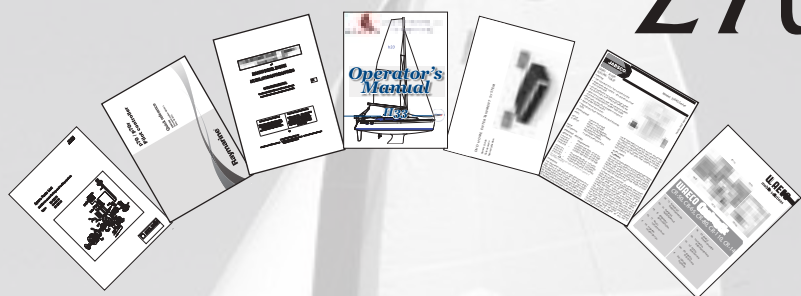




# HUNTER

## 27te

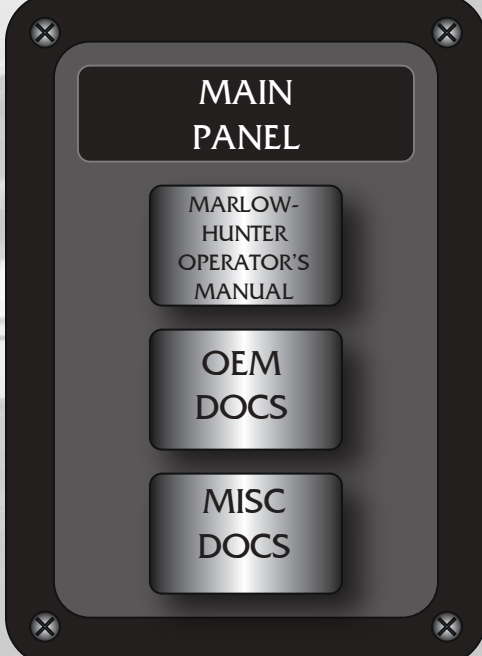


# DOCUMENT FINDER

*New Hunter Boat Owner?*  
*Click on the Balloons!*



The blue balloon is tied to a small illustration of a still life with wine bottles and glasses. The purple balloon is tied to a small illustration of a document with a red header and green bars.



**MAIN PANEL**

- MARLOW-HUNTER OPERATOR'S MANUAL
- OEM DOCS
- MISC DOCS

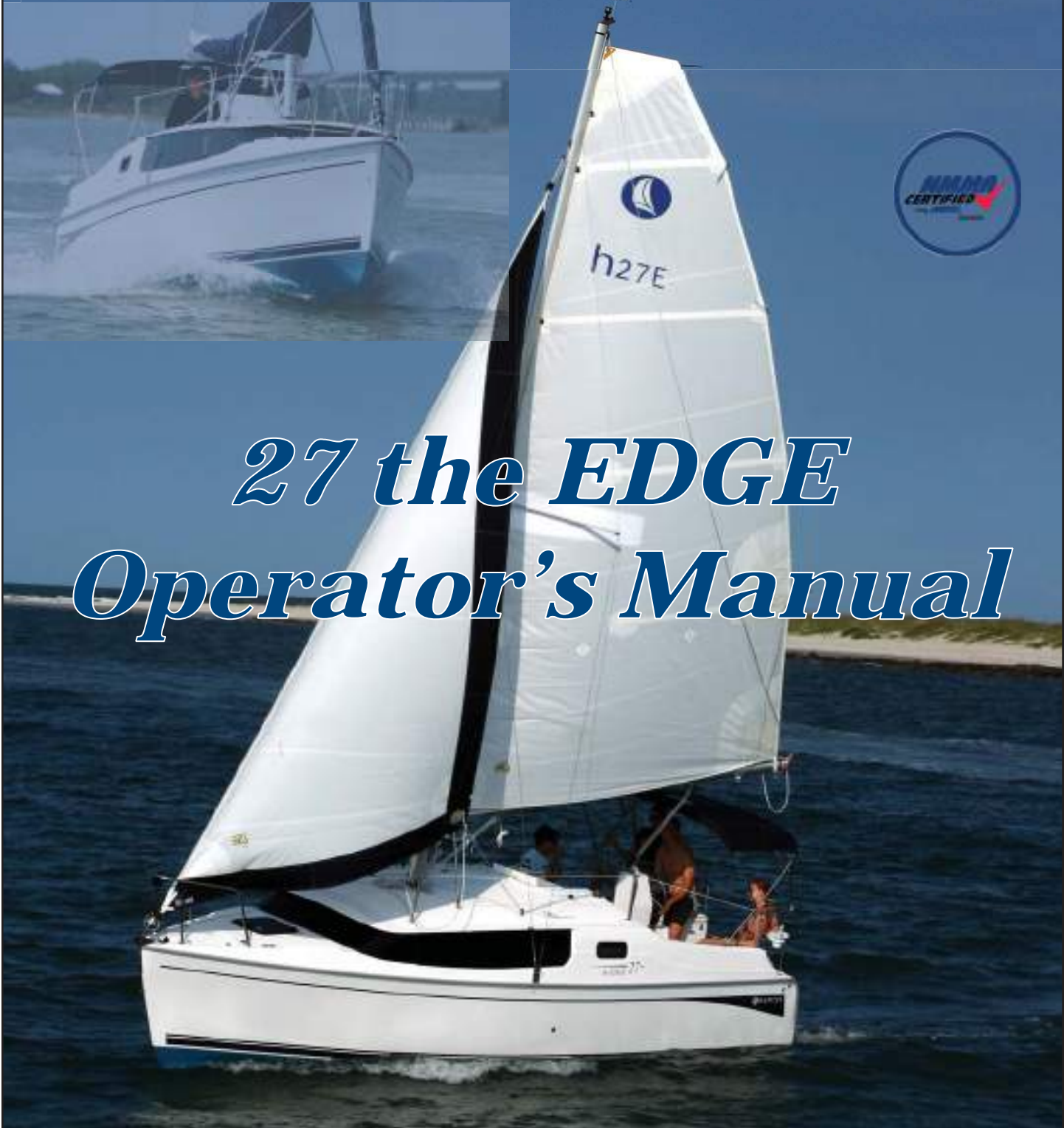


MARLOW-HUNTER, LLC

*"Life Begins at 40"*  
1973-2013



*27 the EDGE*  
*Operator's Manual*



# HUNTER 27 theEDGE OPERATOR'S MANUAL

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# HUNTER 27 theEDGE OPERATOR'S MANUAL

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# 1. WARRANTY REGISTRATION FORM

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## WELCOME TO THE MARLOW-HUNTER FAMILY

Congratulations on ownership of your boat theEDGE, manufactured by Marlow-Hunter, LLC. We have engineered and constructed your boat to the high standards of Marlow-Hunter, the NMMA, and the ABYC. In order to experience the best performance and most enjoyment from your boat you should be familiar with its various elements and their functions. For your boating pleasure and safety, please take time to study this manual.

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

In addition, please complete the warranty cards for your engine, stove, head, electric water pump and other accessories. These are enclosed in the manufacturers' manuals that are included with your Operator's Manual. This manual has been compiled to help you operate your boat properly and safely. It contains details of the boat, equipment supplied or fitted, systems, and information on operation and maintenance. Please read it carefully, and familiarize yourself with the boat before using it. If this is your first sailboat, or you are changing to a type of boat with which you are not familiar, please ensure that you obtain proper handling, safety and operating experience before you assume command of the boat. Your dealer, national sailing federation or yacht club can advise you of local sea schools or competent instructors, such as the ASA ([www.ASA.com](http://www.ASA.com)) or US Sailing ([www.USSailing.org](http://www.USSailing.org)). In addition, the US coast guard can be contacted for important boating and safety information at <http://nws.cgau.org>.

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

---

### OWNER INFORMATION CARD

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

HULL NO.		DATE DELIVERED TO OWNER	
YACHT NAME			
OWNER NAME			
STREET ADDRESS			
CITY	STATE/COUNTRY	ZIP CODE	
HOME PORT			
ENGINE MODEL	SERIAL NO.	PROPELLER SIZE	
DEALER	PHONE		
STREET ADDRESS			
CITY	STATE/COUNTRY	ZIP CODE	

---

## 2. LIMITED WARRANTY

---

Marlow-Hunter offers a limited warranty on every Hunter boat sold through an authorized Hunter dealer. A copy of this warranty is included here, and in your User's Manual. If for some reason you are not able to understand, read, or view this manual, please contact your local dealer for a replacement copy.

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

The following warranties apply to all 2013 Model Year boats produced by  
MARLOW-HUNTER, LLC:

### LIMITED ONE-YEAR WARRANTY

Marlow-Hunter warrants to the first-use purchaser and any subsequent owner during the limited warranty period that any part manufactured by Marlow-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, as the sole and exclusive remedy, Marlow-Hunter's obligation under the warranty is limited to the repair or replacement of any such defective part.

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

Marlow-Hunter warrants to the first-use purchaser and any subsequent owner during the limited 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 Marlow-Hunter are not covered by this limited warranty. As the sole and exclusive remedy, Marlow-Hunter's obligation under the warranty is limited to repair or replacement of any such defective part.

Marlow-Hunter also warrants to the first-use purchaser and any subsequent owner during the limited warranty period that the boat will be free from gelcoat 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, Marlow-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 Marlow-Hunter from time to time; however, if the repair is performed by a non-Hunter dealer, the repair cost must be authorized by Marlow-Hunter in advance and be based on a reasonable number of hours as determined by Marlow-Hunter. Marlow-Hunter will not pay transportation, hauling, launching, bottom paint, storage, dockage, cradling rental, rigging and derigging, or other similar costs. It is recommended that the repair be done during a seasonal haul-out for service or storage.

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

## 2. LIMITED WARRANTY

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

**MARLOW-HUNTER, LLC EXPRESSLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS. NEITHER MARLOW-HUNTER, LLC NOR THE SELLING DEALER SHALL HAVE ANY RESPONSIBILITY FOR LOSS OF USE OF A BOAT, LOSS OF TIME, INCONVENIENCE, COMMERCIAL LOSS, OR CONSEQUENTIAL DAMAGES.**

### VOIDED WARRANTIES

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 Operator's Manual are not followed according to Marlow-Hunter's required bottom preparation procedures.

### RESTRICTIONS APPLICABLE TO WARRANTIES

These limited warranties do not cover:

1. Paint, sealants, adhesives, 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 MARLOW-HUNTER. Any warranty made and issued by the manufacturer of such items will be, if and where available, provided 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.

## 2. LIMITED WARRANTY

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THESE LIMITED WARRANTIES ARE YOUR SOLE AND EXCLUSIVE REMEDIES AND ARE EXPRESSLY IN LIEU OF ANY AND ALL OTHER REMEDIES AND WARRANTIES EXPRESSED AND IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHETHER ARISING BY LAW, CUSTOM, CONDUCT, OR USAGE OF TRADE. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. IN THE EVENT THAT IMPLIED WARRANTIES ARE FOUND TO EXIST UNDER THE LAW OF A PARTICULAR STATE, NOTWITHSTANDING THE EXCLUSION CONTAINED HEREIN, THE DURATION OF ANY SUCH IMPLIED WARRANTY SHALL BE LIMITED TO THE DURATION OF THE APPLICABLE LIMITED WARRANTY STATED HEREIN. THE PURCHASER ACKNOWLEDGES THAT NO OTHER REPRESENTATIONS WERE MADE TO HIM OR HER WITH RESPECT TO THE QUALITY OR FUNCTION OF THE BOAT. ANY ORAL STATEMENT OR PRINTED MATERIAL ADVERTISING THE BOAT WHICH SPEAKS TO ANY PERFORMANCE CHARACTERISTIC OF THE BOAT OR ANY OF ITS COMPONENTS SHALL BE CONSIDERED AND CONSTRUED AS AN ESTIMATED DESCRIPTION ONLY AND SHOULD NOT BE RELIED UPON AS AN EXPRESS WARRANTY OR AS THE BASIS OF THE BARGAIN FOR THE BOAT OR ANY OF ITS COMPONENTS.

ANY CONSEQUENTIAL, INDIRECT OR INCIDENTAL DAMAGES WHICH MAY BE INCURRED ARE EXCLUDED AND PURCHASER'S REMEDY IS LIMITED TO REPAIRS OR REPLACEMENT OF ANY PART(S). SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL OR INDIRECT 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.



## 2. LIMITED WARRANTY

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### OWNER INFORMATION CARD

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

HULL NO. \_\_\_\_\_

DATE DELIVERED TO OWNER \_\_\_\_\_

YACHT NAME \_\_\_\_\_

OWNER NAME \_\_\_\_\_

STREET ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE/COUNTRY \_\_\_\_\_ ZIP CODE \_\_\_\_\_

HOME PORT \_\_\_\_\_

ENGINE MODEL \_\_\_\_\_ SERIAL NO. \_\_\_\_\_ PROPELLER SIZE \_\_\_\_\_

DEALER PHONE \_\_\_\_\_ PHONE \_\_\_\_\_

STREET ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE/COUNTRY \_\_\_\_\_ ZIP CODE \_\_\_\_\_

CUSTOMER SERVICE / WARRANTY \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## 2. LIMITED WARRANTY

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### WARRANTY REGISTRATION

These limited warranties shall not be effective unless the MARLOW-HUNTER Warranty Registration Form and Pre-Delivery Service Record, which are furnished with each new boat, are filled out completely and returned to MARLOW-HUNTER within ten (10) days of delivery.

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

All repairs and/or replacements will be made by an authorized Hunter dealer, or at the option of Marlow-Hunter, at the Marlow-Hunter plant. If the repairs are of such a nature that the warranty work must be performed at the MARLOW-HUNTER plant, transportation costs to and from the MARLOW-HUNTER plant shall be paid by the owner. The labor cost reimbursement will be based on a Labor Allowance Schedule established by MARLOW-HUNTER and where not applicable, on a reasonable number of hours as determined by MARLOW-HUNTER. Any repairs and replacements must be approved in advance by an authorized MARLOW-HUNTER service representative.

### TRANSFER OF LIMITED WARRANTIES

For 1995 and later 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 Marlow-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.

Marlow-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.

## 2. LIMITED WARRANTY

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### SAMPLE FORM LETTER

March 12, 2008

Mr. John Smith  
1456 Joy Street  
Sarasota, FL 34266

Dear Mr. Smith,

Thank you for providing written notice of transfer of ownership. We are pleased you have selected a Hunter sailboat, and we will make every effort to assure Hunter ownership will be a satisfying experience for you.

Based on the information you have provided, we are pleased to notify you of the expiration dates of the limited warranties:

- The limited **one-year** New Boat warranty expires (d)\_\_\_\_\_.
- The limited **five-year** Hull Structure and Bottom Blister warranty expires (d)\_\_\_\_\_.

Should you require assistance at any time during ownership, we encourage you to contact your Hunter dealer or to call us directly at 386-462-3077.

Please confirm the information at the bottom of the page and advise us if any corrections are required.

\_\_\_\_\_  
Customer Service Manager

-----  
Hull No: HUN\_\_\_\_\_ Model:\_\_\_\_\_

Telephone: (H)\_\_\_\_\_ (B)\_\_\_\_\_

Date of Purchase:\_\_\_\_\_

Purchased From: Name:\_\_\_\_\_

Address:\_\_\_\_\_

City/State\_\_\_\_\_ Zip\_\_\_\_\_

Country\_\_\_\_\_

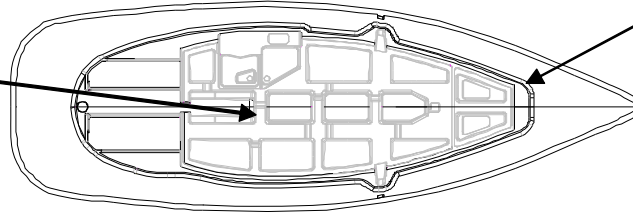
( ) Private Owner

( ) Dealer

## 2. LIMITED WARRANTY

### GRAPHIC EXPLANATION OF WARRANTY COVERAGE

Internal fiberglass pan and fiberglass grid system are covered by the five-year limited warranty.



All fiberglass tabbing, overlays, adhesives, epoxy and secondary bonding are covered only by the one-year limited warranty. They are not covered by the five-year limited warranty.

Footnote 1. All wooden bulkheads, modular components, floors, floor supports, paneling, trim, coring materials, faceplates, countertops, fiberglass tabbing, overlays, secondary bonding, sealants, adhesives, gaskets and epoxies are covered only by the one-year limited warranty. They are not covered by the five-year limited warranty.

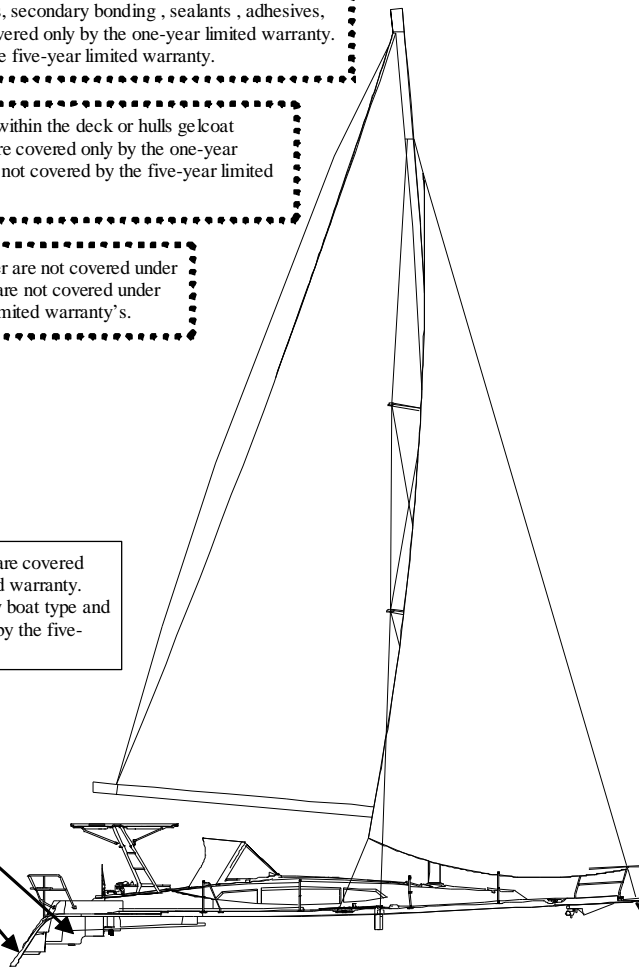
Footnote 2. Voids located within the deck or hulls gelcoat surface or build laminate are covered only by the one-year limited warranty. They are not covered by the five-year limited warranty.

Footnote 3. Keel and rudder are not covered under the blister warranty. They are not covered under the one-year or five-year limited warranty's.

Deck and deck floor-pans are covered only by the one-year limited warranty. Floor-pan sizes will vary by boat type and size. They are not covered by the five-year limited warranty.

Internal fiberglass pan and fiberglass grid system are covered by the five-year limited warranty.

Rudder, keel and centerboards (small boats) are excluded from all warranties. Keel and centerboard leaks at the attachment point are excluded from all warranties.

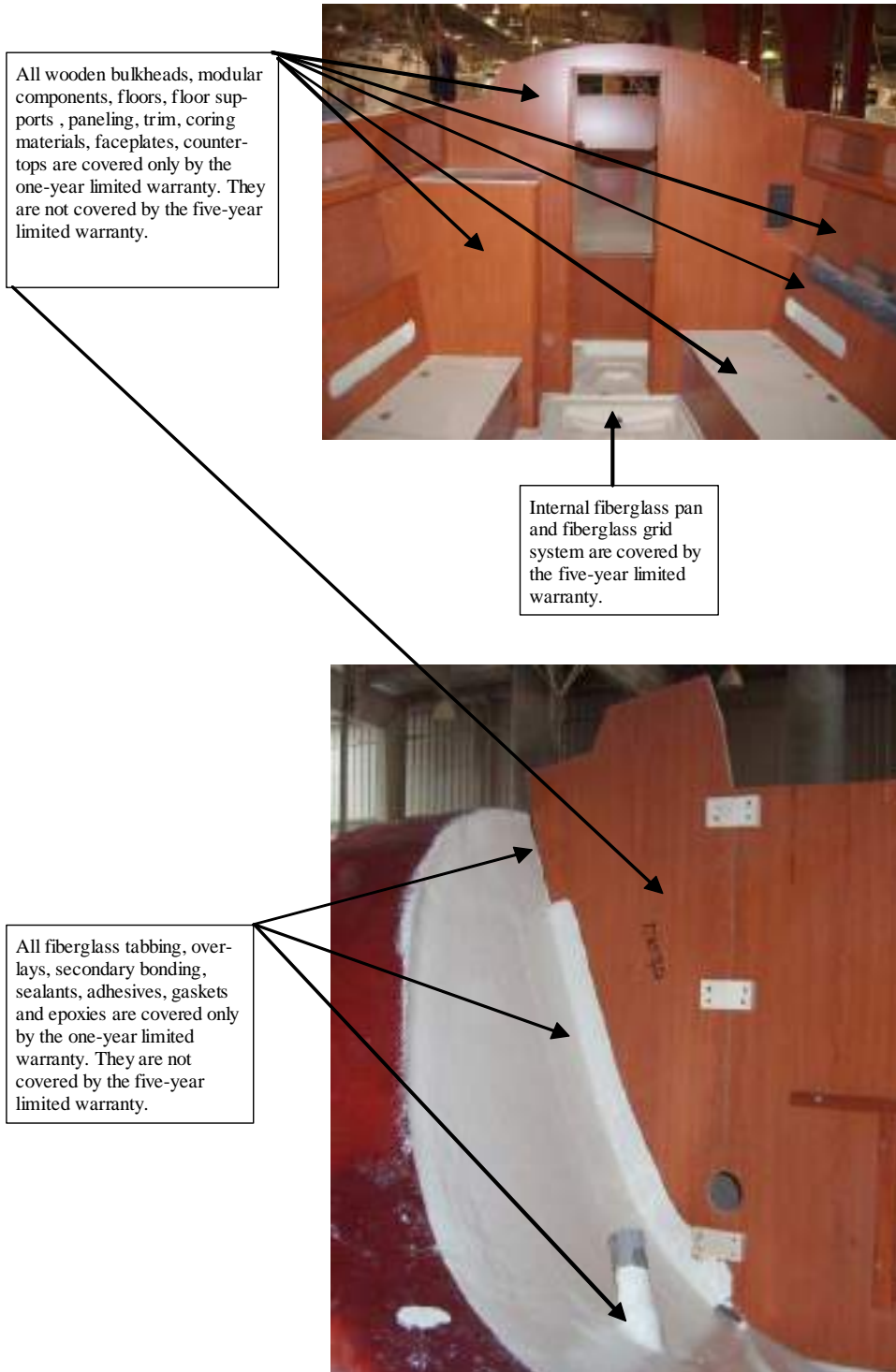


Hull to deck joint adhesives, epoxies and sealants are covered only by the one-year limited warranty. They are not covered by the five-year limited warranty.

The fiberglass hull component is covered by the five-year limited warranty. Installed items such as (but not limited to) ports, shafting, thru-hulls, vents and struts are not covered by the five-year limited warranty. The rudder and keel are excluded from all warranties.

## 2. LIMITED WARRANTY

### GRAPHIC EXPLANATION OF WARRANTY COVERAGE



## 3. CERTIFICATION

---

### CE CERTIFIED

Hunter sailboats are manufactured in the United States and are certified by the IMCI to be in compliance with the relevant parts of the Recreational Craft Directive 94/25/EC from the European Parliament. The CE mark means the boat meets or exceeds the applicable current International Organization for Standardization (ISO) standards and directives as stated on the CE certificate supplied with your craft. The builder's plate, affixed to the boat, describes various parameters involved in the design of the boat. Please refer to it regularly when operating the boat.

Following are the Design Categories, established by the Recreation Craft Directive, which are to be considered a guideline of use application as per the Recreation Craft Directive's criteria. Marlow-Hunter, LLC does NOT establish these criteria, and the category indicated is only a reference to the assigned category. The safety of the captain and crew of any vessel is not measurable by such categories, and you should not interpret these categories as an indication of your safety in such condition. The skill of your captain and crew, proper preparation, appropriate safety equipment for the given conditions and a well maintained vessel are critical to safe sailing.

### CE CRAFT DESIGN CATEGORIES

Category A- "Ocean":

Craft designed for extended voyages where conditions may exceed wind force 8 (Beaufort Scale) and include significant wave heights of 4m or more; for vessels that are largely self-sufficient.

Category B- "Offshore":

Craft designed for offshore voyages where conditions include winds up to and including wind force 8 and significant wave heights up to and including 4m may be experienced.

Category C- "Inshore":

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

Category D- "Sheltered Waves":

Craft designed for voyages on small lakes, rivers and canals, where conditions up to and including wind force 4 and significant wave heights up to and including 0.5m may be experienced.

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

### NMMA CERTIFIED

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

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

## 4. GLOSSARY OF SAILING TERMS

---

### A

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

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

**Abeam:** at right angles to the centerline of the boat.

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

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

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

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

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

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

### B

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

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

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

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

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

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

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

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

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

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

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

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

place on board.

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

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

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

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

**Bottlescrew:** see Rigging screw.

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

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

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

### C

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

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

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

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

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

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

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

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

**Chart datum:** reference level on a chart below which the tide is unlikely to fall. Soundings are given below chart datum. The datum level varies according to country and area.

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

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

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

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

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

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

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

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

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

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

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

**Centerboard:** centerboard is retractable. The mechanism of centerboard allows the keel to be raised to operate in shallow waters.

### 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 life raft to retard drift.

## 4. GLOSSARY OF SAILING TERMS

---

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

### E

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

### F

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

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

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

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

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

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

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

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

### G

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

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

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

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

**Goosewing:** to boom-out the headsail to windward on a run by using a whisker pole to hold the sail on the opposite side to the mainsail.

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

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

**Gudgeon:** a rudder fitting. It is the eye

into which the pintle fits.

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

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

### H

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

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

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

**Hawes pipe:** see Navel pipe.

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

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

**Heads:** the toilet.

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

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

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

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

### I

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

### J

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

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

### K

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

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

### L

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

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

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

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

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

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

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

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

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

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

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

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

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

### M

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

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

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

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

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

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

### N

**Navel pipe:** a metal pipe in the foredeck



## 4. GLOSSARY OF SAILING TERMS

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through which the anchor chain passes to the locker below.

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

### O

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

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

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

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

### P

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

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

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

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

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

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

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

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

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

### Q

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

### R

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

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

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

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

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

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

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

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

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

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

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

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

### S

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

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

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

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

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

**Serving mallet:** tool with a grooved head,

used when serving a rope to keep the twine at a constant and high tension.

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

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

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

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

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

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

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

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

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

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

**Split pin:** see cotter pin.

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

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

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

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

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

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

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

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

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

**Stem:** the timber at the bow, from the keel

## 4. GLOSSARY OF SAILING TERMS

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upward, to which the planking is attached.

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

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

### T

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

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

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

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

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

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

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

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

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

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

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

### Track:

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

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

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

**Trim:** 1, to adjust the angle of the sails, by means of sheets, so that they work most efficiently; 2, to adjust the boat's

load, and thus the fore and aft angle at which it floats.

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

**Turnbuckle:** see Rigging screw.

### U

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

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

### V

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

### W

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

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

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

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

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

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

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

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

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

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

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

### Y

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

## 5. EXPLANTATION OF SYMBOLS AND LABELS

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**THIS MANUAL CONTAINS SAFETY PRECAUTIONS THAT MUST BE OBSERVED WHEN OPERATING OR SERVICING YOUR BOAT. REVIEW AND UNDERSTAND THESE INSTRUCTIONS.**

### **DANGER**

**Denotes an extreme intrinsic hazard exists which will result in death or serious injury if proper precautions are not taken**

### **WARNING**

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

### **CAUTION**

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

## 6. SAFE BOATING TIPS

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### \*\*\* BE PREPARED \*\*\*

Take a safe boating course. In the U.S., contact your local Boating Industry, such as the ASA ([www.ASA.com](http://www.ASA.com)) or US Sailing ([www.USSailing.org](http://www.USSailing.org)), for course information.

Carry all safety equipment required by the laws that apply to your area. Requirements are generally available from the Coast Guard (<http://nws.cgaux.org>) or your local boating industry.



### CAUTION

#### SAFETY HAZARD

Obtaining and maintaining the necessary safety equipment is the responsibility of the owner. For more information about equipment required, contact local boating authorities

### MINIMUM RECOMMENDED SAFETY EQUIPMENT

- Required life saving equipment, including life vests and throwables.
- First Aid kit
- Anchor with sufficient line and/or chain
- Flashlight with good batteries
- Binoculars
- Appropriate navigational charts
- Flares
- Noise emitting device

- Sufficient food and water provisions
- Sunglasses and block
- Blanket
- Oar(s)

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

### LIFE JACKETS

**WEARING** a life jacket may save your life. Keep jackets in a readily accessible place – not in a closed compartment or stored under other gear. Remove them from any packaging and keep throwable floatation devices ready for immediate use.



### WARNING

#### DROWING HAZARD

Children under 12, those physically restricted, and non-swimmers must wear lifejackets at all times. Make sure all passengers are properly instructed in use of life saving gear.

### FIRE EXTINGUISHERS

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



### WARNING

#### FIRE HAZARD


Understand and provide the type and quantity of fire extinguishers required on your boat. Refer to your boating handbook for extinguisher specifications and quantities required for your boat.

## 6. SAFE BOATING TIPS

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### FLARES

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

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

### ALCOHOL / DRUGS AND BOATING

Drugs and alcohol affect a person's ability to make sound judgments and react quickly. As a responsible boater, you should refrain from using drugs or alcohol (singly or combined) while operating your boat. Operation of motorized vessels while under the influence carries a significant penalty. Drugs and alcohol decrease your reaction time, impair your judgment and inhibit your ability to safely operate your boat.

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

### BEFORE GETTING UNDERWAY

- Leave a float plan (see example Section 10).
- Perform a pre-departure checklist (see example Section 9).
- Check the weather. Do not venture out if the weather is, or will be, threatening.

### WHILE UNDERWAY

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


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

## 6. SAFE BOATING TIPS

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### BALLAST TANK

The EDGE is equipped with an internal water ballast tank that provides stability and self-righting. The ballast tank must be completely full when under sail and power. If the tank is not completely full, the boat's stability will be reduced and its ability to self-right may be significantly impaired, plus you may experience decreased steering capability. Periodically inspect ballast tank valves to guard against undesired or unexpected water loss. Under no condition should the water ballast tank be filled by reversing the outboard engine. Forced entry of water into the ballast tank may cause permanent damage to the tank.

 <b>DANGER</b>
<b>CAPSIZE HAZARD</b>
<b>THE WATER LEVEL OF THE BALLAST TANK IS CRITICAL. ENSURE THE BALLAST TANK IS COMPLETELY FULL BEFORE RAISING SAILS, MOTORING ABOVE 6 MPH OR EXCEEDING WAKE SPEED. ANY LEVEL OF THE TANK OTHER THAN COMPLETELY FULL WILL PRODUCE INSTABILITY AND MAY LEAD TO CAPSIZING.</b>

### CREW SIZE, WEIGHT & LOCATION

The EDGE is weight specified at a maximum crew size of 6 persons which must not exceed more than 1,438 pounds (652kg) including persons, gear and propulsion. Crew placement is important when shifting between sail and power modes. The position of the center board, rudder, mast, sail and engine can contribute to various changes in the vessel's handling when the boat is moving. In the power mode, always ensure the crew is seated within the cockpit and evenly distributed port and starboard. In general, weight should be positioned low and aft, therefore, ensure heavy items are not stored in the v-berth and crew is not positioned on the cabin top or foredeck. In sail mode, crew position will fluctuate based on the crew member's role, wind conditions, tacking, etc.

 <b>DANGER</b>
<b>CAPSIZE HAZARD</b>
<b>FAILURE TO ADHERE TO THE FOLLOWING GUIDELINES MAY LEAD TO A CAPSIZED VESSEL RESULTING IN POSSIBLE PROPERTY DAMAGE, MAN OVERBOARD SITUATION OR POSSIBLE DEATH.</b>
<b>Maximum crew size of 6 persons or 1,438 lbs (652 kg) includes persons, gear and propulsion.</b>
<b>In power mode travel, ensure:</b>
<ol style="list-style-type: none"><li><b>1. Crew is off the cabin top and foredeck unless docking at idle speed</b></li><li><b>2. Engine should be off and boat resting before moving forward to deploy anchor</b></li><li><b>3. Crew is seated in cockpit and distributed evenly port and starboard</b></li><li><b>4. Ballast tank should be completely full</b></li></ol>

## 7. PRELIMINARY CARE AND MAINTENANCE CHECKLIST

Dear Hunter Owner,

Attached you will find a list of items and recommendations that we believe should be incorporated into your own ongoing list of preventative maintenance items and safety check points. **THIS LIST SHOULD NOT BE CONSIDERED A COMPLETE SERVICE MANUAL OR THE ONLY ITEMS ON YOUR BOAT IN NEED OF ROUTINE MAINTENANCE, INSPECTION OR ATTENTION.**

You will find that we address commonly found optional equipment items installed on Hunter boats, as well as most standard equipment from Marlow-Hunter, LLC. Owners need to familiarize themselves with individual equipment manuals on all such items, especially aftermarket purchases or optional equipment installed by your dealer or Marlow-Hunter. This should ensure that you are following the manufacturer's recommendations for proper maintenance and up-keep.

We strongly recommend that all owners complete a Power Squadron course followed with a complementary boat inspection before leaving the dock. To locate a Power Squadron in your area please visit < [www.usps.org](http://www.usps.org) >.

Reviewing and familiarizing yourself with the Chapman's Piloting Manual is also highly recommended for every boat owner. This manual contains demonstrations for safety drills which should be practiced routinely, dealing with adverse conditions, general boat handling and recommended safety equipment. Our opinion is that no boat owner should operate a boat without first reviewing this manual and without having ready access to it while sailing.

We hope that this list will be beneficial to you in your ongoing maintenance and upkeep. Safe boating!

Thank You


Marlow-Hunter, LLC

# 7. PRELIMINARY CARE AND MAINTENANCE CHECKLIST

## OUT OF WATER INSPECTION CHECKLIST

REFER TO THE DRAWINGS IN THE DESCRIPTION OF MODEL SECTION OF THIS MANUAL FOR ADDITIONAL INFORMATION.

A QUALIFIED TECHNICIAN SHOULD BE USED IF YOU ARE NOT COMPLETELY CONFIDENT IN YOUR ABILITY TO MAKE REPAIRS OR INSPECTIONS.

 <b>WARNING</b>
<b>TRAVEL HAZARD</b>
<b>Check the ballast tank water intake guillotine valve for proper function prior to any launch procedure. Ensure the ballast tank guillotine valve and vent valve are closed. Failure to do so may cause unexpected results under power or sail.</b>

### General

- Ballast tank guillotine valve is properly functioning
- All thru-hulls and valves inspected for corrosion, labels and closed until after launch
- Bottom paint in satisfactory condition
- Hull freshly cleaned and waxed (free of gelcoat damage)
- Mooring, safety lines and fenders onboard and in good condition
- Inspect start battery and optional 2<sup>nd</sup> battery for proper installation, fully charged and functioning
- All battery terminals clean and wires secured
- Inspect outboard engine according to manufacturer's recommendations

- Transducer(s) are in place and secured properly; throttle/ transmission control handle rotates smoothly
- Hose clamps on all systems below water line are tight
- Centerboard(Keel) bolts tight and clean
- Centerboard(Keel) raising line working properly
- Boat is free of internal and external water leaks above water line (Failure to stop water intrusion could result in permanent damage or deterioration of structural coring materials, internal wiring and cause mildew and molding)

### Mast Assembly

- Maintain mast assembly according to manufacturer's recommendations
- Spreaders securely fastened; mast and spreaders free of corrosion and stress cracks
- Standing rigging and pins inspected for wear, tear, corrosion and cracking
- External wiring secured for navigation lights (anchor/steaming lights, bow light and stern light)
- Optional electronic wind indicator installed per manufacturer's recommendation
- Optional wind indicator installed and functioning properly
- Optional VHF antenna installed and working properly
- Optional headsail furling system installed and inspected per manufacturer's recommendations
- Running rigging inspected for wear and tear



# 7. PRELIMINARY CARE AND MAINTENANCE CHECKLIST

- Mast step stand-up blocks secured and operational
- Main sail, jib sail and flaking system inspected for wear and tear
- Check condition and operation of sails
- Specified pre-bend and diagonal tensions attained in mast according to the mast manufacturer's commendations
- Mast to deck wiring is properly attached

## Anchor System and Ground Tackle

- Optional anchor secured in bow roller assembly
- Optional spare anchor onboard and accessible; see Chapman's Manual for recommendations on anchors, anchor lines and drogues
- Anchor line pays out and retrieves into anchor locker without difficulty
- Anchor assembly inspected and free of abrasions
- Anchor locker hatch secures properly with anchor and line in place
- Anchor locker free of debris inside
- Anchor locker drain-plate is free of debris

## Steering System

- Rudder turns easily and correctly with wheel direction
- Rudder raising system working and functioning properly
- Inspect rudder for cracks and/or concealed damage
- Bolts and brackets secured and steering cable functioning properly

## Primary Pumps

- Optional bilge pump and manual bilge pump functioning properly

- Electric bilge pump, float switch (discharge hose has anti-siphon loop in place to prevent back flow under sail) operating properly
- Optional fresh water pumps functioning properly
- Optional toilet flush pumps functioning properly

## Illumination and Small Electrical Components Check

- Bow light, cabin lights, stern light, masthead light, chart light illuminating
- Anchor light illuminating
- Smoke detectors operational
- CO detector operational
- High water bilge alarm functioning properly
- Optional shore power cord and adapter plug operational
- Optional 110 or 220 VAC outlets operational – Ground fault circuits functioning
- Optional 110 or 220 VAC/battery charging systems functioning properly
- Compass and compass light functioning properly

## Fresh Water Systems

- Portable water tank and galley faucet water pump functioning properly
- Optional water tank and shut-off valve functioning
- All water lines and components purged of air and checked for leaks
- Sinks and drains checked for leaks and adequate flow
- Optional cockpit shower operational
- Optional fresh water system strainer clean

# 7. PRELIMINARY CARE AND MAINTENANCE CHECKLIST

## Head and Holding Tank Systems

- Portable sanitation head holding tank clean
- Optional marine head vent clear from tank to atmosphere
- Optional marine head toilet flushes to holding tanks properly
- Optional marine head holding tank waste level checked
- Optional marine head fittings and hoses checked for leaks or signs of cracks

## Galley Systems

- Optional butane stove operational; refer to manufacturer's manual for proper operation and trouble shooting
- Optional electric cooler operational and proper temperature attained
- Galley sink drain plate free of debris
- Hose clamps tight and secured; no signs of cracks on sink drain hose
- Galley sink drain ball valve/handle functioning properly

## Deck

- Swim seats/ladders/grab plate operational
- Companionway hatches operate properly (recheck this after the boat is in water)
- Companionway drop-ins fit properly in companionway and line locker
- Optional canvas properly cleaned and installed
- Optional cockpit cushions cleaned and installed
- Lifeline shackles tight and secure
- Rubrail sealed and secured to hull
- Load bearing hardware sealed and securely fastened; this includes but is not limited to chainplates, winches and handrail

- Port/starboard chainplate assemblies are secured and tightened
- Plexiglass hatches, ports, windscreens and windows adjusted and cleaned
- All thru deck fittings sealed properly; flipping cap on thru deck fitting functioning properly
- Topside surface clean and free of damage

## Interior Inspection

- Drop-in hatches for bunks and floors in place and fit securely
- Interior steps and grab rails secured
- Ballast tank access cover secured; no signs of cracks on ballast tank
- Bilges clean and free of debris (is this possible??)
- Opening port and hatch screens in place
- Optional blinds/privacy curtains, shades and interior cushions cleaned and secured
- Head door open/shut/latch properly
- Ensure all wires and connection on distribution panels are tight (should be professionally inspected)
- Optional stereo/CD operational
- Owner supplied Chapman's Manual onboard and readily available
- Safety gear onboard, readily available and up to date. See Chapman's Manual and US Coast Guard website at < [www.uscg.mil](http://www.uscg.mil) >for details
- Operator's Manual onboard
- User's Manual onboard

## Outboard Engine and Fuel System

- Review manufacturer's outboard engine manual for operating procedure and maintenance

## 7. PRELIMINARY CARE AND MAINTENANCE CHECKLIST

- |  |   |
|--|---|
| <ul style="list-style-type: none"><li><input type="checkbox"/> <b>Outboard engine mounting bolts in place, tightened, secured and properly torqued</b></li><li><input type="checkbox"/> Crankcase oil at full mark (per engine manual)</li><li><input type="checkbox"/> Transmission fluid/oil at full mark (per engine manual)</li><li><input type="checkbox"/> Seawater intake free of debris</li><li><input type="checkbox"/> Air bled from fuel lines and no sign of fuel leaks at fittings</li><li><input type="checkbox"/> Throttle and outboard engine steering linkages smooth and operational</li></ul> | <ul style="list-style-type: none"><li><input type="checkbox"/> Throttle cable tension set properly</li><li><input type="checkbox"/> Shifter with trim switch functioning properly</li><li><input type="checkbox"/> Shutdown system operational</li><li><input type="checkbox"/> Fuel tank clean, no cracks or damage, shut off valve closed properly</li><li><input type="checkbox"/> Fuel lines clean and free of cracks or damage, hose clamps tightened and secured</li><li><input type="checkbox"/> Starting sequence and alarms correct according to engine manufacturer's recommendations</li></ul> |
|--|---|


Date of inspection: \_\_\_\_\_

Inspection made by: \_\_\_\_\_

# 7. PRELIMINARY CARE AND MAINTENANCE CHECKLIST

## IN WATER INSPECTION CHECKLIST

REFER TO THE DRAWINGS IN THE DESCRIPTION OF MODEL SECTION OF THIS MANUAL FOR ADDITIONAL INFORMATION.

 <b>DANGER</b>
<b>CAPSIZE HAZARD</b>
<b>THE WATER LEVEL OF THE BALLAST TANK IS CRITICAL. ENSURE THE BALLAST TANK IS COMPLETELY FULL BEFORE RAISING SAILS, MOTORING ABOVE 6 MPH OR EXCEEDING WAKE SPEED. ANY LEVEL OF THE TANK OTHER THAN COMPLETELY FULL WILL PRODUCE INSTABILITY AND MAY LEAD TO CAPSIZING.</b>

### Dockside Inspection of Outboard Engine and Operating System

- Review manufacturer's engine manual for proper engine starting procedure
- Correct idle rpm (per engine manual)
- Hour meter operational
- Neutral safety start switch operational
- No fuel/oil/water leaks on engine
- Engine seawater flowing properly

### Dockside Pre-sail Inspection

- Standing rigging tuned statically – all fittings pinned and secured (re-check after sailing)
- Jib sail installed, optional furling system operational
- Main sail installed and operates smoothly
- Main sail flaking system properly adjusted
- All reefing points in good condition and working properly
- Topping lift and outhaul operational
- Sheets/blocks/winch operate correctly and easily under load
- All line stoppers operational and labeled
- All electronic equipment calibrated
- Owner Supplied VHF operational
- Complete safety package onboard and up-to date (see Chapman's manual and US Coast Guard rules and regulations)
- Secure and evenly distribute all loose equipment and weight
- Complementary onboard inspection made by local Power Squadron

Date of inspection: \_\_\_\_\_

Inspection made by: \_\_\_\_\_

## 8. PRE-DEPARTURE CHECKLIST

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theEDGE is designed to operate under sail mode or power mode. You must clearly understand the basic factors directly affecting your chosen mode of travel before departing.

Your boat can not operate at speeds over 6 mph under both auxiliary power and under sail. This will cause significant stability issues and is extremely dangerous.

Depending on your mode of travel, verify the following conditions and their status: rigging, ballast tank, center board, rudder and outboard engine.

1. **Rigging** - when operating your boat under power, the rigging may be installed, setup and secured, but the sails must be down (main and jib sails). Also, it is not recommended to leave the mast on the crutches when powering the boat.
2. **Ballast tank** – when operating your boat under sail and power, the ballast tank must be completely full. If the tank is not completely full, the boats stability will be reduced and its ability to self-right may be significantly impaired, plus you may experience decreased steering capability. Periodically inspect ballast tank valves to guard against undesired or unexpected water loss.

- Check weather conditions and tides
- Check food supply
- Foul weather gear
- Linen, sleeping bags
- Fuel
- Check bilge for extra water
- Water
- Sunscreens and sunglasses
- Tools
- Docking and anchoring gear
- Check radio operations
- Navigation charts and instruments
- Float plan to a friend or Coast Guard** (see next page)
- Fuel for stove

Under no condition should the water ballast tank be filled by reversing the outboard engine. Forced entry of water into the ballast tank may cause permanent damage to the tank. The guillotine valve and vent valve must always be closed when not filling or emptying the tank.

3. **Centerboard** – when operating your boat under power, the centerboard is in the raised position. The lower portion of the centerboard remains exposed and acts as a fin (stabilizer) enhancing directional stability as speed increases. Under sail, lower the centerboard to adjust the center of gravity to provide greater stability.
4. **Rudder** - when operating your boat under power, the rudder is in the raised position. With the rudder fully raised and locked in position, the tip portion of the rudder becomes a fin which provides directional stability of water flow to the outboard engine. When under sail, lower the rudder to allow for proper steering.
5. **Outboard engine** – when operating your boat under power, the outboard engine must be in the down position. When under sail, tilt the outboard engine to the full up position.

- Cooking and eating utensils
- Check that the battery is fully operational
- Oil level, tight Vp-belts
- Check for loose electrical connections in engine compartment
- Doors and drawers secured
- Check steering lock to lock
- Check mast for rigging irregularities and tightness
- Halyards and sheets are clear and ready to run
- No lines or other obstructions near propeller or bow
- Anchor ready to run
- Check lifelines for tightness
- Turn on fuel and waterlines
- Stow all loose gear

# 9. FLOAT PLAN

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

## 2. Description of boat

NAME \_\_\_\_\_ TYPE \_\_\_\_\_

MAKE \_\_\_\_\_ LENGTH \_\_\_\_\_ REGISTRATION# \_\_\_\_\_

HULL COLOR \_\_\_\_\_ STRIPE COLOR \_\_\_\_\_ DECK COLOR \_\_\_\_\_

OTHER DISTINGUISHING MARKS \_\_\_\_\_

## 3. Number of Persons aboard

NAME \_\_\_\_\_ AGE \_\_\_\_\_ PHONE # \_\_\_\_\_

ADDRESS \_\_\_\_\_

NAME \_\_\_\_\_ AGE \_\_\_\_\_ PHONE # \_\_\_\_\_

ADDRESS \_\_\_\_\_

NAME \_\_\_\_\_ AGE \_\_\_\_\_ PHONE # \_\_\_\_\_

ADDRESS \_\_\_\_\_

## 4. Engine

TYPE \_\_\_\_\_ H.P. \_\_\_\_\_ FUEL CAPACITY \_\_\_\_\_

## 5. Safety equipment

PFDs  Flares  Mirror  Flashlight

Food  Water  EPIRB  Raft/Dinghy

## 6. Radio

TYPE \_\_\_\_\_ FREQUENCIES \_\_\_\_\_

## 7. Trip Expectations

DEPARTURE TIME \_\_\_\_\_ DATE \_\_\_\_\_ FROM \_\_\_\_\_

DESTINATION \_\_\_\_\_ RETURN DATE \_\_\_\_\_ NO LATER THAN \_\_\_\_\_

## 8. Automobile:

LICENSE # \_\_\_\_\_ STATE \_\_\_\_\_ MAKE \_\_\_\_\_

COLOR \_\_\_\_\_ PARKED AT \_\_\_\_\_

## 9. If not returned by-

Contact the Coast Guard or-

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

## 10. AFTER SAILING CHECKLIST

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When leaving your Hunter boat at the dock for more than a short time, it is a good idea to review the following checklist to make sure everything is in order. This will help protect the boat's components and add to their attractiveness and usable life.

**REFER TO THE DRAWINGS IN THE DESCRIPTION OF MODEL SECTION OF THIS MANUAL FOR ADDITIONAL INFORMATION.**

- Maintain a full ballast tank to provide stability
  - Flake mainsail and cover or remove and bag
  - Remove and stow all portable deck hardware such as winch handles, etc.
  - Secure the topping lift to the boom and secure it firmly with the mainsheet
  - Coil and stow all lines
- Close all fuel lines (refer to your manufacturer's outboard engine manual for details)
  - Switch off the electrical system; if the boat has the optional battery charger, switch off the main battery switch
  - Pump out the bilge and make sure the optional high water bilge float switch is free of debris
  - Check air vents, secure ports and hatches, and clean deck stainless, especially if you have operated in saltwater
  - Make a final check of mooring lines, fenders, etc.

# 11. TRAILER LAUNCHING AND RETRIEVING

REFER TO THE DRAWINGS IN THE DESCRIPTION OF MODEL SECTION OF THIS MANUAL FOR ADDITIONAL INFORMATION.

## **WARNING**

### TOWING HAZARD

Trailer towing can be hazardous. Overloading can cause serious injury or equipment damage. Do not overload your trailer.

## **WARNING**

### TOWING HAZARD

Check the certification decal located near the hitch of your trailer. The Gross Vehicle Weight Rating (GVWR) for your trailer is 5,000 lbs. Total boat weight with all possible Hunter options installed is 4,920 lbs. (including full fuel and ½ water supply). It is your responsibility to ensure any gear or supplies loaded in the boat while under tow does not exceed the total load limit of 5,000 lbs.

## **WARNING**

### TOWING HAZARD

Ensure the tow vehicle has a towing capacity higher than that of the trailer's GVWR. Using an under-rated tow vehicle is dangerous and illegal.

## **WARNING**

### TOWING HAZARD

Tow your boat with the ballast tank empty. If the ballast tank is not empty you will exceed the GVWR limit of the trailer and can cause equipment damage and serious injury.

**THE MAST MAY BE RAISED WHILE THE BOAT IS ON THE TRAILER OR AFTER THE BOAT IS LAUNCHED. MAKE SURE THAT ALL HALYARDS AND REEFING LINES ARE INSTALLED USING THE MESSENGER LINES ALREADY RUN IN THE MAST. MAKE SURE THE CENTERBOARD AND THE RUDDER ARE SECURED AT ALL TIMES.**

BE SURE TO THOROUGHLY FAMILIARIZE YOURSELF WITH THE TOWING REGULATIONS OF YOUR STATE AND IN ANY OTHERS YOU MAY TRAVEL THROUGH. REGULATIONS VARY FROM STATE TO STATE REGARDING THE TOWING OF BOAT TRAILERS, GOVERNING BOTH THE WIDTH OF THE LOAD AND THE LENGTH OF MAST OVERHANG AT THE REAR OF THE TRAILER. SPECIAL PERMITS MAY BE REQUIRED AND OTHER REGULATIONS MAY APPLY. CONSULT YOUR LOCAL AUTHORITIES FOR MORE INFORMATION.

## PRE-LAUNCH PROCEDURES

1. Ensure the centerboard and rudder are up and secured.
2. Check for damage to the boat caused by towing
3. The engine should be raised so it will not hit bottom during launching.
4. Ensure thru hull ball valves are closed. Ensure the galley sink drain valve and ballast tank guillotine valves are closed. The rudder drum overflow drain ball valves should remain open.
5. Remove trailer tie-down straps and ropes and make sure that the winch snap hook is properly attached to the bow eye and locked in position.
6. Connect the fuel tank, check fluid levels and safety equipment.
7. Disconnect the trailer light plug to prevent shorting the electrical system or burning out a bulb.
8. Loose gear and provisions can be loaded via the swim ladder on the transom.
9. If launching at a dock, attach a line to the bow and the stern of the boat so it will not drift away after launching.
10. Visually inspect the launch ramp for hazards such as a steep drop off, slippery areas and sharp objects.
11. When ready, proceed slowly to the ramp.



# 11. TRAILER LAUNCHING AND RETRIEVING

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## LAUNCHING

1. Drive to the ramp area and back the boat and trailer down the appropriate ramp.
2. Keep the rear wheels of the towing vehicle out of the water. This will generally keep the exhaust pipes out of the water. If the exhaust pipes become immersed in the water, the engine may stall.
3. Set the parking brake and place the transmission in a parking gear ensuring the vehicle will not move.
4. After the boat is in water, turn the winch to payout the towing strap but do not allow the boat to drift away from the trailer.
5. Lower the outboard engine and prepare to start the engine. Make sure the transmission is not engaged at this time. Make sure the lanyard is properly attached to operator.
6. Start the outboard engine and ensure that water is passing through the engine's cooling system. Check with the engine's owners manual for proper operation.
7. Release the winch and disconnect the winch strap snap hook from the bow when the boat's operator is ready. At this point, the boat should launch with a light shove or by backing off from trailer under power.
8. Return the towing vehicle and the trailer to the parking area.
9. Finish any final loading of your boat at the dock.

# 11. TRAILER LAUNCHING AND RETRIEVING

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## RETRIEVING

The steps for retrieving the boat from the water are basically the reverse of those taken to launch it.

1. Consider the following conditions which may have changed since you launched your boat:
  - wind direction and/or speed
  - current and/or tide
  - visibility
2. Ensure the rudder and centerboard are raised and secured.
3. Unload the boat away from the launch ramp. CAREFULLY maneuver the boat under power to the retrieving site.
4. Back the trailer down the appropriate ramp. Keep the rear wheels of the towing vehicle out of the water. This will generally keep the exhaust pipes out of the water. If the exhaust pipes become immersed in the water, the engine may stall. Set the parking brake and put the transmission in a parking gear and ensuring the vehicle will not move.
5. Payout the towing strap so the snap hook can be attached to the bow eye. To avoid hitting the bottom, the outboard engine might need to be partially raised when motoring onto the trailer. When properly aligned on trailer, raise the outboard engine to full up position. Winch the boat securely onto the trailer. Confirm the boat's position on the trailer and secure it.
6. If the ballast tank was not emptied under power, open the ballast tank guillotine valve located on the transom and the vent valve located in the port aft hanging locker. Slowly drive the trailer forward and stop to allow time for the ballast tank water to fully discharge.
7. De-rig and unstep the mast if not already completed. BEWARE OF NEARBY POWER LINES WHEN LOWERING MAST. Secure mast.
8. Attach rear straps from to trailer and stern of the boat. Confirm that all gear and supplies are secured before driving.
9. When the ballast tank is fully drained, carefully drive the trailer with the boat aboard out of the

ramp to the washdown area for cleanup and reloading.

## 12. DOCKING AND ANCHORING

### DOCKING

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

1. Maintain a full ballast tank to provide greater stability.
2. Whenever possible, approach the dock against the prevailing wind and current to assist in stopping the boat. Where these conditions are contrary, the stronger of the two should be used to determine approach.
3. When approaching the dock, dock lines should be at the ready, loose gear stowed and decks cleared. Determine the direction of the wind and current and when you decide which side of the boat will be against the dock, rig dock lines and fenders on the appropriate side.
4. To tie up, attach bow and stern lines to dock with the fenders between the dock and boat. Rig crossing spring lines to limit motion forward and aft. Be sure to allow some slack in all lines to compensate for tidal activity if present. Never use bow rail, stern rail, or stanchions to secure a vessel, even for brief periods. **Consult an approved boating guide if you are new to docking or mooring**

### ANCHORING

 **CAUTION****SAFETY HAZARD**

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

Your Hunter comes with an on-deck anchor well and optional anchor. The optional 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, the following should be considered:

1. Pay particular attention to the slope 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.
2. Consider wind direction, currents, mean low tide depths, local conditions and the position of any anchored boats nearby when anchoring.
3. To raise anchor, motor or sail (under main only) forward slowly. When at the point directly above the anchor, a tug should free it from the bottom. **Consult an approved boating guide for additional information.**

# 13. MAST RAISING AND LOWERING SYSTEM

REFER TO THE DRAWINGS IN THE DESCRIPTION OF MODEL SECTION OF THIS MANUAL FOR ADDITIONAL INFORMATION.



## WARNING

### ELECTROCUTION HAZARD

Make sure that the mast and riggings are clear of all overhead electrical cables when being raised, lowered or maneuvered about the launch area. Contact with an electrical cable can result in property damage, serious injury or death.

## MAST RAISING

### BEFORE STEPPING THE MAST

1. IF RASING THE MAST IN THE WATER, ENSURE THE BALLAST TANK IS FULL.
2. Install lower struts. The lower struts should be secured on the mast and to the base bracket on the deck, but do not tighten down the bolts at this time. Make sure the bolts will remain attached during the entire procedure. The lower strut fasteners will be tightened down after the mast is fully raised.
3. Attach the lower shroud to the turn buckles on chainplate in front of the carriage hole. Install cap shroud turnbuckles on all carriage holes of the chainplate. Make sure turnbuckles are pinned and secured.
4. Confirm that all standing rigging and spreaders are connected and secured to the mast. The spreader mounting bracket bolts should be secured and tightened. Make sure there are no signs of cracks on the mast, shrouds and masthead light wiring harness. Ensure that masthead light is functioning.
5. Confirm that backing shells on top of D2, marine eye terminal on top of forestay and spreader end plugs are secured on the mast.
6. Main halyard, jib halyard, topping lift and shackles should be installed and secured on cleats; do not

allow all halyards hanging loose during the mast raising.

### STEPPING THE MAST

1. Untie the mast from the mast crutches and slide the mast aft on the crutch roller until the bottom of the mast is over the mast step. At this point, the mast will be balanced on the roller only, so do not let it go of the mast base. Remove the safety pin and align the mast base, vang toggle and bottom block. Insert the safety pin and install cotter pin on safety pin. The mast should now be secured to the mast step.

### INSERTING THE GIN POLE

1. Attach jib halyard to the aft thimble on the top of the gin pole. Attach main sheet fiddle block to the bottom thimble of the gin pole. Make sure both attachments to the thimble are secured.
2. Install the gin pole vertically in the hole in the front base of the mast. Attach the lower mainsheet fiddle block (the one with cam cleat) on the U bolt in the anchor-well. Make sure the entire mast raising system is secured and safe for operating.
3. Check to make sure the forestay is not twisted around the jib halyard and the lower shrouds and cap shrouds are not twisted around each other. All shrouds should be outside the life lines, the turnbuckles should be vertical on the chainplate. Recheck that all shrouds, forestays and shackles are properly attached. Make sure the mast is clear of all overhead electrical wiring.

### RAISING THE MAST

1. Tension the halyard with the gin pole in a vertical position (make sure that the jib halyard is being tensioned and not the main halyard). Secure the jib halyard to the cleat on the mast. The mast struts prevent the mast from moving side to side.
2. Raise the mast by pulling in the main sheet through the cam cleat.
3. As soon as the mast is raised, leave the mainsheet jammed and tensioned. Connect the forestay turnbuckle to stem plate; meanwhile, install clevis pin and cotter pin to secure the connection.

# 13. MAST RAISING AND LOWERING SYSTEM

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4. Tension cap shrouds, lower shrouds and forestay by turning the turnbuckle. Use a tension gauge to check loading tensions on standing rigging. When done, all turnbuckles should have cotter pins installed to keep them from reopening.
5. Check the rig tension.
6. After the mast is secured by all standing riggings, remove gin pole and mainsheet system from the mast raising system.
7. Connect the mast wiring plug to the deck fitting at starboard base of the mast.
5. Attach jib halyard shackle to upper spliced eye at forward end of gin pole.
6. Tension jib halyard (again confirming that it is the jib halyard being tensioned and not the main halyard—check the color coding) so that the pole angles up at the front end approximately 10 degrees. Secure halyard to cleat on side of deck and lock down the line on cleat.
7. Attach bottom end of mainsheet to “U” bolt in anchor locker and top end to the bottom loop at end of the gin pole. Tension mainsheet tackle so jib halyard takes the load off the forestay. Make sure mainsheet is jammed and, for extra security, secure to bow mooring cleat.

## BOOM INSTALLATION

1. Connect topping lift on aft bale of the boom. Attach and install forward end of the boom on the mast goose neck. Install bolt and nut to secure this connection.
2. Recheck all riggings, make sure they are secured and safe for operation.

## MAINSHEET PURCHASE

1. Reinstall the mainsheet on boom and on top of cockpit stainless grab rail; the fiddle with cam cleat should be attached on the grab rail. Ensure the system is secured for operation.

## BOOM VANG INSTALLATION

1. Attach and install the lower fiddle block (with cam cleat) on vang toggle on mast step safety pin. Attach boom vang upper fiddle block on forward bale of the boom. Make sure the shackles are secure for operation.
2. Refer to Section 15 **GETTING READY TO SAIL**.

## MAST LOWERING

1. IF LOWERING THE MAST IN THE WATER, ENSURE THE BALLAST TANK IS FULL.
2. Remove sails, boom vang and boom.
3. Install mast support crutch to transom, if not already done.
4. Horizontally install gin pole.

8. Loosen forestay turnbuckle and remove forestay from stemhead fitting.
9. Check for overhead electrical cables, make sure that no one is standing in the cockpit or under the mast, and confirm that the mast is in all respects ready to lower.
10. Allowing the mainsheet to hook around the bow mooring cleat, unjam the mainsheet and, holding the mainsheet tail in one hand, ease tension on the mainsheet tackle while pushing the mast aft with your other hand. Retaining the deflection of the mainsheet around the cleat, ease the mainsheet further until the mast begins to hinge aft.
11. Continue lowering the mast, remembering that the load on the tackle will increase as the mast is being lowered until it rests in the mast crutch.
12. Disconnect the gin pole and mast electrical wiring so the mast can slide forward.
13. Remove mast step pin and disconnect mast base from step while restraining bottom end of mast and retaining boom vang strap. Replace pin, vang strap and cotter pin.
14. Slide mast forward on mast crutch roller until base of mast rests in bow pulpit support cradle. Secure mast in place at pulpit and at mast crutch. Take slack out of shrouds and secure forestay forward.

## 14. GETTING READY TO SAIL / SAIL MODE

REFER TO THE USER'S MANUAL FOR MORE DETAILS ON OPERATING YOUR BOAT UNDER SAIL.

REFER TO THE DRAWINGS IN THE DESCRIPTION OF MODEL SECTION OF THIS MANUAL FOR ADDITIONAL INFORMATION.

**THE MAST MAY BE RAISED WHILE THE BOAT IS ON THE TRAILER OR AFTER THE BOAT IS LAUNCHED. (Caution: the boat will be less stable during the launch and retrieve process.) MAKE SURE THAT ALL HALYARDS AND REEFING LINES ARE INSTALLED USING THE MESSENGER LINES ALREADY RUN IN THE MAST. MAKE SURE THE CENTERBOARD AND THE RUDDER ARE SECURED AT ALL TIMES.**

1. The rudder must be in the down position. Lower the rudder inside the helm seat by removing the safety pin to allow the rudder to drop below the safety bracket; replace the pin. Pull the down-haul sheeting until the rudder is completely down then tie the sheeting to the cleat. The rudder trunk overflow drain ball valves (upper and lower ball valves) must be open. These open ball valves will allow draining of excess water built up during operation. If the ball valves are closed, water may overflow the upper rudder bearing and may flood the aft cabin.
2. The centerboard must be in the down position. To lower the centerboard, coil raising line around starboard winch and hold firm, unlock sheet stopper, slowly payout raising line until centerboard is completely down.
3. If not already done, open the ballast tank guillotine valve, located on the stern of the boat, and the ballast tank vent valve, located in the port locker, and begin filling the ballast tank. To verify the tank is full, open the ballast tank access cover under the lower step and locate the Minimum Water Level Mark. When the water level reaches the Minimum Water Level Mark, close the guillotine valve and vent valve.
4. If the rig was not setup on trailer, follow the mast raising instruction section to setup the rigs on boat. After the mast has been raised, attach the forestay turnbuckle to the most forward of the two holes in the stem fitting. Turnbuckle should be about  $\frac{3}{4}$  open. Confirm that the upper and lower shrouds are supporting the mast.

5. Remove the mast-raising pole.
6. Using the main halyard, center the rig in the middle of the boat by first jamming the halyard in a position so that the halyard shackle just contacts a known point on the toe rail adjacent to the mast on the port side. Transfer the halyard to the starboard side and, applying the same amount of tension, see if the shackle contacts the corresponding position on the starboard toe rail. If the shackle falls short, ease the port upper shroud turnbuckle and tension the starboard, always maintaining some tension on each shroud so they are not slack. If the shackle overshoots the mark on the toe rail, ease the starboard upper shroud turnbuckle and shorten the opposite side until the halyard shackle contacts both points on the opposite toe rail uniformly. Turnbuckles are tensioned by turning the center portion counter clockwise and loosened by turning it clockwise. The turnbuckle's upper swage, the one on the wire, should be held with a wrench to prevent it from turning as the turnbuckle rotates.
7. After the mast is centered, check to see if the rake of the mast is approximately one degree aft. This can be measured by hanging plumb line or a weight, such as an adjustable wrench, from the main halyard shackle and adjusting the halyard so the weight is suspended immediately above the deck. With the boat level, this plumb line or weight, should be 22" from the aft of the mast. Adjust the forestay turnbuckle as necessary to achieve this position.
8. Tension the upper shrouds uniformly, alternately taking six turns on one, then the other, until the upper shrouds are tight. The upper shrouds put tension on the forestay and reduce forestay "sag".
9. Check if the mast is straight when looking from the stern of the boat. To "sight" use the main



### **DANGER**

**ELECTROCUTION HAZARD**

**Make sure that the mast and rigging are clear of all overhead electrical cables when being raised, lowered or maneuvered about a launching area. Contact with an electrical cable can result in property damage, serious injury or death.**

## 14. GETTING READY TO SAIL / SAIL MODE

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halyard by tensioning it to the mast's base plate. If the mast appears to bow to one side, ease the lower shroud on that side and tension the shroud on the opposite side until the mast appears straight.

10. Once the mast is straight when viewed from the back or front, sight up the mast from the side to see if there is any fore and aft bend. The mast should be bowed forward at the spreaders by approximately 4". Ease or tension the lower shrouds uniformly until this slight amount of bend is achieved. When finished, the lower shroud should be slightly less tight than the main shrouds. If you sail in a predominately heavy air region, slightly more mast bend, in the 5" to 6" range, may be desirable in order to flatten and depower the main sail.
11. After tuning the rig, install cotter pins in all turnbuckles to prevent them from moving while sailing.
12. Install the battens in the mainsail. Attach head of mainsail to main halyard. Attach tack of mainsail to cunningham hook. Attach clew of mainsail on outhaul line.
13. Install the reefing line (the longer of the two) in the boom with the messenger line provided and lead from the sheave through the upper cringle at the back of the sail down to the sliding eye on the bottom of the boom. Pull enough slack into the reef line so that the sail can be fully raised unimpeded by the reef line. Tie the mainsail onto the boom with the sail ties.
14. Attach the jib sheet onto the jib and lead the sheets inside the shrouds to the lead blocks on the deck house top, then aft to the cam cleat on the house top. Tie figure eight knots in the end of the sheets to prevent them from running back through the jams. Shackle the bottom of the jib to the padeye aft of stemhead and hank the jib onto the forestay. Bunch and tie to prevent it blowing overboard before it is ready to hoist.
15. Attach jib and main halyards to their respective sails.
16. Lower the rudder blade to the full down position.. The rudder must be down to achieve the correct balance for the proper helm loading. A rudder, which is not lowered, will load up excessively in severe conditions preventing the helmsman from responding to puffs and thus allowing the boat to "round up". The cleat is provided to retain the blade in the correct position.
17. If sailing off an anchorage. Make sure the anchor is retrieved and stowed properly.
18. Raise sails, beginning with the main and then the jib while motoring into the wind. Once each halyard, beginning with the main, is tensioned, the halyard can be tied down into its respective cleat and the excess line coiled. When the sails are raised, the boat can be turned away from the wind. Once sailing the engine can be turned off and tilted upward to clear the water.
19. When the main is sheeted in confirm that the topping lift is not lifting the boom. The main should be capable of sheeting in hard without the topping lift being tight. With the main sheeted in hard, the topping lift should have eight to ten inches of sag and should be adjusted accordingly. When at dock or at mooring, the topping lift can be readjusted to raise the boom to a comfortable height above the cockpit.
20. Final tuning of the rig will take place when sailing by sighting up the mast while going upwind in about ten to twelve knots of breeze. The mast should maintain its 4" (10.2cm) fore and aft bend, but should also still appear straight transversely with the leeward main shroud still retaining its tension and not going slack. If the leeward rigging does go slack when sailing, apply more tension uniformly to both shrouds by first tightening the leeward rigging and then tension the new leeward rigging the same amount. Continue this procedure, as necessary until the leeward upper shrouds no longer appear slack and forestay sag has been reduced. Removal and reinstallation of the turnbuckle cotter pins will be necessary to make these fine tuning adjustments.
21. Once the upper shrouds are tensioned, again sight up the spar to make sure that the middle of the spar at the spreaders is not falling to leeward or bending to weather. Adjust and uniformly retention the lower shrouds as necessary.

NOTE: Standing rigging will stretch slightly when initially loaded. Therefore, the rigging may have to be further tensioned slightly after a few sails in a

## 14. GETTING READY TO SAIL / SAIL MODE

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strong breeze to compensate for this initial stretch. Once the mast is tuned and initial stretch is taken out, the rig should need retuning only at the beginning of each season.

- 22.** Once done sailing, the sails should be lowered while motoring into the wind, with the jib lowered first and then the main.



# 15. GETTING READY TO POWER / POWER MODE

REFER TO THE USER'S MANUAL FOR MORE DETAILS ON OPERATING YOUR BOAT UNDER POWER.


REFER TO THE DRAWINGS IN THE DESCRIPTION OF MODEL SECTION OF THIS MANUAL FOR ADDITIONAL INFORMATION.

THOROUGHLY FAMILIARIZE YOURSELF WITH THE CONTENTS OF THE ENGINE MANUFACTURER'S OWNER'S MANUAL. THE FOLLOWING INFORMATION SHOULD NOT BE CONSIDERED A REPLACEMENT OF THE MANUFACTURER'S MANUAL NOR A COMPLETE LIST OF INSTRUCTIONS OR RECOMMENDATIONS.

## OUTBOARD ENGINE

The engine manufacturer's owner's manual is accompanied with the Hunter Operator's Manual. This manual will contain technical specifications, running instructions and a maintenance schedule on lubricants and other important functions. For longer engine life, follow the routine maintenance schedule recommended by the manufacturer.

## FUEL RECOMMENDATIONS

 <b>WARNING</b>
<b>FIRE HAZARD</b>
Gasoline is extremely flammable and highly explosive under certain conditions. Improper handling of fuel could result in property damage, serious injury or death. Always turn off the outboard before fueling. Never permit anyone other than an adult to refill the fuel tank. Do not fill the fuel tank all the way to the top or fuel may overflow when it expands from sunlight. Remove portable fuel tanks from the boat before fueling and always wipe off any fuel spillage. Do not smoke, allow open flames or sparks or use electrical devices such as cellular phones in the vicinity of a fuel leak or while fueling.

1. Octane: Refer to the manufacturer's manual for minimum to maximum octane rating for the outboard engine.


2. Always use fresh gasoline. Gasoline will oxidize, resulting in loss of octane and volatile compounds, as well as the produce gum and varnish deposits, which can damage the motor.
3. Additives: Do not use any additives other than approved by the engine's manufacturer. Use of other additives can result in poor performance or engine damage.

## BEFORE START-UP

 <b>WARNING</b>
<b>SAFETY HAZARD</b>
Lanyard <b>MUST</b> be securely attached to the operator, and clip <b>MUST</b> be installed on key switch. <b>DO NOT</b> operate outboard with clip removed from switch, except in an emergency.

Make sure to follow the outboard engine manual instructions for first time starting of the engine. It's recommended that you consult with your local dealer and follow the dealer's recommendations for this procedure.

## RUNNING CHECKS

 <b>WARNING</b>
<b>SAFETY HAZARD</b>
<ul style="list-style-type: none"><li>▪ <b>DO NOT</b> run outboard without a water supply to the outboard's cooling system. Cooling system and/or powerhead damage could occur.</li><li>▪ <b>DO NOT</b> run outboard in water when in the up position.</li><li>▪ <b>DO NOT</b> run the engine indoors without adequate ventilation or permit exhaust fumes to accumulate in confined areas.</li><li>▪ Engine exhaust contains carbon monoxide which, if inhaled, can cause serious brain damage or death.</li><li>▪ Contact with a rotating propeller is likely to result in serious injury or death. Ensure the engine and propeller area is clear of people and objects before starting engine or operating boat.</li><li>▪ <b>DO NOT</b> allow anyone near a propeller, even when the engine is off. Propeller blades can be sharp and can continue to turn even after the engine is off.</li></ul>

# 15. GETTING READY TO POWER / POWER MODE

## System Check Operation

1. Attach emergency stop lanyard.
2. Turn key switch to ON.
3. Observe the System Check self-test function. Warning horn should sound for ½ second and all warning lights should turn on at the same time then turn off one at a time.

## Fuel System

1. Squeeze fuel primer bulb until hard. Observe all fuel hoses and connections. Repair any leaks.
2. Start outboard. Inspect all hoses and connections. Repair any leaks or misrouted hoses immediately

## Emergency Stop / Key Switch

Check emergency stop function. With outboard running at idle, pull safety lanyard from emergency stop switch. Outboard should stop immediately.

## Remote Control Operation

Make sure the control can be easily moved into all gear and throttle settings. Do not shift remote control when outboard is not running.

## Start-in-Gear Prevention

Please follow the manufacturer's manual for performing this "Starter-in-Gear Prevention" procedure.

 <b>WARNING</b>
<b>SAFETY HAZARD</b>
<b>Make certain that the starter will not operate when the outboard is in gear. The starter-in gear prevention feature is required by the United State Coast Guard to help prevent personal injuries.</b>

## Tachometer Pulse Setting

1. Confirm accuracy of tachometer reading.
2. Adjust dial on back of tachometer to required setting (the outboard should not be running).
3. Refer to outboard engine manual for settings of tachometer of particular outboard model.

## Water Pump Overboard Indicator

A steady stream of water should flow from the overboard indicator.

## Operating Temperature

An outboard running at idle speed should achieve a temperature based on the engine's thermostatic control. In general, the powerhead temperature should reach at least 104°F ( 40°C) after five minutes of idling. Check that the powerhead reaches idle temperature.

## Idle Speed

Outboard idle speed is essential for proper outboard control and shift function. Make sure the outboard idles within the specified idle RPM range. If the outboard is run on a flushing device, the idle and quality may not be representative of actual "in water" use.

## Break-In

Please refer to the correct break-in procedure in the manufacturer's manual.

## Warm-up

Before cruising, run the engine at a low speed for about three minutes as a warm-up operation to allow the oil to circulate throughout the machine. Otherwise, the life of the engine will be negatively affected. During warm-up operation, confirm that cooling water is discharged from its check port.

## Fueling

When fueling your engine, be sure to use fresh fuel. Fuel that has been in a tank too long can form gum and varnish, which can affect performance. Use oil as recommended by the manufacturer. Two stroke engines require a special oil to be either mixed with gasoline or injected from a remote tank. This lubrication is essential for the operation of the engine.

 <b>WARNING</b>
<b>EXPLOSION/FIRE HAZARD</b>
<ul style="list-style-type: none"><li>• <b>Store flammable material in safety approved containers. Keep containers in an area designed for that purpose. Never store in a non-vented space.</b></li><li>• <b>Observe no-smoking while fueling</b></li><li>• <b>Fill to less than the capacity of the tank. Allow for fuel expansion.</b></li><li>• <b>Inspect fuel system regularly for leaks.</b></li></ul>

## 15. GETTING READY TO POWER / POWER MODE

### **DANGER**

#### **CAPSIZE HAZARD**

**Your boat has been designed for boating under sail OR power mode. Boating under sail and power at the same time may cause the boat to capsize and could result in property damage, man overboard situation or possible death.**

### **MOTOR POWER**

When powering your boat, ensure the following:

1. The ballast tank is completely full. If the tank is full and must be emptied, open the ballast tank guillotine valve, located at the aft end of the boat, and the ballast tank vent valve, located in the port locker, and begin motoring within the docking or boat ramp areas. Do not exceed 6 mph, wake speed or begin emptying before reaching protected waters. After approximately 15 minutes, verify the ballast tank is empty by inspecting the guillotine valve for discharging water. When water no longer flows from the valve, close the guillotine valve and vent valve.
2. Fill the tank when the boat is stationary. The filling process will take approximately 15 minutes in non-moving water. Do not attempt to fill the ballast tank by reversing the boat. This may cause excess pressure in the tank resulting in possible damage. Do not run the outboard engine while filling the tank.
3. Lower ring the sails down and tie them off with the boom properly secured.
4. Put the rudder in the up position. To raise the rudder, simply pull the up-haul line located inside the helm seat. Use the safety pin to lock the rudder on the pivot joint bracket. The rudder trunk overflow drain ball valves (upper and lower ball valves) must be open. These open ball valves will allow draining of excess water built up during operation. If the ball valves are closed, water may overflow the upper rudder bearing and flood the aft cabin.
5. Put the centerboard in the up position with the up-haul locked in the sheet stopper. For greater

control, the centerboard can be in the down position when motoring at speeds less than 6 mph, considering sufficient water depth.

6. Put the outboard engine in the full down position and locked. (Do not operate your outboard engine in the up position).
7. Close and secure the forward deck hatch. It is recommended that all deck ports (windows) be closed.
8. All loose items throughout the boat are securely stored. Ensure no loose items remain on deck.
9. If the boat is equipped with a transducer, make sure the control panel is functioning and monitoring speed and depth.
10. If anchored, make sure the anchor is retrieved and properly stowed.
11. Distribute weight aft, low and centered. Seat the crew within the cockpit and evenly distributed port and starboard. Ensure no one is positioned on the cabin or foredeck. Redistribute storage weight aft of the v-berth area as much as possible.

### **DANGER**

#### **CAPSIZE HAZARD**

**Powering your boat at high speed with rudder and centerboard down may cause the boat to capsize, resulting in property damage, a man overboard situation or possible death.**

### **DANGER**

#### **CAPSIZE HAZARD**

**Powering your boat at high speed in rough water may cause the boat to capsize and could result in property damage, injury, man overboard situation or possible death. Keep the ballast tank full and decrease speed in rough waters.**

### **DANGER**

#### **CAPSIZE HAZARD**

**DO NOT USE MOTOR POWER WITH SAILS UP. Winds could fill the sails and cause the boat to capsize, resulting in property damage, serious injury, man overboard situation or possible death.**

## 16. STOVE AND TOILET

### STOVE

Carefully read and understand the manufacturer's instructions prior to operating your stove. Save the instructions for review and to transfer to subsequent owners.

**USE ONLY THE FUEL RECOMMENDED BY THE MANUFACTURER AND STORE THE FUEL IN AN APPROVED CONTAINER.**

**DO NOT SMOKE WHILE WORKING WITH FUEL. IMMEDIATELY CLEAN UP ANY SPILLED FUEL.**

### **WARNING**

#### **EXPLOSION/FIRE/ASPHYXIATION HAZARD**

- Open flame cooking appliances consume oxygen. This can cause asphyxiation or death.
- Maintain open ventilation.
- Liquid fuel may ignite, causing severe burns.
- Use fuel appropriate for type of stove.
- Turn off stove burner before filling.
- Do not use stove for comfort heating.
- Use special care with flames or high temperatures near urethane foam. Once ignited, it burns rapidly, producing extreme heat, releasing hazardous gasses and consuming a large amount of oxygen.

### TOILET

theEDGE comes standard with a portable, self-contained marine toilet. Please refer to the manufacturer's instructions to familiarize yourself with the correct operation of your toilet.

Be sure to keep your toilet secured by connecting it to supplied hold down brackets. Add a holding tank deodorant to the lower unit of the tank, which is the holding tank.

Empty the holding tank at an approved permanent toilet facility. Ensure the valve is closed and carry it by the built-in handles. Empty, rinse with fresh water and reassemble the unit.

### **CAUTION**

#### **STAINING/PRESSURE HAZARD**

- Avoid adding holding tank deodorant through the bowl. If adding to the bowl, slide valve must be fully opened. Avoid spilling or splashing deodorants on slide valve seals or bowl. Rinse off any spilled or splashed deodorant immediately.
- Atmospheric pressure and temperature changes may cause pressure buildup in lower holding tank. Caution should be used when first opening slide valve.

# 17. PUMPS AND WATER SYSTEM

REFER TO THE DRAWINGS IN THE DESCRIPTION OF MODEL SECTION OF THIS MANUAL FOR ADDITIONAL INFORMATION.

## PUMPS

All pumps should be checked frequently to ensure proper operation. This is a critical regular maintenance item. Properly operating pumps could save your vessel from costly damage.

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

## WATER SYSTEM OPERATION

theEDGE is equipped with a manual pump water system, incorporating a water tank and a level actuated manual pump. After sitting for sometime, the pump will need a few strokes to prime the system. If you are using water for drinking or washing, be aware of the quality of the water on board and periodically flush the water tank to keep it clean. When storing the boat for the winter, empty the water tank and pump the line dry.

### **WARNING**

**SINKING HAZARD**  
Ensure proper bilge pump operation.

### **CAUTION**

**EQUIPMENT DAMAGE HAZARD**  
Take note of the water tank location when adding options or additional features. When installing, ensure fasteners do not violate the tank housing.

# 18. ELECTRICAL SYSTEM

REFER TO THE DRAWINGS IN THE DESCRIPTION OF MODEL SECTION OF THIS MANUAL FOR ADDITIONAL INFORMATION.

THIS SECTION PROVIDES BASIC INFORMATION TO UNDERSTAND, OPERATE AND MAINTAIN YOUR DC ELECTRICAL SYSTEMS. IT IS NOT INTENDED TO EDUCATE YOU ON REPAIRING OR EXTENDING THE ELECTRICAL SYSTEM.

## BATTERIES

The batteries installed in the boat have been selected for their ability to furnish starting power based on engine starting requirements, as well as their ability to power the DC components attached to the electrical system.

The DC power source is a 12V battery, just as with an automobile, and it must be charged regularly. Some outboard motors include a small alternator which will assist in recharging the battery. If not, you must use a battery charger. Perform regular visual inspections to ensure proper water levels and terminals free of corrosion. If the boat sits for long periods without use, it is recommended to remove the battery(s) and connect them to a trickle charger to keep them fully charged and ready for use.

### **WARNING**

#### CHEMICAL HAZARD

Batteries contain Sulfuric Acid and can cause severe personal injury if mishandled. Avoid contact with eyes, skin, or clothing. In case of contact, flush with water at least 15 minutes. If swallowed, drink large quantities of water or Milk of Magnesia, beaten egg, or vegetable oil and get medical attention immediately.

### **WARNING**

#### SAFETY HAZARD

- Carefully follow safety instructions included with battery.
- Always charge battery in a ventilated location.

## BREAKERS, SWITCHES, AND FUSES

All electrical systems aboard the boat are provided with over-current protection in the form of breakers or fuses. Breakers can be found at the component controls at the 12 Volt Panel or in the battery selector switch panel. The systems that require energizing are given switches.

## LIGHTING SYSTEMS

There are three distinct lighting systems aboard your boat: the interior (Cabin), the exterior and the navigational lighting. The lights are powered from the 12 Volt DC Panel.

## ELECTRIC COOLER (OPTION)

If the boat is equipped with the electric cooler option, the manufacturer's manual will be included and normally found in the cooler. Follow the instructions from the manufacturer's manual on cooler use.

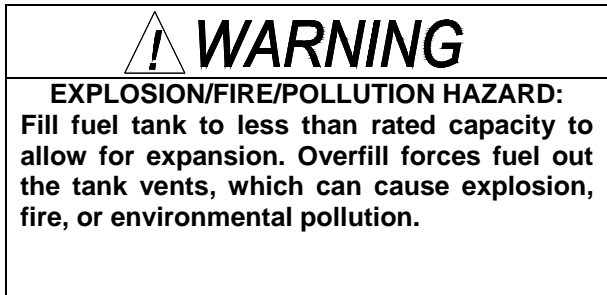
## MAINTENANCE

The electrical system is a 12-volt, negative ground installation. On a weekly basis, you should inspect batteries, terminals and cables for signs of corrosion, cracks, and electrolyte leakage. Battery terminals are to be kept clean and greased. Ensure all connections are clean, tight and covered with a corrosion inhibitor compound. Refer to specific instructions on batteries, wiring diagrams, and electronics.

# 19. ENVIRONMENTAL CONSIDERATIONS

## FUEL AND OIL SPILLAGE

The spilling of fuel or oil into our waterways contaminates the environment and is dangerous to wildlife. Never discharge or dispose of fuel or oil into the water. It is dangerous and unlawful. Common types of accidental discharge include over-filling the fuel tank and pumping contaminated bilge water into the sea.



## DISCHARGE AND DISPOSAL OF WASTE

Waste includes all forms of garbage, plastics, recyclables, food, wood, detergents, sewage, and even fish parts in certain waters. We recommend you return with everything from offshore for proper disposal onshore.

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

## EXHAUST EMISSIONS

Hydrocarbon exhaust emissions pollute our water and air. Keep your engine properly tuned to reduce emissions and improve performance and economy.

## ANTI-FOULING PAINTS

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



## CLEANING CHEMICALS

Cleaning chemicals should be used sparingly and not discharged into waterways. Never mix cleaners and be sure to use plenty of ventilation in enclosed areas. Do not use products that contain phosphates, chlorine, solvents, nonbiodegradable or petroleum based products. Common household cleaning agents may cause hazardous reactions. Fumes can last for hours, and chemical ingredients can attack people, property and the environment.

## 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 Marlow-Hunter Hull Blistering Warranty. The procedure for preparing and applying paint varies between paint manufacturers, but should always include de-waxing, etching and sometimes priming of the surface.

Do not use any sanding, sandblasting or other abrasive preparation of the bottom, as this will void your hull blistering warranty.

## EPOXY BARRIER COAT

Sanding of the gel coat bottom surface will be permitted should a customer wish to have an epoxy barrier coat applied to the hull, (example Interlux Interprotect 1000, 2000, West System or VCTar).

Marlow-Hunter distinguishes between epoxy barrier coatings and epoxy primer paints. If an epoxy barrier coat is applied to a Hunter vessel, it must be

## 19. ENVIRONMENTAL CONSIDERATIONS

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

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



## 20. OUTBOARD ENGINE MAINTENANCE

PROPER ATTENTION TO AND MAINTENANCE OF YOUR ENGINE WILL ASSURE YOU MANY HOURS OF PLEASURABLE, SAFE BOATING, AND WILL PREVENT UNNECESSARY ENGINE PROBLEMS. YOU MUST, THEREFORE, BECOME THOROUGHLY FAMILIAR WITH ALL ASPECTS OF THE ENGINES PROPER OPERATION OUTLINED IN THE MANUFACTURERS OPERATOR'S MANUALS.

### CAUTION

#### OPERATIONAL HAZARD

Take proper care when washing down or cleaning your engine to ensure water does not enter the air in-takes. Water in the air intakes may travel directly to the cylinders, resulting in rust and possible internal engine damage.

Follow the fuel and lubrication requirements in the manufacturer's engine manual. Check oil levels prior to starting, and use lubricants as recommended. Always check fuel lines and connections for possible leaks, which may create a dangerous situation.

ENGINES ARE NOT WARRANTED BY THE MARLOW-HUNTER, LLC; ENGINE WARRANTIES ARE WRITTEN BY THE ENGINE MANUFACTURERS.

### WARNING

#### EXPLOSION/FIRE HAZARD

Fuel system connections that are too loose or too tight can leak, resulting in possible fuel loss, environmental pollution, explosion or fire hazard.

If you use your outboard in salt water, wash down the exposed drive unit after every use to limit corrosion. Also, it is recommended to completely flush out the raw water cooling system as described in the manufacturer's owner's manual. Regularly check the propeller and drive unit for any damage or other signs of serious wear. Propeller damage will reduce

performance as well as contribute to other potential engine problems.

## GENERAL INSPECTION RULES

- 1. Conduct Periodic Inspections for Your Safety** - The functions of engine components will degenerate and engine performance will drop based on engine use. If countermeasures are not taken, you may encounter unexpected troubles while cruising at sea. Consumption of fuel or lubricating oil may become excessive and exhaust gas and engine noise may increase. These all shorten the life of the engine. Periodic inspection and service increase your safety at sea.
- 2. Inspect Before Starting** - Make it a daily rule to inspect before starting.
- 3. Periodic Inspections at Fixed Intervals** - Periodic inspections must be made after every manufacturer's recommended hours of use. Conduct periodic inspections according to the procedures described in your outboard engine manufacturer's manual. Routine inspection and maintenance is necessary to prolong outboard life. **Outboards used in rental, commercial, or other high hour applications require more frequent inspections and maintenance. Adjust schedule for operating and environmental conditions.**
- 4. Servicing Tools** - Have servicing tools available onboard to be ready for inspecting and servicing the engine and other equipment.
- 5. Tightening Torque of Bolts & Nuts** - Over-tightening of bolts and nuts causes them to come off or their threads to be damaged. Insufficient tightening causes oil leakage from the installation face or issues due to the loosening of bolts. Bolts and nuts must be tightened to the appropriate torque specs. Critical parts must be tightened with a torque wrench to the correct tightening torque and in the right order.

## 21. PROTECT YOUR RIGGING

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**WITHOUT CAREFUL INSPECTION AND PROPER MAINTENANCE, THE RIG IS SUBJECT TO FATIGUE, WEAR, DISCOLORATION AND, THEREFORE, PRODUCT FAILURE. REMEMBER, REGULAR INSPECTION AND CLEANING WILL INCREASE THE LIFE OF YOUR INVESTMENT AND SECURE YOUR RIGGING.**

To protect your rigging we suggest the following:

1. Always rinse your rigging with fresh water after sailing, especially salt-water sailing. Salt can create corrosion pits, causing cracks and deterioration.
2. Clean with a water-soluble chlorine-free detergent. Nonabrasive cleansers are best for hard white vinyl coated cables.
3. Inspect rigging for stains. Rust stains may indicate stress cracks or corrosion. Remove stains with synthetic or brass pads. Never use steel wool pads.
4. Look for broken wires, a sign of fatigue in rigging. Replace standing rigging if wires are broken.
5. Never mix stainless steel and galvanized metals on cables, fittings, pins, cotter keys, etc. If mixing dissimilar metals, electric currents may conduct between metals causing rapid deterioration.
6. After unstopping, make sure to release all standing rigging to avoid bending, crushing and kinking.
7. Store rigging in a dry place. Never store in a plastic bag, which can cause corrosion.

### SAIL CARE

Sunlight is a sail's worst enemy, so **cover the mainsail when not in use**. An ultraviolet guard, fitted down the leech of a roller headsail, will protect the exposed part from the weathering effect of the sun and from dirt and grit. Mildew can be prevented by storing sails dry and by hand washing twice a season. Check all sails regularly for chafe, particularly where they chafe on deck fittings or rigging, at reef points, batten sleeves and the foot of the headsail. Sail batten pockets should also be inspected on a regular basis.

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

and continue to the luff. Lash to the boom with sail ties or shock cord.

### GENERAL HARDWARE MAINTENANCE

Check all fittings regularly to be sure screws are tight. Occasionally lubricate (use silicone lubricants) all moving parts on such fittings as blocks, turnbuckles and cam cleats, as well as the locking pins of snatch blocks, track slides, spinnaker poles, etc. Inspect cleat and fairleads for roughness or smoothness with fine-grained emery paper if necessary. Also, replace any missing or damaged cotter pins in turnbuckles and shackles and either tape them or use them or use protective covers manufactured for that purpose. Grease winches annually at a minimum.

### WINCH MAINTENANCE

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

## 22. TRAILER MAINTENANCE

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### **WARNING**

#### **TOWING HAZARD**

Trailer towing can be hazardous. Overloading can cause serious injury or equipment damage. Do not overload your trailer.



### **WARNING**

#### **TOWING HAZARD**

Check the certification decal located near the hitch of your trailer. The Gross Vehicle Weight Rating (GVWR) for your trailer is 5,000 lbs. Total boat weight with all possible Hunter options installed is 4,920 lbs. (including full fuel and ½ water supply). It is your responsibility to ensure any gear or supplies loaded in your boat while under tow does not exceed the total load limit of 5,000 lbs.



### **WARNING**

#### **TOWING HAZARD**

Ensure your tow vehicle has a towing capacity higher than the trailer's GVWR. Using an under-rated tow vehicle is dangerous and illegal.

### **BEFORE USING YOUR TRAILER**

Check all bolts and nuts for tightness, including the lug nuts for the wheels.

1. Check to ensure that all lights are working properly.
2. Always maintain the tires at recommended air pressure.
3. For improved tire life, have your tires spin balanced by a qualified tire service center.
4. When the trailer is hitched to your vehicle, remove the two-speed winch handle before departing.
5. Always check hitch, safety chain connection and boat tie downs prior to departing.

### **PROTECTING AND MAINTAINING YOUR TRAILER**

Before launching your boat, we recommend the light harness be disconnected from your vehicle and allow enough time for bulbs to cool. This will greatly extend the life of your bulbs.

1. The trailer has a galvanized frame, however, some parts, including the brakes, axles, hubs, springs, U bolts, and plates, are not galvanized. Most of these parts have been sprayed with a high gloss black rust resistant paint, plus a clear coating. After launching (especially in salt water locations), rinse your trailer, including the painted components. As a continuing measure to protect your trailer, periodically refinish and repaint surfaces that show signs of rusting.
2. Periodically and regularly check your wheel bearings for sufficient grease and tightness. The more launching you do, the more likely for the need to regrease these bearings.

### **WINCH MAINTENANCE**

1. Periodically grease the gears of your winch with an all-purpose grease.
2. Regularly check the winch cable for signs of wear or damage and replace immediately if needed.

### **WIRING AND LIGHTING**

1. Be sure your vehicle is equipped with the proper lighting connections to avoid overloading circuits.
2. At least once a year, remove light lenses and spray metal components with WD40 or apply a light coating of petroleum jelly.
3. Always carry spare light bulbs.

### **BEARINGS AND HUBS**

## 22. TRAILER MAINTENANCE

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Check wheel bearings periodically with the following procedure:

1. Leave the trailer connected to the tow vehicle with brake set and wheels chocked. (Trailer must be on level ground).
2. The first step in jacking up your trailer is to block the wheel on the opposite side, both front and back.
3. Position the jack on the frame as near to the wheel as possible with supporting-stands installed properly.
4. Proceed to spin the wheel and listen for any noise. Feel the wheel for any roughness in its rotation. If your trailer is equipped with brakes, be certain that the brake shoes are not dragging. A quiet and smooth rotation indicates that the bearings are in good shape. If a noise or grinding sound is evident, the wheel bearing may need an adjustment. To check if an adjustment is needed, grip the edge of the wheel to see if it rocks, or can move. If the wheel moves at all, an adjustment is necessary. Please contact your local dealer for proper procedure. **ALL WORK SHOULD BE DONE BY A QUALIFIED MECHANIC.**

### TIRE PRESSURE

The recommended air pressure can also be found on trailer's certification plate and it will be found molded on the tire. If the plate is damaged, your local dealer can help you in determining the proper tire and rim size.

### NUTS AND BOLTS

Check on all bolts and nuts for tightness. All bolts and nuts should be checked periodically. Please refer to the Manufacturer's manual for torque specification information.

### TRAILER STORAGE

While in storage, the following steps are recommended to ensure continuous optimal performance:

1. If at all possible, park your trailer rig in a protected area, i.e. garage, carport, etc.

2. If you must park your trailer outdoors, install a boat cover that is tight enough for adequate protection but not air tight.
3. Service or repack wheel bearings according to manufacturer's instructions.
4. Jack up the trailer and place blocks under the trailer frame to take most of the weight off trailer springs and tires.
5. Loosen tie-downs and winch line, but be sure the boat is resting properly on hull supports.
6. If the boat has a drain plug, remove it and elevate the trailer tongue slightly (just an inch or two) to allow water to drain out and keep the boat dry. Tie the plug to something obvious, like the steering wheel, so you will remember to replace the drain plug before you take your next trip.
7. While boat is in storage, it is a good time to touch up rust spots, nicks and chips and replace damaged tie-downs, winch line, wiring, etc.
8. Lubricate all moving parts such as rollers, winch, etc.

**PROPER MAINTENANCE AND CARE OF YOUR TRAILER WILL HELP ENSURE A MORE TROUBLE FREE HAULING EXPERIENCE.**

## 23. GENERAL CARE

### CLEANING FIBERGLASS SURFACES

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

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

#### **WARNING**

##### **EXPLOSION/FIRE HAZARD**

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

### CLEANING ACRYLIC

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

#### **CAUTION**

##### **DAMAGE HAZARD**

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

### VINYL

These patterns, like all fabrics, require a regularly scheduled cleaning program. A thorough cleaning should be administered on a daily, weekly or monthly

basis depending on use and exposure to dirt and/or staining agents. It is important to begin treatment of a stain as soon as possible after a spill. It is advisable to clean these products as soon as the first signs of dinginess occur; otherwise, delaying clean up will require a much greater effort to restore the product to its original appearance.

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

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

Finally, please remember that all our fabric grain vinyls require a greater cleaning effort to maintain than comparable smooth grain vinyls. These products will provide an attractive and durable alternative to conventional fabrics and vinyls if properly maintained.

### FABRICS

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

**Fabric:** Blot dry. Do not machine wash. Use only mild soap and water. Wipe with a clean white cloth. If stain persists, dry clean. Be sure to treat cleaned surfaces with scotch guard. Stretched or loose covers may be steam leaned. If foam is removed, it will restuff more easily if wrapped with thin plastic.

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

**Cushions:** If wet, prop cushions vertically to promote airflow around each cushion. Cushions can be

## 23. GENERAL CARE

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cleaned by most dry cleaners. **Dry clean only.**

### WOOD MAINTENANCE

Over time, the boat interior may exhibit normal signs of wear and tear and reveal blemishes in the cherry wood finish. To address light to heavy blemishes, we recommend the following items be used within the process:

- 220 sand paper
- Mohawk Satin Top Coat
- Mohawk Sealer
- Cherry Glaze Blended Stick

Begin by sanding the blemish until it disappears. Touch up the area with the cherry blended stick and smooth out with a finger until well blended. If it is a light blemish, conclude the procedure by applying the Mohawk top coat until you achieve the desired look. If it is a heavier blemish, apply the Mohawk Sealer and allow to dry for 20 minutes. Apply any additional coats if necessary, sanding between each coat. Conclude the procedure by applying the Mohawk top coat until you achieve the desired look.

## 24. STORAGE AND WINTERIZATION

---

THIS SECTION PROVIDES BASIC RECOMMENDATIONS ON STORAGE AND WINTERIZATION AND SHOULD NOT BE CONSIDERED A COMPLETE OR EXACT LIST. CONSULT YOUR LOCAL DEALER FOR SPECIFIC STORAGE AND WINTERIZATION INSTRUCTIONS. BALLAST TANK SHOULD BE EMPTY TO PREVENT FREEZING OR RUPTURING.

### STORAGE METHODS

Winter storage is recommended to be done in one of the following three ways:

1. Cradle blocking
2. Chained stands on level ground
3. 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 sail maker 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 manufacturer's manual) and charge. It is a good idea to also remove the electronics (radio, radar, etc) and store in a safe place.

### CUSHIONS

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

### HATCHES

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

### WATER SYSTEM

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

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

### TOILET AND HOLDING TANK

Drain and flush toilet. Using non-toxic antifreeze, pump through toilet and into holding tank.

### OUTBOARD ENGINE

Store your engine in a safe place. Refer to manufacturer's manual for specific storing and maintenance.

### DEPARTURE FROM THE BOAT

Invest the time necessary to compile and complete a storage checklist. Addressing overlooked items generally becomes impractical or impossible once later remembered. Primary on this list are items relating to the safety and security of the unattended craft: turning off fuel valves, properly setting electrical switches, pumping out bilges and leaving the switch on automatic (or arranging for periodic pumping). **It is recommended that the power be turned off when leaving the boat.** Other departure checklist items should include securing ports, windows, hatches and doors.

### ROUTINE MAINTENANCE

Routine maintenance checklists should include items based on boat use (usually in terms of engine hours) and on calendar dates (weekly, monthly or seasonal checks).

Boat use items typically include oil level checks/changes and oil and fuel filter changes.

## 24. STORAGE AND WINTERIZATION

---

Calendar based items typically include electrolyte levels in batteries, pressure gauges on dry chemical fire extinguishers, and navigation lights.

Check the operation of automatic bilge alarms or pump switches by running water into the boat. Periodically close and open sea cocks several times to ensure their free and easy operation in case they are needed in an emergency. Emergency equipment and supplies should be inspected for any signs of deterioration.



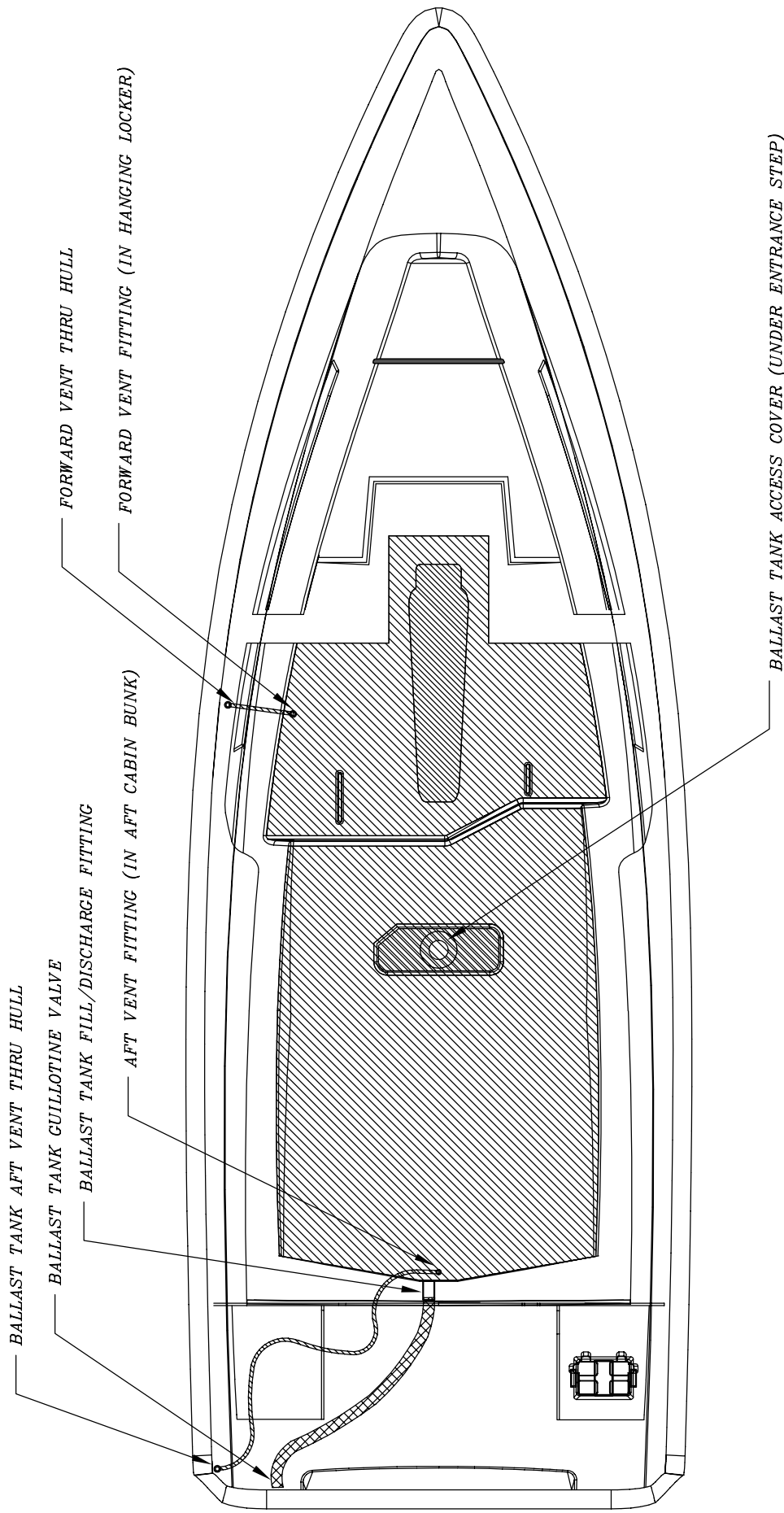
## 25. ELECTROLYSIS AND GALVANIC PROTECTION

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Salt water allows electric current to flow from anodic to cathodic material. For any two distinct metals, their relative positions in the galvanic rating table will determine which loses material (the anode) and which remains largely undisturbed (the cathode). The distance between the two metals on the galvanic table determines the rate of wear. Thus a sacrificial zinc anode is often fitted to the underwater area of a boat to attract any destructive currents away from bronze or steel propeller shafts, for example. An easy place to fit an anode is on the propeller shaft, or covering the propeller nut. The anode should not be painted; this would render it ineffective.

It is not enough to know that your boat does not suffer from electrolysis; a newcomer in the adjacent marina berth may unintentionally allow an unwanted association between metal components.

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



**NOTE:**

1. ALL SHADED AREA ARE PART OF BALLAST TANK.
2. DO NOT DRILL ON ALL SHADED AREA.

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**HUNTER**

**BALLAST TANK DETAILS**

DRAWING NO. 27TE8062	REVISION NO. None
DRAWN BY: ENG	DATE: 07/22/08

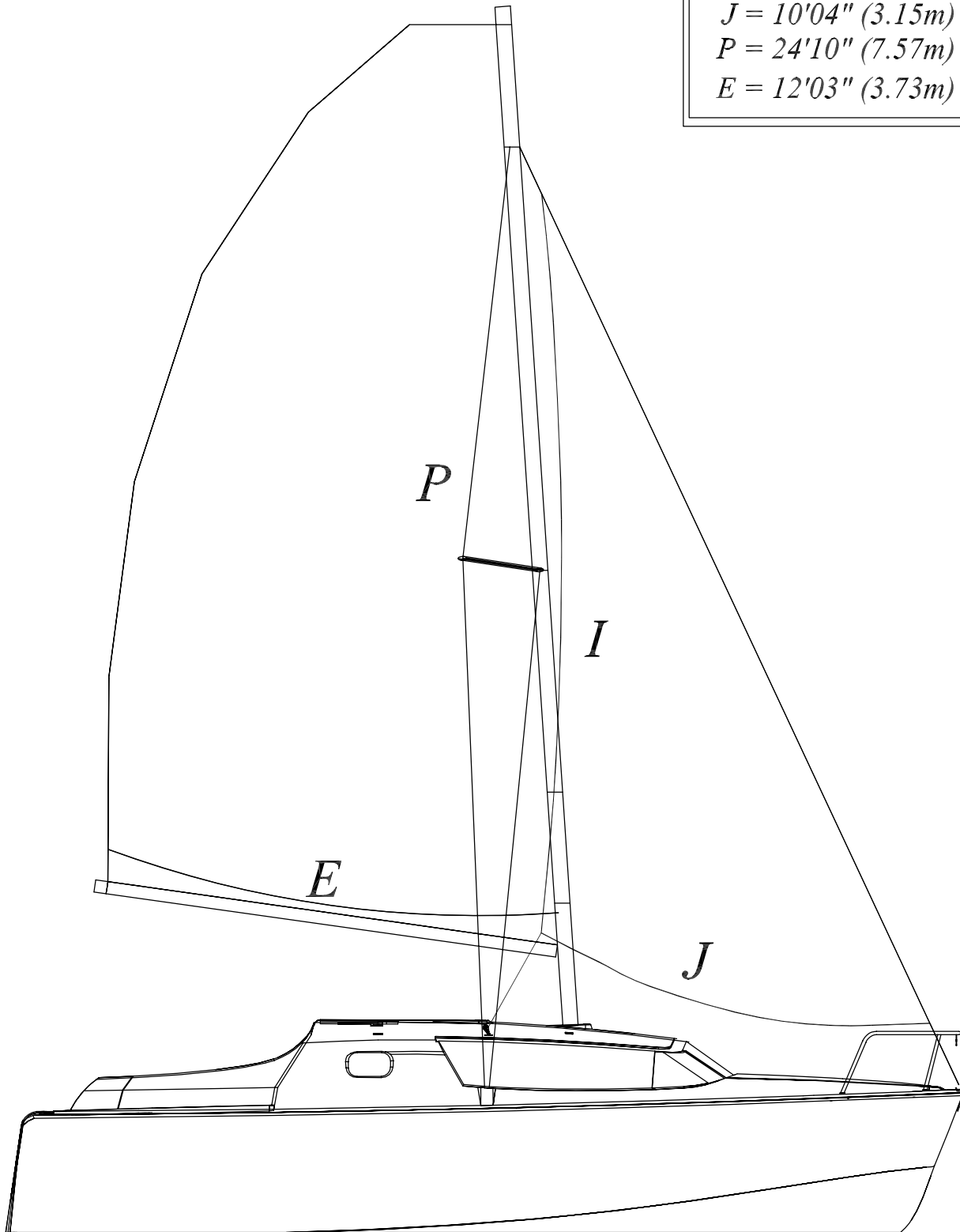
## DIMENSIONS AND CAPACITIES

LENGTH OVERALL	28' 06"	8.69m
HULL LENGTH	26' 04"	8.69m
LENGTH OF WATERLINE (LWL)	23' 04"	7.11m
BEAM (MAX)	8' 04"	2.53m
BEAM WATERLINE	7' 07"	2.31m
DRAFT CENTERBOARD DOWN	5' 11"	1.8m
DRAFT CENTERBOARD UP	1' 06"	0.46m
DISPLACEMENT WITH BALLAST	5540 LBS	2513 KG
BALLAST	1600 LBS	727 KG
MAST HEIGHT FROM WATERLINE	33' 11"	9.42m
SAIL AREA (Actual Area Including Roach and Overlap)	333 SQ.FT.	30.94 SQ.M.
WATER CAPACITY/STANDARD	2.5 U.S. Gallons	9.45 Liters
WATER CAPACITY/OPTION	20 U.S. Gallons	75.7 Liters
HOLDING TANK CAPACITY	12 U.S. Gallons	
STANDARD (PORTA-POTTY)	2.8 U.S. Gallons	10.61 Liters
OPTION ( WITH. MARINE HEAD)	12 U.S. Gallons	45.46 Liters
FUEL TANK CAPACITY (MAX)	2 x 12 U.S. Gallons	2 x 45.42 Liters
BATTERY CAPACITY	DEALER SUPPLIED	
ELECTRICAL VOLTAGES (STANDARD)	12V	
ELECTRICAL VOLTAGES (OPTION)	110V	
OPT. OUTBOARD ENGINE	UP TO 75 H.P.	56.25 kw
MAXIMUM LOADING	6 PERSONS/1,438LBS	652 kg

## STANDING RIGGING

QTY	ITEM	WIRE SIZE	TOP	BOTTOM	WIRE LENGTH (2/3)	PIN SIZE	NOTES
2	Cap shroud	4mm	434 ball	422 turnbuckle	315.35 Inches (8,010 mm)	8mm	2/3 open turnbuckle
1	Headstay	4mm	444 eye	5422 turnbuckle + 5621 toggle	333.66 Inches (8,475 mm)	8mm	2/3 open turnbuckle
2	Lowers	4mm	434 ball	422 turnbuckle	173.82 Inches (4,415 mm)	8mm	2/3 open turnbuckle

HUNTER 27TE STANDARD RUNNING RIGGING SPECIFICATIONS											
Boat: HUNTER 27 THE EDGE											Date: 8/11/08
#	OPT/STD	ITEM	QTY	SIZE/IN	SIZE/MM	COLOR	END 1	END 2	LENGTH/FT	LENGTH/M	
1	STD	MAINSHEET	1	3/8	9.5	WHITE <small>W/BUE/RED TRAGER</small>	EYE	BARE	47.0	14.3	
2	STD	VANG	1	1/4	6.3	WHITE <small>W/BUE/YELLOW TRAGER</small>	EYE	BARE	20.0	6.1	
3	STD	MAIN HALYARD	1	5/16	8	BLUE FLECK	EYE	BARE	65.6	20.0	
4	STD	JIB HALYARD	1	5/16	8	RED FLECK	EYE	BARE	65.6	20.0	
5	STD	TOPPING LIFT	1	5/16	8	GREY SOLID	EYE	BARE	59.0	18.0	
6	STD	JIB SHEET	2	13/32	10	GREEN FLECK	BARE	BARE	55.0	16.7	
7	STD	CENTERBOARD UPHAUL	1	3/8	9.5	WHITE	BARE	BARE	12.0	3.7	
8	STD	CENTERBOARD CONTROL	1	3/8	9.5	WHITE	BARE	BARE	8.0	2.4	
9	STD	RUDDER RAISING LINE	1	1/4	6.3	BLACK	BARE	BARE	14.0	4.3	
10	STD	REEF STRING	1	VARIES	VARIES	VARIES	BARE	BARE	32.8	10.0	
11	STD	OUTHHAUL	1	5/16	8	RED FLECK	BARE	BARE	24.6	7.5	
12	STD	REEFING LINE #1	1	5/16	8	BLUE FLECK	BARE	BARE	37.7	11.5	



$I = 23'08'' (7.21m)$ $J = 10'04'' (3.15m)$ $P = 24'10'' (7.57m)$ $E = 12'03'' (3.73m)$
--

DRAWING TITLE: **STANDARD SAIL PLAN**  
 DRAWING NO: 27PS8058  
 DRAWN BY: ENG

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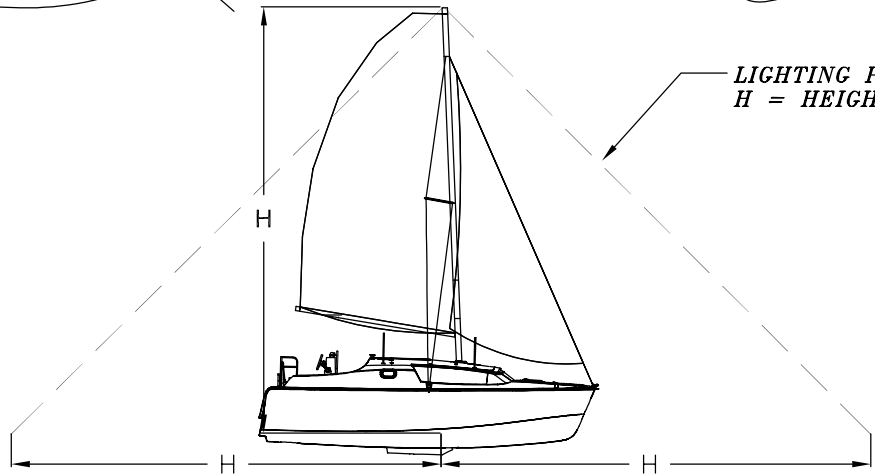
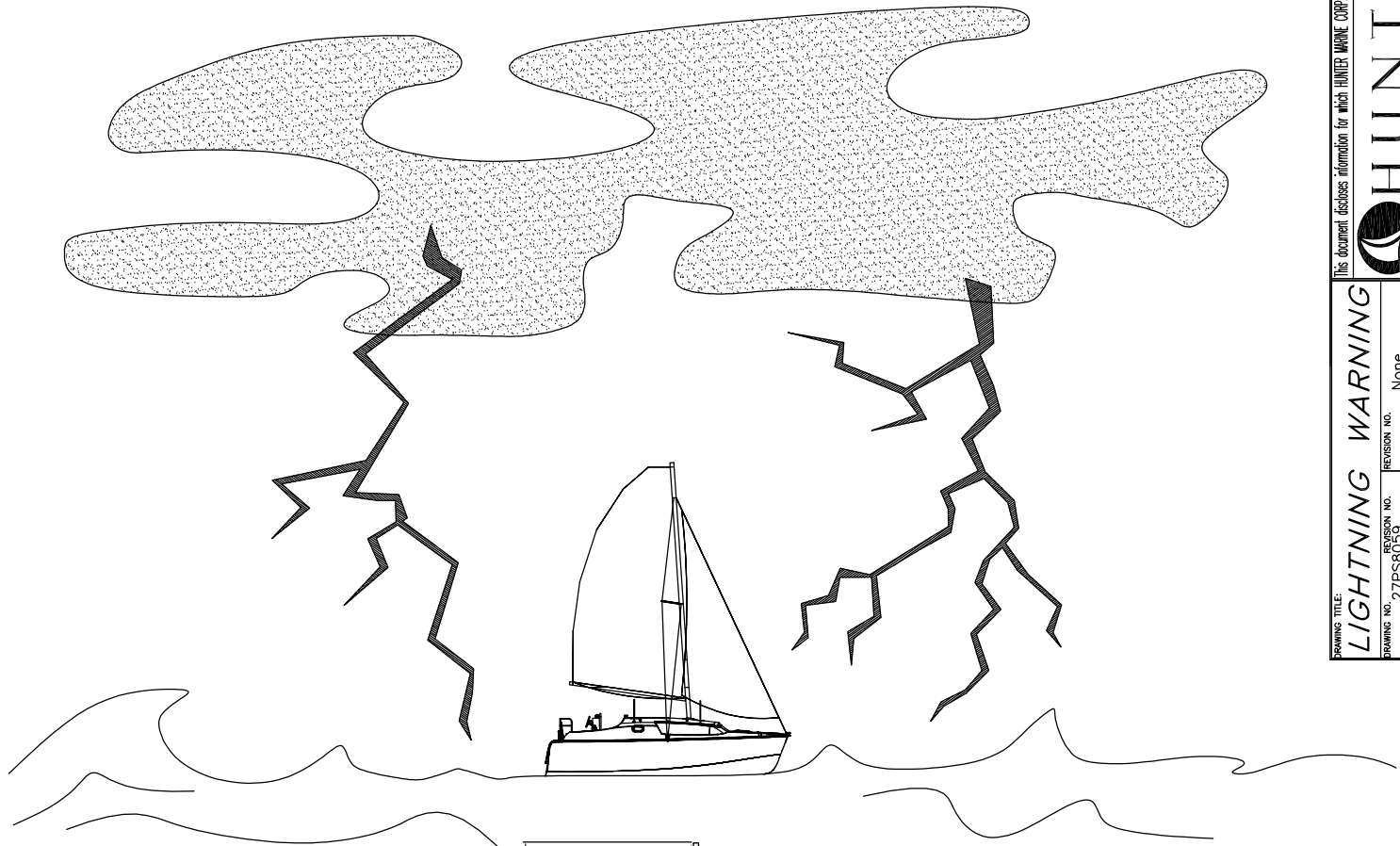
REVISION NO: None DATE: 05/28/08
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**LIGHTNING WARNING**

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REVISION NO. None  
DATE: 05/08/08  
DRAWN BY: ENG



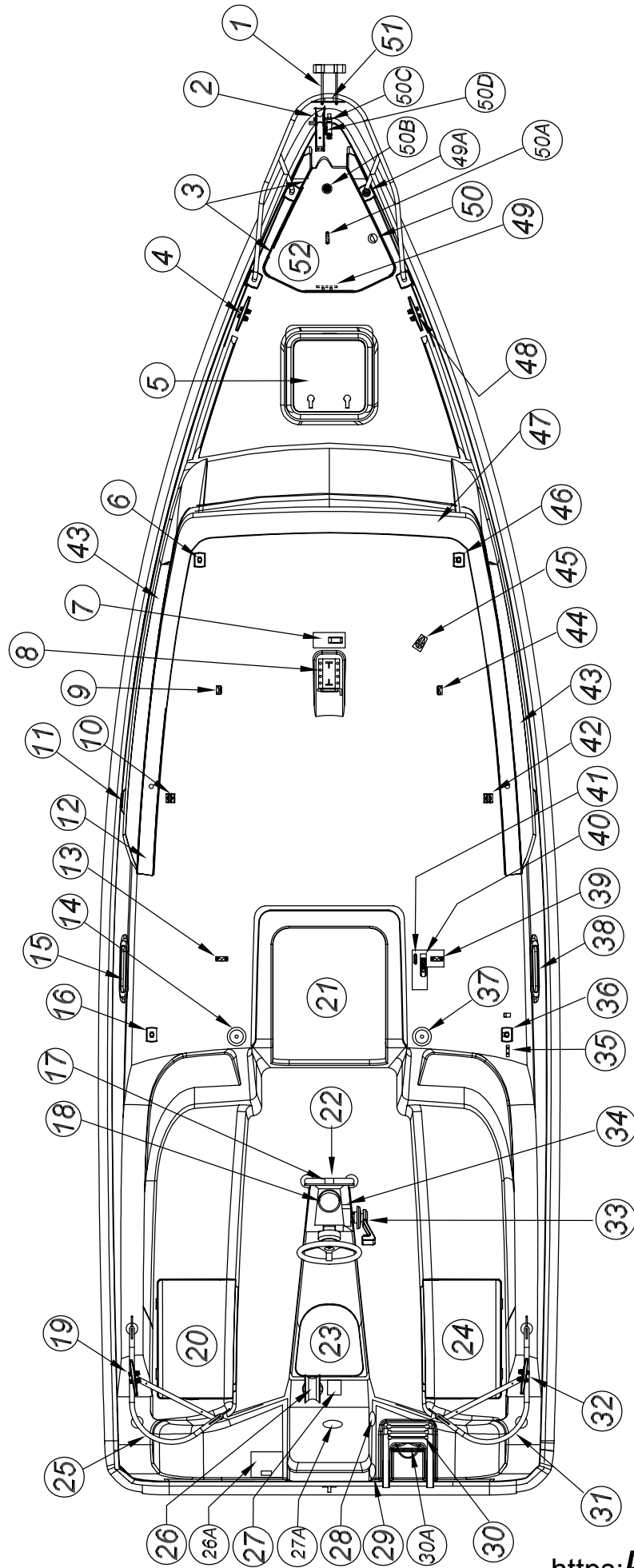
LIGHTNING PROTECTION ZONE  
H = HEIGHT OF MAST

**LIGHTNING STORM WARNING:**

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

**NOTE: THIS BOAT IS NOT PROVIDED WITH ANY LIGHTNING PROTECTION SYSTEM. SEEK A QUALIFIED ABYC CERTIFIED ELECTRICIAN IF SUCH SYSTEM NEEDS TO BE ADDED TO THE BOAT.**

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

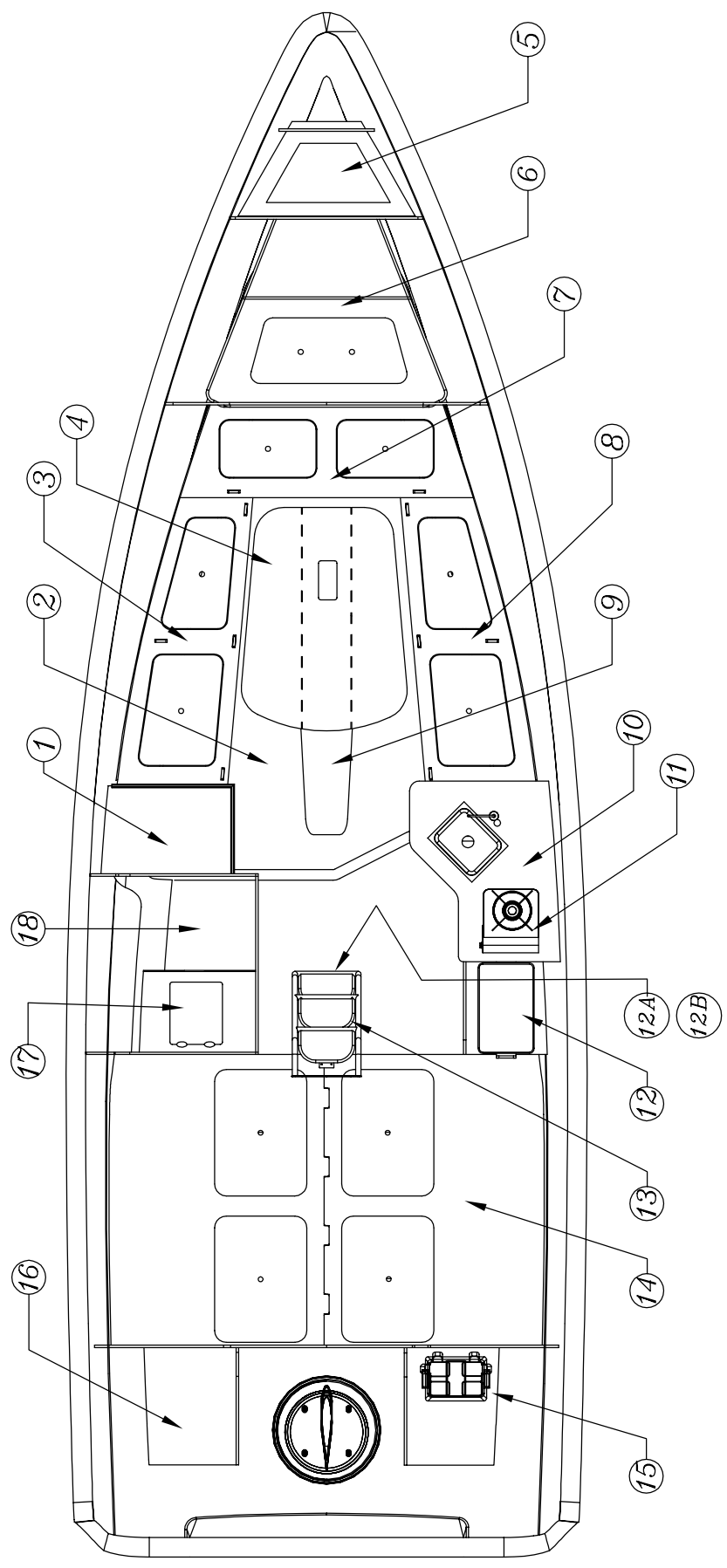




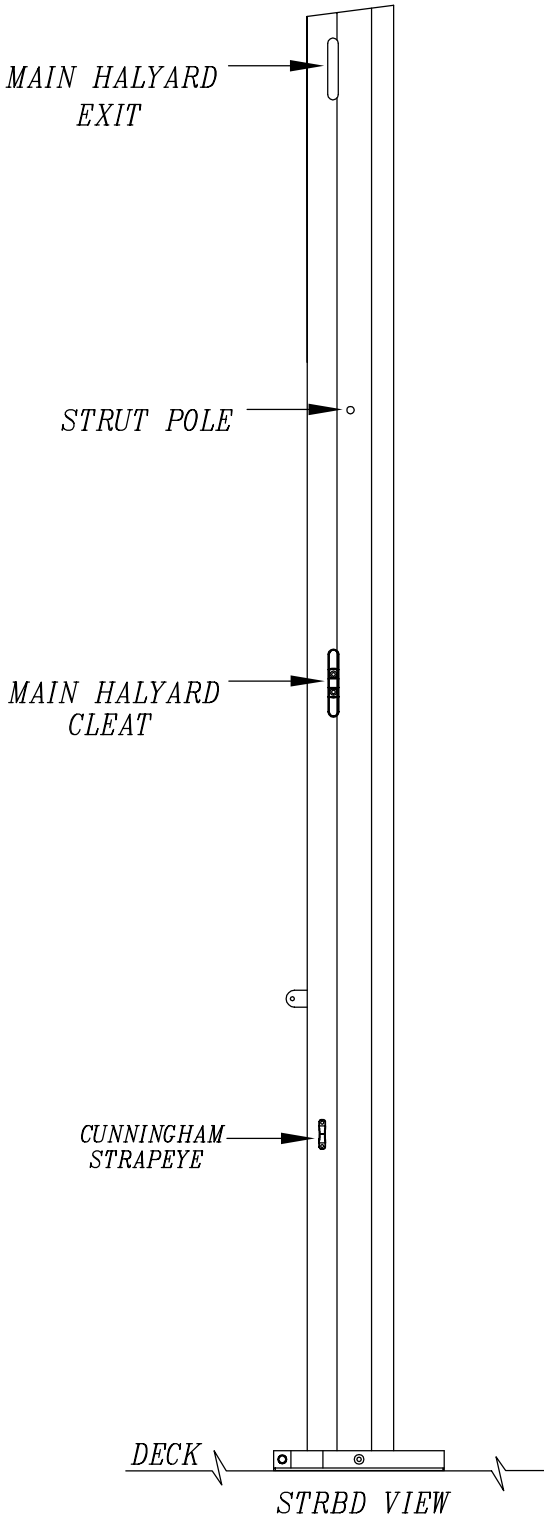
## 27 theEDGE DECK HARDWARE LIST

ITEM	DESCRIPTION
1	MAST FORWARD CRUTCH SUPPORT (ON BOW RAIL)
2	BOW ROLLER
3	ANCHOR WELL LID HINGES
4	PORT FORWARD MOORING CLEAT
5	DECK FORWARD HATCH
6	STANCHION
7	THRU DECK BLOCK
8	MAST STEP
9	MAST PORT LOWER STRUT MOUNT
10	PORT JIB SHEET TURNING BLOCK
11	PORT CHAIN PLATE
12	PORT EYE BROW
13	CAM CLEAT
14	PORT WINCH
15	PORTLIGHT WITH SCREEN
16	PORT AFT STANCHION
17	COCKPIT GRABRAIL
18	COMPASS
19	PORT AFT MOORING CLEAT
20	COCKPIT STORAGE COMPARTMENT LID
21	COMPANIONWAY HATCH ASSEMBLY
22	STEERING PEDESTAL ACCESS COVER
23	HELMSEAT / RUDDER COMPARTMENT
24	OUTBOARD FUEL TANK COMPARTMENT
25	PORT STERN RAIL
26	MAST AFT SUPPORT CRUTCH
26A	STEERING ARM COVER
27	STERN LIGHT
28	INSULATION BOOT FOR ENGINE CONTROL CABLES
29	INSULATION BOOT FOR ENGINE STEERING CABLE
30	SWIM LADDER WITH GRAB PLATE
30A	SWIM LADDER GRABRAIL
31	STARBOARD STERN RAIL
31A	TRANSOM "U" BOLT
32	STARBOARD AFT MOORING CLEAT
33	OUTBOARD ENGINE THROTTLE / TRANSMISSION LEVER
34	COCKPIT STEERING PEDESTAL
35	JIB FURLING CLEAT
36	STARBOARD AFT STANCHION WITH FURLING BULLSEYE
37	STARBOARD WINCH
38	STARBOARD PORTLIGHT
39	CAM CLEAT
40	SINGLE LINE SHEET STOPPER
41	PAD EYE
42	STARBOARD JIB SHEET TURNING BLOCK
43	DECK STARBOARD FIXED WINDOW
44	MAST STARBOARD LOWER STRUT MOUNT
45	CENTERBOARD RAISING TURNING CHEEK
46	STARBOARD FORWARD STANCHION WITH FURLING BULLSEYE
47	STARBOARD EYE BROW
48	STARBOARD FORWARD MOORING CLEAT
49	ANCHORWELL LINE CLEAT
49A	FURLING LINE TURNING BLOCK
50	ANCHORWELL LATCH
50A	ANCHORWELL "U" BOLT
50B	ANCHORWELL DRAIN PLATE
50C	STEM PLATE
50D	STEM PAD EYE
51	BOW LIGHT (ON BOW RAIL)
52	ANCHOR WELL LID

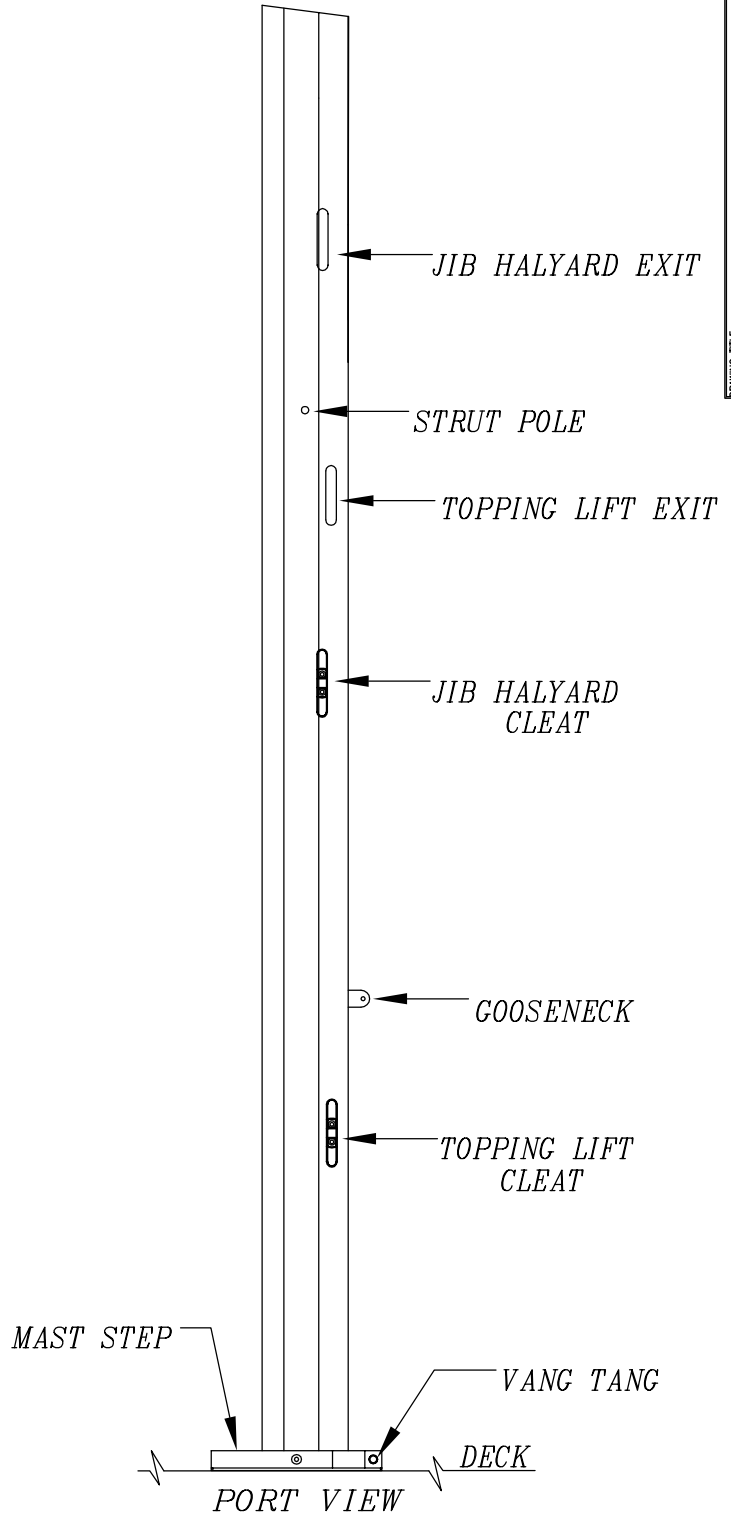
- |                                   |  |                         |
|-----------------------------------|--|-------------------------|
| 1 MAIN CABIN HANGING LOCKER       | 7 MAIN CABIN FORWARD BUNK                    | 13 ENTRANCE STEP        |
| 2 MAIN CABIN FLOOR (BALLAST TANK) | 8 MAIN CABIN STARBOARD BUNK                  | 14 AFT CABIN BUNK       |
| 3 PORT SALON BUNK                 | 9 CENTERBOARD TRUNK COVER                    | 15 ENGINE START BATTERY |
| 4 DINING TABLE                    | 10 GALLEY                                    | 16 WASTE TANK PLATFORM  |
| 5 ANCHORWELL ACCESS DOOR          | 11 COOKING STOVE (OPTION)                    | 17 PORTABLE TOILET      |
| 6 FORWARD CABIN BUNK              | 12 ELECTRIC COOLER (OPTION)                  | 18 HEAD ROOM            |
|                                   | 12A BALLAST TANK ACCESS COVER                |                         |
|                                   | 12B BALLAST TANK LEVEL INDICATOR (IN ACCESS) |                         |



FORWARD →



← FORWARD



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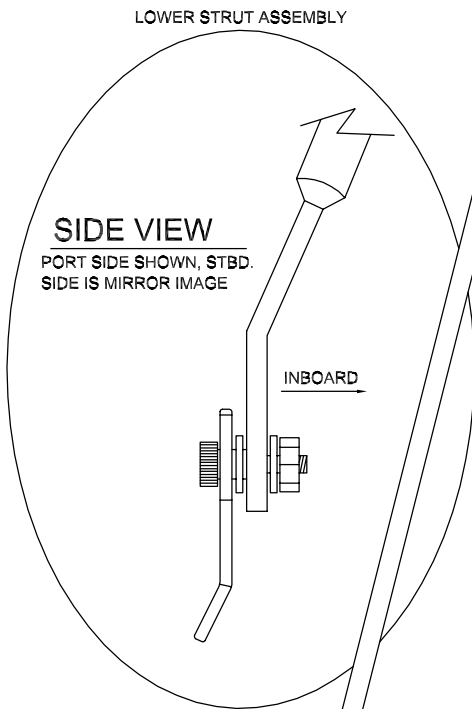
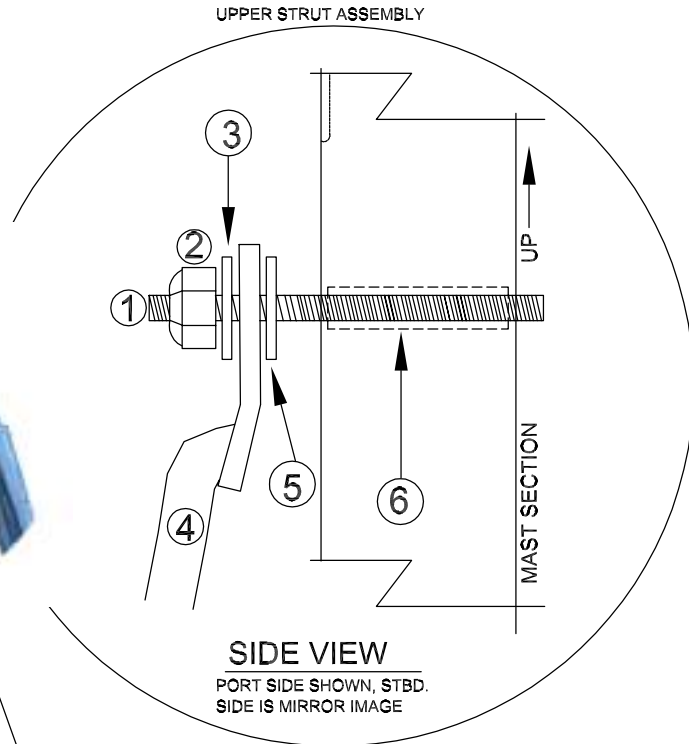
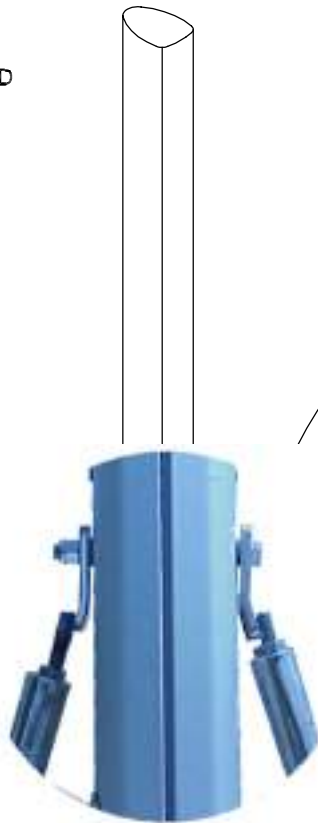
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MAST ARRANGEMENT

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DRAWN BY: ENG	DATE: 04/17/08

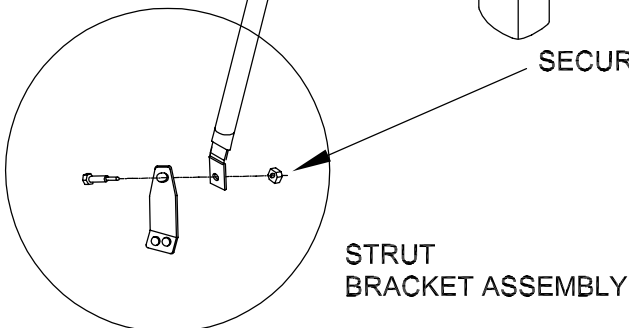
**MOUNTING KITS**

- ① 3/8" (9.5 mm) S.S. THREADED ROD
- ② 3/8" (9.5 mm) LOCK NUT
- ③ 3/8" (9.5 mm) S.S. FLAT WASHER
- ④ UPPER STRUT BRACKET
- ⑤ 3/8" (9.5mm) NYLON WASHER
- ⑥ COMPRESSION SLEEVE



**ATTENTION:**  
NEVER TRY TO SAIL THE VESSEL WITHOUT STRUTS IN PLACE AND PROPERLY FASTENED. SOME PLAY IS DESIRABLE, THEREFORE DO NOT OVERTIGHTEN THE LOWER STRUT BRACKET.

