LEGEND 43 OWNER'S MANUAL
TABLE OF CONTENTS

LEGEND 43 OWNER'S MANUAL
TABLE OF CONTENTS

LEGEND 43 OWNER'S MANUAL
TABLE OF CONTENTS

HUNTER MARINE'S OWNER AND FOUNDER
WARREN R. LUHRS
BRIEF HISTORY

Born in 1944 in East Orange, New Jersey, Warren R. Luhrs' ancestry goes back to his Great-grandfather, Henry, who helped pioneer railroading and clipper ships in America, and to his great-uncle, John, who 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 principal owner of the bark, "Sophia R. Luhrs", named after his wife. He was also a partner with Albert Sprout, who managed a shipyard in Melbridge, Maine, where the "Sophia R. Luhrs" was built.

The Luhrs' family sea tradition was carried on during the Great Depression by Warren Luhrs' father, Henry, who worked at a small boat manufacturer in Morgan, New Jersey, and later started his own company. When war broke out in Europe, the Coast Guard asked Henry Luhrs to repair their boats and install ice sheathing on their bows.

After World War II, 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. He constructed lap strake sea skiffs using assembly-line techniques. Henry personally "shook down" his prototypes with family trips up the Hudson River to Lake Champlain.

The sea skiff is a class of boat which 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 water line to increase stability in rough water or a following sea. Such skiffs can either be smooth-sided or of lapstrake construction.

Henry Luhrs' basic philosophy was to emulate the late Henry Ford in building an inexpensive boat for the average man, thus enabling him to enjoy the luxury of boating. He was both designer and engineer, creating innovative and progressive new models. He designed the change in the line of the bow from straight to curved at a time when all boats were being built with the straight square effect. It is believed he was also the first designer-builder to popularize a small boat with a fly-bridge.

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

Today, Warren R. Luhrs and his brother John, own Hunter Marine Corporation, Silverton Marine Corporation, Mainship Motor Yachts and Luhrs Fishing Boats with its Alura Division. Hunter Marine produces sailboats while the other companies produce powerboats.

Welcome To
THE HUNTER MARINE FAMILY

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 functions. Please take the time to study this manual and its recommendations for trouble-free sailing pleasure.

We stand behind the quality of your boat with a warranty which you should also review. ***To insure your warranty is valid, please fill out the attached card and send it to us within ten (10) days of the purchase date.*** Section 15 of the Federal Boat Safety Act requires first owners to be registered. The warranty data should also be recorded in the space below for your own reference.

You also need to fill out and mail the warranty cards on your diesel auxiliary, battery, stove, head, electric water pump and other accessories. These are enclosed in the manufacturers' manuals which are included in your owner's pouch.

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 COMMUNICATIONS.

HULL NO. _____ DATE DELIVERED TO OWNER _____

YACHT NAME _____

OWNER NAME _____

STREET ADDRESS _____

CITY _____ STATE _____ ZIP CODE _____

HOME PORT _____

MODEL _____ SIZE _____ HULL/SAIL # _____

ENGINE MODEL _____ SERIAL NO. _____ PROPELLER SIZE _____

DEALER _____

STREET ADDRESS _____

CITY _____ STATE _____ ZIP CODE _____

DEALER SIGNATURE _____

OWNER SIGNATURE _____

A copy of Chapman's *Piloting, Seamanship and Small Boat Handling* is provided with your Hunter Marine boat as part of the standard equipment. Any questions regarding the meaning of terminology used in this manual may be referenced in your Chapman's.

GLOSSARY OF SAILING TERMS

Terms which are referred to in the text without a full explanation are included in the glossary. Some other terms which are clearly defined in the book are not included.

A

Aback: describes a sail when the wind strikes it on its 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.
Baggywrinkle: rope, teased out, plaited together and wound around *stays*, *shrouds* etc., to prevent chafing.
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* which supports the deck; 3, on the beam means that an object is at right angles to the *center-line*.
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*.
Belay: 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 connect two ropes with a knot.
Berth: 1, a place occupied by a boat in harbour; 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 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 coloured 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 the *quarter*.
Bulkhead: partition wall in a boat normally fitted *athwartships*.

C

Catamaran: a sailing boat with twin hulls, connected by crossbeams, developed from Polynesian craft.
Catboat: a boat with a single sail.
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 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: 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.

GLOSSARY OF SAILING TERMS

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.
Claw ring: a fitting, which slips over the boom like a claw, to which the main *sheet* is attached after *reefing* the mainsail.
Cleat: a wooden, metal or plastic fitting around which a rope is secured.
Clevis pin: a locking pin through which a split ring is passed to prevent accidental withdrawl.
Clew: the after, lower corner 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.
Coamings: the raised structure surrounding a *hatch*, cockpit etc., which prevents water entering.
Contrail: a trail of condensation left behind a jet aircraft, giving weather clues.
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 planing 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.
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 liferaft 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: a well-faired line or surface is smooth with no bumps, hollows or abrupt changes in direction.
Fairlead: a fitting through which a line is run to alter the direction of the lead of the line.
Fathom: the measurement used for depths of water and lengths of rope. 1 fathom=6ft.=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 keep 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.

GLOSSARY OF SAILING TERMS

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.
Hawse pipe: see Navel pipe.
Head-to-wind: 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

Kedge: a small, light second anchor.
Keel: the main backbone of the boat to which a *ballast keel* is bolted or through which the *center-board* passes.
Ketch: a two-masted sailing vessel with a *mizzen* mast slightly smaller than the main and stepped forward of the rudder stock/post.
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 triangular 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 is blowing.
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.
Let fly: to let a *sheet* go instantly, spilling the wind from 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 travelled 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 the boat's head right into the wind.
Luff groove: a groove in a wooden or metal spar into which the *luff* of the headsail is fed.
Lurch: the sudden rolling 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.

GLOSSARY OF SAILING

Measured mile: a distance of one nautical mile measured between buoys or *transits/ranges* ashore, and marked on the chart.
Member: a part of the skeleton of the hull, such as a *stringer* laminated into a fiberglass hull to strengthen it.
Meridian: an imaginary line encircling the Earth which 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*.
Outhaul: 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.
Pay out: to let a rope out gradually.
Pintle: a rudder fitting with a long pin which slips 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 the wind on which a boat may sail; the boat's *course* relative to the direction of the wind.
Port: the left-hand side of a 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 lie. 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 mid-way 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 or anchor light: an all-round white light, usually hoisted on the *forestay*, to show that a boat under 50 ft (15 m) is at anchor. It must be visible for 2 mls (3km).
Riding sail: a small sail hoisted to enable a boat to maintain *steerage way* during a storm.
Rigging screw: a deck fitting with which the tension of *standing rigging*, e.g. *stays*, *shrouds*, is adjusted.
Roach: the curved part of the *leech* of a sail which extends beyond the direct line from head to *clew*.
Run: to sail 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.

GLOSSARY OF SAILING TERMS

S

Sailmaker's palm: a strong leather protective loop which fits across the palm of the hand. It has a hole for the thumb and metal reinforced plate on the palm to accept the eye of a needle, and is worn when mending sails or *splicing* ropes.
Schooner: a boat with two or more masts, with the mainmast aftermost.
Scope: the length of rope or cable paid out when mooring or anchoring.
Scuppers: holes in the *toe rail* which allow water to drain off the deck.
Seacock: a valve which shuts off an underwater inlet or outlet passing through the hull.
Sea room: room in which a boat can manoeuvre, clear of land or dangers.
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 stream.
Shackle: a metal link with a removable bolt across the open 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 *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 headsail.
Spar: a general term for any wood 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 wires by unlaying the strands and interweaving them.
Split pin: see **Cotter pin.**
Spreaders: horizontal struts attached to the mast, which extend 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 *guard rails* or *lifelines*.
Standing part: the part of a line not used when making a knot; the part of a rope which is made fast, or around which the knot is tied.
Standing rigging: the *shrouds* and *stays* which are permanently set up and support the masts.
Starboard: right-hand side of a boat looking forward (opp. of *port*).
Starboard tack: a boat is on the starboard tack when the wind strikes the starboard side first and the boom is out to *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* upwards, 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 side 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 rope and *blocks* which is used to gain mechanical advantage.
Tang: a strong metal fitting by which *standing rigging* is attached to the mast or other spar.
Tender or 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 principally by the gravitational attraction of the moon.

GLOSSARY OF SAILING TERMS

Toe rail: a low strip of metal or moulding 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 which 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 tension of the *sheets*.
Transit: two fixed objects are in transit when seen in line; two transits give position *fix*.
Traveller: 1, a ring or hoop which can be hauled along a *spar*; 2, a fitting which 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 the shore, at anchor or aground.
Uphaul: a ....e used to raise something vertically, e.g., the spinnaker pole.

V

Veer: 1, the wind veers when it shifts in a 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 a *displacement hull* and affects 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 which 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 the *mizzen* stepped *aft* of the rudder stock/post.

PRE-DEPARTURE CHECK-LIST

- ☐ Check bilge for excess 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 V-belts.
- ☐ Check for loose electrical connections in engine room.
- ☐ Secure tools or any loose equipment in engine room 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 the propeller or bow.
- ☐ Anchor ready to run.
- ☐ Check lifelines for tightness.
- ☐ Turn on fuel and water lines.
- ☐ 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. Persons aboard: NUMBER _____

NAME _____ AGE _____ PHONE # _____

ADDRESS _____

NAME _____ AGE _____ PHONE # _____

ADDRESS _____

NAME _____ AGE _____ PHONE # _____

ADDRESS _____

4. Engine: TYPE _____ H.P. _____ FUEL CAPACITY _____

5. Safety equipment: ☐ PFDs ☐ Flares ☐ Mirror ☐ Flashlight ☐ Food ☐ Water ☐ EPIRB ☐ Raft/Dinghy

6. Radio: TYPE _____ FREQUENCIES _____

7. Trip expectations:

DEPARTING AT (APPROX. TIME) _____ ON (DATE) _____ FROM (LOCATION) _____

GOING TO (LOCATION) _____ RETURNING (DATE) _____ IN NO EVENT LATER THAN (TIME & DATE) _____

8. Automobile: LICENSE # _____ STATE _____

MAKE _____ COLOR _____ PARKED AT _____

9. If not returned by _____, call the Coast Guard on:

_____

at: _____

_____

CLOSING UP YOUR BOAT AFTER SAILING

When leaving your Hunter, Legend or Vision at the dock for more than a short time, it is a good idea to review the following check list 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.

- ☐ Fold and bag headsails and stow below.
- ☐ Furl mainsail and cover, or remove and also bag.
- ☐ Remove and stow all portable deck hardware such as snatch blocks, winch handles, etc.
- ☐ Secure the boom to the topping lift and set it firmly amidships with the mainsheet purchase. (It is also a good idea to rig a line from the steering wheel or tiller to a convenient cleat to keep the rudder from swinging back and forth with the motion of the water.)
- ☐ Attach the shackle ends of all halyards to convenient fittings and take up slack.
- ☐ Cleat and coil halyard tails and permanent sheets, hanging them off the deck to promote drying.
- ☐ Coil and stow all other lines.
- ☐ Cover the winches and steering pedestal when leaving the boat for several days or more.
- ☐ Close all fuel lines and gate valves.
- ☐ Turn off the electrical system.
- ☐ Pump the bilge.
- ☐ Check air vents, secure ports and hatches, and swab the deck, particularly if you have operated on saltwater.
- ☐ Make a final check of mooring lines, chafing gear, fenders, etc.

FOR SAFE BOATING

BE PREPARED

Take a safe boating course from the Coast Guard. You can call 800-336-BOAT for information on courses in your area.

Carry all safety equipment required by federal and state law. Federal requirements are discussed in "Federal Requirements for Recreational Boats" which can be acquired from U.S. Coast Guard Office of Boating, Public, and Consumer Affairs, Washington, D.C. 20593. State requirements will come from your local State Boating Administration. The Coast Guard also recommends a first-aid kit, a pump or bailer, a transistor or weather radio, extra fuel, a paddle, anchor and line, and extra drinking water; also, if not a requirement, flares.

Get a Coast Guard Auxiliary Courtesy Examination. This is a free, confidential safety inspection. Call your local Coast Guard Auxiliary for details.

Be familiar with the use of distress signals and PFDs.

AVOID FIRES

Handle fuels carefully.

Read labels on any stove fuels.

Read the engine owner's manual for proper fuel-system maintenance and inspect your engine's fuel system periodically.

Heed fire extinguisher regulations and keep them in good condition.

While refueling:
a. Fill the portable tanks on the dock.
b. Tie the boat securely.
c. Extinguish cigarettes and all flames on the boat. Turn off all engines and electrical equipment.
d. Keep the hose nozzle in contact with the fuel can or fill.
e. Wipe up all fuel spillage.
f. Ventilate the engine and fuel compartment.
g. Check boat for fumes.

BEFORE GETTING UNDERWAY

Leave a float plan. (See example under Float Plan)
Perform pre-departure check list. (See Pre-Departure Check List)
Check the weather; do not venture out if the weather is threatening.

WHILE UNDERWAY

PFDs should be worn by children and non-swimmers **at all times.** ***Everyone should wear them if conditions become hazardous.***

Do not operate a boat if intoxicated, fatigued or stressed. These human factors cause 50 percent of all boating accidents.

Keep a good lookout. This is especially true of sailboats. Keep a watch to leeward under the headsail. Keep away from swimmers, divers and skiers.

Obey state and federal laws. Know your local laws and "rules of the road."

Respect bad weather: try to get in shore if the weather turns bad. Get and carry a radio with a NOAA "weather band" or FM 162.40-162.55MHZ.

IF TROUBLE OCCURS

Radio for help. Use the emergency VHF, channel (i.e., 156.8MHZ).

Put on PFDs immediately.

Stay with the boat. In cold water, huddle together to prevent hypothermia.

FLOAT PLAN

Make copies of the Float Plan page and use before each trip. Fill it out and leave it with a reliable person who will notify the Coast Guard or other rescue organizations if you fail to return on time. **Do not forget to cancel the float plan upon your return.**

GENERAL HANDLING & OPERATION

Diesel Engine

An engine owner's manual is supplied with your boat and should be read thoroughly. The manual contains technical specifications, running instructions and 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.

If 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 3/4 throttle at least once a month to clean out carbon build-up and moisture.

Starting:

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 engine shut-off cable is properly secured and operating.
4. Place the shift lever in the neutral position.
5. Move the throttle or "fuel" lever forward to approximately the half-speed position.
6. Insert the starter key and turn to the "on" position.
7. Press the starter button and hold until engine starts, then release. The buzzer and/or light should then go off.
8. Back the throttle off to an idle position (700 to 800 rpm); allow cold engine to warm up a minimum of five minutes.
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: To stop engine at any time, pull "engine stop" lever all the way out. Before stopping, however, it is a good idea to idle the engine in neutral for about five minutes, then race it in the full-throttle position for a moment, then return to idle and stop engine.

   CAUTION: Do not turn safety main switch to "off" while engine is running. This can seriously damage the alternator.

Motoring:

If your boat is equipped with 110V shore power, remember to unplug it upon departure. When engine is warm, move the shift lever to forward and reverse to insure that it engages properly. To increase RPM's push throttle lever forward and pull back to decrease RPM's.

GENERAL HANDLING & OPERATION

Motoring Continued:

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.

IMPORTANT: Do not shift from forward to reverse or back without first lowering engine rpm to idle. When sailing, it is best to start the engine before the sails are lowered. This way, it is still possible to maneuver if the engine should not start.

Electrical System

Your Hunter is fitted with an electrical system designed for both AC (AC not available on the 26.5 and smaller) and DC. While in port, you can operate any tool, appliance or other device designed to function on regular house current (120V) simply by plugging your dockside power cord into a convenient outlet on shore and turning your AC main breaker on.

CAUTION: 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.

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 and, just as with your automobile, it must be charged regularly by operating the engine. 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 battery(ies) 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 battery(ies) and attach them to a trickle charger to keep them fully charged and ready to use.

Water System

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

CAUTION: Do not turn the water heater on until you are sure the tank is filled with water. To do so will destroy the heating element, which is not covered by the warranty.

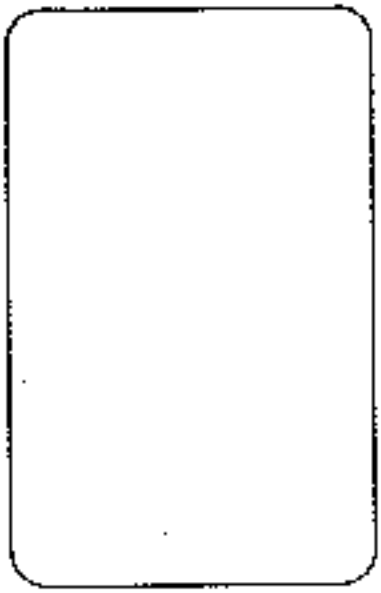
Pressure water pumps are the demand type. Once the circuit breaker switch is on, opening the faucet will produce water flow.

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.

Please refer to your manual under Heads & Galley systems for more specific information.

GENERAL HANDLING & OPERATION

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 "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 the "dry" position and pump slowly until bowl is empty.

Note: Always close seacocks when sailing or when boat is not in use.

Pumps:

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

Inspect all hoses for chafing and dry rot. 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 switch moves freely and is making an electrical connection.

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 and fenders should be at ready, loose gear stowed and decks cleared. Determine the direction of wind and current, and, once 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 fenders

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 vessel, even for brief periods. For other types of moorings, or for abnormal wind or water conditions, consult your *Chapmans's* or other approved boating guide.

Anchoring:

Your Hunter comes with an on-deck anchor well and a burying-type anchor as standard equipment. The anchor is selected to suit the size and weight of your boat under normal anchoring conditions, and provides its best holding characteristic in muddy or sandy bottoms.

When anchoring, pay particular attention to the scope of your anchor rode (i.e., the relationship between the depth 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 the positions of any boats already anchored nearby.

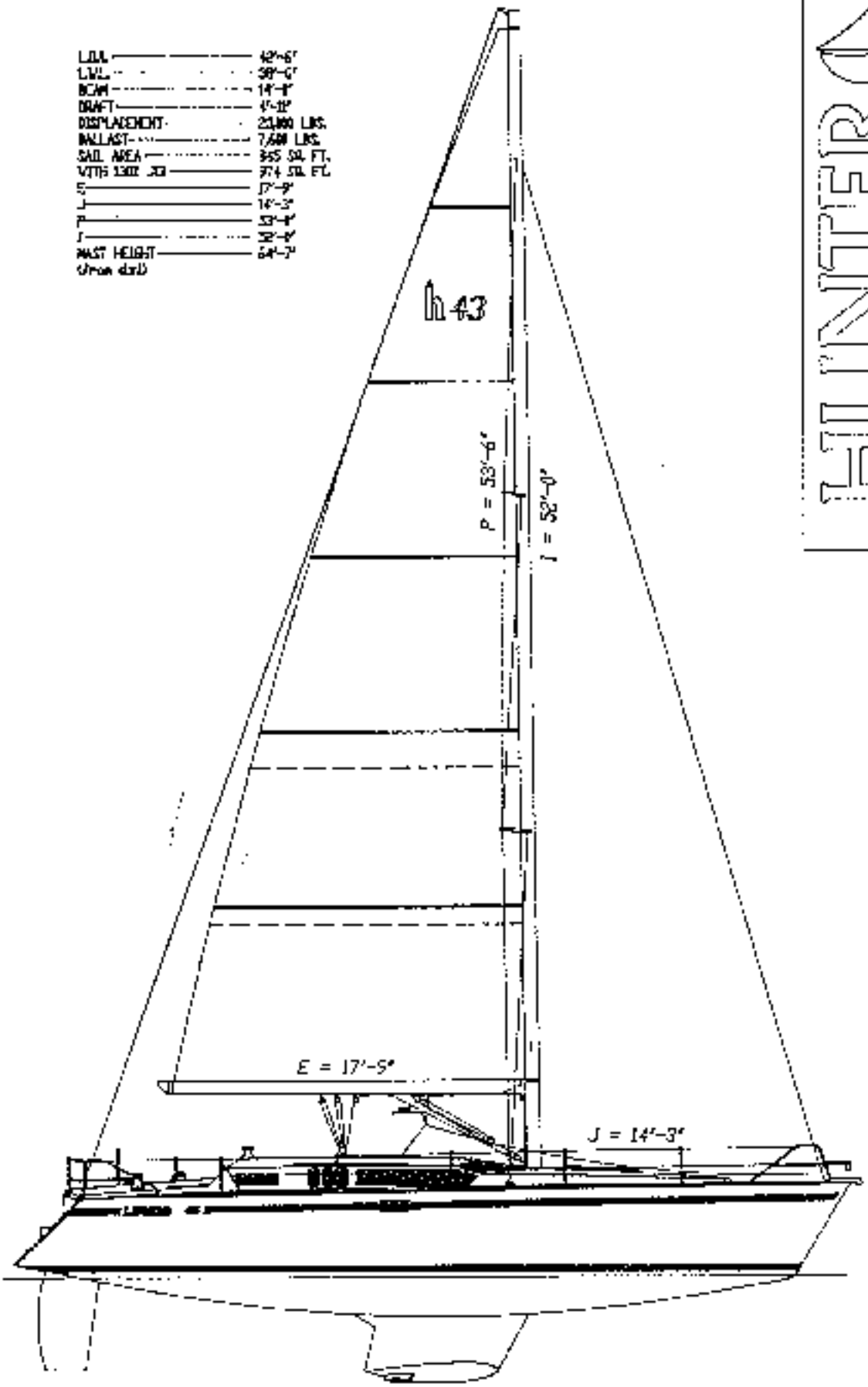
CAUTION: Anchoring in unusual water and/or weather conditions will require additional precautions. Consult your *Chapman's* or other approved guide for suggestions.

To weigh anchor, motor or sail (under main only) slowly forward. 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 the anchor aboard. It is good practice to thoroughly clean the anchor prior to placing it in the anchor well.

HUNTER

LEGEND 43 SAIL PLAN #43APS01

LOA	42'-6"
LWL	38'-0"
BEAM	14'-8"
DRAFT	6'-11"
DISPLACEMENT	21,000 LBS.
BALLAST	7,600 LBS.
SAIL AREA	955 SQ. FT.
WITH 130% JIB	974 SQ. FT.
E	17'-9"
J	14'-3"
P	53'-6"
I	52'-0"
MAST HEIGHT (From dwl)	64'-7"



Tuning the Conventional Fractional Rig (Hunter 27OB, 27IB, 28, 30, 33.5, and Legend 35.5, 37.5 and 43.

Tuning the Rigging:

After raising your mast, attach the headstay, backstay, upper shrouds and lower shrouds. Set the headstay turnbuckle at half open and then tighten backstay turnbuckle to medium tension.

To center the mast athwartships, start with only slight tension on the upper and lower shrouds. Check that the mast is centered in the boat by measuring from the masthead to the chainplates with a steel tape measure hoisted completely up the main halyard. Adjust the upper shroud until the measurements port and starboard are exactly the same. Now the spar is plumb athwartships, tension both uppers equally, counting turnbuckle revolutions as you go. Tighten uppers until you have approximately one inch of "preband" fore and aft in the mast. This is achieved because the swept spreaders will push the middle part of the mast forward as you increase tension of the uppers.

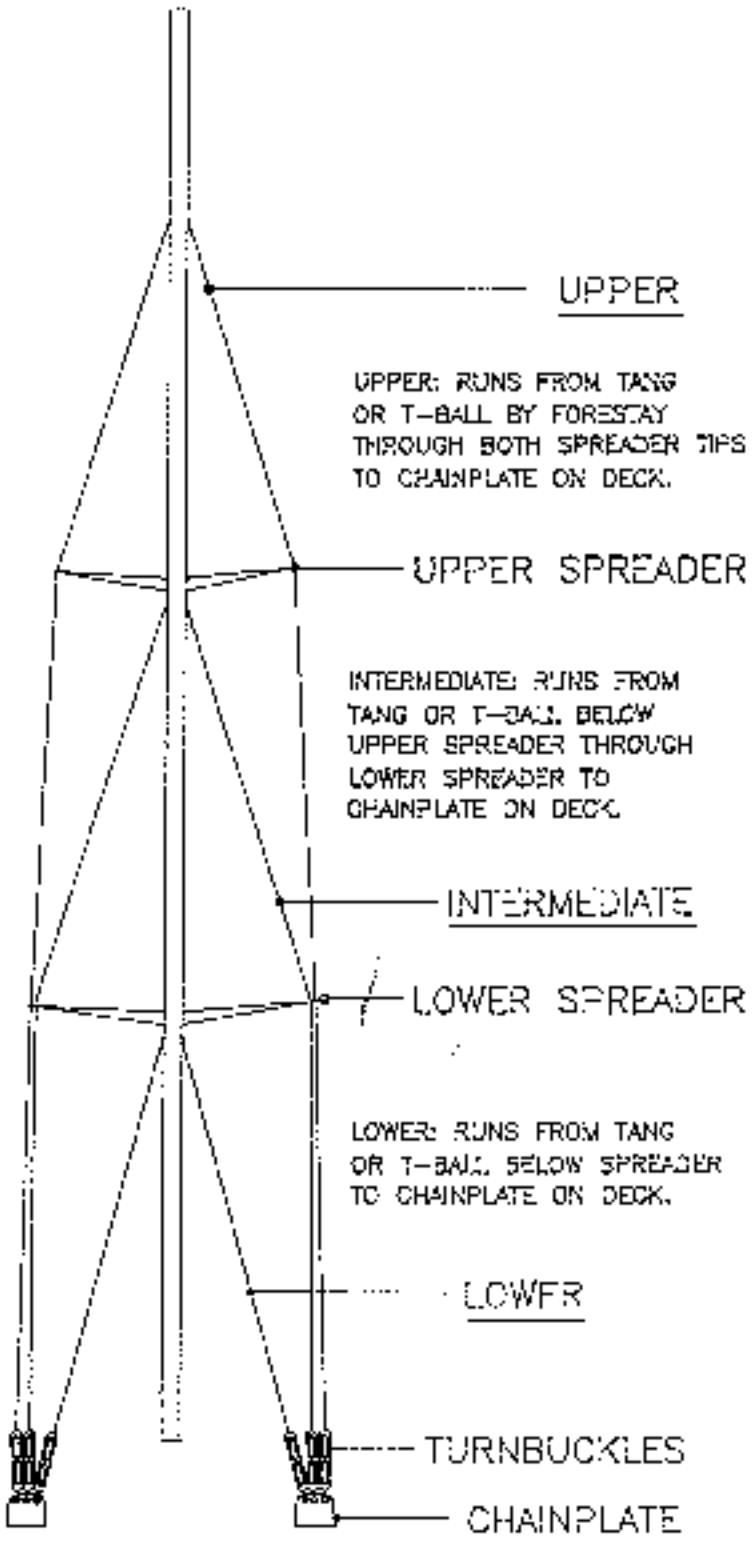
Now tighten the lower shrouds evenly, making sure the mast remains straight athwartship. Sight up the luff groove to assure this straightness. Lowers should end up almost as tight as the uppers. (The uppers should always be the tightest.) The 28, 30, 33.5, and Legend 35.5, 37.5 & 43 are equipped with double spreaders. The three shrouds should be made progressively tighter toward the top of the rig; the uppers should be the tightest of all. Tighten backstay to a taut position: perhaps eight to ten turns past your original tension.

Check the mast tuning by sailing in medium winds (10-12 knots). Sometimes fine tuning the upper and lower shrouds is necessary when the spar is loaded in sailing conditions. Sail on both tacks, sighting up the luff groove to check athwartship straighness. Both upper and lower shrouds should be taut on the leeward side.

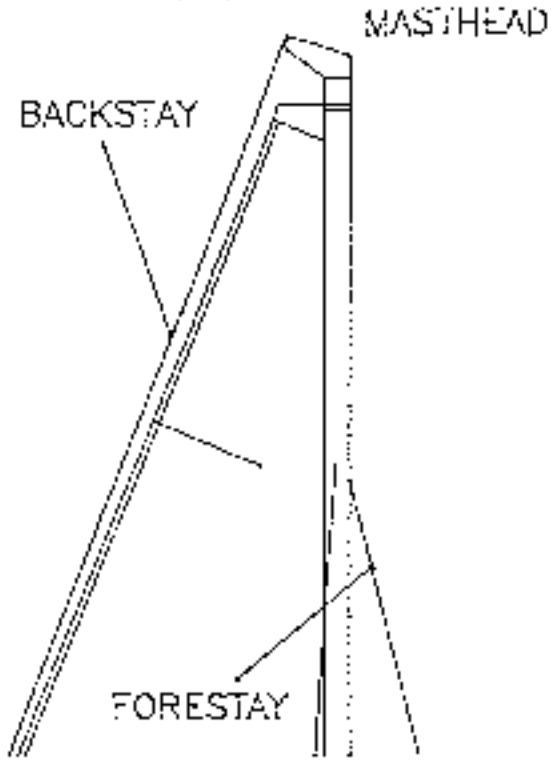
When mast tuning is complete, install cotter pins in all turnbuckles and tape over sharp edges of the cotter pins with chafe tape. (Refer to the drawing on Conventional Fractional Rig).

HUNTER

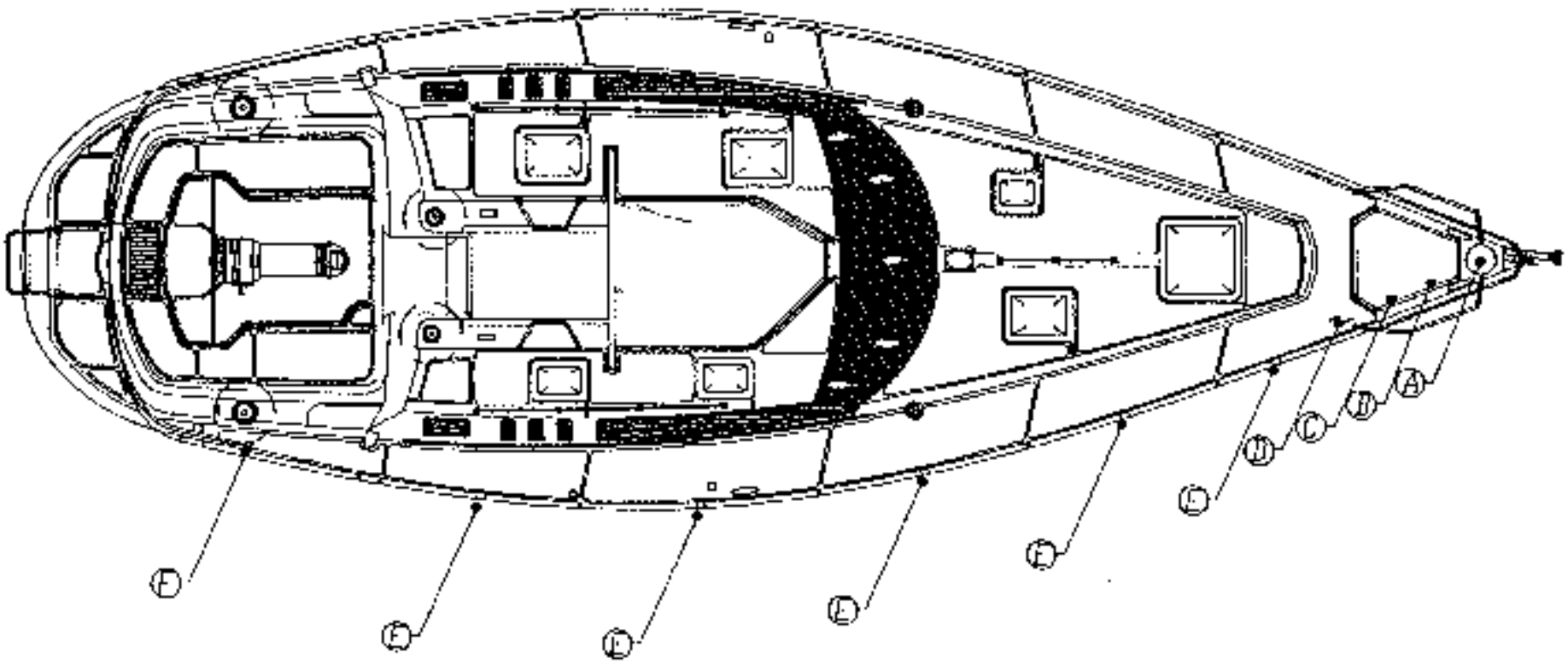
DOUBLE SPREADER FRACTIONAL RIG
W/ SWEPT BACK SPREADERS GENA260'



BACKSTAY: RUNS FROM MASTHEAD TO BACKSTAY-- CHAINPLATE ON DECK.



FORESTAY RUNS FROM A POINT APPROXIMATELY 20% BELOW MASTHEAD TO STEMHEAD FITTING.



(A) HOOD FURLER #915
(B) SCHAEFER #501-39
(C) SCHAEFER #300-32
(D) SCHAEFER #34-46
(E) SCHAEFER #300-31
(F) SCHAEFER #300-35

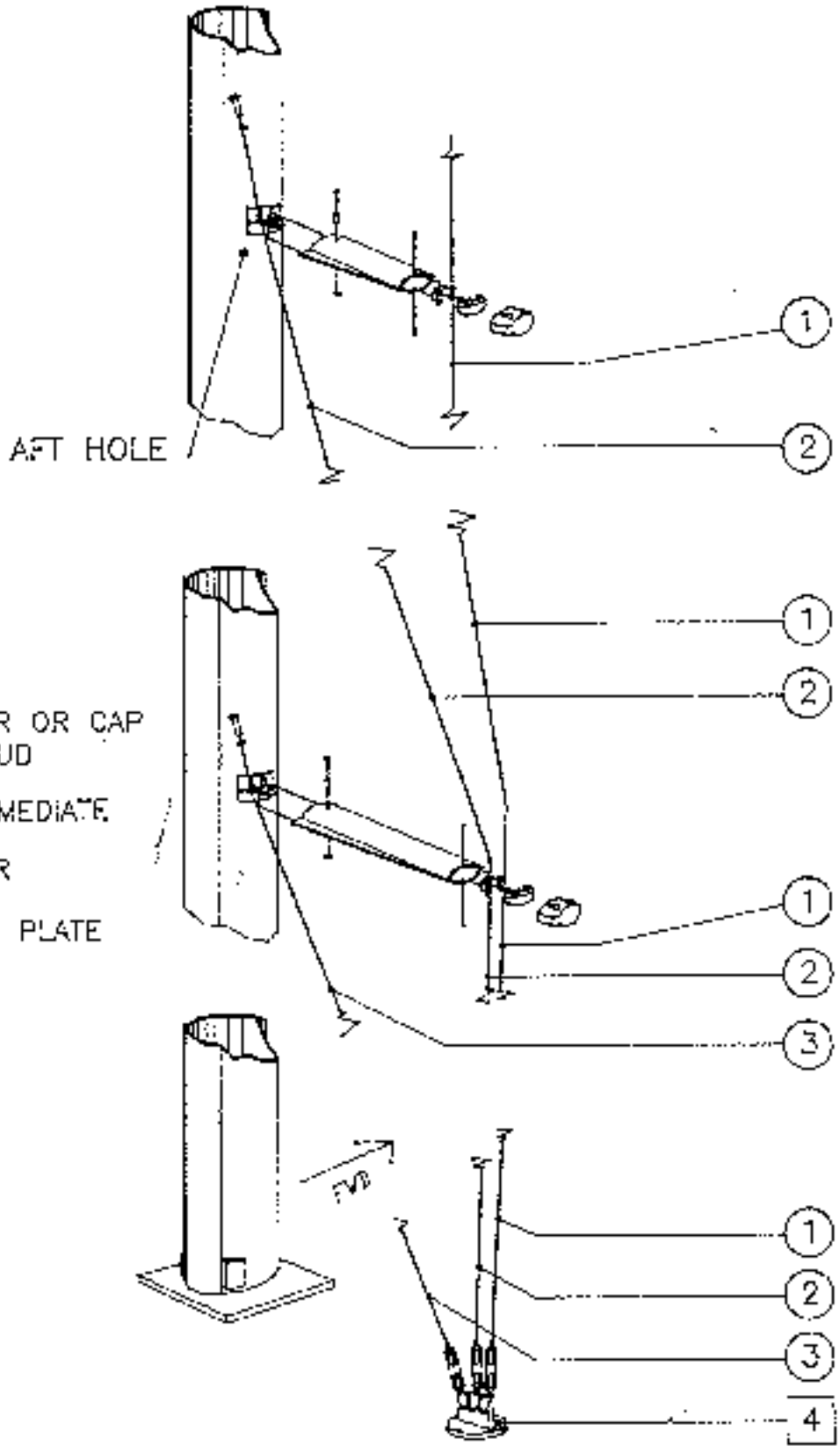
NOTES REGARDING ENDLESS FURLING LINE:
RUN FURLING PART OF THE LINE THRUGH BLOCKS "E" AND STANCHION BASES
RUN UNFURLING PART OF LINE THRUGH STANCHION BASES ONLY.

HUNTER

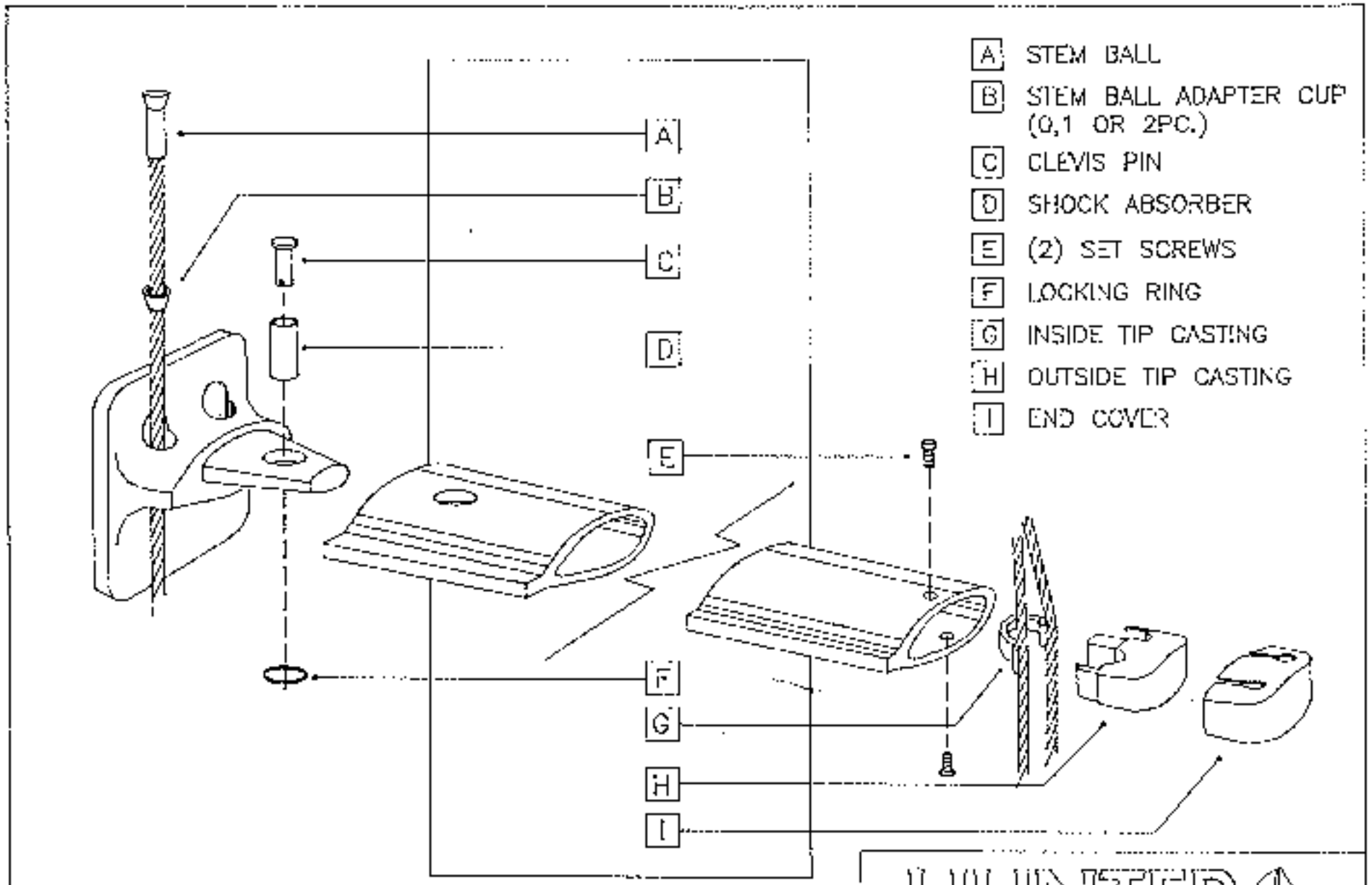
LEGEND 43 HOOD FURLING SYSTEM H43A2636

HUNTER

ISOMAT RIGGING ASSEMBLY GEN/A2603

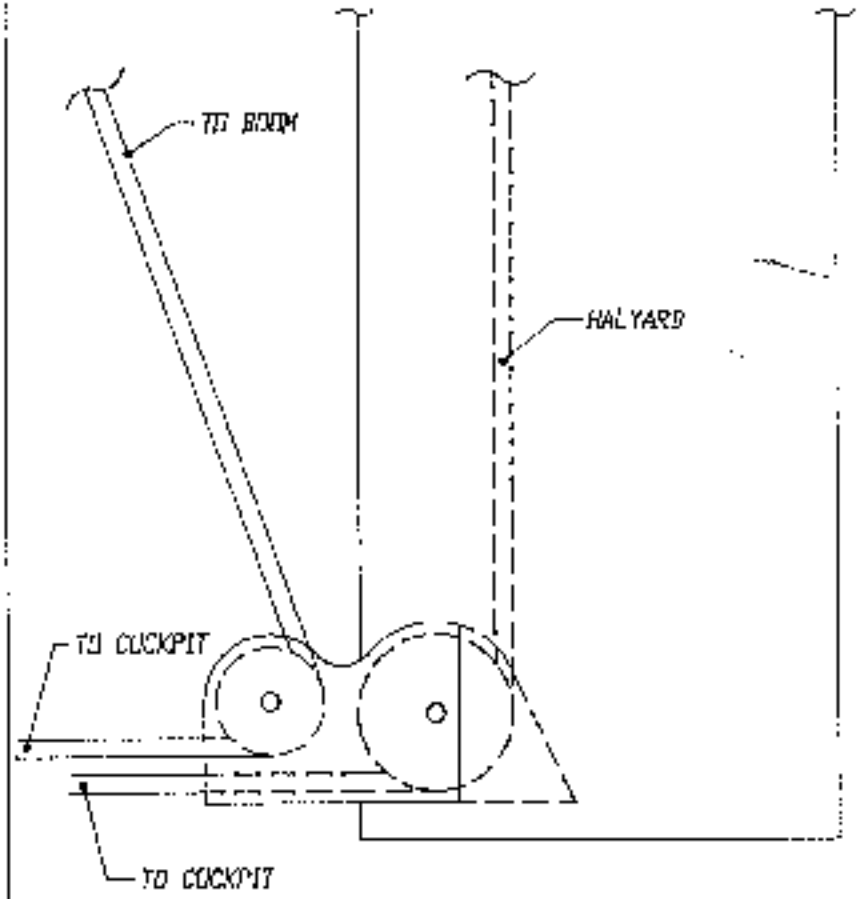


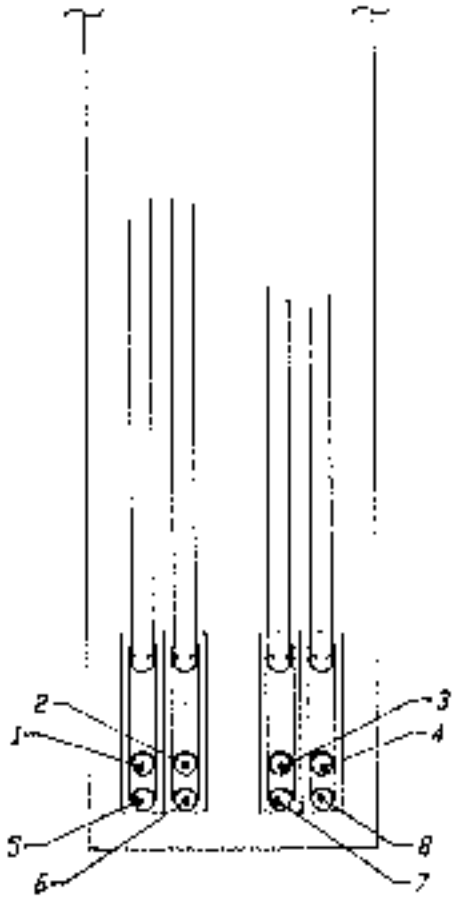
1. UPPER OR CAP SHROUD
2. INTERMEDIATE
3. LOWER
4. CHAIN PLATE



HUNTER

ISOMAT SPREADER DETAIL GEN 2607

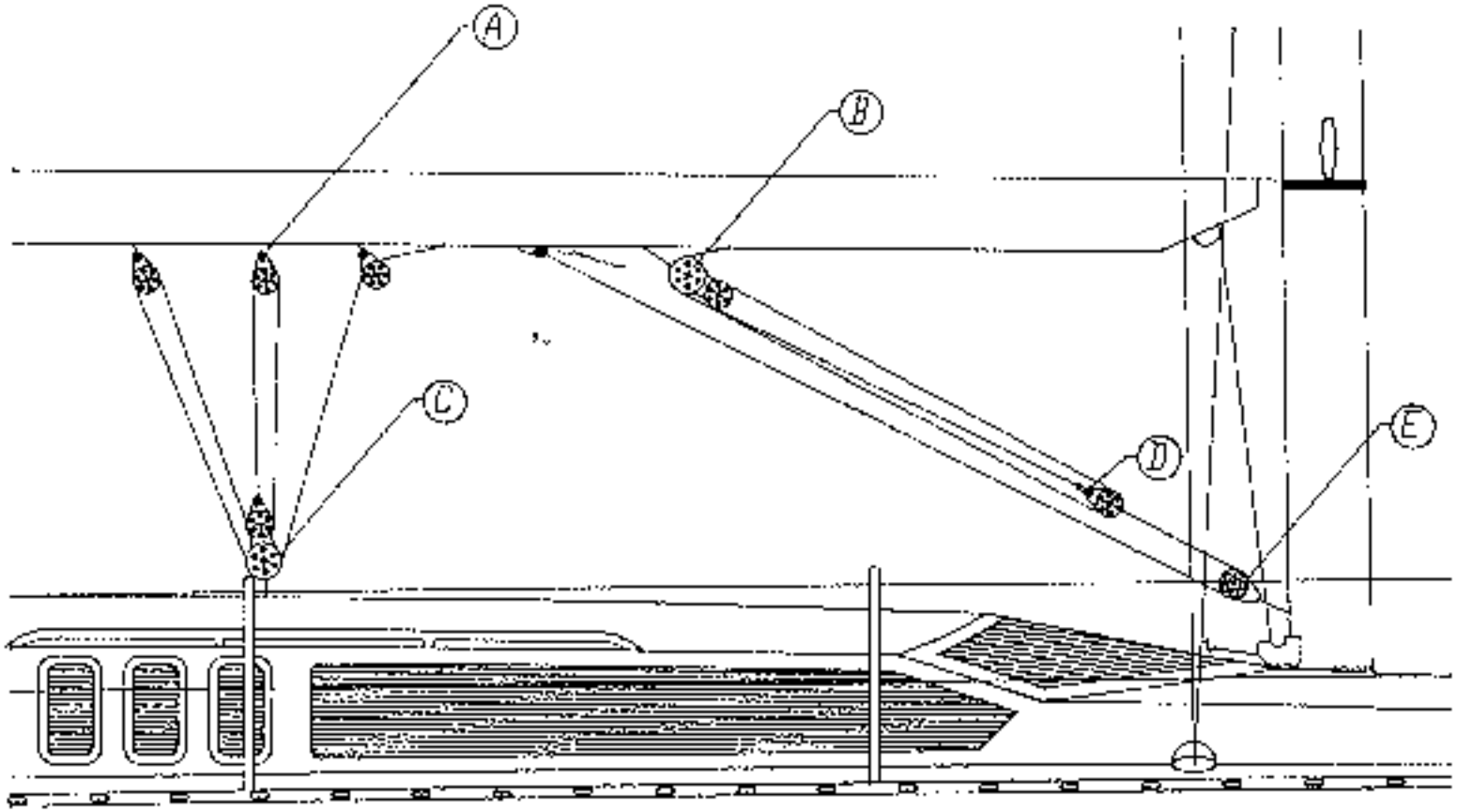




1. REEF #1
2. VANG
3. MAINSHEET
4. REEF #2
5. GENOA HALYARD
6. SPINNAKER POLE TOPPING LIFT (OPTIONAL)
7. SPINNAKER HALYARD
8. MAIN HALYARD

