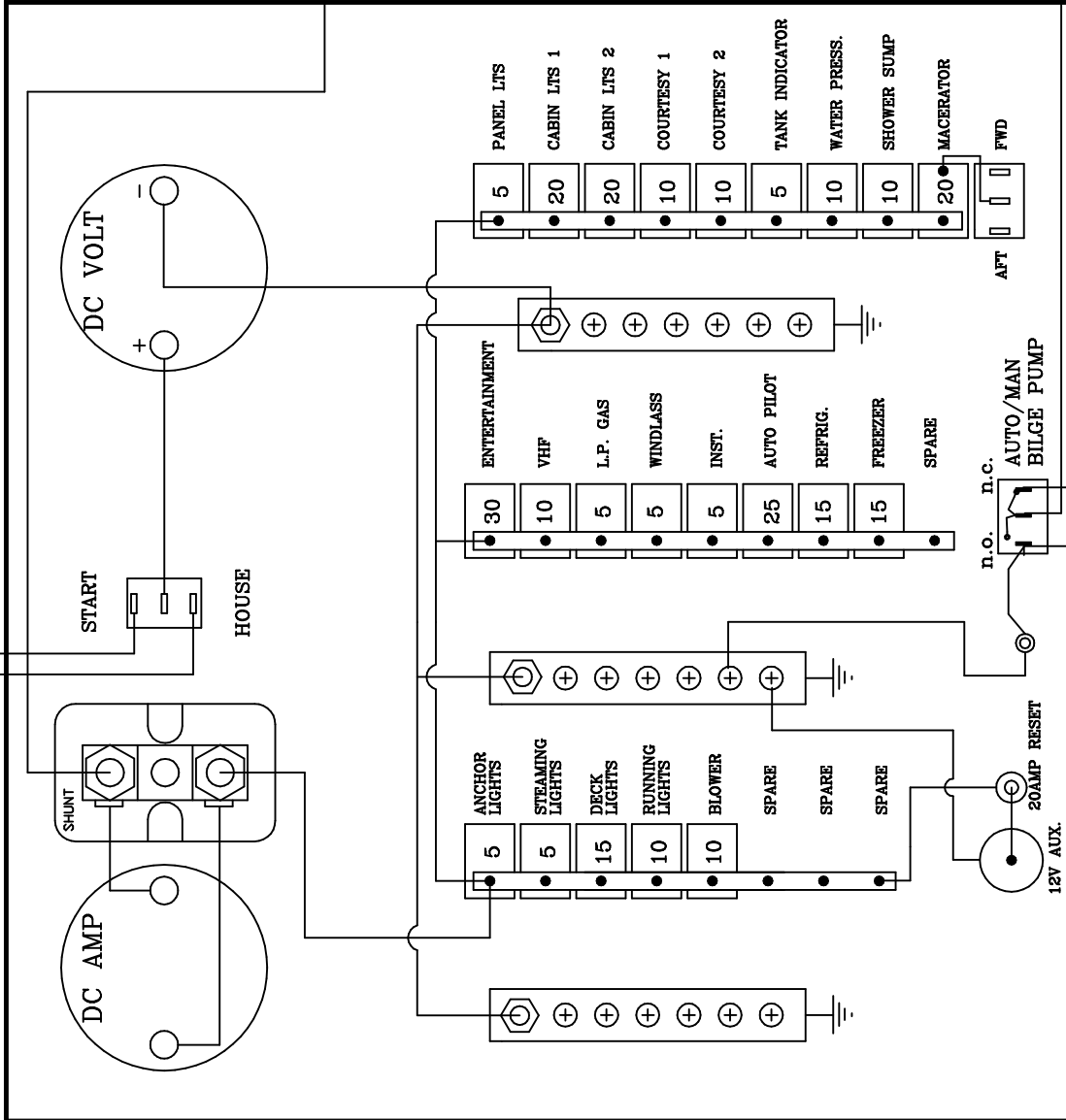
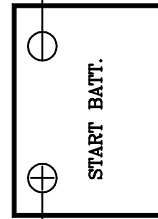
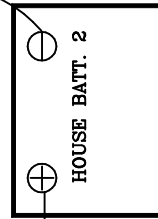
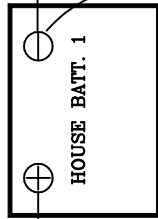
START BATT. SW. PANEL

HOUSE BATT. SW. PANEL



INV. CHARGE/DRAW FROM INVERTER

300 AMP INLINE FUSE



VIEW FROM BACK OF PANEL

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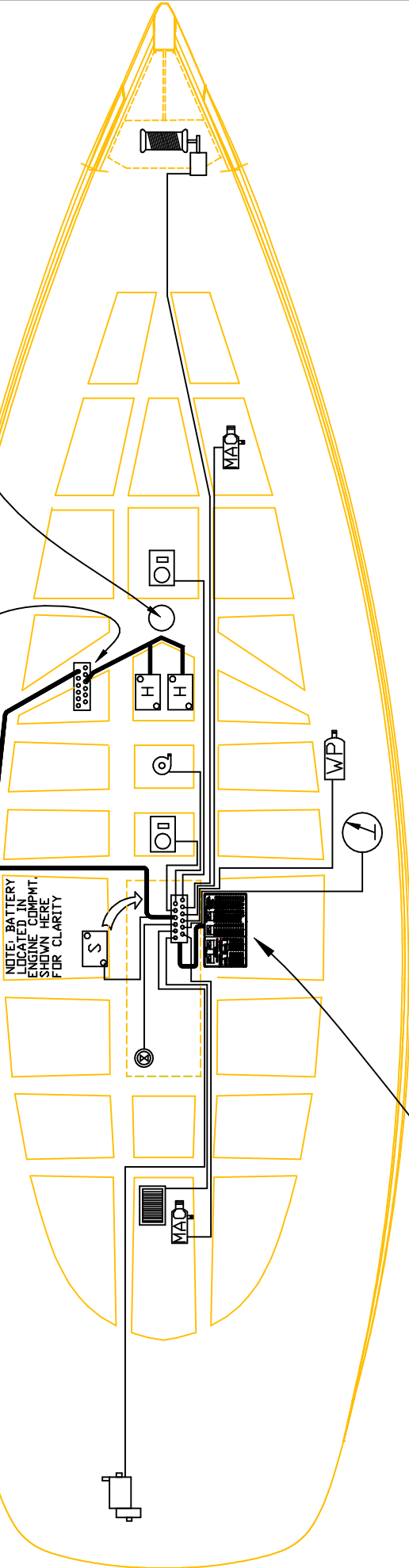
P456 12V.D.C. PANEL SCHEMATIC	
ISSUANCE NO.	4508064A
REVISION NO.	NONE
DATE	2/3/99
ENGINEERING DEPT	



MAST COMPRESSION POST  
GROUNDS TO KEEL STUD

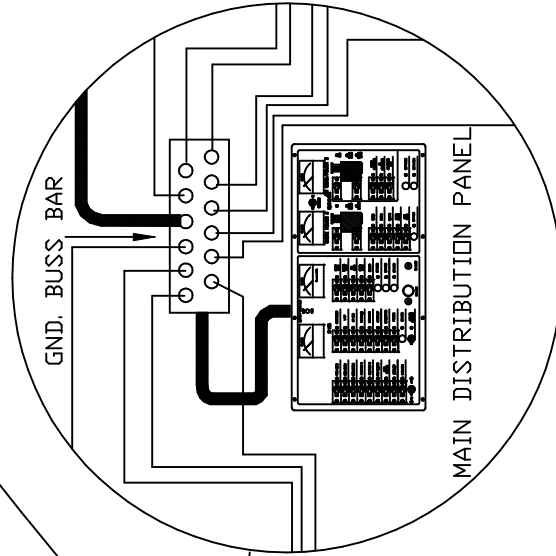
INVERTER  
GND. BUSS BAR

NOTE: BATTERY  
LOCATED IN  
ENGINE COMPMT.  
SHOWN HERE  
FOR CLARITY



**LEGEND:**

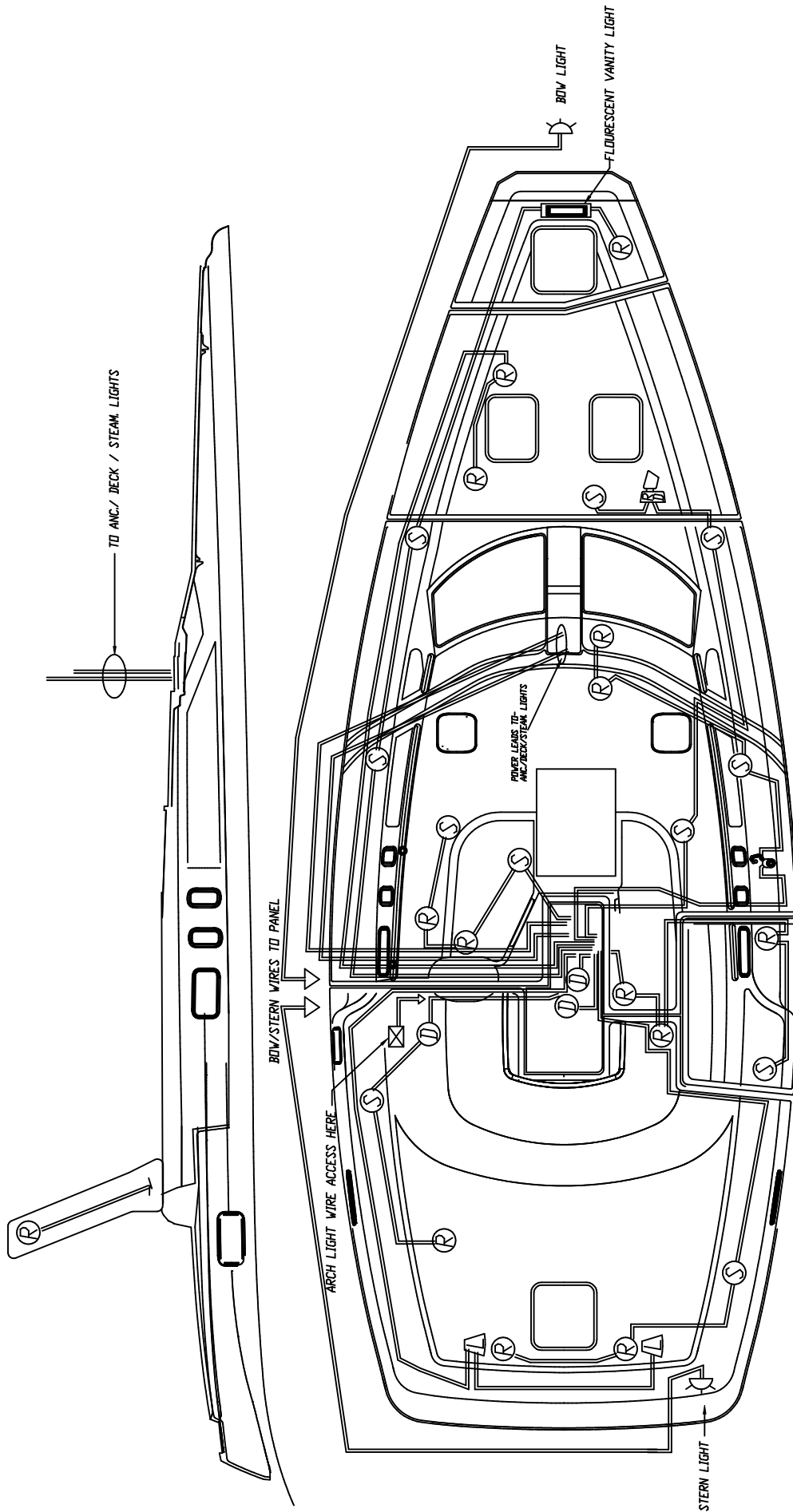
- SUMP PUMPS.....
- BILGE PUMP .....
- FRESH WATER PUMP.....
- MACERATOR.....
- WINDLASS.....
- ENGINE ROOM BLOWER.....
- TANK LEVEL INDICATOR.....
- OPT. AUTOPILOT COURSE COMPUTER...
- OPT. AUTOPILOT DRIVE MOTOR.....
- START BATTERY .....
- HOUSE BATTERY.....



OWNER FILE  
**P456 GROUNDING SYSTEM LAYOUT**  
ISSUANCE NO. 4508064B REVISION NO. NONE DATE 1/26/98  
ENGINEERING DEPT. ENGINEERING

**HUNTERA**

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LEGEND

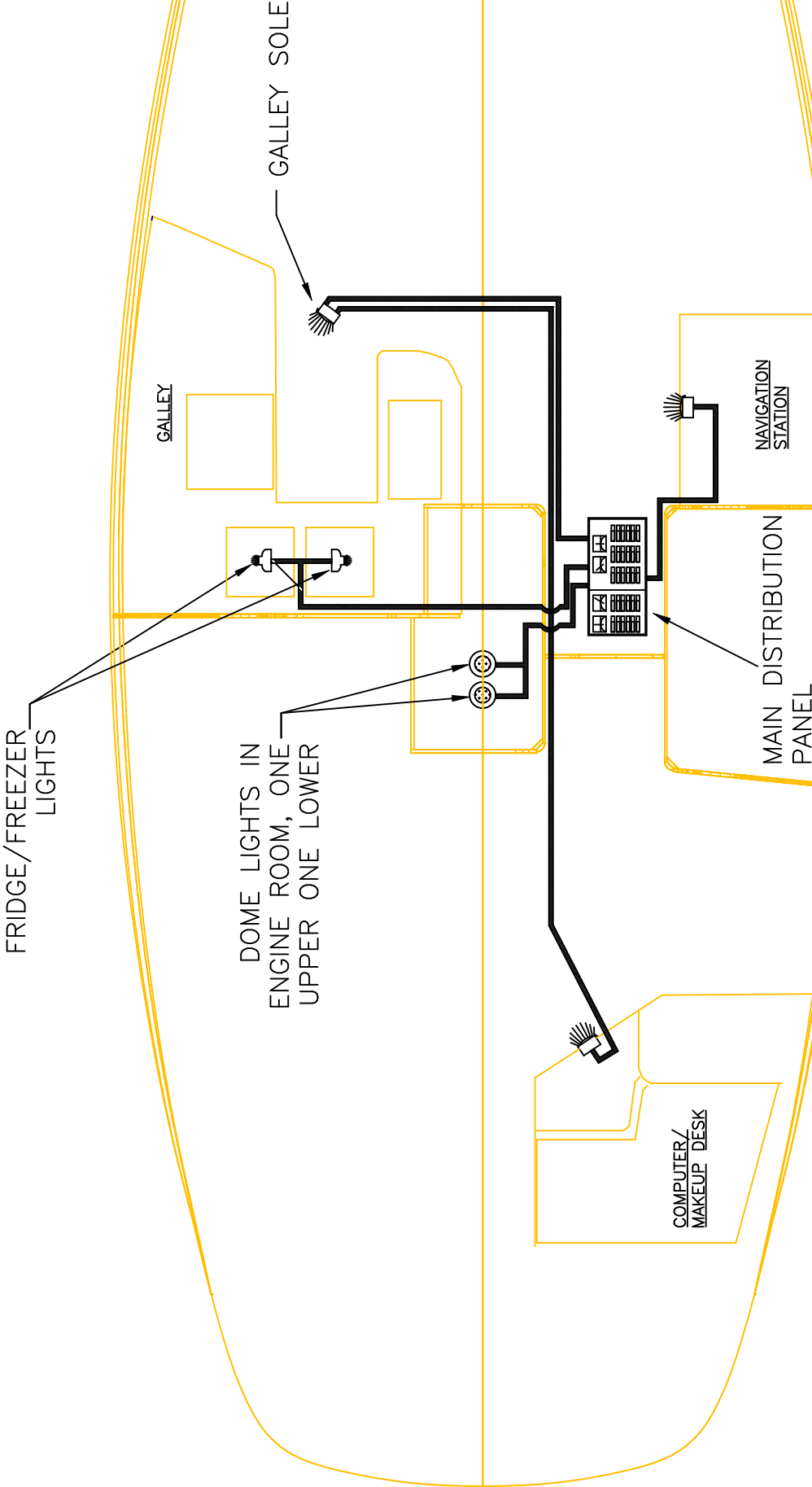
DOME LIGHT	3 REQ'D	①	READING	2 REQ'D	
SWIVEL (HALOGEN)	10 REQ'D	Ⓢ	LAMPS	2 REQ'D	
RECESSED	14 REQ'D	Ⓡ	CHART LAMP	1 REQ'D	
WIRE RUNS					

NOTE: LIGHT ARRANGEMENT IN AFT CABIN DIFFERENT FOR TRI CABIN VERSION  
 1. BOTH LAMPS TO PORT SIDE  
 2. ADDED RECESSED LIGHT TO ST. FWD SIDE  
 3. DOME LIGHT AT FOOT OF BERTH PORT SIDE

P456 12V.D.C. LIGHT WIRING (HEADLINER)

DESIGN NO.	4508064C-1	REVISED NO.	NONE
DATE	1/28/98	ENGINEERING DEPT.	