STRUT MOUNTING PLATES  
NOTE: STRUTS MOUNT TO INBOARD SIDE OF STRUT MTG. PLATE



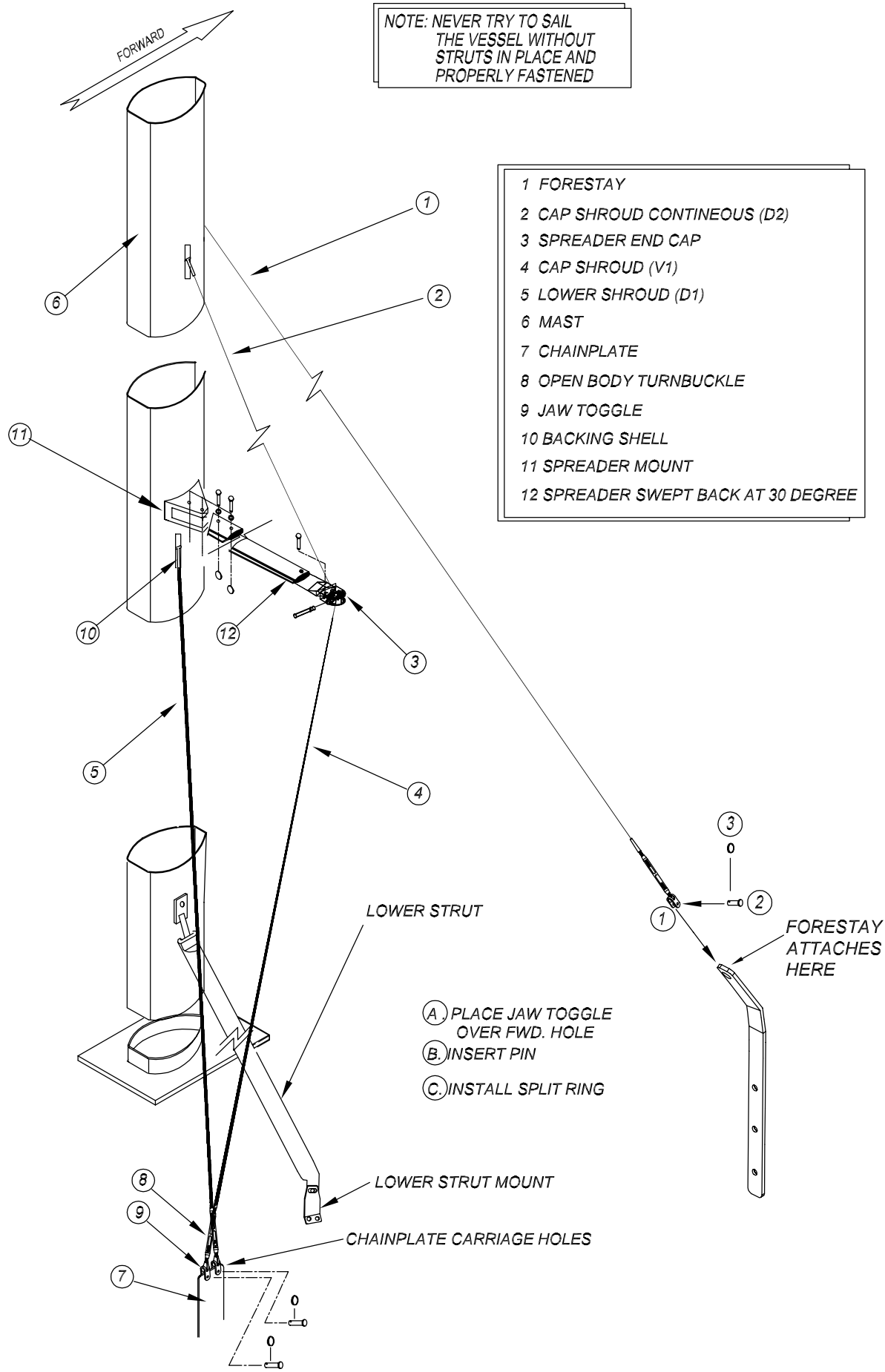
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DRAWING TITLE: <b>STRUT ASSEMBLY</b>	
DRAWING NO.: 27TE8064	REVISION NO.: None
DRAWN BY: ENG	DATE: 04/18/08

DRAWING TITLE	
STANDING RIGGING (STANDARD)	
DRAWING NO.	REVISED BY
27PS8065	NONE
DRAWN BY:	DATE
ENG	04/18/08

NOTE: NEVER TRY TO SAIL THE VESSEL WITHOUT STRUTS IN PLACE AND PROPERLY FASTENED



- 1 FORESTAY
- 2 CAP SHROUD CONTINEOUS (D2)
- 3 SPREADER END CAP
- 4 CAP SHROUD (V1)
- 5 LOWER SHROUD (D1)
- 6 MAST
- 7 CHAINPLATE
- 8 OPEN BODY TURNBUCKLE
- 9 JAW TOGGLE
- 10 BACKING SHELL
- 11 SPREADER MOUNT
- 12 SPREADER SWEPT BACK AT 30 DEGREE

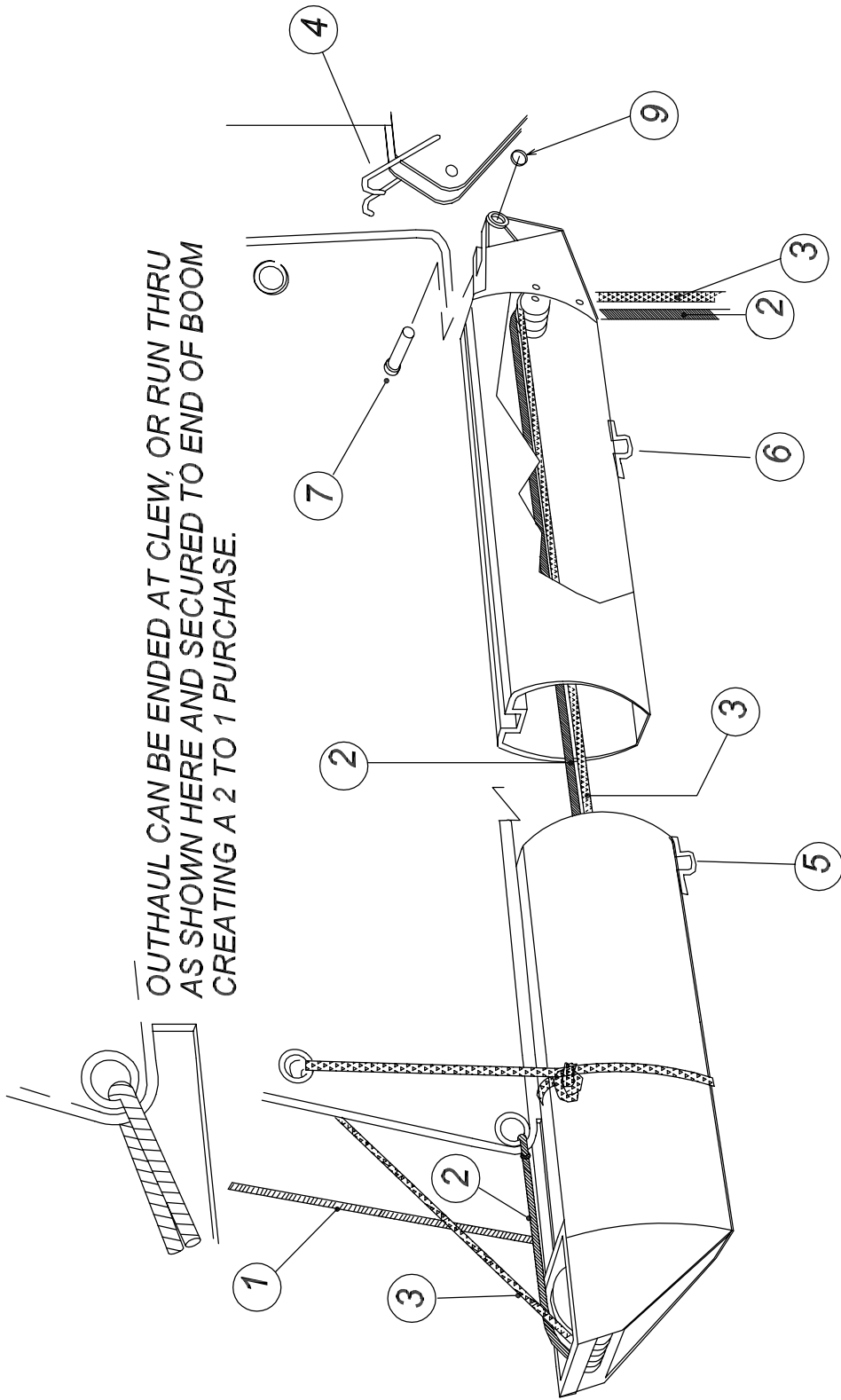
LOWER STRUT

LOWER STRUT MOUNT

CHAINPLATE CARRIAGE HOLES

FORESTAY ATTACHES HERE

- (A) PLACE JAW TOGGLE OVER FWD. HOLE
- (B) INSERT PIN
- (C) INSTALL SPLIT RING



OUTHHAUL CAN BE ENDED AT CLEW, OR RUN THRU AS SHOWN HERE AND SECURED TO END OF BOOM CREATING A 2 TO 1 PURCHASE.

- ① BOOM TOPPING LIFT
- ② OUTHHAUL
- ③ REEF LINE
- ④ RAMSHANK HOOKS (FOR TACK REEF GROMMET)
- ⑤ MAINSHEET PURCHASE BALE
- ⑥ VANG BALE
- ⑦ BOOM CLEVIS PIN
- ⑧ RETAINING RING

DRAWING TITLE: BOOM DETAILS AND LAYOUT

REVISION NO. 27PS8066

DATE: 04/17/08

ENGINEER: ENG



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## 27 theEDGE REEFING INSTRUCTIONS

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**IF THE WIND STRENGTH BUILDS TO THE POINT WHERE THE BOAT HEELS EXCESSIVELY OR UNCOMFORTABLY, YOU MAY REDUCE THE SAIL AREA BY TAKING IN A REEF. REEFING IS EASIEST WHEN DONE ON A STARBOARD TACK (WHEN THE WIND IS BLOWING FROM THE STARBOARD SIDE) SINCE THE JIB SHEET IS ON THE PORT SIDE, AND THE HALYARD WINCH IS THEN FREE. HOWEVER, REEFING CAN BE DONE ON EITHER TACK.**

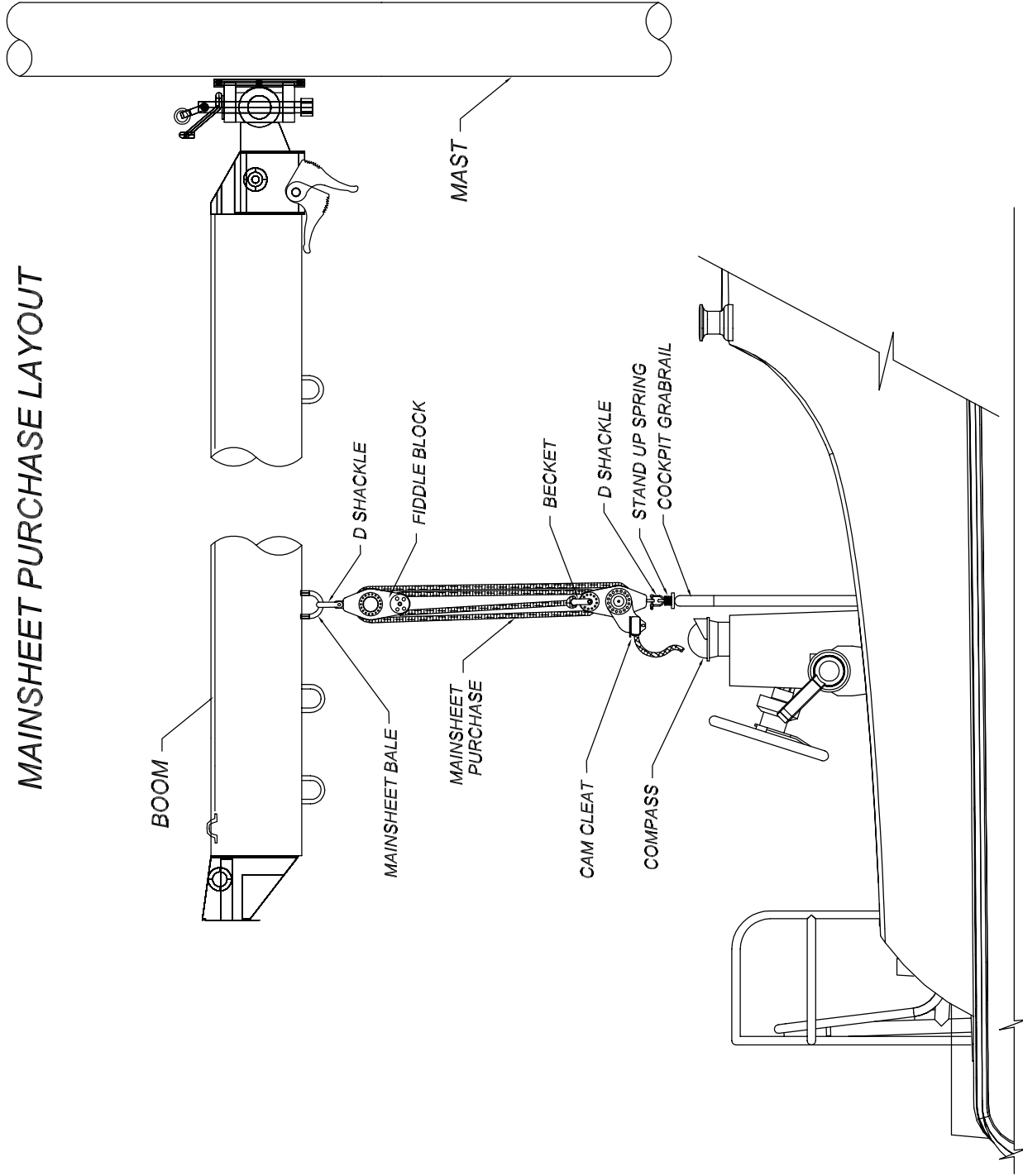
1. FEATHER THE BOAT INTO THE WIND SLIGHTLY TO REDUCE THE HEEL.
2. EASE THE TENSION ON THE MAINSHEET.
3. MAKE SURE THE STARBOARD WINCH IS FREE BY EITHER PUTTING THE BOAT ON A STARBOARD TACK OR BY TAKING THE JIB SHEET AND JAMMING IT IN THE JIB SHEET JAM CLEAT BEFORE REMOVING IT FROM THE WINCH.
4. TRANSFER THE MAIN HALYARD TO THE WINCH, AND TAKE UP FULL TENSION OF THE HALYARD BETWEEN THE WINCH AND THE SHEET STOPPER. THEN UNLOCK THE MAIN HALYARD SHEET STOPPER.
5. LOWER THE MAIN HALYARD UNTIL THE FORWARD REEF CRINGLE ON THE SAIL CAN BE SECURED BY INSERTING THE REEF HOOK THRU LOCATED ON THE BOOM GOOSE NECK THROUGH THE CRINGLE.
6. RETENSION THE MAIN HALYARD UNTIL ALL THE SLACK OR WRINKLES ARE REMOVED FROM THE LUFF.
7. TIGHTEN THE REEF LINE AT THE FORWARD END OF THE BOOM BY PULLING THE LINE DOWN THROUGH THE SHEAVE AND JAM UNTIL THE AFT REEFING CRINGLE IS AGAINST THE BOOM AND THE LINE CANNOT BE TENSIONED ANY FURTHER. THE MAINSHEET AND VANG MAY HAVE TO BE LOOSENED TO BE ABLE TO ACHIEVE THE PROPER TENSION.
8. JAM THE REEF LINE AT THE GOOSENECK. RETENSION THE VANG AND MAINSHEET ACCORDINGLY. REJAM THE MAIN HALYARD AND TRANSFER THE JIB SHEET BACK TO THE WINCH IF NECESSARY.

9. IF THE WIND CONTINUES TO INCREASE, YOU MAY DROP THE JIB COMPLETELY AND LASH IT TO THE DECK USING A SAIL TIE. THIS WILL ALLOW YOU TO SAIL ON A REEFED MAIN ALONE. IN SOME CASES, YOU MAY FIND IT MORE EFFECTIVE TO DROP THE JIB FIRST, INSTEAD OF / BEFORE YOU TAKE IN A REEF. IT MAY ALSO BE EASIER TO TAKE IN A REEF BY TEMPORARILY LOWERING THE JIB DURING THE REEFING PROCESS.

### **SHAKING OUT A REEF**

1. TRANSFER MAIN HALYARD TO THE WINCH AS EXPLAINED ABOVE.
2. EASE THE MAIN HALYARD DOWN ENOUGH TO REMOVE THE FORWARD REEF CRINGLE FROM THE REEF HOOK ON THE BOOM GOOSENECK.
3. UNJAM THE REEF LINE AT THE FORWARD END OF THE BOOM.
4. RAISE MAIN HALYARD USING THE WINCH. WHILE DOING SO, ENSURE THE REEFING LINE CONTINUES TO RUN THROUGH THE SAIL REEF CRINGLE AND THE FORWARD BOOM JAM.
5. TENSION THE MAIN HALYARD AND REJAM
6. ADJUST THE SHEET AND VANG AS NECESSARY.

# MAINSHEET PURCHASE LAYOUT



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# HUNTER

DRAWING TITLE: **MAINSHEET PURCHASE LAYOUT**

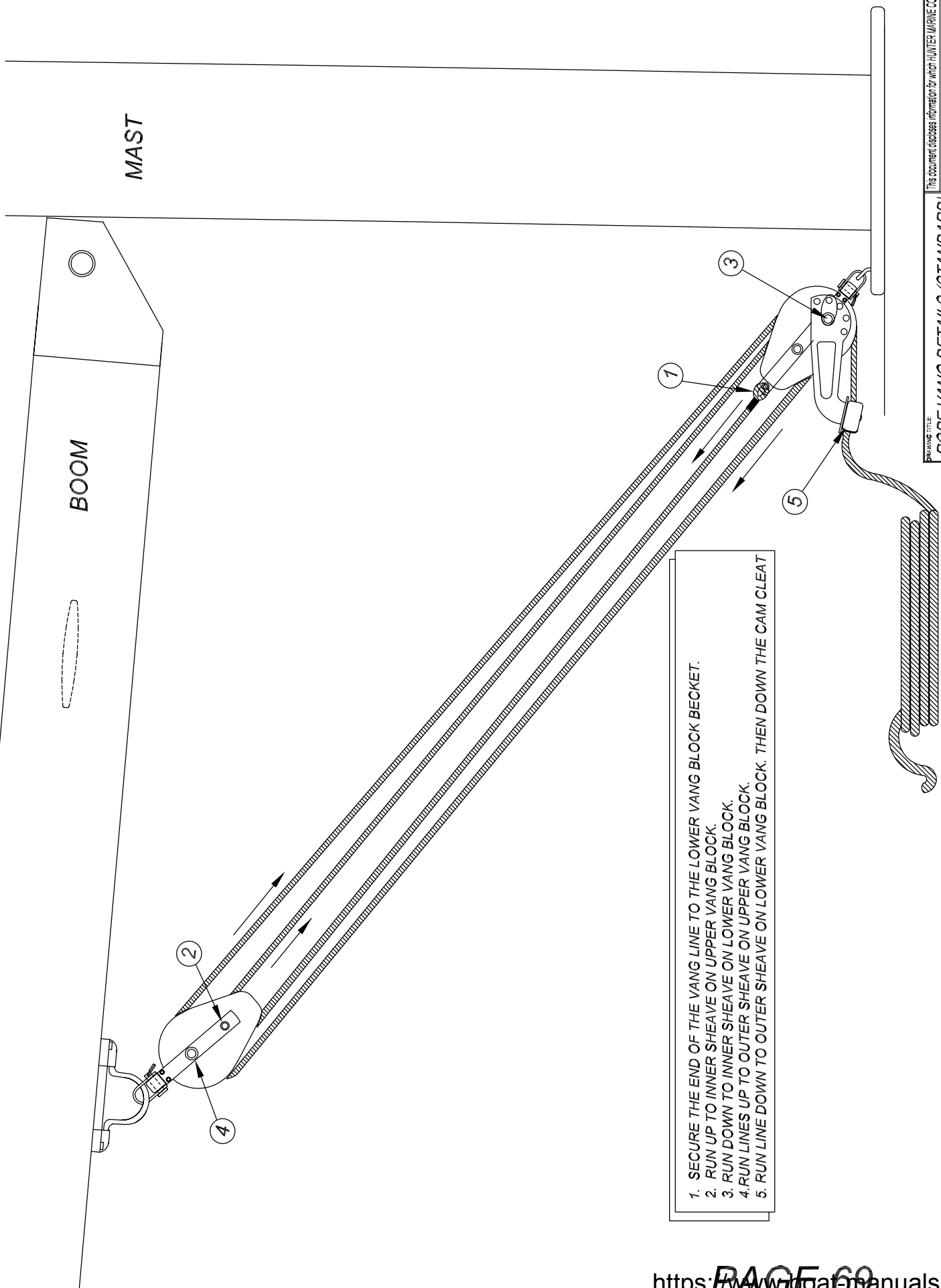
DRAWING NO. 22PS8068	REVISION NO. None
DRAWN BY: ENG	DATE: 04/21/08





**ROPE VANG DETAILS (STANDARD)**

DRAWING NO	27PS8069	REVISION	NONE
DRAWN BY	ENG	DATE	04/18/08

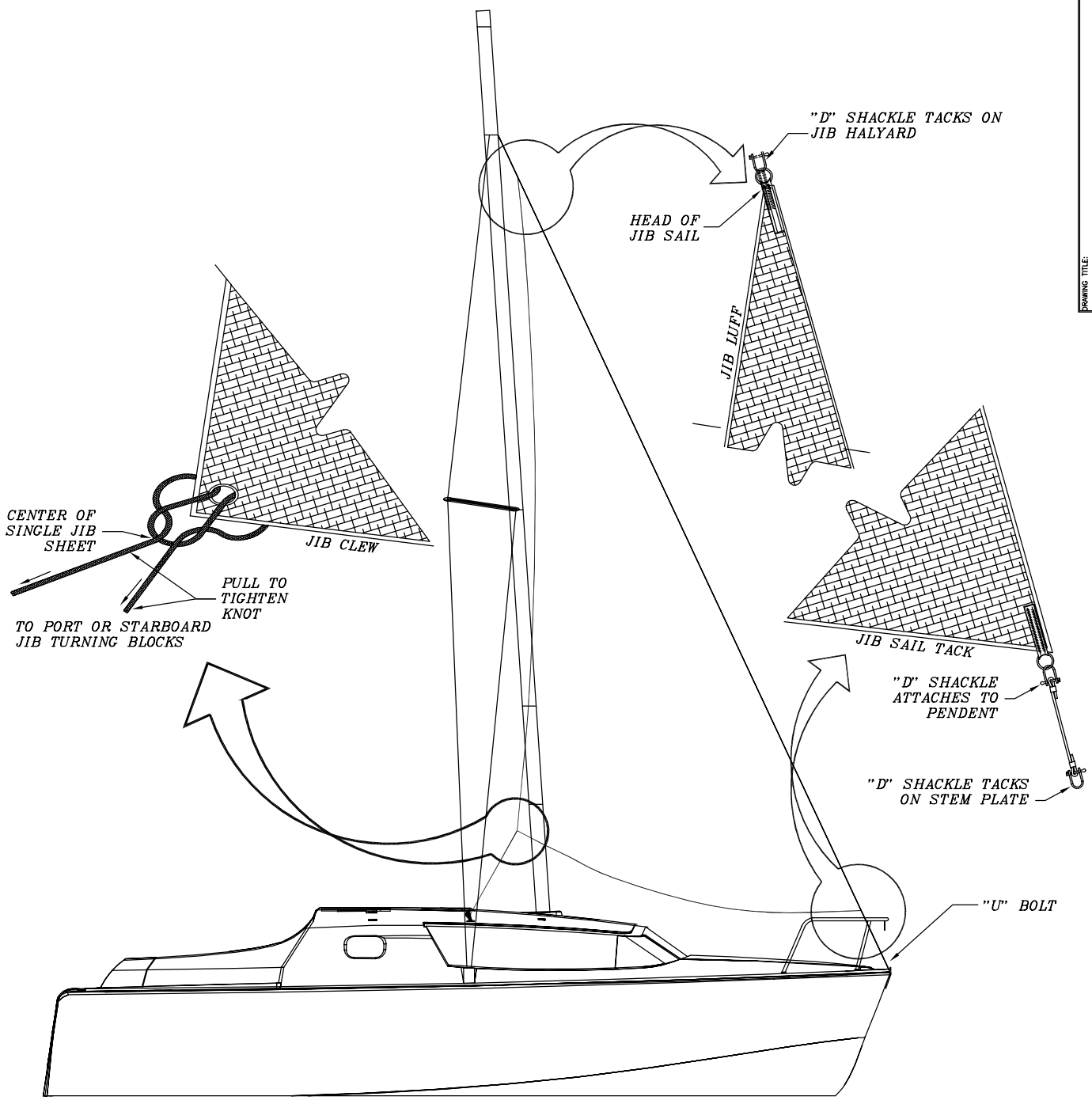


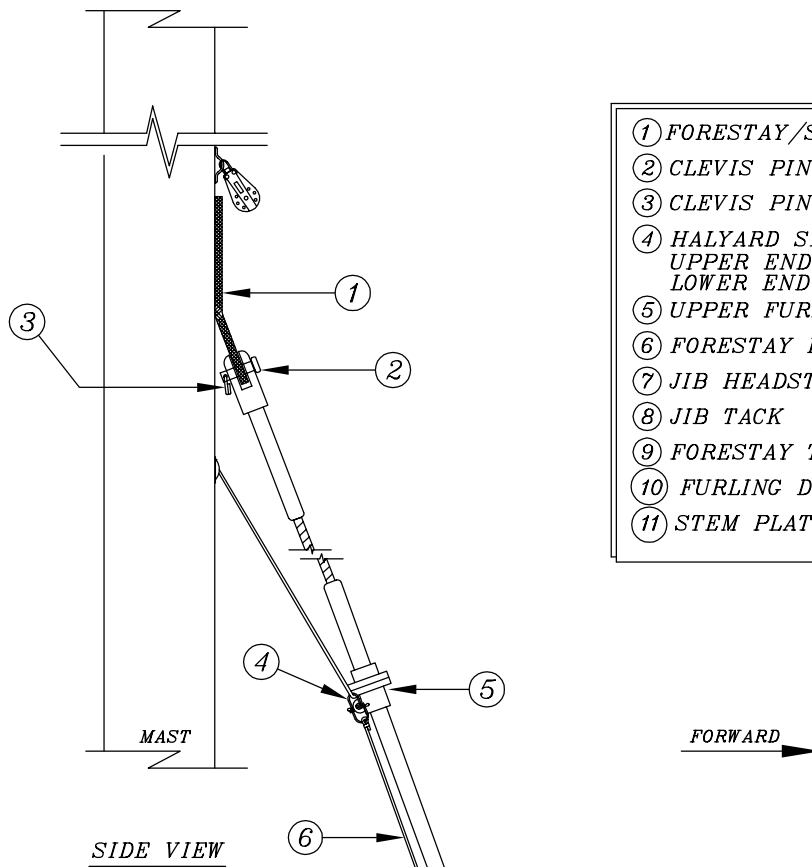
1. SECURE THE END OF THE VANG LINE TO THE LOWER VANG BLOCK BECKET.
2. RUN UP TO INNER SHEAVE ON UPPER VANG BLOCK.
3. RUN DOWN TO INNER SHEAVE ON LOWER VANG BLOCK.
4. RUN LINES UP TO OUTER SHEAVE ON UPPER VANG BLOCK.
5. RUN LINE DOWN TO OUTER SHEAVE ON LOWER VANG BLOCK. THEN DOWN THE CAM CLEAT



STANDARD JIB SHEET ARRANGEMENT

DRAWING NO. 27PS8070	REVISION NO. None
DRAWN BY: ENG	DATE: 04/17/08





- ① FORESTAY/SHROUD TANG
- ② CLEVIS PIN
- ③ CLEVIS PIN SPLIT RING
- ④ HALYARD SHACKLE  
UPPER END = MARINE EYE  
LOWER END = MARINE EYE
- ⑤ UPPER FURLING SWIVEL
- ⑥ FORESTAY PENDENT
- ⑦ JIB HEADSTAY
- ⑧ JIB TACK
- ⑨ FORESTAY TURNBUCKLE
- ⑩ FURLING DRUM
- ⑪ STEM PLATE

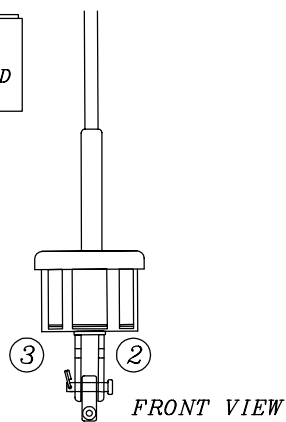
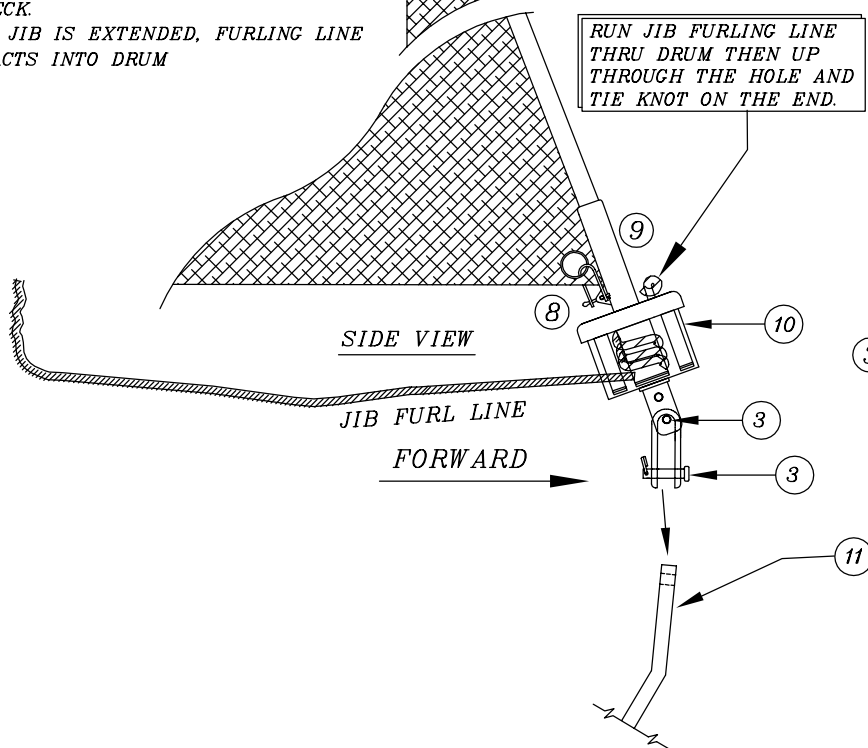
**SIDE VIEW**

FORWARD →

**JIB FURLING:**

1. JIB IS INSTALLED ROLLED UP
2. FURLING LINE IS EXTENDED ALL THE WAY
3. LEAD FURLING LINE THRU FAIRLEADS ON DECK
4. WHEN JIB IS EXTENDED, FURLING LINE RETRACTS INTO DRUM

RUN JIB FURLING LINE THRU DRUM THEN UP THROUGH THE HOLE AND TIE KNOT ON THE END.



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**HUNTER**

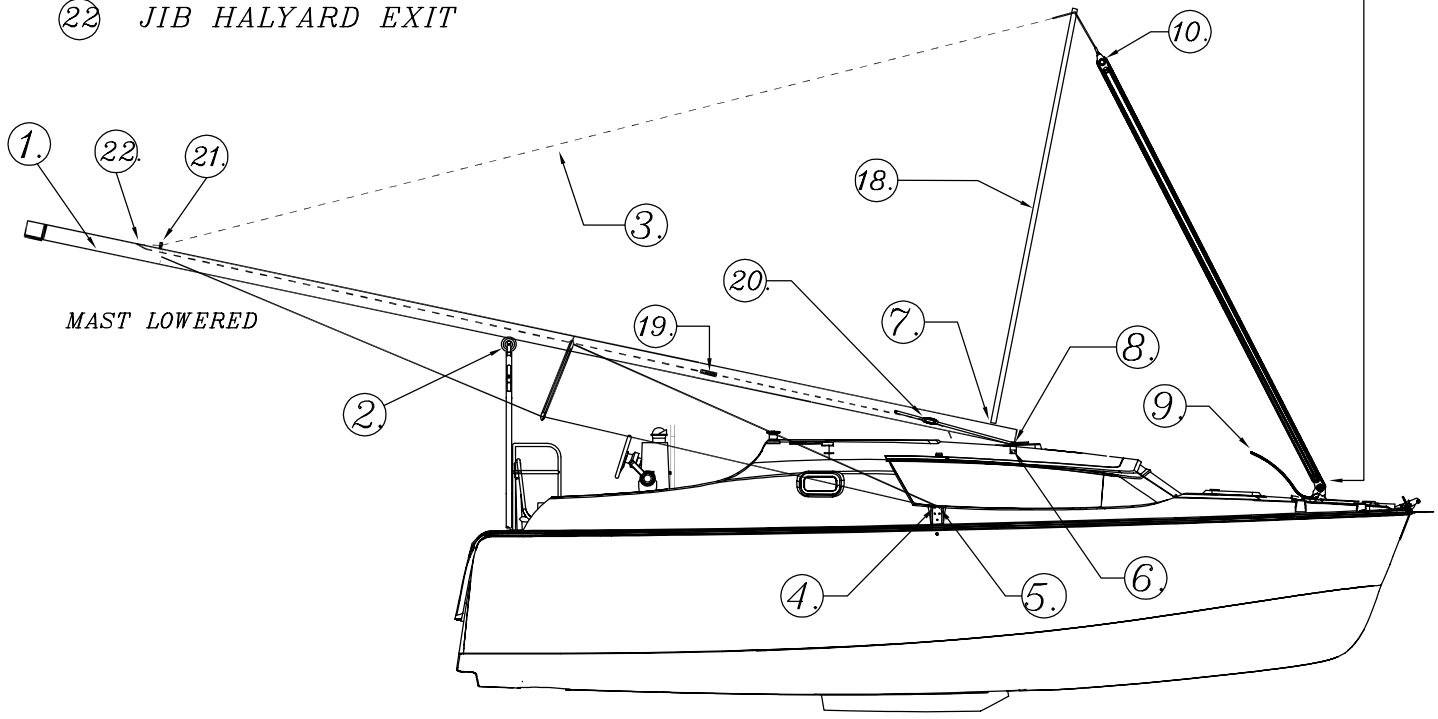
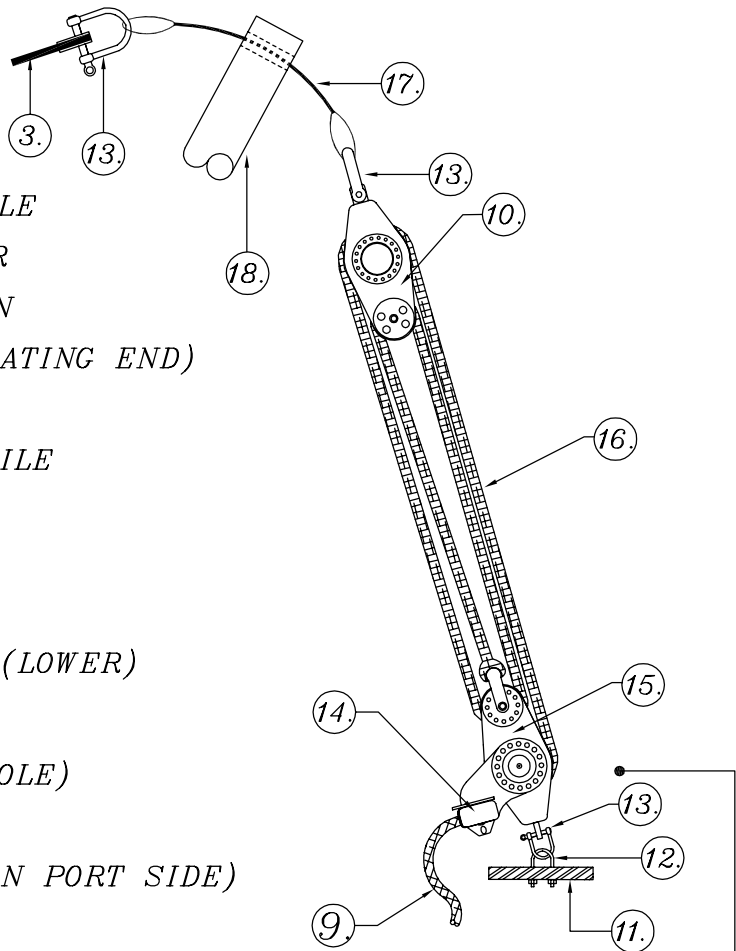
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DRAWING NO. 27PSB071	REVISION NO. None
DRAWN BY: ENG	DATE: 04/24/08

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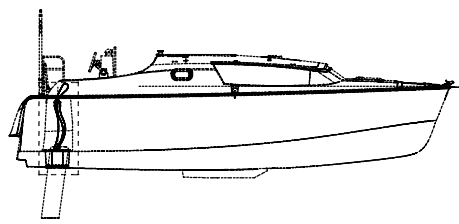


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DRAWING NO.: 27PS8072	REVISION NO.: None
DRAWN BY: ENG	DATE: 04/24/08

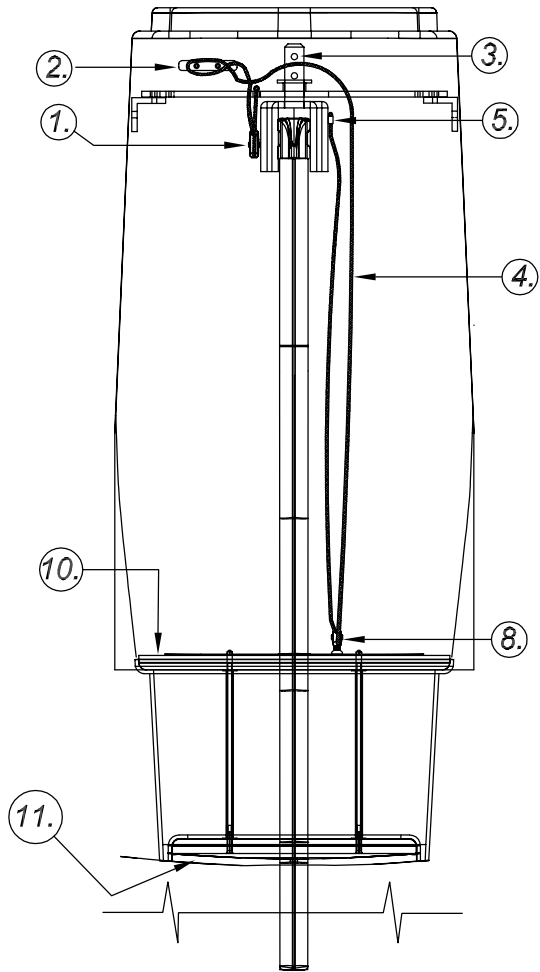
- ① MAST
- ② SLIDE ROLLER
- ③ JIB HALYARD
- ④ CAP SHROUD CARRIAGE HOLE
- ⑤ STRUT MOUNT
- ⑥ LOWER SHROUD CARRIAGE HOLE
- ⑦ MAST RAISING POLE ON SPAR
- ⑧ MAST STEP WITH SAFETY PIN
- ⑨ MAINSHEET PURCHASE (OPERATING END)
- ⑩ FIDDLE BLOCK (UPPER)
- ⑪ ANCHORWELL PLATFORM PROFILE
- ⑫ "U" BOLT IN ANCHORWELL
- ⑬ "D" SHACKLE
- ⑭ CAM CLEAT
- ⑮ FIDDLE BLOCK WITH BECKET (LOWER)
- ⑯ MAINSHEET PURCHASE
- ⑰ THIMPLE (TOP OF RAISING POLE)
- ⑱ MAST RAISING POLE
- ⑲ JIB HALYARD EXIT (LOWER ON PORT SIDE)
- ⑳ CLEAT (PORT SIDE)
- ㉑ EYESTRAP (BELOW JIB HALYARD EXIT)
- ㉒ JIB HALYARD EXIT



1. UPPER TURNING BLOCK (RUDDER UP POSITION)
2. RAISING LINE CLEAT
3. SAFETY PIN
4. RUDDER RAISING / LOWERING LINE
5. UPPER EYESTRAP
6. UPPER EYESTRAP (RUDDER DOWN POSITION)
7. UPPER TURNING BLOCK (RUDDER DOWN POSITION)
8. LOWER TURNING BLOCK
9. HELMSMAN SEAT BASE
10. RUDDER UPPER BEARING
11. RUDDER LOWER BEARING
12. RUDDER BRACKET ASSEMBLY

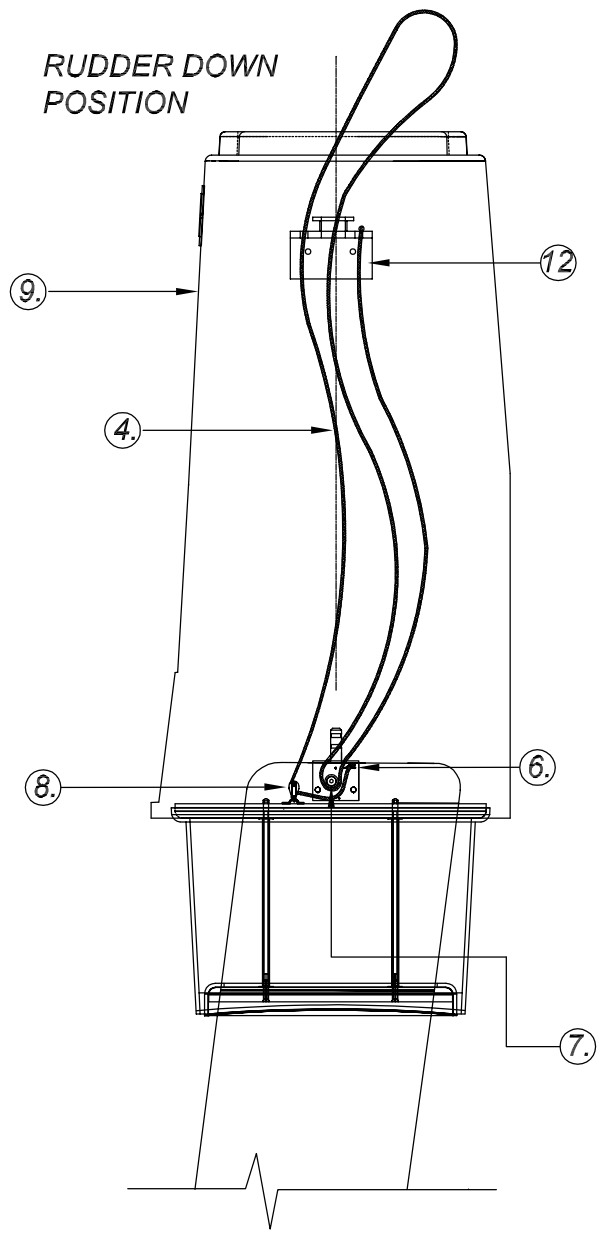


**RUDDER UP POSITION**

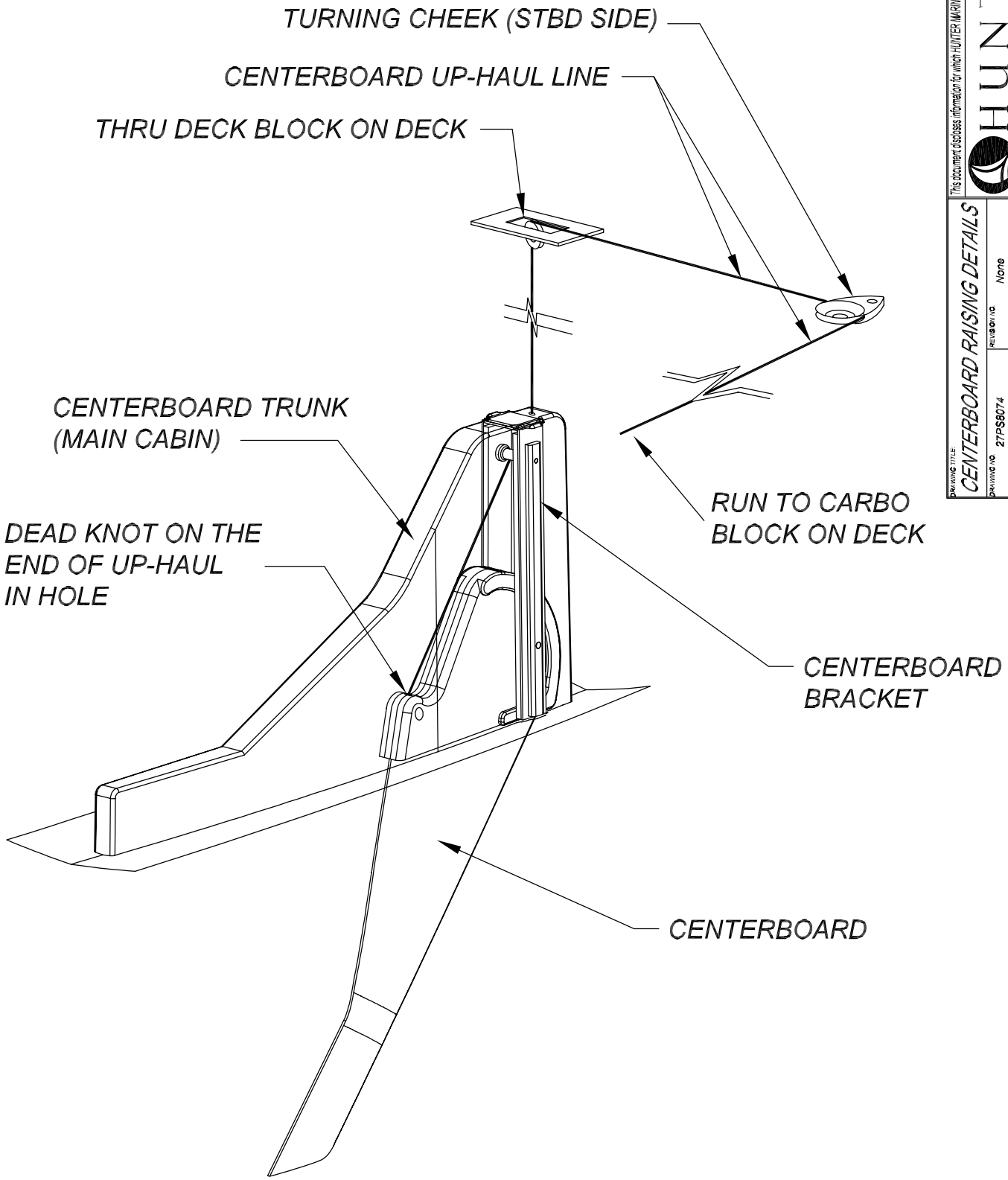


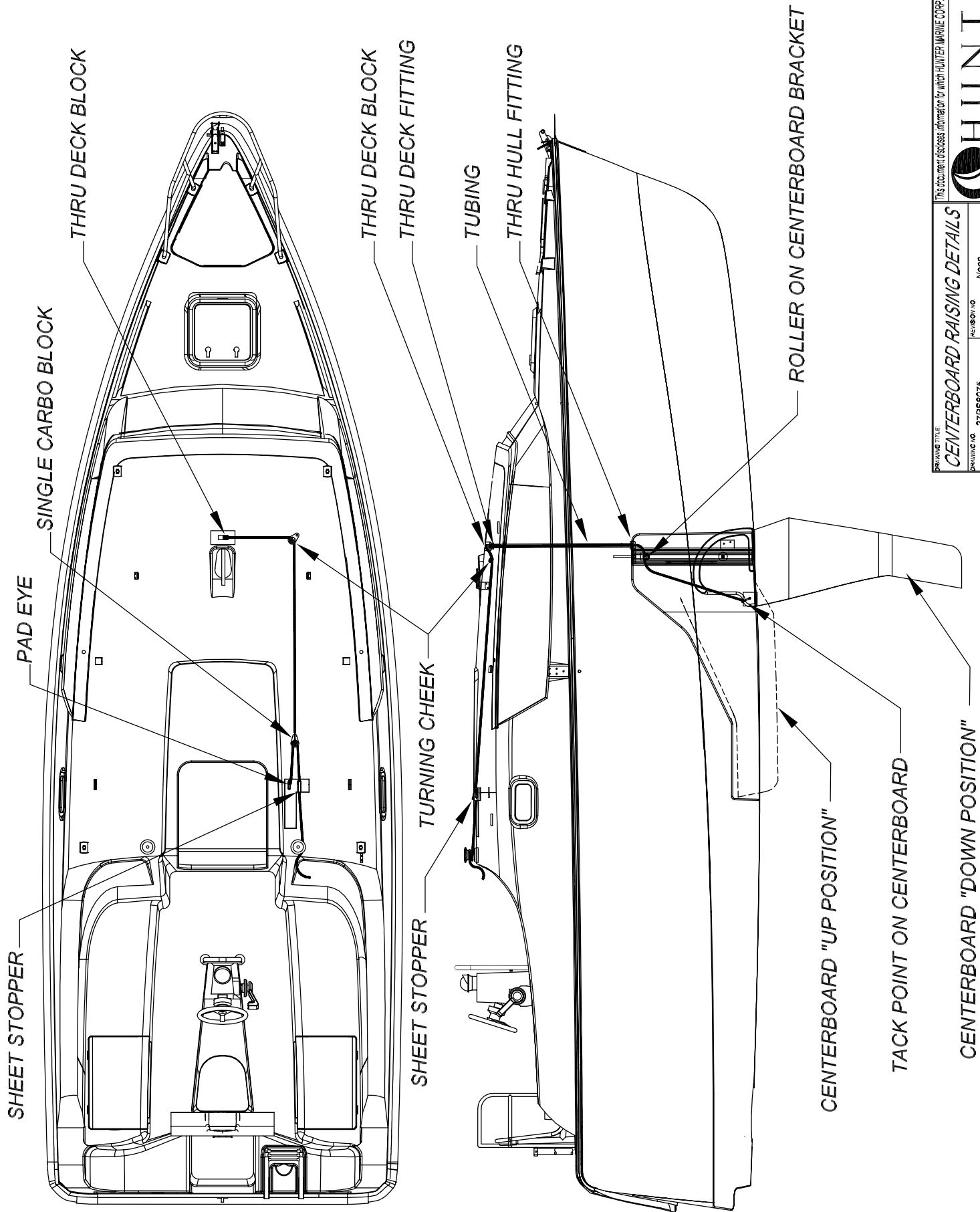
**TRANSOM VIEW**

**RUDDER DOWN POSITION**



**STBD VIEW**





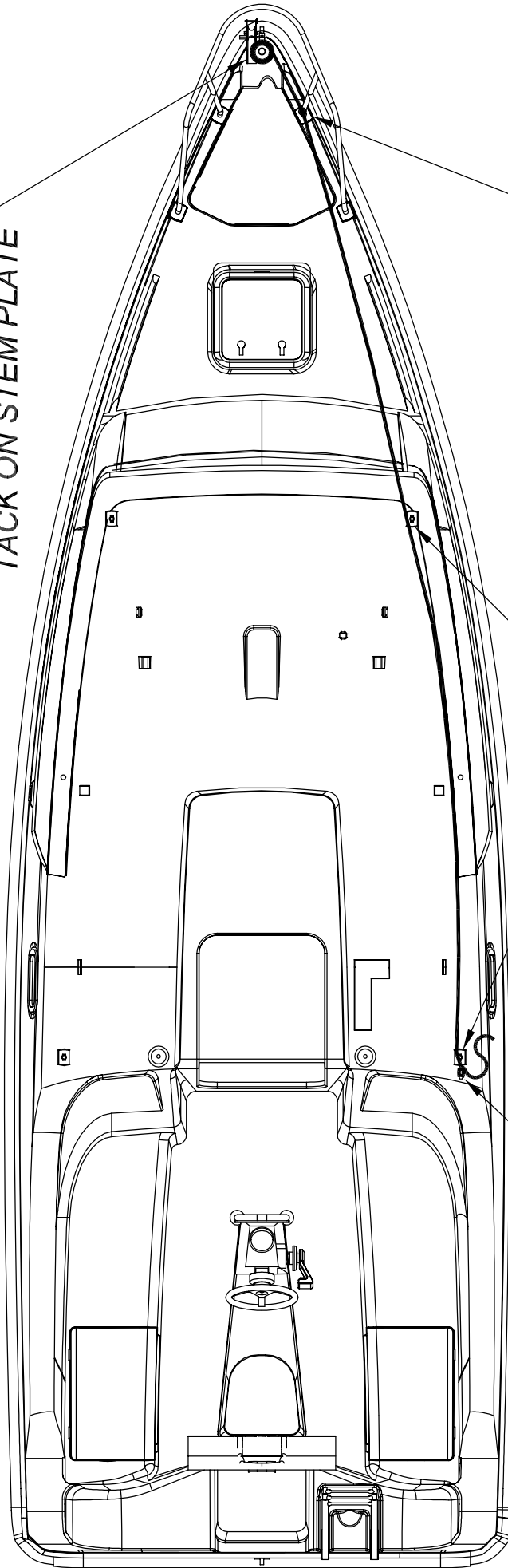
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 DRAWING NO: 27PS8075  
 REVISION NO: NONE  
 DATE: 04/28/08  
 DESIGNED BY: ENG

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**HUNTER**

JIB FURLING DRUM ASSEMBLY  
TACK ON STEM PLATE



JIB FURL LINE LEAD  
BLOCK (ON BOW RAIL)

JIB LINE RUNS THROUGH  
STANCHION EYE BLOCKS

JIB LINE TIES  
OFF ON FURLING CLEAT

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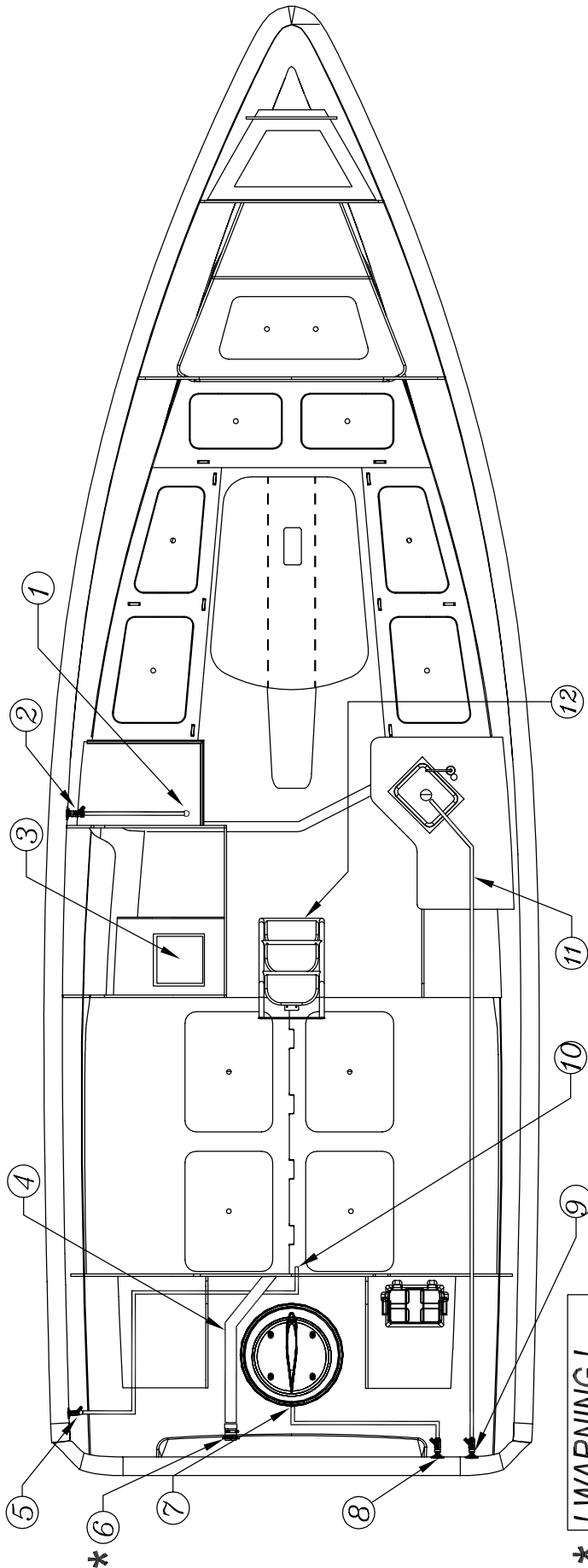
HUNTER

DRAWING TITLE  
**OPTIONAL JIB FURLING LINES LAYOUT**

DRAWING NO.	27PS8076	REVISION NO.	None
DRAWN BY:	ENG	DATE	04/25/08



1. BALLAST TANK FORWARD VENT FITTING (IN HANGING LOCKER)
2. BALLAST TANK FORWARD VENT THRU HULL FITTING WITH BALL VALVE
3. PORTABLE SANIPOTI TANK
4. BALLAST TANK WATER INLET / DISCHARGE HOSE
5. BALLAST TANK AFT VENT THRU HULL FITTING W/ BALL VALVE
- \* 6. BALLAST TANK GALITIEN VALVE ON TRANSOM
7. RUDDER DRUM OVERFLOW DRAIN FITTING W/ BALL VALVE
8. RUDDER DRUM OVERFLOW DRAIN THRU HULL W/BALL VALVE (TRANSOM)
9. GALLEY SINK DRAIN THRU HULL FITTING (ON TRANSOM)
10. BALLAST TANK AFT VENT FITTING
11. GALLEY DRAIN HOSE
12. BALLAST TANK ACCESS COVER



**! WARNING !**  
 BALLAST TANK GALITIEN VALVE (SEE #4 ABOVE) SHOULD REMAIN CLOSED AT ALL TIMES, UNLESS YOUR BOAT HAS BEEN READY FOR OPERATION UNDER THE BALLAST TANK. FAILURE TO DO SO, COULD LEAD TO A FLOODED AND COULD EVEN CAUSE SINK YOUR BOAT.

① ANCHORWELL DRAIN

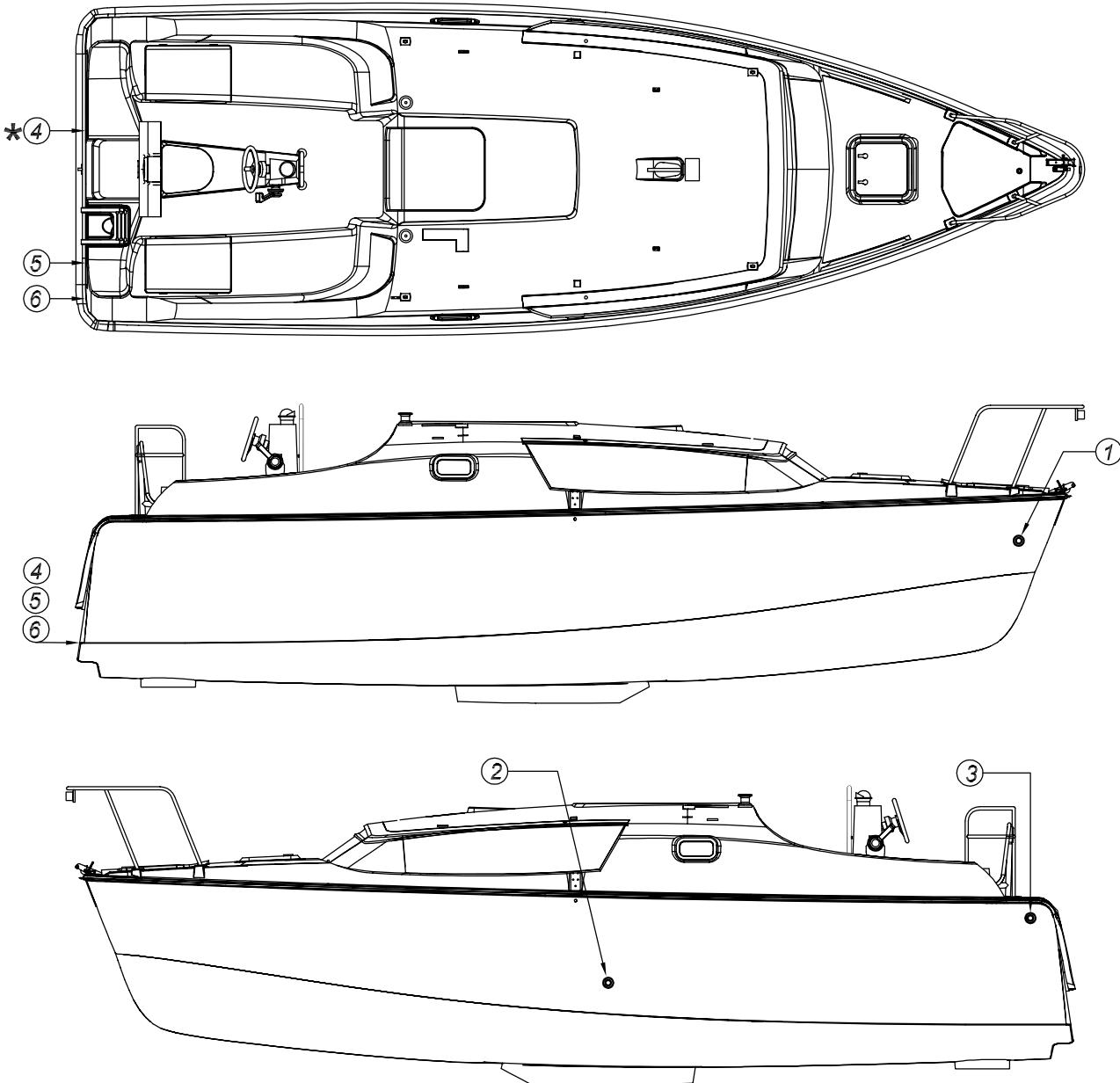
② BALLAST TANK FORWARD VENT

③ BALLAST TANK AFT VENT

\* ④ BALLAST TANK WATER INLET/ OUTLET GATE VALVE

⑤ VARA RUDDER DRUM OVERFLOW DRAIN

⑥ GALLEY SINK DRAIN

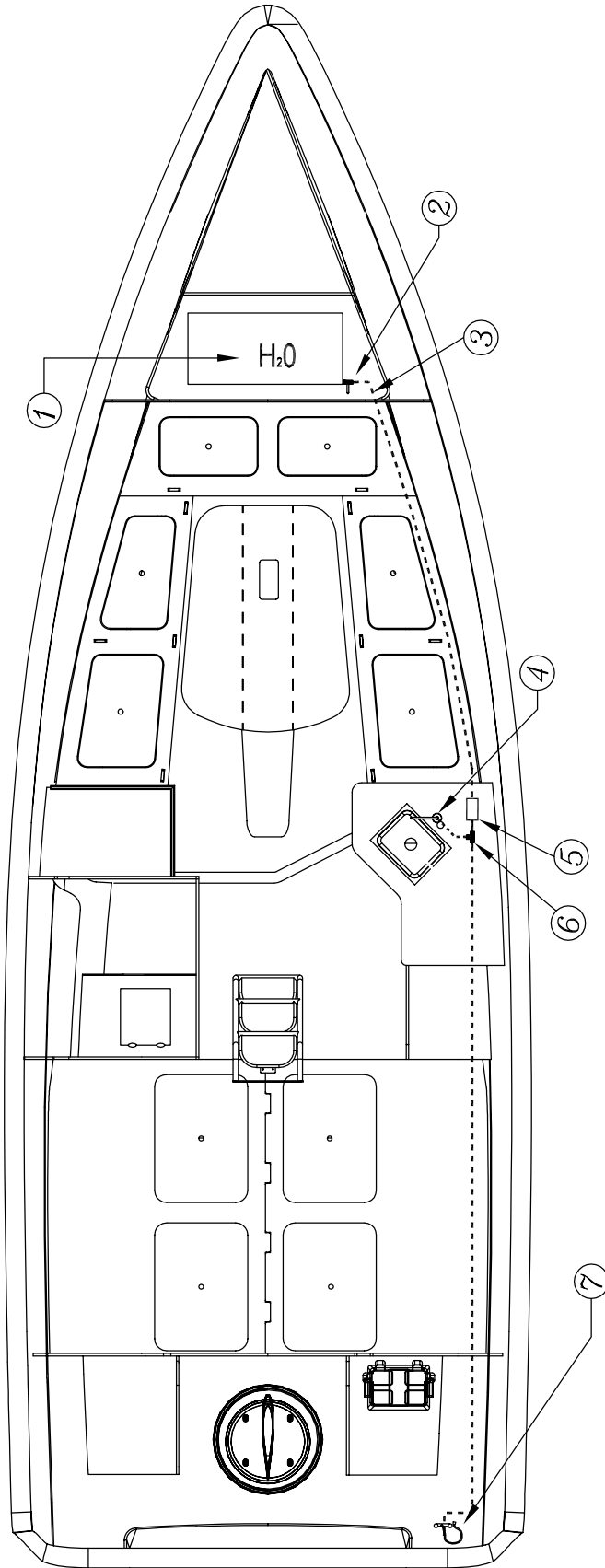


\* **! WARNING !**

BALLAST TANK GATE VALVE (SEE #4 ABOVE) SHOULD REMAIN CLOSED AT ALL TIMES, UNLESS YOUR BOAT HAS BEEN READY FOR OPERATION UNDER USING THE BALLAST TANK. FAILURE TO DO SO, COULD LEAD TO FLOOD CABIN AREA AND COULD EVEN SINK YOUR BOAT.



- |                                      |  |
|--------------------------------------|--|
| 1. OPTIONAL FRESH WATER TANK         | 5. FRESH WATER PUMP                        |
| 2. FRESH WATER SUPPLY SHUT OFF VALVE | 6. WATER LINE T-FITTING                    |
| 3. COLD FRESH WATER LINE             | 7. COCKPIT SHOWER FAUCET (ON DECK TRANSOM) |
| 4. GALLEY FAUCET                     |  |



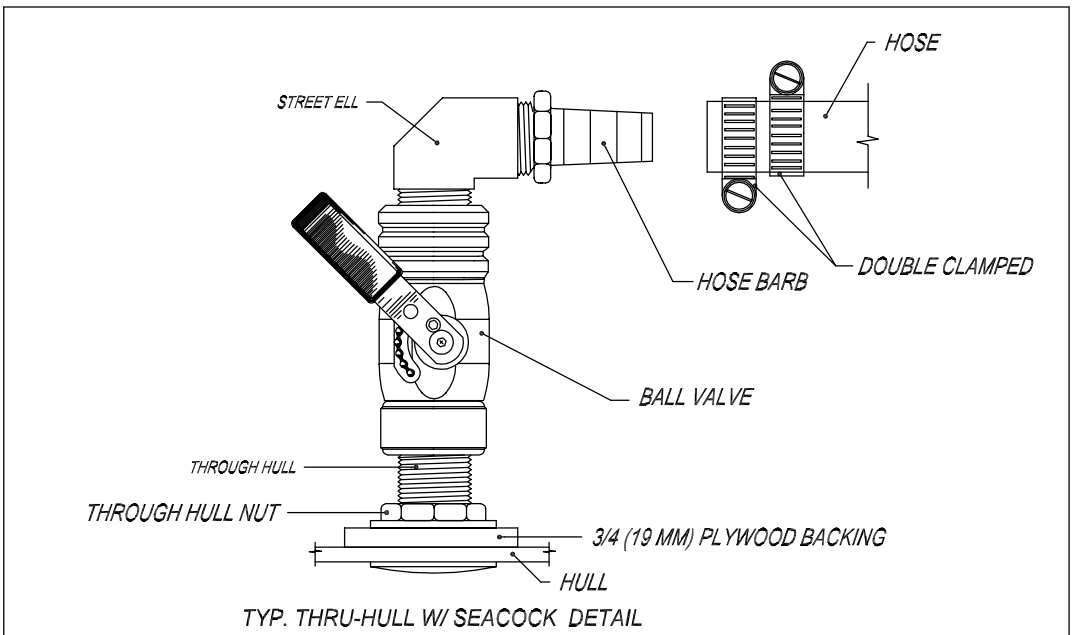
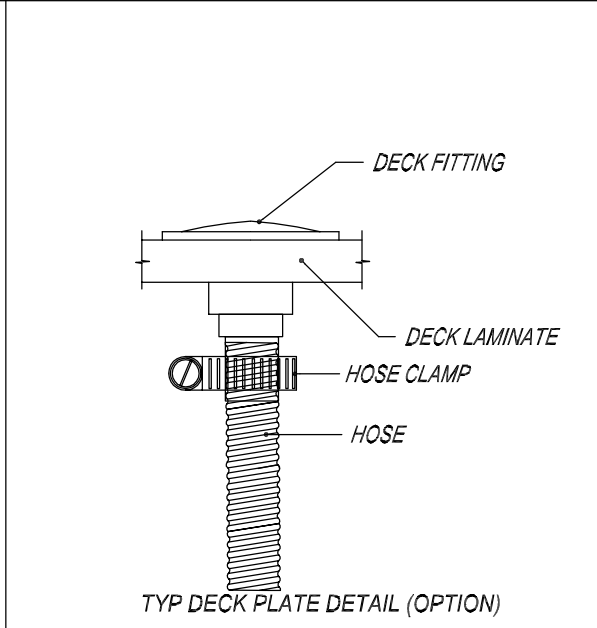
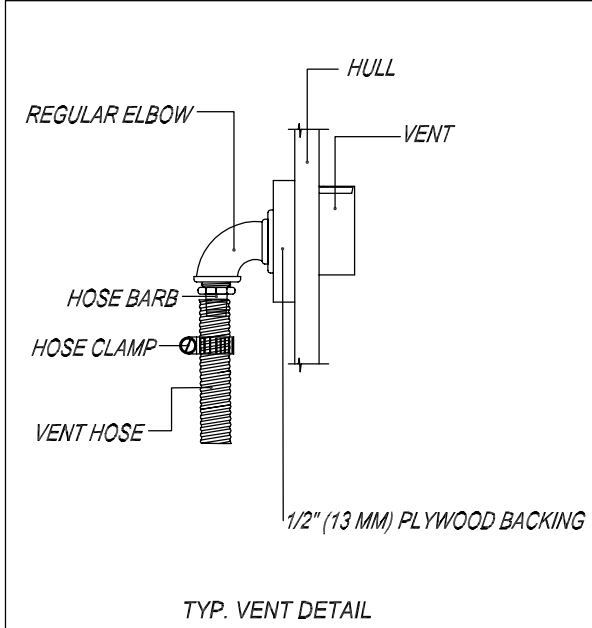
FRESH WATER LINE -----

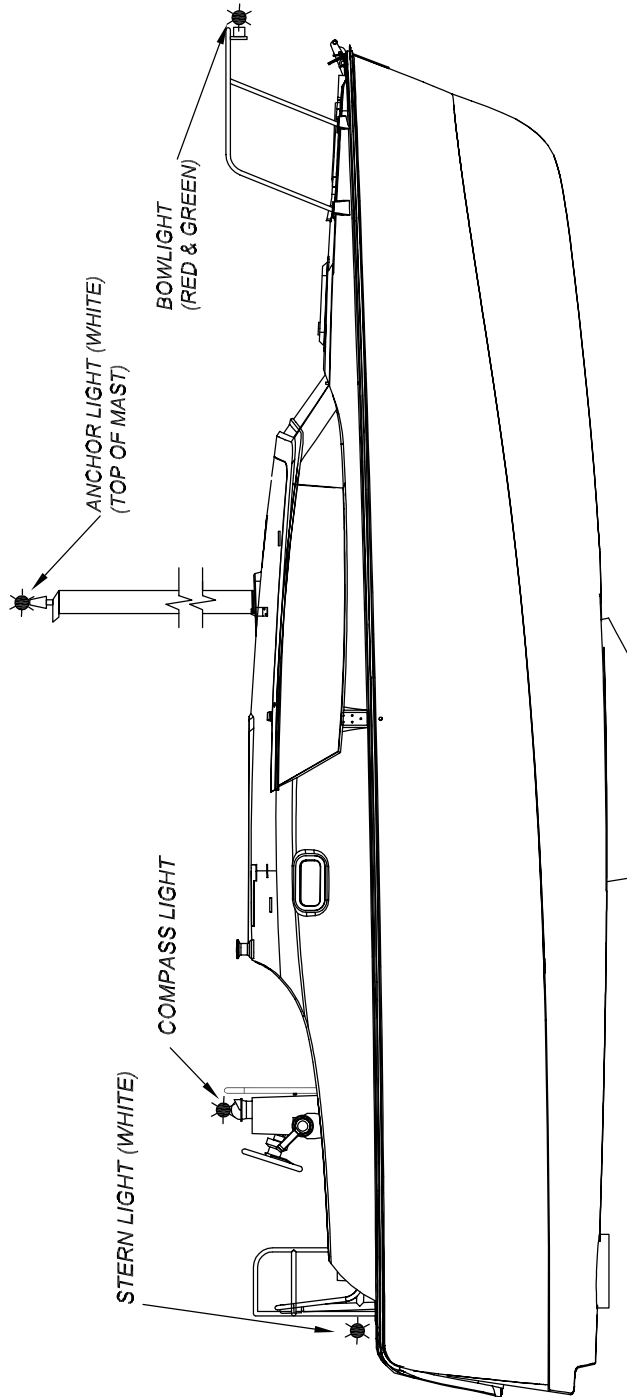
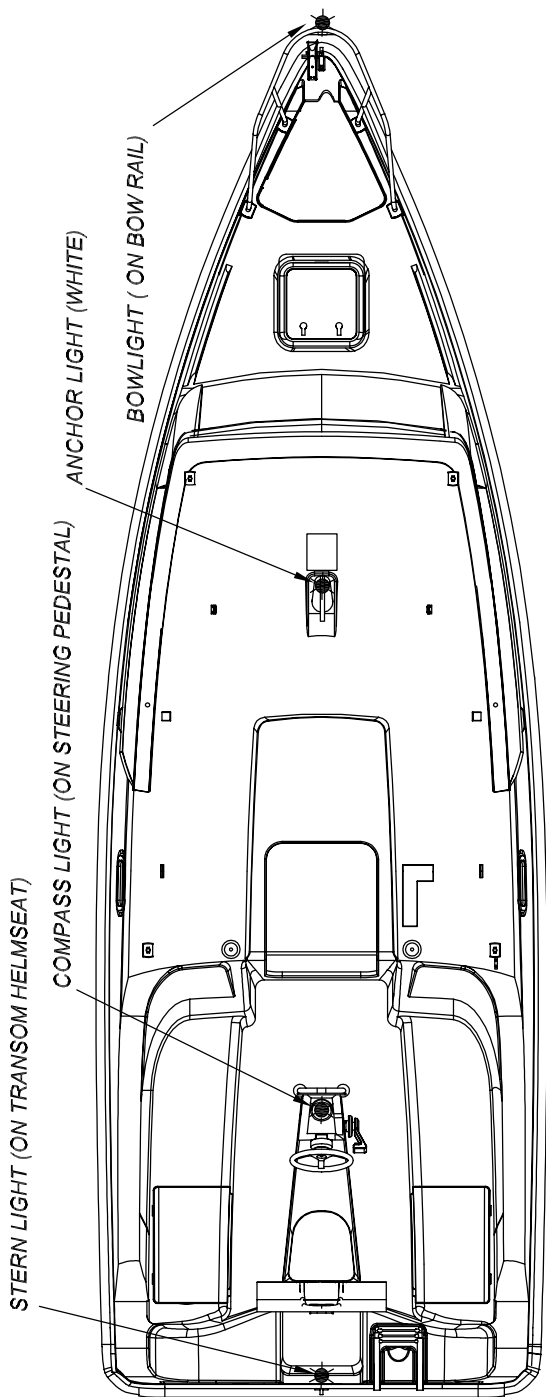
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**HUNTER**

**FRESH WATER LAYOUT (OPTIONAL)**

DRAWING NO. 27PS8080	REVISION NO. None
DRAWN BY: ENG	DATE: 05/08/08





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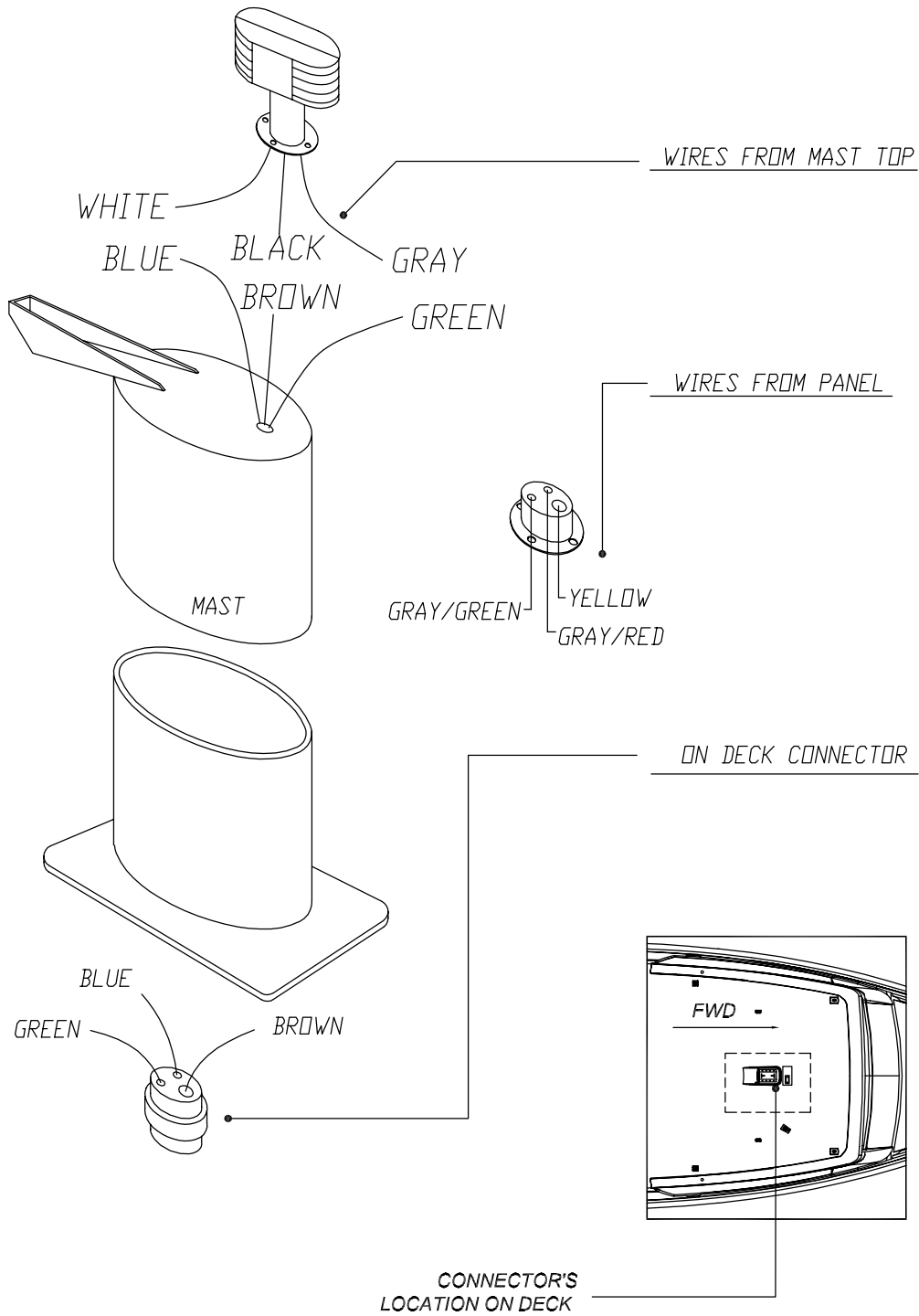


**12/12 C. EXTERIOR LIGHTING LAYOUT**

DRAWING NO	REV. NO.	DATE
27PS8076	NONE	04/28/08

ENG

MAST LIGHT



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**HUNTER**

DRAWING TITLE: **MAST WIRING DETAIL**

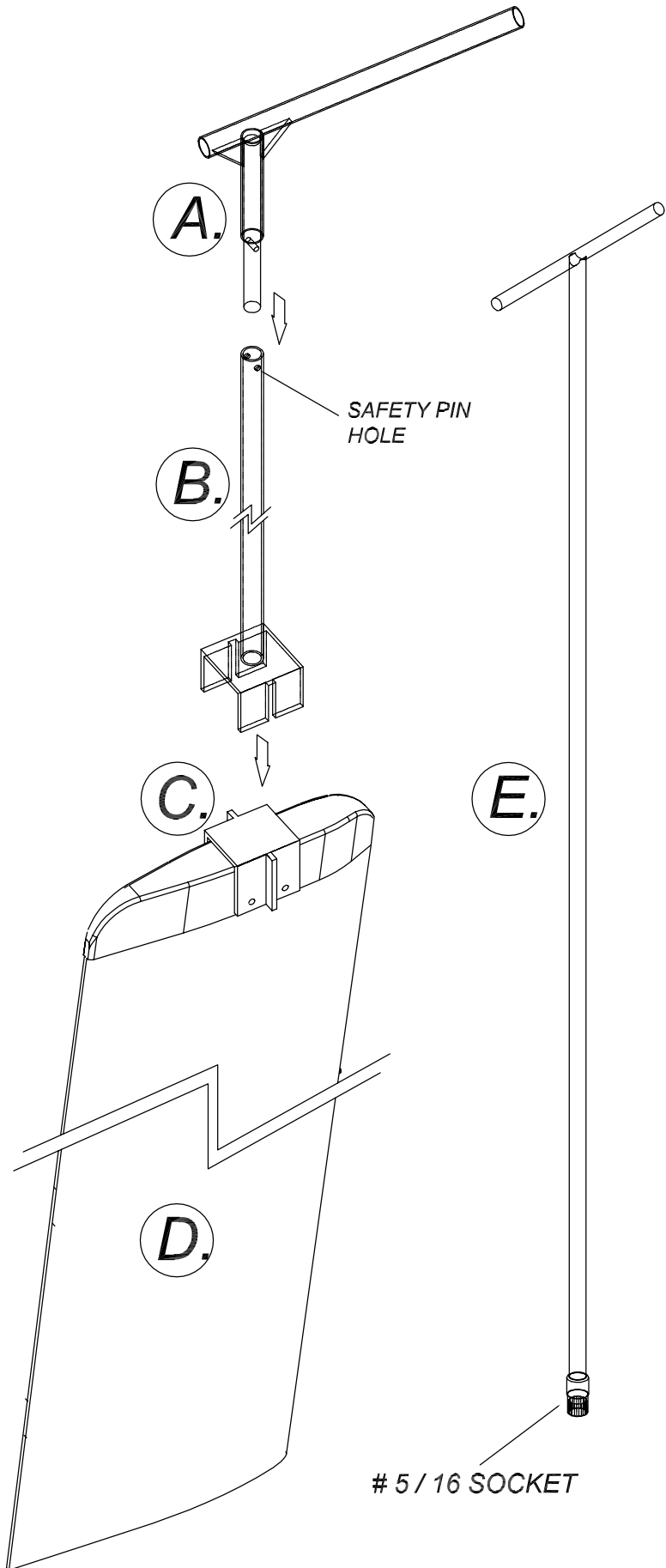
DRAWING NO. 27PS8083

REVISION NO. None

DATE: 04/29/08

DRAWN BY: ENG

DRAWING TITLE	
EMERGENCY TILLER COMPONENTS	
DRAWING NO.	REVISED BY
27PS8083	NONE
DRAWN BY	DATE
ENG	10/16/08



- A. TILLER HANDLE
- B. TILLER BASE
- C. RUDDER BRACKET
- D. RUDDER
- E. CONTROL ARM RELEASE BAR

# EMERGENCY TILLER OPERATION

If the situation arises where the rudder assembly is not functioning properly and affecting your steering, Hunter has available an emergency tiller to provide the required maneuverability. The emergency tiller comes standard for European boats and optional for all other destinations.

If your standard steering is experiencing a problem, inspect the rudder's upper bearing, lower bearing and bearing rods for damage or obstruction (see page 73). If the situation can not be remedied, proceed with the following steps to assemble the emergency tiller for low-speed steering.

1. Idle the boat
2. Remove the emergency tiller components from its packet
3. Ensure all parts are present (see Emergency Tiller Components drawing, page 83)
4. Place the rudder in the down position
5. Secure the downhaul line on cleat
6. Locate the drag link mounting bracket on the front section of the upper bearing
7. Loosen the fastener securing the bracket and free the rudder from the steering wheel
8. Remove the lock nut which secures the drag link using the Control Arm Release Bar
9. Check the rudder freely turns
10. Insert Tiller Handle on top of Tiller Base and secure with the safety pin
11. Place the tiller handle assembly onto rudder bracket with keyway slots fitting over bracket tabs

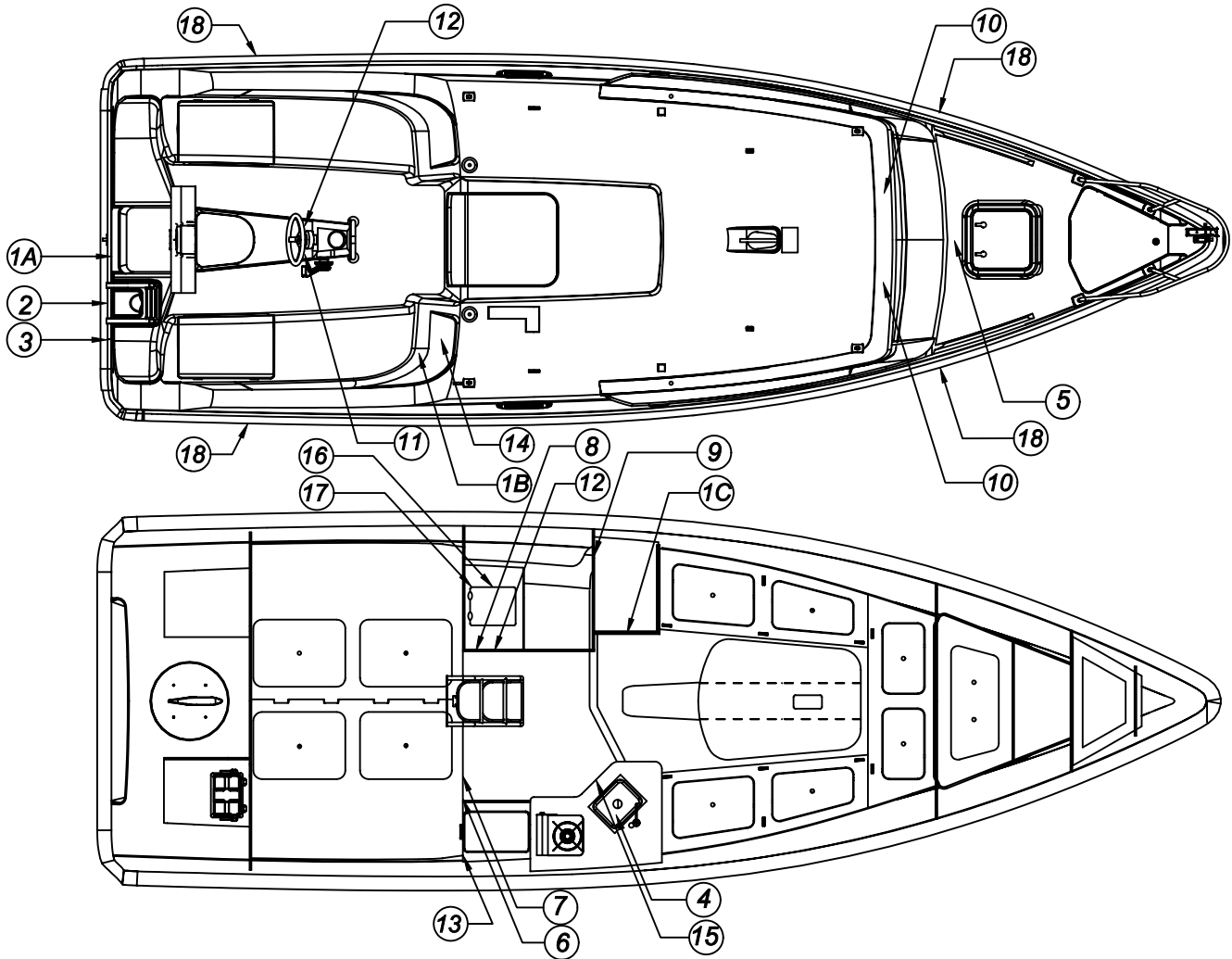
You are now able to manually steer your boat. Proceed to the closest location for standard steering system review and repairs.





**LABEL LOCATIONS**

REVISION NO.	None
DATE	01/09/09
DRAWING NO.	27F58085
DRAWN BY:	ENG



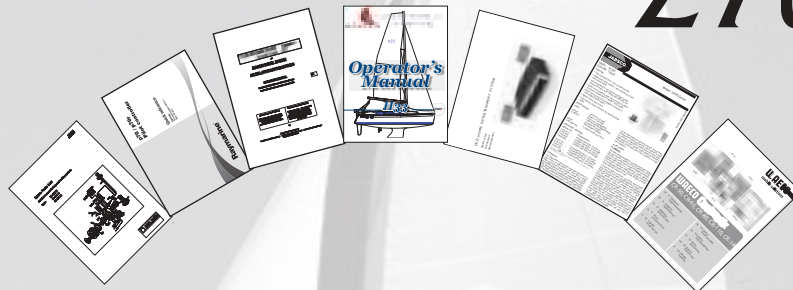
LABEL DESC	LABEL ORDER #	QTY/BOAT
①A CARBON MONOXIDE DANGER (TRANSOM)	NW-206-07	1
①B CARBON MONOXIDE DANGER (COCKPIT)	NW-204-07	1
①C CARBON MONOXIDE DANGER (CABIN)	NW-205-05	1
② PROPELLER WARNING	1013750	1
③ LADDER WARNING	1006616	1
④ FIRE EXTINGUISHER LOCATION (LOOSE)	1021157	2
⑤ FIRE EMERGENCY HATCH ESCAPE (UNDERSIDE)	1006609	1
⑥ READ OWNER'S MANUAL	1023829	1
⑦ CRUISE PAC	1006629	1
⑧ CE MAX CAPACITY	1035743	1
⑨ TANK VENT	1035023	1
⑩ NO STEP	1035121	2
⑪ OPERATING PROCEDURES	1035069	1
⑫ BALLAST TANK	1035741	2
⑬ ELECTRIC SHOCK HAZARD	1006595	1
⑭ US COAST GUARD CAPACITY	1035735	1
⑮ SEACOCK ON SINK DRAIN	1013302	1
⑯ HAZARD OF FLOODING (UNDER TOILET LID)	283310	1
⑰ TOILET GARBAGE (UNDER TOILET LID) (VENDOR)	JABSCO MARINE	1
⑱ SLING (PORT/STARBOARD HULL)	1006624	4



# HUNTER

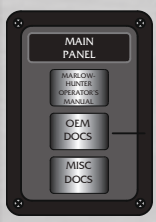


## 27te



# DOCUMENT FINDER

GO BACK



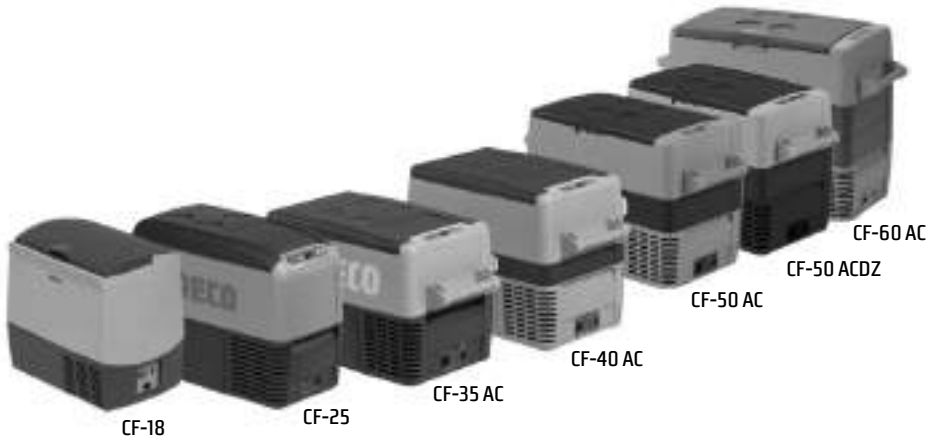
**OEM DOCUMENT PANEL**

APPLIANCES	ENTERTAINMENT	POWER	SAILS & RIGGING
DECK HARDWARE	FUEL	PROPULSION	STEERING
ELECTRONICS	PLUMBING	SAFETY	

---

# WAECO

mobile solutions



## WAECO CoolFreeze

CF-18, CF-25, CF-35, CF-40,  
CF-50, CF-50DZ, CF-60

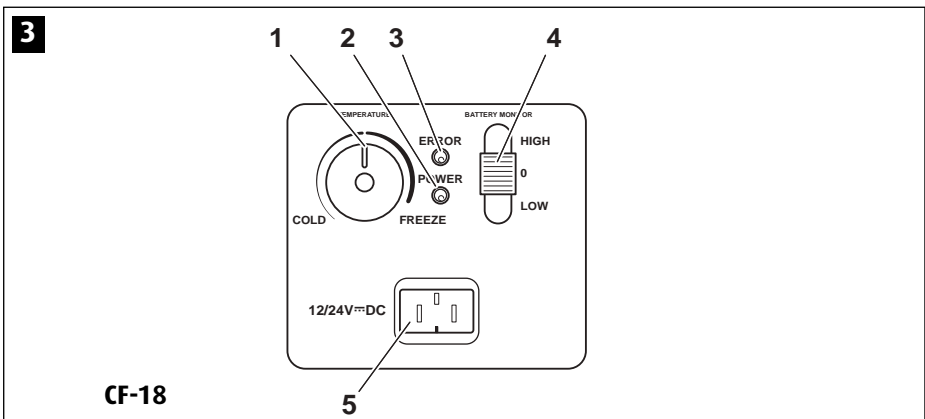
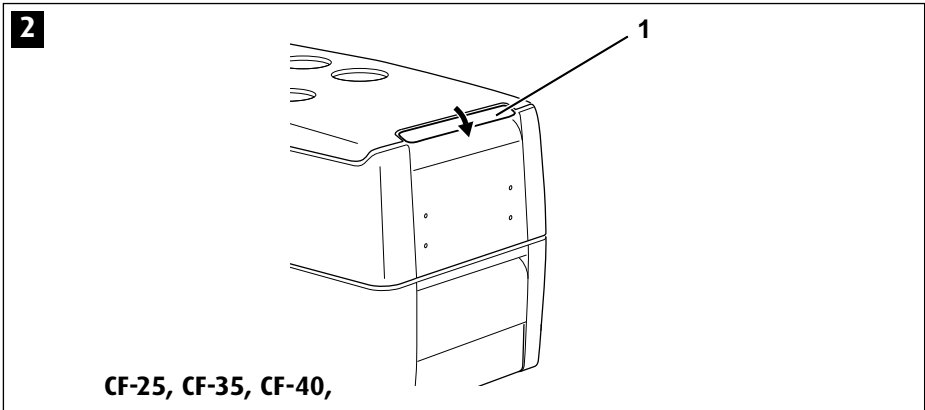
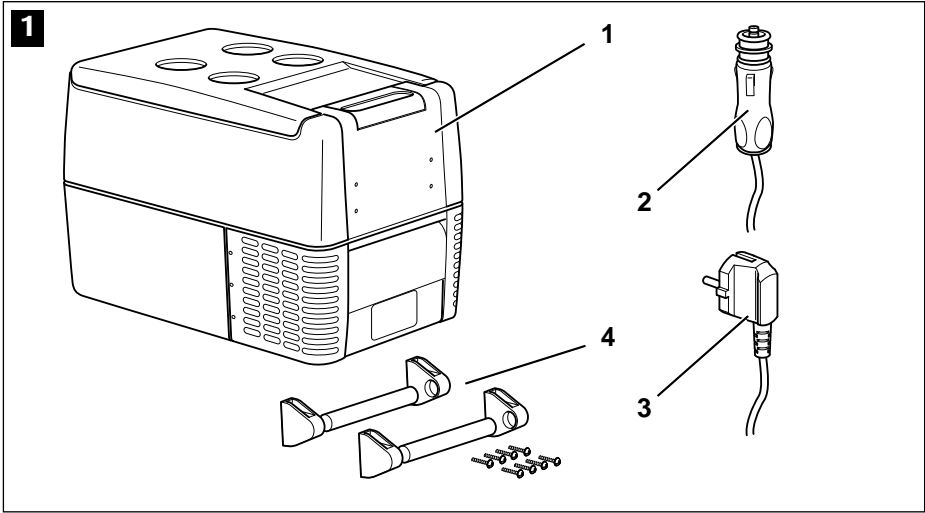


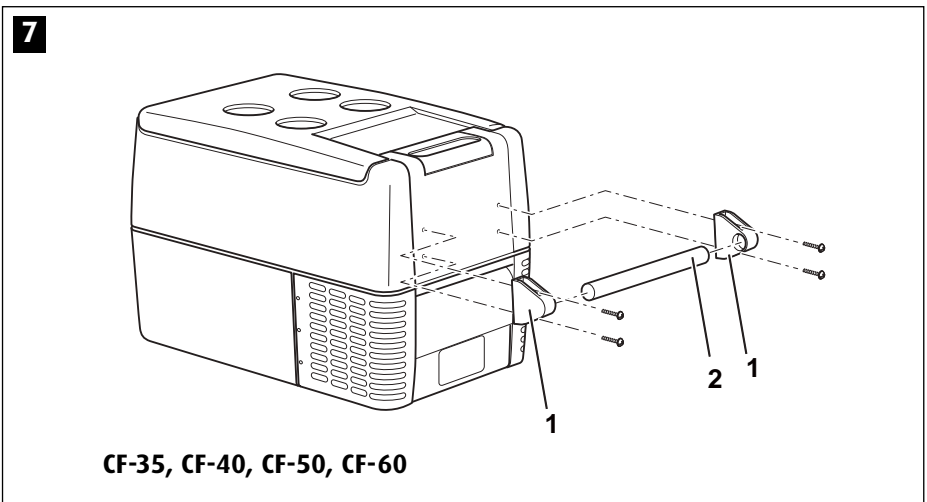
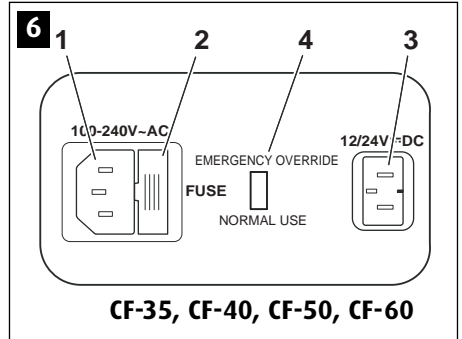
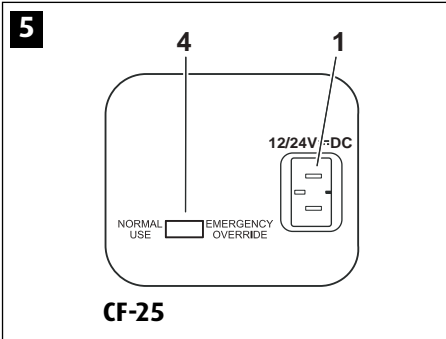
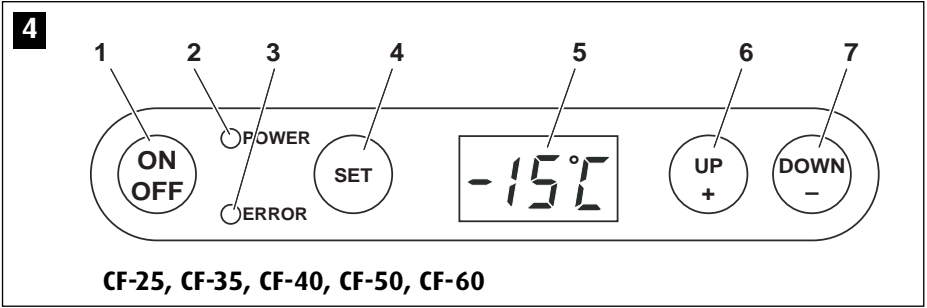
**Compressor Cooler Instruction Manual**

**Please read this operating manual carefully before starting the device. Keep it in a safe place for future reference. If the device is handed over to another person, this operating manual must be handed over along with the device.**

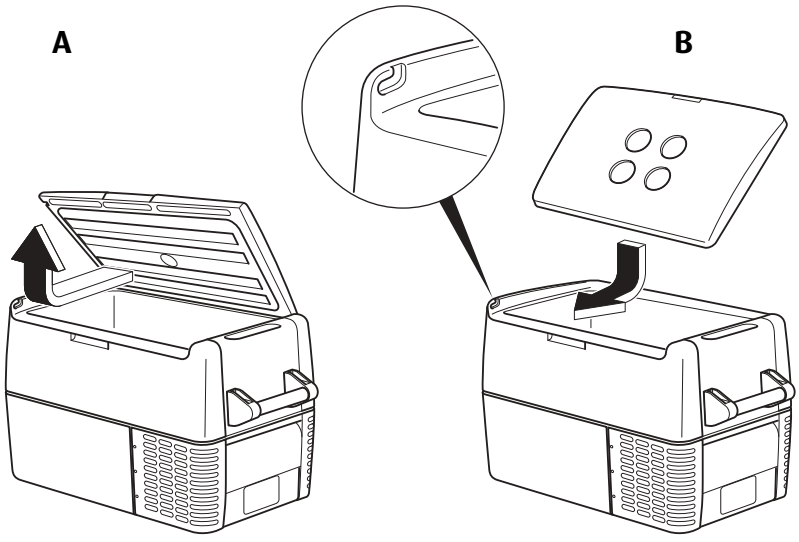
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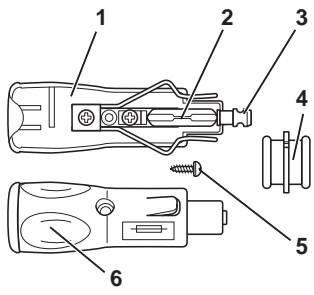




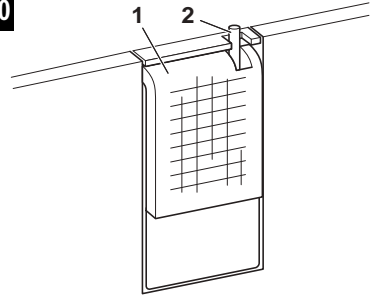
**8**



**9**



**10**



# 1 Notes on using the manual

The following symbols are used in this operating manual:

**Caution!**

**Safety instruction:** Failure to observe this instruction can cause personal injury or damage the device.

**Caution!**

**Safety instruction:** relating to a danger from an electrical current or voltage. Failure to observe this instruction can cause injury or damage the device and impair its function.

**Note:**

Supplementary information for operating the device.

- Action: This symbol indicates that action is required on your part. The required action is described step-by-step.
- ✓ This symbol indicates the result of an action.

**Fig. 2 1, page 3:** This refers to an element in an illustration. In this case, item 1 in figure 2 on page 3.

**Please observe the following safety instructions.**

# 2 Safety instructions

**• Caution!**

WAECO International will not be held liable for claims for damage resulting from the following:

- Damage to the device resulting from mechanical influences and overvoltage
- Alterations to the device made without the explicit permission of WAECO International
- Use for purposes other than those described in the operating manual.



## 2.1 General safety



### • **Caution – Danger of electrocution!**

- When using the device on boats: If the device is powered by the mains, ensure that the power supply is protected with a ground fault interrupter circuit.
- Check that the voltage specification on the type plate corresponds to that of the energy supply.
- Only connect the device as follows:
  - With the cable supplied (Fig. **1** 2, page 4) to the cigarette lighter in the vehicle or to a 12/24 V plug socket in the vehicle
  - or with the enclosed connection cable (Fig. **1** 3, page 4) to the 100-240 V AC mains (only CF-35, CF-40, CF-50, CF-60).
- If the connection cable is damaged, it must be replaced to prevent possible electrical hazards.
- Do not pull the plug out of the cigarette lighter or the socket by the cable.
- Pull out the connection cable:
  - Before cleaning and maintenance
  - After use
  - Before changing a fuse
- Disconnect the cooling device and other power consuming devices from the battery before you connect the battery to a quick charging device. Overvoltage can damage the electronics of the device.



### • **Electronic devices are not toys!**

- Always keep and use the device out of the reach of children.
- Do not operate the device if it is visibly damaged.
  - This device may only be repaired by qualified personnel. Inadequate repairs can lead to considerable hazards.
  - Should your device need to be repaired, please contact WAECO customer service.
  - Do not open the refrigerant circuit under any circumstances!
  - The cooler is not suitable for transporting caustic materials or materials containing solvents.
  - Food may only be stored in its original packaging or in suitable containers.

## 2.2 Operating the device safely



- **Caution – Danger of electrocution!**

Do not touch exposed cables with your bare hands. This especially applies when operating the device from an AC mains.

- Before starting the device, ensure that the power supply line and the plug are dry.



- Do not place any electrical devices inside the cooler.

- Set up the device in a dry location where it is protected against splashing water.

- Protect the device and the cable against rain and moisture.

- Do not place the device near naked flames or other heat sources (heaters, direct sunlight, gas ovens etc.)

- **Caution! Danger of overheating!**

Ensure at all times that there is sufficient ventilation so that the heat generated during normal operation is able to dissipate. Ensure that the ventilation slots are not covered. Make sure that the device is sufficiently far away from walls and other objects so that the air can circulate.

- Never immerse the device in water.

- Do not fill the inner container with ice or fluid.

### 3 Scope of delivery

Fig. 1 page 4, shows the scope of delivery.

Item	Quantity	Description
1	1	Cooler
2	1	Connection cable for 12/24 VDC connection
3	1 (except CF-18, CF-25)	Connection cable for 100 – 240 VAC connection
4	2 (except CF-18, CF-25)	Carrying handle, consisting of: – 2 holders – 1 handle – 4 fastening screws
–	1 (CF-18 only)	Plastic grille divider
–	1 (CF-35 only)	Powdercoated steel evap. protector
–	1 (except CF-18, CF-25, CF-50DZ)	Powdercoated steel basket
–	2 (CF-50DZ only)	Powdercoated steel basket
–	2 (CF-50DZ only)	Internal compartment divider (plastic)
–	1	Operating manual

### 4 Intended use



The cooler is suitable for cooling and freezing foods. The device is also suitable for use on boats.



The device is designed to be operated from a 12 VDC or 24 VDC on-board supply socket of a vehicle (e. g. cigarette lighter), boat or caravan as well as from a 100 – 240 V AC mains (for **CF-18** and **CF-25** an optional accessory adaptor is required for connection to AC mains power).



**Caution – When cooling perishable medicines!**

If you wish to cool medicines, please check if the cooling capacity of the device is adequate for this purpose.

## 5 Function description

The cooler can chill products, keep them cool as well as freeze them. A low maintenance, CFC-free refrigerant circuit with compressor provides the cooling. The extra strong CFC-free insulation and powerful compressor ensure especially fast cooling.

The cooler is designed for mobile use and can be carried by using a folding carrying bracket (**CF-18**), two recessed grips (**CF-25**) or two removable carrying handles (**CF-35, CF-40, CF-50, CF-60**).

When used on boats, the cooler can withstand a constant heel (inclination) of 30°.

### Scope of functions:

	CF-18	CF-25	CF-35, CF-40, CF-50*, CF-60
<b>Power supply with priority circuit</b> for connecting to the AC mains	-	-	●
<b>Battery monitor</b> for protecting the vehicle battery	2-level	3-level	
<b>Turbo mode</b> for rapid cooling	-	●	●
<b>Display</b> with temperature gauge	-	●	●
<b>Temperature setting</b>	With rotary control	With two buttons in steps of 1 °C (2 °F)	
<b>Removable carrying handles</b>	-	-	●

\***Note:** unless otherwise stated, throughout this manual CF-50 refers to both CF-50 AC and CF-50 ACDZ.

## 5.1 Operating and display elements

### CF-25, CF-35, CF-40

Lock for lid: Fig. **2** 1, page 4.

### CF-18

Operating panel and connection socket (Fig. **3** page 4):

Item	Description	Explanation
1	TEMPERATURE	Temperature controller, cooling temperature at the end positions: COLD: +10 °C (+50 °F) FREEZE: -18 °C (0 °F)
2	POWER	Operating display LED is lit green: Device is switched on and ready for operation LED is lit amber: Set temperature has been reached
3	ERROR	LED flashes red: Switched on device is not ready for operation
4	BATTERY MONITOR	Switch-on device/battery monitor: 0: Device is switched off HIGH: Device is switched on, battery monitor is in HIGH mode LOW: Device is switched on, battery monitor is in LOW mode
5	12/24V DC	Connection socket DC voltage supply

**CF-25, CF-35, CF-40, CF-50, CF-60**

Operating panel (Fig. 4 page 5)

Item	Description	Explanation
1	ON OFF	Switches the cooler on or off when the button is pressed for between one and two seconds
2	POWER	Status indication LED lights up green: Compressor is on LED lights up amber: Compressor is off LED flashes amber: Voltage insufficient
3	ERROR	LED flashes red: Device is switched on but not ready for operation
4	SET	Selects the input mode - Temperature setting - Celsius or Fahrenheit display - Set battery monitor
5	-	Display, shows the information
6	UP +	Press once to increase the value
7	DOWN -	Press once to decrease the value

**CF-25**

Connection socket (Fig. 5 page 5):

Item	Description
1	Connection socket DC voltage supply

**CF-35, CF-40, CF-50, CF-60**

Connection sockets (Fig. 6 page 5):

Item	Description
1	Connection socket AC voltage supply
2	Fuse holder
3	Connection socket DC voltage supply

## 5.2 Accessories

If you want to operate the coolers **CF-18** and **CF-25** from the 240 V AC mains, be sure to use the rectifier WAECO CoolPower EPS-816 (CF-18 only) or EPS-817 (CF-18 and CF-25).

# 6 Operation

## 6.1 Before initial use



### Note

Before starting your new cooler for the first time, you should clean it inside and outside with a damp cloth for hygienic reasons (please also refer to the chapter “Cleaning and maintenance” on page 22).

### Mounting the handles

**CF-35, CF-40, CF-50, CF-60**

The handles are enclosed unassembled. If you wish to attach the handles, proceed as follows:

- Make a handle by putting two holders (Fig. **7** 1, page 5) and a handle (Fig. **7** 2, page 5) together.
- Fasten the grip with the enclosed screws in the holes provided.

### Turning the lid around

**CF-50, CF-60**

You can turn the lid around if you want to open the lid from the other side.

To do this, proceed as follows:

- Open the lid and pull it out (Fig. **8** A, page 6).
- Turn the lid.
- Insert the lid in the lid holders on the opposite side of the cooler (Fig. **8** B, page 6).

## Selecting the temperature units – °C or °F

### CF-25, CF-35, CF-40, CF-50, CF-60

You can switch the temperature display between Celsius and Fahrenheit. This is how to do it:

- Switch on the cooler.
- Press the "SET" button (Fig. 4 4, page 5) twice.
- Use the "UP +" (Fig. 4 6, page 5) and "DOWN -" (Fig. 4 7, page 5) buttons to select Celsius or Fahrenheit.
- ✓ The selected temperature units then appear in the display for a few seconds. The display flashes several times before it returns to the current temperature.

## 6.2 Energy saving tips

- Choose a well ventilated installation location which is protected from direct sunlight.
- Allow hot food to cool down first before you place it into the device.
- Do not open the cooler more often than necessary.
- Do not leave the lid open for longer than necessary.
- Defrost the cooler once a layer of ice forms.
- Avoid unnecessarily low temperatures.



## 6.3 Connecting the cooler

### Connecting to a battery (Vehicle or boat)

The cooler can be operated with 12 V or 24 V DC.



#### Caution – Danger of damaging the device!

Disconnect the cooler and other consumer units from the battery before you connect the battery to a quick charging device. Overvoltage can damage the electronics of the device.

For safety reasons the cooler is equipped with an electronic system to prevent polarity reversal. This protects the cooler against short-circuiting when connecting to a battery.

- Plug the 12/24-V connection cable (Fig. **1** 2, page 4) into the DC voltage socket, the cigarette lighter or a 12 V or 24 V socket.

### Connecting to a 100–240 V AC mains (E.g. in the home or office)



#### Caution – Danger of electrocution!

Never handle plugs and switches with wet hands or if you are standing on a wet surface.



#### Caution – Danger of electrocution!

If you are operating your cooler on board a boat from a mains connection of 100–240 V AC, you must install a residual current circuit breaker between the 100–240 V AC mains and the cooler. Seek advice from a trained technician.

### CF-35, CF-40, CF-50, CF-60

The coolers **CF-35, CF-40, CF-50, CF-60** have an integrated multi-voltage power supply with priority circuit for connecting to an AC voltage source of 100–240 V. The priority circuit automatically switches the cooler to mains operation, if the device is connected to a 100–240 V AC mains, even if the 12/24 V connection cable is still attached.

When switching between the AC mains and the battery supply, the red LED may light up briefly.

- Plug the 100 – 240 V connection cable (Fig. **1** 3, page 4) into the AC voltage socket and connect it to the 100 – 240 V AC voltage mains (only **CF-35, CF-40, CF-50, CF-60**).

**CF-18, CF-25**

To operate the coolers **CF-18** and **CF-25** from the 220–240 V AC mains, use the optional accessory rectifier WAECO CoolPower EPS-816 (CF-18 only) or EPS-817 (CF-18 and CF-25).

**6.4 Using the battery monitor**

The device is equipped with a multi-level battery monitor that protects your vehicle battery against excessive discharging when the device is connected to the on-board 12/24 V supply.

If the cooler is operated when the vehicle ignition is switched off, the cooler switches off automatically as soon as the supply voltage falls below a set level. The cooler will switch back on once the battery has been recharged to the restart voltage level.

**Note – during low voltage**

When switched off by the battery monitor, the **digital display** (Fig. 4 5, page 5) **goes blank** and the power LED (Fig. 4 2, page 5) flashes amber.

**Caution – Danger of damage!**

When switched off by the battery monitor, the battery will no longer be fully charged. Avoid starting repeatedly or operating current consumers without longer charging phases. Ensure that the battery is recharged.

In “HIGH” mode, the battery monitor responds faster than at the levels “LOW” and “MED” (see the following table).

Battery monitor mode	CF-18		CF-25, CF-35, CF-40, CF-50, CF-60		
	LOW	HIGH	LOW	MED	HIGH
Switch-off voltage at 12 V	10.4 V	11.5 V	10.1 V	11.4 V	11.8 V
Restart voltage at 12 V	11.5 V	12.5 V	11.1 V	12.2 V	12.6 V
Switch-off voltage at 24 V	22.1 V	24.0 V	21.5 V	24.1 V	24.6 V
Restart voltage at 24 V	23.6 V	25.4 V	22.9 V	25.3 V	26.2 V

The method of battery mode selection follows:

**CF-18**

- Slide the selection switch (Fig. 3 4, page 4) to “LOW” if operating from a supply battery, or “HIGH” if operating from a standard vehicle starter battery.

**CF-25, CF-35, CF-40, CF-50, CF-60**

- Switch on the cooler.
- Press the "SET" button (Fig. 4 4, page 5) three times.
- Use the "UP +" (Fig. 4 6, page 5) and "DOWN -" (Fig. 4 7, page 5) buttons to select the battery monitor mode.
- Digital display will be as follows.

(LOW)    
 (MED)    
 (HIGH)

- ✓ The selected mode then appears in the display for a few seconds. The display flashes several times before it returns to the current temperature.

**Note**

When the cooler is supplied by the starter battery, select the battery monitor mode "HIGH". If the cooler is connected to a supply battery, the battery monitor mode "LOW" will suffice.

If you wish to operate the cooler from the AC mains, set the battery monitor to the "LOW" position.

## 6.5 Using the cooler

**Caution – Danger of overheating!**

Ensure at all times that there is sufficient ventilation so that the heat generated during operation can dissipate. Ensure that the ventilation slots are not covered. Make sure that the device is sufficiently far away from walls and other objects so that the air can circulate.

- Place the cooler on a firm foundation.  
Make sure that the ventilation slots are not covered and that the heated air can dissipate.
- Close the cooler, see "Connecting the cooler" on page 16.

**Note**

If you wish to operate the cooler from the AC mains, set the battery monitor to the "LOW" position.

**Caution – Danger from excessively low temperature!**

Ensure that the only objects placed in the cooler are those intended to be cooled at the selected temperature.

**CF-18**

- Slide the sliding switch (Fig. **3** 4, page 4) to “LOW” or “HIGH” battery protection (See 6.4 “using the battery monitor” for suitable level).
- ✓ The “POWER” LED is lit green.
- ✓ The cooler starts cooling the interior.
- ✓ When the cooling temperature has been reached, the “POWER” LED is lit amber.

**CF-25, CF-35, CF-40, CF-50, CF-60**

- Press the “ON/OFF” button (Fig. **4** 1, page 5) and hold down for between one and two seconds.
- ✓ The “POWER” LED lights up.
- ✓ The display (Fig. **4** 5, page 5) switches on and shows the current temperature.

**Note – Displayed temperatures (Digital display models only).****CF-25, CF-35, CF-40, CF-50, CF-60 (Not CF-50DZ)**

The temperature displayed is that of the middle of the large interior compartment.

**CF-50DZ**

- i **With plastic dividers in:** the display temperature is that of the middle of the freezer compartment (furthest away from control panel).
- ii **With plastic dividers removed:** the actual compartment temperature will be considerably warmer than the displayed temperature.

**ALL MODELS**

Temperatures elsewhere in the compartment (away from centre) will deviate from the displayed temperature.

- ✓ The cooler starts cooling the interior.

**Locking the cooler**

- Close the lid.
- Press the lock (Fig. **2** 1, page 4) down, until it latches in place audibly.

## 6.6 Setting the temperature

### CF-18

- Set the cooling temperature with the temperature controller (Fig. **3** 1, page 4).

### CF-25, CF-35, CF-40, CF-50, CF-60

- Press the "SET" button (Fig. **4** 4, page 5) once.
- Use the "UP +" (Fig. **4** 6, page 5) and "DOWN -" (Fig. **4** 7, page 5) buttons to select the cooling temperature.
- ✓ The cooling temperature appears in the display for a few seconds. The display flashes several times and then the current temperature is displayed again.

## 6.7 Using The Emergency Switch

- The emergency override switch (Fig. **5** & **6** 4, page 5) is located in the connection panel.
- For normal operation the switch should be in the 'NORMAL USE' position.
- In the unlikely event of an electronic control failure slide the Switch to 'EMERGENCY OVERRIDE'.

**NOTE:** in this position the appliance will run all the time and will therefore perform as a freezer only.

## 6.8 Switching off the cooler

- Empty the cooler.
- Switch the cooler off.
- Pull out the connection cable.

If you do not want to use the cooler for a longer period of time:

- Leave the lid slightly open. This prevents odour build-up.

## 6.9 Defrosting the cooler

Humidity can form frost in the interior of the cooling device or on the evaporator. This reduces the cooling capacity. Defrost the device in good time to avoid this.



### **Caution – Danger of damaging the device!**

Never use hard or pointed tools to remove ice or to loosen objects which have frozen in place.

---

To defrost the cooler, proceed as follows:

- Take out the contents of the cooling device.
- If necessary, place them in another cooling device to keep them cool.
- Switch off the device.
- Leave the cover open.
- Wipe off the defrosted water.

## 6.10 Replacing the device fuse (240V)

Only CF-35, CF-40, CF-50, CF-60



### Caution – Danger of electrocution!

Disconnect the connection cable before you replace the device fuse.

---

- Pull off the connection cable.
- Pry out the fuse insert (Fig. 6 2, page 5) with a screwdriver.
- Replace the defective fuse with a new one that has the same rating (T4,0AL 250V).
- Press the fuse insert back into the housing.

## 6.11 Replacing the plug fuse (12/24 V)

- Pull the adapter sleeve (Fig. 9 4, page 6) off of the plug.
- Unscrew the screw (Fig. 9 5, page 6) out of the upper half of the housing (Fig. 9 1, page 6).
- Carefully raise the upper half of the housing from the lower (Fig. 9 6, page 6) half.
- Take out the contact pin (Fig. 9 3, page 6).
- Replace the defective fuse (Fig. 9 2, page 6) with a new one that has the same rating (8A 32V).
- Re-assemble the plug in the reverse order.

## 6.12 Replacing the light bulb

### Only CF-25, CF-35, CF-40, CF-50, CF-60

- Press the switch pin (Fig. **10** 2, page 6) downwards so that the transparent part (Fig. **10** 1, page 6) of the lamp can be removed at the front.
- Replace the light bulb ensuring that:
  - i) the LED's inside the bulb face toward the transparent cover
  - ii) the polarity is correct. Test for operation and if the new bulb does not work fit it the other way around.
- Press the lamp back into the housing.

## 7 Cleaning and maintenance



### **Caution – Danger of electrocution!**

Always pull out the mains plug before you clean and service the device.

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### **Caution – Danger of damaging the device!**

Never clean the device under running water or in dish water.

Do not use abrasive cleaning agents or hard objects during cleaning as these can damage the device.

Never use brushes, scouring pads or hard or pointed tools to remove ice or to loosen objects which have frozen in place.

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- Occasionally clean the inside of the device with a damp cloth.

## 8 Warranty

Our general warranty conditions apply. If the product is defective, please take it to the nearest authorised WAECO repair agent.

For warranty repair processing, please present copy of the receipt with purchase date.

## 9 Troubleshooting

Fault	Possible cause	Suggested remedy
Device does not function, Power LED does not glow.	There is no voltage present in the 12/24 V socket (cigarette lighter) in your vehicle.	The ignition must be switched on in most vehicles to apply current to the cigarette lighter.
	No voltage present in the AC voltage socket.	Try using another plug socket.
	The device fuse is defective.	Replace the device fuse, see "Replacing the device fuse" on page 21.
	The integrated mains adapter is defective.	This can only be repaired by an authorised repair centre.
The device does not cool (plug is inserted, "POWER" LED is lit).	Defective component.	This can only be repaired by an authorised authorised repair centre.
The device does not cool (plug is inserted, "POWER" LED flashes + digital display blank).	Battery voltage is too low.	Test the battery and charge it as needed.
The device does not cool (plug is inserted, "ERROR" LED flashes)	The device has switched off due to an internal fault	This can only be repaired by an authorised repair centre
When operating from the 12/24-V socket (cigarette lighter): The ignition is on and the device is not working and the LED is not lit.	The cigarette lighter socket is dirty. This results in a poor electrical contact.	If the plug of your cooler becomes very warm in the cigarette lighter socket, either the lighter socket must be cleaned or the plug has not been assembled correctly.
	The fuse of the 12/24 V plug has blown.	Replace the fuse in the cigarette lighter plug, see "Replacing the plug fuse (12/24 V)" on page 21.
	The vehicle fuse has blown.	Replace the vehicle's 12/24 V socket fuse (usually 15 A). Please refer to your vehicle's operating manual.
The display shows an error message (e.g. "Err1") and the device does not cool.	The device has switched off due to an internal fault.	This can only be repaired by an authorised repair centre.



## 10 Disposal

- Place the packaging material in the appropriate recycling waste bins wherever possible.



If you wish to finally dispose of the device, ask your local recycling centre or specialist dealer for details about how to do this in accordance with the applicable disposal regulations.

## 11 Technical data

	<b>CF-18</b>	<b>CF-25</b>	<b>CF-35</b>
Overall capacity:	18 litres	23 litres	31 litres
Connection voltage:	12/24 V DC		12/24 V DC and 100-240 V AC
Rated current:			
- 12 VDC:	3.1 A	6.8 A	6.0 A
- 24 VDC:	1.9 A	3.0 A	3.0 A
- 100-240 VAC:	-	-	1.3 to 0.7 A
Cooling range:	+10 °C to -18 °C (+50 °F to 0 °F)		
Dimensions (WxHxD) in mm:	465x414x300	550x425x260	580x385x360
Weight:	11.5 kg	12 kg	15.5 kg

	<b>CF-40</b>	<b>CF-50</b>	<b>CF-60</b>
Overall capacity:	37 litres	49 litres	59 litres
Connection voltage:	12/24 V DC and 100-240 V AC		
Rated current:			
- 12 VDC:	6.0 A	7.0 A	7.0 A
- 24 VDC:	3.0 A	3.0 A	3.0 A
- 100-240 VAC:	1.3 to 0.7 A	1.3 to 0.7 A	1.3 to 0.7 A
Cooling range:	+10 °C to -18 °C (+50 °F to 0 °F)		
Dimensions (WxHxD) in mm:	580x445x360	630x480x360	630x580x360
Weight:	17 kg	CF-50 19 kg CF-50DZ 19.8 kg	21.5 kg



### Note

If the ambient temperature is above 32°C (90 °F), the minimum temperature cannot be attained.

Test/certificates:



- 73/23/EEC - Low Voltage Electrical Equipment Directive

- 89/336/EEC - EMC Directive

- 95/54/EEC



Versions and delivery options may vary due to technical modifications.  
This device is CFC-free. The coolant circuit contains R134a.





# WAECO

## mobile solutions

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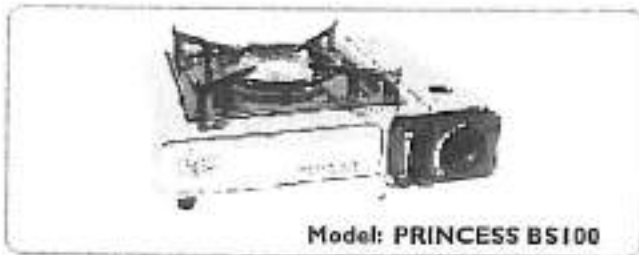
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# US Portable Gas Cooker USER INSTRUCTIONS



Model: PRINCESS BS100

## DANGER: CARBON MONOXIDE HAZARD

- This appliance can produce carbon monoxide, a gas which has no odor.
- Using the appliance in an enclosed space is dangerous and could kill.
- Never use this appliance in an enclosed space. • Use only in well ventilated areas.

### - FOR YOUR SAFETY -

If you smell gas follow the steps below:

- 1) Do not attempt to light appliance
- 2) Extinguish any open flame
- 3) Eject cartridge from appliance and remove

### - FOR YOUR SAFETY -

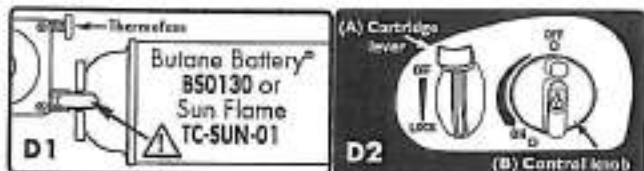
Do not use or store gasoline or other liquids which produce flammable vapors in the vicinity of this or any other appliance.

**Your Purchase:** Thank you for purchasing a Bright Spark® appliance. Your appliance has been designed for reliability, functionality and safety. At Bright Spark® we do not compromise on safety. Your Bright Spark® portable gas cooker is designed and manufactured to the highest quality standards. Used properly it will give many years of service. **Please read and retain these instructions.**

**Warranty:** An RTB (return to base) warranty for Bright Spark® cookers is offered for the following periods: Model BS100 cookers - two years' RTB warranty.

Warranty invalidated if unit is submerged, dropped, mishandled or any repair attempted. The address for warranty returns is:

**Seward Products** 3711 Capitol Ave. Whittier, Ca 90601-1732 USA  
Tel: (562) 699-7997 Fax: (562) 699-0908



## To Operate

- For model BS100 make sure pan support is upright, with pan support arms pointing upwards.
- Remove red cap from cartridge.
- Position gas control knob to **OFF** position (pointing upwards).
- Open cartridge cover. Insert cartridge, making sure to line up tab on regulator with notch in gas cartridge collar (D1).
- Engage cartridge by pushing cartridge lever down (a slight hiss of gas may be heard as unit engages). Turn gas control knob counter clockwise to the "ON" position (D2). Click, exerting a slight pressure in a counter-clockwise movement to activate piezo ignition to spark. Repeat until unit lights.

**NB** Flame Failure Device requires the control knob to be held against spring for two to three seconds to release gas flow and once ignited, must be held against spring for approx 4 seconds to heat thermocouple.

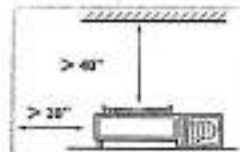
- Unit is now ready to use - adjust flame to desired level by operating control knob.

## To Turn off

- Turn control valve to **OFF** position
- Disengage cartridge

## WARNING

- Before using, check that clearance between appliance and any combustible material is at least 20 inches, and at least 40 inches between appliance and overhead cupboards or ceilings.



- When lighting appliance, check to make sure it is well away from combustible items and flammable gases and liquids.
- Use only UL 1476 listed Butane Battery® type BS0130 or Sun Flame TC-SUN-01 non refillable, disposable containers. Using other types of container may be dangerous.
- Disengage the cartridge when not in use.
- Only use in a well ventilated area away from flammable materials.
- If a leak is detected do not attempt to light appliance. Never use a naked flame to check for gas leaks.
- If a gas leak is detected, take unit outdoors away from naked flames and heat sources and use soapy water to check for leaks. If a leak is detected, do not attempt to modify appliance. Contact your supplier.
- Do not use with pans whose base is larger than 9 inches as they could overhang the cartridge cover, heating the cartridge.
- Do not use two units side by side.
- Do not use for purposes other than for cooking.
- Some parts become very hot during use. Keep children away from appliance.
- Do not store more than 48 cartridges indoors. Store cartridges in a cool place away from exits and fire escapes. It is preferable to store cartridges outdoors away from children in a cool dry place away from exits or fire escapes.

## Safety Devices

- 1) **Thermofuse** available on model BS100. If the cartridge begins to overheat, thermofuse pops out, triggering cut off of gas flow. Should this occur, first allow cartridge to cool, then determine and eliminate source of heat transfer to cartridge (such as overheat gas) before reinserting fuse by pushing it in.
- 2) **Thermocouple Flame Failure Device** available on model BS100 cuts off the flow of gas if flame is extinguished by spllover or wind. Follow operating instructions to re-ignite.
- 3) **Gas Engage Control** Gas cartridge will not engage if gas control is on or pan support is wrong way up.

Safety devices are there to protect you. **DO NOT OVERRIDE SAFETY DEVICES**

## Maintenance Instructions

- Keep unit free from grease or fat by regular cleaning with mild detergent and clean water.
- Ensure there is no obstruction to the flow of combustion and ventilation air around the burner.
- When ignited check that the flame is burning with a steady blue flame. Yellow or spluttering flame indicates poor quality gas or dirt or contamination of the burner.
- There are no user serviceable parts on this unit.

B2304 Issue 6

# Winch Service Manual

Standard and Self Tailing

Models 6 to 66

<https://www.boat-manuals.com/>



**LEWMAR®**

[www.lewmar.com](http://www.lewmar.com)

Lewmar winches are known worldwide for their quality, technical innovation and performance. They have been tested to their limits by our engineers in the laboratory and by racing crews in their search for victory. In addition, they have given years of outstanding service to many thousands of yachtsmen to whom the ultimate performance of a yacht or its equipment is perhaps secondary to the pure joy of sailing a fine craft equipped with the best yacht hardware in the world.

This booklet tells you how to give your Lewmar winches the care and attention they need to ensure that whether you sail for results, records or pleasure, your winches will contribute that extra level of performance that is the hallmark of their design. Your Lewmar winches have been built to perform in the best possible manner in all sailing conditions. With care and attention they will give many years of service.

Service details contained in this booklet apply to the current range of Lewmar winches. The same overall servicing principles may be used for earlier versions, although the detailed construction of the winches may be different.

Lewmar wish you good sailing for many years to come.

Lewmar Winden sind in der ganzen Welt für ihre hohe Qualität, technischen Neuerungen und gute Leistungen bekannt. Unsere Techniker im Labor und viele Wettkampf-Crews beim Streben nach dem Sieg haben unsere Winden an Deck bis zum Äußersten geprüft. Außerdem haben unsere Winden im Laufe der Jahre im Dienst vieler Freizeitsegler bewiesen, bei denen die reine Freude ein mit der besten Ausrüstung der Welt ausgestattetes Bootes zu segeln vielleicht noch wichtiger ist, als die Geschwindigkeit des Schiffes selbst.

Dieses Heft soll Ihnen dabei helfen, Ihren Lewmar Winden die notwendige Pflege und Aufmerksamkeit zu schenken, die sicherstellt, daß sie Ihnen das mehr an Leistung gibt, durch die sich ihre Konstruktion auszeichnet - ob Sie nun für den Erfolg, für Rekorde oder nur aus Freude an der Sache segeln, Lewmar Winden sind vom Design her dazu vorgesehen, unter allen Segelbedingungen optimal zu funktionieren. Mit ein wenig Pflege und Aufmerksamkeit werden Sie viele Jahre an unseren Produkten Freude haben.

Die in diesem Heft enthaltenen Pflegeinformationen beziehen sich auf das aktuelle Sortiment der Lewmar Winden. Die gleichen Pflegegrundsätze lassen sich auch auf frühere Modellreihen übertragen, obwohl die genaue Konstruktion zwischen neuen und alten Winden unterschiedlich sein kann.

Lewmar wünscht Ihnen auf viele Jahre gute Fahrt mit Lewmar!



Les winchs Lewmar sont connus dans le monde entier pour leur qualité, la nouveauté de leur technique et leurs performances. Nos techniciens les ont soumis à des essais maximum en laboratoire et les équipages en compétition ont pu éprouver au mieux leur comportement dans leur course vers la victoire. En outre, ils ont donnés des années de service irréprochable à des milliers de plaisanciers pour qui les performances extrêmes d'in bateau ou de seon équipement n'ont probablement qu'une importance secondaire si on les compare au simple plaisir de naviguer sur un voilier de classe équipé de meilleur matériel de navigation au monde.

Cette notice vous explique comment entretenir au mieux les winchs Lewmar pour qu'ils fournissent systématiquement, que vous naviguiez pour remporter des victoires, pour briser des records ou simplement pour le plaisir, ce degré supérieur de fonctionnement qui caractérise leur construction. Vos winchs Lewmar ont été conçus afin d'offrir une performance optimale quelles que soient les conditions. Bien entretenus, ils vous donneront de nombreuses années de service.

Les explications concernant l'entretien, et contenues dans cette notice, s'appliquent à la gamme actuelle de winchs Lewmar. Les mêmes principes généraux de service peuvent être utilisés pour les versions précédentes, bien que le montage des pièces soit parfois différent.

Lewmar vous souhaite bon vent pendant encore de nombreuses années.

Los winches Lewmar son mundialmente conocidos por su calidad, innovaciones técnicas y rendimiento. Se han probado hasta sus límites por nuestros técnicos en el laboratorio y por tripulaciones de regata en su búsqueda de victorias. Además, han dado años de notable servicio a muchos miles de propietarios de yates para quienes el rendimiento final de su yate no es tan importante como el gozo de navegar en un bonito barco, equipado con el mejor acastillaje del mundo.

El presente folleto le enseñará como cuidar sus winches Lewmar y cuál es la atención que necesitan para asegurar que, tanto si usted navega para obtener resultados, como para conseguir récords, o por placer, sus winches contribuyan a obtener el superior nivel de rendimiento para el que fueron diseñados. Sus winches Lewmar se han construido para rendir de la mejor manera posible en todas las condiciones de navegación. Con cuidado y atención le darán muchos años de mantenimiento.

Los procedimientos de mantenimiento del presente folleto son aplicables a la gama actual de winches Lewmar. Pueden usarse los mismos principios generales para versiones anteriores aunque los detalles constructivos de los winches serán distintos.

Lewmar le desea muchos años felices de singladuras.

Lewmars vinschar är välkända över hela världen för sin kvalitet, tekniska innovation samt prestanda. Vinscharna har testats till deras yttersta gränser av tekniker i våra laboratorium och av besättningar på kappseglingsbåtar, med segern i sikte. Dessutom har dessa vinschar varit till enastående nytta för tusentals seglare, där den slutgiltiga prestandan hos en segelbåt eller dess utrustning, kanske är mindre väsentligt än det rena nöjet att segla en ypperlig båt, som är försedd med den bästa båtutrustningen i världen.

I detta häfte får du anvisningar om hur du ger dina Lewmar vinschar det underhåll de behöver och som ser till att vinscharna ger den extra prestanda som är kännetecknet för deras konstruktion, vare sig du deltar i kappseglingar eller enbart seglar för nöjets skull. Lewmar vinscharna är konstruerade att fungera på bästa möjliga sätt under alla förhållanden.

De underhållsanvisningar som finns i detta häfte gäller för den aktuella Ocean-serien av Lewmars vinschar. Samma underhållsprinciper kan på det hela taget användas för tidigare varianter även om dessa vinschars detaljkonstruktion kan vara annorlunda beskaffad.

## OUR GUARANTEE OF QUALITY

UNSERE QUALITÄTSGARANTIE • NOTRE GARANTIE DE QUALITÉ • NUESTRA GARANTÍA DE CALIDAD  
• VÅR KVALITETSGARANTI

### GB

Lewmar winches have been developed over many years by extensive testing aboard the world's finest ocean racers, long distance cruising yachts and match racing yachts. They are manufactured to the highest quality standards and only the finest materials are used. If installed, used and maintained as described in this booklet, they will give outstanding performance. Full details of our 3 year warranty and conditions of sale are described on page 52/53.

### D

Lewmar Winden wurde im Laufe vieler Jahre durch umfassende Prüfungen an Bord der besten Regattaboote, Langstreckensegler und Wettkampfssegler zum heutigen Standard weiterentwickelt. Sie werden nach den strengsten Qualitätsmaßstäben hergestellt und nur die besten Werkstoffe werden eingesetzt. Solange die Winden - wie in diesem Heft beschrieben - installiert, eingesetzt und gepflegt werden, können Sie beste Leistungen von ihnen erwarten. Nähere Einzelheiten über unsere 3-Jahres Garantie und die Verkaufsbedingungen finden Sie auf Seite 52/53.

### F

Les winchs Lewmar sont l'aboutissement de nombreuses années de développement et d'essais intensifs à bord des plus grands yachts de course, de croisière et de compétition. Ils sont fabriqués d'après des normes de qualités extrêmement sévères et en utilisant les meilleurs matériaux. S'ils sont montés, utilisés et entretenus selon les consignes contenues dans cette notice, ils vous offriront des performances exceptionnelles. Notre garantie de 3 ans et nos conditions de vente sont expliquées en détail à la page 52/53.

### E

Los winches Lewmar se han desarrollado durante muchos años con la realización de numerosas pruebas a bordo de los mejores barcos de regatas oceánicas del mundo, cruceros de larga distancia y yates para competición «match race» como los 12 metros FI. Están fabricados según los más altos niveles de calidad y usando únicamente los mejores materiales. Si se instalan, usan y mantienen como se describe en el presente folleto, darán un notable rendimiento. Los detalles completos de nuestra garantía de 3 años y las condiciones de venta se describen en la página 52/53.

### S

Lewmar-vinscharna har utvecklats under många år genom omfattande testning ombord på världens bästa ocean kappsegelare, på långfärdsbåtar och på bankappsegelare som t ex 12-metersbåtar. Vinscharna tillverkas enligt de högsta kvalitetsnormer och endast det bästa material används. Om vinscharna monteras, används och underhålls enligt anvisningarna i detta häfte kommer de att ge enastående prestanda. Fullständiga uppgifter om vår 3-årsgaranti och våra försäljningsvillkor finns angivna på sid 52/53.

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## WHEN TO SERVICE

WANN IHRE WUNSCHEN GEWARTET WERDEN SOLLTE

GB

### FREQUENCY OF SERVICING

Lewmar winches, like any other precision engineered product, must be serviced regularly. Yacht winches are required to carry deceptively high loads. For example, the genoa sheet load on a 40' (12 m) cruising yacht can easily reach 1000 lbs (453 kg). Regular servicing with attention to correct assembly and condition of parts is vital to the safety and performance of your boat.

#### WHEN?

- 1. TWO OR THREE TIMES DURING ACTIVE SAILING SEASON:** Lewmar winches should be stripped, cleaned and re-lubricated.
- 2. AT THE END OF EACH SAILING SEASON AND BEFORE STARTING THE NEW SAILING SEASON:** All Lewmar winches should be completely stripped, cleaned, thoroughly checked for damage and lubricated with reference to the information provided in the Lewmar Volume 10 Service Manual.

#### EXTERNAL CLEANING OF DRUM

**Chrome winches** - Wash drum regularly with fresh water and dry with a cloth.

Occasionally use non-abrasive liquid chrome cleaner to remove dirt deposits.

**Alloy** - Wash drum regularly with fresh water and dry with a cloth. DO NOT USE POLISHES OR ABRASIVES.

**Stainless Steel Winches** - Wash drum regularly with fresh water and dry with a cloth.

Occasionally use non-abrasive liquid cleaner to remove dirt deposits.

**Bronze** - Wash drum regularly with fresh water and use brinze cleaner.

D

### WARTUNGSHÄUFIGKEIT

Wie alle Winschen müssen auch Lewmar Winschen regelmäßig gewartet werden. Winschen müssen hohe Lasten aufnehmen. Regelmäßiges Warten ist entscheidend für die Sicherheit und Einsatzbereitschaft ihres Bootes. Dabei ist auf den richtigen Einbau und den Zustand der Teile zu achten.

#### WARTUNGSZEITPUNKT

- 1.** Zwei – oder dreimal während der Segelsaison sollten die Winschen zerlegt, gereinigt und neu geschmiert werden.
- 2.** Am Ende jeder Segelsaison und zu Beginn der neuen Segelsaison sollten alle Lewmar Winschen vollständig zerlegt, gereinigt, gründlich auf Schäden überprüft und neu gefettet bzw. Geölt werden (siehe Lewmar Band 10 – Winschenwartung unter www.lewmar.com)

#### AUSSENREINIGUNG DER WINSCHTROMMEL

**Verchromte Winschen** – Verholspill regelmäßig mit frischem Wasser abspülen und mit einem Tuch abtrocknen. Zum Entfernen von Schmutzflecken kann von Zeit zu Zeit ein schonendes Chromreinigungsmittel verwendet werden.

**Aluminium Winschen** – Verholspill regelmäßig mit frischem Wasser abspülen und mit einem Tuch abtrocknen. Kein Polier – oder Schleifmittel verwenden.

**Edelstahl Winschen** – Winschtrummel regelmäßig mit frischem Wasser abspülen und mit einem Tuch abtrocknen. Zum Entfernen von Schmutzflecken kann von Zeit zu Zeit ein schonendes Chromreinigungsmittel verwendet werden.

## WHEN TO SERVICE

A QUEL MOMENT EFFECTUER L'ENTRETIEN • CUANDO HACER EL MANTENIMIENTO

F

### INTERVALLES D'ENTRETIEN

Les winchs Lewmar, comme n'importe quelle pièce de précision, doivent être entretenus régulièrement. Les winchs de yachts doivent supporter des charges extrêmement élevées. Par exemple, la charge des écoutes du génois sur un yacht de croisière de 12 mètres peut facilement atteindre 453 kg. Un entretien régulier, portant notamment sur le montage correct et l'état des pièces, est essentiel pour la sécurité et pour les performances de votre voilier.

#### QUAND?

- 1. DEUX OU TROIS FOIS AU COURS D'UNE SAISON DE NAVIGATION INTENSIVE:** les winchs Lewmar devraient être démontés entièrement, nettoyés et graissés.
- 2. A LA FIN DE CHAQUE SAISON ET AVANT D'ENTAMER UNE NOUVELLE SAISON DE NAVIGATION:** tous les winchs Lewmar devraient être entièrement démontés, nettoyés, examinés minutieusement pour repérer les dégâts éventuels et graissés selon les informations du Manuel d'entretien Lewmar, volume 10.

#### NETTOYAGE EXTÉRIEUR DU TAMBOUR

**Winchs chromés** - Laver régulièrement le tambour à l'eau douce et le sécher avec un chiffon.

Utiliser de temps à autre un nettoyant liquide non abrasif pour chrome afin d'éliminer la saleté déposée.

**Winchs en aluminium anodisé** - Laver régulièrement le tambour à l'eau douce et le sécher avec un chiffon. NE PAS UTILISER DE PRODUITS A POLIR OU ABRASIFS.

**Winchs en acier inoxydable** - Laver régulièrement le tambour à l'eau douce et le sécher avec un chiffon.

Utiliser de temps à autre un nettoyant liquide non abrasif afin d'éliminer la saleté déposée.

E

### FRECUENCIA DEL MANTENIMIENTO

Los winches Lewmar, como cualquier otro producto de ingeniería de precisión, necesitan un mantenimiento periódico. Los winches Lewmar tienen que soportar cargas insospechadamente altas. Por ejemplo, la tracción en la escota de foque en un crucero de 40 pies puede llegar fácilmente a los 453 kg. El mantenimiento regular, con atención al correcto montaje y la comprobación del estado de las piezas es de vital importancia para la seguridad y el rendimiento de su embarcación.

#### CUÁNDO?

- 1. DOS O TRES VECES DURANTE LA TEMPORADA DE NAVEGACIÓN ACTIVA:** se deben desmontar, limpiar y volver a lubricar los winches Lewmar.
- 2. AL FINAL DE CADA TEMPORADA DE NAVEGACIÓN Y ANTES DE COMENZAR LA NUEVA TEMPORADA DE NAVEGACIÓN:** todos los winches Lewmar se deben desmontar completamente y ser limpiados, se deben inspeccionar detalladamente en busca de deterioro y ser lubricados, tomando como referencia la información del Manual de Mantenimiento Lewmar Volumen 10.

#### LIMPIEZA EXTERNA DEL TAMBOR

**Winchs cromados** - Lavar periódicamente el tambor con agua dulce secándolo con un paño. Ocasionalmente se puede usar un limpiador para cromados, líquido, no abrasivo, para quitar depósitos de suciedad.

**Winchs de aluminio anodizado** - Lavar el tambor periódicamente con agua dulce secándolo con un paño. NO USE PRODUCTOS DE PULIDO O ABRASIVOS.

**Winchs de Acero Inoxidable** - Lave el tambor periódicamente con agua dulce y séquelo con un paño. Ocasionalmente se puede usar un limpiador para cromados, líquido, no abrasivo, para quitar depósitos de suciedad.

## WHEN TO SERVICE

### NÄR SKALL UNDERHÅLL UTFÖRAS

## S

### REGELBUNDET UNDERHÅLL

På samma sätt som med andra precisionstillverkade produkter måste Lewmar-vinschama regelbundet underhållas. Det krävs av båtvinsschar att de skall kunna ta upp mycket stora belastningar. Exempelvis, belastning hos genuafocken på en 40 fots långfärdsbåt kan lätt nå upp till cirka 453 kg. Regelbundet underhåll med uppmärksamhet på rätt hopsättning och delamas tillstånd är livsviktigt för säkerheten ombord och för din båts prestanda.