HUNTER

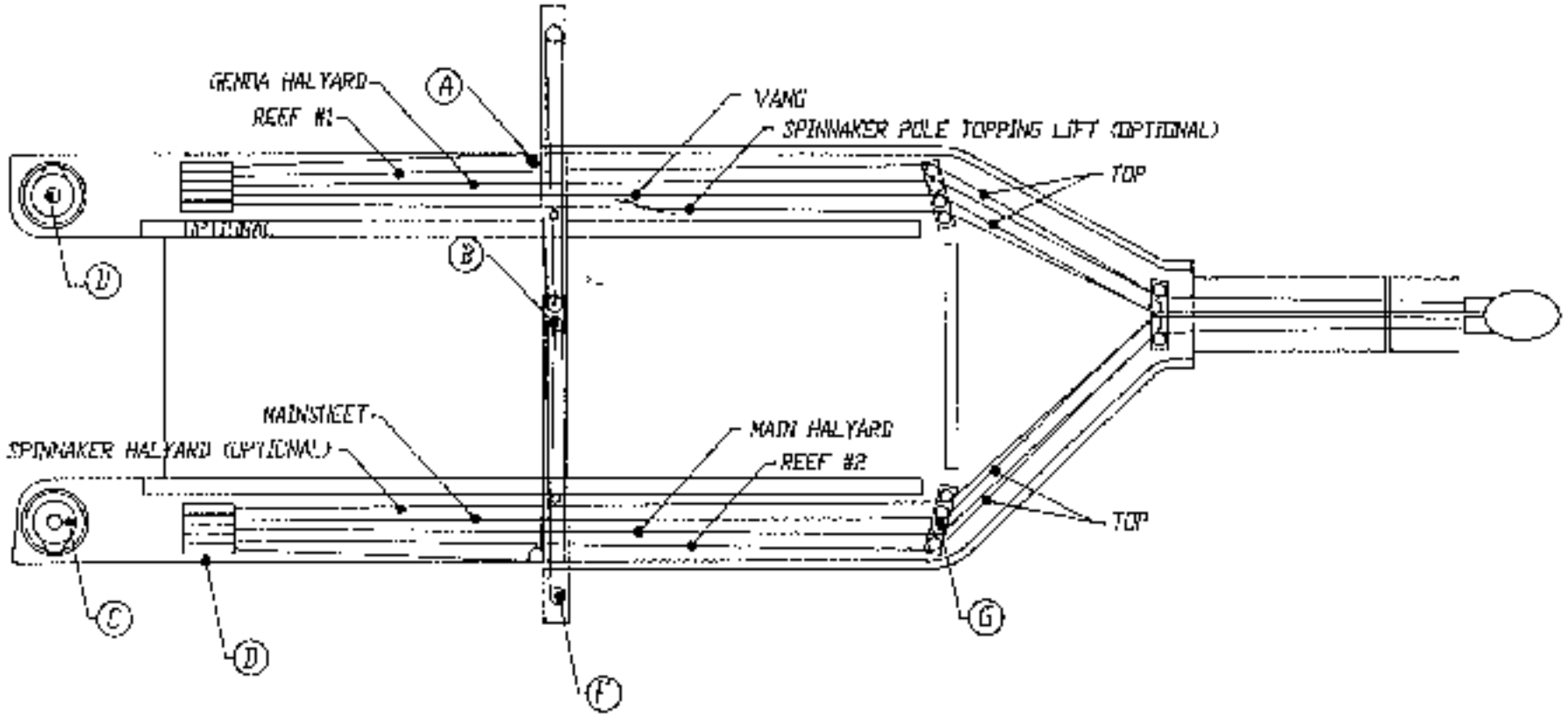
LEGEND 43 MAST STEP DETAIL H43A2639



(A)	SCHAEFER	#701-03
(B)	SCHAEFER	#701-45N
(C)	SCHAEFER	#10-55
(D)	SCHAEFER	#701-13
(E)	SCHAEFER	#08-09

HUNTER

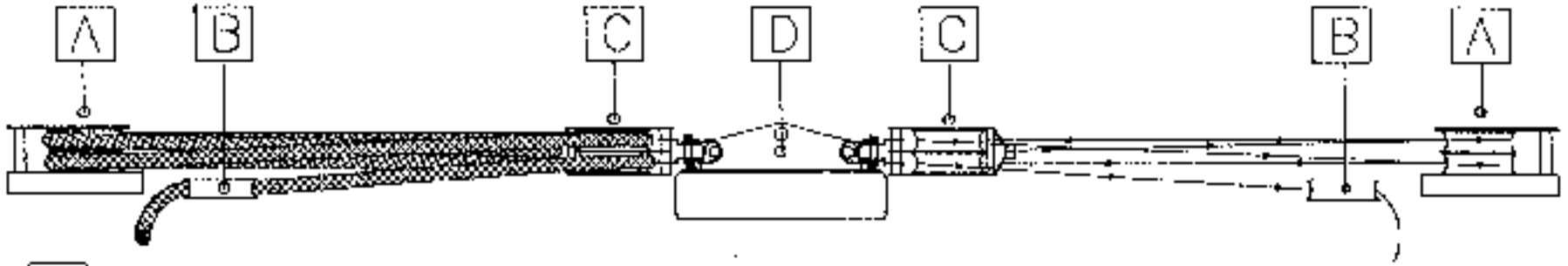
LEGEND 43 MAST AND VANG LAYOUT H43A2627



(A) SCHAEFER 500-32 SWIVEL SHEAVE
(B) SCHAEFER 72-89 8 WHEEL TRAVELLER CAR
(C) HARIENT 24-45 WINCH
(D) HARIENT 21-33 WINCH
(E) HARHAUER HUAD SHEET STOPPER
(F) SCHAEFER 74-50 END CONTROL BLOCK
(G) HARHAUER DECK ORGANIZER

HUNTER

LEGEND 43 RUNNING RIGGING H43A2634

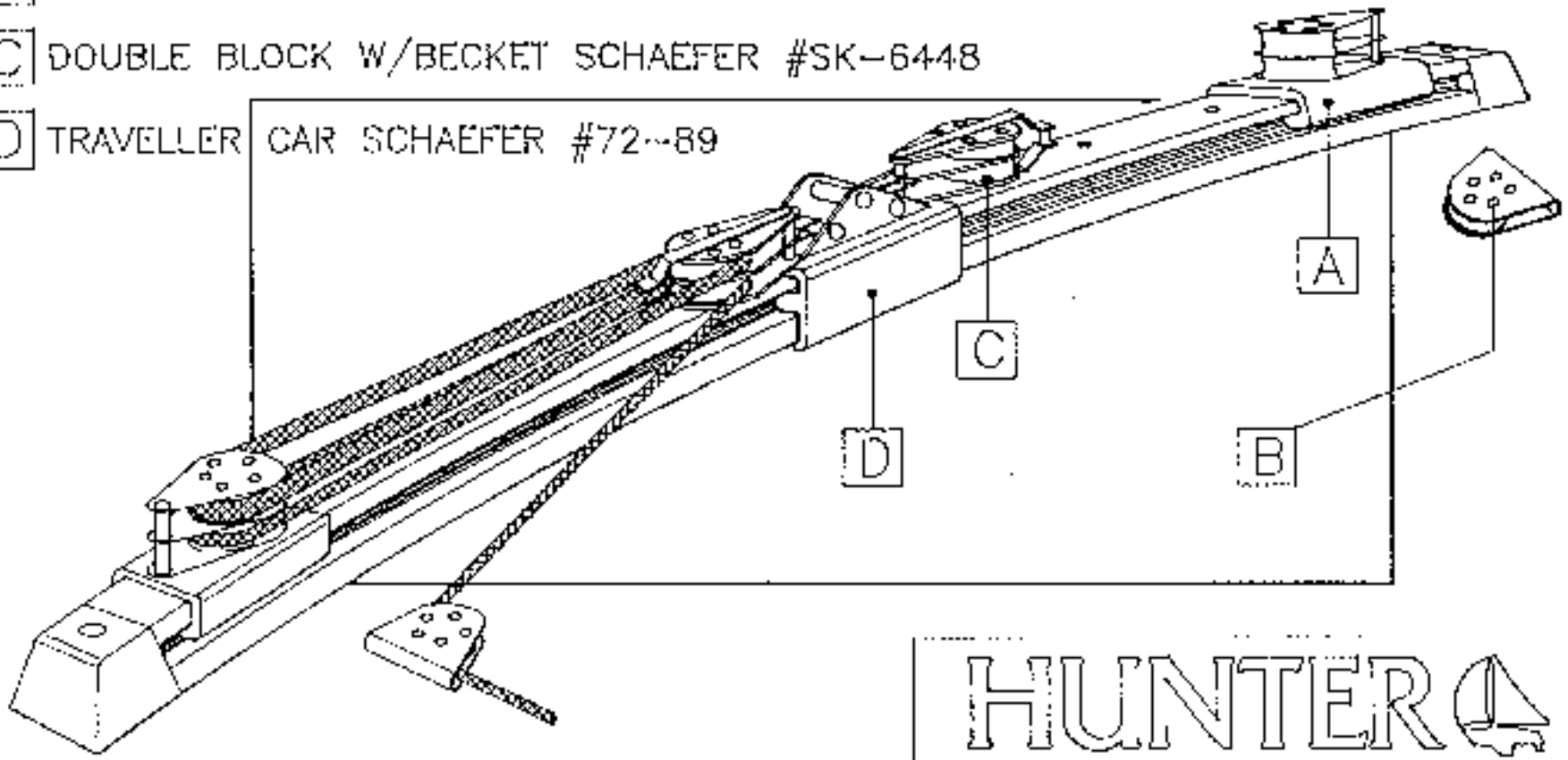


A CONTROL BLOCK SCHAEFER #74--60

B FAIRLEAD BLOCK SCHAEFER #500-32

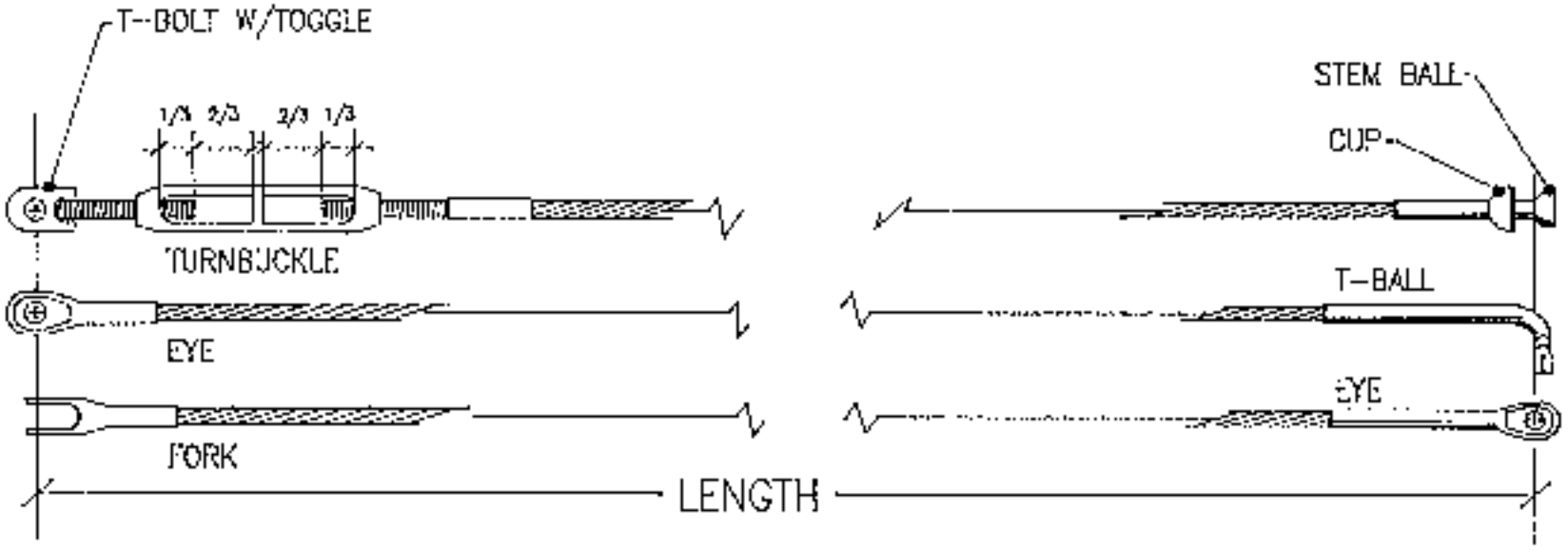
C DOUBLE BLOCK W/BECKET SCHAEFER #SK-6448

D TRAVELLER CAR SCHAEFER #72--89



HUNTER

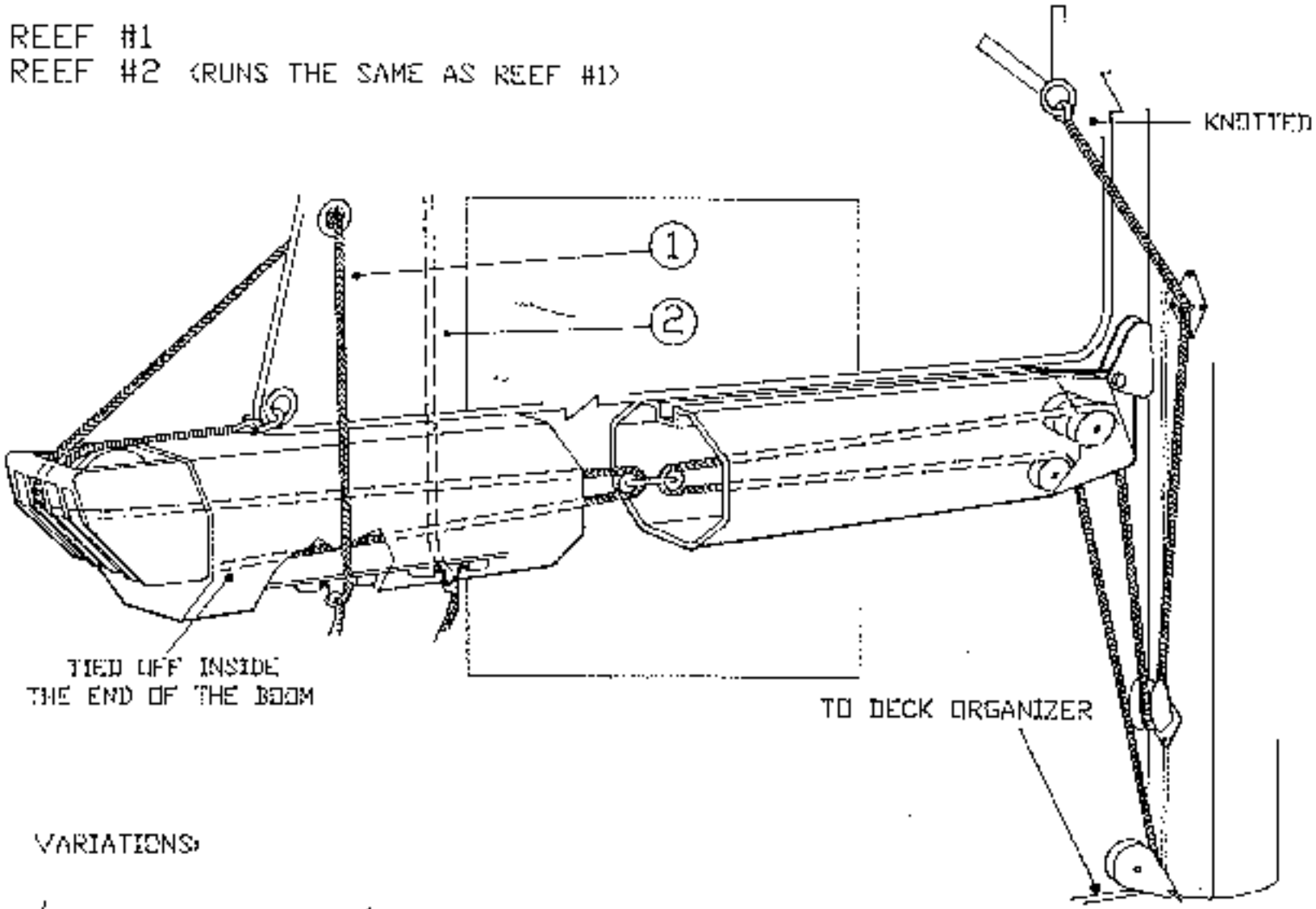
LEGEND 43 MAINSHEET TRAVELLER 143A2640



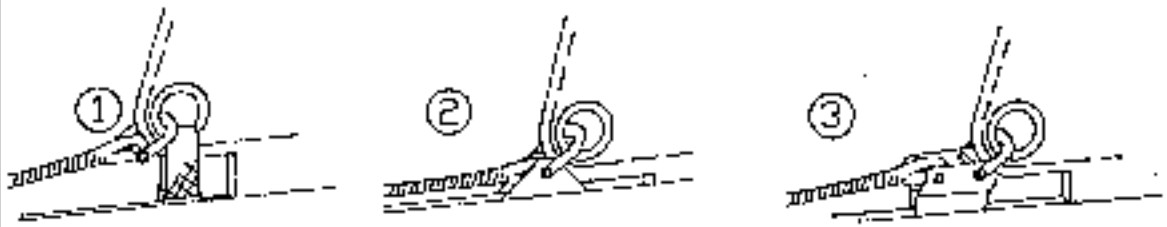
HUNTER

RIGGING LENGTHS GENA2605

① REEF #1
② REEF #2 (RUNS THE SAME AS REEF #1)



VARIATIONS:



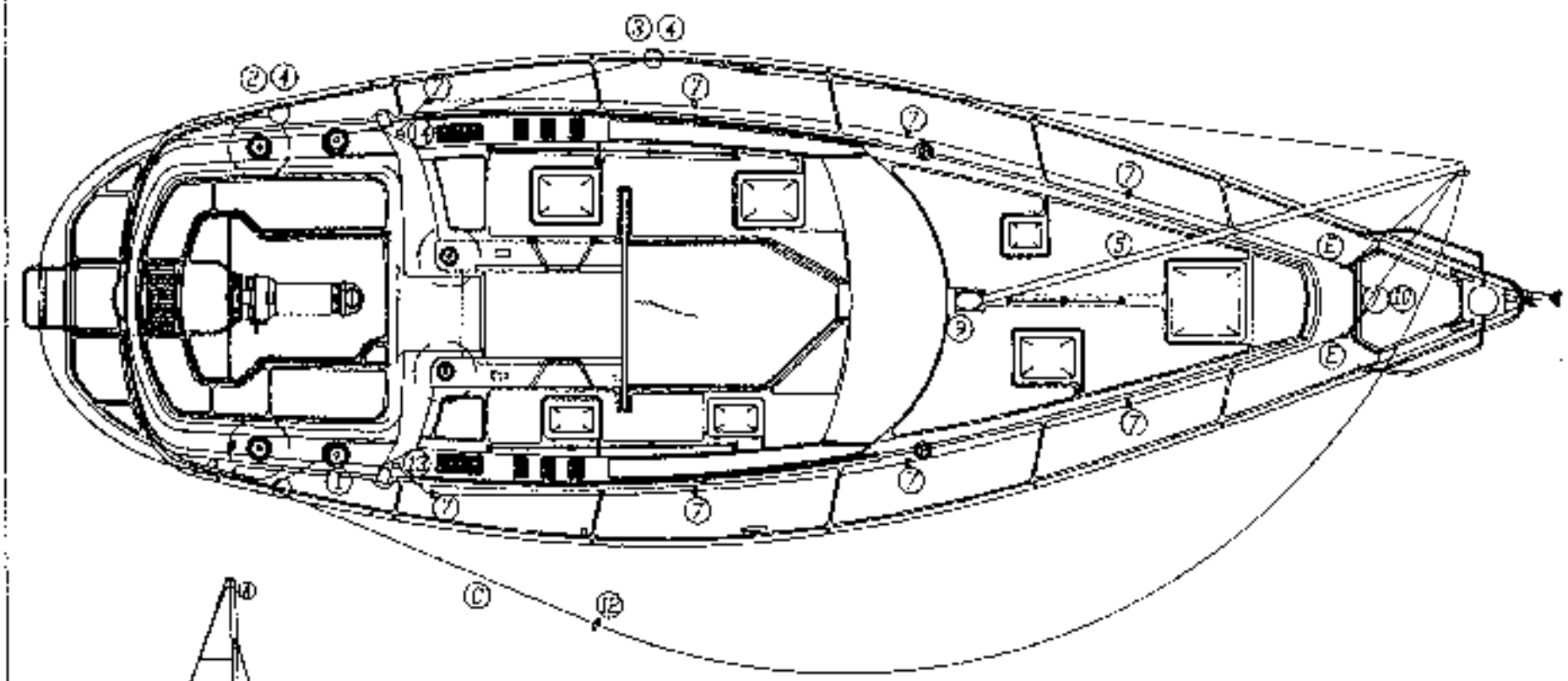
HUNTER

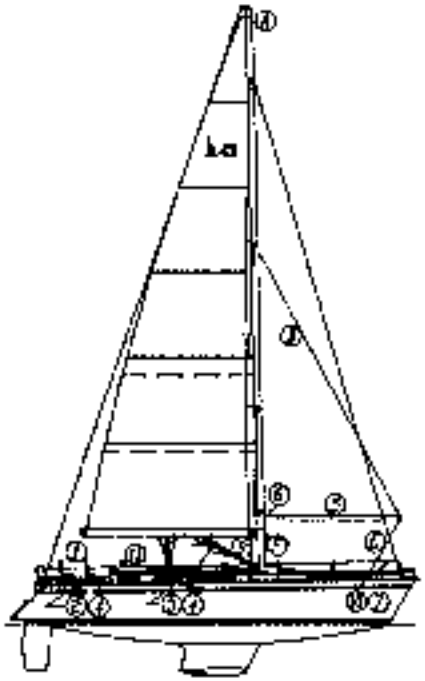
BOOM AND REEF LAYOUT
ISUREEF GENA2609

HUNTER
LEGEND 43 DECK HARDWARE 1434268
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32

LEGEND 43 DECK HARDWARE LAYOUT (See Diag.)

1. Stem plate w/roller	Southcoast	NA	HW1614
2. Reefer furler	Hood	915	RIO423
3. Mooring cleat	Y/S	YS7107F-10"	HW0977
4. Bow rail	Southcoast	NA	HW2411
5. Stanchions	Southcoast	NA	HW2100-A
6. Hatch fwd.	Bomar	1049-10	HW0070
Trim ring	Bomar	NT2049	HW0070-A
Screen	Bomar	NS2049-ex	HW0070-B
7. Handrail, fwd.	Custom	NA	HW2440
8. Hunter vent hatch, fwd	Custom	NA	WC010011
9. Deck organizer	Garhauer	NA	HW0172
10. Hunter hatch, mid	Custom	NA	WC010011
11. Port light	Lewmar	8902	HW0043
12. Handrail, aft	Custom	NA	HW1700
13. Port light	Lewmar	HSK0341	HW0008
14. Turning block	Schaefer	08-09N	HW0270
15. Primary winch	Barient	28CST	HW2550
16. Stern rail	Custom	NA	HW2289
17. Swim ladder	Southcoast	NA	HW1701
18. Toe rail	Tiffon	NA	HW2501
19. Water tank fill	Perko	52I-W00	PL1141
20. Waste deck plate	Perko	NY6146-00	PL1140
21. Genoa track	Schaefer	SK6096	HW0257
End stop	Schaefer	74-36-6	HW0215
Block lead	Schaefer	32-98	HW0217
22. Mainsheet traveller	Schaefer	SK6447	HW0152
Traveller car	Schaefer	72-89	HW0239
Fiddle block w/becket	Schaefer	10-55	HW0223
Double block w/becket	Schaefer	SK-6448	HW0159
Fairhead block	Schaefer	500-32	HW0197
23. Companionway grab rail	Southcoast	NA	HW2433
24. Sheet stopper, quad.	Garhauer	11-11	HW1274
25. Cpway. slider track	Bomar	NA	HW0148
26. Pinboard track	Bomar	NA	HW0147
27. A. Halyard winch	Barient	24-45	HW2542
27. B. Halyard winch	Barient	21-33	HW2545
28. Stanchion gate (stb)	Southcoast	NA	HW2117
Stanchion gate (port)	Southcoast	NA	HW2118
29. Manual bilge pump	Rule	148M	PL0361
30. Diesel fuel fill	Perko	520 000	PL1143
31. Stern rail	Southcoast	NA	HW2289
32. Inspection port	Pyrd	DP40-W	HW0045





HUNTER

LEGEND 43 SPINNAKER PACKAGE H43A2641

LEGEND 43 SPINNAKER PACKAGE (Page Two)

DECK FITTINGS

#	Item	Quantity	Vendor & Model	Notes
1.	Spinnaker sheet winches	2	Barient 28CST	
2.	Spinnaker sheet blocks	2	Schaefer 10-15	
3.	After guy blocks	2	Schaefer 10-15	
4.	Pad eyes sheet & guy	4	Schaefer 78-25	Mount on toerail
5.	Spinnaker pole with ends	1	Isomar	Dip pole style
6.	Spinnaker pole car		Isomat	Car & adj. gear
7.	Pad eye for foreguy	1	Schaefer 78-25	Just behind anchor well
8.	Fair lead eyes for foreguy	8	Schaefer 78-51	Along edge of house above genoa track
9.	Halyard exit plate	1	Schaefer 34-46	Guide through seahood
10.	Block with snap shackle	1	Schaefer 701-09	Foreguy
11.	Sheet stoppers	3	Garhauer single, S.S.	2 port, 1 stbd.
12.	Spinnaker sheet donuts	4	Schaefer 45-50	2 green, 2 red
13.	Spinnaker halyard stopper	1 (stb)	Schaefer 70-86	On house side
14.	Spinnaker halyard stopper	1 (port)	Schaefer 70-85	On house side

LINES

Letter	Item	Line	Length	Shackles	Vendor
A.	Spinnaker halyard (XLS extra)	7/16"	130'	Nicro Fico NF 15000S	Seco South
B.	Spinnaker pole topping lift	7/16"	100'	Nicro Fico NF 11000S	Seco South
C.	Spinnaker Sheets	7/16"	2/80'	Nicro Fico NF 15000 FR	Seco South
D.	Spinnaker after guys (XLS extra)	1/2"	2/65'	Nicro Fico NF 15000 FR	Seco South
E.	Spinnaker foreguy	7/16"	1000'	Nicro Fico NF 15000S	Seco South
F.	Spinnaker car control line	3/8"	30'		Isomat

DUTCHMAN®
Martinus Van Breems, Inc.
571 Riverside Avenue Westport, CT 06880
Tel 203-454-0222 FAX 203-454-1465

Notes to the Dealer for rigging the Dutchman on the Hunter Legend & Passage Series

May 1980

The new Hunter Legend and Passage series are coming standard with the Dutchman System B. The Dutchman system consists of vertical control lines of Nylon Monofilament that weave through custom nylon 'pathleads' in the sail. The control lines are fastened to Dacron zippered tabs sewn into the base of the sail, sandwiched between nylon discs on both sides of the tab. The attachment and proper adjustment of the control lines is described at length in the Owners Manual.

The System B also includes our Continuous Topping Lift (CTL) System. The position of the clamps can be adjusted from the end of the boom by rotating the CTL Line. Boom height is adjusted normally.

A. Parts Check

Make sure the following 2 components are included in the parts bag:

- 2 white discs per control line to attach the control lines to the tabs sewn in the foot of the sail.
- 1 Assembled Continuous Topping Lift (CTL) System. This is made up with the following parts:
  - The CTL Line, which is 1/4" - 5/16" braided Dacron line.
  - Control lines of 400 - 500 lb test Nylon Monofilament.
  - 1 block, 1 jam cleat, and 1 shackle attached to the CTL Line.
  - Black clamps that attach the control lines to the CTL Line

Illustrations and descriptions of these parts can be found on Pages 3 & 4 of the Owners Manual. The Owners Manual should be with the other Owners Manuals and Ships Papers.

B. Rigging the Continuous Topping Lift System

The CTL System will arrive with the clamps, control lines, block, jam cleat, and shackle attached.

1. If a mast adjusted (halyard type) topping lift, install the CTL after the mast is stepped by attaching the block of the CTL to the Topping Lift adjusting line, and hoisting up the CTL.

2. After the boom is attached to the gooseneck fitting, attach the jam cleat to the topping lift adjusting line with the shackle provided.

(over)

C. Adjusting the CTL Clamps

1. Hoist the main. Pull the main sheet and topping lift adjusting line snug. Sight up the vertical rows of grommets.

2. Flip over the V shaped jam cleat. Slacken the topping lift and rotate the CTL Line from the end of the boom until the uppermost clamp is directly above the forward vertical rows of fairleads, then tension the topping lift. Mark where the CTL passes around the jam cleat with a pen.

3. Adjust the lower clamp(s) if needed. This is done by rotating the CTL to get the clamp to deck level, loosening the 4 screws in the clamp, sliding it up or down, tightening the screws, and repositioning the CTL. Again, it helps to slacken the topping lift when rotating the CTL. See Page 9 of the Owners Manual.

D. Threading the Control Lines

1. With the sail raised, count the number of fairleads in either one of the vertical rows. Drop the sail.
   If an **even** number of fairleads, insert the control lines in the uppermost fairleads on the **same** side of the sail as the tabs sewn into the foot are on.
   If an **odd** number, begin weaving the control lines through the uppermost fairleads on the **opposite** side of the sail as the tabs are on.

2. Weave the control lines through all of the fairleads in each vertical row. The end of the control lines should exit through the lowest fairlead on the same side of the sail as the tab.
   Use two people, one on either side of the sail to pass the control line back and forth.

3. Open the zipper in the tab and pull the control line through the hole at the top of the tab. Install the discs and tighten. The nuts should face the sail. See Page 10 of the Owners Manual. Then hoist the sail to adjust the control line length.

E. Adjusting the Control Line Length

The control lines should be slack enough that sail shape is not affected by the tension on the control lines with the sail raised. To adjust the control line length, the sail must be fully raised with the main sheet and topping lift tensioned. Refer to Page 11 of the Owners Manual.

The control lines should have enough slack to allow 1 inch of play up or down.

F. Final Adjustments

1. Make certain that the topping lift adjusting line is long enough to allow the topping lift to be slackened with the sail raised.

2. Make sure the jam cleat is in the locked position (pointing up). **Using rigging tape, tape the CTL line just above the jam cleat to prevent the CTL Line from rotating.**

G. Using the Dutchman

When dropping the sail the first few times, be careful that the folds drop on the correct sides of the boom. First, straighten the folds at the luff, then walk aft and tug aft on the leech. After a few weeks the sail will develop a memory of the folds and little straightening will be needed.

Slacken the topping lift after the sail is raised. With a Mast Adjusted Topping Lift, retighten the topping lift before the sail is dropped.

Please contact us if you have any questions, problems, or if the clamps need adjustment.

LEGEND 43 RIGGING SPECIFICATIONS

STANDING RIGGING

FITTINGS

Description	Wire Size	Upper End	Lower End*	Overall Length
Forestay	3/8	marine eye	12-20-20	54' 11 3/4"
Backstay uppers	1/4	marine eye	marine eye	36' 6 3/8"
Bridles	3/16	marine eye	6-12-12	34' 4 1/4" 2pcs
Uppers	3/8	stemball w/shell	12-20-20	52' 6" 2 pcs
Intermediates	1/4	stemball w/1 cup	8-16-16	35' 6 1/4" 2pcs
Lowers	3/8	stemball w/no cups	12-20-20	18' 5 1/4" 2 pcs.
Inner forestay (opt.)	9/32	marine eye	removable turnbuckle	Approx. 42' (Use *Norseman*)

All wire is 1 x 19 stainless steel.
Backstay is attached to bridle wit two splitter plates and three pins - 1/2" x 3/8" x 3/8"
Tie a 5/8" eye/jaw toggle to forestay.

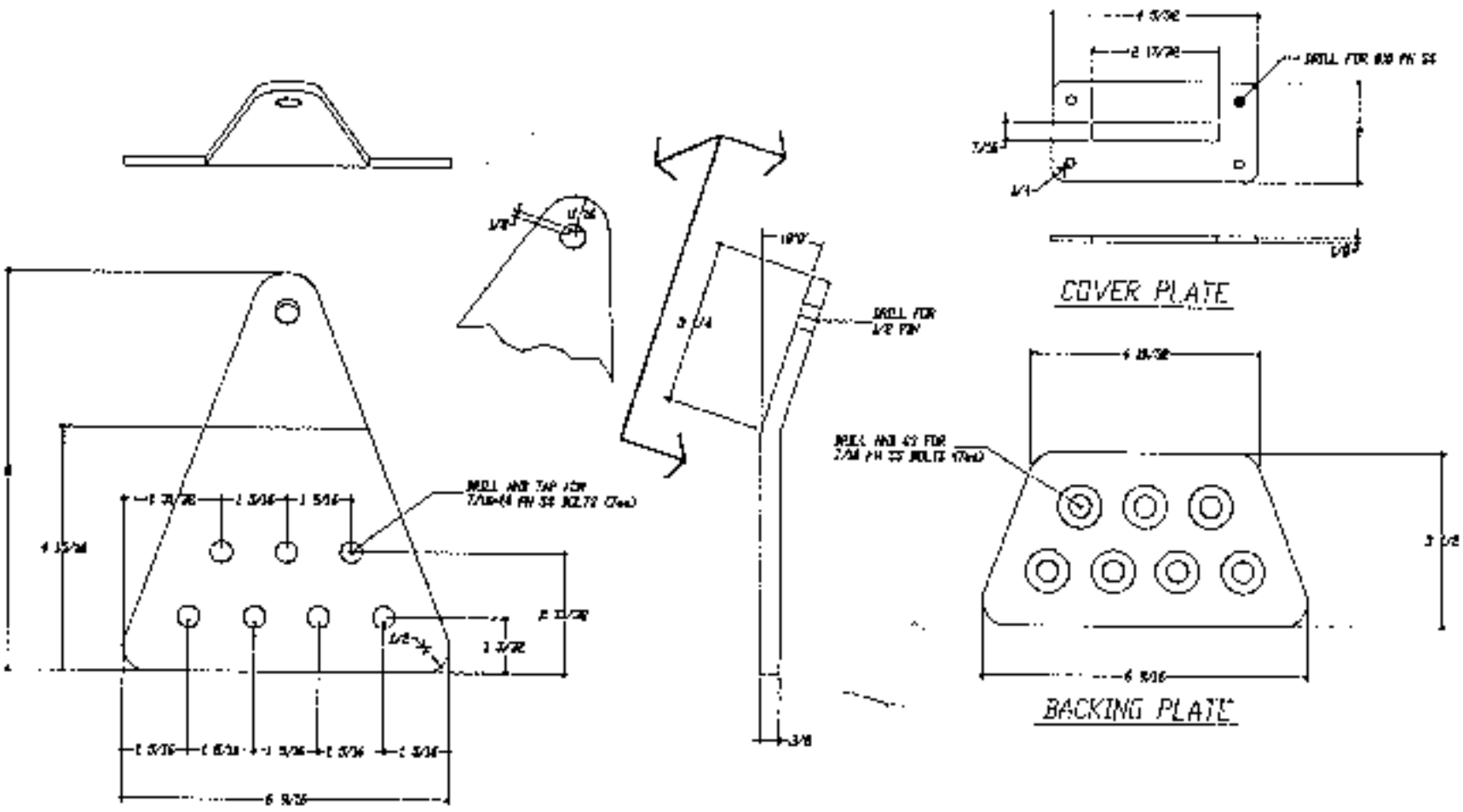
*The three numbers represents the turnbuckle size as follows:
Wire size, body size, pin diameter in 32nd's of an inch.
Example: 12-20-20 is a turnbuckle that accepts a 12/32" wire, has a 3/8" (12/32) thread diameter in the body, and uses a 3/8" (12/32") pin.

RUNNING RIGGING

Line	Size	Attachments	Overall Length
Main Halyard	7/16"	Headboard shackle	134'
Genoa Halyard	7/16"	Swivel snapshackle	120'
Main Sheet	7/16"	Eye splice	76'
Genoa Sheets	1/2"	B.B.E.	55' 2 pcs.
Furling Line	7/16"	B.B.E.	89'
Traveller Control Lines	3/8"	Eye splice	29' 2 pcs.
Vang Line (short)	1/2"	Eye splice w/shackle O.E	8'6"
Vang Line (long)	3/8"	Eye splice	46'
Topping Lift	3/8"	Shackle	70'
Anchor Line	5/8"	Shackle	250'

Main & genoa halyard is *Spectra*

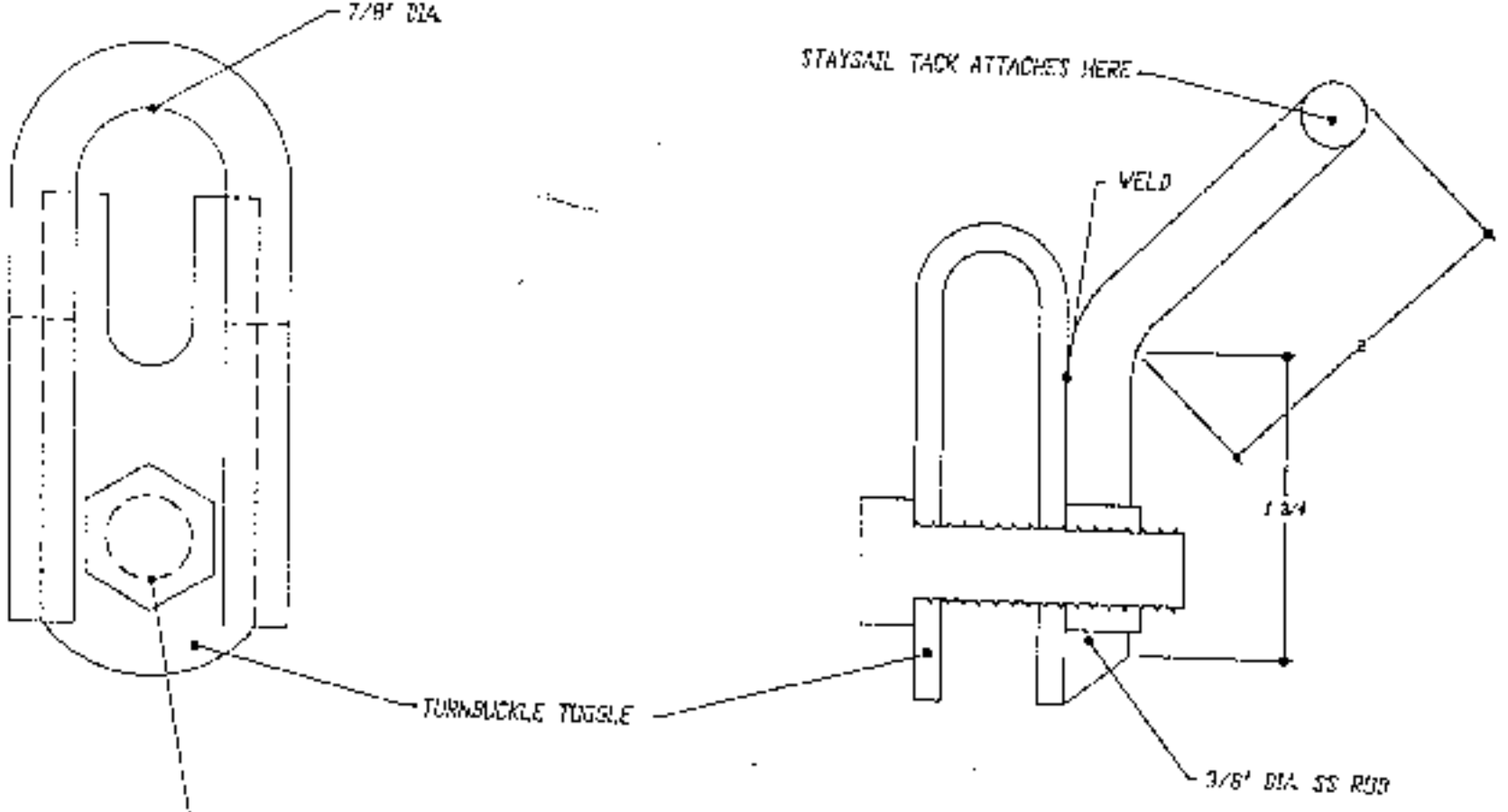
All rigging is supplied by *Seco South*.



HUNTER

LEGEND 42 INNER STAY CHAIN PLATE H4[illegible]42

MODIFICATION REQUIRED TO INNER FORESTAY TURNBUCKLE TOGGLE FOR STAY SAILSAIL TACK ATTACHMENT.



ATTACH TO CHAINPLATE WITH 1/2" DIA. BOLT. DO NOT USE CLEVIS AND COTTER PINS.

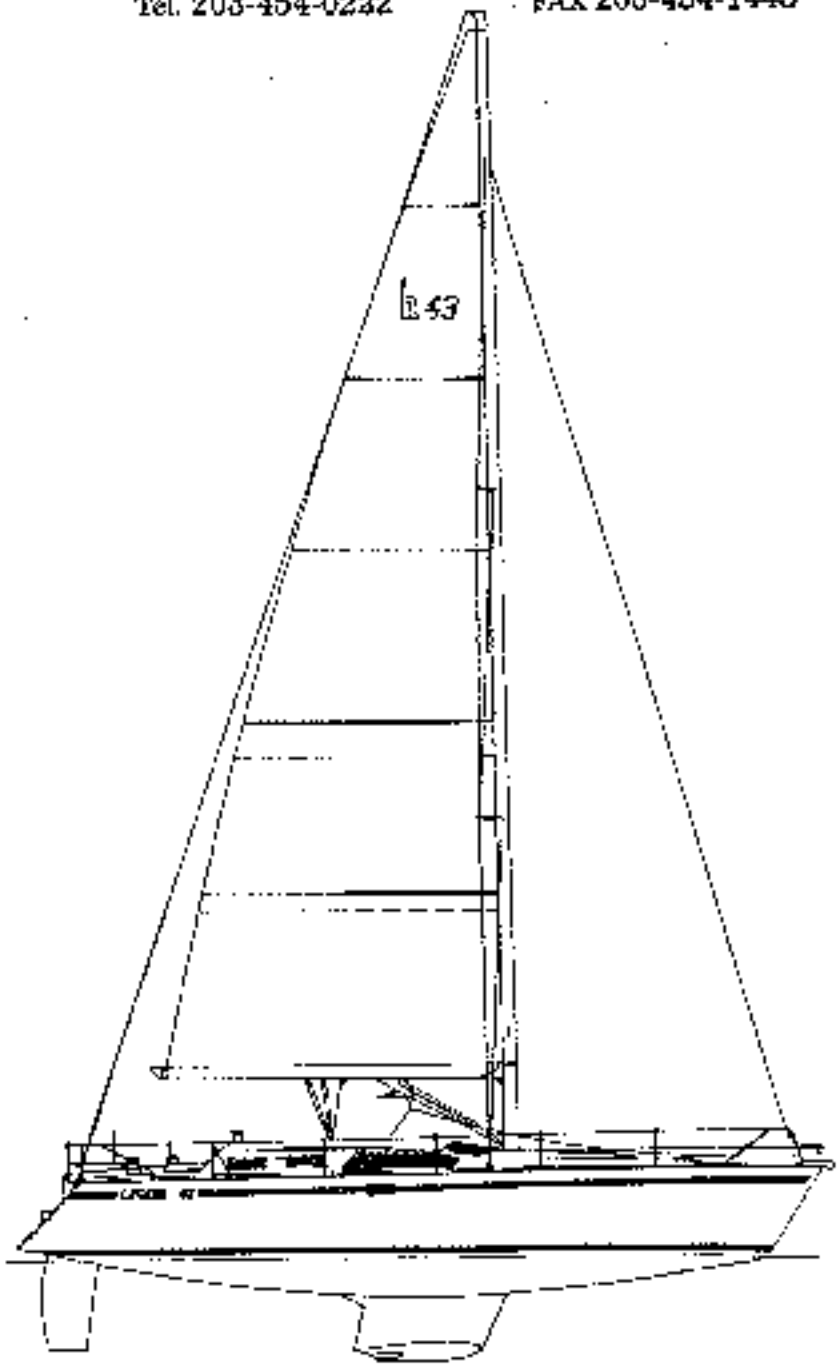
HUNTER

INNER FORESTAY TURNBUCKLE MODIFICATION

FULL SCALE | 1:42A2:12

DUTCHMAN®

Martinus Van Breems, Inc.
571 Riverside Avenue Westport, CT 06880
Tel. 203-454-0232 FAX 203-454-1445



OWNERS MANUAL

Dutchman System B for the Hunter Marine

Legend 43

The purchase price of the Dutchman system includes a prepaid royalty for a limited license to use our Patented system. Each Dutchman installation **must** have our numbered labels sewn onto the tabs in the sail.

These labels are used to identify properly licensed systems. An example of what the label looks like is pictured below. Please check your sail. If the labels are missing or incorrect, contact us immediately.

U. S. Patent #4688506. Foreign Patents Pending. Construction, purchase, or use of unauthorized systems may result in legal action.

Martinus Van Breems, Inc., reserves the right to change all prices, hardware, and specifications without notice at any time.

The **Dutchman** system is unconditionally guaranteed against defects in materials supplied by Martinus Van Breems, Inc., for a period of five (5) years. Defective items may be returned to Martinus Van Breems, Inc., and will be replaced or repaired at the option of Martinus Van Breems, Inc. Return of defective products should be accompanied by a letter giving name, address, phone number, date of purchase, place of purchase, and identification of installing company, as well as an explanation of the defect or malfunction, and the conditions under which the product was being used. This warranty does not apply to or include any product that was improperly installed, or subjected to misuse, negligence, accident, or subjected to unauthorized modification or repair. Normal wear of wire or rope on all equipment is excluded.

This warranty is in lieu of all other implied, express, and statutory warranties and guarantees, and in no even shall Martinus Van Breems, Inc., be liable for special, incidental or consequential damages.

Introduction

Thank you for your selection of a **Dutchman** Sail Handling System. The System B hardware installed into your sail is specifically designed for easy adjustment and replacement of the control lines. Please spend a few minutes learning how to best use and maintain your system, and keep this Manual handy for future reference.

The control lines are attached at the base of the sail to Dacron tabs your sailmaker has installed. The control lines are run through the hole in the top of the tab and are fastened with round nylon discs. The length of the control line can be adjusted easily by opening the zipper in the tab and loosening the screws. The control lines then run through nylon grommets that your sailmaker has installed into the sail, and attach to the continuous topping lift clamps.

The **Dutchman** Continuous Topping Lift System allows for easy installation and adjustment of the control lines on the topping lift. The continuous loop can be rotated, much like a clothesline, allowing the position of the clamps to be adjusted from the end of the boom. This makes the installation or replacement of the control lines plus removal of the sail considerably easier. In addition, the easy adjustment will also be helpful if a sun awning is rigged above the boom.

With the continuous loop arrangement, one of the topping lift lines is held securely by the clamps while the other line runs freely through the clamps. Depending on which way the topping lift is rotated, the clamps can be moved up or down the topping lift line. If the distance between the clamps has to be altered, the clamps can easily be dropped down and adjusted.

We hope you enjoy your **Dutchman**, and we wish you many pleasant voyages. Like most innovative companies, we welcome your input and look forward to your comments.

And remember — when all else fails, read the instructions!

Martinus van Breems

Table of Contents

Section One-B

The Dutchman System Parts List

Attachment Tabs (tabs) Dacron cloth, with canvas inner lining and access zipper. The tabs are sewn into the foot of the sail by your sailmaker. Each system has a six-digit number printed on the tabel. One tab is installed for each control line.

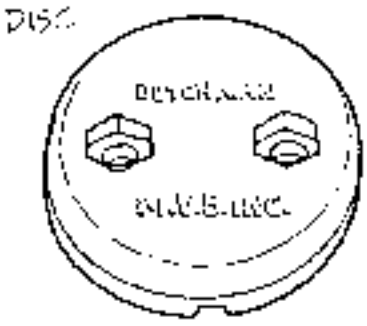
Discs (discs) round, white nylon. The discs fasten the control lines to the tabs. Two are supplied for each control line.
Two 8-32 x 1/2" (4 x 12mm) slotted round-head machine screws and two 8-32 (4mm) lock nuts are supplied for each set of discs.