KEY:	PART	PART #
	CTS LIGHTS (RED)	255752
	FRIDGE/FREEZER LIGHTS	255410
	ENGINE ROOM DOME LIGHTS	255500



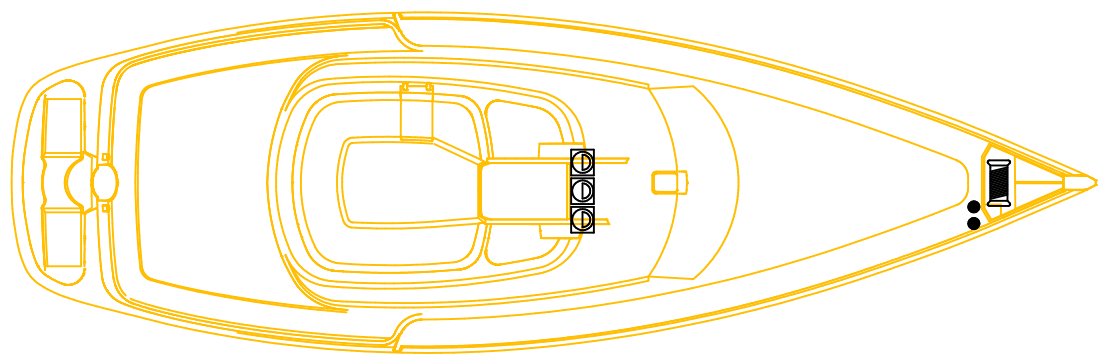
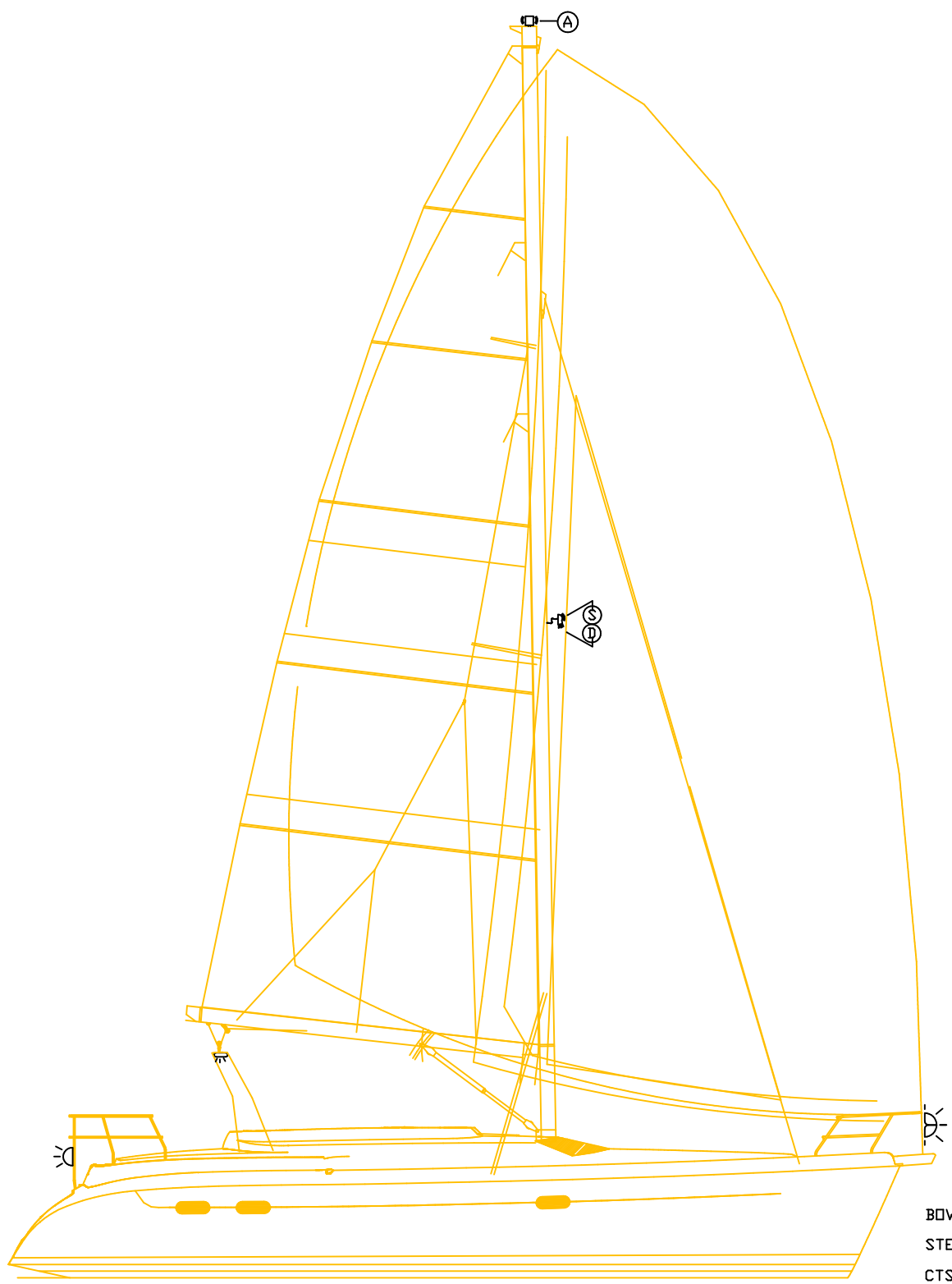
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This document declares information for which HUNTER MARINE CORP. has proprietary rights.



**P456 12 VOLT D.C. DECK LAYOUT**

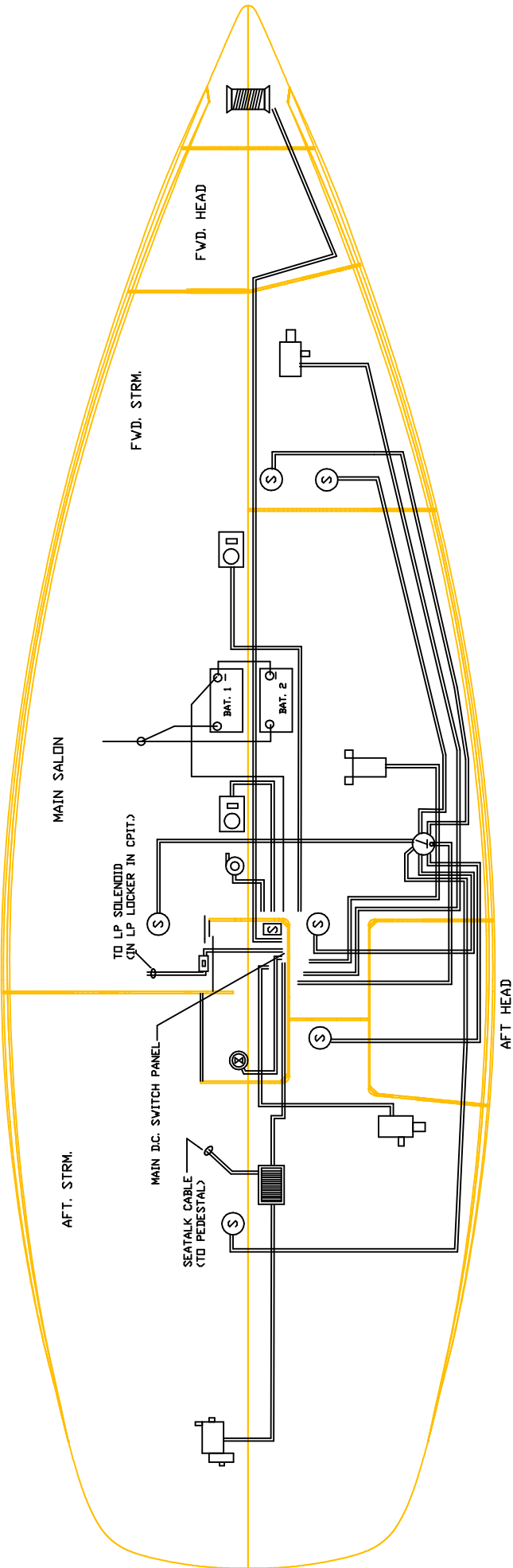
REVISED NO.	4508064D	REVISION NO.	NONE
DATE	1/27/98	ENGINEERING DEPT.	



**LEGEND:**

- BOW LIGHTS.....
- STERN LIGHTS.....
- CTS. LITE.....
- ANCHOR LITE.....
- DECK LITE.....
- STEAMING LITE.....
- WINDLASS.....
- WINDLASS CONTROLS.....
- INSTRUMENTS.....

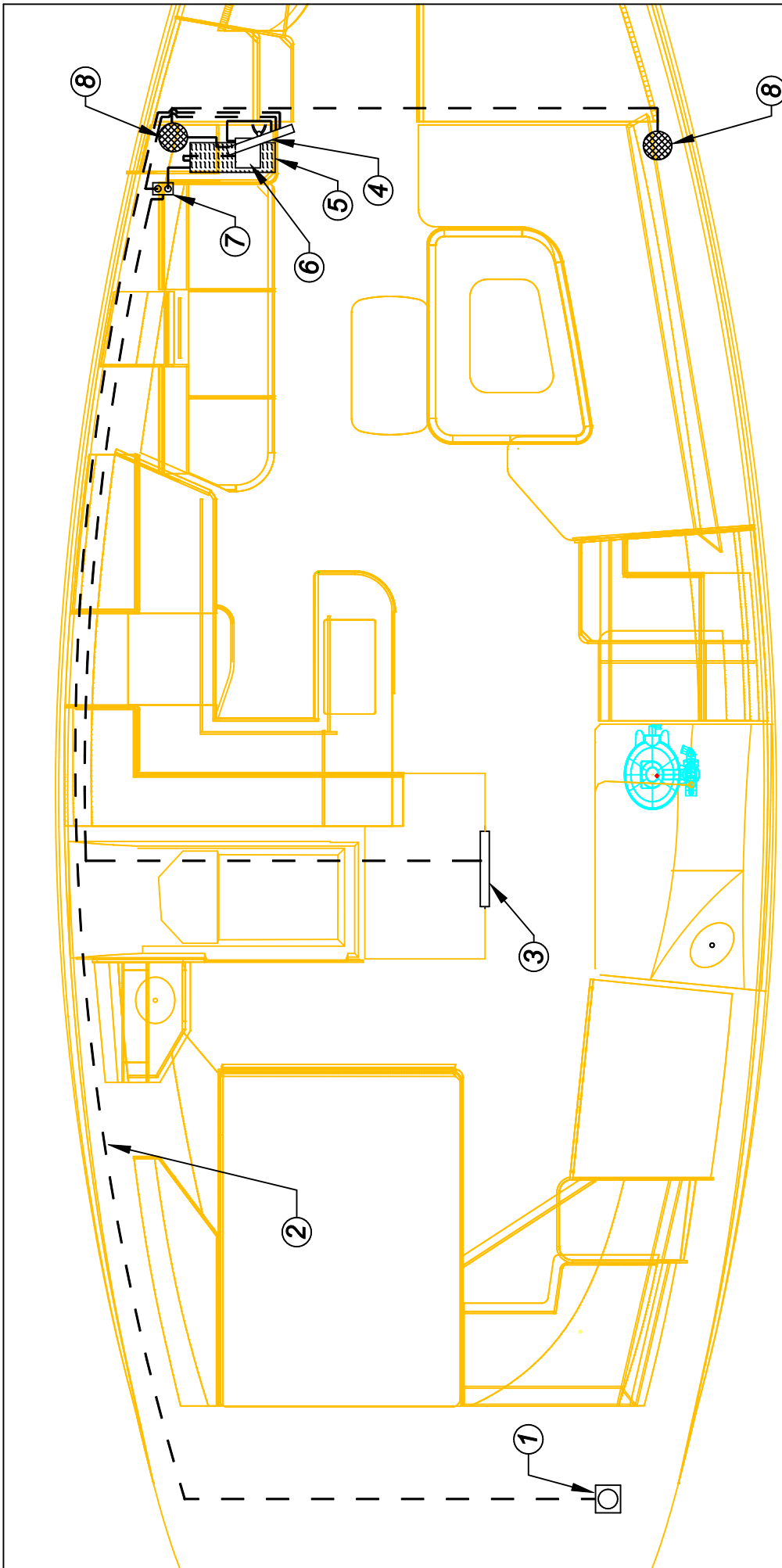
- ☼
- ☼
- ☼
- Ⓐ
- Ⓢ
- ☼
- ☼
- ☼
- ☼



LEGEND

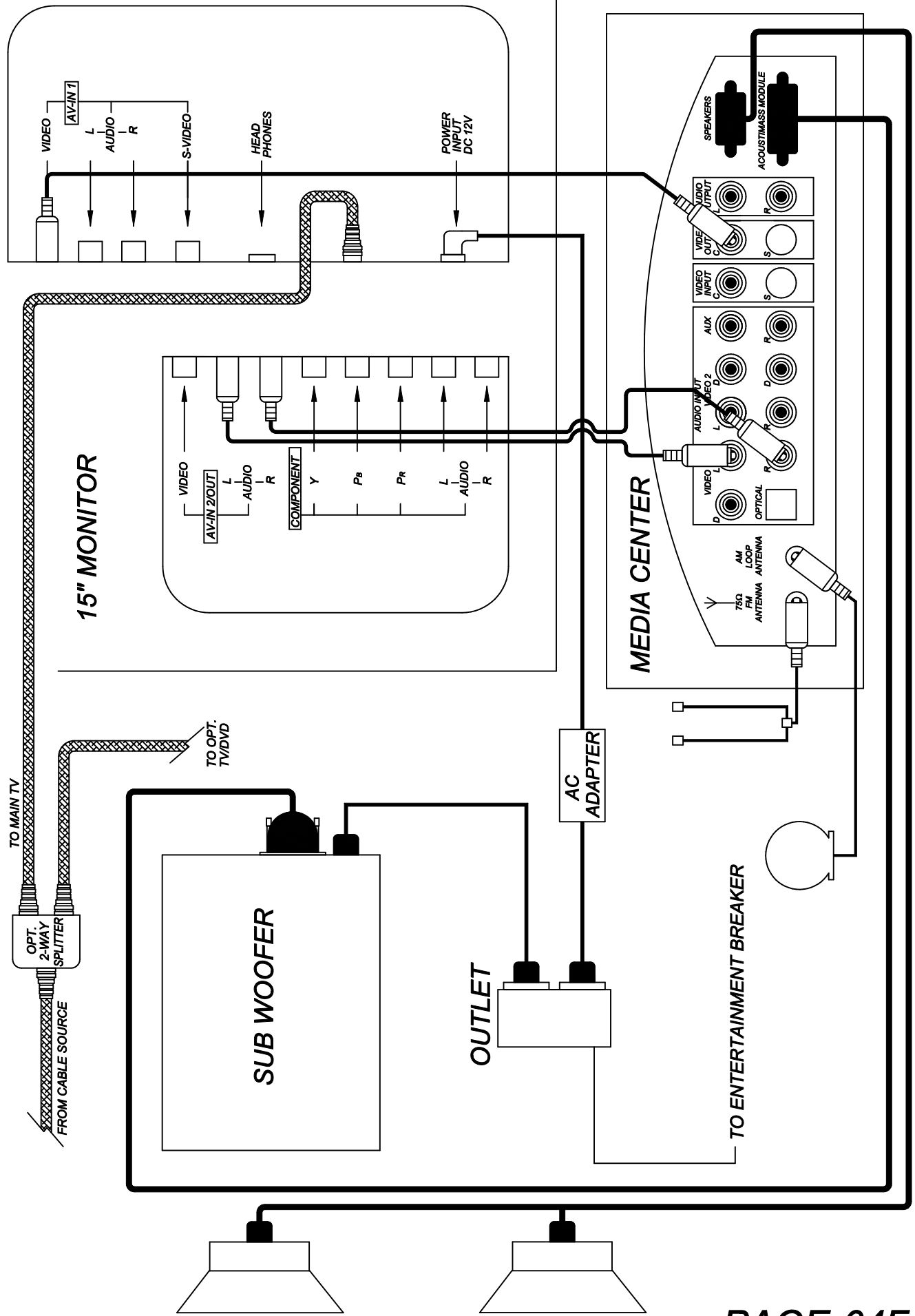
- WIRE RUNS \_\_\_\_\_
- TANK GAUGES \_\_\_\_\_ (L)
- TANK SENDING UNITS \_\_\_\_\_ (S)
- LPG ON/OFF SWITCH \_\_\_\_\_
- ENGINE RM. BLOWER \_\_\_\_\_ (B)
- WINDLASS \_\_\_\_\_
- AUTOPILLOT SYSTEM (OPTIONAL) \_\_\_\_\_
- AUTOPILLOT MOTOR \_\_\_\_\_
- COURSE COMPUTER \_\_\_\_\_
- (SEE AUTOPILLOT MANUAL FOR DETAILS)