### NÄR?

- 1. TVÅ ELLER TRE GÅNGER UNDER SÄSONGEN MED AKTIV SEGLING:** Lewmar-vinscharna skall demonteras, rengöras och smörjas.
- 2. VID SLUTET AV VARJE SEGLATIONSSÄSONG OCH INNAN NÄSTA SÄSONG BÖRJAR:** Alla Lewmar-vinschar skall demonteras helt och hållet, rengöras, grundligt kontrolleras beträffande eventuella skador och smörjas enligt anvisningarna som finns i Lewmar Servicebok, volym 10.

### UTVÄNDIG RENGÖRING AV TRUMMAN

**Förkromade vinschar** - Skölj regelbundet av trumman med sötvatten och torka av den med en trasa. Använd emellanåt flytande kromrengöringsmedel utan slipande verkan för att ta bort smutsbeläggningar.

**Eloxerade aluminiumvinschar** - Skölj regelbundet av trumman med sötvatten och torka av den med en trasa. ANVÄND INTE POLER-ELLER SLIPMEDEL.

**Vinschar av rostfritt stål** - Skölj regelbundet av trumman med sötvatten och torka av den med en trasa. Använd emellanåt flytande rengöringsmedel utan slipande verkan för att ta bort smutsbeläggningar.

## WHAT YOU NEED

### WAS SIE BENÖTIGEN • KITS DE RECHANGE

## GB

### SPARES KIT

#### Winch spares kit

Lewmar provide a maintenance kit for every winch in their range. Each kit is complete and parts are not sold separately.

#### **19700100 Basic Winch Servicing Kit**

4 Circlips, 4 Pawls, 4 Pawl Springs.

#### **19700200 Winch Servicing Kit**

4 Circlips, 8 Pawls, 12 pawl springs, 3 keys, 2 pan head screws (self-tailers).

#### **19700300 Three Speed Winch Servicing Kit**

#### **19700401 STD Large Pawls & Springs (50-66)**

6 Pawls, 12 Pawl Springs.

#### **19700501 STD Small Pawls & Springs (6-48/66)**

6 Pawls, 12 Pawl Springs.

#### **19700900 Allen Key Set**

#### **19701000 GearGrease™**

Packed in handy 100g plastic tube.

#### **19701100 GearGrease™**

Packed in handy 300 g plastic tub. This waterproof grease contains solid activation which aids the load carrying characteristics of a winch. It is also suitable for trailer wheel bearings, steering gear, hydraulic equipment, outboard engines and many other marine applications.

#### **19701300 Naval Jelly**

Packed in handy 200 ml jar. Removes tarnishing from stainless steel surfaces and protects the material.

#### **19701600 RaceLube™**

Packed in a handy 55 ml plastic bottle. Special formula for winch pawls, springs and similar applications where the use of grease is not advised.

#### **19701500 Winch Maintenance Packs**

100 g Tube of GearGrease™, 55ml RaceLube™, Brush, 'How To' Booklet, Pawl Springs x 10.

## D

### ERSATZEILE

#### Winschen Service Kit

Lewmar bietet für jades Winschenmodell ein entsprechendes Wartungskit an. Jedes Kit enthält alle erforderlichen Teile. Ein Einzelverkauf ist nicht vorgesehen.

#### **19700100 Ersatzteilkit**

4 Federringe, 4 Klinken, 4 Klinkenfedern

#### **19700200 Ersatzteilkit**

4 Federringe, 8 Klinken, 12 Klinkenfedern, 3 Passfedern, 2 Flachkopfschrauben

#### **19700300 Ersatzteilkit 44-66PB**

3 Gang Modelle

#### **19700401 Große Klinken und FEDERN (STANDARD) 50-64**

6 Klinken, 12 Klinkenfedern

#### **19700501 Kleine Klinken und Federn (Standard) 5-48 & 66**

6 Klinken, 12 Klinkenfedern

#### **19700900 Inbusschlüsselsatz**

#### **19701000 Spezial - Winschenfett**

Verpackt in praktischer 100g-Plastiktube.

#### **19701100 GearGrease™ Spezial Winschenfett**

Verpackt in praktischer 300 g Dose. Dieses wasserfeste Schmierfett enthält Festaktivatoren zur Unterstützung der Belastbarkeit einer Winde. Es eignet sich außerßem für Radlager an Trailren, für Lenkgetriebe, Hydraulikgeräte, Außenbordmotoren u.a.

#### **19701300 Marine-Gel**

Verpackt in praktischer 200 ml Dose. Beseitigt Anlaufflecken an Edelstahlflächen und schützt das Material.

#### **19701600 RaceLube™**

Verpackt in handlicher 55ml Flasche. Speial-öl für Sperrklin anf Ferern oder auch dort, wo Fett nicht Zulässig ist.

#### **19701500 Winschpflegeset**

100g Winschenfett, 55mm Schmieröl, Bürste, Anleitung, 10 Klinkenfedern.

## WHAT YOU NEED

### KITS DE RECHANGE • QUE SE NECESITA

#### F

#### KITS DE RECHANGE

##### Pièces détachées

Lewmar fournit un kit de maintenance pour chaque winch de sa gamme. Chaque kit est complet et les pièces ne sont pas vendues séparément.

##### **19700100 Kits de rechange**

Kit d'entretien de base pour winch. 4 circlips, 4 cliquets, 4 ressorts de cliquet

##### **19700200 Kit d'entretien pour winch.**

4 circlips, 8 cliquets, 12 ressorts de cliquet, 3 clés, 2 vis à tête tronconique (self-tailing).

##### **19700300 Kit d'entretien pour winch trois vitesses.**

##### **19700401 STD gros cliquets en ressort de cliquets (50-66)**

6 cliquets, 12 ressorts de cliquet.

##### **19700501 STD petit cliquets en ressort de cliquets (6-48/66)**

6 cliquets, 12 ressorts de cliquet.

##### **19700900 Jeu de clés Allen**

##### **19701000 Graisse™**

En tube plastique et pratique de 100 g.

##### **19701100 Graisse™**

Conditionnée en tube plastique et pratique de 300g. Cette graisse étanche contient des composants qui permettent l'optimisation de résistance à la traction du winch. Elle peut aussi être utilisée pour les roulements à bille de remorque, l'engrenage de direction, l'équipement hydraulique, les moteurs hors bord et dans de nombreuses autres applications marines.

##### **19701300 Gelée Marine**

Conditionnée en bocal pratique de 200g. Ravive et protège les surfaces en acier inoxydable.

##### **19701600 Lubrifiant Racing™**

Conditionné dans une bouteille plastique de 55ml. Ce lubrifiant est tout à fait indiqué pour les cliquets, ressorts de cliquets et applications similaires la ou l'emploi de la graisse n'est pas indiqué.

##### **19701500 Pack de maintenance de winchs**

Tube de 100g de graisse™, 55ml de lubrifiant Racing™, pinceau, 'Notice d'entretien', ressorts de cliquets x 10.

#### E

#### RECAMBIOS DE WINCHES

##### Recambios de winches

Lewmar le proporciona un kit de mantenimiento para cualquier winche de su gama. Cada kit es un conjunto completo y los componentes no se venden por separado.

##### **19700100 Juego de repuestos**

Kit básico: 4 arandelas de retención, 4 trinquetes, 4 resortes de trinquete.

##### **19700200 Juego de repuestos**

4 arandelas de retención, 8 trinquetes, 12 resortes de trinquete, 3 llaves, 2 tornillos de cabeza plana (self tailers).

##### **19700300 Juego de repuestos**

Kit de mantenimiento de winches de tres velocidades.

##### **19700401 Estándar de trinquetes y resortes grandes 50-65**

6 trinquetes, 12 resortes de trinquete.

##### **19700501 Estándar de trinquetes y resortes pequeños 5-48/66**

6 trinquetes, 12 resortes de trinquete.

##### **19700900 Juego de llaves Allen**

##### **19701000 GearGrease™**

100 g. en un práctico tubo de plástico.

##### **19701100 GearGrease™**

300 g. en un práctico bote. Grasa resistente al agua con activación sólida que mejora las características de soporte de carga del winche. También es adecuada para cojinetes de ruedas de remolque, sistemas de gobierno, equipos hidráulicos, motores fueraborda y muchas otras aplicaciones marinas.

##### **19701300 Naval Jelly**

Bote de 200 ml. Quitamanchas para superficies de acero inoxidable. Elimina las oxidaciones y protege el material.

##### **19701600 RaceLube™**

Aceite especial envasado en una cómoda botella plástica de 55ml. Formulado especialmente para los trinquetes de winches y otras aplicaciones en las que el uso de grasa no está recomendado.

##### **19701500 Pack de mantenimiento de winches**

Tubo de grasa de 100 g., 55 ml. de aceite RaceLube™, Pincel, Libro de instrucciones, 10 muelles de trinquete.

## WHAT YOU NEED

### VAD DU BEHÖVER

#### S

#### RESERVELSSATSER

##### Reservdelar

Lewmar tillhandahåller kompletta reservdelssatser till varje vinsch. Delarna säljs inte separat.

##### **19700100 RESERVELSKIT 5-44**

4 låsringar, 4 spärrklackar, 4 fjädrar.

##### **19700200 RESERVELSKIT 14ST-68ST**

4 låsringar, 8 spärrklackar, 12 fjädrar, 3 låskilar, 2 stjärnskruvar.

##### **19700300 RESERVELSKIT 44-66PB**

Service kit till 3 växlad vinsch.

##### **19700401 STD-STORA SPÄRRHAKAR & FJÄDRAR 50-65**

6 klackar, 12 fjädrar.

##### **19700501 STD SMÅ SPÄRRHAKAR & FJÄDRAR 4-48/66**

6 klackar, 12 fjädrar.

##### **19700900 Nyckelsats för sexkantshål**

##### **19701000 GearGrease™**

Fett. Förpackat i praktisk 100 g plasttub.

##### **19701100 GearGrease™**

Förpackat i praktisk 300 g plasttub. Detta vattenfasta fett innehåller fast aktiveringsmedel som underlättar vinschens belastningsförmåga. Detta fett passar också för hjullager på släpvagnar, rodermaskineri, hydraulisk utrustning, utombordsmotorer och båtutrustning av många andra slag.

##### **19701300 Naval Jelly**

Båtvaselin. Förpackat i praktisk 200 ml burk. Tar bort missfärgning från detaljer av rostfritt stål och skyddar materialet.

##### **19701600 RaceLube™**

Förpackad smidig 55ml plastfaska. Avsedd att smörja rörliga delar som inte skall fettas in.

##### **19701500 VINSCH UNDERHÅLLNINGSKIT**

Innehållande 100 gr fett på tub, 55ml RaceLube™, borste, spärrklacksfjädrar x 10, och instruktion.

## TOOLS

### WERKZEUGE • OUTILS

#### GB

All winches are designed according to Lewmar's "strip from the top" philosophy, so that any winch can be stripped for servicing in seconds, without the need to remove the winch from its fittings, using a very basic set of tools as described in the table below.

#### TOOLS REQUIRED FOR ROUTINE SERVICING

**Tools** - Small flat bladed screwdriver, clean soft cotton, cleaning fluid - white spirit, paraffin (not petrol), light machine oil, Lewmar winch grease.

#### MODEL

6, 7, 8, 16, 30, 40 & 44

Basic requirement only.

14ST, 16ST, 28/30ST, 34/40ST, 44ST, 48ST

Basic requirement plus cross-headed screwdriver.

50ST, 54ST, 58ST, 64/65ST

Basic requirement plus a 5 mm A/F Allen key.

66ST

Basic requirement plus a 6 mm and 8 mm A/F Allen key.

#### D

Alle Winschen sind nach dem Lewmar-Prinzip "Strip from the top" konstruiert, was bedeutet, daß die Winschen für Wartungszwecke mit nur wenigen einfachen Werkzeugen (siehe egenüberliegende Tabelle) sekundenschnell auseinandergenommen werden können, ohne sie vom Deck demontieren zu müssen.

#### WERKZEUGE FÜR DIE ROUTINEMÄSSIGE WARTUNG

Grundausrüstung kleiner flachblattschraubendreher, sauberes, weiches baumwolltuch, reinigungsmittel - terpentinersatz, parafin (kein benzin), leichtes maschinenöl (harzfrei), Lewmar windenfett.

#### MODELL

6, 7, 8, 16, 24, 30, 40 & 44

Nur Grundausrüstung.

14ST, 16ST, 28/30ST, 34/40ST, 44ST, 48ST

Grundausrüstung (s.o.) plus Kreuzschlitzschraubendreher.

50ST, 54ST, 58ST, 64/65ST

Grundausrüstung plus 5 mm A/F

Inbusschlüssel.

66ST

Grundausrüstung plus 6 mm und 8 mm A/F

Inbusschlüssel.

**LEWMAR**®

## TOOLS

### HERRAMIENTAS • HJÄLPMEDEL

#### E

Todos los winches están diseñados según la filosofía de Lewmar de «desmontaje desde arriba», de modo que cualquiera de ellos se puede desensamblar completamente en unos segundos, sin necesidad de desmontar su base del barco, usando el sencillo conjunto de herramientas que se describe en la tabla adjunta.

#### HERRAMIENTAS NECESARIAS PARA EL MANTENIMIENTO DE RUTINA

**Todos los modelos** - necesidades básicas  
Destornillador pequeño. Paño limpio de algodón:  
Líquido limpiador - Aguarrás, parafina (gasolina no).  
Aceite de maquina de coser, Grasa Lewmar.

#### MODELO

6, 7, 8, 16, 30, 40 y 44

Solo las herramientas básicas.

14ST, 16ST, 28/30ST, 34/40ST, 44ST, 48ST

Herramientas básicas más destornillador de cruz.

50ST, 54ST, 58ST, 64/65ST

Herramientas básicas más llave Allen de 5 mm.

66ST

Herramientas básicas más llaves Allen de 6 y 8 mm.

#### S

Samtliga vinschar är konstruerade enligt Lewmars princip "direkt demontering" vilket innebär att alla vinschar kan demonteras för underhåll på några sekunder, utan att man behöver ta loss vinschen från däck med en mycket enkel uppsättning hjälpmedel som beskrivs i motstående tabell.

#### HJÄLPMEDEL SOM BEHÖVS FÖR LÖPANDE UNDERHÅLL

**Hjälpmedel** - Liten plattbladad skruvmejsel, ren, mjuk bomullstrasa, rengöringsmedel - terpentin, fotogen (ej bensin), symaskinsolja, Lewmars vinschfett.

#### MODELL

6, 7, 8, 16, 30, 40 och 44

Endast grundläggande behov.

14ST, 16ST, 28/30ST, 34/40ST, 44ST, 48ST

Grundläggande behov plus en krysskruvmejsel.

50ST, 54ST, 58ST, 64/65ST

Grundläggande behov plus en 5 mm nyckel för sexkantshål.

66ST

Grundläggande behov plus en 6 mm och en 8 mm nyckel för sexkantshål.

**LEWMAR**®

## SERVICING PRE-OCEAN MODELS

WARTUNG DER WUNSCHEN DER OCEAN-SERIE • ENTRETIEN DES MODÈLES PRÉ-OCEAN  
• MANTENIMIENTO DE MODELOS ANTERIORES A LOS OCEAN • UNDERHÅLL AV VINSCHMODELLER  
FÖRE OCEAN-SERIEN

**GB**

Servicing instructions for earlier models of Lewmar winches are contained in Service Manuals No's 5 & 6. Please consult the table on page 49 of this manual for the appropriate publication, or alternatively contact your Lewmar offices for service details.

**D**

Wartungshinweise für ältere Modelle der Lewmar Deckwinden sind in den Service-Handbüchern Nr. 5 & 6 enthalten. Bitte wählen Sie das richtige Service - Handbuch entsprechend der Tabelle auf Seite 49 je nach Modell und Baujahr Ihrer Winde aus. Im Zweifelsfall wenden Sie sich bitte für Wartungsinformationen über diese Winden an Ihren Lewmar Händler.

**F**

Les consignes d'entretien des anciens modèles de winchs Lewmar sont données dans les Manuels No 5 & 6. Prière de se reporter au tableau de la page 50 de ce manuel pour connaître la publication appropriée ou contacter le concessionnaire Lewmar pour obtenir les renseignements nécessaires.

**E**

Las instrucciones de mantenimiento para modelos anteriores de winches Lewmar figuran en los Manuales de Mantenimiento Nos. 5 y 6. Rogamos consulte la tabla de la página 50 del presente manual para determinar la publicación apropiada, o bien que contacte con su distribuidor Lewmar para obtener instrucciones de mantenimiento.

**S**

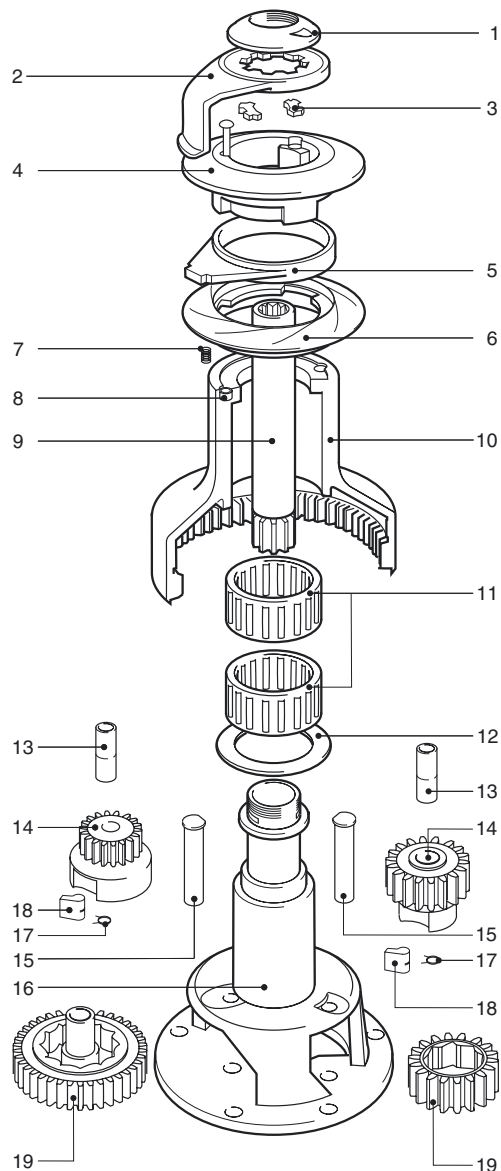
Underhållsanvisningar för tidigare modeller av Lewmar-vinschar finns i Servicebok 5 och 6. Se efter i tabellen på sid 51 i denna handledning för passande publikation, eller kontakta alternativt ett av Lewmars kontor för att få upplysningar om underhåll.





## ABOUT WAVESPRING

DER WAVESPRING • A PROPOS DU WAVESPRING • SOBRE EL WAVESPRING  
• OM WAVESPRING



**GB**

### KNOW YOUR WINCH

1. 'O' Ring 2. Feeder arm 3. Collet 4. Upper crown 5. Stripper ring 6. Lower crown 7. Spring 8. Spring cup 9. Main spindle 10. Drum 11. Roller bearing assembly 12. Drum washer 13. Gear spindle sleeve 14. Pawl gear 15. Gear spindle 16. Centre stem 17. Pawl spring 18. Pawl 19. Ratchet gear.

**D**

### KENNEN SIE IHRE WINDE

1. Top-Kappe 2. Führungsarm 3. Collet 4. Obere Krone 5. Stripper-Ring 6. Untere Krone 7. Feder 8. Federbecher 9. Hauptspindel 10. Trommel 11. Walzenlager 12. Trommelaufscheibe 13. Zahnradspindelbuchse 14. Klinkenzahnrad 15. Zahnradspindel 16. Centre Stem 17. Klinkenfeder 18. Klinke 19. Ratschenzahnrad.

**F**

### APPRENDRE CONNAITRE LE WINCH

1. Ecrou supérieur 2. Doigt de guidage 3. Clavette 4. Couronne supérieure 5. Bague de Self Tailing 6. Couronne inférieure 7. Ressort 8. Logement de cliquet 9. Axe principal 10. Poupée 11. Montage de roulements à Aiguilles 12. Rondelle 13. Bague de butée 14. Pignon à cliquet 15. Axe 16. Embase centrale 17. Ressort de cliquet 18. Cliquet 19. Pignon.

**E**

### CONOZCA SU WINCHE

1. Tapa superior 2. Brazo de alimentación 3. Collarín 4. Corona superior 5. Anillo de extracción 6. Corona inferior 7. Resorte 8. Copa del resorte 9. Huso principal 10. Tambor 11. Conjunto de conjinetes de rodillo 12. Arandeka de tambor 13. Funda del huso de engranaje 14. Engranaje de trinquete 15. Huso de engranaje 16. Eje de centro 17. Resorte de trinquete 18. Trinquete 19. Engranaje de trinquete.

**S**

### LÄR KÄNNA DIN VINSCH

1. Topp 2. Mataram 3. Låsbleck 4. Övre krans 5. Utmatare 6. Nedre krans 7. Fjäder 8. Fjädersäte 9. Drivaxel 10. Trumma 11. Rulllager 12. Glidbricka 13. Växelspindelhylsa 14. Kuggdrev 15. Växelaxel 16. Centrumstam 17. Spärrhaksfjäder 18. Spärrhake 19. Kuggdrev.

## ABOUT WAVESPRING

DER WAVESPRING

**GB**

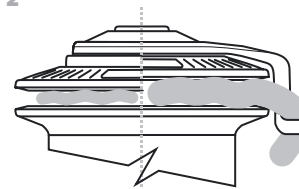
### SELF-TAILER CONVENIENCE

A self tailer enables you to use both hands to wind, by freeing you of the necessity to tail the sheet. Lewmar's patented Wavespring concept is a simple, safe and convenient method of self-tailing.

### A CLOSER LOOK

The Wavespring design is the second generation of Lewmar self tailing systems. It combines the renowned and gentle Wavegrip feature with the automatic self adjusting action that only springs can provide. This enables the Wavespring self-tailing system to handle a large variety of rope diameters and textures without the need for adjustment, yet still allows the valued ability to "tail through", giving even faster sail control. The sleek new feeder and stripper design assures absolute snag-free operation, and the unique jaw design eliminates the possibility of damage caused by too few rope turns (always use a minimum of three turns) being loaded on the drum.

FIGURE 2



### SELF-TAILERS - HOW THEY WORK

The winch must be mounted so that the loose sheet falls correctly into a secure stowage position. The position of the stripper arm can be adjusted to give correct sheet stripping.

There must be a minimum of three turns on the drum. The turn leading from the drum must then be passed across the stripper mechanism and placed into the spring jaws as shown above.

Release the rope from the jaw set with care as LOAD will be present - ease the line away, then remove the turns from the drum.

The jaws of each Lewmar winch are designed to accept a range of rope diameters. Winches should only be used with ropes of recommended size, as set out in the table on page 23.

### RATCHET GEARS - PAWL ENGAGEMENT

When assembling ratchet gears, check pawl engagement as shown in fig. 3, page 23. Incorrect assembly will lead to back winding of the winch. This is very dangerous for obvious reasons, so extreme care should be taken.

**D**

### DIE PRAKTISCHE SELBSTHOLUNG

Mit der Selbstholung bleiben Ihnen beide Hände zum Winden frei, denn das patentierte Wavespring-Konzept von Lewmar ist eine einfache, sichere und praktische Methode der Seilholung.

### GENAU BETRACHTET

FIGURE 2 P.21

Das Wavespring-Design bildet die zweite Generation der Selbsthole-Systemen von Lewmar. Hier wird die bekannte und schonende Wavegrip-Methode mit einer Selbstregelautomatik verbunden, die nur durch Federn erreicht werden kann. So lassen sich mit dem Selbsthole-System Wavespring viele verschiedene Seildurchmesser und -strukturen verwenden. Ein Nachteil ist nicht mehr notwendig, obwohl das wertvolle "Durchholen" immer noch möglich und eine noch schnellere Segelkontrolle gegeben ist. Das elegante neue Führungsdesign versichert eine absolut sichere Funktion, und die ungewöhnliche Konstruktion verhindert mögliche Beschädigungen, die durch zu wenige Schottörns auf der Trommel - es müssen wenigstens drei sein - verursacht werden.

### SELBSTFÜHRUNGEN - WIE SIE FUNKTIONIEREN

Die Winde muß so montiert sein, daß die austretende Schot frei in eine sichere Verstaungslage fällt. Der Führungsarm läßt sich verstellen, damit die Schot richtig ausgeworfen werden kann.

Die Schot muß mindestens dreimal um die Trommel gelegt werden. Dann ist das von der Trommel auslaufende Schotende über den Federarm zu führen und, wie oben abgebildet, in den Selbstholer zu legen.

Beim Lösen des Seils aus dem Selbstholer sollte man vorsichtig vorgehen, denn es ist BELASTET. Die Schot behutsam lockern und dann die Örns von der Trommel nehmen.

Die Selbstholer aller Lewmar Winschen können verschiedene Schotdurchmesser aufnehmen. Dabei sollten die Winschen jedoch nur mit der empfohlenen Schotstärke eingesetzt werden (siehe Tabelle unten).

### GESPERRE - SPERRKLINKE

FIGURE 3 P.23

Beim Zusammenbau der Gesperre bitte darauf achten, daß die Sperrklinken wie unten gezeigt einlinken. Ein fehlerhafter Zusammenbau führt zu einem Rückwinden der Winde. Dies ist sehr gefährlich, daher ist äußerste Vorsicht geboten.

## ABOUT WAVESPRING

A PROPOS DU WAVESPRING • SOBRE EL WAVESPRING

### F

#### AVANTAGE DU SELF-TAILING

Ce dispositif vous permet de garder les mains libres pour wincher en vous évitant d'avoir à tirer sur l'écoute. Lewmar a breveté le concept Wavespring™, une méthode à la fois simple, sûre et pratique de self-tailing.

#### EN DÉTAILS

##### FIGURE 2 P.21

Le modèle Wavespring est la deuxième génération des winchs self-tailing de Lewmar. Il combine les caractéristiques réputées et non agressives du Wavegrip avec l'action de réglage automatique que seuls les ressorts peuvent assurer. Cela permet au self-tailing Wavespring d'accepter une grande variété de diamètres et de textures d'écoutes sans réglage, tout en lui donnant la précieuse capacité d'embraquer, assurant un contrôle de la voile encore plus rapide. Le nouveau bras de chargement assure un fonctionnement sans aucun problème, et la conception originale des mâchoires élimine les risques de dégâts possibles si le nombre de tours sur la poupée du winch n'est pas suffisant (toujours faire un minimum de 3 tours).

#### LE SELF TAILING - COMMENT FONCTIONNE T-IL ?

Le winch doit être monté de telle sorte que l'écoute dévidée tombe correctement en une position de rangement sûre. La position du bras de chargement peut être réglée pour obtenir une orientation correcte.

Un minimum de 3 tours doit être effectué sur le tambour. Le tour partant du tambour doit ensuite être passé sur le bras de chargement et placé dans les mâchoires à ressort de la façon indiquée ci-dessus.

Dégager avec prudence le cordage des mâchoires car une CHARGE sera présente du fait de la charge sur l'écoute - laisser filer, puis ôter les tours du tambour.

Les mâchoires de chaque winch Lewmar sont conçues pour recevoir une gamme de diamètres de cordage. Utiliser uniquement les dimensions de cordage recommandées et indiquées dans le tableau ci-dessous.

#### PIGNONS D'ENTRAÎNEMENT A CLIQUETS: ENGAGEMENT DES CLIQUETS

##### FIGURE 3 P.23

Lors du montage des pignons d'entraînement à cliquets, vérifier l'engagement des cliquets tels que décrits sur le schéma. Un mauvais montage peut occasionner un retour en arrière du winch. C'est extrêmement dangereux pour des raisons évidentes, et nous vous conseillons d'être particulièrement vigilants.

**LEWMAR**

### E

#### LA COMODIDAD DEL SELF-TAILING

Un mecanismo self tailing permite usar las dos manos para cazar con la manivela liberándose la necesidad de ocuparse del cabo. El concepto del mecanismo Wavespring™ patentado por Lewmar, es una manera sencilla, segura y cómoda de cobrar el chicote.

#### UNA VISTA DE CERCA

##### FIGURE 2 P.21

El diseño Wavespring constituye la segunda generación de mecanismos self tailing Lewmar. Combina las conocidas prestaciones del sistema Wavegrip con el ajuste automático que únicamente los muelles pueden dar. Ello permite al sistema self tailing Wavespring manipular una gran variedad de diámetros y texturas de cabo sin necesidad de cobrar el cabo a mano a través de las mordazas. El astuto diseño del nuevo brazo de alimentación y uña de desprendimiento asegura un funcionamiento absolutamente libre de problemas, y el diseño único de las mordazas elimina la posibilidad de averías causadas por demasiado pocas vueltas de cabo (use siempre un mínimo de tres vueltas) en el tambor.

#### SELF TAILINGS - CÓMO FUNCIONAN

El winche tiene que estar montado de manera que el cabo caiga en una posición segura de estiba. La posición del brazo de alimentación y arranque se puede ajustar para que el cabo se desprenda correctamente.

Tiene que haber un mínimo de tres vueltas de cabo en el tambor. La última vuelta se debe pasar por el brazo y colocarse en las mordazas con muelle tal como se muestra arriba.

Suelte el cabo de la mordaza con cuidado porque habrá CARGA - desprenda el cabo con precaución y quite luego las vueltas del tambor.

Las mordazas de cada uno de los winches Lewmar se han diseñado para aceptar un rango de diámetros de cabo. Los winches únicamente deben usarse con cabos de los tamaños recomendados, tal como se indica en la tabla siguiente.

#### ENGRANAJES DE TRINQUETES - DIENTES DE SUJECCIÓN DE TRINQUETE

##### FIGURE 3 P.23

Al ensamblar los engranajes de trinquetes, compruebe que los trinquetes se apoyen en los dientes de los engranajes de antiretroceso de la forma que se muestra abajo. El ensamblaje incorrecto puede ocasionar que el tambor del winche retroceda. Esto es muy peligroso por razones obvias y por lo tanto se debe tener sumo cuidado.

## ABOUT WAVESPRING

OM WAVESPRING

### S

#### BEKVÄM SJÄLVSKOTNING

Denna självskotning funktion möjliggör att du kan använda bägge händerna för skotlindning genom att hålla i dig från behovet att mata skotet. Lewmars patenterade begrepp "Wavespring" är en enkel, säker och bekväm metod för självskotning.

#### EN NÄRMARE TITT

##### FIGURE 2 P.21

Konstruktionen Wavespring är den andra generationen av Lewmars system för självskotning. I detta system kombineras den välkända och varsamma Wavegrip-funktionen med det automatiskt självreglerande verkningssättet som bara fjädrar kan tillhandahålla. Detta möjliggör att det självreglerande systemet Wavespring kan hantera en stor mängd reptyper med olika diametrar och texturer utan behovet av reglering, men ändå finns den värderade möjligheten att "mata igenom" som ger ännu snabbare reglerverkan på segel. Med den nya stilfulla matar - och avdragskonstruktionen säkerställs absolut upphakningsfri drift och med den unika klämbackskonstruktionen elimineras möjligheten av skador som orsakas av alltför få repslag runt trumman (använd alltid minst 3 repslag på trumman).

#### SJÄLVREGLERINGSDON - HUR DE FUNGERAR

Vinschen måste monteras så att det lösa skotet på rätt sätt faller ned på en säker stuvningsplats. Matararmens inställning kan justeras för att ge det rätta skotavdraget.

Det måste vara minst 3 repslag på trumman. Det repslag som avleds från trumman skall sedan ledas över matararmen och sättas in i klämbackarna som visas ovan.

Linan skall lösgöras med försiktighet från klämbackarna eftersom det är BELASTAT - minska linans spänning och ta sedan bort repslagen från trumman.

Klämbackarna i alla Lewmars vinschar är konstruerade för att ta emot rep med en rad olika dimensioner. Vinscharna skall bara användas med linor av rekommenderad dimension enligt nedanstående tabell.

#### SPÄRRVERK - SPÄRRHAKENS INGREPP

##### FIGURE 3 P.23

Vid hopsättning av spärverket skall spärrehakens ingrepp kontrolleras som visas nedan. Felaktig hopsättning leder till backspolning av vinschen. Detta är mycket farligt av lätt förklarliga skäl. Du skall därför vara ytterst noga vid hopsättningen.

#### GB ROPE RANGE

#### D SCHOTSTÄRKEN

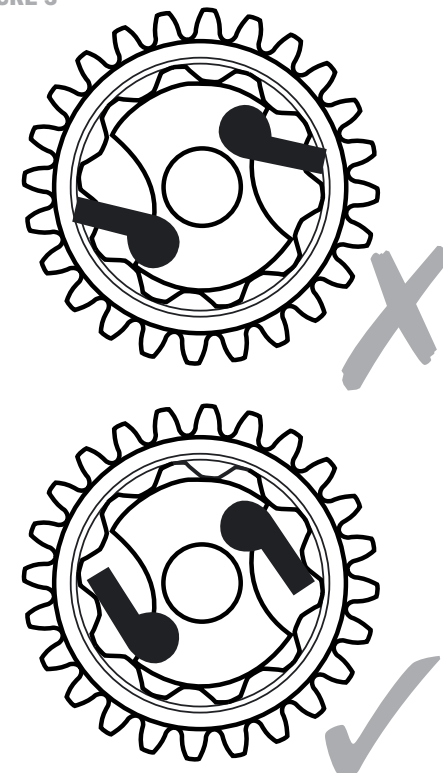
#### F GAMME DE CORDAGE

#### E GAMA DE CABOS

#### S LINDIMENSION

14ST	6-10mm	$\frac{1}{4}'' - \frac{3}{8}''$
16/28/30/34/40ST	8-12mm	$\frac{5}{16}'' - \frac{1}{2}''$
44/48ST	8-14mm	$\frac{5}{16}'' - \frac{9}{16}''$
50/54ST	8-16mm	$\frac{5}{16}'' - \frac{5}{8}''$
58/64/65ST	8-18mm	$\frac{5}{16}'' - \frac{11}{16}''$
66ST	12-22mm	$\frac{1}{2}'' - \frac{7}{8}''$

FIGURE 3



**LEWMAR**



**GB**

**14, 16, 28, 30, 34, 40, 44, 48, 50, 54, 58, 64, 65, 66**

1. Unscrew the top cap.
2. Lift off the feeder arm.
3. Rotate the stripper ring to the required position.
4. Replace the feeder arm in the correct position to suit the stowage of the loose sheet (see note).
5. Check the condition of the 'O' ring in the top cap. Replace if necessary. Lubricate with a light smear of Lewmar winch grease and replace the top cap.

**Note:** When replacing the feeder arm, ensure the stripper ring is correctly located within the groove on the back of the feeder arm.

**EINSTELLEN DES WAVESPRING FÜHRUNGSARMS • POSITION DU BRAS D'ALIMENTATION WAVESPRING • ORIENTACIÓN DEL BRAZO DE ALIMENTACIÓN DEL MECANISMO WAVESPRING • INSTÄLLNING AV WAVESPRING MATARARM**

**D**

**14, 16, 28, 30, 34, 40, 44, 48, 50, 54, 58, 64, 65, 66**

1. Deckkappe abschrauben.
2. Führungsarm abnehmen.
3. Ausführung in die gewünschte Position bringen.
4. Führungsarm in eine dem Verstauen der losen Schot entsprechende Stellung bringen (siehe Hinweis).
5. Den Zustand des O-Rings in der Deckkappe prüfen und gegebenenfalls erneuern. Mit ein wenig Lewmar Windenfett schmieren und die Deckkappe wieder aufsetzen.

**Hinweis:** Wenn der Führungsarm wieder eingesetzt wird, bitte darauf achten, daß der Ausführung richtig in der Rille an der Innenseite der Nase des Führungsarms sitzt.

**F**

**14, 16, 28, 30, 34, 40, 44, 48, 50, 54, 58, 64, 65, 66**

1. Dévisser l'écrou supérieur.
2. Soulever le bras de chargement.
3. Faire tourner la bague du stripper jusqu'à la position désirée.
4. Replacer le bras d'alimentation dans la position adéquate au rangement de l'écoute dévidée (voir note).
5. Vérifier l'état du joint torique dans l'écrou supérieur et le remplacer le cas échéant. Le graisser légèrement avec de la graisse pour winch Lewmar et revisser l'écrou supérieur.

**Note:** En remplaçant le bras de chargement, s'assurer que la bague du stripper se trouve bien à l'intérieur de la rainure au dos du bras.

**E**

**14, 16, 28, 30, 34, 40, 44, 48, 50, 54, 58, 64, 65, 66**

1. Desenrosque la tapa.
2. Levante el brazo de alimentación.
3. Gire el aro de arranque a la posición deseada.
4. Vuelva a colocar el brazo de alimentación en la posición correcta para lograr una buena estiba del chicote (ver nota).
5. Compruebe el estado de la junta tórica de la tapa. Cámbiela si es necesario. Lubriquela con una ligera capa de grasa Lewmar y vuelva a colocar la tapa.

**Nota:** cuando vuelva a colocar el brazo de alimentación, asegúrese de que el aro de arranque esté correctamente colocado en la ranura de la parte trasera del brazo de alimentación.

**S**

**14, 16, 28, 30, 34, 40, 44, 48, 50, 54, 58, 64, 65, 66**

1. Skruva loss överdelen.
2. Lyft av matararmen.
3. Vrid avdragsringen till önskat läge.
4. Sätt tillbaka matararmen i rätt läge för att passa stuvningen av det lösa skotet (se observera nedan).
5. Obs! När du sätter tillbaka matararmen skall du se till att avdragsringen är riktigt inplacerad i spåret på matararmens baksida.

Kontrollera O-ringens beskaffenhet. Byt ut ringen vid behov. Smörj med en lätt påstrykning av Lewmars vinschfett och sätt tillbaka överdelen.



1a

**GB**

### 1a+1b WINCHES FROM 14ST TO 48ST HAVE LOWER SPRUNG JAWS

Using a cross headed screw driver, remove the 3 cross headed screws which secure the crown assembly to the drum.

Lift the crown clear of the drum. Care should be taken not to lose any springs that may adhere to the lower crown. Separate the crowns and clean with fresh water. Check crowns and stripper ring for wear. Replace if necessary. Reassemble in reverse order.

### 2a+2b WINCHES FROM 50ST TO 66ST HAVE UPPER SPRUNG JAWS

Using an allen key, undo the 4 cap headed retaining screws evenly (5 screws on 66ST). Lift off the top plate together with the retaining screws. Also remove the springs and spring pillars. Next, remove and separate the crown assembly, and clean with fresh water. Check crowns and stripper ring for wear. Replace where necessary. Reassemble in reverse order.

**Note:** When rebuilding the crown assembly, care should be taken to engage the locating lug on the underside of the lower crown within its locating hole in the drum top.



1b



2a



2b

**D**

### 1a+1b DIE WINDEN VON 14ST BIS 48ST HABEN VON UNTEN GEFEDERTE BACKEN

Mit einen Kreuzschlitzschraubendreher die drei Kreuzschlitzschrauben entfernen, mit der die Krone an der Trommel befestigt ist. Die Krone von der Trommel abnehmen. Dabei darauf achten, daß keine der Federn verlorenggeht, die an der unteren Krone hängen könnten. Die Krone auseinandernehmen und mit Frischwasser reinigen. Die Kronen und den Ausführring auf Verschleiß prüfen und gegebenenfalls erneuern. In umgekehrter Reihenfolge wieder zusammensetzen.

### 2a+2b DIE WINDEN VON 50ST BIS 66ST HABEN VON OBEN GEFEDERTE BACKEN

Mit einem Inbusschlüssel die 4 Hutschrauben gleichmäßig aufschrauben (5 Schrauben an 66ST). Die Deckkappe zusammen mit den Befestigungsschrauben abnehmen. Auch die Federn und Federstifte entfernen. Dann die Krone abheben, auseinandernehmen und mit Frischwasser reinigen. Die Kronen und den Ausführring auf Verschleiß untersuchen und gegebenenfalls erneuern. In umgekehrter Reihenfolge wieder zusammenbauen.

**Hinweis:** Beim Zusammenbau der Krone darauf achten, daß die Nase an der Unterseite der unteren Krone richtig in ihrem Paßloch auf der Trommeloberseite einrastet.

**F**

### 1a+1b LES WINCHS 14ST À 48ST ONT DES MÂCHOIRES INFÉRIEURES À RESSORT

A l'aide d'un tournevis cruciforme, déposer les 3 vis cruciformes qui fixent l'ensemble flasque sur le tambour.

Enlever les flasques du tambour. Prendre soin de ne pas perdre les ressorts qui peuvent rester coincés sur le flasque inférieur. Séparer les flasques et les nettoyer à l'eau douce. Vérifier si les flasques ou la bague de stripper sont usés et les remplacer le cas échéant. Remonter l'ensemble en suivant l'ordre inverse.

### 2a+2b LES WINCHS DE 50ST À 66ST ONT DES MÂCHOIRES SUPÉRIEURES À RESSORT

A l'aide d'une clé Allen, desserrer les 4 vis de retenue à tête tronconique de la même façon (5 vis sur 66ST). Soulever la plaque supérieure avec les vis de retenue. Déposer aussi les ressorts et les supports de ressorts. Puis déposer et séparer l'ensemble flasque et le nettoyer à l'eau douce. Vérifier si les flasques ou la bague de stripper sont usés et les remplacer le cas échéant. Remonter l'ensemble en suivant l'ordre inverse.

**Note:** Lors du montage de l'ensemble flasque, prendre soin d'introduire l'ergot de positionnement de la surface inférieure du flasque inférieur dans le trou de positionnement situé en haut du tambour.

**E**

### 1a+1b LOS WINCHES DEL 14ST AL 48ST TIENEN LAS MORDAZAS INFERIORES CON MUELLE

Usando un destornillador de cruz, quite los 3 tornillos de cabeza con cruz que sujetan el conjunto de coronas al tambor.

Saque, levantándolas, las coronas del tambor. Hay que tener cuidado de no perder ningún muelle que pueda quedar adherido a la corona inferior. Separe las coronas y límpielas con agua dulce. Compruebe el desgaste de las coronas y el aro de arranque. Cambie estos componentes si fuera necesario. Vuelva a montarlas en orden inverso.

### 2a+2b LOS WINCHES DEL 50ST AL 66ST TIENEN MORDAZAS SUPERIORES CON MUELLE

Con una llave Allen, desenrosque los 4 tornillos de retención uniformemente (5 tornillos en el winche 66ST).

Saque, levantándola, la placa superior con los tornillos de retención. Saque también los muelles y centros de muelle. A continuación, quite y desarme las coronas y límpielas con agua dulce. Compruebe el desgaste de las coronas y el aro de arranque. Cambie estos componentes si fuera necesario. Vuelva a montarlas en orden inverso.

**Nota:** Cuando monte las coronas hay que tener cuidado de encajar el tetón de posicionamiento de la parte de abajo de la corona inferior en el orificio superior del tambor.

**S**

### 1a+1b VINSCHARNA 14ST - 48ST HAR UNDRE FJÄCIDRANDE KLÄCIMBACKAR

Använd en krysskruvmejsel och skruva loss de 3 skruvarna som håller fast kronenheten på trumman. Lyft av kronorna från trumman. Var försiktig så att du inte tappar bort några fjädrar som kan ha fastnat på den undre kronan. Skilj kronorna från varandra och rengör dem med sötvatten. Kontrollera kronorna och avdragsringen beträffande slitage. Byt ut dem vid behov. Sätt ihop vinschen i omvänd ordningsföljd.

### 2a+2b VINSCHARNA 50ST - 66ST HAR ÖVRE FJÄDRANDE KLÄMBACKAR

Använd en nyckel för sexkantshåll och skruva loss de 4 fästskruvarna med jämnt fördelad lossning (5 skruvar på 66ST).

Lyft av överdelen tillsammans med fästskruvarna. Ta också bort fjäderna och fjädertapparna. Ta därefter bort kronenheten, ta isär och rengör den med sötvatten. Kontrollera kronorna och avdragsringen beträffande slitage. Byt ut dem vid behov. Sätt ihop vinschen i omvänd ordningsföljd.

**Obs!** När du sätter ihop kronenheten skall du vara noga med att koppla in fixeringsfliken på den undre kronans undersida i fixeringshcålet i trummans överdel.

## NOTES AND CAUTIONS

WARTUNGSHINWEISE • ENTRETIEN : NOTES ET PRECAUTIONS • MANTENIMIENTO: NOTAS Y PRECAUCIONES

### GB

The performance and safety of your yacht relies upon the efficient function of its winches. A jammed or disabled winch can constitute a severe hazard, therefore any part which appears damaged or displays signs of excessive wear should be replaced immediately. Only use genuine Lewmar parts which are available from your Lewmar Distributor Office.

#### PAWLS AND PAWL SPRINGS

The pawls and their springs need inspecting at regular intervals.

Remember they are among the most important internal parts of your winch and the least costly to replace. Don't wait for them to break before changing them.

### D

Die Funktionstüchtigkeit der Winden ist für die Leistung und Sicherheit Ihrer Yacht von größter Bedeutung. Eine klemmende oder defekte Winde kann eine ernste Gefahr darstellen! Daher sollten alle Teile, an denen Beschädigungen oder Verschleißerscheinungen sichtbar sind, sofort erneuert werden.

Nur original Lewmar Ersatzteile einsetzen, die Sie bei Ihrem anerkannten Lewmar Händler erhalten können!

#### SPERRKLINKE UND KLINKEFEDERN

Prüfen Sie die Sperrklinken und dazugehörigen Federn in regelmäßigen Abständen.

Denken Sie daran, daß diese Teile zu den wichtigsten Bestandteilen Ihrer Winde gehören! Sie sind günstig. Erneuern Sie diese daher nicht erst, wenn sie ganz defekt sind.

Untersuchen Sie die Winde auf beschädigte oder verschlissene Klinkenfedern und klemmende oder blockierte Sperrklinken.

Schmieren Sie die Sperrklinken mit einem hochwertigen, leichten (harzfreien) Maschinenöl.

### F

La performance et la sécurité de votre yacht dépend du fonctionnement efficace de ses winchs. Un winch coincé ou endommagé représente un grave danger potentiel. Aussi, toute pièce qui semble endommagée ou qui présente une usure excessive doit être remplacée immédiatement.

Utiliser uniquement les pièces d'origine Lewmar en vente chez votre distributeur Lewmar.

#### CLIQUETS ET RESSORTS DE CLIQUETS

Les cliquets et leurs ressorts doivent être examinés régulièrement.

Ne pas oublier qu'ils font partie des pièces internes les plus importantes du winch et qu'elles peuvent être remplacées à peu de frais. Ne pas attendre qu'elles se cassent avant de les remplacer.

Toujours s'assurer que les ressorts de cliquets ne sont ni cassés ni usés, et que les cliquets ne sont ni bloqués ni coincés.

Lubrifier les cliquets avec une huile légère pour machines de bonne qualité.

### E

El rendimiento y seguridad de su yate se basan en el eficiente funcionamiento de sus winches. Un winche bloqueado o inútil constituye un serio peligro, por lo tanto cualquier pieza que parezca dañada o que presente señales de desgaste excesivo debe cambiarse inmediatamente.

Use únicamente piezas Lewmar originales disponibles en su distribuidor Lewmar.

#### TRINQUETES Y MUELLES DE TRINQUETE

Los trinquetes y sus muelles necesitan inspección a intervalos regulares.

Recuerde que son las piezas internas más importantes de su winche y que son las que menos cuesta cambiar. No espere a que se rompan para cambiarlos.

Compruebe siempre si hay muelles de trinquete rotos o desgastados, trinquetes bloqueados o inmovilizados.

Lubrique los trinquetes con un aceite de máquina ligero.

## NOTES AND CAUTIONS

UNDERHÅLL UPPMÄRKSAMHET OCH FÖRSIKTIGHETSÅTGÄRDER

### S

Din segelbåts prestanda och säkerheten ombord är beroende av vinschernas prestationsdugliga funktion. En vinsch som är blockerad eller ur funktion kan utgöra en allvarlig risk och därför skall någon del som visar tecken på skador eller stort slitage omedelbart bytas ut.

Använd bara, äkta reservdelar från Lewmar som kan anskaffas från Lewmars distributör.

#### SPÄRRHAKAR OCH SPÄRRHAKEFJÄDRAR

Spärrhakarna och tillhörande fjädrar behöver kontrolleras med jämna mellanrum.

Lägg på minnet att de utgör några av de viktigaste delarna inuti vinschen och de minst dyrbara utbytesdelarna. Vänta inte på att de skall brista innan du byter ut dem.

Kontrollera alltid om det finns söndriga eller slitna spärrhakefjädrar, fastnade eller trögt verkande spärrhakar.

Smörj spärrhakarna med symaskinsolja av god kvalitet.

GB

**CLEANING**

All components should be removed and cleaned in a paraffin bath in the course of servicing. If you do not have access to a paraffin bath, use half of an old plastic container with an old toothbrush. Even a cotton cloth soaked in paraffin or white spirit will suffice.

**CAUTION**

Some Lewmar winches contain plastic components which may be damaged by inappropriate cleaning agents. Always check the manufacturer's directions before using any cleaning agents.

**GREASING**

Never use grease to lubricate your pawls, as this can lead to pawls sticking in their pockets and disabling the winch. Instead, lubricate with a light engine oil.

Use only a light smear of winch grease when lubricating ratchet tracks, gear teeth and bearings. Otherwise, excess grease will be forced out and will collect in potentially dangerous areas, such as pawl pockets.

**ASSEMBLY**

Winches must be re-assembled in the reverse sequence to the order of dismantling. After re-assembly, immediately check the winch functions correctly.

**MOUNTING**

Winches must be fitted in the manner laid out in leaflet B2189 (supplied with every winch) shown below or at [www.lewmar.com](http://www.lewmar.com). Winches are self-draining and care should be taken to ensure the drain holes are not obstructed.

D

**REINIGUNG**

Alle Bestandteile sind im Verlauf der Wartungsarbeiten herauszunehmen und in einem Paraffinbad zu reinigen. Wenn kein Paraffinbad zur Verfügung steht, nehmen Sie einen alten Plastikbehälter und eine alte Zahnbürste. Auch ein mit Paraffin oder Terpentinersatz getränktes Baumwolltuch reicht schon aus.

**VORSICHT**

Manche Lewmar Deckwinden enthalten Bauteile aus Plastik, die durch ungeeignete Reinigungsmittel beschädigt werden können. Schauen Sie daher bitte immer in den Herstellerhinweisen nach, bevor Sie ein Reinigungsmittel verwenden.

**SCHMIEREN**

Benutzen Sie zum Schmierem der Sperrklinken bitte niemals Fett, da diese dadurch durch in

ihrer Ausnehmung festklemmen und so die Winde funktionsuntüchtig machen können.

Benutzen Sie für die Klinkenrastungen, Zahnräder und Lager nur wenig Windenfett. Andernfalls kann überflüssiges Fett herausgedrückt werden und sich an einer möglicherweise gefährlichen Stelle wie z.B. in der Sperrklinkenausnehmungen ansammeln.

**ZUSAMMENBAU**

Die Winden sollten stets in umgekehrter Reihenfolge wieder zusammengebaut werden. Anschließend bitte die Funktion der Winde sofort kontrollieren.

**MONTAGE**

Die Winschen sollten - wie auf Seite 4 dieses Handbuchs beschrieben - montiert werden und [www.lewmar.com](http://www.lewmar.com). Die Winschen lenzen sich von selbst, daher bitte darauf achten, daß die Ablauflöcher nicht zugesetzt werden/sind.

F

**NETTOYAGE**

Toutes les pièces doivent être déposées et nettoyées dans un bain de paraffine au moment de l'entretien. S'il est impossible de se procurer un bain de paraffine, utiliser la moitié d'un vieux récipient en plastique et une vieille brosse à dents. Un chiffon de coton trempé dans de la paraffine ou du White Spirit peut même suffire.

**ATTENTION**

Certains winchs Lewmar comportent des pièces en plastique qui peuvent être endommagées par des nettoyants inadaptés. Toujours lire les consignes du fabricant avant d'utiliser un agent nettoyant.

**GRAISSAGE**

Ne jamais utiliser de graisse pour lubrifier les cliquets, au risque de les faire coller dans leurs poches et de rendre le winch inutilisable. Utiliser à la place une huile moteur légère.

Appliquer juste une fine couche de graisse sur les dents des pignons et des engrenages et les roulements. Un excès de graisse sera expulsé et ira s'accumuler dans des zones potentiellement dangereuses comme les logements de cliquets.

**ASSEMBLAGE**

Les winchs doivent être réassemblés en suivant l'ordre inverse de démontage. Contrôler immédiatement le fonctionnement du winch après réassemblage.

**MONTAGE**

Les winchs doivent être montés de la façon illustrée dans la notice B2189 (livrée avec chaque winch) et sur [www.lewmar.com](http://www.lewmar.com). Ils sont à évacuation automatique. Il faut donc s'assurer que les drains d'écoulement ne sont pas bouchés.

E

**LIMPIEZA**

Todos los componentes deben desmontarse y limpiarse en un baño de petróleo durante el mantenimiento. Si no fuese posible disponer de un baño de petróleo use la mitad de un recipiente plástico viejo y un cepillo de dientes. Incluso un paño de algodón empapado de petróleo a aguarrrás es suficiente.

**PRECAUCIÓN**

Algunos winches Lewmar tienen piezas pequeñas de plástico que se pueden dañar si se usan medios de limpieza inadecuados. Compruebe siempre las indicaciones del fabricante antes de usar cualquier limpiador.

**ENGRASE**

No lubrique jamás los trinquetes con grasa, ya que puede provocar la inmovilización de los trinquetes en sus alojamientos inutilizando el winche. Use un aceite ligero para motor.

Aplique únicamente una capa fina de grasa de winche cuando engrase pistas de trinquete, dientes de engranajes y cojinetes. De lo contrario, el exceso de grasa será expulsada y quedará estancada en áreas donde es potencialmente peligrosa, como los alojamientos de los trinquetes.

**MONTAJE**

Los winches tienen que volver a montarse siguiendo el orden inverso al seguido para desmontarlos. Después del montaje compruebe inmediatamente que el winche funciona correctamente.

**INSTALACIÓN**

Los winches se deben instalar de la manera indicada en la página 4 de este manual. Los winches tienen drenaje y hay que asegurarse de que los orificios de drenaje no estén obstruidos.

S

**RENGÖRING**

Alla komponenter skall tas bort och de bör rengöras i ett fotogenbad. Om du inte har tillgång till ett fotogenbad kan du använda en gammalt förvaringskärl av plast med en gammal tandborste. Det räcker även med en bomullstrasa som är genomdränkt med fotogen.

**FÖRSIKTIGHETSÅTGÄRDER**

Några av Lewmars vinschar innehåller plastkomponenter som kan skadas av olämpliga rengöringsmedel. Kontrollera alltid tillverkarens bruksanvisning innan något rengöringsmedel tas i bruk.

**INFETTNING**

Använd aldrig fett för smörjning av spärrhakarna eftersom detta kan leda till att de fastnar i sina fickor och gör vinschen obrukbar. Smörj i stället med symaskinsolja.

Smörj in med bara en lätt påstrykning av vinschfett vid smörjning av spärrverkens spår, kuggar och lager. I annat tvingas överskottsfett ut och det samlas i potentiellt farliga områden som t ex i spärrhakarnas fickor.

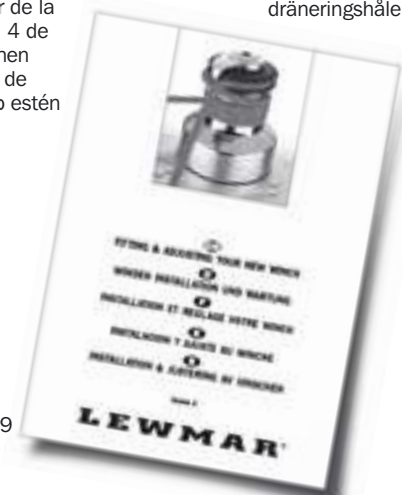
**HOPSÄTTNING**

Vinscharna måste sättas ihop i omvänd ordningsföljd gentemot demonteringen. Kontrollera omedelbart efter hopsättningen att vinschen fungerar på rätt sätt.

**MONTERING**

Vinscharna måste monteras på det sätt som beskrivs på sid 4 i denna handledning. Vinscharna är självdränande och kontrollera därför att dräneringshålen inte är blockerade.

B2189





**GB**

1. Carefully prise off circlip.
2. Remove top plate and lift off drum.
3. Remove and clean the drum bearings.
4. Remove the spindle by easing out the retaining key, clean, regrease and refit.
5. Remove, clean and inspect the four pawls located in the drum, replace as necessary and lubricate with light oil.
6. Lightly grease the two ratchet tracks and the bearing surfaces. Reassemble winch in reverse sequence.

**E**

1. Saque cuidadosamente el circlip de cierre.
2. Saque la placa superior y quite el tambor levantándolo.
3. Saque y limpie los cojinetes del tambor.
4. Saque el eje sacando la chaveta de retención, límpielo, engráselo y vuelva a montarlo.
5. Quite, limpie e inspeccione los cuatro trinquetes situados en el tambor, cámbielos si es necesario y lubríquelos con un aceite ligero de motor.
6. Engrase ligeramente las dos pistas de trinquete y las superficies de rodamiento. Vuelva a ensamblar el winche en orden inverso.

**D**

1. Sicherungsring vorsichtig aufdrehen.
2. Deckplatte entfernen und Trommel abnehmen.
3. Trommellager herausnehmen und reinigen.
4. Den Schaft durch vorsichtiges Herauslösen des Haltestiftes herausnehmen, säubern, fetten und wieder einbauen.
5. Die vier Sperrklinken aus der Trommel herausnehmen, säubern und prüfen, gegebenenfalls erneuern und leicht ölen.
6. Die beiden Klinkenrastungen und die Lagerflächen leicht schmieren. Die Winde in umgekehrter mit Reihenfolge wieder zusammenbauen leicht fetten.

**S**

1. Bånd försiktigt av fjäderringen.
2. Ta bort överdelen och lyft av trumman.
3. Ta bort och rengör trummans lager.
4. Ta bort spindeln genom att lösa och ta ut stoppsprinten. Rengör, fetta in och sätt.
5. Ta bort, rengör och undersök de fyra spärrhakarna som sitter i trumman. Byt ut vid behov och smörj in med symaskinsolja.
6. Fetta lätt in de två spärverken och lagren. Sätt ihop vinschen i omvänd ordningföljd.

**F**

1. Oter le circlip avec précaution.
2. Déposer la plaque supérieure et soulever le tambour pour le déposer.
3. Déposer et nettoyer les roulements du tambour.
4. Déposer l'axe en retirant le clé de fixation, le nettoyer, le regraisser et le remonter.
5. Déposer, nettoyer et contrôler les quatre cliquets situés dans le tambour, les remplacer selon les besoins et les graisser avec une huile légère.
6. Graisser légèrement les dents des 2 pignons d'engrenage et les surfaces des roulements. Réassembler le winch en suivant l'ordre inverse du démontage.



**GB**

1. Remove the circlip and top late then lift off the drum. Remove the 3 x 5 mm screws holding the crown, remove, clean and oil the two pawls.
2. Remove and clean the retaining key and main spindle.
3. Using a small, thin bladed screwdriver lift out the gear spindle. Remove the gears.
4. Separate the gears. Remove, clean and inspect the pawls and springs, replace if necessary. Lubricate the pawls with a light machine oil.
5. Lightly regrease the inside of the ratchet gear with Lewmar winch grease.
6. Reassemble the gears, rotating as you do so to aid assembly. Reassemble winch in reverse sequence.



**D**

1. Sicherungsring und Deckplatte entfernen und Trommel dann abnehmen. Die drei 5 mm Schrauben an der Krone entfernen, Krone abnehmen und die beiden Sperrklinken säubern und ölen.
2. Haltestift und Hauptwelle herausnehmen und säubern.
3. Die Getriebewelle mit einem kleinen Schraubendreher mit dünnem Blatt herausziehen und die Zahnräder entfernen.
4. Die Zahnräder auseinandernehmen. Sperrklinken und Federn abnehmen, säubern und prüfen, gegebenenfalls erneuern und die Sperrklinken mit harzfreiem Maschinenöl schmieren.
5. Die Innenseite der Rastungen leicht mit Lewmar Windenfett bestreichen.
6. Die Zahnräder wieder zusammensetzen. Dabei ist ein leichtes Drehen der Räder behilflich. Die Winde in umgekehrter Reihenfolge wieder zusammenbauen.

**F**

1. Déposer le circlip et la plaque supérieure. Puis soulever et déposer le tambour. Déposer les 3 vis de 5 mm qui fixent le flasque. Déposer, nettoyer et graisser les deux cliquets.
2. Déposer et nettoyer la clé de retenue et l'axe principal.
3. A l'aide d'un petit tournevis à fine lame, extraire l'axe du pignon. Déposer les pignons.
4. Séparer les pignons. Déposer, nettoyer et contrôler les cliquets et ressorts et les remplacer le cas échéant. Graisser les cliquets avec une huile légère pour machines.
5. Appliquer une fine couche de graisse pour winch Lewmar à l'intérieur du pignon d'entraînement.
6. Réassembler les pignons en les faisant tourner pour faciliter l'opération. Réassembler le winch en suivant l'ordre inverse du démontage.

**E**

1. Saque el circlip de cierre y la placa superior y quite, levantándolo, el tambor. Quite los 3 tornillos de 5 mm que sujetan la corona, quite los dos trinquetes, límpielos y acételes.
2. Saque y limpie la chaveta de retención y el eje principal.
3. Con un pequeño destornillador plano saque el eje engranajes.
4. Separe los engranajes. Saque, limpie e inspeccione los trinquetes y muelles, cambie los componentes que sea necesario. Lubrique los trinquetes con un aceite ligero de motor.
5. Vuelva a engrasar ligeramente el interior del engranaje de trinquete con grasa de winche Lewmar.
6. Vulva a ensamblar los engranajes, haciéndolos girar al mismo tiempo para ayudar el ensamblaje. Vuelva a montar el winche en orden inverso.

**S**

1. Ta bort fjäderringen och överdelen och lyft sedan av trumman. Ta bort skruvama 3 x 5 mm som håller fast kronan. Ta bort, rengör och smörj i de två spärrhakarna med olja.
2. Ta bort och rengör stoppsprinten och huvudspindeln.
3. Använd en liten skruvmejsel med tunt blad och lyft ut kuggspindeln. Ta bort kuggghjulen.
4. Ta isär kuggghjulen. Ta bort, rengör och undersök spärrhakarna och fjäderna. Byt ut vid behov. Smörj spärrhakarna med symaskinsolja.
5. Smörj lätt in spärrverkets insida med Lewmars vinschfett.
6. Sätt tillbaka kuggghjulen och vrid på dem för att underlätta hopsättningen. Sätt ihop vinschen i omvänd ordningsföljd.



**GB**

1. Remove circlip and lift off the drum and top cap.
2. Remove and clean drum bearings and washer, then remove the two spindle retaining collets and the main spindle.
3. Using a thin bladed screwdriver, lift out the gear spindle and remove the gears.
4. Inspect the gear assemblies for signs of excess water. Replace pawls and springs if necessary.
5. Using a small bladed screwdriver, raise the two gear spindles.
6. Reassemble the winch in reverse sequence, taking care to grease lightly all gear teeth and bearing surfaces.

**D**

1. Sicherungsring entfernen, Trommel und Deckplatte abnehmen.
2. Trommellager und Scheibe entfernen und reinigen, dann die beiden Halteringe der Hauptwelle und die Hauptwelle abnehmen.
3. Die Getriebewelle mit einem schmalen Schraubendreher herausnehmen und die Zahnräder entfernen.
4. Die Zahnräder auf Verschleißerscheinungen untersuchen. Sperrklinken und Federn gegebenenfalls erneuern.
5. Die Rastungen und Innenseiten des Lagers leicht mit Lewmar Windenfett bestreichen. Die Zahnräder wieder zusammensetzen.
6. Die Winde in umgekehrter Reihenfolge wieder zusammenbauen, dabei alle Zahnräder und Lagerflächen leicht fetten.

**F**

1. Déposer le circlip et soulever le tambour et l'écrou supérieur.
2. Déposer et nettoyer les paliers et la rondelle du tambour, puis déposer les deux clavettes de retenue des axes et l'axe principal.
3. A l'aide d'un petit tournevis à fine lame, extraire les axes de pignon et déposer les pignons.
4. Rechercher toute trace d'usure excessive sur les ensembles pignons. Remplacer les cliquets et les ressorts le cas échéant.
5. Appliquer une fine couche de graisse pour winch Lewmar sur les pignons d'entraînement et sur les surfaces internes des roulements. Remonter les pignons.
6. Réassembler le winch en suivant l'ordre inverse du démontage et en prenant soin de graisser légèrement toutes les dents des pignons et les surfaces des paliers.

**E**

1. Saque el circlip de cierre y quite, levantándolo, el tambor y tapa superior.
2. Saque y limpie los cojinetes y arandela del tambor, luego quite los dos collares de retención del eje y el eje principal.
3. Usando un destornillador plano levante los ejes de engranaje y saque los engranajes.
4. Observe si hay señales de desgaste excesivo en los engranajes y ejes. Cambie los trinquetes y muelles si es necesario.
5. Usando grasa de winche Lewmar engrase un poco los engranajes de trinquetes y las superficies de rodamiento. Vuelva a ensamblar los engranajes.
6. Vuelva a montar el winche en orden inverso, teniendo cuidado de engrasar un poco todos los dientes de engranaje y las superficies de rodamiento.

**S**

1. Ta bort fjäderringen och lyft av trumman och överdelen.
2. Ta bort och rengör trumlagren och brickan. Ta sedan bort spindelns två spärrinsatser och huvudspindeln.
3. Använd en skruvmejsel med tunt blad och lyft kuggspindlarna och ta bort kugghjulen.
4. Undersök kugghjulsensheterna beträffande tecken på svårt slitage. Byt vid behov ut spärrhakar och fjädrar.
5. Använd Lewmars vinschfett och smörj lätt in spärverken och de invändiga lagren. Sätt tillbaka kugghjulen.
6. Sätt ihop vinschen i omvänd ordningsföljd, se till att du smörjer in alla kuggar och lager med ett tunt lager fett.



**GB**

1. Unscrew and remove the top cap, lift off the feeder arm and remove the 2 retaining collets.
2. Lift off the drum.
3. Remove and clean the drum bearings and washer.
4. Remove and clean the gear spindle and gear.
5. To remove the main spindle, rotate it in a clockwise direction as you lift it, also remove the ratchet gear.
6. Remove, clean and inspect the pawls and springs, look for excess wear, replace if necessary. Lubricate pawls with a light machine oil.
7. Lightly grease the ratchet gear, place it in position with the ratchet facing up as shown.
8. Re-assemble in reverse order, remember to lightly grease all gears, ratchet tracks, spindles and bearings.
9. Remove the three fixing screws holding the crown assembly to the drum.
10. Carefully lift off the crowns and lift out the springs.
11. Remove, clean and inspect pawls and pawl springs, look for excess wear, replace as necessary. Lubricate pawls with a light machine oil. Re-assemble.
12. To fit the drum, you will need to use a small bladed screwdriver to close the pawls.

## SERVICING ONE SPEED WINCH 14ST & 16ST

WARTUNG DER EINGANG - WINDE 14 ST & 16ST • ENTRETIEN DES WINCH MONO-VITESSE 14ST & 16ST

### D

1. Deckplatte abschrauben und abnehmen. Führungsarm abheben und die beiden Halteringe entfernen.
2. Trommel abheben.
3. Trommellager und Scheiben abnehmen und reinigen.
4. Getriebewelle und Zahnräder entfernen und reinigen.
5. Die Hauptwelle läßt sich durch Rechtsdrehen beim Abheben entfernen. Auch das Gesperre herausnehmen.
6. Sperrklinken und Federn entfernen, säubern, auf Verschleiß prüfen und gegebenenfalls erneuern. Die Sperrklinken mit Maschienenöl einölen.
7. Die Rastungen leicht schmieren und wie abgebildet einsetzen, sodaß die Rastungen nach oben zeigt.
8. Die Winde in umgekehrter Reihenfolge wieder zusammenbauen, dabei alle Zahnräder, Klinkenrastungen, Wellen und Lager leicht fetten.
9. Die drei Halteschrauben abnehmen, mit der die Krone an der Trommel befestigt ist.
10. Die Kronen vorsichtig abnehmen und die Federn herausnehmen.
11. Die Sperrklinken und Federn entfernen, säubern, auf Verschleiß prüfen und gegebenenfalls erneuern. Die Sperrklinken mit harzfreiem Maschinenöl schmieren. Wieder zusammensetzen.
12. Zum Einbau der Trommel ist ein kleiner Schraubendreher nötig, mit dem die Sperrklinken geschlossen werden können.

### F

1. Dévisser et déposer l'écrou supérieur, soulever le bras de chargement et déposer les 2 clavettes de fixation.
2. Soulever et déposer le tambour.
3. Déposer et nettoyer les paliers et la bague anti-friction du tambour.
4. Déposer et nettoyer l'axe du pignon et le pignon.
5. Pour déposer l'axe principal, le faire tourner dans le sens des aiguilles d'une montre tout en le soulevant, et déposer aussi le pignon d'entraînement.
6. Déposer, nettoyer et examiner les cliquets et ressorts, rechercher toute trace d'usure excessive et les remplacer le cas échéant. Graisser les cliquets avec une huile légère pour machines.
7. Graisser légèrement le pignon d'entraînement et le mettre en place dans la position illustrée.
8. Réassembler en suivant l'ordre inverse, sans oublier de graisser légèrement tous les pignons, les dents des pignons d'entraînement, les axes et les roulements.
9. Déposer les trois vis de fixation qui retiennent l'ensemble flasque sur le tambour.
10. Soulever les flasques avec précaution et déposer les ressorts.
11. Déposer, nettoyer et examiner les cliquets et ressorts, rechercher toute trace d'usure excessive et les remplacer le cas échéant. Graisser les cliquets avec une huile légère pour machines. Réassembler.
12. Pour monter le tambour, un petit tournevis à lame plate sera nécessaire pour fermer les cliquets.

## SERVICING ONE SPEED WINCH 14ST & 16ST

MANTENIMIENTO DE WINCHES DE UNA VELOCIDAD 14ST Y 16ST • UNDERHÅLL AV VINSCHARNA 14ST OCH 16ST MED EN HASTIGHET

### E

1. Desenrosque y quite la tapa superior, levante el brazo de alimentación y quite los dos collares de retención.
2. Levante el tambor.
3. Saque y limpie los cojinetes y arandela del tambor.
4. Saque y limpie el eje de engranaje y el engranaje.
5. Para sacar el eje principal, gírelo hacia la derecha mientras lo levanta, saque también el engranaje de trinquetes.
6. Saque limpie e inspeccione los trinquetes y muelles, examine si hay desgaste excesivo y, si es necesario, cámbielos. Lubrique los trinquetes con un aceite de motor ligero.
7. Engrase ligeramente el engranaje de trinquetes, colóquelo en posición con el alojamiento para trinquetes cara arriba, tal como se muestra.
8. Vuelva a montar en orden inverso, recuerde engrasar ligeramente todos los engranajes, las pistas de trinquetes, los ejes y los cojinetes.
9. Saque los tres tornillos de fijación que unen las coronas al tambor.
10. Saque cuidadosamente las coronas y los muelles.
11. Desmonte, limpie e inspeccione los trinquetes y muelles de trinquete, mire si hay desgaste excesivo, cámbielos si es necesario. Lubrique los trinquetes con aceite de motor ligero al volver a ensamblarlos.
12. Para montar el tambor, necesitará usar un destornillador plano pequeño para cerrar los trinquetes.

### S

1. Skruva loss och ta bort överdelen, lyft av mataramen och ta bort de två spärrensatserna.
2. Lyft av trumman.
3. Ta bort och rengör trummans lager.
4. Ta bort och rengör kuggspindeln och kugghjulet.
5. Ta bort huvudspindeln, vrid den medsols när du lyfter den. Ta också bort spärverket.
6. Ta bort, rengör och undersök spärrhakarna och fjädrarna, se efter om de är svårt slitna och byt ut dem vid behov. Smörj in spärrklackarna med symaskinsolja.
7. Fetta lätt in spärverket och placera det med kuggningen vänd uppåt som visas.
8. Sätt ihop i omvänd ordningsföljd. Kom ihåg att lätt fetta in alla kugghjul, spärrverk, spindlar och lager.
9. Ta bort de tre fästskruvarna och håll kroneheten mot trumman.
10. Lyft försiktigt av kronorna och lyft ut fjädrarna.
11. Ta bort, rengör och undersök spärrklackarna och spärrhakefjädrar, se efter om de är svårt slitna och byt ut dem vid behov.
12. För att montera trumman behöver du en skruvmejsel med litet klinga för att stänga spärrklackarna.



**GB**

1. Unscrew top cap.
2. Lift and remove the feeder arm.
3. Remove the two retaining collets, lift out the main spindle.
4. Remove and clean the drum bearings and washer.
5. Using Lewmar winch grease, lightly grease the gear ratchets and internal bearing surfaces. Reassemble the gears.
6. Lift out the gear spindles and remove the gear assemblies.
7. Remove and inspect the pawls and pawl springs, replace if necessary.
8. Assemble the pawls and springs, lightly oil the pawls, check for correct operation (no sticking).
9. Lightly grease the ratchet and bearing surfaces, reassemble the gears.
10. Lightly grease and fit the gears, gear spindles and the main spindle.
11. Strip and clean crown assembly. See the Servicing Wavespring section in this manual.
12. Reassemble the drum, main spindle retaining collets and feeder arm. Lightly grease the 'O' ring and top cap thread before fitting.

## SERVICING TWO SPEED WINCHES 28ST - 65ST

WARTUNG DER ZWEIFANG - WINSCHEN 28ST - 65ST • ENTRETIEN DES WINCHS A DEUX VITESSES 28ST - 65ST

### D

1. Deckplatte abschrauben.
2. Führungsarm abheben und entfernen.
3. Die beiden Halteringe entfernen und die Hauptwelle herausnehmen.
4. Trommellager und Scheibe entfernen und reinigen.
5. Die beiden Getriebewellen mit einem schmalen Schraubendreher anheben.
6. Getriebewellen herausnehmen und die Zahnräder entfernen.
7. Sperrklinken und Federn herausnehmen, auf Verschleiß prüfen und gegebenenfalls erneuern.
8. Sperrklinken und Federn zusammensetzen, die Sperrklinken leicht ölen und ihre Funktion prüfen (kein Klemmen).
9. Die Oberflächen der Rastungen und Lager leicht fetten, Getriebe wieder zusammensetzen.
10. Zahnräder, Getriebewellen und Hauptwelle leicht schmieren und zusammensetzen.
11. Krone auseinandernehmen und säubern. Bitte die Hinweise für die Wartung des Wavesprings in diesem Handbuch beachten.
12. Trommel, Halteringe der Hauptwelle und Führungsarm zusammensetzen. O-Ring und Deckplattengewinde vor dem Einsetzen leicht einölen.

### F

1. Dévisser l'écrou supérieur.
2. Soulever et déposer le bras de chargement.
3. Déposer les deux clavettes de retenue, soulever et déposer l'axe principal.
4. Déposer et nettoyer les paliers et la bague auto-friction du tambour.
5. A l'aide d'un petit tournevis à lame, soulever les deux axes de pignons.
6. Déposer les axes de pignons et déposer les ensembles pignons.
7. Déposer et examiner les cliquets et ressorts de cliquets, et les remplacer le cas échéant.
8. Assembler les cliquets et ressorts, graisser légèrement les cliquets, vérifier leur bon fonctionnement (pas de coincement).
9. Graisser légèrement les surfaces des pignons et paliers, réassembler les pignons.
10. Graisser et monter les pignons, axes de pignons et l'axe principal.
11. Démonter et nettoyer l'ensemble flasque. Voir la section Entretien du Wavespring™ de ce manuel.
12. Réassembler le tambour, les clavettes de l'axe principal et le bras d'alimentation. Graisser légèrement le joint torique et le pas de l'écrou supérieur avant le montage.

## SERVICING TWO SPEED WINCHES 28ST - 65ST

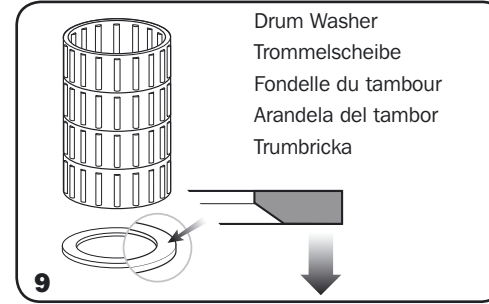
MANTENIMIENTO DE LOS WINCHES DE DOS VELOCIDADES 28ST - 65ST • UNDERHALL VINSCHARNA 28ST - 65ST MED TVÅ HASTIGHETER

### E

1. Desenrosque la tapa superior.
2. Levante y saque el brazo de alimentación.
3. Saque los dos collares de retención, saque el eje principal.
4. Saque y limpie el cojinete y la arandela del tambor.
5. Con un destornillador plano pequeño, levante los dos ejes de engranaje.
6. Saque los ejes de engranaje y desmonte los conjuntos de engranajes.
7. Saque e inspeccione los trinquetes y muelles de trinquete, cámbielos si es necesario.
8. Ensamble los trinquetes y muelles, lubrique someramente los trinquetes con aceite, compruebe su funcionamiento correcto (no deben adherirse).
9. Engrase ligeramente las superficies de apoyo de trinquetes y de rodamiento, vuelva a ensamblar los engranajes.
10. Monte los engranajes, ejes de engranaje y el eje principal, tras haberlos engrasado ligeramente.
11. Desmonte y limpie el conjunto de coronas. Vea la sección de Mantenimiento del «Self tailing» Wavespring™ del presente manual.
12. Vuelva a ensamblar el tambor, los collares de retención del eje principal y el brazo de alimentación. Engrase ligeramente la junta tórica y la rosca de la tapa superior antes de montarlas.

### S

1. Skruva loss överdelen.
2. Lyft och ta bort matararmen.
3. Ta bort de två spärrinsatserna, lyft ut huvudspindeln.
4. Ta bort och rengör trumlagren och brickan.
5. Använd en skruvmejsel med litet klinga och lyft upp de två kuggspindlarna.
6. Lyft ut kuggspindlarna och ta bort kugghjulsenheterna.
7. Ta bort och undersök spärrhakar och spärrhakefjädrar. Byt ut dem vid behov.
8. Sätt in spärrhakarna och fjädrarna. Smörj lätt in spärrhakarna med olja. Kontrollera att de fungerar på rätt sätt (de skall inte hänga upp sig).
9. Fetta lätt in spärverket och lagren och sätt ihop kugghjulen.
10. Fetta lätt in och montera kugghjulen, kuggspindlarna och huvudspindeln.
11. Demontera och rengör kronenheterna. Se avsnittet om underhåll av Wavespring i denna handledning.
12. Sätt ihop trumman, huvudspindelns spärrinsatser och matararmen. Fetta lätt in O-ringen och överdelens gängning före hopsättnitig.



**D**

1. Deckplatte abschrauben. Führungsarm und Halterringe abnehmen. Trommel abheben. Die sechs 10 mm Halteschrauben - mit denen der Mittelschaft an der Bodenplatte befestigt ist - herausdrehen und entfernen.
2. Mittelschaft vorsichtig abheben, dabei die Hauptwelle sorgfältig festhalten.
3. Beide Zahnräder gleichzeitig abheben und herausnehmen.
4. Zahnräder auseinandernehmen, säubern und auf Verschleiß prüfen.
5. Die drei Schrauben, mit denen die Sperrklinkenhalteplatte befestigt ist, mit einem Kreuzschlitzschraubendreher abnehmen. Alle Sperrklinken und Federn säubern, und prüfen, gegebenenfalls erneuern.
6. Die Oberflächen der Klinkenrastungen und Lager leicht fetten. Darauf achten, daß die Plastikunterlegscheibe vor dem Zusammenbau der Getriebe eingesetzt wird.
7. Sicherungsring entfernen. Sperrklinken und Federn herausnehmen, säubern und prüfen, gegebenenfalls erneuern.
8. Alle Lager und leicht fetten.
9. Beim Einsetzen der Trommelscheibe vorsichtig vorgehen. Dabei darauf achten, daß die abgeschrägte Seite nach unten zeigt.



**GB**

1. Unscrew top cap, remove the feeder arm and retaining collets. Lift off the drum. Undo and remove the 6 x 10 mm fixing screws holding the centre stem to the base.
2. Carefully lift off the centre stem, take care to support the main spindle as you do so.
3. To remove the gear assemblies, lift them both out at the same time.
4. Separate the gear assemblies. Clean and inspect for signs of excess wear.
5. Using a cross headed screwdriver, remove the three screws securing the pawl retaining plate. Clean and inspect all pawls and springs, replace if necessary.
6. Lightly grease the ratchet gears and bearing surfaces. Remember to replace the plastic washer before reassembling these gears.
7. Remove the circlip. Remove, clean and inspect pawls and springs, replace as necessary.
8. Remember to lightly grease all bearings and moving parts.
9. Care should be taken when fitting the drum washer. Ensure the chamfer is facing down when fitting the washer.



## SERVICING TWO SPEED WINCHES 66ST

MANTENIMIENTO DE LOS WINCHES DE DOS VELOCIDADES 66ST • UNDERHÅLL AV VINSCHEN 66ST MED TVÅ HASTIGHETER

### F

- Dévisser l'écrou supérieur, déposer le bras de chargement et les clavettes de retenue. Soulever et déposer le tambour. Dévisser et déposer les 6 vis 10 mm qui fixent le corps central à la base.
- Soulever et déposer le corps central avec précaution, en prenant soin de soutenir l'axe principal.
- Pour déposer les ensembles pignons, les soulever tous les deux en même temps.
- Séparer les ensembles pignons, les nettoyer et rechercher toute trace d'usure excessive.
- A l'aide d'un tournevis cruciforme, déposer les trois vis de fixation de la plaque de retenue des cliquets. Nettoyer et vérifier tous les cliquets et ressorts et les remplacer le cas échéant.
- Graisser légèrement les dents des pignons d'entraînement et des paliers. Ne pas oublier de remettre la rondelle de plastique en place avant de remonter ces pignons.
- Déposer le circlip. Déposer, nettoyer et vérifier les cliquets et ressorts et les remplacer le cas échéant.
- Ne pas oublier de graisser légèrement tous les paliers et toutes les pièces mobiles.
- Monter la rondelle du tambour avec précaution. S'assurer que le chanfrein est dirigé vers le bas.

### E

- Desenrosque la tapa superior, saque el brazo de alimentación y los collares de retención. Levante el tambor. Desenrosque y saque los 6 tornillos de fijación de 19 mm que unen el eje central a la base.
- Levante cuidadosamente el eje central, tenga cuidado de soportar el eje principal al hacerlo.
- Para sacar los conjuntos de engranajes levántelos simultáneamente.
- Desmonte los conjuntos de engranajes. Límpielos y examine si se presentan señales de desgaste excesivo.
- Con un destornillador de cruz, saque los tres tornillos que sujetan la tapa de retención de los trinquetes y muelles, y cámbielos si es necesario.

- Engrase ligeramente las superficies de los engranajes de trinquetes y de rodamiento. Recuerde volver a colocar la arandela de plástico antes de volver a ensamblar estos engranajes.
- Quite el circlip de cierre. Saque, limpie e inspeccione los trinquetes y muelles, cámbielos si es necesario.
- Recuerde engrasar ligeramente todos los cojinetes y piezas móviles.
- Hay que tener cuidado al montar la arandela del tambor. Asegúrese de que el chafán está cara abajo cuando monte la arandela.

### S

- Skruva loss överdelen, ta bort, mataramen och spärrinsatserna. Lyft av trumman. Lossa fästskruvarna när delta utförs. 6 x 10 mm och håll mittstammens nederdel.
- Lyft försiktigt av mittstammen se till att du stödjer huvudspindeln.
- För att ta bort kuggghjulsensheterna, lyft ut båda två samtidigt.
- Skilj på kuggghjulsensheterna. Rengör och undersök dem beträffande tecken på svårt slitage.
- Använd en krysskruvmejsel och ta bort de tre skruvarna som haller fast spärrhakespännbrickan. Rengör och undersök all spärrhakar och fjädrar.
- Fetta lätt in spärverken och lagren Kom ihåg att sätta tillbaka plastbrickan före hopsättning av dessa kuggghjul.
- Ta bort fjäderringen. Ta bort och fetta in alla lager undersök spärrklackar och fjädrar och byt ut dem vid behov.
- Glöm ej att sparsamt smörja in alla lager och rörliga delar.
- Var noggrann när du monterar trumbrickan. Se till att avfasningen på brickan är vänd nedåt när du sätter in den.

## SERVICING PRE-OCEAN WINCHES

WARTUNG DER WINDEN DER OCEAN SERIE

### GB

#### SERVICE MANUALS

Full servicing of any winch should not be undertaken without reference to the appropriate service manual, as set out in the table below. These are available from your local Lewmar Distributor office.

For models not mentioned here and earlier models, please contact your Lewmar offices for service details.

#### Service Manual Volume 5 Specials applies

Winch	Start
3 speed, 3 gear 55/3, 65/3	Jan 85
3 speed, 3 gear 55ST,65ST	Jan 85
Also grinders and linkages	

#### Service Manual Volume 6 applies

Winch	Start
6	Jan 83
7, 8	Jan 85
16, 24, 30, 40	May 85
43, 46	Mar 85
52	Dec 84
48, 55, 65	Jan 84
16ST, 40ST	Mar 85
30ST, 43ST, 46ST	Mar 85
48ST, 55ST, 65ST	Jan 84
52ST	Dec 84
56ST	Mar 87
66ST	Dec 88
Nr. 1 Halliard	Jan 78

#### Service Manual Volume 6 Specials applies

Model	Start
430, 460, 520	1987
550, 650, 700	1988
900, 1100, 1200, 1400	1989
All grinders and linkages	

#### Service Manual Volume 7 applies (Ocean) OR Volume 8 Winch Parts Manual

Model	Start
6	Jan 83
7, 8	Jan 85
16, 24, 30, 40	May 85
43	Mar 85
16ST to 66ST	Mar 92

Note: 14ST, 44 in Volume 10 only.

### D

#### SERVICE-HANDBÜCHER

Alle Wartungsarbeiten an den Winden sollten unter Verwendung der entsprechenden Service-Handbücher, die in der Tabelle unten angegeben sind, durchgeführt werden. Diese Handbücher erhalten Sie bei Ihrem Lewmar Händler.

Für hier nicht angegebene und frühere Modelle wenden Sie sich bitte an Ihren Lewmar Händler.

#### Service-Handbuch Band 5 für Sonderausführung

Winde	Beginn
3-Gang, 3-Gang 55/3, 65/3	Jan 85
3-Gang, 3-Gang 55ST, 65ST	Jan 85

Auch Schleifer und Kurbelgetriebe

#### Service-Handbuch Band 6 für Ausführung

Winde	Beginn
6	Jan 83
7, 8	Jan 85
16, 24, 30, 40	Mai 85
43, 46	März 85
52	Dez 84
48, 55, 65	Jan 84
16ST, 40ST	März 85
30ST, 43ST, 46ST	März 85
48ST, 55ST, 65ST	Jan 84
52ST	Dez 84
56ST	März 87
66ST	Dez 88
Nr. 1 [Fallwisch]	Jan 78

#### Service-Handbuch Band 6 für Sonderausführung

Winde	Beginn
430, 460, 520	1987
550, 650, 700	1988
900, 1100, 1200, 1400	1989

Auch Schleifer und Kurbelgetriebe

#### Service-Handbuch Band 7 Ausführung (Ocean) oder WInsch-Ersatzteilliste Vol. 8

Winde	Beginn
6	Jan 83
7, 8	Jan 85
16, 24, 30, 40	Mai 85
43	März 85
16ST bis 66ST	März 92

Note: 14ST, 44 finden Sie ausschließlich in Vol. 10

## SERVICING PRE-OCEAN WINCHES

ENTRETIEN DES WINCHS PRE-OCEAN • MANTENIMIENTO DE WINCHES ANTERIORES A LOS

F

### MANUELS D'ENTRETIEN

Ne pas entreprendre l'entretien intégral d'un winch sans se reporter au manuel d'entretien approprié, indiqué dans le tableau ci-dessous. Les manuels sont disponibles chez les distributeurs Lewmar.

Pour les modèles non mentionnés dans cette notice ou plus anciens, prière de contacter les bureaux Lewmar pour tout renseignement concernant l'entretien.

#### Manuel d'entretien Volume 5 Spéciaux

Winch	Début
3 vitesses, 3 pignons 55/3, 65/3	Jan 85
3 vitesses, 3 pignons 55ST, 65ST	Jan 85

Aussi moulins à café et transmissions à distance

#### Manuel d'entretien Volume 6

Winch	Début
6	Jan 83
7, 8	Jan 85
16, 24, 30, 40	Mai 85
43, 46	Mar 85
52	Déc 84
48, 55, 65	Jan 84
16ST, 40ST	Mar 85
30ST, 43ST, 46ST	Mar 85
48ST, 55ST, 65ST	Jan 84
52ST	Déc 84
56ST	Mar 87
66ST	Déc 88
No 1 drisse	Jan 78

#### Manuel d'entretien Volume 6 Spéciaux

Winch	Début
430, 460, 520	1987
550, 650, 700	1988
900, 1100, 1200, 1400	1989

Aussi moulins à café et transmissions à distance

#### Manuel d'entretien Volume 7 (Ocean) ou manuel d'entretien Volume 8 (réimpression 1996)

Winch	Début
6	Jan 83
7, 8	Jan 85
16, 24, 30, 40	Mai 85
43	Mar 85
16ST à 66ST	Mar 92

Note : 14ST, 44 dans le volume 10 seulement.

**LEWMAR**

E

### MANUALES DE MANTENIMIENTO

No debe realizarse el mantenimiento completo de ningún winche sin consultar el correspondiente manual de despiece, tal como se indica en la tabla siguiente. Estos manuales pueden obtenerse dirigiéndose a su distribuidor Lewmar local.

Para los modelos no mencionados aquí y los modelos anteriores, rogamos contacten a sus oficinas Lewmar para detalles de mantenimiento.

#### El manual de Mantenimiento Volumen 5 Spéciaux se aplica a:

Winche	Comienzo
3 velocidades, 3 engranajes 55/ 3, 65/ 3	Enero 85
3 velocidades, 3 engranajes 55ST, 65ST	Enero 85

También molinillos y sistemas de transmisión

#### El Manual de Mantenimiento Volumen 6 se aplica a:

Winche	Comienzo
6	Enero 85
7, 8	Enero 85
16, 24, 30, 40	Mayo 85
43, 46	Marzo 85
52	Diciembre 84
48, 55, 65	Enero 84
16ST, 40ST	Marzo 85
30ST, 43ST, 46ST	Marzo 85
48ST, 55ST, 65ST	Enero 84
52ST	Diciembre 84
56ST	Marzo 87
66ST	Diciembre 88
No. 1 Halliard	Enero 78

#### El Manual de Mantenimiento Volumen 6 Spéciaux se aplica a:

Winche	Comienzo
430, 460, 520	1987
550, 650, 700	1988
900, 1100, 1200, 1400	1989

También molinillos y sistemas de transmisión

#### El Manual de Mantenimiento Volumen 7 (Ocean) se aplica a todo el manual de piezas de recambio Volumen VIII:

Winche	Comienzo
6	Enero 83
7, 8	Enero 85
16, 24, 30, 40	Mayo 85
43	Marzo 85
16ST a 66ST	Marzo 92

Note: El 14ST, 44 solo esta en el Volumen 10

## SERVICING PRE-OCEAN WINCHES

OCEAN UNDERHÅLL AV VINSCHMODELLER FÖRE OCEAN-SERIEN

S

### SERVICEBÖCKER

Fullständigt underhåll av någon vinsch skall inte utföras utan att först läsa passande servicebok som anges i nedanstående tabell. Dessa serviceböcker kan anskaffas från Lewmars distributör.

Beträffande vinschmodeller som inte finns med i denna tabell och för tidigare modeller, var god kontakta Lewmars kontor för underhållsuppgifter.

#### Servicebok, volym 5 specialvinschar

Vinsch	Start
3-hastighets, 3-hjulsväxel 55/3, 65/3	Jan 85
3-hastighets, 3-hjulsväxel 55ST, 65ST	Jan 85

Även grinder system

#### Servicebok, volym 6

Vinsch	Start
6	Jan 83
7, 8	Jan 85
16, 24, 30, 40	Maj 85
43, 46	Mar 85
52	Dec 84
48, 55, 65	Jan 84
16ST, 40ST	Mar 85
30ST, 43ST, 46ST	Mar 85
48ST, 55ST, 65ST	Jan 84
52ST	Dec 84
56ST	Mar 87
66ST	Dec 88
Nr 1 Fallvinsch	Jan 78

#### Servicebok, volym 6 specialvinschar

Vinsch	Start
430, 460, 520	1987
550, 650, 700	1988
900, 1100, 1200, 1400	1989

Även grinder system

#### Service Manual Volume 7 applies (Ocean) OR Servicebok, volym 8 (Ocean)

Vinsch	Start
6	Jan 83
7, 8	Jan 85
16, 24, 30, 40	Maj 85
43	Mars 85
16ST to m 66ST	Mars 92

Note: 14ST, 44 finns endast i Volym 10

**LEWMAR**



## LIMITED WARRANTY and KEY TERMS OF SUPPLY BY LEWMAR

Lewmar warrants that in normal usage and with proper maintenance its products will conform with their specification for a period of three years from the date of purchase by the end user, subject to the conditions, limitations and exceptions listed below. Any product, which proves to be defective in normal usage during that three-year period, will be repaired or, at Lewmar's option, replaced by Lewmar.

### A CONDITIONS AND LIMITATIONS

- i Lewmar's liability shall be limited to the repair or replacement of any parts of the product which are defective in materials or workmanship.
- ii Responsibility for the selection of products appropriate for the use intended by the Buyer shall rest solely with the Buyer and Lewmar accepts no responsibility for any such selection.
- iii Lewmar shall not be liable in any way for Product failure, or any resulting loss or damage which arises from:
  - a use of a product in an application for which it was not designed or intended;
  - b corrosion, ultra violet degradation or wear and tear;
  - c a failure to service or maintain the product in accordance with Lewmar's recommendations;
  - d faulty or deficient installation of the product (unless conducted by Lewmar);
  - e any modification or alteration of the product;
  - f conditions that exceed the product's performance specifications or safe working loads.
- iv Product subject to a warranty claim must be returned to the Lewmar outlet which supplied the product for examination unless otherwise agreed by Lewmar in writing.
- v This warranty does not cover any incidental costs incurred for the investigation, removal, carriage, transport or installation of product.
- vi Service by anyone other than authorised Lewmar representatives shall void this warranty unless it accords with Lewmar guidelines and standards of workmanship.
- vii Lewmar's products are intended for use only in the marine environment. Buyers intending to use them for any other purpose should seek independent professional advice as to their suitability. Lewmar accepts no liability arising from such other use.

### B EXCEPTIONS

Cover under this Warranty is limited to a period of one year from the date of purchase by the end user in the case of any of the following products or parts of products:

- Electric motors and associated electrical equipment
- Electronic controls
- Hydraulic pumps, valves and actuators
- Weather seals
- Products used in "Grand Prix" racing applications

### C LIABILITY

i Lewmar's liability under this warranty shall be to the exclusion of all other warranties or liabilities (to the extent permitted by law). In particular (but without limitation):

- a Lewmar shall not be liable for:
  - Any loss of anticipated turnover or profit or indirect, consequential or economic loss ;
  - Damages, costs or expenses payable to any third party;
  - Any damage to yachts or equipment;
  - Death or personal Injury (unless caused by Lewmar's negligence).

Some states and countries do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

b Lewmar grants no other warranties regarding the fitness for purpose, use, nature or satisfactory quality of the products.

ii Where applicable law does not permit a statutory or implied warranty to be excluded, then such warranty, if permitted by that state or country's law, shall be limited to a period of one year from the date of purchase by the end user. Some states and countries do not allow limitations on how long an implied warranty lasts, so this limitation may not apply to you.

### D PROCEDURE

Notice of a claim for service under this warranty shall be made promptly and in writing by the end user to the Lewmar outlet which supplied the product or to Lewmar at Southmoor Lane, Havant, Hampshire, England PO9 1JJ.

### E SEVERANCE CLAUSE

If any clause of this warranty is held by any court or other competent authority to be invalid or unenforceable in whole or in part, the validity of the remaining clauses of this warranty and the remainder of the clause in question shall not be affected.

### F OTHER RIGHTS

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

In the case of European States a Consumer customer (as defined nationally) has legal rights under the applicable national law governing the sale of Consumer Goods; this Warranty does not affect those rights.

### G LAW

This warranty shall be governed by and read in accordance with the laws of England or the state or country in which the first end user is domiciled at the time of purchase of the product.

### H DISPUTES

Any dispute arising under this warranty may, at the option of the end-user, be referred to alternative dispute resolution under the rules of the British Marine Federation or to the Courts of the State whose law shall govern the warranty or to the Courts of England and Wales.

The British Marine Federation may be contacted at Marine House, Thorpe Lea Road, Egham, England, TW20 8BF

## D Gewährleistung Und Lieferbedingungen Von Lewmar

Lewmar garantiert für einen Zeitraum von drei Jahren ab Kaufdatum den normalen Gebrauch der Produkte vorausgesetzt - dass seine Produkte keine Herstellungs- oder Materialfehler aufweisen. Diese Gewährleistung erfolgt zu den Bedingungen und mit den Beschränkungen und Ausnahmen, die nachstehend aufgeführt sind. Teile, die sich bei normalem Gebrauch während der dreijährigen Garantiezeit als fehlerhaft erweisen, werden von Lewmar repariert oder aufgrund Lewmars Entscheidung ausgetauscht.

### A BEDINGUNGEN UND EINSCHRÄNKUNGEN

- i Die Haftung von Lewmar ist auf die Reparatur oder den Austausch der Teile beschränkt, die Material- oder Herstellungsfehler aufweisen.
- ii Die Feststellung, ob das Material für die vom Käufer bezweckte Verwendung geeignet ist, fällt unter die alleinige Verantwortung des Käufers. Lewmar übernimmt keine Haftung im Zusammenhang mit einer solchen Eignungsfeststellung.
- iii Lewmar kann nicht haftbar gemacht werden für:
  - a Versagen, Verlust oder Schäden aufgrund der Nutzung der Produkte in Anwendungen, für die sie nicht bestimmt sind.
  - b Versagen, Verlust oder Schäden durch Korrosion, UV-Zersetzung oder normalen Verschleiß.
  - c Versagen, Verlust oder Schäden durch Wartung, die nicht gemäß den Empfehlungen von Lewmar vorgenommen wird.
  - d Versagen, Verlust oder Schäden durch fehlerhafte oder falsche Installation des Produkts (sofern nicht durch Lewmar durchgeführt).
  - e Versagen, Verlust oder Schäden durch Änderungen jeglicher Art des Produkts.
  - f Versagen, Verlust oder Schäden durch Überbeanspruchung der Produkte.
- iv Produkte, für die Garantieansprüche geltend gemacht werden, müssen an die Lewmar-Niederlassung, die das Produkt geliefert hat, zwecks Prüfung zurückgesandt werden, es sei denn, dass Lewmar schriftlich eine andere Vereinbarung bestätigt hat.
- v Lewmar übernimmt keine Frachtkosten oder Kosten für Installationsarbeiten (Ein- und Ausbau) sowie Kosten für die Untersuchung in Zusammenhang mit einem Garantieanspruch.
- vi Diese Garantie verfällt, wenn andere Personen als zugelassene Lewmar-Vertreter Servicearbeiten in Bezug auf die Produkte durchführen, es sei denn, dass diese Arbeiten den Richtlinien und Herstellungsstandards von Lewmar entsprechen.
- vii Lewmar Produkte sind ausschließlich für den Einsatz im Wassersport-Bereich konzipiert. Käufer, die diese Produkte für jeglichen anderen Zweck benutzen wollen, sollten sich hinsichtlich einer solchen Eignung an einen unabhängigen Sachverständigen wenden. Lewmar unterliegt dabei keiner Haftung durch den Gebrauch, den Lewmar nicht ausdrücklich billigt hat.

### B AUSNAHMEN

Die Garantie ist in folgenden Fällen auf die Dauer eines Jahres ab Kaufdatum befristet:

- Elektrische Motoren und elektrische Ausrüstung
- Elektronische Steuerungen
- Hydraulische Pumpen, Ventile und Drehzahlregler
- Wetterdichtungen
- Produkte im „Grand Prix“-Einsatz

### C HAFTUNG

i Die Haftung seitens Lewmar schließt alle anderen Garantien und Verantwortlichkeiten (im gesetzlich zulässigen Rahmen) aus. Insbesondere (jedoch ohne Einschränkung):

- a haftet Lewmar nicht für:
  - entgangenen erwarteten Umsatz oder Gewinn oder indirekte Schäden, Folgeschäden oder wirtschaftliche Schäden.
  - Schäden, Kosten oder Aufwendungen, die an Dritte zahlbar sind.
  - Schäden an Yachten oder Ausrüstung.
- Tod oder Personenschäden (ausgenommen verursacht durch Fahrlässigkeit von Lewmar).

Einige Staaten und Länder gestatten keinen Ausschluss oder keine Beschränkung des Schadenersatzes für Aufwendungen bei Vertragserfüllung oder Folgeschäden. In diesen Fällen gelten die oben genannten Einschränkungen oder Ausschlussbedingungen möglicherweise nicht.

b. Lewmar gewährt keine Garantie bezüglich der Eignung der Produkte hinsichtlich der vom Käufer bezweckten Nutzung, des Gebrauchs, der Art oder der befriedigenden Qualität der Produkte.

ii Wenn die geltenden Gesetze des betreffenden Landes den Ausschluss von Garantien nicht erlauben, wird die Garantie, falls die Gesetze dies zulassen, auf ein (1) Jahr ab dem Kaufdatum beschränkt. Einige Staaten und Länder gestatten keine Beschränkung der gesetzlichen Gewährleistung. In diesen Fällen gelten diese Einschränkungen möglicherweise nicht.

### D VORGEHENSWEISE

Die Geltendmachung von Gewährleistungsansprüchen im Rahmen dieser Garantie ist vom Endabnehmer unverzüglich und in schriftlicher Form gegenüber der Lewmar-Niederlassung, die das Produkt geliefert hat, oder Lewmar Limited in Southmoor Lane, Havant, Hampshire, PO9 1JJ, Großbritannien, anzuzeigen.

### E ABTRENNBARKEIT EINZELNER BESTIMMUNGEN

Falls eine oder mehrere dieser Garantiebestimmungen von einer zuständigen Behörde ganz oder teilweise für nicht gültig oder nicht einklagbar erachtet werden, mindert dies nicht die Gültigkeit der übrigen Bestimmungen dieser Garantie und des Rests der betreffenden Bestimmung.

### F SONSTIGE RECHTE

Aufgrund dieser Garantie haben Sie bestimmte gesetzliche Rechte. Darüber hinaus stehen Ihnen gegebenenfalls je nach Land verschiedene sonstige gesetzliche Rechte zu.

Bei Endverbrauchern aus den Mitgliedsstaaten der Europäischen Union (gemäß der rechtlichen Definition des jeweiligen Landes) gelten die Rechte aus den entsprechenden nationalen Gesetzen, die den Verkauf von Konsumgütern regeln. Diese Rechte werden durch diese Garantie in keiner Weise eingeschränkt.

### G GERICHTSSTAND

Für diese Garantie ist englisches Recht oder das Recht desjenigen Landes maßgeblich, in dem der erste Endkunde seinen Wohnsitz zum Zeitpunkt des Kaufes dieses Produkts hatte.

### H STREITFALL

Streitfälle, die sich im Rahmen dieser Garantie ergeben, können nach Wahl des Endabnehmers an ein alternatives Verfahren zur Streitklärung gemäß den Bestimmungen der British Marine Federation oder an ein Gericht desjenigen Landes, dessen Gesetze für diese Gewährleistung Anwendung finden, oder an ein Gericht in England oder Wales überwiesen werden. Die Anschrift der British Marine Federation lautet: Marine House, Thorpe Lea Road, Egham, TW20 8BF, Großbritannien.

## F Garantie Limitée et Conditions de la Fourniture par Lewmar

Lewmar garantit qu'avec une utilisation normale et un entretien correct, ses produits seront conformes à leur spécification pendant une période de trois ans à partir de la date d'achat par l'utilisateur final, sous réserve des conditions, restrictions et exceptions détaillées ci-dessous. Tout produit qui se trouve être défectueux lors d'une utilisation normale, durant cette période de trois ans, sera réparé ou, au choix de Lewmar, remplacé par Lewmar.

### A CONDITIONS ET RESTRICTIONS

- i La responsabilité de Lewmar sera limitée à la réparation ou au remplacement de toutes les pièces du produit qui sont défectueuses dues aux matériaux ou à la fabrication.
- ii L'Acheteur est seul responsable de la sélection appropriée des produits pour l'usage prévu par lui-même et Lewmar décline toute responsabilité d'une telle sélection.
- iii Lewmar ne sera en aucune façon responsable de la défaillance du Produit ou de toute perte ou dommage qui en résultent et qui proviennent de :
  - a l'utilisation du produit dans une application pour laquelle il n'est pas conçu ou prévu ;
  - b la corrosion et la dégradation causées par les ultra violets ou l'usure normale ;
  - c un manquement à la révision ou l'entretien du produit conformément aux recommandations de Lewmar.
  - d un montage défectueux ou déficient du produit (à moins d'avoir été effectué par Lewmar) ;
  - e toute modification ou transformation du produit ;
  - f des conditions supérieures aux spécifications de performance du produit ou charges maximales d'utilisation.
- iv Product subject to a warranty claim must be returned to the Lewmar outlet which supplied the product for examination unless otherwise agreed by Lewmar in writing.
- v Le produit faisant l'objet d'une réclamation au titre de la garantie doit être retourné pour examen au point de vente Lewmar qui l'a fourni, sauf avis contraire par écrit de Lewmar.
- vi Cette garantie ne couvre pas les coûts annexes contractés lors de l'étude, retrait, transport ou montage du produit.
- vii La révision par toute autre personne que les représentants agréés Lewmar annulera cette garantie à moins qu'elle ne soit en accord avec les indications et critères de fabrication de Lewmar.
- viii Les produits Lewmar sont prévus pour un usage dans un milieu maritime uniquement. Les Acheteurs prévoyant de les utiliser dans un but autre devraient demander conseil à un professionnel indépendant quant à leur adéquation. Lewmar décline toute responsabilité pour toute autre utilisation.

### B EXCEPTIONS

La couverture sous cette Garantie est limitée à une période de un an à partir de la date d'achat par l'utilisateur final pour tous les produits ou pièces de produits suivants :

- Moteurs électriques et équipements électriques associés
- Commandes électroniques
- Pompes hydrauliques, soupapes et actionneurs
- Caoutchoucs d'étanchéité
- Produits utilisés dans des régates "Grand Prix"

### C RESPONSABILITE

i La responsabilité de Lewmar sous cette garantie sera à l'exclusion de toutes autres garanties ou responsabilités (dans la mesure permise par la loi). En particulier (mais sans restriction) :

- a. Lewmar ne sera pas responsable de :
  - Toute perte de chiffre d'affaires prévu, de bénéfices ou de perte économique indirecte ou conséquente ;
  - Dommages et intérêts, coûts ou frais payables à n'importe quel tiers ;
  - Tout dommage aux yachts ou à l'équipement ;
  - Décès ou Atteinte à la personne (à moins d'avoir été causé par la négligence de Lewmar).

Certains états ou pays ne permettent pas l'exclusion ou la restriction des dommages accessoires ou indirects, dans ce cas la restriction ou exclusion ci-dessus peut ne pas vous concerner.

b. Lewmar n'accorde pas d'autres garanties concernant l'adéquation, l'utilisation, la nature ou la qualité satisfaisante des produits.

ii Lorsque la loi applicable ne permet pas qu'une garantie implicite ou légale soit exclue, alors une telle garantie, si permise par la loi de cet état ou pays, sera limitée à une période de un an à partir de la date d'achat par l'utilisateur final. Certains états ou pays ne permettent pas de restrictions sur la durée d'une garantie implicite, dans ce cas cette restriction peut ne pas vous concerner.

**D PROCEDURE**

La notification d'une réclamation au titre de la garantie devra être effectuée par l'utilisateur final rapidement et par écrit, au point de vente Lewmar qui a fourni le produit ou à Lewmar Limited, Southmoor Lane, Havant, Hampshire, Angleterre PO9 1JJ.

**E CLAUSE DE RUPTURE**

Si toute clause de cette garantie est reconnue caduque ou inapplicable dans sa totalité ou en partie par tout tribunal ou autre autorité compétente, la validité des clauses restantes de cette garantie et de l'autre partie de la clause en question ne sera pas affectée.

**F AUTRES DROITS**

Cette garantie vous donne des droits légaux spécifiques. Vous pouvez également avoir d'autres droits légaux qui varient d'états à états et de pays à pays.

Dans le cas des Etats européens, un client Consommateur (comme défini au niveau national) dispose de droits légaux au titre de la loi nationale applicable régissant la vente de Biens de Consommation ; cette Garantie n'affecte pas ces droits.

**G DROIT**

Cette garantie sera régie par et lu conformément aux lois de l'Angleterre ou de l'état ou pays dans lequel le premier utilisateur final est domicilié lors de l'achat du produit.

**H LITIGES**

Tout litige survenant durant cette garantie peut, au choix de l'utilisateur final, être soumis soit à la médiation de litige selon les règlements de la British Marine Federation soit aux Tribunaux de l'Etat dont la loi régira cette garantie, soit encore aux Tribunaux d'Angleterre et du Pays de Galle.

La British Marine Federation peut être contactée à l'adresse suivante : Marine House, Thorpe Lea Road, Egham, Angleterre, TW20 8BF. The British Marine Federation may be contacted at Marine House, Thorpe Lea Road, Egham, England, TW20 8BF

**E GARANTIA LIMITADA Y CONDICIONES DE SUMINISTRO DE LEWMAR**

LEWMAR garantiza que con un uso normal y un mantenimiento apropiado, sus productos se mantendrán acordes a sus especificaciones por un periodo de tres años desde el momento de la compra por parte del cliente final. Esta garantía está sujeta a las condiciones, limitaciones y excepciones que se detallan a continuación. Cualquier producto que, en el plazo de estos tres años, se demuestre defectuoso tras un uso normal, será reparado o, a criterio de Lewmar, reemplazado por Lewmar.

**A CONDICIONES Y LIMITACIONES**

- i El compromiso de Lewmar se limita a la reparación o sustitución de cualquier pieza del producto que resulte defectuosa, ya sea por fallo del material o por errores en la fabricación.
- ii La responsabilidad en la elección de un determinado producto para un uso concreto es, en cualquier caso, del propio comprador, no aceptando Lewmar responsabilidad alguna a este efecto.
- iii Lewmar no podrá ser declarada responsable de ningún defecto en el producto, ni de ninguna pérdida ni daño causados por:
  - a. Uso de un determinado producto para una aplicación para la que no ha sido concebido.
  - b. Efectos de la corrosión, de la acción de los rayos ultravioleta, o del desgaste propio debido al uso.
  - c. Fallos originados por un mantenimiento no acorde a las recomendaciones de Lewmar.
  - d. Instalación errónea o imperfecta del producto; excepto si dicha instalación fue realizada por el servicio oficial Lewmar.
  - e. Fallos originados por modificaciones o alteraciones del producto.
  - f. Fallos originados por exigencias que superen las posibilidades del producto o los límites de carga indicados.
- iv En caso de reclamación de garantía, el producto defectuoso deberá ser devuelto al almacén que lo suministró, al menos que existan otras instrucciones escritas por parte de Lewmar.
- v La garantía no cubre los costes derivados del examen, desmontaje, transporte o instalación del producto.
- vi Cualquier servicio realizado por un agente no autorizado por Lewmar, anulará la garantía, salvo en el caso de que se hayan seguido las especificaciones y los estándares de trabajo dictados por Lewmar.
- vii Los productos Lewmar están diseñados para su uso en el medio marino. Cualquier usuario que quiera destinarlo a otro uso, deberá consultar su viabilidad a un profesional independiente. En ningún caso Lewmar acepta la responsabilidad sobre los fallos que puedan surgir de dicho uso alternativo.

**B EXCEPCIONES**

La cobertura de la garantía se limita al periodo de un año desde la fecha de la compra por parte del cliente final, en los siguientes productos o componentes.

- Motores eléctricos y material eléctrico asociado
- Controles electrónicos
- Bombas hidráulicas, válvulas y operadores
- Selladores atmosféricos
- Productos usados en regatas de altura.

**C RESPONSABILIDAD**

i La responsabilidad de Lewmar bajo esta garantía excluirá cualquier otra garantía o responsabilidades según la legislación vigente-De manera particular, pero sin limitaciones, en los siguientes casos.

- a. Lewmar no será responsable de:
  - Ningún tipo de pérdida de posible beneficio o provecho, consecuente con una pérdida económica.
  - De los desperfectos, costes o gastos a pagar a terceras personas.
  - De ningún tipo de daño causado al yate o al equipo.
  - De la muerte o de un daño físico (salvo en el caso demostrable de negligencia por parte de Lewmar)

Algunos países o estados no permiten la exclusión o limitación de daños accidentales; en tal caso estas limitaciones no serán de aplicación.

b. Lewmar no ofrece ninguna otra garantía que contemple la conveniencia del producto para el uso dado, sobre la naturaleza o la satisfacción sobre la calidad de sus productos.

ii Cuando las leyes locales no permitan la exclusión de la garantía, el periodo de validez de la misma, si la ley del estado o del país lo permite, se limitará a un año desde el momento de la compra por parte del usuario final.

Algunos estados o países no permiten la limitación del periodo de garantía; en tal caso está limitación no será aplicable.

**D PROCEDIMIENTO**

La reclamación de un servicio en garantía, deberá ser comunicado por escrito, y de inmediato, al punto de venta Lewmar que suministró el producto o directamente a: Lewmar Limited, Southmoor Lane, Havant, Hampshire, Inglaterra PO9 1JJ.

**E CLÁUSULA DE INVALIDACIÓN**

Si cualquier cláusula de esta garantía fuese considerada, por un juzgado o por cualquier otra autoridad competente, inválida o imposible de cumplir por entero o parcialmente, las otras cláusulas de la garantía y el resto de la cláusula en cuestión seguirán siendo válidas.

**F OTROS DERECHOS**

Esta garantía le otorga derechos legales específicos, aunque Vd. puede tener otros más que varían de un estado a otro o de un país a otro.

En el caso de la Unión Europea, un cliente consumidor (como se le define nacionalmente) posee derechos legales dictados por la Ley del Consumidor. Esta garantía no afecta dichos derechos.

**G LEGISLACION**

Esta garantía se regirá y leerá según las leyes de Inglaterra o del estado o país en el cual esté domiciliado el primer usuario final, en el momento de la adquisición del producto.

**H CONFLICTOS**

Cualquier conflicto surgido por esta garantía podrá ser- según la opción del consumidor final sometido, para su resolución, a las leyes de la British Marine Federation, al Juzgado del estado o país cuya legislación contemple dichos términos, o bien a los Juzgados de Inglaterra y Gales.

La base de la British Marine Federation se encuentra en Marine House, Thorpe Lea Road, Egham, England, TW20 8BF.

**S Begräsd Garanti****Lewmars Begräsd Garanti Och Leveransvillkor**

Lewmar garanterar att företagets produkter, vid normal användning och rätt skötsel, upp respektive produktspecifikation under en period på tre år från den dag slutanvändaren köpt produkten, med förbehåll för villkor, begränsningar och undantag enligt nedanstående lista. Produkt som vid normal användning visar sig vara defekt under ovannämnda treårsperiod kommer att repareras eller byta ut av Lewmar, efter Lewmars eget godtyckande.

**A VILLKOR OCH BEGRÄNSNINGAR**

- i Lewmars ansvar skall begränsas till reparation eller byte av den del av produkten som är behäftad med material- eller tillverkningsfel.
- ii Köparen bär ensam ansvaret för valet av produkt till en viss tillämpning, och Lewmar kan inte hållas ansvarigt för sådant val.
- iii Lewmar kan inte på något sätt hållas ansvarigt för produktfel, skada eller förslut som uppstår pga:
  - a. produkten används på ett sätt som den inte är konstruerad eller avsedd för,
  - b. korrosion, ultraviolett strålning eller slitage,
  - c. underlåtenhet att göra service och underhåll på produkten i enlighet med Lewmars rekommendationer,
  - d. felaktigt eller bristfälligt installation av produkten (om den inte utförts av Lewmar),
  - e. ombyggnad eller ändring av produkten eller
  - f. förhållanden som ligger utanför produktens driftspecifikationer eller belastningsbegränsningar.
- iv Produkt som omfattas av ett garantianspråk skall returneras till den Lewmar-leverantör som levererat produkten, för inspektion, om inte annat skriftligen överenskommit med Lewmar.
- v Denna garanti omfattar inte kostnader för utredning, demontering, transport eller installation av produkten.
- vi Service utförd av annan än auktoriserad Lewmar-representant innebär att garantin upphör att gälla, med mindre servicen överensstämmer med Lewmars riktlinjer och standarder för yrkesskicklighet.
- vii Lewmars produkter är endast avsedda för användning i marin miljö. Köpare som har för avsikt att använda produkterna i annat syfte bör begära professionell hjälp efter behov. Lewmar påtar sig inget som helst ansvar för sådan användning.

**B UNDANTAG**

Denna garanti gäller, för följande produkter och delar av produkter, under en period på ett år från det datum slutanvändaren köpt produkten:

- Elmotorer och tillhörande elutrustning
- Elektronik
- Hydraulpumpar, ventiler och styrdon
- Tätningar
- Produkter som används i Grand-Prix-tävlingar.

**C ANSVAR**

- i Lewmars ansvar enligt den här garantin skall gälla före all annan garanti och ansvar, i den utsträckning lagen så medger. Detta gäller särskilt, dock utan att begränsas därtill:
  - a. att Lewmar inte kan hållas ansvarigt för:
    - eventuell förlust av förväntad avkastning eller vinst eller indirekt ekonomisk förlust eller följdförlust,
    - skada, kostnad eller utgift som förfaller till tredje part,
    - skada på båt eller utrustning eller
    - dödsfall eller personskada, med mindre den orsakats av Lewmars försumlighet.

I vissa länder/stater tilläts inte undantag i form av begränsat ansvar för olycksfalls- eller följdsador, varför ovannämnda begränsning kanske inte gäller dig.

b. Lewmar utfärdar ingen annan garanti om produktens lämplighet i ett visst syfte, användning, typ eller tillfredsställande kvalitet.

ii Om tillämplig lag inte medger att lagstadgad eller underförstådd garanti undantas, skall sådan garanti, om så medges i den statens eller det landets lag, begränsas till en period på ett år från det datum slutanvändaren köpt produkten. I vissa stater och länder tilläts inte begränsningar avseende en fastställd garanti gäller, varför ovannämnda begränsning kanske inte gäller för dig.

**D FÖRFARANDE**

Användaren skall skriftligen ställa eventuellt anspråk på garantiservice snarast möjligt till den Lewmar-försäljare som levererat produkten eller till Lewmar Limited på Southmoor Lane, Havant, Hampshire, England PO9 1JJ.

**E GILTIGHETSKLAUSUL**

Om en domstol eller annan behörig myndighet finner att en klausul i den här garantin, i sin helhet eller delvis är ogiltig eller ogenomförbar, skall giltigheten i övriga klausuler i den här garantin och resterande del av den aktuella klausulen inte påverkas.

**F ÖVRIGA RÄTTIGHETER**

Den här garantin ger dig specifika juridiska rättigheter, men du kan också ha andra juridiska rättigheter som kan vara olika i olika länder och stater.

I europeiska stater har konsumentkunder, enligt nationell definition, juridiska rättigheter enligt tillämplig nationell konsumentköplag. Den här garantin påverkar inte sådana rättigheter.

**G LAGSTIFTNING**

Den här garantin är underställd och skall tolkas i enlighet med lagstiftningen i England eller den stat eller det land där den förste slutanvändaren är bosatt när produkten köps.

**H TVISTELÖSNING**

Eventuell tvist som uppstår pga den här garantin kan, efter slutanvändarens val, hänvisas till alternativ tvistelösning enligt British Marine Federations regelverk, hos domstol i den stat vars lagstiftning garantin skall följa eller hos domstol i England och Wales.

British Marine Federation kan kontaktas på adressen Marine House, Thorpe Lea Road, Egham, England, TW20 8BF.

**LEWMAR®**

[www.lewmar.com](http://www.lewmar.com)

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<https://www.boat-manuals.com/>

Produced by T. Connell UK (+44) 023 9263 9265 Ref:11776/10/2005

## Installation, Compensation, and Maintenance Instructions

For all

# RITCHIE® HELMSMAN™

Compass Models

Made in U.S.A.

### CAUTION:

All Magnetic Compasses are vulnerable to magnetic interference, which will produce errors, called deviation. It is the Owner/Operator and/or Helmsman's responsibility to make sure the compass is properly installed and compensated. Compensation is the act of correcting for deviation. Magnets (speakers, microphones etc.), ferrous metals (steel, iron, etc.) and current carrying devices are common causes of deviation. It is important to understand that magnetic compasses point toward Magnetic North. There is a difference between Magnetic North and True North, and that difference is called variation. Variation differs depending on your geographical location and can be determined by referring to a local chart.

### Please read the Instructions completely before beginning installation.

#### Selecting the Proper Location

The compass should be close enough to the helmsman and positioned below the helmsman's line of sight so it is easily read during normal operation. Direct Read Dial or CombiDamp Dial models will allow the compass to be mounted higher, near or at eye level.

You will need a flat and level surface (when the boat is on a level keel). Many boats have a curved mounting surface and if this is the case, a fairing block should be utilized to bring the compass to a level position.

Select a location that has no more than 20 degrees deviation on any of the four cardinal points (N S E and W). Most compasses have a built in compensation system that will correct for fixed deviation up to 20 degrees. It is important to realize that proper compensation is not possible when a compass is subjected to a magnetic field that is variable. Some shipboard devices can cause varying magnetic fields. Devices such as windshield wipers, high current carrying wire and even some steering wheels must be considered when selecting a location for your compass.

#### Testing Your Chosen Location

Use your compass to test a location. There are two brass rods near the bottom of the compass which rotate 360 degrees, the slotted ends may be all that is visible. These compensation rods are used to correct your compass for deviation. When testing a location, you do not want pre-set corrections in your compass, so neutralize the compensator rods by setting the slots in a horizontal position.

Begin your test by holding the compass away from any possible interference and observing the compass reading. Then move the compass into position carefully; keeping it pointed in the same direction. If the compass reading is different without a change in direction you are observing deviation. You need to find a location that has less than 20 degrees of deviation on the 4 cardinal points if you intend to adjust your compass using the compensator rods.

After finding a location you should test for intermittent changes in the magnetic field. With the compass mounted temporarily in its intended position try moving the steering wheel, throttle controls or anything else that might cause deviation. It is also advised to turn electrical devices off and on. Please be advised that a changing magnetic field can not be corrected with compensation and you will need to find another location for your compass.

#### Installation (all Models)

##### **Mounting the Compass**

Great care must be taken to mount the compass so that it is aligned with the keel of the boat. **An alignment error is a constant error on all headings caused by the compass not being pointed in the same direction as the boat.** One recommendation is to temporarily mount the compass using one fastener so if an alignment error is detected it is easily corrected. Masking tape can be used as a reference or to keep the compass steady during installation.

If you are mounting to a bulkhead that is not perpendicular to the centerline of the boat, a fairing block must be used.

Due to variations in bulkhead and deck materials, mounting screws are not supplied. Use hardware that is suitable for your specific installation. SELECT MOUNTING HARDWARE THAT IS NON-MAGNETIC. Most quality stainless steel and solid brass fasteners can be used. If you are unsure test them with a magnet.

Most models have built-in lights which will require routing the wire or wires to your power source. To assure a clean installation you may want to wait and drill the routing holes after you are satisfied with the compass alignment.

### **Specific model installation instructions are as follows:**

#### **Note for all flush and bulkhead mount compasses:**

It is important that you use the mounting gasket included with each model. We do NOT recommend the use of bedding compound since some brands contain chemicals that could damage the plastic dome.

#### **HF-72, HF-72W, HF-73, HF-73W, HF-79, HF-79G, HF-79W, SS-1000& SS-1000W Flush Mount**

Using the mounting template supplied with the compass, make the cutout in your chosen location and mount as instructed above (Mounting the Compass). For all HF-79 models, loosen but do NOT remove the single screw in the rear of the dress-bezel. Lift the rear of the dress-bezel and slide it forward to remove it from the compass. When mounting and compensation are completed, replace the dress-bezel. Note: If you cannot access the compensation rods from below you need to allow for easy removal of the compass during compensation. (See Compensation instructions below).

#### **HV-76 & HV-77 Bulkhead Mount**

Before making the cut, make sure the bulkhead surface at the mounting location is at a ninety-degree (90°) angle to the centerline of the boat and is in a vertical position. If such is not the case, a fairing block must be used between the compass and the bulkhead. Use the mounting template supplied with the compass for cutting the necessary opening in the vertical bulkhead. If the compass is not mounted in a vertical position, serious errors can develop when the boat heels over and pitching occurs simultaneously. There is also potential error from the built-in compensator magnets if the compass is not mounted vertically.

#### **HD-74, HD-75 & SS-1100 Deck Mount**

**Follow the instructions above (Mounting the Compass). After mounting, remove the black plastic inserts and begin compensation (see Compensation instructions below).**

#### **HB-70, HB-71 & HB-85 Bracket Mount**

Remove the bracket from the compass and mount it as instructed above (Mounting the Compass). If you mounted the bracket to a gunwale simply rotate the compass 90 degrees in it's housing by removing the four Phillips head screws located in the bottom of the housing. After re-installing the compass in the bracket remove the black plastic inserts, which cover the compensators and begin compensation (see Compensation instructions below).

#### **IMPORTANT NOTE REGARDING HB-85**

This model is designed to be mounted on STEEL HULL Vessels. Special compensation is required and you will need to hire a professional compass adjuster.

#### **Night Light Wiring (all Models)**

All models are supplied with a 12-volt night lighting system. To connect lights to a 24 or 32-volt system, dropping resistors are available.

Lights should be wired to an appropriately fused 12-volt circuit in your electrical system (i.e. running light circuit).

Connect the red wire (white on some models) to positive and black to ground. Some models have a second light assembly, which should be connected to the same circuit.

#### **Compensation**

A built-in correcting magnet system consists of two sets of magnets fixed to two adjusting rods with slotted ends. The slots should be horizontal before starting the adjusting procedure. A small non-magnetic screwdriver is provided for this purpose.

Before starting compensation, make sure you have a suitable location (see Testing Your Chosen Location).

### Method 1. (Preferred)

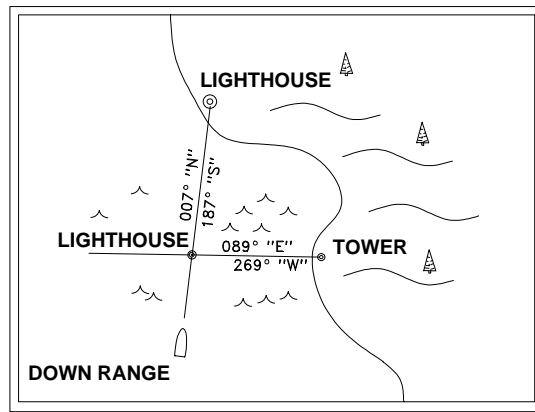
**Step One.** With the compass in its intended position, but not finally secured, (see Mounting the Compass) select a course on your chart using two fixed aids that are within ten degrees ( $10^\circ$ ) of the North/South line. Try to select this course so that you can maneuver your boat "down range" of the marks selected (See example).

**Step Two.** From a position down range of the North/South marks, and keeping the marks lined up, run the boat visually along the Northerly course selected. Turn the port/starboard compensator (slot is facing starboard) until the compass reads correctly.

**Step Three.** Simply repeat steps 1 & 2, except this time, using an East/West course and the fore/aft compensator (slot is facing aft).

**Step Four.** Check compass alignment by running the boat in a Southerly direction, again keeping the mark lined up. If the compass is not correct at this time, there is an alignment error. To correct, rotate the compass itself to remove one half of this error. Repeat steps 1, 2 & 4 until your North/South line is correct then repeat step 3.

**Step Five.** Install fastener (s), taking care not to disturb alignment.



EXAMPLE

### Method 2. (Requires the use of GPS or Loran)

In this method you will be using a GPS or Loran as your reference.

1. Your GPS or Loran must be set to provide you with Magnetic, not True headings. Check your Manual.
2. GPS and Loran provide headings based on COG (course over ground). Compasses provide heading based on the direction the boat is actually pointed. Because of Tides, Currents and Winds, the boat may not always point in the same direction as COG. Pick a time and location that will minimize these effects.
3. Because the GPS and Loran calculate COG based on current and past positions you will see greater heading accuracy while traveling at higher speeds. We recommend at least 10 knots.

**Step One.** While at sea, with the compass in its intended position, but not finally secured, (see Mounting the Compass), obtain the Loran/GPS bearing to a fixed aid or landmark that is within  $10^\circ$  of a North/South line.

**Step Two.** Position your boat along that line and steer directly at that mark. Turn the port/starboard compensator (slot is facing starboard) until the compass heading matches the Loran/GPS bearing.

**Step Three.** Simply repeat steps 1 & 2, except this time, using an East/West course and the fore/aft compensator (slot is facing aft).

**Step Four.** Check compass alignment by running the boat 180 degrees from the heading used in step 2. If the compass is not correct at this time, there is an alignment error. To correct, rotate the compass itself to remove one half of this error. Repeat steps 1, 2 & 4 until your North/South line is correct then repeat step 3.

**Step Five.** Upon completing the procedure, secure the compass in its final position.

**If you feel that the deviation on your boat is of an unusual nature, the services of a professional compass adjuster will be a wise investment.**

To assure accuracy on all headings, check for deviation every thirty degrees and record any deviation on a deviation card. We recommend checking at the start of each boating season, and any time new equipment is added near the compass, for deviation.

### Maintenance

Protect your compass from the sun when not using your boat. Strong sunlight may decrease the life of your compass. Custom fit covers are available from Ritchie.

Ritchie compasses require very little care. To remove salt spray deposits or dirt, rinse the entire compass with clean, fresh water and wipe carefully with a damp cloth. **Important Note: Never Use Chemical or Abrasive Cleaners.**

### Night Lighting Systems

Ritchie's night-lights are designed to last for years of use. If you need to replace one, contact the factory with your model and serial number for a part number and price. Tel. 781-826-5131 Fax. 781-826-7336 E-mail [service@ritchienavigation.com](mailto:service@ritchienavigation.com)

**Warranty:**

We warrant all Ritchie Magnetic Marine Compasses to be free of defects in workmanship or materials. If within three years of purchase date, a compass fails to give satisfactory service, it will be repaired or replaced without charge. This warranty does not cover breakage through accident or misuse. Replacement or repair will be made if the instrument is returned prepaid to a Ritchie Service Station or directly to E.S. Ritchie & Sons, Inc., 243 Oak Street, Pembroke, MA 02359.

## RITCHIE NAVIGATION

E.S. RITCHIE & SONS, INC., P.O. BOX 548, 243 OAK ST., PEMBROKE, MASSACHUSETTS 02359 U.S.A.  
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Rev D 4/00

HL-0032

Printed in U.S.A.

# Dual Digital Display





## EMC Conformance

All Tactick equipment is designed to the best industry standards for use in the recreational marine environment. The design and manufacture of Tactick equipment conforms to the appropriate Electromagnetic Compatibility (EMC) standards. Correct installation is required to ensure that performance is not compromised.



### Important

Due to the wireless communication systems used in Micronet instruments they are only recommended for use on boats up to 18 metres (60 ft.) **Before installing to a boat of aluminium or steel construction, please contact your Tactick dealer.**

Like any other Electronic instruments your Micronet system is designed to serve only as an aid to navigation and it remains the skippers responsibility to maintain a permanent watch and be aware of developing situations.

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# 1 Information

## 1.1 Introduction

Your Micronet display is powered for life by the environment. Although feature packed and highly visible in all conditions, current demand is so low, and the supply so efficient, that the solar-powered display is self sufficient. Combined with other displays in the Micronet range this display becomes part of a complete navigational system.

## 1.2 Specifications

<b>Height of digits:</b>	20mm (0.8")
<b>Backlighting:</b>	3 levels with daylight shutoff System-wide or local control
<b>Power:</b>	Solar Powered 300 hrs autonomy by day, 7 nights at brightest backlighting, 20 nights at economy backlighting without charge
<b>Units of display:</b>	Boat Speed (knots, km per hour, statute miles per hour) Distance (nautical miles, statute miles, kilometres) Depth (metres, feet, fathoms) Wind Speed (knots, metres per second, Beaufort)
<b>Alarm:</b>	Audible Alarm for Depth, Wind and MOB
<b>Weight:</b>	285g (0.63lbs)
<b>Operating Temp.:</b>	10 <sup>0</sup> to +60 <sup>0</sup> C (14 <sup>0</sup> to 14 <sup>0</sup> F)
<b>Frequency:</b>	868 MHz or 916 MHz


















**This unit can be controlled using the T113 Remote Display**

## 1.3 Power Management and Battery Life

What makes your mn100 display possible is Tacktick's revolutionary approach to power management. By reducing the amount of power being used by the electronics and maximizing the potential of the sun to provide power, a mn100 display becomes a virtually perpetual device. Power status is indicated by two icons on the display:

Battery Level  and  Charge Rate

Used together these icons will show the condition of the power supply.

Bright Sunny Day 	 	Battery is charged and being topped up by the sun. (see Note)
	 	Battery is low and being charged by the sun.
Overcast Day 	 	Battery is charged and requires no further charging.
	 	Battery is low but maintaining it's level.
Night 	 	Battery is charged but is not charging.
	 	Battery is low with no charging.
LOW Power	 	It is recommended that the instrument be left in daylight for some time for the battery to recover, or charge from an external 9-30V power source. A fully discharged battery will recharge in approximately 12 hours of direct bright sunlight.

If using the displays at night, power usage can be reduced dramatically by switching the Backlighting to level 1 or Off. If Backlighting is not required on displays located below decks it is best to set them to "Local" Backlighting control (see page 27 -s37) so that power is not being wasted in displays which may not be visible from the one being viewed.

**Note**

If the internal battery is fully charged then it does not matter how much the display is subjected to bright sunlight no further charging is required and the Charge Rate Indicator will remain low.



If the displays are to be stored for a long period of time before next use (Over Winter) ensure that the batteries are fully charged before storage. If necessary connect to a 9-30V DC power supply for 24 hrs prior to storage.

## Sleep Mode

If there is no boat speed or change in heading registered on the system for a period of 12 hours your Micronet display will switch off to conserve power. A "POWER SAVE" alarm will sound before the system switches off. Pressing any button within 10 seconds of the alarm sounding will allow the system to remain switched on.

Backlighting will automatically shut down/off when operated in daylight.



**Artificial light WILL NOT recharge the battery.** Placing your Micronet display close to an artificial light will seriously damage the display. Only recharge in natural daylight.

## Applying External Power

In cases where displays are mounted permanently below decks it will be necessary to apply an external power source to prevent complete discharge of the built in battery.

Connections on the rear of the display allow a 9V to 30V DC power source to be connected. Connections can be made to the vessels DC system or a 9V battery pack may be connected. It is recommended that permanent connection is only made when the displays are permanently fixed to the vessel and not when the clip brackets are used.

Connection to a 9V (PP3) battery will fully recharge the internal battery over a period of 24 hours.

## 1.4 Safety and Disposal

Your Micronet display contains Manganese Lithium Dioxide batteries which should be disposed of correctly. Do not dispose of any instrument in domestic waste. Refer to regulations in force in your country. If in doubt return the instrument to Tacktick Ltd. for correct disposal.

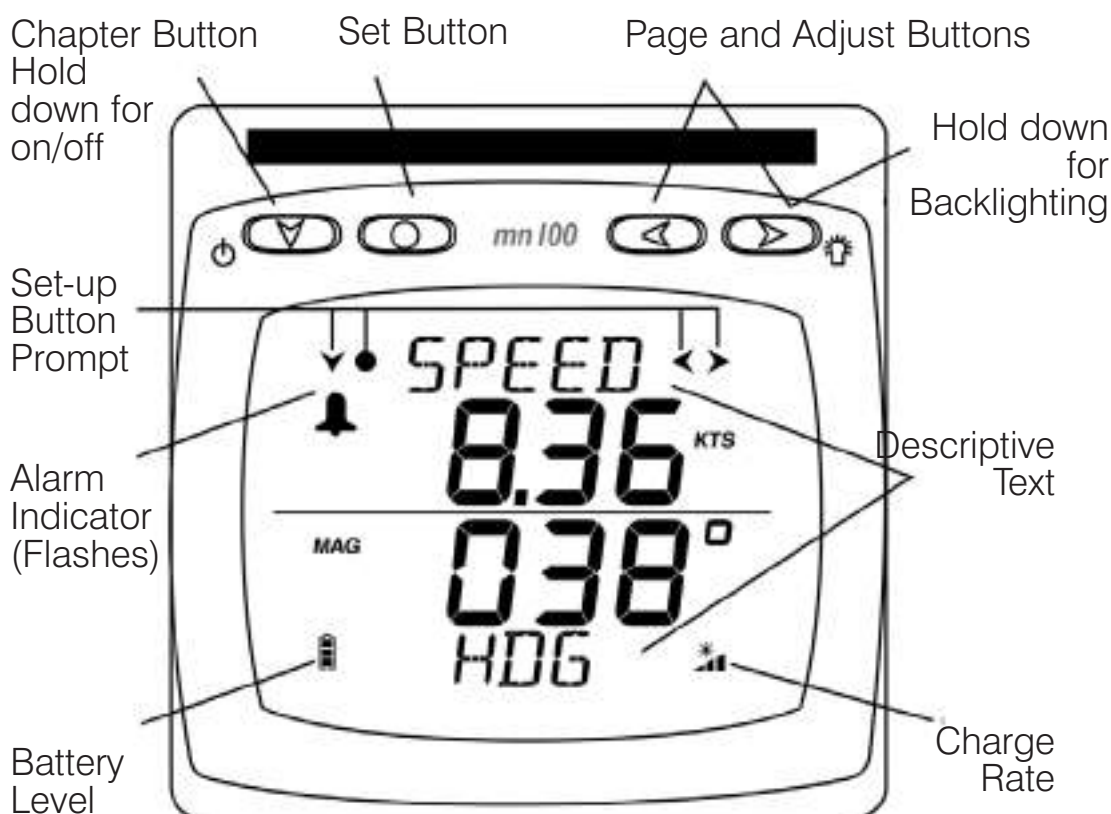
## 2 Operation



### Important:

Ensure that the "Auto Network" procedure described on the yellow instruction sheet and full Setup and Calibration has been performed correctly before attempting to use your Micronet system.

### 2.1 Display Information



### Display Icons

The following icons are used to display information on the screen:

**KTS, KPH, MPH** to display speed units

**KTS, M** to display wind speed units

**TRUE, APP** to indicate True or Apparent wind


**TRUE, MAG** to indicate True or Magnetic bearings and headings

**LAT, LON** to indicate Latitude or Longitude

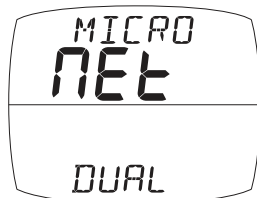
**LOG, TRIP** to indicate a Total Logged or Trip distance

**°** to indicate degrees of angle or temperature

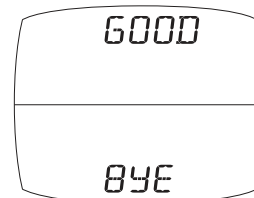
## 2.2 Switching the System On and Off

To switch your Micronet system on or off select any display and press the  button for 2 seconds.

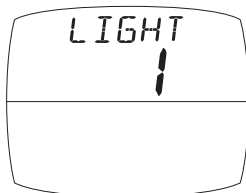
### Switch on






### Switch off



## 2.3 Backlighting



At any stage of the display's operation press and hold for 2 seconds the  button to access the lighting control.

Pressing the  and  buttons will scroll through setting OFF, 1, 2 and 3 whilst changing the Backlighting.

Depending on the display setup (see page 27 -s37), Backlighting on the whole system or just the single display will be altered.




Backlighting is automatically switched off in daylight as part of the display's power saving feature and will not operate in daylight.


## 2.4 Audible Signals and Alarms

At stages during its operation your Micronet display will beep to indicate alarms or moments of importance.

### Power-up

Once operating as part of a network the display will issue a single beep as it is switched on by pressing the  button for 2 second.

### Button Press


A single beep is issued each time a button is pressed. A second beep is issued after a 2 second hold down of the  button.

### Timer

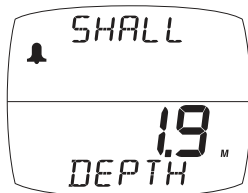
A single beep will be issued at each minute of the countdown. With 1 minute left to go a beep will sound every 10 seconds. With 10 seconds to go a beep will sound every second.

Countdown complete will be indicated by a single burst of three beeps.

## Alarm

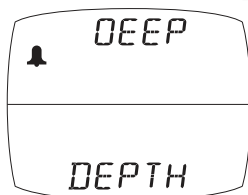
Continuous bursts of three beeps will indicate an alarm. The alarm activated will be indicated on the digital display, accompanied by the flashing  symbol. Pressing any button will silence the alarm. See fault finding section on p37.

### Depth Shallow Alarm



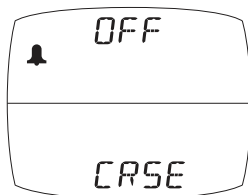
The water depth has fallen below the preset alarm level. The depth value that triggers the alarm is affected by any keel or waterline offsets that have been added. See page 22 s11 to set the alarm function. This alarm does not sound as the depth increases above the preset alarm level.

### Depth Deep Alarm



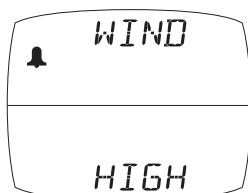
The water depth has increased above or fallen below the preset alarm level. The depth value that triggers the alarm is affected by any keel or waterline offsets that have been added. See page 22 s12 to set the alarm function.

### Off Course Alarm



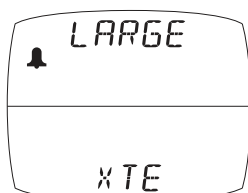
The heading has deviated from its locked value by more than the preset alarm level. See page 22 -S13 to set the alarm function. See page 17 -P33 to lock a heading.

### Wind High Alarm



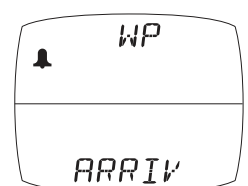
The wind speed has increased beyond the preset alarm level. See page 22 s14 to set the alarm function. This alarm does not sound as the wind speed decreases below the preset alarm level.

### Cross Track Error Large Alarm



A large cross track error has been alerted by the GPS. See page 23 s15 to set the alarm function.

### Waypoint Arrival Alarm



A waypoint arrival signal has been received from the GPS. The waypoint name is shown on the top line of the display. See page 23 s16 to set the alarm function.



## 2.5 Utilities

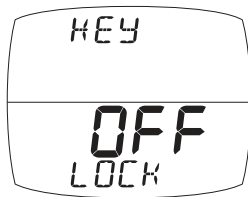
### Keylock

The Keylock feature protects from accidental key presses and is intended for use in high activity applications such as crewed race yachts. If your display is mounted in a position where keys may be pressed accidentally (eg the companionway of a race yacht), then you can enable keylock as follows:

Press and hold  to enter set up



Press  repeatedly to reach the **OPTS** chapter

Press  repeatedly to reach the **Key Lock** page



Press  to activate keylock

Press and hold  to exit setup.