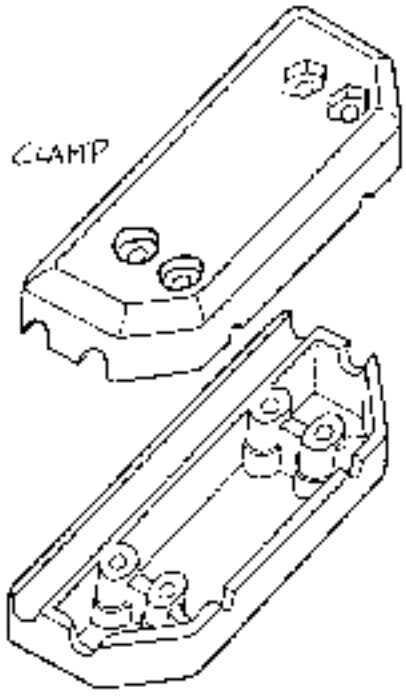
Grommets (grommets) round, white nylon with vertically-orientated, cigar-shaped hole. Installed by sailmaker into the sail. Used for protecting the sail where the control lines run through it.

2" grommets: 1/8" (3.5mm) for boats with **P** (luff) measurements up to 30'.
5/32" (4mm) for boats with P measurements up to 40'.

2 1/2" grommets: 5/32" (4mm) for boats with P measurements up to 50'.
3/16" (4.5 to 5mm) for boats with P measurements over 50'.

Topping Lift Clamps (clamps) black, glass-filled nylon parts, rectangular shape, with 2 hex-shaped and 2 round-shaped recesses each. Used to attach the control line to the topping lift and to join the two ends of the topping lift together. Two halves are supplied for each control line.
Four 8-32 x 1" (4 x 25mm) slotted round-head machine screws and four 8-32 (4mm) lock nuts are supplied for each set of clamps.





Jam Cleat (cleat) black, glass-filled nylon part, triangular shape. The jam cleat is used to attach and secure the lower end of the continuous topping lift. The topping lift line is run through and wedged into the narrow end of the cleat to keep the topping lift from rotating when the clamps are under tension. The wide end of the cleat is used when rotating the line during adjustment. One is supplied with each system.

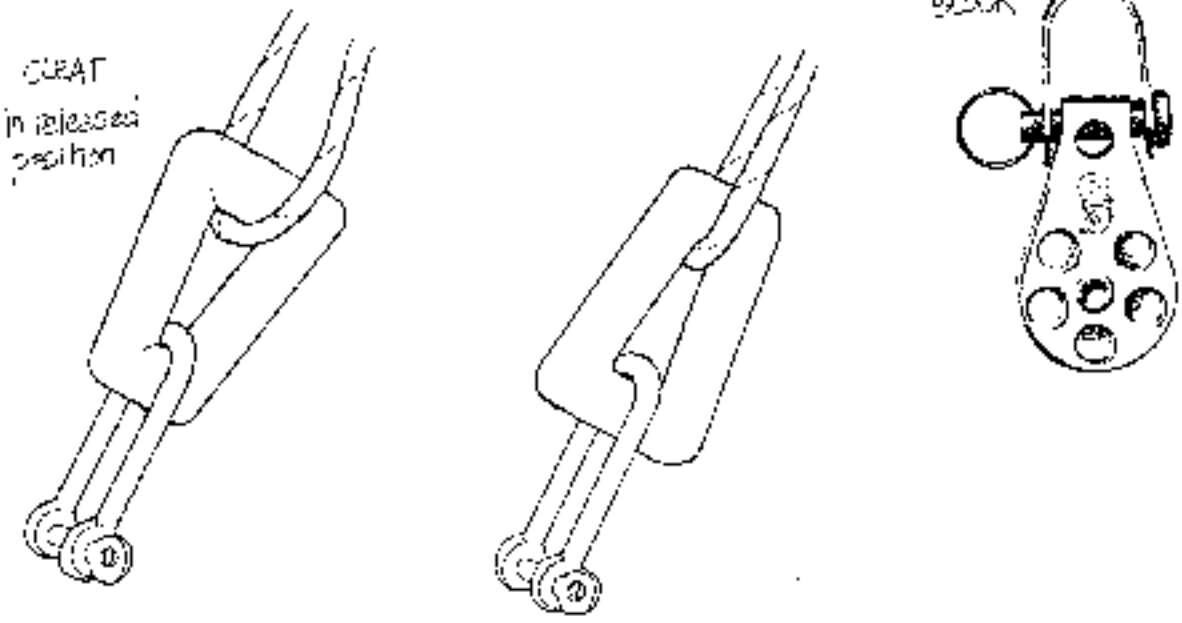
Long D Shackle (shackle) stainless steel. 1/4" (6 mm) pin, 1/2" (13 mm) jaw width, 1-3/4" (44 mm) or longer inside length. Fastens the cleat to the boom. One is supplied with each system.

Single Block (block) stainless steel and high impact plastic with clevis pin. For 1/4" (6 mm) line. Schaefer Marine Series 01-03 (Series 200-03 for boats over 40 feet). Attached to the top of the mast with the topping lift line run through it. One is supplied with each system.

Continuous Topping Lift Line (CTL line) 1/4" (6 mm) low-stretch braided Dacron line. Length should be twice the distance from the top of the mast to the end of boom.
Supplied by the sailmaker.

Control Line (control line) braided Dacron cord with low stretch and smooth outside surface characteristics. Runs from the CTL line to the tabs through the rows of grommets in the sail. The length of the control line should be enough to run from the topping lift, through the sail, to the attachment tab with 1 to 2 feet (30 to 60cm) of extra line.
Supplied by the sailmaker.

<u>If any parts are missing, please contact us immediately.</u>



Section One-C

Definition of Terms

Boom Adjusted Topping Lift — A topping lift which is fixed at the top of the mast. Tension adjustment is usually done at the aft end of the boom.

Mast Adjusted Topping Lift – A topping lift fixed at the end of the boom with a shackle and run to the top of the mast, over a sheave, and back down to the base of the mast. Adjustment is usually done at the base of the mast.

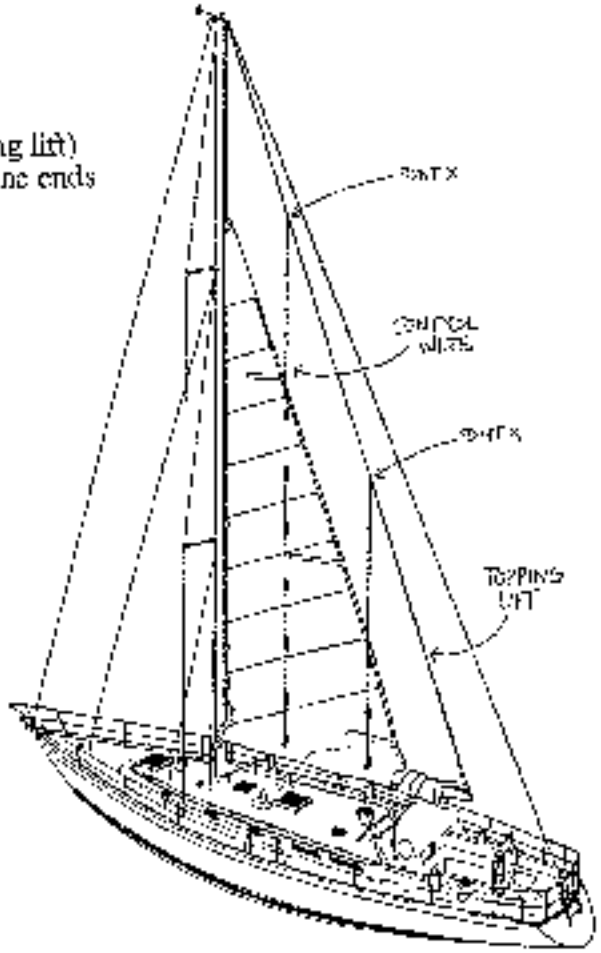
Point X — The point on the topping lift where the control line attaches. This location is found when the sail is raised and the vertical row of grommets is sighted up to the topping lift. On a two line system, there will be 2 Point X's.

CTL System — The Continuous Topping Lift System, which includes the clamps, block, jam cleat, and the CTL line.

Section One-D

Tools Required for Installation

- colored tape to mark CTL line
- knife to cut control line
- vice grips (or locking pliers)
- medium size slotted screwdriver
- bosun's chair (for boom adjusted topping lift)
- matches, whipping line, or dip to seal line ends



Section Two

Installation Procedures

Briefly, to install the **Dutchman** sail handling system, the CTL System is installed then the control lines are fastened to the CTL line, threaded through the grommets in the sail, and secured to the tabs with the discs.

If your CTL System is not already made up, please go to Section Five, Page 16.

The first step is to run the CTL line in place of the original topping lift. Next, you will have to adjust, if needed, the length of the CTL line and the position of the clamps.

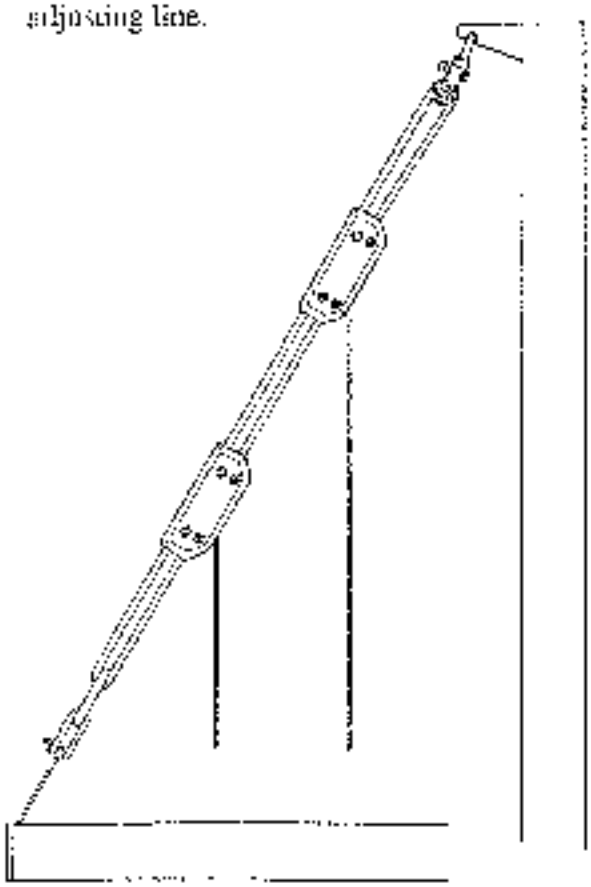
Section Two-A

Configuration of the CTL System

Boom Adjusted Topping Lifts and Mast Adjusted Topping Lifts have different configurations of the shackle and block in relation to the boat's adjusting lines.

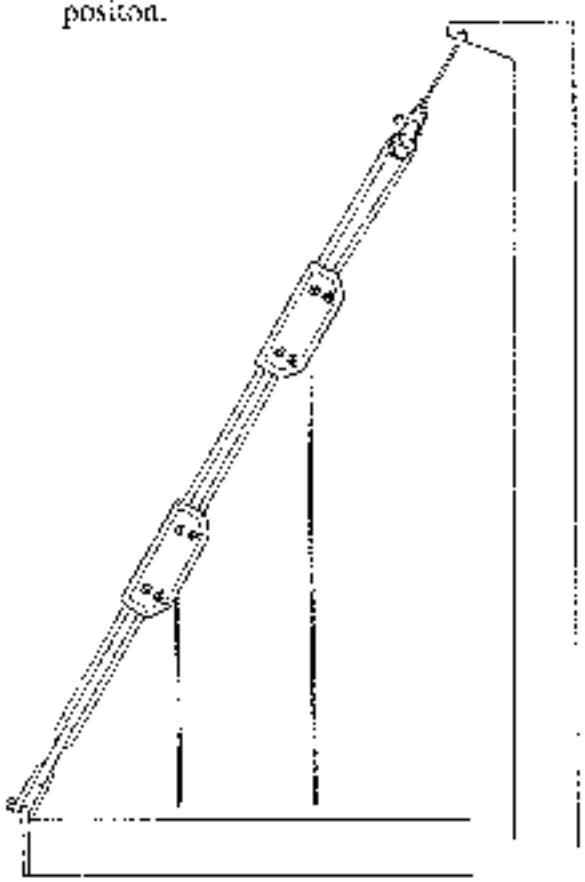
Boom Adjusted Topping Lift

- block is fixed on the masthead fitting where the boat's topping lift was attached.
- shackle fastens the cleat to the boom's adjusting line.



Mast Adjusted Topping Lift

- block is fastened to the end of the boat's topping lift line.
- shackle fastens the cleat to the end of the boom in a fixed position.



Section Two-B

Attaching the CTL System

Many sailmakers will construct the CTL System on the loft floor with the clamps attached, requiring you only to do the installation and adjustment on the boat.

1. Remove the tension from the topping lift by releasing the boom. Either drop the boom to the deck, secure it with the main halyard, or support with a hydraulic vang. The control lines should not be threaded through the sail yet. For that matter, the sail does not have to be on the boom yet.

Boom Adjusted Topping Lift

2. Rig a bosun's chair, and hoist a person up the mast until they are at the masthead fitting. Disconnect the old topping lift from the masthead and reconnect the CTL System by fastening the block to the masthead. The person in the bosun's chair can now be lowered to the deck.

3. Raise the boom and connect the cleat on the bottom of the CTL line to the boat's topping lift adjusting line with the shackle provided. The narrower end of the cleat should be pointed down in the shackle. Hoist the boom up to its normal position.

Mast Adjusted Topping Lift

2. Connect the block to the existing fixture at the end of the boat's topping lift. Hoist the block to within one foot (35cm) of the top of the mast.

3. Connect the cleat at the bottom of the CTL line to the end of the boom with the shackle provided. The narrower end of the the cleat should be pointed down in the shackle. Hoist the boom up to its normal position.

Section Two-C

Adjusting the CTL Line Length

Determine whether the length of the CTL line is correct. You should have enough adjustment capability with your rig to be able to hoist the end of the boom up enough to get it clear of the cockpit. You should also be able to lower the boom enough so that it won't interfere with sail shape.

1. Raise the boom up to the highest level you normally would raise it to clear the cockpit, then raise it an additional 5 inches (13 cm).

Boom Adjusted Topping Lift

2. Make sure that the adjusting line on the boom is long enough so that you can drop the boom down to its sailing position.

Mast Adjusted Topping Lift

2. The block should be far enough (approximately one foot) from the top of the mast so that the boom can drop down to its sailing position.

3. Estimate whether the CTL line has to be shortened. If it needs to be shortened, proceed with Step 4. If the length is correct, skip on to the next Section, Adjusting the CTL System Clamps.

Boom Adjusted Topping Lift

4. Flip the cleat with the base of the triangle up so that the CTL line can rotate. Rotate the CTL line to drop the clamps down. Mark the location of the lower clamp on the CTL line with colored tape.

   Loosen the clamp's screws (do not take the clamps apart). Continue rotating the CTL line until you get the uppermost clamp down to your level.

Mast Adjusted Topping Lift

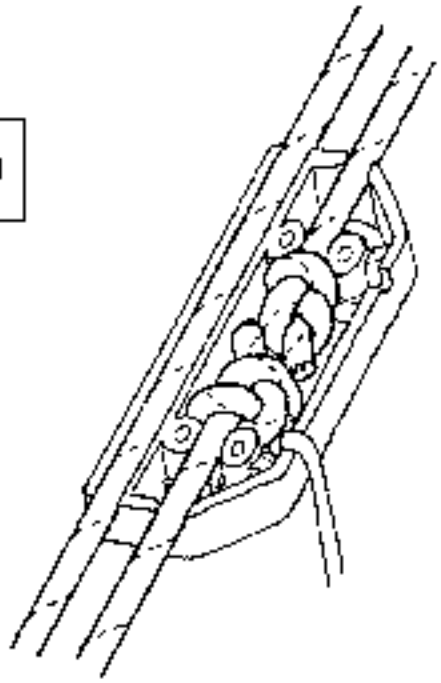
4. Drop the CTL System down entirely using the boat's existing topping lift.

5. Open the uppermost clamp. Remove and shorten the end of the CTL line that goes up to the block. Do not shorten the line leading to the lower clamp. Protect the rope end from unraveling by melting, dipping, or seizing.

> **If you need to shorten the CTL System by one foot, you will have to shorten the CTL line by two feet.**

6. Remove any twists that may have appeared in the CTL line. Tie a figure-8 knot in end of the CTL line and pull tight.

> **Leave 1/2" (14mm) of line remaining beyond the knot after the line is pulled tight.**



7. Fit the knot into the center cavity of the clamp. Lead both of the lines between the screw holes then out of the clamp.

8. Attach the other half of the clamp. Tighten until you begin to feel the rope compress. Pull as much of the CTL line out of the clamp as possible, then tighten clamp securely.

9. Raise the CTL System and double-check the new length.

Section Two-D

Adjusting the CTL System Clamps

In this section, you will check and adjust the position of the clamps. When the sail is raised and you sight up the vertical row of grommets to check the position of the clamps, you will notice that the grommets are on a somewhat curved line. This is normal because the grommets are designed to follow the luff curve. Also note that the uppermost clamp cannot be moved, since it is used to join the two ends of the CTL line together.

1. Install the sail on the boom. The control lines should not be threaded through the grommets. Hoist the sail with the topping lift and main sheet tight.

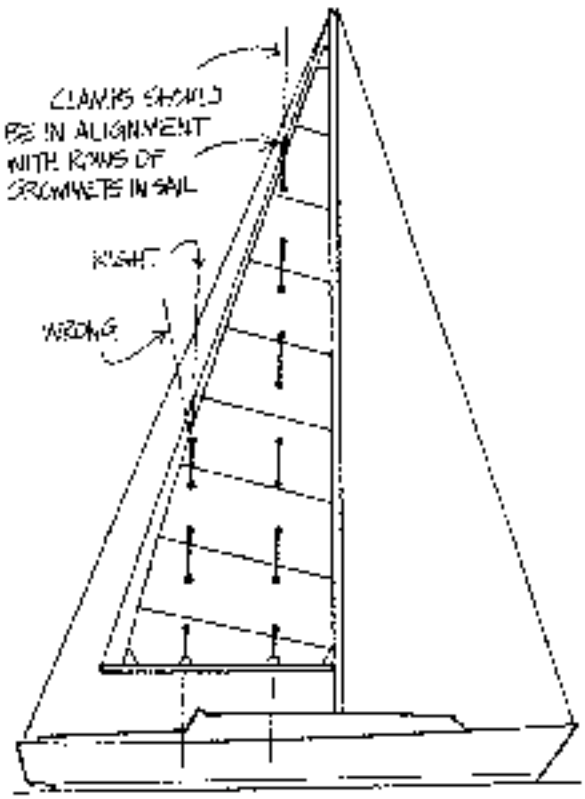
2. Sight up each vertical row of grommets to check the position of the clamps. The clamps should be directly in line with the vertical row of grommets, plus or minus 2 inches (5cm). If the topping lift clamps are within 2 inches of Point X, then skip over to next Section. Threading the Control Lines.

3. If the position of the clamps needs to be adjusted, flip the cleat so that the CTL line can rotate. Rotate the CTL line until the uppermost clamp is in line with the forward row of grommets at the correct Point X. Mark the CTL line at the cleat with colored tape for future reference.

4. With the sail raised visually estimate how much the next lower clamp has to be moved to get it in line with its Point X. Rotate the CTL line until the next lower clamp is at deck level, and reposition it by loosening the screws and moving the clamp to the correct position.

5. Tighten the screws, and raise the clamps until you reach the cleat's reference mark on the CTL line. Sight up the grommets and check the repositioned clamp. If not at Point X, repeat Step 4. Also double check that the uppermost clamp is in the correct position.

6. For a 3 or more line system, repeat Steps 4 and 5 for the next lower clamps. Always start with the uppermost clamp and work down.



Section Two-E

Threading the Control Lines

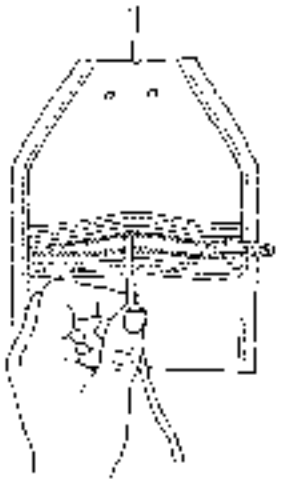
1. Count the number of grommets in each vertical row for the control lines. All the rows should be either even or odd in number. If this is not so, contact us. Drop the sail after you count the grommets.

2. If there is an odd number of grommets in the vertical rows, start the control line through the uppermost grommet from the opposite side of the sail as the tab is on. If there is an even number of grommets in the vertical rows, start the control line on the same side of the sail as the tab is on.

3. Thread the control lines through the rest of the sail. It helps to have two people; one on each side of the sail to pass the control line back and forth. If possible, hoist the sail after the control lines are run through. Tie a slip knot in the end of the line to keep it from pulling through the grommets.

Section Two-F

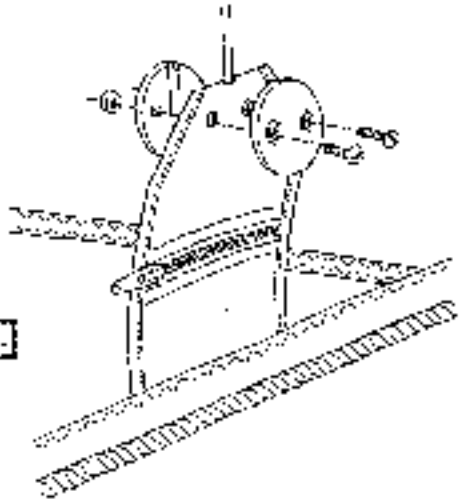
Fastening the Control Lines



1. Insert the control line through the hole on the top of the tab. Make sure the control line runs between the inner layers of canvas.

2. Open the zipper in the tab, reach inside, and pull through as much control line as possible. Cut the lower end of the control line approximately one foot (30cm) under the boom.

3. Place one disc on either side of the tab, matching the screw holes with the pre-cut holes in the tab. The flat surfaces of the discs should face the tab. Insert the screws from the outside with the lock nuts facing the sail. It may be necessary to first force the lock nuts into the hex accesses with a pair of pliers.



4. Loosely fasten the screws.

Never tie knots in the ends of the control lines.

Section Two-G

Adjusting the Control Line Length

To check the adjustment of the control line length, the sail must be fully raised with the main sheet and topping lift tensioned. This can be done while out sailing. The control lines should have enough slack to allow 2 inches (5cm) of play up or down. The control lines should be adjusted if there is more or less play.

1. Have the sail fully raised with the topping lift and main sheet tight. This can be done while out sailing or on the dock.
2. Loosen the screws securing the discs.
3. Open the zipper and adjust the control line length until the slack is 1 to 2 inches (5cm).
4. Tighten down the screws and check the tension again. Do not over-tighten the screws. After the discs begin to grab the line, 3 or 4 more turns on each screw will suffice. The screws can always be tightened down farther if the control line pulls out of the tab in moderate conditions.

> The control line **should** automatically release from the tab if too much strain is placed on the system, which may happen if the control line catches on the rigging or if the sail is violently flogging.

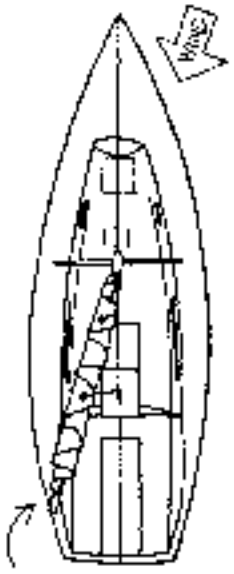
Section Three-A

Lowering the Sail

When lowering the sail, the topping lift should be tensioned, the boat headed to the wind, and the main sheet let off. The **Dutchman** will not work properly if the sail is not luffing freely in the wind. The system works better in more wind, so you do not need to slow down your motor. It helps to push or pull the luff (or forward edge) of the sail to alternate sides of the boom as the sail comes down. After the sail is dropped, straighten the leech edge of the sail by tugging it aft.

Especially in winds of over 10 knots, you may want to head so the wind is 15 to 20 degrees off the bow. You will then keep the boom clear of the cockpit. Because the sail stays on the boom, you can lower the sail out to the side to protect your head in the cockpit.

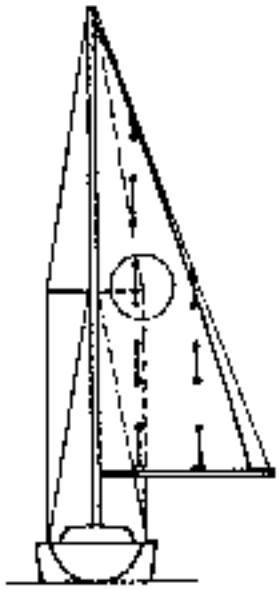
If you have running backstays, keep them away from the mainsail while it's being raised or lowered. Also keep the sail away from the spreader tips while it's being raised or lowered. The **Dutchman** grommets have a rounded edge that possibly could catch on running backs or spreader tips.



BECAUSE SAIL STAYS ON BOOM, IT CAN BE LOWERED WITH BOOM OUT TO SIDE TO PROTECT YOUR HEAD.

Section Three-B

Downwind



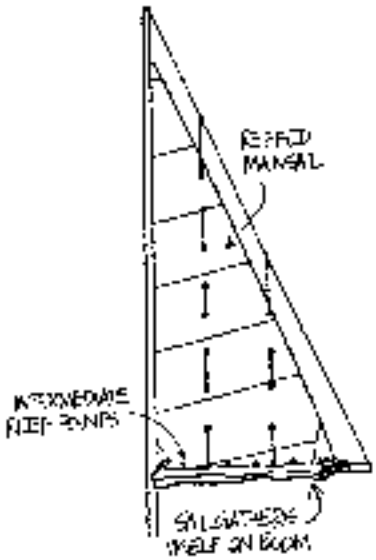
There is a very remote possibility that when running downwind with the sail touching the spreader, a control line may become snagged on a spreader tip if the tip is not well faired. If this were to happen, the sail could be damaged when it is sheeted in. Therefore, when initially running downwind with the **Dutchman**, check how close the control line is to the spreader tip.

You may also want to install a spreader hook or similar device that prevents lines from snagging on the spreader tip.

> Your sailmaker has already set the location of the control line a certain distance away from the spreader tip when building the system into your sail to prevent this type of damage from happening.

Section Three-C

Reefing



One of the greatest advantages of the **Dutchman** is how it assists in Jiffy or Slab reefing. The sail is always held on top of the boom, so in most cases, you will not need to tie off the intermediate reef points. The **Dutchman** will only work with jiffy or slab reefing. Roller reefing systems cannot be used.

Section Three-D

Check Ajustment

The rule of thumb is to tighten the control lines if the sail falls off the boom, loosen them if sail shape is affected.

You should loosen the control lines if the topping lift cannot be slackened enough so as to keep the control lines from affecting the sail shape. On the other hand, you should tighten the control lines if the sail always falls partly off the boom as you drop it. The control line length will also need to be adjusted if you adjust the position of the clamps. There should be about 1 to 2 inches (5 cm) of play.

Keep an eye on the adjustment of the clamps and the control line length. You should have no problem in doing this yourself. The only tool you will need is a medium slotted screwdriver. The clamps should never be more than 2 inches (5cm) out of alignment with the vertical rows of grommets. See Section Two-G if they are.

The topping lift may need to be eased while sailing to allow the leach of the sail to develop twist. You may want to give a tug on the control lines after you let off on the topping lift.

> You cannot hoist the boom abnormally high with a mast topping lift, nor drop the boom too much if you have a boom topping lift, without over-tensioning the control lines. However, it is possible to rotate the clamps down to slacken them.

Section Three-E

Release Feature

The discs and tabs are designed to release the control line if too much pull is placed on the control line. This is to protect the grommets. Such stresses could be placed on the control line if the sail is flogging in winds over 25 knots, if the control line were to catch part of the rigging, or if an accidental jibe occurs. If this happens, loosen the discs and adjust the control lines.

Do not tighten down the control lines more than the specified amount (see Section Two-G), unless you find that the control lines are being released in moderate conditions. And never tie knots in the control line.

> **WARNING:** Do not apply more than 400 pounds of strain to the topping lift. Never let people hang off the boom when it's supported by the topping lift.

Section Three-F

Removing the Sail

The easiest way to store your sail is to keep the control lines with it. Before you remove the sail, it helps to tie a slip knot directly above the uppermost grommet. This will keep the sail from spilling all over the deck as you pull the foot of the main forward off the boom. If you neaten out the flakes and roll the sail up, you will also help the sail to 'remember' where it's supposed to flake while stored.

Boom Adjusted Topping Lift

1. Use the main halyard to support the boom. Flip the cleat and rotate the CTL line to lower the clamps down. Loosen the screws and remove the control line from the clamp.

2. Tie a slip knot directly above the uppermost grommet. Reassemble the clamp and repeat for the rest of the clamps. Wrap up the clamps with canvas or plastic to protect from UV exposure.

Mast Adjusted Topping Lift

1. Drop the CTL System down and remove the block from the boat's existing topping lift.

2. Keep the entire CTL system and control lines with the sail. Attach the boat's topping lift to the aft end of the boom.

Section Four

Maintenance

The most important maintenance required is a periodic check of the CTL line and control lines. At least twice a season, the CTL line should be checked for chafe or deterioration at Point X. The control lines should be replace at least once a season.

The control lines will tend to pick up dirt in more pollinated or polluted areas. Replacing the control lines keeps the sail cleaner, as you will notice streakes in the sail where the control lines lie against it. Replace the control lines with an equivalent low-stretch Dacron cord, according to the specifications in the beginning of this Manual.

Also check that the cleat is not abraded from the topping lift line.

Section Four-A

Installing New Control Lines

When you are ready to replace the control lines, it is easiest to do so while the existing control lines are still threaded through the sail. Estimate the correct length of control line by using the old control lines as guides.

Boom Adjusted Topping Lift

1. Flip the cleat and rotate the CTL line to drop the clamps down. Loosen the lower clamp screws and continue rotating the line until you get to the uppermost clamp.

Mast Adjusted Topping Lift

1. Drop the CTL System to the deck.

2. Open the clamps, and replace the control lines. Make sure to use a figure-8 knot, and leave 1/2" free at the end after the knot. Reassemble the clamps.

3. Tape the top end of the old control lines to the bottom end of the new control lines. Gently pull through the sail. Raise the sail as you do so. Remove the old control line. See Sections Two-F and Two-G, Pages 10-11 for more information on how to fasten and adjust the new control lines.

Section Four-B

Replacing the Existing CTL Line

Use these instructions if you are replacing a CTL line. The CTL line may need replacing after a number of years from UV damage. It will also need to be replaced if abraded in any way at the clamps or cleat.

Boom Adjusted Topping Lift

1. Flip the cleat and rotate the CTL line to drop the clamps down. Disassemble the lower clamps and continue rotating the line until you get to the uppermost clamp.

2. Disassemble the uppermost clamp, and carefully tape the new CTL line to the old CTL line **end for end**, so it will fit through the block at the masthead. Do not use too much tape.

3. Pull the new CTL line through the block, and back down to the deck.

Mast Adjusted Topping Lift

1. Use the main halyard to support the boom. Drop the CTL system to the deck.

2. Disassemble the clamps, and pull the old CTL line through the cleat and block.

3. Slide the block and jam cleat onto the new CTL line. Arrange the new line on the ground so it roughly is in the same position the old line was in before it was disassembled, with the block and the jam cleat at their respective ends.

4. Assemble the new clamps with the control lines on to the topping lift, and hoist CTL system into position. See Sections Two-D through Two-G, Pages 9-11 to adjust the clamps, control lines, and complete the installation.

Section Five

Installing a New CTL Line

If you no longer have the CTL line, or if your boat came without the CTL line made up with the clamps, block, and jam cleat attached, you will have to assemble it yourself. This is not a very difficult job. The following Steps 1, 2, and 3 should be done with the mast unstepped, if possible.

Have enough line to reach from the end of the boom to the top of the mast, and back down again. You can use the main halyard and a messenger line to measure this distance. CTL line specifications are given in Section One-B on Page 4.

Section Five-A

Measure and Install the CTL Line

1. Drop boom down to the deck or into a boom crutch.

2. Thread the CTL line through the block and cleat. Temporarily tie the two ends of the CTL line together.

Boom Adjusted Topping Lift

3. Remove the old topping lift. If the mast is stepped, send one person aloft in a bosun's chair to remove the old topping lift, and fasten the block to the top of the mast. Lower the rest of the CTL line to the base of the mast.

Mast Adjusted Topping Lift

3. Connect the block to the existing fixture at the end of the boat's topping lift. Hoist the block to within one foot (35cm) of the top of the mast.

4. At this point, the mast must be stepped. First, rig the main halyard as a temporary topping lift. Then raise the boom up to the highest level you normally would raise it to clear the cockpit, then raise it an additional 5 inches (13cm). Tape and cut the CTL line so that both ends of the line just touch the end of the boom. Protect the rope ends from unraveling by melting, dipping, or seizing.

Boom Adjusted Topping Lift

5. Make sure that the adjusting line on the boom is long enough so that you can drop the boom down to the sailing position.

Mast Adjusted Topping Lift

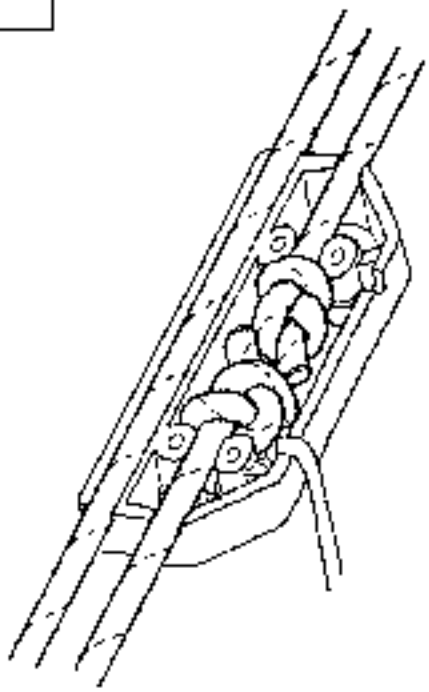
5. The block should be approximately one foot (30cm) from the top of the mast.

Section Five-B

Attach the Uppermost Clamp

1. Tie a figure-8 knot in each end of the line.

Make certain that there is 1/2 inch (14 mm) of line remaining beyond the knot after it is pulled tight.



2. Sight up and remove any twists that may have appeared in the CTL line. The length of line that runs over the **top** of the the block should then be placed in the lengthwise passage that runs along the **straight side** of the clamp.

3. Put the figure-8 knots into the cavity in the center of one of the clamp halves, lead the lines between the screw holes, then out of the clamp. Make sure that the cleat is located on the CTL line below this clamp.

4. Tie a figure-8 knot into the end of the longest of the control lines, leaving 1/2 inch (14mm) of line remaining beyond the knot. Fit this knot into the center cavity of the clamp. Lead the control line out through the downward-facing small passage.

5. Attach the other half of the clamp using the screws and locking nuts. Tighten the screws until you begin to feel the rope compress. Pull as much topping lift line out of the clamp as possible, then tighten the clamp securely.

Boom-type Topping Lift

6. Fasten the cleat to the end of the adjusting line on the boom using the shackle provided. The narrower end of the cleat should be pointed down in the shackle.

Mast-type Topping Lift

6. Fasten the cleat to the end of the boom using the shackle provided. The narrower end of the cleat should be pointed down in the shackle.

Section Five-C

Attach the Rest of the Clamps

1. After the first clamp is attached to the CTL line, hoist the mainsail and pull the CTL System snug.

2. Estimate the distance between the uppermost grommet of the forward control line and the uppermost grommet of the second control line. Rotate the CTL line until the uppermost clamp is roughly the same distance away from the end of the boom. This does not have to be exact.

3. Attach the second clamp. Make certain there are no twists in the line. The upper part of the CTL line should be placed in the lengthwise passage next to the long side of the clamp.. The lower CTL line will be run straight through the center cavity between the machine screw holes with no figure-8 knots.

4. Attach the control line by tying a figure-8 knot into the end of the shorter of the control lines, leaving 1/2 inch (14 mm) of line remaining beyond the knot. Fit this knot into the center cavity of the clamp. Lead the control line out through the downward-facing small passage. Loosely tighten the screws.

5. Attach the rest of the clamps, if any, by repeating steps 2,3, and 4. To do the final adjusting and installation of the control lines, see Sections Two-E through Two-G, Pages 10-11.

Fill out and return the attached licensing card.

This licensing card will help us to provide you with product updates, identify properly licensed systems and allows us to keep in touch with you. We may also send you information on new products we are developing. We will not sell or give your name to any other firm.
Thank you.

MARINCO SHORE POWER CABLE SET

INSTRUCTION SHEET

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

1. Turn off the boat's shore connection switch 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 MARINCO shore power cable set is intended for use outdoors. To prolong the life of the set, store indoors when not in use.

MAINTENANCE

WARNING - To prevent electrocution, always disconnect from power source before performing maintenance.

General:

The metallic parts of your MARINCO cable set are made to resist corrosion. In salt water environment, life of the product can be increased by periodically wiping the exposed parts with fresh water, drying and spraying with a moisture repellent.

A soiled cable can be cleaned with grease cutting household detergent. A periodic application of vinyl protector will help both ends and cable maintain their 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 a moisture repellent before re-use.

REPAIR

If either plug or connector end requires replacement (component or molded type), it can be replaced with the following MARINCO devices.

CABLE RATING	PLUG	COVER	CONNECTOR	COVER
30A-125V 2 pole, 3 wire	305CRP	102	305CRC	103R
50A-125V 2 pole, 3 wire	6361CR	7717	6360CR	7715CR
50A-125/250V 3 pole, 4 wire	6365CR	7717	6364CR	7712CR

VIGIL RT-80
VHF Radio

USER'S GUIDE

THE IMI PERFORMANCE TEAM: AIR FRIGADOUR · AUTOHELM AMERICA · BARIENT · COMS
FRANCESPAR · ISOMAT · KENYON GALLEY · KENYON SPARS · SPARCRAFT · VIGIL ELECTRONICS

IMI VIGIL®
ELECTRONICS

Table of Contents

Specifications

General

Compliance:
FCC Regulations Parts 15, 80, 90S and 90T
Canadian Regulations DOC, CAT V

Channels:
All US and International (ITU Appendix 18)
10 Weather
42 Programmable

Frequency Range:
Transmit - 156.000 to 159.175 Mhz
Receive - 156.025 to 163.775 Mhz

Frequency Stability: .001% from -20° C to +50° C

Input Power:

11-15 VDC (13.8 VDC Nominal)

0.6 Ampere Receive

6 Amperes Transmit

Operating Temperature Range: -20 °C to +50° C

Transmitter

Power Output: 1 or 25 watts selectable

Modulation: Frequency Modulated 16F3

Modulation Limiting: 16 Khz deviation

Spurious Emissions:
-70 db @ 25 watts output
-56 db @ 1 watt output

Output Impedence: 50 ohms

Antenna Mismatch:
Built in VSWR protection with fault warning Annunciator

Audio:
Less than 10% distortion at 3 Khz deviation,
+6 dB per octave pre-emphasis

Receiver

Sensitivity: 0.25 µv max for 12 db Sinad

Selectivity: - 6 dB max at 7.5 Khz
-60 dB min at 24 Khz

Spurious Response: -70 dB min

Squelch Threshold: 0.20 µv max

Audio:
- 6dB per octave de-emphasis. Less than 10% distortion at 8.5 watts to external speaker

Hall/Intercom Output:
8 watts into external 8 ohm speaker with less than 10% distortion @ 14.5 VDC input

16 watts into external 4 ohm speaker with less than 10% distortion @ 14.5 VDC input

Physical

Width: 4-3/8 inches
Height: 4-3/8 inches
Depth: 5 inches
Weight: 3-3/4 pounds

Introduction

General Information

The RT-60 is a fully waterproof, digitally synthesized FM transceiver operating in the frequency range of 156-163 Mhz and can provide reliable communications between ships, and from ships to public or private shore stations. It is capable of operating on all USA, International and Weather channels and in addition, may be programmed to operate on 42 additional channels (U.S. models only).

It can receive 10 weather channels which include all U.S. NOAA and Canadian channels.

The transceiver is a panel mounted design allowing the user to custom install it into the vessel's instrument panel. A spacer is provided to allow the user to control the "thickness" of the bezel to further customize the installation and match other instruments that may be also installed in the panel.

Channel Number and status annunciators are provided on a liquid crystal display (LCD) which is lighted for low ambient light conditions.

An external waterproof microphone and speaker are provided.

In addition, the transceiver contains both a powerful hailer and intercom system that may be used with optional speakers.

License Requirements

All radio stations aboard US flag vessels *must* be licensed by the Federal Communications Commission. A marine VHF station license is obtained by submitting FCC form 506 to the Federal Communications Commission, Gettysburg, PA. This form includes a temporary operating authorization which will allow you to use your RT-60 while the FCC is processing your license application.

Operator License

If you plan to only sail in domestic or international water without docking in any foreign port, you do not need an operator's permit. If however, you plan to dock in a foreign port, you must have, at least, a RESTRICTED RADIOTELEPHONE OPERATOR'S PERMIT.

To obtain this permit you must file FCC form 753. There is no test requirement and the permit is good for a lifetime.

These forms are available at any FCC field office, or by writing to the Federal Communications Commission. P.O. Box 1020, Gettysburg, PA 17326.

Equipment Supplied

VHF Radiotelephone with Power Cable, Output Cable Microphone Cable, and Hail and Intercom Speaker Cables attached.

Mounting Spacer

Waterproof Microphone

Microphone Mounting Plate

Waterproof Speaker with mounting bezel

Mounting Hardware

Optional Equipment

Hail Speaker

Intercom Speaker

Installation

Mounting Methods

The RT-80 can be mounted in basically two ways. The first mounting method places the mounting spacer on the back of the unit which will space the RT-80 up to the same height as some other instruments.

The second method drops the unit all the way down to the Redline Gasket which is placed directly against the instrument panel.

Mounting

Tape the template provided onto the mounting surface and mark the center. Using this center mark, drill or cut a 4 inch hole into the mounting surface. Drill four 1/16" holes (one in each corner) into the mounting surface.

At this time, decide whether you will use the mounting spacer supplied, or not.

Mounting with Spacer

If the spacer is to be used, feed all the wires coming from the back of the RT-80 through the Redline gasket, through the spacer and then through the hole in the panel. Apply a thin film of non corrosive Silicone Bedding (GE Silicone II or equal) to the back of the mounting spacer.

Secure the RT-80 to the mounting surface with the four stainless screws provided. **Do not overtighten.** See figure 1.

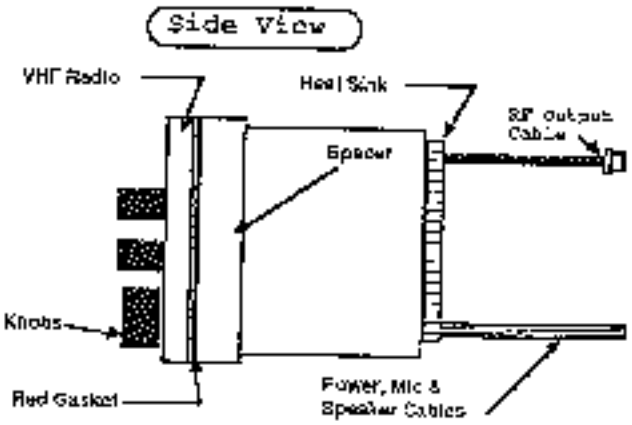


FIGURE 1

Mounting without Spacer

If the spacer is not to be used, feed all the wires coming from the back of the RT-80 through the Redline gasket and then through the hole in the panel.

Secure the RT-80 to the mounting surface with the four stainless screws provided. **Do not overtighten.**

Plastic Plugs

After the RT-80 is mounted by either of the above methods, press the four plastic plugs (provided) into the screw holes on the face of the Radio. This will hide the screws and provide a clean look to the RT-80.

Speaker Mounting

Select a location for the external speaker provided with the RT-80. This location should be at least 3-4 feet away from *any* compass on the vessel, including autopilots, sat-navs, etc. The chosen location should position the speaker in such a way as to assure that it can be easily heard by the operator while the vessel is underway.

The speaker can be mounted either as a surface mount by using the spacer provided, or by drilling a hole through the instrument panel and "flush" mounting it.

Tape the template provided onto the mounting surface and mark the center. Drill four 1/16" holes (one in each corner) into the mounting surface.

Through Instrument Panel

Using this center mark in the template, drill or cut a 4 inch hole into the mounting surface.

Pass the speaker wire through the Redline gasket and then through the mounting hole.

Carefully position the speaker on the panel and using the speaker itself as a guide, drill four 1/8" holes (one in each corner) into the mounting surface.

Secure the speaker to the mounting surface with the four stainless screws provided. Do not overtighten.

Surface Mount

Drill a 1/4" hole at the location of the hole in the lower left hand side of the mounting spacer. This

When the microphone push-to-talk button is pressed, the operator's voice will be amplified and sent to the optional hail speaker. To increase or decrease the HAIL volume, turn the VOL Knob as you would the radio volume in the NORM mode.

All receive and transmit functions of the radio are disabled when operating in this mode.

ICM Mode

The use of the Intercom (ICM) mode will allow the operator to communicate with an optional remote anywhere else in the vessel. Turn the Function Knob to ICM. "IC" will be displayed on the LCD to indicate that the intercom mode is in use and that normal receive and transmit functions disabled. The Volume Knob will control the volume coming from and going to the optional external intercom speaker.

To talk to the remote station, simply press the microphone push-to-talk and speak into the microphone. To listen for a reply, release the button.

Pushbutton Functions

Refer to Figure 3 for the location of all pushbuttons.

DIM Button

The Liquid Crystal Display (LCD) may be lighted for night use by pressing the DIM button until the desired illumination intensity is achieved. There are four levels of brightness available, LOW, MEDIUM, HIGH and OFF. Successive presses of the DIM button will increment through the four available levels.

U/I Button

The use of this button will allow the user to toggle between US and International channels. The LCD will display either USA or INTL, depending on which type is selected by the user.

This key also functions as the LEFT ARROW Key in certain modes of operation (such as MEM and PRI). See those sections for details on this alternate action.

SCAN Button

There are four different modes of scanning available in the RT-80. These are the ALL CHANNEL, MEMORY, PRIORITY and WEATHER. The SCAN button alternately turns on and off the channel scanning function. When the SCAN function is ON, the SCAN Annunciator will be displayed on the LCD.

Please note that when the SCAN is turned off, then on again, scanning will start from the displayed channel upward.

ALL CHANNEL SCAN

To initiate ALL CHANNEL Scan, first select the NORM mode and then press the SCAN button. This will first scan all US channels and then all INTL channels continuously. When activity is detected on a channel, scanning will stop until 1 second after activity ceases. Scanning of all channels will then resume.

To halt the scanning, either press the SCAN button, rotate the Channel Select Knob or press the microphone button. If the mic is keyed while in the SCAN mode, the SCAN mode will be canceled, and the RT-80 will transmit on the displayed frequency.

MEMORY SCAN

To activate the MEMORY scan mode, it is first necessary to store desired channels into the memories. See the MEM mode section for details on how to do this.

To select MEMORY SCAN mode first select MEM by using the Function Knob and then press the SCAN button. This will cause the RT-80 to scan all of the channels programmed into the memory. Any blank memories (not programmed by the user) will be skipped. When activity is detected on a channel, scanning will stop until 1 second after activity ceases. MEMORY SCAN will then resume. Scanning may be stopped by pressing the SCAN button again, turning the Channel Select Knob or by pressing the microphone button.

If the mic is keyed while in the MEMORY SCAN mode, the SCAN mode will be canceled, and the RT-80 will transmit on the displayed frequency.

WX SCAN

To activate the WX SCAN mode, select WX by turning the Function Knob. Press the SCAN button and the RT 80 will scan all 10 weather channels until one is found with activity.

To exit this mode, either press the SCAN button again, or rotate the Channel Select Knob.

PRIORITY SCAN

The PRIORITY SCAN is commonly used to maintain a listening watch on channel 16 (the calling and distress channel), while operating on some other channel. In addition, the RT-80 allows the operator to select a different priority channel. To program the priority channel and/or the normal channel see the PRI mode section of this manual.

The PRIORITY SCAN function allows the user to monitor any two channels at the same time. One channel is the currently selected channel (Normal) and the other is a predetermined priority channel.

In the PRIORITY Mode, the RT-80 will switch from the selected channel to the priority channel once each second to check for a squelch break. If the priority channel is active, the RT-80 will stay on the channel until activity stops.

The transceiver will then resume checking both channels for traffic. While in the priority mode, the RT-80 will only transmit on the selected non-priority channel (the Normal channel). However, if the microphone is keyed while there is a squelch break on the priority channel, the radio will transmit on the priority channel and the Scan mode will be cancelled.