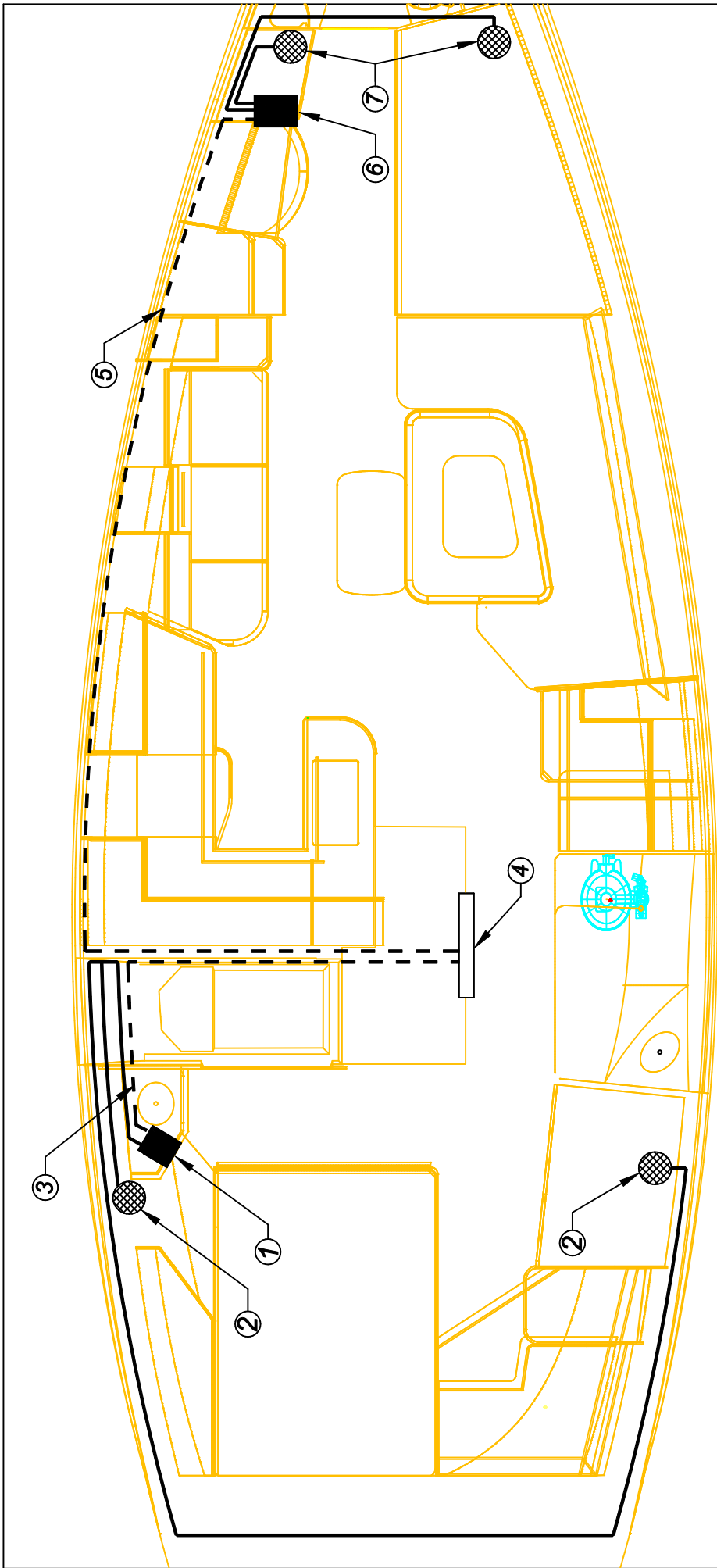
- BILGE PUMP \_\_\_\_\_
- SUMP PUMPS \_\_\_\_\_
- WATER PUMP \_\_\_\_\_
- MACERATORS \_\_\_\_\_
- HOUSE BATTERIES \_\_\_\_\_ (BAT. 1 < 2 >)
- START BATTERY \_\_\_\_\_ (S)



- ① CABLE/PHONE INLET
- ② CABLE LEAD
- ③ AC/DC MAIN PANEL
- ④ 15" FLAT SCREEN MONITOR
- ⑤ SUB-WOOFER
- ⑥ BOSE 3-2-1
- ⑦ POWER OUTLET
- ⑧ STEREO SPEAKERS



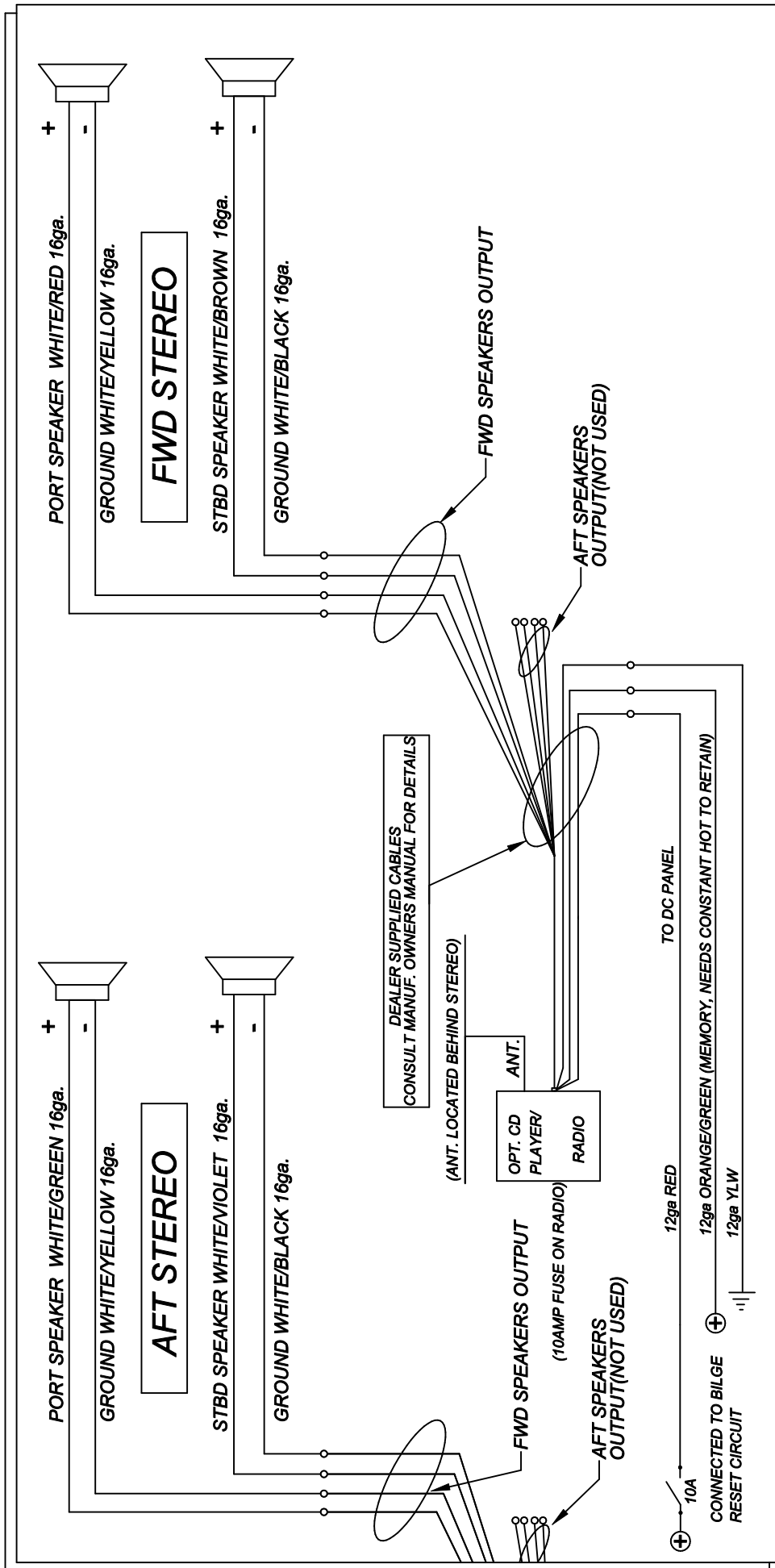




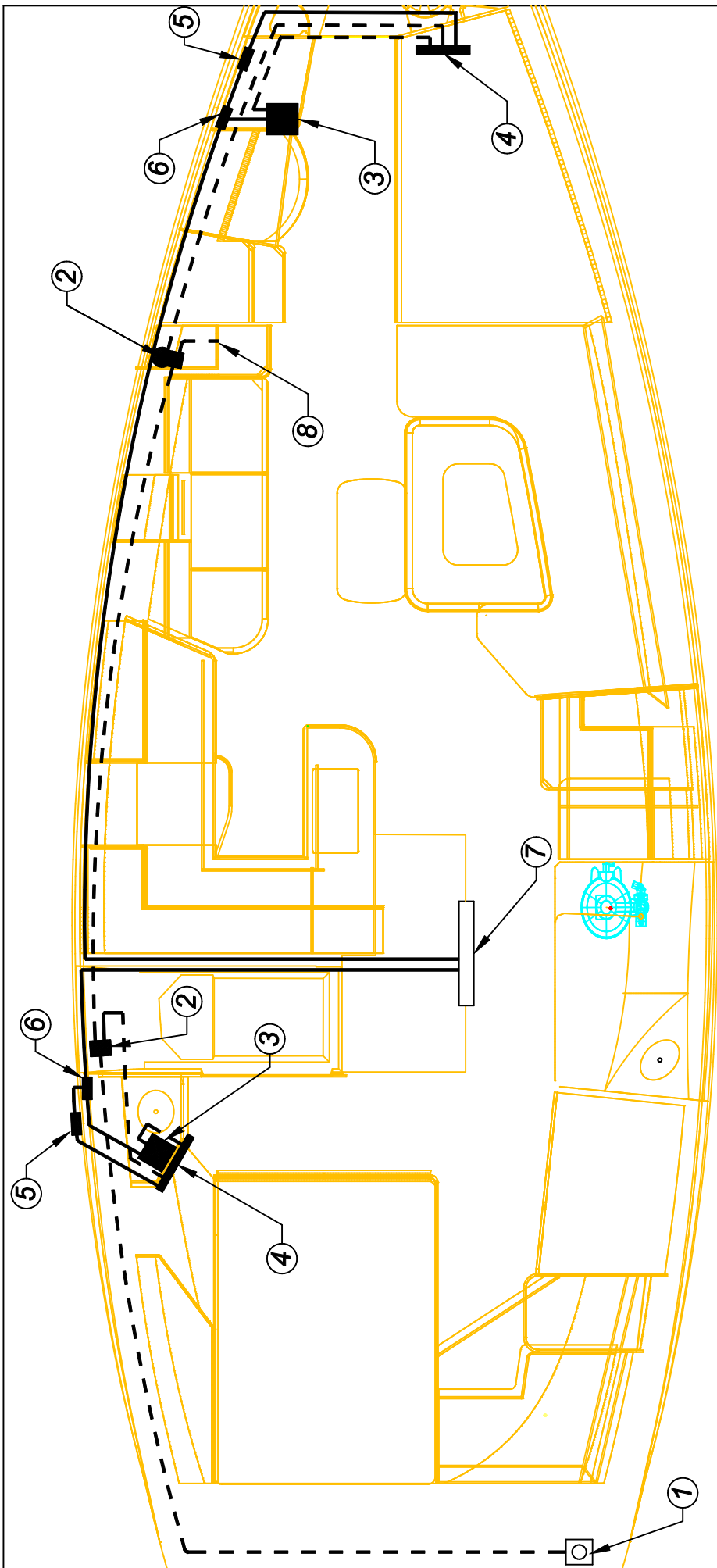
- ① AFT STEREO CD PLAYER
- ② AFT STEREO SPEAKERS (MOUNTED IN HEADLINER)
- ③ AFT STEREO POWER LEAD
- ④ AC/DC MAIN PANEL
- ⑤ FWD STEREO POWER LEAD
- ⑥ FWD STEREO CD PLAYER
- ⑦ FWD STEREO SPEAKERS (MOUNTED IN HEADLINER)







**NOTE:**  
THE FWD AND THE AFT STEREO ARE WIRED THE SAME. THE ONLY DIFFERENCE IS THE COLOR OF THE POSITIVE SPEAKER LEAD.