Once keylock is activated, pressing a key causes the unit to give the unlock key prompt. Press  followed by  to unlock the keys (this will allow the keys to function for one minute, after which the keys will automatically relock).

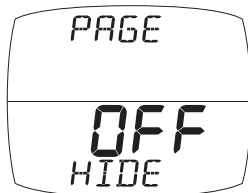
### Page Hiding

To hide unwanted pages and configure an instrument to your needs:

Press and hold  to enter set up



Press  repeatedly to reach the **OPTS** chapter

Press  repeatedly to reach the **Page Hiding** page



Press  to activate page hiding for 5 minutes

Press and hold  to exit setup.

Once page hiding is activated, press  for 2 seconds to hide a top page or press  for 2 seconds to hide a bottom page. A period of 5 minutes is allowed during which you can select pages to hide.

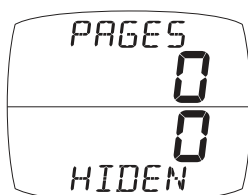
### Page Unhide

To clear Page Hiding and return to all pages visible:

Press and hold  to enter set up

Press  repeatedly to reach the **OPTS** chapter




Press  repeatedly to reach the **Pages Hidden** page

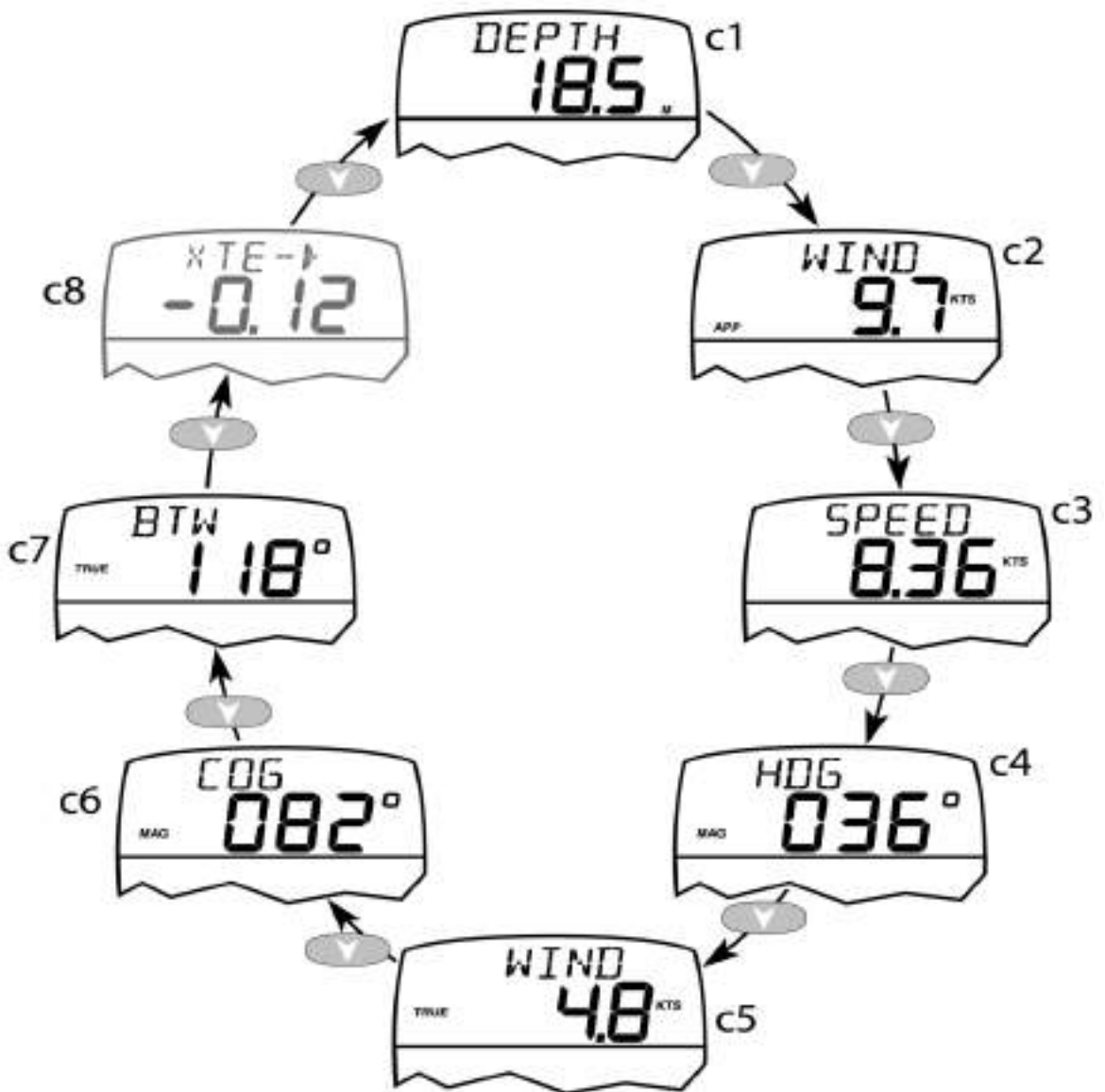


Press  to clear page hiding

Press and hold  to exit setup.

## 2.6 Chapter and Page Operation

Information is displayed in a “Chapter and Page” format using the  (Chapter) button to scroll through the Chapters which are displayed in the upper part of the window and the  and  (Page) buttons to move between Pages within a Chapter which are displayed in the lower part of the window.

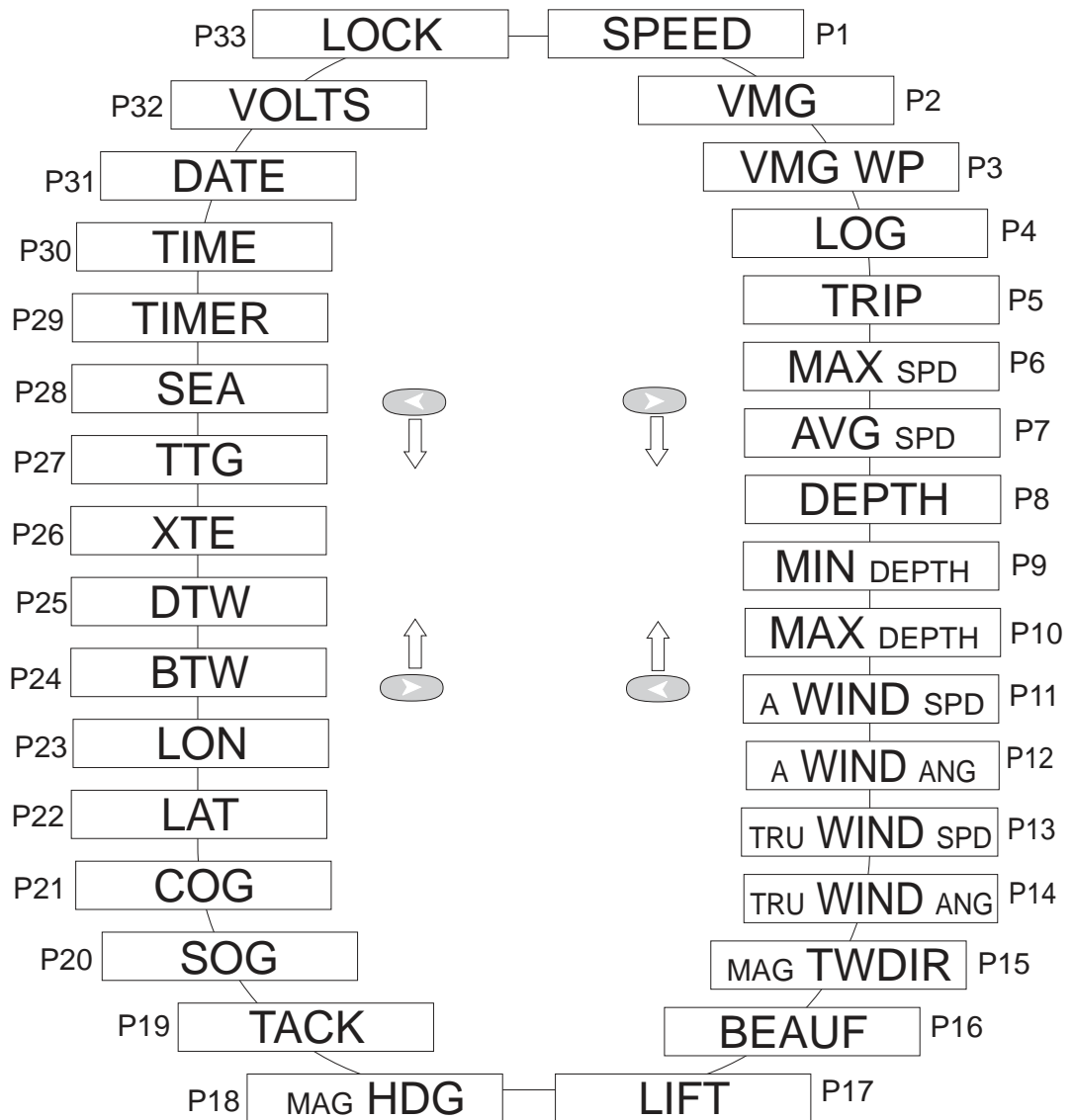


037\_003

*Chapter Sequence Shown in Upper Window  
(for a full description of each Chapter see page 11 - c1 to c8)*

It is possible to select any Page (lower window) within any Chapter (upper window) giving you a chance to display any two pieces of information available at any time.

Once a Page display has been selected within a Chapter the same Page will be displayed every rollover of the Chapter sequence ensuring that you return to your choice of display within a maximum of 8 presses of the (Chapter) button.



*Full Page Selection List Shown in Lower Window  
(for a full description of each Page see page 12 -p1 to p33)*

To move through the pages in chapter groups, press and hold . To then move individually page by page, let go of and step forward and back with a single press of and buttons.

## 2.7 Chapter and Page Descriptions

### Chapters

#### C1 Depth



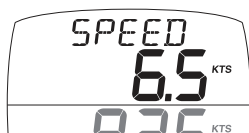
The Actual Depth beneath the vessel as measured by the Depth Transducer. The displayed value will be affected by any keel or waterline offset added (see page 29).

#### C2 Apparent Wind Speed



The actual Wind Speed with respect to the vessel as measured by the Wind Transmitter.

#### C3 Boat Speed



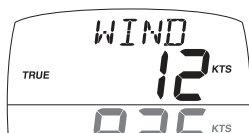
The vessels actual speed through the water as measured by the Speed Transducer.

#### C4 Heading



Current Compass Heading of the vessel as measured by the Compass Transducer. The value displayed will be affected by the calibration routine for the compass (see page 32).

#### C5 True Wind Speed



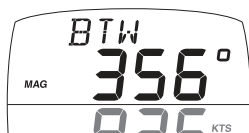
The True Wind Speed with respect to the vessel, calculated by the display taking into account the vessels speed through the water. Both Apparent Wind Speed, Angle and Boat Speed must be available for this calculation.

#### C6 Course Over the Ground



Course Over the Ground as calculated by the GPS Antenna.

#### C7 Bearing to Waypoint



Bearing To (active) Waypoint. The active Waypoint being the one to which the GPS is currently navigating.

#### C8 PROG (Custom Chapter)

A Custom Chapter which allows you to select from a full list the information you wish to display in the Chapter (upper) window (see page 26 -s35 for selection). This chapter is not displayed if no Custom Chapter has been defined in Setup.

## Pages

### P1 Boat Speed



The vessels Actual Speed through the water as measured by the Speed Transducer.

### P2 Velocity Made Good to windward



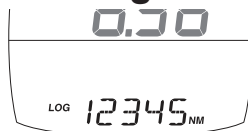
The vessels calculated Speed Directly Upwind. This value is calculated by the display from the Boat Speed and True Wind Angle.

### P3 Velocity Made Good to waypoint



The vessels calculated Speed directly towards the active Waypoint. This value is calculated by the GPS Antenna.

### P4 Log distance



The total distance travelled by the vessel since installation of the display or since a Factory Reset.

### P5 Trip distance



The distance travelled since the last Trip Reset. To Reset see page 20 -s1.

### P6 Maximum Speed (Identified by displayed KTS/KPH/MPH icon)



The Maximum Speed attained since the last reset. To Reset see page 20 -s4.

### P7 Average Speed (Identified by displayed KTS/KPH/MPH icon)



The Average Speed attained since the last reset. To Reset see page 20 -s5.

### P8 Depth










The Actual Depth beneath the vessel as measured by the Depth Transducer. The displayed value will be affected by any keel or waterline offset added (see page 29).

### P9 Minimum Depth (identified by displayed FT/M/FTM icon)






The Minimum Depth encountered since switch on or since the last Minimum Depth Reset. To Reset see page 20 -s2.

- P10 Maximum Depth (identified by displayed FT/M/FTM icon)**  

 The Maximum Depth encountered since switch on or since the last Maximum Depth Reset. To Reset see page 20 -s3.
- P11 Apparent Wind Speed (identified by displayed KTS/M icon)**  

 The Actual Wind Speed with respect to the vessel as measured by the Wind Transmitter.
- P12 Apparent Wind Angle**  

 The actual Wind Angle with respect to the vessel as measured by the Wind Transmitter.
- P13 True Wind Speed (identified by displayed KTS/M icon)**  

 The True Wind Speed with respect to the vessel, calculated by the display taking into account the vessels speed through the water. Both Apparent Wind Speed, Angle and Boat Speed must be available on the network for this calculation.
- P14 True Wind Angle**  

 The True Wind Angle with respect to the vessel, calculated by the display taking into account the vessels speed through the water. Both Apparent Wind Speed, Angle and Boat Speed must be available on the network for this calculation.
- P15 True Wind Direction**  

 The Actual Wind Direction over the water, calculated by the display taking into account the vessels speed through the water and compass heading. Apparent Wind Speed, Direction and Compass Heading must be available on the network for this calculation.
- P16 Beaufort Wind Strength**  

 The Actual Wind Speed over the water displayed using the Beaufort scale, calculated by the display taking into account the vessels speed through the water and compass heading. Apparent Wind Speed, Direction and Compass Heading must be available on the network for this calculation.



**P17 Wind Shift, Head or Lift**




Indicates changes in the wind against a compass heading. Spotting these wind changes is the key to fast sailing upwind.

The system automatically detects the mean wind direction by averaging over a time period of 2 minutes to 60 minutes (this time period can be changed in setup). However, to manually override this automatic calculation and set the mean wind direction:

1. If a Wind Transmitter is included in your Micronet system then simply press the  button; (the current wind direction is stored as the mean wind direction and displayed for 5 seconds during which time the  and  buttons may be used to adjust the value.)

If the mean wind direction changes, press  again.

2. If you do not have a Wind Transmitter included, sail close hauled and press the  button then tack and, once close hauled, press the  button again.

If the mean wind direction changes then the instrument may be updated press and holding the  button while sailing on port tack, the  button while sailing on starboard tack or the  button while head to wind.

See Tacktick's "Using wind shifts to your advantage" sheet for further information.

**P18 Heading**

Current Magnetic Compass Heading of the vessel as measured by the Compass Transducer. The value displayed will be affected by the calibration routine for the compass (see page 32).

**P19 Heading on opposite tack**

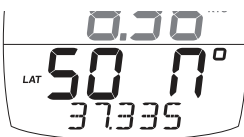






Magnetic Compass heading which the vessel will follow should it tack through the wind, calculated by the display. Apparent Wind Angle and Magnetic Heading must be available on the network for this calculation to be made.

**P20 Speed Over the Ground**

Vessels Speed Over the Ground as calculated by the GPS Antenna.

**P21 Course Over the Ground**

Vessels Course Over the Ground as calculated by the GPS Antenna.

- P22 Latitude**  

 Vessels current Latitude as calculated by the GPS Antenna.
- P23 Longitude**  

 Vessels current Longitude as calculated by the GPS Antenna.
- P24 Bearing to Waypoint**  

 Bearing To (active) Waypoint. The active Waypoint being the one to which the GPS is currently navigating.
- P25 Distance to Waypoint**  

 Distance To (active) Waypoint. The active Waypoint being the one to which the GPS is currently navigating. When the Waypoint has been named in the GPS the name will be displayed (first five digits only).
- P26 Cross Track Error**  

 Cross Track Error as defined by the GPS Antenna.
- P27 Time to Go to Waypoint**  

 The calculated time remaining before you will arrive at the (active) waypoint as calculated by a GPS receiver or plotter.
- P28 Sea Temperature**  

 Current Sea Temperature as measured by the sensor in the Speed Transducer.




## P29 Timer

Countdown or elapsed time stopwatch.



Press and hold for 1 second the  button and use the  and  buttons to set the required countdown time in minutes.

Press and hold for 1 second the  button to prepare to start the countdown.

Press the  button quickly to start the countdown.

The display will sound a single beep each 30 seconds until 1 minute remains when a beep will sound at 10 second intervals. The final 10 seconds will count down with a beep each second with "START" being indicated by a triple quick beep at 0. The timer will automatically start to count the elapsed time and this will continue until the  button is pressed and held for one second.

At any stage a quick press of the  button will resynchronise the timer to the nearest full minute and then carry on the count down.

**Example:** Press  at 3mins 24secs the timer will reset to 3mins 0 secs  
Press  at 7mins 52secs the timer will reset to 8mins 0 secs



*Press and hold for 1 second to enter the timer setup*



*Select the desired countdown time*



*Press and hold for 1 second to store the countdown time*




*Press to start*





*Countdown time in progress*




*Press to resynchronise to nearest full minute (8:00)*



**P30 Time**  

 Current Time as received from the GPS Antenna corrected to local time if an offset has been added (see page 26 -s36).

**P31 Date**  

 Current date as received by the GPS Antenna.

**P32 Volts**  

 The voltage connected to the PWR input of the hull transmitter or the Wireless (NMEA) Interface.

**P33 Lock**  
 Produces a "Trim" indication showing an increase or decrease in value from a set point.  
 Select the appropriate chapter in the upper display using the  button.

Select "Lock" in the lower display using the  or  buttons.

 Press the  button to lock the upper display value, the lower display will now indicate increase or decrease from the set value.

Values displayed as units will show a percentage (%) increase or decrease whereas values displayed as degrees will show the difference in degrees.




*Heading locked at 269° now showing +008 change meaning current heading is 277°*



*Speed locked at 8.69 kts now showing +10% change meaning current speed is 9.56 kts)*

## 3 Setup and Calibration




### 3.1 Entering Setup and Calibration Mode

To enter the Setup and Calibration menu press and hold for 2 seconds the  button.







This will not work when in the Race Timer page.

### 3.2 Chapter and Page Setup and Calibration

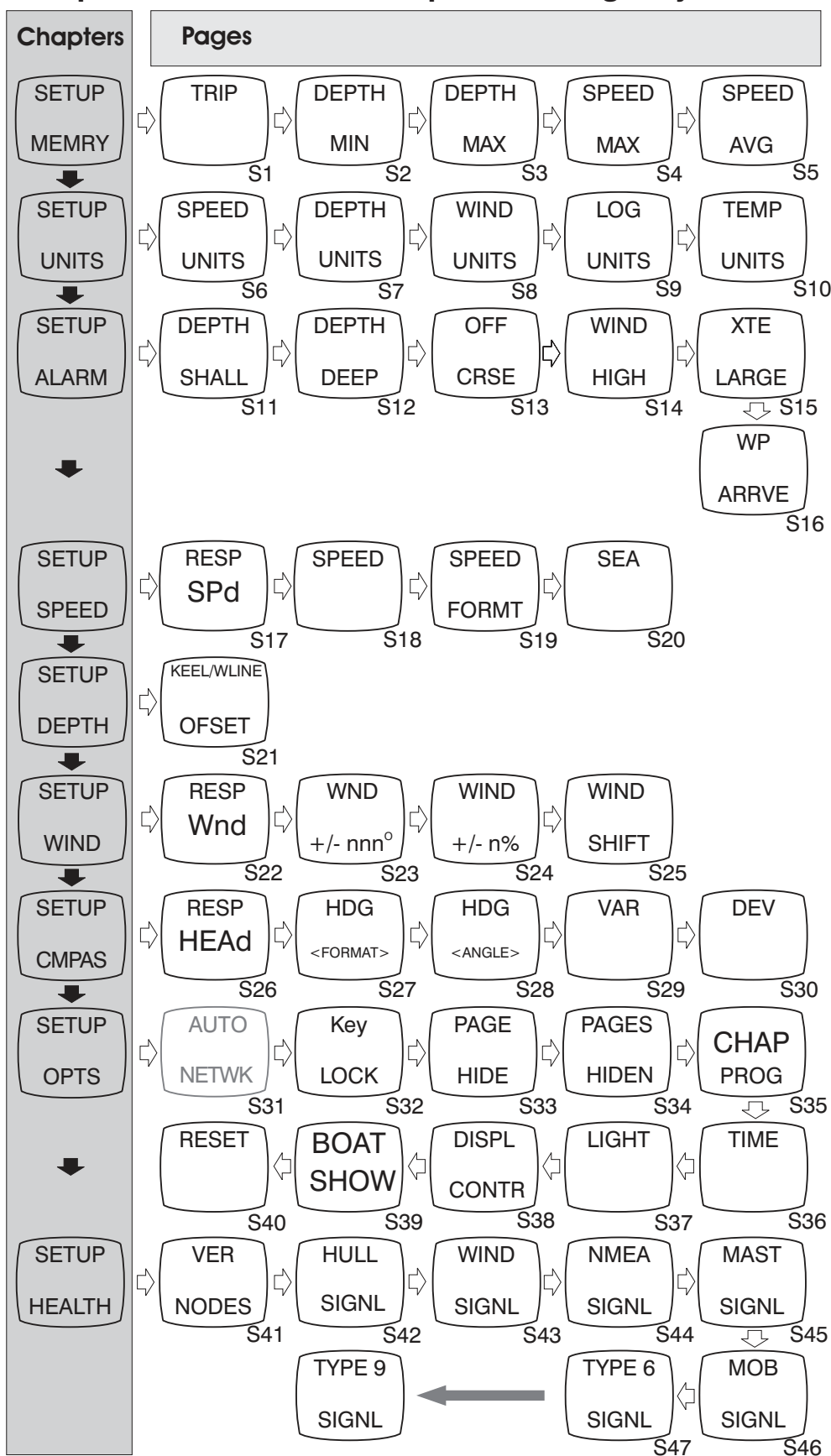
Setup and Calibration is displayed in a “Chapter and Page” format using the  button to scroll through the Chapters and the  and  buttons to move between Pages. The diagram below shows the information format.

**Note:** Unlike normal operation you must scroll to the Chapter heading page before moving to another chapter.

### 3.3 Editing Values

To adjust any settings press the  button. The setting will start to flash and the  and  buttons will change the value. Then press the  button again to save the new setting.

## Setup and Calibration - Chapter and Page layout



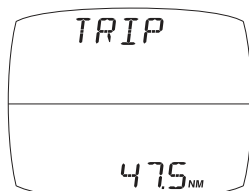
For a full description of each Page refer to items s1 to s47 on the following pages

## 3.4 Setup Page Description

### SETUP MEMRY - Memory Chapter

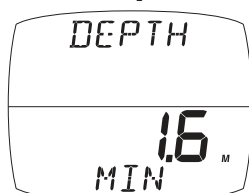
In each case press the  button quickly to reset.

#### S1 Trip Distance



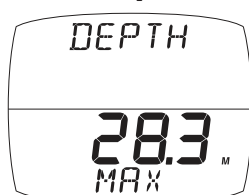
The Distance Travelled since the last Trip Reset. Resets to 0.00.

#### S2 Depth Minimum



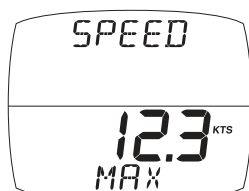
The Minimum Depth encountered since switch on or since the last Minimum Depth Reset. Resets to Current Depth.

#### S3 Depth Maximum



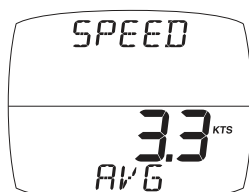
The Maximum Depth encountered since switch on or since the last Maximum Depth Reset. Resets to Current Depth.

#### S4 Speed Maximum







The Maximum Speed attained since switch on or since the last Maximum Speed Reset. Resets to Current Boat Speed.

#### S5 Speed Average

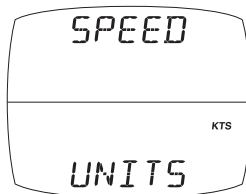


The average speed attained since switch on or since the last Average Speed Reset. Reset to Current Boat Speed.

## SETUP UNITS - Units Chapter

In each case press the  button quickly to edit, press the  or  button to change units and press the  button quickly to select the chosen units. Default values are indicated in bold.

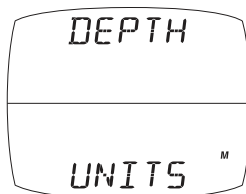
### S6 Speed



The units in which ALL speed related information is displayed.

The options available are: **Knots (KTS)**, Kilometres per hour (KPH) or Statute Miles per hour (MPH).

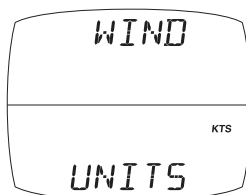
### S7 Depth



The units in which ALL depth related information is displayed.

The options available are: **Feet (FT)**, Metres (M) or Fathoms (FTM).

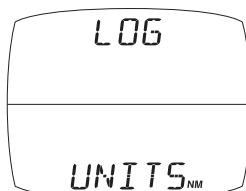
### S8 Wind



The units in which ALL wind speed related information is displayed.

The options available are: **Knots (KTS)** or Metres per second (M).

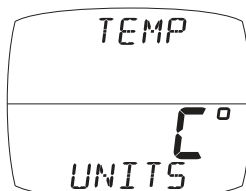
### S9 Distance



The units in which ALL distance related information is displayed.

The options available are: **Nautical Miles (NM)**, Kilometres (KM) or Statute Miles (SM).






### S10 Temperature



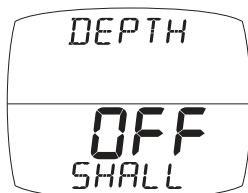
The units in which the Sea Temperature reading is displayed.

The options available are: **Degrees Celsius (C°)** or Degrees Fahrenheit (F°).

## SETUP ALARM - Alarms Chapter

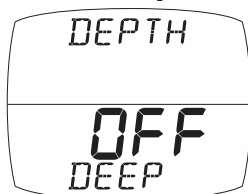
In each case press the  button quickly to edit, press the  or  to change values and press the  button quickly to save the entered value. In the case of On/Off selection the  button will toggle the setting On and Off. Default values are indicated in bold.

### S11 Shallow Water Alarm



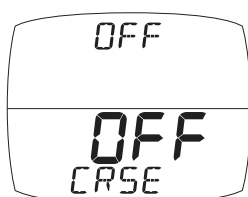
Sets the Shallow Depth at which the display will alarm. The options are: **OFF** and 0.0 to 25 feet (0.0 to 7.6 metres) (0.0 to 4.1 fathoms). Values are displayed in the previously selected units (see page 21 -s7 to select units) and are all subject to any keel or waterline offset added (see page 24 -s21 to set an offset). This alarm sounds as the depth passes below the set value and NOT as the depth increases past this value.

### S12 Deep Water Alarm



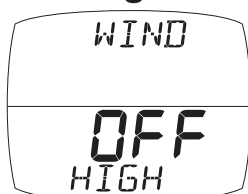
Sets the Deep Depth at which the display will alarm. The options are **OFF** and 0.0 to 250 feet.(0.0 to 76.2 metres (0.0 to 41.6 fathoms). Values are displayed in the selected units (see page 21 -s7) and are all subject to any keel or waterline offset added (see page 24 -S21 to set an offset). This alarm sounds as the depth increases past this value or decreases past this value.

### S13 Off Course Alarm

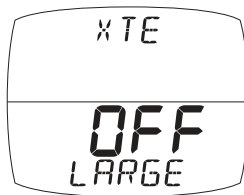


Sounds if the vessel turns further than the set angle away from a "Locked" heading (see page 17 -p33). **Off/**<value in degrees>

### S14 High Wind alarm

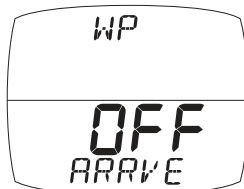


Sets the Wind Speed at which the display will alarm. The options are: **OFF** and 0.0 to 100 knots (0.0 to 51.4 m/s). Values are displayed in the previously selected units (see page 21 -s8 to select units). This alarm sounds as the wind speed increases past the set value and NOT as it decreases past this value.

**S15 Cross Track Error Alarm**


Sets the display to alarm if a Large Cross Track Error alarm is issued by the GPS.





The options are: On/**Off**.

**S16 Waypoint Arrival Alarm**


Sets the display to alarm if a Waypoint Arrival alarm is issued by the GPS.

The options are: On/**Off**.

### 3.5 Calibration Page Description

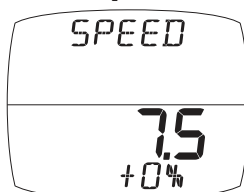
In each case press the  button quickly to edit, press the  or  button to change units and press the  button quickly to select the chosen units. Default values are indicated in **bold**.

#### SETUP SPEED - Speed Chapter

**S17 Speed Response**

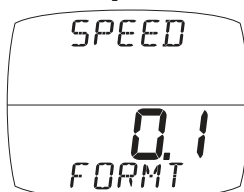

Sets the update period of the Speed display.

The options are: **Auto**/Slow/Medium/Fast

**S18 Speed Calibration**


The Boat Speed Calibration Factor adds a percentage factor which corrects the information from the Speed Transducer and ensures the Boat Speed is displayed correctly.

See page 29 for the calibration factor.

**S19 Speed Display Format**


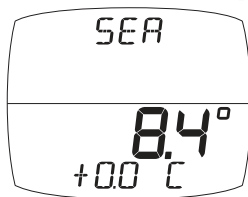
Sets the number of decimal places to which the boat speed information is displayed

Applies to the units selected on page 21 -S6.

The options are: **0.1** or 0.01.



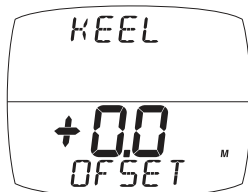
## S20 Sea Temperature Calibration



The sea temperature calibration factor adds a value which corrects the information from the temperature sensor and ensures the water temperature is displayed correctly.

## SETUP DEPTH - Depth Chapter

### S21 Keel/Waterline Offset



Allows a keel offset to be added allowing the display depth reading to indicate depth below the bottom of the boat, or a waterline offset allowing the depth reading to indicate actual water depth.

See page 29 to set a depth offset.

## SETUP WIND - Wind Chapter

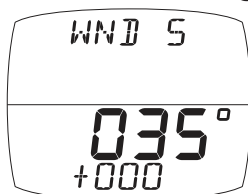
### S22 Wind Response



Sets the update period of the Wind display.

The options available are: **Auto**/Slow/Medium/Fast

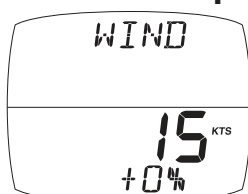
### S23 Wind Angle



Aligns the displayed Apparent Wind Angle with the Actual Wind Direction with respect to the boat.

See page 31 for the calibration process.

### S24 Wind Speed



Adds a percentage factor which corrects the information from the Wind Transmitter and ensures the Apparent Wind Speed is displayed correctly.

See page 31 for the calibration process.

### S25 WIND SHIFT



The time period over which the system determines the mean wind direction can be user adjusted in the range 2 to 60 minutes.

## SETUP CMPAS - Compass Chapter

### S26 Heading Response



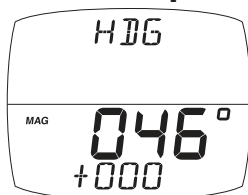
Sets the update period of the Compass display.  
Auto/Slow/Medium/Fast

### S27 Heading Format



Tells the display system to show heading information in either Magnetic or True format.

### S28 Compass Heading



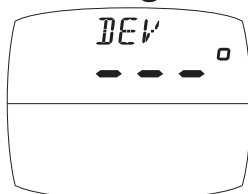
Aligns the displayed heading with the Actual Magnetic Heading of the boat.  
See page 32 for the calibration process.

### S29 Magnetic Variation



Allows manual entry of local magnetic variation. This setting is ignored if variation information is available from a GPS source.

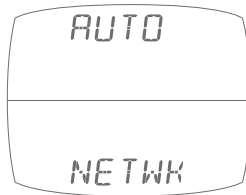
### S30 Magnetic Deviation



However carefully positioned the Compass Transducer is, there is always the likelihood of errors being introduced by the vessel and equipment. To remove errors it is necessary to "Swing" the compass by turning the boat slowly until the system can optimize the readings. Once the correction has been completed the deviation correction value will be displayed.  
See page 32 for the calibration process.

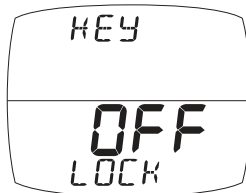
## SETUP OPTS - Options Chapter

### S31 Auto Networking



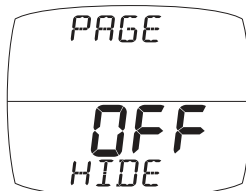
Only available on the display which was used to power up the system. Refer to the "Auto Network" sheet for further information.

### S32 Key Lock



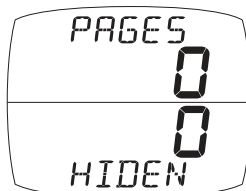
Enables the key locking feature. See page 8 section 2.5 for the key locking process.

### S33 Page Hiding



Enables the user to hide pages. Refer to page 8, section 2.5. See page 8 section 2.5 for the page hiding process.

### S34 Pages Hidden/Unhide Pages



Displays the number of hidden pages. Clears Page Hiding, returning to all pages visible. See page 8 section 2.5 for the page un hiding process.

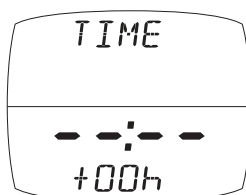
### S35 User Defined Chapter



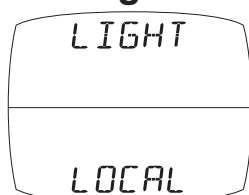
Allows one further selection to be added to the Chapter list (see page 11 -C8).

The current selection is indicated in the Chapter window.

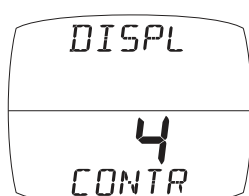
### S36 Time



The number of hours added or subtracted from UTC (GMT) to allow the display to show local time.

**S37 Light**


Tells the display to control the system Backlighting or just its own Backlighting.  
The options are: Network/Local.

**S38 LCD Contrast**


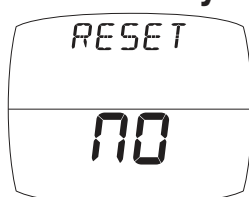
Allows the contrast of the LCD display to be adjusted to suit the viewing angle of the display. The lower the figure the less contrast is visible.

The available options are: 1 - 7 default 4.

**S39 Boat Show**


Allows the display to show information when NOT installed as part of a Micronet system for demonstration purposes only.

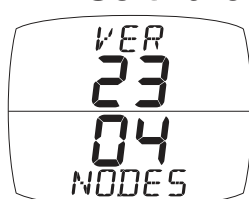
Displays will return to default Off on power down.

**S40 Factory Reset**


Returns all the calibration setting to the factory default values but does not reset your Auto Networking.

Only carry out a Reset after consulting with an authorized Tacktick dealer.

## SETUP HEALTH - Health Chapter

**S41 Software Version/Network Nodes**


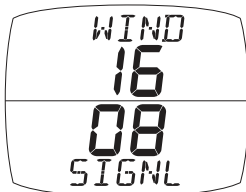
The upper window shows the display's Software Version.

The lower window shows battery level and charge rate, by means of the appropriate icons, to assist in troubleshooting and fault finding.

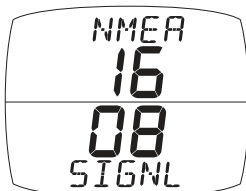
If the display is the "Master" (the one used to switch on the system) then the number of items (nodes) in the system will be displayed in the lower window. If the display is a "Slave" (was switched on by the system) then the signal strength to the "Master" will be shown.

**S42 Hull Transmitter Signal Strength**

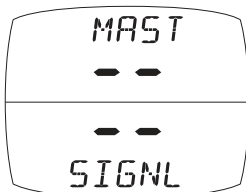
Shows the software version (upper display), signal strength and battery condition (level and charge rate) of the Hull Transmitter to assist in trouble shooting and fault finding.

**S43 Wind Transmitter Signal Strength**

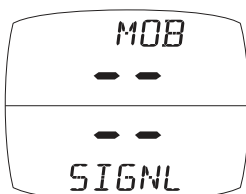
As above but for Wind Transmitter information.

**S44 Wireless (NMEA) Interface Signal Strength**

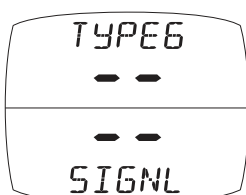
As above but for Wireless (NMEA) Interface information.

**S45 Mast Angle Sensor Signal Strength**

As above but for Mast Angle sensor information

**S46 MOB Sensor Signal Strength**

As above but for MOB sensor information.

**S47- TYPE 6 to TYPE 9**

Further signal strength indications will be displayed if available.

## 4 Seatrial and Calibration

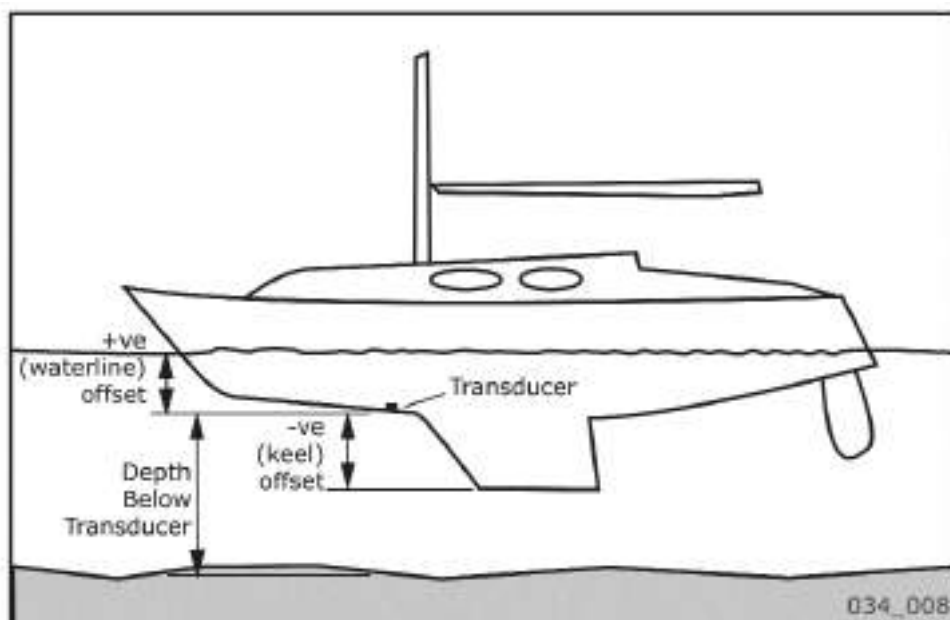
Once the Micronet display system has been installed on the vessel and Auto Networking has been completed it is necessary to carry out Calibration.





**It is not safe to use the instruments for navigational purposes until Calibration has been carried out correctly.**

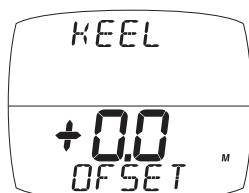
### 4.1 Depth Offset

The default depth offset is 0.0 making the display read the Depth below the Transducer. By adding a +ve or -ve offset the display will show the waterline depth or depth below the keel respectively.



Press and hold the  button for 2 seconds to enter Setup  
Press the  button repeatedly to scroll to the **SETUP DEPTH** Chapter

Press the  button to advance to the **Keel/Waterline Offset** page



Press the  button to enter Edit Mode

Press the  and  buttons to change the value

Press the  button to exit Edit Mode

Press and hold the  button to exit Setup and return to normal operation.

## 4.2 Speed Calibration


To ensure that the Boat Speed (and Distance) is accurate it is necessary to calibrate the speed to take into account variations in water flow between different hulls. Adjustment is made by multiplying the Speed through the Water (V) by a percentage Calibration Factor.

It is essential to carry out this procedure at a time where little or no tide is flowing.

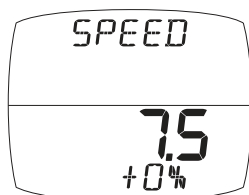
### To enter a Log Calibration Factor:

With the vessel under power, steer a straight course allowing the Boat Speed reading to settle to a constant value. Check the GPS is showing a constant SOG.



Press and hold the  button for 2 seconds to enter Setup

Press the  button repeatedly to scroll to the **SETUP SPEED** Chapter


Press the  button to advance to the **Speed Calibration** page



Press the  button to enter Edit Mode

Press the  and  buttons to change the Calibration Factor until the Speed reading displayed matches the GPS SOG reading

Press the  button to exit Edit Mode

Press and hold the  button to exit Setup and return to normal operation.

Should you be unable to carry out this procedure due to strong tidal conditions or poor GPS information there is further information regarding Speed Calibration using a measured distance on the Tacktick website at [www.tacktick.com](http://www.tacktick.com).

## 4.3 Wind Calibration

Both Wind Speed and Direction can be calibrated to ensure that readings from the Wind Transmitter are displayed accurately.

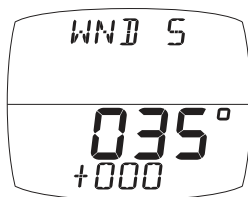
### Wind Angle Offset

Motor the vessel directly into the wind.

Press and hold the  button for 2 seconds to enter Setup

Press the  button repeatedly to scroll to the **SETUP WIND** chapter

Press the  button to advance to the **Wind Angle** page




Press the  button to enter Edit Mode

Press the  and  buttons to change the displayed value to 000.

The bottom digits will indicate the number of degrees of offset entered.

Press the  button to exit Edit Mode


Press and hold the  button to exit Setup and return to normal operation.

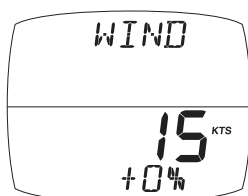
### Wind Speed Correction

**Note:** Wind Speed reading is factory calibrated to display correctly and should not be altered unless external factors are thought to be causing incorrect readings. Correction should only be carried out if a known correct Wind Speed is available.



Press and hold the  button for 2 seconds to enter Setup

Press the  button repeatedly to scroll to the **SETUP WIND** chapter

Press the  button to advance to the **Wind Speed** page




Press the  button to enter Edit Mode

Press the  and  buttons to change the displayed value to the required percentage.

The bottom digits will indicate the displayed wind speed.



Press the  button to exit Edit Mode

Press and hold the  button to exit Setup and return to normal operation.



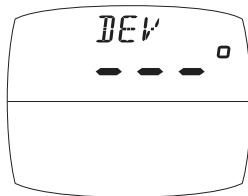
## 4.4 Compass Calibration and Alignment


To ensure that inaccuracies caused by metallic and magnetic objects on the boat are kept to a minimum is necessary to calibrate the compass. A deviation caused by surrounding objects will be compensated for and the compass reading may be set to the correct heading.

Press and hold the  button for 2 seconds to enter Setup  
Press the  button repeatedly to scroll to the **SETUP COMPAS** Chapter

### To Complete a deviation correction turn:

Press the  button to advance to the **Deviation** Page



Press the  button to enter Compass Calibration Mode  
Turn the vessel slowly keeping the speed below 4 knots and taking approximately 2 minutes to complete 360 degrees. Keep turning the vessel until the display changes to show a value (usually about 1.25 turns)

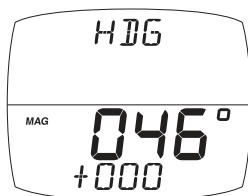
**Note:** If the rate of turn of the vessel is too fast the display will show "TURN HIGH". It is not necessary to abandon the turn at this stage but do lessen the rate of turn by reducing speed or widening the turning circle.





Continue to align the heading

Steer the vessel on a known heading.

**Note:** only use the main steering compass as a known heading if you are certain it has been checked and compensated.

Press the  button twice to display the **Heading** page



Press the  button to enter Edit Mode  
Press the  and  buttons to change to the known value. The lower digits will display the offset entered.  
Press the  button to exit Edit Mode  
Press and hold the  button to exit Setup and return to normal operation.

## 5 Installation

### 5.1 Tools list and Parts

**Tools Required** 2.5mm or 5mm Drill Bit (7mm if power connection required)  
 Power Drill  
 Cross Head Screwdriver

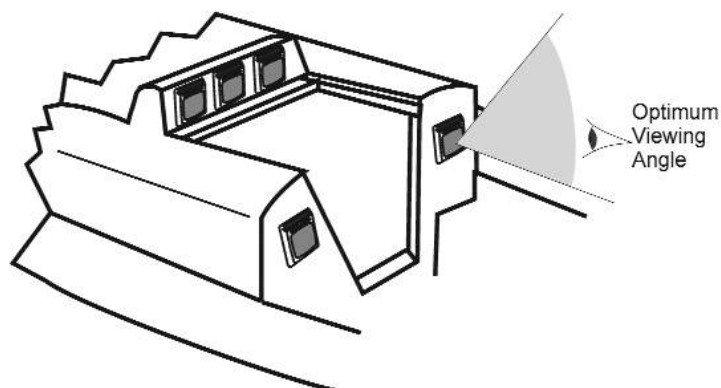
**Parts List** Mounting Template  
 Display Backplate and 2x Clip Brackets  
 Mounting Screws (3)  
 Mounting Bolts (3)  
 M4 Studs & Thumbnuts (3)  
 Sealing Gaskets (4)  
 Double Sided Tape

### 5.2 Precautions and Positioning Advice

Ensure mounting surface is flat.  
 Leave space between displays for sun covers.  
 Leave space to remove display from bracket (if used).  
 Avoid areas where damage may occur (winch handles, feet, warps etc.)  
 Select a flat, smooth, surface for mounting and use the template provided to select a suitable position for mounting your Micronet display.  
 Check for clarity of vision and ease of access to the control buttons, it is recommended that displays are positioned such that your arm does NOT pass through the spokes of the steering wheel when operating the buttons.



**Contrast is limited at night when a display is viewed from beneath. Avoid mounting displays in a position where you will look upwards to view them.**



034\_009

### 5.3 Bracket Mounting (Preferred Method)

This method allows for the easy removal of a display as and when required, for either security reasons or to prevent damage or discomfort whilst not in use.

1. Using the three supplied M4 bolts attach the back plate to the rear of the display (Fig.1).
2. Drill three 2.5mm holes marked "A" on the Template and using the supplied self tapping screws, screw the clip bracket to the mounting surface (Fig.2).
3. Place the display flat against the bracket slightly higher than the final position and slide gently down into position. There will be a small click as the bracket secures the display into position (Fig.3).
4. To release the display press lightly on the bracket tab and slide it upwards (Fig.4).

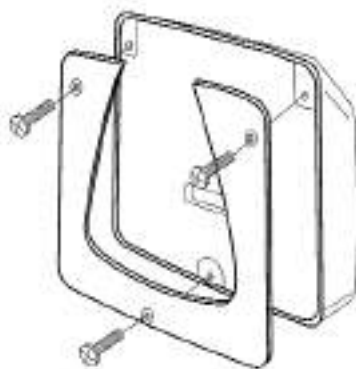


Fig. 1

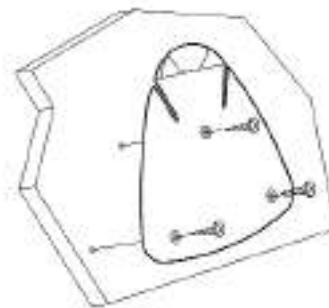


Fig. 2

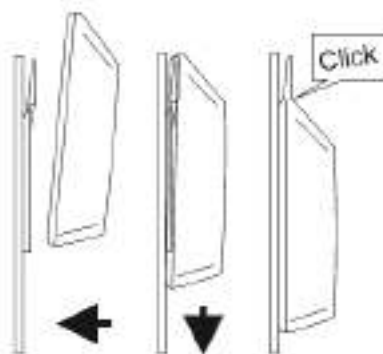


Fig. 3

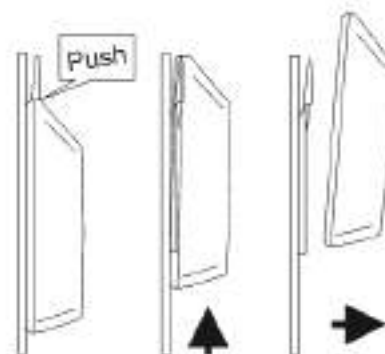


Fig. 4

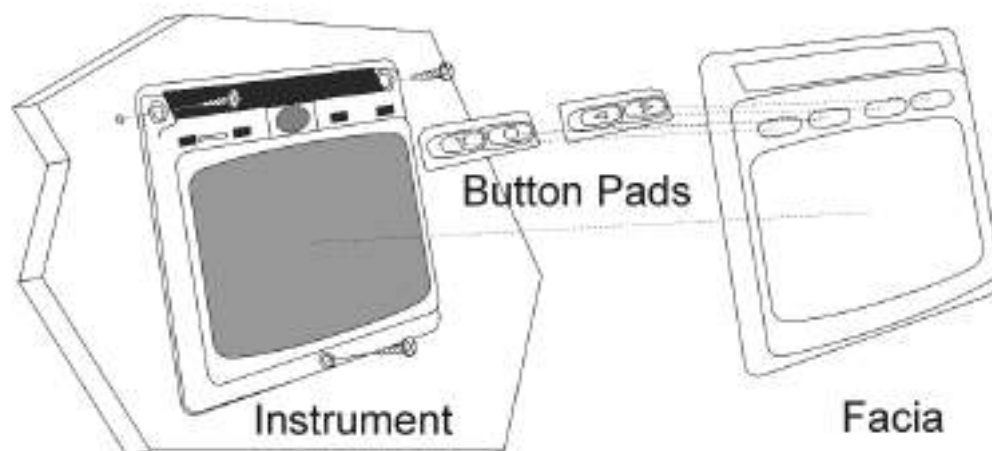
044-004

## 5.4 Surface Mounting

### Where there is no access to the rear of the mounting surface

Easy installation but will allow removal without gaining access to the boat. Position the supplied Template carefully before starting.

1. Drill three 2.5mm holes marked "B" on the Template.
2. Carefully snap the facia of the display off the main body taking care not to drop the button pads. .  
**HINT** – It may be useful to place a piece of sticky tape across the front of the buttons before removing the facia to prevent them from falling out during the installation.
3. Remove the three captive M4 nuts from the plastic moulding and attach the display to the mounting surface using the three self tapping screws provided. Take care not to over tighten the screws as this may cause the moulding to crack..
4. Check the display is perfectly level, carefully position the button inserts into the correct slots and snap the facia back into position.



034\_010

### Temporary Mounting

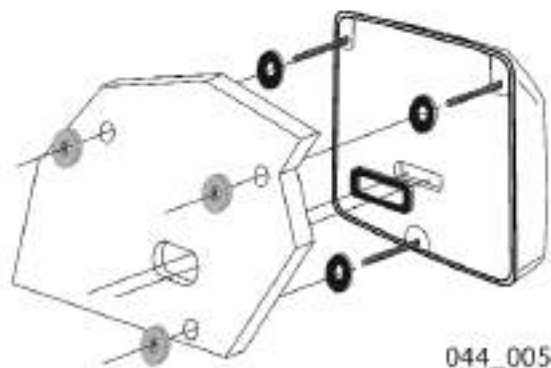
1. Use the double sided tape provided to secure the display to a suitable mounting surface. Press it firmly against the surface until secure.

**Note:** This method is recommended for temporary use only. For example, finding an appropriate location before drilling holes.

## Where access is available to the rear of the mounting surface

This method allows for maximum security of a permanently mounted display. Position the supplied Template carefully before starting.

1. Drill three 5mm holes marked "B" on the Template.
2. Stick the 3 supplied gaskets on the back of the display.
3. Screw the four M4 brass studs into the rear of the display.
4. Place the display in position pushing the three studs through the newly drilled holes.
5. Using the three supplied thumb nuts, secure the display to the surface making sure it is level before final tightening.



## 5.5 External Power Connections

To connect an external 9 to 30V DC power supply to the display head from either a portable battery or the vessel's existing power system.

1. Drill two 7mm holes marked "P" on the Mounting Template and smooth them together with a sharp knife or small file.
2. Pass the supply cable through the new hole and attach the supplied crimp spade receptacles.
3. Remove the blanking plug from the rear of the display to expose the terminals.
4. Stick the supplied gasket on the back of the display.
5. Taking care to connect the correct polarity push the receptacles firmly onto the spades on the rear of the case.
6. Mount the display head securely in position following the steps shown above.
7. Clamp the cable securely close to the display.

## 6 Maintenance and Fault Finding

### 6.1 Care and Maintenance

All Micronet products are totally sealed against water and are not serviceable. Any attempt to take a Micronet product apart will invalidate the warranty.

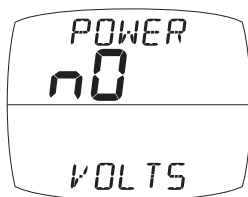
To clean, use only a damp, soft cloth. No detergents, solvents or abrasives should be used. To avoid damaging a Micronet display unit we recommend storing in the supplied soft pack when not in use.



If the displays are to be stored for a long period of time before next use (Over Winter) ensure that the batteries are fully charged before storage. If necessary connect to a 9 to 30V DC power supply for 24 hrs prior to storage.

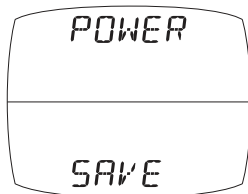
### 6.2 Fault Finding and Technical Support

#### Power No Volts Alarm sounds.



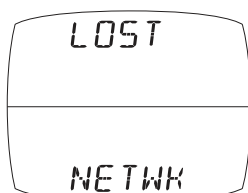
The Hull Transmitter and Wireless (NMEA) Interface must be connected to external power supplies. If this connection is not made, then you will see this alarm 10 seconds after powering up your system. Any DC voltage between 9 and 30V is sufficient to power the Hull Transmitter or Wireless (NMEA) Interface.

#### Power Save Alarm sounds.



There has been no significant data activity on the network. The alarm sounds to indicate that the display system will turn itself off. To continue using the system press any button to cancel the alarm.

#### Lost Network Alarm sounds.



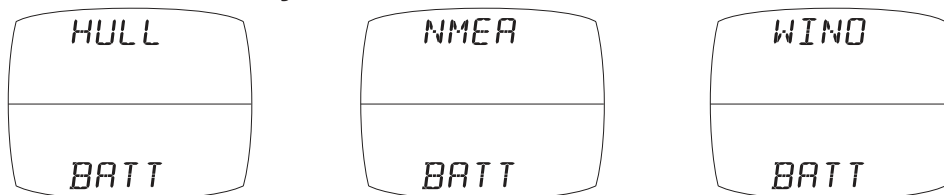
On a single display this indicates that the particular display has lost communication with the Master\*. Either there is a problem with the Master\* display or the display in question has been moved out of effective range.

On several displays this indicates that these displays have lost communication with the Master\*. Either there is a problem with the master or the Master\* has been moved out of effective range. The displays will power down shortly after sounding the alarm to save power.

**A single display flashes the battery symbol and then switches off.**

The battery level is low on the particular display affected. Connect to a 9 to 30V DC power source or leave in bright sunlight for 12 hours minimum to recharge the display's internal battery. If the particular display is the system Master\* then the other displays will sound the Lost Network Alarm. To continue using the rest of the system power down and restart the system from another display.

**Low Battery Alarm sounds.**



The power level is low in the Hull Transmitter, Wireless (NMEA) Interface or Wind Transmitter. On any Digital Display enter Setup and Calibration mode (Page 18) and scroll through to the Health Chapter. Check the battery levels of the Transmitters and Interface Box. The battery level icon should show 1, 2 or 3 bars to ensure correct operation. Connect the Hull Transmitter or Wireless (NMEA) Interface to a 9 to 30V DC power source for 12 hours minimum to recharge the internal battery. Leave the Wind Transmitter in bright sunlight for 12 hours minimum to recharge its internal battery.

**Data is shown as dashes.**

The information is not being transmitted to the displays. There may be lost communication between the Wind Transmitter or Hull Transmitter and the displays. On any Digital display enter Setup and Calibration mode (page 18) and scroll through to the Health Chapter. Check the signal levels of the Hull and Wind Transmitters. The signal level should show a value of greater than 3 to ensure correct operation.

**Compass Transducer rattles and/or splashes.**

Good! The fluxgate compass is gimballed in a fluid filled container to ensure it is not affected by the boats movement in the water.

**Compass information on the display system does not agree with the main steering compass.**

Ensure that the main steering compass has been swung correctly and is showing correct information. Ensure that the display system has completed correctly the "Swing" procedure described on page 32. If there are still differences, look for magnetic objects (loud speakers, pumps and motors, etc.) close to the Transducer and try mounting the compass transducer in an alternative location. After changing position of nearby equipment or the Compass Transducer it will be necessary to re-swing the compass following the procedure on page 32.

**Boat Speed reads 0.**

Information being transmitted from the Hull Transmitter is being received with a Zero value. Check the paddle wheel for fouling, clean it and make sure it turns easily.

**Wind Speed reads 0.**

Information being transmitted from the Wind Transmitter is being received with a Zero value. If the anemometer cups at the top of the mast are turning and the Wind Speed reads 0 then there is a problem with your Wind Transmitter.

**No NMEA data showing on external displays.**

From any Digital display enter Setup and Calibration Mode (page 18) and scroll through to the Health Chapter. Check the signal level and battery status of the Wireless (NMEA) Interface. If the signal level shows a value of greater than 3 then check the data connections and the settings of the NMEA source equipment to ensure that NMEA 0183 is being transmitted correctly.

**The Depth Alarm does not sound.**

If the actual water depth is shallow and the alarm has not sounded it is most likely that the alarm is switched off. From any Digital display enter Setup and Calibration mode (page 18) and scroll through to the Depth Chapter. Ensure the Depth Alarm settings are correct.

**Note: \*** The "Master Instrument" is the display which was used to power up the entire system. This display may be different each time the system is used. If you are fault finding and are uncertain which display is the master the switch off the system and switch on again. The display which you switched on is now the master.



## 7 Warranty Information

### General

All Tactick products are designed and built to standards suitable for use in a harsh marine environment. If the products are installed correctly and operated as described in the user guides they will provide long and reliable service. For information and assistance Tactick operates a network of international distributors.

### Limited Warranty

The warranty covers repair or replacement of parts due to faulty manufacturing and includes labour charges. The warranty period is two years from the date of purchase. Tactick specifically exclude the implied warranty of merchantability and fitness for a particular purpose.

### Conditions

- A receipt with proof of purchase date must be shown to validate any warranty claim.
- The warranty is extended only to the original purchaser and is non transferable.
- Products that have been incorrectly installed or have serial numbers removed will not be covered.
- No compensation is payable for consequential damage caused directly or indirectly by any malfunction of Tactick products.
- Tactick is not liable for any personal damage caused as a consequence of using its equipment.
- Tactick, its distributors or dealers are not liable for charges arising from sea trials, installation surveys or visits to the boat to attend to the product whether under warranty or not.
- Tactick reserves the right to replace any products deemed faulty, within the warranty period, with the nearest equivalent.
- The terms and conditions of this warranty do not affect your statutory rights.

### Claims Procedure

Product should be returned to the national distributor, or one of its appointed dealers, in the country where it was originally purchased. Valid claims will then be serviced and returned to the sender free of charge. Distributors reserve the right to charge for exceptional or express carriage if requested.

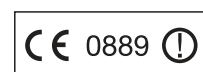
Alternatively, if the product is being used away from the country of purchase, it may be returned to the national distributor, or one of its approved dealers, in the country where it is being used. In this case valid claims will cover parts only. Labour, handling costs and return shipping will be invoiced to the sender.

## **Disclaimer**

Tacktick products should only be considered an aid to navigation and common sense must be applied at all time when navigating at sea. Tacktick reserves the right to change product specification without notice to comply with its policy of continuous improvement.

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions. (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference's that may cause undesirable operation.

Tacktick Ltd hereby declare that the mn100 Dual Digital Display is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.





\*UU037 - GB - rev09 1052965\*



Tacktick Limited  
22 North Street, Emsworth,  
Hampshire, PO10 7DG, UK  
Tel. +44 (0)1243 379331  
Fax. +44 (0)1243 379199  
www.tacktick.com

# Hull Transmitter

Emetteur de Coque

Rumpf-Sender

Transmisor de Casco

Centralina interna

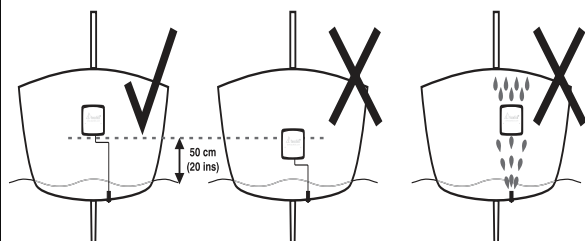
**GB** **Warning:** Failure to follow these instructions may invalidate your warranty

**FR** **Attention:** Le non-respect de ces instructions peut annuler votre garantie

**DE** **Achtung:** Wenn Sie den folgenden Anweisungen nicht folgen, könnte dies Ihre Garantie ungültig machen

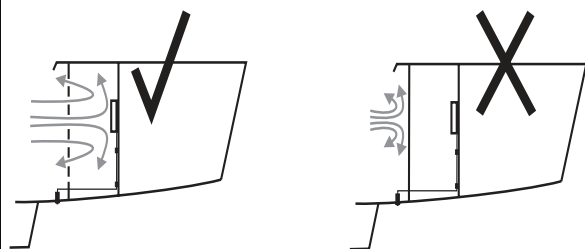
**ES** **Atención:** No seguir estas instrucciones puede invalidar la garantía

**IT** **Avvertimento:** Inadempiendo alle seguenti istruzioni si può invalidare la garanzia



**GB** Mount at least 50cm above the waterline. Avoid direct contact with water. Mount in a well ventilated area. DO NOT mount in a sealed compartment. Mount the unit vertically, with the cables exiting at the bottom **Note:** the template must be inverted for Transmitters. Drill three 2.5mm holes marked "B" on the Template. Attach the Transmitter using the selftapping screws provided. **Warning:** do not over tighten the screws, this may cause the moulding to crack.

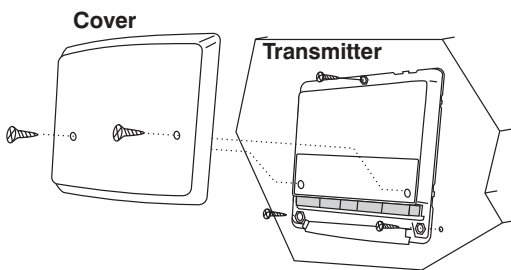
**FR** Monter au moins 50 cm au dessus de la ligne de flottaison. Eviter le contact direct avec l'eau. Monter dans un endroit bien ventilé. NE PAS monter dans un compartiment étanche. Montez l'émetteur verticalement, les câbles sortant en bas. **Note:** le gabarit doit être monté à l'envers par rapport à l'émetteur. Percez trois trous de 2,5 mm (marque B sur le gabarit). Fixer l'émetteur en utilisant les vis auto-foreuses fournies. **Attention:** ne pas trop serrer les vis afin de pas briser le moulage.



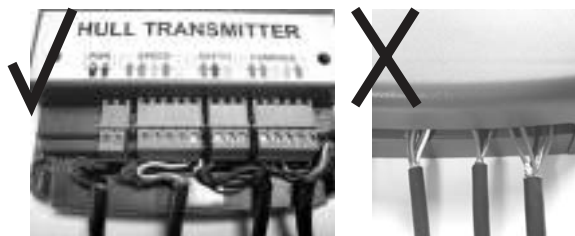
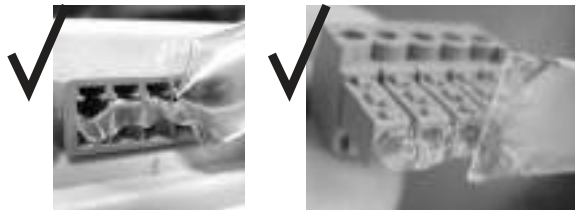
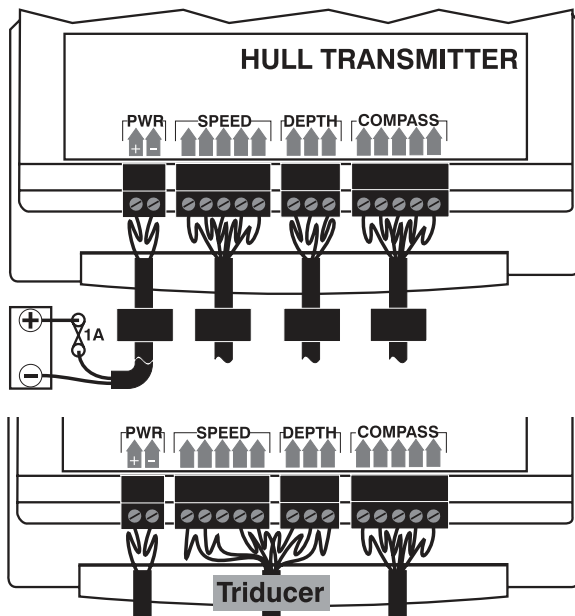
**DE** Mindestens 50cm über der Wasserlinie installieren. Direkten Kontakt mit Wasser vermeiden. An einer gut belüfteten Stelle anbringen. NICHT in einem abgedichteten Schott montieren. Das Gerät vertical, mit den Kabel unten außfahrend, anbringen **Hinweis:** Für Geber muss die Schablone umgekehrt werden. Drei 2.5mm Löcher ("B" auf der Schablone) bohren. Den Geber mit den beigegeführten Blechschrauben befestigen. **Achtung:** Die Schrauben nicht zu fest andrehen, weil sonst das Formteil splintern könnte.

**ES** Montar por lo menos a 50cm sobre la línea de flotación. Evitar el contacto directo con el agua. Montar en una zona bien ventilada. NO montar en un compartimento estanco/sellado. Monte la unidad verticalmente, con los cables saliendo por abajo **Nota:** Para colocar el trasmisor invierta la plantilla. Haga tres agujeros de 2.5mm donde la plantilla marca "B". Coloque el trasmisor utilizando los tornillos adjuntos. **Atención:** No apriete los tornillos demasiado, ya que puede dañar la montura.

**IT** Installare almeno 50 cm sopra la linea di galleggiamento. Evitare il contatto diretto con l'acqua. Installare in un'area ben ventilata. NON installare in un compartimento stagno. Montare l'unità verticalmente, facendo fuoriuscire i cavi dal basso. **Nota:** la sagoma deve essere invertita per i trasmettitori. Forare tre buchi da 2.5 mm segnati sulla sagoma con "B". Ancorare il trasmettitore usando le viti autoforanti fornite. **Attenzione:** non stringere troppo le viti, potrebbe causare la rottura dell'apparecchio.



\*UU044 - rev13\*



**GB** Connect the unit to the vessels 12/24Vdc supply. **Note:** *If there is no power supply, use a Tacktick Solar Panel.* Connect the transducer cables, following the colour coding on the unit. Sheath the screens to avoid short circuits. **Note:** *for a Triducer, the screen MUST be connected to the Depth connector, NOT to the Speed connector.* **Note:** *if the Speed transducer does not have a temperature sensor, a link MUST be connected between the brown and white terminals of the Speed connector (check carefully if using older/existing transducers).* Apply silicon grease to the terminals. Support the cables close to the transmitter. Ensure the cover is fitted correctly, clamping the cable outer sheaths inside the transmitter.

**FR** Branchez l'émetteur au 12/24 V du bateau. **Note:** *s'il n'y en a pas de disponible, utilisez un panneau solaire Tacktick.* Branchez les fils de l'émetteur, selon le codage couleur prévu. Connectez la tresse de masse pour éviter les court-circuits. **Note:** *pour un Triducer, la masse doit être branchée au connecteur du sondeur, et non au connecteur de la vitesse.* **Note:** *si le capteur de vitesse n'a pas d'entrée de température, il faut relier les fils blancs et marrons du connecteur de vitesse.* Mettez de la graisse silicon sur les contacts. Fixez les câbles près de l'émetteur. Assurez-vous que le capot est correctement fixé et qu'il bloque le câble dans le boîtier.

**DE** Das Gerät an die 12/24 V Versorgung des Bootes anschließen. **Hinweis:** *Wenn es keine Stromversorgung gibt, den Tacktick Solarkollektor benutzen.* Die Schwingerkabel gemäß den Farbmarkierungen an das Gerät anschließen. Die Abschirmungen isolieren, um Kurzschlüsse zu vermeiden. **Hinweis:** *Beim Triducer MUSS die Abschirmung am Lotstecker und NICHT am Logstecker angeschlossen werden.* **Hinweis:** *Wenn der Logschwinger keine Temperatureingabe hat, MÜSSEN die braune und die weiße Klemme des Logsteckers verbunden werden.* Siliziumfett auf die Anschlüsse auftragen. Die Kabel dicht am Sender sichern. Sicherstellen, dass die Abdeckung richtig, mit den äußeren Kabelhüllen innerhalb des Gerätes beklemmt, angebracht ist.

**ES** Conecte la unidad a una fuente de 12/24v. **Nota:** *Si no dispone de fuente alguna, utilice un panel solar Tacktick.* Conecte los cables del transductor siguiendo el código de colores. Proteja los cables para evitar cortocircuitos. **Nota:** *para el Triducer el cable DEBE conectarse al conector de profundidad, NO al de velocidad.* **Nota:** *Si el transductor de velocidad no tiene entrada de temperatura, debe conectar los terminales marrón y blanco del conector de velocidad.* Aplique silicona a los terminales. Fije los cables cerca del transmisor. Asegúrese que la cubierta encaja correctamente, y que la funda de los cables queda en el interior.

**IT** Connettere l'unità all'alimentazione della barca 12/24 V. **Nota:** *Se non c'è alimentazione, usare un pannello solare Tacktick.* Connettere i cavi del trasduttore rispettando il codice dei colori sull'unità. Ringuainare la schermatura per evitare corto circuiti. **Nota:** *per il Triducer, la schermatura DEVE essere connessa al connettore della Profondità, NON a quello della Velocità.* **Nota:** *se il trasduttore della velocità non mostra la temperatura, si DEVE fare un collegamento tra il terminale bianco e il marrone del connettore della Velocità.* Applicare del grasso di silicone ai terminali. Fissare i cavi vicino al trasmettitore. Assicurarsi che il coperchio sia fissato bene, bloccare i cavi fuori dalla rispettiva guaina nel trasmettitore.

# JVC

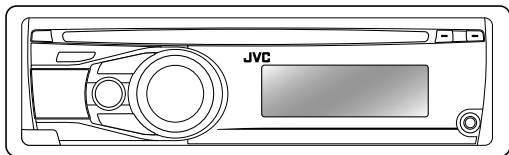
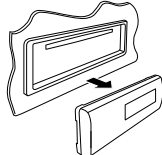
ENGLISH

ESPAÑOL

FRANÇAIS

## KD-A315/KD-R310

CD RECEIVER / RECEPTOR CON CD /  
RÉCEPTEUR CD



**MP3**  
**WMA**

For canceling the display demonstration, see page 4. / Para cancelar la demostración en pantalla, consulte la página 4. / Pour annuler la démonstration des affichages, référez-vous à la page 4.

For installation and connections, refer to the separate manual.  
Para la instalación y las conexiones, refiérase al manual separado.  
Pour l'installation et les raccordements, se référer au manuel séparé.

### For customer Use:

Enter below the Model No. and Serial No. which are located on the top or bottom of the cabinet. Retain this information for future reference.

Model No. \_\_\_\_\_

Serial No. \_\_\_\_\_

## INSTRUCTIONS

MANUAL DE INSTRUCCIONES  
MANUEL D'INSTRUCTIONS

GET0626-001A

<https://www.boat-manuals.com/> <sup>[J]</sup>

## INFORMATION (For U.S.A.)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

### **Caution:**

Changes or modifications not approved by JVC could void the user's authority to operate the equipment.

## IMPORTANT FOR LASER PRODUCTS

### 1. CLASS 1 LASER PRODUCT

2. **CAUTION:** Do not open the top cover. There are no user serviceable parts inside the unit; leave all servicing to qualified service personnel.

3. **CAUTION:** (For U.S.A.) Visible and/or invisible class II laser radiation when open. Do not stare into beam.

(For Canada) Visible and/or invisible class 1M laser radiation when open. Do not view directly with optical instruments.

### 4. REPRODUCTION OF LABEL: CAUTION LABEL, PLACED OUTSIDE THE UNIT.

<b>CAUTION</b> VISIBLE AND/OR INVISIBLE CLASS 1M LASER RADIATION WHEN OPEN. DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS. IEC00025-1:2001 (ENG)	<b>ATTENTION</b> RAYONNEMENT LASER VISIBLE ET/OU INVISIBLE DE CLASSE 1M UNE FOIS OUVERT. NE PAS REGARDER DIRECTEMENT AVEC DES INSTRUMENTS OPTIQUES. (FRA)	<b>AVISO</b> RADIACION LASER DE CLASE 1M VISIBLE Y/O INVISIBLE CUANDO ESTA ABIERTO. NO MIRAR DIRECTAMENTE CON INSTRUMENTAL OPTICO. (ESP)	<b>VARNING</b> SYNLIG OCH/ELLER OSYNLIG LASERSTRÅLNING, KLASS 1M, NÄR DENNA DEL ÄR ÖPPNAD. BETRÄKTA EJ STRÅLEN MED OPTISKA INSTRUMENT. (SWE)	<b>注意</b> ここに書くと写真 及び音声は不可視 のクラス1M レーザー放射が あります。 光学機器で直接 見ないでください。 (JPN)	<b>CAUTION</b> VISIBLE AND/OR INVISIBLE CLASS II LASER RADIATION WHEN OPEN. DO NOT STARE INTO BEAM. FDA 21 CFR (ENG)
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[European Union only]

### **Warning:**

If you need to operate the unit while driving, be sure to look around carefully or you may be involved in a traffic accident.

### **For safety...**

- Do not raise the volume level too much, as this will block outside sounds, making driving dangerous.
- Stop the car before performing any complicated operations.

### **Temperature inside the car...**

If you have parked the car for a long time in hot or cold weather, wait until the temperature in the car becomes normal before operating the unit.

## How to read this manual

The following icons/symbols are used to indicate:



[Hold]

Press and hold the button(s) until the desired operation begins.




Turn the control dial.



Turn the control dial to make a selection, then press to confirm.



( XX)

Reference page number



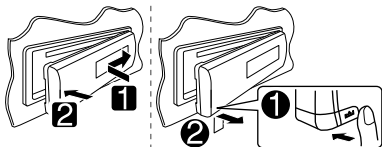
<XXXX>

Menu setting item

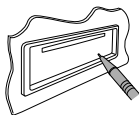



Continued on the next page

## How to attach/detach the control panel

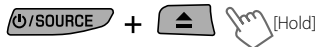



## How to reset your unit



Your preset adjustments will also be erased (except the registered Bluetooth device). ( 10)

## How to forcibly eject a disc



- You can forcibly eject the loaded disc even if the disc is locked. To lock/unlock the disc,  8.
- Be careful not to drop the disc when it ejects.
- If this does not work, reset your unit.

Thank you for purchasing a JVC product. Please read all instructions carefully before operation, to ensure your complete understanding and to obtain the best possible performance from the unit.

## CONTENTS

- 3 How to read this manual
- 3 How to attach/detach the control panel
- 3 How to reset your unit
- 3 How to forcibly eject a disc
- 4 **Canceling the display demonstration**
- 4 **Setting the clock**
- 5 **Preparing the remote controller**
- 6 **Basic operations**
- 7 **Listening to the radio**
- 8 **Listening to a disc**
- 10 **Using Bluetooth® devices**
  - 11 Using a Bluetooth mobile phone
  - 13 Using a Bluetooth audio player
- 15 **Listening to the HD Radio™ Broadcast**
- 16 **Listening to the satellite radio**
- 18 **Listening to the other external components**
- 19 **Selecting a preset sound mode**
- 20 **Menu operations**
- 25 **Title assignment**
- 26 **More about this unit**
- 29 **Maintenance**
- 30 **Troubleshooting**
- 34 **Specifications**

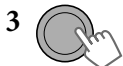


# Canceling the display demonstration

1 Turn on the power.



2 MENU [Hold]



4 Select <DEMO OFF>.



6 Finish the procedure.



# Setting the clock

1 Turn on the power.



2 MENU [Hold]



3 Select <CLOCK>.



4 Select <CLOCK SET>.



5 Adjust the hour.



6 Adjust the minute.

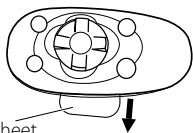


7 Finish the procedure.



# Preparing the remote controller

When you use the remote controller for the first time, pull out the insulation sheet.



Insulation sheet

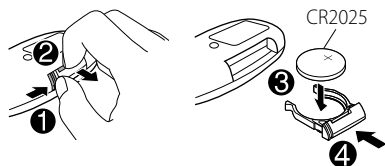
For USA-California Only:

This product contains a CR Coin Cell Lithium Battery which contains Perchlorate Material—special handling may apply.

See [www.dtsc.ca.gov/hazardouswaste/perchlorate](http://www.dtsc.ca.gov/hazardouswaste/perchlorate)

**If the effectiveness of the remote controller decreases, replace the battery.**

## Replacing the lithium coin battery



### Caution:

- Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type.
- Battery shall not be exposed to excessive heat such as sunshine, fire, or the like.

### Warning (to prevent accidents and damage):

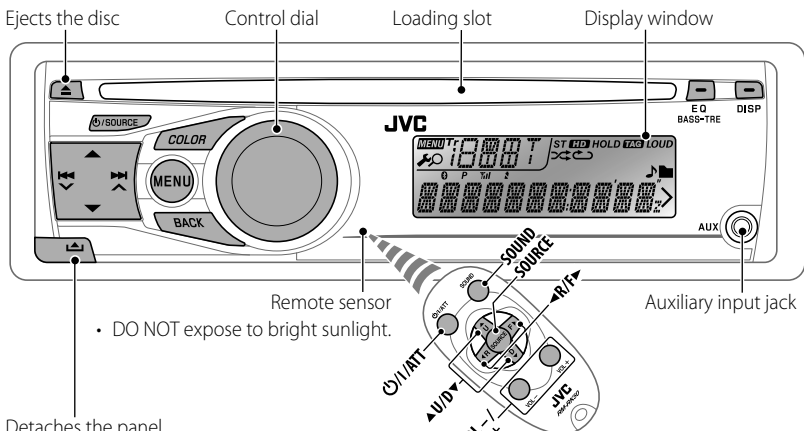
- Do not install any battery other than CR2025 or its equivalent.
- Do not leave the remote controller in a place (such as dashboards) exposed to direct sunlight for a long time.
- Store the battery in a place where children cannot reach.
- Do not recharge, short, disassemble, heat the battery, or dispose of it in a fire.
- Do not leave the battery with other metallic materials.
- Do not poke the battery with tweezers or similar tools.
- Wrap the battery with tape and insulate when throwing away or saving it.

KD-A315 is equipped with the steering wheel remote control function.

Before operating, connect an exclusive remote adapter (not supplied) which matches your car to the steering wheel remote input terminal on the rear of the unit.












- For details, refer also to the instructions supplied with the remote adapter.

# Basic operations



Detaches the panel

When you press or hold the following button(s)...

Main unit	Remote controller	General operation
		Turns on. • When the power is on, pressing <b>ATT</b> on the remote controller also mutes the sound or pauses. Press <b>ATT</b> again to cancel muting or resume playback. Turns off if pressed and held.
		Selects the available sources (if the power is turned on). • If the source is ready, playback also starts.
		Adjusts the volume level.
	—	Selects items.
	—	• Mutes the sound during playback. If the source is "CD," playback pauses. Press the control dial again to cancel muting or resume playback. • Confirms selection.
		Selects the sound mode. • Enters tone level adjustment directly (🔍 19) if pressed and held <b>EQ BASS-TRE</b> on the main unit.
	—	• Enters <COLOR> setting directly (🔍 22). • Enters <COLOR SETUP> setting directly (🔍 22) if pressed and held.
	—	Returns to the previous menu.
	—	<b>Power off</b> : Checks the current clock time. <b>Power on</b> : Changes the display information.

# Listening to the radio



⇒ "FM" or "AM"



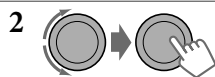
"ST" lights up when receiving an FM stereo broadcast with sufficient signal strength.

## Manual search



"M" flashes, then press the button repeatedly.

## When an FM stereo broadcast is hard to receive



⇒ <TUNER> ⇒ <MONO> ⇒  
<MONO ON>


Reception improves, but stereo effect will be lost.

**To restore the stereo effect**, repeat the same procedure to select <MONO OFF>.

## Changing the display information



Station name\* → Frequency →  
Clock → (back to the beginning)

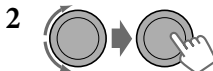
\* If no title is assigned to a station, "NO NAME" appears for a few seconds. To assign a title to a station,  25.

## Automatic presetting (FM)—

### SSM (Strong-station Sequential Memory)

You can preset up to 18 stations for FM.


While listening to a station...



⇒ <TUNER> ⇒ <SSM> ⇒  
<SSM 01 – 06> / <SSM 07 – 12> /  
<SSM 13 – 18>

"SSM" flashes and local stations with the strongest signal are searched and stored automatically.

**To preset another 6 stations**, repeat the above procedure by selecting one of the other 6 SSM setting ranges.

If an HD Radio tuner box is connected ( 15), you can also search and store 6 stations for AM by following the above operations.



## Manual presetting (FM/AM)

You can preset up to 18 stations for FM and 6 stations for AM.

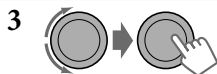
Ex.: Storing FM station of 92.50 MHz into preset number "04."



⇒ "92.50MHz"



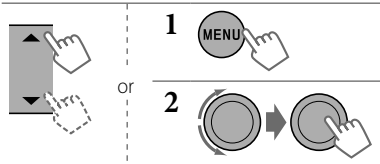
"PRESET MODE" flashes.



⇒ Selects preset number "04."

"P04" flashes and "MEMORY" appears.

## Selecting a preset station



## Using the remote controller



▲ U/D ▼ : Changes the preset stations

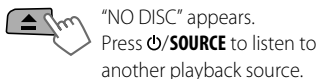
◀ R/F ▶ : Searches for stations

## Listening to a disc



All tracks will be played repeatedly until you change the source or eject the disc.

## Stopping playback and ejecting the disc



## Prohibiting disc ejection



To cancel the prohibition, repeat the same procedure.



Selects folder of the MP3/WMA

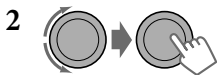


Selects track



Fast-forwards or reverses the track

## Selecting a track/folder



For MP3/WMA discs, select the desired folder, then the desired track by repeating step 2.

- To return to the previous menu, press **BACK**.

## Changing the display information



Disc title/Album name/performer (folder name)\* → Track title (file name)\* → Current track number with the elapsed playing time → Current track number with the clock time → (back to the beginning)

\* If the current disc is an audio CD, "NO NAME" appears.

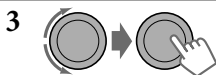
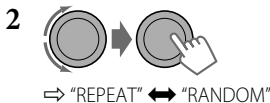
If an MP3/WMA file does not have Tag information or <TAG DISPLAY> is set to <TAG OFF> (📺 21), folder name and file name appear.

## Caution on volume setting:

Discs produce very little noise compared with other sources. Lower the volume before playing a disc to avoid damaging the speakers by the sudden increase of the output level.

## Selecting the playback modes

You can use only one of the following playback modes at a time.



REPEAT

TRACK RPT : Repeats current track

FOLDER RPT : Repeats current folder

RANDOM

FOLDER RND : Randomly plays all tracks of current folder, then tracks of next folders

ALL RND : Randomly plays all tracks

To cancel repeat play or random play, select "RPT OFF" or "RND OFF."

## Using the remote controller



▲ U/D ▼ : Selects folder of the MP3/WMA

◀ R/F ▶ : Selects track

◀ R/F ▶ : Fast-forwards or [Hold] reverses the track

# Using Bluetooth® devices

For Bluetooth operations, it is required to connect the Bluetooth adapter, KS-BTA200 (not supplied) to the expansion port on the rear of this unit.

- Refer to pages **i** and **ii** at the end of the manual to check the countries where you may use the Bluetooth® function.
- For details, refer also to the instructions supplied with the Bluetooth adapter and the Bluetooth device.

To use a Bluetooth device through the unit ("BT-PHONE" and "BT-AUDIO") for the first time, you need to establish a Bluetooth wireless connection between the unit and the device.

- Once the connection is established, it is registered on the unit even if you reset your unit. Up to five devices can be registered in total.
- Only one device can be connected at a time for each source ("BT-PHONE" and "BT-AUDIO").

## Registration (Pairing) methods

Use either of the following items ("OPEN" or "SEARCH") in the Bluetooth menu to register and make the unit ready to establish a new Bluetooth connection with a device.

"OPEN" : Connection is established by operating the Bluetooth device.

"SEARCH" : Connection is established by operating the unit.

## Registering using "OPEN"

**Preparation:** Operate the device to turn on its Bluetooth function.



⇒ "BT-PHONE" or "BT-AUDIO"



⇒ "NEW DEVICE" ⇒ "OPEN"



⇒ Enter a PIN (Personal Identification Number) code in to the unit.

You can enter any number you like (1-digit to 16-digit number).

[Initial: 0000]

- Some devices have their own PIN code. Enter the specified PIN code in to the unit.

**4** Repeat step **3** until you have finished entering the PIN code.



"OPEN.." flashes.

**6** Use the Bluetooth device to search and connect.

On the device to be connected, enter the same PIN code you have just entered for this unit. "CONNECTED" appears.

Now connection is established and you can use the device through the unit.

The device remains registered even after you disconnect the device. Use "CONNECT" (or activate "AUTO CNNECT") to connect the same device from next time on. (🔍 11, 14)

## Registering a device ("SEARCH"/"SPECIAL")



⇒ "BT-PHONE" or "BT-AUDIO"



⇒ "NEW DEVICE"



⇒ "SEARCH": To search for available devices

The unit searches and displays the list of the available devices. "UNFOUND" appears if no available device is detected.

----- or -----

⇒ "SPECIAL": To connect a special device

The unit displays the list of the preset devices.



⇒ Select a device you want to connect.

### 5 For available devices...

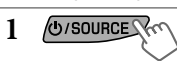
⇒ Enter the specific PIN code of the device to the unit.

- Refer to the instructions supplied with the device to check the PIN code. Use the Bluetooth device to connect. Now connection is established and you can use the device through the unit.

### For special device...

Use "OPEN" or "SEARCH" to connect.

## Connecting/disconnecting/ deleting a registered device



⇒ "BT-PHONE" or "BT-AUDIO"




⇒ Select a device you want to connect/disconnect/delete.



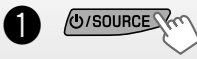
⇒ "CONNECT" or "DISCONNECT": To connect/disconnect the selected device

----- or -----

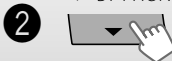
⇒ "DELETE" ⇒ "YES": To delete the selected device

You can set the unit to connect the Bluetooth device automatically when the unit is turned on. ("AUTO CNNECT,"  14)

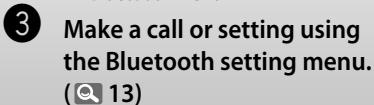
## Using a Bluetooth mobile phone



⇒ "BT-PHONE"




⇒ Bluetooth menu










### When a call comes in....

The source is automatically changed to "BT-PHONE."

- The display will flash in blue. (<RING COLOR>,  22)

### When "AUTO ANSWER" is activated....


The unit answers the incoming calls automatically. ( 14)


- When "AUTO ANSWER" is deactivated, press any button (except  /SOURCE /  / ) to answer the incoming call.
- You can adjust the microphone volume level. ( 14)

### To end the call

Hold any button (except  /SOURCE /  / )









### When a text message comes in....

If the mobile phone is compatible with text message (notified through JVC Bluetooth adapter) and "MSG INFO" (message info) is set to "AUTOMATIC" ( 14), the unit rings to inform you of the message arrival.

- "RCV MESSAGE" (receiving message) appears and the display illuminate in blue. (<RING COLOR>,  22)

## Using the remote controller



- |  |                           |
|--|---------------------------|
|  U /  D /  R /  F / SOURCE   | : Answers calls           |
|  U /  D /  R /  F / SOURCE | : Rejects calls<br>[Hold] |

## Making a call



⇒ "BT-PHONE"



⇒ Select "DIAL" menu.



⇒ Select a calling method.

PHONE BOOK\* ↔ MISSED\* ↔

NUMBER ↔ VOICE DIAL ↔

REDIAL\* ↔ RECEIVED\* ↔ (back to the beginning)

### 5 For REDIAL, RECEIVED, MISSED

⇒ Repeat step 4 to select a name (if it is acquired) or a phone number.

#### For PHONE BOOK

⇒ Repeat step 4 to select a name or a phone number.

#### For NUMBER



⇒ Enter a phone number.



⇒ Confirm.

#### For VOICE DIAL

⇒ Speak the name you want to call when "SAY NAME" appears.

- If your mobile phone does not support the voice recognition system, "ERROR" appears.
- Using voice tags may be difficult in a noisy environment or during an emergency.

• To return to the previous menu, press .

\*Displays only when your mobile phone is equipped with these functions and is compatible with this unit.

## Using a Bluetooth audio player



⇒ "BT-AUDIO"

If playback does not start, operate the Bluetooth audio player to start playback. Operate the Bluetooth audio player to pause (if playback does not pause when you change the source).



Reverse skips/forward skips



Pauses/starts playback\*  
\* Operation may be different according to the connected Bluetooth audio player.



Enter setting menu (Device list)

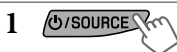
For connecting/disconnecting/deleting a registered device, 11.

## Using the remote controller



◀R/F▶ : Reverse skips/forward skips

## Changing the Bluetooth settings



⇒ "BT-PHONE" or "BT-AUDIO"



⇒ Bluetooth menu



⇒ "SETTINGS"



⇒ Select a setting item.

**AUTO CNNECT** ↔ **AUTO ANSWER**\*<sup>1</sup>

↔ **MSG INFO**\*<sup>2</sup> ↔ **MIC SETTING**\*<sup>1</sup>

↔ **VERSION**\*<sup>3</sup> ↔ (back to the beginning)



⇒ Change the setting accordingly. For setting menu, 14.

\*<sup>1</sup> Appears only when a Bluetooth phone is connected.

\*<sup>2</sup> Appears only when a Bluetooth phone is connected and it is compatible with text message (notified through JVC Bluetooth adapter).

\*<sup>3</sup> Bluetooth Audio: Shows only "Version."

## Setting menu ( \_\_\_ : Initial)

### AUTO CNNCT (connect)

When the unit is turned on, the connection is established automatically with...

**OFF:** No Bluetooth device.

**LAST:** The last connected Bluetooth device.

**ORDER:** The available registered Bluetooth device found at first.

### AUTO ANSWER

Only for the device being connected for "BT PHONE."

**ON:** The unit answers the incoming calls automatically.


**OFF:** The unit does not answer the calls automatically. Answer the calls manually.

**REJECT:** The unit rejects all incoming calls.

### MSG INFO (message info)

Only for the device being connected for "BT-PHONE."

**AUTOMATIC:** The unit informs you of the arrival of a message by ringing and displaying "RCV MESSAGE" (receiving message).

- The display illuminate in blue. (<RING COLOR>,  22)

**MANUAL:** The unit does not inform you of the arrival of a message.

### MIC SETTING (microphone setting)


Only for the device being connected for "BT-PHONE." Adjust microphone volume connected to the Bluetooth adapter, [LEVEL 01/02/03].

### VERSION

The Bluetooth software and hardware versions are shown.

## Warning messages

### ERROR CNNCT (Error Connection)

The device is registered but the connection has failed. Use "CONNECT" to connect the device again. ( 11)

### ERROR

Try the operation again. If "ERROR" appears again, check if the device supports the function you have tried.

### UNFOUND

No available Bluetooth device is detected by "SEARCH."

### LOADING\*

The unit is updating the phone book.

### PLEASE WAIT

The unit is preparing to use the Bluetooth function. If the message does not disappear, turn off and turn on the unit, then connect the device again (or reset the unit).

### RESET 8

Check the connection between the adapter and this unit.

*\*Displays only when your mobile phone is equipped with these functions and is compatible with this unit.*

---

### Bluetooth Information:

If you wish to receive more information about Bluetooth, visit the following JVC web site: <<http://www.jvc.co.jp/english/car/>> (English website only)

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# Listening to the HD Radio™ Broadcast

Before operating, connect HD Radio tuner box, KT-HD300 (not supplied) to the expansion port on the rear of the unit.

- For details, refer also to the instructions supplied with the HD Radio tuner box.

## What is HD Radio Technology?

HD Radio Technology can deliver high-quality digital sound—AM digital will have FM-like quality (in stereo) and FM digital will have CD-like quality—with static-free and clear reception. Furthermore, stations can offer text and data, such as artist names and song titles.

- When the HD Radio tuner box is connected, it can also receive conventional analog broadcasts.
- Many HD Radio stations also offer more than one channel of programming. This service is called multicasting.
- To find HD Radio stations in your area, visit <a href="http://www.hdradio.com/">http://www.hdradio.com/.

For basic radio operations,  7, 8.

## When receiving...

### An HD Radio station

Lights up when digital audio is broadcast  
Flashes when analog audio is broadcast



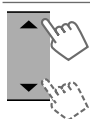
Station Call Sign appears.

### HD Radio multicast channels



Channel number

First four letters of Call Sign



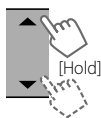
Select your desired channel.

HD1 ↔ HD2 ↔ ... ↔ HD8

↔ (back to the beginning)

“LINKING” appears while linking to a multicast channel.

## Searching for HD Radio stations only

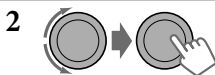


“HD” flashes.

## Changing HD Radio reception mode

While receiving an HD Radio broadcast, the unit receives digital or analog audio automatically due to the receiving condition.

While listening to an HD Radio station...



⇔ <TUNER> ⇔ <BLEND HOLD> ⇔  
<AUTO> / <DIGITAL> / <ANALOG>

“HD” lights up when holding the digital reception or flashes when holding the analog reception.

- If no sound can be heard with <AUTO>, change the setting to <ANALOG> or <DIGITAL>.
- The setting automatically changes to <AUTO> if you tune in to or change to another station, or if you turn off the power.



- This setting cannot take effect for the conventional FM/AM stations.
- If the radio station forces the reception mode to digital, the HOLD indicator flashes.

## Using the remote controller



▲ **U/D** ▼ : Changes the preset stations

◀ **R/F** ▶ : Searches for stations

## Changing the display information



**Call Sign** \*1 → **Frequency** → **Title/artist/album name of the current segment** \*2 → **Clock** → (back to the beginning)

\*1 "\*\*\*\* -FM" or "\*\*\*\*" appears when no Call Sign is received.

\*2 "NO TEXT" appears when no text is received.

# Listening to the satellite radio

Before operating, connect either one of the following systems (not supplied) to the expansion port on the rear of this unit.

### For listening to a SIRIUS Satellite radio:

- SC-C1 and KS-SRA100
- PnP, SC-VDOC1 and KS-SRA100

### For listening to an XM Satellite radio:

- JVC Smart Digital Adapter (XMDJVC100)
- CNP2000UC and CNPJVC1

• For details, refer also to the instructions supplied with the other components.

## GCI (Global Control Information) update

- If channels are updated after subscription, updating starts automatically. "UPDATING" flashes and no sound can be heard.
- Update takes a few minutes to complete.
- During update, you cannot operate your satellite radio.

1



⇒ "SIRIUS" or "XM"

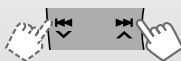
2



⇒ Select a category.

**SIRIUS:** If you select "ALL," you can tune in to all the channels of all categories.

3



⇒ Select a channel to listen.

Holding the button changes the channels rapidly.

While searching, invalid and unsubscribed channels are skipped.

**XM:** If you do not select a channel within 15 seconds, category selected in step 2 is canceled. You can select all channels of all categories now (including non-categorised channels).

## Activate your SIRIUS subscription after connection



⇒ "SIRIUS"

SIRIUS Satellite radio starts updating all the SIRIUS channels. Once completed, SIRIUS Satellite radio tunes in to the preset channel, CH184.



- 3** Contact SIRIUS on the internet at <<http://activate.siriusradio.com/>> to activate your subscription, or you can call SIRIUS toll-free at 1-888-539-SIRIUS (7474).
- "SUB UPDT PRESS ANY KEY" scrolls on the display once subscription has been completed.

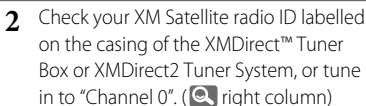
## Activate your XM subscription after connection

- Only Channel 0, 1, and 247 are available before activation.



⇒ "XM"

XMDirect™ Tuner Box or XMDirect2 Tuner System starts updating all the XM channels. "Channel 1" is tuned in automatically.



- 3** Contact XM Satellite radio on the internet at <<http://xmradio.com/activation/>> to activate your subscription, or you can call 1-800-XM-RADIO (1-800-967-2346).
- Once completed, the unit tunes in to one of the available channels (Channel 4 or higher).

## Storing channels in memory

You can preset up to 18 channels for both SIRIUS and XM.

Ex.: Storing channel into preset number "04."

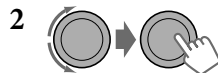


⇒ Select preset number "04."



"P04" flashes.

## Selecting SIRIUS/XM preset station



## Checking the satellite radio ID

While selecting "SIRIUS" or "XM"...



⇒ Select "Channel 0."

**SIRIUS:** SIRIUS identification number is displayed after "Channel 0" is selected.

**XM:** The display alternately shows "RADIO ID" and the 8-digit (alphanumeric) ID number.

**To cancel the ID number display,** select any channel other than "Channel 0."



## Using the remote controller



- ▲ U/D ▼ : Changes the categories
- ◀ R/F ▶ : Changes the channels
- ◀ R/F ▶ : Changes the channels rapidly [Hold]

## Changing the display information



Category name → Channel name  
→ Artist name → Composer  
name\* → Song/program name/  
title → Clock → (back to the  
beginning)

\* Only for SIRIUS Satellite radio.

## Listening to the other external components

You can connect an external component to:

- **EXT INPUT:** Expansion port on the rear of this unit using the following adapters (not supplied):
  - KS-U57, Line Input Adapter
  - KS-U58, AUX Input Adapter**Preparation:** Make sure <EXT ON> is selected for the <SRC SELECT> → <EXT IN> setting. (🔍 24)
- **AUX IN:** AUX (auxiliary) input jack on the control panel.  
**Preparation:** Make sure <AUX ON> is selected for the <SRC SELECT> → <AUX IN> setting. (🔍 24)

- For details, refer also to the instructions supplied with the adapter or external components.



⇒ "EXT INPUT" or "AUX IN"

2

Turn on the connected component and start playing the source.

3

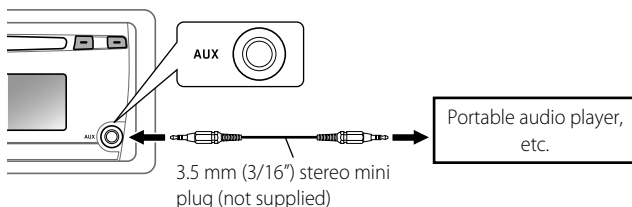


⇒ Adjust the volume.

4

**Adjust the sound as you want.** (🔍 19)

## Connecting an external component to the AUX input jack



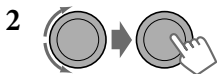
# Selecting a preset sound mode

You can select a preset sound mode suitable for the music genre.



**FLAT** → **NATURAL** → **DYNAMIC** → **VOCAL BOOST** → **BASS BOOST** → **USER** → (back to the beginning)

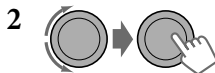
While listening, you can adjust the tone level of the selected sound mode.



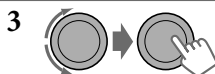
Adjust the level (-06 to +06) of the selected tone (BASS / MIDDLE / TREBLE). The sound mode is automatically stored and changed to "USER."

## Storing your own sound mode

You can store your own adjustments in memory.



⇒ <PRO EQ> ⇒ <BASS> / <MIDDLE> / <TREBLE>



Adjust the sound elements of the selected tone. (🔍 table on the left)

**4** Repeat steps **2** and **3** to adjust other tones.


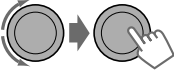
The adjustments made will be stored automatically in "USER."

The current sound mode changes to "USER" automatically.

Tone	Sound element		
	Frequency	Level	Q
BASS	60 Hz	-06 to +06	Q1.0
	80 Hz		Q1.25
	100 Hz		Q1.5
	200 Hz		Q2.0
MIDDLE	0.5 kHz	-06 to +06	Q0.75
	1.0 kHz		Q1.0
	1.5 kHz		Q1.25
	2.5 kHz		
TREBLE	10.0 kHz	-06 to +06	Q FIX
	12.5 kHz		
	15.0 kHz		
	17.5 kHz		







# Menu operations

- 1  [Hold]
- 2 
- 3 Repeat step 2 if necessary.
  - To return to the previous menu, press **BACK**.
  - To exit from the menu, press **DISP** or **MENU**.

Category	Menu item	Selectable setting, [Initial: <u>Underlined</u> ]
DEMO	<b>DEMO</b> Display demonstration	<ul style="list-style-type: none"> <li>• <b>DEMO ON</b> : Display demonstration will be activated automatically if no operation is done for about 20 seconds. (🔍 4)</li> <li>• <b>DEMO OFF</b> : Cancels.</li> </ul>
	<b>CLOCK SET</b> Clock setting	— : Adjust the hour, then the minute. (🔍 4) <u>[1:00]</u>
CLOCK	<b>CLOCK ADJ</b> *1 Clock adjustment	<ul style="list-style-type: none"> <li>• <b>AUTO</b> : The built-in clock is automatically adjusted using the clock data provided via the satellite radio channel.</li> <li>• <b>OFF</b> : Cancels.</li> </ul>
	<b>TIME ZONE</b> *1,*2	<b>EASTERN, ATLANTIC, NEWFOUND, ALASKA, PACIFIC, MOUNTAIN, CENTRAL</b> : Select your residential area from one of the time zones for clock adjustment.
	<b>DST</b> *1,*2 Daylight savings time	<ul style="list-style-type: none"> <li>• <b>DST ON</b> : Activates daylight savings time if your residential area is subject to DST.</li> <li>• <b>DST OFF</b> : Cancels.</li> </ul>
	<b>BASS</b>	— : For settings, 🔍 19.
PRO EQ	<b>MIDDLE</b>	
	<b>TREBLE</b>	

\*1 Displayed only when SIRIUS Satellite radio or XM Satellite radio is connected.

\*2 Displayed only when <CLOCK ADJ> is set to <AUTO>.

Category	Menu item	Selectable setting, [Initial: <u>Underlined</u> ]
DISPLAY	<b>DIMMER</b>	<ul style="list-style-type: none"> <li>• <b>DIMMER ON</b> : Dims the display and button illumination.</li> <li>• <b>DIMMER OFF</b> : Cancels.</li> </ul>
	<b>SCROLL</b> *3	<ul style="list-style-type: none"> <li>• <b>SCROLL ONCE</b> : Scrolls the displayed information once.</li> <li>• <b>SCROLL AUTO</b> : Repeats scrolling (at 5-second intervals).</li> <li>• <b>SCROLL OFF</b> : Cancels.</li> </ul> Pressing <b>DISP</b> for more than one second can scroll the display regardless of the setting.
	<b>TAG DISPLAY</b>	<ul style="list-style-type: none"> <li>• <b>TAG ON</b> : Shows the Tag information while playing MP3/WMA tracks.</li> <li>• <b>TAG OFF</b> : Cancels.</li> </ul>
TUNER	<b>SSM</b> Strong-station Sequential Memory	<ul style="list-style-type: none"> <li>• <b>SSM 01 – 06</b> *4 : For settings,  7.</li> <li>• <b>SSM 07 – 12</b></li> <li>• <b>SSM 13 – 18</b></li> </ul>
	<b>AREA</b> Tuner channel interval	<ul style="list-style-type: none"> <li>• <b>AREA US</b> : When using in North/Central/South America. AM/FM intervals are set to 10 kHz/200 kHz.</li> <li>• <b>AREA EU</b> : When using in any other areas. AM/FM intervals are set to 9 kHz/50 kHz (100 kHz during auto search).</li> <li>• <b>AREA SA</b> : When using in South American countries where FM interval is 100 kHz. AM interval is set to 10 kHz.</li> </ul>
	<b>MONO</b> *5 Monaural mode	<ul style="list-style-type: none"> <li>• <b>MONO ON</b> : Activate monaural mode to improve FM reception, but stereo effect will be lost. ( 7)</li> <li>• <b>MONO OFF</b> : Restore the stereo effect.</li> </ul>
	<b>SID</b> *6 SIRIUS ID	— : Your SIRIUS identification number scrolls on the display 5 seconds after "SID" is selected. (  17) If no operation is done for about 60 seconds, the unit returns to playback mode.
	<b>BLEND HOLD</b> *7 HD Radio reception mode	<ul style="list-style-type: none"> <li>• <b>AUTO</b> : Switch between digital and analog audio automatically. ( 15)</li> <li>• <b>DIGITAL</b> : Tune in to digital audio only.</li> <li>• <b>ANALOG</b> : Tune in to analog audio only.</li> </ul>






\*3 Some characters or symbols will not be shown correctly (or will be blanked) on the display.

\*4 If an HD Radio tuner box is connected, you can also search and store the AM stations to <SSM 01 – 06>.

\*5 Displayed only when the source is "FM" or "HD Radio."

\*6 Displayed only when SIRIUS Satellite radio is connected.

\*7 Displayed only when HD Radio tuner box is connected.

Category	Menu item	Selectable setting, [Initial: <u>Underlined</u> ]
TUNER	<b>IF BAND</b> Intermediate frequency band	<ul style="list-style-type: none"> <li>• <b>AUTO</b> : Increases the tuner selectivity to reduce interference noises between adjacent stations. (Stereo effect may be lost.)</li> <li>• <b>WIDE</b> : Subject to interference noises from adjacent stations, but sound quality will not be degraded and the stereo effect will remain.</li> </ul>
	<b>BUTTON ZONE</b>	<b>COLOR 01 —</b> : For settings,  24. [ <b>COLOR 06</b> ]
COLOR	<b>DISP ZONE</b> Display zone	<b>COLOR 29, USER</b> : For settings,  24. [ <b>COLOR 01</b> ]
	<b>ALL ZONE</b>	: For settings,  24. [ <b>COLOR 06</b> ]
	<b>DAY COLOR</b>	<ul style="list-style-type: none"> <li>• <b>BUTTON ZONE</b> : For settings,  24, 25.</li> <li>• <b>DISP ZONE</b></li> </ul>
COLOR SETUP	<b>NIGHT COLOR</b>	<ul style="list-style-type: none"> <li>• <b>BUTTON ZONE</b> : For settings,  24, 25.</li> <li>• <b>DISP ZONE</b></li> </ul>
	<b>MENU COLOR</b>	<ul style="list-style-type: none"> <li>• <b>ON</b> : Changes the display and buttons (except for ▲ / <b>EQ BASS-TRE</b> / <b>DISP</b>) illumination during menu, list search and playback mode operations.</li> <li>• <b>OFF</b> : Cancels.</li> </ul>
	<b>RING COLOR</b> * <sup>8</sup>	<ul style="list-style-type: none"> <li>• <b>ON</b> : When a call comes in, the display will flash in blue. • The display will change to the original color when the call is answered or the incoming call stops. When the unit receives a text message, the display only illuminate in blue.</li> <li>• <b>OFF</b> : Cancels.</li> </ul>
	<b>FADER</b> * <sup>9</sup>	<b>R06 – F06</b> [00] : Adjust the front and rear speaker output balance.
AUDIO	<b>BALANCE</b> * <sup>10</sup>	<b>L06 – R06</b> [00] : Adjust the left and right speaker output balance.
	<b>LOUD</b> Loudness	<ul style="list-style-type: none"> <li>• <b>LOUD ON</b> : Boost low and high frequencies to produce a well-balanced sound at a low volume level.</li> <li>• <b>LOUD OFF</b> : Cancels.</li> </ul>

\*<sup>8</sup> Displayed only when Bluetooth adapter, KS-BTA200 is connected.

\*<sup>9</sup> If you are using a two-speaker system, set the fader level to "00."

\*<sup>10</sup> This adjustment will not affect the subwoofer output.

Category	Menu item	Selectable setting, [Initial: <u>Underlined</u> ]
AUDIO	<b>VOL ADJUST</b> Volume adjust	<b>VOL ADJ -05</b> — : Preset the volume adjustment level of each source (except FM), compared to the FM volume level. The volume level will automatically increase or decrease when you change the source. <b>VOL ADJ +05</b> <b>[VOL ADJ 00]</b>  • Before making an adjustment, select the source you want to adjust. • "VOL ADJ FIX" appears on the display if "FM" is selected as the source.
	<b>L/O MODE</b> Line output mode	• <b>SUB.W</b> : Select if the REAR LINE OUT terminals are used for connecting a subwoofer (through an external amplifier).  • <b>REAR</b> : Select if the REAR LINE OUT terminals are used for connecting the speakers (through an external amplifier).
	<b>SUB.W FREQ</b> *11 Subwoofer cutoff frequency	• <b>LOW</b> : Frequencies lower than 72 Hz are sent to the subwoofer. • <b>MID</b> : Frequencies lower than 111 Hz are sent to the subwoofer. • <b>HIGH</b> : Frequencies lower than 157 Hz are sent to the subwoofer.
	<b>SUB.W LEVEL</b> *11 Subwoofer level	<b>SUB.W 00</b> — : Adjust the subwoofer output level. <b>SUB.W 08</b> <b>[SUB.W 04]</b>
	<b>BEEP</b> Keytouch tone	• <b>BEEP ON</b> : Activates the keypress tone. • <b>BEEP OFF</b> : Deactivates the keypress tone.
	<b>AMP GAIN</b> *12 Amplifier gain control	• <b>LOW POWER</b> : VOLUME 00 – VOLUME 30 (Select if the maximum power of each speaker is less than 50 W to prevent damaging the speakers.) • <b>HIGH POWER</b> : VOLUME 00 – VOLUME 50

\*11 Displayed only when <L/O MODE> is set to <SUB.W>.

\*12 The volume level automatically changes to "VOLUME 30" if you change to <LOW POWER> with the volume level set higher than "VOLUME 30."

Category	Menu item	Selectable setting, [Initial: <u>Underlined</u> ]
SRC SELECT	AM *13 AM station	<ul style="list-style-type: none"> <li>• <u>AM ON</u> : Enable "AM" in source selection.</li> <li>• <u>AM OFF</u> : Disable "AM" in source selection.</li> </ul>
	EXT IN *14 External input	<ul style="list-style-type: none"> <li>• <u>EXT ON</u> : Enable "EXT IN" in source selection.</li> <li>• <u>EXT OFF</u> : Disable "EXT IN" in source selection.</li> </ul>
	AUX IN *15 Auxiliary input	<ul style="list-style-type: none"> <li>• <u>AUX ON</u> : Enable "AUX IN" in source selection.</li> <li>• <u>AUX OFF</u> : Disable "AUX IN" in source selection.</li> </ul>

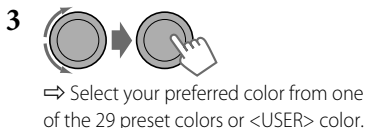
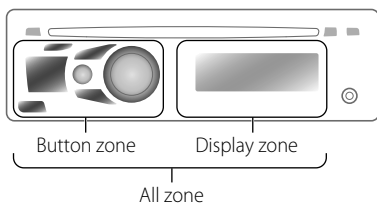
\*13 Displayed only when any source other than "AM" is selected.

\*14 Displayed only when any source other than "EXT INPUT" is selected.

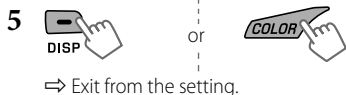
\*15 Displayed only when any source other than "AUX IN" is selected.

## Selecting the variable buttons and display color illumination

You can select your preferred color for buttons illumination (except for **▲ / EQ BASS-TRE / DISP**) and display color separately.



- 4** Repeat steps 2 and 3 to select a different zone and your preferred color.
- If <ALL ZONE> is selected in step 2, the buttons and display illumination changed to the current/selected <BUTTON ZONE> color. You can also change the <ALL ZONE> color to one of your preferred color by performing step 3.



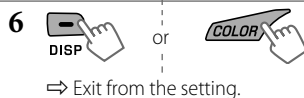
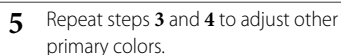
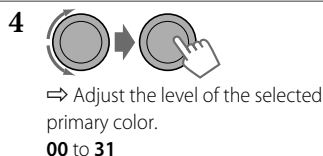
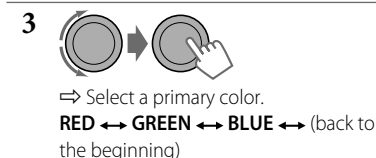
## Creating your own day and night colors—USER

You can create your own colors for <DAY COLOR> and <NIGHT COLOR> to apply to button zone and display zone.

- <DAY COLOR> Displayed when <DIMMER> is set to <DIMMER OFF>.
- <NIGHT COLOR> Displayed when <DIMMER> is set to <DIMMER ON>.

Menu hierarchy		Operation	
COLOR SETUP	DAY COLOR	• BUTTON ZONE	Follow example below.
		• DISP ZONE	Press <b>BACK</b> after step 5, then select DISP ZONE in step 2.
	NIGHT COLOR	• BUTTON ZONE	Press <b>BACK</b> after step 5, then select NIGHT COLOR in step 2.
		• DISP ZONE	

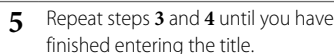
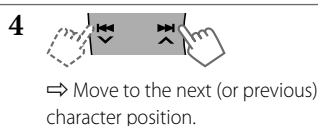
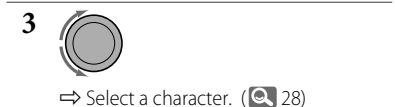
Ex.: Creating <USER> color for <BUTTON ZONE> in <DAY COLOR>.



## Title assignment

You can assign titles to 30 station frequencies (FM and AM) using 8 characters (maximum) for each title.

- If you try to assign titles to more than 30 station frequencies, "NAME FULL" appears. Delete unwanted titles before assignment.
- When HD Radio tuner box is connected, this feature will be disabled.



**To erase the entire title**, press and hold DISP in step 2, then press the control dial to confirm.

# More about this unit

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## Basic operations

### Turning off the power

- If you turn off the power while listening to a track, playback will start from where it had been stopped previously next time you turn on the power.

### General

- If you change the source while listening to a disc, playback stops. Next time you select "CD" as the playback source, playback will start from where it had been stopped previously.
- After ejecting a disc, "NO DISC" appears and you cannot operate some of the buttons. Insert another disc or press **⏪/SOURCE** to select another playback source.
- If no operation is done for about 60 seconds after pressing **MENU** button, the operation will be canceled.

## Tuner operations

### Storing stations in memory

- During SSM search...
  - All previously stored stations are erased and the stations are stored anew.
  - When SSM is over, the station stored in the lowest preset number will be automatically tuned in.
- When storing a station manually, the previously preset station is erased when a new station is stored in the same preset number.

## Disc operations

### Caution for DualDisc playback

- The Non-DVD side of a "DualDisc" does not comply with the "Compact Disc Digital Audio" standard. Therefore, the use of Non-DVD side of a DualDisc on this product may not be recommended.

### General

- This unit has been designed to reproduce CDs/CD Texts, and CD-Rs (Recordable)/CD-RWs (Rewritable) in audio CD (CD-DA), MP3 and WMA formats.
- When a disc is inserted upside down, "PLEASE" and "EJECT" appear alternately on the display. Press **▲** to eject the disc.
- MP3 and WMA "tracks" (words "file" and "track" are used interchangeably) are recorded in "folders."
- While fast-forwarding or reversing on an MP3 or WMA disc, you can only hear intermittent sounds.

### Playing a CD-R or CD-RW

- Use only "finalized" CD-Rs or CD-RWs.
- This unit can only play back files of the same type as those detected first if a disc includes both audio CD (CD-DA) files and MP3/WMA files.
- This unit can play back multi-session discs; however, unclosed sessions will be skipped while playing.

- Some CD-Rs or CD-RWs may not play back on this unit because of their disc characteristics, or for the following reasons:
  - Discs are dirty or scratched.
  - Moisture condensation has occurred on the lens inside the unit.
  - The pickup lens inside the unit is dirty.
  - The files on the CD-R/CD-RW are written using the “Packet Write” method.
  - There are improper recording conditions (missing data, etc.) or media conditions (stained, scratched, warped, etc.).
- CD-RWs may require a longer readout time since the reflectance of CD-RWs is lower than that of regular CDs.
- Do not use the following CD-Rs or CD-RWs:
  - Discs with stickers, labels, or a protective seal stuck to the surface.
  - Discs on which labels can be directly printed by an ink jet printer.
 Using these discs under high temperature or high humidity may cause malfunctions or damage to the unit.
- The maximum number of characters for file/folder names vary depending on the disc format used (includes 4 extension characters—<mp3> or <wma>).
  - ISO 9660 Level 1: up to 12 characters
  - ISO 9660 Level 2: up to 31 characters
  - Romeo: up to 128 characters
  - Joliet: up to 64 characters
  - Windows long file name: up to 128 characters
- This unit can recognize a total of 512 files, 255 folders, and 8 hierarchical levels.
- This unit can play back files recorded in VBR (variable bit rate).
  - Files recorded in VBR have a discrepancy in the elapsed time display, and do not show the actual elapsed time. In particular, this difference becomes noticeable after performing the search function.
- This unit cannot play back the following files:
  - MP3 files encoded in MP3i and MP3 PRO format.
  - MP3 files encoded in an inappropriate format.
  - MP3 files encoded with Layer 1/2.
  - WMA files encoded in lossless, professional, and voice format.
  - WMA files which are not based upon Windows Media® Audio.
  - WMA files copy-protected with DRM.
  - Files which have data such as AIFF, ATRAC3, etc.
- The search function works but search speed is not constant.

### **Playing an MP3/WMA disc**

- This unit can play back MP3/WMA files with the extension code <mp3> or <wma> (regardless of the letter case—upper/lower).
- This unit can show the names of albums, artists (performer), and Tag (Version 1.0, 1.1, 2.2, 2.3, or 2.4) for MP3 files and for WMA files.
- This unit can display only one-byte characters. No other characters can be correctly displayed.
- This unit can play back MP3/WMA files meeting the conditions below:
  - Bit rate: 8 kbps — 320 kbps
  - Sampling frequency:
    - 48 kHz, 44.1 kHz, 32 kHz (for MPEG-1)
    - 24 kHz, 22.05 kHz, 16 kHz (for MPEG-2)
  - Disc format: ISO 9660 Level 1/Level 2, Romeo, Joliet, Windows long file name



## **Ejecting a disc**

- If the ejected disc is not removed within 15 seconds, it is automatically inserted into the loading slot again to protect it from dust. Playback starts automatically.

## **Bluetooth operations**

- While driving, do not perform complicated operation such as dialing the numbers, using phone book, etc. When you perform these operations, stop your car in a safe place.
- Some Bluetooth devices may not be connected to this unit depending on the Bluetooth version of the device.
- This unit may not work for some Bluetooth devices.
- Connecting condition may vary depending on the circumstances around you.
- When the unit is turned off, the device is disconnected.

## **HD Radio reception**

- HD Radio broadcasting can normally be received in the USA, and it may also be received in countries where limited broadcasting has already begun.
- During SSM search...
  - All stations including conventional FM/AM stations are searched and stored for the selected band.

## **Satellite radio**

- To know more about SIRIUS Satellite radio or to sign up, visit <<http://www.sirius.com>>.
- For the latest channel listings and programming information, or to sign up for XM Satellite radio, visit <<http://www.xmradio.com>>.

## **Available characters**

<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>I</b>
<b>J</b>	<b>K</b>	<b>L</b>	<b>M</b>	<b>N</b>	<b>O</b>	<b>P</b>	<b>Q</b>	<b>R</b>
<b>S</b>	<b>T</b>	<b>U</b>	<b>V</b>	<b>W</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>0</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>
<b>—</b>	<b>/</b>	<b>&lt;</b>	<b>&gt;</b>	<b>Space</b>				

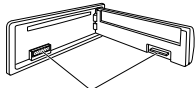
- Microsoft and Windows Media are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
- The Bluetooth word mark and logos are owned by the Bluetooth SIG, Inc. and any use of such marks by Victor Company of Japan, Limited (JVC) is under license. Other trademarks and trade names are those of their respective owners.
- HD Radio™ and the HD Radio Ready logo are proprietary trademarks of iBiquity Digital Corp.
- “SIRIUS” and the SIRIUS dog logo are registered trademarks of SIRIUS Satellite Radio Inc.
- XM and its corresponding logos are registered trademarks of XM Satellite Radio Inc.
- “SAT Radio,” the SAT Radio logo and all related marks are trademarks of SIRIUS Satellite Radio Inc., and XM Satellite Radio, Inc.

# Maintenance

## How to clean the connectors

Frequent detachment will deteriorate the connectors.

To minimize this possibility, periodically wipe the connectors with a cotton swab or cloth moistened with alcohol, being careful not to damage the connectors.



Connectors

## Moisture condensation

Moisture may condense on the lens inside the unit in the following cases:

- After starting the heater in the car.
  - If it becomes very humid inside the car.
- Should this occur, the unit may malfunction. In this case, eject the disc and leave the unit turned on for a few hours until the moisture has evaporated.

## How to handle discs

**When removing a disc from its case**, press down the center holder of the case and lift the disc out, holding it by the edges.

Center holder



- Always hold the disc by the edges. Do not touch its recording surface.

**When storing a disc in its case**, gently insert the disc around the center holder (with the printed surface facing up).

- Make sure to store discs in cases after use.

## To keep discs clean

A dirty disc may not play correctly. If a disc does become dirty, wipe it with a soft cloth in a straight line from center to edge.



- Do not use any solvents (for example, conventional record cleaner, spray, thinner, benzene, etc.) to clean discs.








## To play new discs

New discs may have some rough spots around the inner and outer edges. If such a disc is used, this unit may reject the disc.



**To remove these rough spots**, rub the edges with a pencil or ball-point pen, etc.

## Do not use the following discs:

Single CD—8 cm (3-3/16") disc 	Warped disc 
Sticker and sticker residue 	Stick-on label 
Unusual shape 	C-thru Disc (semitransparent disc) 
Transparent or semitransparent parts on its recording area 	

# Troubleshooting

	Symptom	Remedy/Cause
General	Sound cannot be heard from the speakers.	<ul style="list-style-type: none"> <li>• Adjust the volume to the optimum level.</li> <li>• Make sure the unit is not muted/paused (🔊 6).</li> <li>• Check the cords and connections.</li> </ul>
	“PROTECT” appears on the display and no operations can be done.	<p>Check to be sure the terminals of the speaker leads are covered with insulating tape properly, then reset the unit (🔊 3).</p> <p>If “PROTECT” does not disappear, consult your JVC car audio dealer or a company supplying kits.</p>
	The unit does not work at all.	Reset the unit. (🔊 3)
	“AUX” cannot be selected.	Check the <SRC SELECT> → <AUX IN> setting. (🔊 24)
FM/AM	SSM automatic presetting does not work.	Store stations manually.
	Static noise while listening to the radio.	Connect the antenna firmly.
	“AM” cannot be selected.	Check the <SRC SELECT> → <AM> setting. (🔊 24)
Disc playback	Disc cannot be played back.	Insert the disc correctly.
	<ul style="list-style-type: none"> <li>• CD-R/CD-RW cannot be played back.</li> <li>• Tracks on the CD-R/CD-RW cannot be skipped.</li> </ul>	<ul style="list-style-type: none"> <li>• Insert a finalized CD-R/CD-RW.</li> <li>• Finalize the CD-R/CD-RW with the component which you used for recording.</li> </ul>
	Disc can neither be played back nor ejected.	<ul style="list-style-type: none"> <li>• Unlock the disc. (🔊 8)</li> <li>• Eject the disc forcibly. (🔊 3)</li> </ul>
	Disc sound is sometimes interrupted.	<ul style="list-style-type: none"> <li>• Stop playback while driving on rough roads.</li> <li>• Change the disc.</li> <li>• Check the cords and connections.</li> </ul>
	“NO DISC” appears on the display.	Insert a playable disc into the loading slot.
	“PLEASE” and “EJECT” appear alternately on the display.	Press ▲, then insert a disc correctly.


	Symptom	Remedy/Cause
MP3/WMA playback	Disc cannot be played back.	<ul style="list-style-type: none"> <li>• Use a disc with MP3/WMA tracks recorded in a format compliant with ISO 9660 Level 1, Level 2, Romeo, or Joliet.</li> <li>• Add the extension code &lt;.mp3&gt; or &lt;.wma&gt; to the file names.</li> </ul>
	Noise is generated.	Skip to another track or change the disc. (Do not add the extension code <.mp3> or <.wma> to non-MP3 or WMA tracks.)
	A longer readout time is required ("READING" keeps flashing on the display).	Do not use too many hierarchical levels and folders.
	Tracks do not play back in the order you have intended them to play.	The playback order is determined when the files are recorded.
	The elapsed playing time is not correct.	This sometimes occurs during playback. This is caused by how the tracks are recorded on the disc.
	The correct characters are not displayed(e.g. album name).	This unit can only display letters (upper case), numbers, and a limited number of symbols.
Bluetooth*	Bluetooth device does not detect the unit.	The unit can be connected with one Bluetooth mobile phone and one Bluetooth audio device at a time. While connecting a device, this unit cannot be detected from another device. Disconnect currently connected device and search again.
	The unit does not detect the Bluetooth device.	<ul style="list-style-type: none"> <li>• Check the Bluetooth setting of the device.</li> <li>• Search from the Bluetooth device. After the device detects the unit, select "OPEN" on the unit to connect the device. (🔍 10)</li> </ul>

\* For Bluetooth operations, refer also to the instructions supplied with the Bluetooth Adapter.

	Symptom	Remedy/Cause
Bluetooth	The unit does not make pairing with the Bluetooth device.	<ul style="list-style-type: none"> <li>• Enter the same PIN code for both the unit and target device.</li> <li>• Select the device name from "SPECIAL," then try to connect again. (🔍 11)</li> <li>• Try to pair/connect from the Bluetooth device.</li> </ul>
	Echo or noise occurs.	Adjust the microphone unit position.
	Phone sound quality is poor.	<ul style="list-style-type: none"> <li>• Reduce the distance between the unit and the Bluetooth mobile phone.</li> <li>• Move the car to a place where you can get a better signal reception.</li> </ul>
	The sound is interrupted or skipped during playback of a Bluetooth audio device.	<ul style="list-style-type: none"> <li>• Reduce the distance between the unit and the Bluetooth audio device.</li> <li>• Disconnect the device connected for "BT-PHONE."</li> <li>• Turn off, then turn on the unit.</li> <li>• (When the sound is not yet restored,) connect the device again.</li> </ul>
	The connected audio device cannot be controlled.	Check whether the connected audio device supports AVRCP (Audio/Video Remote Control Profile).
HD Radio reception	Sound quality changes when receiving HD Radio stations.	Fix the reception mode either to <DIGITAL> or <ANALOG>. (🔍 15, 21)
	No sound can be heard.	<ul style="list-style-type: none"> <li>• &lt;ANALOG&gt; is selected when receiving all digital broadcast of HD Radio station. Select &lt;DIGITAL&gt; or &lt;AUTO&gt;. (🔍 15, 21)</li> <li>• &lt;DIGITAL&gt; is selected when receiving weak digital signals or receiving conventional radio broadcast. Select &lt;ANALOG&gt; or &lt;AUTO&gt;. (🔍 15, 21)</li> </ul>
	"RESET 8" appears on the display.	Reconnect this unit and the HD Radio tuner box correctly, then reset the unit.

	<b>Symptom</b>	<b>Remedy/Cause</b>
Satellite Radio	"CALL 1-888-539-SIRIUS TO SUBSCRIBE" scrolls on the display while listening to the SIRIUS Satellite radio.	Starts subscribing to SIRIUS Satellite radio. (📶 17)
	No sound can be heard. "UPDATING" appears on the display.	The unit is updating the channel information and it takes a few minutes to complete.
	"ACQUIRING" or "NO SIGNAL" appears on the display.	Move to an area where signals are stronger.
	"NO ANTENNA" or "ANTENNA" appears on the display.	Connect the antenna firmly.
	"NO CHANNEL" appears on the display for about 5 seconds, then returns to the previous channel or default channel while listening to the SIRIUS Satellite radio.	No broadcast on the selected channel. Select another channel or continue listening to the previous channel or default channel.
	Blank display appears.	No text information for the selected channel.
	"CH---" or "CH UNAVAIL" appears on the display for about 2 seconds, then returns to the previous channel while listening to the XM Satellite radio.	Selected channel is no longer available or is unauthorized. Select another channel or continue listening to the previous channel.
	"OFF AIR" appears on the display while listening to the XM Satellite radio.	Selected channel is not broadcasting at this time. Select another channel or continue listening to the previous channel.
	"LOADING" appears on the display while listening to the XM Satellite radio.	The unit is loading the channel information and audio. Text information are temporarily unavailable.
<ul style="list-style-type: none"> <li>• "RESET 8" appears on the display.</li> <li>• Satellite radio does not work at all.</li> </ul>	Reconnect this unit and the satellite radio correctly and reset this unit.	

# Specifications

AUDIO AMPLIFIER SECTION	Power Output:	20 W RMS × 4 Channels at 4 Ω and ≤ 1% THD+N		
	Signal-to-Noise Ratio:	80 dBA (reference: 1 W into 4 Ω)		
	Load Impedance:	4 Ω (4 Ω to 8 Ω allowance)		
	Tone Control Range:	Bass:	±12 dB (60 Hz, 80 Hz, 100 Hz, 200 Hz) Q1.0, Q1.25, Q1.5, Q2.0	
		Middle:	±12 dB (0.5 kHz, 1.0 kHz, 1.5 kHz, 2.5 kHz) Q0.75, Q1.0, Q1.25	
		Treble:	±12 dB (10.0 kHz, 12.5 kHz, 15.0 kHz, 17.5 kHz) Q (Fixed)	
	Frequency Response:	40 Hz to 20 000 Hz		
	Line-Out Level/Impedance:	KD-A315:	5.0 V/20 kΩ load (full scale)	
		KD-R310:	2.5 V/20 kΩ load (full scale)	
	Subwoofer-Out Level/Impedance:	KD-A315:	5.0 V/20 kΩ load (full scale)	
KD-R310:		2.5 V/20 kΩ load (full scale)		
Output Impedance:	1 kΩ			
Other Terminal:	AUX (auxiliary) input jack, Expansion port, Steering wheel remote input (only for KD-A315), Antenna input			
TUNER SECTION	Frequency Range:	FM:	with channel interval set to 100 kHz or 200 kHz	87.5 MHz to 107.9 MHz
			with channel interval set to 50 kHz	87.5 MHz to 108.0 MHz
		AM:	with channel interval set to 10 kHz	530 kHz to 1 710 kHz
			with channel interval set to 9 kHz	531 kHz to 1 602 kHz
	FM Tuner:	Usable Sensitivity:	9.3 dBf (0.8 μV/75 Ω)	
		50 dB Quieting Sensitivity:	16.3 dBf (1.8 μV/75 Ω)	
		Alternate Channel Selectivity (400 kHz):	65 dB	
		Frequency Response:	40 Hz to 15 000 Hz	
		Stereo Separation:	40 dB	
	AM Tuner:	Sensitivity:	20 μV	
Selectivity:		40 dB		

CD PLAYER SECTION	Type:		Compact disc player	
	Signal Detection System:		Non-contact optical pickup (semiconductor laser)	
	Number of Channels:		2 channels (stereo)	
	Frequency Response:		5 Hz to 20 000 Hz	
	Dynamic Range:		93 dB	
	Signal-to-Noise Ratio:		98 dB	
	Wow and Flutter:		Less than measurable limit	
	MP3 Decoding Format: (MPEG1/2 Audio Layer 3)		Max. Bit Rate: 320 kbps	
	WMA (Windows Media® Audio) Decoding Format:		Max. Bit Rate: 192 kbps	
	GENERAL	Power Requirement:	Operating Voltage:	DC 14.4 V (11 V to 16 V allowance)
Grounding System:		Negative ground		
Allowable Operating Temperature:		0°C to +40°C (32°F to 104°F)		
Dimensions (W × H × D): (approx.)		Installation Size:	182 mm × 52 mm × 160 mm (7-3/16" × 2-1/16" × 6-5/16")	
		Panel Size:	188 mm × 58 mm × 6 mm (7-7/16" × 2-5/16" × 1/4")	
Mass:		1.3 kg (2.9 lbs) (excluding accessories)		

Design and specifications are subject to change without notice.

If a kit is necessary for your car, consult your telephone directory for the nearest car audio speciality shop.





## ■ The countries where you may use the Bluetooth® function

- Die Länder, in denen Sie die Bluetooth® Funktion verwenden können
  - Pays où vous pouvez utiliser la fonction Bluetooth®
  - De landen waar u de Bluetooth®-functie mag gebruiken
  - Países en los que se puede utilizar la función Bluetooth®
  - Paesi nei quali è possibile utilizzare la funzione Bluetooth®
  - Länder där du kan använda Bluetooth®-funktionen
  - Lande, hvor du kan bruge Bluetooth®-funktionerne
  - Land hvor du kan bruke Bluetooth®-funksjonen
  - Maat, joissa voi käyttää Bluetooth®-toimintoa
  - Países onde pode usar a função Bluetooth®
  - Οι χώρες όπου μπορείτε να χρησιμοποιήσετε τη λειτουργία Bluetooth®
  - Страны, где можно воспользоваться функцией Bluetooth®
  - Země, ve kterých můžete využívat funkci Bluetooth®
  - Azok az országok, amelyekben használhatjuk a Bluetooth®-funkciót
  - Kraje, w których można używać funkcji Bluetooth®
  - Države, kjer lahko uporabljate funkcijo Bluetooth®
  - Krajiny, v ktorých môžete využívať funkciu Bluetooth®
  - Valstis, kur jūs varat izmantot Bluetooth® funkciju
  - Šalys, kuriose galite naudotis „Bluetooth®“ funkcija
  - Il-pajjiżi fejn tista' tuża l-funzjoni Bluetooth®
  - Lönd þar sem hægt er að nota Bluetooth®
  - Riigid, kus on võimalik kasutada Bluetooth® funktsiooni
  - Bluetooth® fonksiyonunu kullanabileceğiniz ülkeler
  - Na tíortha inar féidir leat feidhmiú Bluetooth® a úsáid
  - Länner an denen der d'Bluetooth® Funktioun benotze könnt.
  - Ở những quốc gia mà bạn có thể sử dụng chức năng Bluetooth®
  - Els països on podrà fer servir la funció Bluetooth®
  - Zemlje u kojima je dozvoljena upotreba Bluetooth® funkcije.
  - Zemlje u kojima možete koristiti Bluetooth® funkciju
  - Zemlje u kojima je dopušteno koristiti Bluetooth®.
  - Земљи каде можете да ја користите функцијата Bluetooth®
  - Страните, в които можете да ползвате функцията Bluetooth®
  - Tärile in care puteți utiliza funcția Bluetooth®
  - Die lande waar u die Bluetooth®-funksie kan gebruik
  - Amazwe lapho ungasebenzisa khona uhlelo lwe-Bluetooth®
  - Negara-negara yang membolehkan penggunaan fungsi Bluetooth®
  - Negara-negara yang anda boleh menggunakan fungsi Bluetooth®
  - 您能够使用 Bluetooth® 功能的國家
  - 您能夠使用 Bluetooth® 功能的國家
- המדינות שבהן באפשרותך להשתמש ב־Bluetooth®
- الدول التي يمكنك استخدام وظيفة Bluetooth® فيها

Country
Andorra
الإمارات العربية المتحدة
Australia
Österreich
Bosna i Hercegovina
Belgien Belgique
България
Canada
Schweiz Suisse
Κύπρος Kıbrıs
Česká republika
Deutschland
Danmark
Eesti
España
Suomi Finland
France
United Kingdom
Ελλάδα
Hong Kong 香港 香港
Hrvatska
Magyarország
Indonesia
Ireland Éire
ישראל إسرائيل
Ísland
Italia
Lichtenstein
Lietuva

Country
Luxemburg Luxembourg Lëtzebuerg
Latvija
Monaco
Crna Gora
Македонија
Malta
Nederland
Norge
New Zealand
Polska
Portugal
România
Srbija
Россия
Sverige
Singapore 新加坡 Singapura
Slovenija
Slovensko
Türkiye 台灣
United States of America
Vietnam Việt Nam
South Africa ENingizimu Afrika Suid-Afrika

**Having TROUBLE with operation?**  
**Please reset your unit**  
Refer to page of How to reset your unit  
**Still having trouble??**

USA ONLY

**Call 1-800-252-5722**

**<http://www.jvc.com>**

**We can help you!**

**JVC**



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**<https://www.boat-manuals.com/>**

# JVC KD-A315/KD-R310

## Installation/Connection Manual

## Manual de instalación/conexión

## Manuel d'installation/raccordement

GET0626-002A  
[J]

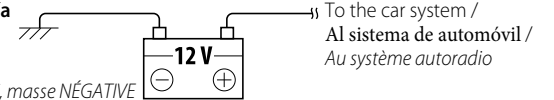
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ENGLISH / ESPAÑOL / FRANÇAIS

You need the installation kits which corresponds to your car. /  
Necesitará los kits de instalación que corresponden con su vehículo. /  
Vous avez besoin des kits d'installation correspondants à votre voiture.

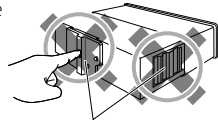
Check the battery system in your car / Verifique el sistema de batería  
de su vehículo / Vérifiez le système de batterie de votre voiture.



12 V DC, NEGATIVE ground / 12 V CC, NEGATIVO a masa / 12 VCC, masse NÉGATIVE

### WARNINGS / ADVERTENCIAS / AVERTISSEMENTS

- To prevent short circuits:
  - Disconnect the battery's negative terminal and make all electrical connections before installing the unit.
  - Cover the terminals of the UNUSED leads with insulating tape.
- Be sure to ground this unit to the car's chassis again after installation.
- Replace the fuse with one of the specified rating.
- Connect speakers with a maximum power of more than 50 W (impedance of 4 Ω to 8 Ω). Otherwise, change the <AMP GAIN> setting. (See page 23 of the INSTRUCTIONS.)
- The heat sink becomes very hot after use. Be careful not to touch it when removing this unit.



Heat sink / Sumidero térmico / Dissipateur de chaleur

- Para evitar cortocircuitos:
  - Desconecte el terminal negativo de la batería y realice todas las conexiones eléctricas antes de instalar la unidad.
  - Cubra los terminales de los conductores NO UTILIZADOS con cinta aislante.
- Asegúrese de volver a conectar a masa esta unidad al chasis del automóvil después de la instalación.
- Reemplace el fusible por uno con la corriente especificada.
- Conecte los altavoces con una potencia máxima de más de 50 W (impedancia de 4 Ω a 8 Ω). De lo contrario, cambie el ajuste <AMP GAIN>. (Véase la página 23 del MANUAL DE INSTRUCCIONES.)
- El sumidero térmico estará muy caliente después del uso. Asegúrese de no tocarlo al desmontar esta unidad.

- Pour éviter les courts-circuits:
  - Déconnectez la borne négative de la batterie et réalisez toutes les connexions avant d'installer l'appareil.
  - Recouvrez les prises des fils NON UTILISÉS avec du ruban isolant.
- Assurez-vous de raccorder de nouveau la mise à la masse de cet appareil au châssis de la voiture après l'installation.
- Remplacer le fusible par un de la valeur précisée.
- Connectez des enceintes avec une puissance maximum de 50 W (impédance de 4 Ω à 8 Ω). Sinon, changez le réglage <AMP GAIN>. (Voir la page 23 du MANUEL D'INSTRUCTIONS.)
- Le dissipateur de chaleur devient très chaud après usage. Faire attention de ne pas le toucher en retirant cet appareil.

### INSTALLATION / INSTALACION / INSTALLATION

The following illustration shows a typical installation. If you have any questions or require information regarding installation kits, consult your JVC car audio dealer or a company supplying kits.

La siguiente ilustración muestra una instalación típica. Si tiene alguna pregunta o necesita información acerca de las herramientas para instalación, consulte con su concesionario de JVC de equipos de audio para automóviles o a una compañía que suministra tales herramientas.

L'illustration suivante est un exemple d'installation typique. Si vous avez des questions ou avez besoin d'information sur des kits d'installation, consulter votre revendeur d'autoradios JVC ou une compagnie d'approvisionnement.

#### In-dash mounting / Montaje en el tablero / Montage encastré

**1** Insert the control panel into the dashboard.

**2** Secure the unit with the sleeve and handles.

**3** Do the required electrical connections. Realice las conexiones eléctricas requeridas. Réalisez les connexions électriques.

Install the unit at an angle of less than 30°. Instale la unidad a un ángulo de menos de 30°. Installez l'appareil avec un angle de moins de 30°.

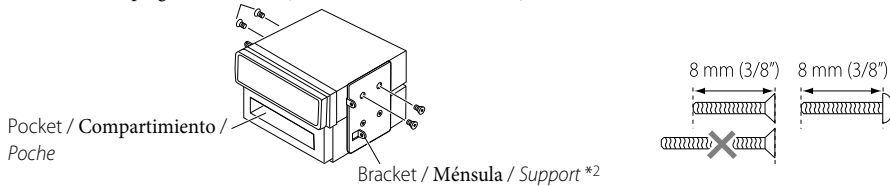
Bend the appropriate tabs to hold the sleeve firmly in place. Doble las lengüetas apropiadas para retener firmemente la manga en su lugar. Tordez les languettes appropriées pour maintenir le manchon en place.

#### Part list / Lista de componentes / Liste de pièces

- (A) Control panel / Panel de control / Panneau de commande (x1)
- (B) Sleeve / Cubierta / Manchon (x1)
- (C) Trim plate / Placa de guarnición / Plaque d'assemblage (x1)
- (D) Power cord / Cordon de alimentación / Cordon d'alimentation (x1)
- (E) Handles / Manijas / Poignées (x2)

#### When installing the unit without using the sleeve / Instalación de la unidad sin utilizar la cubierta / Lors de l'installation de l'appareil sans utiliser de manchon

Flat head screws—M5 × 8 mm (M5 × 3/8") / Tornillos de cabeza plana—M5 × 8 mm (M5 × 3/8 pulgada) / Vis à tête plate—M5 × 8 mm (M5 × 3/8 pouces) \*2

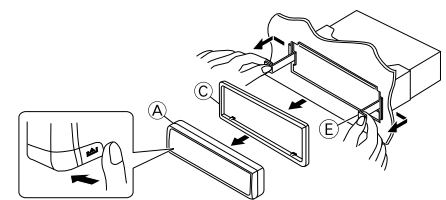


- \*1 When you stand the unit, be careful not to damage the fuse on the rear.
- \*2 Not supplied for this unit.

- \*1 Al poner la unidad vertical, tenga cuidado de no dañar el fusible provisto en la parte posterior.
- \*2 No suministrado con esta unidad.

#### Removing the unit / Extracción de la unidad / Retrait de l'appareil

Release the rear section first... / Primero libere la sección trasera... / Ouvrez la section arrière en premier...