The Function Knob should be turned to PRI and then the SCAN button is pressed to activate the PRIORITY SCAN mode. The LCD will show the Normal (non-priority) channel in the left window and the priority channel in the right window. The PRI and the SCAN Annunciators will be displayed.

Please note that the unit switches very quickly from the active normal channel to the priority channel and may be difficult at times to tell that the scanning is actually occuring unless the LCD is displaying the SCAN Annunciator.

The PRIORITY SCAN mode is alternately engaged and disengaged by pressing the SCAN button.

The SCAN button also functions as the RIGHT ARROW button in some modes to exit from certain programming modes. See MEM and PRI Mode sections for details of this alternate action.

H/L BUTTON

The H/L button toggles the transmitter output power between 1 watt and 25 watts. To turn the low power mode on or off, press the H/L button. The LCD will indicate LOW when the transmitter power is reduced to 1 watt.

On certain channels (such as 13 and 67), the output power is automatically set to 1 watt by the microprocessor in the RT-80. To override the microprocessor, press and continue to hold down the H/L button during the entire transmission. If the H/L button is released at any time during the transmission, the RT-80 will revert the power to the 1 watt setting.

Channels 15, 17, 75 and 76 have the output power limited to 1 watt, but can be switched to High Power with the H/L button just like the other channels. They just default to 1 watt initially.

Programmable Channels

The Programmable Channel Mode allows the user to the RT-80 to assign any frequency between 156.025 and 159.175 Mhz to Channels 29 to 59 or channels 89 to 99. This will allow the RT-80 to accomodate any future frequency allocations without modification. In programming these new channels note that the channel spacing must be maintained at 25 Khz.

Important Notice!!!

The use of unauthorized channels can cause harmful interference to Safety Services other than the marine service.

Entering the Programmable Channel Program Mode

To enter this mode, hold down the U/I and SCAN key simultaneously for approximately 2 seconds until 29 is shown in the right hand display. The RT-80 is now in the Programmable Channel Programming Mode.

Reviewing Stored Data

To review the frequency information stored for a programmable channel, enter the desired channel number in the right hand display by rotating the Channel Select Knob. The programmed data will be displayed in the left hand digits.

If the selected channel was not previously programmed, the data in the left display will show as 00. At this point, you may store new information, review another channel or exit the Programming Mode.

Storing Information

To store new data in a programmable channel, press the button below the LEFT ARROW to activate the left display digits. The left display will begin flashing to indicate that new data is expected.

Rotate the Channel Select Knob to change the data in the display to the data from Table 1 that corresponds with the desired frequency of operation.

Press the button below the RIGHT ARROW to accept the data and to exit back to the Channel Select mode. The new data will have been stored in the RT-80's electronic memory, and the radio will remain in the Channel Programming mode.

After storing the new data above, you may select another programmable channel to be reviewed or changed by rotating the Channel Select Knob to the desired channel.

You may exit the Channel Programming mode at any time by pressing the button below the RIGHT ARROW. If terminating from the left window, you must press this button below the RIGHT ARROW twice.

Programmable Channel

TABLE 1

Frequency	Simplex	Duplex	Frequency	Simplex	Duplex	Frequency	Simplex	Duplex
156.000	N/A*	80	157.075	2B	AB	158.150	58	D8
156.025	01	81	157.100	2C	AC	158.175	57	D7
156.050	02	82	157.125	2D	AD	158.200	58	D8
156.075	03	83	157.150	2E	AE	158.225	59	D9
156.100	04	84	157.175	2F	AF	158.250	5A	DA
156.125	05	85	157.200	30	B0	158.275	5B	DB
156.150	06	86	157.225	31	B1	158.300	5C	DC
156.175	07	87	157.250	32	B2	158.325	5D	DD
156.200	08	88	157.275	33	B3	158.350	5E	DE
156.225	09	89	157.300	34	B4	158.375	5F	DF
156.250	0A	8A	157.325	35	B5	158.400	60	E0
156.275	0B	8B	157.350	36	B6	158.425	61	E1
156.300	0C	8C	157.375	37	B7	158.450	62	E2
156.325	0D	8D	157.400	38	B8	158.475	63	E3
156.350	0E	8E	157.425	39	B9	158.500	64	E4
156.375	0F	8F	157.450	3A	BA	158.525	65	E5
156.400	10	90	157.475	3B	BB	158.550	66	E6
156.425	11	91	157.500	3C	BC	158.575	67	E7
156.450	12	92	157.525	3D	BD	158.600	68	E8
156.475	13	93	157.550	3E	BE	158.625	69	E9
156.500	14	94	157.575	3F	BF	158.650	6A	EA
156.525	15	95	157.600	40	C0	158.675	6B	EB
156.550	16	96	157.625	41	C1	158.700	6C	EC
156.575	17	97	157.650	42	C2	158.725	6D	ED
156.600	18	98	157.675	43	C3	158.750	6E	EE
156.625	19	99	157.700	44	C4	158.775	6F	EF
156.650	1A	9A	157.725	45	C5	158.800	70	F0
156.675	1B	9B	157.750	46	C6	158.825	71	F1
156.700	1C	9C	157.775	47	C7	158.850	72	F2
156.725	1D	9D	157.800	48	C8	158.875	73	F3
156.750	1E	9E	157.825	49	C9	158.900	74	F4
156.775	1F	9F	157.850	4A	CA	158.925	75	F5
156.800	20	A0	157.875	4B	CB	158.950	76	F6
156.825	21	A1	157.900	4C	CC	158.975	77	F7
156.850	22	A2	157.925	4D	CD	159.000	78	F8
156.875	23	A3	157.950	4E	CE	159.025	79	F9
156.900	24	A4	157.975	4F	CF	159.050	7A	FA
156.925	25	A5	158.000	50	D0	159.075	7B	FB
156.950	26	A6	158.025	51	D1	159.100	7C	FC
156.975	27	A7	158.050	52	D2	159.025	7D	FD
157.000	28	A8	158.075	53	D3	159.050	7E	FE
157.025	29	A9	158.100	54	D4	159.075	7F	FF
157.050	2A	AA	158.125	55	D5			

N/A is Not Available. 156.000 is not available because 00 code indicates a blank programmable channel.
Duplex indicates that the received frequency is 4.6 Mhz above the transmit frequency listed in the left column.

Channel Useage

United States VHF Marine Channel Useage Chart

CHANNEL	CHANNEL ASSIGNMENT	RECEIVER FREQ (MHZ)	TRANSMITTER FREQ. (MHZ)
01	Port Operations	156.050	156.050
02	Port Operations	156.100	156.100
03	Intership & Coast to Coast	156.150	156.150
04	Port Operations	156.200	156.200
05	Port Operations, Intership, Coast to Coast	156.250	156.250
06	Ship to Ship Safety Only	156.300	156.300
07	Commercial, Intership, Ship to Coast	156.350	156.350
08	Commercial Ship to Ship	156.400	156.400
09	Commercial & Non-Commercial Ship to Ship, Ship to Coast	156.450	156.450
10	Commercial & Non-Commercial Ship to Ship, Ship to Coast	156.500	156.500
11	Commercial & Non-Commercial Ship to Ship, Ship to Coast	156.550	156.550
12	Port Operations Ship to Ship, Ship to Coast	156.600	156.600
13	Navigation Ship to Ship	156.650	156.650**
14	Port Operations Ship to Ship, Ship to Coast	156.700	156.700
15	Environmental	156.750	156.750*
16	DISTRESS, SAFETY, CALLING	156.800	156.800
17	State Control	156.850	156.850*
18	Commercial Ship to Ship, Ship to Coast	156.900	156.900
19	Commercial Ship to Ship, Ship to Coast	156.950	156.950
20	Port Operation Ship to Ship, Ship to Coast	161.600	157.000
21	US Government Only	157.050	157.050
22	US Coast Guard Liason	157.100	157.100
23	US Government Only	157.150	157.150
24	Public Correspondence	161.800	157.200
25	Public Correspondence	161.850	157.250
26	Public Correspondence	161.900	157.300
27	Public Correspondence	161.950	157.350
28	Public Correspondence	162.000	157.400
60	-	160.625	156.025
61	-	160.675	156.075
62	Public Correspondence	160.725	156.125
63	Port Operations	156.175	156.175
64	-	160.825	156.225
65	Port Operations Ship to Ship, Ship to Coast	156.275	156.275
66	Port Operations Ship to Ship, Ship to Coast	156.325	156.325
67	Commercial Mississippi River	156.375	156.375**
68	Non-Commercial	156.425	156.425
69	Non-Commercial	156.425	156.425
70	Digital Selective Calling (Do Not Use as a Working Channel)	156.525	156.525
71	Non-Commercial	156.425	156.425
72	Non-Commercial	156.425	156.425

* 1 Watt Initially
** 1 Watt with manuel overide to 25 Watts

Channel Useage

United States VHF Marine Channel Useage Chart

CHANNEL	CHANNEL ASSIGNMENT	RECEIVER FREQ (MHZ)	TRANSMITTER FREQ. (MHZ)
73	Port Operations Ship to Ship, Ship to Coast	156.675	156.675
74	Port Operations Ship to Ship, Ship to Coast	156.725	156.725
75	Guard Channel	156.775	156.775*
76	Guard Channel	156.825	156.825*
77	Port Operations Ship to Ship	156.875	156.875
78	Non-Commercial	156.925	156.925
79	Commercial Ship to Ship, Ship to Coast	156.975	156.975
80	Commercial Ship to Ship, Ship to Coast	157.025	157.025
81	US Government Only	157.075	157.075
82	US Government Only	157.125	157.125
83	US Government Only	157.175	157.175
84	Public Correspondence	161.825	157.225
85	Public Correspondence**	161.875	157.275
86	Public Correspondence	161.925	157.325
87	Public Correspondence	161.975	157.375
88	Commercial Ship to Ship	157.425	157.425

* 1 Watt in duplex

** 1 Watt with manual override to 25 Watts

Channel Useage

International VHF Marine Channel Useage Chart

CHANNEL	CHANNEL ASSIGNMENT	RECEIVER FREQ (MHZ)	TRANSMITTER FREQ. (MHZ)
01	Port Operations	160.650	156.050
02	Port Operations	160.700	156.100
03	Public Correspondence	160.750	156.150
04	Port Operations	160.800	156.200
05	Port Operations	160.850	156.250
06	Ship to Ship Safety Only	156.300	156.300
07	Public Correspondence	160.950	156.350
08	Commercial	156.400	156.400
09	Port Operations	156.450	156.450
10	Port Operations	156.500	156.500
11	Port Operations	156.550	156.550
13	Port Operations	156.650	156.650
14	Port Operations	156.700	156.700
15	On-Board Communications	156.750	156.750*
16	DISTRESS, SAFETY, CALLING	156.800	156.800
17	On-Board Communications	156.850	156.850*
18	Port Operations	161.500	156.900
19	Port Operations	161.550	156.950
20	Port Operations	161.600	157.000
2	Port Operations	161.650	157.050
22	Port Operations	161.700	157.100
23	Public Correspondence	161.750	157.150
24	Public Correspondence	161.800	157.200
25	Public Correspondence	161.850	157.250
26	Public Correspondence	161.900	157.300
27	Public Correspondence	161.950	157.350
28	Public Correspondence	162.000	157.400
60	Port Operations	160.625	156.025
61	Port Operations	160.675	156.075
62	Public Correspondence	160.725	156.125
63	Port Operations	160.775	156.175
64	-	160.825	156,225
65	Special Emergency	160.875	156.275
66	-	160.925	156,325
67	Port Operations	156.375	156.375
68	Port Operations	156.425	156.425
69	Port Operations	156.475	156.475
70	Commercial	156.525	156.525
71	Port Operations	156.425	156.425
72	Commercial	156.425	156.425
73	Port Operations	156.575	156.575
74	Port Operations	156.725	156.725
75		156.775	156.775*
76		156.825	156.825*
77	Commercial	156.875	156.875
78	Port Operations	161.525	156.925
79	Port Operations	161.575	156,075
80	Ship to Ship, Ship to Coast Commercial/	157.025	157.025
81	Ship to Ship, Ship to Coast Government Only	157.075	157.075
82	Government Only	157.125	157.125
83	Government Only	157.175	157.175
84	Public Correspondence	161.825	157.225
85	Public Correspondence	161.875	157.275
86	Public Correspondence	161.925	157.325
87	Public Correspondence	161.975	157.375

* 1 Watt Initially

Channel Useage

International VHF Marine Channel Useage Chart

CHANNEL	CHANNEL ASSIGNMENT	RECEIVER FREQ (MHZ)	TRANSMITTER FREQ. (MHZ)
79	Port Operations	161.575	156.975
80	Port Operations	161.625	157.025
81	Port Operations	161.675	157.075
82	Port Operations	161.725	157.125
83	Public Correspondence	161.775	157.175
84	Public Correspondence	161.825	157.225
85	Public Correspondence	161.575	157.275
86	Public Correspondence	161.925	157.325
87	Public Correspondence	161.975	157.375
88	Public Correspondence	162.025	157.425

* 1 Watt initially

VHF Marine Weather Channel Useage Chart

CHANNEL	CHANNEL ASSIGNMENT	RECEIVER FREQ (MHZ)	
WX0	- - -	162.275	
WX1	NOAA Weather	162.550	
WX2	NOAA Weather	162.400	
WX3	NOAA Weather	162.475	
WX4	NOAA Weather	162.425	
WX5	NOAA Weather	162.450	
WX6	- - -	162.500	
WX7	- - -	162.525	
WX8	Canadian Weather	161.650	
WX9	Environmental Weather	161.775	

Transmission on Weather Frequencies is not allowed

Operating Techniques

Your VIGIL RT-80 VHF Transceiver is easy to use and very reliable. The increasing popularity of such equipment has lead to areas where the airwaves are very crowded. The use of professional radio techniques when you are transmitting will help to reduce the congestion. Below are a few rules of thumb which will help everyone using the Marine VHF Service.

Listen BEFORE you transmit. Assure that you will not interfere with traffic already in progress on the channel.

Give absolute priority to Distress Calls. Continue to listen but do not transmit in response to a distress call unless you are in a position to help.

Agree on a working channel, and switch to that channel as soon as you have established contact on the calling channel 16. All calls on channel 16 should be less than 30 seconds long.

Wait 2 minutes before calling another station again after getting no response to your first call.

Keep transmissions short as possible and still get your message across.

Use professional operating procedures. This is not a CB band.

Use the Phonetic Alphabet when necessary.

Do not use profanity. It is illegal.

Do not transmit false distress signals. The FCC takes a dim view of this and violators may be prosecuted under FCC regulations, which carry a maximum fine of $10,000 and a year in prison.

Keep your equipment in good working order. Have it checked periodically by a qualified, licensed technician

Radiotelephone conversations are private. It is unlawful to make use of any information intended for others.

Register with your local Coast Station. If you plan to use the Marine Operator Services in your area, it is a good idea to register your station with them. It provides billing information to them and saves much time on the air.

The helmsmen of each commercial vessel must monitor Channel 13. Don't hesitate to call if there is any doubt about either his or your navigation.

Monitor Channel 16 if your radio is turned on and not in use. This channel is monitored 24 hours a day by the Coast Guard. If help is needed, it can be on its way in short order, either from the Coast Guard or by other vessels in your area.

MAYDAY is the distress call. Use Mayday only if there is an *immediate* danger of loss of life or property. A vessel simply running out of fuel does not constitute such a situation.

PAN is the urgency signal. It is pronounced "pawn". It is used when the safety of a person or vessel is in jeopardy. Pan has priority over all other traffic except distress (Mayday) traffic.

SECURITY is the safety signal. It is used for messages concerning the safety of navigation or giving storm warnings.

Example Distress Call

"Mayday, Mayday, Mayday, this is the yacht Nora A, Nora A, Nora A - Have struck a log and am taking on water - Position is 1 mile North of Can #13 off Eatons Neck - 4 persons on board and need immediate assistance - Over"

Example Urgency Call

"Pan, Pan, Pan, this is the yacht Nora A, Nora A, Nora A - Have run out of fuel at Can #13 off Eatons Neck - I have anchored but need assistance - Over"

Phonetic Alphabet	
A - ALPHA	N - NOVEMBER
B - BRAVO	O - OSCAR
C - CHARLIE	P - PAPA
D - DELTA	Q - QUEBEC
E - ECHO	R - ROMEO
F - FOXTROT	S - SIERRA
G - GOLF	T - TANGO
H - HOTEL	U - UNIFORM
I - INDIA	V - VICTOR
J - JULIET	W - WHISKEY
K - KILO	X - X-RAY
L - LIMA	Y - YANKEE
M - MIKE	Z - ZULU

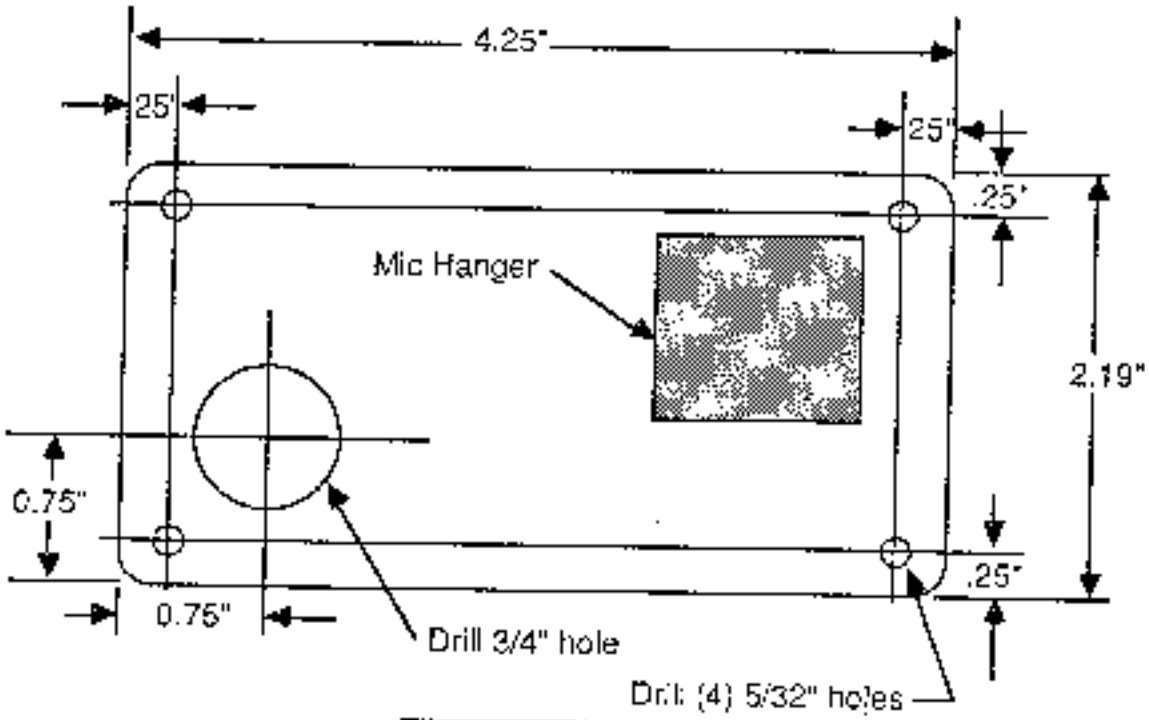
Warranty

The VIGIL RT-80 is fully guaranteed to be free from defects in material or workmanship for two years from date of purchase. Claims under warranty must be accompanied by a copy of proof of purchase.

Please include your name and address, the serial number of the instrument and the reason for return.

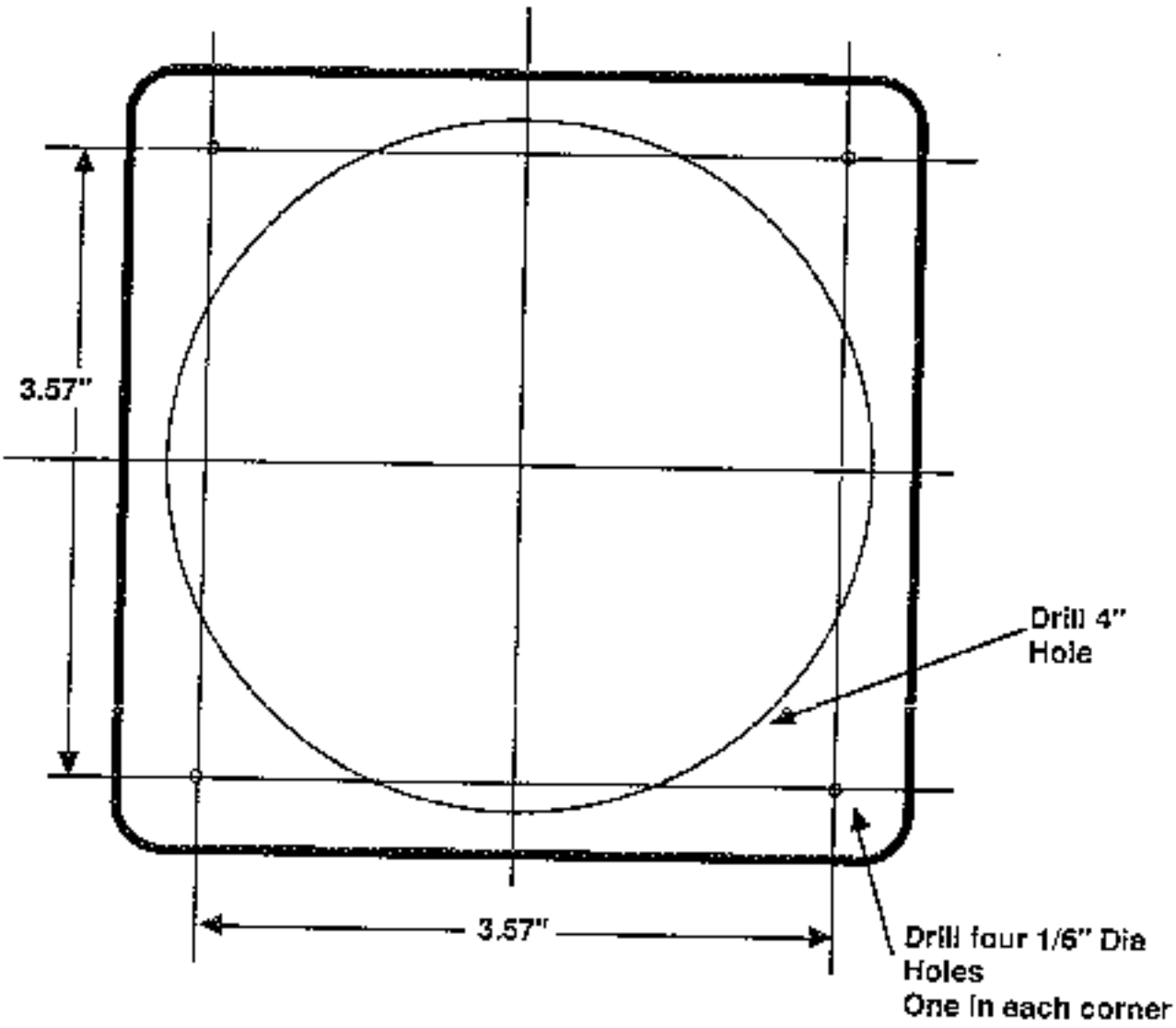
IMI VIGIL Electronics
Customer Service Department
New Whitfield Street
Guilford, CT 06437
(800)-CALL IMI
(203) 453-4374

Microphone Mounting Plate



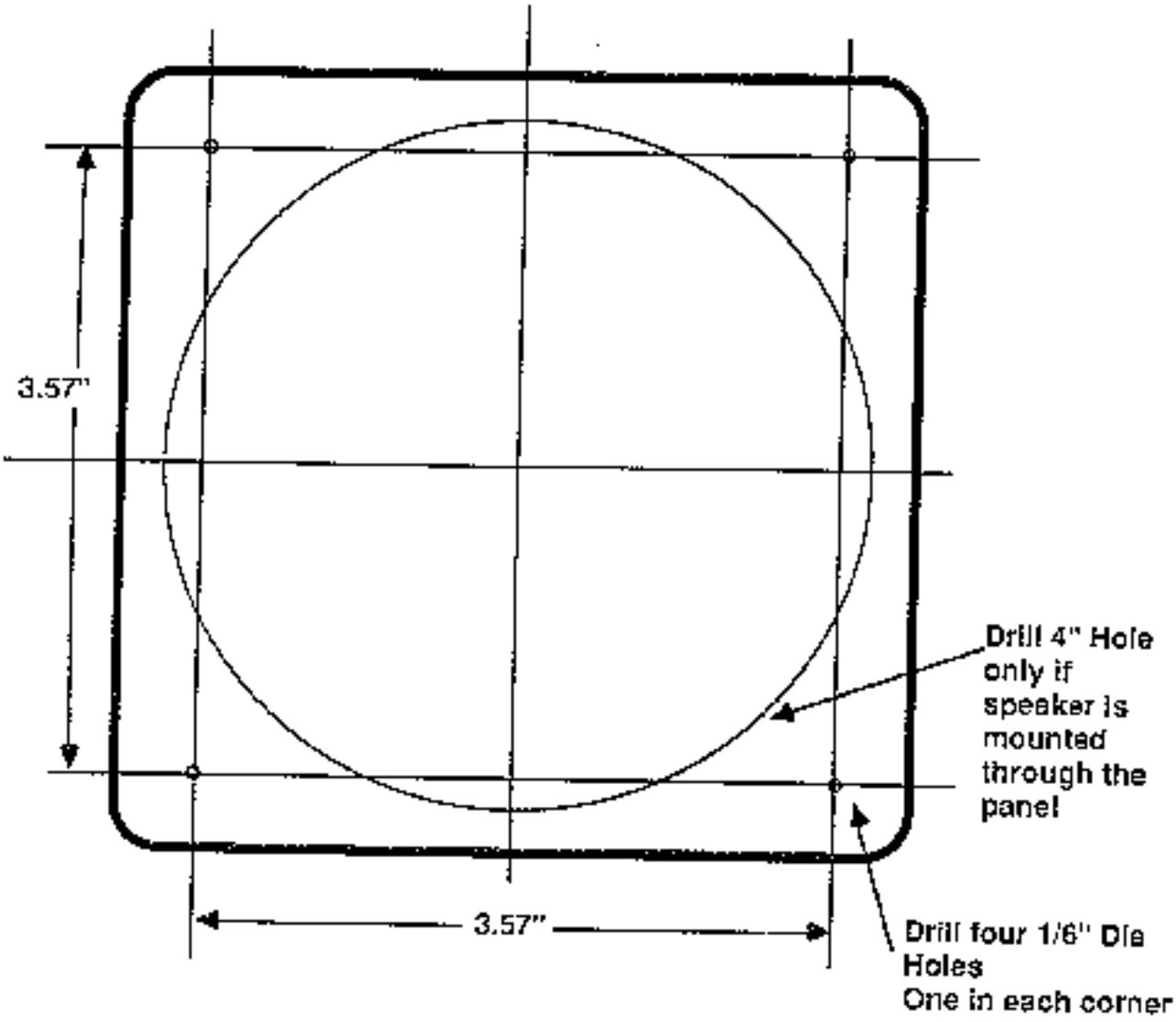
Mic Hanger Template

Radio Drilling Template



VHF Drilling Template

Speaker Drilling Template



Speaker Drilling Template

IMI VIGIL Electronics
Post Office Box 308
New Whitfield Street,
Guilford, CT 06437
TEL: (800) 225-5464 • (203) 453-4374

SURE POWER MULTI-BATTERY ISOLATOR APPLICATION AND INSTALLATION INSTRUCTIONS

The installation of a Sure Power multi-battery isolator is quite simple as long as you carefully read and understand these instructions and most importantly review the application chart below, before you begin.

First, make sure you have all the tools, wire, connectors and circuit breakers you will need. Sure Power offers a range of installation wiring kits that make the job a snap. See the table that follows for the right kit for your installation.

For optimum system performance it is recommended that a battery labeled "Deep Cycle" be used in the auxiliary position.

Finally, Sure Power multi-battery isolators are designed for alternator systems with negative ground, and batteries of the same nominal voltage. Batteries of differing voltages cannot be used. **For positive ground systems, marine outboard systems, or heavy duty truck systems, contact Sure Power for the proper isolator for your specialized application.**

PLEASE READ INSTRUCTIONS COMPLETELY PRIOR TO STARTING INSTALLATION

MULTI-BATTERY ISOLATOR APPLICATION CHART

ALTERNATOR TYPE	MAXIMUM ALT. OUTPUT	SURE POWER MODEL NUMBER: 2 Batteries 1 main (bank) 1 aux. (bank)	SURE POWER MODEL NUMBER: 3 Batteries 1 main (bank) 2 aux. (banks)	RECOMMENDED WIRE SIZE CIRCUIT BREAKER OR INSTALLATION KIT: Up to 15 Ft	15 Ft to 20 Ft	20 Ft to 25 Ft	25 Ft to 30 Ft
GROUP #1 **Original Equipment Delco (GM)**, except Delcotron CS series alternators (CS series used on most 1985 and newer GM vehicles). **Motorcraft (Ford)** All models, all years. **Mopar (Chrysler)** All models, all years. **Japanese Imports** with alternators using external voltage regulator or external sensing **Motorola** Load Handler Series. SCM Remote Sense Series.	Up to 70 Amps	702	703	#8 ga. 50 Amp (1)	#8 ga. 50 Amp (2)	#6 ga. 50 Amp (3)	#6 ga. 50 Amp
	Up to 95 Amps	952 or 9523A	1203 or 12033A	#8 ga. 50 Amp (1)	#6 ga. 50 Amp (3)	#4 ga 50 Amp	#4 ga. 50 Amp
	Up to 120 Amps	1202 or 12023A	1203 or 12033A	#6 ga. 80 Amp (4)	#4 ga. 80 Amp	#2 ga. 80 Amp	#1 ga. 80 Amp
	Up to 160 Amps	1602	1603	#4 ga. 120 Amp	#2 ga. 120 Amp	#2 ga. 120 Amp	#0 ga. 120 Amp
	Up to 240 Amps	2402	2403	#2 ga. 150 Amp	#0 ga. 150 Amp	#00 ga. 150 Amp	#000 ga. 150 Amp
GROUP #2 Delco (GM) equipped with: Delcotron CS series alt. (most 1985 and newer.)* Jeep vehicles equipped with Delcotron CS series alt. (most 1985 and newer)* Toyota 1985 and newer equipped with Nippondenso alternator	Up to 95 Amps	9523A**	12033A**	#8 ga. 50 Amp (1)	#6 ga. 50 Amp (3)	#4 ga. 50 Amp	#4 ga. 50 Amp
	Up to 120 Amps	12023A**	12033A**	#6 ga 80 Amp (4)	#4 ga. 80 Amp	#2 ga. 80 Amp	#1 ga. 80 Amp
	*The CS series alternator can be identified by unplugging the plug-in connector from the alternator and counting the number of holes in the connector. The CS series will have 4 square holes in the connector; the standard series will have 2 slotted holes in the connector. **Sure Power Model 144-CD Connector Kit required for Group #2 applications. All Group #2 isolators may also be used in Group #1 applications - simply disregard the additional excitation ("E") terminal.						
GROUP #3 Motorola (other than Load Handler) Bosch (requiring regulator sensing.)	Up to 70 Amps	702R	703R	#8 ga. 50 Amp (2)	#8 ga. 50 Amp (2)	#6 ga. 50 Amp (2)	#6 ga. 50 Amp
	Up to 95 Amps	952R	N/A	#8 ga. 50 Amp (1)	#8 ga. 50 Amp (2)	#4 ga. 50 Amp	#4 ga 50 Amp
	Up to 120 Amps	1202R	1203R	#6 ga. 80 Amp (4)	#4 ga. 80 Amp	#2 ga. 80 Amp	#1 ga. 80 Amp
	All Group #3 isolators may also be used in Group #1 applications - disregard the "R" terminal.						
Group #4 For alternators with internal voltage sensing, for some Mitsubishi and Hitachi, or single wire self exciting Delco alternators.	N/A	*1314 BATTERY SEPARATOR	N/A	#8 ga. N/A (4)	#6 ga. N/A (3)	#4 ga. N/A N/A	#2 ga. N/A N/A
*A SOLENOID PRIORITY SYSTEM, NOT AN ELECTRONIC ISOLATOR							

* CONSULT SURE POWER WIRING KITS AVAILABLE
(1) 8 gauge wire, 50 amp circuit breaker or SURE POWER KIT #1848-D (includes 15 ft. #8 ga. wire, 50 amp CB, terminals and connectors)
(2) 6 gauge wire, 50 amp circuit breaker or SURE POWER KIT #1846-D (includes 25 ft. #6 ga. wire, 50 amp CB, terminals and connectors)
(3) 4 gauge wire or SURE POWER KIT #1847 (includes 25 ft. #4 ga. wire and connector)
(4) 4 gauge wire or SURE POWER KIT #1848-D (includes 15 ft. #8 ga. wire and connector)

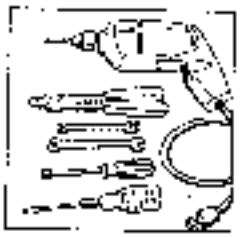
SURE POWER INDUSTRIES

GENERAL INSTALLATION INSTRUCTIONS RELEVANT TO ALL SIZES OF ISOLATORS, INCLUDING THOSE SHOWN ON THE SIMPLIFIED APPLICATION CHART.

CAUTION: IF YOU ARE INSTALLING AN ISOLATOR ON A TOYOTA ALTERNATOR GROUP TYPE #3 SEE SPECIAL TOYOTA INSTRUCTIONS BEFORE DISCONNECTING ANY PART OF THE EXISTING SYSTEM.
IF YOU ARE INSTALLING AN ISOLATOR ON A MOTOROLA OR BOSCH (ALTERNATOR GROUP TYPE #3) SEE SPECIAL MOTOROLA AND BOSCH INSTRUCTIONS BEFORE DISCONNECTING ANY PART OF THE EXISTING SYSTEM.

SURE POWER MULTI-BATTERY ISOLATOR INSTALLATION INSTRUCTIONS.

1. You need only six simple tools to install your isolator: • Screwdriver • Drill with ¼" bit • Wire stripper • Crimper • Open end wrench set • ½" Nut driver

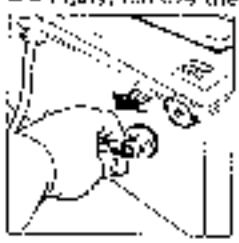


2. You will also need an adequate length of automotive grade wire, ring terminals and butt connectors. Use the Isolator Wire Size chart to determine the proper size wire for your needs.

We also recommend the use of a circuit breaker when applicable to protect your auxiliary battery circuit. See application chart for the proper size and type.

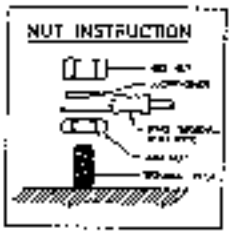
To make the job easier an Installation Kit is available from SURE POWER. The kits come in various sizes as shown on page 1 of the instruction sheet. Your dealer can assist you in the correct selection.

3. To avoid possible electrical shock and injury, remove the wire from the negative (−) terminal of the vehicle's battery. If there is more than one battery on your vehicle, disconnect the negative (−) lead on each one. Do not run the engine with the battery disconnected. Doing so could burn out the alternator. Also, extinguish any burning material and do not smoke near the battery or engine compartment.



4. Mount the isolator in a convenient location as near to the alternator as possible and away from the exhaust manifold. Allow for proper ventilation. Do not mount on the engine. Drill ¼" holes and mount with the screws provided.

5. Install hardware to the studs in the order shown in diagram, being careful not to over torque the bottom jam nut. Failure to install bottom jam nut will void warranty.



CAUTION: If you are installing an isolator in conjunction with a 1985 and later Ford alternator, do not proceed until you have read and understand the "Helpful Hint for Ford Installations" on Page 4.

6. Locate the "BAT" terminal at the rear of the alternator. It is usually the largest connection. DISCONNECT THE WIRES (INCLUDING THE VOLTAGE REGULATOR WIRE, IF PRESENT) FROM THE "BAT" TERMINAL OF THE ALTERNATOR. Reconnect those same wires to the "1" terminal of the battery isolator. Lengthen the wires, if necessary. Be sure you follow proper splicing techniques. **NOTE: DISCONNECTING OR CUTTING THESE WIRES IN A LOCATION OTHER THAN AT THE ALTERNATOR MAY RESULT IN IMPROPER FUNCTIONING OF THE CHARGING SYSTEM.**

7. Connect one end of a new wire of the proper size (see Isolator Application Chart - Recommended Wire Size) to the battery "BAT" terminal of the alternator and the other end to the "A" terminal of the isolator. This should now be the only wire connected to either of these terminals.

8. Mount a circuit breaker as near to the auxiliary battery as practical, and away from engine or exhaust heat (see application chart).

Connect one end of a new wire of the proper size (see Isolator Wire Size Chart) to the "2" terminal of the isolator. Run the wire to the circuit breaker and connect it to the "AUX" terminal. Run another wire from the circuit breaker to the auxiliary battery, connecting one end to the "BAT" terminal of the circuit breaker and the other to the positive "+" terminal of the auxiliary battery.

9. For three or four battery isolators repeat step 8 for each auxiliary battery.

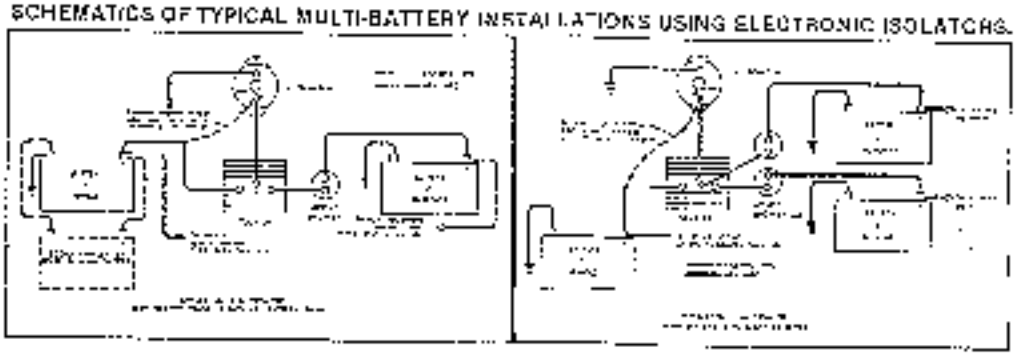
connecting terminal "3" to auxiliary battery 3 through its circuit breaker, terminal "4" to auxiliary battery 4 through its circuit breaker, etc.

10. IF YOUR INSTALLATION FALLS IN ALTERNATOR GROUP TYPE #2 OR #5, PROCEED TO SPECIFIC INSTRUCTIONS FOR THAT RELEVANT GROUP. OTHERWISE PROCEED TO STEP #11.

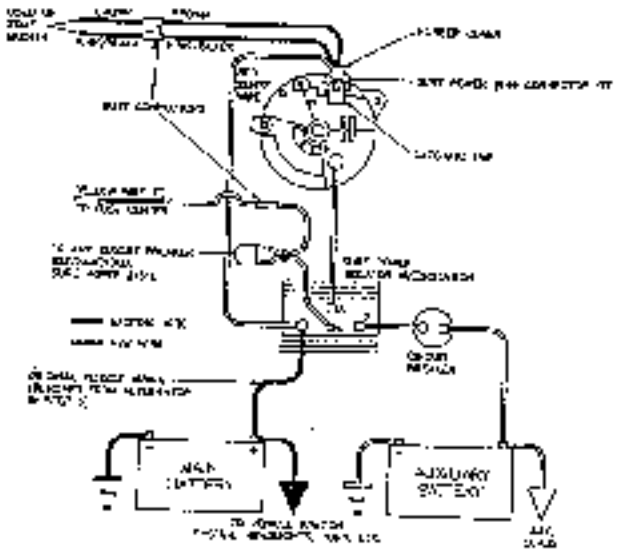
11. Connect all of the auxiliary loads (phone, lights, stereo, refrigerator, winch, etc.) to the positive post of the auxiliary battery or batteries. Then reconnect the ground cables removed in step 3. Also, make sure the negative (−) terminals of the auxiliary battery(s) are properly grounded with a conventional ground strap.

12. Perform electrical tests (Page 4) to assure proper operation.

SCHEMATICS OF TYPICAL MULTI-BATTERY INSTALLATIONS USING ELECTRONIC ISOLATORS.



SEE APPLICATION CHART FOR APPROPRIATE SIZE AND ISOLATOR MODEL NUMBER. FOR SPECIAL APPLICATIONS SUCH AS TWO ALTERNATORS, SEE YOUR DEALER OR SURE POWER CATALOG FOR APPROPRIATE ISOLATOR MODEL.



GENERAL MOTORS DELCOTRON. Before proceeding with any installation it is recommended that you look closely at your Delcotron alternator to ascertain its size. The amperage output is molded in close proximity to the output stud - verify that you have the correct size isolator. Delcotron CS Series alternators will be becoming more and more common in the late 1980's on vehicles manufactured by General Motors in North America.

When installing an isolator on a GM "CS" series alternator equipped vehicle the general isolator installation instructions should be followed. However, this alternator requires external excitation and external sensing. An isolator with an excitation terminal "E" and a plug connector (144 or 144-C) are required.

The following procedure refers to 3A isolators and installation kit #144 and #144-C.

1. Locate and remove the plug-in connector from the alternator. This may be done by inserting a small screwdriver under the latching tab.
2. Cut the wire(s) (brown and/or pink/black) at a convenient location within 6" of the connector plug end. **NOTE: If the existing Delco connector has a wire in the "S" position, replacement of this connector is not necessary. Proceed to Step #3.**
3. Remove the rubber dust cover (if installed) from the old plug-in connector and install it on the new plug-in connector provided in the #144 or #144-C kit.
4. Strip ¼" insulation from the cut wire(s) (Step 2) and insert the wire(s) into the butt connectors of the new plug-in connector and crimp, matching brown and/or pink/black wire(s). Secure all loose wires.
5. Reconnect the new plug in to the alternator.
6. Route the remaining red wire of the plug-in connector to terminal #1 of the Sure Power isolator. Cut to the correct length, strip and crimp on the ¼" ring terminal supplied. Now connect to terminal #1 of the isolator.
7. External excitation connection. The "E" post of the isolator requires connection to a 6I ignition switched source such that power is applied only in the start/run position. BE SURE POWER IS NOT APPLIED WHEN IGN IS SWITCHED TO ACCESSORY POSITION. On most late GM vehicles this point may be one of the spare ignition terminals marked "IGN" on the fuse center. Connect one end of the yellow wire supplied to one of these spare ignition terminals. Route the other end of the yellow wire to the "E" terminal of the isolator. (If using the recommended 10 amp circuit breaker [supplied with the 144-C Kit] insert the circuit breaker in the yellow wire as shown in the diagram.) Cut to the correct length, strip and crimp on the supplied #10 ring terminal (or 10 amp circuit breaker if used.) Now connect the yellow wire to the "E" terminal of the isolator with the lock washer and nut.
8. Now proceed to Step 11 of the GENERAL ISOLATOR INSTALLATION INSTRUCTIONS.

GROUP #2 ALTERNATORS Continued

TOYOTA. When installing an isolator to a Toyota alternator, follow general installation instructions.

1. Locate the small sensing wire that runs from the alternator to the wiring harness. Check that you have the right wire by stripping a small section of wire and then determining that voltage is present only when the key is in the "run" position but not in the "accessory" position. Do not interrupt wire.
2. After completing Steps 1-9 of general instructions, connect an excitation wire from the point located in Step #1 above, to the "E" terminal of the isolator. **Sure Power recommends a 10 amp circuit breaker (Sure Power Model 1510) be inserted in this line.**

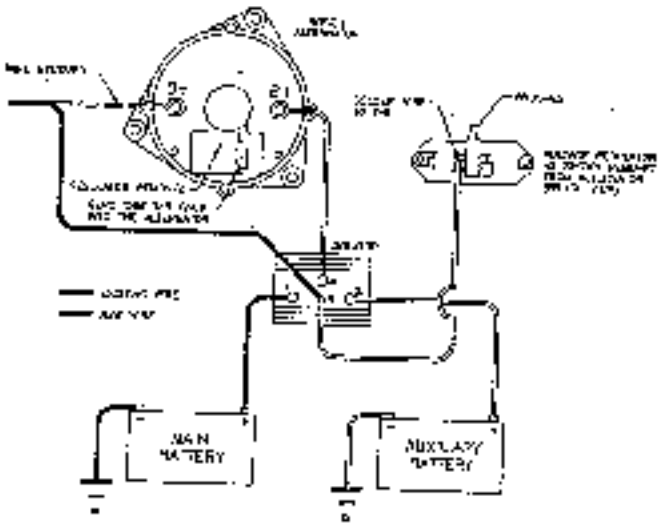
NOTE: The Group #2 isolator may be used in applications not requiring the excitation by not connecting the "E" terminal.

GROUP #3 ALTERNATORS:

Carefully review the individual schematics shown below and then follow the specific installation instructions relative to the type of alternator and vehicle with which you are working.

FOR BOSCH ALTERNATOR USING ALTERNATOR MOUNTED REGULATOR SYSTEM (AS USED ON VOLKSWAGEN VANAGONS).

FOR ALTERNATOR EQUIPPED VOLKSWAGEN VANS USING AN EXTERNAL MOUNTED REGULATOR, CONSULT FACTORY.

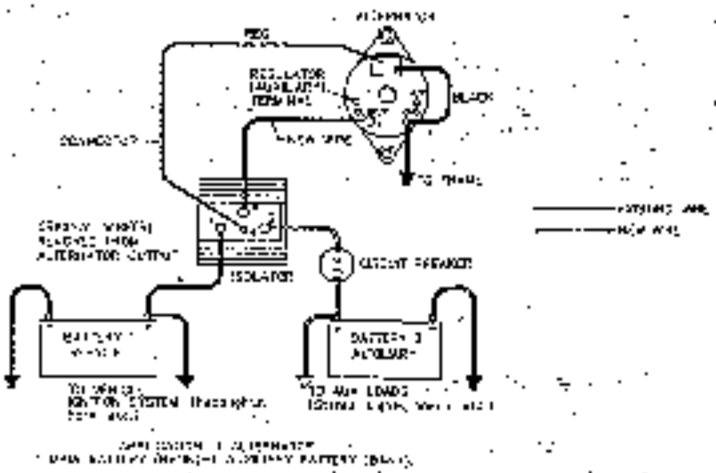


1. After completing Step #4 of standard instructions, remove the two screws attaching the regulator to alternator. With great care, remove the regulator. Use a downward, rolling motion to prevent breaking off the brushes.
2. Bend the connector prong of the alternator, as illustrated, so that it will no longer mate with the internal connection strip of the regulator. (The regulator connector may need to be bent also to insure no contact.)
3. Solder an appropriate length of #14 wire to the regulator connector prong, as was bent in Step #2 (see illustration).
4. Replace regulator. Note: suggest a flat blade to hold the brushes in the holder until regulator is in place. Replace mounting screws (route wire so it will not be pinched or in the way).
5. Connect the other end of the wire that was soldered on the regulator to the "R" terminal on the isolator.
6. Disconnect the wire (s) going to the D– terminal of the alternator.
7. Reconnect these same wire(s) to the "A" terminal of the isolator with the wire connected in Step #5.
8. Now proceed to Step #5 of the GENERAL ISOLATOR INSTALLATION INSTRUCTIONS.

GROUP #3 ALTERNATORS Continued

MOTOROLA ALTERNATORS EXCEPT LOAD HANDLER SERIES. (FOR LOAD HANDLER SERIES, USE STANDARD INSTRUCTION)

FIG. 8



1. Prior to starting Isolator installation, take the following measurements:
   A. Start engine. Run at fast idle.
   B. Measure the voltage at the output of alternator. This should be about 14 volts.
   C. Measure the voltage at the "REG" terminal of the alternator. (This is the terminal with the small red wire)
   Note whether this voltage is the same or about one volt higher than that measured at the output.
2. Complete steps 1-9 of standard instructions.
3. If the regulator voltage (as measured in step #1 above) is the same as the output voltage:
   A. Disconnect regulator wire from regulator (or auxiliary) terminal of alternator.
   B. Connect the regulator wire to the "R" terminal of the isolator. Leave the regulator terminal on the alternator empty.
4. If the regulator voltage is higher than the output voltage, move the red regulator wire from the regulator post to the output post of the alternator. Do not use "R" post of isolator.
5. If the red regulator wire is already on the output post, follow standard instructions.
6. Complete Step #11 of standard instructions.