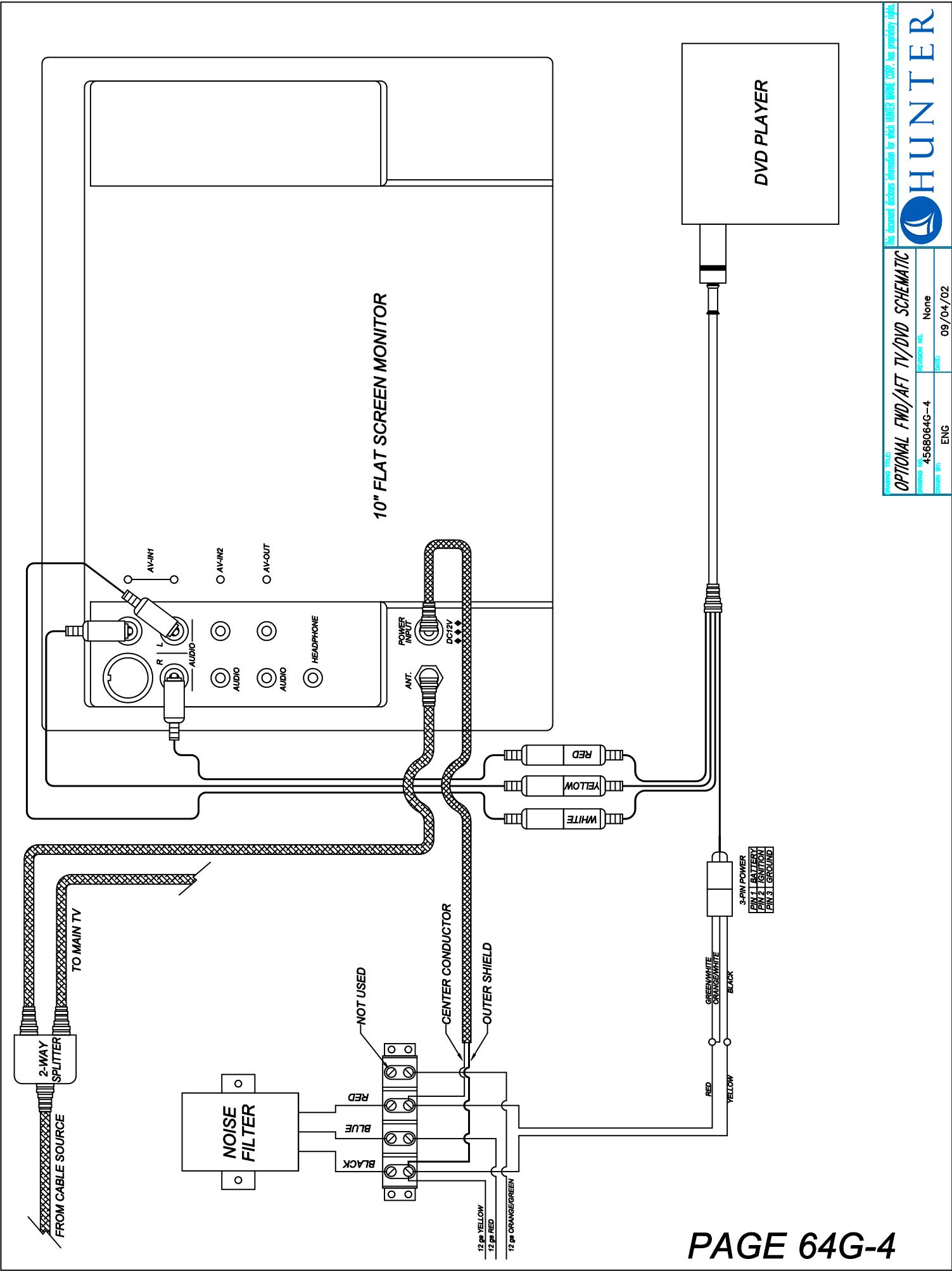
- |                           |                          |
|---------------------------|--------------------------|
| ① CABLE/PHONE INLET       | ⑤ NOISE REDUCTION FILTER |
| ② CABLE SPLITTER          | ⑥ TERMINAL STRIP         |
| ③ DVD PLAYER              | ⑦ AC/DC MAIN PANEL       |
| ④ 10" FLAT SCREEN MONITOR | ⑧ TO MAIN TV             |

--- CABLE LEADS  
 — POWER LEADS

POWER FILE  
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<b>OPTIONAL FWD/AFT TV/DVD LAYOUT</b>	
DRAWING NO.	4568064G-3
REVISION NO.	None
DATE	09/10/02
DESIGNER	ENG

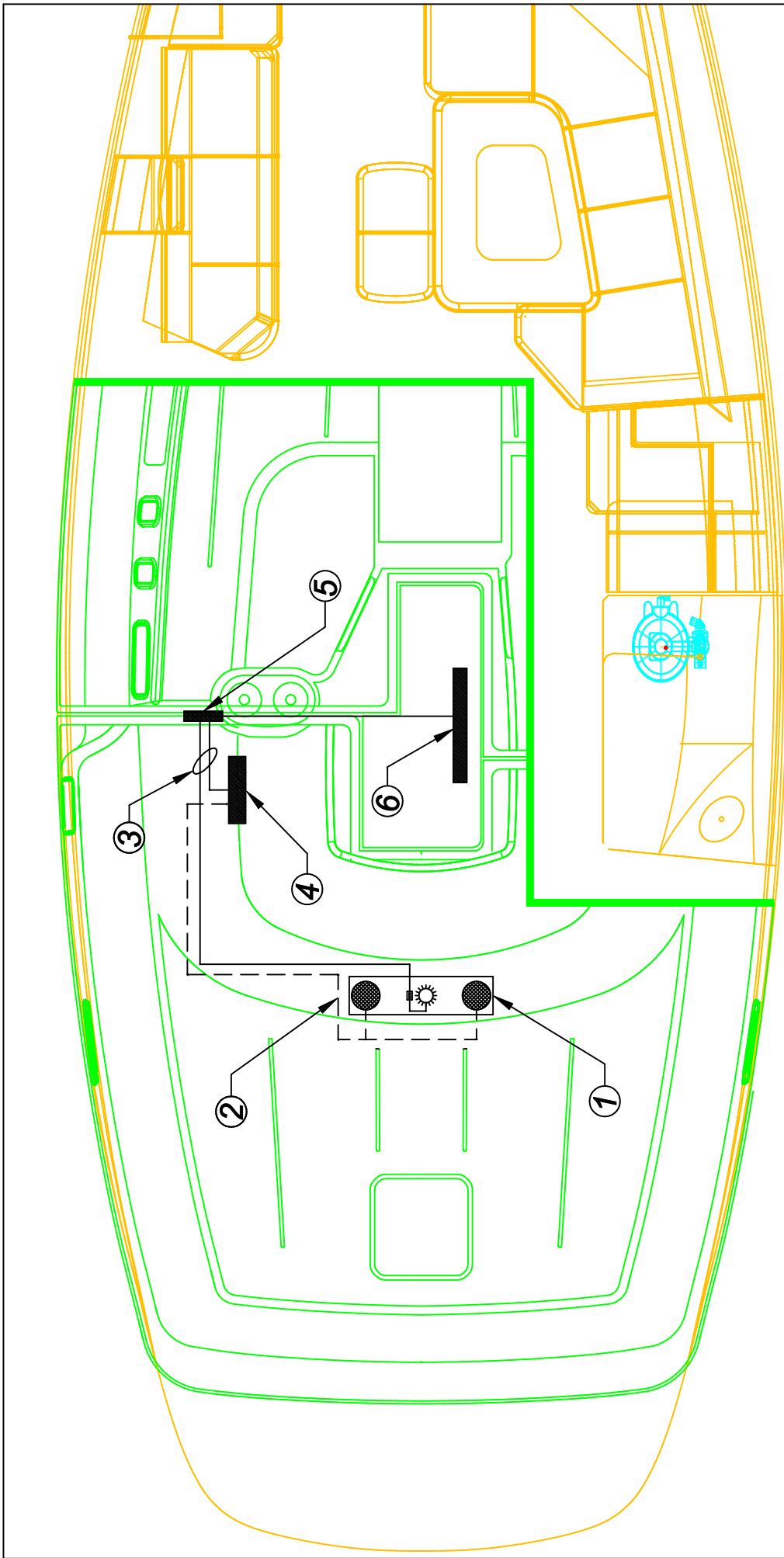
**HUNTER**



10" FLAT SCREEN MONITOR

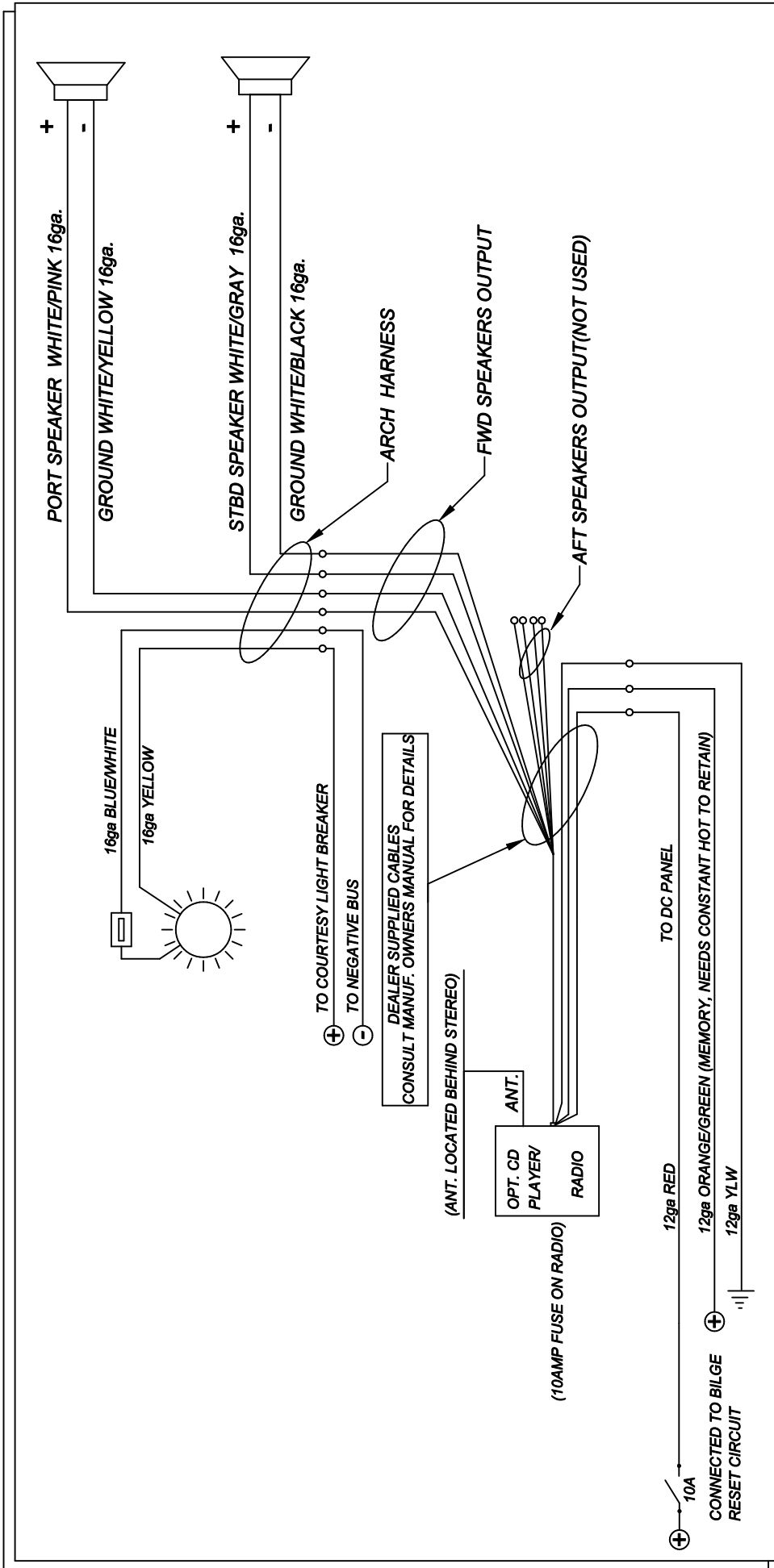
DVD PLAYER

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**HUNTER**  
**OPTIONAL FWD/AFT TV/DVD SCHEMATIC**  
 DRAWING NO. 4568064G-4  
 DATE 09/04/02  
 REVISED NO. None  
 DRAWN BY: ENG



- ① SPEAKER POD W/LIGHT (MOUNTED ON ARCH)
- ② SPEAKER WIRE RUN
- ③ POWER LEADS
- ④ STEREO CD PLAYER
- ⑤ TERMINAL STRIP
- ⑥ AC/DC MAIN PANEL

—— POWER LEADS  
 - - - - SPEAKER WIRE



POWER FILE  
This document contains information for which HUNTER MARINE CORP. has proprietary rights.  
**OPTIONAL COCKPIT STEREO WIRING SCHEMATIC**  
REVISED NO. 4568064G-6 REVISED NO. None DATE 09/09/02  
DESIGNER ENG



## SECTION 64H...OPTIONAL WINDLASS SYSTEM

### BASIC OPERATING INSTRUCTIONS:

#### LOWERING ANCHOR....

- ① START ENGINE IF NOT ALREADY RUNNING
- ② TURN ON WINDLASS BRKR. ON MAIN D.C. BRKR. PANEL. THIS CONTROLS THE UP/DOWN BUTTONS (ON FOREDECK) ONLY.
- ③ PUSH WINDLASS "DOWN" BUTTON ON FOREDECK AFT OF ANCHOR WELL.

NOTE: "BUMP" SWITCH UNTIL ANCHOR CLEARS ANCHOR ROLLER AND HULL BEFORE LETTING ANCHOR DOWN FREELY.

#### RAISING ANCHOR....

- ① START BOAT ENGINE, THIS WILL ALLOW CONTROL OF BOAT WHEN ANCHOR BECOMES FREE, AS WELL AS REDUCING LOAD ON BATTERY
- ② SAME AS STEP #1 OF LOWERING ANCHOR
- ③ SAME AS STEP #2 OF LOWERING ANCHOR
- ④ PUSH WINDLASS "UP" BUTTON (LOCATED NEXT TO "DOWN BUTTON" BEING CAREFUL AS THE ANCHOR APPROACHES THE HULL AND ANCHOR ROLLER) UNTIL THE ANCHOR RESTS IN THE STEMHEAD PROPERLY.

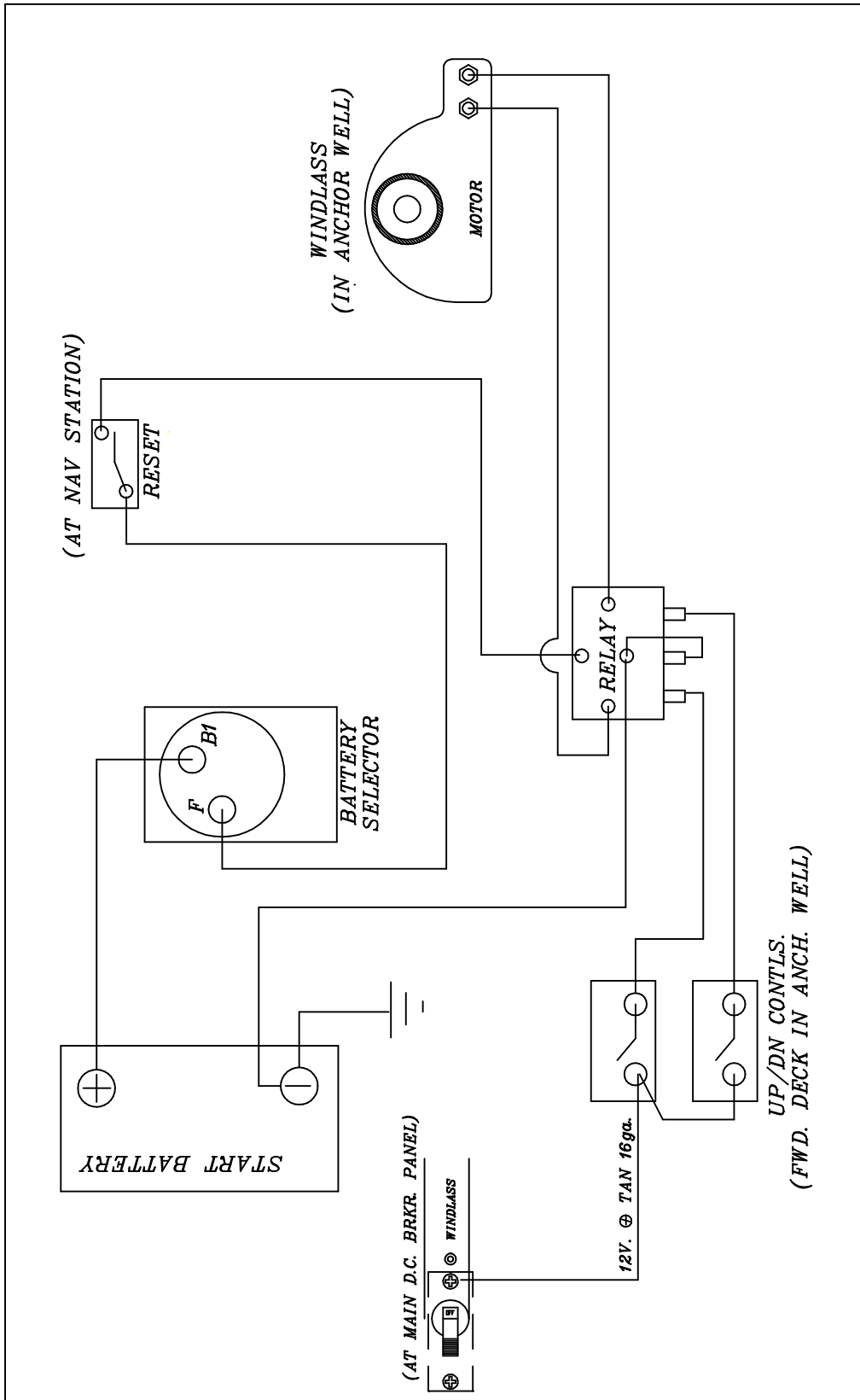
NOTE: IF IT APPEARS THERE IS NO POWER TO THE WINDLASS, CHECK RESET. IF WINDLASS BECOMES INOPERABLE ELECTRICALLY, A MANUAL WINCH HANDLE IS SUPPLIED, SEE THE "HORIZON WINDLASS MANUAL" SUPPLIED IN YOUR OWNERS MANUAL PACKAGE FOR INSTRUCTIONS.