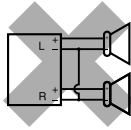
- \*1 Lorsque vous mettez l'appareil à la verticale, faire attention de ne pas endommager le fusible situé sur l'arrière.
- \*2 Non fourni avec cet appareil.

### TROUBLESHOOTING / LOCALIZACION DE AVERIAS / EN CAS DE DIFFICULTES

- The fuse blows.** ⇒ Are the red and black leads connected correctly?
- Power cannot be turned on.** ⇒ Is the yellow lead connected?
- No sound from the speakers.** ⇒ Is the speaker output lead short-circuited?
- "PROTECT" appears on the display and no operation can be done.** ⇒ Is the speaker output lead short-circuited or touches the chassis of the car/head unit? ; Have you reset your unit?
- Sound is distorted.** ⇒ Is the speaker output lead grounded? ; Are the "-" terminals of L and R speakers grounded in common?
- Noise interfere with sounds.** ⇒ Is the rear ground terminal connected to the car's chassis using shorter and thicker cords?
- This unit becomes hot.** ⇒ Is the speaker output lead grounded? ; Are the "-" terminals of L and R speakers grounded in common?
- This unit does not work at all.** ⇒ Have you reset your unit?
- El fusible se quema.** ⇒ ¿Están los conductores rojo y negro correctamente conectados?
- No es posible conectar la alimentación.** ⇒ ¿Está el cable amarillo conectado?
- No sale sonido de los altavoces.** ⇒ ¿Está el cable de salida del altavoz cortocircuitado?
- Aparece "PROTECT" en la pantalla y no se puede realizar ninguna operación.** ⇒ ¿El conductor de salida de altavoz está en cortocircuito o en contacto con el chasis del automóvil/auriculares? ; ¿Reinicializó la unidad?
- El sonido presenta distorsión.** ⇒ ¿Está el cable de salida del altavoz conectado a masa? ; ¿Están los terminales "-" de los altavoces L y R conectados a una masa común?
- Perturbación de ruido.** ⇒ ¿El terminal de tierra trasero está conectado al chasis del automóvil utilizando los cordones más corto y más grueso?
- Esta unidad se calienta.** ⇒ ¿Está el cable de salida del altavoz conectado a masa? ; ¿Están los terminales "-" de los altavoces L y R conectados a una masa común?
- Esta unidad no funciona en absoluto.** ⇒ ¿Reinicializó la unidad?
- Le fusible saute.** ⇒ Les fils rouge et noir sont-ils raccordés correctement?
- L'appareil ne peut pas être mise sous tension.** ⇒ Le fil jaune est-elle raccordée?
- Pas de son des enceintes.** ⇒ Le fil de sortie d'enceinte est-il court-circuité?
- "PROTECT" apparaît sur l'affichage et aucune opération ne peut être réalisée.** ⇒ Est-ce qu'un fil de sortie d'enceinte est court-circuité ou touche le châssis de la voiture/appareil principal? ; Avez-vous réinitialisé votre appareil?
- Le son est déformé.** ⇒ Le fil de sortie d'enceinte est-il à la masse? ; Les bornes "-" des enceintes gauche et droit sont-elles mises ensemble à la masse?
- Interférence avec les sons.** ⇒ La prise arrière de mise à la terre est-elle connectée au châssis de la voiture avec un cordon court et épais?
- Cet appareil devient chaud.** ⇒ Le fil de sortie d'enceinte est-il à la masse? ; Les bornes "-" des enceintes gauche et droit sont-elles mises ensemble à la masse?
- Cet appareil ne fonctionne pas du tout.** ⇒ Avez-vous réinitialisé votre appareil?

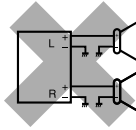
**PRECAUTIONS on power supply and speaker connections**

- DO NOT connect the speaker leads of the power cord to the car battery; otherwise, the unit will be seriously damaged.
- BEFORE connecting the speaker leads of the power cord to the speakers, check the speaker wiring in your car.



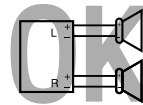
**PRECAUCIONES sobre las conexiones de la fuente de alimentación y de los altavoces**

- NO conecte los conductores de altavoz del cable de alimentación a la batería de automóvil, pues podrían producirse graves daños en la unidad.
- ANTES de conectar a los altavoces los conductores de altavoz del cable de alimentación, verifique el conexionado de altavoz de su automóvil.

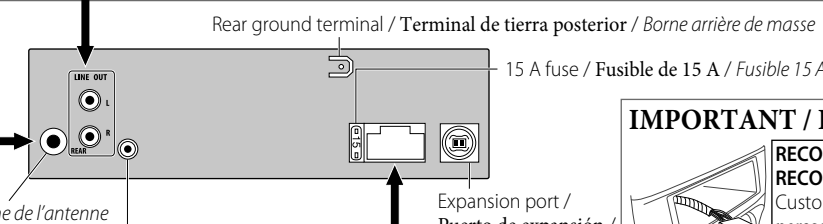
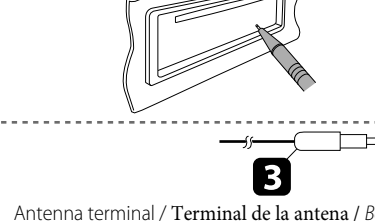
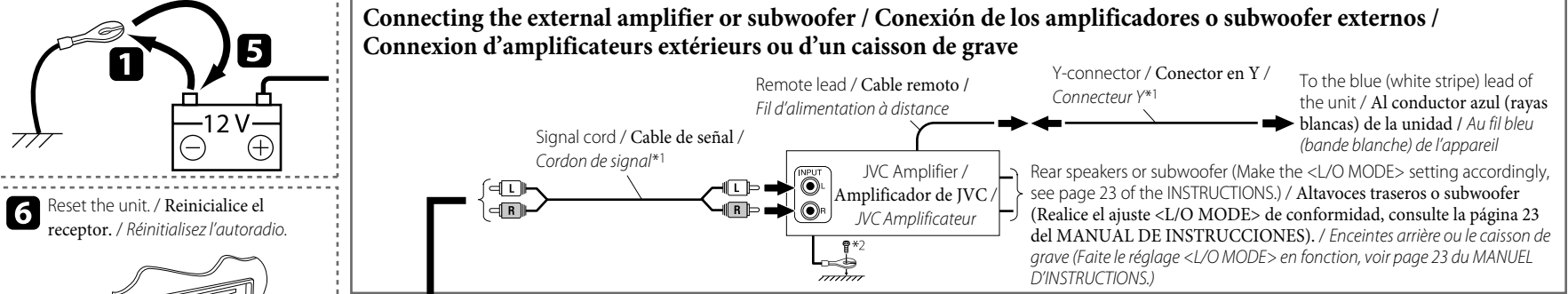


**PRECAUTIONS sur l'alimentation et la connexion des enceintes**

- NE CONNECTEZ PAS les fils d'enceintes du cordon d'alimentation à la batterie; sinon, l'appareil serait sérieusement endommagé.
- AVANT de connecter les fils d'enceintes du cordon d'alimentation aux enceintes, vérifiez le câblage des enceintes de votre voiture.



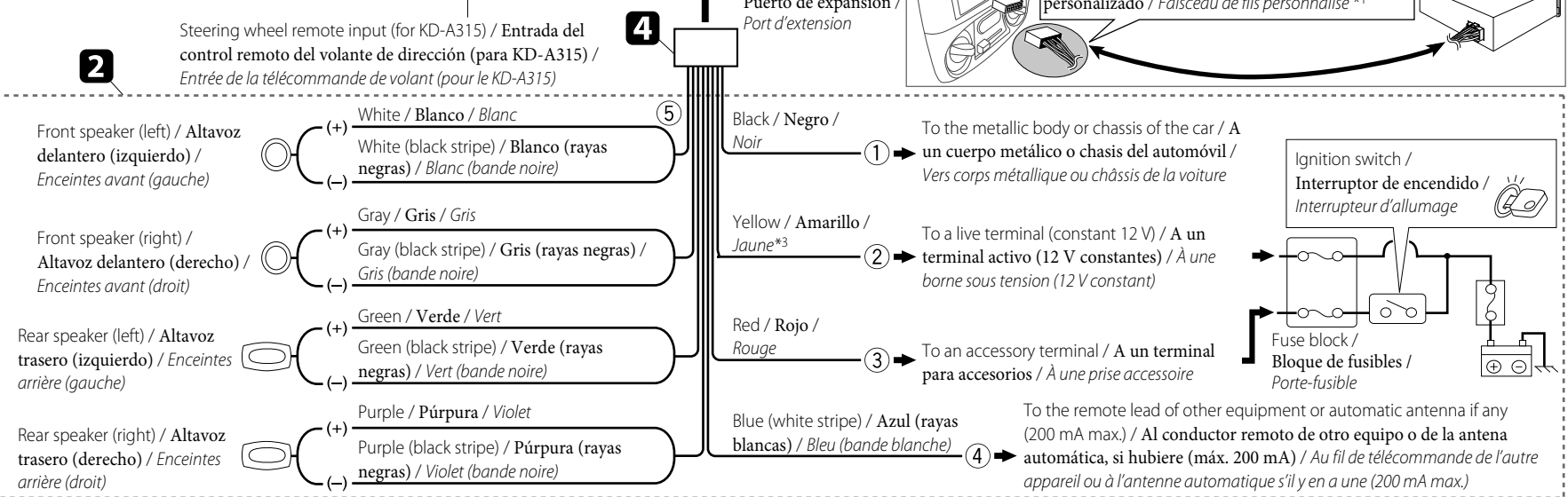
**Connecting the external amplifier or subwoofer / Conexión de los amplificadores o subwoofer externos / Connexion d'amplificateurs extérieurs ou d'un caisson de grave**



**IMPORTANT / IMPORTANTE / IMPORTANT**

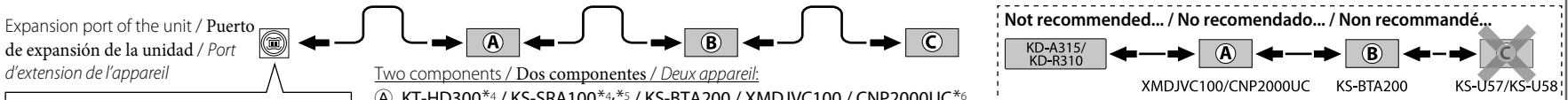
**RECOMMENDED CONNECTION / CONEXIÓN RECOMENDADA / CONNEXION RECOMMANDÉE**

Custom wiring harness / Mazo de cables personalizado / Faisceau de fils personnalisé\*1



**Connecting the external components in series / Conexión de componentes externos en serie / Connexion d'appareils extérieurs en série**

When connecting the external components, refer also to the manuals supplied for the components and adapter. / Cuando conecte componentes externos, consulte, también, los manuales suministrados con los componentes y el adaptador. / Lors de la connexion des appareils extérieurs, référez-vous aussi aux manuels fournis avec les appareils et les adaptateurs.



**Caution / Precaucion / Precaution:**

Before connecting the external components, make sure that the unit is turned off. / Antes de conectar los componentes externos, asegúrese de que la unidad esté apagada. / Avant de connecter les appareils extérieurs, assurez-vous que l'appareil est hors tension.

You can connect the HD Radio™ tuner box (KT-HD300) or the following components through the various JVC adapters or system to the expansion port. / Puede conectar el sintonizador HD Radio™ (KT-HD300) o los siguientes componentes al puerto de expansión, a través de los diversos adaptadores o sistema JVC. / Vous pouvez connecter le tuner HD Radio™ (KT-HD300) ou les appareils suivants à l'aide de divers adaptateur JVC ou système au port d'extension.

• Connection cords may need to be purchased separately. / Puede ser necesario comprar los cables de conexión por separado. / Vous pouvez avoir besoin d'acheter certains cordons de connexion séparément.

Component / Componente / Appareil	Adapter/System / Adaptador/Sistema / Adaptateur/Système	Model name / Nombre del modelo / Nom du modèle
Bluetooth device / Dispositivo Bluetooth / Périphérique Bluetooth	Bluetooth adapter / Adaptador Bluetooth / Adaptateur Bluetooth	KS-BTA200
XMDirect™ Tuner Box / XMDirect™ Tuner Box / XMDirect™ Tuner Box	Smart Digital Adapter / Adaptador digital inteligente / Adaptateur numérique intelligent	XMDJVC100
XMDirect2 Tuner System / Sistema de sintonizador XMDirect2 / XMDirect2 Tuner System	XM satellite radio System / Sistema de radio XM Satellite / Système radio satellite XM	CNP2000UC, CNPJVC1
SIRIUS satellite radio / Radio por satélite SIRIUS / Radio satellite SIRIUS	SIRIUS satellite radio System / Sistema de radio satelital SIRIUS / Système radio satellite SIRIUS	SC-C1, KS-SRA100 PnP, SC-VDOC1, KS-SRA100
Portable audio player with line output jacks / Reproductor de audio portátil con jacks de salida de línea / Lecteur audio portable avec prises de sortie de ligne	Line input adapter / Adaptador de entrada por línea / Adaptateur d'entrée de ligne	KS-U57
Portable audio player with 3.5 mm (3/16") stereo mini jack / Reproductor de audio portátil con jack mini estéreo de 3,5 mm (3/16 pulgada) / Lecteur audio portable avec mini fiche stéréo de 3,5 mm (3/16 pouces)	AUX input adapter / Adaptador de entrada AUX / Adaptateur d'entrée auxiliaire	KS-U58

XM Radio and SIRIUS satellite radio cannot be used together. / No puede utilizar juntas la radio XM y la radio satelital SIRIUS. / La radio XM et SIRIUS ne peuvent pas être utilisées en même temps.

• HD Radio™ is a proprietary trademark of iBiquity Digital Corp. / HD Radio™ es una marca comercial de iBiquity Digital Corp. / HD Radio™ est une marque de commerce d'iBiquity Digital Corp.

\*1 Not supplied for this unit. / \*1 No suministrado con esta unidad. / \*1 Non fourni avec cet appareil.

\*2 Firmly attach the ground wire to the metallic body or to the chassis of the car—to the place uncoated with paint. / \*2 Fije firmemente el cable de tierra a la carrocería metálica o al chasis—a un lugar no cubierto con pintura. / \*2 Attachez solidement le fil de mise à la masse au châssis métallique de la voiture—à un endroit qui n'est pas recouvert de peinture.

\*3 Before checking the operation of this unit prior to installation, this lead must be connected; otherwise, the power cannot be turned on. / \*3 Antes de comprobar el funcionamiento de esta unidad previa a de la instalación, es necesario conectar este cable, de lo contrario no se podrá conectar la alimentación. / \*3 Pour vérifier le fonctionnement de cet appareil avant installation, ce fil doit être raccordé, sinon l'appareil ne peut pas être mis sous tension.

\*4 Connect the power cord supplied for the component separately for power supply. / \*4 Conecte el cable de alimentación suministrado separadamente para el componente. / \*4 Connectez le cordon d'alimentation fourni avec les appareils séparément à l'alimentation.

\*5 This model is a component of SIRIUS satellite radio System. / \*5 Este modelo es un componente del sistema de radio satelital SIRIUS. / \*5 Ce modèle est un composant du système radio satellite SIRIUS.

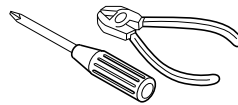
\*6 This model is a component of XM satellite radio System. / \*6 Este modelo es un componente del sistema de radio XM Satellite. / \*6 Ce modèle est un composant du système radio satellite XM.

# JVC KD-R338/KD-R330

## Installation/Connection Manual

### Manual de instalación/conexión

### Manuel d'installation/raccordement



GET0760-002A  
[J]

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## WARNINGS / ADVERTENCIAS / AVERTISSEMENTS

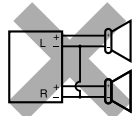
- You need the installation kits which corresponds to your car.
- If you have any questions or require information regarding installation kits, consult your JVC car audio dealer or a company supplying kits.
- The unit can only be installed in a car with a 12 V DC power supply, negative ground.
- Disconnect the battery's negative terminal and make all electrical connections before installing the unit.
- Connect speakers with a maximum power of more than 50 W (impedance of 4 Ω to 8 Ω). Otherwise, change the <AMP GAIN> setting. (See page 12 of the INSTRUCTIONS.)
- Insulate unconnected wires with vinyl tape or other similar material. To prevent a short circuit, do not remove the caps on the ends of the unconnected wires or the terminals.
- If the fuse blows, first make sure the wires are not touching to cause a short circuit, then replace the old fuse with one that has the same rating.
- Install this unit in the console of your vehicle.
- Mount the unit so that the mounting angle is 30° or less.
- Be sure to ground this unit to the car's chassis again after installation.
- After the unit is installed, check whether the brake lamps, blinkers, wipers, etc. on the car are working properly.
- Do not touch the metal part of this unit during and shortly after the use of the unit. Metal part such as the heat sink and enclosure become hot.

- Necesitará los kits de instalación que corresponden con su vehículo.
- Si tiene alguna pregunta o necesita información acerca de las herramientas para instalación, consulte con su concesionario de JVC de equipos de audio para automóviles o a una compañía que suministra tales herramientas.
- La unidad puede instalarse solamente en un automóvil con fuente de alimentación de 12 V CC, negativo a masa.
- Desconecte el terminal negativo de la batería y realice todas las conexiones eléctricas antes de instalar la unidad.
- Conecte los altavoces con una potencia máxima de más de 50 W (impedancia de 4 Ω a 8 Ω). De lo contrario, cambie el ajuste <AMP GAIN>. (Véase la página 12 del MANUAL DE INSTRUCCIONES).
- Aíse los cables no conectados con cinta de vinilo u otro material similar. Para prevenir los cortocircuitos, no quite las tapas de los extremos de los cables o terminales no conectados.
- Si se funde un fusible, asegúrese primero de que los cables no estén en contacto pues pueden ocasionar un cortocircuito, luego reemplace el fusible dañado por otro de las mismas características.
- Instale esta unidad en la consola de su vehículo.
- Instale la unidad en un ángulo de montaje de 30° o menos.
- Asegúrese de volver a conectar a masa esta unidad al chasis del automóvil después de la instalación.
- Después de haber instalado la unidad, compruebe que las luces de freno, los intermitentes, los limpiaparabrisas, etc. del automóvil funcionan correctamente.
- No toque la parte metálica de esta unidad durante e inmediatamente después de usar la unidad. Las partes metálicas tal como el dissipador de calor y la carcasa estarán calientes.

- Vous avez besoin des kits d'installation correspondants à votre voiture.
- Si vous avez des questions ou avez besoin d'information sur des kits d'installation, consulter votre revendeur d'autoradios JVC ou une compagnie d'approvisionnement.
- L'appareil peut uniquement être installé dans une voiture avec une alimentation de 12 V CC, à masse négative.
- Déconnectez la borne négative de la batterie et réalisez toutes les connexions avant d'installer l'appareil.
- Connectez des enceintes avec une puissance maximum de 50 W (impédance de 4 Ω à 8 Ω). Sinon, changez le réglage <AMP GAIN>. (Voir la page 12 du MANUEL D'INSTRUCTIONS.)
- Isoler les câbles non-connectés avec un ruban de vinyle ou d'un autre matériel similaire. Pour éviter les courts-circuits, ne retirez pas non plus les capuchons à l'extrémité des câbles non-connectés ou des prises.
- Si un fusible saute, assurez-vous d'abord que les câbles n'ont pas causé de court-circuit puis remplacez le vieux fusible par un nouveau de même valeur.
- Installez cet appareil dans la console de votre véhicule.
- Monter l'unité de façon à ce que l'angle de montage soit de 30° ou moins.
- Assurez-vous de raccorder de nouveau la mise à la masse de cet appareil au châssis de la voiture après l'installation.
- Après avoir installé l'appareil, vérifiez si les lampes de frein, les indicateurs, les clignotants, etc. de la voiture fonctionnent correctement.
- Ne touchez pas la partie métallique de cet appareil pendant ou juste après son utilisation. Les parties métalliques, comme le dissipateur de chaleur et le boîtier, deviennent chaudes.

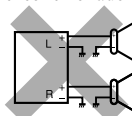
### PRECAUTIONS on power supply and speaker connections

- DO NOT connect the speaker leads of the power cord to the car battery; otherwise, the unit will be seriously damaged.
- BEFORE connecting the speaker leads of the power cord to the speakers, check the speaker wiring in your car.



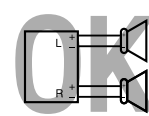
### PRECAUCIONES sobre las conexiones de la fuente de alimentación y de los altavoces

- NO conecte los conductores de altavoz del cable de alimentación a la batería de automóvil, pues podrían producirse graves daños en la unidad.
- ANTES de conectar a los altavoces los conductores de altavoz del cable de alimentación, verifique el conexionado de altavoz de su automóvil.



### PRECAUTIONS sur l'alimentation et la connexion des enceintes

- NE CONNECTEZ PAS les fils d'enceintes du cordon d'alimentation à la batterie; sinon, l'appareil serait sérieusement endommagé.
- AVANT de connecter les fils d'enceintes du cordon d'alimentation aux enceintes, vérifiez le câblage des enceintes de votre voiture.



## INSTALLATION / INSTALACION / INSTALLATION

### In-dash mounting / Montaje en el tablero / Montage encastré

**1** Do the required electrical connections. / Realice las conexiones eléctricas requeridas. / Réalisez les connexions électriques.

**2** Bend the appropriate tabs to hold the sleeve firmly in place. / Doble las lengüetas apropiadas para retener firmemente la manga en su lugar. / Tordez les languettes appropriées pour maintenir le manchon en place.

**3** Install the unit at an angle of less than 30°. / Installez l'appareil avec un angle de moins de 30°.

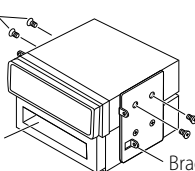
**Part list / Lista de componentes / Liste de pièces**

- A Control panel / Panel de control / Panneau de commande (x1)
- B Sleeve / Cubierta / Manchon (x1)
- C Trim plate / Placa de guarnición / Plaque d'assemblage (x1)
- D Power cord / Cordón de alimentación / Cordon d'alimentation (x1)
- E Handles / Manijas / Poignées (x2)

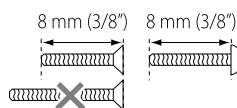
### When installing the unit without using the sleeve / Instalación de la unidad sin utilizar la cubierta / Lors de l'installation de l'appareil sans utiliser de manchon

Flat head screws—M5 × 8 mm (M5 × 3/8") / Tornillos de cabeza plana—M5 × 8 mm (M5 × 3/8 pulgada) / Vis à tête plate—M5 × 8 mm (M5 × 3/8 pouces) \*

Pocket / Compartimiento / Poche



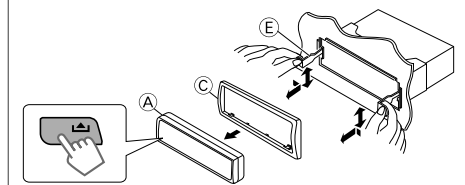
Bracket / Ménsula / Support \*



- \* Not supplied for this unit.
- \* No suministrado con esta unidad.
- \* Non fourni avec cet appareil.

### Removing the unit / Extracción de la unidad / Retrait de l'appareil

Release the rear section first... / Primero libere la sección trasera... / Ouvrez la section arrière en premier...



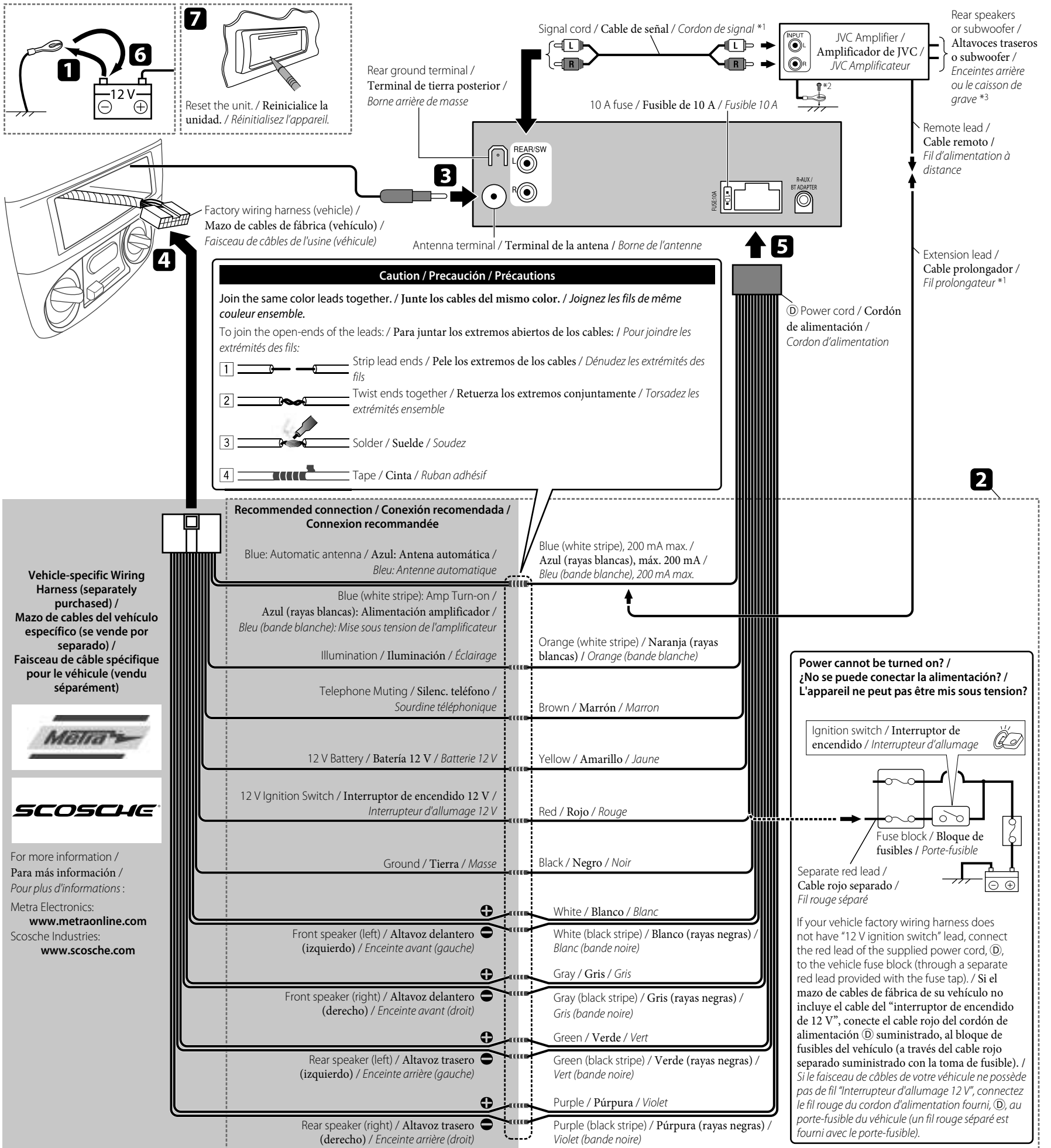
## TROUBLESHOOTING / LOCALIZACION DE AVERIAS / EN CAS DE DIFFICULTES

- The fuse blows.** ⇒ Are the red and black leads connected correctly?
- Power cannot be turned on.** ⇒ Is the yellow lead connected?
- No sound from the speakers.** ⇒ Is the speaker output lead short-circuited?
- "MISWIRING CHK WIRING THEN RESET UNIT" / "WARNING CHK WIRING THEN RESET UNIT" appears on the display and no operation can be done.** ⇒ Is the speaker output lead short-circuited or touches the chassis of the car/head unit?; Have you reset your unit?
- Sound is distorted.** ⇒ Is the speaker output lead grounded?; Are the "-" terminals of L and R speakers grounded in common?
- Noise interfere with sounds.** ⇒ Is the rear ground terminal connected to the car's chassis using shorter and thicker cords?
- This unit becomes hot.** ⇒ Is the speaker output lead grounded?; Are the "-" terminals of L and R speakers grounded in common?
- This unit does not work at all.** ⇒ Have you reset your unit?

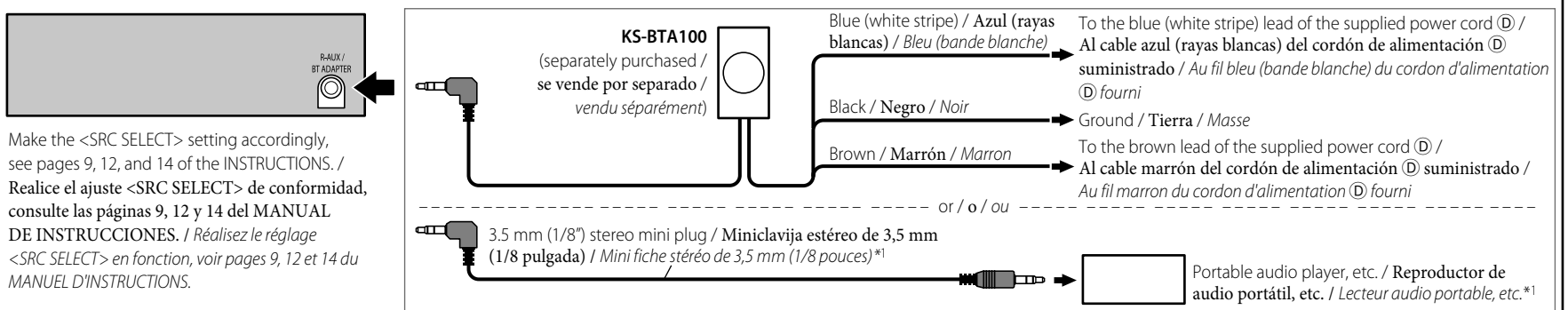
- El fusible se quema.** ⇒ ¿Están los conductores rojo y negro correctamente conectados?
- No es posible conectar la alimentación.** ⇒ ¿Está el cable amarillo conectado?
- No sale sonido de los altavoces.** ⇒ ¿Está el cable de salida del altavoz cortocircuitado?
- Aparece "MISWIRING CHK WIRING THEN RESET UNIT" / "WARNING CHK WIRING THEN RESET UNIT" en la pantalla y no se puede realizar ninguna operación.** ⇒ ¿El conductor de salida de altavoz está en cortocircuito o en contacto con el chasis del automóvil/auriculares?; ¿Reinicializó la unidad?
- El sonido presenta distorsión.** ⇒ ¿Está el cable de salida del altavoz conectado a masa?; ¿Están los terminales "-" de los altavoces L y R conectados a una masa común?
- Perturbación de ruido.** ⇒ ¿El terminal de tierra trasero está conectado al chasis del automóvil utilizando los cordones más corto y más grueso?
- Esta unidad se calienta.** ⇒ ¿Está el cable de salida del altavoz conectado a masa?; ¿Están los terminales "-" de los altavoces L y R conectados a una masa común?
- Esta unidad no funciona en absoluto.** ⇒ ¿Reinicializó la unidad?

- Le fusible saute.** ⇒ Les fils rouge et noir sont-ils raccordés correctement?
- L'appareil ne peut pas être mise sous tension.** ⇒ Le fil jaune est-elle raccordée?
- Pas de son des enceintes.** ⇒ Le fil de sortie d'enceinte est-il court-circuité?
- "MISWIRING CHK WIRING THEN RESET UNIT" / "WARNING CHK WIRING THEN RESET UNIT" apparaît sur l'affichage et aucune opération ne peut être réalisée.** ⇒ Est-ce qu'un fil de sortie d'enceinte est court-circuité ou touche le châssis de la voiture/appareil principal?; Avez-vous réinitialisé votre appareil?
- Le son est déformé.** ⇒ Le fil de sortie d'enceinte est-il à la masse?; Les bornes "-" des enceintes gauche et droit sont-elles mises ensemble à la masse?
- Interférence avec les sons.** ⇒ La prise arrière de mise à la terre est-elle connectée au châssis de la voiture avec un cordon court et épais?
- Cet appareil devient chaud.** ⇒ Le fil de sortie d'enceinte est-il à la masse?; Les bornes "-" des enceintes gauche et droit sont-elles mises ensemble à la masse?
- Cet appareil ne fonctionne pas du tout.** ⇒ Avez-vous réinitialisé votre appareil?

# ELECTRICAL CONNECTIONS / CONEXIONES ELECTRICAS / RACCORDEMENTS ELECTRIQUES



## Connecting the Bluetooth adapter or portable audio player / Conexión del adaptador Bluetooth o del reproductor de audio portátil / Connexion de l'adaptateur Bluetooth ou d'un lecteur audio portable



\*1 Not supplied for this unit.

\*2 Firmly attach the ground wire to the metallic body or to the chassis of the car—to the place uncoated with paint.

\*3 Make the <L/O MODE> setting accordingly, see page 11 of the INSTRUCTIONS.

\*1 No suministrado con esta unidad.

\*2 Fije firmemente el cable de tierra a la carrocería metálica o al chasis—a un lugar no cubierto con pintura.

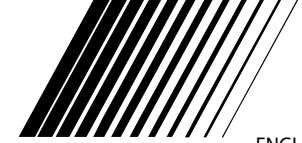
\*3 Realice el ajuste <L/O MODE> de conformidad, consulte la página 11 del MANUAL DE INSTRUCCIONES.

\*1 Non fourni avec cet appareil.

\*2 Attachez solidement le fil de mise à la masse au châssis métallique de la voiture—à un endroit qui n'est pas recouvert de peinture.

\*3 Réalisez le réglage <L/O MODE> en fonction, voir page 11 du MANUEL D'INSTRUCTIONS.

# JVC



ENGLISH  
ESPAÑOL  
FRANÇAIS

## KD-R338/KD-R330

CD RECEIVER / RECEPTOR CON CD /  
RÉCEPTEUR CD

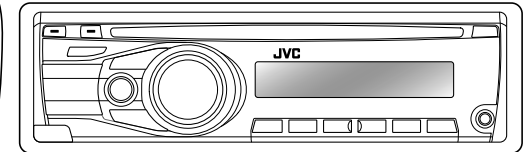
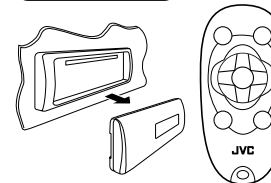
**Having TROUBLE with operation?**  
**Please reset your unit**  
Refer to page of How to reset your unit  
**Still having trouble??**

USA ONLY

**Call 1-800-252-5722**  
**<http://www.jvc.com>**  
**We can help you!**



**WMA MP3**



For canceling the display demonstration, see page 4. / Para cancelar la demostración en pantalla, consulte la página 4. / Pour annuler la démonstration des affichages, référez-vous à la page 4.

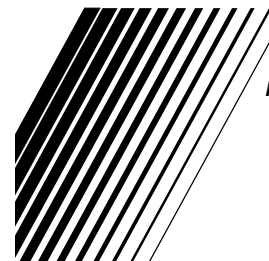
For installation and connections, refer to the separate manual.  
Para la instalación y las conexiones, refiérase al manual separado.  
Pour l'installation et les raccordements, se référer au manuel séparé.

**For customer Use:**  
Enter below the Model No. and Serial No. which are located on the top or bottom of the cabinet. Retain this information for future reference.  
Model No. \_\_\_\_\_  
Serial No. \_\_\_\_\_

# JVC

 EN, SP, FR  
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0811DTSMJTJEIN



**INSTRUCTIONS**  
**MANUAL DE INSTRUCCIONES**  
**MANUEL D'INSTRUCTIONS**

GET0760-001A

[J]

<https://www.boat-manuals.com/>



Thank you for purchasing a JVC product.

Please read all instructions carefully before operation, to ensure your complete understanding and to obtain the best possible performance from the unit.

## **INFORMATION (For U.S.A.)**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

## **Caution:**

Changes or modifications not approved by JVC could void the user's authority to operate the equipment.

## **IMPORTANT FOR LASER PRODUCTS**

### 1. CLASS 1 LASER PRODUCT

2. **CAUTION:** Do not open the top cover. There are no user serviceable parts inside the unit; leave all servicing to qualified service personnel.

3. **CAUTION:** (For U.S.A.) Visible and/or invisible class II laser radiation when open. Do not stare into beam.

(For Canada) Visible and/or invisible class 1M laser radiation when open. Do not view directly with optical instruments.

### 4. REPRODUCTION OF LABEL: CAUTION LABEL, PLACED OUTSIDE THE UNIT.

<b>CAUTION</b> VISIBLE AND/OR INVISIBLE CLASS 1M LASER RADIATION WHEN OPEN. DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS. IEC60825-1:2001 (ENG)	<b>ATTENTION</b> ENVIRONNEMENT LASER VISIBLE ET/OU INVISIBLE DE CLASSE 1M UNE FOIS OUVERT. NE PAS REGARDER DIRECTEMENT AVEC DES INSTRUMENTS OPTIQUES. (FRA)	<b>AVISO</b> RADIACION LASER DE CLASE 1M VISIBLE Y/O INVISIBLE CUANDO ESTA ABIERTO. NO MIRAR DIRECTAMENTE CON INSTRUMENTAL OPTICO. (ESP)	<b>VARNING</b> SYNLIG OCH/ELLER OBYNLIG LASERSTRÅLNING, KLASS 1M, NÄR DENNA DEL ÄR ÖPPNAD. BETRÄKTA EJ STRÅLEN MED OPTISKA INSTRUMENT. (SWE)	<b>注意</b> レーザー放射が 出ます。 光学機器で直接 見ないでください。 (JPN)	<b>CAUTION</b> VISIBLE AND/OR INVISIBLE CLASS II LASER RADIATION WHEN OPEN. DO NOT STARE INTO BEAM. FDA 21 CFR (ENG)
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[European Union only]

## **Caution:**

Adjust the volume so that you can hear sounds outside the car. Driving with the volume too high may cause an accident.

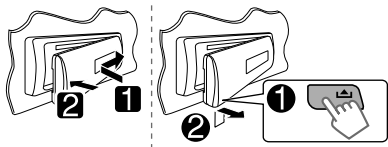
## **WARNING:**

Stop the car before operating the unit.

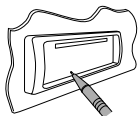
## **Caution on volume setting:**

Discs produce very little noise compared with other sources. Lower the volume before playing a disc to avoid damaging the speakers by the sudden increase of the output level.

## How to attach/detach the control panel



## How to reset your unit



Your preset adjustments will also be erased.

## How to forcibly eject a disc



- Be careful not to drop the disc when it ejects.
- If this does not work, reset your unit.

## Maintenance

### Cleaning the unit

Wipe off the dirt on the panel with a dry silicon or soft cloth. Failure to observe this precaution may result in damage to the monitor or unit.

### Cleaning the connector

Wipe off dirt on the connector of the unit and panel. Use a cotton swab or cloth.

### Caution for DualDisc playback:

The Non-DVD side of a "DualDisc" does not comply with the "Compact Disc Digital Audio" standard. Therefore, the use of Non-DVD side of a DualDisc on this product may not be recommended.

## CONTENTS

- 3 How to attach/detach the control panel
- 3 How to reset your unit
- 3 How to forcibly eject a disc
- 3 Maintenance
- 4 **Canceling the display demonstration**
- 4 **Setting the clock**
- 5 **Preparing the remote controller**
- 5 **About discs**
- 6 **Basic operations**
- 7 **Listening to the radio**
- 8 **Listening to a disc**
- 9 **Connecting the other external components**
- 9 **Listening to the other external components**
- 10 **Selecting a preset sound mode**
- 10 **Menu operations**
- 13 **Troubleshooting**
- 14 **Using Bluetooth® devices**
- 15 **Specifications**

**Condensation :** When the car is air-conditioned, moisture may collect on the laser lens. This may cause disc read errors. In this case, remove the disc and wait for the moisture to evaporate.

**Temperature inside the car :** If you have parked the car for a long time in hot or cold weather, wait until the temperature in the car becomes normal before operating the unit.

# Canceling the display demonstration

## 1 Turn on the power.



## 2 MENU [Hold]



## 4 Select <DEMO OFF>.



## 6 Finish the procedure.



# Setting the clock

## 1 Turn on the power.



## 2 MENU [Hold]



## 3 Select <CLOCK>.



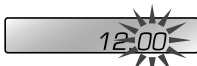
## 4 Select <CLOCK SET>.



## 5 Adjust the hour.



## 6 Adjust the minute.

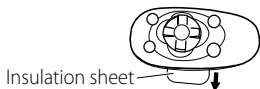


## 7 Finish the procedure.



# Preparing the remote controller

When you use the remote controller for the first time, pull out the insulation sheet.

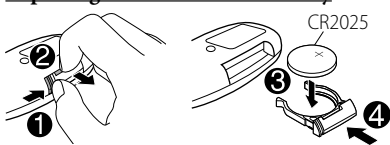


For USA-California Only:

This product contains a CR Coin Cell Lithium Battery which contains Perchlorate Material—special handling may apply. See [www.dtsc.ca.gov/hazardouswaste/perchlorate](http://www.dtsc.ca.gov/hazardouswaste/perchlorate)

**If the effectiveness of the remote controller decreases, replace the battery.**

## Replacing the lithium coin battery



## Caution:

- Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type.
- Battery shall not be exposed to excessive heat such as sunshine, fire, or the like.

## Warning (to prevent accidents and damage):

- Do not install any battery other than CR2025 or its equivalent.
- Do not leave the remote controller in a place (such as dashboards) exposed to direct sunlight for a long time.
- Store the battery in a place where children cannot reach.
- Do not recharge, short, disassemble, heat the battery, or dispose of it in a fire.
- Do not leave the battery with other metallic materials.
- Do not poke the battery with tweezers or similar tools.
- Wrap the battery with tape and insulate when throwing away or saving it.

# About discs

This unit can only play the CDs with:



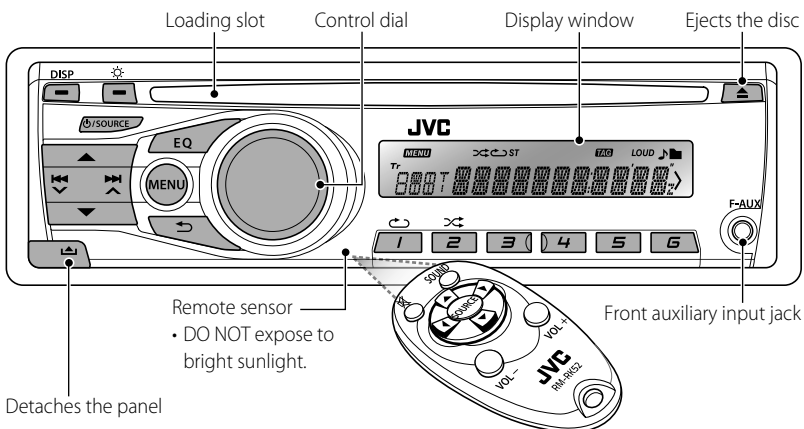
## Discs that cannot be used:

- Discs that are not round.
- Discs with coloring on the recording surface or discs that are dirty.
- You cannot play a Recordable/ReWritable disc that has not been finalized. (For the finalization process refer to your disc writing software, and your disc recorder instruction manual.)
- 3-inch CD cannot be used. Attempt to insert using an adapter can cause malfunction.

## Handling discs:

- Do not touch the recording surface of the disc.
- Do not stick tape etc. on the disc, or use a disc with tape stuck on it.
- Do not use any accessories for the disc.
- Clean from the center of the disc and move outward.
- Clean the disc with a dry silicon or soft cloth. Do not use any solvents.
- When removing discs from this unit, pull them out horizontally.
- Remove the rims from the center hole and disc edge before inserting a disc.

# Basic operations



When you press or hold the following button(s)...

Main unit	Remote controller	General operation
⏻ / SOURCE	—	Turns on/off [Hold].
	<b>SOURCE</b>	Selects the sources (FM, CD, F-AUX, BT AUDIO or R-AUX or BT PHONE, AM). • "CD" is selectable only when a disc is loaded.
Control dial (turn)	<b>VOL - / +</b>	Adjusts the volume level.
	—	Selects items.
Control dial (press)		Mutes the sound during playback. If the source is "CD," playback pauses. • Press the button again to cancel muting or resume playback.
	—	Confirms selection.
<b>EQ</b>	<b>SOUND</b>	Selects the sound mode. • Hold the <b>EQ</b> button on the main unit to enter tone level adjustment directly. (page 10)
Number buttons (1 – 6)	—	• Selects preset stations. • Stores the current station into the selected number button [Hold]. • Press number button <b>1</b> (↺) or <b>2</b> (↻) to enter REPEAT/RANDOM setting directly. (page 8)
	—	Enters <BRIGHTNESS> menu directly. (page 11)
	—	• Returns to the previous menu. • Exit from the menu [Hold].
<b>DISP</b>	—	• Changes the display information. • Scrolls the display information [Hold].

# Listening to the radio



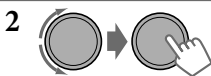
⇒ "FM" or "AM"



- [Press] Searches for stations automatically.
- [Hold] Searches for stations manually. "M" flashes, then press the button repeatedly.

"ST" lights up when receiving an FM stereo broadcast with sufficient signal strength.

## Improving the FM reception



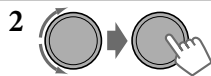
⇒ <TUNER> ⇒ <MONO> ⇒ <MONO ON>  
Reception improves, but stereo effect will be lost.

**To restore the stereo effect**, repeat the same procedure to select <MONO OFF>.

## Automatic presetting (FM)— SSM (Strong-station Sequential Memory)

You can preset up to 18 stations for FM.

While listening to a station...



⇒ <TUNER> ⇒ <SSM> ⇒  
<SSM 01 – 06 / 07 – 12 / 13 – 18>  
"SSM" flashes and local stations with the strongest signal are searched and stored automatically.

**To preset another 6 stations**, repeat the above procedure by selecting one of the other SSM setting ranges.

## Changing the display information

DISP



Frequency ↔ Clock

## Manual presetting (FM/AM)

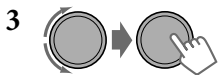
You can preset up to 18 stations for FM and 6 stations for AM.



⇒ Tune in to a station you want to preset.



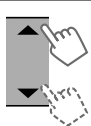
"PRESET MODE" flashes.



⇒ Selects preset number.  
Preset number flashes and "MEMORY" appears.

- Pressing and holding the number buttons (1 – 6) can also store the current station to the selected number buttons (1 – 6).

## Selecting a preset station



- Pressing the number buttons (1 – 6) can also select the preset stations (1 – 6).

## Using the remote controller

▲/▼ : Changes the preset stations.

◀/▶ : [Press] Searches for stations automatically.

[Hold] Searches for stations manually.

# Listening to a disc



Playback starts automatically.

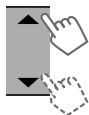
All tracks will be played repeatedly until you change the source or eject the disc.

## Stopping playback and ejecting the disc



If the ejected disc is not removed within 15 seconds, it is automatically inserted into the loading slot.

## Selecting a track/folder



Selects folder of the MP3/WMA



[Press] Selects track.  
[Hold] Fast-forwards or reverses the track.

## Using the remote controller

▲/▼ : Selects folder of the MP3/WMA.

◀/▶ : [Press] Selects track.

[Hold] Fast-forwards or reverses the track.

## Changing the display information




Disc title/Album name/performer (folder name)\* → Track title (file name)\* → Current track number with the elapsed playing time → Current track number with the clock time → (back to the beginning)

\* "NO NAME" appears for conventional CDs or if not recorded.

## Selecting a track/folder from the list





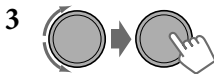
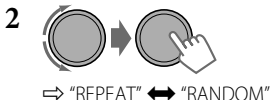
- If the MP3/WMA disc contains many tracks, you can fast search ( $\pm 10, \pm 100$ ) through the disc by turning the control dial quickly.
- To return to the previous menu, press .

## Selecting the playback modes

You can use only one of the following playback modes at a time.



- Pressing number button **1** () or **2** () can enter REPEAT/RANDOM setting directly. Then, perform step 3.



### REPEAT

TRACK RPT : Repeats current track  
FOLDER RPT : Repeats current folder

### RANDOM

FOLDER RND : Randomly plays all tracks of current folder, then tracks of next folders  
ALL RND : Randomly plays all tracks

To cancel repeat play or random play, select "RPT OFF" or "RND OFF."

# Connecting the other external components

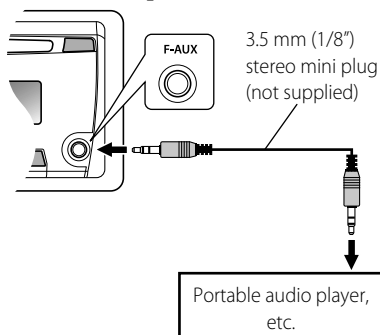
You can connect an external component to the auxiliary input jack on the control panel (F-AUX) and/or on the rear side of the unit (R-AUX).

Summary of using the external components through the auxiliary input jacks:

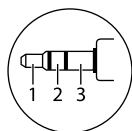
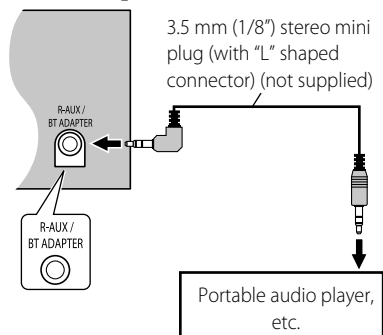
External component	Auxiliary input jack	Preparation			Source name	Connecting cable/device (not supplied)
		Menu setting item	Sub-item	Setting		
Portable audio player	Front	SRC SELECT	F-AUX	ON	F-AUX	See below.
	Rear	SRC SELECT	R-AUX	ON	R-AUX	
Bluetooth device	Rear	SRC SELECT	R-AUX	BT ADAPTER	BT AUDIO/ BT PHONE*	KS-BTA100 (page 14)

\* "BT PHONE" appears when a Bluetooth phone is in use.

## On the control panel (F-AUX):



## On the rear panel (R-AUX):



Recommended to use a 3-terminal plug head stereo mini plug for optimum audio output.

# Listening to the other external components

For details, refer also to the instructions supplied with the external components.

1



⇒ "F-AUX" or "R-AUX"

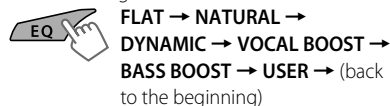
2

Turn on the connected component and start playing the source.

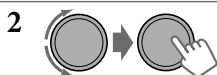


# Selecting a preset sound mode

You can select a preset sound mode suitable for the music genre.



While listening, you can adjust the subwoofer and tone level of the selected sound mode.

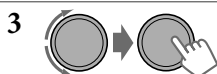


Adjust the level:  
 SUB.W\*: 00 to 08  
 BASS/ MID/ TRE : -06 to +06  
 The sound mode is automatically stored and changed to "USER."

\* Subwoofer level is adjustable only when <L/O MODE> is set to <SUB.W>. (page 11)

## Storing your own sound mode

You can store your own adjustments in memory.



Adjust the sound elements of the selected tone.

**BASS** [Initial: 80 Hz, 00, Q1.0]

Frequency: 60/ 80/ 100/ 200 Hz

Level: -06 to +06

Q: Q1.0/ 1.25/ 1.5/ 2.0

**MIDDLE** [Initial: 1.0 kHz, 00, Q1.25]

Frequency: 0.5/ 1.0/ 1.5/ 2.5 kHz

Level: -06 to +06

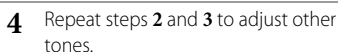
Q: Q0.75/ 1.0/ 1.25

**TREBLE** [Initial: 10.0 kHz, 00, Q FIX]

Frequency: 10.0/ 12.5/ 15.0/ 17.5 kHz

Level: -06 to +06

Q: Q FIX

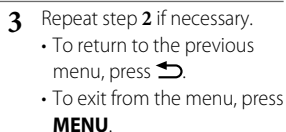
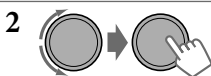


The adjustments made is automatically stored and changed to "USER."

# Menu operations



If no operation is done for about 60 seconds, the operation will be canceled.



Menu item	Selectable setting, [Initial: <u>Underlined</u> ]
DEMO	<u>ON</u> : Display demonstration will be activated automatically if no operation is done for about 20 seconds. / <u>OFF</u> : Cancels. (page 4)
CLOCK	For settings, see page 4.

Menu item		Selectable setting, [ <u>Initial: Underlined</u> ]
DIMMER	DIMMER SET	<b>AUTO</b> : Changes the display and button illumination between the Day/Night adjustments in <BRIGHTNESS> setting when you turn off/on the car headlights. *1 / <b>ON</b> : Selects the Night adjustments in <BRIGHTNESS> setting for the display and button illumination. / <b>OFF</b> : Selects the Day adjustments in <BRIGHTNESS> setting for the display and button illumination.
	BRIGHTNESS	<b>DAY [ 31 ] / NIGHT [ 15 ]</b> : Selects the display and button illumination brightness level [00 — 31] for day and night.
DISPLAY	SCROLL *2	<b>ONCE</b> : Scrolls the displayed information once. / <b>AUTO</b> : Repeats scrolling (at 5-second intervals). / <b>OFF</b> : Cancels. (Pressing <b>DISP</b> for more than one second can scroll the display regardless of the setting.)
	TAG DISPLAY	<b>ON</b> : Shows the Tag information while playing MP3/WMA tracks. / <b>OFF</b> : Cancels.
PRO EQ		See page 10.
AUDIO	FADER *3, *4	<b>R06 — F06 [ 00 ]</b> : Adjusts the front and rear speaker output balance.
	BALANCE *4	<b>L06 — R06 [ 00 ]</b> : Adjusts the left and right speaker output balance.
	LOUD	<b>ON</b> : Boost low and high frequencies to produce a well-balanced sound at a low volume level. / <b>OFF</b> : Cancels.
	VOL ADJUST	<b>-05 — +05 [ 00 ]</b> : Presets the volume adjustment level of each source (except "FM"), compared to the FM volume level. The volume level will automatically increase or decrease when you change the source. Before adjustment, select the source you want to adjust. ("VOL ADJ FIX" appears on the display if "FM" is selected as the source.)
	L/O MODE	<b>SUB.W</b> : Selects if the REAR/SW terminals are used for connecting a subwoofer (through an external amplifier). / <b>REAR</b> : Selects if the REAR/SW terminals are used for connecting the speakers (through an external amplifier).
	SUB.W LPF *5	<b>LOW 55Hz / LOW 85Hz / LOW 120Hz</b> : Frequencies lower than 55 Hz/85 Hz/120 Hz are sent to the subwoofer.
	SUB.W LEVEL *5	<b>00 — 08 [ 04 ]</b> : Adjusts the subwoofer output level.
	HPF	<b>ON</b> : Activates the High Pass Filter. Low frequency signals are cut off from the front/rear speakers. / <b>OFF</b> : Deactivates (all signals are sent to the front/rear speakers).
	BEEP	<b>ON / OFF</b> : Activates or deactivates the keypress tone.
	TEL MUTING *6	<b>ON</b> : Mutes the sounds while using the cellular phone (not connected through KS-BTA100). / <b>OFF</b> : Cancels.

\*1 The illumination control lead connection is required. (See "Installation/Connection Manual.") This setting may not work correctly on some vehicles (particularly on those having a control dial for dimming). In this case, change the setting to any other than <DIMMER AUTO>.

\*2 Some characters or symbols will not be shown correctly (or will be blanked) on the display.

\*3 If you are using a two-speaker system, set the fader level to "00."

\*4 This adjustment will not affect the subwoofer output.

\*5 Displayed only when <L/O MODE> is set to <SUB.W>.

\*6 This setting does not work if <BT ADAPTER> is selected for <R-AUX> of the <SRC SELECT>.

Menu item		Selectable setting, [ <u>Initial: Underlined</u> ]
AUDIO	<b>AMP GAIN</b> *7	<b>LOW POWER</b> : VOLUME 00 – VOLUME 30 (Selects if the maximum power of each speaker is less than 50 W to prevent damaging the speakers.) / <b>HIGH POWER</b> : VOLUME 00 – VOLUME 50
	<b>SSM</b> *8	See page 7.
TUNER	<b>AREA</b>	<b>US</b> : When using in North/Central/South America. AM/FM intervals are set to 10 kHz/200 kHz. / <b>EU</b> : When using in any other areas. AM/FM intervals are set to 9 kHz/50 kHz (50 kHz during auto search). / <b>SA</b> : When using in South American countries where FM interval is 50 kHz. AM interval is set to 10 kHz.
	<b>MONO</b> *8	See page 7.
	<b>IF BAND</b>	<b>AUTO</b> : Increases the tuner selectivity to reduce interference noises between adjacent stations. (Stereo effect may be lost.) / <b>WIDE</b> : Subject to interference noises from adjacent stations, but sound quality will not be degraded and the stereo effect will remain.
SRC SELECT	<b>AM</b> *9	<b>ON / OFF</b> : Enable or disable “AM” in source selection.
	<b>F-AUX</b> *9	<b>ON / OFF</b> : Enable or disable “F-AUX” in source selection.
	<b>R-AUX</b> *9	<b>ON / OFF</b> : Enable or disable “R-AUX” in source selection. / <b>BT ADAPTER</b> *10 : Selects if the rear auxiliary input jack is connected to the Bluetooth adapter, KS-BTA100. (page 9)

\*7 The volume level automatically changes to “VOLUME 30” if you change to <LOW POWER> with the volume level set higher than “VOLUME 30.”

\*8 Displayed only when the source is “FM.”

\*9 Displayed only when any source other than “AM/ F-AUX/ R-AUX/ BT AUDIO” is selected separately.

\*10 When <BT ADAPTER> is selected, source name is changed to “BT AUDIO” from “R-AUX.”

### **Additional information**

- This unit can play back multi-session discs; however, unclosed sessions will be skipped while playing.
- This unit can play back files with the extension code <.mp3> or <.wma> (regardless of the letter case—upper/lower).
- This unit can play back the files meeting the conditions below:
  - Bit rate: MP3: 8 kbps — 320 kbps  
WMA: 32 kbps — 192 kbps
  - Sampling frequency:  
MP3: 48 kHz, 44.1 kHz, 32 kHz  
24 kHz, 22.05 kHz, 16 kHz  
12 kHz, 11.025 kHz, 8 kHz  
WMA: 48 kHz, 44.1 kHz, 32 kHz, 22.05 kHz
- This unit can show WMA Tag and ID3 Tag Version 1.0/1.1/2.2/3/2.4 (for MP3).
- The search function works but search speed is not constant.
- The maximum number of characters for file/folder names vary depending on the disc format used (includes 4 extension characters—<.mp3> or <.wma>).  
ISO 9660 Level 1 and 2, Romeo: 64 characters, Joliet: 32 characters, Windows long file name: 64 characters
- This unit can play back files recorded in VBR (variable bit rate). (Files recorded in VBR have a discrepancy in elapsed time indication.)
- This unit cannot play back the following files:
  - MP3 files: encoded in MP3i and MP3 PRO format; an inappropriate format; layer 1/2.
  - WMA files: encoded in lossless, professional, and voice format; not based upon Windows Media® Audio; copy-protected with DRM.
  - Files which have data such as AIFF, ATRAC3, etc.

# Troubleshooting

	Symptom	Remedy/Cause
General	Sound cannot be heard from the speakers.	Adjust the volume to the optimum level. / Make sure the unit is not muted/paused. (page 6) / Check the cords and connections.
	“MISWIRING CHK WIRING THEN RESET UNIT” / “WARNING CHK WIRING THEN RESET UNIT” appears on the display and no operations can be done.	Check to be sure the terminals of the speaker leads are covered with insulating tape properly, then reset the unit. (page 3) If the message does not disappear, consult your JVC car audio dealer or a company supplying kits.
	The unit does not work at all.	Reset the unit. (page 3)
	“F-AUX” or “R-AUX” cannot be selected.	Check the <SRC SELECT> → <F-AUX / R-AUX> setting. (page 12)
	Sound is sometimes interrupted while listening to an external component connected to the auxiliary input jack.	Check to be sure the recommended stereo mini plug is used for connection. (page 9)
FM/AM	SSM automatic presetting does not work.	Store stations manually.
	Static noise while listening to the radio.	Connect the antenna firmly.
	“AM” cannot be selected.	Check the <SRC SELECT> → <AM> setting. (page 12)
Disc playback	Disc cannot be played back.	Insert the disc correctly.
	CD-R/CD-RW cannot be played back and track cannot be skipped.	Insert a finalized CD-R/CD-RW (finalize with the component which you used for recording).
	Disc sound is sometimes interrupted.	Stop playback while driving on rough roads. / Change the disc. / Check the cords and connections.
	“NO DISC” appears on the display.	Insert a playable disc into the loading slot.
	“PLEASE” and “EJECT” appear alternately on the display.	Press ▲, then insert a disc correctly.
	“IN DISC” appears on the display.	The disc cannot be ejected properly. Make sure nothing is blocking the loading slot.
MP3/WMA playback	Disc cannot be played back.	<ul style="list-style-type: none"> <li>• Use a disc with MP3/WMA tracks recorded in a format compliant with ISO 9660 Level 1, Level 2, Romeo, or Joliet.</li> <li>• Add the extension code &lt;.mp3&gt; or &lt;.wma&gt; to the file names.</li> </ul>
	Noise is generated.	Skip to another track or change the disc.
	“READING” keeps flashing on the display.	A longer readout time is required. Do not use too many hierarchical levels and folders.
	Tracks do not play back in the order you have intended them to play.	The playback order is determined when the files are recorded.
	The elapsed playing time is not correct.	This sometimes occurs during playback. This is caused by how the tracks are recorded on the disc.
	The correct characters are not displayed (e.g. album name).	This unit can only display letters (upper case), numbers, and a limited number of symbols.

# Using Bluetooth® devices

For Bluetooth operations, it is required to connect the Bluetooth adapter, KS-BTA100 (not supplied) to the auxiliary input jack (R-AUX/BT ADAPTER) on the rear of the unit. (page 9)

- For details, refer also to the instructions supplied with the Bluetooth adapter and the Bluetooth device.
- Operations may be different according to the connected device.

## Preparation

### 1 Register (pair) a Bluetooth device with KS-BTA100.

Refer to the instructions manual supplied with KS-BTA100.

### 2 Change the <SRC SELECT> settings of this unit.

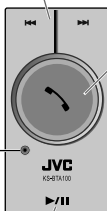


## Using the Bluetooth mobile phone



KS-BTA100

Microphone



#### • Receiving a call

When a call comes in...

#### • Making a call

Making a call to the last connected number from your phone.

#### • Switching between handsfree and phone

While talking...



#### • Ends/rejects call

#### • Voice dialing

Voice dialing is available only when the connected mobile phone has the voice recognition system.

## Using the Bluetooth audio device

1 SOURCE (CD receiver) ⇒ "BT AUDIO"

2

If playback does not start, operate the Bluetooth audio player to start playback.



[Press] Selects track.

[Hold] Fast-forwards or reverses the track.

### About microphone volume:

- When you turn off the power of the CD receiver, the volume level changes to Normal.

# Specifications

## AUDIO AMPLIFIER SECTION



**Power Output** : 20 W RMS  $\times$  4 Channels at 4  $\Omega$  and  $\leq$  1% THD+N

**Signal-to-Noise Ratio** : 80 dBA (reference: 1 W into 4  $\Omega$ )

**Load Impedance** : 4  $\Omega$  (4  $\Omega$  to 8  $\Omega$  allowance)

**Frequency Response** : 40 Hz to 20 000 Hz

**Line-Out or Subwoofer-Out Level/**

**Impedance** : 2.5 V/20 k $\Omega$  load (full scale)

**Output Impedance** :  $\leq$  600  $\Omega$

**Other Terminal** : Front auxiliary input jack,  
Rear auxiliary/Bluetooth adapter input jack,  
Antenna terminal

## TUNER SECTION

**Frequency Range** :

**FM** :

- with channel interval set to 200 kHz :  
87.9 MHz to 107.9 MHz
- with channel interval set to 50 kHz :  
87.5 MHz to 108.0 MHz

**AM** :

- with channel interval set to 10 kHz : 530 kHz  
to 1 700 kHz
- with channel interval set to 9 kHz : 531 kHz  
to 1 611 kHz

**FM Tuner** :

**Usable Sensitivity** : 9.3 dBf (0.8  $\mu$ V/75  $\Omega$ )

**50 dB Quietening Sensitivity** : 16.3 dBf  
(1.8  $\mu$ V/75  $\Omega$ )

**Alternate Channel Selectivity (400 kHz)** :  
65 dB

**Frequency Response** : 40 Hz to 15 000 Hz

**Stereo Separation** : 40 dB

**AM Tuner** :

**Sensitivity/Selectivity** : 20  $\mu$ V/40 dB

## CD PLAYER SECTION

**Type** : Compact disc player

**Signal Detection System** : Non-contact optical pickup (semiconductor laser)

**Number of Channels** : 2 channels (stereo)

**Frequency Response** : 5 Hz to 20 000 Hz

**Signal-to-Noise Ratio** : 98 dB

**Wow and Flutter** : Less than measurable limit

**MP3 Decoding Format (MPEG1/2 Audio Layer 3)** : Max. Bit Rate: 320 kbps

**WMA (Windows Media® Audio) Decoding Format** : Max. Bit Rate: 192 kbps

## GENERAL

**Power Requirement** : Operating Voltage :  
DC 14.4 V (11 V to 16 V allowance)

**Grounding System** : Negative ground

**Allowable Operating Temperature** :  
0°C to +40°C (32°F to 104°F)

**Dimensions (W  $\times$  H  $\times$  D) : (approx.)**

- Installation Size :  
182 mm  $\times$  52 mm  $\times$  158 mm  
(7-3/16"  $\times$  2-1/16"  $\times$  6-1/4")

- Panel Size :  
188 mm  $\times$  59 mm  $\times$  9 mm  
(7-7/16"  $\times$  2-3/8"  $\times$  3/8")

**Mass** : 1.2 kg (2.8 lbs) (excluding accessories)

Subject to change without notice.

If a kit is necessary for your car, consult your telephone directory for the nearest car audio speciality shop.

Microsoft and Windows Media are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

Muchas gracias por la compra de un producto JVC.

Como primer paso, por favor lea detenidamente este manual para comprender a fondo todas las instrucciones y obtener un máximo disfrute de esta unidad.

## **IMPORTANTE (EE.UU.)**

Este equipo se ha sometido a todo tipo de pruebas y cumple con las normas establecidas para dispositivos de Clase B, de conformidad con la Parte 15 de las reglas de la FCC (Comisión Federal de Comunicaciones). Estas reglas están diseñadas para asegurar una protección razonable contra este tipo de interferencias en las instalaciones residenciales. Este equipo genera y utiliza energía de radiofrecuencia. Si no se instala y utiliza debidamente, es decir, conforme a las instrucciones, podrían producirse interferencias en radiocomunicaciones. Sin embargo, no se garantiza que estas interferencias no se produzcan en una instalación determinada. Si este equipo ocasiona interferencias en la recepción de radio o televisión, lo cual puede comprobarse mediante la conexión o desconexión del equipo, el problema podrá corregirse mediante una o una combinación de las siguientes medidas:

- Reoriente la antena receptora o cámbiela de lugar.
- Aumente la separación entre el equipo y el aparato receptor.
- Enchufe el equipo a una toma de corriente situada en un circuito distinto del aparato receptor.
- Consulte a su distribuidor o a un técnico experto en radio/televisión.

## **Precaución:**

Los cambios o modificaciones no aprobados por JVC pueden anular la autoridad del usuario para operar el equipo.

## **IMPORTANTE PARA PRODUCTOS LÁSER**

1. PRODUCTO LÁSER CLASE 1

2. **PRECAUCIÓN:** No abra la tapa superior. En el interior de la unidad no hay piezas que pueda reparar el usuario; encargue el servicio a personal técnico cualificado.

3. **PRECAUCIÓN:** (EE.UU.) Radiación láser de clase II visible y/o invisible, cuando está abierto. No mire fijamente el haz.

(Para Canadá) Radiación láser de clase 1M visible y/o invisible cuando ésta abierto. No mirar directamente con instrumental óptico.

4. REPRODUCCIÓN DE LA ETIQUETA: ETIQUETA DE PRECAUCIÓN, COLOCADA EN EL EXTERIOR DE LA UNIDAD.

<b>CAUTION</b> VISIBLE AND/OR INVISIBLE CLASS 1M LASER RADIATION WHEN OPEN. DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS. IEC60825-1:2001 (ENG)	<b>ATTENTION</b> RAYONNEMENT LASER VISIBLE ET/OU INVISIBLE DE CLASSE 1M UNE FOIS OUVERT NE PAS REGARDER DIRECTEMENT AVEC DES INSTRUMENTS OPTIQUES. (FRA)	<b>AVISO</b> RADIACIÓN LASER DE CLASE 1M VISIBLE Y/O INVISIBLE CUANDO ESTA ABIERTO. NO MIRAR DIRECTAMENTE CON INSTRUMENTAL ÓPTICO. (ESP)	<b>VARNING</b> SYNLIG OCH/ELLER OSYNLIG LASERSTRÅLNING KLASS 1M, NÄR DENNA DEL ÄR ÖPPNAD. BETRÄKTA EJ STRÅLEN MED OPTISKA INSTRUMENT. (SWE)	<b>注意</b> レーザー光線と可視 及び不可視レーザー のクラス1M レーザー放射が 出ます。 光学装置で直接 見ないでください。 (JPN)	<b>CAUTION</b> VISIBLE AND/OR INVISIBLE CLASS 1 LASER RADIATION WHEN OPEN. DO NOT STARE INTO BEAM. FDA 21 CFR (ENG)
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[Sólo Unión Europea]

## **Precaución:**

Ajuste el volumen a un nivel que permita escuchar el ruido del tráfico y otros sonidos ambientales. La conducción con el volumen demasiado alto puede causar un accidente.

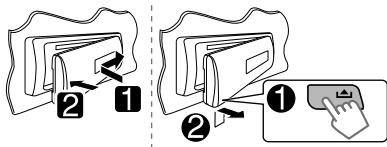
## **ADVERTENCIA:**

Detenga el automóvil antes de operar la unidad.

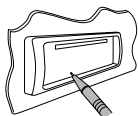
## **Precaución sobre el ajuste de volumen:**

Los discos producen muy poco ruido al compararse con otras fuentes. Antes de reproducir un disco, baje el volumen para evitar daños a los altavoces debido a un repentino aumento del nivel de salida.

## Cómo montar/desmontar el panel de control



## Cómo reposicionar su unidad



También se borrarán los ajustes preestablecidos por usted.

## Cómo expulsar el disco por la fuerza



- Tenga cuidado de no dejar caer el disco al ser expulsado.
- Si esto no funciona, intente reposicionar su receptor.

## Mantenimiento

### Limpeza de la unidad

Limpie la suciedad del panel con un paño de silicona seco o un paño suave. La negligencia en la observación de esta precaución puede causar daños al monitor o a la unidad.

### Limpeza del conector

Elimine la suciedad del conector de la unidad y del panel. Utilice un paño o un palillo de algodón.

### Precaución sobre la reproducción de DualDisc:

El lado no DVD de un "DualDisc" no es compatible con la norma "Compact Disc Digital Audio". Por consiguiente, no se recomienda usar el lado no DVD de un DualDisc en este producto.

## CONTENIDO

- 3 Cómo montar/desmontar el panel de control
- 3 Cómo reposicionar su unidad
- 3 Cómo expulsar el disco por la fuerza
- 3 Mantenimiento
- 4 Cancelación de las demostraciones en pantalla
- 4 Puesta en hora del reloj
- 5 Preparación del control remoto
- 5 Acerca de los discos
- 6 Operaciones básicas
- 7 Para escuchar la radio
- 8 Escuchando un disco
- 9 Conexión de otros componentes externos
- 9 Escuchando otros componentes externos
- 10 Selección de un modo de sonido preajustado
- 10 Operaciones de los menús
- 13 Localización de averías
- 14 Uso de dispositivos Bluetooth®
- 15 Especificaciones

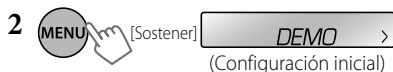
**Condensación:** Cuando se está usando el aire acondicionado, se puede condensar humedad en la lente láser. Esto puede ocasionar errores de lectura del disco. En este caso, extraiga el disco y espere hasta que se evapore la humedad.

**Temperatura dentro del automóvil:** Si ha dejado el automóvil estacionado durante largo tiempo en un sitio cálido o frío, no opere la unidad hasta que se normalice la temperatura del habitáculo.



# Cancelación de las demostraciones en pantalla

## 1 Encienda la unidad.



## 4 Seleccione <DEMO OFF>.



## 6 Finalice el procedimiento.



# Puesta en hora del reloj

## 1 Encienda la unidad.



## 3 Seleccione <CLOCK>.



## 4 Seleccione <CLOCK SET>.



## 5 Ajuste la hora.



## 6 Ajuste los minutos.



## 7 Finalice el procedimiento.



# Preparación del control remoto

Retire la lámina aislante cuando utilice el control remoto por primera vez.

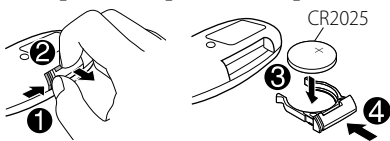


Sólo para EE.UU.-California:

Este producto contiene una batería de litio CR de tipo botón que contiene perclorato (puede requerirse una manipulación especial). Visite [www.dtsc.ca.gov/hazardouswaste/perchlorate](http://www.dtsc.ca.gov/hazardouswaste/perchlorate)

**Si disminuye la efectividad de acción del control remoto, cambie la pila.**

## Reemplazo de la pila de litio tipo botón



## Precaución:

- Peligro de explosión si se instala la pila de manera incorrecta. Cámbiela solamente por una del mismo tipo o de un tipo equivalente.
- No debe exponer la batería a una fuente de calor intensa como, por ejemplo, a los rayos directos del sol, al fuego, etc.

## Advertencia (para evitar accidentes y daños):

- No instale ninguna otra pila distinta de CR2025 o su equivalente.
- No deje el control remoto en un lugar expuesto a la luz directa del sol (como los cubretablero) durante un tiempo prolongado.
- Guarde la pila fuera del alcance de los niños.
- Evite recargar, cortocircuitar, desarmar, calentar la pila, o arrojarla al fuego.
- No deje la pila con otros objetos metálicos.
- No toque la pila con pinzas u otras herramientas similares.
- Enrolle la pila con una cinta y aislela antes de desecharla o guardarla.

# Acerca de los discos

Esta unidad puede reproducir sólo discos CD



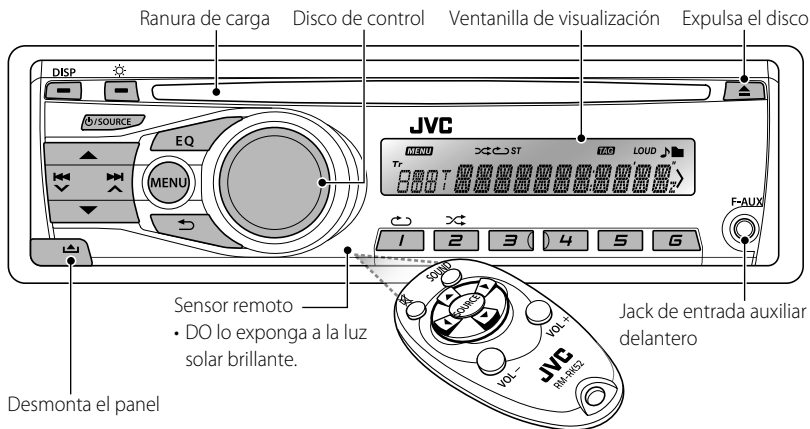
## Discos que no se pueden utilizar:

- Discos que no sean redondos.
- Discos con coloración en la superficie de grabación o discos sucios.
- No es posible reproducir discos grabables/reescribibles no finalizados. (Para obtener información sobre el proceso de finalización, consulte su software de escritura de discos o el manual de instrucciones de su grabador de discos).
- No es posible utilizar un CD de 3 pulgadas. Cualquier intento de usar un adaptador puede causar un mal funcionamiento.

## Manejo de los discos:

- No toque la superficie de grabación del disco.
- No pegue cintas, etc. en el disco, ni utilice un disco que lleve una cinta adherida.
- No utilice accesorios para discos.
- Limpie el disco desde el centro hacia fuera.
- Limpie el disco con un paño de silicona seco o un paño suave. No utilice ningún tipo de solvente.
- Cuando extraiga el disco de la unidad, hágalo en sentido horizontal.
- Antes de insertar un disco, elimine las rebabas del orificio central y del borde del disco.

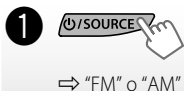
# Operaciones básicas



Si pulsa o mantiene pulsado(s) el(los) siguiente(s) botón(es)...

Unidad principal	Control remoto	Operaciones generales
⏻ / SOURCE	—	Se enciende/apaga [Sostener].
	<b>SOURCE</b>	Selecciona las fuentes (FM, CD, F-AUX, BT AUDIO o R-AUX o BT PHONE, AM). • "CD" se puede seleccionar solamente cuando hay un disco cargado.
Disco de control (girar)	<b>VOL - / +</b>	Ajusta el nivel de volumen.
	—	Selecciona las opciones.
Disco de control (pulse)		El sonido se enmudece durante la reproducción. Si la fuente es "CD", la reproducción se pone en pausa. • Pulse de nuevo el botón para cancelar el silenciamiento o reanudar la reproducción.
	—	Confirma la selección.
<b>EQ</b>	<b>SOUND</b>	Selecciona el modo de sonido. • Sostenga el botón <b>EQ</b> en la unidad principal para acceder directamente al ajuste de nivel de tono. (página 10)
Botones numéricos (1 – 6)	—	• Selecciona las emisoras preajustadas. • Guarda la emisora actual en el botón numérico seleccionado [Sostener]. • Pulse el botón numérico <b>1</b> (↺) o <b>2</b> (↻) para acceder directamente al ajuste REPEAT/RANDOM. (página 8)
	—	Accede directamente al menú <BRIGHTNESS>. (página 11)
	—	• Vuelve al menú anterior. • Salga del menú [Sostener].
<b>DISP</b>	—	• Cambia la información en pantalla. • Desplaza la información en la pantalla [Sostener].

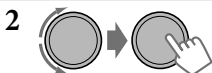
# Para escuchar la radio



- [Pulse] Efectúa automáticamente la búsqueda de emisoras.
- [Sostener] Efectúa manualmente la búsqueda de emisoras. "M" parpadea, a continuación, pulse el botón repetidamente.

"ST" se enciende cuando se recibe una radiodifusión FM estéreo con una intensidad de señal suficiente.

## Mejora de la recepción FM



⇒ <TUNER> ⇒ <MONO> ⇒ <MONO ON>  
Se consigue mejorar la recepción, pero se pierde el efecto estereofónico.

**Para restablecer el efecto estereofónico,** repita el procedimiento para seleccionar <MONO OFF>.

## Preajuste automático (FM)—SSM (Memoria secuencial de las emisoras más fuertes)

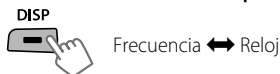
Se pueden preajustar hasta 18 emisoras para FM. Mientras escucha una emisora...



⇒ <TUNER> ⇒ <SSM> ⇒ <SSM 01 – 06 / 07 – 12 / 13 – 18>  
"SSM" parpadea y las emisoras locales con las señales más fuertes serán exploradas y guardadas automáticamente.

**Para presintonizar otras 6 emisoras,** repita el procedimiento anterior seleccionando uno de los otros rangos de ajuste SSM.

## Cambio de la información en pantalla



## Preajuste manual (FM/AM)

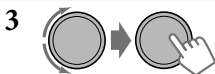
Es posible preajustar hasta 18 emisoras para FM y 6 emisoras para AM.



⇒ Sintonice la emisora que desea preajustar.



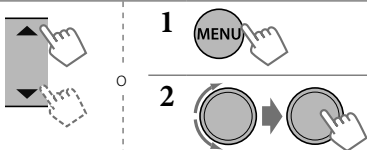
Parpadea "PRESET MODE".



⇒ Selecciona el número de preajuste. El número de preajuste parpadea y aparece "MEMORY".

- También puede guardar la emisora actual en los botones numéricos seleccionados (1 – 6) pulsando y manteniendo pulsado los botones numéricos (1 – 6).

## Selección de emisoras preajustadas



- Las emisoras seleccionadas (1 – 6) también se pueden seleccionar pulsando los botones numéricos (1 – 6).

## Uso del control remoto

- ▲/▼ : Cambia las emisoras preajustadas.
- ◀/▶ : [Pulse] Efectúa automáticamente la búsqueda de emisoras. [Sostener] Efectúa manualmente la búsqueda de emisoras.

# Escuchando un disco



La reproducción se inicia automáticamente.

Todas las pistas se reproducen repetidamente hasta que usted cambie la fuente o extraiga el disco.

## Para detener la reproducción y expulsar el disco



Si no extrae el disco expulsado en el lapso de 15 segundos, el disco será insertado automáticamente en la ranura de carga.

## Selección de una pista/carpeta



Selecciona la carpeta de MP3/WMA



[Pulse] Seleccionar la pista.  
[Sostener] Avanzar o retroceder rápidamente la pista.

## Uso del control remoto

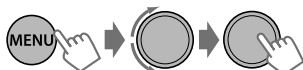
▲/▼ : Selecciona la carpeta de MP3/WMA.  
◀/▶ : [Pulse] Seleccionar la pista.  
[Sostener] Avanzar o retroceder rápidamente la pista.

## Cambio de la información en pantalla



Título del disco/Nombre del álbum/ejecutante (nombre de la carpeta)\* → Título de la pista (nombre del archivo)\* → Número de la pista actual con el tiempo de reproducción transcurrido → Número de la pista actual con la hora del reloj → (vuelta al comienzo)  
\* Aparece "NO NAME" para los CDs convencionales, o en caso de que no esté grabado.

## Selección de una pista/carpeta de la lista



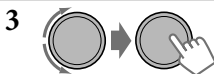
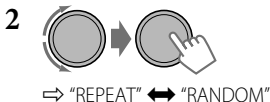
- Si el disco MP3/WMA contiene numerosas pistas, puede efectuar una búsqueda rápida ( $\pm 10$ ,  $\pm 100$ ) a través de los discos girando rápidamente el control giratorio.
- Para volver al menú anterior, pulse ↶.

## Cómo seleccionar los modos de reproducción


Podrá utilizar solamente uno de los siguientes modos de reproducción a la vez.



- Si pulsa el botón numérico **1** (↶) o **2** (↷) podrá acceder directamente al ajuste REPEAT/RANDOM. Luego, realice el paso 3.



**REPEAT**   
TRACK RPT : Repetir la pista actual  
FOLDER RPT : Repetir la carpeta actual

**RANDOM**   
FOLDER RND: Reproducir aleatoriamente todas las pistas de la carpeta actual y luego las pistas de las siguientes carpetas  
ALL RND : Reproducir aleatoriamente todas las pistas

Para cancelar la reproducción repetida o aleatoria, seleccione "RPT OFF" o "RND OFF".

# Conexión de otros componentes externos

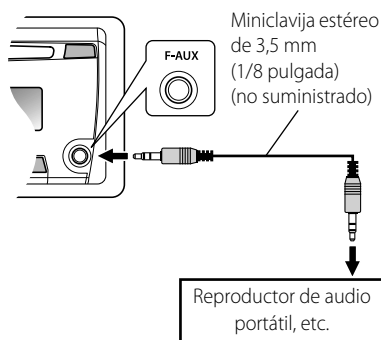
Puede conectar un componente externo al jack de entrada auxiliar en el panel de control (F-AUX) y/o en el lado trasero de la unidad (R-AUX).

Ejemplos de uso de los componentes externos a través de los jacks de entrada auxiliar:

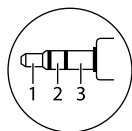
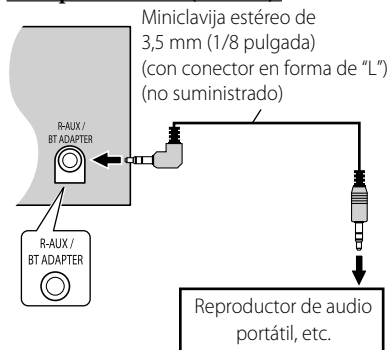
Componente externo	Toma de entrada auxiliar	Preparativos			Nombre de la fuente	Cable/dispositivo de conexión (no suministrado)
		Elemento de ajuste del menú	Elemento secundario	Ajuste		
Reproductor de audio portátil	Delantera	SRC SELECT	F-AUX	ON	F-AUX	Véase debajo.
	Trasero	SRC SELECT	R-AUX	ON	R-AUX	
Dispositivo Bluetooth	Trasero	SRC SELECT	R-AUX	BT ADAPTER	BT AUDIO/ BT PHONE*	KS-BTA100 (página 14)

\* Aparece "BT PHONE" cuando hay un teléfono Bluetooth en uso.

## En el panel de control (F-AUX):



## En el panel trasero (R-AUX):



Para una óptima salida de audio, se recomienda utilizar una miniclavija estéreo para enchufe de 3 terminales.

# Escuchando otros componentes externos

Para mayor información, consulte también las instrucciones suministradas con los componentes externos.



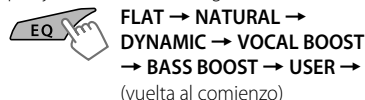
⇒ "F-AUX" o "R-AUX"



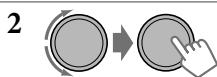
Encienda el componente conectado y comience a reproducir la fuente.

# Selección de un modo de sonido preajustado

Podrá seleccionar un modo de sonido preajustado adecuado al género musical.



Durante la audición, podrá ajustar el nivel del subwoofer y el nivel de tono del modo de sonido seleccionado.



Ajuste el nivel:  
SUB.W \*: 00 a 08  
BASS/ MID/ TRE : -06 a +06  
El modo de sonido se guarda automáticamente y cambia a "USER".  
\* El nivel del subwoofer se puede ajustar sólo cuando <L/O MODE> está en <SUB.W>. (página 11)

## Cómo guardar su propio modo de sonido

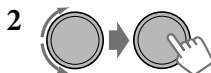
Es posible almacenar sus propios ajustes en la memoria.



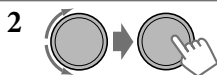
## Operaciones de los menús



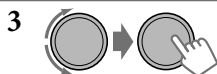
La operación se cancela si no se efectúa ninguna operación durante aproximadamente 60 segundos.



**3** Repita el paso 2, si es necesario.  
• Para volver al menú anterior, pulse ↶.  
• Para salir del menú, pulse **MENU**.



⇨ <PRO EQ> ⇨ <BASS / MIDDLE / TREBLE>



Ajuste los elementos de sonido del tono seleccionado.

**BASS** [Inicial: 80 Hz, 00, Q1.0]

Frequency: 60/ 80/ 100/ 200 Hz

Nivel: -06 a +06

Q: Q1.0/ 1.25/ 1.5/ 2.0

**MIDDLE** [Inicial: 1.0 kHz, 00, Q1.25]

Frequency: 0.5/ 1.0/ 1.5/ 2.5 kHz

Nivel: -06 a +06

Q: Q0.75/ 1.0/ 1.25

**TREBLE** [Inicial: 10.0 kHz, 00, Q FIX]

Frequency: 10.0/ 12.5/ 15.0/ 17.5 kHz

Nivel: -06 a +06

Q: Q FIX

**4** Repita los pasos 2 y 3 para ajustar otros tonos.

Los ajustes se almacenan y cambian automáticamente a "USER".

Opción del menú	Ajuste seleccionable, [Inicial: <u>Subrayado</u> ]
DEMO	<b>ON</b> : La demostración en pantalla se activará automáticamente si no se efectúa ninguna operación durante unos 20 segundos. / <b>OFF</b> : Annulation. (página 4)
CLOCK	Para los ajustes, consulte la página 4.

Opción del menú		Ajuste seleccionable, [Inicial: <u>Subrayado</u> ]
DIMMER	DIMMER SET	<b>AUTO</b> : Cambia la iluminación de la pantalla y de los botones entre los ajustes diurno/nocturno en <BRIGHTNESS> cuando usted apaga/enciende los faros del vehículo *1. / <b>ON</b> : Selecciona el ajuste nocturno en <BRIGHTNESS> para la iluminación de la pantalla y de los botones. / <b>OFF</b> : Selecciona el ajuste diurno en <BRIGHTNESS> para la iluminación de la pantalla y de los botones.
	BRIGHTNESS	<b>DAY [ 31 ] / NIGHT [ 15 ]</b> : Selecciona el nivel de brillo de la pantalla y la iluminación de los botones <b>[00 — 31]</b> para uso diurno y nocturno.
DISPLAY	SCROLL *2	<b>ONCE</b> : Desplaza una vez la información visualizada. / <b>AUTO</b> : El desplazamiento se repite (a intervalos de 5 segundos). / <b>OFF</b> : Se cancela. (Pulsando <b>DISP</b> durante más de 1 segundo podrá desplazar la indicación independientemente del ajuste.)
	TAG DISPLAY	<b>ON</b> : Muestra la información de etiqueta mientras se reproducen pistas MP3/WMA. / <b>OFF</b> : Se cancela.
PRO EQ		Consulte la página 10.
AUDIO	FADER *3, *4	<b>R06 — F06 [ 00 ]</b> : Ajusta el balance de salida de los altavoces delanteros y traseros.
	BALANCE *4	<b>L06 — R06 [ 00 ]</b> : Ajusta el balance de salida de los altavoces izquierdo y derecho.
	LOUD	<b>ON</b> : Refuerza las frecuencias altas y bajas para producir un sonido bien balanceado a bajos niveles de volumen. / <b>OFF</b> : Se cancela.
	VOL ADJUST	<b>-05 — +05 [ 00 ]</b> : Preajuste el nivel de volumen de cada fuente (excepto "FM"), en comparación con el nivel de volumen de FM. El nivel de volumen aumenta o disminuye automáticamente al cambiar la fuente. Antes del ajuste, seleccione la fuente que desea ajustar. (Aparece "VOL ADJ FIX" en la pantalla si se selecciona "FM" como fuente.)
	L/O MODE	<b>SUB.W</b> : Selecciónelo si los terminales REAR/SW se utilizan para conectar un subwoofer (a través de un amplificador externo). / <b>REAR</b> : Selecciónelo si los terminales REAR/SW se utilizan para conectar los altavoces (a través de un amplificador externo).
	SUB.W LPF *5	<b>LOW 55Hz / LOW 85Hz / LOW 120Hz</b> : Las frecuencias inferiores a 55 Hz/85 Hz/120 Hz se envían al subwoofer.
	SUB.W LEVEL *5	<b>00 — 08 [ 04 ]</b> : Ajusta el nivel de salida del subwoofer.
	HPF	<b>ON</b> : Activa el filtro pasaaltos. Las señales de baja frecuencia se suprimen de los altavoces delanteros/traseros. / <b>OFF</b> : Se desactiva (todas las señales se envían a los altavoces delanteros/traseros).
	BEEP	<b>ON / OFF</b> : Activa o desactiva el tono de pulsación de teclas.
	TEL MUTING *6	<b>ON</b> : Enmudece el sonido durante el uso del celular (no conectado a través de KS-BTA100). / <b>OFF</b> : Se cancela.

\*1 Se requiere la conexión del conductor de control. (Consulte el "Manual de instalación/conexión.") Este ajuste podría no funcionar correctamente en algunos vehículos (especialmente en aquellos que disponen de un dial de control). En este caso, cambie el ajuste a cualquier otra opción distinta de <DIMMER AUTO>.

\*2 Algunos caracteres o símbolos no serán mostrados correctamente (o aparecerán en blanco) sobre la pantalla.

\*3 Si está utilizando un sistema de dos altavoces, ajuste el nivel de fader a "00".

\*4 El ajuste no afecta a la salida del subwoofer.

\*5 Se visualiza sólo cuando <L/O MODE> se ajusta a <SUB.W>.

\*6 Este ajuste no se activa si se selecciona <BT ADAPTER> para <R-AUX> de <SRC SELECT>.



Opción del menú		Ajuste seleccionable, [Inicial: <u>Subrayado</u> ]
AUDIO	AMP GAIN *7	<b>LOW POWER</b> : VOLUME 00 – VOLUME 30 (Seleccíonelo si la potencia máxima de cada altavoz es inferior a 50 W, con el fin de evitar posibles daños en los altavoces.) / <b>HIGH POWER</b> : VOLUME 00 – VOLUME 50
	SSM *8	Consulte la página 7.
TUNER	AREA	<b>US</b> : Cuando se utiliza en América del Norte/Central/Sur. Los intervalos de AM/FM están ajustados a 10 kHz/200 kHz. / <b>EU</b> : Cuando se utiliza en cualesquier otras áreas. Los intervalos de AM/FM están ajustados a 9 kHz/50 kHz (50 kHz durante la búsqueda automática). / <b>SA</b> : Cuando se utiliza en los países de América del Sur donde el intervalo de FM es 50 kHz. El intervalo de AM está ajustado a 10 kHz.
	MONO *8	Consulte la página 7.
	IF BAND	<b>AUTO</b> : Aumenta la selectividad del sintonizador para reducir las interferencias entre emisoras adyacentes. (El efecto estereofónico puede perderse). / <b>WIDE</b> : Sujeto a interferencias de las emisoras adyacentes, pero la calidad del sonido no se degrada y se conserva el efecto estereofónico.
SRC SELECT	AM *9	<b>ON / OFF</b> : Habilita o deshabilita "AM" en la selección de fuentes.
	F-AUX *9	<b>ON / OFF</b> : Habilita o deshabilita "F-AUX" en la selección de fuentes.
	R-AUX *9	<b>ON / OFF</b> : Habilita o deshabilita "R-AUX" en la selección de fuentes. / <b>BT ADAPTER</b> *10 : Selecciona si el jack de entrada auxiliar trasero está conectado al adaptador Bluetooth, KS-BTA100. (página 9)

\*7 Si usted cambia a <LOW POWER> cuando el nivel de volumen está ajustado a un nivel superior a "VOLUME 30", se cambiará automáticamente a "VOLUME 30".

\*8 Se puede visualizar solamente cuando la fuente sea "FM".

\*9 Se visualiza sólo cuando se selecciona por separado cualquier otra fuente distinta de "AM/F-AUX/R-AUX/BT AUDIO".

\*10 Cuando se selecciona <BT ADAPTER>, el nombre de la fuente cambia de "R-AUX" a "BT AUDIO".

### Información adicional

- Este receptor puede reproducir discos multisección; no obstante, las sesiones no cerradas serán omitidas durante la reproducción.
- Esta unidad puede reproducir archivos con el código de extensión <.mp3> o <.wma> (sin distinción de caja—mayúsculas/minúsculas).
- Este receptor puede reproducir archivos que cumplan con las siguientes condiciones:
  - Velocidad de bit: MP3: 8 kbps — 320 kbps  
WMA: 32 kbps — 192 kbps
  - Frecuencia de muestreo:
    - MP3: 48 kHz, 44,1 kHz, 32 kHz  
24 kHz, 22,05 kHz, 16 kHz  
12 kHz, 11,025 kHz, 8 kHz
    - WMA: 48 kHz, 44,1 kHz, 32 kHz, 22,05 kHz
- Esta unidad es capaz de mostrar etiquetas WMA y etiquetas ID3 Versión 1,0/1,1/2,2/3,2/4 (para MP3).
- La función de búsqueda funciona pero la velocidad de búsqueda no es constante.
- El número máximo de caracteres para los nombres de archivo/carpeta varía según el formato de disco usado (incluye extensión de 4 caracteres—<.mp3> o <.wma>).  
ISO 9660 Nivel 1 y 2, Romeo: 64 caracteres, Joliet: 32 caracteres, Nombre de archivo largo de Windows: 64 caracteres
- Este receptor puede reproducir archivos grabados en VBR (velocidad variable de bits). (Los archivos grabados en VBR presentan una discrepancia en la indicación del tiempo transcurrido.)
- Este receptor no puede reproducir los siguientes archivos:
  - Archivos MP3: codificado en formato MP3i y MP3 PRO, en un formato inadecuado, capa 1/2.
  - Archivos WMA: formato sin pérdida, profesional y de voz; que no se basan en Windows Media® Audio; protegido contra copia con DRM.
  - Archivos que disponen de datos tales como AIFF, ATRAC3, etc.

# Localización de averías

	Síntoma	Soluciones/Causas
General	No se puede escuchar el sonido a través de los altavoces.	Ajuste el volumen al nivel óptimo. / Asegúrese de que la unidad no esté enmudecida/en pausa. (página 6) / Inspeccione los cables y las conexiones.
	Aparece "MISWIRING CHK WIRING THEN RESET UNIT" / "WARNING CHK WIRING THEN RESET UNIT" en la pantalla y no se puede realizar ninguna operación.	Asegúrese de que los terminales de los conductores de altavoz estén correctamente cubiertos con cinta aislante y luego reposicione la unidad. (página 3) Si el mensaje no desaparece, consulte con su concesionario de equipos de audio para automóvil JVC o con una compañía que suministra tales kits.
	El receptor no funciona en absoluto.	Reinicie la unidad. (página 3)
	"F-AUX" o "R-AUX" no se pueden seleccionar.	Verifique el ajuste <SRC SELECT> → <F-AUX / R-AUX>. (página 12)
	El sonido se interrumpe algunas veces mientras se escucha un componente externo conectado al jack de entrada auxiliar.	Asegúrese de que se utiliza la miniclavija estéreo recomendada para la conexión. (página 9)
FM/AM	El preajuste automático SSM no funciona.	Almacene manualmente las emisoras.
	Ruidos estáticos mientras se escucha la radio.	Conecte firmemente la antena.
	"AM" no se puede seleccionar.	Verifique el ajuste <SRC SELECT> → <AM>. (página 12)
Reproducción del disco	No se puede reproducir el disco.	Inserte correctamente el disco.
	No se pueden reproducir CD-R/CD-RW ni saltar pistas.	Inserte un CD-R/CD-RW finalizado (finalícelo con el componente utilizado para la grabación).
	Algunas veces el sonido del disco se interrumpe.	Detenga la reproducción mientras conduce por caminos accidentados. / Cambie el disco. / Inspeccione los cables y las conexiones.
	Aparece "NO DISC" en la pantalla.	Inserte un disco reproducible en la ranura de carga.
	"PLEASE" y "EJECT" aparecen alternativamente en la pantalla.	Pulse ▲, luego inserte un disco correctamente.
	Aparece "IN DISC" en la pantalla.	El disco no puede expulsarse correctamente. Asegúrese de que no hay ningún obstáculo en la ranura de carga.
Reproducción de MP3/WMA	No se puede reproducir el disco.	<ul style="list-style-type: none"> <li>Utilice un disco con pistas MP3/WMA grabadas en un formato compatible con ISO 9660 Nivel 1, Nivel 2, Romeo o Joliet.</li> <li>Añada el código de extensión &lt;.mp3&gt; o &lt;.wma&gt; a los nombres de archivos.</li> </ul>
	Se generan ruidos.	Salte a otra pista o cambie el disco.
	"READING" permanece parpadeando en la pantalla.	Se requiere mayor tiempo de lectura. No utilice demasiados niveles de jerarquías y carpetas.
	Las pistas no se reproducen en el orden de reproducción intentado por usted.	Se ha determinado el orden de reproducción durante la grabación de los archivos.
	El tiempo de reproducción transcurrido no es correcto.	Esto sucede a veces durante la reproducción. Esto depende de cómo fueron grabadas las pistas en el disco.
	No se visualizan los caracteres correctos (por ej.: nombre del álbum).	Esta unidad sólo puede visualizar letras (mayúsculas), números, y un número limitado de símbolos.

# Uso de dispositivos Bluetooth®

Para las operaciones Bluetooth, se deberá conectar el adaptador Bluetooth (KS-BTA100) (no suministrado) al jack de entrada auxiliar (R-AUX/BT ADAPTER) en la parte trasera de la unidad. (página 9)

- Si desea más información, consulte también las instrucciones suministradas con el adaptador Bluetooth y el dispositivo Bluetooth.
- Las operaciones pueden diferir según el dispositivo conectado.

## Preparativos

### 1 Registre (emparejamiento) un dispositivo Bluetooth con KS-BTA100.

Consulte el manual de instrucciones suministrado con el KS-BTA100.

### 2 Cambie los ajustes <SRC SELECT> de esta unidad.

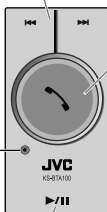


## Uso del teléfono móvil Bluetooth



KS-BTA100

Micrófono



#### • Recibiendo una llamada

Cuando entra una llamada...

#### • Cómo hacer una llamada

Se hace una llamada al último número conectado.

#### • Cambio entre el modo manos libres y teléfono

Mientras habla...



#### • Finaliza/rechaza la llamada

#### • Marcación por voz

Marcación por voz disponible solamente cuando el teléfono móvil conectado dispone del sistema de reconocimiento de voz.

[Sostener]

## Uso del dispositivo de audio Bluetooth

1 [Pulse] ⇒ "BT AUDIO"  
(Receptor con CD)

2

Si la reproducción no se inicia, opere el reproductor de audio Bluetooth para comenzar la reproducción.



[Pulse]

Seleccionar la pista.

[Sostener]

Avanzar o retroceder rápidamente la pista.

### Acerca del volumen del micrófono:

- Cuando usted apaga el receptor con CD, el nivel de volumen cambia a Normal.

# Especificaciones

## SECCIÓN DEL AMPLIFICADOR DE AUDIO



**Salida de potencia:** 20 W RMS x 4 canales a  $4 \Omega$  y  $\leq 1\%$  THD+N

**Relación señal a ruido:** 80 dBA (referencia: 1 W en  $4 \Omega$ )

**Impedancia de carga:**  $4 \Omega$  (tolerancia de  $4 \Omega$  a  $8 \Omega$ )

**Respuesta de frecuencias:** 40 Hz a 20 000 Hz  
**Nivel/impedancia de salida de línea o salida del subwoofer:** 2,5 V/20 k $\Omega$  de carga (plena escala)

**Impedancia de salida:**  $\leq 600 \Omega$

**Otro terminal:** Jack de entrada auxiliar delantero, Jack de entrada auxiliar trasero/adaptador Bluetooth, Terminal de la antena

## SECCIÓN DEL SINTONIZADOR

**Gama de frecuencias:**

**FM:**

– con el intervalo entre canales ajustado a 200 kHz: 87,9 MHz a 107,9 MHz

– con el intervalo entre canales ajustado a 50 kHz: 87,5 MHz a 108,0 MHz

**AM:**

– con el intervalo entre canales ajustado a 10 kHz: 530 kHz a 1 700 kHz

– con el intervalo entre canales ajustado a 9 kHz: 531 kHz a 1 611 kHz

**Sintonizador de FM:**

**Sensibilidad útil:** 9,3 dBf (0,8  $\mu$ V/75  $\Omega$ )

**50 dB sensibilidad de silenciamiento:** 16,3 dBf (1,8  $\mu$ V/75  $\Omega$ )

**Selectividad de canal alternativo (400 kHz):** 65 dB

**Respuesta de frecuencias:** 40 Hz a 15 000 Hz

**Separación estereofónica:** 40 dB

**Sintonizador de AM:**

**Sensibilidad/Selectividad:** 20  $\mu$ V/40 dB

## SECCIÓN DEL REPRODUCTOR DE CD

**Tipo:** Reproductor de discos compactos

**Sistema de detección de señal:** Captor óptico sin contacto (láser semiconductor)

**Número de canales:** 2 canales (estereofónicos)

**Respuesta de frecuencias:** 5 Hz a 20 000 Hz

**Relación señal a ruido:** 98 dB

**Lloro y trémolo:** Inferior al límite medible

**Formato de decodificación MP3 (MPEG1/2**

**Audio Layer 3):** Máx. velocidad de bits: 320 kbps

**Formato de decodificación WMA (Windows**

**Media® Audio):** Máx. velocidad de bits: 192 kbps

## GENERAL

**Requisitos de potencia:** Voltaje de funcionamiento: 14,4 V CC (tolerancia de 11 V a 16 V)

**Sistema de puesta a tierra:** Negativo a masa

**Temperatura de funcionamiento admisible:** 0°C a +40°C (32°F a 104°F)

**Dimensiones (An x Al x Pr): (aprox.)**

– Tamaño de instalación:  
182 mm x 52 mm x 158 mm  
(7-3/16 pulgada x 2-1/16 pulgada x 6-1/4 pulgada)

– Tamaño del panel:  
188 mm x 59 mm x 9 mm  
(7-7/16 pulgada x 2-3/8 pulgada x 3/8 pulgada)

**Peso:** 1,2 kg (2,8 lbs) (excluyendo accesorios)

Sujeto a cambios sin previo aviso.

Si necesita un kit para su automóvil, consulte su directorio telefónico para buscar la tienda especializada en car audio más cercana.

Microsoft y Windows Media son marcas registradas o bien marcas comerciales de Microsoft Corporation en los Estados Unidos y/u otros países.

Merci pour avoir acheté un produit JVC.

Veuillez lire attentivement toutes les instructions avant d'utiliser l'appareil afin de bien comprendre son fonctionnement et d'obtenir les meilleures performances possibles.

## Précautions:

Tout changement ou modification non approuvé par JVC peut annuler l'autorité de l'utilisateur d'utiliser l'appareil.

## IMPORTANT POUR PRODUITS LASER

1. PRODUIT LASER CLASSE 1

2. **ATTENTION:** N'ouvrez pas le couvercle supérieur. Il n'y a aucune pièce réparable par l'utilisateur à l'intérieur de l'appareil; confiez toute réparation à un personnel qualifié.

3. **ATTENTION:** (Pour les Etats-Unis) Radiation laser de classe II visibles et/ou invisible si l'appareil est ouvert. Ne regardez pas le rayon.

(Pour le Canada) Rayonnement laser visible et/ou invisible de classe 1M une fois ouvert. Ne pas regarder directement avec des instruments optiques.

4. REPRODUCTION DE L'ÉTIQUETTE: ÉTIQUETTE DE PRÉCAUTION PLACÉE À L'EXTÉRIEUR DE L'APPAREIL.

<b>CAUTION</b> VISIBLE AND/OR INVISIBLE CLASS 1M LASER RADIATION WHEN OPEN. DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS. IEC60825-1:2001 (ENG)	<b>ATTENTION</b> RAYONNEMENT LASER VISIBLE ET/OU INVISIBLE DE CLASSE 1M UNE FOIS OUVERT. NE PAS REGARDER DIRECTEMENT AVEC DES INSTRUMENTS OPTIQUES. (FRA)	<b>AVISO</b> RADIACIÓN LASER DE CLASE 1M VISIBLE Y/O INVISIBLE CUANDO ESTA ABIERTO. NO MIRAR DIRECTAMENTE CON INSTRUMENTAL ÓPTICO. (ESP)	<b>VARNING</b> SYNLIG OCH/ELLER OYNLIG LASERSTRÅLNING KLASS 1M, NÄR DENNA DEL ÄR ÖPPNAD. BETRÄKTA EJ STRÅLEN MED OPTISKA INSTRUMENT. (SWE)	<b>注意</b> ここを覆くと有害 及びまたは不可視 のクラス1M レーザー放射が 出ます。 光学眼鏡で直接 見ないでください (JPN)	<b>CAUTION</b> VISIBLE AND/OR INVISIBLE CLASS II LASER RADIATION WHEN OPEN. DO NOT STARE INTO BEAM. FDA 21 CFR (ENG)
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[Union européenne seulement]

## Attention:

Ajustez le volume de façon à pouvoir entendre les sons extérieurs à la voiture. Conduire avec le volume trop haut peut être la cause d'un accident.

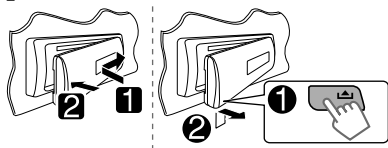
## AVERTISSEMENT:

Arrêtez la voiture avant de manipuler l'appareil.

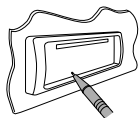
## Précautions sur le réglage du volume:

Les disques produisent très peu de bruit par rapport aux autres sources. Réduisez le volume avant de reproduire un disque afin d'éviter d'endommager les enceintes par la soudaine augmentation du niveau de sortie.

## Comment attacher/détacher le panneau de commande



## Comment réinitialiser votre appareil



Vos ajustements pré réglés sont aussi effacés.

## Comment forcer l'éjection d'un disque



[Maintenez pressée]

- Faites attention de ne pas faire tomber le disque quand il est éjecté.
- Si cela ne fonctionne pas, essayez de réinitialiser l'autoradio.

## Entretien

### Nettoyage de l'appareil

Essayez la saleté sur le panneau avec un chiffon sec au silicone ou un chiffon doux. Ne pas respecter ces précautions peut entraîner des dommages au moniteur ou à l'appareil.

### Nettoyage du connecteur

Essayez toute les saletés sur le connecteur de l'appareil et le panneau. Utilisez une coton-tige ou un chiffon.

### Précautions pour la lecture de disques à double face

La face non DVD d'un disque à "DualDisc" n'est pas compatible avec le standard "Compact Disc Digital Audio". Par conséquent, l'utilisation de la face non DVD d'un disque à double face sur cet appareil n'est pas recommandée.

## TABLE DES MATIERES

- 3 Comment attacher/détacher le panneau de commande
- 3 Comment réinitialiser votre appareil
- 3 Comment forcer l'éjection d'un disque
- 3 Entretien
- 4 **Annulation des démonstrations des affichages**
- 4 **Réglage de l'horloge**
- 5 **Préparation de la télécommande**
- 5 **À propos des disques**
- 6 **Opérations de base**
- 7 **Écoute de la radio**
- 8 **Écoute d'un disque**
- 9 **Connexion d'autres appareils extérieurs**
- 9 **Écoute d'un autre appareil extérieur**
- 10 **Sélection d'un mode sonore pré réglé**
- 10 **Utilisation des menus**
- 13 **Guide de dépannage**
- 14 **Utilisation de périphériques Bluetooth®**
- 15 **Spécifications**

**Condensation :** Quand une voiture est climatisée, de la condensation peut se produire sur la lentille du laser. Cela peut être la cause d'une erreur de lecture du disque. Dans ce cas, retirez le disque et attendez que l'humidité s'évapore.

### **Température à l'intérieur de la voiture :**

Si votre voiture est restée garée pendant longtemps dans un climat chaud ou froid, attendez que la température à l'intérieur de la voiture redevienne normale avant d'utiliser l'appareil.

# Annulation des démonstrations des affichages

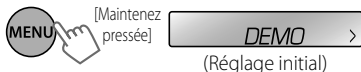
## 1 Mise sous tension de l'appareil.



## 4 Choisissez <DEMO OFF>.



## 2 [Maintenez pressée]

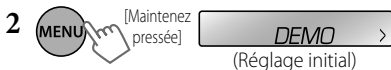


## 6 Terminez la procédure.



# Réglage de l'horloge

## 1 Mise sous tension de l'appareil.



## 3 Choisissez <CLOCK>.



## 4 Choisissez <CLOCK SET>.



## 5 Ajustez les heures.



## 6 Ajustez les minutes.



## 7 Terminez la procédure.



# Préparation de la télécommande

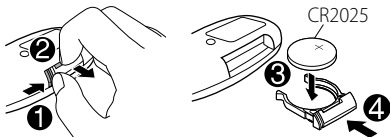
Lorsque vous utilisez la télécommande pour la première fois, tirez sur la feuille isolante pour la retirer.



Pour Californie des États-Unis seulement:  
Cet appareil contient une pile-bouton CR au lithium qui contient du perchlorate—une manipulation spéciale peut être requise. Voir [www.dtsc.ca.gov/hazardouswaste/perchlorate](http://www.dtsc.ca.gov/hazardouswaste/perchlorate)

**Si la télécommande perd de son efficacité, remplacez la pile.**

## Remplacement de la pile-bouton au lithium



### **Attention:**

- Danger d'explosion si la pile est remplacée de façon incorrecte. Remplacez-la uniquement avec le même type de pile ou un type équivalent.
- Les piles ne doivent en aucun cas être exposées à une chaleur excessive (lumière du soleil, feu, etc.).

### **Avertissement (pour éviter tout accident et tout dommage):**

- N'installez pas une autre pile qu'une CR2025 ou son équivalent.
- Ne laissez pas la télécommande dans un endroit (tel que le tableau de bord) exposé à la lumière directe du soleil pendant longtemps.
- Rangez la pile dans un endroit hors d'atteinte des enfants.
- Ne rechargez pas, ne court-circuitiez pas, ne chauffez pas la pile ni ne la jeter dans un feu.
- Ne laissez pas la pile avec d'autres objets métalliques.
- Ne piquez pas la pile avec des ciseaux ou d'autres objets similaires.
- Enveloppez la pile de ruban isolant avant de la mettre au rebut ou de la ranger.

## À propos des disques

Cet appareil ne peut lire que les CD comportant:



### **Disques qui ne peuvent pas être utilisés:**

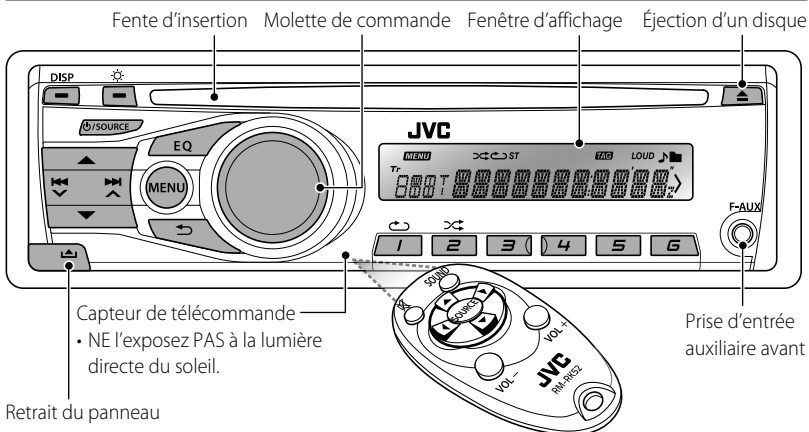
- Disques qui ne sont pas ronds
- Disques avec des colorations sur la surface d'enregistrement ou disques sales
- Vous ne pouvez pas reproduire un disque enregistrable/réinscriptible qui n'a pas été finalisé. (Pour le processus de finalisation, reportez-vous au logiciel utilisé pour graver le disque et au mode d'emploi du graveur de disque.)
- Les CD de 3 pouces ne peuvent pas être utilisés. Essayer d'insérer un disque à l'aide d'un adaptateur peut entraîner un dysfonctionnement de l'appareil.

### **Manipulation des disques:**

- Ne pas toucher la surface d'enregistrement du disque.
- Ne pas coller de ruban adhésif, etc. sur les disques et ne pas utiliser de disque avec du ruban adhésif collé dessus.
- N'utilisez aucun accessoire pour le disque.
- Nettoyez le disque en partant du centre vers l'extérieur.
- Nettoyez le disque avec un chiffon sec au silicone ou un chiffon doux. N'utilisez aucun solvant.
- Pour retirer les disques de cet appareil, tirez-les horizontalement.
- Retirez les ébarbures du bord du trou central du disque avant d'insérer un disque.



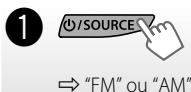
# Opérations de base



Quand vous appuyez ou maintenez pressées les touches suivantes...

Appareil principal	Télécommande	Opérations générales
⏻ / SOURCE	—	Met l'appareil sous/hors tension [Maintenez pressée].
	<b>SOURCE</b>	Choisit la source (FM, CD, F-AUX, BT AUDIO ou R-AUX ou BT PHONE, AM). • "CD" peut être sélectionné uniquement quand un disque est en place.
Molette de commande (tournez)	<b>VOL - / +</b>	Ajuste le niveau de volume.
	—	Choisissez les éléments.
Molette de commande (appuyez sur la touche)		Coupe le son pendant la lecture. Si la source est "CD", la lecture se met en pause. • Appuyez de nouveau sur la touche pour annuler la sourdine ou reprendre la lecture.
	—	Valide la sélection.
<b>EQ</b>	<b>SOUND</b>	Choisit les modes sonores pré réglés. • Maintenez la touche <b>EQ</b> pressée sur l'appareil principal pour accéder directement à l'ajustement du niveau de tonalité. (page 10)
Touches numériques (1 - 6)	—	• Choisit une station pré réglée. • Mémoire la station actuelle sur la touche numérique choisie [Maintenez pressée]. • Appuyez sur la touche numérique <b>1</b> (↺) ou <b>2</b> (↻) pour accéder directement au réglage REPEAT/RANDOM. (page 8)
	—	Affiche directement le menu <BRIGHTNESS>. (page 11)
	—	• Retourne au menu précédent. • Quittez le menu [Maintenez pressée].
<b>DISP</b>	—	• Change l'information sur l'affichage. • Fait défiler les informations de l'affichage [Maintenez pressée].

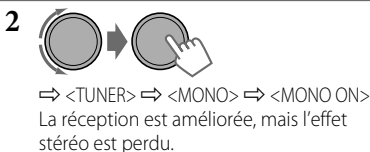
# Écoute de la radio



- [Appuyez sur la touche] Recherche des stations automatiquement.
  - [Maintenez pressée] Recherche des stations manuellement.
- "M" clignote, puis appuyez sur la touche répétitivement.

"ST" s'allume lors de la réception d'une émission FM stéréo avec un signal suffisamment fort.

## Amélioration de la réception FM

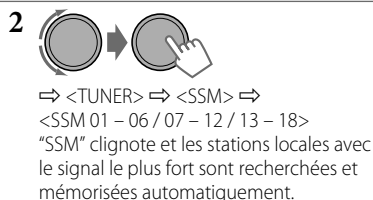


Pour rétablir l'effet stéréo, répétez la même procédure et choisissez <MONO OFF>.

## Préréglage automatique (FM) — SSM (Mémorisation automatique séquentielle des stations puissantes)

Vous pouvez préréglager un maximum de 18 stations pour FM.

Pendant l'écoute d'une station...



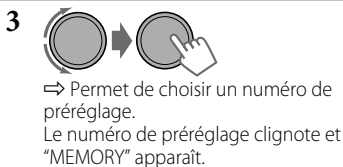
Pour préréglager 6 autres stations, répétez la procédure ci-dessus en choisissant une des autres pages de réglage SSM.

## Changement des informations sur l'affichage DISP



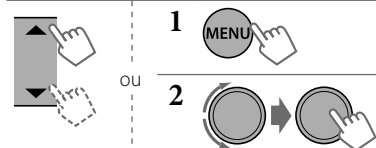
## Préréglage manuel (FM/AM)

Vous pouvez préréglager un maximum de 18 stations pour FM et de 6 stations pour AM.



- Maintenir pressées les touches numériques (1 – 6) permet aussi de mémoriser la station actuelle sur les touches numériques (1 – 6) choisies.

## Sélection d'une station préréglée



- Appuyer sur les touches numériques (1 – 6) permet aussi de choisir les stations préréglées (1 – 6).

## Utilisation de la télécommande

- ▲/▼ : Change les stations préréglées.
- ◀/▶ : [Appuyez sur la touche] Recherche des stations automatiquement.
- [Maintenez pressée] Recherche des stations manuellement.

# Écoute d'un disque



La lecture démarre automatiquement.

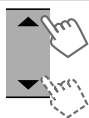
Toutes les plages sont reproduites répétitivement jusqu'à ce que vous changez la source ou éjectiez le disque.

## Arrête de la lecture et éjection du disque



Si le disque éjecté n'est pas retiré avant 15 secondes, il est réinséré automatiquement dans la fente d'insertion.

## Sélection d'une plage/dossier



Choisit un dossier d'un disque MP3/WMA



[Appuyez sur la touche] Sélection d'une plage.  
[Maintenez pressée] Avance ou recule rapidement la page.

## Utilisation de la télécommande

▲/▼ : Choisit un dossier d'un disque MP3/WMA.

◀/▶ : [Appuyez sur la touche] Sélection d'une page.

[Maintenez pressée] Avance ou recule rapidement la page.

## Changement des informations sur l'affichage




Le titre du disque/Nom de l'album/interprète (nom du dossier)\* → Titre de la plage (nom de fichier)\* → Numéro de la plage actuelle avec la durée de lecture écoulée → Numéro de la plage actuelle avec l'horloge → (retour au début)

\* "NO NAME" apparaît pour les CD ordinaire ou si aucun nom n'a été enregistré.

## Sélection d'une plage/dossier à partir de la liste





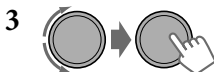
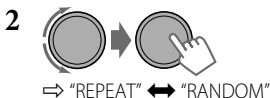
- Si le disque MP3/WMA contient beaucoup de plages, vous pouvez effectuer une recherche rapide ( $\pm 10$ ,  $\pm 100$ ) sur le disque en tournant rapidement la molette de commande.
- Pour revenir au menu précédent, appuyez sur .

## Sélection des modes de lecture


Vous pouvez utiliser un des modes de lecture suivants à la fois.



- Appuyer sur la touche numérique 1 () ou 2 () permet d'accéder directement au réglage REPEAT/RANDOM. Puis, réalisez l'étape 3.



- REPEAT 
- TRACK RPT : Répète la plage actuelle  
FOLDER RPT : Répète le dossier actuel

- RANDOM 
- FOLDER RND : Reproduit aléatoirement toutes les plages du dossier actuel, puis toutes les plages des dossiers suivants

- ALL RND : Reproduit aléatoirement toutes les plages

Pour annuler la lecture répétée ou la lecture aléatoire, choisissez "RPT.OFF" ou "RND.OFF"

# Connexion d'autres appareils extérieurs

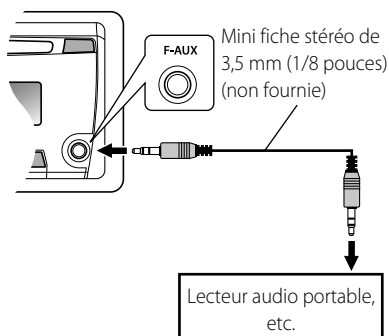
Vous pouvez connecter un appareil extérieur à la prise d'entrée auxiliaire sur le panneau de commande (F-AUX) et/ou à l'arrière de l'appareil (R-AUX).

Résumé de l'utilisation des appareils extérieurs par les prises d'entrée auxiliaire.

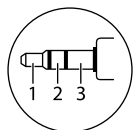
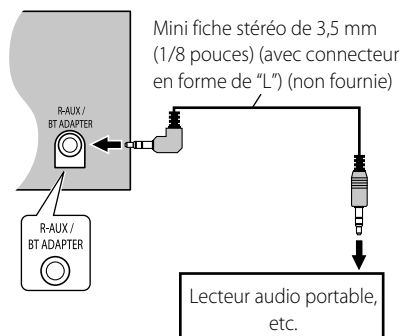
Appareil extérieur	Prise d'entrée auxiliaire	Préparation			Nom de la source	Câble de connexion/ appareil (non fournie)
		Élément de réglage de menu	Élément secondaire	Réglage		
Lecteur audio portable	Avant	SRC SELECT	F-AUX	MARCHE	F-AUX	Voir ci-dessous.
	Arrière	SRC SELECT	R-AUX	MARCHE	R-AUX	
Périphérique Bluetooth	Arrière	SRC SELECT	R-AUX	BT ADAPTER	BT AUDIO/ BT PHONE*	KS-BTA100 (page 14)

\* "BT PHONE" apparaît quand un téléphone Bluetooth est en cours d'utilisation.

## Sur le panneau de commande (F-AUX):



## Sur le panneau arrière (R-AUX):



Il est recommandé d'utiliser une mini fiche stéréo munie d'une fiche à 3 connecteurs pour obtenir une sortie audio optimum.

# Écoute d'un autre appareil extérieur

Pour plus d'informations, référez-vous aussi aux instructions fournies avec les appareils extérieurs.



⇒ "F-AUX" ou "R-AUX"

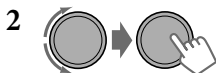


# Sélection d'un mode sonore pré-réglé

Vous pouvez sélectionner un mode sonore pré-réglé adapté à votre genre de musique.



Pendant l'écoute, vous pouvez ajuster le niveau du caisson de grave et le niveau de tonalité du mode sonore choisi.



Ajustez le niveau:  
SUB.W \* : 00 à 08  
BASS/ MID/ TRE : -06 à +06  
Le mode sonore est mémorisé automatiquement et changé sur "USER".  
\* Le niveau du caisson de grave peut être ajusté uniquement quand <L/O MODE> est réglé sur <SUB.W>. (page 11)

## Mémorisation de votre propre mode sonore

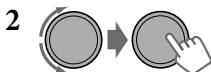
Vous pouvez mémoriser vos propres ajustements en mémoire.



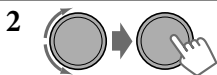
## Utilisation des menus



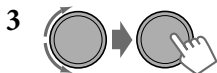
Si aucune opération n'est effectuée pendant environ 60 secondes, l'opération est annulée.



**3** Répéter l'étape **2** si nécessaire.  
• Pour revenir au menu précédent, appuyez sur .  
• Pour quitter le menu, appuyez sur **MENU**.



⇨ <PRO EQ> ⇨ <BASS / MIDDLE / TREBLE>



Ajustez les éléments sonores de la tonalité choisie.

**BASS** [Réglage initial: 80 Hz, 00, Q1.0]

Fréquence: 60/ 80/ 100/ 200 Hz

Niveau: -06 à +06

Q: Q1.0/ 1.25/ 1.5/ 2.0

**MIDDLE** [Réglage initial: 1.0 kHz, 00, Q1.25]

Fréquence: 0.5/ 1.0/ 1.5/ 2.5 kHz

Niveau: -06 à +06

Q: Q0.75/ 1.0/ 1.25

**TREBLE** [Réglage initial: 10.0 kHz, 00, Q FIX]

Fréquence: 10.0/ 12.5/ 15.0/ 17.5 kHz

Niveau: -06 à +06

Q: Q FIX

**4** Répétez les étapes **2** et **3** pour ajuster les autres tonalités.

L'ajustement fait est mémorisé automatiquement et changé sur "USER".

Article de menu	Réglages pouvant être choisis, [Réglage initial: <u>Souligné</u> ]
DEMO	<b>ON</b> : La démonstration des affichages entre en service si aucune opération n'est réalisée pendant environ 20 secondes. / <b>OFF</b> : Annulation. (page 4)
CLOCK	Pour les réglages, voir page 4.

Article de menu		Réglages pouvant être choisis, [Réglage initial: <u>Souligné</u> ]
DIMMER	DIMMER SET	<b>AUTO</b> : Change l'éclairage de l'affichage et des touches entre les réglages Jour et Nuit dans le réglage <BRIGHTNESS> quand vous allumez ou éteignez les feux du véhicule *1. / <b>ON</b> : Choisit le réglage Nuit dans le réglage <BRIGHTNESS> pour l'éclairage de l'affichage et des touches. / <b>OFF</b> : Choisit le réglage Jour dans le réglage <BRIGHTNESS> pour l'éclairage de l'affichage et des touches.
	BRIGHTNESS	<b>DAY [ 31 ] / NIGHT [ 15 ]</b> : Choisit le niveau de luminosité de l'affichage et de l'éclairage des touches <b>[00 — 31]</b> pour le jour et la nuit.
DISPLAY	SCROLL *2	<b>ONCE</b> : Fait défiler une fois les informations affichées. / <b>AUTO</b> : Répète le défilement (à 5 secondes d'intervalle). / <b>OFF</b> : Annulation. (Appuyer sur <b>DISP</b> pendant plus d'une seconde peut faire défiler l'affichage quelque que soit le réglage utilisé.)
	TAG DISPLAY	<b>ON</b> : Affiche les informations des balises lors de la lecture d'une plage MP3/WMA. / <b>OFF</b> : Annulation.
PRO EQ		Voir page 10.
AUDIO	FADER *3, *4	<b>R06 — F06 [ 00 ]</b> : Ajustez la balance de sortie avant-arrière des enceintes.
	BALANCE *4	<b>L06 — R06 [ 00 ]</b> : Ajustez la balance de sortie gauche-droite des enceintes.
	LOUD	<b>ON</b> : Accentue les basses et hautes fréquences pour produire un son plus équilibré aux faibles niveaux de volume. / <b>OFF</b> : Annulation.
	VOL ADJUST	<b>-05 — +05 [ 00 ]</b> : Préréglez le niveau d'ajustement du volume de chaque source (sauf "FM"), en comparaison avec le niveau de volume FM. Le niveau de volume augmente ou diminue automatiquement quand vous changez la source. Avant un ajustement, choisissez la source que vous souhaitez ajuster. ("VOL ADJ FIX" apparaît sur l'affichage si "FM" est choisis comme source.)
	L/O MODE	<b>SUB.W</b> : Choisissez ce réglage si les prises REAR/SW sont utilisées pour connecter un caisson de grave (à travers un amplificateur). / <b>REAR</b> : Choisissez ce réglage si les prises REAR/SW sont utilisées pour connecter les enceintes (à travers un amplificateur).
	SUB.W LPF *5	<b>LOW 55Hz / LOW 85Hz / LOW 120Hz</b> : Les fréquences inférieures à 55 Hz / 85 Hz / 120 Hz sont envoyées sur le caisson de grave.
	SUB.W LEVEL *5	<b>00 — 08 [ 04 ]</b> : Ajuste le niveau de sortie du caisson de grave.
	HPF	<b>ON</b> : Met en service le filtre passe haut. Les signaux basse fréquence sont coupés des enceintes avant/arrière. / <b>OFF</b> : Met le réglage hors service (tous les signaux sont envoyés aux enceintes avant/arrière.)
	BEEP	<b>ON / OFF</b> : Met en ou hors service la tonalité des touches.
	TEL MUTING *6	<b>ON</b> : Coupe le son pendant l'utilisation d'un téléphone portable (non connecté par le KS-BTA100). / <b>OFF</b> : Annulation.

\*1 La connexion du fil de commande de l'éclairage est requise. (Référez-vous au "Manuel d'installation/raccordement"). Ce réglage peut ne pas fonctionner correctement sur certains véhicules (en particulier sur ceux qui possèdent une bague de commande de gradation). Dans ce cas, changez le réglage sur autre chose que <DIMMER AUTO>.

\*2 Certains caractères ou symboles n'apparaissent pas correctement (ou un blanc apparaît à leur place) sur l'affichage.

\*3 Si vous utilisez un système à deux enceintes, réglez le niveau du fader sur "00".

\*4 L'ajustement ne peut pas affecter la sortie du caisson de grave.

\*5 Est affiché uniquement quand <L/O MODE> est réglé sur <SUB.W>.

\*6 Ce réglage ne fonctionne pas si <BT ADAPTER> est choisi pour <R-AUX> de <SRC SELECT>.

À suivre...

Article de menu		Réglages pouvant être choisis, [Réglage initial: <b>Souligné</b> ]
AUDIO	<b>AMP GAIN</b> *7	<b>LOW POWER</b> : VOLUME 00 – VOLUME 30 (Choisissez ce réglage si la puissance maximum de chaque enceinte est inférieure à 50 W pour éviter tout dommage des enceintes.) / <b>HIGH POWER</b> : VOLUME 00 – VOLUME 50
	<b>SSM</b> *8	Voir page 7.
TUNER	<b>AREA</b>	<b>US</b> : Lors de l'utilisation de l'appareil en Amérique du Nord/Centrale/du Sud. L'intervalle de fréquences AM/FM est réglé sur 10 kHz/200 kHz. / <b>EU</b> : Lors de l'utilisation de l'appareil dans les autres régions. L'intervalle des fréquences AM/FM est réglé sur 9 kHz/50 kHz (50 kHz pendant la recherche automatique). / <b>SA</b> : Lors de l'utilisation de l'appareil dans les pays d'Amérique du Sud ou l'intervalle FM est de 50 kHz. L'intervalle AM est réglé sur 10 kHz.
	<b>MONO</b> *8	Voir page 7.
	<b>IF BAND</b>	<b>AUTO</b> : Augmente la sélectivité du tuner pour réduire les interférences entre les stations adjacentes. (L'effet stéréo peut être perdu.) / <b>WIDE</b> : Il y a des interférences des stations adjacentes, mais la qualité du son n'est pas dégradée et l'effet stéréo est conservé.
SRC SELECT	<b>AM</b> *9	<b>ON / OFF</b> : Met en ou hors service "AM" pour la sélection de source.
	<b>F-AUX</b> *9	<b>ON / OFF</b> : Met en ou hors service "F-AUX" pour la sélection de source.
	<b>R-AUX</b> *9	<b>ON / OFF</b> : Met en ou hors service "R-AUX" pour la sélection de source. / <b>BT ADAPTER</b> *10 : Choisit si la prise d'entrée auxiliaire arrière est connectée à l'adaptateur Bluetooth, KS-BTA100. (page 9)

\*7 Le niveau de volume change automatiquement sur "VOLUME 30" si vous réglez sur <LOW POWER> quand le niveau de volume est plus haut que "VOLUME 30".

\*8 S'affiche uniquement quand la source est "FM".

\*9 S'affiche uniquement quand une source autre que "AM/ F-AUX/ R-AUX/ BT AUDIO" est choisie séparément.

\*10 Quand <BT ADAPTER> est choisi, le nom de la source change sur "BT AUDIO" à partir de "R-AUX".

### Informations complémentaires

- Cet autoradio peut reproduire les disques multi-session; mais les sessions non fermées sont sautées lors de la lecture.
- Cet appareil peut reproduire les fichiers portant le code d'extension <.mp3> ou <.wma> (quel que soit la casse des lettres—majuscules/minuscules).
- Cet autoradio peut reproduire les fichiers respectant les conditions suivantes:
  - Débit binaire: MP3: 8 kbps à 320 kbps  
WMA: 32 kbps à 192 kbps
  - Fréquence d'échantillonnage:  
MP3: 48 kHz, 44,1 kHz, 32 kHz  
24 kHz, 22,05 kHz, 16 kHz  
12 kHz, 11,025 kHz, 8 kHz  
WMA: 48 kHz, 44,1 kHz, 32 kHz, 22,05 kHz
- Cet appareil peut afficher les balises WMA et ID3, version 1,0/1,1/2,2/3/2,4 (pour MP3).
- La fonction de recherche fonctionne mais la vitesse de recherche n'est pas constante.
- Le nombre maximum de caractères pour les noms de fichier/dossier varie en fonction du format du disque utilisé (et inclus les 4 caractères de l'extension—<.mp3> ou <.wma>).  
ISO 9660 Niveau 1 et 2, Romeo: 64 caractères, Joliet: 32 caractères, Nom de fichier long Windows: 64 caractères
- Cet autoradio peut reproduire les fichiers enregistrés au mode VBR (débit binaire variable). (Les fichiers enregistrés en VBR affichent une durée écoulée différente.)
- Cet autoradio ne peut pas reproduire les fichiers suivants:
  - Fichiers MP3: codé au format MP3i et MP3 PRO, dans un format inapproprié, couche 1/2.
  - Fichiers WMA: codés au format sans perte (lossless), professionnel et vocal; avec un format non basé sur Windows Media® Audio; protégé contre la copie avec DRM.
  - Fichiers qui contiennent des données telles que AIFF, ATRAC3, etc.

# Guide de dépannage

	Symptôme	Remède/Cause
Généralités	Aucun son n'est entendu des enceintes.	Ajustez le volume sur le niveau optimum. / Assurez-vous que le son de l'appareil n'est pas coupé et qu'il n'est pas en pause. (page 6) / Vérifiez les cordons et les connexions.
	"MISWIRING CHK WIRING THEN RESET UNIT" / "WARNING CHK WIRING THEN RESET UNIT" apparaît sur l'affichage et aucune opération ne peut être réalisée.	Assurez-vous que les prises des fils d'enceintes sont recouvertes correctement de ruban isolant, puis réinitialisez l'appareil. (page 3) Si le message ne disparaît, consultez votre revendeur d'autoradio JVC ou la société qui fabrique les kits.
	Cet autoradio ne fonctionne pas du tout.	Réinitialisez l'appareil. (page 3)
	"F-AUX" ou "R-AUX" ne peuvent pas être choisis.	Cochez le réglage <SRC SELECT> → <F-AUX / R-AUX>. (page 12)
	Le son est parfois interrompu pendant l'écoute d'un appareil extérieur connecté à la prise d'entrée auxiliaire.	Assurez-vous d'utiliser une fiche mini stéréo recommandée pour la connexion. (page 9)
FM/AM	Le pré-réglage automatique SSM ne fonctionne pas.	Mémorez les stations manuellement.
	Bruit statique pendant l'écoute de la radio.	Connectez l'antenne solidement.
	Vous ne pouvez pas choisir "AM".	Cochez le réglage <SRC SELECT> → <AM>. (page 12)
Lecture de disque	Le disque ne peut pas être reproduit.	Insérez le disque correctement.
	Un CD-R/CD-RW ne peut pas être reproduit et les plages ne peuvent pas être sautées.	Insérez un CD-R/CD RW finalisé (finalisez-le avec l'appareil que vous avez utilisé pour l'enregistrement).
	Le son du disque est parfois interrompu.	Arrêtez la lecture lorsque vous conduisez sur une route accidentée. / Changez le disque. / Vérifiez les cordons et les connexions.
	"NO DISC" apparaît sur l'affichage.	Insérez un disque reproductible dans la fente d'insertion.
	"PLEASE" et "EJECT" apparaissent alternativement sur l'affichage.	Appuyez sur ▲, puis insérez un disque correctement.
"IN DISC" apparaît sur l'affichage.	Le disque ne peut pas être éjecté correctement. Assurez-vous que rien ne bloque la fente d'insertion.	
Lecture MP3/WMA	Le disque ne peut pas être reproduit.	<ul style="list-style-type: none"> <li>Utilisez un disque avec des plages MP3/WMA enregistrées dans un format compatible avec ISO 9660 Niveau 1, Niveau 2, Romeo ou Joliet.</li> <li>Ajoutez le code d'extension &lt;.mp3&gt; ou &lt;.wma&gt; aux noms de fichier.</li> </ul>
	Du bruit est produit.	Sautez à une autre plage ou changez le disque.
	"READING" continue de clignoter sur l'affichage.	Un temps d'initialisation plus long est requis. N'utilisez pas trop de niveaux de hiérarchie et de dossiers.
	Les plages ne sont pas reproduites dans l'ordre dans lequel vous vouliez les reproduire.	L'ordre de lecture est déterminé quand les fichiers sont enregistrés.
	La durée de lecture écoulée n'est pas correcte.	Cela se produit quelque fois pendant la lecture. C'est causé par la façon dont les plages ont été enregistrées sur le disque.
Les caractères corrects ne sont pas affichés (ex.: nom de l'album).	Cet appareil peut uniquement afficher les lettres (majuscules), les chiffres et un nombre limité de symboles.	



# Utilisation de périphériques Bluetooth®

Pour les opérations Bluetooth, il faut connecter l'adaptateur Bluetooth, KS-BTA100 (non fournis) à la prise d'entrée auxiliaire (R-AUX/BT ADAPTER) à l'arrière de cet appareil. (page 9)

- Pour en savoir plus, référez-vous aussi aux instructions fournies avec l'adaptateur Bluetooth et le périphérique Bluetooth.
- Les opérations peuvent différer en fonction du périphérique connecté.

## Préparation

### 1 Enregistrement (paire) d'un appareil Bluetooth avec le KS-BTA100.

Référez-vous aux manuels d'instruction fournis avec le KS-BTA100.

### 2 Changez les réglages <SRC SELECT> de cet appareil.

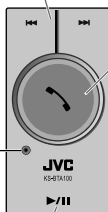


## Utilisation d'un téléphone portable Bluetooth



KS-BTA100

Microphone



#### • Réception d'un appel

Quand un appel arrive...



#### • Pour faire un appel

Faire à appel au dernier numéro connecté à partir de votre téléphone.

#### • Commutation entre le mode mains libres et le téléphone

Pendant une conversation...

#### • Permet de terminer/refuser l'appel

#### • Composition vocale

La composition vocale est disponible uniquement quand le téléphone portable connecté possède un système de reconnaissance vocale.



[Maintenez pressée]

## Utilisation d'un périphérique audio Bluetooth



Si la lecture ne démarre pas, utilisez la lecture audio Bluetooth pour démarrer la lecture.



[Appuyez sur la touche] Sélection d'une page.

[Maintenez pressée] Avance ou recule rapidement la page.

### À propos du volume du microphone:

- Quand vous mettez hors tension le récepteur CD, le niveau de volume change sur Normal.

# Spécifications

## SECTION DE L'AMPLIFICATEUR

### AUDIO



**Puissance de sortie :** 20 W RMS × 4 canaux à 4 Ω et avec ≤ 1% THD+N

**Rapport signal sur bruit :** 80 dBA (référence: 1 W pour 4 Ω)

**Impédance de charge :** 4 Ω (4 Ω à 8 Ω admissible)

**Réponse en fréquence :** 40 Hz à 20 000 Hz

**Niveau de sortie de ligne ou niveau de sortie du caisson de grave/Impédance :** 2,5 V/20 kΩ en charge (pleine échelle)

**Impédance de sortie :** ≤ 600 Ω

**Autre prise :** Prise d'entrée auxiliaire avant, Prise d'entrée arrière auxiliaire/adaptateur Bluetooth, Borne de l'antenne

## SECTION DU TUNER

### **Plage de fréquences :**

#### **FM :**

–avec l'intervalle des canaux réglé sur 200 kHz : 87,9 MHz à 107,9 MHz

–avec l'intervalle des canaux réglé sur 50 kHz : 87,5 MHz à 108,0 MHz

#### **AM :**

–avec l'intervalle des canaux réglé sur 10 kHz : 530 kHz à 1 700 kHz

– avec l'intervalle des canaux réglé sur 9 kHz : 531 kHz à 1 611 kHz

### **Tuner FM :**

**Sensibilité utile :** 9,3 dBf (0,8 μV/75 Ω)

**Sensibilité utile à 50 dB :** 16,3 dBf (1,8 μV/75 Ω)

**Sélectivité de canal alterné (400 kHz) :** 65 dB

**Réponse en fréquence :** 40 Hz à 15 000 Hz

**Séparation stéréo :** 40 dB

### **Tuner AM :**

**Sensibilité/Sélectivité :** 20 μV/40 dB

## SECTION DU LECTEUR CD

**Type :** Lecteur de disque compact

**Système de détection du signal :** Capteur optique sans contact (laser semi-conducteur)

**Nombre de canaux :** 2 canaux (stéréo)

**Réponse en fréquence :** 5 Hz à 20 000 Hz

**Rapport signal sur bruit :** 98 dB

**Pleurage et scintillement :** Inférieur à la limite mesurable

**Format de décodage MP3 (MPEG1/2 Audio**

**Layer 3) :** Débit binaire maximum: 320 kbps

**Format de décodage WMA (Windows Media®**

**Audio) :** Débit binaire maximum: 192 kbps

## GÉNÉRALITÉS

**Alimentation :** Tension de fonctionnement:

CC 14,4 V (11 V à 16 V admissibles)

**Système de mise à la masse :** Masse négative

**Températures de fonctionnement admissibles :**

0°C à +40°C (32°F à 104°F)

**Dimensions (L × H × P) : (approx.)**

– Taille d'installation :

182 mm × 52 mm × 158 mm

(7-3/16 pouces × 2-1/16 pouces × 6-1/4 pouces)

– Taille du panneau :

188 mm × 59 mm × 9 mm

(7-7/16 pouces × 2-3/8 pouces × 3/8 pouces)

**Masse :** 1,2 kg (2,8 livres) (sans les accessoires)

Sujet à changement sans notification.

Si un kit est nécessaire pour votre voiture, consultez votre annuaire téléphonique pour trouver le magasin spécialisé autoradio le plus proche.

Microsoft et Windows Media est une marque déposée ou une marque de commerce de Microsoft Corporation aux États-Unis et/ou dans les autres pays.

## **TO OUR VALUED CUSTOMER**

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WE WANT TO HELP YOU ACHIEVE A PERFECT EXPERIENCE.

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NEED ASSISTANCE ON HOW TO OPERATE?  
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LIKE TO PURCHASE ACCESSORIES?**

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**TOLL FREE: 1(800)252-5722**  
**<http://www.jvc.com>**

Remember to retain your Bill of Sale for Warranty Service.