ELECTRICAL TEST:

1. Engine not running: #1 terminal of Isolator should read vehicle battery voltage. #2 terminal should read auxiliary battery voltage. The "A" terminal may read from zero to 12 volts. The "E" terminal on -3 Isolators should read zero volts, the "R" terminal on -4 isolators should read from zero to 12 volts.
2. Engine running and alternator charging: #1, and #2 ("E" terminal on -3A isolators, "R" terminal on -4 Isolators) should read approximately the same voltage, which will be the voltage regulator setting or less. The "A" terminal should read .8 to 1 volt higher than the reading of #1 and #2 terminals and ("E" terminal on -3A isolators, "R" terminal -4 isolators).
3. For 12 volt systems the "A" post should read approximately 15 volts. The #1 and #2 post should read 13.8 to 14.2 volts. If the "A" post reads 13.8 to 14.2 volts the regulator is sensing the alternator output rather than the main battery. This situation needs to be corrected for proper charging.

SURE POWER INDUSTRIES

10189 S.W. Avery
Tualatin, Oregon 97062 U.S.A.
Phone: (503) 692-5360
Fax (503) 692-9091

Printed in U.S.A. Inst. 2/8/90, Rev. B 9/91

HELPFUL HINT FOR FORD INSTALLATIONS (LATE 1985 & UP)

ISOLATOR INSTALLATION INSTRUCTIONS FOR FORD PRODUCTS USING AN ALTERNATOR WITH PLUG-IN CONNECTION (LATE 1985 & LATER)
This section applies to Ford alternators with 2 plug-in connections. If your alternator has an output bolt, return to Step 6 of general instructions.

Note: Wire colors may vary on different model Ford vehicles.

GROUP #1 ALTERNATORS: FORD INSTALLATIONS

CAUTION: Disconnect battery before proceeding with modification and installation.

1. Locate the connector on the side of alternator that has one light wire and two heavy black wires with orange or red trace.
2. Cut both black/orange wires close to the alternator, allowing enough length to attach a butt splice. (Approximately 2 to 3 inches). This is the proper connection.
3. Damage to vehicle may occur if wires are cut beyond the factory cabling splice (Approximately 5 inches from the alternator).
4. Splice an extension wire to *both* wires that are attached to the alternator and connect the other end to the "A" terminal of the isolator.
5. Splice an extension wire to both wires extending from the vehicle wire harness and connect the other end to the "1" terminal of the isolator.
6. Return to Step #8 of general instructions.

INSTRUCTIONS FOR TESTING A SURE POWER ISOLATOR WITH OHMMETER*

1. Remove all wires from the Isolator.
2. Using a needle movement ohmmeter Rx-1 scale or a digital ohmmeter diode scale, hold the Red* probe on terminal "A" and with the Black* probe touch terminal #1 and #2, and the "E" terminal for -3A Isolators (Group #2), and the "R" terminal for -4 Isolators (Group #3). A good Isolator will show a current flow from "A" to #1, #2 and "R", and no current flow to "E".
3. Next, hold the Black* probe on terminal "A" and with the Red* probe touch terminals #1 and #2 (Terminal "E" and "R", if used). A good Isolator will allow no current flow from "A" to #1, #2 or "R" and will show a current flow from "A" to "E".
4. Hold one probe on the aluminum heatsink, being sure there is contact by scratching thru the protective coating. Then touch with the other probe, terminals "A", #1, #2 (the "E" terminal for -3A Isolators, the "R" terminal for -4 Isolators). A good isolator will show no current flow.

*On some import ohmmeters, the red and black probes are reversed for these tests.

SURE POWER BATTERY ISOLATOR ONE-YEAR LIMITED WARRANTY.

Sure Power Industries, Inc. warrants each new product against factory defects in material and workmanship for one year after date of purchase. The owner will be responsible for removing from the vehicle and returning any defective unit, transportation costs prepaid to Sure Power Industries, Inc. factory or a factory authorized servicing distributor. Sure Power Industries, Inc. will, without charge, repair or replace at its option, units which it inspects and determines to be defective. All transportation charges must be borne by the purchaser. A copy of the purchaser's receipt must be returned with the defective unit in order to qualify for warranty coverage. Exclusions from this warranty are the [illegible] of any unit [illegible] by Sure Power Industries, Inc. to have been caused by abnormal use or service. This warranty shall not apply to any Sure Power product which has been improperly installed.

There are no warranties, expressed or implied, including any implied warranties of merchantability or fitness, which extend beyond this warranty period. The loss of use of the product, loss of time, inconvenience, commercial loss or consequential damages are not covered. Sure Power Industries, Inc. reserves the right to change the design of any product without assuming any obligation to modify any product previously manufactured.

This warranty gives you specific legal rights. You may also have other rights which vary from state to state. Some states do not allow limitations on how long an implied warranty lasts. Some states do not allow the exclusion or limitation of incidental or consequential damages. The above limitation or exclusion may not apply to you.

GALLEY/HEAD SYSTEMS

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

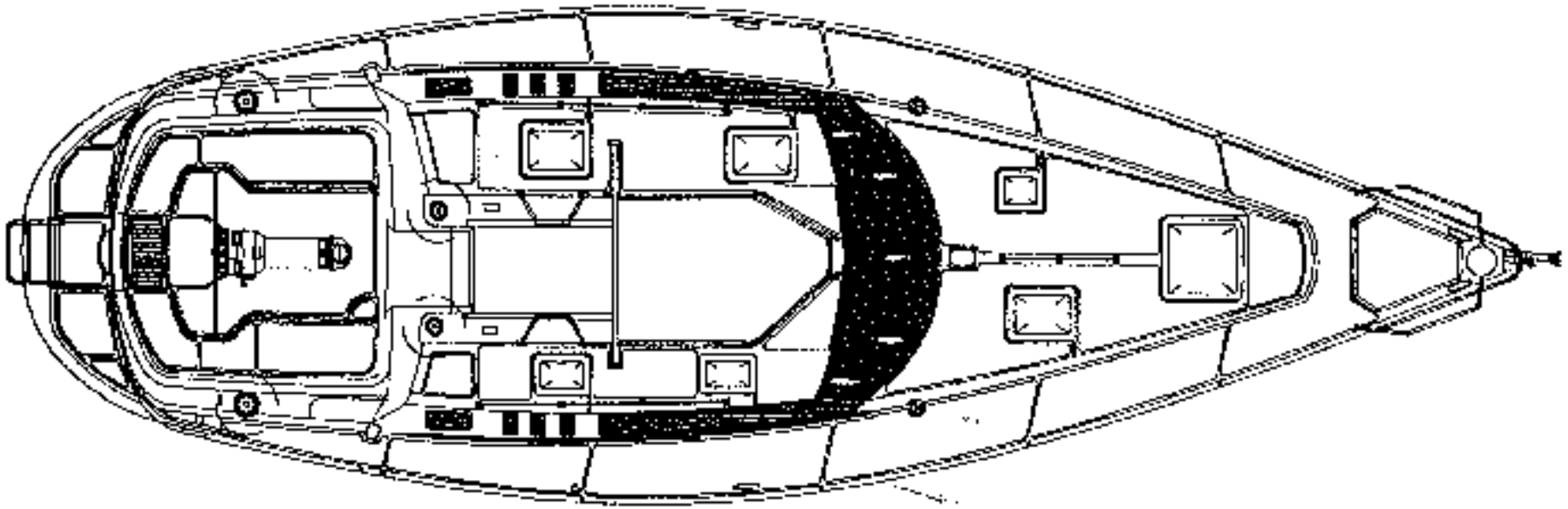
To activate the water system, flip the "water pressure" switch on the electrical panel. This will start the pump and pressurize the system. When the pressure builds, the pump will shut off . With continued use of fresh water the pressure in the system is reduced, automatically re-starting the pump. Make sure there is water in the system while pump is in operation to prevent damage to the motor.

If pump kicks in frequently without system use, you may have a leak in the system and it should be checked. **Do not activate water heater unless there is water in the system.**

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.

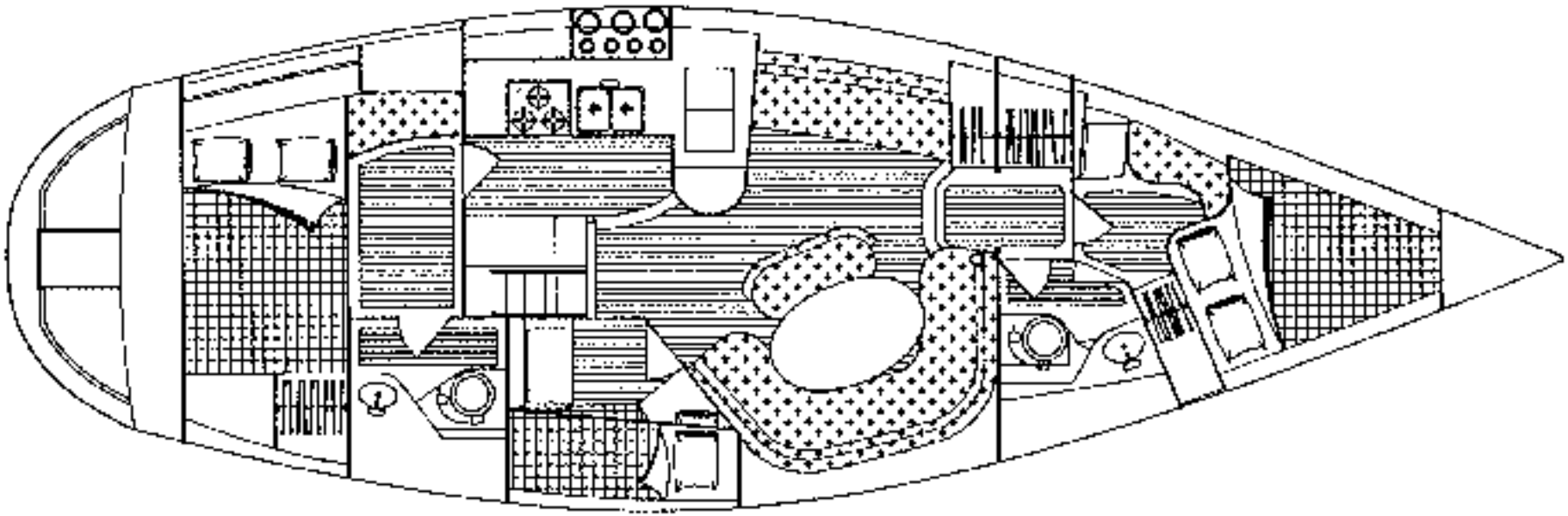
To operate shower, turn on hot & cold faucets until desired temperature is reached, while shower head is retracted at sink. Pull the shower head out and use. An "on-off" valve is located on the upper most portion of the shower head. This can be used to stop water flow at the head. However, this will not stop water flow at the sink. The faucets must be turned off to prevent system drainage.

LEGEND 43



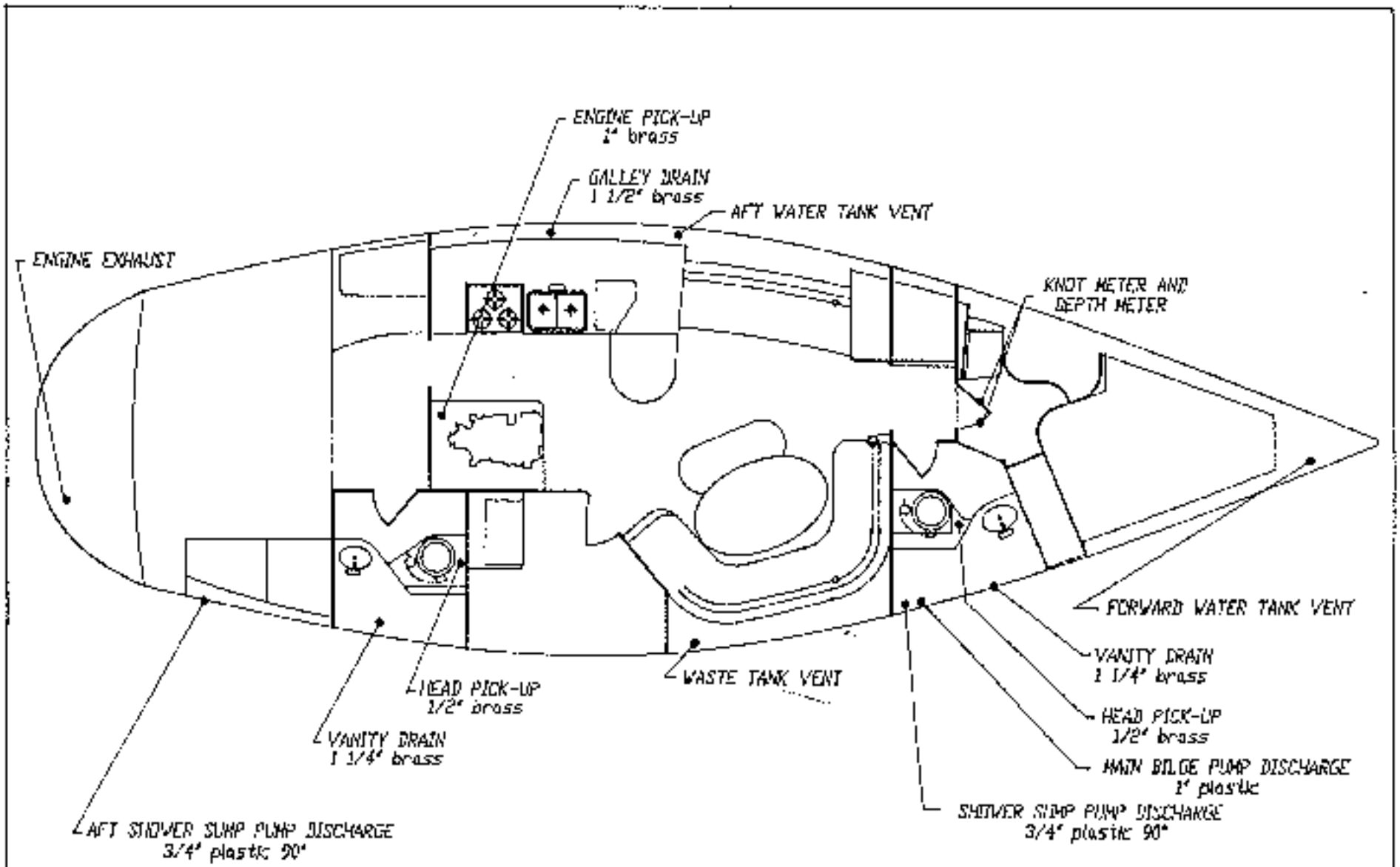
HUNTER

LEGEND 43 DECK PLAN H43A2628



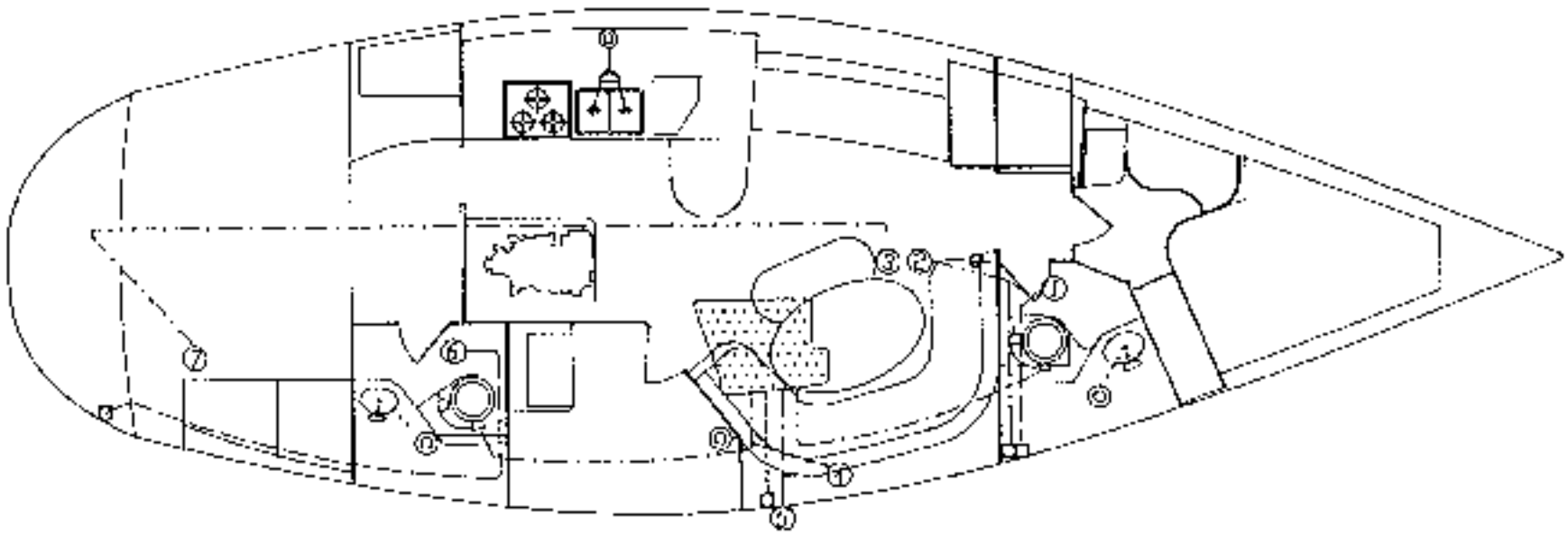
HUNTER

LEGEND 43 INTERIOR PLAN 1143426



HUNTER

LEGEND 43 THUR-HULL LOCATION NO. 643



LEGEND

① FORWARD SHOWER SUMP PUMP
② BILGE PUMP
③ MANUAL BILGE PUMP
④ MACERATOR
⑤ WASTE PUMP OUT STATION (DECK)
⑥ AFT SHOWER SUMP PUMP
⑦ MANUAL BILGE PUMP (DECK)

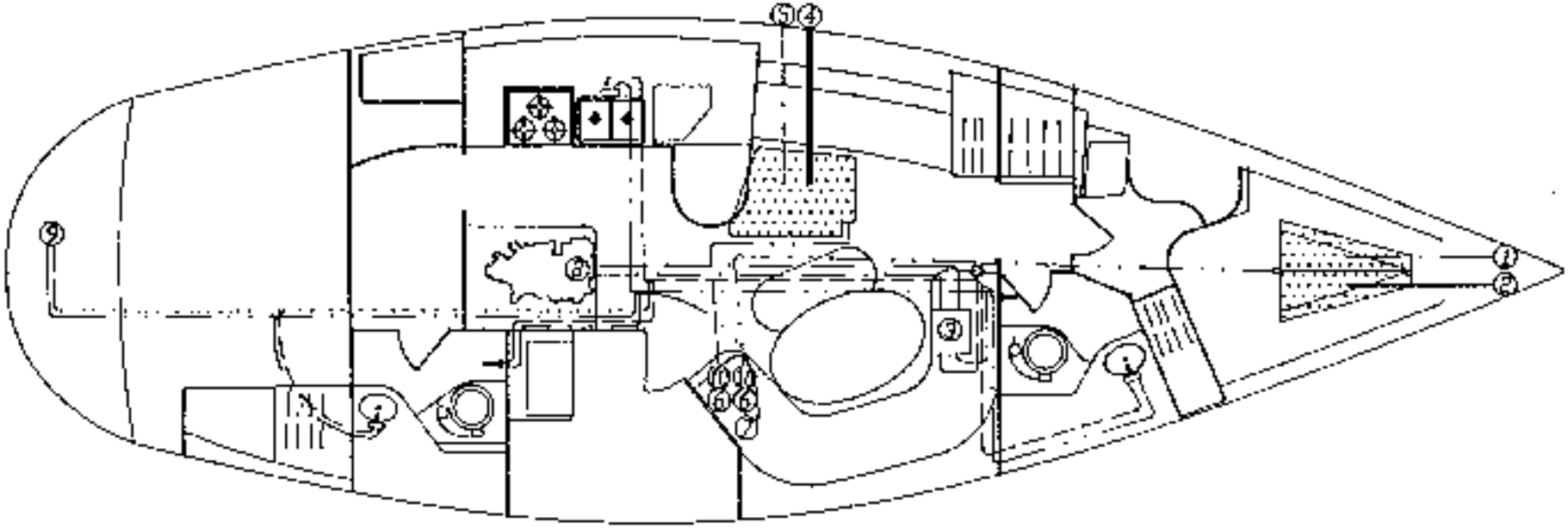
◎ BRONZE THRU-HULL W/ BALL VALVE
□ PLASTIC THRU-HULL

LINE TYPES

1 1/2" SANITATION HOSE
1 1/2" SHIELDVAC
1" SHIELDVAC
1" SHIELDFLEX
3/4" SHIELDVAC

HUNTER

LEGEND 43 WASTE SYSTEM H43A2[illegible]



LEGEND

1. FORWARD WATER TANK VENT
2. FORWARD WATER TANK DECK FILL
3. HOT WATER HEATER
4. MIDSHIP WATER TANK DECK FILL
5. MIDSHIP WATER TANK VENT
6. WATER FILTER
7. WATER PUMP
8. HEAT EXCHANGE
9. COCKPIT SHOWER
10. TANK SELECTOR VALVES

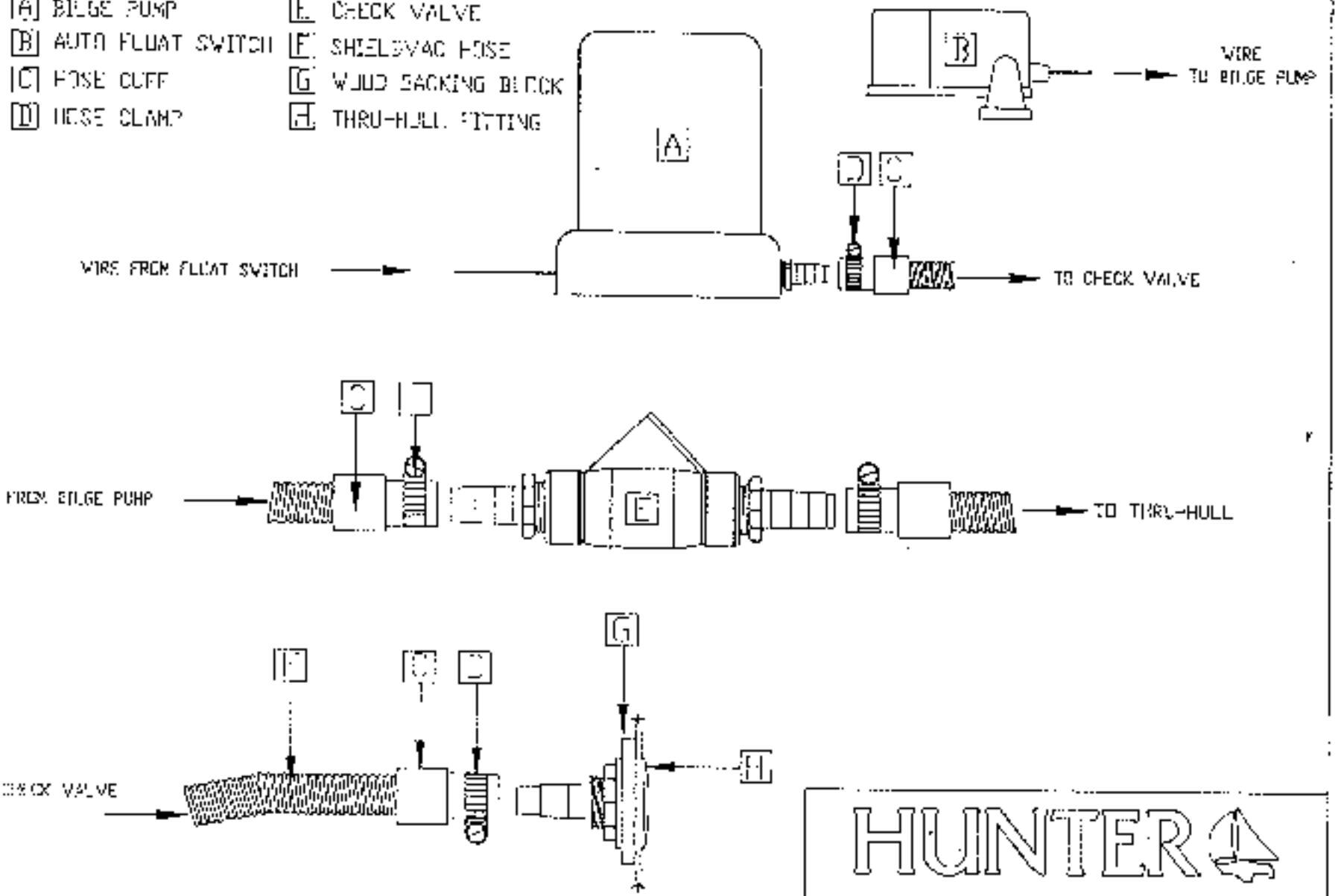
LINE TYPES

HOT WATER	3/8" POLYBUTYLENE
COLD WATER	3/8" POLYBUTYLENE
WATER HEATER	5/8" SMOOTHFLEX
TANK VENT HOSE	3/4" SHIELDVAC
FRESH WATER FILL HOSE	1 1/2" SHIELDVAC

HUNTER

LEGEND 43 WATER SUPPLY SYSTEM #4 3629

[A] BILGE PUMP
[B] AUTO FLOAT SWITCH
[C] HOSE CUFF
[D] HOSE CLAMP
[E] CHECK VALVE
[F] SHIELDVAC HOSE
[G] WOOD BACKING BLOCK
[H] THRU-HULL FITTING



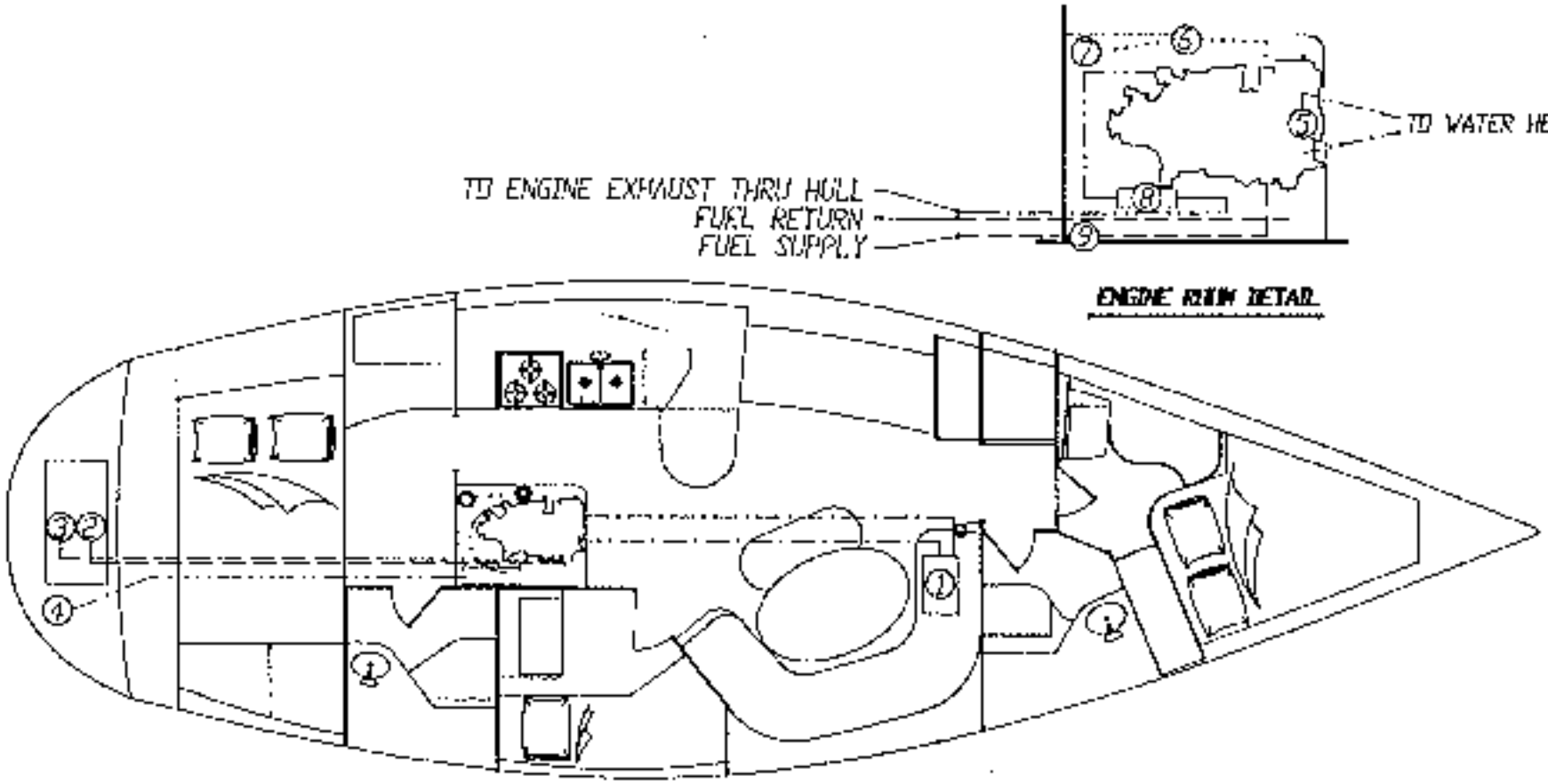
HUNTER

AUTO BILGE PUMP LAYOUT GENA2613

PUMPS, STRAINERS AND FILTERS

LEGEND 43

COMPONET	MANUFACTURER AND PART NUMBER
Bilge pump (automatic)	Rule 1500
(automatic)	Rule 800 or Mayfair 800 (SHOWER SUMPS)
(manual)	Rule 148 M
Waste pump	ITT Jabsco #18590-000
Water pump	ITT Jabsco Flo-Jet 4405-143-C
Water strainer	ITT Jabsco 35400-1000
Engine strainer	3/4" Perko 499-006 PLB
Fuel filter	Racor 110



LEGEND

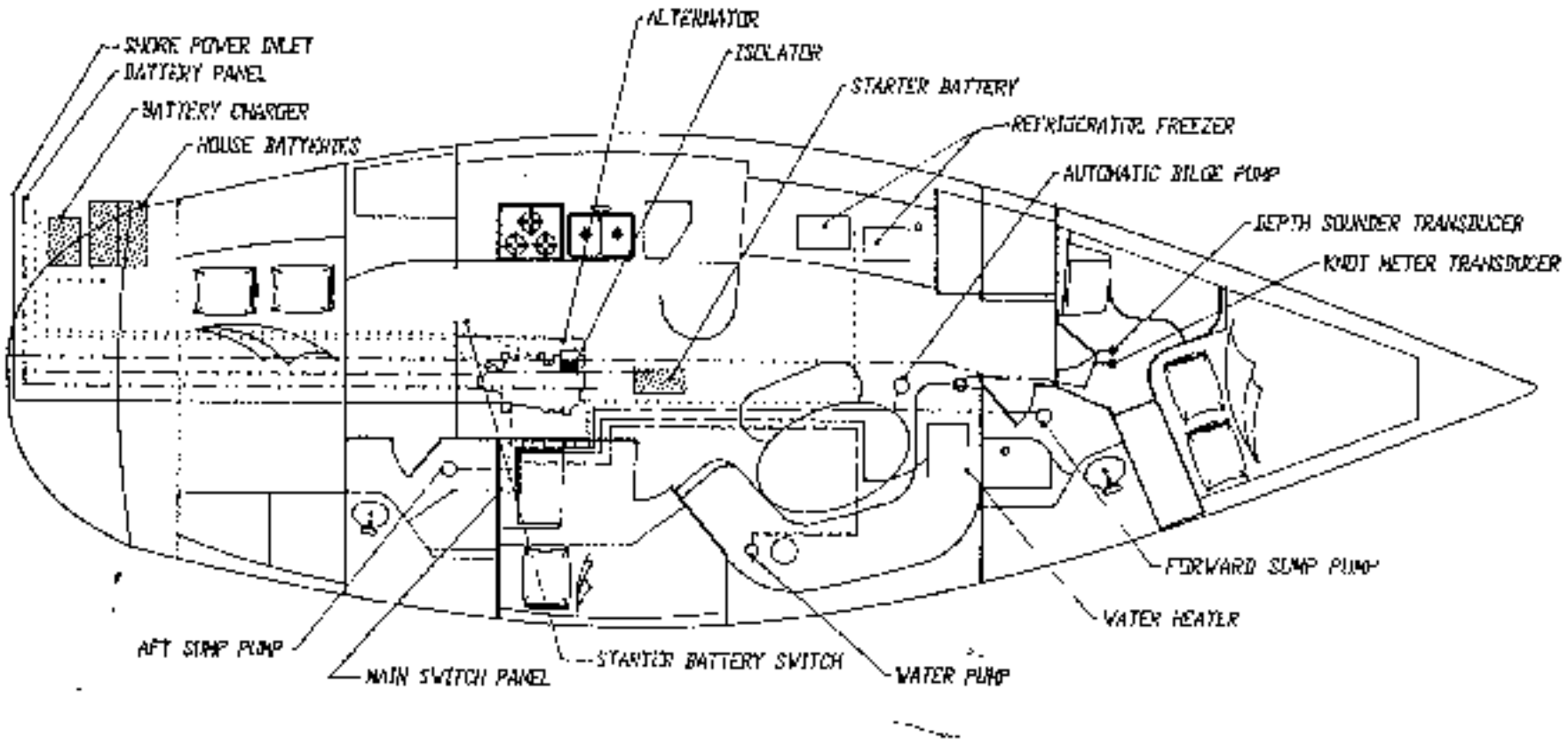
1. WATER HEATER
2. FUEL RETURN
3. FUEL SUPPLY
4. ENGINE EXHAUST, THRU HULL
5. ENGINE HEAT EXCHANGER
6. WATER STRAINER
7. ENGINE INTAKE
8. MUFFLER
9. FUEL FILTER

LINE TYPES

FUEL LINE	1/4" FUEL LINE
WATER HEATER	5/8" SHIELDFLEX
COOLING WATER	1" SHIELDFLEX
ENGINE EXHAUST	3" EXHAUST HOSE

HUNTER

LEGEND 43 ENGINE SYSTEM H43A2632



12 GAUGE

8 GAUGE

IMI CABLES

4 GAUGE

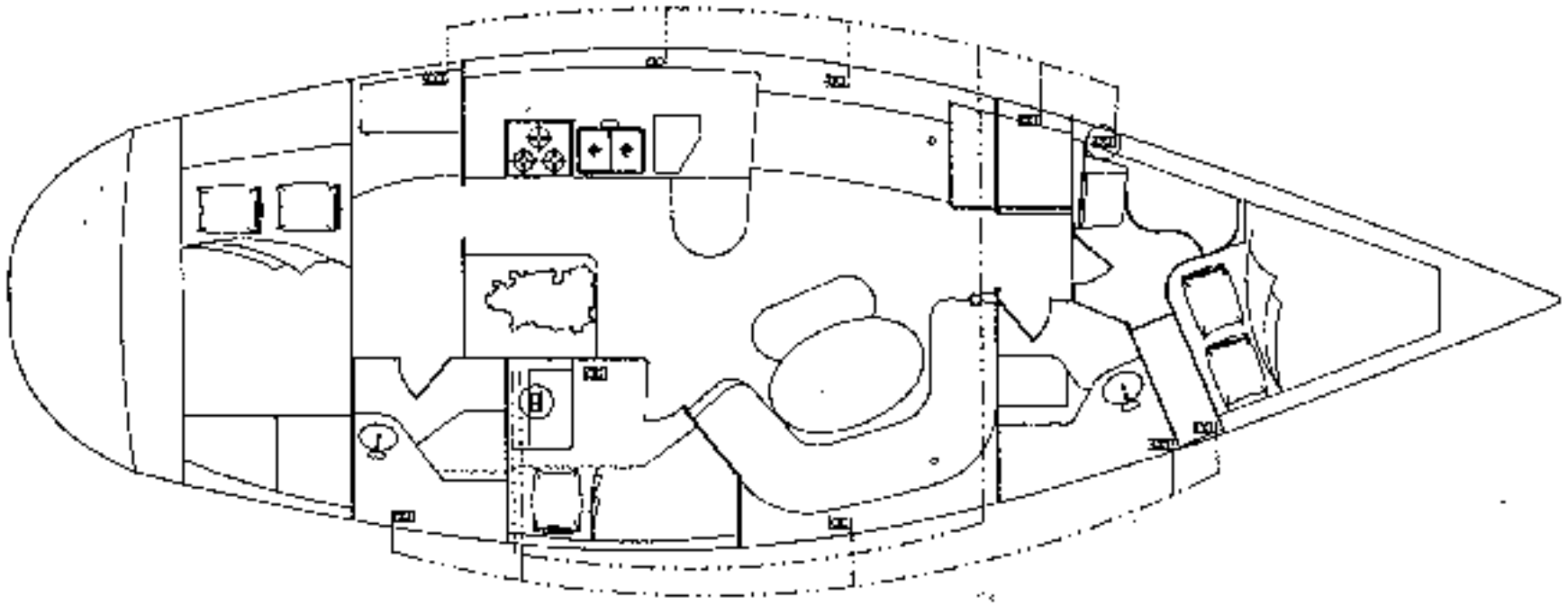
ENGINE HARNESS

14/3 BOAT CABLE

3 BOAT CABLE

HUNTER

LEGEND 43 PAN ELEC. SYSTEM H43: '14



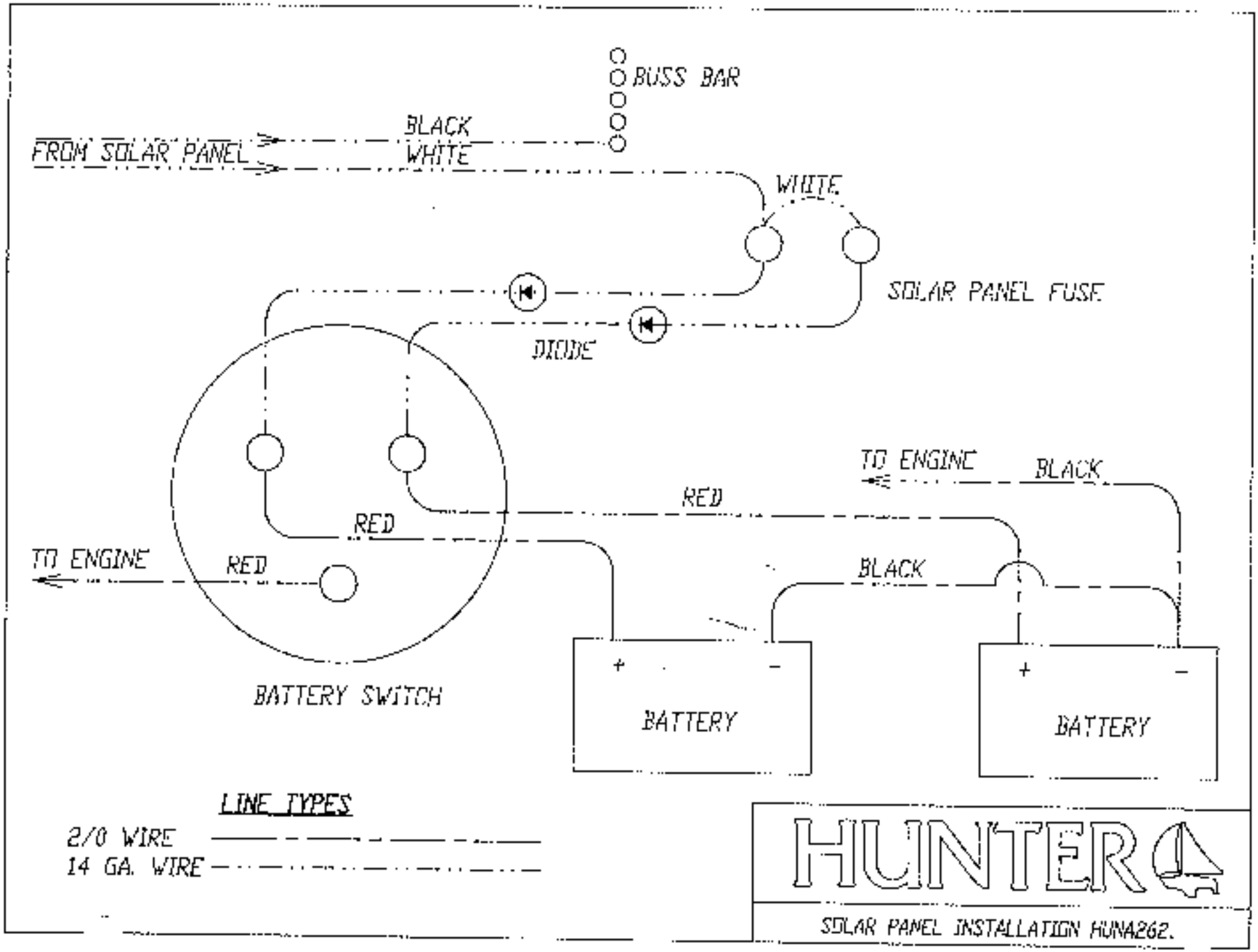
⊗ OUTLET

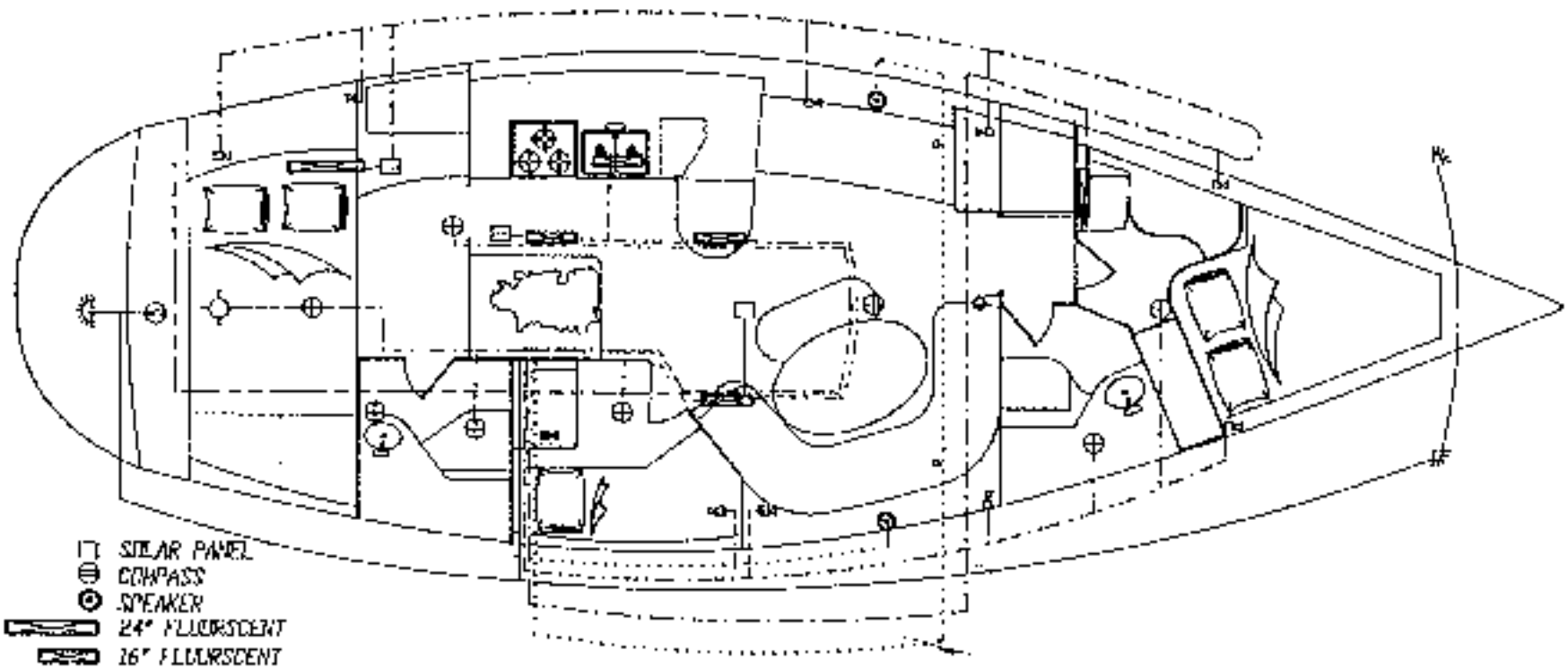
⊗ GROUND FAULT RECEPTICAL

RECEPTACLES ——·——·——·—— 14/3 SC WIRE

HUNTER

LEGEND 43 HEADLINER 110 VOLT SYSTEM '342633


BUSS BAR
FROM SOLAR PANEL
BLACK
WHITE
WHITE
SOLAR PANEL FUSE
DIODE
TO ENGINE
BLACK
RED
RED
TO ENGINE
RED
BLACK
BATTERY SWITCH
+
-
BATTERY
+
-
BATTERY
LINE TYPES
2/0 WIRE
14 GA. WIRE
HUNTER
SOLAR PANEL INSTALLATION HUNA262.



SOLAR PANEL
COMPASS
SPEAKER
24" FLUORSCENT
16" FLUORSCENT
OUTLET
READING LIGHT
CHART LIGHT
DOME LIGHT
STBD RUNNING LIGHT
PORT RUNNING LIGHT
STERN LIGHT
COCKPIT LIGHT
LIGHT SWITCH

NOTE
WIRES LEADING TO DOME AND SWIVEL LIGHTS ARE IN PAIRS OF 16 GAUGE BLACK AND BLUE W/WHITE STRIPE.
WIRES LEADING TO BOW LIGHTS ARE IN PAIRS OF 16 GAUGE BLACK AND GRAY W/WHITE STRIPE.
WIRES LEADING TO STERN LIGHT ARE IN A PAIR OF 16 GAUGE BLACK AND GRAY.
WIRES LEADING TO PORT SIDE SPEAKERS ARE RAN IN PAIRS IN 16 GUAGE BLACK AND YELLOW.
WIRES LEADING TO STARBOARD SIDE SPEAKERS ARE RAN IN PAIRS OF 16 GAUGE BLACK AND BROWN.

LIGHTING
SPEAKERS
NAVIGATION LIGHTS

HUNTER

LEGEND 43 12 VOLT SYSTEN 1143, 35

LEGEND 43 LIGHT BULB SPECIFICATION

Your Legend 43 has 28 interior lights and 7 exterior lights. Of the interior lights, 10 are dome lights, 9 swivel lights, 6 fluorescent lights, 2 courtesy tube lights, and 1 light which is removable from its bracket and installed over the chart table. Of the exterior lights, 3 are navigation lights, 3 are on the mast, and 1 on the cockpit table.

LIGHT	REPLACEMENT BULB
Interior	
Dome	#1572 and Wagner #S8-1141
Swivel	#1831 and Wagner #S8-1073
Fluorescent (16")	#F8T5CW/GE
Fluorescent (24")	#F15T5CW/GE
Courtesy tube	Vista TAC15'-3'CL
Chart	Aqua Signal #90400282
Exterior	
Red bow	Hella #78292 (12v25w)
Green bow	Same as above
Stern	Hella #78206 (12v10w)
Anchor	Perko #375-12v-10w
Steaming	Forespar CAT #132025
Deck	Forespar CAT #132027
Cockpit	Guest #A22998

INSTRUCTIONS FOR PREPARATION FOR BOTTOM PAINTING

WARNING!

Do not use any sanding, sandblasting or other abrasive preparation of the bottom as this will void your hull blistering warranty. More information on the warranty is available in this owner's 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 for and painting the bottom varies between paint manufacturers, but should always include dewaxing, etching and sometimes priming of the surface.

The rudder should always be bottom painted using a white bottom paint, to avoid heat build-up in the rudder, which colored paints can contribute to, when the boat is on land. For further instructions on preparation of the rudder, see the instructions sheet from *Foss Foam, Inc.* under the General Information heading within this manual.

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 interior, we have sealed the beauty of your interior with a 3 to 4 coat finish system of high quality Seafin Teak Oil, manufactured by *Dalys* (wood finishing products). This material is a penetrating oil that dries to a low sheen to seal and protect the wood from moisture and weathering. It creates a durable, non slip 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 maintain and repair. With proper maintenance it will out live urethane varnish on interior and even exterior surfaces. (floor, bulkheads, trim wood & furniture).

MAINTENANCE

When oiled surfaces require renewing, simply wipe the surface area free of loose dirt, dust or other contaminants. Dampen a cloth with the Seafin Teak Oil and wipe on. Let stand for 5-15 minutes then polish dry.

REPAIRS

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

1. Take 180 to 220 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 a 400A wet/dry sand paper.
5. Wipe dry with a clean rag. Allow 8-12 hours drying time.
6. Apply 2nd coat, and repeat above procedure.

This process may be repeated as many times as needed to bring damaged area back up to its original finish. If you have trouble with getting the same sheen, you may apply with a completely dampened/ rung out rag, a very light coat over this area and/or whole surface area to get an even sheen.