**P456 WINDLASS OPERATING INST.**

4508064H-1 NONE  
ENGINEERING DEPT. 1/27/98

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<b>P456 OPTIONAL WINDLASS WIRING</b>			
FORMING TITLE	4508064H-2	REVISION NO.	NONE
ENGINEERING DEPT.		DATE	2/3/99

UP/DOWN CONTROL  
SWITCH POWER LEADS  
(16ga. TAN & 16ga.YLW)

WINDLASS/MOTOR

WIRE RUNS BETWEEN  
DECK AND HEADLINER

WINDLASS RELAY  
(FOR UP/DOWN CONTROLS)

TO MAIN  
DISTRIBUTION  
PANEL

WINDLASS

WINDLASS MOTOR POWER LEADS  
1/O RED AND YLW  
(RUNS THRU PAN BEAM)

TO THE RESET & START BATTERY  
SEE SCHEMATIC ON PREVIOUS PAGE

MAIN DISTRIBUTION  
PANEL

START BATTERY

WINDLASS RESET

START BATTERY  
ON/OFF SWITCH

WINDLASS MOTOR

NOTE: THIS DRAWING PROVIDES BASIC  
WINDLASS COMPONENT LOCATIONS.  
SEE PREVIOUS PAGE FOR SCHEMATIC.

**P456 WINDLASS COMPONENT LAYOUT**

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REVISED BY	4508064H-3	REVISION NO.	NONE
DESIGNED BY		DATE	1/28/98
ENGINEERING DEPT.			





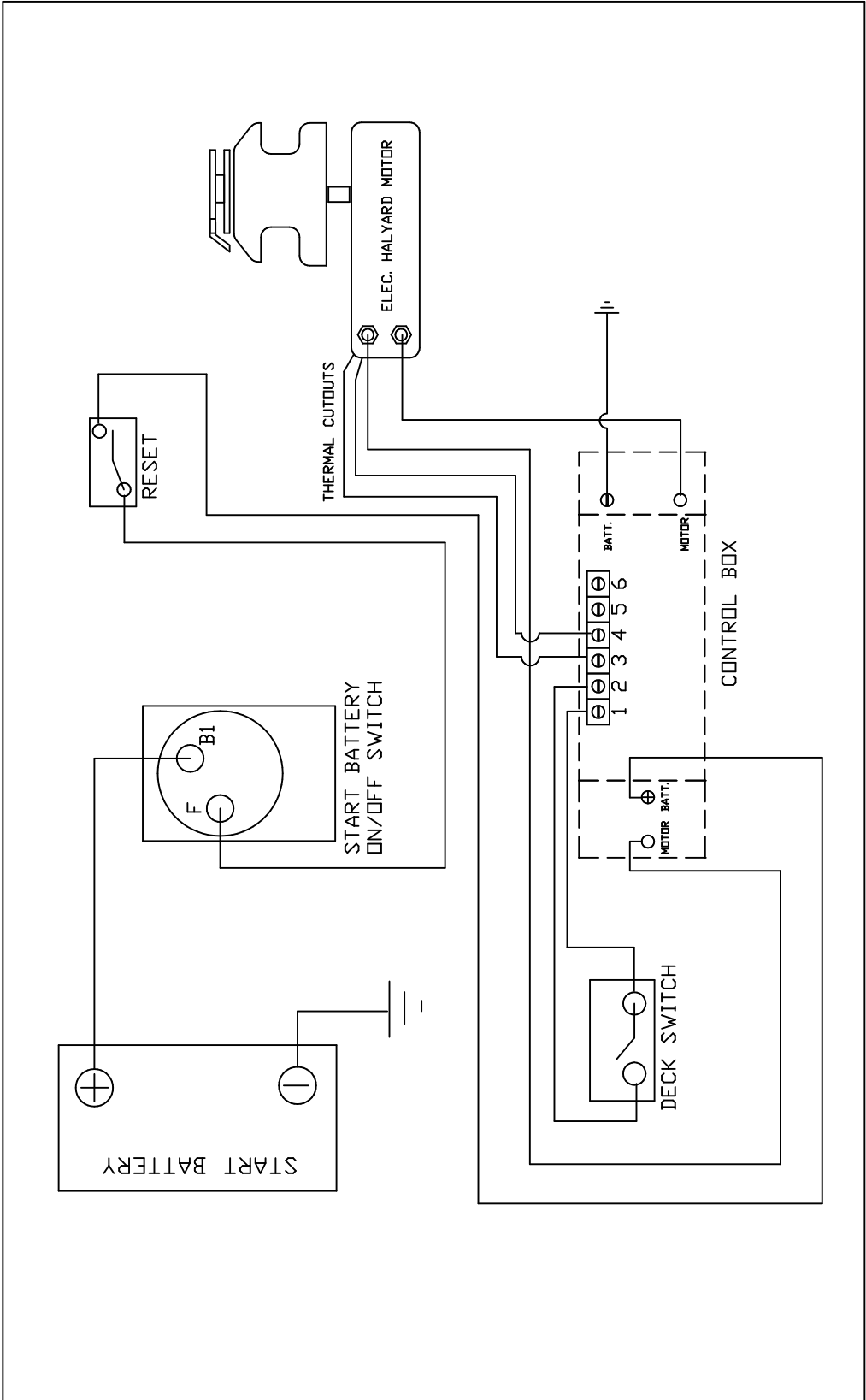
SECTION 641..ELEC. HALYARD WINCH SYSTEM (OPT. ON FURLING MODELS)

BASIC OPERATING INSTRUCTIONS:

- ① START ENGINE IF NOT ALREADY RUNNING
- ② HALYARD SWITCH ON DECK SHOULD NOW OPERATE WINCH

NOTE:

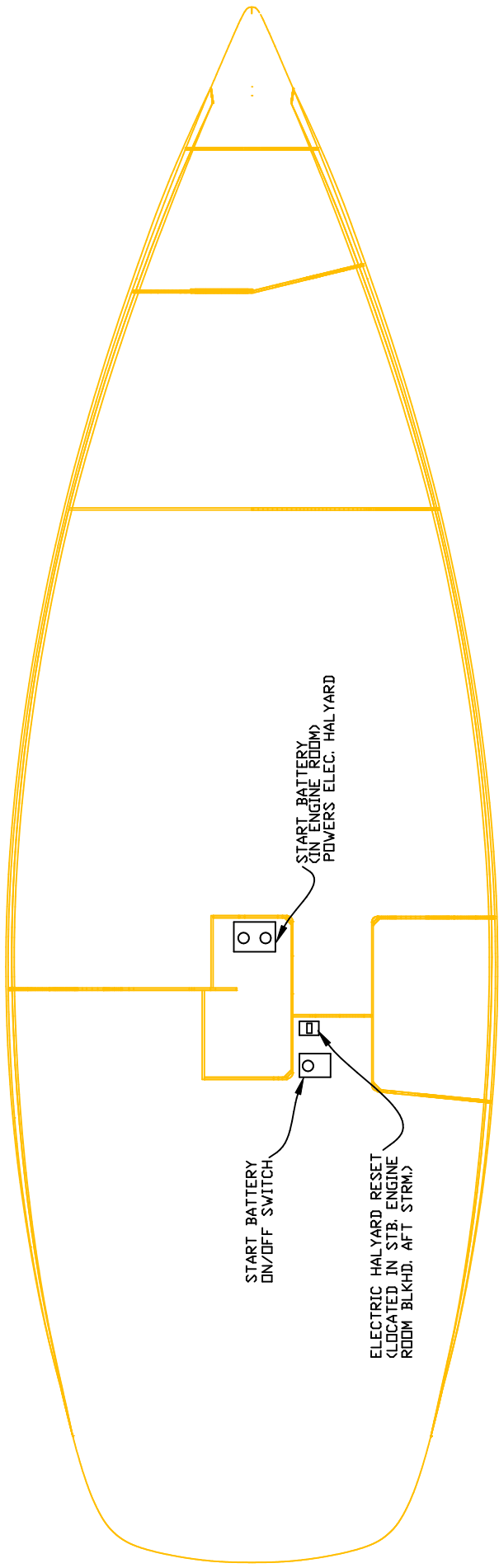
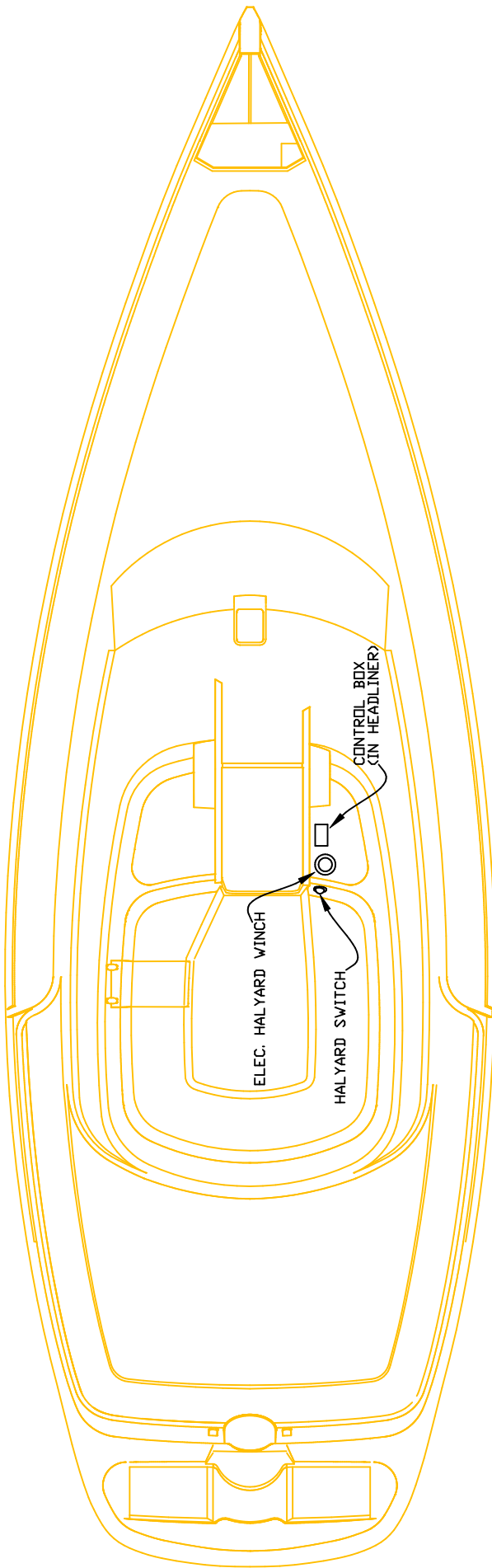
SEE PG 63A-8 FOR RESET FUNCTION



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<b>P456 ELEC. HALYARD SCHEMATIC</b>	
REVISED NO.	45080641-2
DESIGNER NO.	NONE
DATE	1/27/98
ENGINEERING DEPT.	



THIS DRAWING SHOWS THE COMPONENTS AND THEIR LOCATION OF THE ELEC. HALYARD SYSTEM SEE PREVIOUS PAGE FOR SCHEMATIC & WIRING DETAILS NOTE: ELEC. HALYARD IS OPTIONAL ON FURLING MAST MODELS

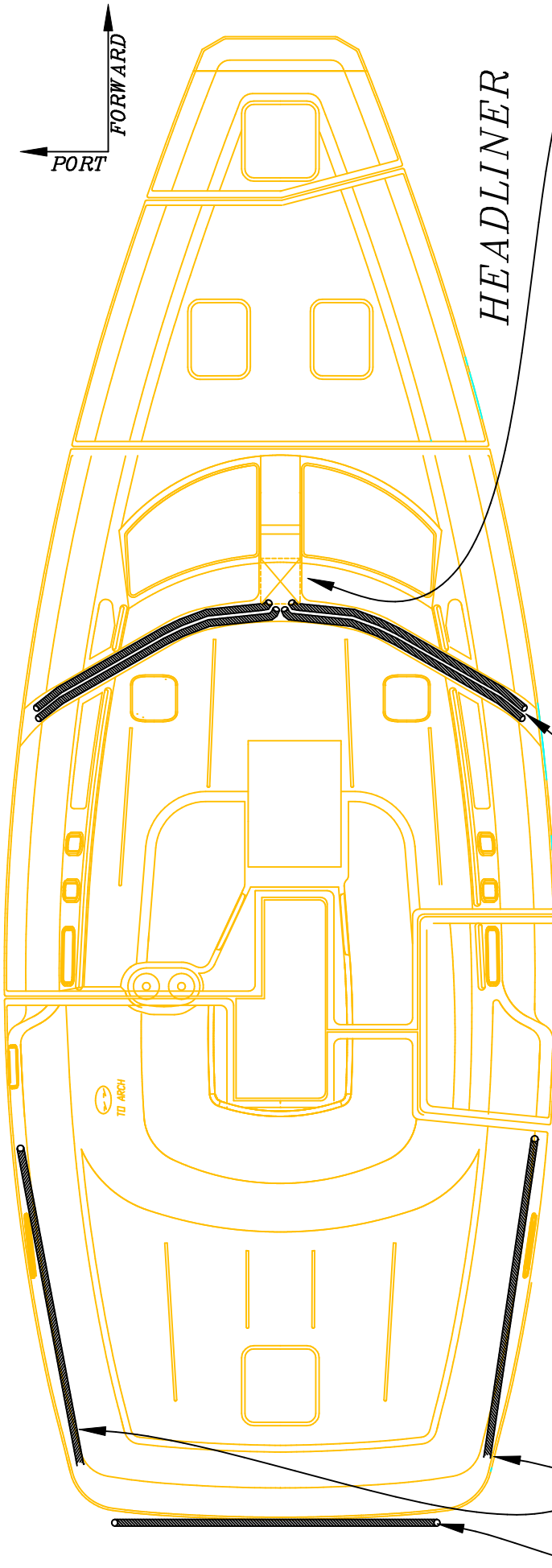
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**P456 ELEC. HALYARD COMPONENTS LAYOUT**

REVISED NO.	45080641-3	REVISION NO.	NONE
DATE	1/28/98	ENGINEERING DEPT.	