**Do not attempt to service the product yourself**

### **Caution**

To prevent electrical shock, do not open the cabinet.  
There are no user serviceable parts inside.  
Please refer to qualified service personnel for repairs.



# LIMITED WARRANTY

1-1 USA ONLY

ONLY FOR PRODUCT PURCHASED IN U.S.A.

JVC Americas Corp. (JVC) warrants this product and all parts thereof, except as set forth below ONLY TO THE ORIGINAL RETAIL PURCHASER to be FREE FROM DEFECTIVE MATERIALS AND WORKMANSHIP from the date of original purchase for the period shown below. ("The Warranty Period")

PARTS	1 YR	LABOR	1 YR
-------	------	-------	------

THIS LIMITED WARRANTY IS VALID ONLY IN THE FIFTY (50) UNITED STATES, THE DISTRICT OF COLUMBIA AND IN THE COMMONWEALTH OF PUERTO RICO.

### WHAT WE WILL DO:

If this product is found to be defective within the warranty period, JVC will repair or replace defective parts with new or rebuilt equivalents at no charge to the original owner. Such repair and replacement services shall be rendered by JVC during normal business hours at JVC authorized service centers. Parts used for replacement are warranted only for the remainder of the Warranty Period. All products may be brought to a JVC authorized service center on a carry-in basis. Color televisions with a screen size of 37" class or greater qualify for in-home service. In such cases, a technician will come to your home and either repair the TV there or remove and return it if it cannot be repaired in your home.

### WHAT YOU MUST DO FOR WARRANTY SERVICE:

Please do not return your product to the retailer. Instead, return your product to the JVC authorized service center nearest you. If shipping the product to the service center, please be sure to package it carefully, preferably in the original packaging, and include a brief description of the problem(s). Please call 1-800-252-5722 to locate the nearest JVC authorized service center. Service locations can also be obtained from our website <http://www.jvc.com>. If your product qualifies for in-home service, the service representative will require clear access to the product.

If you have any questions concerning your JVC Product, please contact our Customer Care Center at 800-252-5722

### WHAT IS NOT COVERED:

This limited warranty provided by JVC does not cover:

1. Products which have been subject to abuse, accident, alteration, modification, tampering, negligence, misuse, faulty installation, lack of reasonable care, or if repaired or serviced by anyone other than a service facility authorized by JVC to render such service, or if affixed to any attachment not provided with the products, or if the model or serial number has been altered, tampered with, defaced or removed;
2. Initial installation, installation and removal from cabinets or mounting systems.
3. Operational adjustments covered in the Owner's Manual, normal maintenance, video and audio head cleaning;
4. Damage that occurs in shipment, due to act of God, and cosmetic damage;
5. Signal reception problems and failures due to line power surge;
6. User Removal Memory Devices/Video Pick-up Tubes/OCD Image Sensors are covered for 90 days from the date of purchase;
7. Accessories;
8. Batteries (except that Rechargeable Batteries are covered for 90 days from the date of purchase);
9. Products used for commercial purposes, including, but not limited to rental.
10. Loss of data resultant from malfunction of hard drive or other data storage device;

There are no express warranties except as listed above.

THE DURATION OF ANY IMPLIED WARRANTIES, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY, IS LIMITED TO THE DURATION OF THE EXPRESS WARRANTY HEREIN.

JVC SHALL NOT BE LIABLE FOR ANY LOSS OF USE OF THE PRODUCT, INCONVENIENCE, OR ANY OTHER DAMAGES, WHETHER DIRECT, INCIDENTAL OR CONSEQUENTIAL (INCLUDING, WITHOUT LIMITATION, DAMAGE TO TAPES, RECORDS OR DISCS) RESULTING FROM THE USE OF THIS PRODUCT, OR ARISING OUT OF ANY BREACH OF THIS WARRANTY. ALL EXPRESS AND IMPLIED WARRANTIES, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE, ARE LIMITED TO THE WARRANTY PERIOD SET FORTH ABOVE.

Some states do not allow the exclusion of incidental or consequential damages or limitations on how long an implied warranty lasts, so these limitations or exclusions 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.

### JVC AMERICAS CORP.

1700 Valley Road, Wayne, New Jersey 07470

<http://www.jvc.com>

REFURBISHED PRODUCTS CARRY A SEPARATE WARRANTY, THIS WARRANTY DOES NOT APPLY. FOR DETAIL OF REFURBISHED PRODUCT WARRANTY, PLEASE REFER TO THE REFURBISHED PRODUCT WARRANTY INFORMATION PACKAGED WITH EACH REFURBISHED PRODUCT.

### For customer use:

Enter below the Model No. and Serial No. which is located either on the rear, bottom or side of the cabinet. Retain this information for future reference.

Model No. : \_\_\_\_\_

Serial No. : \_\_\_\_\_

Purchase date : \_\_\_\_\_

Name of dealer : \_\_\_\_\_

CANADA  
ONLY

**JVC**

CANADA  
SEULEMENT

### OWNER'S COPY OF WARRANTY CARD COPIE D'ENREGISTREMENT DE LA GARANTIE DU PROPRIÉTAIRE

(Save sales docket together with this warranty card, as a proof of date of purchase.  
La facture et cette garantie sont vos preuves de la date d'achat; rangez-les.)

MODEL / MODÈLE: SERIAL NO. / NO DE SÉRIE: Date purchased / Date acheté: \_\_\_\_\_

Purchase from / Acheté chez: \_\_\_\_\_

Dealer's Address / Adresse du Vendeur: No. / No. Street / Rue: \_\_\_\_\_ Prov. / Prov. \_\_\_\_\_

City or Town / Ville: \_\_\_\_\_ Postal Code / Code Postal: \_\_\_\_\_

Owner's Name / Nom du Propriétaire: \_\_\_\_\_

Owner's Address / Adresse du Propriétaire: No. / No. Street / Rue: \_\_\_\_\_ Apt. / App. \_\_\_\_\_ Prov. / Prov. \_\_\_\_\_ Postal Code / Code Postal: \_\_\_\_\_

City or Town / Ville: \_\_\_\_\_ Postal Code / Code Postal: \_\_\_\_\_

BT-52006-1  
(1007)

Detach here, à découper ici

Printed in Indonesia

### WARRANTY CONTROL CARD CARTE DE CONTRÔLE DE LA GARANTIE

IMPORTANT: This warranty control card must be filled in and posted to the address indicated on the back hereof or register via internet within 7 (seven) days from the date of purchase.  
IMPORTANT: Cette carte doit être renvoyée dûment remplie à l'adresse indiquée au verso, dans les 7 jours de la date d'achat ou aller sur le site par internet pour l'enregistrement.

(PLEASE PRINT IN UPPERCASE LETTERS)

MODEL / MODÈLE: SERIAL NO. / NO DE SÉRIE: Date purchased / Date acheté: \_\_\_\_\_

Purchased from / Acheté chez: \_\_\_\_\_

Dealer's Address / Adresse du Vendeur: No. / No. Street / Rue: \_\_\_\_\_ Prov. / Prov. \_\_\_\_\_ Postal Code / Code Postal: \_\_\_\_\_

City or Town / Ville: \_\_\_\_\_ Postal Code / Code Postal: \_\_\_\_\_

Owner's Name / Nom du Propriétaire: \_\_\_\_\_

Owner's Address / Adresse du Propriétaire: No. / No. Street / Rue: \_\_\_\_\_ Apt. / App. \_\_\_\_\_ Prov. / Prov. \_\_\_\_\_ Postal Code / Code Postal: \_\_\_\_\_

City or Town / Ville: \_\_\_\_\_ Postal Code / Code Postal: \_\_\_\_\_

You may also register on-line at: [www.jvc.ca](http://www.jvc.ca)

You may also register on-line at: [www.jvc.ca](http://www.jvc.ca)

WARRANTY APPLIES ONLY TO PRODUCT  
DISTRIBUTED IN CANADA BY JVC CANADA INC.

LA GARANTIE S'APPLIQUE SEULEMENT AUX PRODUITS  
DISTRIBUÉS AU CANADA PAR JVC CANADA INC.

Warranty applies only to PRODUCT distributed in Canada by JVC Canada Inc.

**JVC**

La garantie s'applique seulement aux PRODUITS distribués au Canada par JVC Canada Inc.

# WARRANTY GARANTIE

JVC CANADA INC.

21 Finchdene Square, Toronto, ON M1X 1A7  
TEL: (416) 293-1311 FAX: (416) 293-8208

<http://www.jvc.ca>

JVC CANADA INC. (hereafter called "JVC") gives the following express warranty for each new JVC product distributed in Canada by JVC and sold by an authorized JVC dealer.

JVC warrants that this JVC product is free, under normal use and maintenance, from any defects in material and workmanship subject to the following terms and conditions:

#### 1. To Obtain Warranty Service:

- The JVC Warranty Control Card herein provided must be completed in full and posted or registered via internet within 7 days of date of purchase of the JVC product.
- This JVC Warranty Control Card must be completed in full and presented together with proof of purchase of the JVC product requiring service.
- The JVC product must be brought in for service to an authorized JVC Service Centre.

#### 2. Limitation:

This Warranty shall not apply to:

- Repair or replacement of any cabinets, batteries, plates, connection cords, antennas, dust covers, knobs, speaker grills, speaker cones, projection screens, projection screen savers, and all accessories.
- Any defects caused or repairs required as a result of misuse, abusive operation, negligence, improper use and/or insufficient care.
- Any defect caused or repairs required as a result of not following the instructions in the operation manual.
- Any JVC product tampered with, adjusted or repaired by any party other than JVC or authorized JVC Service Centre personnel.

JVC CANADA INC. (ci-après appelé "JVC") énonce la garantie expresse suivante pour tout nouveau produit JVC distribué au Canada par JVC et vendu par un détaillant JVC autorisé.

JVC vous garantit que ce produit est déposé, sous utilisation et entretien normal, de tout défaut matériel et de fabrication sous réserve des modalités et conditions suivantes :

#### 1. Pour obtenir un service de garantie :

- La carte de contrôle de garantie JVC ci-incluse doit être complétée avec les renseignements complets et être postée ou enregistrée via internet dans les 7 jours suivant l'achat du produit JVC.
- Cette carte de contrôle de garantie JVC doit être dûment remplie et être présentée avec la preuve d'achat du produit JVC nécessitant une réparation.
- Le produit JVC doit être apporté pour service chez un centre de service JVC autorisé.

#### 2. Restrictions:

Cette garantie ne s'applique pas aux :

- Réparation ou remplacement de tout cabinet, batteries, panneau avant, cordons de raccord, antennes, housses de protection, boutons, couvercles de haut-parleur, cônes de haut-parleur, écrans de projection, protecteurs d'écran de projection et tous les accessoires.
- Tous défauts occasionnés ou réparations requises suite à une utilisation abusive, mauvaise, négligente et/ou une utilisation incorrecte.
- Tous défauts occasionnés ou réparations requises suite à l'omission de suivre les recommandations du manuel d'instruction.
- Tout produit JVC altéré, ajusté ou réparé par tout autre entreprise que JVC ou un centre de service d'entretien ou de service autorisé JVC.



**PRODUCT REGISTRATION**

First Name: \_\_\_\_\_  
 Last Name: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Apt.# \_\_\_\_\_  
 City: \_\_\_\_\_  
 State: \_\_\_\_\_  
 Zip Code: \_\_\_\_\_  
 Phone Number: \_\_\_\_\_  
 E-Mail Address: \_\_\_\_\_

- 1) Would you like to receive the JVC Community e-mail newsletter?      Yes    No  
 2) Would you like to receive special offers from JVC?                      Yes    No  
 3) Have you purchased an extended warranty for this product?            Yes    No

Date of Purchase: \_\_\_\_\_  
 Model Number: \_\_\_\_\_  
 Serial Number: \_\_\_\_\_  
 Purchase Price: \_\_\_\_\_  
 Dealer: \_\_\_\_\_

On a scale of 1 to 5, with 5 being the best, please rate each of the following attributes about your new JVC product.

Performance	1	2	3	4	5
Features	1	2	3	4	5
Ease of use	1	2	3	4	5
Design	1	2	3	4	5
Value	1	2	3	4	5

**COMMENTS:**

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Thank You  
for completing  
this questionnaire.

Please do not send products or other  
correspondence to this address.

JVC AMERICAS CORP.  
1700 Valley Road  
Wayne, NJ 07470



PLEASE  
PLACE  
STAMP  
HERE

**JVC®**

PO BOX 1189  
BEDFORD, TX 76095-1189



**PRODUCT REGISTRATION CARD / QUESTIONNAIRE**

***USA CUSTOMERS ONLY***

Registering your product will allow us to contact you in the unlikely event a product safety notification is required.

This form is for Product Registration purposes only. Failure to return this form does not diminish your rights during the warranty period.

**THANK YOU FOR PURCHASING THIS JVC PRODUCT**

**REGISTER ONLINE AT: *REGISTER.JVC.COM***



# FUEL LINE KIT

MERCURY, 6 ft x 3/8 in (1.83 m x 9.5 mm)

- Includes low permeation primer bulb, Mercury fuel line fittings (use with Mercury tank connector: 8873), stainless steel hose clamps and 3/8 in (9.5 mm) fiber-reinforced fuel line for additional strength and kink resistance.
- For Mercury engines.
- Engineered low permeation material prevents fuel evaporation saving fuel and money.
- Bulb engineered to maintain flexibility and prevent collapse in hot and cold temperatures.
- Industry leading vertical fuel draw for priming in any application

## Made in USA

Fabrique aux E-U.

Fabricado en los Estados Unidos

©2011 Attwood Corporation

Lowell, MI 49331

www.attwoodmarine.com

74448 Rev. B

93806MIP7

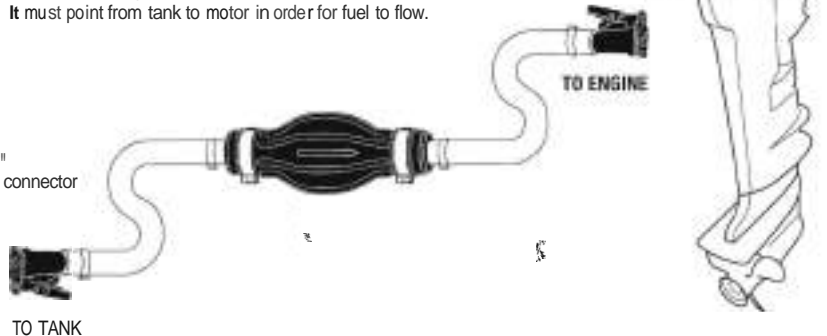


Use with Mercury tank connector  
(8873)



- Certified to meet all EPA and CARB requirements.
- Meets all USCG and ABYC standards.
- OEM Equivalent = Mercury: 32-80188A2
- 6 ft (1.83 m) length

**NOTE:** Arrow on primer bulb indicates fuel flow direction.  
It must point from tank to motor in order for fuel to flow.



Attwood Marine parts are specified, more than any other brand, as original equipment by America's best known boat manufacturers.

This product is designed, built and certified to meet the requirements of EPA CFR 40 and California CCR 2468 and has been demonstrated to meet the maximum permeation limit of 15 g/m<sup>2</sup>/day per CARB test TP-512.

This product is warranted to be free of defects in material and workmanship for 2 years from the date of first sale.

<https://www.boat-manuals.com/>

NOTICE - Pursuant to section 213 of the Clean Air Act (42 U.S.C. section 7545) 40 CFR 1060, in addition to the California Air Resources Board Regulation governing Portable Outboard Marine Tanks, this portable marine tank and cap assembly has been manufactured to meet the January 2011 regulations contained within the applicable regulations for emission permeation and fuel vapour retention. This system has a 2 year limited warranty from Date of Sale.

### SPECIAL FEATURES OF THIS SYSTEM

The closure cap includes:

- 2 way vent valve which allows air to enter the tank while engine is in operation, and a pressure relief valve which is designed for fuel vapour retention when not in use
- Click-to-close audible close indication
- Manual vent screw (on top of cap) which should be CLOSED for TRANSPORTATION and OPEN for OPERATION AND CAP REMOVAL.
- Pressure Relief Tab under cap



# STOP



### WARNING- CONTENTS MAY BE **UNDER** PRESSURE!

As part of the fuel vapour retention system your tank will expand under internal pressures. This is normal.

TO REMOVE CAP FOLLOW THESE STEPS:

- 1** Open VENT SCREW on top of cap FULLY (VENT SCREW should be CLOSED for TRANSPORTATION and OPEN for OPERATION AND CAP REMOVAL.)
- 2** Locate Pressure Relief Tab under cap. Turn cap until Pressure Relief Tab Lock engages.
- 3** Press down on tab, rotate cap 1/4 turn (to relieve pressure before opening tank) and release tab. STOP. Lock may engage again.
- 4** PRESS Pressure Relief Tab down again and turn to remove cap.

DIRECTIONS FOR USE:

1. Always loosen cap to relieve tank pressure *BEFORE* connecting or disconnecting fuel line.
2. Always disconnect fuel line from engine or fuel tank when not in use.
3. Closure caps should be tightened until an audible "click" is heard.
4. Always remove from vessel for refueling.
5. When removing the closure cap *ALWAYS FOLLOW INSTRUCTIONS AND REMOVE CAPSLOWLY TO REDUCE INTERNAL PRESSURE AND AVOID FUEL SPILLAGE- CONTENTS MAY BE UNDER PRESSURE!*

<https://www.boat-manuals.com/>

D



TURN VENT SCREW FULLY  
TOURNER COMPLÈMENT LA VIS DE PURGE  
GIRE COMPLETAMENTE EL TORNILLO DE VENTILACION

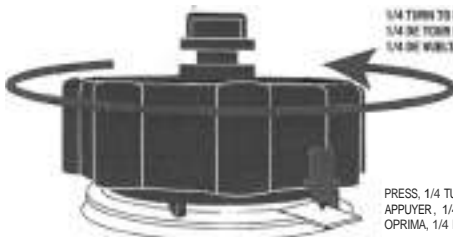
2



TURN TO ENGAGE LOCK  
**TOURNER POUR ENGAGER LE VERROU**  
GIRE PARA ACTIVAR EL CIERRE

LOCATE PRESSURE RELIEF TAB  
LOCALISER LA LANGUETTE  
DE DECOMPRESSION  
LOCALICE LA LENGUETA  
DE DESPRESURIZACION

3



1/4 TURN TO RELIEVE PRESSURE  
1/4 DE TORN POUR LIBERER LA PRESSION  
1/4 DE VUELTA PARA DESPRESURIZACION

PRESS, 1/4 TURN, RELEASE  
APPLUYER, 1/4 OETOUR, REUCHER  
OPRIMA, 1/4 DE VUELTA, SUELTE

4



TURN TO REMOVE CAP  
TOURNER POUR RETIRER LE BOUCHON  
GIRE PARA RETIRAR LA TAPA

PRESS DOWN  
ENFONCER  
OPRIMA HACIA ABAJO

## Submersible Bilge Pumps

CARTRIDGE L-SERIES L450, L550, L650, L750

IB-103 R05 (02/2012)

ORIGINAL INSTRUCTIONS/TRANSLATION OF ORIGINAL INSTRUCTIONS  
READ AND UNDERSTAND THIS MANUAL PRIOR TO OPERATING OR  
SERVICING THIS PRODUCT



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Made in USA



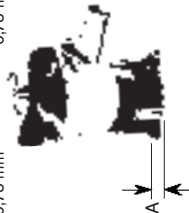
Garanti 3 år  
Warranty 3 years  
Garantie 3 Jahren  
Garantie 3 ans  
Garantía 3 años  
Garanzia 3 anni

### Modellspecifikation

Modellspecifikation	L450 – 12 V	L550 – 12 V	L650 – 12 V	L750 – 12 V
Pumptyp (EU)	32-1450-01	32-1550-01	32-1650-01	32-1750-01
Art nr	500	750	1000	1250
Pumptyp (USA)	500	750	1000	1250
Art nr	32503	32703	32903	42123

### Teknisk beskrivning

Teknisk beskrivning	L450 (EU)	L550 (EU)	L650 (EU)	L750 (EU)
(USA)	500	750	1000	1250
Slanganslutning	3/4"	3/4"	3/4"	1,1/8"
Kapacitet, fritt utlopp (13,6 V)	40 l/min/630 GPH	50 l/min/800 GPH	63 l/min/1000 GPH	73 l/min/1150 GPH
Kapacitet, lyfthöjd 1 m (13,6 V)	33 l/min/525 GPH	44 l/min/700 GPH	50 l/min/800 GPH	60 l/min/952 GPH
Spänning	12 V DC	12 V DC	12 V DC	12 V DC
Strömförbrukning	2,5 A	3 A	3,2 A	3 A
Säkkring	5 A	5 A	5 A	5 A
Höjd	112 mm	112 mm	112 mm	112 mm
Max dia	70 mm	70 mm	70 mm	70 mm
Vikt	0,27 kg	0,27 kg	0,27 kg	0,32 kg
Pumphus	Termoplast	Termoplast	Termoplast	Termoplast
Axeltätning	Läpptätning	Läpptätning	Läpptätning	Läpptätning
Ledningsarea	0,75 mm <sup>2</sup>	0,75 mm <sup>2</sup>	0,75 mm <sup>2</sup>	0,75 mm <sup>2</sup>



### Lägsta sugnivå

Mått "A"	L450/500 – 8 mm
	L550/750 – 8 mm
	L650/1000 – 8 mm
	L750/1250 – 8 mm

- Placera pumpen vid lägsta punkten
- För längre livslängd, kör inte pumpen torr

## > Svenska

### INSTALLATION

Följ anvisningarna noggrant för att uppnå maximal effekt.

1. Placera pumpen vid lägsta punkten.
2. Välj en plats där vattnet ska pumpas överbord - så högt som möjligt över vattenlinjen och så nära pumpen som möjligt. Använd en 19 mm (3/4") bordsgenomföring (L750/1250 – 28 mm (1.1/8")).
3. Anslut en 19 mm (3/4") (L750/1250 – 28 mm (1,1/8")) bränslesäker slang från pumpens utlopp till bordsgenomföringen. Undvik skarpa veck och öglor. Om nödvändigt, fäst slangen. Obs! För att förhindra luftfickor är det viktigt att slangen inte riktas nedåt vid utloppet. Slangen ska hela tiden riktas uppåt.

### Elektrisk installation

1. Anslut den bruna kabeln till batteriets pluspol (+).
2. Anslut den svarta kabeln till batteriets minuspol (-).
3. Ta inte bort mer än nödvändigt av plasten runt kabeln. Alla elanslutningar måste alltid sitta över högsta vattennivån. Kabelskarvarna ska tätas med ett marint tätningsmedel för att förhindra oxidation.

### Montering/demontering av motor-/impellerenheten

Se sid 21

1. Lyft låshaken och vrid de två vingarna moturs och lyft ur enheten.
2. Innan enheten återplaceras, kontrollera att tätningen sitter på plats. Smörj tätningen med mineral- eller vegetabilisk olja. Placera enheten så att den passar in i skåorna på pumphuset. Pressa ned och vrid vingarna medurs. Prova om enheten är rätt placerad genom att vrida vingarna moturs utan att lyfta låshaken. Enheten ska då sitta fast ordentligt.

## TILLBEHÖR

### Automatisk nivåströmbrytare AS888

Art nr  
(EU) 34-888  
(USA) 26014



Den automatiska nivåströmbrytaren skyddar eldrivna pumpar och ger en helautomatisk drift. Nivåströmbrytaren är gjord av korrosionsbeständiga material.

### Strömbrytarpanel 12 eller 24 V

Art nr  
(EU) 12 V –  
34-1224, 24 V –  
34-1225  
(USA) 12 V – 82044, 24 V –  
82044-24



Panelen tillsammans med nivåströmbrytaren AS888 ger den absolut bästa installationen i din båt.

### Installation av dränkbar länsump/ nivåströmbrytare AS888/strömbrytarpanel

Se sid 22

Installera alltid AS888, strömbrytarpanel och säkringar mellan batteriets pluspol (+) och pumpens plusanslutning (+) (brun kabel).

Pumpens minusanslutning (-) (svart kabel) ansluts till batteriets minuspol (-) direkt. Säkringsstorlek väljs efter pumpens säkringsspecifikation.

### Elektronisk nivåström-brytare

Art nr  
(EU) 34-1900 B  
– 12 V, 34-1900  
B – 24 V  
(USA) 36152 – 12  
V, 36252 – 24 V

Den elektroniska strömbrytaren är likadan som den som sitter på Cartridge Duo. Den passar till alla pumpar i SPX Johnson Pumps L-serie.



### Avfallshantering/ materialåtervinning

Vid avfallshantering ska produkten lämnas för destruktion/återvinning enligt gällande lagstiftning. Vid tillämpliga fall demonteras och separeras tillräckligt stora materialfraktioner.



Type designation

Pump type (EU)	L450 – 12 V	L550 – 12 V	L650 – 12 V	L750 – 12 V
Art no	32-1450-01	32-1550-01	32-1650-01	32-1750-01
Pump type (USA)	500 GPH	750 GPH	1000 GPH	1250 GPH
Art no	32503	32703	32903	42123

Design features

	L450	L550	L650	L750
(EU)	500	750	1000	1250
(USA)	3/4"	3/4"	3/4"	1.1/8"
Hose size	40 l/min/630 GPH	50 l/min/800 GPH	63 l/min/1000 GPH	73 l/min/1150 GPH
Capacity, straight (13.6 V)	33 l/min/525 GPH	44 l/min/700 GPH	50 l/min/800 GPH	60 l/min/952 GPH
Capacity, 1 m head (13.6 V)	12 V DC	12 V DC	12 V DC	12 V DC
Voltage	2,5 A	3 A	3,2 A	3 A
Amperage	5 A	5 A	5 A	5 A
Fuse size	112 mm	112 mm	112 mm	112 mm
Height	70 mm	70 mm	70 mm	70 mm
Max dia	0,27 kg	0,27 kg	0,27 kg	0,32 kg
Weight	Thermoplastic	Thermoplastic	Thermoplastic	Thermoplastic
Body	Lip seal	Lip seal	Lip seal	Lip seal
Shaft seal	0,75 mm <sup>2</sup>	0,75 mm <sup>2</sup>	0,75 mm <sup>2</sup>	0,75 mm <sup>2</sup>
Wire size				



Lowest level for suction

Measure "A"

- L450/500 – 8 mm
- L550/750 – 8 mm
- L650/1000 – 8 mm
- L750/1250 – 8 mm

- Mount in the lowest point of the bilge
- For longer pump life, do not run dry

## INSTALLATION

Please follow the installation instructions carefully to assure maximum efficiency in your bilge pump operation.

1. Mount the pump in the lowest point of the bilge.
2. Select a point where the bilge water is to be pumped overboard as high as possible above the water line and at the shortest distance from the pump. Install a 3/4" thru-hull fitting (L750/1250 – 1.1/8").
3. Fasten a 3/4" (L750/1250 – 1.1/8") fuel resistant hose from the pump outlet to the thru-hull fitting. Avoid sharp bends or loops. Support the hose if necessary. Note: In order to prevent air lock is important that the hose not be allowed to dip below the pump outlet. The hose should be constantly rising.

### Electrical installation

1. Connect the brown wire to the positive (+) terminal of the battery.
2. Connect the black wire to the negative (-) terminal of the battery.

3. Do not cut back insulation more than necessary. Insulation or cable sheathings have to be removed in such a way that they end well above the highest bilge water level. The wire connections should be sealed with a marine sealant to prevent wire corrosion.

### To remove or replace power cartridge

See page 21

1. Lift tab and rotate the two fins in a counter clockwise direction and lift out.
2. To reinstall, first make sure that the seal is properly located. Coat the seal with a light film of vegetable oil or mineral oil, then align the two cams on either side of the power cartridge with the two slots in the outer housing. Press down and twist in a clockwise rotation. To ensure that the power cartridge is properly located, twist tins in a counter clock-wise direction without lifting tab. Cartridge should stay in place.

## > English

### ACCESSORIES

#### Automatic Switch AS888

Part No. 34-888/26014

The automatic switch AS888 protects electrically operated pumps and gives fully automatic operation.

The AS888 is made of corrosion resistant materials.



#### Panel 12 or 24 V

Part No.

12 V –

34-1224/82044

24 V –

34-1225/82044-

24

The panel

combined with automatic switch AS888 is an excellent installation for your boat.



#### Installation SPX Johnson Pump submersible bilge pump/ automatic switch AS888/ Panel

*See page 22*

Always install switch AS888, panel and fuses between the positive (+) terminal of the battery and the positive (+) connection of the pump (brown wire). The negative (-) connection (black wire) of the pump to be connected directly to the negative (-) terminal of the battery. Fuse size applies to pump specification.

#### Electronic Float Switch

Part No.

34-1900 B/36152 – 12 V

34-1900 B/36252

– 24 V

The electronic float switch is the same switch as on Cartridge Duo.

As a separate accessory it is

possible to attach

the switch to all pumps in the SPX Johnson Pump L-serie.



#### Waste handling/ material recycling

At the products end of life, please dispose of the product according to applicable law. Where applicable, please disassemble the product and recycle the parts material.

## Modellvarianten

Typ (EU)	L450 – 12 V	L550 – 12 V	L650 – 12 V	L750 – 12 V
Artikel Nr.	32-1450-01	32-1550-01	32-1650-01	32-1750-01
Typ (USA)	500 GPH	750 GPH	1000 GPH	1250 GPH
Artikel Nr.	32503	32703	32903	42123

## Technische Beschreibung

(EU)	L450	L550	L650	L750
(USA)	500	750	1000	1250
Schlauchdurchm.	3/4"	3/4"	3/4"	1,1/8"
Leistung, bei direktem Auslauf (13,6 V)	40 l/min/630 GPH	50 l/min/800 GPH	63 l/min/1000 GPH	73 l/min/1150 GPH
Leistung, 1 m Förderhöhe (13,6 V)	33 l/min/525 GPH	44 l/min/700 GPH	50 l/min/800 GPH	60 l/min/952 GPH
Spannung	12 V DC	12 V DC	12 V DC	12 V DC
Stromaufnahme	2,5 A	3 A	3,2 A	3 A
Sicherung	5 A	5 A	5 A	5 A
Höhe	112 mm	112 mm	112 mm	112 mm
Durchmesser	70 mm	70 mm	70 mm	70 mm
Gewicht	0,27 kg	0,27 kg	0,27 kg	0,32 kg
Gehäuse	Thermoplastik	Thermoplastik	Thermoplastik	Thermoplastik
Wellendichtung	Lippendichtung	Lippendichtung	Lippendichtung	Lippendichtung
Kabelquerschnitt	0,75 mm <sup>2</sup>	0,75 mm <sup>2</sup>	0,75 mm <sup>2</sup>	0,75 mm <sup>2</sup>

## Niedrigste Ansaughöhe

Abmessung "A"

L450/500	- 8 mm
L550/750	- 8 mm
L650/1000	- 8 mm
L750/1250	- 8 mm



- An der niedrigsten Stelle in der Bilge montieren
- Nicht trocken laufen lassen, verringert die Lebensdauer der Pumpe

## > Deutsch

### **EINBAU**

Bitte befolgen Sie diese Anweisungen, nur dann kann garantiert werden, daß die Pumpe einwandfrei und mit voller Leistung arbeitet.

1. Die Pumpe an der niedrigsten Stelle im Bilgenraum montieren.
2. Wählen Sie eine günstige Stelle, wo das Bilgenwasser leicht überboard gepumpt werden kann, so hoch wie möglich über der Wasserlinie und den kürzesten Abstand zur Pumpe. Zu diesem Zweck soll ein 3/4 (L750/1250 – 1,1/8") Schottdurchgang angebracht werden.
3. Befestigen Sie eine brennstoffeste, 3/4" (L750/1250 – 1,1/8") Schlauchverbindung an dem Pumpenauslaß, das andere Ende zum 3/4" Schottdurchgang. Der Schlauch sollte eine konstante Steigung haben.

### **Elektrische Anlagen**

1. Den braunen Leiter zur positiven (+) Klemme der Batterie legen.
2. Den schwarzen Leiter zur negativen (-) Klemme der Batterie legen.
3. Die Isolierung so wenig wie möglich zurückschneiden und

alle Anschlüsse wohl über der Wasserfläche halten. Die elektrischen Verbindungen müssen auf sicherem Abstand über dem Hochwasserstand im Bilgenboden angebracht werden. Als Korrosionsschutz sollen die Leiter mit einer wasserfesten Dichtung geschützt werden. Isolierungen oder Kabelummantelungen müssen so zurückgeschnitten werden, daß die Isolierung oder Ummantelung in einem sicheren Abstand über dem Hochwasserstand endet.

### **Um die Treibeinheit zu entfernen oder ersätzen**

*Siehe Seite 21*

1. Die Zunge heben und die zwei Flügeln gegen Uhrzeigersinn drehen und aufheben.
2. Um wieder zu montieren, sich vergewissern dass die Dichtung richtig gelegen ist. Die Dichtung mit einem dünnen schicht vegetabilischer oder Mineralöl einschmieren, dann die zwei Kämme auf beiden Seite der Treibeinheit mit der zwei Aussparungen in der äussere Gehäuse einrichten. Herunterdrücken und im Uhrzeigersinn umdrehen. Um sich zu vergewissern dass die Treibeinheit richtig eingesetzt ist, die zwei Flügeln gegen

Uhrzeigersinn drehen, ohne die Zunge zu heben. Die Treibeinheit sollte sich nicht bewegen.

## ZUBEHÖR

### Automatischer Niveauschalter AS888

Art. Nr. 34-888/26014

AS888 schützt elektrische Pumpen und bietet vollauto-matischen Betrieb.

Der AS888 Schalter ist aus korrosionsfesten Materialien hergestellt.



### Schalttafel 12 oder 24 V

Art. Nr.

(EU) 12 V – 34-1224, 24 V – 34-1225

(USA) 12 V – 82044, 24 V – 82044-24

Die Schalttafel, zusammen mit dem Niveauschalter AS888 ist eine vorzügliche Kombination für Ihr Boot.



**SPX Johnson Pump Tauchbilgenpumpe/Niveauschalter AS888/Schalttafel**  
*Siehe Seite 22*

Den Niveauschalter AS888, die Schalttafel und die Sicherung immer zwischen der positiven (+) Klemme der Batterie und der positiven (+) Verbindung an der Pumpe (brauner Leiter) anschließen.

Der negative (-) Leiter (schwarz) der Pumpe wird direkt an die negative (-) Klemme der Batterie gelegt. Der Nennstrom der Sicherung bezieht sich auf die Pumpenspezifikation.

### Elektronik-Schwimmerschalter

Art. Nr.

(EU) 34-1900 B – 12 V, 34-1900 B – 24 V

(USA) 36152 – 12 V, 36252 – 24 V

Der elektronische Schwimmerschalter ist der gleiche, wie an der Duo Patronenpumpe. Als separates Zubehör ist es möglich, diesen an alle SPX Johnson Pump Bilge-Pumpen der L-Serie zu befestigen.



### Entsorgung/Recycling

Nach Lebensdauerende entsorgen Sie die Pumpe nach den örtlichen Vorschriften.

Nach Möglichkeit demontieren Sie Teile der Pumpe um sie dem Recycling-Prozess zuzuführen.

Spécifications du modèle

Modèle (EU)	L450 – 12 V	L550 – 12 V	L650 – 12 V	L750 – 12 V
Référence	32-1450-01	32-1550-01	32-1650-01	32-1750-01
Modèle (USA)	500 GPH	750 PGH	1000 GPH	1250 GPH
Référence	32503	32703	32903	42123

Caractéristiques techniques

	L450	L550	L650	L750
(EU)	500	750	1000	1250
(USA)	19 mm	19 mm	19 mm	28 mm
Diam. de tuyau	40 l/min/630 GPH	50 l/min/800 GPH	63 l/min/1000 GPH	73 l/min/1150 GPH
Débit, refoulement libre (13,6 V)	33 l/min/525 GPH	44 l/min/700 GPH	50 l/min/800 GPH	60 l/min/952 GPH
Débit, refoulement à 1 m (13,6 V)	12 V DC	12 V DC	12 V DC	12 V DC
Voltage	2,5 A	3 A	3,2 A	3 A
Intensité	5 A	5 A	5 A	5 A
Fusible	112 mm	112 mm	112 mm	112 mm
Hauteur	70 mm	70 mm	70 mm	70 mm
Diam. maxi	0,27 kg	0,27 kg	0,27 kg	0,32 kg
Poids	Thermoplastique	Thermoplastique	Thermoplastique	Thermoplastique
Corps	Joint à lèvres	Joint à lèvres	Joint à lèvres	Joint à lèvres
Étanchéité	0,75 mm <sup>2</sup>	0,75 mm <sup>2</sup>	0,75 mm <sup>2</sup>	0,75 mm <sup>2</sup>
Section de câbles				

Plus bas niveau pour la succion

Mesure "A"

L450/500	- 8 mm
L550/750	- 8 mm
L650/1000	- 8 mm
L750/1250	- 8 mm



- Installer la pompe au point le plus bas de la cale

- Pour une plus longue durée de vie de la pompe, ne pas la faire fonctionner à vide

## INSTALLATION

Suivre méticuleusement les instructions ci-dessous afin d'obtenir un rendement optimum.

1. Monter la pompe au point le plus bas de la cale.
2. Choisir un endroit par lequel les eaux de cale seront pompées et évacuées aussi haut que possible au-dessus de la ligne d'eau et le plus près possible de la pompe. Installer un raccord fileté de 19 mm (L750/1250 – 28 mm) à travers la coque.
3. Monter un tuyau résistant à l'essence de 19 mm (L750/1250 – 28 mm) entre la sortie de la pompe et le raccord fileté traversant la coque. Eviter les plis et les boucles. Fixer le tuyau si nécessaire. Important: Afin d'éviter les poches d'air, il est important de s'assurer que la sortie du tuyau ne soit pas dirigée vers le bas, mais toujours vers le haut.

### Installation électrique

1. Relier le fil marron à la borne positive (+) de la batterie.
2. Relier le fil noir à la borne négative (-) de la batterie.
3. Ne pas enlever la pellicule isolatrice plus que nécessaire. Tous les branchements électriques doivent être placés au-dessus du niveau le plus

haut des eaux de cale. Toutes les connexions et les bornes doivent être isolées à l'aide d'un matériau étanche pour éviter toute corrosion. Le dénudage des câbles doit être fait de façon à ce que l'isolant ou le revêtement extérieur du câble soit bien au-dessus du niveau le plus haut des eaux de cale.

### Pour enlever ou remplacer l'ensemble moteur

*Voir page 21*

1. Soulever la languette et tourner les deux oreilles dans le sens de rotation inverse à celui des aiguilles d'une montre.
2. Pour remonter, s'assurer d'abord que le joint est bien en place. Enduire le joint d'une mince couche d'huile végétale ou minérale, et aligner ensuite les deux tenons des deux côtés de l'ensemble moteur, avec les échancrures correspondantes du corps extérieur. Presser et tourner dans le sens de rotation des aiguilles d'une montre. Pour s'assurer que l'ensemble moteur est bien en place, tourner les oreilles dans le sens de rotation inverse à celui des aiguilles d'une montre, sans soulever la languette. L'ensemble moteur doit rester en place.



## > Français

### ACCESSOIRES

#### Interrupteur automatique à flotteur AS888

Ref. No. 34-888/26014  
AS888 protège les pompes fonctionnant à l'électricité et offre un mode de fonctionnement entièrement automatique. Le AS888 est composé de matériaux résistants à la corrosion.

#### Tableau de commande

12 ou 24 V

Ref. No.

(EU) 12 V – 34-1224

24 V – 34-1225

(USA) 12 V –

82044, 24 V –

82044-24

Avec un tableau de commande pour l'interrupteur AS888 vous aurez une installation parfaite pour votre bateau.



#### Pompe de cale submersible SPX Johnson Pump/Interrupteur à flotteur AS888/Tableau de commande

*Voir page 22*

Toujours brancher l'interrupteur à flotteur AS888, le tableau de



commande et les fusibles entre la borne positive (+) de la batterie et la borne positive (+) de la pompe (fil marron).

La borne négative (-) de la pompe doit être directement connectée à la borne négative (-) de la batterie. Le choix des fusibles se fait en fonction des spécifications de la pompe.

#### Contacteur de niveau électronique

Ref. No.

(EU) 34-1900 B – 12 V

34-1900 B – 24 V

(USA) 36152 – 12 V,

36252 – 24 V

Le contacteur de niveau électronique

est le même que sur les pompes à cartouche Duo.

Il est fourni en tant qu'accessoire séparé et il est possible de l'accrocher sur les pompes SPX Johnson Pump series L.



#### Gestion des déchets/recyclage des matériaux

Lorsque le matériel arrivera en fin de vie, veuillez le mettre au rebut en fonction des lois applicables. Lorsque c'est possible, veuillez démonter le matériel et recycler les pièces pouvant l'être

**Modelo**

Tipo (EU)	L450 – 12 V	L650 – 12 V	L750 – 12 V
Pieza No.	32-1450-01	32-1650-01	32-1750-01
Tipo (USA)	500 GPH	1000 GPH	1250 GPH
Pieza No.	32503	32903	42123

**Características técnicas**

	L450	L550	L650	L750
(EU)	500	750	1000	1250
(USA)	3/4"	3/4"	3/4"	1,1/8"
Manga	40 l/min/630 GPH	50 l/min/800 GPH	63 l/min/1000 GPH	73 l/min/1150 GPH
Capacidad, directo (13,6 V)	33 l/min/525 GPH	44 l/min/700 GPH	50 l/min/800 GPH	60 l/min/952 GPH
Capacidad, altura 1 m (13,6 V)	12 V DC	12 V DC	12 V DC	12 V DC
Tensión	2,5 A	3 A	3,2 A	3 A
Amperaje	5 A	5 A	5 A	5 A
Fusible	112 mm	112 mm	112 mm	112 mm
Altura	70 mm	70 mm	70 mm	70 mm
Diá. max.	0,27 kg	0,27 kg	0,27 kg	0,32 kg
Peso	Thermoplástico	Thermoplástico	Thermoplástico	Thermoplástico
Material	Junta de labio	Junta de labio	Junta de labio	Junta de labio
Junta eje	0,75 mm <sup>2</sup>	0,75 mm <sup>2</sup>	0,75 mm <sup>2</sup>	0,75 mm <sup>2</sup>
Conductor				



**Altura mínima de aspiración**

Medida "A"	
L450/500	- 8 mm
L550/750	- 8 mm
L650/1000	- 8 mm
L750/1250	- 8 mm

- Montar en el punto más bajo de la sentina
- Para prolongar vida útil, no hacer funcionar en seco

## INSTALACIÓN

Se recomienda observar estrictamente estas instrucciones de instalación para asegurar la mayor eficacia de la bomba de sentina.

1. Montar la bomba en el punto más bajo de la sentina.
2. Elegir un punto por el que el agua de sentina se vaya a bombear fuera que esté lo más alejado posible de la línea de flotación y a la menor distancia de la bomba. Instalar un accesorio de 3/4" (L750/1250 - 1,1/8") atravesando el casco.
3. Fijar una manga de 3/4" (L750/1250 - 1,1/8") resistente al petróleo de la salida de la bomba al accesorio que atraviesa el casco. Evitar cocas y lazos. Si fuera necesario, apoyar la manga. Observación: para evitar la entrada de aire, es importante no dejar que la manga caiga por debajo de la salida de la bomba. La manga debe presentar una elevación constante.

### Equipo eléctrico

1. Conectar el conductor castaño al borne positivo (+) de la batería.
2. Conectar el conductor negro al borne negativo (-) de la batería.
3. No quitar el aislamiento

mas que necesario. Todo el cableado debe quedar por encima del nivel más alto de agua. Las conexiones deben sellarse con un compuesto para aplicaciones marinas a fin de evitar la corrosión de los cables. El material aislante o camisa del cable debe separarse de tal modo que el aislante o camisa termine bien por encima del nivel más alto de agua de la sentina.

### Para quitar o substituir la unidad motriz

*Ver página 21*

1. Levantar la lengüeta y girar las dos orejas en sentido contrario a lo de la rotación de las agujas del reloj, y sacar la unidad motriz.
2. Para montar de nuevo, asegurarse que la junta estea en su sitio. Untar la junta de una capa menuda de aceite vegetal o mineral, y luego alinear los dos cames de los dos lados de la unidad motriz con las dos muecas del cuerpo exterior. Apretar y girar en el sentido de rotación de las agujas del reloj. Para asegurarse que la unidad motriz estea bien en su sitio, girar las orejas en el sentido contrario a lo de la rotación de las agujas del reloj sin levantar la lengüeta. La unidad motriz suele quedarse en su sitio.

## ACCESORIOS

### Interruptor flotante automático AS888

Pieza No.  
34-  
888/26014



El interruptor flotante automático AS888 protege bombas eléctricas aportando una operación completamente automática. El AS888 está hecho de materiales resistentes a la corrosión.

### Tablero 12 o 24 V

Pieza No.  
(EU) 12 V – 34-  
1224  
24 V – 34-1225  
(USA) 12 V –  
82044, 24 V –  
82044-24



El tablero junto con el interruptor AS888 constituyen un equipamiento excelente para su embarcación.

### Bomba sumergible de sentina SPX Johnson Pump/ Interruptor flotante AS888/Tablero

*Ver página 22*

Instalar siempre el interruptor flotante AS888, el tablero y los fusibles entre el borne positivo (+) de la batería y el terminal positivo (+) de la bomba (conductor

marrón).

El terminal negativo (-) de la bomba debe ser conectado directamente al borne negativo (-) de la batería. La capacidad del fusible depende de la bomba.

### Interruptor electrónico de achique

Pieza No.  
(EU) 34-1900 B –  
12 V  
34-1900 B – 24 V  
(USA) 36152 – 12  
V, 36252 – 24 V



Es el mismo interruptor que llevan las bombas "Cartridge Duo". Como accesorio es posible conectarlo a todas las bombas sumergibles SPX Johnson Pump serie L.

### Desguace/Reciclado

Al final de la vida del equipo disponga de este de acuerdo a la ley. Donde sea de aplicación desmonte el equipo y recicle los diferentes materiales.

**Specifica del tipo**

Tipo (EU)	L450 - 12 V	L550 - 12 V	L650 - 12 V	L750 - 12 V
Art. No.	32-1450-01	32-1550-01	32-1650-01	32-1750-01
Tipo (USA)	500 GPH	750 GPH	1000 GPH	1250 GPH
Art. No.	32503	32703	32903	42123

**Caratteristiche tecniche**

(EU)	L450	L550	L650	L750
(USA)	500	750	1000	1250
Sezione tubo	3/4"	3/4"	3/4"	1,1/8"
Portata massima (13,6 V)	40 l/min/630 GPH	50 l/min/800 GPH	63 l/min/1000 GPH	73 l/min/1150 GPH
Portata a 1 mt di prevalenza (13,6 V)	33 l/min/525 GPH	44 l/min/700 GPH	50 l/min/800 GPH	60 l/min/952 GPH
Voltaggio	12 V DC	12 V DC	12 V DC	12 V DC
Amperaggio	2,5 A	3 A	3,2 A	3 A
Capacità fusibile	5 A	5 A	5 A	5 A
Altezza	112 mm	112 mm	112 mm	112 mm
Diametro max.	70 mm	70 mm	70 mm	70 mm
Peso	0,27 kg	0,27 kg	0,27 kg	0,32 kg
Corpo	Termoplastico	Termoplastico	Termoplastico	Termoplastico
Guarnizione albero	Tipo "Corteco"	Tipo "Corteco"	Tipo "Corteco"	Tipo "Corteco"
Dimensione cavo	0,75 mm <sup>2</sup>	0,75 mm <sup>2</sup>	0,75 mm <sup>2</sup>	0,75 mm <sup>2</sup>

**Livello più basso per aspirazione**

Misura "A"	
L450/500	- 8 mm
L550/750	- 8 mm
L650/1000	- 8 mm
L750/1250	- 8 mm



- *Montare nel punto più basso della sentina*
- *Per prolungare la vita della pompa, evitare le operazioni a secco*

## INSTALLAZIONE

Si prega di seguire con attenzione le istruzioni di montaggio per garantire la massima efficacia di funzionamento alla vostra pompa di sentina.

1. Montare la pompa nel punto più basso della sentina.
2. Scegliere il punto da cui l'acqua di sentina deve essere pompata fuori bordo, il più alto possibile rispetto alla linea d'acqua ed alla minima distanza dalla pompa. Installare un attacco di 3/4" (L750/1250 – 1,1/8") attraverso la carena.
3. Collegare un tubo di 3/4" (L750/1250 – 1,1/8") resistente ai carburanti dalla mandata della pompa all'attacco a carena. Evitare curve brusche o occhiali. Se necessario, supportare il tubo. Nota: per prevenire bolle d'aria è importante che il tubo non si immerga al di sotto della mandata della pompa. Il tubo dovrebbe essere costantemente sollevato.

### Installazione elettrica

1. Collegare il cavo elettrico marrone al terminale positivo (+) della batteria.
2. Collegare il cavo elettrico nero al terminale negativo (-) della batteria.

3. Non rimuovere il isolamento più che necessario. Tutti i collegamenti elettrici devono essere posti al di sopra del livello più alto dell'acqua. I collegamenti ed i cavi devono essere sigillati con un sigillante marino per prevenire la corrosione. L'isolamento o la guaina del cavo devono essere rimossi in modo tale che l'isolamento o la guaina terminino ben al di sopra del livello più alto dell'acqua di sentina.

### Per rimuovere o sostituire l'unità motrice

*Vedi pagina 21*

1. Levare la linguetta e girare le due ali in senso antiorario e sollevare l'unità motrice.
2. Per rimontare, in primo luogo assicurarsi che la guarnizione sia in luogo. Ungere la guarnizione con una pellicola di olio vegetale o minerale, dopo allineare le due camicie da tutti e due i lati dell'unità motrice con le due tacche del corpo esteriore. Opprimere e girare in senso orario. Per assicurarsi che l'unità motrice sia in luogo, girare le ali in senso antiorario senza sollevare la linguetta. L'unità motrice dovrà rimanere in luogo.

## > Italiano

### ACCESSORI

#### Interruttore Automatico galleggiante AS888

Art. Nr. 34-888/26014 AS888



protegge le pompe a funzionamento elettrico ed automatizza completamente le operazioni. AS888 è prodotto usando materiali resistenti alla corrosione.

#### Pannello 12 o 24 V

Art. Nr. (EU) 12 V – 34-1224  
24 V – 34-1225  
(USA) 12 V – 82044, 24 V – 82044-24



Il pannello combinato con l'interruttore AS888 garantisce una eccellente installazione per la vostra barca

#### Pompa di sentina sommersa/ Interruttore galleggiante AS888/ Pannello

*Vedi página 22*

Installare sempre l'interruttore galleggiante AS888, il pannello ed i fusibili tra il terminale positivo (+) della batteria ed il collegamento positivo (+) della pompa (cavo marrone).

Il collegamento negativo (-) (cavo nero) della pompa deve essere collegato direttamente al terminale negativo (-) della batteria. La capacità del fusibile è determinata dalla specifica della pompa.

#### Interruttore elettronico di livello

Art. Nr. (EU) 34-1900 B – 12 V  
34-1900 B – 24 V

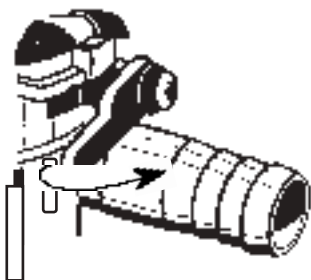


(USA) 36152 – 12 V, 36252 – 24 V

Questo interruttore elettronico di livello è lo stesso che viene montato sulle pompe di sentina Duo. Può essere montato su tutte le pompe SPX Johnson Pump serie L come accessorio separato.

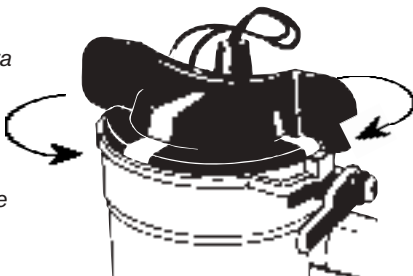
#### Gestione dei rifiuti/ riciclaggio dei materiali

Al termine della vita del prodotto si prega di smaltire il prodotto secondo le leggi in vigore per queste operazioni. Quando possibile, si raccomanda di smontare il prodotto e riciclare i materiali dei componenti.



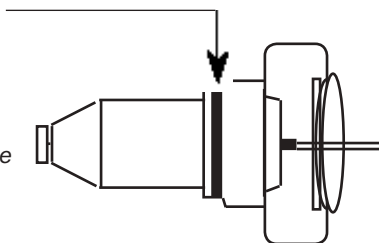
Lyft låshaken  
Lift tab  
Die Zunge heben  
Soulever la languette  
Levantar la lengüeta  
Levare la linguetta

Demontera  
Remove  
Entfernen  
Enlever  
Quitar  
Rimuovere



Montera  
Reinstall  
Montieren  
Remonter  
Montrar  
Rimontare

Tätning  
Seal  
Dichtung  
Joint  
Junta  
Guarnizione







Elektrisk intallation utan panel

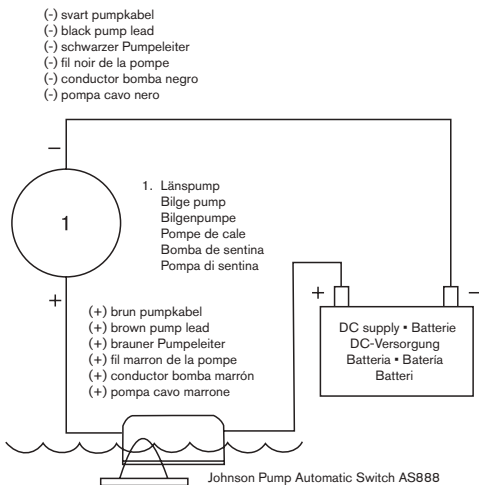
Electrical installation without panel

Elektrischer Anschluss ohne Schalttafel

Schéma de raccordement sans tableau de commande

Instalación eléctrica sin panel

Schema collegamento elettrico senza pannello di controllo



# Submersible Bilge Pumps

CARTRIDGE L-SERIES L450, L550,  
L650, L750



## JOHNSON PUMPS OF AMERICA INC.

1625 Hunter Road, Suite B,  
Hanover Park, Illinois, 60133, USA  
P: +1 847 671 7867  
F: +1 847 671 7909  
E: johnson-pump.americas.marine@spx.com

## SPX FLOW TECHNOLOGY

Nastagatan 19, P.O. Box 1436  
SE-701 14 Örebro, Sweden  
P: +46 (0)19 21 83 00  
F: +46 (0)19 27 23 72  
E: johnson-pump.marine@spx.com

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Please contact your local sales representative for product availability in your region. For more information visit [www.spx.com](http://www.spx.com).

ISSUED 02/2012 IB-103 R05  
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<https://www.boat-manuals.com/>

### FEATURES

- Smooth Flow
- Self-Priming up to 10 feet (3m)
- Dry running capability
- Soft noise absorbing mounts
- Snap-fit port fittings
- Built-in bypass — less pulsation
- Reduces need for accumulator tank
- Corrosion resistant materials
- Thermal overload protection
- Motor rating: IP 54
- CSA listed
- ISO 8846 MARINE (ignition protection)
- CE

### SPECIFICATIONS

**Motor:** Permanent Magnet, Ball Bearing Totally Enclosed.  
Not for Continuous Duty. Intermittent Duty Only.

**Pump:** Body - Polypropylene  
Diaphragm - Santoprene  
Valves - EPDM



**Fittings:** (2) 1/2" - 14 Male pipe  
(2) 1/2" (13 mm) Hose Barbs



31295 / 31395 - Series

Pump Series	Dimensions - Inches (mm)			Weight lb. (kg)
	Height	Width	Length	
31X95-XXXX	4-3/4" (121)	6" (152)	9" (229)	3.5 (1.6 kg)

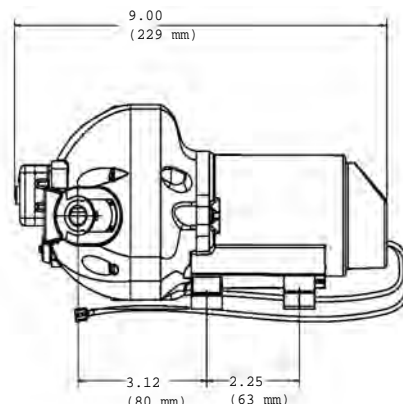
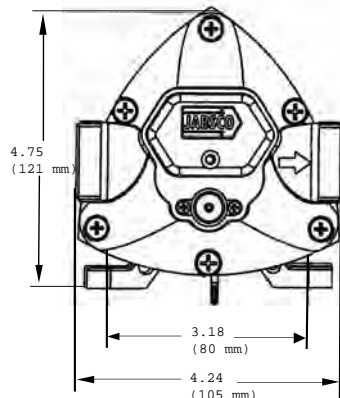
MODEL	VOLTS	AMP DRAW (A) @ 10 psi (0.7 bar)	FUSE SIZE (A)	OPEN FLOW GPM (l/min)	MAX PSI (bar)
31395-0092	12V dc	4.4	10	2.9 (11)	50 (3.4)
31395-0094	24V dc	2.2	5	2.9 (11)	50 (3.4)
31395-0392	12V dc	4.4	10	2.9 (11)	40 (2.7)
31395-0394	24V dc	2.2	5	2.9 (11)	40 (2.7)
31395-0292	12V dc	4.4	10	2.9 (11)	25 (1.7)
31395-0294	24V dc	2.2	5	2.9 (11)	25 (1.7)
31295-0092	12V dc	3.5	10	1.9 (7)	25 (1.7)
31295-0094	24V dc	1.7	5	1.9 (7)	25 (1.7)

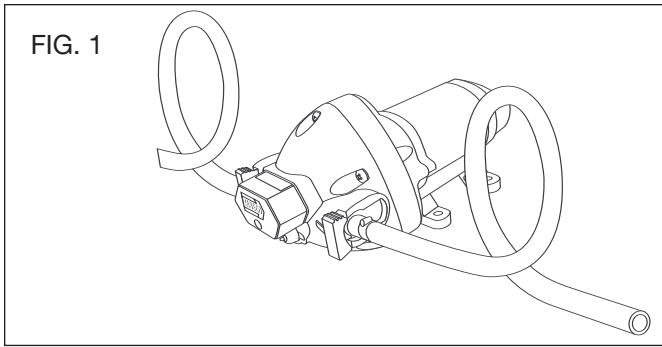
### OPERATION

With pump switch off and battery fully charged, fill water tank, open all faucets, then turn pump switch on. Water will begin to flow. When the water is free of air, turn faucets off. Remember,

you are filling the water heater and the toilet and shower lines. When all valves are shut-off, pump will stop. Should pump fail to stop, turn switch off and see the trouble shooting guide.

### DIMENSIONAL DRAWING





**INSTALLATION**

**STEP 1**

Remove shipping plugs from pump ports. There may be slight amount of water that drains out of the pump as all pumps are tested at the factory before shipment.

**STEP 2**

A direction arrow can be found on the pump head to indicate direction of flow. Connect the appropriate sized hose to one of the supplied fittings and then connect the hose to the water supply tank outlet. To reduce vibration use 1/2" (13 mm) braided or reinforced flexible hose on the inlet and outlet of the pump as shown on Fig.1. Use hose clamps on the slip-on barb connectors.

**WIRING** (Fig. 3)

IF YOU ARE NOT FAMILIAR WITH APPLICABLE ELECTRICAL STANDARDS, HAVE THE UNIT INSTALLED BY A QUALIFIED ELECTRICIAN.

Suggested wiring information is given as a reference. For proper information, please reference USCG regulations for marine applications and wiring gauges, connectors and fuse protection.

**STEP 1**

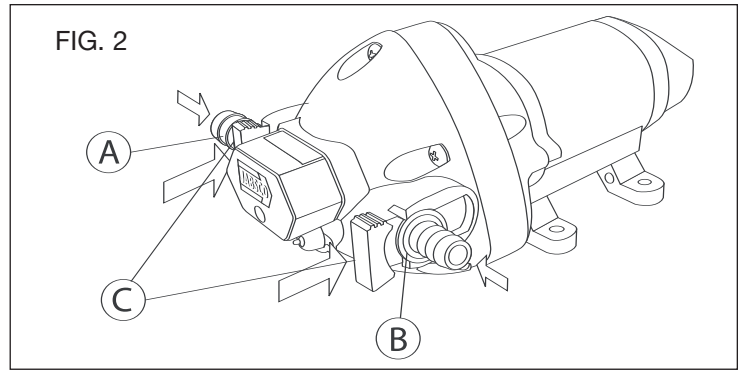
Determine the distance from the power source to the pump and then double the measurement. Wire gauge installation is determined on the entire run length, to the pump and back.

**STEP 2**

Connect to power supply lead (red)(+) to the positive (+) terminal on the battery or through a properly installed fuse / circuit breaker panel. Then run the length of wire to the pump, connecting the red wire through a switch appropriately rated to the pump's current requirements.

**STEP 3**

Route the wire so as not to create hazards in operation of the engine, movement of steering components or human traffic.



**STEP 3**

Slide rubber mounts fully into 4 mounting tracks.

**STEP 4**

Mount pump horizontally in an accessible location or vertically with pumphead down. Support weight of the pump and attach pumphead mounts first then motor mounts second.

**STEP 5** (Fig. 2)

Install inlet A and discharge B port connectors. Firmly push slide clips C forward to lock port connectors in place.

**STEP 6** (Fig. 4)

Install a Pumpgard™ strainer in an accessible location (for inspection and cleaning) between the tank and pump inlet in order to protect valves from debris.

**STEP 4**

Connect the red lead to the red lead on the pump housing located pressure switch.

**STEP 5**

Connect the black lead from the pump to the ground or negative power side (-) of the vessel.

**STEP 6**

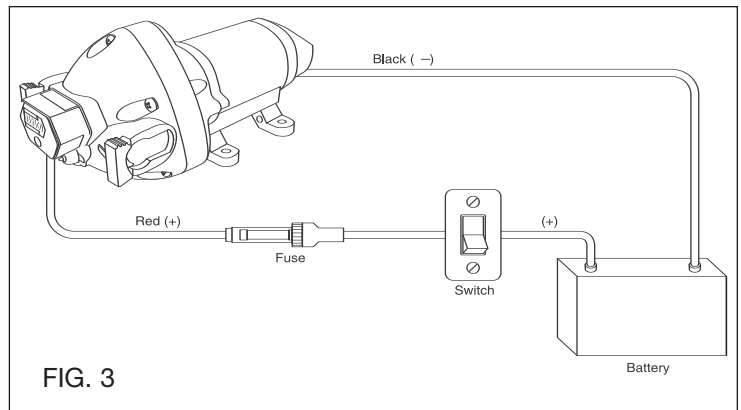
Turn the system off when not in use for extended periods of time or when the water supply tank is empty.

**STEP 7**

After installation, check voltage at the pump motor. Voltage should be checked when pump is operating. Full voltage must be available at the pump motor at all times for proper pump operation and pump motor life.

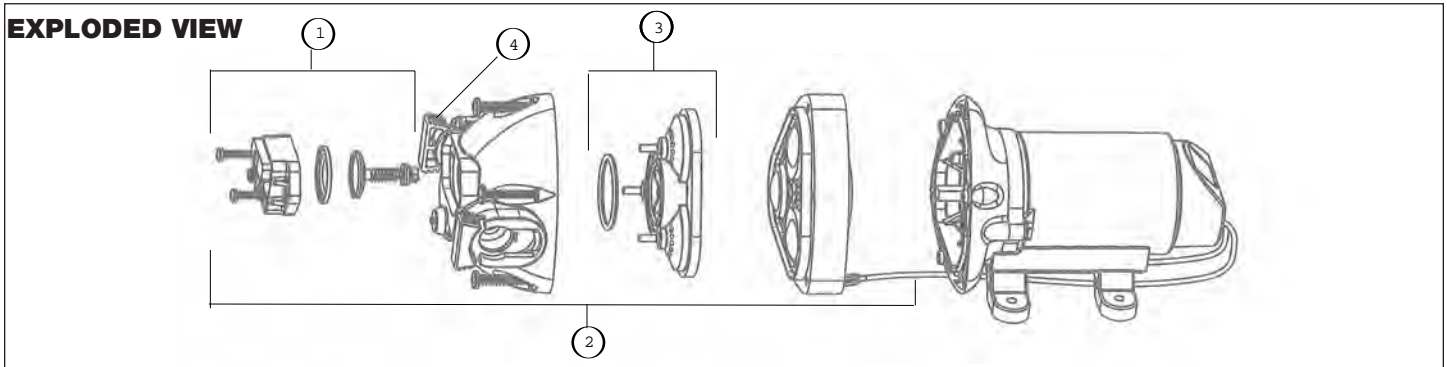
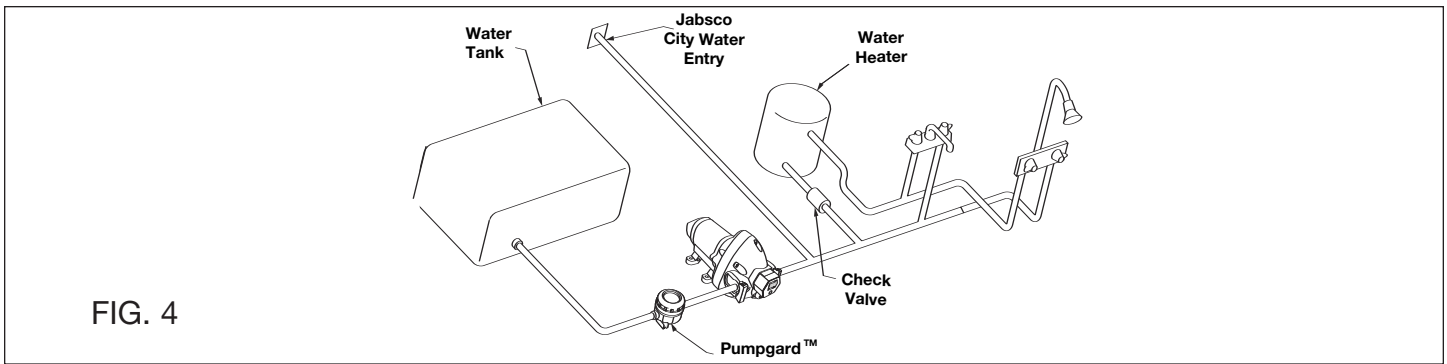
**WIRE SIZE**

Pump Voltage	Total Wire Length - feet (meters)		
	0 - 20 ft (0 - 6 m)	20 - 35 ft (6 - 9 m)	35 - 55 ft (9 - 12 m)
12 VDC	#14 AWG (2.5 mm <sup>2</sup> )	#12 AWG (4 mm <sup>2</sup> )	#10 AWG (6 mm <sup>2</sup> )
24 VDC	#16 AWG (1.5 mm <sup>2</sup> )	#14 AWG (2.5 mm <sup>2</sup> )	#12 AWG (4 mm <sup>2</sup> )



**CAUTION** Motor case could get hot during extended operation. Prolonged contact with skin may cause a burn.

**WARNING** Fire hazard. Wiring must comply with applicable electrical standards and include a properly sized fuse or circuit breaker. Improper wiring can cause a fire resulting in injury or death.



**AUTOMATIC WATER SYSTEM PUMP SERVICE PARTS**

KEY#	DESCRIPTION	SERIES	
		31395 - XXXX	31295 - XXXX
1	Pressure Switch	(25 psi)	18916-1025
		(40 psi)	18916-1040
		(50 psi)	18916-1050
2	Pumphead Assembly	(25 psi)	18914-1025
		(40 psi)	18914-1040
		(50 psi)	18914-1050
3	Check Valve Assembly	18911-1030	18911-1030
4	Slide Clips (Pair)	30647-1000	30647-1000

**ACCESSORIES  
SNAP-IN PORT SYSTEM**

<b>30649-1000</b> (1 PAIR) SNAP-IN PORT X 1/2" - 14 MALE PIPE STRAIGHT	<b>30654-1000</b> (1 PAIR) SNAP-IN PORT X 1/2" (13 mm) HOSE BARB STRAIGHT	<b>30653-1000</b> (1 PAIR) SNAP-IN PORT X 3/4" (19 mm) HOSE BARB STRAIGHT	<b>30650-1000</b> (1 PAIR) SNAP-IN PORT X GARDEN HOSE STRAIGHT	<b>30655-1000</b> (1 PAIR) SNAP-IN PORT X 1/2" - 14 MALE PIPE 90° ELBOW	<b>30651-1000</b> (1 PAIR) SNAP-IN PORT X 1/2" (13 mm) HOSE BARB 90° ELBOW	<b>30642-1000</b> (1 PAIR) SNAP-IN PORT X 3/4" (19 mm) HOSE BARB 90° ELBOW

**Winterizing**

Allowing water to freeze in the system may result in damage to the pump and plumbing system. Non-Toxic antifreeze for potable water may be used with Jabsco pumps. Follow manufacturer's recommendations. Refer to boat or equipment manufacturer's instructions for their specific winterizing and drainage procedures. **Do not use automotive antifreeze** to winterize potable water systems. These solutions are highly toxic and may cause serious injury or death if ingested.

1. Drain the water tank. Open tank drain valve. You may use the pump to drain the tank by opening all the faucets in the system. Allow the pump to operate until the tank is empty. Do not operate the pump more than 15 minutes continuously.

2. Open all faucets and purge the water from the plumbing system. Turn off power to the pump. Be sure that all the water from the drain lines is drained.

3. Remove quick-connect inlet and outlet fittings from the pump and turn the pump on to pump out remaining water from the pump head. Be sure to have a catch pan or a rag under the pump to prevent water from spilling onto the boat. Turn the pump off once the plumbing is empty. Leave the fittings disconnected from the pump until the system is ready to be used again. Make a note on your tank filler that the plumbing is not connected.

4. Be sure that all faucets are left open to protect against damage to the plumbing.

## Sanitizing

Potable water systems require periodic maintenance to deliver a consistent flow of fresh water. Depending on use and the environment the system is subjected to, sanitizing is recommended prior to storing and before using the water system after a period of storage. Systems with new components, or ones that have been subjected to contamination, should also be disinfected as follows:

**(NOTE: The sanitizing procedure is in conformance with the approved procedures of the US Public Health Service.)**

1. Use the following methods to determine the amount of common household bleach needed to sanitize the tank:
  - A. Multiply "gallons of tank capacity" by 0.13; the result is the ounces of bleach needed to sanitize the tank (30 gallons X .13 = 3.9 oz bleach).
  - B. Use the number of liters of tank capacity to determine the number of milliliters of bleach needed to sanitize the tank (120 liters of tank capacity = 120 milliliters of bleach).
2. Mix into solution the proper amount of bleach within a container of water
3. Pour the solution (water/bleach) into the tank and fill the tank with potable water.
4. Open all faucets (hot and cold) allowing the water to run until the distinct odor of chlorine is detected.
5. The standard solution must have four (4) hours of contact time to disinfect completely. Doubling the solution concentration allows for contact time of one (1) hour.
6. When the contact time is completed, drain the tank. Refill with potable water and purge the plumbing of all sanitizing solution.

## TROUBLESHOOTING

**WARNING: BEFORE SERVICING PUMP, TURN OFF PUMP AND DRAIN WATER FROM SYSTEM!!**

PROBLEM	SOLUTION
Pulsation Flow - Pump cycles on and off	Restricted pump delivery. Check discharge lines, fittings and valves for undersizing or clogging. Clean screens in faucets. Some filters or purifiers are highly restrictive. Filters/purifiers with high pressure drop may require a separate line and/or the installation of an accumulator tank in the system.
Failure to Prime - Motor operates, but no pump discharge	Restricted intake or discharge line Air leak in intake line Punctured pump diaphragm Debris under flapper valves Crack in pump housing
Pump fails to turn off after all fixtures are closed	Empty water tank Punctured pump diaphragm Discharge line leak Defective pressure switch Insufficient voltage to pump Debris under flapper valves
Low flow and pressure	Air leak at pump intake Accumulation of debris inside pump and plumbing Worn pump bearing (excessive noise) Punctured pump diaphragm Defective motor
Motor fails to turn on	Loose wiring connection Pump circuit has no power Blown fuse/thermal protector tripped Pressure switch failure Defective motor

Jabsco

[www.jabsco.com](http://www.jabsco.com)



**ITT Industries**  
*Engineered for life*

THE PRODUCTS DESCRIBED HEREIN ARE SUBJECT TO THE JABSCO THREE-YEAR LIMITED WARRANTY, WHICH IS AVAILABLE FOR YOUR INSPECTION UPON REQUEST.

U.S.A Jabsco Cape Ann Industrial Park Gloucester, MA 01930 Tel: +1 978 281 0440 Fax: +1 978 283 2619	UK Jabsco Bingley Road, Hoddesdon Hertfordshire EN11 0BU Tel: +44 (0) 1992 450145 Fax: +44 (0) 1992 467132	CANADA Fluid Products Canada 55 Royal Road Guelph, Ontario N1H 1T1 Tel: 519 821 1900 Fax: 519 821 2569	JAPAN NHK Jabsco Company Ltd. 3-21-10, Shin-Yokohama Kohoku-Ku, Yokohama, 222 Tel: +45 475 8906 Fax: +45 475 8908	GERMANY Jabsco GmbH Oststrasse 28 22840 Norderstedt Tel: +49 (40) 53 53 730 Fax: +49 (40) 53 53 7311	ITALY Jabsco Marine Italia Via Tommaseo, 6 20059 Vimercate, Milano Tel: +39 039 685 2323 Fax: +39 039 666 307
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962,964

965,966

**960 SERIES PORTABLE TOILETS**  
**ASEOS PORTATILES SERIE 960**  
**TOILETTES PORTABLES, SÉRIE 960**

INSTRUCTION MANUAL            EN . . . 1-8  
MANUAL DE INSTRUCCIONES    ES . . . 9-15  
MODE D'EMPLOI                FR . . . 16-22

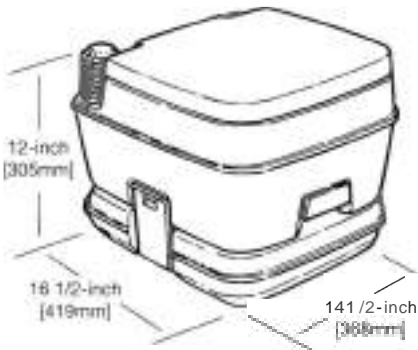
<https://www.boat-manuals.com/>



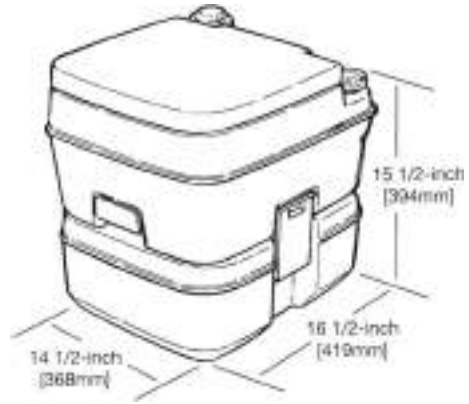
<u>Dimensions</u>	2
<u>Operation</u>	3
<u>Installation (964, 965, 964MSD, 965MSD)</u>	4-5
<u>Cleaning and Maintenance</u>	6
<u>Winterizing</u>	6
<u>Convenience Products</u>	6
<u>Parts</u>	7
<u>Customer Service</u>	8
<u>Warranty</u>	8

## DIMENSIONS

962, 964, 964MSD




965, 965MSD, 966




All dimensions may vary  $\pm$  3/8-inch (10mm).

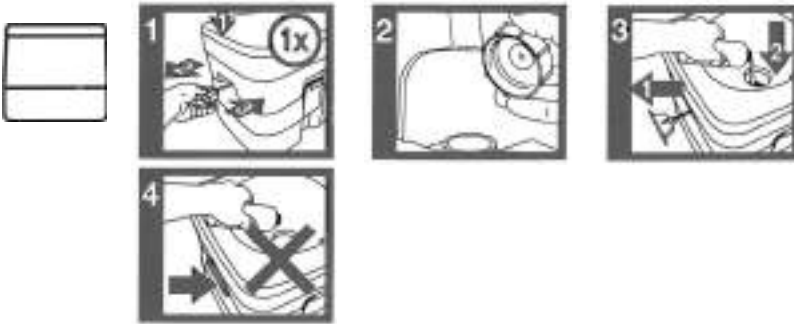
# OPERATION

## Prepare toilet for use


1.  **CAUTION!** With seat lid closed, pull flush handle to open slide valve, then push to close. This relieves air pressure that may be created in lower holding tank due to changes in temperature or altitude.
2. Remove water cap and fill upper tank. Replace cap.

3. Pull flush handle to open slide valve.
4. Pour deodorant directly into lower tank, then close slide valve.

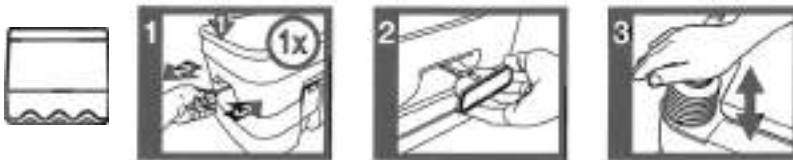
 **CAUTION!** Never pour deodorant into bowl with slide valve closed.




## Use toilet

1.  **CAUTION!** BEFORE EACH USE, with seat lid closed, pull flush handle to open slide valve, then push to close. This relieves air pressure that may be created in lower holding tank due to changes in temperature or altitude.

2. Use toilet. (If flushing solids, press bellows pump to add water to bowl before use.)
3. Pull flush handle to release waste into lower tank.
4. Press bellows pump one or more times to rinse bowl. Push flush handle to close valve.

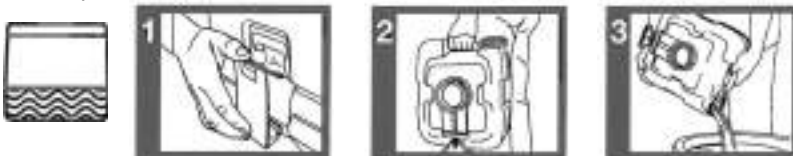


## Empty holding tank

 **CAUTION!** MAKE SURE slide valve handle is all the way in.

1. Unlatch upper unit by disengaging side latches and lift from holding tank.
2. Carry holding tank to permanent toilet facility.

3. Remove cap and empty contents into permanent toilet.
4. Rinse tank thoroughly, replace cap and reassemble unit and prepare for use.



**MSD Models:** Pull flush handle to open flush valve. Pump out holding tank through boat's discharge fittings according to boat manufacturer's instructions.

## INSTALLATION

BE SURE TO READ INSTRUCTIONS COMPLETELY BEFORE INSTALLING PORTABLE TOILET.

### Models 964, 965

1. Position portable toilet in desired location. Make sure of adequate clearance for lid and seat in "up" position and clearance at the sides to unlatch and remove top tank.
2. Open side clasps by pulling outward at top of side clasps.
3. Place hold-down brackets, with mounting holes facing away from toilet, under the tank and align with grooves. See Figure 1.
4. Use pencil or awl to mark location of hold-down bracket mounting holes.
5. Remove portable toilet.
6. Attach hold-down brackets to the floor or deck with screws provided.
7. Set portable toilet between brackets and latch in place with side clasps.

### MOUNTING BRACKETS



### Models 964 MSD, 965 MSD

#### WARNINGS

Dometic marine toilet systems must be installed according to Dometic's recommended procedures. Equipment damage, injury to personnel or death could result from improper installation. DOMETIC SANITATION CORPORATION ACCEPTS NO RESPONSIBILITY OR LIABILITY FOR DAMAGE TO EQUIPMENT, OR INJURY OR DEATH TO PERSONNEL THAT MAY RESULT FROM IMPROPER INSTALLATION, SERVICE OR OPERATION OF THIS PRODUCT.



#### WARNING!

**HAZARD OF FLOODING** - If the toilet system is connected to ANY through-the-hull fittings, properly installed seacocks MUST be installed in all piping connected to through-the-hull fittings. Seacocks MUST be easily accessible to all users of the toilet system or secondary valves fitted in hoses where they are easily accessible. ALWAYS close seacocks when toilet system is not in use (even if boat is unattended for a brief period. All valves MUST be full bore valves and marine quality. Screw-to-close gate valves are not recommended. Failure to comply can result in flooding which can cause loss of property and life.



#### WARNING!

**HAZARD OF FLOODING** - If toilet is connected to ANY through-the-hull fittings, ALL flexible hoses must be of marine sanitation quality and must be secured to ANY fittings (such as those at seacock, vented loop or toilet) with two stainless steel, worm-drive hose band clamps at each connection. Connections MUST be checked frequently for integrity. Failure to comply can result in flooding which can cause loss of property and life.



#### WARNING!

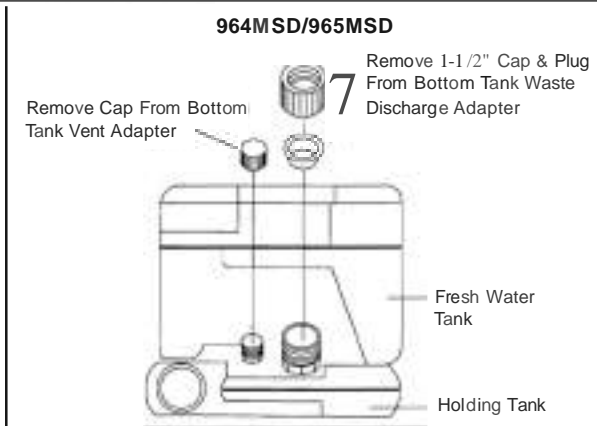
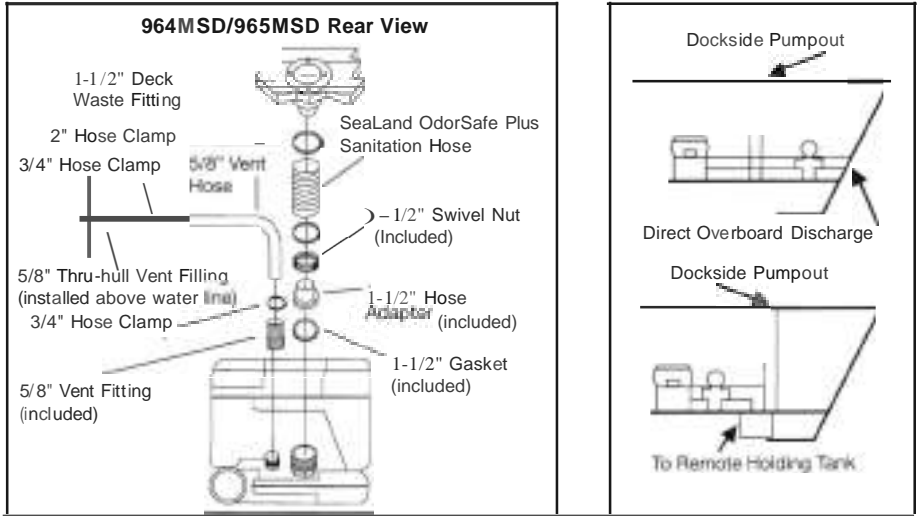
**HAZARD OF FLOODING** - If toilet rim is below the waterline at ANY time (during any conditions of heel, load or trim) and is connected to ANY through-the-hull fittings, properly positioned ventilated (vented) loops MUST be installed in discharge piping to prevent potential back siphonage of seawater into the boat. Failure to do so can result in flooding which can cause loss of property and life.

# INSTALLATION

## Models 964MSD, 965MSD

Portable toilets are legally acceptable for use in vessels not having permanently installed toilets, as determined by the United States Coast Guard. However, some states and the Canadian province of Ontario require a permanently installed portable toilet, such as the 964MSD and 965MSD.

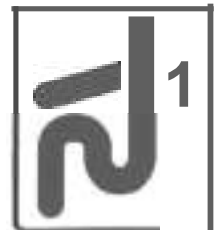
### Installation Possibilities



## MARINE SANITATION REGULATIONS

All boats with fixed toilets in U.S. waters and in the waters of some other countries are required to have an operable, permanently installed marine sanitation device (MSD). Series 970 MSD models, when permanently installed in a boat, are holding tank or Type III systems as defined by the U.S. Coast Guard. Type III systems permit operation of the toilet without direct discharge of untreated waste after every flush. Type III systems can be discharged at marina dockside pump-out stations or, in coastal waters, a minimum of three miles offshore. Overboard discharge capability must remain secured while within the three-mile limit. If an overboard discharge pump is activated by a keyed switch in the toilet compartment, the key must be removed at all times except when discharge pump is operating and in the process of vessel operation.

Sewage from any source should not be discharged directly into boating waters. If you are interested in learning more about this issue, please visit our website at [www.DometicSanitation.com](http://www.DometicSanitation.com).



*This symbol appears on the discharge fitting of MSD models.*

## CLEANING AND MAINTENANCE

### Cleaning

For most effective cleaning, use **SeaLand® Toilet Bowl Cleaner**. It's intended for use with all Dometic toilets. If you cannot find it in your area, contact Dometic for your nearest dealer. If it is not available, you can also use most non-abrasive bathroom and toilet bowl cleaners (Bar Keeper's Friend® spray cleaner, Clorox® toilet bowl cleaner, SaniFlush® toilet bowl cleaner, etc.). Follow label instructions.

### Maintenance

If flush handle becomes difficult to pull, lubricate slide valve seals with silicone spray.

## WINTERIZING

### Use

When using the Dometic portable toilet in cold or winter weather, the addition of nontoxic antifreeze designated for potable water systems provides safe winter protection. Use amounts specified on container that are safe for use with 4 gallons (15 l) of water.

NOTE: Never use alcohol-based or automotive-type antifreeze in freshwater systems.

### Storage

To store Dometic portable toilet during the winter:

1. Empty freshwater tank and holding tank.
2. Make sure all water is cleared from freshwater tank's water lines by pressurizing tank and pushing flush button until no water enters bowl.

A small amount of water may remain in bottom of freshwater tank but will be harmless during winter storage.)

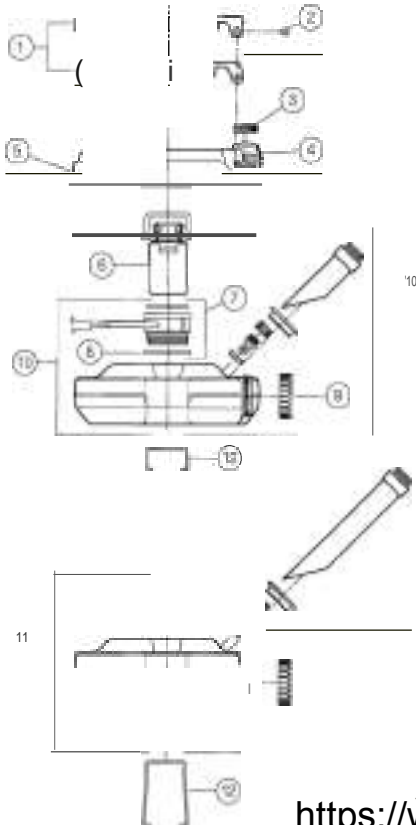
## CONVENIENCE PRODUCTS

SeaLand® brand products are specially developed to work best in Dometic portable toilets. There are no better holding tank deodorizers and rapid-dissolving tissues available. To deodorize holding tank, follow instructions on package.

Toilet System	Deodorant Charge		Charging Procedure
	Liquid	Granulated or Toss-in Packet	
Portable toilet	See directions on deodorant container	One 2 oz. (57 g) packet with 1 pint (.47 l) of water	Add directly to waste holding tank

# PARTS

NO.	USA	DESCRIPTION
1	385311520	Seat lid and seat - parchment
	385311521	Seat lid and seat - platinum
2	385310900	Seat hinge pin - white
	385310899	Seat hinge pin - parchment
3	385310102	Water cap - parchment
	385310103	Water cap - platinum
4	385310104	Bellows assembly - parchment
	385310105	Bellows assembly - platinum
5	385230374	2.6-gal. (9.8 l) freshwater tank assembly - parchment (items 1 - 5)
	385230375	2.6-gal. (9.81) freshwater tank assembly - platinum (items 1 - 5)
6	385310066	Latch assembly - white
	385310067	Latch assembly - parchment
7	385239064	Slide valve assembly - white
8	385346401	Bottom O-ring
9	385310050	Waste tank cap - parchment
	385310031	Waste tank cap - platinum
10	385311522	2.5-gal. (9.5 l) wastewater tank assembly - parchment
	385311523	2.5-gal. (9.5 l) wastewater tank assembly - platinum
	385230376	2.5-gal. (9.51) 964MSD tank assembly - parchment
	385230377	2.5-gal. (9.5 l) 964MSD tank assembly - platinum
11	385311524	5.0-gal. (18.9 l) wastewater tank assembly - parchment
	385311525	5.0-gal. (18.91) wastewater tank assembly - platinum
	385230378	5.0-gal. (18.91) 965MSD tank assembly - parchment
	385230379	5.0-gal. (18.9 l) 965MSD tank assembly - platinum
12	385310018	Hold-down brackets - 2.5-gal. waste tank
	385310239	Hold-down brackets - 5.0-gal. waste tank



## CUSTOMER SERVICE

There is a strong, worldwide network to assist in servicing and maintaining your sanitation system. For the Authorized Service Center near you, please call from 8:00 a.m. to 5:00 p.m. (ET) Monday through Friday.

You may also contact or have your local dealer contact the Parts Distributor nearest you for quick response to your replacement parts needs. They carry a complete inventory for the Dometic product line.

Telephone:	1 800-321-9886 U.S.A. and Canada 330-496-3211 International
Fax:	330-496-3097 U.S.A. and Canada 330-496-3220 International
Web site:	<a href="http://www.DometicSanitation.com">www.DometicSanitation.com</a>

## ONE-YEAR LIMITED WARRANTY

Dometic Sanitation Corporation warrants, to the original purchaser only, that this Dometic portable toilet, if used for personal, family or household-like purposes, and if installed according to Dometic's recommended procedures, is free from defects in material and workmanship for a period of one (1) year from the date of purchase.

If this Dometic product is placed in commercial or business use, it will be warranted, to the original purchaser only, to be free of defects in material and workmanship for a period of ninety (90) days from the date of purchase.

Dometic reserves the right to replace or repair any part of this product that proves, upon inspection by Dometic, to be defective in material or workmanship. All labor and transportation costs or charges incidental to warranty service are to be borne by the purchaser-user.

### EXCLUSIONS

IN NO EVENT SHALL DOMETIC BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, FOR DAMAGES RESULTING FROM IMPROPER INSTALLATION, OR FOR DAMAGES CAUSED BY NEGLIGENCE, ABUSE, ALTERATION, FOREIGN OBJECTS DEPOSITED IN THE TOILET, OR USE OF UNAUTHORIZED COMPONENTS. THIS INCLUDES FAILURES WHICH MAY RESULT FROM NOT FOLLOWING THE WINTERIZATION OR CLEANING PROCEDURES AS DESCRIBED IN THIS MANUAL. ALL IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, ARE LIMITED TO A PERIOD OF ONE (1) YEAR FROM DATE OF PURCHASE.

### IMPLIED WARRANTIES

No person is authorized to change, add to, or create any warranty or obligation other than that set forth herein. Implied warranties, including those of merchantability and fitness for a particular purpose, are limited to one (1) year from the date of purchase for products used for personal, family or household-like purposes, and ninety (90) days from the date of purchase for products placed in commercial or business use.

### OTHER RIGHTS

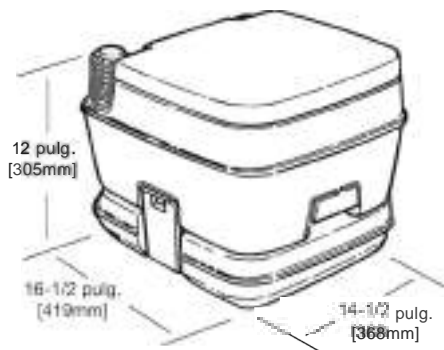
Some states do not allow limitations on the duration of an implied warranty, and some states do not allow exclusions or limitations regarding incidental or consequential damages; so, the above limitations may not apply to you. This warranty gives you specific legal rights, and you may have other rights which vary from state to state.

To obtain warranty service, first contact your local dealer from whom you purchased this product.

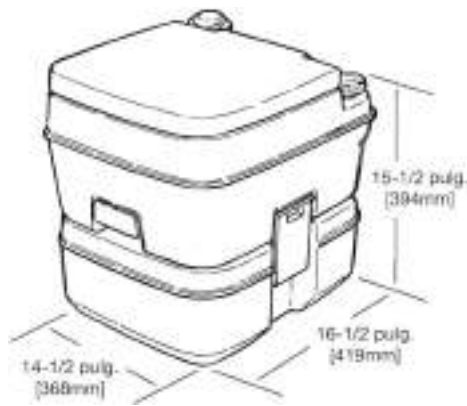
Dimensiones	9
Funcionamiento	10
Instalaci6n (964, 965, 964MSD, 965MSD)	11-12
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## DIMENSIONES

962, 964, 964MSD



965, 965MSD, 966

Las dimensiones pueden variar  $\pm$  3/8-pulgada (10 mm.).



## FUNCIONAMIENTO

### Preparar el aseo para su uso

1. **PRECAUCIÓN!** Con la tapa del aseo bajada, tire de la bomba para abrir el distribuidor de concha, a continuación empuje para cerrar. Esto expulsa la presión de aire que pudiera haberse acumulado en el depósito de retención inferior debido a los cambios de temperatura o altitud.
2. Retire la válvula de agua y llene el depósito superior. Reemplace la válvula.

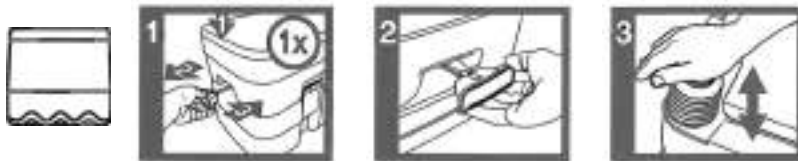
3. Tire de la bomba para abrir el distribuidor de concha.
4. Vierta el desodorante directamente en el depósito inferior y a continuación cierre el distribuidor de concha.

**PRECAUCIÓN!** Nunca vierta el desodorante en la taza cuando el distribuidor de concha **esté** cerrado.



### Utilizar el aseo

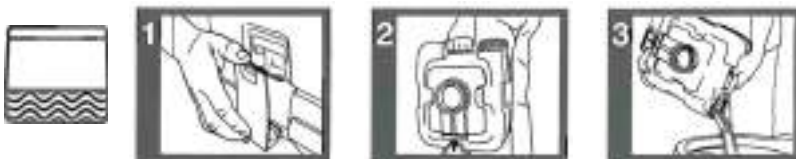
1. **PRECAUCIÓN!** ANTES DE CADA USO, con la tapa del aseo bajada, tire de la bomba para abrir el distribuidor de concha y a continuación empuje para cerrar. Esto expulsa la presión de aire que pudiera haberse acumulado en el depósito de retención inferior debido a los cambios de temperatura o altitud.
2. Utilizar el aseo. (Si va a dispersar sólidos, presione la bomba de fuelle para añadir agua a la taza antes de usar.)
3. Tire de la bomba para liberar agua al depósito inferior.
4. Presione la bomba de fuelle una o más veces para aclarar la taza. Empuje la bomba para cerrar la válvula.



### Vaciar el depósito de retención

**PRECAUCIÓN!** ASEGURESE DE deslizar el tirador de la válvula completamente hacia dentro.

1. Desacople la unidad superior desenganchando los sujetadores laterales y separandola del depósito de retención.
2. Transporte el depósito de retención a la ubicación del aseo permanente.
3. Retire el tapon y vacíe el contenido en el aseo permanente.
4. Aclare el depósito completamente, reemplace el capuchon, rearme la unidad y prepárela para su uso.




**Modelos MSD:** Tire de la bomba para abrir la válvula de descarga. Vade el depósito de retención a través de los accesorios de descarga de la embarcación conforme a las instrucciones del fabricante.

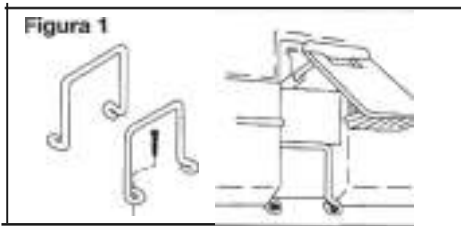
# INSTALACION

FAVOR DE LEER TODAS LAS INSTRUCCIONES COMPLETAMENTE ANTES DE INSTALAR EL ASEO PORTATIL.

## Modelos 964 , 965

1. Coloque el aseo portatil en la ubicacion deseada. Compruebe que haya el espacio suficiente para la tapa y la tabla en la posicion "subida" y el espacio suficiente en los laterales para desacoplar y retirar el deposito superior.
2. Abra las presillas laterales tirando de elias hacia afuera en la seccion superior de las presillas laterales.
3. Coloque los soportes de sUjecion, con los orificios de montaje en el sentido opuesto al aseo, debajo del deposito y alineados con las ranuras.  Ver la Figura 1.
4. Utilice un lapicero o una lenza para marcar la posicion de los orificios de montaje del soporte de sujecion.
5. Retire el aseo portatil.
6. Acople los soportes de sUjecion en el suelo o cubierta con los tornillos provistos a estos efectos.
7. Ajuste el aseo portatil entre los soportes y acoplelo en posicion con las presillas laterales.

### SOPORTES DE MONTAJE



## Modelos 964MSD, 965MSD

### WARNINGS

Los sistemas de aseos marinos de Dometic deben instalarse conforme a los procedimientos de instalacion recomendados por Dometic. La instalacion incorrecta de los mismos puede dar lugar a **daños** de los equipos, lesiones personales o muerte. DOMETIC SANITATION CORPORATION NO ACEPTA NINGUNA RESPONSABILIDAD U OBLIGACION POR LOS **DAÑOS** A LOS EQUIPOS, LESIONES PERSONALES O MUERTE DEL PERSONAL QUE PUEDAN SER EL RESULTADO DE LA INSTALACION, SERVICIO O FUNCIONAMIENTO IMPROPIO DE ESTE PRODUCTO.

### ¡ADVERTENCIA!

**PELIGRO DE INUNDACION** - Si el aseo se conecta a CUALQUIER accesorio a traves del casco, DEBEN instalarse tomas o valvulas de mar correctamente instaladas en todas las tuber/as conectadas a los accesorios a traves del casco. Las tomas de mar DEBEN poder accederse facilmente por parte de todos los usuarios del aseo o deben ajustarse valvulas secundarias en las mangueras donde puedan accederse facilmente. Cierre SIEMPRE las tomas de mar cuando no se esté utilizando el aseo (incluso si la embarcacion queda desatendida durante un corto periodo de tiempo). Todas las valvulas DEBEN ser valvulas de diametro interno completo y de calidad marina. No se recomienda utilizar valvulas de compuerta con tornillo para cerrar. La falta de cumplimiento puede dar como resultado la inundacion de la embarcacion lo que a su vez puede ocasionar la perdida de propiedad y vida.



### ¡ADVERTENCIA!

**PELIGRO DE INUNDACION** - Si el aseo está conectado a CUALQUIER accesorio a traves del casco, TODAS las mangueras flexibles deben ser de calidad de saneamiento marino y deben estar sujetas a CUALQUIER accesorio (por ejemplo los accesorios en las tomas de mar, circuito de ventilacion o aseo) con dos abrazaderas de tornillo sin fin de acero inoxidable en cada conexion. La integridad de las conexiones DEBE comprobarse frecuentemente. La falta de cumplimiento puede dar como resultado la inundacion de la embarcacion lo que a su vez puede ocasionar la perdida de propiedad y vida.



### ¡ADVERTENCIA!

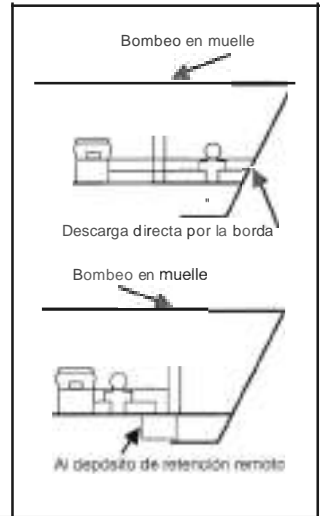
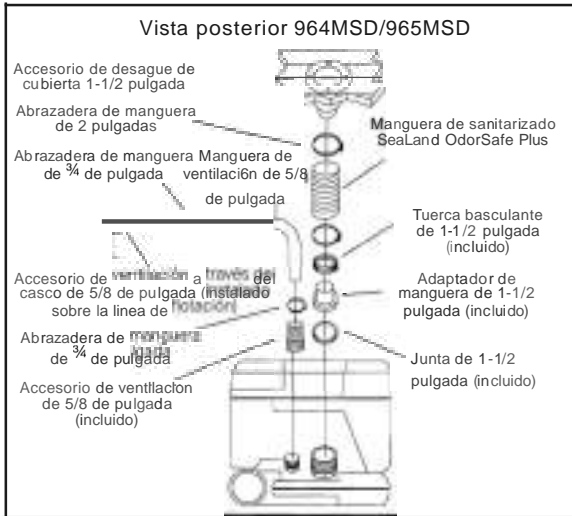
**PELIGRO DE INUNDACION** - Si el borde del aseo está por debajo de la linea de flotacion en CUALQUIER momenta (durante cualquier condicion de escora, carga o amujame) y está conectado a CUALQUIER accesorio a traves del casco, DEBEN instalarse circuitos ventilados (venteados) correctamente ubicados en las tuberfas de descarga para evitar cualquier posible contra sifonaje del agua del mar en la embarcacion. La falta de cumplimiento puede dar como resultado la inundacion de la embarcacion lo que a su vez puede ocasionar la perdida de propiedad y vida.

## INSTALACION

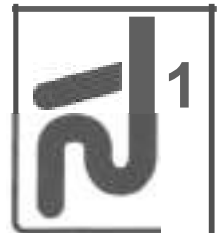
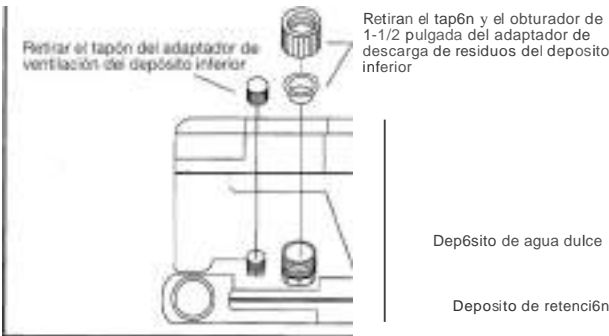
### Modelos 964 MSD, 965MSD

los aseos portatiles son legalmente aceptables para su uso en embarcaciones que no tienen instalaciones sanitarias permanentes, según lo determine el servicio de vigilancia costera de los Estados Unidos de America. Sin embargo, algunos estados y la provincia canadiense de Ontario requieren un aseo portatil permanentemente instalado, como los modelos 964MSD y 965MSD.

### Installation Possibilities



### 964MSD/965MSD



Este símbolo aparece en el accesorio de descarga de los modelos MSD.

## REGLAMENTO SOBRE SANITARIZADO MARINO

Todas las embarcaciones con aseos fijos en aguas de los Estados Unidos de America y en las aguas de algunos otros países necesitan tener instalado un dispositivo de sanitizado marino permanentemente instalado (MSD par sus siglas en ingles). Los modelos MSD de la serie, cuando se han instalado permanentemente en una embarcación, son depósitos de retención o sistemas Tipo III según lo define el servicio de vigilancia costera de los Estados Unidos de America. Los sistemas Tipo III permiten el funcionamiento del aseo sin descarga directa de residuos no tratados después de dar la bomba del aseo. Los sistemas Tipo III pueden descargarse en las estaciones marinas de bombeo ubicadas en los muelles o, si la embarcación está en aguas litorales, a una distancia mínima de tres millas costa afuera. La capacidad de descarga por la borda debe permanecer segura mientras la embarcación se encuentre dentro del límite de tres millas. Si la bomba de descarga por la borda se activa mediante un interruptor con llave en el compartimiento del aseo, la llave debe retirarse siempre excepto cuando la bomba de descarga esté funcionando y durante el proceso de funcionamiento de la embarcación.

Las aguas fecales de la fuente que fueren no deben descargarse directamente en aguas litorales. Si desea más información a este respecto, favor de visitar nuestro sitio Web en [www.DometicSanitation.com](http://www.DometicSanitation.com).

# LIMPIEZA V MANTENIMIENTO

## Limpeza

Para la limpeza más eficaz, utilice el limpiador para aseos SeaLand®. Es apto para su uso con todos los aseos Dometic. Si no puede encontrar este producto donde usted vive, contacte con Dometic para más información sobre su distribuidor más cercano. Si no está disponible, también puede utilizar la mayoría de los productos de limpeza no abrasivos para banos y aseos (Spray limpiador Bar Keeper's Friend®, Limpiador para aseos Clorox®, Limpiador para aseos SaniFlush®, etc.). Siga las instrucciones en la etiqueta.

## Mantenimiento

Si el tirador de la bomba se hace difícil de tirar, lubrique los sellos de la válvula lateral con spray de silicona.

# ADAPTACION PARA EL INVIERNO

## Uso

Quando utilice el aseo portátil Dometic cuando haga frío o durante el invierno, la adición de un anti-congelante inodoro indicado para sistemas de agua portátiles ofrece una protección segura durante el invierno. Utilice las cantidades especificadas en el recipiente que sean seguras para su uso con 4 galones (15 l) de agua.

NOTA: No utilice nunca en los sistemas de agua dulce anti-congelantes con base de alcohol ni para automóviles.

## Almacenaje

Para almacenar el aseo portátil Dometic durante el invierno:

1. Vade el depósito de agua dulce y el depósito de retención.
2. Asegure de haber vaciado todo el agua de las líneas de agua del depósito de agua dulce, presurizando el depósito y pulsando el botón de ahorro de agua hasta que no entre agua en la taza.

(Es posible que permanezca una cantidad pequeña de agua en el fondo del depósito de agua dulce que no ocasionará ningún daño durante el almacenamiento invernal.)

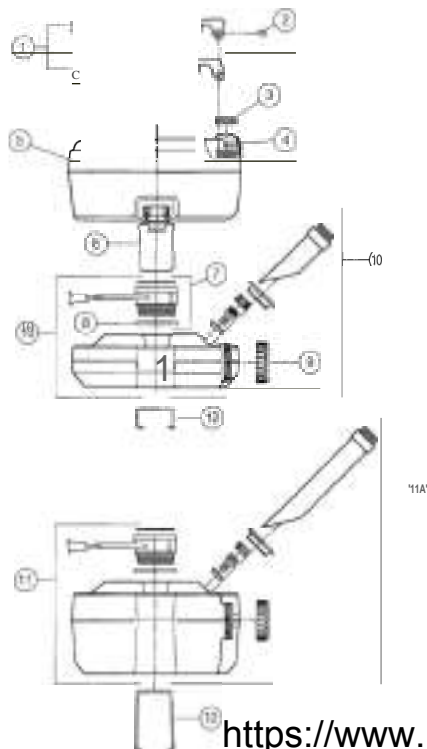
# PRODUCTOS PRACTICOS

Los productos de la marca SeaLand® han sido especialmente desarrollados para funcionar de la forma más óptima en los aseos portátiles Dometic. No hay disponibles mejores desodorizantes para el depósito de retención ni tan sólo de disolución más rápida. Para desodorizar el depósito de retención, siga las instrucciones del paquete.

Sistema de aseo	Opciones de desodorante		Procedimiento de dosificación
	Líquido	Paquete granulado o de tirar	
Aseo portátil	Ve las instrucciones de uso en el envase del desodorante	Un paquete de 2 onzas (57 g) con 1 pinta (0.471) de agua	Añadir directamente al depósito de retención de residuos

# REPUESTOS

NO.	EE UU	DESCRIPCION
1	385311520	Tabla y tapa - pergamino
	385311521	Tabla y tapa - platino
2	385310900	Pasador de bisagra de la tabla - blanco
	385310899	Pasador de bisagra de la tabla - pergamino
3	385310102	Tapon de agua - pergamino
	385310103	Tapon de agua - platino
4	385310104	Conjunto de fuelle - pergamino
	385310105	Conjunto de fuelle - platino
5	385230374	Conjunto deposito de agua dulce de 2,6-galones (9,8 l) - pergamino (1 - 5)
	385230375	Conjunto deposito de agua dulce de 2,6-galones (9,8 l) - platino (1 - 5)
6	385310066	Conjunto sujetador - blanco
	385310067	Conjunto sujetador - pergamino
7	385239064	Conjunto distribuidor de concha - blanco
8	385346401	Junta torica inferior
9	385310050	Tapon deposito de residuos - pergamino
	385310031	Tapon deposito de residuos - platino
10 10A	385311522	Conjunto deposito de residuos de 2,5-galones (9,51) - pergamino
	385311523	Conjunto deposito de residuos de 2,5-galones (9,51) - platino
	385230376	Conjunto deposito de residuos 964MSD de 2,5-galones (9,51) - pergamino
	385230377	Conjunto deposito de residuos 964MSD de 2,5-galones (9,51) - platino
11 11A	385311524	Conjunto deposito de aguas residuales de 5,0-galones (18,91) - pergamino
	385311525	Conjunto deposito de aguas residuales de 5,0-galones (18,91) - platino
	385230378	Conjunto deposito 965MSD de 5,0-galones (18,91) - pergamino
	385230379	Coniunto deposito 965MSD de 5,0-galones (18,91) - platino
12	385310018	Soportes de sujecion - deposito de residuos 2,5 galones
	385310239	Soportes de sujecion - deposito de residuos 5,0 galones



# SERVICIO DE ATENCION AL CLIENTE

Dometic cuenta con una amplia red internacional de centros de mantenimiento y servicio para sistemas de saneamiento. Para más información sobre el Centro de Servicio autorizado más cercano, llame de 8 de la mañana a 5 de la tarde (Hora del Este) de lunes a viernes.

También puede ponerse en contacto con su distribuidor local, el Distribuidor de repuestos más cercano quien tendrá mucho gusto en responder rápidamente a todas sus necesidades de repuestos para la línea de productos Dometic.

Telefono: 1 800-321-9886 EE UU Y Canada  
330-496-3211 Internacional  
Fax: 330-496-3097 EE UU Y Canada  
330-496-3220 Internacional  
SitioWeb: www.DometicSanitation.com

## GARANTIA LIMITADA DE UN AÑO

Dometic Sanitation Corporation garantiza, al comprador original solamente, que este aseo portátil Dometic, cuando se use con fines personales, familiares o domésticos, y siempre que se instale conforme a los procedimientos recomendados por Dometic, estará libre de defectos materiales y de mano de obra durante un (1) año a partir de la fecha de compra.

Si este producto Dometic se utiliza con fines comerciales, se garantizará, al comprador original solamente, que estará libre de defectos materiales y de mano de obra por un periodo de noventa (90) días de la fecha de compra.

Dometic se reserva el derecho de reemplazar o reparar cualquier pieza de este producto que, después de la inspección por parte de Dometic, demuestre estar defectuosa en material o mano de obra. Todos los costos de mano de obra y de transporte o cualquier cargo incidental al servicio de garantía correrán a cargo del comprador/usuario.

### EXCLUSIONES

EN NINGUN CASO SE CONSIDERARÁ QUE DOMETIC ES RESPONSABLE DE CUALQUIER DAÑO DIRECTO O INDIRECTO, POR DAÑOS RESULTANTES DE LA INSTALACIÓN INCORRECTA, O POR DAÑOS OCASIONADOS POR ELABORACIÓN, ABUSO, MODIFICACIÓN, OBJETOS EXTRANOS ARROJADOS AL ASEO, O USO DE COMPONENTES NO AUTORIZADOS. ESTO INCLUYE AVERÍAS QUE PUEDAN RESULTAR DE NO SEGUIR LOS PROCEDIMIENTOS DE ADAPTACIÓN INVERNAL O LIMPIEZA SEGÚN SE DESCRIBEN EN ESTE MANUAL. TODAS LAS GARANTÍAS IMPLÍCITAS, INCLUYENDO CUALQUIER GARANTÍA IMPLÍCITA SOBRE LA CAPACIDAD DE COMERCIALIZACIÓN O APTITUD PARA UN FIN PARTICULAR, ESTÁN LIMITADAS A UN PERÍODO DE UN (1) AÑO A PARTIR DE LA FECHA DE COMPRA.

### GARANTÍAS IMPLÍCITAS

Ninguna persona está autorizada a cambiar, añadir a, o crear cualquier garantía u obligación con la excepción de las garantías incluidas en este documento. Las garantías implícitas, incluyendo cualquier garantía sobre la capacidad de comercialización y aptitud para un fin particular, están limitadas a un (1) año a partir de la fecha de compra para los productos utilizados para uso personal, familiar o doméstico, y noventa (90) días a partir de la fecha de compra para los productos utilizados con fines comerciales.

### OTROS DERECHOS

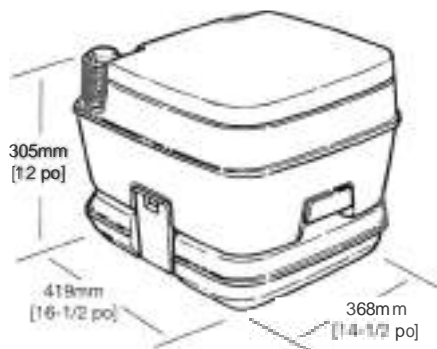
Algunos estados no permiten limitaciones sobre la duración de una garantía implícita, y algunos estados no permiten exclusiones o limitaciones asociadas con daños directos o indirectos; por ello, es posible que las limitaciones anteriores no sean aplicables en su caso. Esta garantía le ofrece derechos legales específicos, y el consumidor puede tener otros derechos adicionales que varían de un estado a otro.

Para obtener el servicio de garantía, póngase en contacto en primer lugar con su distribuidor local donde adquirió el producto.

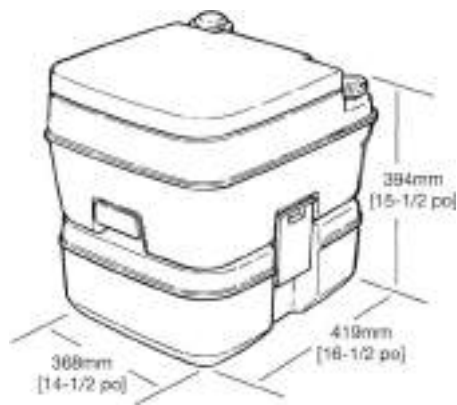
Dimensions	16
Utilisation	17
Installation (964, 965, 964MSD, 965MSD))	18-19
Nettoyage et entretien	20
Préparation à l'hiver	20
Produits pour sanitaires	20
Pièces détachées	21
Service clientèle	22
Garantie	22

## DIMENSIONS

962, 964, 964MSD




965, 965MSD, 966




Toutes les dimensions peuvent varier de  $\pm 10$  mm (3/8 po).

# UTILISATION


## Preparation de la toilette avant utilisation

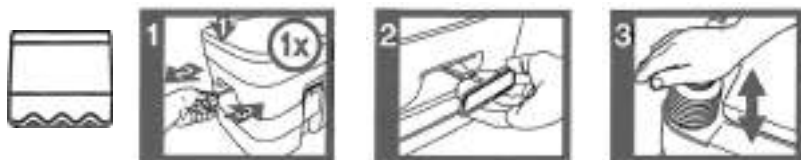
1.  **ATTENTION !** Couvercle ferme, tirez puis repoussez la poignée ouvrant la valve coulissante de fond de cuvette. Ce geste sert à réduire la pression de l'air excessive qui peut parfois regner dans le réservoir inférieur en cas de changements de température ou d'altitude.
2. Otez le bouchon du réservoir supérieur et remplissez celui-ci d'eau douce. Remplacez le bouchon.
3. Tirez la poignée ouvrant la valve coulissante de fond de cuvette.
4. Versez le désodorisant directement dans le réservoir inférieur puis refermez la valve coulissante.

 **ATTENTION ! Ne PAS verser le désodorisant dans la cuvette si la valve coulissante est fermée.**




## Utilisation de la toilette

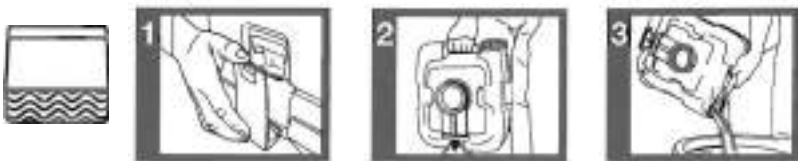
1.  **ATTENTION! AVANT CHAQUE UTILISATION, couvercle ferme, tirez puis repoussez la poignée ouvrant la valve coulissante de fond de cuvette. Ce geste sert à réduire la pression de l'air excessive qui peut parfois regner dans le réservoir inférieur en cas de changements de température ou d'altitude.**
2. Utilisez la toilette. (En cas de besoin d'évacuer des matières solides, pressez la pompe à soufflet afin d'ajouter de l'eau dans la cuvette avant utilisation.)
3. **Après** utilisation, tirez la poignée ouvrant la valve coulissante de fond de cuvette afin de faire tomber les matières dans le réservoir inférieur.
4. Pressez la pompe à soufflet une ou plusieurs fois pour rincer la cuvette. Ensuite, repoussez la poignée de la chasse pour refermer la valve.



## Vidange du réservoir inférieur

 **ATTENTION! ASSUREZ-VOUS que la valve coulissante est fermée.**

1. Désolidarisez l'unité supérieure en débloquant les attaches latérales et soulevez-la pour la séparer du réservoir inférieur.
2. Rendez-vous avec le réservoir inférieur à un point de vidange autorisé ou dans des toilettes traditionnelles.
3. Otez le couvercle et videz le contenu du réservoir dans ce lieu de vidange adéquat.
4. Rincez soigneusement le réservoir, remplacez le couvercle, remontez les deux parties et préparez votre toilette à l'utilisation.



Modeles marins MSD : Tirez la poignée de la chasse afin d'ouvrir la valve de la chasse. Pompez le contenu du réservoir à eaux usées à travers la tuyauterie d'évacuation du bateau en suivant les instructions du constructeur de celui-ci.



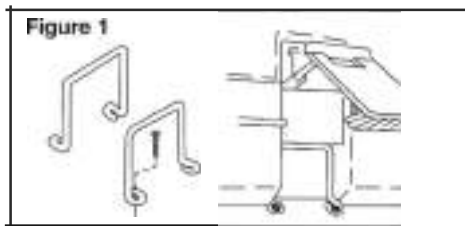
## INSTALLATION

VEUILLEZ LIRE SOIGNEUSEMENT LES PRESENTES INSTRUCTIONS AVANT D'INSTALLER VOTRE TOILETTE PORTABLE.

### Modeles 964, 965

1. Placez votre toilette portable à l'endroit souhaité. Veillez à garder suffisamment d'espace libre pour que le couvercle et la lunette puissent tenir en position haute et que, sur les côtés, il soit toujours possible de détacher et ôter le réservoir supérieur.
2. Ouvrez les verrous latéraux en tirant leur sommet vers l'extérieur.
3. Placez les pattes de fixation, les trous de montage pointant vers l'extérieur de la toilette, sous le réservoir, et alignez-les avec les rainures-guides. Voir Figure 1.
4. Utilisez un crayon ou un poinçon pour marquer l'endroit des trous des pattes de fixation.
5. Eloignez la toilette portable.
6. Attachez les pattes de fixation au sol au moyen des vis fournies.
7. Placez la toilette portable entre les pattes de fixation et bloquez-la en place au moyen des verrous latéraux.

#### PATTES DE FIXATION



### Modeles 964MSD, 965 M SD AVERTISSEMENTS

L'installation des systèmes de toilettes marines Dometic doit suivre les procédures recommandées par Dometic. Dégradés, blessures et même mort pourraient résulter d'une installation defectueuse. DOMETIC SANITATION CORPORATION DECLINE TOUTE RESPONSABILITE OU OBLIGATION EN CAS DE DOMMAGES MATERIELS, CORPORELS OU DE DECES RESULTANT D'INSTALLATION, D'ENTRETIEN OU D'UTILISATION IMPROPRE DE CE PRODUIT.

#### ATTENTION!

**DANGER D'INONDATION** - Si la toilette est reliée à un raccord passe-coque (QUEL QU'IL SOIT), des robinets adéquats et montés de manière appropriée DOIVENT être installés sur toute la tuyauterie reliée au passe-coque. Ces robinets DOIVENT être aisément accessibles à tout utilisateur de la toilette ou bien des vannes secondaires facilement accessibles doivent être placées dans la tuyauterie. TOUJOURS fermer les vannes lorsque la toilette n'est pas en service (même si le bateau est laissé sans surveillance durant une brève période). Toutes les vannes DOIVENT être de type " passage intégral " et de qualité marine. Les robinets-vannes à visser ne sont pas recommandés. Ne pas se conformer à ces instructions peut entraîner une inondation qui elle-même peut causer des pertes matérielles et en vies humaines.



#### ATTENTION!

**DANGER D'INONDATION** - Si la toilette est reliée à un passe-coque (QUEL QU'IL SOIT), TOUTE la tuyauterie souple doit être de qualité marine adaptée aux sanitaires et doit être reliée à CHAQUE raccord (vanne, boucle de ventilation ou toilette) avec deux colliers de serrage par vis sans fin en acier inoxydable à chaque raccord. Ces raccords DOIVENT être inspectés fréquemment pour s'assurer de leur étanchéité. Ne pas se conformer à ces instructions peut entraîner une inondation qui elle-même peut causer des pertes matérielles et en vies humaines.



#### ATTENTION!

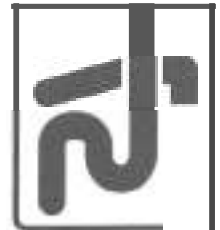
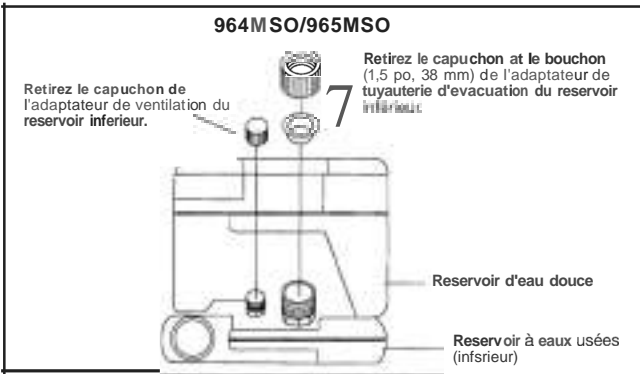
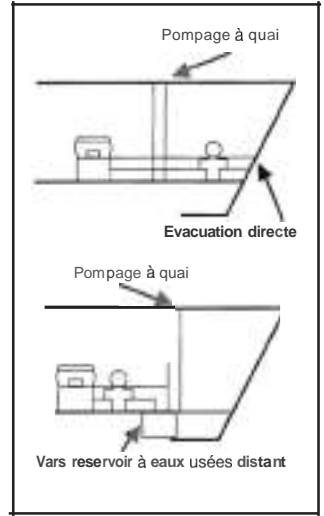
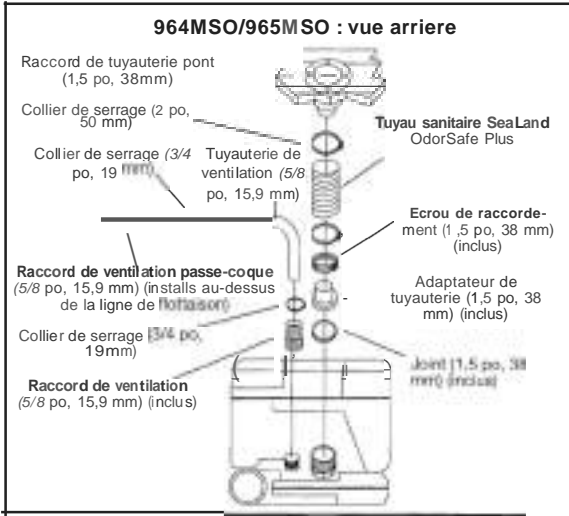
**DANGER D'INONDATION** - Si le rebord de la toilette risque de se situer sous le niveau de l'eau à un QUELCONQUE moment (inclinaison, chargement, assiette) alors qu'il se trouve relié à un raccord passe-coque, des boucles de ventilation de tuyauterie DOIVENT être installées dans la tuyauterie d'évacuation afin d'empêcher tout siphonnement de l'eau de mer dans le bateau. Ne pas se conformer à ces instructions peut entraîner une inondation qui elle-même peut causer des pertes matérielles et en vies humaines.

# INSTALLATION

## Modeles 964MSD, 965MSD

L'utilisation de toilettes portables est ~~agréée~~ dans les navires ne possédant pas de toilettes fixes (agrement des Garde-Cotes américains). Toutefois, certains Etats, de ~~même~~ que la province canadienne d'Ontario, exigent une toilette portable installée de ~~manière~~ permanente comme les 964MSD et 965MSD.

### Possibilités d'installation



Ce pictogramme apparaît sur le raccord d'évacuation des modèles marins (MSO).

### REGLEMENTATION CONCERNANT LES SANITAIRES MARINS

Tous les bateaux ~~équipés~~ de toilettes fixes naviguant dans les eaux des Etats-Unis et de certains autres pays doivent obligatoirement disposer de sanitaires marins installés de ~~façon~~ permanente (Marine Sanitation Device, MSD). Tout modèle de la ~~Série~~ 960 MSD, lorsqu'il est installé de manière permanente dans un bateau, est un système de Type III tel que défini par les Garde-Cotes américains. Les systèmes de Type III permettent d'utiliser la toilette sans évacuation directe d'eaux non-traitées ~~après~~ chaque opération de la chasse d'eau. Les systèmes de Type III permettent l'évacuation des eaux ~~usées~~ dans les stations de pompage au port ou à un minimum de trois milles des côtes. Le système d'évacuation en mer des eaux ~~usées~~ doit ~~être~~ dans la limite de trois milles des côtes. Si la pompe d'évacuation en mer dispose d'un interrupteur à clef situé dans le compartiment des toilettes, cette clef doit ~~être~~ et rangée à tout moment sauf quand la pompe d'évacuation est utilisée et lors des interventions pratiques sur le bateau.

Les eaux usées, d'où qu'elles proviennent, ne doivent jamais être ~~évacuées~~ directement dans les eaux côtières. Si cette question vous intéresse, n'hésitez pas à visiter notre site web à l'adresse [www.DometicSanitation.com](http://www.DometicSanitation.com).

## NETTOYAGE ET ENTRETIEN

### Nettoyage

Pour nettoyer très efficacement votre toilette, faites appel au nettoyant 5eaLand® Toilet Bowl Cleaner. Ce produit convient à toutes les toilettes Dometic. Si vous ne pouvez le trouver dans votre région, contactez Dometic qui vous indiquera l'adresse du revendeur le plus proche. Vous pouvez également utiliser la plupart des nettoyants non-abrasifs pour sanitaires et salles de bain (Bar Keeper's Friend® en spray, Clorox®, SaniFlush®, etc.). Suivez les instructions mentionnées sur l'étiquette du produit.

### Entretien

Si la chasse d'eau devient difficile à tirer, lubrifiez les joints de la valve coulissante à l'aide d'un spray à la silicone.

## PREPARATION A L'HIVER

### Utilisation hivernale

Si vous souhaitez utiliser votre toilette portable Dometic par temps très froid, nous vous conseillons d'ajouter à l'eau un antigel non-toxique prévu pour systèmes à eau potable. Utilisez la quantité prévue par le fabricant pour 15 litres (4 gallons) d'eau.

REMARQUE : N'utilisez jamais d'antigel à base d'alcool ou d'antigel pour circuit de refroidissement automobile dans le réservoir à eau douce de votre toilette.

### Entreposage

Pour stocker votre toilette portable Dometic durant l'hiver :

1. Videz les réservoirs d'eau propre et d'eaux usées.
2. Veillez à ce que toute l'eau douce ait quitté le réservoir et les conduites en mettant le réservoir sous pression et en tirant la chasse jusqu'à ce que l'eau ne s'écoule plus dans la cuvette.

Il est possible qu'une petite quantité d'eau subsiste dans le fond du réservoir d'eau douce, sans aucun risque pour celui-ci durant l'entreposage hivernal.

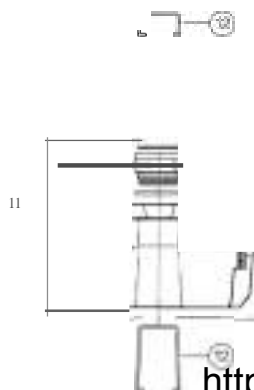
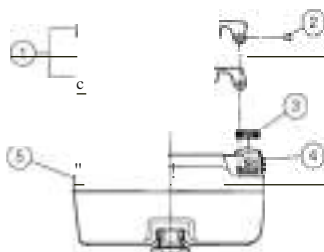
## PRODUITS POUR SANITAIRES

Les produits 5eaLand® ont été spécialement développés pour les toilettes portables Dometic. Il n'existe pas de meilleurs désodorisants pour réservoir à eaux usées ni de papier aussi facilement dégradable après usage. Pour désodoriser le réservoir à eaux usées (inférieur), suivez les instructions mentionnées sur l'emballage.

Système de toilette	Type de désodorisant		Procédure d'utilisation
	Liquide	En granules ou en sachet	
Toilette portable	Suivez les instructions mentionnées sur le flacon	Un sachet de 57 g (2 oz) pour ± 0,5 l (1 pint) d'eau	Verser directement dans le réservoir à eaux <u>usées</u>

# PIECES DÉTACHÉES

N°	USA	DESCRIPTION
1	385311520 385311521	Couvercle et lunette de cuvette - « parchemin » Couvercle et lunette de cuvette - « platine »
2	385310900 385310899	Goupille de charniere de lunette - « blanc » Goupille de charniere de lunette - « parchemin »
3	385310102 385310103	Bouchon de remplissage d'eau - « parchemin » Bouchon de remplissage d'eau - « platine »
4	385310104 385310105	Pompe à soufflet - « parchemin » Pompe à soufflet - « platine »
5	385230374 385230375	Reservoir à eau douce de 9,81 (2,6 gal.) - « parchemin » (1 - 5) Reservoir à eau douce de 9,5 l (2,5 gal.) - « platine » (1 - 5)
6	385310066 385310067	Attaches laterales - « blanc » Attaches laterales - « parchemin »
7	385239064	Valve coulissante - « blanc »
8	385346401	Joint torique inferieur
9	385310050 385310031	Reservoir à eaux usées - « parchemin » Reservoir à eaux usées - « platine »
10	385311522 385311523	Reservoir à eaux usées de 9,5 l (2,5 gal.) - « parchemin » Reservoir à eaux usées de 9,5 l (2,5 gal.) - « platine »
10A	385230376 385230377	Reservoir à eaux usées de 9,5 l (2,5 gal.) 964MSD - « parchemin » Reservoir à eaux usées de 9,5 l 964MSD - « platine »
11	385311524 385311525	Reservoir à eaux usées de 18,9 l (5 gal.) - « parchemin » Reservoir à eaux usées de 18,9 l (5 gal.) - « platine »
11A	385230378 385230379	Reservoir à eaux usées de 18,9 l (5 gal.) 965MSD - « parchemin » Reservoir à eaux usées de 18,9 l (5 gal.) 965MSD - « platine »
12	385310018 385310239	Pattes de fixation - reservoir à eaux usées de 9,5 l (2,5 gal.) Pattes de fixation - reservoir à eaux usées de 18,9 l (5 gal.)



11A

## SERVICE CLIENTELE

Vous pouvez compter sur un solide réseau mondial dévolu à l'entretien et à la maintenance de votre système sanitaire. Pour connaître l'adresse du centre d'entretien agréé le plus proche de chez vous, veuillez nous appeler entre 8h et 17h du lundi au vendredi.

Vous pouvez également, en direct ou par l'intermédiaire de votre concessionnaire local, entrer en contact avec le distributeur de pièces le plus proche de chez vous si vous avez besoin de pièces de remplacement pour tout produit de la gamme Dometic.

Téléphone :	1 800-321-9886 Etats-Unis et Canada 330-496-3211 International
Fax:	330-496-3097 Etats-Unis et Canada 330-496-3220 International
Site web:	<a href="http://www.DometicSanitation.com">www.DometicSanitation.com</a>

## GARANTIE D'UN AN

Dometic Sanitation Corporation garantit, à l'acheteur initial seulement, que cette toilette portable Dometic, si elle est utilisée dans le cadre personnel, familial ou domestique, et pour autant qu'elle ait été installée suivant les prescriptions de Dometic, est exempte de tout défaut de matériau et de fabrication durant une période de un (1) an à partir de la date d'achat.

Si ce produit Dometic est utilisé dans un cadre commercial ou professionnel, il jouira d'une garantie, au bénéfice de l'acheteur initial seulement, contre tout vice de fabrication et de matériau de quatre-vingt-dix (90) jours à compter de la date d'achat.

Dometic se réserve le droit de remplacer ou de réparer toute pièce de ce produit se examiné par Dometic, défectueux en fabrication ou en matériau. Les frais de port et de manutention ou tout autre coût lié à cette garantie sont à la charge de l'utilisateur-acheteur.

### EXCLUSIONS

EN AUCUN CAS DOMETIC NE POURRA ETRE TENU RESPONSABLE DE DOMMAGES ACCESSOIRES OU INDIRECTS OU SUBIS DU FAIT D'UNE INSTALLATION INCORRECTE, DE NEGLIGENCE, D'ABUS, DE MODIFICATION DU PRODUIT, D'OBJETS INAPPROPRIÉS INSÉRÉS DANS LE PRODUIT OU D'UTILISATION DE PIÈCES NON-AUTORISÉES. CECI INCLUT ÉGALEMENT LE NON RESPECT DES INSTRUCTIONS DE PRÉPARATION À L'HIVER, DE NETTOYAGE ET D'ENTRETIEN TELLES QUE DÉCRITES DANS CE MANUEL. TOUTES LES GARANTIES IMPLICITES, Y COMPRIS CELLES QUI SONT LIÉES À LA QUALITÉ LOYALE ET MARCHANDE OU À TOUT USAGE PARTICULIER, SONT LIMITÉES À UNE PÉRIODE DE UN (1) AN À COMPTER DE LA DATE D'ACHAT.

### GARANTIES IMPLICITES

Nul n'est autorisé à modifier la présente garantie ou à y ajouter toute autre garantie ou obligation. Les garanties implicites, y compris la garantie de qualité loyale et marchande et de convenance à tout usage particulier, sont limitées à un (1) an à compter de la date d'achat pour des produits utilisés dans le cadre personnel, familial ou domestique, et à quatre-vingt-dix (90) jours à compter de la date d'achat pour des produits utilisés dans le cadre commercial ou professionnel.

### AUTRES DROITS

Certains États n'admettent pas de limites à la durée d'une garantie implicite. De même, certains États ne permettent pas d'exclusions ou de limitations concernant les dommages accessoires ou indirects. Dès lors, il est possible que les limitations mentionnées ci-dessus ne s'appliquent pas à vous. Cette garantie vous confère des droits légaux spécifiques auxquels d'autres peuvent venir s'ajouter selon ce que la loi autorise dans un État ou dans un autre.

En cas de nécessité de recourir à la garantie, veuillez contacter le concessionnaire agréé qui vous a vendu le produit.



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Models 29090-2000  
29120-2000

## MANUAL MARINE TOILET FEATURES

- Easy to clean white ceramic bowl
- Sturdy wood seat with durable baked enamel finish
- Forward angled pump for easy operation
- Convenient top-mounted dry bowl selector
- Reversible pump mounting for right or left hand installation
- External seal housing/rod guide for easy replacement
- Extra large seal housing allows piston rod assembly to be removed without removing valve cover
- Smooth external surfaces with skirted base to maintain cleanliness
- Base of pump and valve cover are skirted to conceal gasket/flap valves
- Triadic full-flow joker valve to avoid accidental blockage
- Multi-angle discharge port for versatility of plumbing connection

## VARIATIONS AVAILABLE

MODEL NO.	DESCRIPTION
29090-2000	Compact Size Bowl & Seat
29120-2000	Household Size Bowl & Seat

	<b>WARNING</b> Flood hazard. If toilet is installed below the waterline or may be below the waterline at any angle of heel or trim, it must be installed with properly positioned vented loops. Failure to do so can result in flooding which can cause loss of property and life.
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## SPECIFICATIONS

- Inlet port – 3/4"
- Discharge port – 1-1/2"
- Weight – compact bowl: 26 lb  
large bowl: 32 lb

## APPLICATION

The Jabsco Manual toilet is designed to meet the requirements of onboard marine applications. It may be installed above or below the waterline. If the toilet is, or can be, below the waterline at any normal (including static) attitude of vessel heel and/or trim, a 3/4" Vented Loop Fitting must be installed in a length of hose that connects the flushing pump to the rear of the bowl. The vented Loop Fitting should be positioned so it remains about eight inches or more above the waterline at all angles of heel and trim. If the toilet is plumbed to an overboard discharge, the discharge hose must also include a Vented Loop Fitting. (See WARNING.) The toilet may be plumbed so waste is



Models 29090-2000 & 29120-2000

discharged to holding tank, directly overboard (where permitted by law) or into a certified waste treatment device. For installation versatility, the pump assembly may be positioned on the left or right hand side of the bowl. Its multi-angle discharge port will allow routing of discharge hose in almost any direction for ease of installation and neat appearance.

The toilet is available with either a compact china bowl to fit restrictive areas or a large bowl with household size seat assembly for maximum comfort. Its forward angled double action pump with convenient top mounted dry bowl selector is easy and natural to operate. It is self-priming with a dry suction lift of up to 3 feet (1 meter) and a discharge head to 9 feet (3 meters). A full-flow triadic joker valve resists blockage while providing positive back-flow prevention.

## OPERATION

Manual Marine toilets have traditionally been somewhat cumbersome and confusing to operate and maintain. The Jabsco toilet has been designed with user convenience in mind. The pump assembly is angled forward to provide a natural, smooth stroke action. It has a top mounted wet/dry bowl selector which can be operated with the same hand used for pumping without releasing the pump handle.

The Jabsco toilet is surprisingly easy to operate. Simply move the wet/dry bowl selector to the wet bowl position (left) and pump handle up and down a few times to add some water to the bowl prior to use. After using, flush by again pumping handle up and down (in wet bowl position) until bowl is thoroughly rinsed and evacuated. Then move the wet/dry bowl selector to the dry bowl position (right) and continue pumping until only about one cup of water remains in the bottom of bowl. Leave the wet/dry bowl selector in the dry bowl position when toilet is not in use.



## Positioning and Mounting

The Jabsco Manual Toilet is assembled at the factory for operation with the right hand. If preferred, or required by available space, the pump and bowl may be rotated 180 degrees to provide left hand operation. To do this, remove hose from inlet elbow (back of bowl) and rotate elbow 180 degrees. It may be necessary to remove the elbow, loosen spud retaining nut and rotate the spud fitting so elbow will be tight when pointing in the opposite direction. Remove, rotate 180 degrees and reinstall both the bowl and pump assembly. Reconnect hose to inlet elbow and the toilet is ready for left hand operation.

The toilet must be installed on a well supported flat surface. Ideally, if underside of mounting surface is accessible, the toilet base should be through-bolted (using 5/16" bolts, washers and locknuts) to the mounting surface. If the underside of mounting surface is not accessible, the use of 5/16" lag bolts and washers is an acceptable alternative.

Before installing, position toilet in location to be installed. Ensure there is adequate space around toilet to easily operate pump and raise seat and lid to a fully opened position. Seat and lid should swing open at least 110 degrees and be supported when open to avoid strain on hinges. Ensure the base drain plug is accessible and inlet and discharge hoses can be attached to their respective ports without inducing significant lateral force. The discharge elbow may be rotated (by loosening two flange screws, rotating elbow and retightening screws) to accept the most convenient routing of the discharge hose.

When proper installation has been established mark the four base mounting holes on mounting surface and remove toilet. Ensure that no wiring or plumbing is positioned under the mounting surface which may be accidentally damaged when the surface is drilled. Drill appropriate size holes for fasteners being used. Mount toilet using flat washers between head of bolts and plastic toilet base. If desired a small bead of silicone or latex sealant may be applied around base where it contacts the mounting surface to prevent moisture from getting under the toilet base.


NOTICE: Do not use Polysulfide base sealants because they may chemically attack the plastic which can result in breakage.

## Plumbing


**WARNING** Do not plumb the toilet to vessel's potable water supply. To do so can cause water contamination that can cause illness or death.

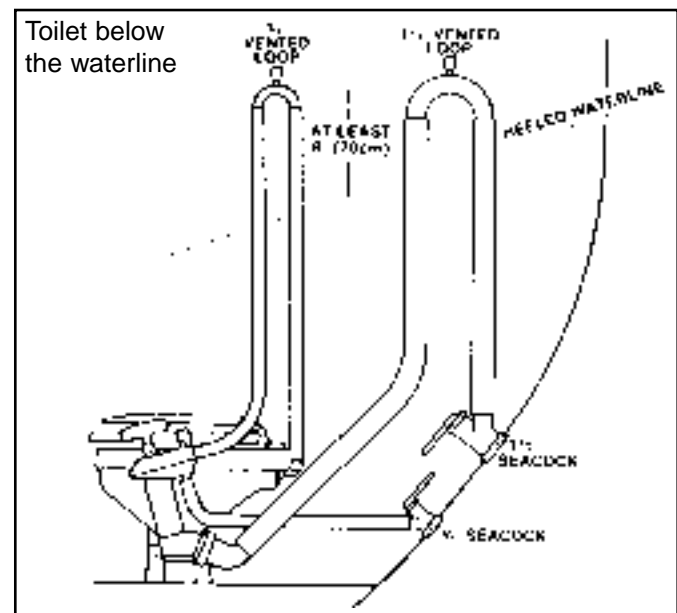
If installing a new inlet thru-hull/seacock, ensure that it is positioned on a part of the hull which is wetted at all angles of heel or trim and free of water turbulence at any hull speed. If discharging waste overboard (check legal restrictions for overboard discharge), ensure discharge thru-hull/seacock is both aft of and higher than the inlet thru-hull/seacock. All inlet plumbing should be a minimum of 3/4" ID and discharge plumbing a minimum of 1-1/2" ID. All hose ends should be double clamped

with stainless steel hose clamps. If the toilet is above waterline route hoses to seacocks, holding tank or treatment device via a route as direct as possible. However, for maximum sealing effect on the discharge joker valve, it is recommended that the discharge hose is looped upward about 8" above the discharge elbow before it descends to its termination point. All bends and elbows in plumbing should be kept to a minimum. It should not be necessary to use any sealing compound when attaching hoses to the inlet or discharge ports.

	<b>WARNING</b> Flood hazard. If toilet is installed below the waterline or may be below the waterline at any angle of heel or trim, it must be installed with properly positioned vented loops. Failure to do so can result in flooding which can cause loss of property and life.
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If the toilet is, or can be, below the waterline, at any normal (including static) attitude of vessel heel and/or trim, a 3/4" vented loop must be installed in a length of hose connecting the flushing pump to the rear of the bowl. The vented loop fitting must be positioned 8" above the waterline at all angles of heel and trim. To accomplish this, remove the 3/4" hose supplied with toilet and replace with a new length of hose long enough to properly position the vented loop. If the toilet is plumbed for overboard discharge, a 1-1/2" vented loop must be installed in the discharge hose. The waste vented loop fitting must also be positioned 8" above the waterline at all angles of heel and/or trim and ideally should be located as close to the toilet as practical. (See WARNING.)

	<b>WARNING</b> Flood hazard. Close inlet and outlet seacocks prior to disassembling toilet. Failure to do so can result in flooding which can cause loss of property and life.
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If unfamiliar with proper plumbing requirements for marine toilets, it is recommended that a qualified marine plumbing technician is contacted to do the installation.

## Maintenance

Periodic maintenance is generally not required other than periodic cleaning and lubricating with Rule® brand toilet cleaner and conditioner. To winterize toilet, operate the pump in the dry bowl mode to evacuate as much water as possible. Drain the remaining water from the base by removing the base plug or sponge from bottom of bowl. If charging the holding tank with anti-freeze by pumping it through the toilet, use only ethylene glycol based anti-freeze. To use petroleum based anti-freeze can cause damage to the internal rubber toilet parts.