DALYS
3525 STONEWAY NORTH
SEATTLE, WA 98103
(206) 633-4200

MAINTENANCE

Engine, Transmission and Drivetrain

ENGINE: Follow the fuel and lubrication requirements in the Engine Manual. Check the engine oil level before and after operation and use quality motor oil (refer to Engine Manual). Be certain the proper amount of oil 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 equally. Severe vibration will result from misalignment and can cause strut bearing and shaft damage.

Alignment should be checked again after several weeks of use.

(Refer to this manual's alignment drawing)

Any questions or problems concerning the engine, please contact our distributor, Mack Boring at (201) 964 0700.

TRANSMISSION: Follow the lubrication requirements of the Engine Manual. The oil level should be checked immediately after operation.

DRIVETRAIN: The shaft log (stuffing box) should be inspected periodically.

The stuffing box is held to the shaft log tube by a rubber tube secured by hose clamps. The clamps should be tight and no water should leak from this location. A slight drip from the stuffing box at the shaft exit is necessary (four drops a minute) and is normal.

To adjust, loosen the lock nut, tighten gland nut one-quarter turn, and retighten lock nut. If excessive water flow persists after adjustment, replace the packing and then adjust as above

Steering

Refer to the manufacturer's instructions for maintaining pedestal steering system. Cables should routinely be inspected for proper tension. Lightly oil all cables.

Electrical Systems

The electrical system is a 12-volt, negative ground installation. The owner should weekly inspect battery(ies), terminals and cables 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.

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 dry rot. 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. Refer to Engine Manual.

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 thru-hull valve locations and inspects for leaks frequently. Refer to plumbing diagrams in Spec & Tech section.

General Thru-hull List *(varies from boat to boat-see diagrams in Spec & Tech Info.)*

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

Fuel System

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 seek out 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.

General Care

CLEANING FIBERGLASS SURFACES: Fiberglass surfaces should be cleaned regularly. Normal accumulations of surface dirt can be removed simply by occasional rinsings with water. If your boat is operated 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 clean fresh water.

It is also 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.

Sail Care: Sunlight is a sail's worst enemy, so cover the sails when they are 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, which discolors, is prevented by storing sails dry and by hand-washing twice a season.

Sail care continued.

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 on to 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.

The headsail, neatly rolled and fastened, can be temporarily stowed along the lifelines. To stow below, flake it into a length; 1. then roll from luff to leech, 2. Take care not to crease the leech. Pack in a clearly marked bag.

Fabric Care

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

Winch Maintenance

Follow the maintenance instructions prescribed by the winch manufacturer. We recommend a minimum of an annual cleaning and light greasing.

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 chocks, cleats 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 protective covers manufactured for that purpose.

Electrolysis and Galvanic Protection

Salt water allows electric current to flow from anodic to cathodic material. Any two metals from two components, and their relative positions in the galvanic rating table, will determine which loses material (the anode) and which remains largely undisturbed (the cathode). The rate of wear is determined by the distance apart on the galvanic table of two metals. 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 because this will only defeat the purpose.

To prevent electrolysis in sea water, the difference between the voltage of two adjacent metals should not exceed 0.20V. Zinc and carbon steel, for example, 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 electro-chemical reaction.

Alignment Procedure

1. Seperate 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 bottom of the log - note position - repeat sidewise 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.

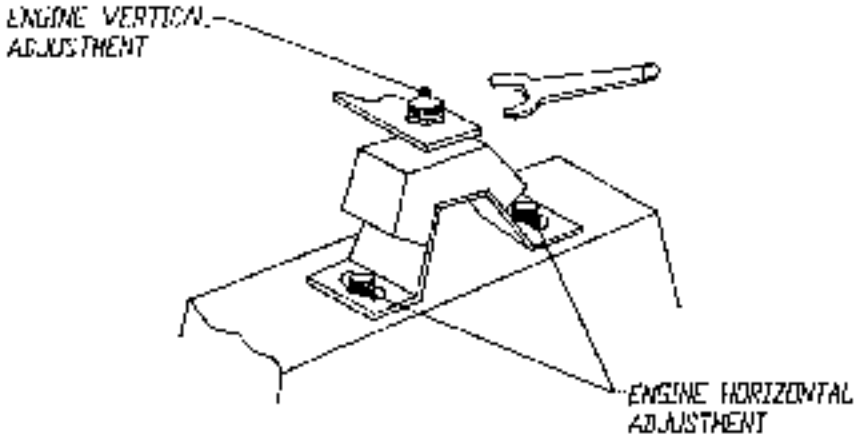
4. Adjust the engine mounts as necessary until a 0.004" feeler gauge will not enter anywhere along the edge of the flange between the faces.

5. Tighten the locks on the adjustable mounts.

6. Re-check coupling with feeler, re adjust if necessary.

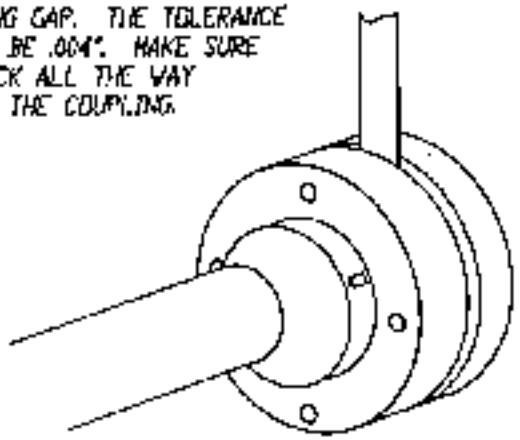
7. Check stuffing box (allow to drip slightly).

STEP 1



STEP 2

USE FEELER GAUGE TO CHECK COUPLING GAP. THE TOLERANCE SHOULD BE .004". MAKE SURE TO CHECK ALL THE WAY AROUND THE COUPLING.



NOTE: CHECK COUPLING GAP WITHOUT COUPLING BOLTS IN PLACE.

HUNTER

ALIGNMENT DIAGRAM GEN2619A

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; or 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 to 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 airflow 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 - WATER HEATER

WATER SYSTEM:

Open a faucet and allow the pump to empty the tank. Then add approximately two gallons of non-toxic anti-freeze 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 shoret piece 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 HEATER:

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

TOILET AND HOLDING TANK

Drain and flush toilet. Using automotive anti-freeze (ethyleneglycol) in a 50/50 mixture with water, pump through toilet and into holding tank. Refer to Galley/Head section for instructions.

STORAGE/WINTERIZATION CONTINUED.

ENGINE

1. Drain the cooling water completely out of the engine and flush the line thoroughly with fresh water. Don't use high pressure through the line.
2. Remove the fuel completely from all fuel lines.
3. Disconnect the main battery cables from the battery terminals.
4. To prevent corrosion inside the cylinders, pour a little lubricating oil into the suction pipe while turning the engine. Enough oil to reach the intake/exhaust valve is sufficient.
5. Put the piston at top dead center of compression stroke so that the intake/exhaust valves are completely closed.
6. Apply a thin anti-corrosion treatment to the plating and exposed painted surfaces.
7. The engine should be in a well ventilated area, and protected from any kind of dampness.
8. Put a dust cover over the engine.
9. Check your operation manual for engine diagram and for "Manufacturer's Recommended Winterizing Procedures."

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.

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, the proper settings for electrical switches, pumping out the bilge and leaving the switch on automatic (or arranging for periodic pumping out). Other departure check list items are securing ports, windows, hatches, and doors.

ROUTINE MAINTENANCE

Routine maintenance check lists 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 seacocks 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.

PEDESTAL STEERING MAINTENANCE

To properly maintain the moving parts in the top of the pedestal, it is necessary to remove the compass and its binnacle. For proper alignment when reinstalling the compass, we recommend placing three or four lengths of tape on the pedestal and compass as shown below. Slit the tape when removing compass, align the strips of tape when reinstalling the compass for visual realignment. Your compass MUST then be checked out for accuracy. Lubrication of needle bearings should be done by squeezing Edson Fig 827 Teflon Lubricant into the holes located on top of the bearing housings inside the pedestal bowl. Spin the wheel when squeezing the lubricant in to make sure the entire bearing is serviced. Winch grease or water pump grease can be used as an alternative, but don't let the bearings run dry. Do not over grease as it will run onto the brake pads. Oil the chain with #30 weight motor oil. Do NOT grease chain as it does not penetrate the links.

Inspect the condition of the wire section of the wire and lightly oil. Edson recommends placing about five layers of "Kleenex" on the palm of your hand, squirt oil on the tissues and lightly oil the wire. This will lubricate the strands but will also "flag" a broken or hooked strand by tearing off a small section of tissue. If you do have a wire break, replace the wire immediately. See Edson Fig 775 Wire and Chain Replacement Kits. (Caution: Wire splinters can cause painful cuts.) Replace the wire after 5 years; if still good, keep the old wire on board as a spare.

STEERING WIRE TENSION

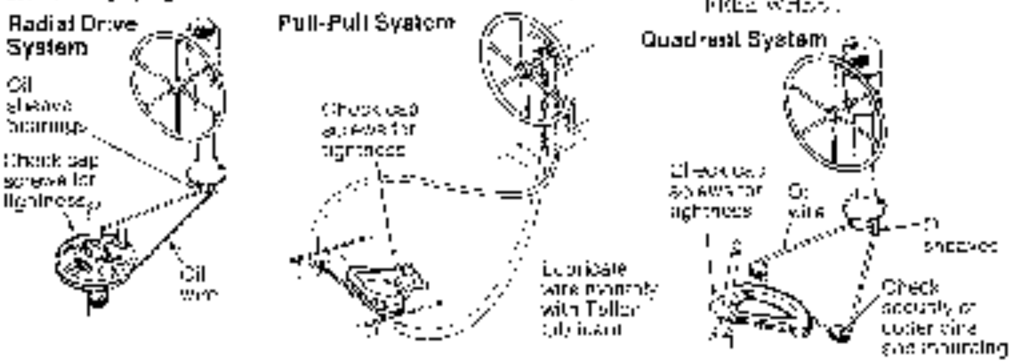
A top quality roller chain to wire steering system can be kept in "like new" sensitivity by keeping the wire at a correct tension. To check for proper wire tension, lock the wheel in position by using the pedestal brake, or by tying off the wheel. Cable tension is best when you cannot move the quadrant or drive wheel by hand with the wheel locked in place. Over tightening will greatly reduce the sensitivity of the system.

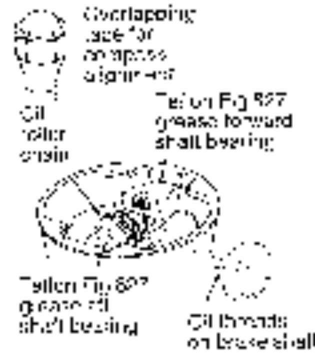
It must be emphasized that all on board must be familiar with the care and operation of the Steering System and engine controls. One person must be assigned the job of maintenance and must be thoroughly familiar with the operation and intent of all the equipment. If at any time your Steering System makes strange noises or reacts differently than it has previously, you must find the causes immediately and correct the problem.

Screws, nuts, bolts, as well as clevis and cotter pins that are part of the steering system, engine controls or pedestal accessories, must be checked regularly for tightness and wear. Failure to inspect all steering parts, engine controls and pedestal accessories may cause loss of control or failure of the engine or steering system. *All boats must have an emergency tiller or its equivalent and all on board must be familiar with its location and operation. An emergency tiller drill is just as important as a man-overboard drill and must be regularly conducted.*

On a new boat, and at least once a year, inspect the system when under a strong load. On a calm day and under power, go away from the other boats and, with the person who is assigned the maintenance watching from below, put the wheel hard over at full throttle. The maintenance man should watch carefully for all parts of the system bending, distorting, creaking, or giving any indication of failing if placed under a heavy load for a period of time. If, for any reason, something did fail or need adjusting, the day is early and you will have plenty of time.

When leaving your boat at her mooring or slip, make sure that your wheel is properly tied off. DO NOT LEAVE THE STEERING SYSTEM TO FREE WHEEL.





CLEANING STAINLESS STEEL

Pedestal guards, steering wheels and shafts are all made from top quality stainless steel. The implication of its name "stainless steel" does not mean it is totally rustproof. All stainless steel will rust to a certain degree due to chemical reaction to air and salt water. This is mainly cosmetic and will require an occasional polishing with an abrasive type cleaner such as "Brasso" or equivalent.

CLEANING PEDESTAL AND ACCESSORIES

Clean them with soap and water; don't use chemicals such as MEK or acetone as they break down the super finish on your Edson pedestal and compasses and instruments. Most manufacturers of compasses and electronic instruments suggest that they all be removed during winter storage and kept in a warm dry area. Compasses are normally held in place by two or three slotted-head screws, placed near the top of the compass. A Fig 672 Rubber Connector will assist in removing the compass. Instruments can be removed by the screws in the Edson faceplate, unplugging the instrument and you are all set.

CAUTION: When the equipment is at the mercy of a charter service, the maintenance schedule must be speeded up. Or, to put it in a few words: clean it, lube it, inspect it, cover it. The effects of sun, saltwater and inexperienced operators can be severe.

LUBRICATION RECORD

component	lubricant	schedule	1st year 19__	2nd year 19__	3rd year 19__	4th year 19__	5th year 19__	6th year 19__	7th year 19__
sheave bearings	#30 oil*	check and oil monthly							
pull-pull cables	Teflon Fig 827	check and grease monthly							
wire rope	#30 oil*	check and oil annually							
roller chain	#30 oil*	check and oil annually							
pedestal shaft bearings	Teflon Fig 827	check and grease annually							

*Any light oil is suitable. We recommend #30 weight motor oil since most boat owners have it aboard.

CAUTION: 1. On extended voyages your steering system should be inspected each day and lubricated weekly. Carefully inspect your steering system at least once a week by [illegible] to avoid [illegible] once.

2. When the boat is unattended [illegible] the wheel with the brake [illegible] the rudder can swing violently [illegible].

As a further service to our customers we have an illustrated parts breakdown showing the design and construction of your Edson Pedestal Steerer. These parts drawings will assist you in the proper maintenance of your steering system.

If disassembly should become necessary, the following instructions will provide a simple but precise method of removing and replacing the steering shaft and its components.

DISASSEMBLY

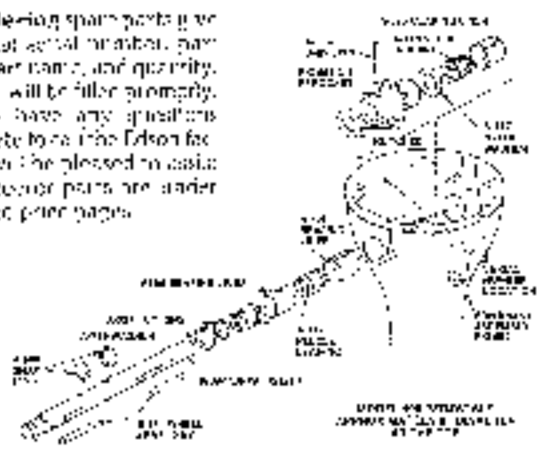
1. With the wheel and brake assembly removed, replace the wheel nut with any standard thread 3/4" or 1" hex nut.
2. Loosen the steering cables and chain by backing off the take-up eyes at the Quadrant or Radial Drive. Lift the chain off the sprocket and tie to the forward part of the bowl.
3. Put a cloth rag under the sprocket so no parts drop down.
4. Align the notch in the shiny on washer with the "V" stamped on the sprocket.
5. Carefully drive the pin out of the sprocket (drive from the notched end toward the grooved end).
6. With a piece of wood against the 3/4" or 1" hex nut, gently tape the wheelshaft from the housing (see illustration); be careful not to drop the shaft components into the pedestal.
7. Remove the sprocket, two nylon washers and forward needle bearing.
8. Remove aft needle bearing and washers.
9. Wipe out any dirt or old grease before reassembly.

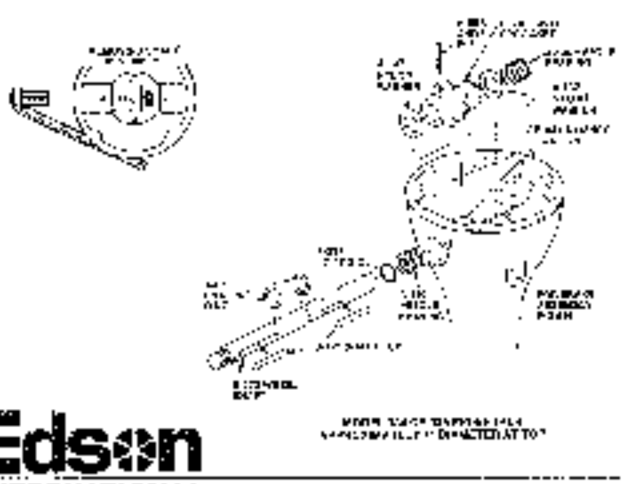
To reassemble, reverse the above procedure; do not grease the bearings until reassembly is completed.

NOTE: Check your compass for possible readjustment.

When ordering spare parts give the pedestal serial number, part number, part name, and quantity. Your order will be filled promptly.

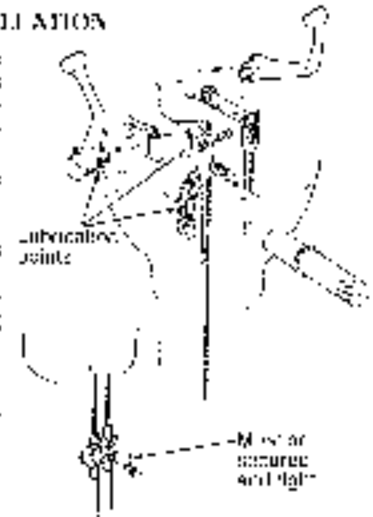
If you have any questions don't hesitate to call the Edson factory. We will be pleased to assist you. All steerer parts are under Fig 960 see price pages.





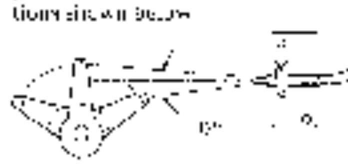
ENGINE CONTROLS INSTALLATION

Great care must be taken to assure ease and safety of engine controls operation. Components must be installed and adjusted so the engine goes into gear smoothly and completely and the throttle operates easily. Cables must be installed straight or in loose curves. Refer to the Engine Connections illustrations (opposite) for installation procedures. Don't force engine controls when operating above idle. Forcing shifting can result in broken cables and loss of boat control. Familiarize yourself with the operation of the engine controls. Caution and train all those on board.

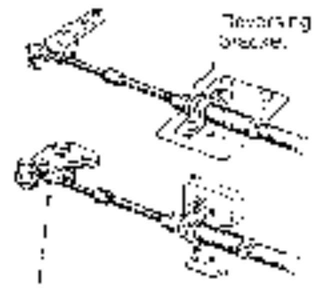


ENGINE CONNECTIONS

NOTE: Use the information below as a guideline. Most engine and control cable manufacturers furnish instructions for installing their products. Use their instructions if there is any variance with the instructions shown below.



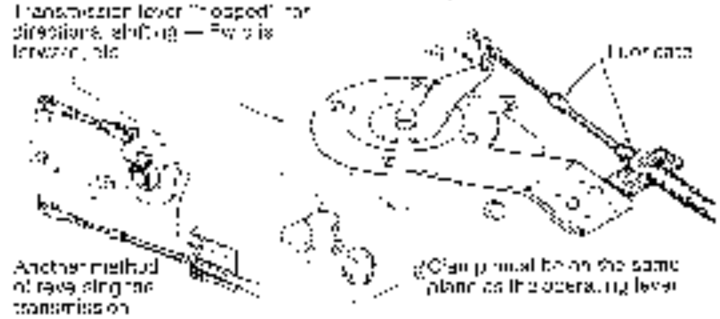
When aligning the cable anchor point with the control lever, the installation of the cable must be aimed at the mid point of the lever to allow an equal amount of travel to each side. No more than 10° total cable bend is allowed.



Two holes must be provided in the engine throttle lever to optionally select the proper travel. Holes both 1 3/4" [?] or 2 3/4" The inner hole will provide increased throttle travel control handle pressure.

Typical working end clamping brackets with extra holes for centering and reverse if required. Straight rod is very important.

Transmission lever "flopped" for directional shifting — Fwd is forward, etc.



Another method of reversing the transmission

Clamp must be on the same plane as the operating lever

ENGINE CONTROLS MAINTENANCE

Oil the control handle shaft bearings with #30 motor oil. Use a good grade of Teflon spray with an extension nozzle for the pedestal end of the engine control push/pull cables.

At the engine, clean off the control cable metal ends and spray with Teflon grease. This will increase cable life and make operation easier. Engine cables are subject to high heat from the transmission and salty bilge water, both very hard on moving parts. If stiff, replace.

PEDESTAL STEERING MAINTENANCE

To properly maintain the moving parts in the top of the pedestal it is necessary to remove the compass and its cylinder. For proper alignment when re-installing the compass, we recommend placing three or four lengths of tape on the pedestal and compass as shown below. Slit the tape when removing compass. Align the strips of tape when re-installing the compass for visual realignment. Your compass MUST then be checked out for accuracy. Lubrication of needle bearings should be done by squeezing Edson Fig 827 Teflon Lubricant into the holes located on top of the bearing housings inside the pedestal bowl. Spin the wheel when squeezing the lubricant in to make sure the entire bearing is serviced. Winch grease or water pump grease can be used as an alternative, but don't let the bearings run dry. Be careful, excess grease as it will run onto the brake pads. Oil the chain with 30 weight motor oil. Do NOT grease chain as it does not penetrate the links.

Inspect the condition of the wire, tension of the wire and lightly oil. Edson recommends placing about two layers of "Kleenex" on the palm of your hand, squirt oil on the tissues and lightly oil the wire. This will lubricate the strands but will also "flag" a broken or loosened strand by tearing off a small section of tissue. If you do have a wire break, replace the wire immediately. See Edson Fig 770 Wire and Chain Replacement Kits. (Caution: Wire splinters can cause painful cuts.) Replace the wire after 5 years. If still good, keep the old wire on board as a spare.

STEERING WIRE TENSION

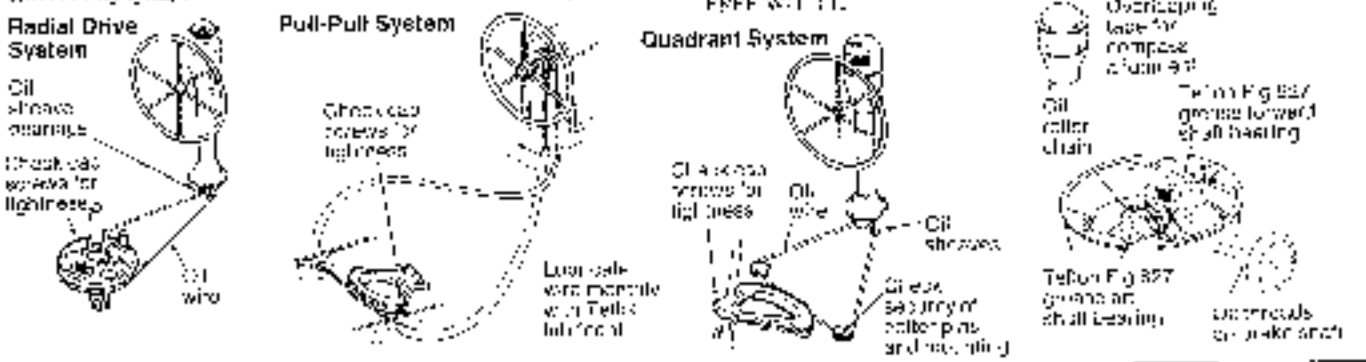
A top quality roller chain to wire steering system can be kept in like new sensitivity by keeping the wire at a correct tension. To check for proper wire tension, lock the wheel in position by using the pedestal brake, or by tying off the wheel. Cable tension is best when you cannot move the quadrant or drive wheel by hand with the wheel locked in place. Over tightening will greatly reduce the sensitivity of the system.

It must be emphasized that all on board must be familiar with the care and operation of the Steering System and engine controls. One person must be assigned the job of maintenance and must be thoroughly familiar with the operation and intent of all the equipment. If at any time your Steering System makes strange noises or reacts differently than it has previously, you must find the causes immediately and correct the problem.

Screws, nuts, bolts as well as clevis and cotter pins that are part of the steering system, engine controls or pedestal accessories, must be checked regularly for tightness and wear. Failure to inspect all steering parts, engine controls and pedestal accessories may cause loss of control or failure of the engine or steering system. *All boats must have an emergency tiller or its equivalent and all on board must be familiar with its location and operation. An emergency tiller drill is just as important as a man-overboard drill and must be regularly conducted.*

On a new boat and at least once a year, inspect the system when under a strong load. On a calm day and under power, go away from the other boats and with the person who is assigned the maintenance watching from below, put the wheel hard over at full throttle. The maintenance man should watch carefully for all parts of the system bending, distorting, creaking, or giving any indication of being ill placed under a heavy load for a period of time. If, for any reason something did fail or needs adjusting, the day is early and you will have plenty of time.

When leaving your boat at her mooring or slip, make sure that your wheel is properly tied off. DO NOT LEAVE THE STEERING SYSTEM TO FREE WHEEL.



CLEANING STAINLESS STEEL

Pedestal guards, steering wheels and shafts are made from top quality stainless steel. The implication of its name "stainless steel" does not mean it is totally rustproof. All stainless steel will rust to a certain degree due to chemical reaction to air and salt water. This is mainly cosmetic and will require an occasional polishing with a non-abrasive type cleaner such as "Brasso" or equivalent.

CLEANING PEDESTAL AND ACCESSORIES

Clean them with soap and water, don't use chemicals such as MEK or acetone as they break down the super finish on your Edson pedestal system, compasses and instruments. Most manufacturers of compasses and electronic instruments suggest that they all be removed during winter storage and kept in a warm dry area. Compasses are normally held in place by two or three slotted-head screws, placed near the top of the compass. A Fig 872 Rubber Connector will assist in removing the compass. Instruments can be removed by the screws in the Edson faceplate. Just unplug the instrument, and you are all set.

CAUTION: When the equipment is in the hands of inexperienced service, the maintenance schedule must be speeded up. Or, to put it in a few words: clean it, oil it, inspect it, cover it. The effects of sun, salt water and inexperienced operators can be severe.

LUBRICATION RECORD

component	lubricant	schedule	1st year 19__	2nd year 19__	3rd year 19__	4th year 19__	5th year 19__	6th year 19__	7th year 19__
sheave bearings	30 oil*	check and oil monthly							
pull-pull cables	Teflon Fig 827	check and grease monthly							
wire rope	30 oil*	check and oil annually							
roller chain	30 oil*	check and oil annually							
pedestal shaft bearings	Teflon Fig 827	check and grease annually							

*Any light oil is suitable. We recommend 30 weight motor oil since most boats would have it aboard.

CAUTION: 1.) On extended voyages your steering system should be inspected each day and lubricated weekly. Carefully inspect your steering system at least one week before a vacation cruise to avoid last minute maintenance.
2.) When the boat is unattended secure the wheel with the brake while in rough weather to avoid rudder swinging violently from stop to stop and causing damage.

As a further service to our customers we have an illustrated parts breakdown showing the design and construction of your Edson Pedestal Steerer. These parts drawings will assist you in the proper maintenance of your steering system.

If disassembly should become necessary, the following instructions will provide a simple but precise method of removing and replacing the steering shaft and its components.

DISASSEMBLY

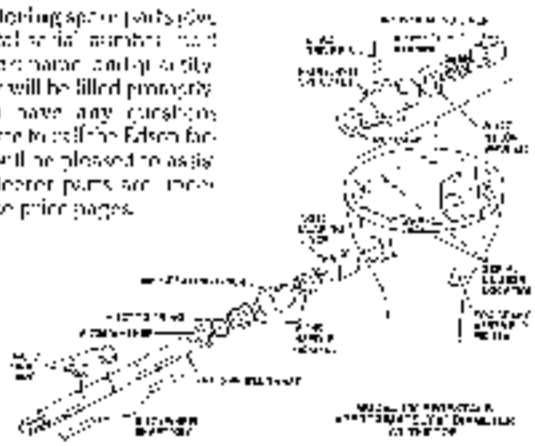
1. With the wheel and brake assembly removed, replace the wheel nut with any standard thread ⅝" or 1" hex nut.
2. Loosen the steering cables and chain by backing off the take-up eyes at the Quadrant or Radial Drives, lift the chain off the sprocket and tie to the forward part of the bowl.
3. Put a cloth just under the sprocket so no parts drop down.
4. Align the notch in the aft nylon washer with the "M" stamped on the sprocket.
5. Carefully drive the pin out of the sprocket (drive from the splined end toward the grooved end).
6. With a piece of wood against the ⅝" or 1" hex nut, gently tap the wheel shaft from the housing (see illustration) be careful not to drop the shaft components into the pedestal.
7. Remove the sprocket, two nylon washers and forward needle bearing.
8. Remove aft needle bearing and washers.
9. Wipe out any dirt or old grease before reassembly.

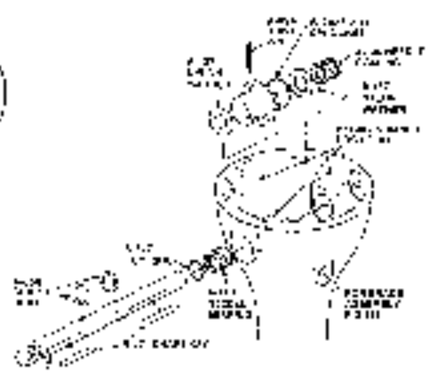
To reassemble, reverse the above procedure. Do not grease the bearings until reassembly is completed.

NOTE: Check your compass for possible readjustment.

When ordering spare parts give the pedestal serial number, model number, part name and quantity. Your order will be filled promptly.

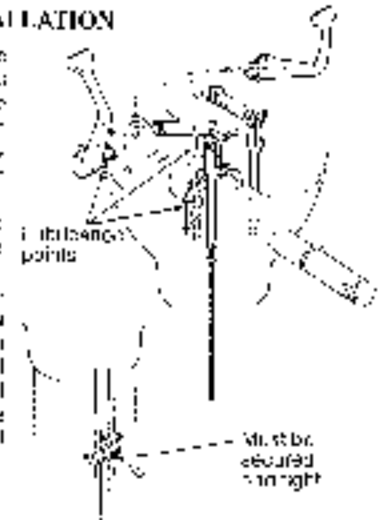
If you have any questions don't hesitate to call the Edson factory. We will be pleased to assist you. All steerer parts are shown in the 990 see prior pages.





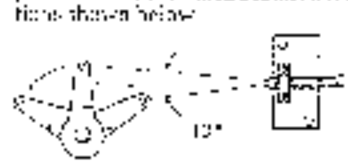
ENGINE CONTROLS INSTALLATION

Great care must be taken to assure ease and safety of engine controls operation. Components must be installed and adjusted so the engine goes into gear smoothly and completely and the throttle operates easily. Cables must be installed straight and in broad curves. Refer to the Engine Connections illustrations opposite for installation procedures. Don't force engine controls when operating above idle. Force shifting can result in broken cables and loss of boat control. Familiarize yourself with the operation of the engine controls. Caution and train all those on board.

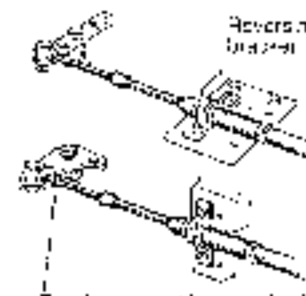


ENGINE CONNECTIONS

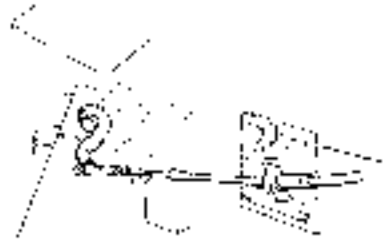
NOTE: Use the information below as a guideline. Most engine and control cable manufacturers furnish instructions for installing their products. Use their instructions if there is any variance with the instructions shown below.



When aligning the cable anchor point with the control lever, the centerline of the cable must be aligned to the midpoint of the lever to allow an equal amount of swivel to each other. No more than 13° total cable bend is allowed.



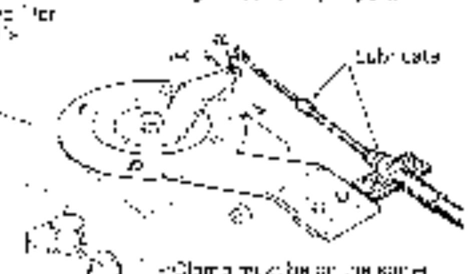
Two holes must be provided in the engine throttle lever to optionally select the proper travel. Holes with 1⅝" throw or 2⅛" throw. The lower hole will provide increased throttle travel and handle pressure.



Transmission lever. Stopped lever directional shifting. Reverse to forward, etc.

Typical working and clamping brackets with back holes for centering and reverse. Required straight lead is very important.

Another method of reversing the mechanism.



Clamp must be on the same plane as the operating lever.

ENGINE CONTROLS MAINTENANCE

Oil the control handle shaft bearings with #30 motor oil. Use a good grade of Teflon spray with an extension nozzle for the pedestal end of the engine control push/pull cables.

At the engine, clean off the control cable metal ends and spray with Teflon grease. This will increase cable life and make operation easier. Engine cables are subject to high heat from the transmission, and bilge water, both very hard on moving parts. If hit, replace.

MORSE MARINE PRODUCTS

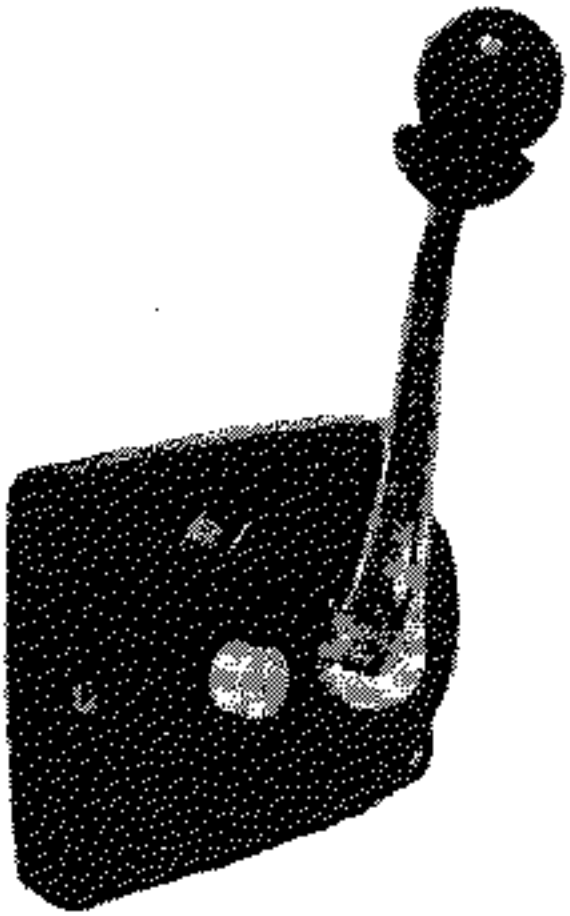
OWNER'S MANUAL

INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

FOR THE

MV-2

CONTROL



PLEASE READ THESE INSTRUCTIONS CAREFULLY AND THOROUGHLY BEFORE INSTALLING OR OPERATING THIS CONTROL.

66001-618 MARCH 1988

Imo Industries Inc.
Morse Controls Division
31 Clinton Street
Hudson, Ohio 44236-2690
FAX 216-653-7709
216 653 7701

BARIENT

MAINTENANCE & SERVICE INFORMATION

NORTHEAST
Regional Office
IM Barient
New Whitfield Street
Guilford, CT 06437
Tel: 203/453-4374
FAX: 203/453-6109

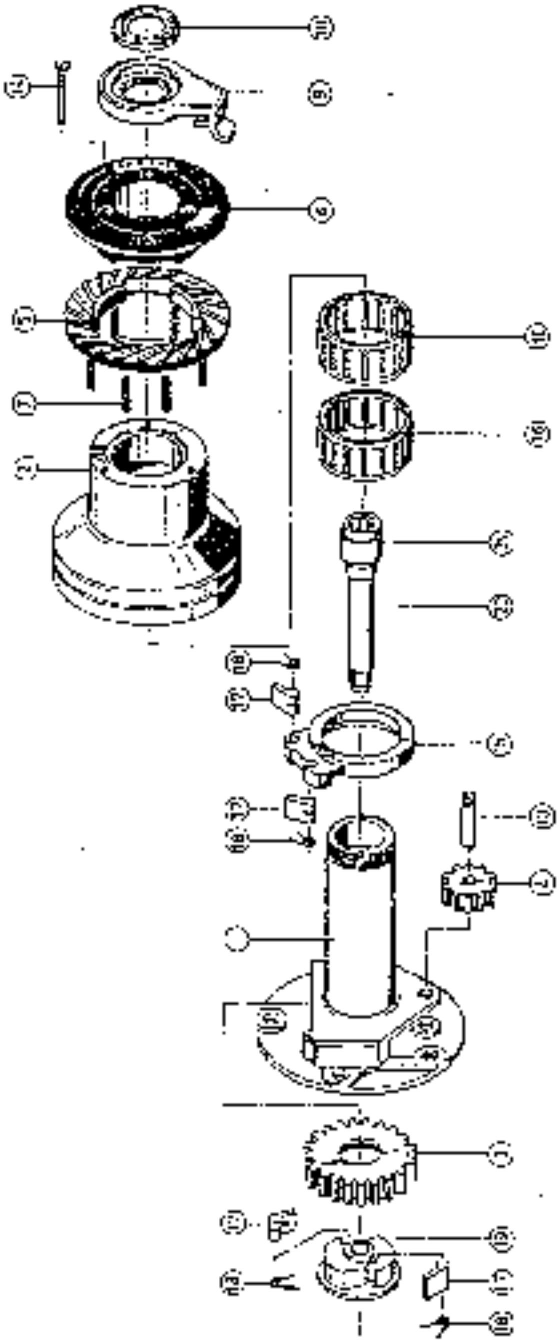
SOUTHEAST
Regional Office
IM Barient
7355 126th Ave. N.
Largo, FL 34643
Tel: 813/536-6868
FAX: 813/531-7187

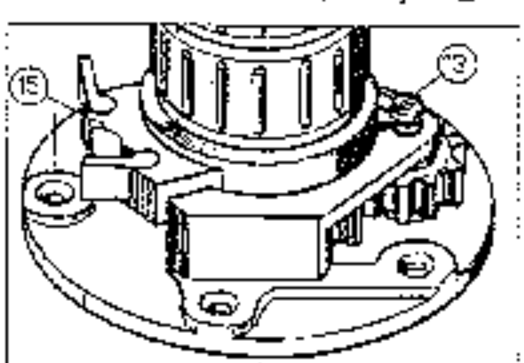
WEST COAST
Regional Office
IM Barient
1600 E. St. Gertrude Place
Santa Ana, CA 92705
Tel: 714/557-8104
FAX: 714/557-7394

MODEL 17

1-SPEED SELF TAILING WINCH

MAINTENANCE & SERVICE INFORMATION





MOUNTING INSTRUCTIONS

1. Using a [illegible] drum nut tool, remove the retaining nut (10) in the [illegible].
2. Lift the drum assy. and the line stripper together from the gear box assy (1). CAUTION: The drum bearings (16) may come off with the drum - be careful not to let them fall out.
3. Bolt the base to a flat and smooth surface drilled to take five [illegible] screws [illegible] (metal) cut. Use the base as a template. Apply [illegible] of bedding (sealing) compound to seal the base to the deck.
   NOTE: Ensure that the winch is mounted to the deck so as the [illegible] drive pinion (9) is as near as possible to where the line first makes contact with the drum, fig 2.
4. Install the drum assy. with the line stripper in suitable [illegible] position over the gear box assy. (1) See Fig. 1.
5. [illegible] the retaining nut (10) and tighten [illegible].

TO LUBRICATE & DISASSEMBLE

NOTE: It is not necessary to remove the base (1) from the deck to lubricate the winch.

1. Dismantle as Step 1 and 2 above.
2. Remove the line stripper (3) and bearings (16). Lift off the main shaft (20,3) [illegible] out of the gearbox (1).

NOTE: It is not necessary to disassemble the self-tailing mechanism [illegible] step 4.

3. Remove three screws (14) holding the spring loaded self tailing jaws (5,6) to the drum and carefully lift off the jaws. CAUTION: Do not let the springs (7) fall out.
4. Remove the springs (7) out of bottom jaw - clean and inspect them for damage.
5. Re-assemble the drum and spring loaded S/T jaw assemblies.
6. Lift out the plastic pawl carrier (15) with the idler shaft (11) [illegible] gear box [illegible]. (It may be necessary to gently lift the idler shaft and pawl carrier with small screwdrivers.
7. Remove the pinion (9) and center [illegible] gear assy. (4,13) from the inside of housing.
8. Separate the centre [illegible] gear (3) and carrier (13).
9. Remove the ratchet pawls (17) & ring (15) from the centre carrier (13) and plastic carrier (15).
10. Clean all parts in petroleum solvent. Replace any parts showing damage or excessive wear. During the assembly procedure, all gears and bearings should be liberally greased with Barient - Avelube. The ratchet pawls should be lubricated with machine oil only - NEVER grease the pawls and springs.

Assemble winch in reverse to that shown above.
NOTE: In re-assembly procedure, ensure that centre ratchet gear (13) is not [illegible] [illegible]. If this is not done, [illegible] will [illegible] the retaining nut (10) is tightened.
The plastic pawl carrier (15) must be inserted into the groove of idler shaft (11) first and assembled together.

TOOLS REQUIRED

Barient drum nut tool, screwdriver.

LUBRICANT

Non detergent Machine Oil (SAE 30), Barient - Avelube.

INSPECTION & LUBRICATION

Mounting Information

[illegible]

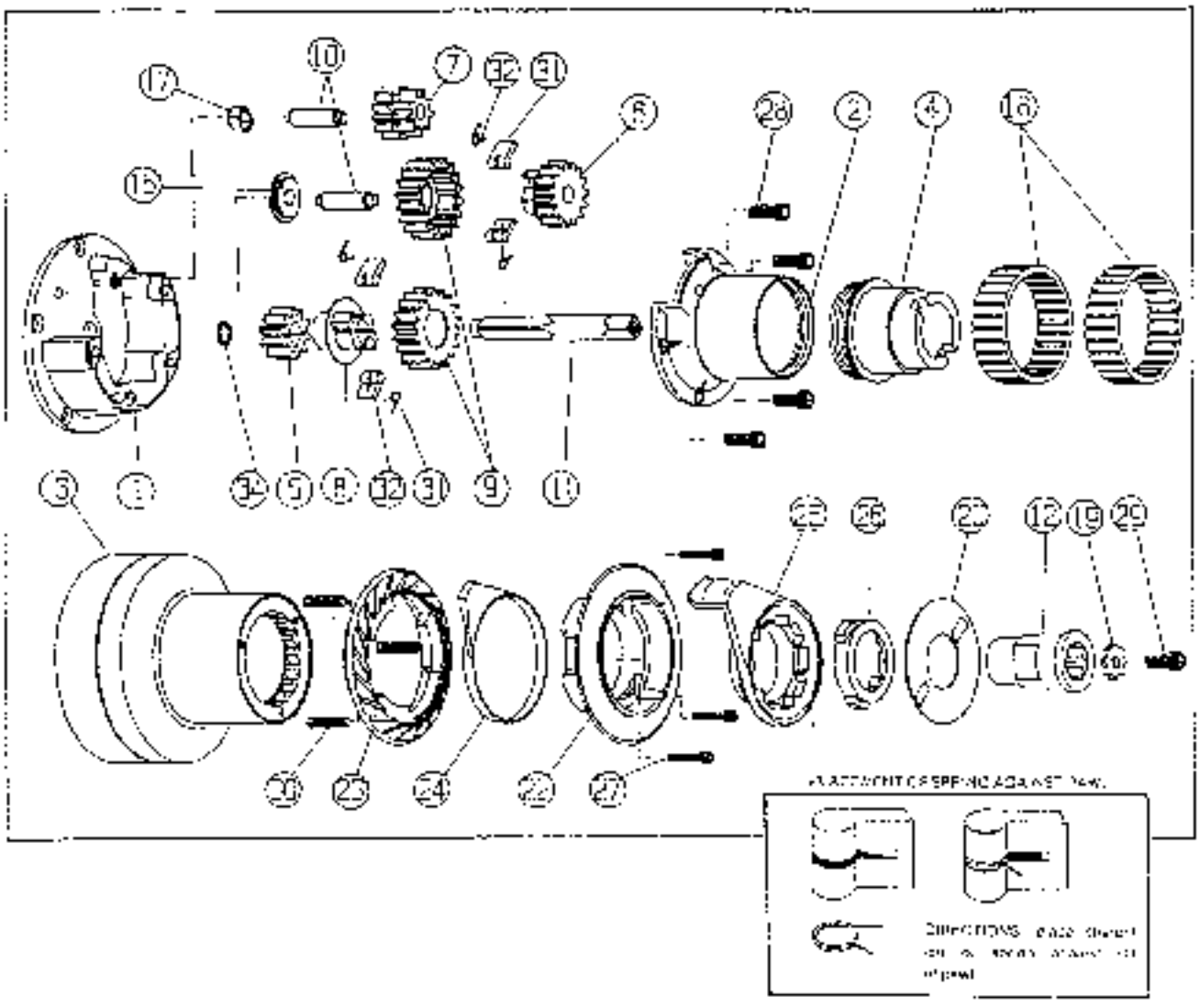
PLACEMENT OF STRINGING AGAINST PAWL

SHACKLE [illegible] stripping [illegible] pawl

ITEM	PART NO.	DESCRIPTION	QTY
1	262124	Column	1
2	262125	Drum - Alum.	1
2A	262125	Drum - Chrome	1
3	262127	Center Gear	1
4	262128	Idler Gear	1
5	262201	Bottom Jaw	1
6	262202	Top Jaw	1
7	540 70	Spring - Jaw	[illegible]
8	512060	Line Lifter	1
10	17-106	Retaining Nut	1
11	912129	Idler Shaft	1
12	01-207	Disk Screw	3
13	942015	Pawl Carrier	
14	01-221	Bearing	2
15	01-400	Ratchet Pawl	4
16	01-500	Ratchet Spring	4
19	912150	Ratchet Carrier	1
20,21	562602	[illegible] Assy	1

MODEL 2-SPEED SELF-TAILING WINCH

21-30 22-35 24-41
21-33 22-39 24-45



[illegible]

[illegible]

TO LUBRICATE & DISASSEMBLE:

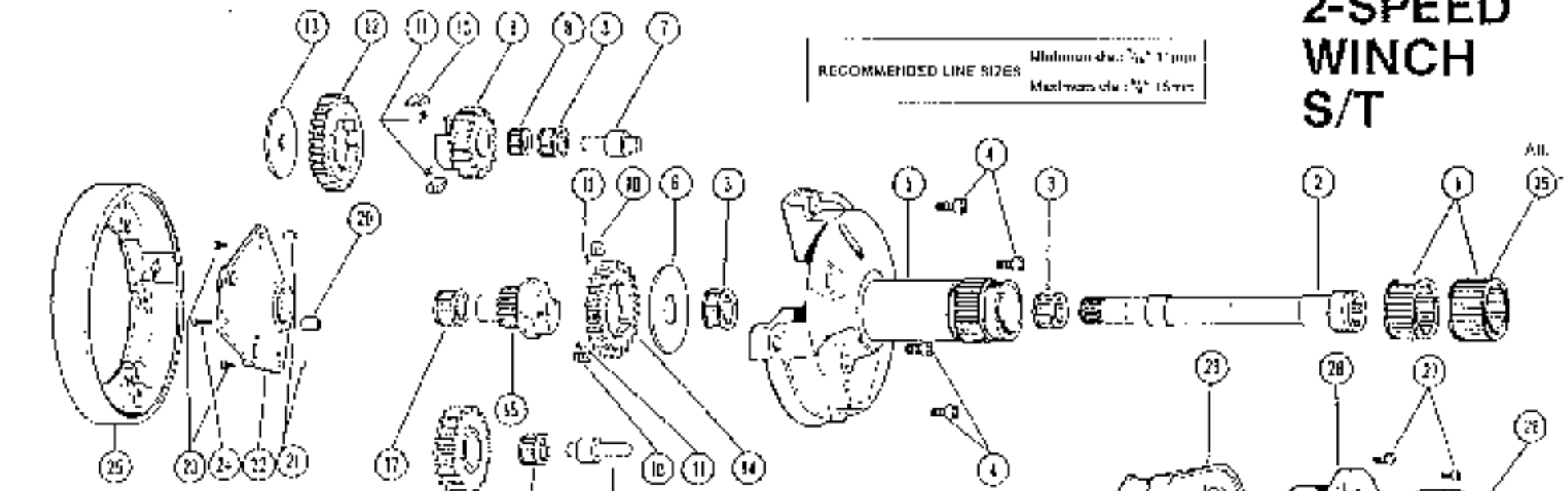
[illegible]

Item	21-30	21-33	22-35	22-30	24-41	24-45	Description
			Part Number				
1	300101	300101	400101	400101	450101	450101	Base
2	300201	300201	400201	400201	450201	450201	Gearbox
3	300401A	300401A	400401A	400401A	450401A	450401A	Drum, Alum
All	300401C	300401C	400401C	400401C	450401C	450401C	Drum, Chrome
All	300401B	300401B	400401B	400401B	450401B	450401B	Drum, Bronze
4	301102M	301102M	301102M	301102M	301102M	301102M	S-T, G'Box Extension
5	300701	330701	300701	330701	300701	330701	Centre Gear
6	450702	450702	450702	450702	450702	450702	Drive Pinion 15T
7	300703	300703	300703	300703	300703	300703	Idler Pinion
8	300901	300901	300901	300901	300901	300901	Cl'fat. Drive
9	300704	300704	400704	400704	450704	450704	Ratchet Gear
10	300801	300801	300801	300801	300801	300801	GEar Spindle
11	300502	300502	400502	400502	450502	450502	Main Shaft
12	300601	300601	300601	300601	300601	300601	Main Shaft Drive
16	301801M	301801M	301801M	301801M	301801M	301801M	Drive Pinion Washer
17	301802M	301802M	301802M	301802M	301802M	301802M	Idler Pinion Washer
19	301901	301901	301901	301901	301901	301901	Drum Bearing
19	301803M	301803M	301803M	301803M	30180M	30180M	Retaing Washer
20	301001	331001	351001	391001	471001	451001	Cover Plate
22	301301M	301301M	401301M	401301M	401301M	401301M	Top Jaw - Plastic
All	301301C	301301C	401301C	401301C	401301C	401301C	Top Jaw - Metal
23	301401M	301401M	401401M	401401M	451401M	451401M	Bottom Jaw - Plastic
All	301401C	301401C	401401C	401401C	451401C	451401C	Bottom Jaw - Metal
24	301501M	301501M	401501M	401501M	451501M	451501M	Line Stripper
25	301601C	301601C	401601C	401601C	401601C	401601C	Line Lifter
26	302501M	302501M	302501M	302501M	302501M	302501M	Line Lifter Key
27	01-268	01-268	01-268	01-268	01-268	01-268	Cap Screw 10-24 x 3/4"
28	01-231	01-231	01-231	01-231	01-251	01-251	Cap Screw 5/16" x 3/4"
29	01-215	01-215	01-215	01-215	01-215	01-215	Cap Screw 5/16" x 5/8"
30	01-330	01-330	01-330	01-330	01-330	01-330	Jaw Spring
31	01-400	01-400	01-400	01-400	01-400	01-400	Ratchet Pawl
32	01-300	01-300	01-300	01-300	01-300	01-300	Ratchet Spring
34	01045 50	01045-50	01045 50	01045-50	01045-50	01045-50	Snap Ring

	GEAR RATIO		POWER RATIO	
	1st	2nd	1st	2nd
21-30	[illegible]	4.5:1	10.5:1	[illegible]
21-33	[illegible]	5.4:1	10.8:1	[illegible]
22-35	[illegible]	[illegible]	5:1	[illegible]
22-39	[illegible]	[illegible]	5:1	[illegible]
24-41	1.5:1	[illegible]	[illegible]	[illegible]
24-45	1.5:1	[illegible]	[illegible]	45:1

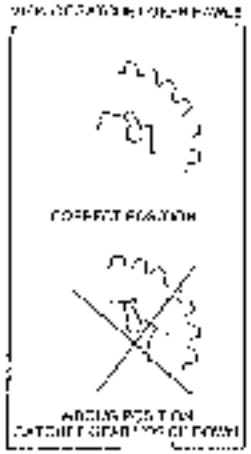
MAINTENANCE & SERVICE INFORMATION

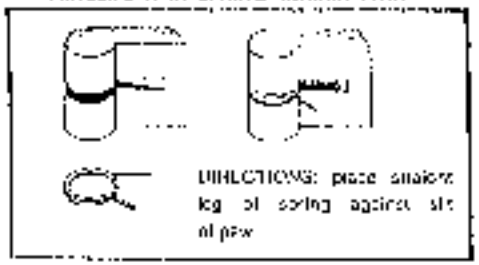
MODEL 28 2-SPEED WINCH S/T

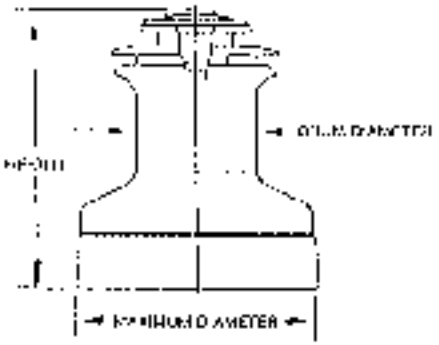


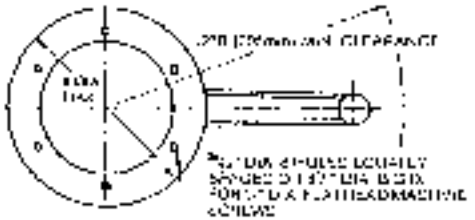
RECOMMENDED LINE SIZES

	1st	2nd
GEAR RATIO	2.5:1	7.4:1
POWER RATIO	12.5:1	37.7:1
DRUM DIA.	102mm	4"
MAXIMUM DIA.	203mm	8"
HEIGHT	230mm	9 3/16"









MOUNTING INSTRUCTIONS:

1. Using a Barient drum nut tool or deck plate key remove the drum nut (26) in the line lifter (29) & (20).
2. Lift the drum assembly and the line lifter together from the gearbox assembly (5). CAUTION. The drum bearings (1) may come off with drum — be careful not to let them fall out.
3. Remove the four capscrews (4) holding the gearbox assembly to the base (25). Keeping the gearbox assembly completed remove it from base (25). NOTE: The mainshaft (2) may fall out when turning the gearbox assy. over — be careful not to drop.
4. Bolt the base (25) to flat and smooth surface drilled to take six flathead bolts ⅜" (10mm) dia. on 7¾" (197mm) bolts circle dia. (Use base (25) as a template.) Be sure adequate reinforcement is provided to take the loads produced by the winch. DO NOT block the drain channels in the base (25) with bedding (sealing) compound.
5. To re-assemble winch — reverse dismantling procedure. Be sure the line lifter is orientated towards the winch cranker's position (see fig. 1).