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PORT  
FORWARD



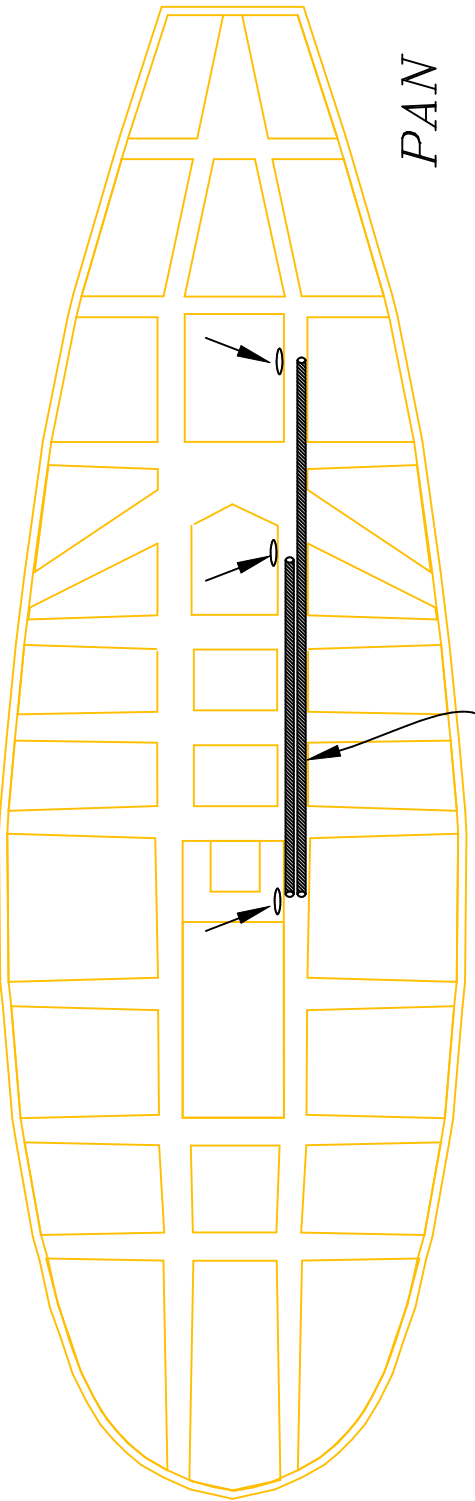
**HEADLINER**

CHASE TUBING RUNS FROM TRANSOM AREA FORWARD 13' 6" ACCESSIBLE THROUGH HEADLINER ACCESS PANELS.

CHASE TUBING AFT OF AFT STRM. BULK. ACCESSIBLE THRU PT. & STBD. SWIM SEAT LOCKERS

CHASE TUBING INSIDE MAIN CABIN BEAM ACCESSIBLE AT CHAIN PLATE COVERS PORT &

STBD. AND ABOVE COMPRESSION POST



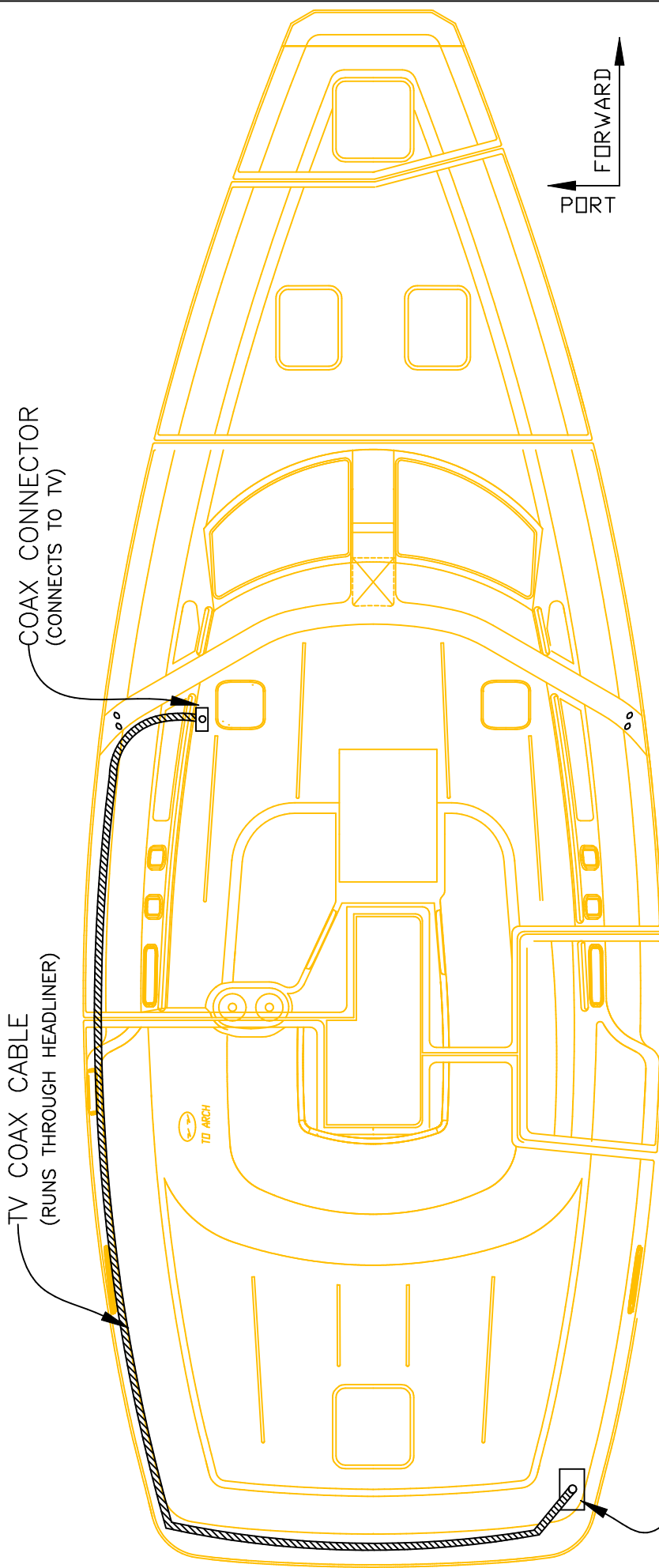
**PAN**

CHASE TUBING MAIN PAN BEAM STBD. SIDE ACCESSIBLE THRU STBD. LOWER ENGINE ROOM AND BELOW FWD. BILGE COVERS

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<b>P456 WIRE CHASE LOCATIONS</b>			
PROJECT FILE NO.	4508064J	REVISION NO.	NONE
DATE	1/28/98	ENGINEERING DEPT.	

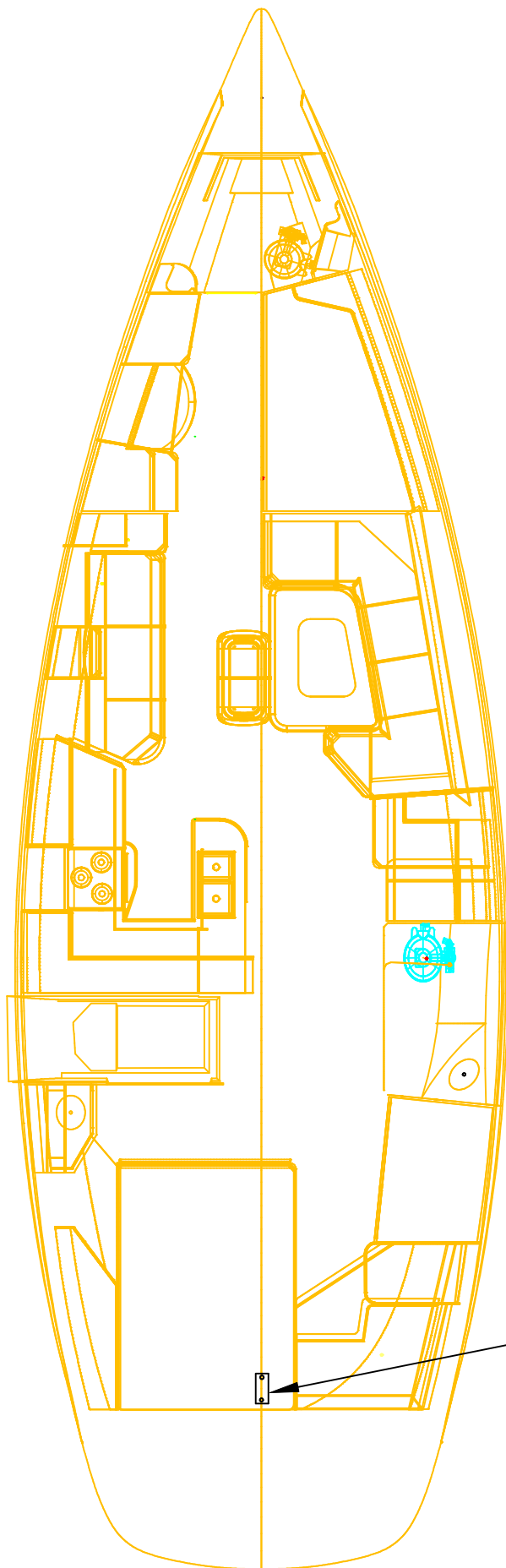


TV / PHONE INLET  
 NOTE: PHONE WIRE IS NOT SUPPLIED

PROPERTY TITLE  
**P456 T.V. COAX CABLE LAYOUT**  
DESIGN NO. 4508064K REVISION NO. NONE  
DATE 1/28/98  
ENGINEERING DEPT.

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**HUNTER**



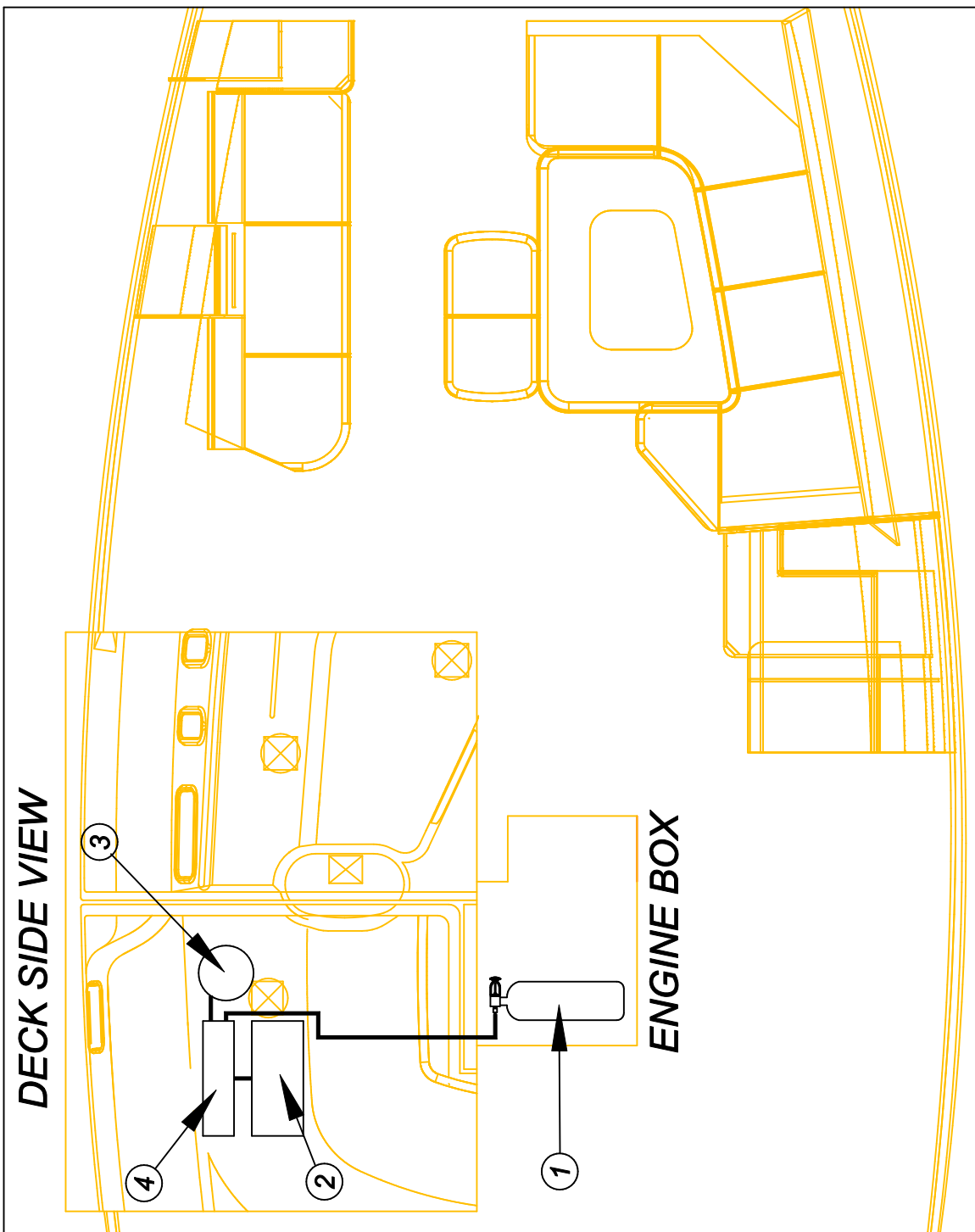
DYNAPLATE  
GROUNDING PLATE  
INSTALLED  
BETWEEN STRUT  
AND RUDDER

**OPTIONAL DYNAPLATE GROUND LAYOUT**

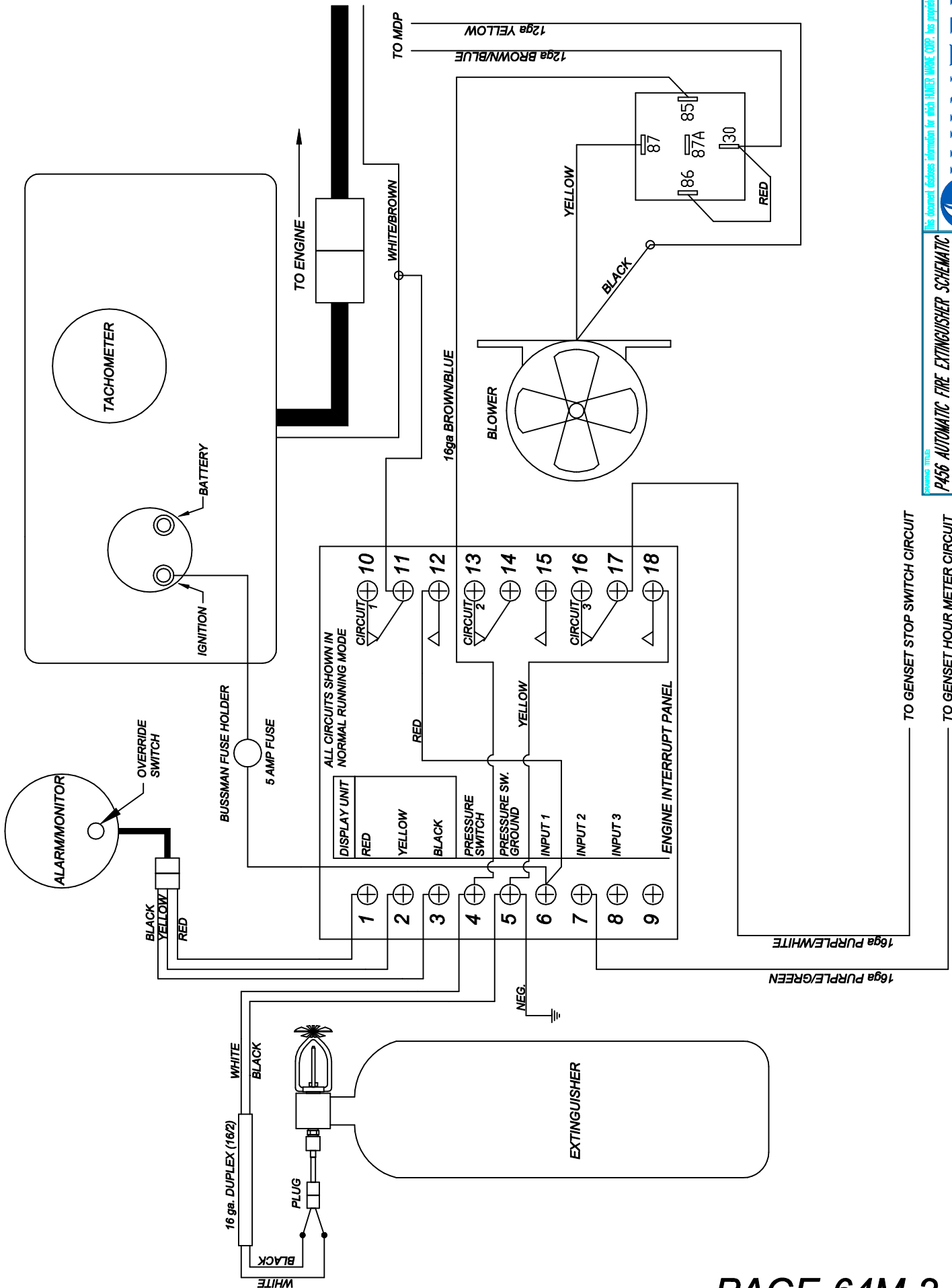
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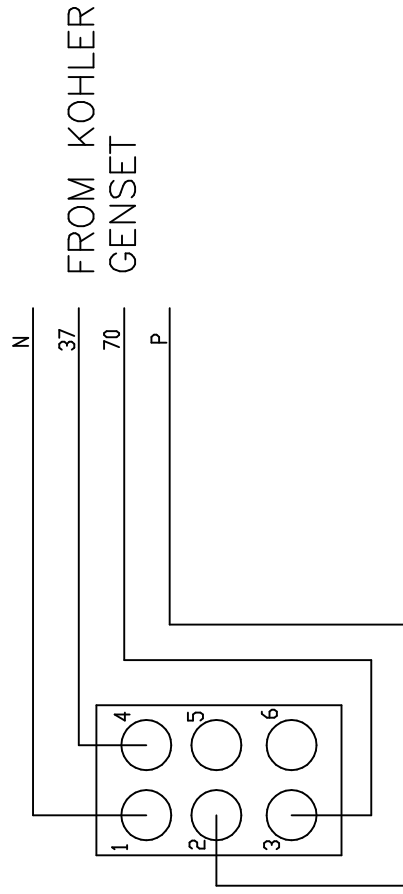
DRAWING TITLE	REVISION NO.	DATE
4568064L	None	08/15/02
DESIGNED BY	ENGINEER	
	ENG	