## Service

Before performing any service, flush the toilet long enough to ensure all waste is flushed from the discharge hose. Close both inlet and discharge (if applicable) seacocks and put a "DO NOT OPEN" notice on each to guard against accidental opening and flooding while service is being performed.

**SEAL REPLACEMENT** - Lift handle and wrap rod with one turn of tape just under the handle. Gently grasp piston rod (on tape) with pliers and unscrew handle. **HOLD PISTON ROD AT ALL TIMES OR IT MAY DROP DOWN INTO PUMP.** Remove bumper washer and unscrew and remove seal/rod guide assembly. Wrap threads of piston rod with one turn of tape to protect new seal and install new seal/rod guide assembly. Remove tape from threads and reinstall bumper washer and handle. Tighten handle snugly (do not overtighten) and remove remaining tape.

**MAJOR OVERHAUL** - Loosen hose clamps on inlet hose and remove it from the pump. Remove bowl link hose from rear of pump assembly. Remove the two screws that secure the discharge flange and elbow. Remove the four screws that secure the pump to the base and remove pump assembly.

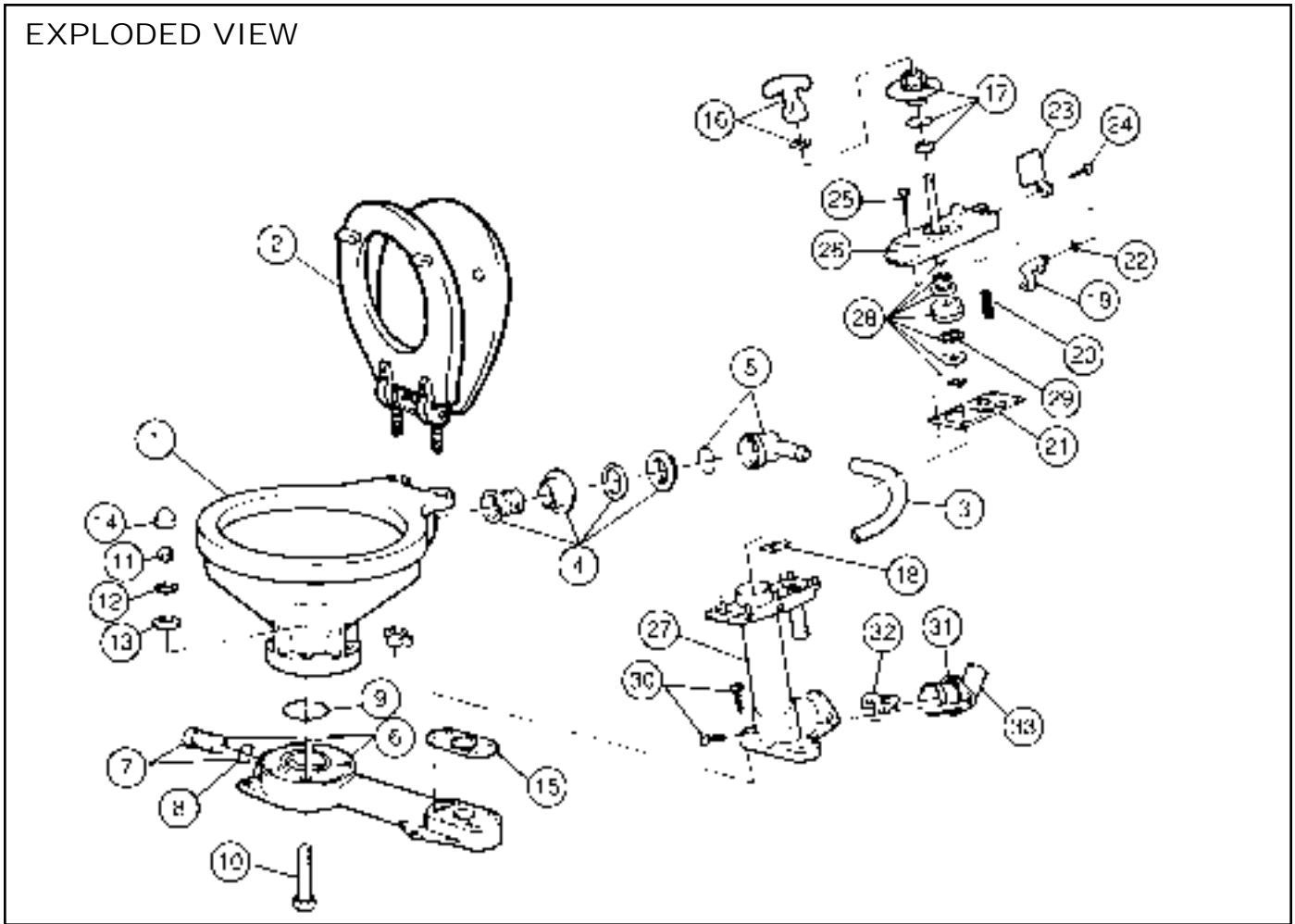
The discharge joker valve and base valve/gasket can now be removed. Remove the six screws that secure the top valve cover, move the wet/dry bowl selector to the wet bowl position and remove valve cover and piston rod assembly from pump cylinder, taking care not to lose the flap valve seating spring on the underside of the cover. Remove top valve/gasket assembly and valve seat. Remove piston O-Ring and seal/rod guide assembly (see Seal Replacement instructions.). Clean all parts and inspect for damage. Ensure pump cylinder wall is not badly grooved or worn.

Install new seal/rod guide assembly (see Seal Replacement instructions). Install new piston O-Ring. Lubricate bore of pump cylinder with petroleum jelly. Position valve seat and top valve/gasket assembly on top of cylinder. Ensure the flap valve seating spring is pushed securely on its locator post on the underside of the valve cover. With the wet/dry bowl selector in the wet bowl position, insert piston into cylinder bore and position valve cover on top of cylinder. Secure with six screws. Install joker valve in discharge elbow and base valve/gasket assembly on base. Position discharge

flange and elbow on pump and secure with two screws. Position pump assembly on base and secure with four screws. Reattach bowl link hose to pump. Reattach inlet hose to pump and secure with clamps.

**BOWL SEAL REPLACEMENT** - To replace the bowl seal (base O-Ring) disconnect inlet and discharge hoses and remove toilet from its mounting surface. Pry nut caps from bowl fasteners. Invert toilet and hold bolts on underside of base while removing nuts and washers. Lift base from bowl and remove O-Ring. Install new O-Ring, position base on bowl and secure with fasteners ensuring plastic washers are sandwiched between S. S. flat washers and ceramic bowl. Invert toilet and snap plastic nut caps onto nuts. Reinstall toilet on mounting surface, connect hoses and secure with hose clamps.

# EXPLODED VIEW



## REPAIR KITS AVAILABLE

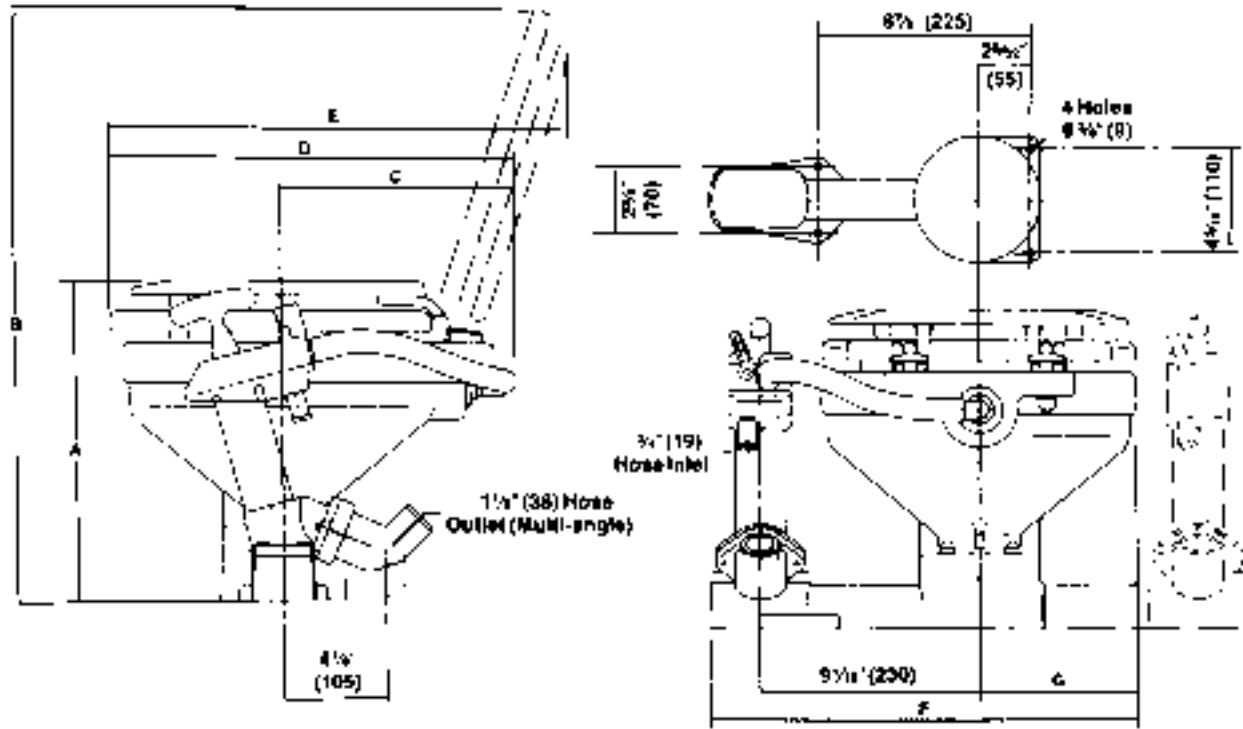
A	29045-2000	MAJOR SERVICE KIT, PUMP
B	29040-2000	PUMP ASSEMBLY
C	29094-2000	VALVE COVER & HANDLE ASSEMBLY
D	29051-2000	PUMP CYLINDER ASSEMBLY
E	29047-0000	BOWL INSTALLATION KIT

## PARTS LIST

Key	Description	Qty. per Toilet	Part Number	Qty per Repair Kit					
				A	B	C	D	E	
1	BOWL								
	COMPACT	1	59127-7002						
	LARGE	1	18753-0060						
2	SEAT, LID & HINGE SET								
	COMPACT	1	29097-1000						
	LARGE	1	29127-1000						
2A	HINGE KIT-COMPACT	1	18753-0181						
3	HOSE								
	COMPACT	1	29035-0000						
	LARGE	1	29035-0001						
4 & 5	BOWL SPUD AND INTAKE ELBOW & O-RING	1	29048-0000						
6	BASE, PLUG & O-RING ASSY	1	29041-1000						
7	PLUG & O-RING ASSY	1	29028-1000						
8	O-RING (PLUG)	1			1				
9	O-RING (BOWL)	1	44101-1000					1	
10	BOLT	4						4	
11	NUT	4						4	
12	WASHER (SS)	4						4	
13	WASHER (NYLON)	4						4	
14	CAP	4			2			4	
15	BASE VALVE GASKET	1	29043-0000	1	1				
16	HANDLE				1				
	WITH BUMPER WASHER			1	1				

Key	Description	Qty. per Toilet	Part Number	Qty per Repair Kit					
				A	B	C	D	E	
17	SEAL ASSEMBLY *	1	29044-2000	1	1	1			
18	TOP VALVE SEAT	1			1	1		1	
19	CAM				1			1	1
20	FLAP VALVE SEATING SPRING	1				1	1		
21	TOP VALVE GASKET	1	29042-0000	1	1				
22	O-RING (FLUSH LEVER)	1			1	1	1		
23	FLUSH CONTROL LEVER	1				1	1		
24	SCREW (FLUSH LEVER)	1			1	1	1		
25	SCREW (VALVE COVER)	6			1	6	6		
26	VALVE COVER	1				1	1		
27	PUMP CYLINDER	1				1		1	
28	PISTON, ROD & O-RING ASSY	1	29046-0000		1				
29	O-RING (PISTON)	1	29017-1000	1					
30	SCREW (PUMP CYLINDER)	6			1	2		2	
31	DISCHARGE FLANGE	1	29091-0000		1		1		
32	JOKER VALVE	1	29092-0000	1	1	1	1		
33	DISCHARGE ELBOW	1	29029-0000		1		1		

**DIMENSIONAL DRAWING**  
Inches (Millimeters)



	A	B	C	D	E	F	G
29090-2000 <b>MANUAL TOILET STANDARD BOWL</b>	13 3/8 (335)	24 1/2 (615)	9 3/4 (247)	16 3/4 (425)	19 1/4 (485)	17 3/4 (450)	6 1/2 (165)
29120-2000 <b>MANUAL TOILET LARGE BOWL</b>	13 3/8 (345)	27 3/8 (700)	11 (280)	19 3/8 (490)	22 1/8 (560)	18 1/4 (465)	7 1/8 (190)

**Jabsco**



THE PRODUCTS DESCRIBED HEREIN ARE SUBJECT TO THE JABSCO ONE YEAR LIMITED WARRANTY, WHICH IS AVAILABLE FOR YOUR INSPECTION UPON REQUEST.

U.S.A.  
Jabsco  
1485 Dale Way, P.O. Box 2158  
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Fax: 949.859.1153

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Fax: 045.475.8908

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22840 Norderstedt  
Tel: +49-40-53 53 73 -0  
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## JABSCO Y-VALVE

### FEATURES

- Chemical and corrosion resistant polypropylene and stainless steel construction
- Selector lever can be padlocked (lock not included) and/or sealed in either position
- Ports can be rotated so discharge plumbing can be routed away in parallel, at 90° or in opposite directions, or either up or down without disassembly
- Valve is supplied with both 1-1/2" (38 mm) ports (fitted) and extra 1" (25 mm) straight inlet port
- Optional shaft extension allows valve to be mounted through a bulkhead up to 1-3/4" thick with only the selector handle exposed
- Self cleaning design provides trouble free operation
- Molded in flow direction indicator arrows
- Easy access to three sturdy mounting feet for quick and simple installation
- Easy access to valve – by removal of just three hex head machine screws, top cover and diverter assembly lift away from the body

### APPLICATION

The Jabsco Y-Valve is designed to provide flexibility of onboard waste management by diverting waste either into an onboard holding tank or directly overboard where legal to do so. Check local and Federal regulations to determine where direct overboard discharge of untreated waste is permitted. No overboard discharge of untreated waste is allowed within three miles of shore.

Some near shore areas and inland areas are designated as "No-Discharge Zones" where the discharge of any onboard waste, even treated waste is strictly prohibited. Many of these areas require a waste retention system that can be positively secured in an onboard retention mode. The Jabsco Y-Valve accommodates this requirement by providing the ability to add a padlock that secures the selector handle in either direction to ensure waste is directed to an onboard holding tank. The Y-Valve may also be used to direct waste from a holding tank to an onboard waste discharge pump for holding tank evacuation or, alternatively, to a waste deck plate for removal by a shoreside pump-out facility.

The Y-Valve may also be used in a bilge pumping system to select between two separate bilge pickups in different bilge compartments providing for evacuation of two separate bilge areas with only one bilge pump.

## Model 45490-1000



Optional Shaft  
Extension  
45500-1000

### INSTALLATION

#### (WASTE DIVERTER VALVE)

Waste system plumbing should be kept as short and straight as possible. There should be no dips or low spots in the plumbing that would create water traps where waste can collect and solidify. Ideally, the highest point of a waste plumbing system should be as close to the toilet as possible, with the remainder of the system running down hill from that point to take advantage of gravity. Other than the one way valve located in the discharge port of most toilets, check valves should not be used in waste system plumbing as they can create points of possible blockage. If plumbed to an onboard holding tank, the tank must be properly vented. If plumbed to an overboard discharge through hull fitting and seacock, the discharge through hull fitting should be positioned well aft of and ideally lower than any intake through hulls.

Choose a location for the Y-Valve that offers easy access to the selector handle for valve operation. The optional 45500-1000\* handle extension kit may be used to mount the valve assembly on one side of a bulkhead with the selector handle on the opposite side. Determine the best routing of plumbing to the inlet and discharge ports. The discharge port fittings may be rotated 360° allowing the discharge hoses to be routed away from the valve in parallel (on the same axis as the inlet port), at 90° to each other or in opposite directions to each other. Alternatively, each port can be rotated to point either up or down.

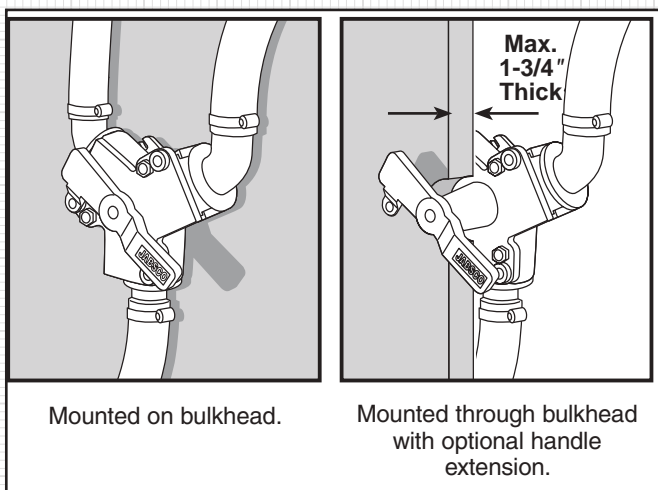
If desired, the 1" (25 mm) barbed port (included with the valve) can be installed in the inlet port to simplify plumbing

\*Y-Valves manufactured prior to 2002 with blue handles require handle extension Model 45489-1000

when the valve is used with macerating type toilets having 1" (25 mm) discharge ports. To accomplish this, simply remove the three machine screws that secure the top cover to the valve body and remove the cover with diverter and handle as an assembly. Remove the 1-1/2" (38 mm) inlet port from its socket in the valve body and insert the 1" (25 mm) port fitting in its place. Refit the top cover & diverter assembly with the diverter positioned near the discharge ports and secure it in place with the three machine screws.

The valve should be secured to a solid mounting surface. After selecting an appropriate mounting position, hold the valve in place and mark the location of the three mounting holes in the valve base. Drill appropriate size holes for the fasteners being used and attach the valve to the mounting surface. Rotate the discharge ports to orient them in the desired direction that best accommodates the plumbing. Attach each waste hose to the appropriate valve port and secure each connection with two stainless steel band clamps.

The valve may also be mounted in a through bulkhead configuration with just the selector handle being exposed on the operational side of the bulkhead. To install this way, an optional 45500-1000 Handle Extension Kit is required. Remove the handle retention screw and handle from the diverter shaft. Position the valve in its desired mounting location and mark the position of the diverter shaft. Bore a 1-5/8" (40 mm) hole through the bulkhead at the position marked for the diverter shaft. Push the 45500-0000 Handle Extension onto the diverter shaft. Reposition the valve assembly in its mounting location with the shaft extension centered in the 1-5/8" (40 mm) hole and mark the location of the three mounting holes in the valve top cover plate on the bulkhead. Drill holes for the mounting fasteners at each of the three marked locations and attach the valve via its top plate to the bulkhead. Fit the handle to the handle extension and secure the handle and handle extension to the Diverter shaft with the long screw provided in the Handle Extension Kit. Rotate each port to the desired position and attach each hose securing them with two stainless steel band clamps on each port.



**SERVICE**

The Y-Valve is designed to be self cleaning as the diverter is moved from one port position to the other. Therefore, it is recommended that the valve be operated periodically (about once per month) to prevent debris from accumulating on the sealing surfaces. Other than this periodic operation, there is no regular service required unless the valve stops functioning properly.

Should the valve ever develop a leak or show signs of leakage past the diverter allowing liquid into the port that is intended to be closed, the valve should be serviced with a service kit number 45488-0000. This kit includes all Y-Valve O-Ring seals and a molded rubber diverter seal.

Flush and drain the plumbing system in which the Y-Valve is installed. If connected to an overboard through hull and seacock, close the discharge seacock. It may be easier to remove the entire Y-Valve assembly so it can be serviced on a workbench but it is not required, unless the valve is installed in a through bulkhead configuration. Remove the three screws that retain the valve cover to the body. Lift the top cover, handle and diverter assembly off and out of the body.

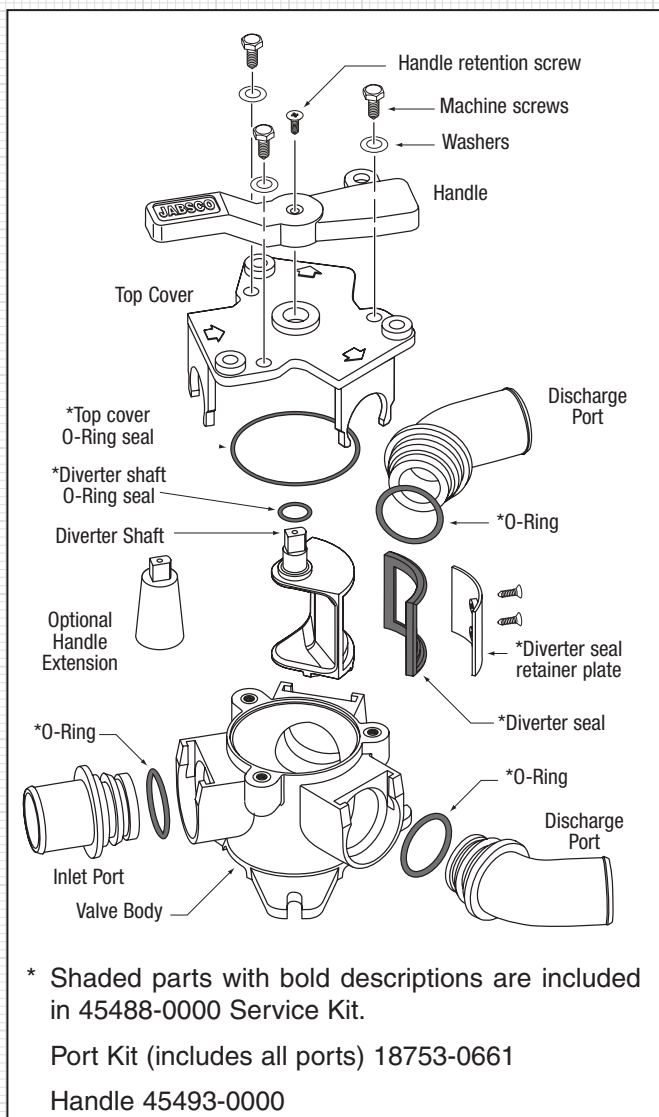
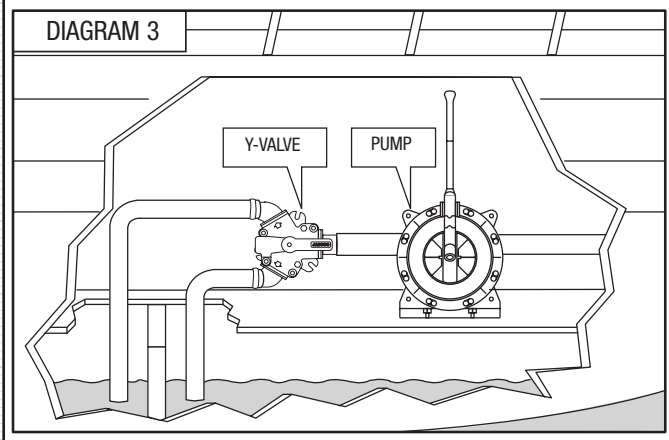
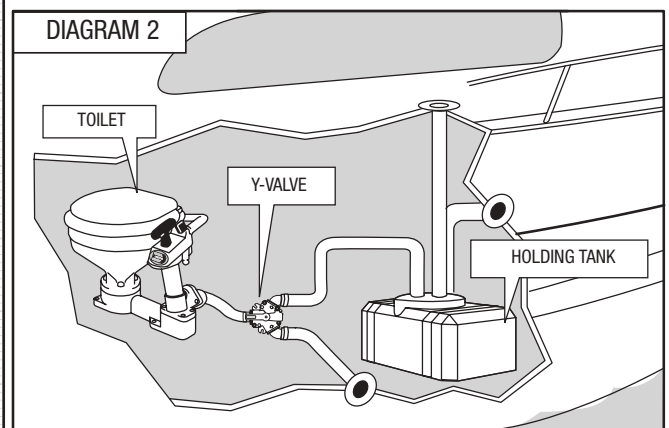
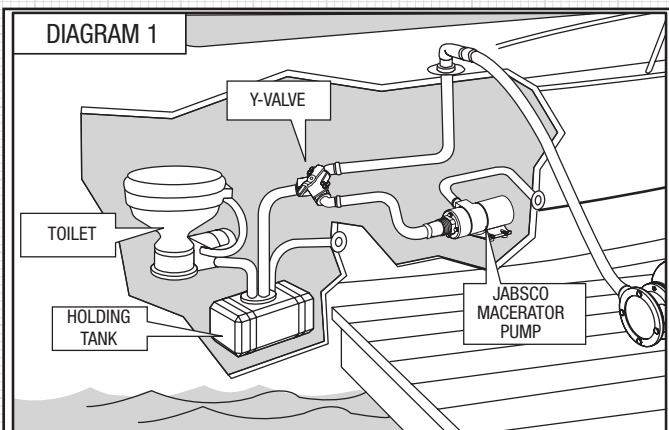
Note: There are three pockets on the underside of the cover near each cover screw where the blade of a screwdriver can be inserted to gently pry the cover upward to begin the separation process.

Unscrew the handle retention screw and remove the handle from the diverter. Pull the diverter from the top cover. Pull each port fitting from the body port pockets.

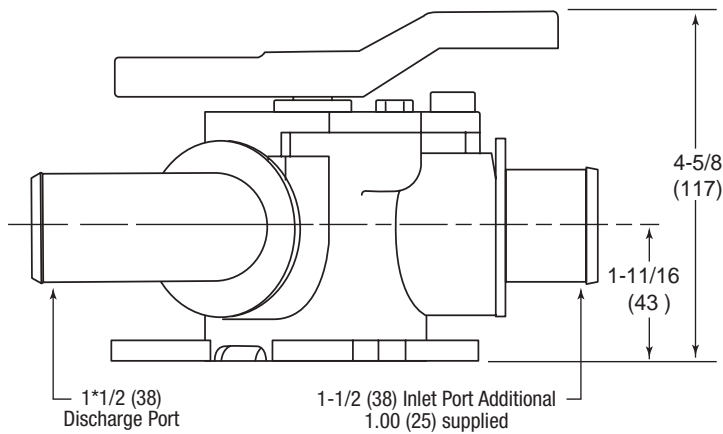
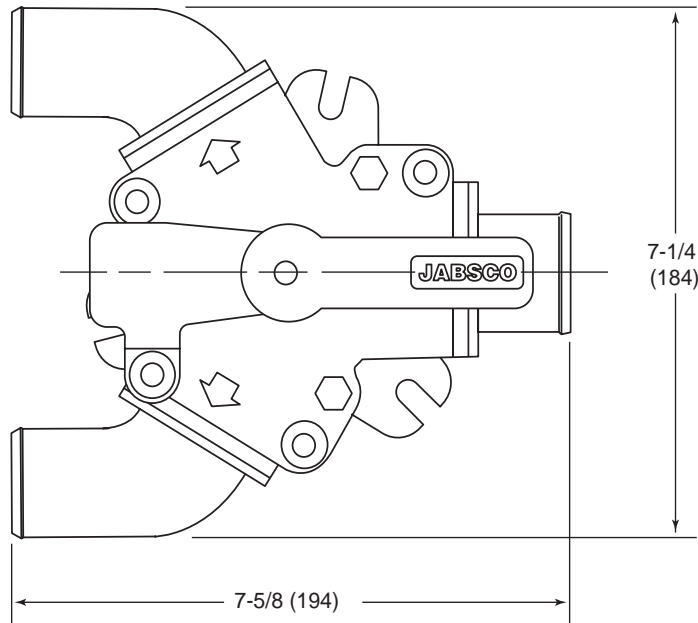
Remove the O-Ring seals from each port fitting. Remove the top cover O-Ring seal from its locator ring on the cover. The diverter shaft O-Ring seal will likely remain in the O-Ring bore in the top cover but may also stick to the diverter shaft. Remove the diverter shaft O-Ring seal. Remove the two screws that retain the diverter seal retainer plate to the diverter. Remove the seal retainer plate and molded rubber diverter seal. Clean all parts, especially each O-Ring groove and diverter shaft O-Ring bore in the top cover. Also clean the diverter shaft where it contacts its O-Ring seal and the diverter pivot pin at the bottom of the valve body and pivot pin socket in the diverter. Take care while cleaning not to scratch any of the sealing surfaces.

Position the new molded rubber diverter seal in the frame of the diverter face. Place the diverter seal retainer plate in the center of the diverter seal and secure it in place with the two plate retainer screws. Install new top cover O-Ring on its locator ring on the top cover and port O-Rings on each port. Position the diverter shaft O-Ring in its bore in the top cover. Lubricate all O-Rings, the diverter seal and the diverter shaft pivot pin on the bottom of the diverter with a small amount of grease or petroleum jelly. Slide each port with installed O-Ring into its respective socket in the valve body. Slide the diverter shaft into the center hole of the top cover, through the O-Ring seal, with the

diverter positioned opposite the raised molded-in handle stop on the underside of the top cover. Position the handle on the diverter shaft and secure it in place with its screw. Orient the top cover so the discharge indicator arrows align with their respective discharge ports and secure the top cover to the valve body with its three machine screws. Slide the diverter into the valve body positioned near the discharge ports. Ensure the diverter pivot pin is properly aligned, with the pivot pin socket in the bottom of the body and push the top cover firmly against the body.



**DIMENSIONAL DRAWING**  
Inches (Millimetres)



Engineered for life

[www.jabSCO.com](http://www.jabSCO.com)

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Warranty: All products of the company are sold, and all services of the company are offered subject to the company's warranty and terms of sale, copies of which will be furnished upon request. Details correct at time of printing. We reserve the right to change specifications without prior notice.

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- ▶ Digital Mobile Charge In-Transit Chargers
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UL 03/07 B

# ProMariner®

## ProTechi Series

Automatic Marine Battery Charger

### Owner's Manual and Installation Guide



Advanced Electronic Fully Automatic, 4-Stage On-Board Battery Charger

Models	Part No.	Amperage	No. of Banks	Volts
ProTech1210i	63310	10 Amps	2 Banks	12
ProTech1215i	63315	15 Amps	3 Banks	12
ProTech1220i	63320	20 Amps	3 Banks	12
ProTech1225i	63325	25 Amps	3 Banks	12
ProTech1230iPLUS	63331	30 Amps	3 Banks	12
ProTech1240iPLUS	63341	40 Amps	3 Banks	12
ProTech2420iPLUS	63420	20 Amps	3 Banks	24

#### IMPORTANT NOTICE

This manual contains important safety and operating instructions for ProTech-i Models: 1210i, 1215i, 1220i, 1225i, 1230iPlus, 1240iPlus and 2420iPlus. Please save and read all safety, operating, and installation instructions before installing or applying AC power to your ProTech-i Series Battery Charger.

#### Your Satisfaction is Important to Us!

Do not return this product to retailer or dealer for any service or warranty requirements.

Please call our Customer Care Department at 800-824-0524 from 8:30 am to 5 pm Eastern Time for any warranty, service or installation assistance. Thank you - ProMariner Customer Care

#### PLEASE RECORD YOUR:

Model Number: \_\_\_\_\_ Serial Number: \_\_\_\_\_ Date of Purchase: \_\_\_\_\_

Serial number is located inside the ProTech-i Charger. To view, simply unscrew and slide off the top cover of the DC Power end cap.



### ► Important Notices - Please read each important notice below and this entire manual before installing your ProTech-i Series Charger.

This manual is written to assist in the installation of the ProTech-i Series On-Board Marine Battery Charger, however because this is a permanent AC and DC hardwired installation, **ProMariner strongly recommends that an ABYC certified marine electrical technician be used for the electrical installation of your new ProTech-i Series charger to insure a safe install that is compliant to ABYC and UL Marine Standards to include but not limited to proper marine grade wire rated for the amperage rating of your charger and the length of wire used or needed.**

All existing electrical hardware i.e. battery switches, distribution blocks, fuses, protective breakers for each battery, must be inspected for proper condition, ratings and operation. All connections and wiring must conform to ABYC and UL standards.

To avoid risk of injury, fire, and electrical shock, inspect all new or existing AC and DC wiring associated with your boat's battery charging system for properly rated wire gauge for the amperage rating of the ProTech-i Series Charger you will be installing (See page 11 for wire gauge and Ratings by ProTech-i Series model). **All undersized and substandard non-marine wiring must be replaced before proceeding with your installation and applying power connections to your ProTech-i Series Charger.**

The ProTech-i Series Charger is a dry or weatherproof compartment charger and must be installed with the required protective drip shield included with your charger. Do not expose your ProTech-i Series Charger to rain, snow, fresh or saltwater, wash down water or bilge water.

### ► Important Notice: FCC Class B Part 15 Notification

Your ProTech-i Series On-Board Marine Battery Charger has been designed and tested to comply to FCC Class B part 15. These regulations are to provide adequate protection against harmful interference while operating in a commercial application. If in a residential setting you are encountering interference with TV and Radio reception then: Simply disconnect AC power from the ProTech-i Series Charger to confirm if your battery charger is causing interference, if so the user can explore the following to minimize interference:

- 1) Choose a different AC circuit to power your On-Board Marine Battery Charger
- 2) Make sure your AC Connections include a proper Ground Connection.
- 3) Reposition the receiving antenna
- 4) Purchase a separate AC Line filter
- 5) Relocate Charger so separation from the receiving equipment is at its furthest point.

**World Wide Approvals and Certifications:**  
 Certified to UL 1236 SB, ULc, Ignition Protected, CE,  
 c UL To: CSA C22.2 No. 107.2-01  
 FCC Class B, Meets ABYC A-31 requirements



### ► Customer Service & Warranty

We are committed to customer satisfaction and value your business. If at any time during the warranty period you experience a problem with your ProTech-i Series On-Board Marine Battery Charger call us at 1-800-824-0524 or email [info@promariner.com](mailto:info@promariner.com) for technical support.

WARRANTY CARD CAN BE REGISTERED AT [WWW.PROMARINER.COM](http://WWW.PROMARINER.COM) or the warranty card included in this manual can be completed and sent to ProMariner by mail.

#### PROTECH-i SERIES ON-BOARD MARINE BATTERY CHARGER TWO YEAR WARRANTY WITH A LIMITED LIFETIME REPAIR OR REPLACEMENT POLICY

Each ProMariner ProTech-i Series Model is guaranteed against defects in material and workmanship for two full years after purchase.

Each serial numbered product has an additional repair adjustment provision after the 2 year limited warranty that limits the maximum charge for repair or replacement to 50% of the current list price, plus shipping and handling.

- Warranty and repair adjustment calculated from manufacture date if not registered or proof of purchase within two weeks of sale.
- Warranty void if unauthorized repairs attempted.
- Customer is responsible for shipping to ProMariner.
- Cosmetic repairs are done at the owner's request and expense.

Purchase or other acceptance of the product shall be on the condition and agreement that Professional Mariner, LLC SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND. (Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations may not apply to you.) This warranty is made in lieu of all other obligations or liabilities on the part of Professional Mariner. Professional Mariner neither assumes nor authorizes any person for any obligation or liability in connection with the sale of this product.

To make a claim under warranty, go to [www.promariner.com](http://www.promariner.com) and click on the support tab and follow the instructions making sure to identify the product and the problem. If you can not use our online warranty claim registration, please feel free to call ProMariner at the toll free number listed below. Professional Mariner will make its best effort to repair or replace the product, if found defective within the terms of the warranty, within 30 days after return of the product to the company. Professional Mariner will ship the repaired or replaced product back to the purchaser.

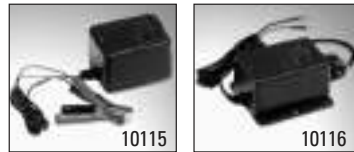
This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state. This warranty is in lieu of all others expressed or implied.

Factory Service Center & Technical Support  
 Professional Mariner, LLC  
 200 International Drive, STE 195  
 Portsmouth, NH 03801  
 Tel: 1-800-824-0524

Professional Mariner, LLC  
 Tel: (603) 433-4440 / Fax: (603) 433-4442

► **Accessories**

**ProSport 1.5 Battery Maintainers**  
Fully automatic, with built-in safety.  
LED status indicator, 1-year warranty



**Corrosion Control: Galvanic Isolation Products & Systems**  
ProMariner makes a variety of corrosion control products providing corrosion protection, isolation & green wire/ground wire monitoring.



**Corrosion Control Workbook**  
Educate yourself on the process of performing a galvanic survey. (Recommended with Corrosion Test Meter Part # 20006)



**Test Meters**  
ProMariner makes a variety of hand held digital test meters for measuring voltage and amperage on-board.



Model	Part No.	Cable Length	Volts	Banks
Handheld DC System Tester	87710	n/a	n/a	n/a
Digital Multi-Meter	60016	3'	12	3
ProSport 1.5 Portable	10115	4'	12	1
ProSport 1.5 On-Board	10116	4'	12	1
Clamp-It Multimeter	87015	n/a	n/a	n/a
ProSafe 1 Single Line Galvanic Isolation System	22086	n/a	120	n/a
ProSafe Isolation Transformers 3.6-12KVA, visit <a href="http://www.promariner.com">www.promariner.com</a> for details			120/240	n/a
Adjustable Corrosion Monitoring System	22020	n/a	n/a	n/a
Corrosion Monitoring System	22030	n/a	n/a	n/a
Corrosion Workbook	20001	n/a	n/a	n/a

To Place an Order Please Contact Your Local Dealer, retailer or call ProMariner at:  
Tel: 603-433-4440 / Fax: 603-433-4442 / [www.promariner.com](http://www.promariner.com)

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Thank you from all of us at Professional Mariner, LLC and congratulations on the recent purchase of your ProTech-i Series On-Board Marine Battery Charger. The ProTech-i On-Board Marine Battery Charger is the latest in Advanced Electronic Marine Battery Charging Technology and is ideal for: cuddy, cruiser, sail, house boats, yachts commercial offshore & sport fishing boats.

The ProTech-i Series is designed to be installed in an area where the charger will NOT be subjected to water. Recommended installation is in an engine room or dry compartments where 6 inches of clearance on all sides is available.

The ProTech-i Series battery charger incorporates industry leading technology, delivering fully automatic and Sequential Multi-Stage Charging that provides electronically controlled charging, conditioning and maintenance of all batteries and or banks connected.

**High Line Features:**

- ✓ Automatic Wide Range / Global AC input 95 - 250VAC
- ✓ Active Battery Balance Control (BBC) monitors charging while conditioning and extending battery life ensuring that no battery is ever overcharged (1230i Plus, 1240i Plus & 2420i Plus only)
- ✓ User Programmable Absorption / Conditioning Mode: 1, 2, 3, or 4 hours.
- ✓ User Programmable Battery Type / Charge Profile Selector- 3 Settings:  
Out of Box Factory / User Setting 1 : Flooded (Lead-acid)  
User Setting 2 : AGM  
User Setting 3 : GEL

**Standard Features:**

- ✓ Advanced Electronic Technology yielding a heavy duty stylish and compact On-Board Marine Charger.
- ✓ Expanded LED Operation Status Center Includes High Visibility LED's for:  
Fast Charge, Absorption, Float, and Discrete Battery Type LED indicators for: Flooded, AGM and GEL Batteries.
- ✓ Fully Automatic & Sequential Multi-Stage Charging (example below is for a 12 Volt ProTech-i model)  
Factory set out of the box for Flooded (Lead-acid) battery (s).

**Sequential Multi-Stage Battery Charging**

- Stage 1** Fast Charge = Maximum Amperage Output until Battery (s) reach 14.7 VDC
- Stage 2** Absorption Charge / Conditioning Mode = Precision 14.7 VDC to Fully Charge & Desulfate Battery(s).
- Stage 3** Float / Maintenance/ Ready Mode= Precision Finishing & maintenance Voltage of 13.5VDC
- Stage 4** Recycle / Dockside Power = If while docked and connected to shore power your Batteries have a continuous excessive DC load for lighting, entertainment, or appliances, etc. The ProTech-i Series will return to Mode 1 providing your batteries up to the full amperage rating of the charger to meet the demand of the load and begin charging your battery (s).

► **Important Safety Instructions**

<p><b>⚠ WARNING: HIGH VOLTAGE / ATTENTION : HAUTE TENSION</b>                  AVOID SERIOUS INJURY OR DEATH FROM ELECTRICAL SHOCK. BEFORE OPENING TURN OFF AC SUPPLY POWER. CHOC ELECTRIQUES PEUVENT PROVOQUER LA MORT OU DE SERIEUSE BLESSURES. AVANT D'OUVRIR LA BOITE, COUPER LE COURANT.</p> <p><b>⚠ WARNING: LOW VOLTAGE / ATTENTION : BASSE TENSION</b>                  ELECTRICAL BURN AND SPARK HAZARD. BEFORE OPENING DISCONNECT CHARGER CONNECTIONS AT BATTERY(S). (DANGER DE BRULURES ELECTRIQUE ET ETINCELLES). AVANT D'OUVRIR LA BOITE DECONNECTER LES CONNECTIONS ENTRE CHARGEUR ET BATTERIE.</p> <p><b>⚠ WARNING / AVERTISSEMENT :</b>                  DO NOT EXPOSE TO RAIN OR SPRAY / NE PAS EXPOSER AUX INTEMPERIES</p> <p><b>⚠ CAUTION:</b>                  - HOT SURFACES - TO REDUCE THE RISK OF BURNS, DO NOT TOUCH.                  - CHARGE ONLY USER SELECTABLE TYPE BATTERIES (FLOODED, AGM, GEL OR CALCIUM) OTHER TYPES OF BATTERIES MAY BURST CAUSING PERSONAL INJURY AND DAMAGE                  - RISK OF ELECTRIC SHOCK. NO USER SERVICEABLE PARTS. RETURN TO MANUFACTURER FOR SERVICING                  - THIS CHARGER IS MEANT FOR CONTINUOUS DUTY                  - IGNITION PROTECTED                  - FOR MARINE USE</p> <p><b>⚠ ATTENTION :</b>                  - SURFACES CHAUDE-NE PAS TOUCHER, RISQUES DE BRULURES                  - UTILISER POUR ATTENTION: CHARGER UNIQUEMENT LES BATTERIES DU TYPE (PLOMB/ACIDE OU PLOMB/GEL/AGM ET BATTERIE AU CALCIUM), D'AUTRES TYPES DE BATTERIES POURRAIENT ECLATER ET CAUSER DES BLESSURES OU DOMMAGES                  - RISQUE DE CHOCES ELECTRIQUE-RETOURNER AU FABRIQUANT POUR SERVICE.                  - CE CHARGEUR EST FABRIQUE POUR LE DEVOIR CONTINU                  - PROTÉGÉ CONTRE L'EXPLOSION                  - POUR UTILIZATION MARINE</p>
--

**Before connecting to batteries or AC power, read all instructions and cautionary markings on the battery charger and batteries. Do not discard this manual, save it for future reference.**

- 1. SAVE THESE INSTRUCTIONS** - This manual contains important safety & operating instructions for ProTech-i Models 1210i, 1215i, 1220i, 1225i, 1230i Plus, 1240i Plus, & 2420i Plus chargers.
2. Do not expose charger to rain or snow.
3. Use of attachments not recommended or sold by Professional Mariner, LLC will void warranty and may result in a risk of fire, electrical shock or personal injury.
4. Do not operate the charger if it has received a sharp blow, direct hit of force, been dropped or otherwise damaged in any way.
5. Do not disassemble the battery charger. If service or repair is required please contact customer service at 1-800-824-0524. Incorrect reassembly may result in a risk of electric shock or fire.
6. To reduce the risk of electrical shock, remove 120 volt or 240 volt AC shore power. Also remove DC battery connections prior to any maintenance or cleaning. Turning off controls will not reduce this risk.

<p><b>⚠ WARNING AVOID SERIOUS INJURY OR DEATH FROM FIRE, EXPLOSION OR ELECTRICAL SHOCK</b>                  - Make connection in an open atmosphere free of explosive fumes.                  - Make connection in a secure manner that will avoid contact with water.</p>
--

► **Periodic Maintenance Continued**

<b>Process:</b>	Check charger for water damage
<b>When:</b>	Monthly
<b>Process:</b>	Visually inspect all wiring for cuts and/or abrasions. Have all damaged or sub standard wiring or electrical hardware replaced to conform to ABYC marine UL standards for AC & DC electrical systems on boats. Consult your local certified ABYC marine electrical technician. Contact ProMariner if your charger needs to be serviced.
<b>When:</b>	Monthly
<b>Process:</b>	Clean and tighten all battery connections. Follow battery manufacturer's instructions for cleaning a battery. Clean all battery terminals with a wire brush where required and tighten all battery connections.
<b>When:</b>	Monthly

► **Frequently Asked Questions**

- Q: Do I have GEL Cell batteries?**  
 A: Look at the battery housing and see if it is identified as a GEL battery. If you do not know what kind of battery you have contact the manufacturer of the batteries you have on-board.
- Q: What do I do if my ProTech-i Series LEDs do not turn on?**  
 A: Check to make sure that an AC power connection is made. If LEDs remain off, review the troubleshooting procedure on page 14.
- Q: Will water hurt my ProTech-i Series charger?**  
 A: Yes, these are dry compartment chargers and must be mounted in a dry location. Damage caused by water is not covered under the ProTech-i warranty policy.
- Q: How do I change my ProTech-i Series charger to GEL cell mode?**  
 A: Please double check that you have a GEL cell battery(s). There is a misconception that AGM is GEL. This is not the case. AGM (Absorbed Glass Mat) battery(s) require a different charge profile than GEL Batteries. If you have confirmed that you have GEL (Gelled Electrolyte Lead-acid) battery(s), simply follow the procedure outlined on page 6 of this manual.
- Q: Does my ProTech-i Series really need 6 inches of all around clearance for ventilation?**  
 A: We recommend this for cooling, more clearance is better.
- Q: I think my ProTech-i Series charger is too hot. What should I do?**  
 A: The charger will get to the point where it can be touched, but you would not want to carry it across a room. This is normal. *Note: the charger is thermally protected.*
- Q: How do I change the AC input on my ProTech i charger from 120v to 240v?**  
 A: The NEW Pro Tech-i charger is equipped with the most advanced charging technology and will automatically adjust for the correct voltage.

► **Trouble Shooting**

**Note:** *When working with tools near electricity serious electrical shock can occur resulting in injury.*

- 1) Turn off all power to the charger and disconnect all the DC cables at the batteries making sure that no cables are in contact with equipment, other wiring, or one another.
- 2) Please note switch positions before changing settings. Set the user programmable battery type selector switch to the Flooded (Lead-acid) position shown on page 6 (Note switch position to reset after troubleshooting is complete).
- 3) Set the user programmable absorption type selector switch to one hour as shown on page 6. (Note: Please make sure to make note of your ProTech i Charger's programmed settings for battery type and absorption time so you can reprogram your charger after troubleshooting is completed).
- 4) Apply AC power. The charger will first be in the Fast Charge Mode, followed by the Absorption / Conditioning Mode. Note: Because the batteries will not be connected during this test the transition from Fast Charge to absorption may be so quick you will not see the change in modes. This is normal and acceptable. Once you have confirmed your ProTech-i Series Charger is in the absorption mode use a digital volt meter (DVM) to check the output voltage of the charger. It should read between 14.6 and 14.7 Volts DC (for the Factory Flooded (Lead-acid) Setting).



- 5) If the voltage is 14.6-14.7 keep the charger's AC power on with the DC outputs disconnected from the battery(s). Leave the charger on for approximately one hour, make sure absorption switch is in one hour setting otherwise it could take up to 4 hours or until float mode is observed. The voltage should drop to 13.5 VDC indicating float mode.
- 6) If you see all of the above voltages, your charger is working correctly. Turn off the charger and reprogram your ProTech i charger back to your original program settings. Place end caps back on and reapply AC shore power to charger.
- 7) If you don't see the initial 14 VDC, the charger either has a blown fuse, or a circuit board failure. Please contact ProMariner's Customer Service 1-800-824-0524 or email us at info@promariner.com

► **Periodic Maintenance**

<b>Process:</b>	Per battery manufacturers' instructions monitor and maintain proper levels of distilled water. <b>(not tap or bottled water that contains minerals)</b> in each battery
<b>When:</b>	Monthly

► **Important Safety Instructions Continued**

**7. WARNING – RISK OF EXPLOSIVE GASES.**

a) WORKING IN THE VICINITY OF A LEAD-ACID BATTERY IS DANGEROUS. BATTERIES GENERATE EXPLOSIVE GASES DURING NORMAL BATTERY OPERATION. FOR THIS REASON, IT IS OF UTMOST IMPORTANCE THAT EACH TIME BEFORE USING YOUR CHARGER, YOU READ THIS MANUAL AND FOLLOW THE INSTRUCTIONS EXACTLY.

b) To reduce risk of battery explosion, follow these instructions and those published by battery manufacturer and manufacturer of any equipment you intend to use in vicinity of a battery(s). Review cautionary markings on these products.

**8. PERSONAL PRECAUTIONS**

- a) Someone should be within the range of your voice or close enough to come to your aid when working near a Lead-acid battery.
- b) Have plenty of soap and water nearby in case battery acid comes in contact with skin, clothes or eyes.
- c) Wear complete eye protection and clothing protection. Avoid touching eyes while working near battery(s).
- d) If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flood eye with running cold water for at least 10 minutes and get medical attention immediately.
- e) NEVER smoke or allow a spark or flame in the vicinity of a battery or engine.

**CAUTION** - To reduce the risk of injury, charge only Lead-acid type rechargeable batteries (Flooded, Sealed Flooded, GEL (Gelled Electrolyte Lead-acid) or AGM (Absorbed Glass Mat)). Other types of batteries may burst, causing personal injury. The ProTech-i is factory set for Flooded (Lead-acid) batteries. ***Check the position of the battery type selector switch before applying power to insure the charger is in the correct setting for the battery type. This switch is located on the DC end of the charger see Page 5.***

Incorrect assembly may result in electrical shock or fire.

- f) Be extra cautious to reduce risk of dropping a metal tool onto a battery, it might spark or short-circuit the battery or other electrical hardware that may cause a fire or explosion.
- g) Remove all personal metal items such as rings, bracelets, necklaces, watches, and jewelry when working near a battery. A battery can produce a short circuit current high enough to weld a ring or any other metal, causing serious burns.
- h) Do not use the battery charger to charge dry cell batteries that are commonly used with home appliances i.e. a cordless power drill battery. These batteries may burst and cause injury to persons and damage to property.
- i) NEVER charge a frozen battery.

► **Important Safety Instructions Continued**

**9. PERSONAL SAFETY WHILE PREPARING TO CHARGE BATTERIES ON-BOARD OR OFF-BOARD**

- a) If necessary to remove a battery(s) from a boat to charge, always remove the negative (-) grounded terminal from battery first. Make sure all accessories in the boat are off, so as not to cause an arc.
- b) Be sure the area around the charger and batteries is well ventilated while the batteries are being charged. Gases can be forcefully blown away using a piece of cardboard or other nonmetallic material as a fan.
- c) When cleaning battery terminals wear full eye protection to prevent corrosive material from coming in contact with eyes.
- d) Add distilled water (*not tap or bottled water that contain minerals*) in each cell until electrolyte reaches the levels specified by the battery manufacturer. Do not overfill. For batteries without fill caps, carefully follow manufacturer's recharging instructions.
- e) Study all battery manufacturer's specific precautions such as removing cell caps while charging and recommended rates of charge.
- f) Determine battery type / charge profile for battery (s) by referring to the boat owner's manual / electrical equipment(s) package and or the manufacturer's specifications located on each battery. Make sure Battery Type and Charge Profile are properly selected before charging your batteries.

**10. ON-BOARD MARINE BATTERY CHARGER COMPARTMENT SAFETY AND LOCATION REQUIREMENTS**

- a) Refer to the installation section of this manual for installation of your battery charger. Be sure all electrical connections and cables are in compliance with ABYC E-11 standards for proper fusing, bundling and strain relief.
- b) Never place the charger directly above the battery(s) being charged; gases from battery will corrode and damage charger.
- c) Never allow battery acid to drip on the charger when reading specific gravity or filling battery.
- d) Do not operate the charger in a closed-in area or restrict ventilation in any way.
- e) Do not set the battery(s) on top of charger.

**AC GROUNDING INSTRUCTIONS** - The Ground (GND) terminal of the AC input connector must be connected to the AC grounding system at the AC ground buss.

**DC GROUNDING INSTRUCTIONS** - The case grounding stud should be connected to the DC negative grounding buss (same location as the DC negative output cable terminal) with a cable one size smaller than the DC negative output cable.

**ProTech-i Series Dry Compartment Installation Requirements:**

Install / Mount your ProTech-i Series in a dry compartment that is protected from coming in contact with Water, and non service personnel.

*NOTE: The ProTech-i Series is not intended to be mounted in an open cockpit or deck mounting where weather is a factor.*

*NOTE: The ProTech-i Series models are required to be mounted in the vertical position with the supplied drip shield. This is required to be in compliance to Marine UL Standards.*

► **DC Grounding Installation**



DC Grounding Connection  
(DC Case / Chassis Ground ⚡)  
see system wiring illustrations  
on page 11

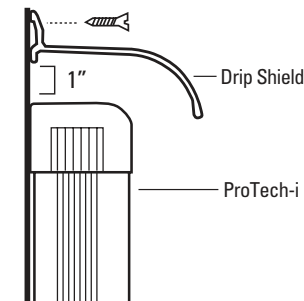
9) The case DC grounding connection (DC Case / Chassis Ground ⚡) should be connected to the boat's DC negative / common ground buss using a cable one gauge smaller than the negative battery cable.

*Note: The DC negative buss/common ground is the same negative (-) connection point used for the charger's negative (-) DC output post connections.*

10) After all cables are in place re-check connections making sure all connections are tight. Confirm, the charger is in a dry location. Damage caused by water is not covered under the ProTech-i Series warranty.

► **Drip Shield Installation**

ProTech-i mounted with drip shield 1" above the flange of the unit. Make sure to properly center and mark for installation the drip shield provided 1" over the top of the ProTech-i Series Charger. Drip shield protects your Protech-i Series Charger from any moisture that can build up due to harsh marine environmental effects or elements.



Please use stainless steel screws properly sized for your boat. **Mounting Screws Not Included.**

*Please note: Damage caused by water is not covered under the ProTech-i Series warranty.*

► **Applying AC Power**

11) Apply AC power, Battery Type LED will turn on to indicate the battery type selected as determined by the selector switch shown on page 5. The Fast Charge LED will illuminate until proper voltage is achieved. Next, the Fast Charge LED will turn off and Absorption LED will illuminate. The Absorption LED will turn off after 1 to 4 hours depending upon the selection of the absorption timer switch shown on page 6. After absorption mode is complete the Float LED will illuminate. In Float mode your boats battery(s) are fully charged and are being maintained at the optimal battery voltage and will supply DC power for house loads of any type up to the maximum output of the charger. The ProTech-i Multi-Stage Modes are Fast Charge, Absorption (conditioning), Float (Maintenance and Storage) and dockside power.

▶ **AC Connections**

5) AC power should not be present until step 10 is completed. After connecting the AC and DC cables to the charger use cable support on the cables within 6" of the charger for both the AC and DC cables.

6) Be cautious when connecting battery cables to the charger and check to make sure AC power is off. Be careful when placing battery cables near one another to avoid possible shorting or arcing (sparking) that can occur when positive and negative wires touch.

7) USA 120 Volt or European 230 Volt AC Connections: (For USA 240V AC please refer to step #8). A terminal strip is provided on the charger for AC power input. Connect Black (Europe-Brown) to the terminal marked Line. Connect White (Europe-Blue) to the terminal marked Neutral. Connect Green (Europe-Green/Yellow) to the terminal marked (Ground/ Earth). Install an appropriate circuit breaker dedicated to the charger at the boat's electrical panel. Please refer to the table at the bottom of the page for minimum protective AC fuse or circuit breaker sizes.

8) USA 240 Volt AC Connections: (If using 120 volt AC or European 230 volt AC please refer to step #7 and ignore this step). A terminal strip is provided on the charger for AC power input. Connect Black to the terminal marked Line. Connect Red to terminal marked Neutral. Connect Green to the terminal marked (Ground/ Earth). Install an appropriate circuit breaker dedicated to the charger at the boat's electrical panel. Please refer to the table at the bottom of the page for minimum protective AC fuse or circuit breaker sizes.



**L = LINE**  
**N = NEUTRAL**  
**G = GROUND**

Shown Above: AC terminal block. Please note the connections and wire appropriately. The circuit board is also labeled to indicate proper connections.

Please note: All AC wire connections and installations must be made in compliance with ABYC E-11

Minimum Amp Ratings <small>when selecting AC breaker sizes.</small>	Charger Model	110 volt breaker	220-230 volt breaker
	ProTech1210i	6 Amp	4 Amp
	ProTech1215i	7 Amp	5 Amp
	ProTech1220i	8 Amp	6 Amp
	ProTech1225i	11 Amp	7 Amp
	ProTech1230iPlus	11 Amp	7 Amp
	ProTech1240iPlus	14 Amp	8 Amp
	ProTech2420iPlus	14 Amp	8 Amp

Minimum AC Wire Size examples with Marine grade wire rated at 105° C for 10 feet in length:  
14 AWG = up to 15 amps, 12 AWG = up to 20 Amps

(See ABYC E-11 for exact wire sizes for length of run, ampacity, temperature, location and number of wires in bundles.)

▶ **Setup and Operation**

1) Install your ProMariner battery charger by referring to page 8 of this manual.

2) After installation is complete including AC and DC connections please ensure proper fusing and strain relief have been properly installed..

3) **After proper installation, apply AC power and observe the following. Example for Factory Flooded (Lead-acid) setting**

- a. Battery Type LED will turn on as controlled by the battery type selector switch. (Shown on Page 6)
- b. Fast Charge LED will illuminate until battery voltage reaches approximately 14.2 Volts DC, at which time the Fast Charge LED will turn off. The Absorption LED will then illuminate.
- c. Absorption LED will continue to be on for 1-4 hours as determined by the user programmable Absorption timer switch.
- d. After 1-4 hours the Absorption LED will turn off and the Float light will illuminate indicating the battery charger is in Float mode.
- e. In Float mode the batteries are fully charged and will be maintained at the selected finishing/maintenance voltage for the battery type selected. In Float mode your ProTech-i Series Charger will supply DC power for house loads of any type up to the maximum rated amperage output of the charger.



Shown Above - Programmable Absorption and Battery Type Selector Switches. Please refer to page 6 for settings and selections.

After the Fast Charge cycle, Absorption time is determined by the user programmable absorption timer switch shown in the figure above.

Full-rated battery charger amperage is available while in Float Mode.

*Note: The charger is equipped with an internal temperature sensor that will shut down the charger in the event of thermal overload.*

*Note: Your ProTech-i charger is equipped with a fan, which is temperature controlled and will only run when cooling is necessary.*

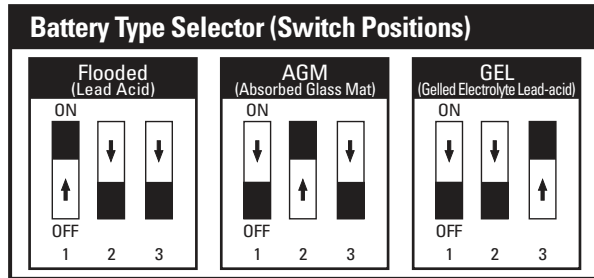
Your ProMariner Marine Battery Charger is self current limiting with built in: over temperature, overvoltage, reverse polarity and ignition protection for boating safety and peace of mind. If at any time you have trouble configuring your ProTech-i Series Charger or need technical information please call ProMariner at 1-800-824-0524 8:30 am to 5 pm Eastern Time, or email us at [info@pmariner.com](mailto:info@pmariner.com).

Setup and Operation Continued

Programmable Battery Type Selector Switch

Your battery charger has a user programmable battery type selector switch that is factory set for Flooded (Lead-acid) battery(s). Please confirm the appropriate battery type and the orientation of selector switch before use.

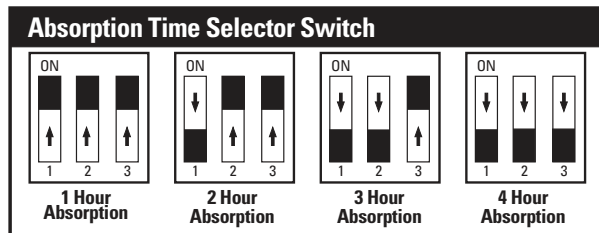
In order to change the factory setting from Flooded (Lead-acid) to either AGM or GEL type batteries, simply, remove AC power to the battery charger, remove the end cap cover on the DC end of the charger and locate the user programmable battery selector switch. Shown below you will find the three battery type configuration settings that are used to program the 3 position dip switch as shown below. Choose the correct one for your battery type. **If you are unsure as to what kind of battery you have please refer to "Selecting a Charging Profile & Understanding Battery Types" on page 7.** Once your ProTech-i is programmed for your battery type, reinstall DC endcap. Apply AC power. The Battery Type LED will illuminate indicating your selection.



Note: If more than 1 battery type is illuminated, recheck your battery type selector switch positions as illustrated above. It should be noted, only (1) of the 3 switch tabs located on top of the 3 tab dip switch can be in the "ON" position for proper selection and operation.

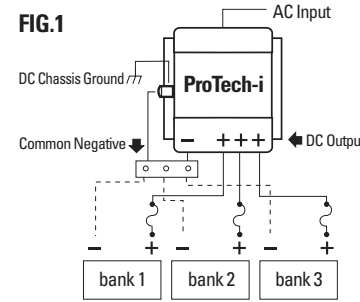
Programmable Absorption Timer Switch

The ProTech-i Series is equipped with a programmable absorption timer switch that places the charger into the absorption / conditioning mode for a period of 1,2,3 or 4 hours as programmed and indicated by the switch selection. Determine the best absorption / conditioning time either by obtaining your battery manufacturers recommended specifications or by using the guidelines on page 7. Below are the 1,2,3 and 4 hour switch configuration settings that are used to program the 3 position dip switch to the desired length of time.



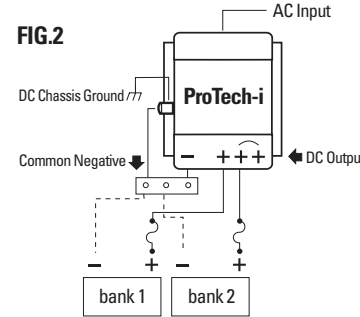
Typical 12 Volt DC Common Ground Installation Wiring Diagrams

FIG.1



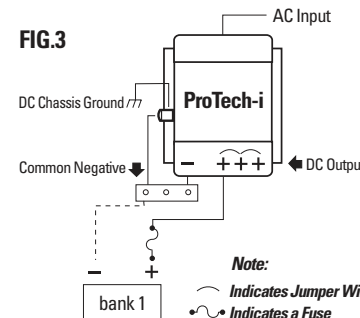
**Three Bank / 12 Volt DC Installation (FIG.1)**  
Connect DC cables to three of the positive DC output posts as shown. Connect common ground negative wire (as described below)

FIG.2



**Two Bank / 12 Volt DC Installation (FIG.2)**  
Connect DC cables to two of the positive DC output posts and use one jumper wire to connect the unused post. Connect common ground negative wire (as described below)

FIG.3



**One Bank / 12 Volt DC Installation (FIG.3)**  
Connect to one positive DC output post and use two jumpers to connect to the remaining unused posts. Connect common ground negative wire (as described below)

Battery negative wires are installed separately to the boat's DC Negative / Ground buss bar (not provided). Then a single connection is made to the charger. Note: See page 13 for DC Chassis Ground connection details.

**Table No.1** Wire gauges by amp rating and total out and back wire distance as defined by the length of the positive wire which must be added to the length of the return negative wire.

12 Volt 10 Amp	Length Out and Back				
Wire length	10'	15'	20'	25'	30'
AWG	14	12	10	10	10
12 Volt 15 Amp					
Wire length	10'	15'	20'	25'	30'
AWG	12	10	10	8	8
12 Volt 20 Amp					
Wire length	10'	15'	20'	25'	30'
AWG	10	10	8	6	6
12 Volt 25 & 30 Amp					
Wire length	10'	15'	20'	25'	30'
AWG	10	8	6	6	4
12 Volt 40 Amp					
Wire length	10'	15'	20'	25'	30'
AWG	8	6	6	4	4
24 Volt 20 Amp					
Wire length	10'	15'	20'	25'	30'
AWG	14	12	10	10	10

(ABOVE) It is recommended that a jumper(s) be used between unused positive DC output post(s) and a used positive DC post connected on your ProTech-i Series Charger. Please note you can connect all three positive DC output posts together to form a single DC output on your ProTech-i Series Charger.

All installations should be made in compliance with ABYC E-11 specifications for AC and DC electrical systems on boats and specifications for A-31 Battery Chargers and inverters.



▶ **DC Installation Continued**



Shown Above: ProTech-i Plus model. The circuit board is clearly marked to identify the polarity of each DC output connection.

*Note: For your safety the charger is equipped with an internal temperature sensor that will shutdown the charger in the event of thermal overload.*

*Note: Your ProTech-i charger is equipped with a fan, the fan will only run when needed. The fan is temperature controlled and will only turn on when cooling is necessary.*

4) Battery cables, connections and installation must comply with ABYC E-11 and A-31 standards. To avoid risk of injury, fire or an explosion, ProMariner requires that when making a wire connection to **EACH BATTERY(s)** Positive (+) Post, install the positive cable with an over current protection fuse within 7 inches of connection to the battery or battery connection point. The fuse rating should be at least 10 amps higher than the rated full output of the charger. See ABYC E-11 for specific requirements. Over current protection within 7 inches of the **charger's negative (-) DC output post** is not required as the ProTech-i is self limiting and can not exceed its rated current output. The internal fuses protect the unit against reverse polarity.

▶ **Typical 12 Volt DC Common Ground Installation Wiring**

**For 24 Volt installations, always make sure you have a 24 Volt Common Ground ProTech-i Series Charger, and that your batteries are configured in series as a 24 Volt battery bank or banks. Each 24 Volt bank will require a 24 Volt positive connection. Not sure you know what voltage system you have on board your boat? Contact your local certified ABYC marine electrical technician.**

**Installation Note:** Preventing a short circuit of "live" DC Wires can be accomplished with the following proper steps:

- 1) Always connect the positive (+) DC output cables to the charger first.
- 2) Connect the remaining end of the DC cables to the required Protective fuse or DC breaker 4 to 7 inches from the battery positive (+) post with the fuse out or the DC breaker in the off position.
- 3) Once all of the above wiring connections are completed and inspected, proceed with the protective fuses out of the holder and or the protective breakers in the off position, make your final connections from the protective devices to the Positive (+) posts of the associated Battery (s). Proceed to make the DC Ground Connection from the Charger to the DC common Ground Buss followed by the Negative (-) Connections from the Battery (s) to the DC common Ground Buss. When all wiring is completed install the protective fuses and or turn on the protective DC breaker(s). See illustrations on page 11.

▶ **Setup and Operation Continued**

**General recommendation for the Absorption Timer Switch is as follows:**

Single Group 24 or Group 27...	2 Hours
Two Group 24, 27 or Single Group 31...	3 Hours
Single 4D or 8D...	4 Hours
Multiple 4 or 8Ds or Multiple...	4 Hours

**\*\*\*ACTUAL SWITCH SETTINGS ARE SHOWN ON PAGE 6\*\*\***

▶ **Selecting a Charging Profile and Understanding Battery Types**

There are three primary types of batteries; Flooded (Lead-acid), AGM (Absorbed Glass Mat) and GEL Cell (Gelled Electrolyte Lead-acid). Traditionally, the most common type of batteries used are Flooded (Lead-acid batteries).

Almost all GEL Cell Batteries will state that they are GEL Cell on the battery case or labels.

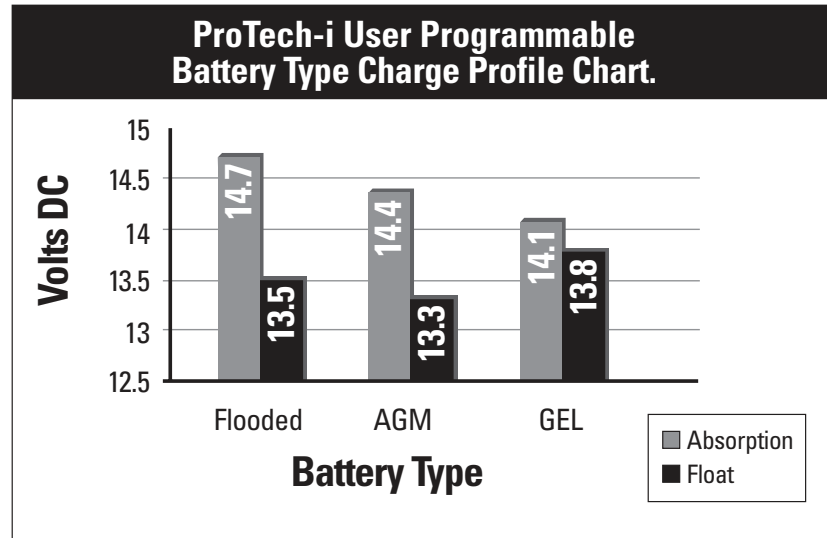
Battery Type	12 Volt Charging Profile	24 Volt Charging Profile	Battery Information
Flooded (Lead-acid)	14.7 Absorption, 13.5 Float	29.4 Absorption, 27.0 Float	Electrolyte (with or without removable caps)
AGM (Absorbed Glass Mat)	14.4 Absorption, 13.3 Float	28.8 Absorption, 26.6 Float	Sealed
GEL (Gelled Electrolyte Lead-acid)	14.1 Absorption, 13.8 Float	28.2 Absorption, 27.6 Float	Sealed

**NOTE: AGM (Absorbed Glass Mat) batteries are not GEL (Gelled Electrolyte Lead-acid) batteries. AGM batteries are charged with a completely different charge profile when compared to GEL batteries.**

\*\*\*If you are unsure as to what kind of battery you have, we recommend that you contact the manufacturer of the battery.

ProMariner battery maintainers are designed to keep batteries charged during the off season to maintain the life of your battery. ProMariner maintainers keep a battery voltage at a safe level so that a battery does not self discharge. For more information please visit [www.promariner.com](http://www.promariner.com) or call 1-800-824-0524 for a dealer or retailer near you.

► Charging Information



► Installation

*Please Note: This manual is written describing 12 Volt ProTech-i models. For 24 Volt Models please read the bold note directly below:*

**Note: For 24 Volt installations, always make sure you have a 24 Volt Common Ground Protech-i Series Charger, and that your batteries are configured in series as a 24 Volt battery bank or banks. Each 24 Volt bank will require a 24 Volt positive connection. Not sure you know what voltage system you have on board your boat? Contact your local certified ABYC electrical technician.**

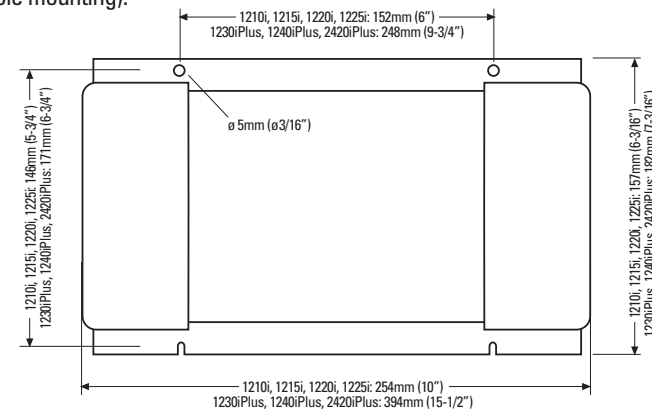
The ProTech-i battery charger will automatically operate from 95 to 250 VAC, 50/60 Hz single phase. The charger is designed for the marine environment, with an epoxy painted aluminum case for effective heat dissipation and corrosion resistance. The charger should be permanently mounted and wired directly to battery(s) or associated battery switches per ABYC E-11 standards for AC and DC electrical systems on boats.

Your ProTech-i Series is equipped with a user programmable battery type selector switch that is factory set for Flooded (Lead-acid). To change your battery type / charge profile, please refer to the "Selecting a Charging Profile" section of your owner's manual. (Page 7)

Don't know what kind of battery(s) you have? Refer to Page 7 of this manual on "Understanding Battery Types" or contact the manufacturer of your battery(s).

► Installation Continued

- 1) Make sure to mount the charger in a dry ventilated location with easy access. Remember to leave plenty of room for battery cables and AC wiring.
- 2) Six inches of clearance minimum is required on all sides. (Including the front / face) Make sure to leave room for the drip shield to be mounted as illustrated on page 13.
- 3) Use the ProTech-i as a template for drilling four 1/8" pilot holes. Stainless Steel self tapping screws (#10 X 3/4" are recommended) or drill four 3/16" through holes if using 3/16" thru bolts with washers, lock washers and nuts, (in mounting areas that can allow for thru hole mounting).



**Please note: Dimensions are nominal measurements**  
**Stainless steel mounting screws and hardware not included**

► DC Installation



Shown above is the ProTech-i split DC endcap. Please note that this is a two piece end cap. To remove simply unscrew the two self tapping screws on the top of the DC end cap and slide top cap off. This will allow access to the low voltage DC terminals for connections of cables.

**Visit [www.promariner.com](http://www.promariner.com) for online warranty registration**

NOTE: REGISTRATION CARD MUST BE COMPLETELY FILLED OUT AND MUST BE RECEIVED WITHIN TWO WEEKS OF PRODUCT PURCHASE

DATE OF PURCHASE: \_\_\_\_\_

FIRST & LAST NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CITY: \_\_\_\_\_

STATE: \_\_\_\_\_

ZIP: \_\_\_\_\_

E-MAIL ADDRESS: \_\_\_\_\_

PHONE: \_\_\_\_\_

SERIAL NUMBER ON PRODUCT \_\_\_\_\_

MODEL NUMBER \_\_\_\_\_

TYPE OF BOAT INSTALLED ON: \_\_\_\_\_

PURCHASED FROM: \_\_\_\_\_

INSTALLED BY (CHECK ONE)  FACTORY

DEALER

SELF

SEND ME A FULL COLOR BROCHURE:  YES

NO

COMMENTS: \_\_\_\_\_



**Installation Instructions For MarInco 30 Amp, 125 Volt Contoured or Stainless steel Inlet**  
**Product Numbers: 304EL-B, 303SSEL-B**

**WARNING:**

**To prevent electrocution, make sure the inlet is not connected to a power source before installing it. Failure to comply with the following instructions could cause an electrical failure or fire.**

**Tools Required For Installation:**

- Pencil
- Electric Drill
- 2-3/4" Hole Saw
- 1/8" Drill Bit
- Small Flat Blade Screwdriver
- #8 Pan Head Stainless Steel Screws (3)
- Cutting/Wire Stripping Pliers

**New Installation**

1. Determine mounting location in hull. Be careful that the location you select for the mounting hole does not go through any electrical wiring, plumbing or other obstruction. Be sure that power tools are properly grounded.
2. Mark the installation location and cut opening in hull using 2-3/4" diameter hole saw.
3. Place the inlet in the opening and align so that the inlet is square with the hull. Use the inlet as a template and mark the mounting hole locations with a pencil. Remove inlet and drill mounting holes using 1/8" drill bit.
4. Remove the rear safety enclosure (if included with this inlet) from the inlet.
5. Pull internal wiring through hull opening. Note: This inlet requires the use of 10 AWG wire, but will accept up to 8 AWG wire. Using smaller gauge wire will result in overheating which could lead to an electrical fire.
6. Thread the wiring through the strain relief on the rear safety enclosure, leaving the clamp loose. Slide the mounting gasket over the wiring.
7. Back off terminal screws on the rear housing of the inlet.
8. Strip wire ends 1/2". **Make sure the wire strands are clean and not corroded.** If necessary, cut back the wire until clean wire is uncovered. **Do not solder the ends of the wire.** Insert wires into color coded openings (see below) on the back of the inlet. Tighten terminal screws to 14-20 in.-lbs. torque. **Make certain there is no wire insulation under any terminal.**

**30 Amp 125 Volt, 3-wire**

Black - Load (125 Volt)

White - Neutral

Green - Equipment ground

9. Slide the rear safety enclosure onto the back of the inlet. Note: The rear safety enclosure has slots on the sides that must align with the tab on the back of the inlet. The rear safety enclosure can be attached in 8 different positions. Attach the rear safety enclosure to the inlet with the center set screw. Tighten the strain relief clamp screw until it is snug around the wiring.
10. Position the gasket and inlet over the hull opening, align the mounting holes and attach the inlet to the hull with screws. Use #8 oval head stainless steel screws.

**Retro Fit**

1. Turn off power to inlet at breaker box.
2. Remove old inlet from hull. Disconnect inside wiring from inlet.
3. Examine wiring for corrosion. If wires are corroded, cut off corroded portion and re-strip wiring.
4. Follow "New Installation" instructions above.

**Note:**

1. The installation of hull power inlets by boat builders requires compliance with the Federal Regulations covering Electrical Systems, 33CFR 183, Subpart 1, as well as the standards of the National Fire Protection Assn., NFPA 302, Chapter 8, and the American Boat and Yacht Council's Standards and Recommended Practices for Small Craft, Project E-11.
2. All power inlets covered by this instruction are equipped with compression screw terminals, which are suitable for use with stranded wire complying with Paragraph 183.425(a) of 33CFR Part 183.
3. This inlet is provided with a rear safety enclosure, which provides integral strain relief and protection of energized terminals. No additional enclosure is required.

**Marinco Easy Lock™ System**

All Marinco power inlets feature the exclusive Easy Lock System. Using an Easy Lock ring on your cordset will eliminate cross threading. Marinco Easy Lock rings can only be used on Marinco hull inlets marked "Easy Lock". All new Marinco cordsets come with an Easy Lock ring. Or, Easy Lock rings can be purchased from your retailer, for retrofit to your current Marinco cordset.



To use the Easy Lock System, align the lock locator tabs on the Easy Lock ring on the cordset with the slots on the sides of the threaded boss on the inlet. Push the Easy Lock ring onto the boss and twist 1/8 turn for a positive water-proof connection.

**If you choose not to use the Easy Lock System, this inlet will accept all threaded cordset rings.**



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 Napa, California 94558  
 Phone: 707-226-8600  
 Fax: 707-226-9670  
 www.marinco.com

200343 02/22/05



## Installation Instructions for MarincO 50 Amp, 125 Volt and 50 Amp, 125/25D Volt Inlets

### **WARNING:**

To prevent electrocution, make sure the inlet is not **connected** to a **power** source before installing it. Failure to comply with the following instructions could cause an electrical failure or fire.

### Tools Required For Installation:

- Pencil
- Electric Drill
- 2-1/2" Hole Saw
- 1/8" Drill Bit
- Small Flat Blade Screwdriver
- #8 Oval Head Stainless Steel Screws (4) To Mount Stainless **Steel Inlet** or
- #8 Pan Head Stainless Steel Screws (4) To Mount Non-Metallic Inlet
- Cutting/Wire Stripping Pliers

### New Installation

1. Determine mounting location in hull. Be careful that the location you select for the mounting hole does not go through any electrical wiring, plumbing or other obstruction. Be sure that power tools are properly grounded.
2. Mark the installation location and cut opening in hull using 2-1/2" diameter hole saw.
3. ~~Place the inlet in the~~ opening and align so that the inlet is square with the ~~hull~~. Use the inlet as a template and mark ~~the~~ mounting hole locations with a pencil. ~~Remove~~ inlet and drill mounting holes using 1/8" drill bit.
4. Remove the rear safety enclosure (if included with this inlet) from the inlet.
5. Pull internal wiring through hull opening. Note: This inlet requires the use of 6 AWG wire. Using smaller gauge wire will result in overheating which could lead to fire.
6. Thread the wiring through the rear safety enclosure and the strain relief on rear enclosure (if included), then ~~slide~~ the mounting gasket over the Wiring.
7. Back off terminal screws on the rear housing of the inlet.
8. Strip wire ends 5/8" to 3/4". Make sure the wire strands are clean and not corroded. If necessary, cut back the wire until clean wire is uncovered. Do not solder the ends of the wire. Insert wires into color coded openings (see below) on the back of the inlet. Tighten terminal screws to 22-25 in.-lbs. torque. Make certain there is no wire insulation under any terminal.

125 Volt, 3-wire

Black - Load (125 Volt), White - Neutral, Green - Equipment ground

125(250 Volt, ~~4-wire~~

Black-load (125 Volt), Red -load (125 Volt), White - Neutral,  
Green - Equipment Ground

9. ~~Tighten~~ the strain ~~relief~~ clamp screws until they are snug around the wiring. Slide the rear safely enclosure onto the back of the inlet if it has one.
10. Position the gasket and inlet ~~over~~ the hull opening, align the ~~mounting~~ holes and ~~attach~~ the inlet to the ~~hull~~ with screws. Use #2 oval head stainless steel screws to install the stainless steel inlet or #8 pan head stainless steel screws to install the Inon-mela/Hc ~~inlet~~.

#### Retro Fit

1. Turn off power to inlet at breaker box.
2. Remove old ~~inlet~~ from hull. Disconnect inside wiring ~~from inlet~~.
3. Examine ~~wiring~~ for corrosion. If wires are corroded, cut off corroded portion and ~~re-strip~~ Wiring.
4. Follow "New Installation" instructions above.

#### Note:

1. The ~~installation~~ of hull power inlets by boat builders ~~requires~~ compliance with the Federal Regulations covering Electrical Systems, 33CFR 183, Subpart 1, as well as the standards of the National Assn., NFPA 302, Chapter 8, and the America's Boat and Yacht Council's Standards and Recommended Practices for Small Craft, Project E-11.
2. All power inlets covered by this instruction are equipped with compression screw terminals, which are suitable for use with stranded wire complying with Paragraph 183.425(a) of 33CFR Part 183.
3. If this inlet is provided with a rear safety enclosure, which provides integral strain relief and protection of energized terminal, no additional enclosure is required.

#### Marinco Easy Lock™ System

All Marinco power inlets feature the exclusive ~~Easy~~ Lock System. Using an ~~Easy~~ Lock ring on your cordset will eliminate ~~cross~~ threading. Marinco Easy Lock rings can only be used on Marinco hull inlets marked "Easy Lock". All new Marinco cordsets come with an Easy Lock ring. Or, Easy Lock rings can be purchased from your retailer, for retrofit to your current Marinco cordset.



To use the Easy Lock System, align the ~~lock~~ local or tabs on the Easy Lock ring on the cordset with the slots on the sides of the threaded boss on the inlet. Push the Easy Lock ring onto the boss and twist 1/8 turn for a positive water-proof connection.

If you choose not to use the Easy Lock System, this inlet will accept all threaded cordset rings.



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100556

02122/05

www.marinco.com

<https://www.boat-manuals.com/>

Warning: Before working on any electrical equipment, always turn off the power.

WARRANTY Marincor warrants that at the time of shipment, the products manufactured by Marincor and sold hereunder shall be in conformity with applicable written specification and descriptions referred to or set forth herein, free from defects in material and workmanship, merchantable, and suitable for a particular purpose, provided such is implied by state law under the circumstances of this sale. Please visit the Marincor Shower Power page at marincor.com for online warranty registration.

WARRANTY ADJUSTMENT

- 1. Marincor agrees to repair or furnish a replacement for, but not remove or install, any product or component thereof which, within five (5) years from the date of shipment by Marincor shall, upon test and examination by Marincor, prove to be defective within the above warranty.
2. Buyer shall notify Marincor of any defect within this warranty no later than thirty (30) days after a defect is discovered.
3. No product shall be accepted for return or replacement without the written authorization of Marincor. Upon such authorization, and in accordance with instructions from Marincor, the product will be returned to Marincor, shipping charges prepaid by buyer. Product returned to Marincor will be addressed as follows:

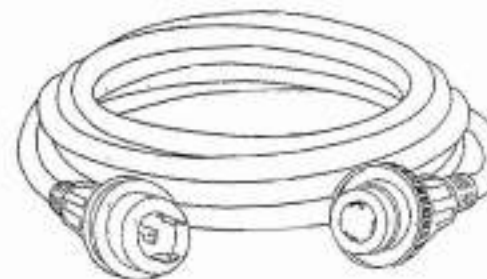
Marincor, N86 W12545 Westbrook Crossing, Menomonee Falls, WI 53051, or such alternate locations as may be designated on the product or its container. Repair or replacement made under this warranty will be shipped prepaid.

EXCLUSION FROM WARRANTY

- 1. This warranty is limited solely to the above and applies only for the period set forth.
2. Marincor will not be liable for any loss, damage, incidental, or consequential damages of any kind, whether based upon warranty contract, or negligence, and arising in connection with the sale, use, or repair of the products.
3. Marincor's maximum liability shall not, in any case, exceed the contract price for the products claimed to be defective or unsuitable.
4. This warranty does not extend to any product manufactured by Marincor which has been subjected to misuse, neglect, accident, improper installation, or use in violation of instructions furnished by Marincor.
5. This warranty does not extend to or apply to any unit which has been repaired or altered at any place other than at Marincor's factory, or by persons not expressly approved by Marincor, nor to any unit from which the identification has been removed or altered.
6. Components or products manufactured by any supplier other than Marincor shall bear only that warranty made by the manufacturer of that product.



PowerCord PLUS Cordset



PowerCord Cordset

This manual covers all Marincor 30A Products.

Milwaukee, WI

Phone: 800-307-8702 • Fax: 262-293-7022

For more information visit our website at marincor.com



marincor.com

MAR\_TL\_021\_0111

Choice of Boat Builders Worldwide



**This manual covers all Marincor® 30A products.**

**WARNING:** To minimize shock hazard, follow these instructions:

**POWER CONNECTION**

- Turn off the boat's shore connection switch before connecting the PowerCord cordset.
- Connect the cordset to the boat inlet first, then to the shore outlet. *If polarity warning indicator in the boat is activated, immediately disconnect cordset and have the fault corrected by qualified electrician.*

**POWER DISCONNECTION**

- Turn off the boat's shore connection switch before disconnecting the PowerCord cordset.
- Disconnect the cordset at shore outlet first, then disconnect the boat inlet. Close boat inlet cover tightly to prevent water intrusion.

**NEVER ALTER POWERCORD CORDSET CONNECTORS**

**CONNECTION RINGS** Marincor cordsets are compatible with all other brands of inlets and adapters. All Marincor PowerCord cordsets come with a threaded sealing ring for use with threaded inlets. Marincor's exclusive Easy Lock™ connection ring is also available. The lock locators on the Easy Lock connection ring (180° opposite of each other) mate with the built-in grooves on all Marincor Easy Lock inlets. Simply turn and lock. If your inlet was manufactured and installed prior to 4-1-92, it is of the thread-locking design. A threaded ring is included for use with threaded inlets.

**CHANGING CONNECTION RINGS** To change the connection ring on the cordset, apply a soap solution around the ring and the boat to lubricate the parts. Using a twisting motion, force the ring past the shoulder of the boat. You may need the use of a large screwdriver to pry the ring off. Use caution with any tools to avoid damage to the shoulder. Follow the same procedure to install the ring.

**GROUND BLADE ORIENTATION** All Marincor 30A cordsets feature a ground blade orientation feature that makes hook-up easier.

**POWERCORD PLUS THUMBPRINT LOCATOR** Grasp the cordset with your thumb above the LED light. With your thumb at the 12 o'clock position, the ground blade is located in the 6 o'clock position for easy electrical connection.

**POWERCORD LINE-UP RIDGE** The PowerCord features a line-up ridge on both the plug and connector ends. The ridge lines up with the ground blade; both are in the 12 o'clock position to provide positive orientation.

**POWERCORD PLUS POWER INDICATOR LIGHT** Power indicator LED Light located in the connector end glows red to show when the power is on. For safety, always use the PowerCord Plus cordset as if the power is still on, even if the LED light is not on.

**STORAGE** Your Marincor PowerCord cordset is intended for use outdoors. To prolong the life of the cordset, store indoors when not in use.

**MAINTENANCE WARNING** – To prevent electrocution, always disconnect cordset from power source before performing any maintenance.

- Before each use, examine the ends of the cordset, the face of the inlet on the boat, and the receptacle on the dock. Look for signs of discoloration which indicates overheating.
- If a connection shows signs of overheating, replace it immediately. Do not wait for the problem to get worse.

- If a cordset end is overheating, it might be the boat's inlet, or the dock's receptacle that is causing the problem. Both mating parts should be replaced.
- **Carefully follow the wiring instructions** supplied with all replacement devices to insure proper operation.

**CARE** The metallic parts of your Marincor cable set are made to resist corrosion. In a salt-water environment, life of the product can be increased by periodically cleaning the exposed parts with fresh water, drying, and apply Gardner Bender Ox-Gard™.

**Salt Water Immersion:**

Disconnect from power source. Rinse plug end or connector end thoroughly in fresh water, shake, or blow out excess water and allow to dry. Spray with Gardner Bender Ox-Gard™.

**Marincor® recommends this PowerCord Owner's Guide be made a part of your Boat Service Manual.**

**TROUBLE SHOOTING GUIDE**

Marincor® plugs, connectors, receptacles, and inlets are engineered to provide years of trouble free service. However, the marine environment can cause problems with even the best designed devices. If problems can be detected while they are small, it can save the boat owner time and expense later on. The most common problems with electrical connections are salt water immersion and overheating. Fortunately, overheating can be easily detected and quickly remedied. The following are precautions and solutions to extend the life of your Marincor® equipment.

**What to look for...** Examine the ends of the shore power cords. Look for discoloration or melting around the blades of the plug (male end) and around the slots on the connector (female end). Examine the face of the inlet on the boat and look for discoloration or melting around the blades and the inlet. Examine the receptacle on the dock and look for discoloration or deterioration around the slots.

**What causes overheating...** If a device shows signs of overheating, it is generally caused by one or two conditions: corrosion on the metal blades or contacts, or bad connections between the wiring device and the wires connected to it. Severely corroded blades or contacts are a result of exposure to a corrosive environment, most commonly salt water if the ends of the cordset are dropped into salt water and not properly cleaned and dried, the contacts will eventually corrode. Corroded contacts do not make a good electrical connection and overheating results. Bad connections between a wiring device and the electrical wire can be a result of loose terminations, corrosion on the wires or terminals, or the wires not being shipped properly so the wire insulation is under the terminals. A bad connection will result in overheating of the terminal, and this will be visible on the face of the wiring device.

**What to do...** If a wiring device shows signs of overheating, it should be replaced immediately. Do not wait for the problem to get worse. When replacing wiring devices, examine the electrical wire and make sure the wire strands are clean, and are not corroded. Even a new device can not make a good connection to corroded wire. Many boat owners think overheating is a result of over loading the circuit, but this is rarely the case. A bad connection in an inlet will also cause the mating connector to overheat. All too frequently a boat owner will merely continue to replace his connector, not realizing that the inlet is causing the problem. Both devices should be replaced in order to prevent the problem from happening again. The same is true for the plug and the receptacle on the dock.

# USER MANUAL

## *Installation and Operation*

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Please read these instructions through carefully and entirely before beginning installation or operation.

This manual must be accessible to the owner/user of this Teleflex Marine product.

# CH1700

# CH7500

# CH7600

## Mechanical Engine Controls

PATENT No. D508,227; D510,310;  
D510,311; D510,557;  
D510,558; D510,559



**CH7500**




**CH7600**



**CH1700**

# Notice to Boat Manufacturer, Installer, and Boat Operator

Throughout this manual, Warnings and Cautions (accompanied by the International Hazard Symbol ) are used to alert the manufacturer or installer to special instructions concerning a particular service or operation that may be hazardous if performed incorrectly or carelessly.

Warnings **alone** do **not** eliminate dangers, nor are they a substitute for safe boat handling and proper accident prevention measures.

Observe these alerts carefully!

These “safety alerts” alone, cannot eliminate the hazards that they signal. **Strict compliance to these special instructions** when installing, operating or performing maintenance and using **common sense** are the most effective accident prevention measures.

## **DANGER**

*Immediate hazards which **WILL** result in severe personal injury or death.*

## **WARNING**

*Hazards or unsafe practices which **COULD** result in severe personal injury or death.*

## **CAUTION**

*Hazards or unsafe practices which **COULD** result in injury, product and/or property damage.*

## **NOTICE**

*Information that is important to proper installation, operation or maintenance, but is not hazard-related.*

For example:

## **CAUTION**

*Do not tighten cable hangers or clamps to the extent that they crush or stress the cables in any way. Doing so may impair the function of the cable.*

The information contained in this manual is believed to be accurate at the time of going to print but no responsibility, direct or consequential, can be accepted for damage resulting from the use of this information. The manufacturer reserves the right to make changes, without notice, to any of its products.

## INTRODUCTION

This Teleflex Marine Control provides both shift and throttle operation for inboards, outboards, and inboard/outboards.

*We recommended the use of Teleflex TFXtreme™ engine cables.*

<b>Control Features</b>	<b>Side Mount CH1700</b>	<b>Top Mount CH7500 / CH7600</b>
Single Lever Shift and Throttle Operation	✓	✓
Neutral Throttle Warm-Up	✓	✓
Neutral Throttle Interlock	✓	<b>Option</b>
Neutral Safety Switch (to prevent starting in gear)	✓	✓
Friction Adjust Screw (to prevent throttle "creep")	✓	✓

### Control Options

Trim Switch	Option	Option
Trim & Tilt Switch	Option	Option
Emergency Ignition Interrupt Switch & Lanyard	Option	<i>n/a</i>

### Other Parts Required for Installation

<b>Quantity</b>	<b>Part</b>
2	<b>Control Cables</b> Check section 2 of installation instructions for routing and length. <i>Teleflex TFXtreme™ cables are recommended.</i>

## Adaptability

### Control Cable

This control will connect to ANY current 3300-/OEM-type control cable. A cable nest kit (also known as a quick-connect adapter; part #212151-001), which mates to the engine's shift and throttle cable, is included with this control. Unique cable nests, which are required for Mercury Gen II Engines only, are included with the control connection kit.

## CONTROL FEATURES AND OPERATION

(Option Numbers correspond to diagrams below)

### 1. NEUTRAL THROTTLE WARM-UP BUTTON

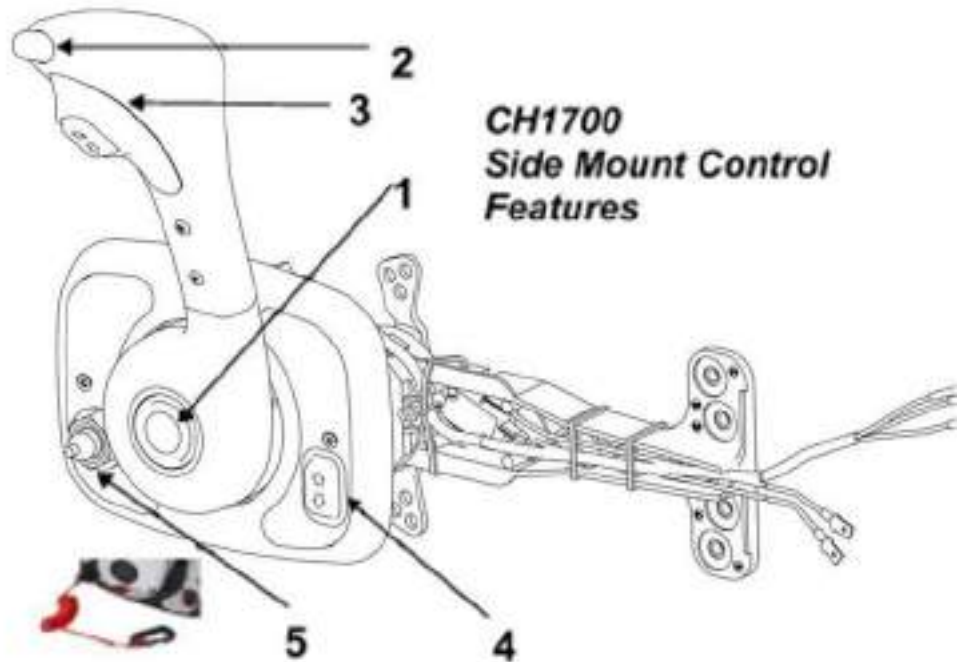
This feature provides a throttle only option to warm-up the engine before driving the boat

When the Control Hand Lever is in **Neutral**, push and hold the button at the base of the handle. While holding the button (1), move the lever forward to throttle up the engine.

When you return the handle to the Neutral position, the button will reset automatically.

Once the button resets the hand lever will work both shift and throttle functions.

*Note: On models with neutral interlock you must depress both the Neutral Interlock (2) and the Neutral Warm-up Button (1) together and move the handle forward*



**CH1700  
Side Mount Control  
Features**

### 2. NEUTRAL INTERLOCK BUTTON

To prevent bumping the side mount control out of neutral, the button must be depressed and held to shift into forward or reverse. (option on top mount)

### 3. ENGINE TRIM SWITCH

Used to move the engine IN or OUT to level the boat while underway. This switch controls trim and tilt on most outboards.

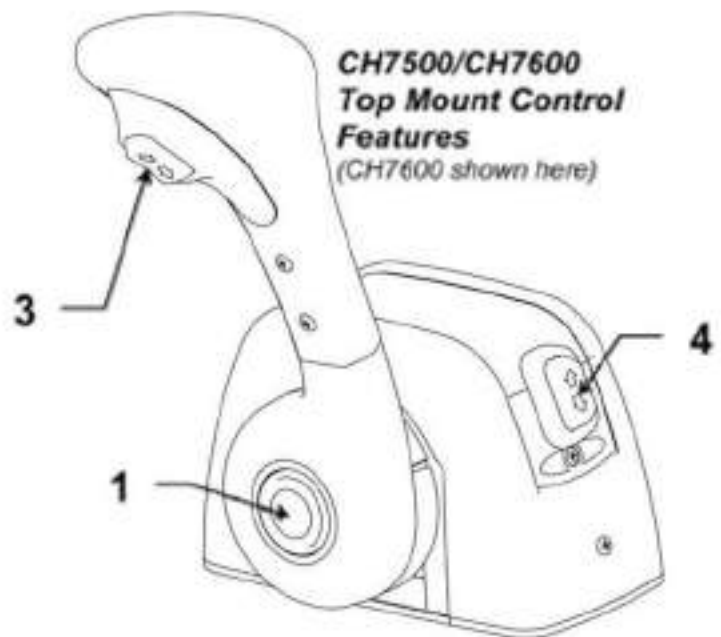
### 4. TRAILER TILT SWITCH

Used to raise the engine for trailering the boat. This switch normally is used on I/O applications.

### 5. OPTIONAL EMERGENCY IGNITION INTERRUPT SWITCH

*(Used as a safety device )*

To work as a safety device, the lanyard clip must be attached to the emergency ignition interrupt switch (5) and the lanyard (see photo) itself must be secured to the boat operator. If the clip is pulled free of the control, the engine will shut down.



**CH7500/CH7600  
Top Mount Control  
Features  
(CH7600 shown here)**

# INSTALLATION

## Section 1: Location of Control

- 1.1 Allow adequate clearance for hand lever swing (**forward** and **reverse** positions).
- 1.2 Allow adequate clearance under the console or in the gunwale for the cables AND **allow a minimum of 36" from the cable nest connection with no restraint**. When supporting the cables beyond 36", do not tie or clamp tightly.
- 1.3 After a suitable location for the control is determined, use the separate mounting template.
- 1.4 Closely follow the instructions provided on the template. Cut & drill the mounting holes required.

**On all models, the cover will have to be removed to expose the mounting holes.**

Tools for Installation		
Phillips head screwdrivers	Power drill	5/8" or 16mm deep well socket
Standard slot screwdriver	7/32" & 17/64" drill bits	Ratchet wrench
Saber saw	3/8" box end wrench	
4 1/4 " Hole Saw (optional)	Multimeter (optional)	

## Section 2: Measuring the Cables

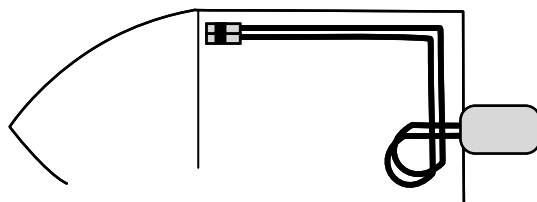
Measure the cable routing path from the control head connection to the engine connection.

### Outboards:

Measure from the control connection -- along an unobstructed cable routing --to the center of the outboard engine.

**Add four (4) feet** to the measurement to allow for a loop which provides unrestricted engine movement. Round **UP** to the next whole foot and order the required cable part number.

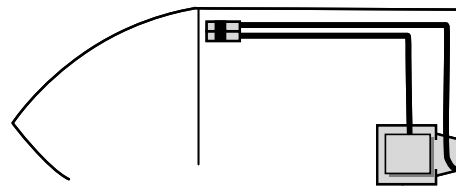
*(Last two digits of the Teleflex cable number equal the length of the cable in feet.)*



### Inboards & Stern Drives:

Measure from the control connection -- along an unobstructed cable routing -- to the SHIFT or THROTTLE connection. Round this dimension **UP** to the next whole foot and order the required cable part number.

*(Last two digits of the Teleflex cable number equal the length of the cable in feet.)*



**Section 3: Shift & Throttle Cable Connection - Control End**

- **PUSH / PULL** refer to the direction of cable motion to shift into "forward" or to "open" the throttle
- Refer to the appropriate manufacturer's manual for shift and throttle direction and adjustments
- **Numbered holes on mechanism chassis correspond to holes in shift and throttle levers** (for example: connect cable mount to hole 4 on chassis and cable end fitting to hole 4 on lever)
- Cables and wiring should be pre-installed on control before final mounting is made

**Cable Connection Guide**

**PUSH to OPEN THROTTLE**

MANUFACTURER	CH1700/ CH7600		CH7500	
	CABLE NEST KIT	THROTTLE LEVER	CABLE NEST KIT	THROTTLE LEVER
MERCURY18 & 25 HP	# 1	# 1	# 1	# 1
JOHNSON / EVINRUDE	# 1	# 1	# 1	# 1
BRP/OMC I/O	# 1	# 1	# 1	# 1
YAMAHA 90HP & UP	# 1	# 1	# 1	# 1
US MARINE	# 1	# 1	# 1	# 1
SUZUKI	# 1	# 1	# 1	# 1

**PULL to OPEN THROTTLE**

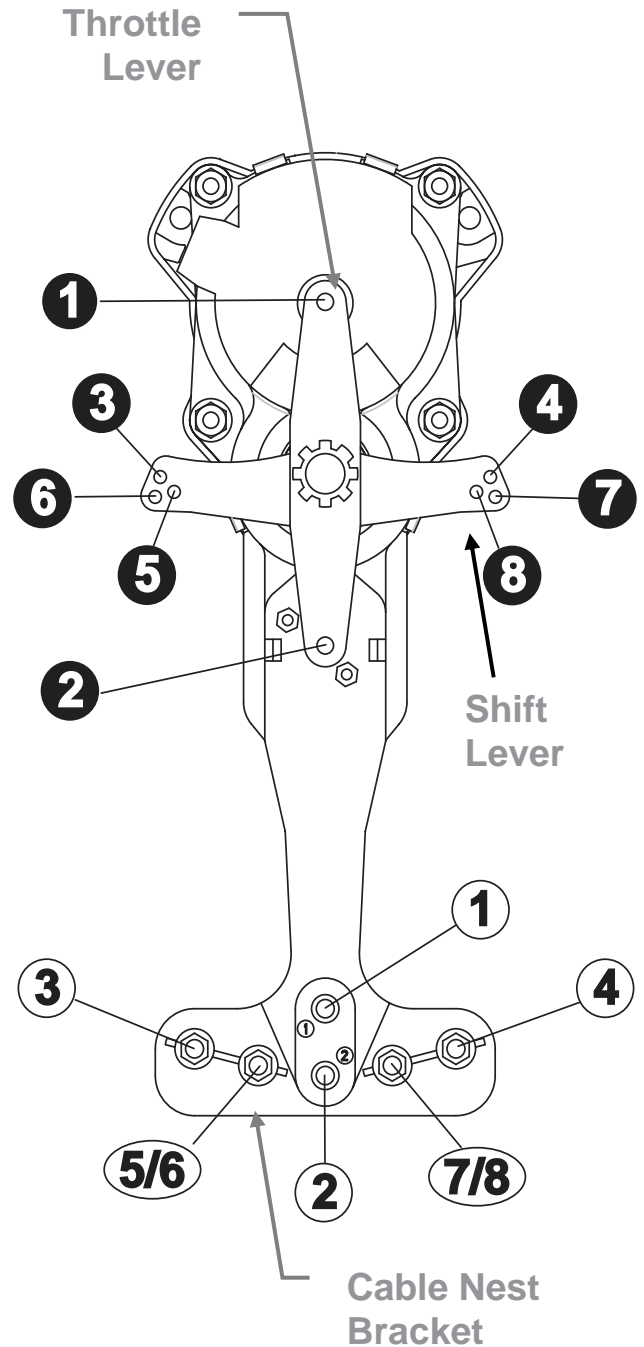
MANUFACTURER	CH1700/ CH7600		CH7500	
	CABLE NEST KIT	THROTTLE LEVER	CABLE NEST KIT	THROTTLE LEVER
MERCURY I/O & O/B	# 2	# 2	# 2	# 2
VOLVO I/O	# 2	# 2	# 2	# 2
YAMAHA 70HP & UNDER	# 2	# 2	# 2	# 2
HONDA	# 2	# 2	# 2	# 2
NISSAN/TOHATSU	# 2	# 2	# 2	# 2

**PUSH for FORWARD SHIFT**

MANUFACTURER	CH1700/ CH7600		CH7500	
	CABLE NEST KIT	SHIFT LEVER	CABLE NEST KIT	SHIFT LEVER
VOLVO I/O & INBOARDS	# 3	# 3	# 4	# 4
3300 CABLES	# 3	# 3	# 4	# 4
MERCURY18 & 25 HP	# 5/6	# 6	# 7/8	# 7
EVINRUDE/ JOHNSON	# 5/6	# 5	# 7/8	# 8
INBOARDS	# 3	# 3	# 4	# 4

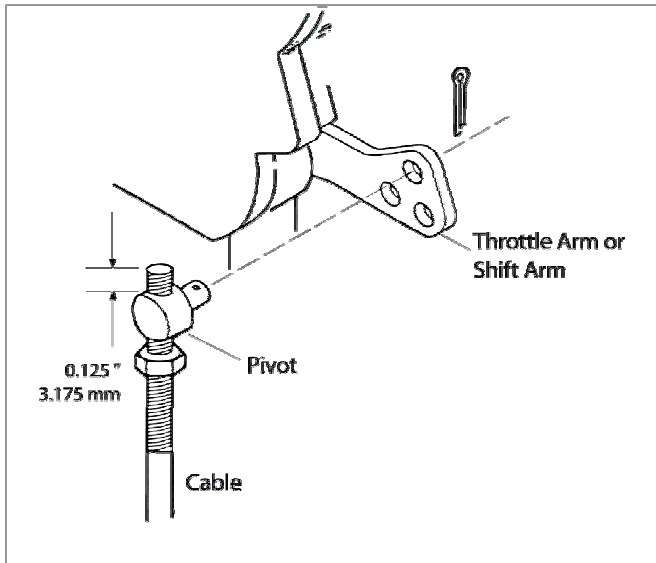
**PULL for FORWARD SHIFT**

MANUFACTURER	CH1700/ CH7600		CH7500	
	CABLE NEST KIT	SHIFT LEVER	CABLE NEST KIT	SHIFT LEVER
3300 CABLES	# 4	# 4	# 3	# 3
MERCURY	# 7/8	# 7	# 5/6	# 6
EVINRUDE/JOHNSON	# 7/8	# 8	# 5/6	# 5
HONDA/NISSAN/SUZUKI	# 4	# 4	# 3	# 3
TOHATSU/ US MARINE	# 4	# 4	# 3	# 3
YAMAHA	# 4	# 4	# 3	# 3
INBOARDS	# 4	# 4	# 3	# 3

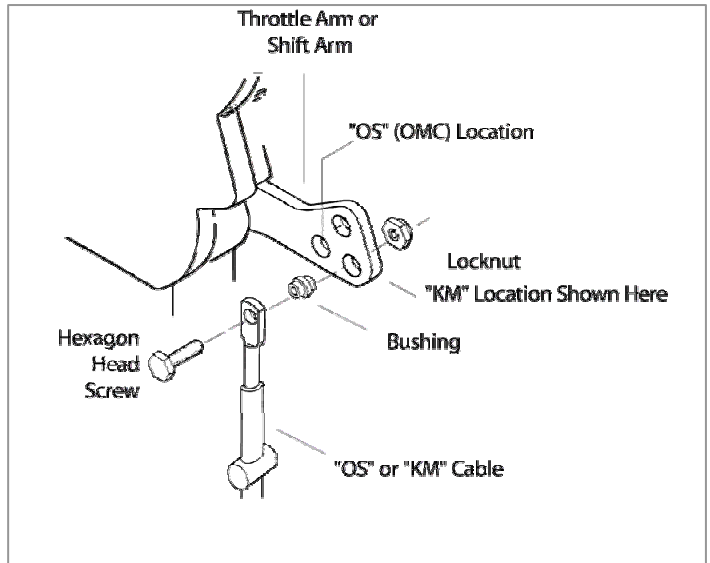


**Cable Mounting Diagram**

**Section 3: Shift & Throttle Cable Connection - Control End**



Shift Arm Cable Terminal Connection for 33 C Cable



Shift Arm Cable Terminal Connection for "OS" is BRP/OMC/Johnson and Evinrude and "KM" is Mercury

**Mercury**      **BRP/OMC**      **33C Cable**

Snap-on cover (to retain cables)

Clip for 33C Cables

Flat Head Screw

Swivel Bearing

Nut

Note: Nest is black in color.

Note: For GEN II, nest is neutral in color.

**New Mercury Gen II Nest Kit**

**Cable End Options**

- 33C (Universal) (note black nest color)
- BRP/OMC/JOHNSON/EVINRUDE (note black nest color)
- MERCURY (note black nest color)
- MERCURY GEN II (note neutral nest color)

Each cable type connects differently.

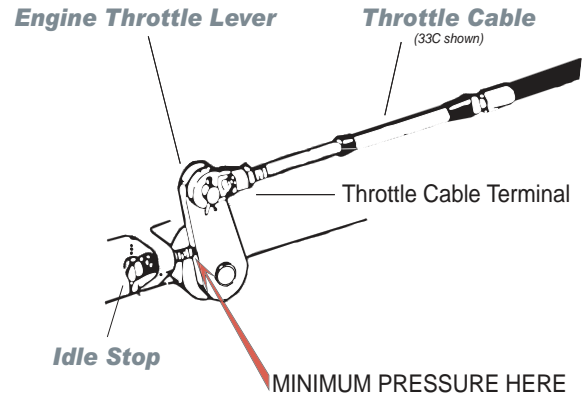


## Section 4: Shift & Throttle Cable Connection - Engine End

The throttle cable must be disconnected from the motor before making motor idle adjustments.

**Caution**

Adjustment of the motor idle while the throttle cable is connected to the motor may cause jamming action against the idle stop. As a result, the control may not function properly and damage to the control, the cable and/or the motor may occur.



- 4.1 Make sure the Control is in **NEUTRAL DETENT**.
- 4.2 The Engine Throttle Lever should rest lightly against the "Idle Stop" on the carburetor.
- 4.3 Connect the Throttle Cable to the Engine Throttle Lever.

Please Note: This figure does not represent any particular engine.

**NOTICE**

Throttle Cable must be free of load (NO LOAD) when throttle lever is in the idle position to prevent hard shifting.

## Section 5: Electrical Connections

### 5.1 Neutral Safety Switch

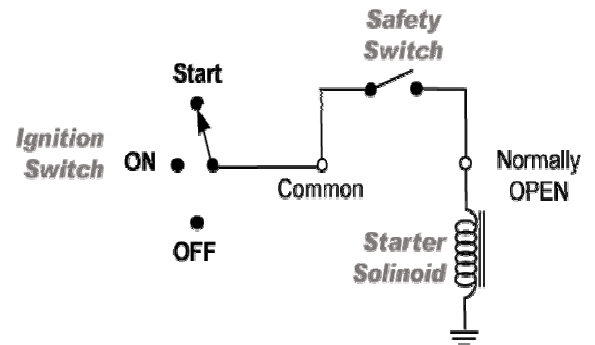
This control is provided with a Neutral Safety Switch. This switch is used to prevent the engine from starting in gear.

**NOTICE**

Use a battery-powered test light or test meter to check continuity.

5.1.1 With the Control in NEUTRAL, connect one wire of the tester to the common terminal, and one wire to the "NO" (Normally Open) Terminal. The test light MUST light.

5.1.2 Connect the neutral safety switch between the ignition switch (start lead) and the starter solenoid



Use a multi-meter or continuity tester to make sure that there is electrical continuity only when the control is in neutral position. When the control is in forward or reverse gear there must not be electrical continuity. The multimeter or tester should show an open circuit.

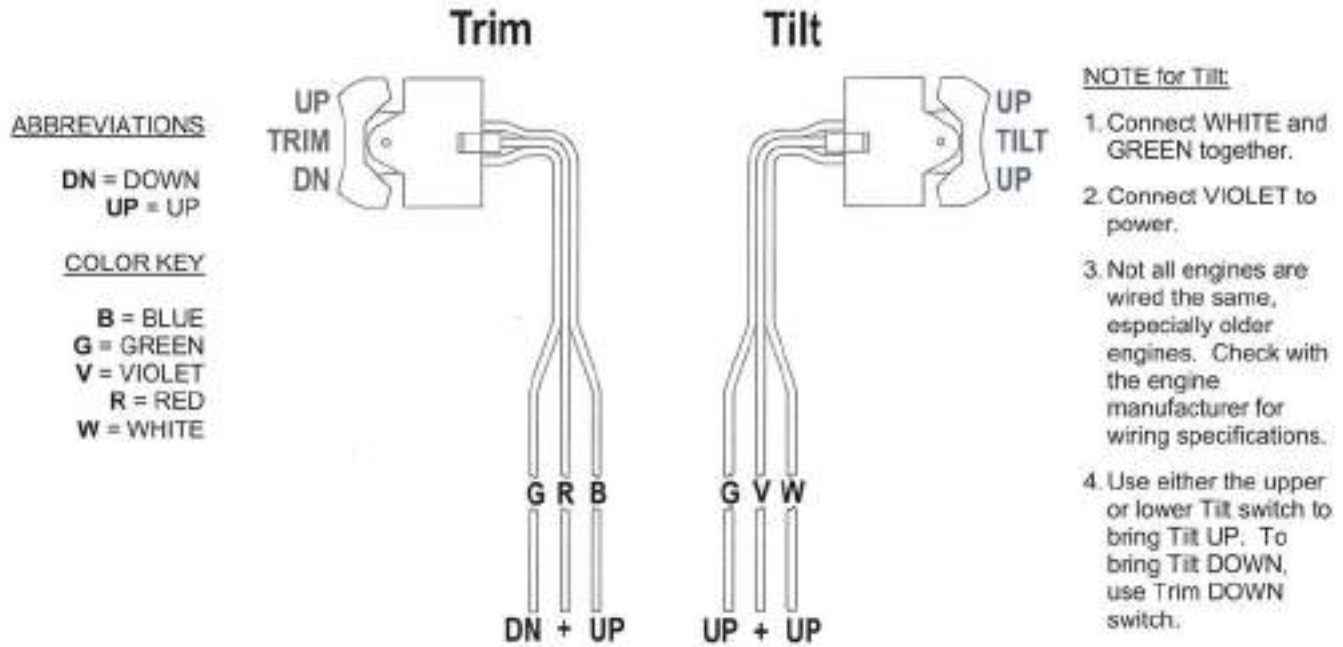
**Caution**

## 5.2 Trim and Tilt

Refer to the wiring diagrams (below) for the correct "Trim" and "Tilt" switch connections and wire accordingly.

### NOTICE

On both 3-wire AND 5-wire systems: reverse the blue and green connections for opposite "trim" operation.

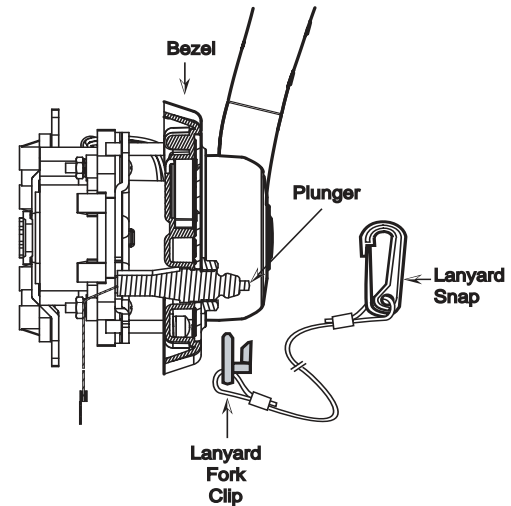


### 5.3 Ignition Interrupt Switch

This switch includes a lanyard clip which holds the plunger of the Switch in position to allow engine operation. A lanyard extends from the clip and is connected securely to the operator. If the operator moves away from the controls, the clip is pulled free, releasing the plunger and stopping the engine.

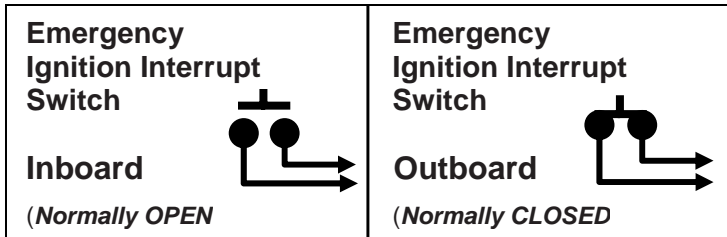
#### 5.3.1 Operation of the Ignition Interrupt Switch

- Before each motor start, check that the Lanyard Fork Clip is properly seated over the switch and rotates freely.
- Inspect the lanyard. If it is cut, worn or frayed, it must be replaced.
- Start the engine.
- Test the switch by pulling the lanyard fork clip free from the switch. The engine should stop.



#### ⚠ WARNING

*If engine fails to stop, recheck all wiring. Should the engine fail to start or stop, or resume running with the lanyard fork removed, consult your local marine dealer for assistance. Do not change the length of the lanyard or use another manufacturer's lanyard on this interrupt switch. Either may affect switch operation. Misuse, misapplication, unauthorized modifications, or incorrect installation of this safety device could result in serious bodily injury or death.*



#### 5.3.2 Installation Instructions for the Ignition Interrupt Switch

All wiring, connections and terminations should be done in accordance with ABYC Spec E 11-03.

**Before drilling, check behind the gunwale or panel for sufficient clearance and space around wires tubes, pipes and other obstructions.**

- If installing the switch as a retro fit, remove the 4 mounting screws that retain the bezel. Remove the bezel. Overlay the cutout template supplied in the kit. If the cutout profile does not match the template, cutout the gunwale to suit the template profile.
- If installing the control for the first time, use the template to cutout the gunwale.
- Insert the switch from the rear of the gunwale or from the front. Your choice will depend on the design of your boat and access to the cavity between to hull and the gunwale.
- Orient the switch according to the diagram before inserting the switch into the space provided in the control mounting plate, the cutout and into the bezel.
- Insert the 4 mounting screws through the bezel cutout and into the control mounting plate.
- Assemble the bezel Insert onto the bezel and add the Interrupt Switch retaining nut. Torque to 40 – 50 inch pounds (3.5 to 4 foot-pounds)
- Insert the lanyard clip under the Interrupt Switch plunger. Pull firmly on the lanyard to verify that the clip snaps free. Ensure the nut remains tight, re-torque if necessary. Reattach the lanyard clip to the switch.
- Complete the Interrupt Switch wiring into the engine electrical circuit according to the instructions below.
- Complete all testing of the Interrupt Switch function according to the instructions on the following page(s).

5.3.3 Electrical Connections: I/O or Inboard Use

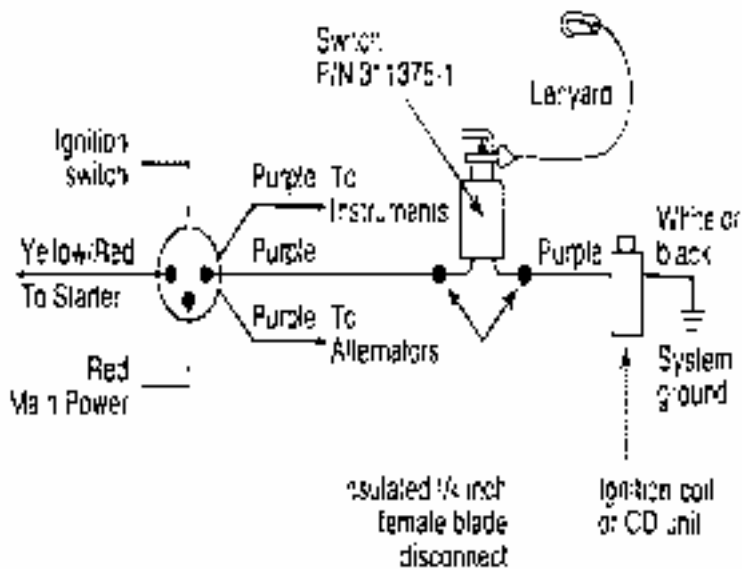
Use 16 AWG Purple stranded, insulated marine quality wire for IO or inboard applications. (Type HDT, THW, UL 1426 or equivalent.)

**⚠ WARNING**

Be sure this wire goes directly to the coil and not to the instrument or alternator circuit. Selecting the incorrect wire will result in improper switch operation which could lead to serious injury.

<b>I/O or Inboard Use ONLY (Normally OPEN)</b>	
1.	Disconnect all batteries and any auxiliary on-board or dockside power supplies.
2.	Locate the purple ignition switch-to-coil wire; See Diagram A below.
3.	Cut the purple wire, strip the ends and install two (2) insulated crimp-on 1/4 inch female disconnect terminals. A crimping tool designed for insulated terminals <b>MUST</b> be used.
4.	Attach the female disconnects to each of the male terminals on the Interrupt Switch
5.	Recheck all connections.
6.	Install Lanyard with the Fork Clip seated on the Plunger.
7.	Reconnect battery.
8.	Start engine. If engine does not start: disconnect battery, recheck all electrical connections, reconnect battery, and restart engine.
9.	Remove Lanyard. Engine should stop immediately.

**Diagram A**  
**I/O and Inboard Wiring**  
 (basic wiring; no specific manufacturer)



5.3.4 Electrical Connections: Outboard Use

<b>Outboard Use ONLY (Normally CLOSED)</b>	
Use 16 AWG Black stranded, insulated marine quality wire for all outboard applications. (Type HDT, THW, UL 1426 or equivalent.)	
1.	Disconnect all batteries and any auxiliary on-board or dockside power supplies.
2.	Remove Engine Cover
3.	Locate the correct color emergency stop wire for your motor. (See Reference Table 1 at right.)
4.	Measure and cut two lengths of black 16 AWG marine quality wire of sufficient length to connect one Interrupt Switch terminal to the Emergency Stop Wire and the other terminal to a System Ground. (See Diagram B at right.)
5.	Strip one end of each wire and crimp on an insulated 1/4 inch female disconnect terminal. A crimping tool designed for insulated terminals MUST be used.
6.	Attach the female disconnects to each of the male terminals on the Interrupt Switch.
7.	Attach the other end of one wire to the Emergency Stop Wire, using a suitable insulated wire connecting device. (See Reference Table 1 and Diagram B.)
8.	Attach the other end of the second wire to the ground point, using a suitable insulated wire connection device as shown in Diagram B at right.
9.	Recheck all connections. Install the Lanyard with the Fork Clip seated over the Plunger
10.	Replace engine cover and reconnect battery.
11.	Start engine. If engine does not start: a) disconnect battery; b) remove engine cover; c) recheck all electrical connections; d) replace engine cover; and e) restart engine.  Remove Lanyard. Engine should stop immediately

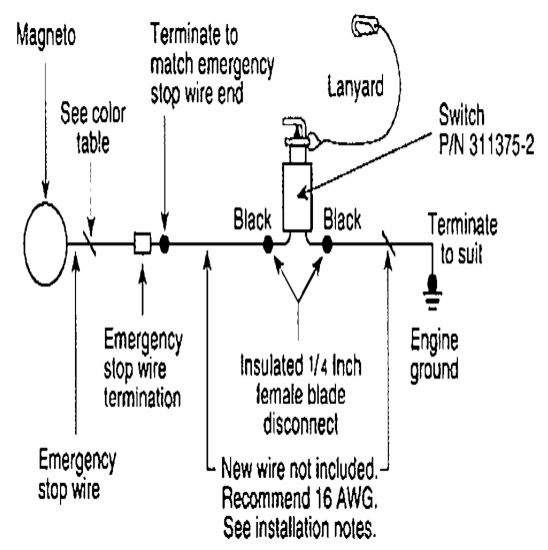
This interrupt switch is designed for use with outboard motors equipped with grounding type emergency stop circuits only!

**CAUTION**

**Reference Table 1**  
**Wire Color Table**  
**for Late Model Outboards**

Engine	Color
<b>Daihatsu</b>	Solid Brown
<b>Evinrude</b> Before 1969	Black w/ Yellow Stripe
	Solid Blue
<b>Force</b>	Solid White
<b>Johnson</b> Before 1969	Black w/ Yellow Stripe
	Solid Blue
<b>Mariner</b>	Black w/ Yellow Stripe
<b>Mercury</b>	Black w/ Yellow Stripe
<b>Nissan</b>	Solid Brown
<b>OMC</b> Before 1969	Black w/ Yellow Stripe
	Solid Blue
<b>Suzuki</b>	Solid Brown
<b>US Marine</b>	Blue w/ Black Stripe or Solid Blue
<b>Yamaha</b>	Black w/ Yellow Stripe

**Diagram B**  
**Outboard Wiring**

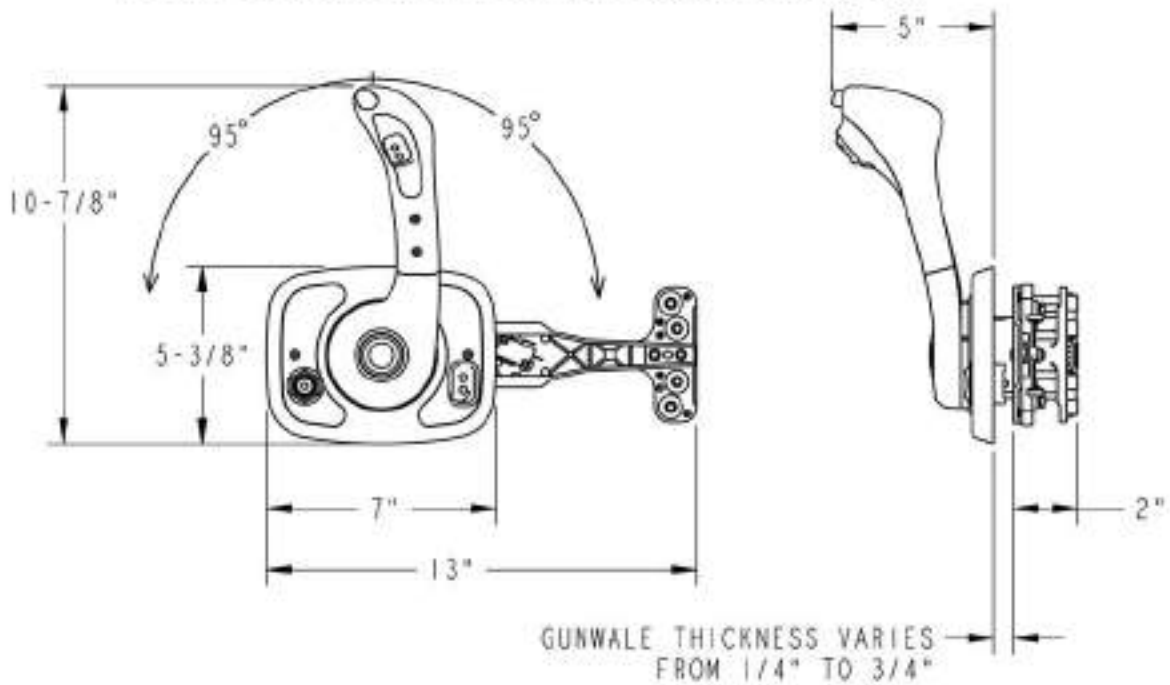


**CAUTION**

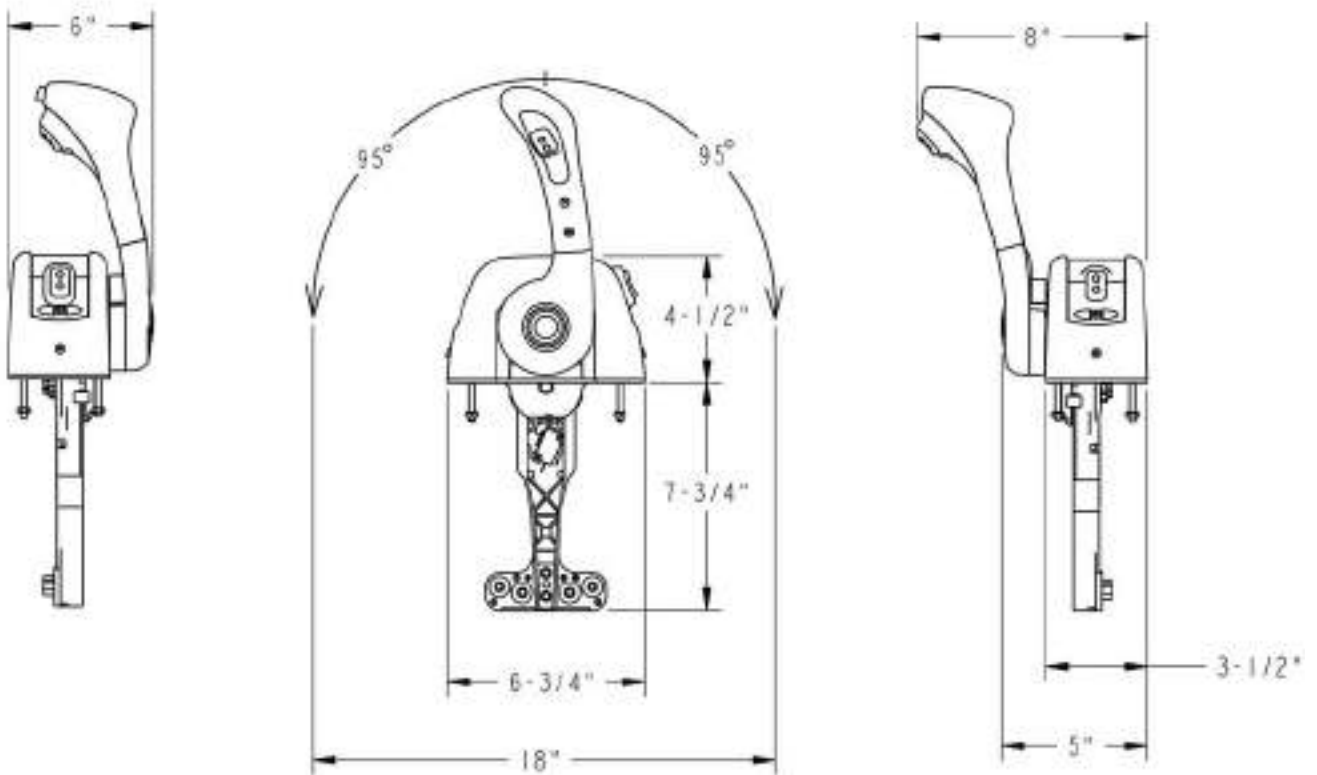
If engine fails to stop, recheck all wiring. Should the engine fail to start or stop or resume running with the lanyard fork removed, consult your local marine dealer for assistance.

## General Control Dimensions

### CH1700: Side-Mount Control General Dimensions



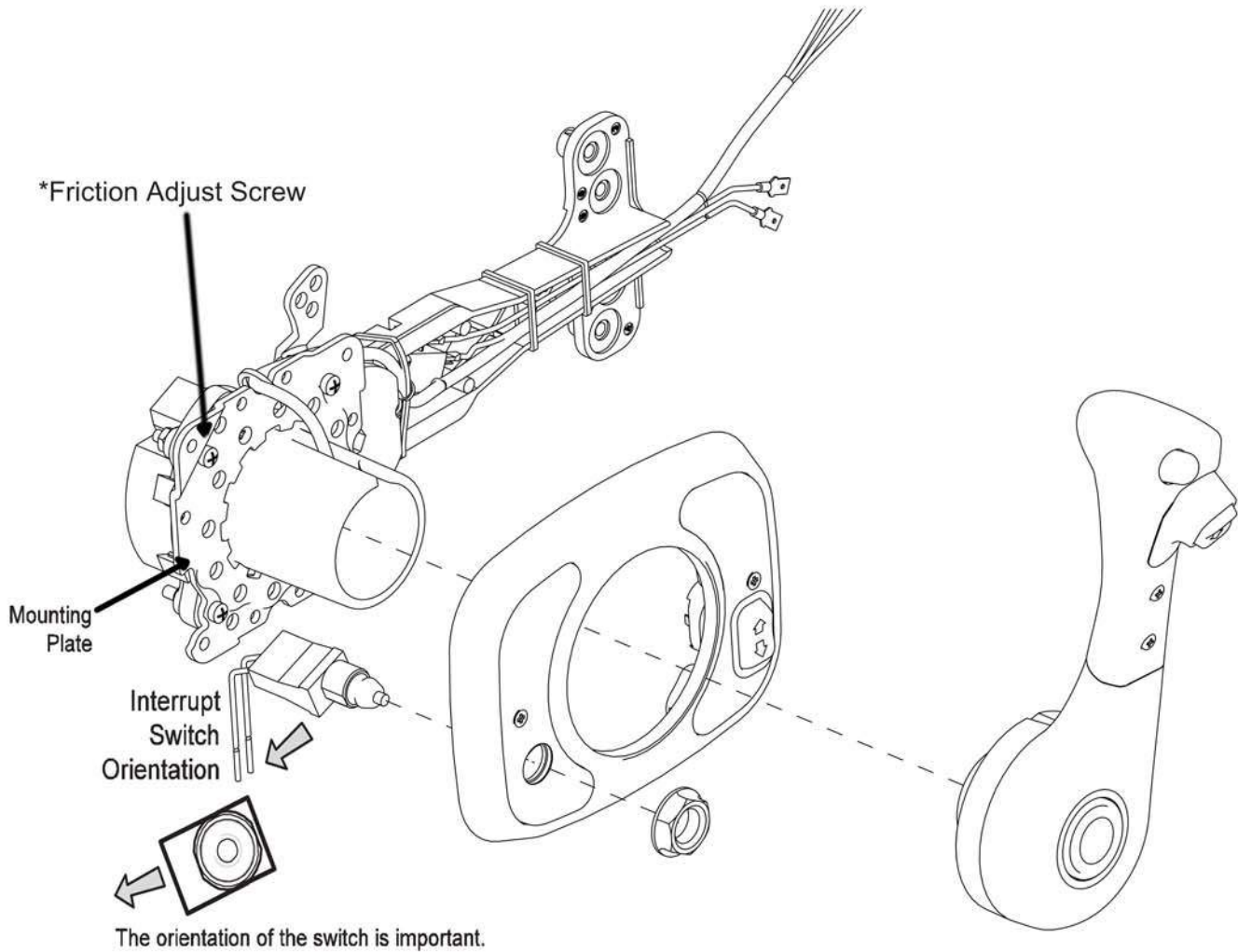
### CH7500/7600: Top-Mount Control General Dimensions



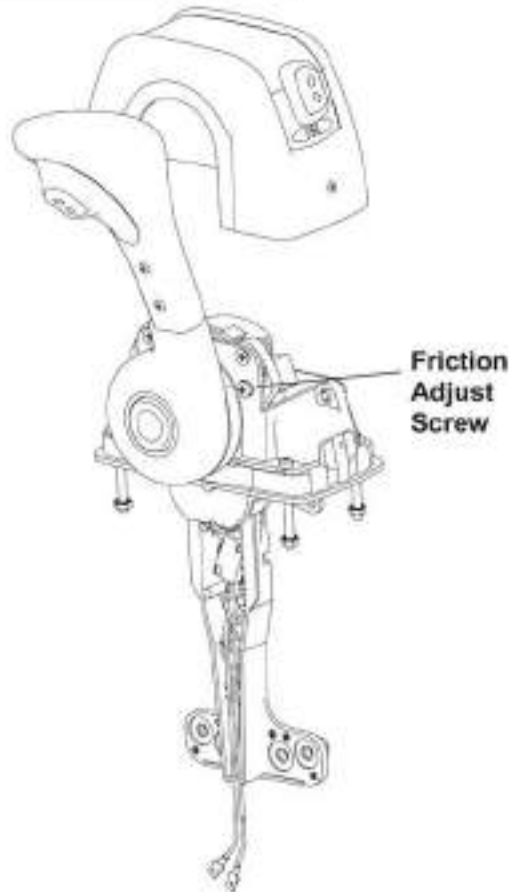
## Exploded View CH1700

### Friction Adjust Screw

Adjustment of this screw enables the friction in the throttle operating mechanism to be increased and prevent unwanted handle movement. To adjust, place the lever in the forward or reverse throttle position (just beyond the shift position). Remove the cover and adjust the friction adjust screw; turning the screw clockwise increases the friction. Do not over-tighten.



## Exploded View CH7500/7600



### **Friction Adjust Screw**

Adjustment of this screw enables the friction in the throttle operating mechanism to be increased and prevent unwanted handle movement.

To adjust, place the lever in the forward or reverse throttle position (just beyond the shift position). Remove the cover and adjust the friction adjust screw; turning the screw clockwise increases the friction. Do not over-tighten.

### **Maintenance and Corrosion Protection**

- For maximum protection, especially in a saltwater environment, the control head and hand lever should be washed lightly with fresh water on a regular basis.
- Periodically check the control head mechanism for loose fasteners and signs of wear on moving parts.
- Keep moving parts well lubricated with a moisture-displacing lubricant.
- Periodically check the cables and engine connections for signs of wear and corrosion. Replace as necessary.

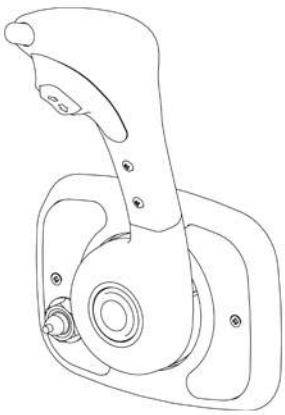


## SERVICE PARTS KITS

All service parts can be purchased from your local Teleflex Marine Distributor.

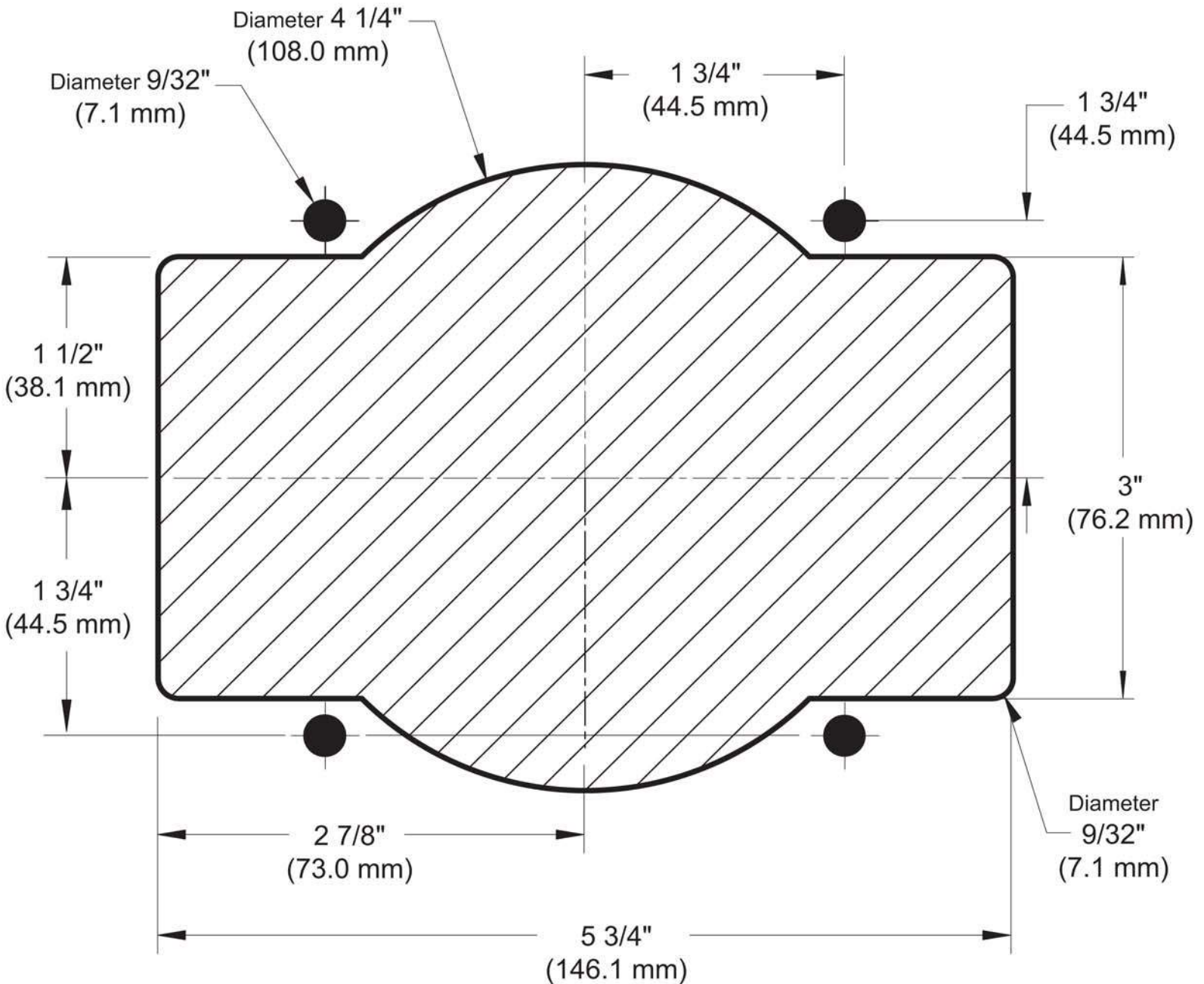
Kit #	Kit Name and Description	Model Used On ...
212151-001	Cable Nest And Connection Kit	All
<b>CH1700 Replacement Parts</b>		
7212616	Chrome Replacement Handle without Trim	CH1700
7212710	Black Replacement Handle without Trim	CH1700
7213017	Chrome Side Mount Insert Kit	CH1700
7213111	Black Side Mount Insert Kit	CH1700
7213214	Throttle Only, Button Kit Side Mount	CH1700
<b>CH7500/CH7600 Replacement Parts</b>		
7213318	Chrome Replacement Handle without Trim	CH7500
7213411	Black Replacement Handle without Trim	CH7500
7213712	Chrome Replacement Handle without Trim	CH7600
7213816	Black Replacement Handle without Trim	CH7600
7214113	Chrome Top Mount Cover	CH7500; CH7600
7214311	Chrome Top Mount Insert Kit <b>with or without Tilt</b>	CH7500; CH7600
7214518	Black Top Mount Insert Kit <b>with or without Tilt</b>	CH7500; CH7600
7214715	Neutral Throttle Warm-up Kit (Top Mount)	CH7500; CH7600

# CH1700 Mounting Template Side Mount Control



**NOTICE:**

THIS TEMPLATE MAY NOT BE TO SCALE. ITS PRESENCE IS FOR INFORMATION PURPOSES. A SEPARATE WORK TEMPLATE -- **MT\_CH17\_75\_76 Rev 0** -- HAS BEEN INCLUDED WITH THIS CONTROL.