TO LUBRICATE & DISASSEMBLE:

1. As step 1, 2 and 3 above.
2. Remove the line lifter (29), the anchor sleeve (28) and the bearings (1) with spacer (33). NOTE: If it is not necessary to disassemble self-tailing mechanism proceed to step 5.
3. Remove four capscrews (27) from anchor sleeve (28) and line lifter (29), separate them.
4. It is usually not necessary to remove the clamp ring (31) from the drum. If this is required push the spring guides (18) up from the inside of the drum to allow removal of the lock rings (30).
5. Carefully turn the gearbox assembly on side, making sure the main shaft (2) does not fall out. The drum can be used as a holder-stand for inverted gearbox assembly, (insert the stem of the gearbox HSG. into the top of the drum).
6. Remove the three ¼" capscrews (23) and (24) from gearbox cover (22) and remove the cover. (It may be necessary to gently lift the cover off with a screwdriver).
7. Remove the spacer (20) beneath the cover screw (24), the center pinion bearing (17) and thrust washer (13).
8. Lift out the final drive pinion (9) in assembly with its ratchet gear (12), ratchet pawls (10) and springs (11). NOTE: Keep this assembly together until you are ready to clean it, then re-assemble it immediately. This avoids confusion in the assembly procedure.
9. Remove the two bearings (3) and (6).
10. Remove the idler gear (16) and its bearing (3).
11. Lift up the center ratchet gear (14) — removing it in assembly with the center pinion (15), the pawls (19) and springs (11). Keep this assembly together until it can be cleaned and reassembled.
12. Remove the thrust washer (6), the main shaft (2) and its upper and lower bearings (3). The two gear spindles (8), (34) are pressed into the housing and should not be removed unless they are damaged.
13. Clean all parts in petroleum solvent. Replace any parts showing damage or excessive wear. During the assembly procedure, all gears and bearings should be liberally greased with Barient — Barlube.
14. Assemble winch in reverse order to that shown above.

TOOL REQUIRED:

⅛" and 5/32" Allen key; Barient drum nut tool or deck plate key.

LUBRICANT: Non detergent Machine Oil (SAE 30); Barient Barlube.

INSPECTION & LUBRICATION:

Quarterly ... spection is recommended. Inspect more frequently in a racing ... un.
Monthly ... ing and lubrication of the aluminium drum winches is advisable.

Item	Part No.	Description	Qty
1	00422	Drum Bearing	2
2	29-403	Mainshaft	1
3	00400	Bearing	2
4	01-214	Capscrew ⅜" unc x 1" L.G.	4
5	11750	Gearbox Housing	1
All	29-603	Gearbox Housing — Ultralight	1
6	00922	Thrust Washer — Mainshaft	1
7	11211	Gear Spindle	1
8	00401	Bearing	1
9	29-311	Final Drive Pinion 15T	1
10	33-402	Ratchet Saw.	4
11	01-305	Pawl Spring	4
12	29-314	Ratchet Gear — Final Drive	1
13	00922	Thrust Washer — Final Drive	1
14	29-313	Center Ratchet Gear — 22T	1
15	29-112	Center Pinion	1
16	11709	Idler Gear	1
17	00400	Bearing	1
18	28021	Spring Guide	1
19	20006	Clamp Spring	4
20	11217	Spacer	1
21	11716	Dowel Pin	2
22	11709	Gear box Cover	1
All	29-401	Gear box Cover — Ultralight	1
23	01-205	Capscrew ¼" unc x ⅝" L.G.	2
24	01-206	Capscrew ¼" unc x 1¼"	1
25	11746	Base Aluminium	1
26	28007	Drum Nut	1
All	28007A	Drum Nut — Ultralight	1
27	01-265	Capscrew ⅜" unc x ⅝" L.G.	4
28	28025	Anchor Sleeve	1
All	28025A	Anchor Sleeve — Ultralight	1
29	29516	Line Lifter	1
All	29516A	Line Lifter — Ultralight	1
30	28020	Spring Guide Lock	4
31	28016	Clamping Ring — Chrome	1
All	28016A	Clamping Ring — Aluminium	1
32	28-304S	Drum — Stainless Steel 54T	1
All	28-304C	Drum — Chrome-54T	1
All	28-304A	Drum — Aluminium 54T	1
All	28-304B	Drum — Bronze-54T	1
33	11211-2	Gear Spindle	1
34	01-537	Thrust Washer (Aluminium Drums Only)	1
All	01-537	Thrust Washer (Ultralight Winches Only)	2
35	01-021	Alternative Bearing with Plastic Rollers	3

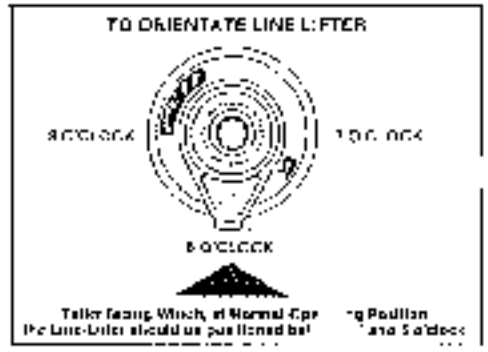
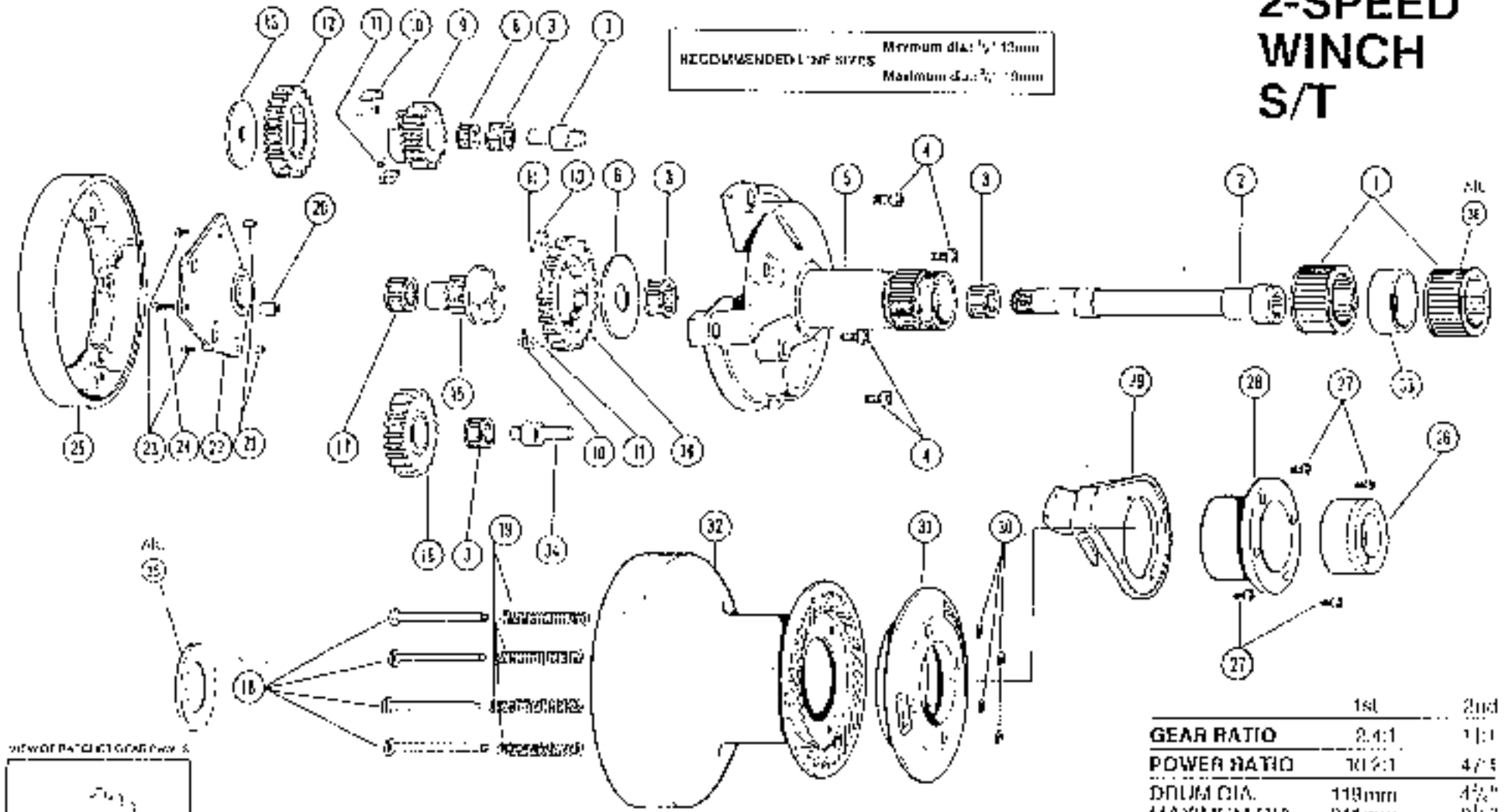


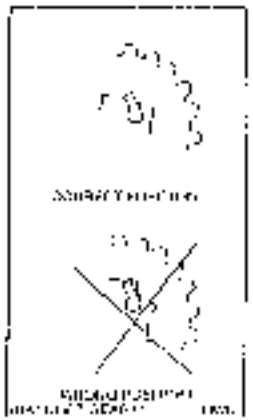
Fig 1.

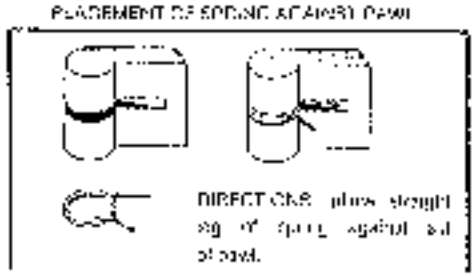
MAINTENANCE & SERVICE INFORMATION

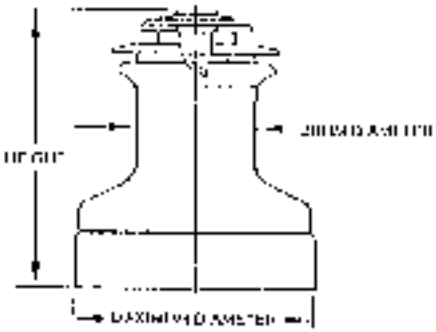
MODEL 32 2-SPEED WINCH S/T

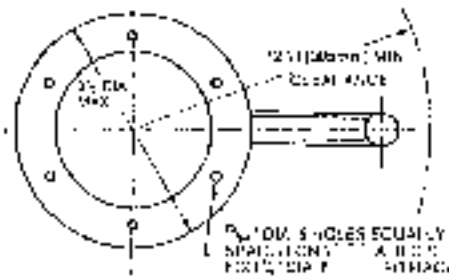


	1st	2nd
GEAR RATIO	2.4:1	1:1
POWER RATIO	10.2:1	4.2:1
DRUM DIA.	119mm	4¾"
MAXIMUM DIA	241mm	9½"
HEIGHT	254mm	10"









MOUNTING INSTRUCTIONS:

1. Using a Barient drum nut tool or dock plate key remove the drum nut (26) in the line lifter (29) & (28).
2. Lift the drum assembly and the line lifter together from the gearbox assembly (5). CAUTION: The drum bearings (1) may come off with drum — be careful not to let them fall out.
3. Remove the four capscrews (4), holding the gearbox assembly to the base (25). Keeping the gearbox assembly completed remove it from base (25). NOTE: The mainshaft (2) may fall out when turning the gearbox assy. over — be careful not to drop.
4. Bolt the base (25) to a flat and smooth surface drilled to take six flathead bolts ⅜" (10mm) dia. on 7¾" (197mm) bolts circle dia. (Use base (25) as a template.) Be sure adequate reinforcement is provided to take the loads produced by the winch. DO NOT Block the main channels in the base (25) with bedding (sealing) compound.
5. To re-assemble winch — reverse dismantling procedure. Be sure the line lifter is orientated towards the winch cranker's position (see fig. 1.).

TO LUBRICATE & DISASSEMBLE:

1. As steps 1, 2 and 3 above.
2. Remove the line lifter (29). The anchor sleeve (28) and the bearings (1) with spacer (33). NOTE: If it is not necessary to disassemble self-tailing mechanism proceed to step 5.
3. Remove four capscrews (27) from anchor sleeve (28) and line lifter (29), separate them.
4. It is usually not necessary to remove the clamp ring (31) from the drum. If this is required push the spring guides (18) up from the inside of the drum to allow removal of the lock rings (30).
5. Carefully turn the gearbox assembly on side making sure the main shaft (2) does not fall out. The drum can be used as a holder-stand for inverted gearbox assembly, (insert the stem of the gearbox housing into the top of the drum).
6. Remove the three ¼" capscrews (23) and (24) from gear box cover (22) and remove the cover. (It may be necessary to gently lift the cover off with a screwdriver.)
7. Remove the spacer (20) beneath the cover screw (24), the center pinion bearing (17) and thrust washer (13).
8. Lift out the final drive pinion (9) in assembly with its ratchet gear (12), ratchet pawls (10) and springs (11). NOTE: Keep this assembly together until you are ready to clean it, then re-assemble it immediately. This avoids confusion in the assembly procedure.
9. Remove the two bearings (3) and (8).
10. Remove the idler gear (16) and its bearing (3).
11. Lift up the center ratchet gear (14) — removing it in assembly with the center pinion (15), the pawls (10) and springs (11). Keep this assembly together until it can be cleaned and re-assembled.
12. Remove the thrust washer (6), the main shaft (2) and its upper and lower bearings (3). The two gear spindles (7), (34) are pressed into the housing and should not be removed unless they are damaged.
13. Clean all parts in petroleum solvent. Replace any parts showing damage or excessive wear. During the assembly procedure, all gears and bearings should be liberally greased with Barient — Darlube.
14. Assemble winch in reverse order to that shown above.

TOOL REQUIRED: 5/16" and 3/16" Allen Key; Barient drum nut tool or dock plate key.

LUBRICANT: Non detergent Machine Oil (SAE 30); Barient Barlube.

INSPECTION & LUBRICATION:

Quarterly ins[illegible]tion is recommended. Inspect more frequently in a racing ses
Monthly cle[illegible] and lubrication of the aluminium drum winches is advisable.

Item	Part No.	Description	Qty
1	00432	Drum Bearing	2
2	32-406	Mainshaft	1
3	00435	Bearing	4
4	01-267	Capscrew ¼" UNC x ¾" L.G.	4
5	32567	Gearbox Housing	1
Alt	32-432L	Gearbox Housing — Ultralight	1
6	00372	Thrust Washer — Mainshaft	1
7	31211	Gear Spindle	1
8	00401	Bearing	1
9	11240	Final Drive Pinion	1
10	01-403	Ratchet Pawl	4
11	01-200	Paw Spring	4
12	11330	Ratchet Gear — Final Drive	1
13	00320	Thrust Washer — Final Drive	1
14	11240	Centre Ratchet Gear	1
15	32-010	Centre Pinion	1
16	11250	Idler Gear	1
17	00404	Bearing	1
18	29021	Spring Guide	6
19	23003	Clamp Spring	4
20	11227	Spacer	1
21	11216	Dowel Pin	2
22	11233	Gearbox Cover	1
Alt.	32-411	Gearbox Cover — Ultralight	1
23	01-205	Capscrew ¼" UNC x ½" L.G.	2
24	01-2016	Capscrew ¼" UNC x 1¼" L.G.	1
25	32534	Base Aluminium	1
26	29037	Drum Nut	1
Alt.	29037A	Drum Nut — Ultralight	1
27	01-265	Capscrew ¼" UNC x ⅝" L.G.	4
28	29026	Anchor Sleeve	1
Alt.	29026A	Anchor Sleeve — Ultralight	1
29	32721	Line Lifter	1
Alt	32721A	Line Lifter — Ultralight	1
30	29020	Spring Guide Lock	4
31	32577C	Clamping Ring	1
Alt.	32577A	Clamping Ring	1
32	32719S	Drum — Stainless Steel	1
Alt.	32722C	Drum — Chrome	1
Alt	32722A	Drum — Aluminium	1
Alt	32722B	Drum — Bronze	1
33	11215	Bearing Spacer	1
Alt.	21-133	Bearing Spacer (for Ultralight Winches)	1
34	11211-S	Gear Spindle	1
35	01-507	Thrust Washer (Aluminium Drum Only)	1
Alt	01-507	Thrust Washer (Ultralight Winches Only)	2
36	01-021	Alternative Bearings will Plastic Rotate	4

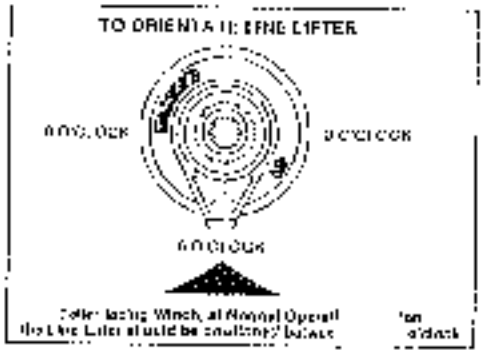


Fig. 1. [illegible] Winch at Normal Operat[illegible] the Line Lifter should be positioned between [illegible] o'clock

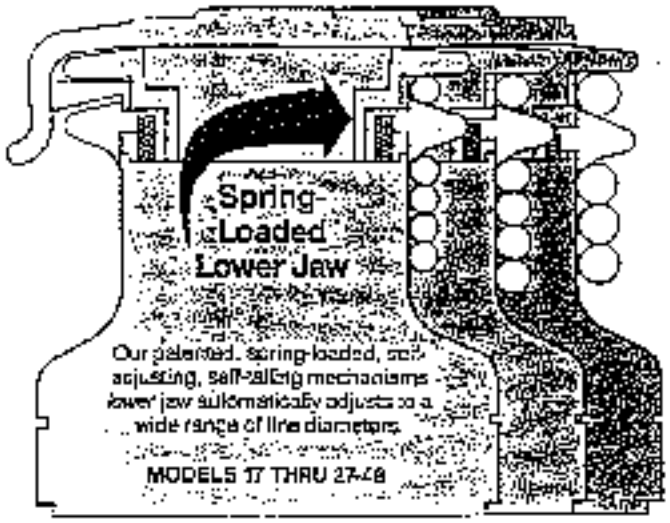
BARIENT'S AMAZING SELF-TAILING WINCHES
No Other Design Even Comes Close

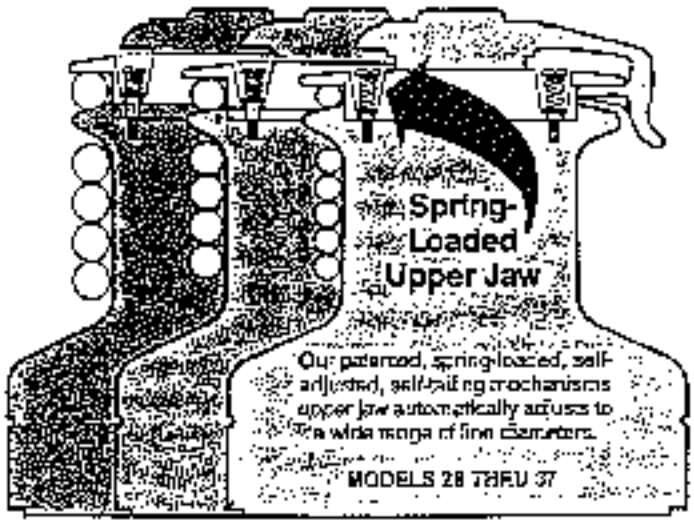
The Advantages Of Self-Tailing:

The advantages of self-tailing are important to racing and cruising sailors alike. With a standard winch, a crew member must wind with one hand and tail the line coming off the drum with the other. When more speed or power is required, it often becomes a necessity to have a second crew member handle the tailing while the other winds the winch.

With self-tailing winches, one crew member can do it all in one continuous motion without assistance. If additional power or speed is required the winder is free to use both hands on one of Barient's double grip winch handles. With a Barient, while the line is slack, it can actually be taken right through the jaws.

BARIENT'S SELF-TAILING SYSTEMS





How Do They Work And Why Is Barient's Design So Much Better?

The jaws of a Barient self-tailing winch actually take the place of a human hand. With three to five wraps of line on the drum (depending on wind speed), the tail is placed over the feeder and into the jaws which grip it gently and allow it to rotate with the jaws to the stripper finger without building friction.

Constant Feed Rate

When a self-tailer works efficiently, the "lead-out" from the drum, through the self-tailing device, remains absolutely constant. The jaws, therefore, must be able to accept and forward the line at precisely the same rate that it comes off the drum. Should the drum feed the line faster than the jaws can take it up, the line will "spill" out; if the jaws take up the line faster than the drum can feed it, efficiency falls off dramatically and friction and line wear increase. Constant "lead-rate" can be achieved only if the line on the drum and the line to the self-tailer are in precise vertical alignment.

Automatically Adjusts to Line Width

All Barient self-tailing winches are able to achieve this critical alignment with lines of many different diameters. This is accomplished through the utilization of our patented spring-loaded jaws. Small compression springs behind the movable jaw apply a gentle pressure to the line as it travels the jaws inner radius. As larger or smaller diameter lines are used the spring-loaded jaw compensates for the differences automatically. You cannot get this feature on any other self-tailing winch out of Barient. On both racing and cruising yachts where one winch must serve multiple functions, which require a number of different line sizes, this feature is invaluable.

HUNTER

Committed to Better Engineering

HUNTER

Hunter Marine Corporation
P.O. Box 1030, Route 441
Alachua, Florida 32615
(904) 462-3077

Edson INTERNATIONAL

Dear Edson Owner,

Welcome to the World of Edson! So that we may properly register your new Edson Steering System, please fill out and return the attached Steerer Registration Card to the Edson Corporation. We will register the serial number of your steerer so that if you ever have any questions, Edson's worldwide sales network will be ready to be of assistance. If you ever have any questions pertaining to your steering system, please be sure to contact Edson immediately. We are standing by ready to help you.

Upon receipt of the Edson Registration Card, we will not only register your Pedestal Serial number, but we will also send you the latest 60 page Edson catalog/handbook, showing Edson's complete line of accessories which can be purchased through your dealer.

Thank you,

Customer Service Dept.
THE EDSON CORPORATION

EDSON REGISTRATION CARD

In order to properly register Edson's steerer, please fill out and return the Edson Registration Card below. By return mail Edson will send the latest catalog/handbook.

THE EDSON CORP., 460 INDUSTRIAL PK. RD., NEW BEDFORD, MA., 02745 TEL. (508) 995-9711 FAX: (508) 995-5031

PLEASE PRINT CLEARLY

OWNER'S NAME _____

STREET _____

CITY _____ STATE _____ ZIP _____

BOAT DEALER _____

DEALER ADDRESS _____

BOAT BUILDER _____ LENGTH _____

CLASS _____ YEAR BUILT _____

HULL # _____ EDSON SERIAL # _____

EDSON SERIAL NO. LOCATED ON INSIDE OF PEDESTAL BOWL BENEATH COMPASS.

CHECK IF YOU ALREADY HAVE OUR CATALOG

RECORD YOUR SERIAL NO. BELOW FOR YOUR RECORDS

_____

DEALER/OWNER CHECK LIST

Edson

For the best performance of your new steering system, engine control, or Edson accessories, Edson recommends that the owner and dealer carefully check over the steerer installation before the boat leaves the dock.

Our experience has shown that fastenings tend to be vibrated loose in delivery especially those boats delivered by truck, and we advise that the items on the check list be inspected. After the initial inspection this check list should be followed on a regular basis.

FASTENERS	USE AND LOCATION
Screws	☐ Quadrant-at rudder post ☐ Radial Drive-at rudder post ☐ Engine Controls at handles and cable holder
Nuts	☐ Wheel ☐ Pedestal Bolts ☐ Idler Sheaves ☐ Wire Take Up Eyes on Quadrant or Radial Drive
Bolts	☐ Outer radius joint of Rad of Drive ☐ Sheave housings ☐ Rudder stop on Radial Drive
Cotter Pins	☐ Chain ends ☐ Sheave Pins ☐ Engine Control Clevis Pins

For the best performance of the steering system, the roller chain, bearings, and sheave pins and bushings must be properly lubricated. Also check for proper wire tension. Please refer to the maintenance guide for the complete instructions.

Be sure that all crew members are familiar with the care and operation of the steering system as well as the location and use of the emergency tiller. This guide, the maintenance guide, and the catalog, should be kept on the boat for reference purposes.

PLACE STAMP HERE

Edson International

46 INDUSTRIAL PARK RD
NEW BEDFORD, MASS 02745

ATT: CUSTOMER SERVICE DEPT.

STAMP HERE

U K SAILMAKERS HONG KONG
P. O. BOX 69527
KWUN TONG
KOWLOON
HONG KONG

UK SAILMAKERS
HONG KONG

UK SAILS MADE IN HONG KONG ARE WARRANTED FOR A PERIOD OF ONE YEAR AGAINST DEFECTS IN MATERIALS OR WORKMANSHIP. THE WARRANTY COVERS SAILS THAT HAVE RECEIVED REASONABLE USE AND HAVE NOT BEEN DAMAGED DUE TO ASUSE OR NEGLECT.

NOTICE OF DEFECT MUST BE GIVEN WITHIN 30 DAYS OF DISCOVERY TO UK SAILMAKERS HONG KONG, P. O. BOX 68527, KWUN TONG, KOWLOON. HONG KONG. PHONE NO.: (852) 775-7711. UK SAILMAKERS H.K. WILL ARRANGE TO HAVE THE SAIL REPAIRED OR REPLACED. THIS WARRANTY IS IN LIEU OF ANY OTHER WARRANTY EXPRESS OR IMPLIED AND DOES NOT COVER ANY INCIDENTAL DAMAGES AND DOES NOT COVER TRANSPORTATION COSTS.

SAILS WARRANTY REGISTRATION FORM

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

TELEPHONE: (OFFICE) _____ TYPE OF BOAT _____
(RES.) _____

FAX _____

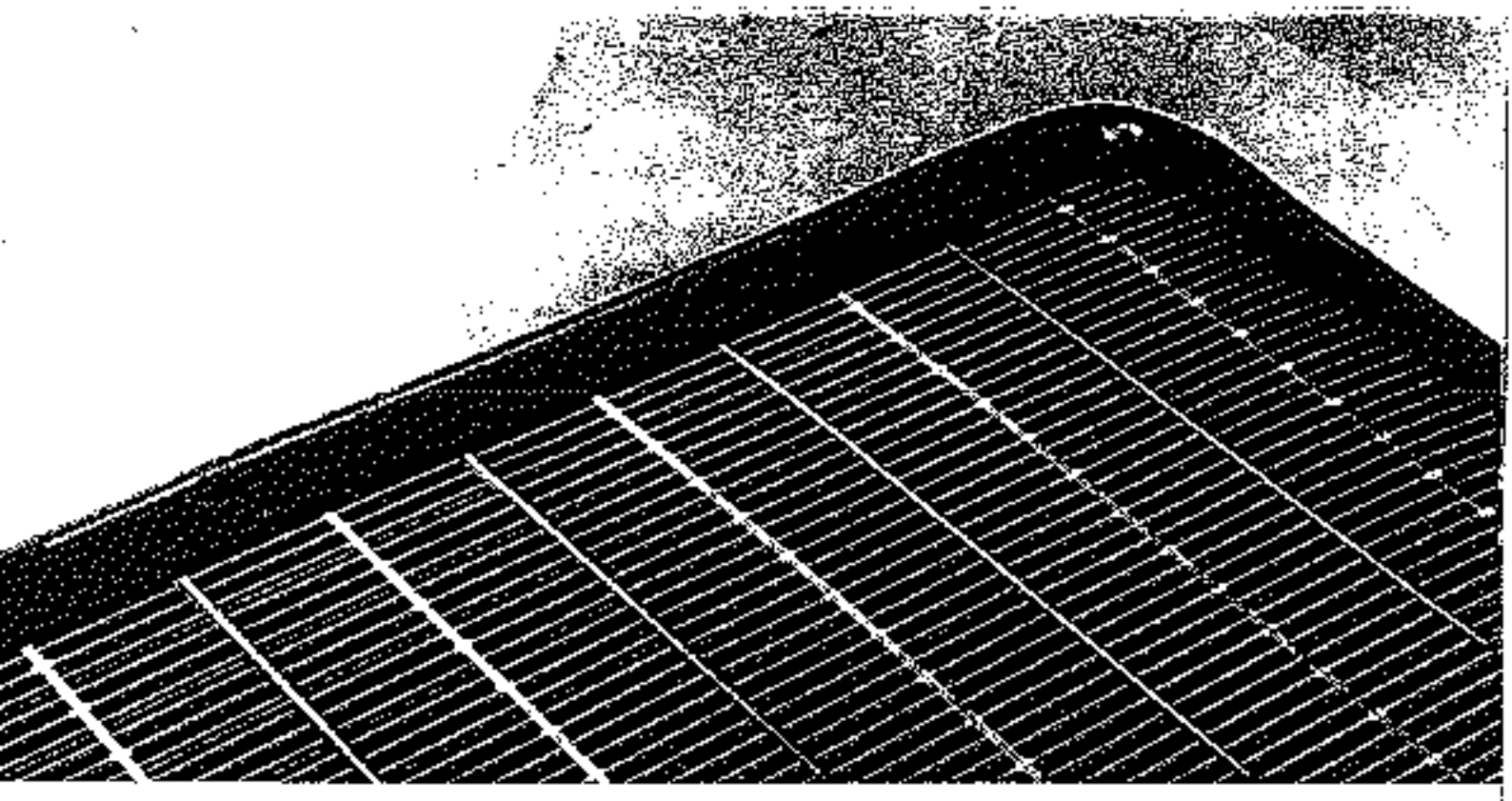
DATE SAILS PURCHASED _____ SAIL SERIAL # _____

NAME OF DEALER _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

* THIS WARRANTY FORM MUST BE RETURNED WITHIN 30 DAYS OF RECEIPT OF SAIL TO UK SAILMAKERS HONG KONG.



Installation and User's Guide
For Sovonics Solar Chargers: MA-6, MA-12, MA-21, MA-33

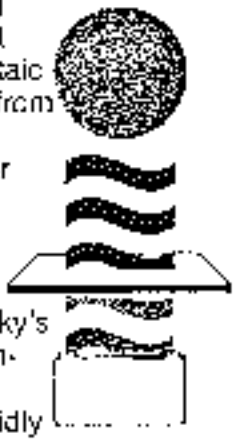
CONGRATULATIONS. You are the proud owner of a Sovonics Solar Charger. Welcome to the world of clean, silent, non-polluting, reliable solar electric power. The convenience and safety of boating with a Sovonics Solar Charger aboard is remarkable. It converts sunlight directly into electricity. No moving parts, fuel, maintenance or hassels. Sovonics Solar Chargers are designed to make installation simple and operation automatic, safe and reliable.

Please read these instructions carefully. Important procedures on how to install and use your Sovonics Solar Charger are covered. This manual also offers you a basic understanding of the Sovonics Solar Charger technology: "photovoltaics" (photo—from light, voltaics—from voltage).

How They Work

Sovonics Solar Chargers convert sunlight directly to DC electricity by the photovoltaic effect. A photovoltaic effect occurs when light energy causes electrons to become excited and flow between two materials, typically silicon alloys. Sovonics Solar Systems utilizes the unique world famous technology of its parent company Energy Conversion Devices (ECD). Sovonics photovoltaic modules are tandem junction thin film amorphous silicon alloy devices.

A pioneer in the field, Stanford Ovshinsky, founder of Energy Conversion Devices (parent company of Sovonics Solar Systems), identified tandem junction thin film amorphous silicon alloy materials placed on a flexible substrate (stainless steel) as the means to achieve low cost high efficiency versatile photovoltaic modules. Mr. Ovshinsky's ideas from almost 20 years ago have been translated into the Sovonics Solar Chargers for marine batteries.



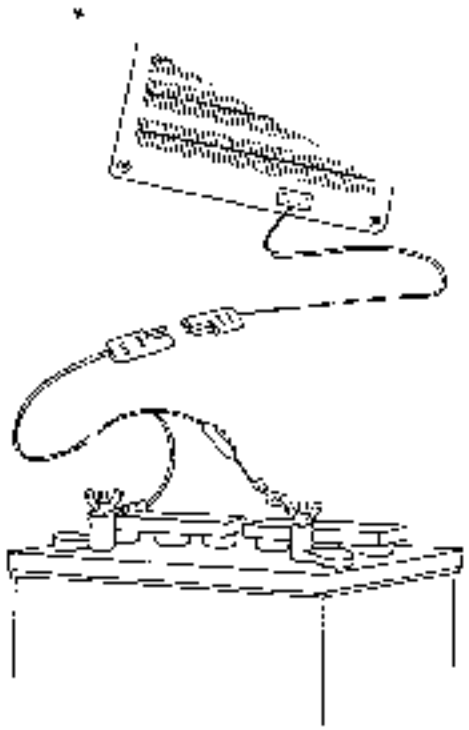
Sovonics Solar Systems is also making inroads on conventional electric utility power. Mr. Ovshinsky's visions of a cleaner, safer environment through advanced low cost amorphous technologies are rapidly becoming reality.

Battery Connections:

Sovonics Solar Chargers contain a built-in blocking diode permitting a direct connection to the battery through an in-line fuse. Connection to the battery requires these simple steps:

1. Decide the mounting location for your solar charger.
2. Mount solar charger. (see above: Portable or Fixed Mount)
3. Connect In-line Fuse Assembly to positive and negative terminal of the battery.
4. Connect SAE Connector of In-line Fuse Assembly to the SAE Connector of the solar charger.

You can check for charging by either connecting an ammoter in the circuit or by checking battery voltage over time.

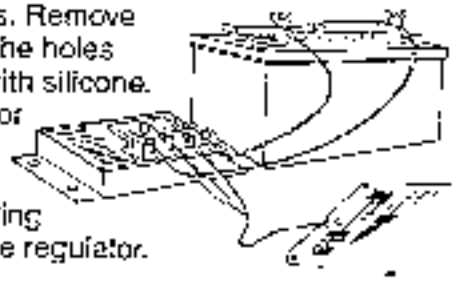


Use of a Charge Regulator

A charge regulator prevents overcharging of the battery. When the maximum charging current of the module is less than approximately 2% of the battery capacity (example: MA-21 producing 1.4 amps and a battery of 105 AH capacity or more), a **charge regulator is not required.**

A charge regulator is recommended when a battery and module do not meet the 2% criteria, or when the battery is to be left on charge unattended for extended period (3 months).

When a regulator is used, it should be mounted as close to the battery as possible. Using the regulator as a template, mark the mounting holes. Remove the regulator, drill the holes and fill the holes with silicone. Secure the regulator using stainless screws or bolt/nut sets. Follow the wiring instructions with the regulator.



Quick Disconnect

Recommended for all modules. The SAE connector is supplied as part of the solar charger module and in-line fuse assembly.

Operating Performance

Multiply the panel peak charging rate in amperes times 6 for southern US, 5 for middle US, and 4 for northern US to estimate ampere-hours per day (summer) delivered to the battery by the respective panel. Match panel output (in ampere-hours/day) to your load requirements to determine which panel suits your needs.

More than one panel may be connected to a battery. Consult battery manufacturer for maximum charging amperes allowed with your particular battery.

*Not to Scale

From _____

PLACE
STAMP
HERE

Seaward Products
P.O. Box 566
La Puente, CA 91747

Customer Service

OWNERSHIP REGISTRATION
(Please fill out and Return within 10 days)

NAME _____ BRAND NAME OF BOAT _____

ADDRESS _____ ☐ POWER ☐ SAIL

CITY _____ OVERALL LENGTH _____

STATE _____ ZIP _____ TYPE OF APPLIANCE

DEALER'S NAME _____ ☐ STOVE ☐ RANGE ☐ MICROWAVE

ADDRESS _____ ☐ WATER HEATER

CITY _____ YOUR AGE: ☐ 20-30 ☐ 30-40 ☐ 40+

STATE _____ ZIP _____ ANY COMMENTS: _____

DATE PURCHASED _____ _____

PRODUCT SERIAL # _____ _____

PRODUCT MODEL # _____ _____

SEAWARD PRODUCTS

AUTHORIZED SERVICE CENTERS

CALIFORNIA

PROPER TIGHE MARINE
2427 Clement, Alameda, CA 94501
(415) 523-3143

SAILING SUPPLY
2822 Cannon Street, San Diego, CA 92106
(619) 225-3156

SOUTH BAY MARINE ENTERPRISES, INC.
2500 Miner Street, San Pedro, CA 90731
(213) 833-1450

WESLEY HEINMILLER CO.
1045 Lomita Blvd., Lomita, CA 90717
(213) 534-6116

CANADA

RIVER MARINE SUPPLIES
P.O. Box 25500 Vancouver AMF
8060 Capstan Way, Richmond, B.C., Canada V6X 1H5
(604) 270-9155

SHORTWAVE MARINE SERVICE, LTD
81 Lakeshore Road East, Mississauga, Ontario, Canada L5H 1C9
(416) 278-6541

CONNECTICUT

MACHI MARINE
7 Buoy Street, Norwalk, CT 06850
(203) 255-1108

FLORIDA

A.C. MARINE, INC.
2012 Whitfield Park Drive, Sarasota, FL 34243
(813) 755-8052

APPLIANCES OF PALM COAST
2 Hargrove Grade, Palm Coast, FL 32037
(904) 445-1430

D & S SERVICE
11330 S.W. 94 LN, Miami, FL 33176
(305) 271-3644

SPACE COAST APPLIANCE INC.
7412 North Atlantic Lane, Coco, FL 32926
(407) 784-0202 • 639-0375

TAMPA MARINE
202 North Thirteenth Street, Tampa, FL 33602
(813) 229-2701

HAWAII

ALA WAI MARINE LTD.
1651 Ala Moana, Honolulu, HI 96815
(808) 946-4213

MARYLAND

VIKING BOAT SUPPLY
320 Sixth Street East Port, Annapolis, MD 21403
(301) 268-8301
.. & Kent County

MICHIGAN

NORTHLAND APPLIANCE SERVICE CO.
2231 Adams Road, Sterling, MI 48659
(517) 654-3560

TORRESEN MARINE, INC.
3126 Lakeshore Drive, Muskegon, MI 49441
(616) 759-8596

MISSISSIPPI

GULFPORT MARINE SUPPLY
1319 27th Avenue, Gulfport, MS 39507
(601) 868-3599

NEW JERSEY

JAY MARINE
Rt. 30 & Hudderow Avenue, Maple Shade, NJ 08052
(609) 482-1671

NEW YORK

ACME SERVICE CO.
5 Davidson Plaza, East Rockaway, NY 11518
(516) 593-6929

SURFSIDE 3 MARINA
846 S. Wellwood, Lindenhurst, NY 11757
(516) 957-0868

OREGON

JIM PRINGLE'S REEL REPAIR
30 North Oakdale, Medford, OR 97501
(503) 770-5104

SEXTONS CHANDLERY
303 N.E. Tomahawk Island Drive, Portland, OR 97217
(503) 289-9352

RHODE ISLAND

CORP BROS
47 Brook Street, Providence, RI 02903
(401) 331-8020

F & M SERVICE, INC
2580 East Main Road, Portsmouth, RI 02871
(401) 683-5025

ISLAND MR. FIX IT, INC.
72 East Main Road, Middletown, RI 02840
(401) 849-3340

UTAH

PETERSON MARINE SUPPLY
4453 South 900 West, Ogden, UT 84405
(801) 621-2570

WASHINGTON

MULTITRONICS, INC.
5807 Stoneway Avenue North, Seattle, WA 98103
(206) 522-4434

SURE MARINE SERVICES, INC
5320 28th Avenue N.W., Seattle, WA 98107
(206) 789-1030

LIMITED TWO YEAR WARRANTY

SEAWARD PRODUCTS warrants the products delivered will be:
A. free from (1) encumbrances and (2) defects in material and workmanship under the normal use and service, and
B. will meet applicable specifications and descriptions at time of delivery to BUYER.

The obligation of SEAWARD under this Warranty is limited to the repair, rework, or replacement, at SEAWARD'S option, any part or component thereof, which examination discloses to our satisfaction to have been nonconforming or defective. SEAWARD, after establishing customer's purchase date and determining problem to be under warranty, will either repair the product at their factory or authorized service center and allow labor and parts for (2) two years from purchase date. Transportation charges are the responsibility of the customer. Items not covered under warranty are

(1) Porcelain Enamel
(2) Glass
(3) Routine Maintenance that may be required.

The foregoing Warranty and condition shall apply to any repaired, reworked, or replaced products, part or component supplied by SEAWARD. SEAWARD shall in no event be liable to BUYER or BUYER'S customers for any incidental or consequential damages, or loss of use, or other losses, however occasioned.

Implied Warranties of merchantability and of the fitness of the product for any purpose are warranted for a period of two years on parts and labor, SEAWARD makes no warranties, expressed or implied after that time.

Some states do not allow limitation on how long an implied warranty lasts or for the exclusion or limitations of incidental or consequential damages, therefore, the above limitations may not apply to you.

This Warranty is extended to the original purchaser only, unless purchased for purposes of resale.