- ① AUTOMATIC FIRE EXTINGUISHER
- ② ENGINE PANAL (PORT COCKPIT COAMING)
- ③ DISPLAY (PORT COCKPIT COAMING)
- ④ ENGINE INTURRUPT CONTROL BOX







FROM KOHLER  
GENSET

FROM ENGINE  
INTERRUPT CONTROL  
BOX

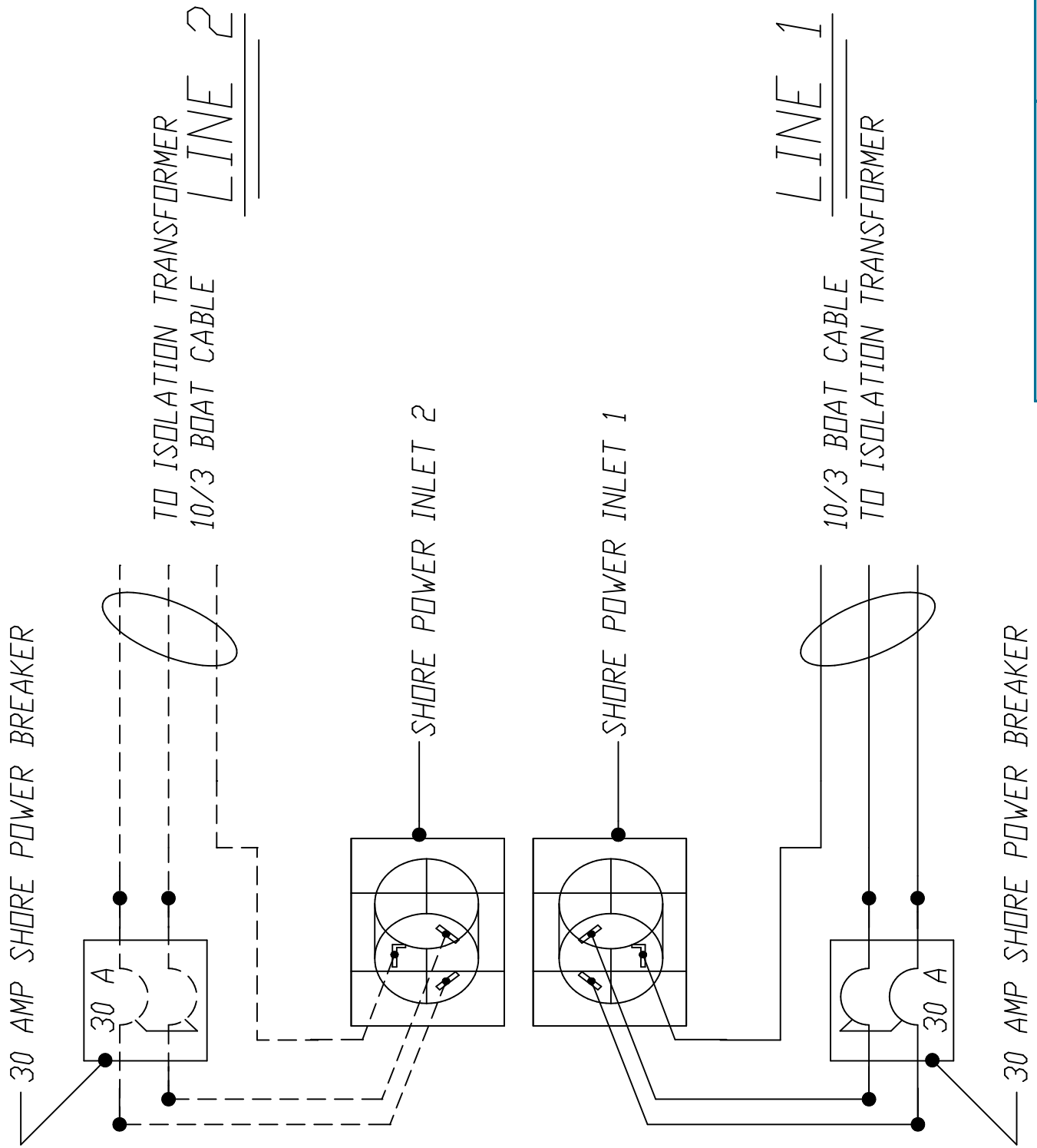
16GA PURPLE/WHITE

16GA PURPLE/GREEN

NOTE: SEE KOHLER WIRING  
DIAGRAM FOR FURTHER DETAIL.

456 GENERATOR SHUTDOWN

<small>For document address information for other HUNTER ENGINE CORP. has proprietary rights</small> <b>HUNTER</b>	
<b>456 GENERATOR SHUTDOWN</b>	
<small>PROJECT NO.</small> 4508064M-3	<small>REVISION NO.</small> NONE
<small>ENGINEERING DEPT.</small> ENGINEERING DEPT.	<small>DATE</small> 1/26/98



POWER FILE  
**P456 SHORE POWER DIAGRAM**  
ISSUANCE NO. 4508065A REVISION NO. NONE DATE 4/2/00  
ENGINEERING DEPT.

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**HUNTER**

## H456 ELECTRICAL AMPERAGE DATA

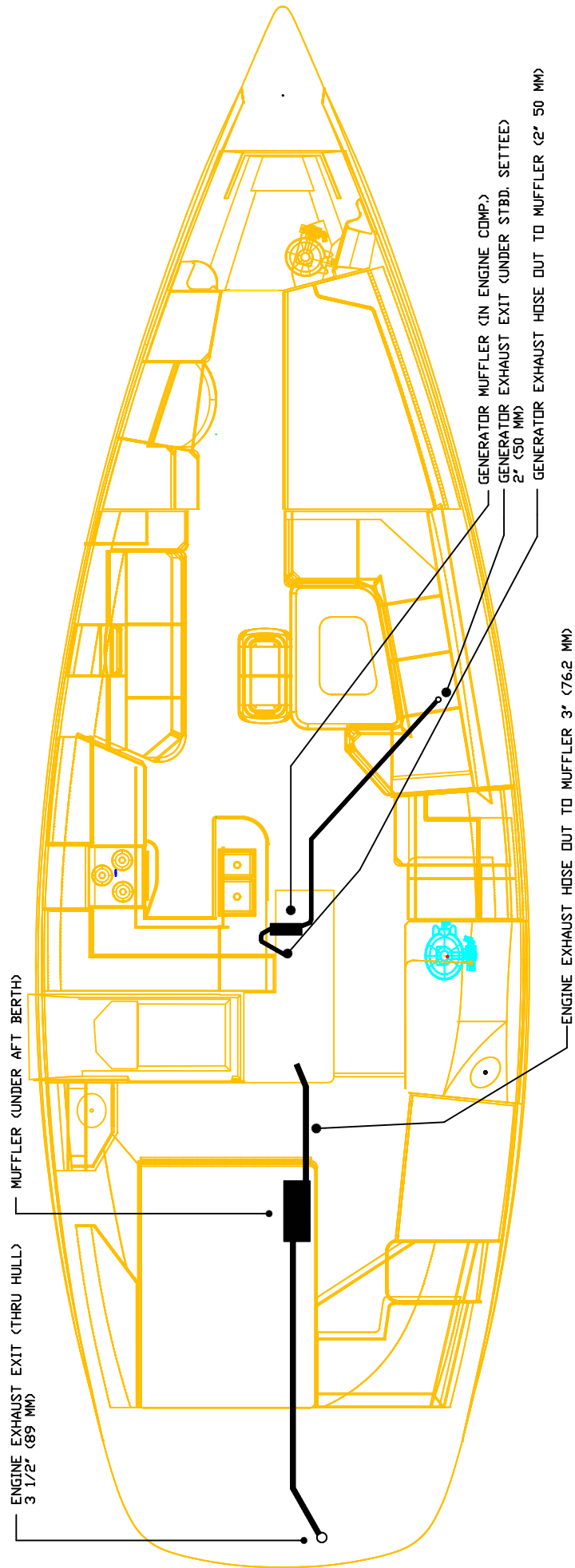
<b>12V.D.C. SYSTEM</b>	
<b>CIRCUIT/BREAKER</b>	<b>AMPERAGE</b>
D.C. MAIN	75amp
PANEL LIGHTS	5amp
CABIN LIGHTS 1	20amp
CABIN LIGHTS 2	20amp
COURTESY 1	10amp
COURTESY 2	10amp
TANK INDICATOR	5amp
WATER PRESSURE	10amp
FWD.SHOWER SUMP	10amp
AFTSHOWER SUMP	10amp
MACERATOR 1	20amp
MACERATOR 2	20amp
STEREO	15amp
STEREO W/AMPLIFIER	20amp
REFRIGERATION OR FREEZER	15amp
L.P. GAS	5amp
WINDLASS (SWITCH)	5amp
INSTRUMENTS	5amp
G.P.S.	5amp
V.H.F.	10amp
AUTO-PILOT	VARIES PER MODEL
ANCHOR LIGHT	5amp
STEAMING LIGHT	5amp
DECK LIGHT	15amp
RUNNING LIGHTS	10amp (LGR. MOD.)
RUNNING LIGHTS	5amp (SM. MOD.)
COMPASS (TIES TO RUN. LIGHTS)	
BATTERY CABLES	
ENGINE STARTER CABLE	
HALYARD WINCH	
WINDLASS (MOTOR) CABLE	

<b>120V.A.C. SYSTEM</b>	
SHORE POWER A.C. MAIN/S	30 amp
OUTLETS	15amp
MICROWAVE OVEN	15amp
WATER HEATER	15amp
BATTERY CHARGER	15amp
INVERTER	INTERNAL
AIR CONDITIONING	25amp

<b>230V.A.C. SYSTEM (ON SELECT OVERSEAS MODELS ONLY)</b>	
SHORE POWER A.C. MAIN/S	15 amp
OUTLETS	10amp
MICROWAVE OVEN	10amp
WATER HEATER	10amp
BATTERY CHARGER	10amp
INVERTER	N/A
AIR CONDITIONING	15amp

H456 ELECTRICAL WIRING/CABLE DATA

DISCRIPTION	PRT. NUMBER	WIRE SIZE	WIRE COLOR
LPG SWITCH/POWER	659802	16 gauge	ORANGE/RED
SENDER GUAGES	658600	16 gauge	RED
FUEL SENDER	658100	16 gauge	PINK
GROUND	659800	16 gauge	YELLOW
WATER SENDER	659806	16 gauge	ORANGE/BLUE
GROUND	659800	16 gauge	YELLOW
WATER PUMP	655200	12 gauge	BROWN
GROUND	659700	12 gauge	YELLOW
VACCU FLUSH	652202	10 gauge	BROWN/RED
GROUND	653631	16 gauge	YELLOW
WASTE SENDER	659805	16 gauge	ORANGE/GREEN
GROUND	659800	16 gauge	YELLOW
AFT SUMP PUMP	655400	12 gauge	BROWN/BLACK
GROUND	659700	12 gauge	YELLOW
FWD MACERATOR	655800	10 gauge	BROWN/WHITE
GROUND	653631	16 gauge	YELLOW
SOLAR PANEL	653640	16/2 DUPLEX	RED/YELLOW
VHF	653300	16 gauge	RED/WHITE
GROUND	659800	16 gauge	YELLOW
COURTESY LIGHTS	655100	16 gauge	BLUE/WHITE
GROUND	659800	16 gauge	YELLOW
CABIN LIGHTS	655000	16 gauge	BLUE
GROUND	659800	16 gauge	YELLOW
PORT FWD SPEAKERS	653620	16 gauge	WHITE/RED
STBD FWD SPEAKERS	653622	16 gauge	WHITE/BROWN
PORT MAIN SPEAKERS	653623	16 gauge	WHITE/ORANGE
STBD MAIN SPEAKERS	653624	16 gauge	WHIT/EBLUE
PORT AFT SPEAKER	653625	16 gauge	WHITE/GREEN
STBD AFT SPEAKER	653626	16 gauge	WHITE/VIOLET
PORT ARCH SPEAKER	653627	16 gauge	WHITE/PINK
PORT GROUND	653629	16 gauge	WHITE/YELLOW
STBD ARCH SPEAKER	653630	16 gauge	WHITE/GRAY
STBD GROUND	653623	16 gauge	WHITE/BLACK
COMPASS WIRE BOW	659804	16 gauge	GRAY/YELLOW
GROUND	659800	16 gauge	YELLOW
MAST	657300	16 gauge	GRAY
STEAMING LIGHT	656800	16 gauge	GRAY/GREEN
ANCHOR LIGHT	656900	16 gauge	GRAY/RED
HOUSE BATTERY	653610	2/O	RED
GROUND	653900	2/O	YELLOW
AC/DC PANEL	657900	6 gauge	ORANGE/RED
GROUND	653618	6 gauge	YELLOW
ENGINE	654100	1/O	RED
HALYARD	654010	1/O	RED/YELLOW
T.V. / V.C.R.	658400	10 gauge	RED
GROUND	653631	10 gauge	YELLOW
REFRIGERATION	658800	8 gauge	RED/BLACK
FREEZER	658900	8 gauge	RED/WHITE
GROUND	653615	8 gauge	YELLOW
STEREO OUT	657600	12 gauge	ORANGE/GREEN
STEREO POWER	658500	12 gauge	RED
GROUND	659700	12 gauge	YELLOW
INVERTER GROUND	653642	4 gauge	GREEN/YELLOW
WINDLASS SWITCH	659200	16 gauge	TAN
MANUAL BILGE	655700	12 gauge	BROWN/RED
AUTO BILGE	655600	12 gauge	BROWN/ORANGE
GROUND	659700	12 gauge	YELLOW
AFT MACERATOR	652400	10 gauge	BROWN
AFT SUMP PUMP	655400	12 gauge	BROWN/BLACK
FWD SUMP PUMP	654600	12 gauge	BROWN/YELLOW
AUTO PILOT	658700	8 gauge	RED
GROUND	653615	8 gauge	YELLOW
CHAINPLATE	653642	4 gauge	GREEN/YELLOW
BATTERY CHARGER # 1	658000	8 gauge	ORANGE/RED
BATTERY CHARGER # 2	657800	8 gauge	ORANGE/GREEN



ENGINE EXHAUST EXIT (THRU HULL)  
3 1/2" (89 MM)

MUFFLER (UNDER AFT BERTH)

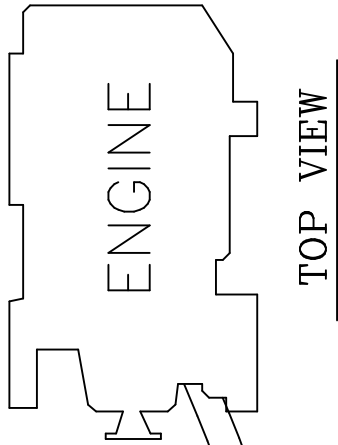
ENGINE EXHAUST HOSE OUT TO MUFFLER 3' (76.2 MM)

GENERATOR MUFFLER (IN ENGINE COMP.)