This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Seaward *Products*

P.O. BOX 566
LA PUENTE, CA 91747
(818) 986-2117

PLACE
STAMP
HERE

Seaward Products
P.O. Box 566
La Puente, CA 91747

Customer Service

OWNERSHIP REGISTRATION
(Please Fill out and Return within 10 days)

NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

DEALER'S NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

DATE PURCHASED _____

PRODUCT SERIAL # _____

PRODUCT MODEL # _____

BRAND NAME OF BOAT _____

[ ] POWER [ ] SAIL

OVERALL LENGTH _____

TYPE OF APPLIANCE:

[ ] STOVE [ ] RANGE [ ] MICROWAVE

[ ] WATER HEATER

YOUR AGE: [ ] 20-30 [ ] 30-40 [ ] 40+

ANY COMMENTS: _____

_____

_____

SEAWARD PRODUCTS

AUTHORIZED SERVICE CENTERS

CALIFORNIA

PROPER TICHE MARINE
2427 Clement, Alameda, CA 94501
(415) 523-3143

SAILING SUPPLY
2822 Cannon Street, San Diego, CA 92106
(619) 225-0158

SOUTH BAY MARINE ENTERPRISES, INC.
2500 Miner Street, San Pedro, CA 90731
(213) 833-1450

WESLEY HEINMILLER CO
1545 Lomita Blvd., Lomita, CA 90717
(213) 534-9115

CANADA

RIVER MARINE SUPPLIES
P.O. Box 23500 Vancouver AMF
8080 Capstan Way, Richmond, B.C., Canada V6X 1R1
(604) 270-5405

SHORTWAVE MARINE SERVICE LTD.
87 Lakeshore Road East, Mississauga, Ontario, Canada L5H 1C9
(416) 278-5541

CONNECTICUT

YACHT MARINE
7 Burry Street, Norwalk, CT 06850
(203) 259-1150

FLORIDA

A.C. MARINE, INC.
2012 Whitfield Park Drive, Sarasota, FL 34243
(813) 755-8053

APPLIANCES OF PALM COAST
2 Hargrove Grade, Palm Coast, FL 32037
(904) 445-1439

D & S SERVICE
11325 S.W. 84 LN. Miami, FL 33173
(305) 271-9644

SPACE COAST APPLIANCE INC.
7412 North Atlantic Lane, Cocoa, FL 32920
(407) 784-5202 • 539-0975

TAMPA MARINE
202 North Tortdesto Street, Tampa, FL 33602
(813) 225-2734

HAWAII

ALA WAI MARINE LTD.
1651 Ala Moana, Honolulu, HI 96815
(808) 946-4215

MARYLAND

VIKING BOAT SUPPLY
990 Sixth Street East Port, Annapolis, MD 21403
(301) 268-8000
[illegible] & Sales Only

MICHIGAN

NORTHLAND APPLIANCE SERVICE CO.
2231 Adams Road, Sterling, MI 48659
(517) 654-3160

TORRESEN MARINE, INC.
3126 Lakeshore Drive, Muskegon, MI 49441
(616) 759-8596

MISSISSIPPI

GULFPORT MARINE SUPPLY
1315 27th Avenue, Gulfport, MS 39501
(601) 868-3696

NEW JERSEY

JAY MARINE
Rt. 38 & Hedgerow Avenue, Maple Shade, NJ 08052
(609) 482-1501

NEW YORK

ACME SERVICE CO.
8 Davidson Plaza, East Rockaway, NY 11518
(516) 593-6823

SURFSIDE 3 MARINA
846 S. Wellwood, Lindenhurst, NY 11757
(516) 957-9289

OREGON

JIM PRINGLE'S REEL REPAIR
30 North Oakdale, Medford, OR 97501
(503) 770-6184

SEXTONS CHANDLERY
333 N.E. Tomahawk Island Drive, Portland, OR 97217
(503) 289-5356

RHODE ISLAND

CORP BROS
61 Brook Street, Providence, RI 02903
(401) 331-8320

F & M SERVICE, INC.
2500 East Main Road, Portsmouth, RI 02871
(401) 683-5025

ISLAND MR. FIX IT, INC
12 East Main Road, Middletown, RI 02840
(401) 849-3340

UTAH

PETERSON MARINE SUPPLY
4433 South 900 West, Ogden, UT 84405
(801) 521-7532

WASHINGTON

MIRTOTRONICS, INC.
3807 Stoneway Avenue North, Seattle, WA 98103
(206) 633-4134

SURE MARINE SERVICES, INC.
5320 28th Avenue N.W., Seattle, WA 98107
(206) 789-1650

LIMITED TWO YEAR WARRANTY

SEAWARD PRODUCTS warrants the products delivered will be:
A. free from (1) encumbrances and (2) defects in material and workmanship under the normal use and service, and
B. will meet applicable specifications and descriptions at time of delivery to BUYER.

The obligation of SEAWARD under this Warranty is limited to the repair, rework, or replacement, at SEAWARD'S option, any part or component thereof, which examination discloses to our satisfaction to have been nonconforming or defective. SEAWARD, after establishing customer's purchase date and determining problem to be under warranty, will either repair the product at their factory or authorized service center and allow labor and parts for (2) two years from purchase date. Transportation charges are the responsibility of the customer. Items not covered under warranty are

(1) Porcelain Enamel
(2) Glass
(3) Routine Maintenance that may be required.

The foregoing Warranty and condition shall apply to any repaired, reworked, or replaced products, part or component supplied by SEAWARD. SEAWARD shall in no event be liable to BUYER or BUYER'S customers for any incidental or consequential damages, or loss of use, or other losses, however occasioned.

Implied Warranties of merchantability and of the fitness of the product for any purpose are warranted for a period of two years on parts and labor, SEAWARD makes no warranties, expressed or implied after that time.

Some states do not allow limitation on how long an implied warranty lasts or for the exclusion or limitations of incidental or consequential damages, therefore, the above limitations may not apply to you.

This Warranty is extended to the original purchaser only, unless purchased for purposes of resale.

This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Seaward *Products*

P.O. BOX 565
LA PUENTE, CA 91747
(818) 968-2117

HUNTER MARINE
LIMITED WARRANTY

The following warranties apply to all 1993 Model Year boats produced by HUNTER MARINE CORPORATION:

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 the 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 limited to the repair or replacement of hulls, that it determines to be structurally defective. This is your sole and exclusive remedy.

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 from time to time, however if the repair is performed by a non-Hunter dealer, the repair cost must be authorized by Hunter in advance and be based on a reasonable number of hours as determined by Hunter. Transporation, hauling, launching, bottom paint, storage, dockage, cradling rental, rigging and derigging, or other similar costs will not be paid by Hunter. It is recommended that the repair be done during a seasonal haul out for service or storage.

The following circumstances will void the bottom blister limited warranty:

(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 are not followed according to Hunter's required bottom preparation procedures.

HUNTER MARINE
LIMITED WARRANTY

RESTRICTIONS APPLICABLE TO WARRANTIES

These limited warranties do not cover:

(1.) Paint, window glass, gelcoat, upholstery damage,plastic finishes, 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.

(3) Boats used for commercial activities including charter.

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 DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. THE PURCHASER ACKNOWLEDGES THAT NO OTHER REPRESENTATIONS WERE MADE TO HIM OR HER WITH RESPECT TO THE QUALITY AND FUNCTION OF THE BOAT. ANY CONSEQUENTIAL DAMAGES WHICH MAY BE INCURRED ARE EXCLUDED AND PURCHASER'S REMEDY IS LIMITED TO REPAIRS OR REPLACEMENT OF ANY PART(S) JUDGED DEFECTIVE BY HUNTER. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.

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.

Return of the Warranty Registration Form to HUNTER, signed by both Dealer and Owner, is critical. Warranty coverage cannot be initiated until the completed form is received at HUNTER.

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, transportation costs to and from the HUNTER plant shall be paid by the owner. 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. Any repairs and replacements must be approved in advance by an authorized HUNTER service representative.

HUNTER MARINE
LIMITED WARRANTY

TRANSFER OF LIMITED WARRANTIES

Effective with 1993 hull numbers, the limited warranties will be transferred to a subsequent purchaser of the boat if:

(1) A notice of the transfer of ownership of the boat is given by the subsequent purchaser in writing to Hunter 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 to the subsequent purchaser notice of the expiration dates of the limited warranties. (see form letter, attached) The transfer of the ownership of the boat will not extend the expiration dates of the limited warranties.

CUSTOMER SATISFACTION SURVEYS

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 dealer's ability to sell and commission the boat, and the Owner's initial satisfaction. The second survey (CSS#2), nine to ten months into ownership, "measures" dealer service capability and allows the owner to evaluate most of the boat's functional systems and characteristics. Both surveys are dependent upon receipt of the first purchaser's Warranty Registration Form.

PERKO®

Cat. No. 493 Series Standard Intake Water Strainers
Cat. No. 503 Series Heavy Duty Intake Water Strainers

INSTALLATION AND OPERATING INSTRUCTIONS

NOTE: Prior to installation, consult your Engine Manual for recommended pipe size and strainer location. For proper protection, A.B.Y.C. Standrds E-1 (Bonding of Direct Current Systems) and E-2 (Cathodic Protection) must be adhered to.*

1). The PERKO Water Strainers have been designed to be installed on the intake side of the water cooling system.

2). Mount strainer on a flat surface in a vertical position. Allow clearance above strainer to remove basket for cleaning.

3). For correct installation, note that the inlet and outlet fittings are marked on the top casting. For convenience in piping, there are mounting legs on both sides of the strainer.

4). Drill mounting holes, using mounting lugs on strainer as a template. Strainer should be mounted to ensure proper support from bulkhead to eliminate any strain on the pipe.

5). PERKO strainers are designed to give 100% full flow, without restriction (see Note No. 7). The use of reducers may cause engine damage and therefore is not recommended. The following table shows the rated strainer open area to pipe cross-section ratios:

CAT. NO.	PIPE SIZE	RATIO
493-003-PLB	3/8	22:1
493-004-PLB	1/2	30:1
493-005-PLB	3/4	25:1
493-006-PLB	1	20:1
493-007-PLB	1-1/4	13:1
493-008-PLB	1-1/2	17:1
493-009-PLB	2	13:1
493-010-PLB	2-1/2	10:1
503-009-PLB	2	20:1
503-010-PLB	2-1/2	19:1
503-011-PLB	3	14:1

6). After all connections are complete, start engine and check entire system for leaks.

7). IMPORTANT: Periodic inspection and removal of foreign matter is essential for safe operation. This requirement will vary, depending on amount of use and local operating conditions. Quick cleaning of strainer is accomplished by removal of basket through access plate in top of casting.

8). IMPORTANT: Periodic inspection of components is also essential for safe operation. Make sure to check castings, fasteners, cover gaskets, plug, tie rods, etc. for damage or deterioration on a regular schedule.

9). WINTERIZING: To prevent damage by freezing, drain the strainer cylinder prior to storage in freezing temperatures.

SPARE PARTS

Specify Cat. No. of Strainer, Size and Part No. Below
(For Example: 493-005-99F Specifies a cover gasket for a 3/4 inch strainer)

- 99A - Top Casting
- 99B - Bottom Casting
- 99C - Transparent Cylinder
- 99D - Basket Strainer
- 99E - Cover with Gasket
- 99L - Hinged Bolt for Cover with Pin, Nut and Washer
- 99M - Gasket Kit Consists of: 1 - Cover Gasket and 2 - Cylinder Gaskets
- 99N - Cover Gaskets (2 per pkg)
- 99P - Tie Rods, Nuts and Washers Consists of: (4 of each for 493 Series.) (1 of each for 503 Series.)

* Above standards can be obtained from:

American Boat & Yacht Council, Inc.
405 Headquarters Drive, Suite 3
Millersville, MD 21108

PERKO, INC.
16490 N.W. 13th Avenue
Miami, FL 33169-5707

6/93

4480 - 196th AVENUE NORTH
CLEARWATER, FLORIDA
34620
AREA CODE (813) 577-0478

FOSS FORM, INC. // POLYURETHANE FOAM

YOUR FOSS FIBERGLASS AND URETHANE RUDDER

Foss Foam Inc. has been producing sailboat rudders for over twenty five years for most major boat companies. The fiberglass blade with it's rigid urethane core has proven to be an excremely strong dependable rudder.

The near neutral bouyancy of your rudder helps the performance of your boat by reducing total weight, as well as reducing the moment of inertia in the stern. Near neutral bouyancy also is helpful should the rudder ever need to be removed for steering system repairs. The boat does not need to be hauled out of the water to remove the rudder.

Tough fiberglass and urethane plastic used in the construction of your rudder is nearly indestructable. The urethane core is composed of a strong rigid closed cell urethane. Water, diesel, solvents or marine borers will not damage your rudder blade, even if the glass coating has been damaged.

The edge seam should not be ground flush unless you re-glass the seam. If it is ground flush without re-glassing it will cause it to seperate.

When you paint your rudder the first time, particular attention should be paid to the paint manufacturer's instructions for preparing the surface. Solvent washing is not enough. The rudder must be sanded heavily to remove a heavy coating of mold release. We recommend white paint be used. White is a popular color as it is easy to see weeds and other debri which can catch on your rudder.

Cosmetic surface repairs may be performed by cleaning, drying and roughting up the damaged area and applying Marine bondo or any similar filler with a putty knife. Should a small blister appear, it may be filled with resin or cut away and repaired. Once the patch has dried, it may be sanded smooth and painted directly with bottom paint or any coating you desire.

We do not recommend the use of dark colors on your rudder, as they generate heat when the boat is out of the water in the sun. Since the rudder is made of cellular material this heat can cause dimentional changes and cosmetic damage. If the rudder is painted with a dark color it should be shielded from the sun with a white wrapping when the boat is out of the water. The rudder Warranty excludes damage caused by heat.

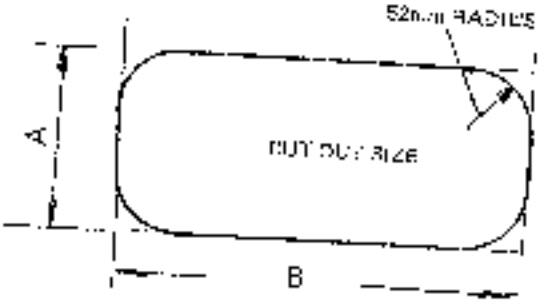
You should make periodic inspections of your rudder and look for possible damage from grounding or electrolysis. Slight bends or shaft erosion often are not noticed until the shaft fails in heavy sea conditions.

Should you have any questions about your rudder, feel free to call us at (813)577-0478

LEWMAR PORTLIGHT – FITTING INSTRUCTIONS FOR OPENING VERSIONS

1) Check that Portlight can be fitted in the planned position. Hold the outer frame at the intended position and check that a flat surface (to +/– 1mm) exists to 12mm beyond the edge of the planned cutout. Hold the inner frame on the inside at the intended position and check that all fastenings will be clear of any deck moulding radius in the build em, and that a flat bearing surface exists over the surface of the inner frame to ensure a good bolting down seal. (See sketch of Typical Cross Section.)

2) With a pencil mark out the cutout to the recommended dimensions shown.



SIZE	PORTLIGHT SIZE	DIMENSION A		DIMENSION B	
0	4" x 10"	150mm	5 1/8"	304mm	12"
1	5" x 12"	171mm	6 3/4"	347mm	13 5/8"
2	4" x 14"	185mm	6 1/4"	406mm	16"
3	5" x 15"	177mm	6 3/4"	429mm	
4	5" x 23"	177mm	6 3/4"	627mm	

3) Cut out to just inside of the pencil line using a suitable jig saw. It is important to make an accurate cut within the line. It may be necessary to ease/rasp out beyond this size to achieve the best possible fit of your Portlight. As production tolerances exist we advise that you measure your Portlight to check exactly the cutout sizing before you cut. (Remember the old adage: Measure twice, cut once).

4) Measure thickness of skin (and inner trim if fitted).

5) Clear away swarf, apply bedding compound to outer frame. Fit outer frame unit, and with inner frame in place (such that the butt joint is at the lower edge to allow for water drainage), bolt firmly up to a maximum torque of 25 in.lb (0.113 N.m.) from the centre working out to the edges using the bolts supplied. Make sure compound spreads out evenly on the outside of outer frame. Clean off surplus sealant compound.

Caution

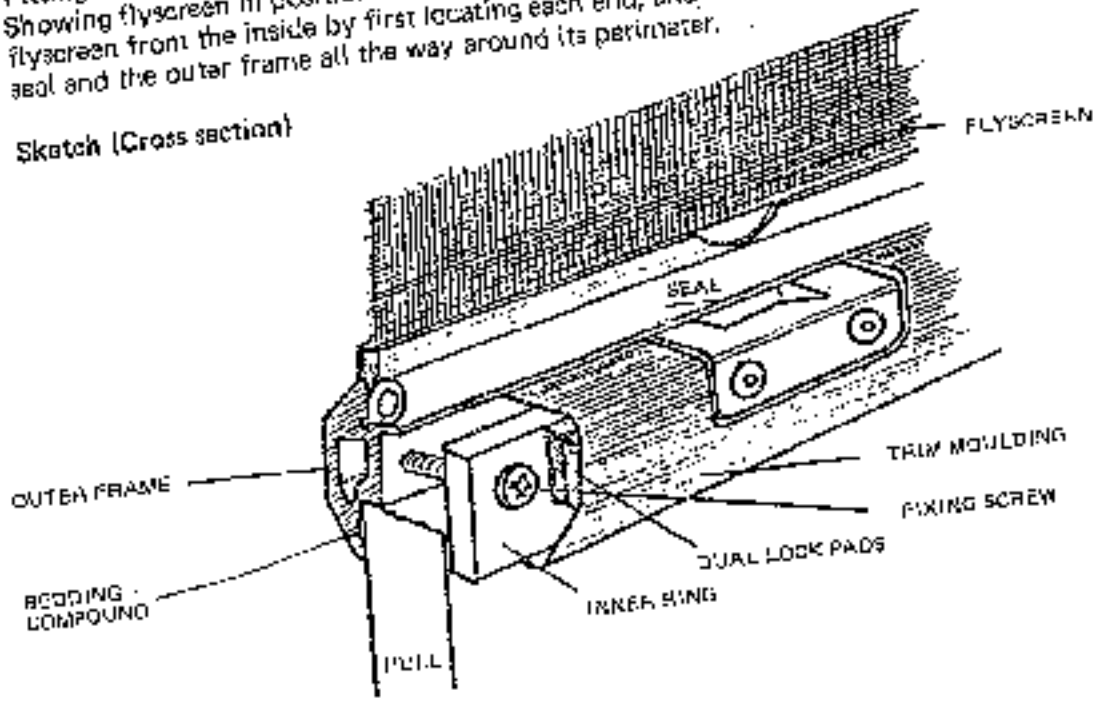
M5 screws supplied are for hull thickness 15–19mm. It is important that you use the correct length screw otherwise you will damage the portlight. Check depth of hull and select correct length of screw from table overleaf.

6) Adjust the trim moulding by cutting the inner edge only to suit, using fine toothed saw or tin snips, such that when in place the trim ring fixes to the 'dual lock' pads. Snap the trim mouldings into final position making sure the trim ring picks up the top dual lock pads and that the trim is fully home all around its perimeter. It is a simple matter to remove the trim ring by prising it away and refitting by snapping back onto the dual lock pads. On craft with considerable wrap/curvature or difficult inner trim it may be necessary to use more dual lock fixing, in which case use our spares kit. Alternatively, in extreme cases, it may be necessary to use screw fixings through the trim into the inner ring.

7) Check for correct operation

8) **Fitting Flyscreen**
Showing flyscreen in position – behind outer frame and in front of seal. Fit the flyscreen from the inside by first locating each end, and then easing it between the seal and the outer frame all the way around its perimeter.

Sketch (Cross section)



9) **M5 fixing screws**
For hull thickness

6 – 10mm	use M5 x 16,	Cat. 8991
11 – 14mm	use M5 x 20,	Cat. 8992
15 – 19mm	use M5 x 25,	Cat. 8993
20 – 24mm	use M5 x 30,	Cat. 8994
25 – 29mm	use M5 x 35,	Cat. 8995
30 – 34mm	use M5 x 40,	Cat. 8996

(supplied as standard)

Min. hull thickness 6mm. Max hull thickness 32mm.

10) **Spares:**
Spares are available, should damage occur. These include:

Portlight Size	Replacement Trim Mouldings	Replacement Flyscreen	Replacement Seals
4 x 10	8973	8980	8985
5 x 12	8974	8981	8986
4 x 14	8975	8982	8987
5 x 16	8970	8983	8988
5 x 23	8978	8984	8989

11) **Deadlight**
If a deadlight is required we suggest that the trim moulding be removed.

A plywood/aluminium/fibreglass plate be cut to cover the port (notched to clear hinges and locking handles), and drilled such that by using longer bolts it may be bolted on top of the aluminium frame.

Warning

Cleaning of portlight with all solvents could cause damage.

18 MONTH LIMITED PUMP WARRANTY

Johnson Pumps of America of 3700 North Rose Street, Schiller Park, Illinois 60 76 warrants to the original consumer purchaser that this bilge pump will be free from defects in material and workmanship, providing that the case is not opened or the pump otherwise abused for a period of eighteen (18) months from the date originally purchased.

The exclusive remedy of the consumer purchaser in the event the product does not meet the express Limited Warranty is to return the pump to Johnson at the above address. Freight prepaid with your sales receipt and $2.50 to help defray the cost of postage and handling. IMPORTANT: FOR THIS WARRANTY TO BE EFFECTIVE, JOHNSON MUST BE SUPPLIED WITH PROOF OF THE ORIGINAL PURCHASE DATE OF THE PUMP. THE ACCEPTANCE BY JOHNSON OF ANY PUMP RETURNED SHALL NOT BE DEEMED AN ADMISSION THAT SUCH PUMP IS DEFECTIVE OR IN VIOLATION OF ANY WARRANTY. THE COMPANY RESERVES THE RIGHT TO REPAIR OR REPLACE THE PUMP.

NO REPRESENTATIVE OR OTHER PERSON IS AUTHORIZED TO ASSUME FOR JOHNSON ANY ADDITIONAL LIABILITY IN CONNECTION WITH THE SALE OF ITS PRODUCTS OR TO ALTER THIS WARRANTY IN ANY WAY.

IN NO EVENT WILL JOHNSON PUMPS OF AMERICA BE LIABLE FOR MORE THAN THE SALES PRICE OF THE PUMP. UNDER NO CIRCUMSTANCES WILL JOHNSON BE LIABLE FOR ANY LOST PROFITS, INCIDENTIAL OR CONSEQUENTIAL COSTS, EXPENSES, OR DAMAGES. THE LIMITATION ON LIABILITY FOR LOST PROFITS, INCIDENTAL OR CONSEQUENTIAL COSTS, EXPENSES OR DAMAGES SHALL SURVIVE ANY FAILURE OF ESSENTIAL PURPOSE OF THIS LIMITED WARRANTY. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation may not apply to you.

NO EXPRESS OR LIMITED WARRANTY, INCLUDING WARRANTY OF MERCHANTABILITY AND FITNESS SHALL EXTEND FOR ANY PERIOD OF TIME GREATER THAN 18 MONTHS FROM THE DATE OF ORIGINAL PURCHASE OF THIS PRODUCT. Some states do not allow limitation on how long an implied warranty lasts so the above limitation may not apply to you.

CAUTION - Warranty void if seal on pump is broken, if any electric wire is cut back more than 3 inches, if electric splices become submerged, or if pump is installed contrary to instructions or warnings.

Bilge Pumps are designed to exhaust standing water only. These pumps are not intended for damage control. Bilge Pump capacities may not be sufficient to prevent flooding from rapid accumulation of water due to storms, rough weather and/or rapid leaks created by hull damages or unsafe navigational conditions.

JOHNSON PUMPS OF AMERICA

Mayfair Marine Division

3700 N. ROSE STREET

SCHILLER PARK, ILLINOIS 60176

P/N 52213

MAYFAIR

PRO LINE JETTISON

NMMA

BIA

Submersible Bilge Pumps

INSTALLATION INSTRUCTIONS

MUNSTER SIMMS
ENGINEERING LIMITED
Old Belfast Road, Bangor,
Co. Down, Northern Ireland
BT19 1LT.
Telephone: +44 (0) 247 270581
Telex: 747350
Fax: +44 (0) 247 466421

WHALE® GUSHER®10 MK3 PUMP

Models: BP2708 and BP3740

READ CAREFULLY BEFORE INSTALLATION AND USE

To the Fitter: Check that the product is suitable for the intended application, follow installation instructions and ensure operating instructions are passed on to the end user.

To the User: Read the following instructions carefully. (See parts diagram).

APPLICATION

This bilge pump is designed to exhaust standing water. Actual capacity depends on installation conditions and pumping rate. Users should be aware that capacity may not be sufficient to cope with rapid inflow of water.

It is intended for use for any other purpose or with any other liquid, it is the users' responsibility to ensure that the pump is suitable for the intended use and, in particular, that the materials are fully compatible with the liquids to be used. With all applications it is important that a system of safe working practice is applied to installation, use and maintenance.

INSTALLATION

The Gusher 10 is designed for mounting on or through deck, or on or through bulkhead. The handle can be fixed in four different positions relative to the inlet and outlet (see Fig. 1).

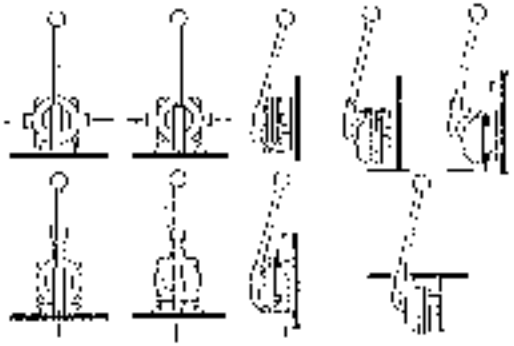


Fig. 1 Some of the many mounting arrangements possible with the standard pump.

To Reposition Handle:

a) Slacken worm drive clip and remove diaphragm.

b) Undo the bolts from bracket and rotate body to new position relative to the fork and diaphragm. Note: inlet and outlet are always at 180 to each other.

c) Reassemble bolts washers and securing bushes in bracket and tighten.

Select a suitable position free from obstructions where the pump can be operated efficiently and comfortably.

Avoid installations which require a cocktail locker to be opened in order to operate the pump.

To minimise pumping effort, site the pump halfway (in height) between the strum box/strainer and hull outlet.

To ensure good priming and flow, avoid sharp bends in pipework and fit a Whale strum box/strainer (incorporating a non-return valve) which prevents the end of the hose sucking against a flat surface and allows the water level to be sustained to a minimum.

Ensure that the pump is installed to allow easy access for servicing.

For Mounting On Deck/Bulkhead:

1. Using pump as template, mark off and drill four 1/4" (6mm) holes.

Fig. 2

2. Check flow direction and secure the pump with 1/4" (6mm) bolts.

3. Attach 1 1/2" (38mm) smooth bore reinforced hose with stainless steel worm drive hose clips. Tighten clips to prevent air leaks.

4. With thru-hull discharge, make sure that the discharge point is well above the water line.

5. Check the installation for air leaks, correct priming and discharge.

For Mounting Underdeck or Through Bulkhead:

Three deck plates are available see ACCESSORIES.

1. Using template mark off the 4 holes for the mounting and cut out the hole for the pump handle. Round off top edge of large hole as shown in fig. 3.

DECK-FITTING FOR GUSHER PUMPS
(NOT TO SCALE) SHOWN ELEVATION OF DECK-FITTING, POWER & DRAUGHT

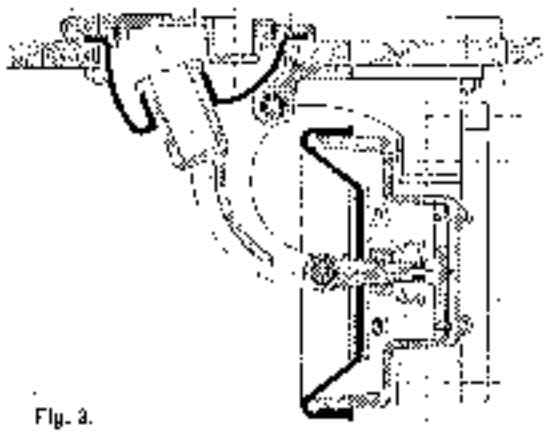


Fig. 3.

2. Minimum deck thickness required is 1/4" (6mm). For thinner decks use a backing plate of such a thickness so that the backing plate plus the deck is at least the minimum thickness and no greater than 1" (25mm). Bond the backing plate to the deck.

   Note: If using deck plate DP3904 minimum deck thickness is 1/2" (13mm).

3. Position pump under deck and check flow direction. Work the rubber gaiter up through the hole until its flange rests on the deck. Secure the six 1/4" (6mm) countersunk mounting screws provided.

4. As points 3, 4 and 5 of previous instructions.

OPERATION

The Gusher 10 ensures efficient throughput with an easy pumping action. Full even strokes will obtain the best results. The detachable handle is fitted with a lanyard and should be safely secured close to the pump.

Performance Table

WHALE GUSHER 10 MK3
OUTPUT AT 1m LIFT AND 0.5m HEAD

OUTPUT	AT 80 STROKES/MIN.	AT 60 STROKES/MIN.
GALLONS/MIN	15.8	18.7
LITRES/MIN.	71.8	85.0

Performance data is based on factory tests and is typical of what may reasonably be achieved. Actual performance may vary depending on installation and operating conditions.

MAINTENANCE

Inspection:
Regular inspection of the pump is recommended. Rubber components should be replaced if worn or every three years regardless of condition.

Replacement components and Service Kits (SK3708 for clean bilge water and SK3714 for oily bilge water) are available from dealers or direct from the manufacturer. It is recommended that a service kit is kept on board.

Winterising:
At the end of the season, drain all the water in the pipework and pump chamber.

Changing The Diaphragm and Valves:

1. Slacken and remove the worm drive clip to release the diaphragm.
2. Remove diaphragm nut and remove diaphragm plates and diaphragm.
3. Replace old inlet and outlet valves. Note: both inlet and outlet valves are same shape. The Service Kits contain two sets of valves, the round shaped valves are for the MK2 pump and the square shaped valves are for the MK3 pump. DO NOT mix the valve types!
4. Replace diaphragm, and tighten wormdrive clip in position and test for correct priming and discharge.

ACCESSORIES:

*DP3604 - Alloy deck plate with lid.
*DP3020 - Polished alloy deck plate.
*DP8900 - Plastic deck plate.
*SF5425 - Skin fitting.
*SB5865 - Top entry strum box/strainer.
*SB4222 - Side entry strum box/strainer.
*DV5606 - 2-way diverter valve.
*SB3488 - 90 elbow (male to female).
*LV1215 - In-line non-return valve.
*SK3708 - Service Kit Neoprene.
*SK3714 - Service Kit Nitrile.

HELPFUL HINTS

(a) Pump fails to prime or chokes:
— Check inlet hose connection is airtight, free from blockages, and does not collapse during the suction stroke.
— Inspect inlet and outlet valves for blockages. Clear with finger or screwdriver and test.
— Inspect diaphragms — replace if damaged.
— Solid objects in the body of the pump may not prevent its operation but should be removed to prevent damage.

WARRANTY

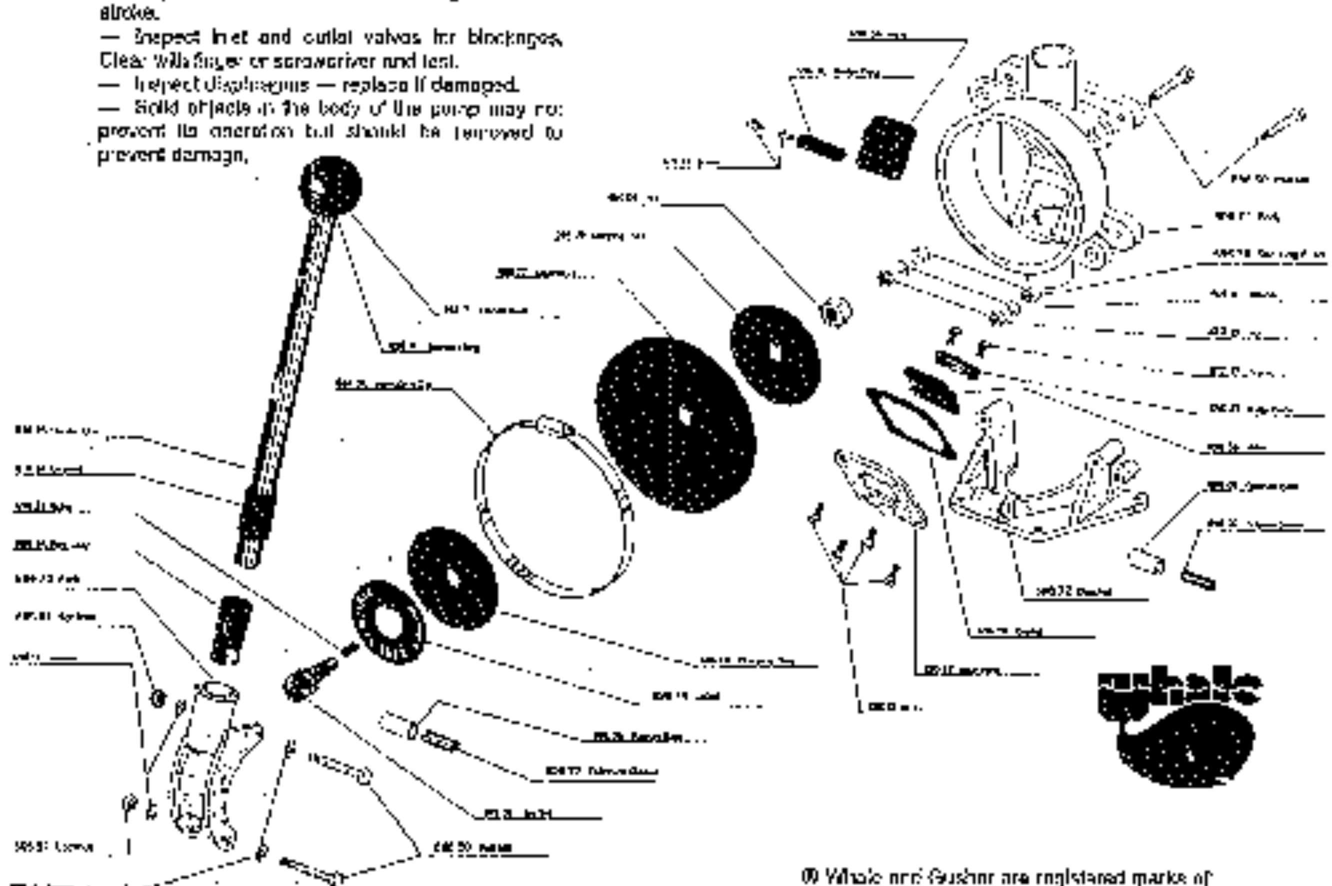
Whale pumps are guaranteed for one year from date of purchase against defects in materials and workmanship. If the unit proves faulty, return it to your supplier with proof of purchase and purchase date.

The manufacturer retains the right to repair or replace the unit.

The manufacturer cannot be held responsible for claims arising from incorrect installation, unauthorised modification or misuse of the product.

The above does not affect your statutory rights.

WHALE and Gusher are registered trade marks of Munster Simms Engineering Ltd.



100.07 V6/90

is where the wire from the speaker will go through the bulkhead.

Feed the wire coming from the back of the speaker through the Redline gasket, through the spacer and then through the 1/4" hole in the panel.

Apply a thin film of non-corrosive Silicone Bedding (GE Silicone II or equal) to the back of the mounting spacer.

Secure the speaker to the mounting surface with the four stainless screws provided. Do not overtighten.

After the speaker is mounted by either of the above methods, press the four plastic plugs (provided) into the screw holes on its face. This will hide the screws and provide a clean look to the speaker.

Microphone Mounting Plate

Select a convenient location on the instrument panel for the mounting the microphone and connecting it to the RT-80. The microphone connecting cable is permanently attached to the back of the RT-80. This cable is approximately 10 feet in length and has an eight pin male connector attached to it. This connector is designed to mount onto the Microphone Mounting Plate (supplied) and to mate with the eight pin female connector on the end of the cable attached to the microphone.

A single 3/4" hole and four 1/16" holes must be drilled through the panel where the microphone will be connected to the RT-80.

A full size drilling template is provided in the back of this manual. This 3/4" hole must be located in such a position that the connector attached to the RT-80 cable will reach (remember it's about 10 feet long), and pass through the hole. A brushed Stainless Steel plate is provided to which the connector from the RT-80 is attached.

Remove the nut and the washer from the connector, pass the connector through the hole in the supplied plate from the back of the plate, and first place the washer and then the thread the nut onto the connector. Gently tighten the nut to secure the connector to the panel using a spanner wrench or long nose pliers. Do not overtighten.

Coil any excess wire. **Do Not Cut the Cable!!!**

Secure the plate to the bulkhead using the #6 sheet metal screws provided.

Plug the microphone into the connector just installed and place the microphone into the hanger on the plate.

Electrical Wiring

Power Input

The 12 VDC power is supplied to the RT-80 through RED and BLACK #12 AWG wires permanently attched to the RT 80. The RED wire should be connected to the ship's power circuit breaker/fuse panel. It should be protected by using either a 10 ampere circuit breaker or fuse.

The BLACK wire should be connected to the ship's negative power buss. Both of these wires should be cut as short as possible to minimize the voltage drop.

RF Output

The RF output to the antenna is supplied through a coaxial cable/connector that is permanently attached to the RT-80. This cable is approximately one foot in length and is black in color.

The coaxial cable from the antenna should be terminated with a PL-259 coaxial connector. This connector from the antenna should be screwed onto the RF output connector of the RT-80 and secured to prevent damage from vibration and chaffing.

Speaker Wiring

There are three different speakers that can be connected to the RT-80.

The VIGIL **Panel Speaker** (supplied) is used for all normal communications and for hearing the intercom audio from the remote speaker.

An optional **Hail Speaker** can be installed for Hailing and is only used in the Hail Mode.

The optional remote VIGIL Intercom Speaker is used as the remote intercom and is used only in the ICM mode as both a speaker and microphone for the remote station.

Installation

All speaker wiring permanently attached to the RT-80 is contained in a multi-conductor cable that contains six color coded wires. They are connected as follows:

The Panel Speaker, previously installed, should be connected to the Red and Black wires within the multi-conductor cable coming from the RT-80. The leads coming from the speaker are also Red and Black. Connect red to red and black to black.

Warning!!!

Do Not connect these leads to the RED and BLACK heavy (#12 AWG) Power Cable previously connected as damage to either the Radio or Speaker could result.

If you are using the optional Hall Speaker it should be connected to the White and Green leads in the multi-conductor cable.

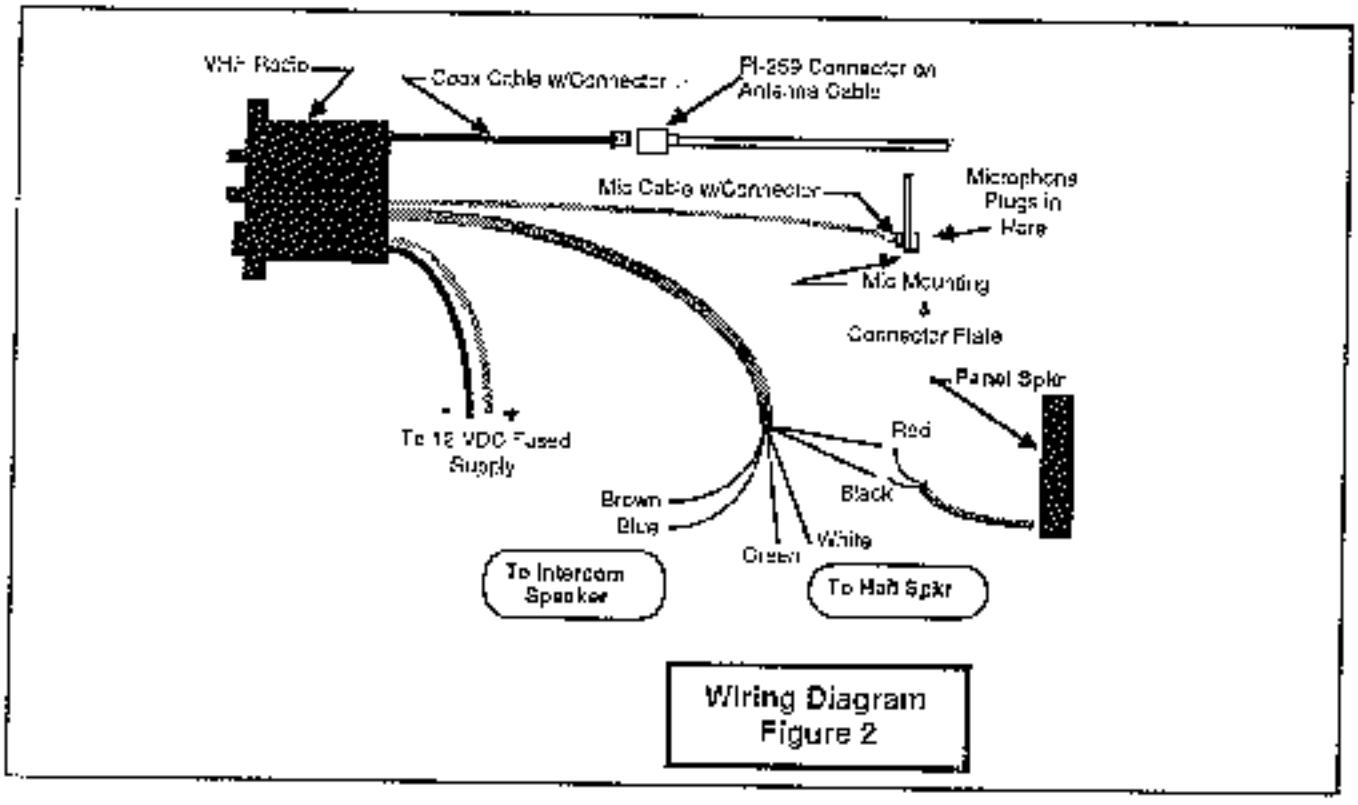
If you are using the optional Intercom Speaker it should be connected to the Brown and Blue leads in the multi-conductor cable.

The microphone connector comes prewired and only needs to be mounted in a convenient location as previously described. The following wiring information is provided only for reference.

Pin No.	Function
1	Privacy
2	DO
3	DI
4	SCL
5	Headphone Audio
6	Ground
7	+8 VDC
8	Microphone Audio and Push to Talk

A full wiring diagram is shown in figure 2.

This completes the installation of the RT-80.



Wiring Diagram
Figure 2

Operation

General

The VIGIL RT-80 is an easy to operate, full function VHF Radio with many features unavailable in any competitive unit. After you learn the purpose of each knob and button you will find the RT-80 operation truly functional and straightforward. Please refer to Figure 3.

Power On

Rotate the Function Knob to NORM to apply power to the unit. The radio will power up to it's previous operational channel.

Normal Mode

The NORM mode is used for all normal communications. This is the mode that is used for simple two-way radio communications.

Volume

Rotate the Volume Knob clockwise to increase the audio volume. Rotating the Volume Knob counterclockwise will decrease the volume.

Squelch

Rotating the Squelch Knob clockwise will increase the squelch threshold, decreasing the receiver sensitivity. This will cause the receiver to be quieted until a signal of sufficient strength is received.

Rotating the Squelch Knob counterclockwise will decrease the squelch threshold, increasing the receiver sensitivity. At the lowest squelch setting (fully counterclockwise) the receiver sensitivity will be maximum, the audio will be turned on (even with no signal being received) and the receiver noise will be heard.

The squelch should normally be increased until the background noise just disappears when no signal is present. If you are trying to receive an extremely weak signal, the squelch should be set at its minimum position (fully counterclockwise).

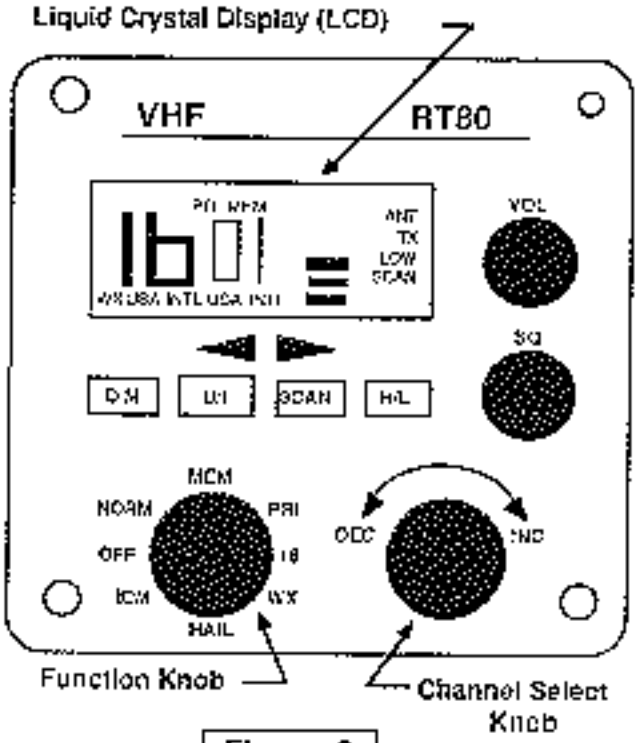


Figure 3

Channel Selection

The RT-80 will power on with the last used channel displayed. Rotate the Channel Select Knob either clockwise to increase the channel number or counterclockwise to decrease the channel number. The selected channel will be displayed in the left side of the Liquid Crystal Display (LCD).

Channels that cannot be used (by law) will be skipped automatically as the channel knob is rotated.

The relative strength of the received signal will be indicated by the horizontal bars on the LCD. The more bars seen, the stronger the signal.

Transmitting

Pressing the microphone Push-to-Talk button will place the RT-80 into the transmit mode. The TX annunciator will be displayed on the LCD. Pressing the HI/L button prior to Transmitting will change the power to either 1 or 25 watts and will be discussed fully in a later section.

The RT-80 has a built in Antenna Fault detector. If the connection to the Antenna is either open or shorted, or if the antenna is defective, the ANT fault Annunciator will be displayed. Note that this functions *only* when transmitting.

Before transmitting, please read the OPERATING TECHNIQUES section of this manual carefully.

Memory Mode

The MEM mode will probably be your most used mode of operation. Turn the Function Knob to the MEM position. The MEM Annunciator will be dis-

played. When the RT-80 is first used, the 20 memories available will be empty and must be programmed by the user. An empty memory is indicated by "--" in the LCD display.

Programming the Memory

To program a memory, first select the desired memory number (1-20) in the smaller right most digit pair. This is done by turning the Channel Select Knob either CW or CCW until the desired memory number is indicated. Then press the button below the Left Arrow (<) to activate the "left window". The display will indicate "00" and flash indicating that the "Program Mode" is active and input by the user is anticipated.

Then rotate the Channel Select Knob until the desired channel is indicated in the Left Window. If it is desired, an International Channel may be programmed by pressing the U/I (US/ International) Button (Same as Left Arrow <). When the desired channel is set into the left window, press the button below the Right Arrow (>). This will install the channel selected into the memory number selected and return you to the Memory Number Mode. To program additional channels into memory, repeat the above procedure for each of the 20 available memories.

After programming the memories, whenever the MEM mode is selected, these channels will be recalled in the corresponding memory number.

Pressing the SCAN button while in the MEM mode will initiate Memory Scan. This is described in full detail in the SCAN section of this manual.

Pressing the H/L button will change the transmit power (1 or 25 watts) just as in the NORM mode.

Pressing the Mic Push-to-Talk button will cause the RT-80 to TRANSMIT.

In short, the MEM mode will do everything that can be done in the NORM mode, but it is done more conveniently. The MEM mode allows the most often used channels to be more quickly selected and scanned.

Priority Mode

The PRI mode allows simultaneous monitoring of any two channels programmed by the user. After they have been programmed, these two channels are monitored automatically when the PRI Scan mode is selected. With both channels displayed on the LCD, it is always simple to see what channels are being monitored.

To program the channels, turn the Function Knob to PRI. The PRI Annunciator will be displayed. To change the Priority Channel turn the Channel Select Knob as usual. To change the Normal Channel press the button below the Left Arrow (<). The Left Display will flash. Rotating the Channel Select Knob will change the channel indicated (and thus selected). Pressing the U/I button will allow the user to select either a US or International Channel.

Pressing it again will change the US/INTL in the Normal display. Another press will change the Normal back to its previous state. Pressing it again will change the Priority channel back to its previous state.

This can be continued until both the Normal and Priority displays indicate US or INTL as desired.

After the two channels are programmed as desired, pressing the button below the Right Arrow (>) will Exit the Setup mode and will shift the Channel Select back to the right most display.

Pressing the SCAN button will begin the Normal/ Priority scan.

16 Mode

The 16 mode is intended as a quick way to immediately select channel 16 as the active channel. To get to the Calling and Distress channel simply turn the Function Knob to 16. In this mode the Channel Select is disabled. Transmitter operation is the same as normal.

WX Mode

To receive a weather broadcast turn the Function Knob to WX. Rotate the Channel Select Knob till the Weather Channel desired (0-9) is displayed on the LCD. In addition, the LCD will display the WX Annunciator below the channel selected.

Pressing the SCAN button will begin a scanning of all weather channels.

HAIL Mode

Selecting the HAIL function, by turning the Function Knob to HAIL, allows the microphone to be used as a power hailer. The display will indicate HAIL when the RT-80 is in this mode.