GENERATOR EXHAUST EXIT (UNDER STBD. SETTEE)  
2" (50 MM)

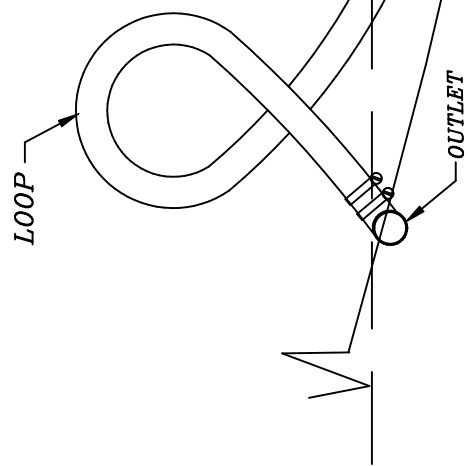
GENERATOR EXHAUST HOSE OUT TO MUFFLER (2' 50 MM)

HEAVY DUTY FLEXIBLE EXHAUST HOSE  
 3" (76.2mm) FOR THE ENGINE  
 2" (50.8mm) FOR THE GENERATOR




TOP VIEW

ALL HOSES ARE  
 DOUBLE CLAMPED.



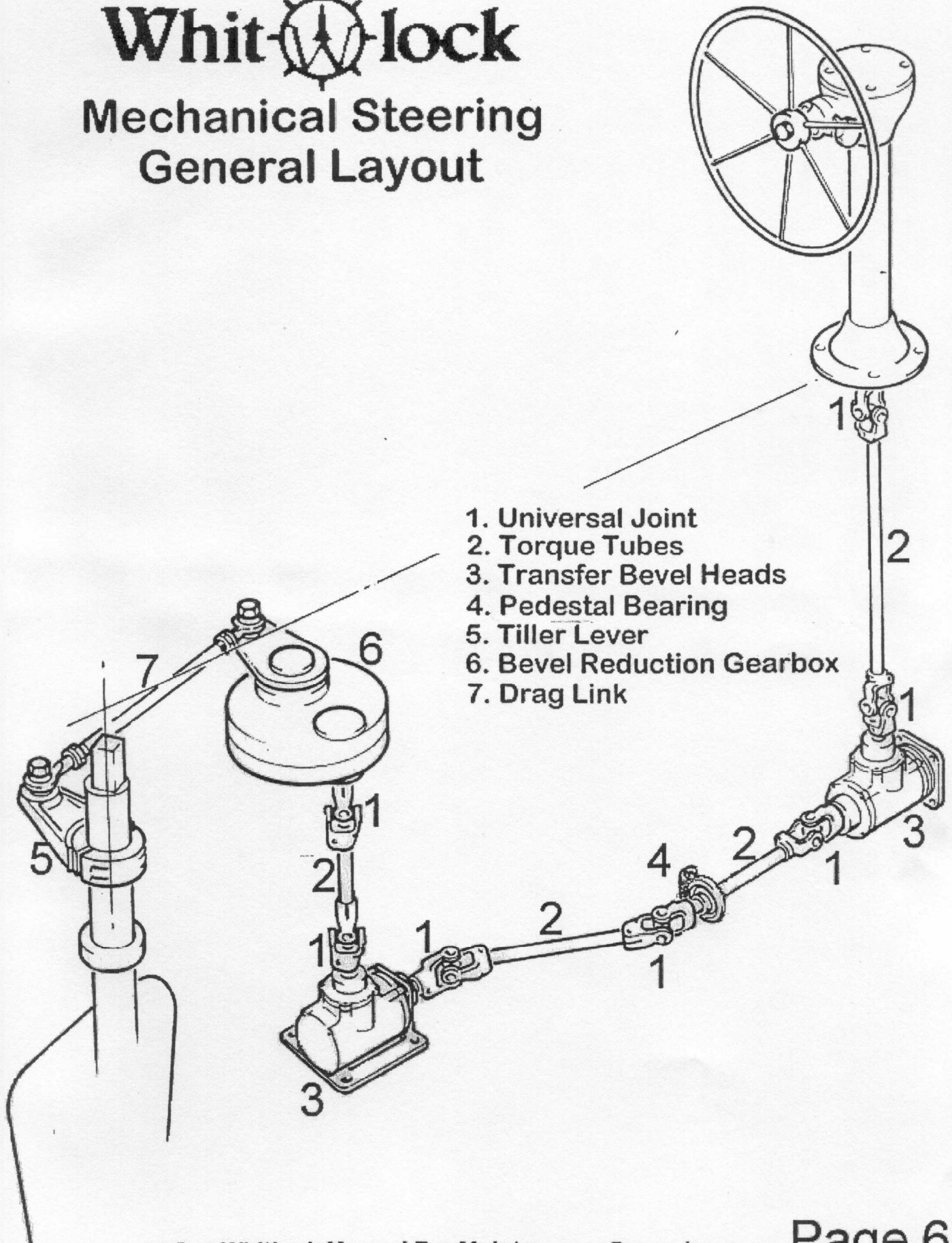
SIDE VIEW

FOR MORE INFO  
**P456 EXHAUST SYSTEM LAYOUT**  
REVISED NO. 4508066B REVISED NO. NONE  
DATE 1/18/00  
ENGINEERING DEPT.

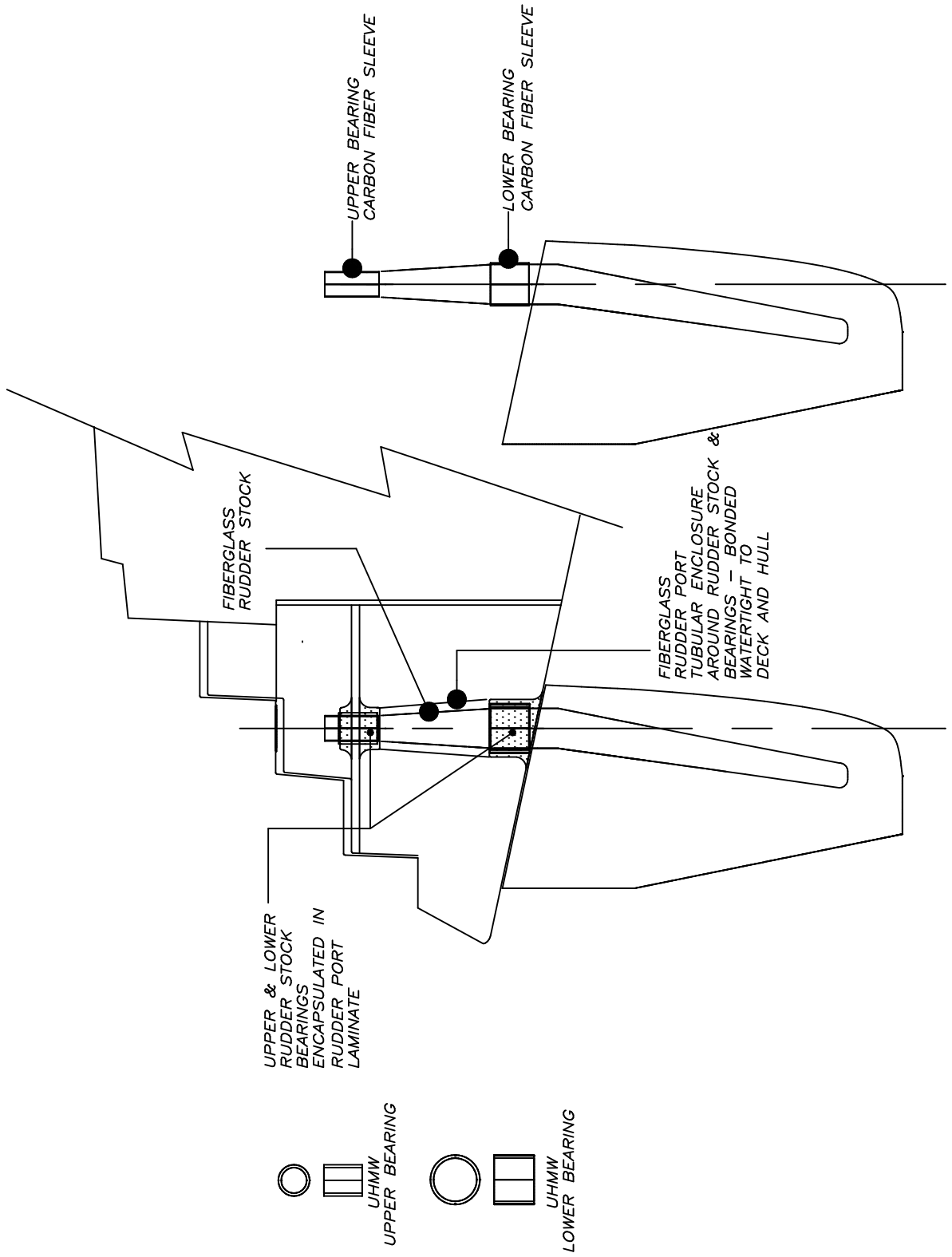


# Whitlock

## Mechanical Steering General Layout

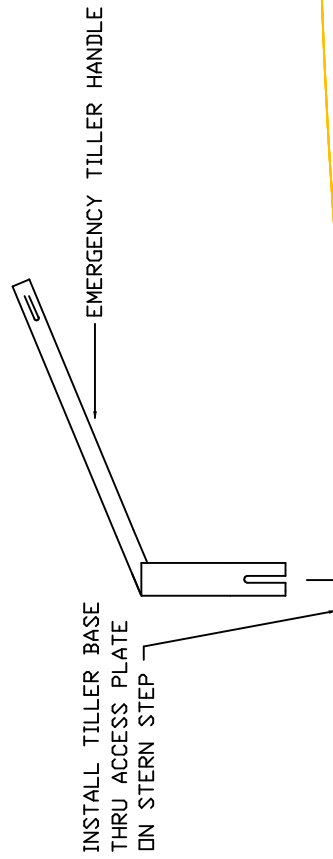


See Whitlock Manual For Maintenance Procedures





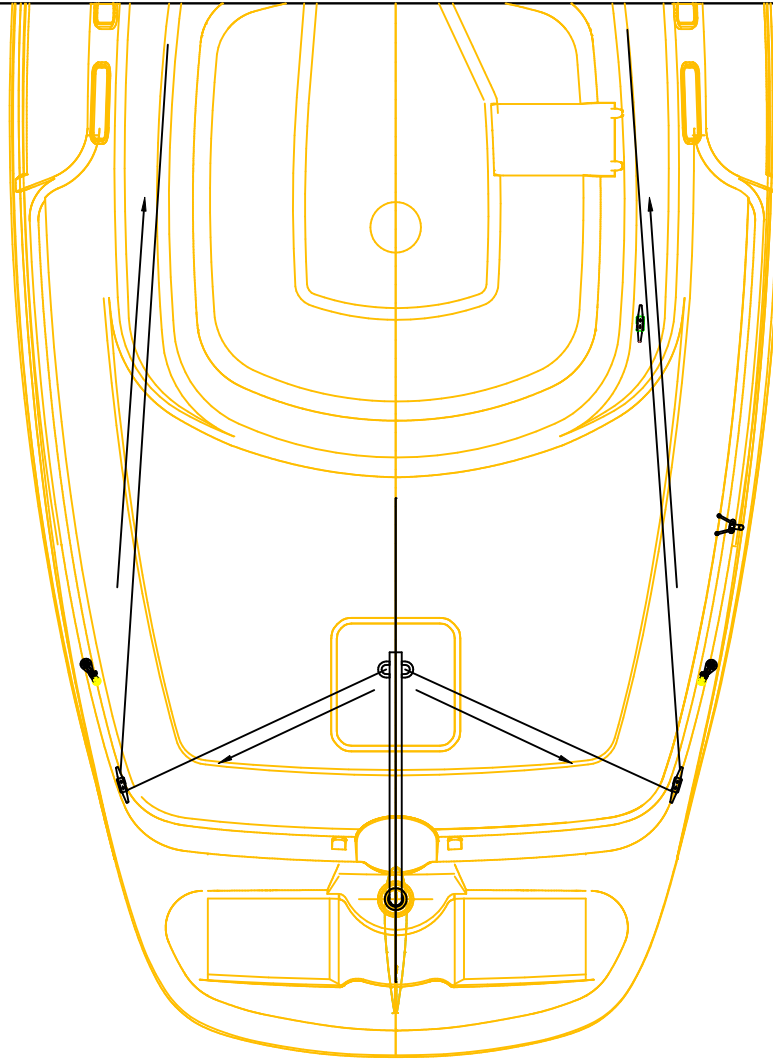
NOTR: EMERGENCY TILLER HANDLE & BASE LOCATED ON BULK. (STBD SIDE) IN AFT SWIM SEAT LOCKER



1. REMOVE ACCESS PLATE COVER ON STERN STEP
2. INSERT SLOT IN TILLER BASE OVER PIN IN TOP OF RUDDER POST.
3. INSTALL TILLER HANDLE OVER TILLER BASE ALIGNING PIN HOLES, INSERT LOCKING PIN.

NOTE: IF SECURING TILLER BECOMES NECESSARY- OR IF YOU DESIRE TO STEER FROM COCKPIT

SECURE LINE TO EYE ON TILLER HANDLE LEAD AROUND MOORING KLEATS AS SHOWN THEN TO WINCHES AS SHOWN



EMERGENCY

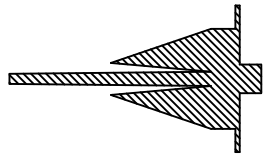
STEERING

HUNTER

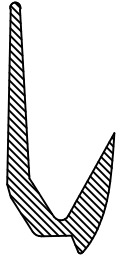
P450 EMERG. TILLER

4508069

NOTE: THE FORWARD SIDE CLEATS ON THE DECK ARE CONSIDERED THE STRONG POINT. THAT SHOULD BE THE ANCHOR POINT IF THE BOAT IS TO BE LEFT UNATTENDED.



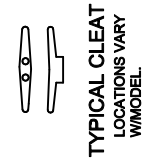
DANFORTH ANCHOR



FLOW ANCHOR



ANCHOR RODE  
(CHAIN OR ROPE OR COMBO)

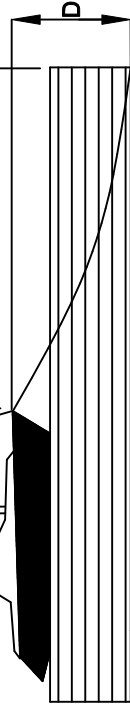


TYPICAL CLEAT LOCATIONS VARY W/ MODEL.

STAINLESS BOW ROLLER  
(SIZE & SHAPE VARIES BETWEEN MODELS)

- GROUND TACKLE:**
- 1.) BOW SHACKLE(W/PIN WIRED) @ ANCHOR...FOLD BY...
  - 2.) SWIVEL...FOLD BY...
  - 3.) CHAIN(OPTION)...FOLD BY...
  - 4.) D-SHAPED SHACKLE(W/PIN WIRED) @ EA. 27M OF CHAIN OR @ CHAIN TO ROPE RODE.

3D=CHAIN  
5D=ROPE



**PLAN**

ELECTRIC ANCHOR WINDLASS (STANDARD OR OPTIONAL ON LARGER MODELS)

WELL: SMALLER MODELS

WELL: LARGER MODELS

**ELEVATION**

WATERLINE

**BASIC ANCHORING DIAGRAM**

DESIGN NO.	4508070
DATE	12/1/002
ENGINEER	ENG
DESIGNER	NONE