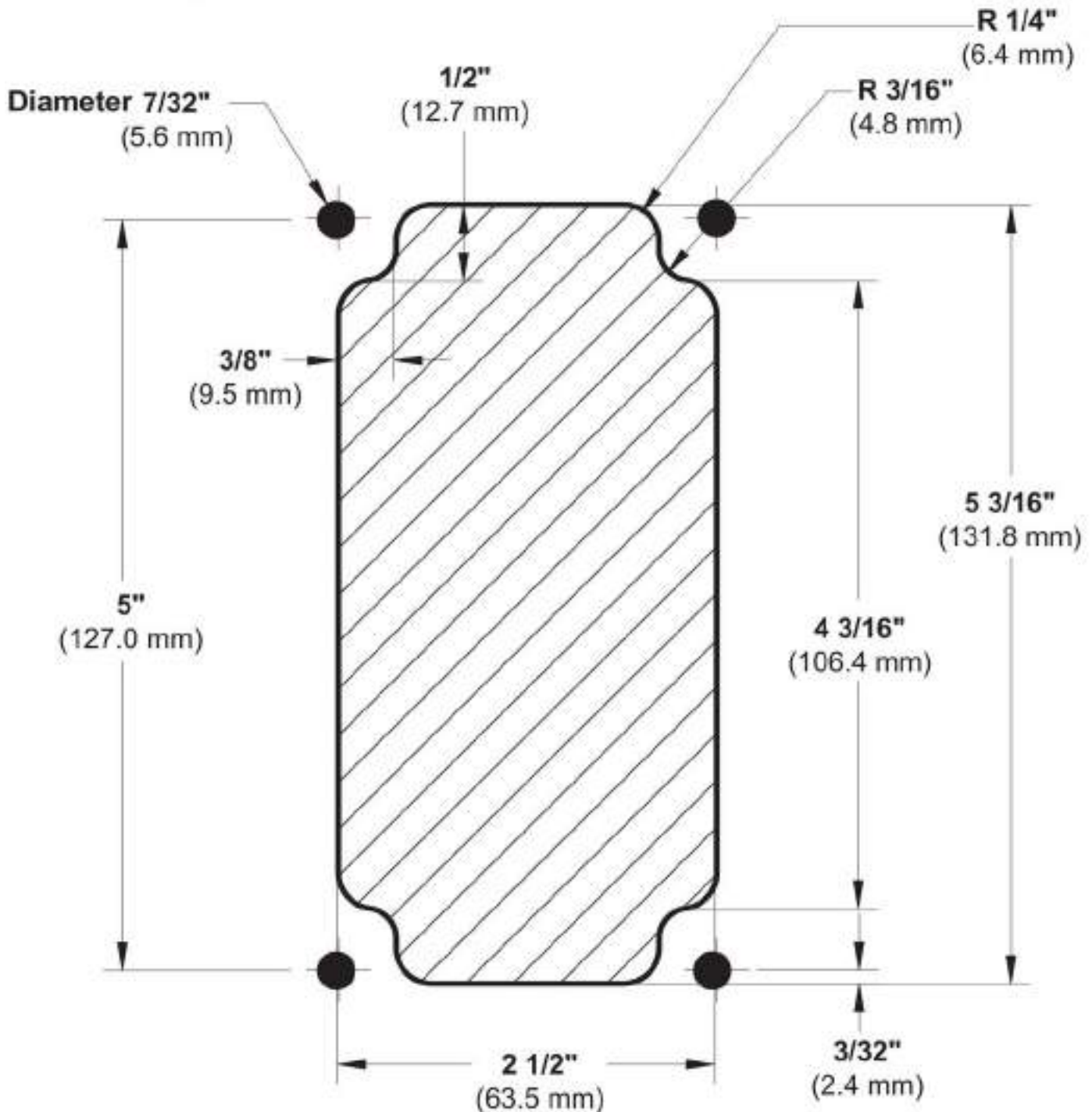


# CH7500 and CH7600 Mounting Template Top Mount Single Lever Control



**NOTICE:**

THIS TEMPLATE MAY NOT BE TO SCALE. ITS PRESENCE IS FOR INFORMATION PURPOSES. A SEPARATE WORK TEMPLATE -- MT\_CH17\_75\_76 Rev 0 -- HAS BEEN INCLUDED WITH THIS CONTROL.

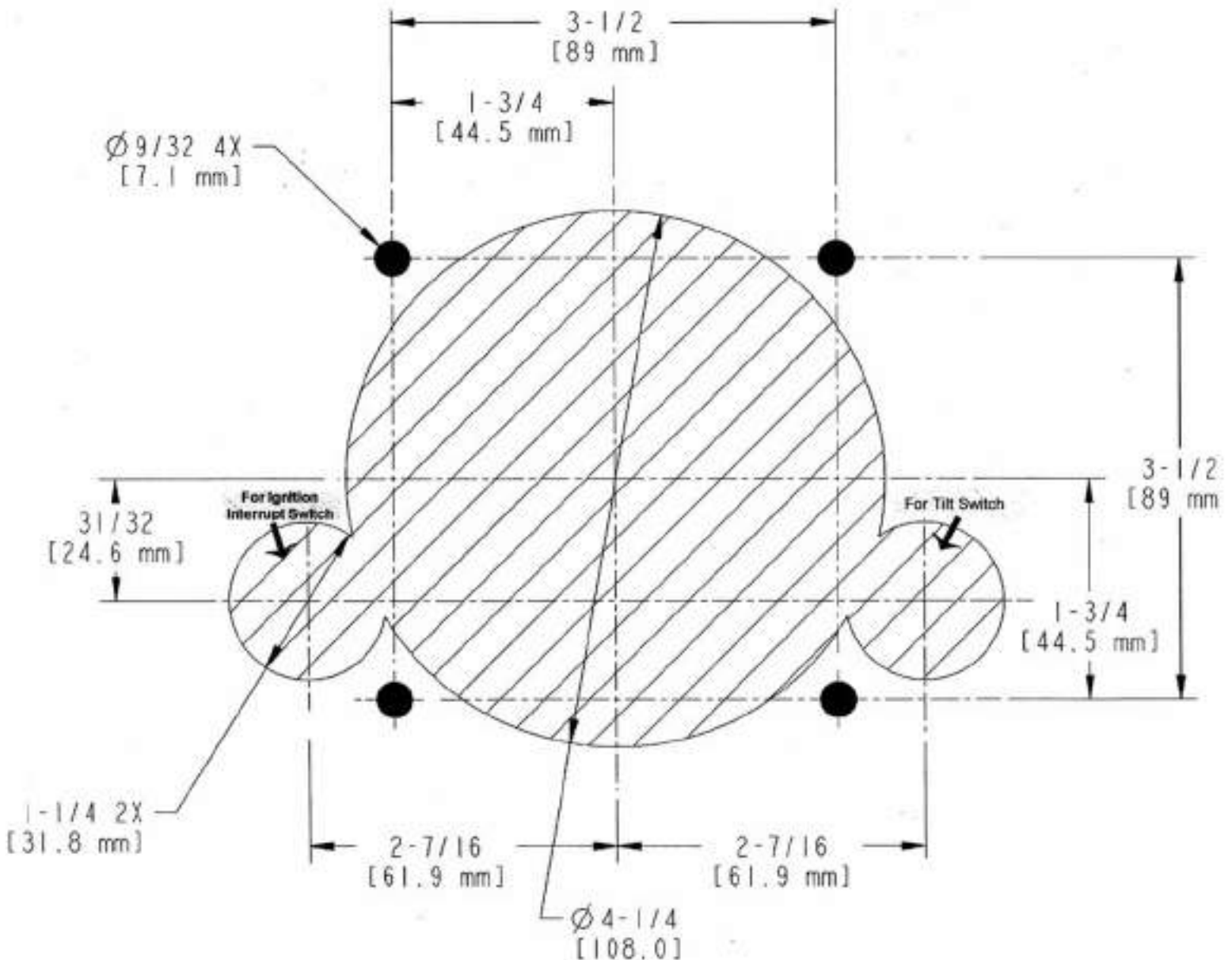


# CH1700 Mounting Template Side Mount Control Back Mount Installation



**NOTICE:**

THIS TEMPLATE MAY NOT BE TO SCALE. ITS PRESENCE IS FOR INFORMATION PURPOSES. A SEPARATE WORK TEMPLATE -- **MT\_CH17\_BACKMOUNT** -- HAS BEEN INCLUDED WITH THIS CONTROL.



## **CH1700/CH7500/CH7600 Mechanical Engine Controls**

(Patent No. D508,227; D510,310; D510,311; D510,558; D510,559, D510,557)

### **User Manual**

#### *Operation & Instructions*

Part Number: ISCH7500\_Rev2

January, 2006

#### **APPLICABLE STANDARDS**

ABYC P-14, Propulsion Control Systems

USCG 33 CFR Part 183, Subpart "L", "Start in Gear Protection"

#### **SAFE BOATING STATEMENT**

This device meets or exceeds the applicable ABYC, ISO, and USCG safe boating rules, regulations, standards, and guidelines.

#### **SAFE BOATING ON THE WEB**

U.S. Coast Guard: [www.uscg.mil](http://www.uscg.mil)

U.S. Power Squadron: [www.usps.org](http://www.usps.org)

American Boat & Yacht Counsel: [www.abycinc.org](http://www.abycinc.org)



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[www.teleflexmarine.com](http://www.teleflexmarine.com)

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**Teleflex®**  
**MARINE**

# EVINRUDE

## E-TEC

**EVINRUDE**



## Operator's Guide

**40/50/60 HORSEPOWER**

PL

**Model Year**

2008



**WARNING**  
Read this Operator Guide thoroughly. It contains important safety information. When operating your boat, always have this Operator Guide onboard.

**40/50/60 HORSEPOWER**

PL

**2008 Model Year**







# FEATURES AT A GLANCE

## Easy to Own and Operate

- Three-Year Limited Warranty
- No Scheduled Dealer Maintenance for Three Years of Normal Recreational Use
- No Operational Break-In Procedure
- Easy Starts (no choking or priming)
- Digital Engine Management
- Self Flushing Cooling System
- Long Term Storage Design
- Simplified Winterization Procedure
- Digital Diagnostics
- Low Oil Usage
- CANbus Capable

## Durable and Reliable

- Full Corrosion Protection
- *Evinrude E-TEC* Lubrication System
- Auto-Calibrated Linkage
- Robust, Heavy-Duty Design
- Posi-Lock Latches
- Extra Capacity Water Pump
- Iridium Spark Plugs
- Vibration Isolated Electronics
- Beltless 25 Amp Charging System
- Stainless Steel Thermostats
- Nickel/Chrome-Faced Piston Rings
- Micro Finished Connecting Rods/Crankshaft

## Cleaner and Quieter

- EPA Emissions Compliance
- European Union Emissions Compliance
- California 3-Star Emissions Compliance
- Sealed Fuel System
- Low Friction Design (No powerhead gears, belts, cams, oil scraping rings, or mechanical oil pump)
- Full Length Insulated Lower Pans
- Quiet Signature Sound
- Air Intake/Silencer
- Idle Air Bypass

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*I-Command*™

*Evinrude*® *E-TEC*®

BRP Logo

S.A.F.E.™

*Evinrude*®/*Johnson*® Genuine Parts

2+4™ Fuel Conditioner

*SystemCheck*™

*Evinrude*®/*Johnson*® XD100™

HPF XR™ Gearcase Lubricant

*Triple-Guard*™ Grease

*Evinrude*®/*Johnson*® XD50™

HPF Pro™ Gearcase Lubricant

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<https://www.boat-manuals.com/>



Dear Boating Enthusiast,

Congratulations on your purchase of our industry-leading *Evinrude E-TEC* outboard! Your purchase comes with the full commitment and backing of the BRP Outboard Engine team. We know your *Evinrude E-TEC* outboard will provide you with years of reliable use, and we hope you will enjoy using it as much as we enjoyed designing and building this innovative product.

You can be proud you purchased an *Evinrude E-TEC* outboard with the following benefits.

### **EASY TO OWN & OPERATE**

With your *Evinrude E-TEC* outboard there is no more time wasted in the shop. In fact, you only have to bring your *Evinrude E-TEC* outboard in for dealer scheduled maintenance every 300 hours or every three years of normal recreational use. That's three trips to the shop in nine years... four trips in twelve years... five trips in fifteen years... you get the picture! And if that is not enough, with your new outboard you will have zero oil changes, absolutely no break-in period, and a simple winterization process that can be done at the boat ramp or in your driveway. We are proud of how easy we have made it for you to own this outboard. Hopefully it means you will be spending more time on the water each year.

### **POWER & PERFORMANCE**

*Evinrude E-TEC* outboards have been engineered to outperform anything on the water—acceleration, top-end speed, any size, any horsepower, across the line. And for your buddies who own a four-stroke? Well, they cannot touch our power-to-weight ratio. And you can tell them that no four-stroke comes close to the pure power and torque of an *Evinrude E-TEC* outboard.

### **DURABILITY / QUALITY / RELIABILITY**

Fewer parts. Fewer problems. Every *Evinrude E-TEC* outboard component is tested and retested for maximum performance and longer life. Parts are bigger and stronger to work harder and last longer.

### **CLEAN & QUIET**

You do not even have to think about emissions—anywhere in the country; anywhere in the world. *Evinrude E-TEC* outboards are the only outboard marine engines to have received a Clean Air Excellence Award from the United States Environmental Protection Agency (EPA). The entire *Evinrude E-TEC* line meets or exceeds all worldwide emission standards. We have even got 3-Star certification from the toughest of the tough: the California Air Resources Board. And thanks to the sophisticated, acoustically tuned air intake and exhaust systems, you will not be filling the air with a lot of noise either.

BRP is proud you have purchased this technology-leading *Evinrude E-TEC* outboard engine. We thank you for your business and wish you many years of enjoyable use.

Happy Boating,



Roch Lambert

Vice President, General Manager  
Outboard Engines

<https://www.boat-manuals.com/>

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# ABOUT THIS GUIDE

This Operator's Guide is an essential part of your *Evinrude E-TEC* outboard. It contains pertinent information which, if followed, will provide you with a thorough understanding needed for proper operation, maintenance, care, and—above all—safety. Safety is our first priority and it should be yours too. It is strongly recommended you read this Guide from cover to cover. The more you know and understand about your *Evinrude E-TEC* outboard, the greater the safety and pleasure you will get from using it. Following this recommendation will assure the completeness of the information essential to your safety, the safety of any passengers, and other water users.

This Operator's Guide identifies important safety messages.

Although the mere reading of such information does not eliminate the hazard, the understanding and application of the information will promote the correct use of your outboard engine.



## Warning Symbols in this Guide

How can you reduce the risk of death, personal injury, and possible property damage? This Operator's Guide answers such questions and are contained in boxes highlighted by the Safety Alert Symbol. It is imperative to read, understand, and follow these comments.

This Guide should be kept in a waterproof bag with the outboard at all times during operation. If the product ownership is transferred, this Guide should be forwarded to the new owners.

A responsible, educated boater will fully appreciate the pleasures of boating and will be a safe boater. Boating Safety Classes are conducted by the U.S. Coast Guard Auxiliary, the U.S. Power Squadron and some Red Cross Chapters. For information about classes, call toll free 1-800-336-BOAT.

For additional information about boating safety and regulations, call:

- U.S. Coast Guard Boating Safety Hotline  
1-800-368-5647.

Outside North America please contact your Dealer or distributor for details about boating safety.

This Operator's Guide uses the following signal words identifying important safety messages.



## DANGER



Indicates an imminently hazardous situation which, if not avoided, **WILL** result in death or serious injury.



## WARNING



Indicates a potentially hazardous situation which, if not avoided, **CAN** result in severe injury or death.



## CAUTION



Indicates a potentially hazardous situation which, if not avoided, **MAY** result in minor or moderate personal injury or property damage. It also may be used to alert against unsafe practices.

**IMPORTANT:** Identifies information that will help prevent damage to machinery and appears next to information that controls correct assembly and operation of the product.

These safety notices mean:

ATTENTION!

BECOME ALERT!

YOUR SAFETY IS INVOLVED!



Additionally, Bombardier Recreational Products (BRP) has identified key information that is essential to the operation of your *Evinrude E-TEC* outboard.












Key information appears throughout this Guide in gray boxes with a key above the text. This highlighted information is a vital reference when using your outboard.

# IMPORTANT SAFETY MESSAGES

*This Operator's Guide contains essential information to help prevent personal injury and damage to equipment. Safety messages appear throughout this Guide in the applicable section.*

 <b>WARNING</b> 
<p><b>Be careful! Human error is caused by many factors: carelessness, fatigue, overload, preoccupation, unfamiliarity of operator with the product, drugs and alcohol to name a few. Damage to your boat and outboard can be fixed in a short period of time, but injury or death, has a lasting effect.</b></p> <p><b>For your safety and the safety of others, follow all safety warnings and recommendations. Do not disregard any of the safety precautions and instructions.</b></p> <p><b>Anyone operating your boat should first read and understand this Guide before they operate your boat and outboard.</b></p>

## SAFETY MEASURES — General

-  To fully appreciate the pleasures, enjoyment and excitement of boating there are some basic rules that should be observed and followed by any boater. Some rules may be new to you and others may be common sense or obvious... irrespective, take them seriously!
-  Be sure at least one of your passengers knows how to handle your boat in case of an emergency.
-  All passengers should know the location of emergency equipment and how to use it.
-  Know the marine traffic laws and obey them.
-  All safety equipment and personal floatation devices must be in good condition and suitable for your type of boat. Always comply with the regulations that apply to your boat.
-  Remember, gasoline fumes are flammable and explosive. Always adhere to the fueling procedure contained in this Operator's Guide and those given to you by the fueling station. Always verify fuel level before use and during the ride. Apply the principle of 1/3 fuel to destination, 1/3 back and 1/3 reserve fuel supply. Do not carry spare fuel or flammable liquids in any storage or engine compartments.
-  Whenever running the engine, assure there is proper ventilation to avoid the accumulation of carbon monoxide (CO), which is odorless, colorless, and tasteless, and can lead to unconsciousness, brain damage, or death if inhaled in sufficient concentrations. CO accumulation can occur while docked, anchored, or underway, and in many confined areas such as the boat cabin, cockpit, swim platform, and heads. It can be worsened or caused by weather, mooring and operating conditions, and other boats. Avoid exhaust fumes from your engine or other boats, provide proper ventilation, shut off your engine when not needed, and be aware of the risk of backdrafting and conditions that create CO accumulation. In high concentrations, CO can be fatal within minutes. Lower concentrations are just as lethal over long periods of time.
-  Avoid standing up or shifting weight suddenly in light weight boats.
-  Keep your passengers seated in seats. The boat's bow, gunwale, transom and seat backs are not intended for use as seats.

## **SAFETY MEASURES — Installation and Maintenance**

- ⚠ Insist on the use of personal floatation devices, approved by the U.S. Coast Guard, by all passengers when boating conditions are hazardous, and by children and nonswimmers at all times.
- ⚠ Proceed with caution and at very low speed in shallow water. Grounding or abrupt stops may result in personal injury or property damage. Also be alert for debris and objects in the water.
- ⚠ Be familiar with the waters you are operating in. The gearcase of this outboard extends below the water surface and could potentially come in contact with underwater obstructions. Contact with underwater obstructions may result in loss of control and personal injury.
- ⚠ Respect no wake zones, rights of other water users and the environment. As the "skipper" and owner of a boat you are responsible for damage to other boats caused by the wake of your boat. Allow no one to throw refuse overboard.
- ⚠ Do not operate your boat if you are under the influence of drugs or alcohol.
- ⚠ High performance boats have a high power-to-weight ratio. If you are not experienced in the operation of a high performance boat, do not attempt to operate one at, or near, its top speed until you have gained that experience.
- ⚠ Become completely familiar with the control and operation of your boat and outboard before embarking on your first trip or taking on a passenger(s). If you have not had the opportunity to do so with your Dealer, practice driving in a suitable area and feel the response of each control. Be familiar with all controls before applying the throttle above idle speed. As the operator, you are in control and responsible for safe operation.
- ⚠ The outboard must be correctly installed. Failure to correctly install the outboard could result in serious injury, death or property damage. We strongly recommend that your Dealer install your outboard to ensure proper installation.
- ⚠ Do not overpower your boat by using an engine that exceeds the horsepower indicated on the boat's capacity plate. Overpowering could result in loss of control. If your boat has no capacity plate, contact your Dealer or the boat's manufacturer.
- ⚠ When replacement parts are required, use *Evinrude/Johnson Genuine Parts* or parts with equivalent characteristics, including type, strength and material. Using substandard parts could result in injury or product malfunction.
- ⚠ Only perform service procedures which are detailed in this Operator's Guide. Attempting to perform maintenance or repair on your outboard if you are not familiar with the correct service and safety procedure could cause personal injury or death. Further information can be obtained from your authorized *Evinrude/Johnson* Dealer. In many instances proper tools and training are required for certain service or repair procedures.
- ⚠ Maintain your boat and engine in top condition at all times. Adhere to the **Maintenance Schedule** on page 35.
- ⚠ Operate your boat and outboard prudently and have fun. Do not forget that all persons must assist other boaters in case of emergency.
- ⚠ Prevent injury from contact with rotating propeller; remove propeller before flushing or before performing any maintenance.





## PRODUCT REFERENCES, ILLUSTRATIONS AND SPECIFICATIONS

BRP reserves the right to make changes at any time, without notice, to features, specifications and model availability, and to change any specification or part at any time without incurring any obligation to update older models. The information in the Guide is based on the latest specifications available at the time of publication.

Photographs and illustrations used in this Guide might not depict actual models or equipment but are intended as representative views for reference only.

Certain features of systems discussed in this Guide might not be found on all models in all marketing areas.

### ***Owner's Identification***

**United States and Canada** — At the time of purchase, your Dealer will complete your outboard registration forms. Your portion provides proof of ownership and date of purchase.

**Outside United States and Canada** — See your Dealer or distributor for details.

### ***Model and Serial Numbers***

The model and serial numbers appear on a plate attached to the stern bracket or swivel bracket. Record your outboard's:

Model Number \_\_\_\_\_

Serial Number \_\_\_\_\_

Purchase Date \_\_\_\_\_

Ignition Key Number \_\_\_\_\_

### ***Stolen Outboards***

**United States and Canada** — Report stolen outboards to your local dealer or distributor.

**Outside United States and Canada** — Report the theft to the Bombardier Recreational Products distributor where the outboard was registered.

## Technical Literature

BRP offers technical literature specifically for your outboard. A service manual, a parts catalog, or an extra Operator's Guide can be purchased from your selling Dealer. For the name and location of the nearest *Evinrude* Dealer in the United States and Canada visit [www.evinrude.com](http://www.evinrude.com).

## Declaration of Conformity

- **Application of Council Directives:** Directive 2003/44/EC Recreational-Craft
- **Relevant Directive(s):** Directive 89/336/CEE Elettromagnetic Compatibility
- **Relevant Harmonized Standard(s):** As referenced by Council and Relevant Directives
- **Product Type:** Marine Outboard 2-Stroke Cycle SI Engine
- **Manufacturer:** BRP US Inc.  
10101 Science Drive  
Sturtevant, WI 53177

## EC Type Certificate:

Engine Model(s)	Exhaust Emissions Certificate Number	Sound Emissions Certificate Number
E40DPLSC, E50DPLSC	EXBOMB002	SDBOMB012
E60DPLSC	EXBOMB002	SDBOMB013

I, the undersigned, hereby declare that the product specified above conforms to the above Directive(s) and Standard(s).



Fernando Garcia,  
Director of Regulatory Affairs and Public Relations

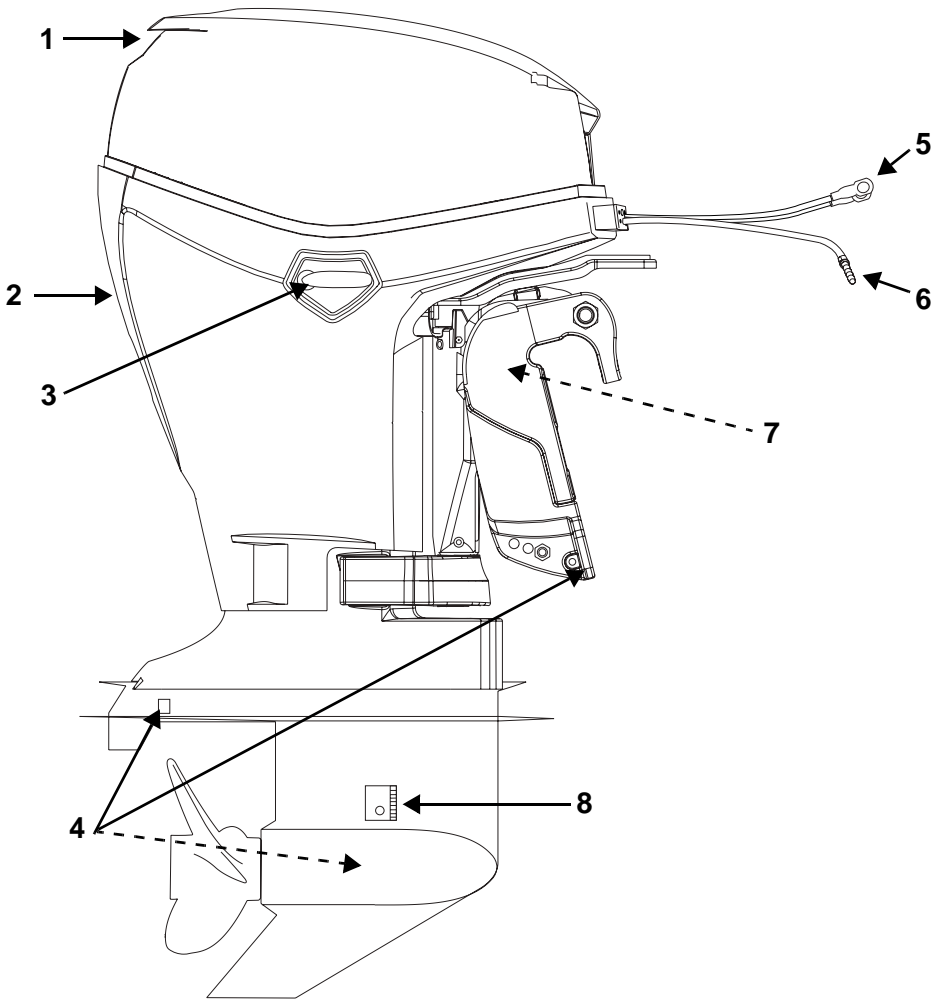


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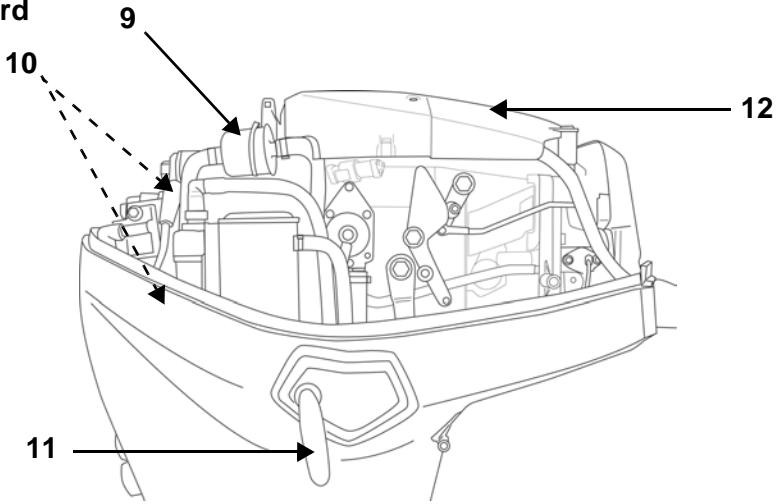
# USING YOUR *EVINRUDE E-TEC* OUTBOARD

## COMPONENT IDENTIFICATION

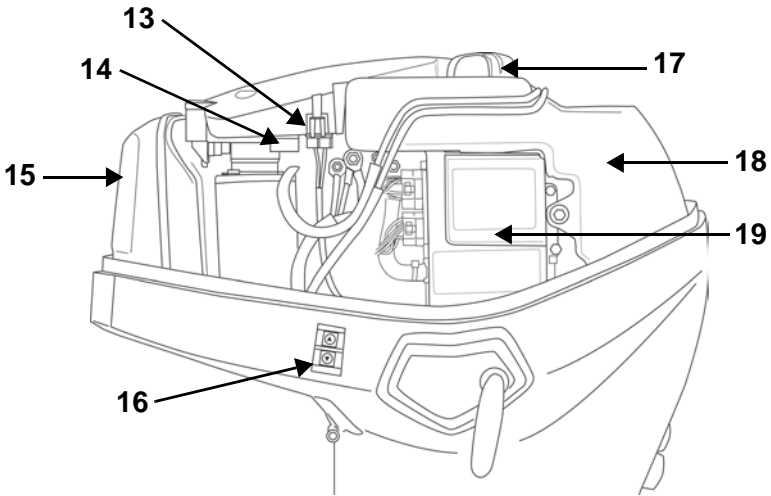


Item	Description	Item	Description
1	Air Inlet, Tilt Handle	5	Battery Cables
2	Water Pump Indicator, Flushing Port	6	Fuel Fitting
3	Engine Cover Latch	7	Tilt Support
4	Anti-Corrosion Anodes	8	Water Intake Screens

**Starboard**



**Port**



Item	Description	Item	Description
9	Fuel Filter	15	Air Silencer
10	Spark Plugs	16	Trawling Tilt Switch (Power Models only)
11	Engine Cover Latch	17	Oil Fill Cap
12	Flywheel Guard	18	Oil Tank
13	Fuse	19	EMM (Engine Management Module)
14	Spare Fuse		

## OIL AND FUEL

## OIL REQUIREMENTS

**Evinrude/Johnson Brand Oils**

*Evinrude/Johnson* outboard oils are formulated to give best engine performance while controlling piston and combustion chamber deposits, providing superior lubrication, and ensuring maximum spark plug life.

The following outboard oils are recommended for use in your *Evinrude E-TEC* outboard:

- *Evinrude/Johnson XD100*;
- *Evinrude/Johnson XD50*; or
- *Evinrude/Johnson XD30*.

**Evinrude/Johnson XD100 Oil**

*Evinrude/Johnson XD100* oil is preferred for your *Evinrude E-TEC* outboard. This synthetic formula oil provides uncompromised lubrication and superior performance, even in extreme conditions—especially in cold temperatures down to 0°F (-17°C).

If requested, an authorized dealer can program your *Evinrude E-TEC* outboard *EMM* for the exclusive use of *Evinrude/Johnson XD100*. **Only an authorized *Evinrude* dealer can program your outboard for this optional benefit.**

Oil consumption is reduced if the outboard is programmed for exclusive use of *Evinrude/Johnson XD100* as compared to using a conventional oil.

**IMPORTANT:** If your *EMM* has been programmed for *Evinrude/Johnson XD100*, **DO NOT** use any other oil unless in an emergency. If *Evinrude/Johnson XD100* is temporarily unavailable, a **one-time-only use** of an oil that meets NMMA TC-W3 certification standards is allowed. If you discontinue using *Evinrude/Johnson XD100*, you **MUST** first return to your Dealer to have the *EMM* reprogrammed back to the original factory setting.

**Other Oils**

If *Evinrude/Johnson* brand oils are not available, you must use an oil that meets NMMA TC-W3 certification standards.

**IMPORTANT:** Failure to follow oil specifications could void the engine warranty if a lubrication-related failure occurs.

## OILING SYSTEM



If the “LOW OIL” warning light illuminates, you have approximately five hours of normal operation before running out of oil. Refill the oil tank at next convenient opportunity.

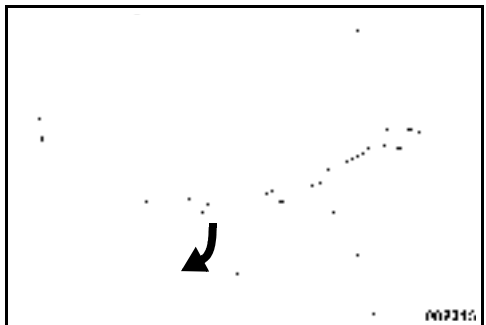
Always “top off” your oil tank prior to prolonged usage or long trips.

New outboards are programmed to use additional oil during the first two hours of operation above 2000 RPM.

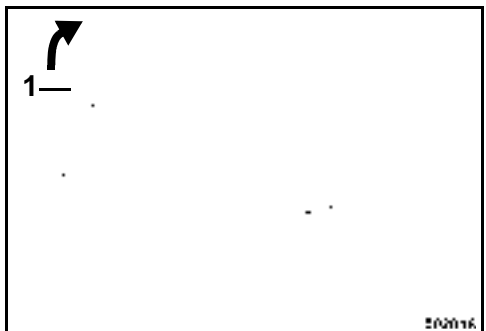
**IMPORTANT:** When operating in conditions under 32°F (0°C), *Evinrude/Johnson XD100* oil must be used.

## FILLING THE OIL TANK

Release the port and starboard engine cover latches by turning each handle downward.

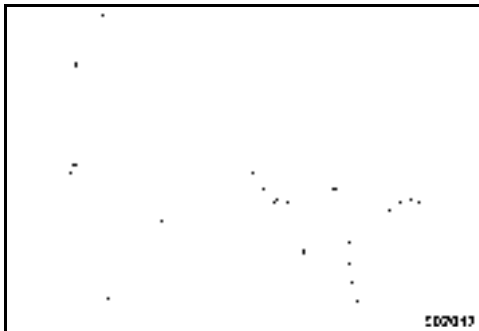


Pull up on the tilt handle to release the engine cover seal on the engine cover.

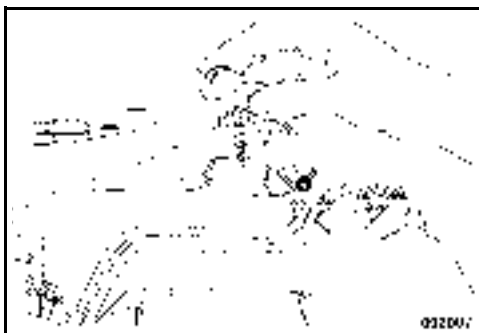


1. Tilt handle

Remove the engine cover to access the oil tank.



Remove the filler cap and fill the tank with the recommended outboard lubricant, as specified in **Oil Requirements** on page 14.



Replace the filler cap and tighten securely. Reinstall the engine cover.

**IMPORTANT:** The oil tank capacity is 2.0 quarts (1.9 liters).

## PRIMING THE OIL SYSTEM



The oiling system must be primed before using the outboard if:

- The outboard is new (check with your dealer to ensure oil system was primed);
- You run completely out of oil; or
- The outboard is laid down for transportation or storage.

Prime the oiling system by performing winterization. Refer to **Long-Term Storage (Winterization)** on page 37.

## FUEL REQUIREMENTS



### WARNING



Gasoline is extremely flammable and highly explosive under certain conditions. Follow the instructions in this section explicitly. Improper handling of fuel could result in property damage, serious injury or death.

Leaking fuel is a fire and explosion hazard. All parts in the fuel system should be inspected frequently and replaced if signs of deterioration or leakage are found. Inspect the fuel system each time you refuel, each time you remove the engine cover and annually.

Follow these instructions to ensure safety when handling fuel:

- Always turn off the engine before fueling.
- Never permit anyone other than an adult to refill the fuel tank.
- Do not fill the fuel tank all the way to the top or fuel may overflow when it expands due to heating by the sun.
- Remove portable fuel tanks from the boat before fueling.
- Always wipe off any fuel spillage.
- Do not smoke, or allow open flames, or sparks or use electrical devices such as cellular phones in the vicinity of a fuel leak or while fueling.
- Always work in a well ventilated area.

**IMPORTANT:** Always use fresh gasoline. Gasoline will oxidize; the result is loss of octane, volatile compounds, and the production of gum and varnish deposits which can degrade the fuel system.

### Minimum Octane

Your outboard is certified to operate on unleaded automotive gasoline with an octane rating equal to or higher than:

- 87 (R+M)/2 AKI — Inside the U.S.
- 90 RON — Outside the U.S.

Using unleaded gasoline that contains methyl tertiary butyl ether (MTBE) is acceptable **ONLY** if the MTBE content does not exceed 15% by volume.

### Alcohol Fuels

Your outboard has been designed to operate using the specified fuels; however, be aware of the following:

- The boat's fuel system may have different requirements regarding the use of alcohol fuels. Refer to the boat's owner guide.
- Alcohol attracts and holds moisture that can cause corrosion of metallic parts in the fuel system.
- Alcohol blended fuel may cause engine performance problems.

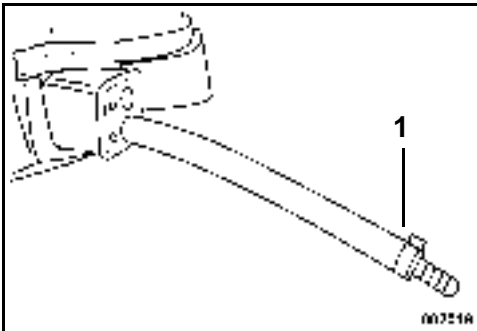
Using alcohol-extended fuels is acceptable **ONLY** if the alcohol content does not exceed:

- 10% ethanol by volume; or
- 5% methanol with 5% cosolvents by volume.

## FUEL SYSTEM OPERATION

### Connecting the Fuel Hose

- 1) If the fuel hose is disconnected for any reason, seal it to prevent spillage. Cap the fuel fitting to prevent contamination.
- 2) Connect the fuel hose to the 3/8 in. (9 mm) fuel fitting. Fasten hose securely with clamp (18.5 mm) from owner's kit.



1. Fuel hose and fitting – 3/8 in. (9 mm)



## WARNING



**Store fuel tanks in a well-ventilated area, away from heat and open flame. Prevent escape of liquid or vapors which could accidentally ignite.**

**Close the filler cap vent screw, if equipped.**

**Be sure the disconnected fuel hose does not drip.**

**IMPORTANT:** Fuel distribution hoses in the boat must deliver fuel at the rate of flow needed by the outboard. Minimum inside diameter of fuel hoses must be 3/8 in. (9 mm).

Fuel systems with built-in tanks, particularly those that include antisiphon valves and filter/primer units, may have restrictions not allowing the engine fuel pump to deliver sufficient fuel under all conditions. This can result in a loss of performance. If a performance problem exists, see your Dealer.

## FUEL ADDITIVES

The only fuel additives approved for use in your *Evinrude E-TEC* outboard are:

- *Evinrude/Johnson 2+4 Fuel Conditioner*
- *Evinrude/Johnson Fuel System Cleaner*

**Use of other fuel additives can result in poor performance or engine damage.**

*Evinrude/Johnson 2+4 Fuel Conditioner* will help prevent gum and varnish deposits from forming in fuel system components and will remove moisture from the fuel system. It can be used continuously and should be used during any period when the outboard is not being operated on a regular basis. Its use will reduce spark plug fouling, fuel system icing, and fuel system component deterioration.

*Evinrude/Johnson Fuel System Cleaner* will help keep fuel injectors in optimal operating condition.



# ENGINE MONITORING

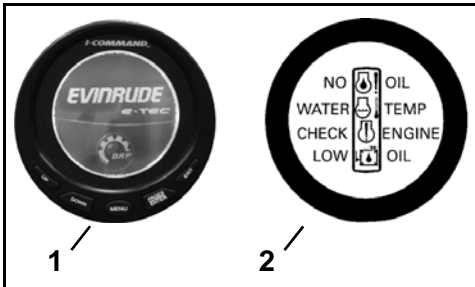
**IMPORTANT:** Your outboard must be equipped with an engine monitoring system such as *I-Command*, *SystemCheck*, or equivalent. Operating your outboard without an engine monitor will void your warranty for failures related to monitored functions.

The engine monitoring system warns you of conditions that could damage your outboard. The monitoring system consists of a dash-mounted gauge, a warning horn, sensors on the engine and oil tank, and related wiring.

The system is compatible with the *Evinrude* Modular Wiring System (MWS) or can be connected to an *I-Command* system, or other NMEA 2000 compliant CANbus instruments.

## GAUGES

Gauges are available in several styles, such as a digital *I-Command* gauge with LCD displays or a basic *SystemCheck* gauge.



1. Typical *I-Command* Digital gauge
2. Typical *SystemCheck* gauge

## Function

The *EMM* activates the warning horn and the gauge displays as follows:

- **LOW OIL** means that oil in the tank is at reserve level (about 1/4 full).
- **NO OIL** indicates an oil delivery problem such as an empty oil tank or damaged oil system.
- **WATER TEMP** or **HOT** indicates an engine or *EMM* overheat condition.
- **CHECK ENGINE** or **FAULT** is used to indicate other fault conditions identified by the *EMM*.

For *I-Command* and other gauges, refer to the gauge user's guide for gauge displays, operation, warnings, and monitoring instructions.

## SYSTEM SELF-TEST

During engine start-up, pause with the key switch in the ON position. The monitoring system self-tests by sounding a half-second beep. *SystemCheck* gauges self-test by turning the indicator lights on simultaneously, then off in sequence.

**IMPORTANT:** If the self-test does not happen as stated, see your Dealer.

## ENGINE MONITOR WARNINGS

Engine monitor system warnings activate the horn for 10 seconds and the appropriate gauge light for a minimum of 30 seconds, or until alarm is acknowledged. If the failure is momentary (for example, oil moving in the tank), the engine monitor gauge light or display may remain ON for a full 30 seconds before going out. If the unsafe operating condition continues, a light or display remains ON until the key is turned OFF or the failure is corrected.

The warning will reoccur at the next startup if the problem is not corrected.

If the *EMM* senses a problem could cause permanent engine damage, it will also limit engine speed to 1200 RPM. This additional protection feature is referred to as *S.A.F.E.* (Speed Adjusting Failsafe Electronics). If the engine was running faster than 1200 RPM when the *S.A.F.E.* mode activated, it will shake noticeably. Under certain operating conditions the *EMM* will shut OFF the engine.



## CAUTION



**In the *S.A.F.E.* mode, the engine speed is limited. Under certain conditions, the engine's limited speed may reduce maneuverability of your boat.**

**If the *S.A.F.E.* mode is activated and you are unable to correct the problem, seek assistance and/or return to safe harbor. Serious engine damage, engine shutoff, and/or reduced maneuverability may be imminent.**

## Using Your E-TEC Outboard

The following warnings may appear on the engine monitor gauge.

### “LOW OIL”

Symptom	Oil in the oil tank is at reserve level (about 1/4 full)
Result	<i>EMM</i> will activate low oil light or display warning
Action	<ul style="list-style-type: none"><li>• Fill the oil tank with recommended oil as soon as possible to avoid emptying the tank. The outboard has approximately five hours (ten hours if using <i>Evinrude/Johnson XD100</i> oil) of normal running time before “NO OIL” condition occurs. Refer to <b>Filling the Oil Tank</b> on page 14.</li></ul>

### “NO OIL”

Symptom	There is an oil delivery problem
Result	<i>EMM</i> will activate <i>S.A.F.E.</i> * mode
Action	<ul style="list-style-type: none"><li>• If the oil tank is empty, add the recommended oil.</li><li>• If the oil tank is not empty, seek assistance and/or return to safe harbor.</li></ul>

Your outboard is designed to run in “get home” mode for up to five hours in the event you run out of oil. Refill the oil tank. Prime oil system. Refer to **Priming the Oil System** on page 15.

### “WATER TEMP” or “HOT”

Symptom	The engine is overheating
Result	<i>EMM</i> will activate <i>S.A.F.E.</i> * mode
Action	<ul style="list-style-type: none"><li>• A <b>continuous</b> light with <i>S.A.F.E.</i> mode — The <i>EMM</i> has identified an overheating condition. Check the water pump indicator for a steady stream of water. Shut OFF the engine. Clear the water intake screens of any debris. If the overheat condition still exists, the engine will operate in “get home” mode. Return to harbor immediately.</li><li>• A <b>flashing</b> light — The <i>EMM</i> has identified a damaging overheating condition. The engine will not operate. Allow the engine to cool for 20 minutes and return to harbor immediately. See your Dealer.</li></ul>

### “CHECK ENGINE” or “CHK ENG”

Symptom	An abnormal operating condition
Result	<i>EMM</i> will activate check engine light or display warning
Action	<ul style="list-style-type: none"><li>• A <b>flashing</b> light — The <i>EMM</i> has identified an abnormal operating condition related to the fuel system. The engine will shut OFF and cannot be restarted.</li><li>• A <b>continuous</b> light with <i>S.A.F.E.</i> mode — The <i>EMM</i> has identified a problem with the outboard. Seek assistance and/or return to harbor. See your Dealer.</li><li>• A <b>continuous</b> light without <i>S.A.F.E.</i> mode — The <i>EMM</i> has identified a problem that should be addressed by your Dealer as soon as practical to avoid operational difficulties.</li></ul>



## WARNING



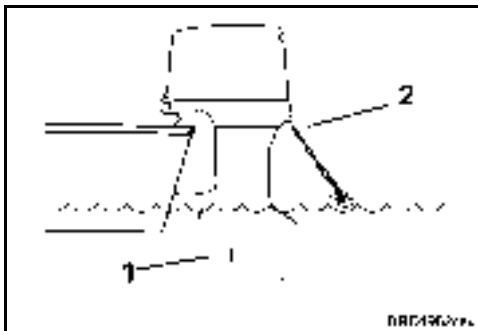
If the outboard shuts OFF and the “CHECK ENGINE” or “CHK ENG” light is flashing, the outboard cannot be restarted. A hazardous fuel condition may exist. Seek assistance to return to port.

\*Speed Adjusting Failsafe Electronics

## ENGINE OVERHEATING

**IMPORTANT:** Do not run your outboard—even for a brief start-up—without supplying water to it. Refer to **Flushing** on page 36.

While boating, the outboard's water intakes must stay completely submerged and unobstructed. Observe proper transom height and trim angle. While the outboard is running, the outboard's water pump indicator must discharge a steady stream of water. Check the indicator often, especially when operating in weeds, mud and debris-laden water, and at extreme trim angles.



1. Water intake screens
2. Water pump indicator

If the engine overheats, the engine monitor will sound the warning horn and turn on the "WATER TEMP" or "HOT" light. Also, the S.A.F.E. (Speed Adjusting Failsafe Electronics) mode will immediately limit the engine's speed to 1200 RPM. If the engine was running faster than 1200 RPM when the S.A.F.E. mode activated, it will shake noticeably. The protection system must be **RESET** before the engine will operate at speeds over 1200 RPM. Under certain conditions the *EMM* will shut off the engine.



To **RESET** the system:

- The engine must be shut off and the cooling temperature restored.

**IF** the S.A.F.E. mode activates and the stream from the water pump indicator becomes intermittent or stops, reduce speed to idle and:

- 1) Shift to NEUTRAL.
- 2) SHUT OFF the engine.
- 3) Tilt the outboard up.
- 4) Clean the intake screens of any blockage.
- 5) Clean the water pump indicator of any blockage.
- 6) Lower the outboard.
- 7) Restart the engine and run at idle.

**IF** cleaning the screens and indicator *does not* restore the water pump indicator's steady discharge, the engine will operate only in "get home" mode. Return to harbor immediately. See your Dealer.

**IF** cleaning the screens and indicator *does* restore the water pump indicator's steady discharge, you might have to run for two minutes in NEUTRAL to allow the engine to cool and the light to go off.

**IMPORTANT:** If cooling is not restored, the *EMM* will identify a progressive overheating condition and shut off the engine. The "WATER TEMP" or "HOT" light will flash. The engine will not restart until the engine is allowed to cool.

After any overheat causing engine shutdown, see your Dealer for:

- Inspection of the water pump for excessive wear or damage.
- Inspection of the thermostats.

**IMPORTANT:** Although the S.A.F.E. mode can help prevent engine damage, it does not guarantee you can run your engine indefinitely without engine damage.

## OPERATION

## SAFETY INFORMATION


**DANGER**


**DO NOT** run the engine indoors or without adequate ventilation or permit exhaust fumes to accumulate in confined areas. Engine exhaust contains carbon monoxide which, if inhaled, can cause serious brain damage or death.

Contact with a rotating propeller is likely to result in serious injury or death. Assure the engine and prop area is clear of people and objects before starting engine or operating boat. Do not allow anyone near a propeller, even when the engine is off. Blades can be sharp and the propeller can continue to turn even after the engine is off. Always shut off the engine when near people in the water.

**WARNING**

The engine cover is a machinery guard. **DO NOT** operate your outboard with the cover off unless you are performing maintenance or emergency starting, and then be careful to keep hands, hair, and clothing clear of all moving parts. Contact with moving parts could cause injury.

 Always shut off the outboard when your boat is near people who are in the water.

 Be familiar with the waters you are operating in. The gearcase of this outboard extends below the water surface and could potentially come in contact with underwater obstructions. Contact with underwater obstructions may result in loss of control and personal injury.

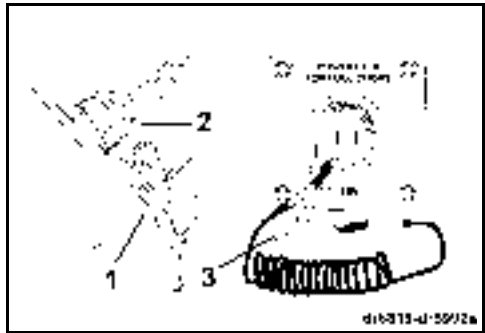
## ENGINE STARTING

Refer to the **Routine Inspection Checklist** on page 31 for pre-launch checks before using your *Evinrude E-TEC* outboard.

You **MUST** supply water to the engine before attempting to start it. Engine damage can occur quickly.

Be sure the water intake screens are below the water surface.

Connect the clip to the emergency stop/key switch. Snap the lanyard to a **secure** place on the operator's clothing or life vest — not where it might tear away instead of activating the stop switch.



1. Clip
2. Emergency stop clip / key switch
3. Lanyard

**IMPORTANT:** In an emergency situation, the engine will start and run without the clip connected to the key switch. **The operator should always use the clip and lanyard anytime the engine is running.** Refer to **Emergency Stop/Key Switch** on page 23.

**WARNING**

**Always use the safety lanyard when operating your boat to help prevent a runaway boat and reduce the risk of personal injury or death.**

Move the remote control handle to NEUTRAL.



## WARNING

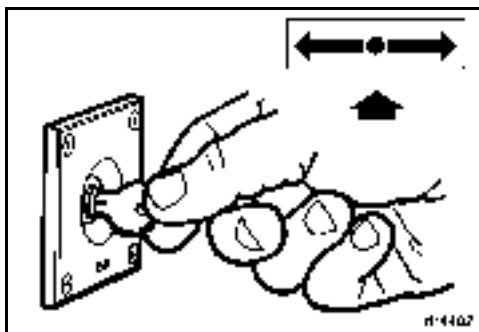


**If you are using a remote control that does not have start-in-gear prevention, the outboard can be started while it is in gear. Protect against unexpected boat movement by always starting your outboard in NEUTRAL.**



**DO NOT** advance the throttle before start-up. Advancing the throttle overrides the electronic idle control system. After the engine starts, the engine management module (EMM) automatically increases idle speed slightly. Idle speed will decrease as the engine warms up. The engine monitor gauge lights or display will illuminate if the throttle is advanced.

Turn the key switch fully clockwise to the START position. Crank the engine no longer than 20 seconds.



**IMPORTANT:** The starter motor can be damaged if operated **continuously** for more than 20 seconds.

Upon start-up, release the key.

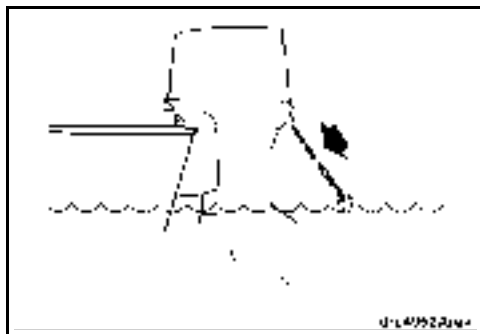
If the engine did not start, release the key momentarily, then try again.

Each time the key switch is turned from OFF to ON, the warning system will self-test. Refer to **Engine Monitoring** on page 17. If the warning system fails to self-test during start-up, see your Dealer.

If your outboard does not react normally to this starting procedure or if it fails to start, refer to **Troubleshooting** on page 42.

### After Engine Starts

Check the water pump indicator. A steady stream of water indicates the water pump is working. If a steady stream of water from the water pump indicator is not visible, stop the engine. Refer to **Engine Overheating** on page 19.



### ENGINE STOPPING

Move control handle to NEUTRAL.

Turn key switch counterclockwise to the OFF position. Remove the key when the boat will be unattended.

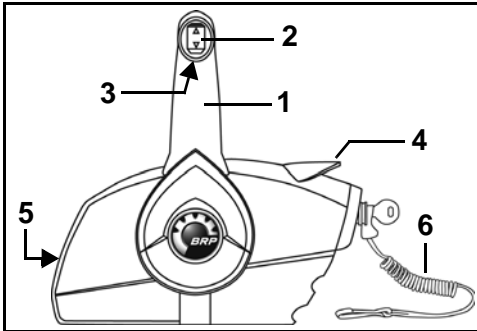
## REMOTE CONTROLS



If you choose a non-Evinrude remote control, it must have a start-in-gear prevention feature. This feature can prevent injuries resulting from unexpected boat movement when the engine starts.

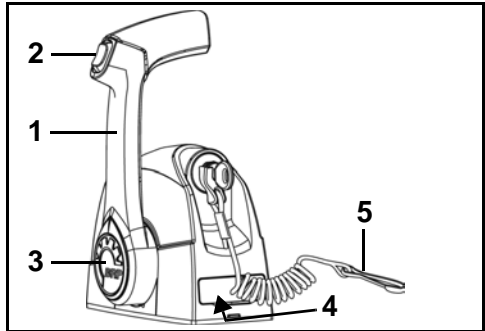
**IMPORTANT:** When selecting the remote control system for your boat, specify Evinrude components. Evinrude controls deliver the cable stroke your outboard needs for positive shift and throttle control, and they incorporate such safety and convenience features as:

- Start-in-gear prevention
- Plug-in compatibility with Evinrude Modular Wiring System (MWS)



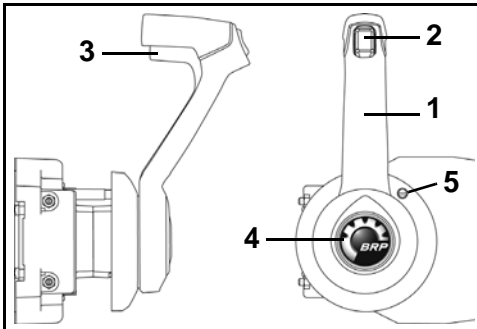
Side Mount Control

1. Handle – shift and throttle
2. Trim/tilt switch (where equipped)
3. Neutral lock lever
4. Fast idle lever (warm-up)
5. Throttle friction adjusting screw
6. Emergency stop clip and lanyard



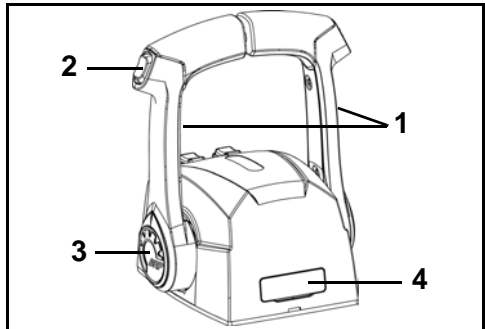
Single Lever Binnacle Mount Control

1. Handle – shift and throttle
2. Trim/tilt switch (where equipped)
3. Fast idle button (warm-up)
4. Throttle friction adjusting screw (under cover)
5. Emergency stop clip and lanyard



Concealed Side Mount Control

1. Handle – shift and throttle
2. Trim/tilt switch (where equipped)
3. Neutral lock lever
4. Fast idle button (warm-up)
5. Throttle friction adjusting screw



Dual Lever Binnacle Mount Control

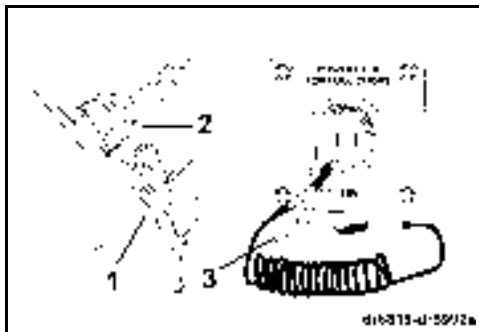
1. Handle – shift and throttle
2. Trim/tilt switch (where equipped)
3. Fast idle button (warm-up)
4. Throttle friction adjusting screw (under cover)

## Emergency Stop/Key Switch

A combination emergency stop switch and key switch is a feature of *Evinrude* prewired remote controls and all *Evinrude* control wiring kits.

Connect the clip to the emergency stop/key switch. Snap the lanyard to a **secure** place on the operator's clothing or life vest — not where it might tear away instead of activating the stop switch. Disconnecting the clip and lanyard will stop the engine and prevent the boat from becoming a runaway if the driver moves beyond the range of the lanyard. If the lanyard is too long, it can be shortened by knotting or looping it. **DO NOT** cut and retie the lanyard. In an emergency situation, the engine can be started without the clip in place. Follow the normal starting procedure. Reinstall a clip as soon as possible.

**IMPORTANT:** Your emergency stop switch can be effective only when in good working condition. At each outing, inspect clip and lanyard for cuts, breaks, or wear. Replace worn or damaged parts.



1. Clip
2. Emergency stop / key switch
3. Lanyard



## DANGER



**Always use the safety lanyard when operating your boat to help prevent a runaway boat and reduce the risk of personal injury or death.**



## WARNING



**Avoid knocking or pulling the clip off the stop switch during normal boating. Avoid bumping the key if operating without the clip on the switch. The resulting unexpected loss of forward motion can throw occupants forward, causing injury.**

**Keep the lanyard free from obstructions and entanglements.**

**At each outing, test the system's operation. With the engine running, remove the clip from the switch by pulling the lanyard. If the engine does not stop running, see your Dealer.**

## SHIFTING AND SPEED CONTROL

**IMPORTANT:** Carefully check the function of all control and engine systems before leaving the dock. **DO NOT** shift the engine into FORWARD or REVERSE while it is shut off.

If the following directions are not suitable for your boat's control, see your Dealer before proceeding.

### Shifting

**IMPORTANT:** When shifting from FORWARD to REVERSE or from REVERSE to FORWARD, pause at NEUTRAL until the engine is at idle speed and the boat has slowed.

With engine running and control handle in NEUTRAL:

#### Side Mount Controls

Unlock the control handle by lifting the neutral lock lever on the hand grip. With a firm, quick motion, move the control handle fore or aft until it engages the forward or reverse gear detent.

#### Binnacle Mount Controls

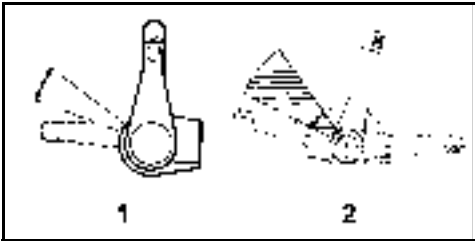
With a firm, quick motion, move the control handle fore or aft until it engages the forward or reverse gear detent.

### Speed Control

After gear engagement, move the control handle slowly in the same direction to increase speed.

### FUEL ECONOMY

Fuel economy can vary depending on boat load, hull design, and throttle setting. When boat reaches top speed, throttle back from FULL SPEED to a lower throttle setting. You will save fuel with a minimal loss of speed.



Typical Fuel Economy Throttle Range

1. Side mount control
2. Binnacle mount control

### POWER TRIM AND TILT



#### WARNING



Any malfunction of the power trim and tilt unit could result in loss of shock absorber protection if an underwater obstruction is hit. Malfunction can also result in loss of reverse thrust capability.

Correct fluid level must be maintained to ensure operation of the impact protection on this unit.

When operating in rough water or crossing a wake, excessive bow-up trim may result in the boat's bow suddenly rising skyward, possibly ejecting or otherwise seriously injuring occupants.

Some boat/outboard/propeller combinations may encounter boat instability and/or high steering torque when operated at high speed at or near the outboard's trim range limits (full bow-up or bow-down). Boat stability and steering torque can also vary due to changing water conditions. If any adverse conditions occur, reduce throttle and/or adjust trim angle to maintain control. If you experience boat instability and/or high steering torque, see your Dealer to correct these conditions.

Some boats plow, or are difficult to plane, when operated in the trim's lowest position. If your boat handles unsuitably when trimmed fully bow-down, set the angle adjusting rod or trim limiter rod to limit the travel of the power trim. If your outboard is not equipped with this rod, purchase one from your Dealer.

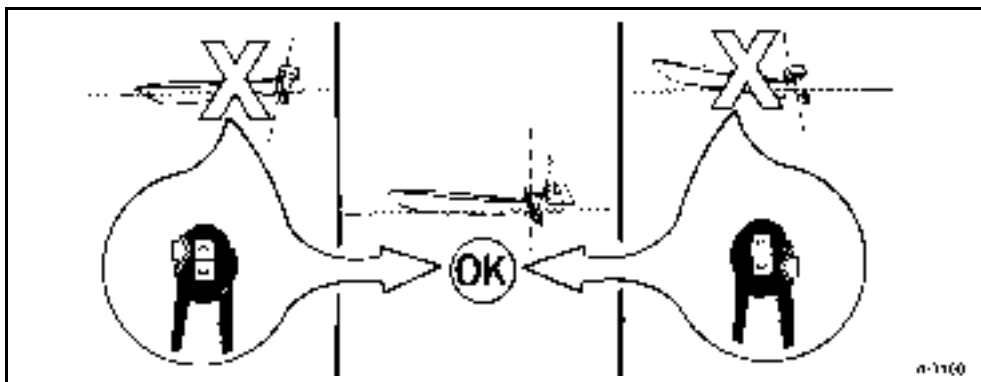


#### WARNING



If the bow of the boat plows the water at high speeds, the boat may bow steer or spin suddenly, possibly ejecting or otherwise seriously injuring occupants.





a-1160



### Trim

In most operating conditions, it is recommended to **trim** the outboard to the full down position when accelerating. Once on plane, trim the outboard up for best performance.

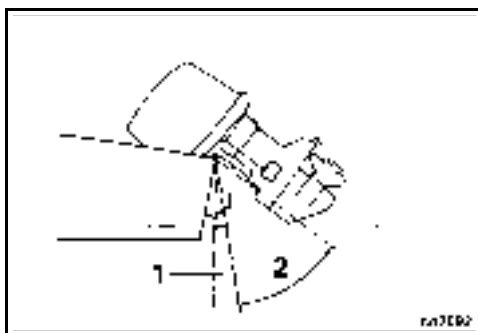
Over-trimming increases engine RPM while decreasing speed. The best trim setting is when the highest speed is achieved with the lowest engine RPM.

### Shallow Water Drive

You can **tilt** the outboard to any position within the tilt range but **DO NOT** run the engine faster than idle speed. If idling a tilted outboard, keep its water intakes submerged at all times.

### Tilt

The full tilt is often used to tilt the outboard for clearance when beaching, mooring, or launching.



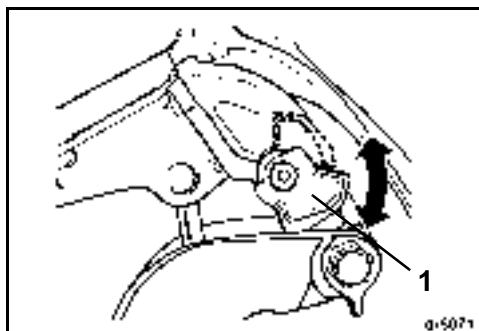
a-1162

1. Trim range
2. Tilt range

### Tilt Lock Lever

If you intend to leave the outboard tilted for a period of time, engage the tilt lock lever:

- 1) Tilt the outboard UP using the trailering tilt switch.
- 2) Flip the tilt lock lever down.
- 3) Lower the outboard until the tilt lock lever rests solidly on the stern brackets.



a-5071

#### 1. Tilt support lever

When you are finished tilting the outboard, disengage the tilt lock lever:

- 1) Tilt the outboard UP.
- 2) Flip the tilt lock lever up.
- 3) Lower the outboard to operating position.

### Manual Release Valve

If needed, the outboard will tilt up or down manually, using the manual release valve.



### WARNING



**Keep everyone clear of a tilted outboard when backing out the manual release screw. The outboard could drop suddenly and forcibly. Be sure to tighten the manual release screw after manually repositioning the outboard. Tightening the screw also reactivates the outboard's impact protection and reverse thrust capability.**

- 1) Turn the manual release screw counter-clockwise, slowly (about 3 1/2 turns), until it **lightly** contacts its retaining ring.
- 2) Reposition the outboard.
- 3) Tighten the manual release valve to hold the outboard in its new position.



1. Manual release screw

### TRAILERING

Trailer your boat with the outboard in a vertical position. If your trailer does not provide adequate road clearance, support the outboard with an accessory trailering bracket.

**IMPORTANT:** The outboard must be restrained when trailering. Bouncing during transport may damage the outboard and the boat's transom.

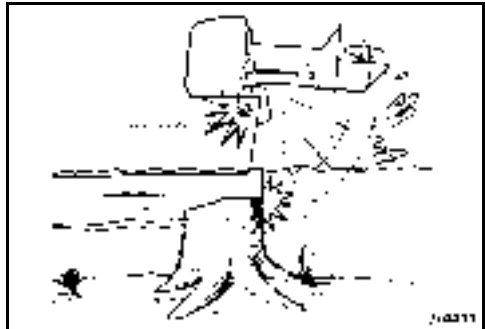
**IMPORTANT:** Use of the tilt lock lever when trailering may cause damage to the outboard.

### IMPACT DAMAGE

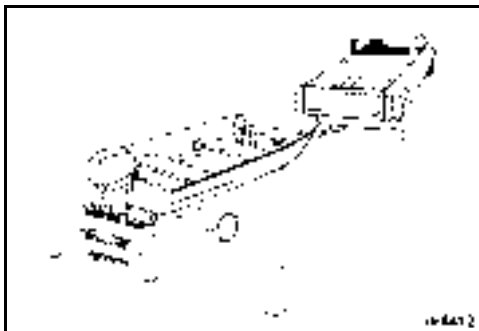
Your outboard has a shock absorption system designed to help withstand damage from impact with underwater objects at low to moderate speeds. High speed impacts with rigid underwater objects like pilings or boulders can be beyond the capability of the absorption system. Such impacts can result in serious damage to your outboard and injury to boat occupants from the outboard or its parts entering the boat. Occupants can also be ejected or injured by falling against portions of the boat as a result of rapid deceleration following impacts.

When boating in unfamiliar, shallow, or debris-laden waters, seek information on safe boating areas and navigation hazards from a reliable local source. Reduce your speed and keep a sharp lookout!

**IMPORTANT:** Impact damage is NOT covered by the outboard warranty.



The outboard's shock absorption system does not work while operating in reverse. If you back into an object, either in the water or while trailering, your boat and outboard can be seriously damaged.



If you hit any object:

- STOP immediately and examine the outboard for loosening of attaching hardware.
- INSPECT for damage to swivel and stern brackets, and steering components.
- EXAMINE the boat for structural damage.
- TIGHTEN any loosened hardware.

If the collision occurred in the water, proceed slowly to harbor. Before boating again, have your Dealer thoroughly inspect all components.



## WARNING



Failure to inspect for damage after an accident or striking an object could result in sudden, unexpected component failure, loss of boat control, and personal injury. Unrepaired damage could reduce your boat and outboard's ability to resist future impacts.

## EMERGENCY STARTING

If the starter fails, your engine can be started using a 1/4 in (6 mm) cord about 4 ft. (1.2 m) long.



## WARNING



Move the shift lever to **NEUTRAL** before performing emergency starting procedures. Failure to do so may result in unexpected boat movement.

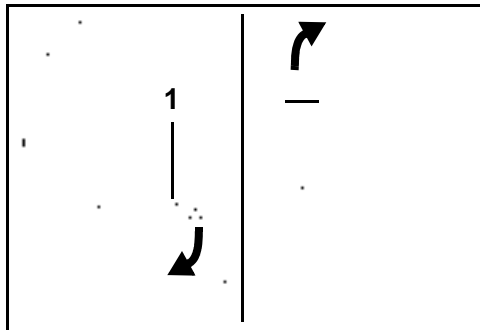
The engine cover is a machinery guard. To prevent injury from moving engine components, keep hands, clothes, and hair clear of powerhead.

Prevent electric shock by keeping clear of the ignition coils and spark plug leads when the outboard is being started or is running. Shock can cause serious personal injury under certain conditions.

**DO NOT** turn flywheel by hand. Use starter cord only.

Be sure:

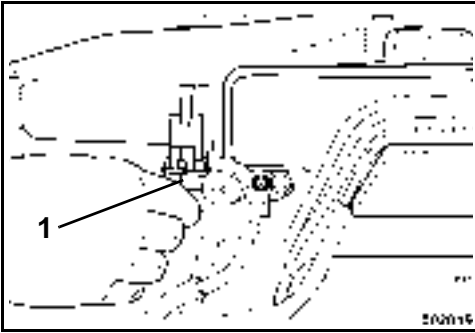
- Key switch is OFF.
  - Engine is in normal operating position.
  - Shift lever is in NEUTRAL.
- 1) Release port and starboard side engine cover latches downward. Pull up on the tilt handle to release the engine cover seal and remove the engine cover.



1. Engine cover latch
2. Tilt handle

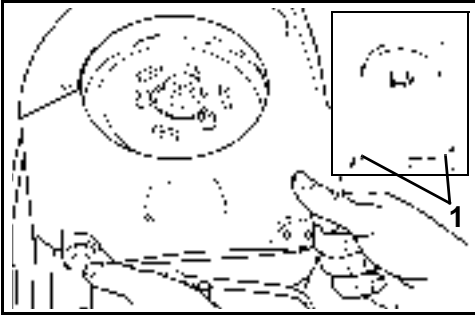
## Using Your E-TEC Outboard

- 2) Remove fuse holder from flywheel cover.



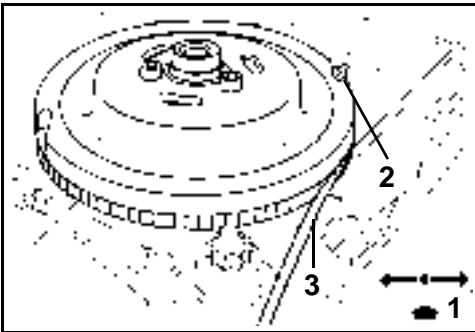
1. Fuse

- 3) Raise flywheel guard from the fittings by pulling up on the front two fastening tabs.



1. Fastening tabs

- 4) Holding the flywheel guard out of the way, hook the knot of your emergency start cord into the notch on the flywheel. Wind the cord clockwise in the flywheel ridge, making one and a half full windings with the cord.



1. NEUTRAL  
2. Knot  
3. Rope in flywheel ridge

- 5) Turn key switch ON.

- 6) From a secure position in the boat, pull hard on emergency starting cord to start engine.



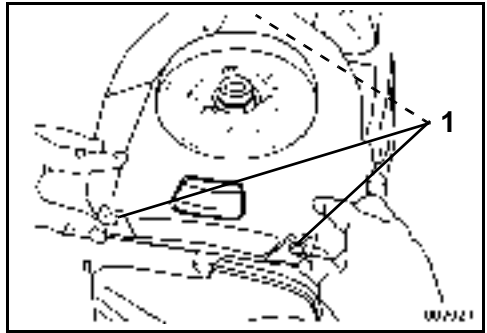
### CAUTION



Keep everyone clear of your immediate area when pulling on emergency starting cord, especially behind you.

Repeat procedure, if necessary, until engine starts.

- 7) Refasten flywheel guard in place by pushing the three fastening tabs back onto the fittings.



1. Fastening tabs



### DANGER



Contact with a rotating flywheel can cause severe personal injury. Use extreme care in re-fastening the flywheel guard on the fastening tabs. Keep hands, hair, and clothing away from coming in direct contact with rotating parts.

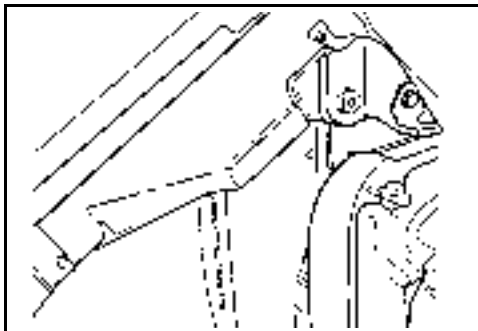
If equipped, snap emergency stop switch lanyard to secure place on clothing. Proceed immediately to nearest landing for service.

## SALT WATER

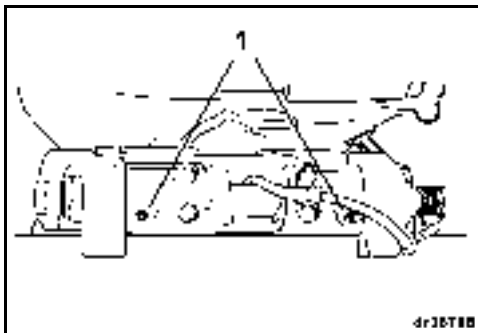
Additional anodic protection for the outboard has been provided for use in salt or brackish water.

Upon removal from salt water, leave outboard in a vertical position until its cooling system has drained. During long periods of mooring, tilt the gearcase out of the water, except in freezing temperatures. Flush the outboard, if desired. Refer to **Flushing** on page 36.

### Salt Water Lubrication Points



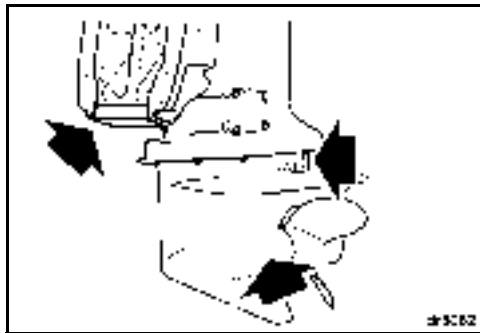
1. Trawling bracket and swivel bracket lubrication points (annually)



1. Tilt tube lubrication points (annually)

### Anti-Corrosion Anodes

Your outboard is equipped with one or more anodes that protect it from galvanic corrosion. Disintegration of the anode is normal and indicates it is working. Check each anode periodically. Replace anodes smaller than 2/3 their original size. See your Dealer for replacements.



Galvanic corrosion destroys underwater metal parts and can occur in fresh or salt water; however, salt, brackish, and polluted waters will accelerate corrosion.

Metal-based antifouling paint on the boat or outboard and the use of improperly installed shore power in the area of your moored boat will also accelerate corrosion.

**IMPORTANT:** NEVER paint the anode, its fasteners, or its mounting surface. Painting will reduce its corrosion protection.

### WEEDY WATER

Weeds block water intakes and may cause your outboard to overheat. Weeds on the propeller create vibration and reduce boat speed.

When operating in weedy water, run at slow speeds and in REVERSE frequently to clear weeds from the propeller and water intakes. Check the water pump indicator often.

If REVERSE operation does not clear away weeds, SHUT OFF the engine. Remove weeds from propeller area and water intakes before operating at higher speed.

### HIGH ALTITUDE

Your outboard's *EMM* will automatically compensate for changes in altitude. However, if you boat above 3000 ft. (900 m), you will experience a slight loss of power due to reduced air density.

If your engine drops below the recommended RPM operating range at full throttle, have your Dealer select a lower pitch propeller.

If you return to sea level, have your Dealer install the original propeller and verify correct RPM operating range.

### FREEZING WEATHER

**IMPORTANT:** When operating in conditions under 32°F (0°C), *Evinrude/Johnson XD100* oil must be used.

During operation in freezing weather, keep the gearcase submerged at all times.

Upon removing your outboard from the water, leave it in a vertical position until its cooling system is drained. Store the outboard vertically.

If the outboard's gearcase is equipped with an integral speedometer pickup, all water must be cleared from the hose to prevent gearcase damage. Refer to **Storage** on page 36.



### WARNING



**Water remaining in the gearcase, cooling system or other components can freeze, causing serious engine damage.**

### SHALLOW WATER

Gearcase damage can occur if the gearcase is allowed to drag on the waterway bottom. Use caution when operating in shallow water.

**IMPORTANT:** Impact damage is NOT covered by the outboard warranty.

### DUAL OUTBOARD OPERATION

When in reverse above slow speed, be sure both outboards are running, even if one is NEUTRAL.

If it is necessary to return to harbor with one outboard not running, tilt the inoperative outboard high enough to keep its propeller out of the water.

### UNDER TOW

Should you require a tow from another boat:

- Shift your engine to NEUTRAL;
- Tilt its gearcase out of the water;
- Off-load all persons into another boat; and
- Keep speed slower than planing speed.

### FUSE



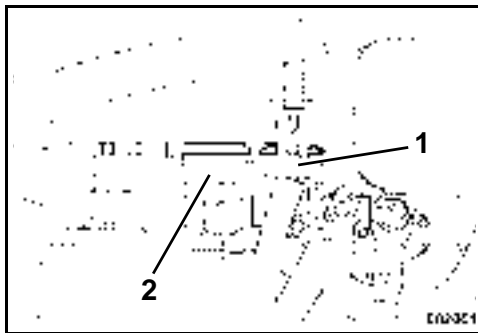
A blown fuse will not allow the engine to crank. Replace it with a fuse of the same rating. A spare fuse is provided.

Repeated fuse failures indicate a potentially serious problem. Do not replace it with higher rated fuse; see your Dealer for service.

### Fuse Replacement

**IMPORTANT:** Use only fuses of the same rating. Your *Evinrude E-TEC* outboard uses 10-amp fuses.

Remove engine cover. Install spare fuse in place of failed fuse.



1. Fuse
2. Spare fuse

**IMPORTANT:** Failure to install cover securely may cause electrical problems.

# ROUTINE INSPECTION CHECKLIST

## ***Pre-Launch Checks (Each Use)***

- Check fuel level.
- Check oil level.
- Check function of steering, throttle, shift, and emergency stop circuit and lanyard.
- Check condition of propeller.
- Confirm operation of engine monitor system self-test and warning horn.
- Confirm the cooling system is operational (water intake screens and water pump indicator).
- Confirm this Operator's Guide is onboard and readily accessible.

## ***Periodic Checks***

- Check condition of anti-corrosion anodes (annually or every 100 hours).
- Check for debris on propeller shaft (requires propeller removal).
- Clean and wax upper and lower engine covers (annually or every 100 hours).
- In salt water applications, check lubrication points and corrosion protection. Use *Evinrude* anti-corrosion spray or *Evinrude* "6 in 1" multi-purpose lubricant (annually or 100 hours).







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# MAINTENANCE

## ENGINE EMISSIONS INFORMATION

**Maintenance, replacement, or repair of the emission control devices and systems may be performed by any marine SI (spark ignition) engine repair establishments or individual.**

### ***Manufacturer's Responsibility***

Beginning with 1999 model year outboards, manufacturers of marine engines must determine the exhaust emission levels for each engine horsepower family and certify these outboards with the United States of America Environmental Protection Agency (EPA). An emissions control information label, showing emission levels and engine specifications, must be placed on each outboard at the time of manufacture.

### ***Dealer's Responsibility***

When performing service on all 1999 and more recent *Evinrude* outboards that carry an emissions control information label, adjustments must be kept within published factory specifications.

Replacement or repair of any emission related component must be executed in a manner that maintains emission levels within the prescribed certification standards.

Dealers are not to modify the outboard in any manner that would alter the horsepower or allow emission levels to exceed their predetermined factory specifications.

Exceptions include manufacturer's prescribed changes, such as altitude adjustments, for example.

### ***Owner Responsibility***

The owner/operator is required to have engine maintenance performed to maintain emission levels within prescribed certification standards.

The owner/operator is not to, and should not allow anyone to, modify the engine in any manner that would alter the horsepower or allow emissions levels to exceed their predetermined factory specifications.

Tampering with the fuel system to change horsepower or modify emission levels beyond factory settings or specifications will void the product warranty.

### **EPA Emission Regulations**

All new 1999 and more recent *Evinrude* outboards manufactured by BRP are certified to the EPA as conforming to the requirements of the regulations for the control of air pollution from new watercraft marine spark ignition engines. This certification is contingent on certain adjustments being set to factory standards. For this reason, the factory procedure for servicing the product must be strictly followed and, whenever practicable, returned to the original intent of the design. The responsibilities listed above are general and in no way a complete listing of the rules and regulations pertaining to the EPA requirements on exhaust emissions for marine products. For more detailed information on this subject, you may contact the following locations:

#### **VIA U.S. POSTAL SERVICE:**

Office of Mobile Sources  
 Engine Programs and Compliance Division  
 Engine Compliance Programs  
 Group (6403J)  
 401 M St. NW  
 Washington, DC 20460

#### **VIA EXPRESS or COURIER MAIL:**

Office of Mobile Sources  
 Engine Programs and Compliance Division  
 Engine Compliance Programs  
 Group (6403J)  
 501 3rd St. NW  
 Washington, DC 20001

#### **EPA INTERNET WEB SITE:**

[www.epa.gov](http://www.epa.gov)

# MAINTENANCE SCHEDULE

Routine inspection and maintenance is necessary to prolong outboard life. The following chart provides guidelines for inspection and maintenance to be performed by an authorized Dealer.

**IMPORTANT:** Outboards used in rental, commercial, or other high hour applications require more frequent inspections and maintenance. Adjust schedule for operating and environmental conditions.

Description	Engine Care Product	Every 300 Hours or Three Years <sup>(1)</sup>
Electrical and ignition wires, inspect for wear or chafing		✓
Engine to transom mounting hardware, re-torque (40 ft. lbs.)		✓
Fasteners, inspect any loosened components		✓
Fuel and oil system components, inspect and repair leaks <sup>(2)</sup>		✓
Fuel filter, replace		✓
Gearcase lubricant, replace	A	✓
Grease fittings, lubricate <sup>(3)</sup>	C	✓
Muffler foam, inspect and replace if necessary		✓
Power trim/tilt system and fluid level, inspect	B	✓
Propeller shaft splines, inspect and lubricate <sup>(3)</sup>	C	✓
Spark plugs, inspect and replace if necessary <sup>(2)</sup>		✓
Starter pinion shaft, inspect and lubricate	D	✓
Steering system, inspect and lubricate	C	✓
Thermostats, inspect <sup>(2)</sup>		✓
Throttle cable, inspect and re-tension		✓
Water pump, inspect or replace if necessary		✓

(1) Average recreational use. Commercial use, heavy use, or use in salt or polluted water requires more frequent inspection and maintenance (annual checks are recommended).

(2) Emission-related component – Refer to **Owner Responsibility** on page 34, **Product Warranty Information** on page 50 and, if applicable, **California Emission Control Warranty Statement** on page 53

(3) Annually in salt water applications – Refer to **Salt Water Lubrication Points** on page 29

**A. HPF XR Gearcase Lubricant**

*HPF Pro* Gearcase Lubricant in high performance or commercial applications

**B. Evinrude/Johnson Biodegradable TNT Fluid**

**C. Triple-Guard Grease**

**D. Starter Bendix Lube ONLY, P/N 337016**

## STORAGE

**DANGER**

**DO NOT** run the engine indoors or without adequate ventilation or permit exhaust fumes to accumulate in confined areas. Engine exhaust contains carbon monoxide which, if inhaled, can cause serious brain damage or death.

You must protect against natural environmental conditions that can be damaging to an outboard. Your warranty does not cover engine failure caused by these conditions.

Temperature and humidity changes during storage period can cause corrosion of internal engine components.

Winterization prepares your outboard for long-term off-season storage. During winterization, the engine is "fogged" and extra oil is used to coat internal engine components. Refer to **Long-Term Storage (Winterization)** on page 37.

**Stabilize the fuel supply.** Fuel remaining in your fuel tank can oxidize, resulting in loss of octane and fuel system deposits.

Use *Evinrude/Johnson 2+4 Fuel Conditioner* to prevent gum and varnish deposits from forming in fuel system components. Refer to **Fuel Additives** on page 16.

**WARNING**

**Prevent injury from moving engine components. Before starting the outboard:**

- Shift it to **NEUTRAL**.
- Keep hands, clothes, and hair clear of powerhead.
- Remove the propeller.

Store fuel tanks in a well-ventilated area, away from heat and open flame. Prevent escape of liquid or vapors which could accidentally ignite. Close filler cap vent screws (if equipped) and be sure any disconnected fuel hoses do not drip.

## TRANSPORTING THE OUTBOARD

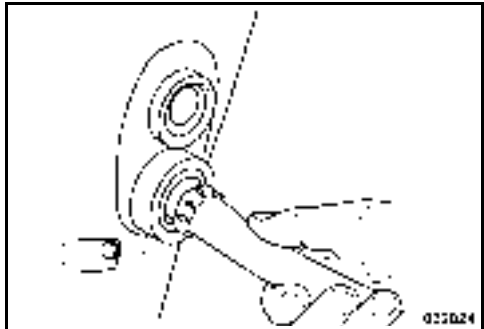


If the outboard is laid down for transportation or storage, the oiling system must be primed before reusing the outboard. Refer to **Priming the Oil System** on page 15.

## FLUSHING

If desired, the outboard can be flushed after each use on a trailer or at dockside while it is vertical.

- 1) Place the outboard in an area with good drainage.
- 2) Connect garden hose to flushing port.
- 3) Turn on the water. It is **not** necessary to run the engine for a good flushing.



- 4) Leave the outboard in vertical position long enough to completely drain the powerhead.

**IMPORTANT:** If you cannot store the outboard in the recommended vertical position, be sure the cooling system is drained completely. Never place the gearcase higher than the powerhead. Any water remaining in the exhaust passages can run into the cylinders and cause serious damage.

## SHORT-TERM STORAGE

Between uses, store your outboard in a vertical position to allow the cooling system to drain completely.

## LONG-TERM STORAGE (WINTERIZATION)



### WARNING



Outboard must be in **NEUTRAL** before performing winterization. Starting outboard in gear can cause personal injury.

If winterizing on a trailer, the propeller must be removed before performing procedure. Failure to remove propeller can cause personal injury or death.

Winterization prepares your outboard for long-term off-season storage. During winterization, the engine is “fogged” and extra oil is used to coat internal engine components.

Winterization requires a specific process of steps.

Closely follow the applicable winterization procedure for your outboard:

- Remote control
- Tiller control
- Remote control with foot throttle

If you are unsure which procedure is right for you, contact your Dealer for assistance.

You can confirm your outboard enters winterization mode when the engine runs at fast idle and:

- The *SystemCheck* gauge lights flash (if equipped).
- The *I-Command* gauge displays winterization message (if equipped).

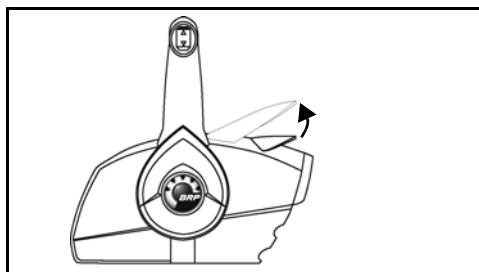
### Preparation

Your outboard can be winterized in the water. **If winterizing in water**, make sure the water intake screens are completely submerged.

- 1) Stabilize the engine’s fuel supply. Add 2+4 *Fuel Conditioner* following instructions on container. Fill fuel tank.
- 2) **If winterizing on a trailer**, remove the propeller. Attach a garden hose to flushing port and turn on the water. Refer to **Flushing** on page 36.
- 3) Outboard **must** be in **NEUTRAL**, and remote control and shift linkage must be in **NEUTRAL** position at all times during winterization procedure.

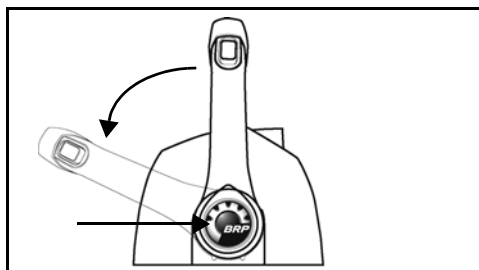
### Remote Control Outboards

- 1) **For side mount controls**, lift fast idle lever. Start the outboard. Outboard runs at slow idle speed.

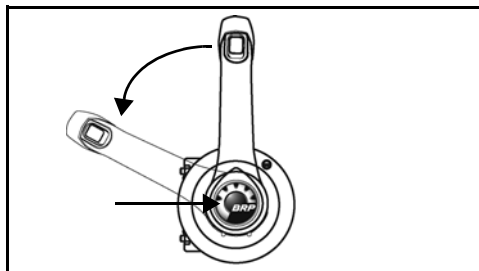


Side Mount Control – Typical

**For binnacle or concealed side mount controls**, press fast idle button and advance throttle handle to **HALF** throttle position. Start the outboard. Outboard runs at slow idle speed.



Binnacle Control – Typical



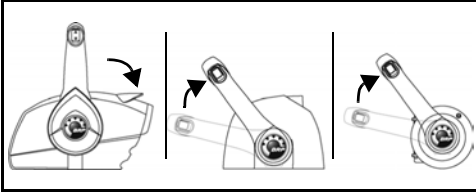
Concealed Side Mount Control – Typical

2) After outboard runs for about 15 seconds:

**For side mount controls,** lower fast idle lever.

**For binnacle or concealed side mount controls,** return throttle handle to IDLE position.

Outboard continues to run at slow idle speed.

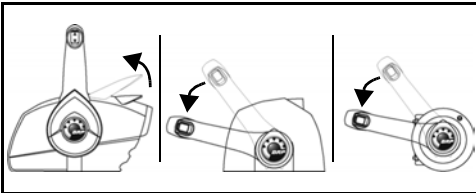


3) After outboard runs for another 15 seconds:

**For side mount controls,** raise fast idle lever again.

**For binnacle or concealed side mount controls,** advance throttle handle to HALF THROTTLE position.

Outboard will accelerate to fast idle speed and fog itself.



4) Allow outboard to run until it shuts itself OFF automatically (less than one minute).

Winterization is complete when outboard shuts itself off.

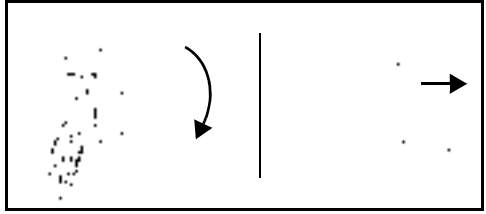
- **If the outboard DOES NOT shut itself off,** you may not have used the fast idle lever or button and the outboard was shifted into gear.

- **If the engine exceeds 3000 RPM,** the outboard may have been shifted into gear.

In either event, immediately turn key switch OFF and re-start the procedure.

### Tiller Control Outboards

1) Advance throttle grip to HALF THROTTLE position. Start the outboard. Outboard runs at slow idle speed.



Tiller Control – Typical

2) After outboard runs for about 15 seconds, move throttle grip to IDLE position. Outboard continues to run at slow idle speed.



3) After outboard runs for another 15 seconds, advance throttle grip to HALF THROTTLE position. Outboard will accelerate to fast idle speed and fog itself.

4) Allow outboard to run until it shuts itself OFF automatically (less than one minute).

Winterization is complete when outboard shuts itself off.

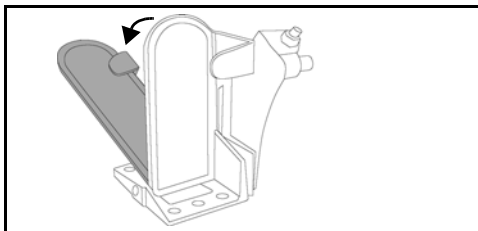
- **If the outboard DOES NOT shut itself off,** you may not have properly advanced throttle grip.

- **If the engine exceeds 3000 RPM,** the outboard may have been shifted into gear.

In either event, immediately press STOP button to turn outboard OFF and re-start the procedure.

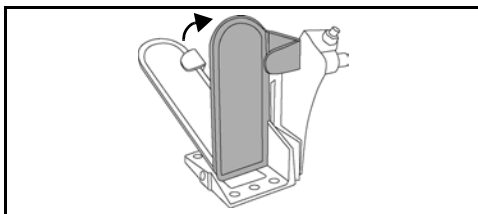
## Remote Control Outboards with Foot Throttle

- 1) Press foot throttle to HALF THROTTLE position. Start the outboard. Outboard runs at slow idle speed.

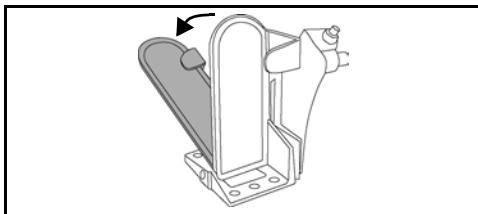


Foot Throttle – Typical

- 2) After outboard runs for about 15 seconds, remove foot from foot throttle and allow throttle to return to IDLE position. Outboard continues to run at slow idle speed.



- 3) After outboard runs for another 15 seconds, press foot throttle to HALF THROTTLE position. Outboard will accelerate to fast idle speed and fog itself.



- 4) Allow outboard to run until it shuts itself OFF automatically (less than one minute).

Winterization is complete when outboard shuts itself off.

- **If the outboard DOES NOT shut itself off**, you may not have allowed enough running time at a throttle position.
- **If the engine exceeds 3000 RPM**, the outboard may have been shifted into gear.

In either event, immediately turn key switch OFF and re-start the procedure.

## After Winterization – All Outboards

- 1) After the outboard shuts itself off, turn key switch OFF. (For tiller models, remove emergency stop clip / key switch.) Do not start the outboard again after winterization is completed.
- 2) **If winterizing on a trailer**, turn off water and detach garden hose. Grease propeller shaft splines with recommended lubricant, and re-install propeller.

**IMPORTANT:** When winterizing is finished, leave the outboard in vertical position long enough to completely drain the powerhead. If equipped, disconnect the speedometer pick-up at the upper connection and blow all water out of the hose using air pressure of 25 psi or less. Reconnect speedometer pickup after all the water has been removed.

- 3) Top off oil tank.



Extra engine oil is used during the winterization procedure. Some excess oil may appear on the skeg below the gearcase area. **This is normal.**

Avoid potential oil stains by placing a shop towel or suitable container under the propeller and skeg for the duration of the storage.

## PRE-SEASON CHECK

Prepare your outboard for a season of reliable service by performing a general check and a few preventive maintenance procedures.

Examine all loosened or removed hardware. Replace damaged or missing parts with *Evinrude/Johnson Genuine Parts* or equivalent. Check the gearcase for leakage. If leakage is evident, the gearcase seals should be replaced. See your Dealer.

**IMPORTANT:** Gearcase lubricant is **thick and clear**. Do not confuse this with engine oil, which may normally appear on the skeg after performing the long-term (winterization) storage procedure.

**Anticorrosion anodes** — Check condition. Refer to **Anti-Corrosion Anodes** on page 29.

**Battery** — Charge fully. Refer to **Battery** on page 45.



### WARNING



Failure to check for fuel leakage could allow a leak to go undetected, resulting in fire or explosion.

## SPARK PLUGS



### WARNING



The ignition system presents a serious shock hazard. Use caution to avoid injury from shock or injury resulting from your reaction to shock. Do not handle primary or secondary ignition components while the engine is cranking or running.

Spark plugs should be serviced by an *Evinrude E-TEC* Dealer. Incorrect spark plug maintenance can lead to engine damage.

**IMPORTANT:** Replacement spark plugs MUST be indexed correctly.

### Marine Engine Duty Cycles

The International Council of Marine Industry Associations (ICOMIA) Standard No. 36-88 specifies a marine engine duty cycle based on documented studies. A duty cycle is a profile of engine running and usage. This duty cycle is used to determine average spark plug longevity and maintenance requirements for *Evinrude E-TEC* outboards.

ICOMIA Marine Engine Duty Cycle	
Engine Speed as Percentage of Rated Speed (RPM)	Time at Specified RPM (Percentage of total engine running time)
IDLE	40%
40%	25%
60%	15%
80%	14%
100%	6%

**IMPORTANT:** Some running profiles and conditions can lead to spark plug wear sooner than expected. Depending on your specific usage, the spark plug maintenance schedule may require adjustment.



### WARNING



Do not use a booster battery and jumper cables to start the outboard. Gasoline fumes can cause explosion and fire, resulting in property damage, personal injury or death.

Review your outboard's warning system self-test routine. During your preseason start-up, make sure the warning system self-tests properly. If it does not, see your Dealer.

**IMPORTANT:** Do not run your outboard—even for a brief start-up—without supplying water to it. Refer to **Flushing** on page 36.

Following **Engine Starting** on page 20, start the outboard. If the outboard was auto-winterized, it will smoke for a short time after the first start of the season.

Let engine idle and observe running quality. If poor, refer to **Troubleshooting** on page 42 or see your Dealer.

Let engine idle and confirm water pump operation. Water must flow from the water pump indicator in a steady stream. If it does not, shut off the outboard and investigate. Refer to **Engine Overheating** on page 19.

Stop the outboard and check the fuel system for leaks.



## OUTBOARD EXTERNAL FINISH



Your outboard's upper and lower engine covers use molded-in color technology, providing a deep, durable gloss with maximum ultraviolet (sunlight) protection.

The high gloss finish will show polish marks when viewed closely in certain light conditions. This glossing is NORMAL.

Periodically, wash the entire boat and outboard with soapy water and apply a coat of automotive wax. Leave the engine cover in place when washing the outboard.

**IMPORTANT:** When trailering your outboard, DO NOT cover the engine with canvas—it will dull the finish of the outboard's engine covers.

## HULL FINISH

The condition of your boat's bottom affects performance. Marine growth or bottom painting may reduce speed and fuel efficiency.

For maximum performance, keep the boat's running surface clean by rinsing it with fresh water and wiping it dry. Apply *Evinrude* anti-corrosion spray to any surface subject to corrosion, but avoid the anti-corrosion anode(s).

## SCRATCH REPAIR



Surface scratches on the upper and lower engine covers can be polished out with buffing compound.

Treat affected areas using these steps:

- 1) Sand the affected area with 800-grit sandpaper.
- 2) Wet sand the area with 1200-grit sandpaper.
- 3) Using a composite material buffing compound, polish the area, closely following the product directions.

**IMPORTANT:** Your Dealer has the professional materials to properly repair scratches. Do not attempt to paint over marks or scratches in the composite material. See your Dealer to repair any deep scratches or gouges.

## SUBMERGED OUTBOARD

If your outboard has been under water, **have it serviced immediately upon recovery**. If immediate service is unavailable, resubmerge it in fresh water to avoid prolonged exposure to the atmosphere.

After submersion, all boat and engine electrical, fuel, and oiling systems must be inspected for signs of water intrusion. Your Dealer should perform this service.

# TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE
Starter motor will not operate	<ul style="list-style-type: none"> <li>• Shift handle not in NEUTRAL.</li> <li>• Fuse blown.</li> <li>• Battery is dead.</li> </ul>
Engine will not start	<ul style="list-style-type: none"> <li>• Not following starting instructions. Refer to <b>Engine Starting</b> on page 20.</li> <li>• Fuel tank empty.</li> <li>• Fuel hose kinked.</li> <li>• Fuel system contaminated with water or dirt.</li> <li>• Fuel filter obstructed.</li> <li>• Throttle not at IDLE. Return throttle to IDLE.</li> <li>• Spark plugs incorrect. Refer to <b>Spark Plugs</b> on page 40.</li> <li>• Spark plugs improperly gapped, carboned, burned, or wet.</li> <li>• Fuse blown.</li> <li>• Flashing “Water Temp” or hot light, refer to <b>Engine Monitoring</b> on page 17 and <b>Engine Overheating</b> on page 19.</li> <li>• Flashing “Check Engine” or “Chk Eng” light, refer to <b>Engine Monitoring</b> on page 17.</li> </ul>
Engine will not idle properly	<ul style="list-style-type: none"> <li>• Debris on propeller.</li> <li>• Spark plugs damaged or incorrect. Refer to <b>Spark Plugs</b> on page 40.</li> <li>• Fuel system contaminated with water or dirt.</li> </ul>
Engine loses power	<ul style="list-style-type: none"> <li>• Spark plugs damaged or incorrect. Refer to <b>Spark Plugs</b> on page 40.</li> <li>• Fuel filter obstructed.</li> <li>• Fuel system contaminated with water or dirt.</li> <li>• Water intakes obstructed and cooling system not operating correctly. Refer to <b>Engine Overheating</b> on page 19.</li> <li>• Oiling system malfunction.</li> <li>• S.A.F.E. protection mode activated. Refer to <b>Engine Monitoring</b> on page 17.</li> </ul>
Engine runs, but makes little or no progress	<ul style="list-style-type: none"> <li>• Propeller hub loose, slipping.</li> <li>• Propeller blades bent or missing.</li> <li>• Propeller shaft bent.</li> <li>• Propeller debris.</li> </ul>
Warning system activates	<ul style="list-style-type: none"> <li>• Refer to <b>Engine Monitoring</b> on page 17.</li> </ul>



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# PRODUCT INFORMATION

# RIGGING AND ACCESSORIES

## PROPELLER

### Propeller Selection



### WARNING



**Be alert of people in the water. Always shift the outboard to NEUTRAL and shut off the engine immediately when your boat is in an area where there might be people in the water. Serious injury or death can result from contacting a rotating propeller or moving boat and outboard.**

To select the correct propeller for your boating application, your boat and outboard **MUST** be water tested. See your Dealer for assistance.

**IMPORTANT:** The correct propeller for your boat, under normal load conditions, will allow the engine to run near the midpoint of the RPM operating range at full throttle. Refer to **Specifications** on page 49.



### WARNING



**When servicing the propeller, always shift the outboard to NEUTRAL position, turn the key switch OFF, and twist and remove all spark plug wires so the outboard cannot be started accidentally.**

**IMPORTANT:** Apply *Triple-Guard* grease to the entire propeller shaft before installing the propeller. At least annually, remove the propeller and check for debris. Clean the shaft and regrease it before reinstalling a propeller.

### Installation

Slide thrust washer onto shaft with shoulder facing aft.

Slide propeller onto shaft, engaging the splines and seating it on the thrust bushing.

Slide spacer onto the shaft and engage the propeller shaft splines.

Wedge a block of wood between the propeller blade and the anti-ventilation plate.

Install propeller nut and tighten to a torque of 120-144 in. lbs. (13.6-16.3 N-m).

Install keeper on propeller nut, align keeper slots and cotter pin hole.

Install new cotter pin and bend ends to secure.

Remove block of wood. Make sure engine is in NEUTRAL; give propeller a spin. It must turn freely.

### Repair

If your propeller hits a solid object, the impact is partially absorbed by the rubber bushing in the hub to help prevent damage to the outboard. A strong impact can damage the hub and propeller blades. Damage to blades can cause unusual and excessive vibration. Damage to the hub can cause excessive engine RPM with little forward movement.

**IMPORTANT:** Avoid or limit operation using a damaged propeller. Carry a spare propeller.

Keep your propeller in good condition. Use a file to smooth slight damage to blade edges. See your Dealer for repair of serious damage.

## BATTERY

### Requirements

- 12-volt, heavy-duty, designated for "marine" use;
- Vented/refillable or maintenance-free; and
- Rated according to the minimum requirements in **Specifications** on page 49.

Deep-cycle batteries are suitable **IF** they meet or exceed the minimum CCA requirements.

Ask your Dealer about your outboard's requirements before installing longer battery cables or a battery switch.

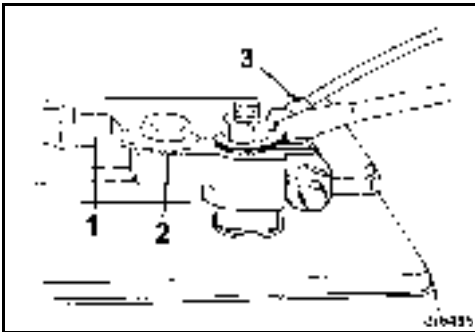
### Installation

Read and understand the safety information supplied with your battery BEFORE you begin installation.

**IMPORTANT:** Make sure all components are clean and free of corrosion.

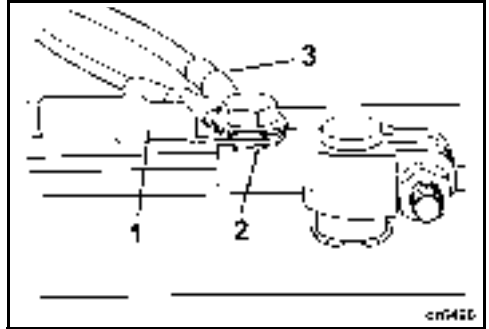
Connect the RED (+) cable to the positive (+) battery post first. Connect the BLACK (-) cable to the negative (-) battery post last.

If you have marine battery posts, install each main cable on the clamp adapter with a starwasher below it. Install all wires from accessories on the threaded portion of the post.



1. Main cable
2. Starwasher
3. Accessory wires

If you have automotive battery posts, place a starwasher on the clamp adapter first, then the main cable, and then the wires from the accessories.



1. Main cable
2. Starwasher
3. Accessory wires

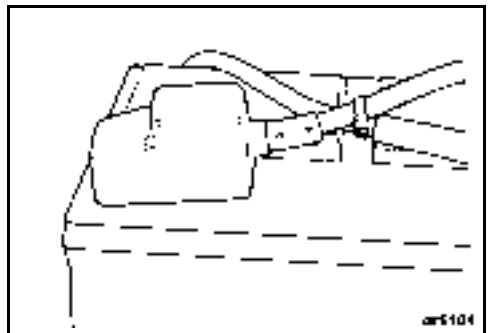
Tighten all connections securely and coat the installation with *Triple-Guard* grease.



## WARNING



**Keep the battery connections clean, tight, and insulated to prevent their shorting or arcing and causing an explosion. If the battery mounting system does not cover the connections, install covers. Check often to see that connections stay clean and tight.**



**IMPORTANT: DO NOT** use wing nuts on battery connections even if they came with the battery. Wing nuts can loosen and cause errant warning signals or electrical system damage.

### Service

Before servicing the battery or the outboard, remove both battery cables from the battery, battery negative (-) cable first. Keep metal objects from contacting either battery post.

**IMPORTANT:** Service electrical components only while the outboard is **NOT** running. Be careful when identifying positive and negative battery cables and posts.



### WARNING

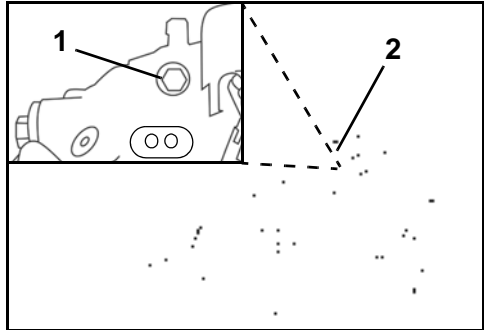


**Battery electrolyte is acidic — handle with care. If electrolyte contacts any part of the body, immediately flush with water and seek medical attention.**

**Do not use a booster battery and jumper cables to start the outboard. Gasoline fumes can cause explosion and fire, resulting in property damage, personal injury or death.**

### WATER PRESSURE

An optional water pressure gauge is recommended to monitor cooling system pressures. Noticing changes in water pressure can help prevent engine overheating. The water pressure gauge must be connected at the correct point to ensure the most accurate pressure readings. Follow the installation instructions included with the water pressure gauge.



1. Water pressure port (behind fuel filter)
2. Fuel filter

## ADJUSTMENTS

### Idle RPM in Gear

The idle RPM in gear setting can be adjusted, if desired, to provide more idle control, steering, and quietness in certain applications.

**IMPORTANT:** Only your Dealer can adjust the idle RPM in gear setting.

### Trim Tab



#### WARNING

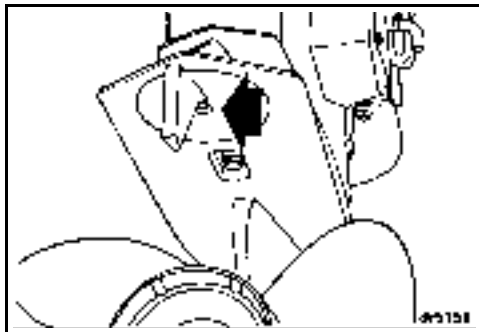


**Improper trim tab adjustment can cause difficult steering.**

A propeller will generate steering torque when the propeller shaft is not running parallel to the water's surface. The trim tab is adjustable to compensate for this steering torque.

**IMPORTANT:** A single trim tab adjustment will relieve steering effort under only one set of speed, outboard angle and load conditions. No single adjustment can relieve steering effort under all speed, outboard angle and load conditions. If the boat pulls to the left or right when its load is evenly distributed, adjust the trim tab as follows:

**With the outboard shut OFF**, loosen the trim tab screw. If the boat pulled to the right, move the rear of the trim tab slightly to the right. If the boat pulled to the left, move the rear of the trim tab slightly to the left.



Tighten the trim tab screw to a torque of 35-40 ft. lbs. (47-54 N-m).

Test the boat and, if needed, repeat the procedure until steering effort is as equal as possible.

**High outboard installations** — The trim tab might be above the water when the outboard is trimmed out. Steering effort might increase. Steering effort will be reduced if you trim the outboard in and submerge the trim tab.





# SPECIFICATIONS

<b>40, 50, 60 Models</b>	
Displacement	52.7 cu. in. (864 cc)
Engine Type	In-line, 2 Cylinder, Two-Cycle, <i>E-TEC</i>
Full Throttle Operating Range	<b>40 HP</b> – 5000 to 6000 RPM <b>50 HP</b> – 5500 to 6000 RPM <b>60 HP</b> – 5500 to 6000 RPM
Power <sup>(1)</sup>	<b>40 HP</b> – 40 HP (29.8 kw) @ 5500 RPM <b>50 HP</b> – 50 HP (37.3 kw) @ 5750 RPM <b>60 HP</b> – 60 HP (44.7 kw) @ 5750 RPM
Idle RPM in Gear <sup>(2)</sup>	850 ± 50
Idle RPM in Neutral <sup>(2)</sup>	750 ± 50
Ignition Timing <sup>(2)</sup>	Not Adjustable
Emission Control System: per SAE J1930 <sup>(2)</sup>	ECM, <i>E-TEC</i> (Engine Control Module, <i>E-TEC</i> )
Fuel Requirements <sup>(2)</sup>	87 Pump Posted AKI (90 RON) – Refer to <b>Fuel Requirements</b> on page 15
Oil – Lubricant – Capacity	TC-W3 NMMA-certified oil or <i>Evinrude/Johnson XD100</i> oil – Refer to <b>Oil Requirements</b> on page 14 2.0 qt. (1.9 l)
Warning Signals	Controlled by the outboard's <i>EMM</i>
Battery, Minimum <sup>(3)</sup>	640 CCA (800 MCA) 12 volt or 800 CCA (1000 MCA) 12 volt below 32°F (0°C)
Spark Plug <sup>(2)</sup>	Refer to ECI Label
Fuses	Refer to <b>Fuse</b> on page 30
Fuel Filter	In-line Replaceable
Battery Charging	25-Amp, Fully Regulated
Gearcase – Lubricant <sup>(4)</sup> – Capacity	<i>Evinrude Ultra-HPF</i> <b>L Models</b> – 22 fl. oz. (650 ml)
Power Trim/Tilt – Fluid Capacity	11.7 fl. oz. (345 ml)
Propeller	Refer to <b>Propeller Selection</b> on page 44
Weight	<b>L Models</b> – 240 lbs. (109 kg)
Sound at Driver's Ear (LpA) ICOMIA 39.94	76.8 dB(A)
Transom Height	<b>L Models</b> – 19 1/2 to 20 in. (495 to 508 mm)

(1) Rated following the standards of ICOMIA 28.83, ISO 3046 and NMMA.

(2) Emission Control Information.

(3) Use a 800 CCA (1000 MCA) battery when operating in temperatures below 32°F (0°C).

(4) Use *Evinrude/Johnson HPF Pro* Gearcase Lubricant for high performance outboards and commercial applications. *Evinrude/Johnson HPF Pro* Gearcase Lubricant delivers exceptional durability and reliability and promotes long gearcase life in marine use.

# PRODUCT WARRANTY INFORMATION

## BOMBARDIER RECREATIONAL PRODUCTS LIMITED WARRANTY FOR 2008 EVINRUDE OUTBOARD ENGINES SOLD IN THE UNITED STATES AND CANADA

### 1. SCOPE OF THE LIMITED WARRANTY

Bombardier Recreational Products\* ("BRP") warrants its 2008 Evinrude® outboard engines sold by authorized Evinrude dealers in the fifty United States and Canada ("Product") from defects in material or workmanship for the period and under the conditions described below.

### 2. EXCLUSIONS — *The following are not warranted under any circumstances:*

- Replacement of parts due to normal wear and tear;
- Routine maintenance parts and services including but not limited to: maintenance requirements, engine and lower unit oil changes, lubrication, valve and linkage adjustments and replacement of fuses, zinc anodes, thermostats, timing belts, starter motor bushings, trim motor brushes, filters, propellers, propeller bushings and spark plugs;
- Damage caused by improper or lack of installation, maintenance, winterization and/or storage, failure to follow the procedures and recommendations in the Operator's Guide;
- Damage resulting from removal of parts, improper repairs, service, maintenance, or modification, or use of parts or accessories not manufactured or approved by BRP, which in its reasonable judgment, are either incompatible with Product or adversely affect its operation, performance, or durability, or resulting from repairs done by a person that is not an authorized Dealer;
- Damage caused by abuse, misuse, abnormal use, neglect, racing, improper operation or operation of the Product in a manner inconsistent with the recommended operation described in the Operator's Guide;
- Damage resulting from external damage, accident, submersion, water ingestion, fire, theft, vandalism or any act of God;
- Operation without proper fuel, oil or lubrication, or with fuels, oils or lubricants which are not suitable for use with the Product (see the Operator's Guide);
- Damage resulting from rust or corrosion;
- Damage caused from cooling system blockage by foreign material;
- Damage resulting from sand or debris in the water pump;
- Cosmetic or paint changes due to exposure to the elements.

This warranty will be **voided in its entirety and rendered null and void** where:

- Product has been altered or modified in such a way so as to adversely affect its operation, performance or durability, or change its intended use, horsepower or emission levels; or
- Product is or has been used for racing at any point, even by a prior owner.

### 3. LIMITATIONS OF LIABILITY

**ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED IN DURATION TO THE LIFE OF THE EXPRESS LIMITED WARRANTY.**

**ALL INCIDENTAL, CONSEQUENTIAL, DIRECT, INDIRECT OR OTHER DAMAGES OF ANY KIND ARE EXCLUDED FROM COVERAGE UNDER THIS WARRANTY INCLUDING, BUT NOT LIMITED TO:** expense for gasoline, expense for transporting Product to and from Dealer, removal of Product from a boat and reinstallation, mechanic's travel time, in-and-out of water charges, slip or dock fees, trailering or towing, storage, telephone, cell phone, fax or telegram charges, rental of a like or replacement Product or boat during warranty services or down time, taxi, travel, lodging, loss of or damage to personal property, inconvenience, cost of insurance coverage, loan payments, loss of time, loss of income, revenue or profits, or loss of enjoyment or use of Product.

**SOME STATES, PROVINCES, OR JURISDICTIONS DO NOT ALLOW FOR THE DISCLAIMERS, LIMITATIONS OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, OR OTHER EXCLUSIONS IDENTIFIED ABOVE. AS A RESULT, THEY MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC RIGHTS, AND YOU MAY ALSO HAVE OTHER LEGAL RIGHTS WHICH MAY VARY FROM STATE TO STATE, OR PROVINCE TO PROVINCE.**

No distributor, Dealer or any other person is authorized to make any affirmation, representation or warranty regarding Product other than those contained in this limited warranty and, if made, shall not be enforceable against BRP. BRP reserves the right to modify this warranty at any time, being understood that such modification will not alter the warranty conditions applicable to the Products sold while this warranty is in effect.

#### **4. WARRANTY COVERAGE PERIOD**

This limited warranty will be in effect from the date of delivery to the first retail consumer or the date the Product is first put to use, whichever occurs first, for a period of:

THIRTY-SIX (36) CONSECUTIVE MONTHS for private, recreational use; or

TWELVE (12) CONSECUTIVE MONTHS for commercial use, except that emission-related components providing input to emission controls (e.g. sensors) are warranted for twenty-four (24) months or two hundred (200) hours of engine use, whichever occurs first. The Product is used commercially when it is used in connection with any work or employment that generates income, during any part of the warranty period. The Product is also used commercially when, at any point during the warranty period, it is installed on a boat that has commercial tags or is licensed for commercial use.

In cases where the delivery date is not established to BRP's satisfaction, the date of sale will be used to determine the warranty start date.

The repair or replacement of parts or the performance of service to Product under this warranty does not extend the life of this limited warranty beyond its original expiration date. All *Evinrude/Johnson® Genuine Parts* and accessories installed by an authorized dealer at the time of sale, including but not limited to propellers, bear the standard BRP parts and accessories one-year limited warranty.

California residents who purchased or warranty-registered a Product in California should refer to BRP's California Emissions Control Warranty Statement.

#### **5. CONDITIONS TO HAVE WARRANTY COVERAGE**

This warranty coverage is available only on *Evinrude* outboard engines purchased as new and unused from a dealer authorized to distribute *Evinrude* products in the country in which the sale occurred ("Dealer"), and then only after the BRP specified pre-delivery inspection process has been completed and documented by the purchaser and Dealer. Warranty coverage only becomes available upon proper registration of Product by Dealer or owner.

Only the original purchaser and any subsequent owners who reside in the United States and Canada and have purchased Product from a U.S. or Canadian Dealer are eligible for warranty registration and warranty coverage hereunder. Such limitations are necessary in order to allow BRP to protect the safety of its products, its consumers, and the general public.

As outlined in the Operator's Guide, timely routine required maintenance must be performed to maintain warranty coverage. BRP may require proof of proper maintenance prior to authorizing warranty coverage.

#### **6. WHAT TO DO TO OBTAIN WARRANTY COVERAGE**

The registered owner must notify an authorized Dealer within two (2) days of the appearance of a defect. Owner must bring Product, including any defective part therein, to Dealer promptly after the appearance of the defect, and in any event, within the warranty period, and must provide Dealer with reasonable opportunity to repair the defect. The expenses of transporting Product to and from Dealer for warranty service are to be borne by the owner.

If the Product has not previously been registered, the owner may also be required to present proof of purchase to Dealer for warranty repairs. Owner is required to sign the repair/work order prior to the start of the repair in order to validate the warranty repair.

All parts replaced under this warranty become the property of BRP.

#### **7. WHAT BRP WILL DO**

BRP's obligations under this warranty are limited to, at its sole discretion, repairing or replacing parts of Product found to be defective in material or workmanship, in the reasonable judgment of BRP. Such repair or replacement of parts will be done without charge for parts and labor, at any authorized Dealer. BRP's responsibility is limited to making the required repairs or replacements of parts with new or BRP-certified re-manufactured parts. No claim of breach of warranty shall be cause for cancellation or rescission of the sale of Product to owner.

In the event that warranty service is required outside of the fifty United States or Canada, owner will bear responsibility for any additional charges due to local practices and conditions, such as, but not limited to, freight, insurance, taxes, license fees, import duties, and any and all other financial charges, including those levied by governments, states, territories and their respective agencies.

BRP reserves the right to improve, modify or change Products from time to time without assuming any obligation to modify Products previously manufactured.

## **8. TRANSFER**

If the ownership of Product is transferred during the warranty coverage period, this warranty shall also be transferred and be valid for the remaining coverage period provided that the former or new owner promptly contacts BRP or Dealer and gives the name and address of the new owner.

## **9. CONSUMER ASSISTANCE**

- In the event of a controversy or dispute in connection with this BRP limited warranty, BRP recommends that you first try to resolve the issue at the dealership level by discussing the issue with Dealer's service manager or owner;
- If further assistance is required, please contact Bombardier Recreational Products Customer Support Services, 250 Sea Horse Drive, Waukegan, IL 60085, 1-847-689-7090.

## **BOMBARDIER RECREATIONAL PRODUCTS LIMITED WARRANTY FOR 2008 *EVINRUDE* OUTBOARD ENGINES SOLD OUTSIDE THE UNITED STATES AND CANADA**

For a copy of the Limited Warranty, see your Bombardier Recreational Products ("BRP") distributor/dealer authorized to distribute *Evinrude* products in the country in which the sale occurs.

If further assistance is required, please contact Bombardier Recreational Products Customer Support Services, 250 Sea Horse Drive, Waukegan, Illinois, 60085, or the affiliate of BRP where the Product was registered for warranty.

\* Engines sold in Canada are distributed and serviced by Bombardier Recreational Products Inc.  
Limited Warranty Revision February 2007

# CALIFORNIA EMISSION CONTROL WARRANTY STATEMENT

Your *Evinrude E-TEC* outboard has a special environmental label required by the California Air Resources Board. The label has one, two, three, or four stars. A hangtag, provided with your outboard, describes the meaning of the star rating system.

## *The Star Label Means Cleaner Marine Engines*



### **The Symbol for Cleaner Marine Engines:**

#### **Cleaner Air and Water**

For a healthier lifestyle and environment.

#### **Better Fuel Economy**

Burns up to 30 to 40 percent less gas and oil than conventional carbureted two-stroke engines, saving money and resources.

#### **Longer Emission Warranty**

Protects consumer for worry free operation.

#### ***One Star – Low Emission***

The one-star label identifies Personal Watercraft, Outboard, Sterndrive and Inboard engines that meet the Air Resource Board's Personal Watercraft and Outboard marine engine 2001 exhaust emission standards. Engines meeting these standards have 75% lower emissions than conventional carbureted two-stroke engines. These engines are equivalent to the U.S. EPA's 2006 standards for marine engines.

#### ***Two Stars – Very Low Emission***

The two-star label identifies Personal Watercraft, Outboard, Sterndrive and Inboard engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2004 exhaust emission standards. Engines meeting these standards have 20% lower emissions than One Star – Low Emission engines.

#### ***Three Stars – Ultra Low Emission***

The three-star label identifies engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2008 exhaust emission standards or the Sterndrive and Inboard marine engine 2003 exhaust emission standards. Engines meeting these standards have 65% lower emissions than One Star – Low Emission engines.

#### ***Four Stars – Super Ultra Low Emission***

The four-star label identifies engines that meet the Air Resources Board's Sterndrive and Inboard marine engine 2009 exhaust emission standards. Personal Watercraft and Outboard marine engines may also comply with these standards. Engines meeting these standards have 90% lower emission than One Star – Low Emission engines.

For more information: Cleaner Watercraft – Get the Facts

1-800-END-SMOG

[www.arb.ca.gov](http://www.arb.ca.gov)

**YOUR EMISSION CONTROL WARRANTY RIGHTS AND OBLIGATION**

The California Air Resources Board and Bombardier Recreational Products ("BRP") are pleased to explain the emission control system warranty on your 2008 *Evinrude E-TEC* outboard. In California, new outboard engines must be designed, built, and equipped to meet the State's stringent anti-smog standards. BRP must warrant the emission control system on your outboard for the periods of time listed below provided there has been no abuse, neglect, or improper maintenance of your outboard.

Your emission control system may include parts such as the carburetor or fuel injection system, the ignition system, and catalytic converter. Also included may be hoses, belts, connectors, and other emission-related assemblies.

Where a warrantable condition exists, BRP will repair your outboard at no cost to you including diagnosis, parts, and labor provided that such work is performed by an authorized BRP dealer.

**Manufacturer's Limited Warranty Coverage**

This emission limited warranty covers *Evinrude* outboards certified and produced by BRP for sale in California, that are originally sold in California to a California resident, or subsequently warranty-registered to a California resident. The BRP U.S. and Canada limited warranty conditions for *Evinrude* outboards are still applicable to these models with the necessary modifications.

Select emission control parts of your *Evinrude E-TEC* outboard are warranted from the date of purchase by the first retail consumer or the date the product is first put to use, whichever occurs first, for a period of: 4 years, or for 250 hours of use, whichever occurs first.

However, warranty coverage based on the hourly period is only permitted for outboards equipped with the appropriate hour meters or their equivalent. If any emission-related part on your engine is defective under warranty, the part will be repaired or replaced by BRP.

Parts covered are:

<b>1. Electrical System</b>	<b>4. Air Induction System</b>
A. EMM (Engine Management Module)	A. Reed Valves
B. Spark Plugs and Wires	B. Throttle Body Assembly
C. Ignition Coils	C. Intake Manifold
D. Wiring Harness	
	<b>5. Oil System</b>
<b>2. Exhaust System</b>	A. Oil Injector
A. Inner Exhaust Housing	B. Oil Lines, Fittings, and Clamps
B. Adaptor (Exhaust Manifold)	
	<b>6. Sensors</b>
<b>3. Fuel System</b>	A. Air Temperature Sensor
A. Fuel Lift Pump	B. Crank Position Sensor
B. Fuel Supply Pump	C. Throttle Position Sensor
C. Fuel Injectors	D. Water Temperature Sensor
D. Vapor Separator	E. Thermostat
E. Fuel Lines, Fittings, and Clamps	
	<b>7. Gaskets</b>
	A. All Emission Component Gaskets

The emission warranty covers damage to other engine components that is caused by the failure of a warranted part.

The BRP Operator's Guide provided contains written instructions for the proper maintenance and use of your outboard. All emission warranty parts are warranted by BRP for the entire warranty period of the outboard, unless the part is scheduled for replacement as required maintenance in the Operator's Guide.

Emission warranty parts that are scheduled for replacement, as required maintenance, are warranted by BRP for the period of time before the first scheduled replacement date for that part. Emission warranty parts that are scheduled for regular inspection but not regular replacement are warranted by BRP for the entire warranty period of the outboard. Any emission warranty part repaired or replaced under the terms of this warranty statement is warranted by BRP for the remainder of the warranty period of the original part. All parts replaced under this limited warranty become the property of BRP.

Maintenance receipts and records should be transferred to each subsequent owner of the outboard.

### ***Owner's Warranty Responsibilities***

As the outboard owner, you are responsible for the performance of the required maintenance listed in your Operator's Guide. BRP recommends that you retain all receipts covering maintenance on your outboard, but BRP cannot deny warranty solely for the lack of receipts or your failure to ensure the performance of all scheduled maintenance.

As the outboard owner, you should however be aware that BRP may deny you warranty coverage if your outboard or a part has failed due to abuse, neglect, improper maintenance, or unapproved modifications.

You are responsible for presenting your outboard to an authorized BRP dealer as soon as a problem exists. The warranty repairs will be completed in a reasonable amount of time, not to exceed 30 days.

For any questions regarding your warranty rights and responsibilities or for the name and location of the nearest authorized BRP dealer, contact Bombardier Recreational Products Customer Support Services, 250 Sea Horse Drive, Waukegan, IL 60085, 1-847-689-7090 or visit [www.evinrude.com](http://www.evinrude.com).





# Readiness Test

The Operator's Readiness Test....

1. Did you read this Guide from front cover to rear cover?
2. Are you ready to take responsibility for the safe operation of your boat and outboard?
3. Do you understand all the safety precautions and instructions contained in this Guide?
4. Do you understand that this Guide contains essential information to help prevent personal injury and damage to equipment?
5. Are you ready to follow the recommendations in this Guide and take a boating safety course before you operate your boat and outboard?
6. Do you know who to ask if you have any questions about your boat and outboard?
7. Do you know your local marine traffic laws?
8. Do you understand that human error can be caused by carelessness, fatigue, overload, preoccupation, unfamiliarity of operator with the product, drugs and alcohol, just to name a few?



## WARNING



**It is impossible for this Guide to cover every hazardous situation you may encounter; however, your understanding of and adherence to essential information contained in this Guide will build good judgment when boating. Always be alert and careful: a good foundation for safety.**

## FREQUENTLY ASKED QUESTIONS

*No dealer-scheduled maintenance for the first three years of normal recreational use? Really?*

- Yes! BRP knows you want to spend your time out on the water, not servicing your *Evinrude E-TEC* outboard. There are no valves to adjust, belts to service, chains to replace, or oil to change. We do recommend pre-launch inspections of your outboard at each use and at regular intervals. Salt water applications require minimal additional inspections and lubrication.

*What fuel octane is recommended for my Evinrude E-TEC outboard?*

- *Evinrude E-TEC* outboards require a minimum octane of 87 (U.S.). Use of higher octane fuels is not harmful, but also not necessary.

*What kind of oil does my Evinrude E-TEC outboard require?*

- Any TC-W3RL oil may be used. The outboard can be programmed by your Dealer to run on *Evinrude/Johnson XD100* oil for lower oil consumption and reduced operating cost. Refer to **Filling the Oil Tank** on page 14; see also **Oil Requirements** on page 14.

*Do I need to mix oil into my fuel?*

- No. *Evinrude E-TEC* outboards do not require any mixing of oil and fuel.

*Where should I take my Evinrude E-TEC outboard for service?*

- For repairs covered under warranty, you must take your *Evinrude E-TEC* outboard to an authorized dealer. BRP-approved dealers and distributors have received the necessary training to properly service your outboard. Contact BRP for an authorized *Evinrude E-TEC* dealer near you.

*Can I order replacement parts and accessories for my Evinrude E-TEC outboard?*

- Yes. When replacement parts are required, use *Evinrude/Johnson* Genuine Parts or parts with equivalent characteristics, including type, strength, and material. Using substandard parts could result in injury or product malfunction. Your dealer can order the parts and accessories you desire.

*Do I need to complete any paperwork when I move or sell my Evinrude E-TEC outboard?*

- Yes. In order to maintain contact with you or the new *Evinrude E-TEC* owner, BRP requests you complete the form outlining **Change of Address / Change of Ownership** on page 59. This will ensure you or the new owner is made aware of any product announcements and keep the warranty coverage up-to-date.

*What do I need to do before storing my Evinrude E-TEC outboard for the winter?*

- Winterization is minimal. Refer to **Storage** on page 36 for step-by-step instructions to store your *Evinrude E-TEC* outboard for the off-season.

# CHANGE OF ADDRESS / CHANGE OF OWNERSHIP

If your address has changed or if there has been a change of ownership, be sure to fill out and mail the form provided on this page.

This notification is necessary for your own safety even after expiration of the original warranty, since BRP will be in a position to contact you if correction to your outboard is required. Outside the U.S. and Canada, this card should be sent to the Bombardier Recreational Products division where the outboard was registered. Please contact your Dealer or Distributor.



Change of Address

Change of Ownership

Model number

Serial Number

## Old Address / Previous Owner

Last name

First name  M.I.

Address

City  State

Zip code  Country

Phone number

Signature \_\_\_\_\_ Date \_\_\_\_\_

## New Address / New Owner

Last name

First name  M.I.

Address

City  State

Zip code  Country

Phone number

Signature \_\_\_\_\_ Date \_\_\_\_\_

## Dealer Information

Dealer name

Dealer number

Phone number

Contact name

In the U.S. or Canada, mail completed form to: Bombardier Recreational Products  
After Sales Support  
250 Seahorse Drive  
Waukegan, IL 60085

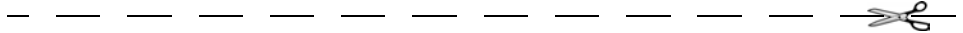


# CONFIRMATION OF RECEIPT

## Your Dealer

Name:	_____
	_____
Address:	_____
	_____
	_____

Upon delivery of your new *Evinrude/Johnson* outboard, complete and sign the form below. Your Dealer will take receipt of the form for their records.



## Receipt

Name:	_____
	_____
Address:	_____
	_____
Owner of Model No:	_____
Serial No:	_____
	(To be completed by customer or selling Dealer)
<p>The Dealer named on this document has instructed me on the operation, maintenance, safety features and warranty policy, all of which I understand and agree to be bound with. I am also satisfied with the predelivery set-up and inspection of my <i>Evinrude/Johnson</i> outboard. I have also received a copy of the Operator's Guide.</p>	
Signature:	_____
Date:	_____



**EVINRUDE**<sup>®</sup>  
**E-TEC**



# EVINRUDE

## E-TEC

**EVINRUDE**



## Operator's Guide

**75/90 HORSEPOWER**

PL, PX, SL, WEL, WEX

**Model Year**

2008



**WARNING**  
Read this Operator Guide thoroughly. It contains important safety information. When operating your boat, always have this Operator Guide onboard.



**75/90 HORSEPOWER**

PL, PX, SL, WEL, WEX

**2008 Model Year**





# FEATURES AT A GLANCE

## Easy to Own and Operate

- Three-Year Limited Warranty
- No Scheduled Dealer Maintenance for Three Years of Normal Recreational Use
- No Operational Break-In Procedure
- Easy Starts (no choking or priming)
- Digital Engine Management
- Self Flushing Cooling System
- Long Term Storage Design
- Simplified Winterization Procedure
- Digital Diagnostics
- Low Oil Usage
- CANbus Capable

## Durable and Reliable

- Full Corrosion Protection
- *Evinrude E-TEC* Lubrication System
- Auto-Calibrated Linkage
- Robust, Heavy-Duty Design
- Posi-Lock Latches
- Extra Capacity Water Pump
- Iridium Spark Plugs
- Vibration Isolated Electronics
- Beltless 25 Amp Charging System
- Stainless Steel Thermostats
- Nickel/Chrome-Faced Piston Rings
- Micro Finished Connecting Rods/Crankshaft

## Cleaner and Quieter

- EPA Emissions Compliance
- European Union Emissions Compliance
- California 3-Star Emissions Compliance
- Sealed Fuel System
- Low Friction Design (No powerhead gears, belts, cams, oil scraping rings, or mechanical oil pump)
- Full Length Insulated Lower Pans
- Quiet Signature Sound
- Air Intake/Silencer
- Idle Air Bypass

The following trademarks are the property of Bombardier Recreational Products Inc. or its affiliates:

*Evinrude*®

*Evinrude*®/*Johnson*® *XD30*™

*I-Command*™

*Evinrude*® *E-TEC*®

*BRP Logo*

*S.A.F.E.*™

*Evinrude*®/*Johnson*® *Genuine Parts*

*2+4*™ *Fuel Conditioner*

*SystemCheck*™

*Evinrude*®/*Johnson*® *XD100*™

*HPF XR*™ *Gearcase Lubricant*

*Triple-Guard*™ *Grease*

*Evinrude*®/*Johnson*® *XD50*™

*HPF Pro*™ *Gearcase Lubricant*

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<https://www.boat-manuals.com/>



Dear Boating Enthusiast,

Congratulations on your purchase of our industry-leading *Evinrude E-TEC* outboard! Your purchase comes with the full commitment and backing of the BRP Outboard Engine team. We know your *Evinrude E-TEC* outboard will provide you with years of reliable use, and we hope you will enjoy using it as much as we enjoyed designing and building this innovative product.

You can be proud you purchased an *Evinrude E-TEC* outboard with the following benefits.

### **EASY TO OWN & OPERATE**

With your *Evinrude E-TEC* outboard there is no more time wasted in the shop. In fact, you only have to bring your *Evinrude E-TEC* outboard in for dealer scheduled maintenance every 300 hours or every three years of normal recreational use. That's three trips to the shop in nine years... four trips in twelve years... five trips in fifteen years... you get the picture! And if that is not enough, with your new outboard you will have zero oil changes, absolutely no break-in period, and a simple winterization process that can be done at the boat ramp or in your driveway. We are proud of how easy we have made it for you to own this outboard. Hopefully it means you will be spending more time on the water each year.

### **POWER & PERFORMANCE**

*Evinrude E-TEC* outboards have been engineered to outperform anything on the water—acceleration, top-end speed, any size, any horsepower, across the line. And for your buddies who own a four-stroke? Well, they cannot touch our power-to-weight ratio. And you can tell them that no four-stroke comes close to the pure power and torque of an *Evinrude E-TEC* outboard.

### **DURABILITY / QUALITY / RELIABILITY**

Fewer parts. Fewer problems. Every *Evinrude E-TEC* outboard component is tested and retested for maximum performance and longer life. Parts are bigger and stronger to work harder and last longer.

### **CLEAN & QUIET**

You do not even have to think about emissions—anywhere in the country; anywhere in the world. *Evinrude E-TEC* outboards are the only outboard marine engines to have received a Clean Air Excellence Award from the United States Environmental Protection Agency (EPA). The entire *Evinrude E-TEC* line meets or exceeds all worldwide emission standards. We have even got 3-Star certification from the toughest of the tough: the California Air Resources Board. And thanks to the sophisticated, acoustically tuned air intake and exhaust systems, you will not be filling the air with a lot of noise either.

BRP is proud you have purchased this technology-leading *Evinrude E-TEC* outboard engine. We thank you for your business and wish you many years of enjoyable use.

Happy Boating,



Roch Lambert  
Vice President, General Manager  
Outboard Engines

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# ABOUT THIS GUIDE

This Operator's Guide is an essential part of your *Evinrude E-TEC* outboard. It contains pertinent information which, if followed, will provide you with a thorough understanding needed for proper operation, maintenance, care, and—above all—safety. Safety is our first priority and it should be yours too. It is strongly recommended you read this Guide from cover to cover. The more you know and understand about your *Evinrude E-TEC* outboard, the greater the safety and pleasure you will get from using it. Following this recommendation will assure the completeness of the information essential to your safety, the safety of any passengers, and other water users.

This Operator's Guide identifies important safety messages.

Although the mere reading of such information does not eliminate the hazard, the understanding and application of the information will promote the correct use of your outboard engine.



## Warning Symbols in this Guide

How can you reduce the risk of death, personal injury, and possible property damage? This Operator's Guide answers such questions and are contained in boxes highlighted by the Safety Alert Symbol. It is imperative to read, understand, and follow these comments.

This Guide should be kept in a waterproof bag with the outboard at all times during operation. If the product ownership is transferred, this Guide should be forwarded to the new owners.

A responsible, educated boater will fully appreciate the pleasures of boating and will be a safe boater. Boating Safety Classes are conducted by the U.S. Coast Guard Auxiliary, the U.S. Power Squadron and some Red Cross Chapters. For information about classes, call toll free 1-800-336-BOAT.

For additional information about boating safety and regulations, call:

- U.S. Coast Guard Boating Safety Hotline  
1-800-368-5647.

Outside North America please contact your Dealer or distributor for details about boating safety.

This Operator's Guide uses the following signal words identifying important safety messages.



## DANGER



Indicates an imminently hazardous situation which, if not avoided, **WILL** result in death or serious injury.



## WARNING



Indicates a potentially hazardous situation which, if not avoided, **CAN** result in severe injury or death.



## CAUTION



Indicates a potentially hazardous situation which, if not avoided, **MAY** result in minor or moderate personal injury or property damage. It also may be used to alert against unsafe practices.

**IMPORTANT:** Identifies information that will help prevent damage to machinery and appears next to information that controls correct assembly and operation of the product.

These safety notices mean:

ATTENTION!

BECOME ALERT!

YOUR SAFETY IS INVOLVED!

Additionally, Bombardier Recreational Products (BRP) has identified key information that is essential to the operation of your *Evinrude E-TEC* outboard.



Key information appears throughout this Guide in gray boxes with a key above the text. This highlighted information is a vital reference when using your outboard.



# IMPORTANT SAFETY MESSAGES

*This Operator's Guide contains essential information to help prevent personal injury and damage to equipment. Safety messages appear throughout this Guide in the applicable section.*



## WARNING












**Be careful! Human error is caused by many factors: carelessness, fatigue, overload, preoccupation, unfamiliarity of operator with the product, drugs and alcohol to name a few. Damage to your boat and outboard can be fixed in a short period of time, but injury or death, has a lasting effect.**

**For your safety and the safety of others, follow all safety warnings and recommendations. Do not disregard any of the safety precautions and instructions.**

**Anyone operating your boat should first read and understand this Guide before they operate your boat and outboard.**

## SAFETY MEASURES — General

-  To fully appreciate the pleasures, enjoyment and excitement of boating there are some basic rules that should be observed and followed by any boater. Some rules may be new to you and others may be common sense or obvious... irrespective, take them seriously!
-  Be sure at least one of your passengers knows how to handle your boat in case of an emergency.
-  All passengers should know the location of emergency equipment and how to use it.
-  Know the marine traffic laws and obey them.
-  All safety equipment and personal floatation devices must be in good condition and suitable for your type of boat. Always comply with the regulations that apply to your boat.
-  Remember, gasoline fumes are flammable and explosive. Always adhere to the fueling procedure contained in this Operator's Guide and those given to you by the fueling station. Always verify fuel level before use and during the ride. Apply the principle of 1/3 fuel to destination, 1/3 back and 1/3 reserve fuel supply. Do not carry spare fuel or flammable liquids in any storage or engine compartments.
-  Whenever running the engine, assure there is proper ventilation to avoid the accumulation of carbon monoxide (CO), which is odorless, colorless, and tasteless, and can lead to unconsciousness, brain damage, or death if inhaled in sufficient concentrations. CO accumulation can occur while docked, anchored, or underway, and in many confined areas such as the boat cabin, cockpit, swim platform, and heads. It can be worsened or caused by weather, mooring and operating conditions, and other boats. Avoid exhaust fumes from your engine or other boats, provide proper ventilation, shut off your engine when not needed, and be aware of the risk of backdrafting and conditions that create CO accumulation. In high concentrations, CO can be fatal within minutes. Lower concentrations are just as lethal over long periods of time.
-  Avoid standing up or shifting weight suddenly in light weight boats.
-  Keep your passengers seated in seats. The boat's bow, gunwale, transom and seat backs are not intended for use as seats.

## **SAFETY MEASURES — Installation and Maintenance**

- ⚠ Insist on the use of personal floatation devices, approved by the U.S. Coast Guard, by all passengers when boating conditions are hazardous, and by children and nonswimmers at all times.
- ⚠ Proceed with caution and at very low speed in shallow water. Grounding or abrupt stops may result in personal injury or property damage. Also be alert for debris and objects in the water.
- ⚠ Be familiar with the waters you are operating in. The gearcase of this outboard extends below the water surface and could potentially come in contact with underwater obstructions. Contact with underwater obstructions may result in loss of control and personal injury.
- ⚠ Respect no wake zones, rights of other water users and the environment. As the "skipper" and owner of a boat you are responsible for damage to other boats caused by the wake of your boat. Allow no one to throw refuse overboard.
- ⚠ Do not operate your boat if you are under the influence of drugs or alcohol.
- ⚠ High performance boats have a high power-to-weight ratio. If you are not experienced in the operation of a high performance boat, do not attempt to operate one at, or near, its top speed until you have gained that experience.
- ⚠ Become completely familiar with the control and operation of your boat and outboard before embarking on your first trip or taking on a passenger(s). If you have not had the opportunity to do so with your Dealer, practice driving in a suitable area and feel the response of each control. Be familiar with all controls before applying the throttle above idle speed. As the operator, you are in control and responsible for safe operation.
- ⚠ The outboard must be correctly installed. Failure to correctly install the outboard could result in serious injury, death or property damage. We strongly recommend that your Dealer install your outboard to ensure proper installation.
- ⚠ Do not overpower your boat by using an engine that exceeds the horsepower indicated on the boat's capacity plate. Overpowering could result in loss of control. If your boat has no capacity plate, contact your Dealer or the boat's manufacturer.
- ⚠ When replacement parts are required, use *Evinrude/Johnson Genuine Parts* or parts with equivalent characteristics, including type, strength and material. Using substandard parts could result in injury or product malfunction.
- ⚠ Only perform service procedures which are detailed in this Operator's Guide. Attempting to perform maintenance or repair on your outboard if you are not familiar with the correct service and safety procedure could cause personal injury or death. Further information can be obtained from your authorized *Evinrude/Johnson Dealer*. In many instances proper tools and training are required for certain service or repair procedures.
- ⚠ Maintain your boat and engine in top condition at all times. Adhere to the **Maintenance Schedule** on page 37.
- ⚠ Operate your boat and outboard prudently and have fun. Do not forget that all persons must assist other boaters in case of emergency.
- ⚠ Prevent injury from contact with rotating propeller; remove propeller before flushing or before performing any maintenance.



## PRODUCT REFERENCES, ILLUSTRATIONS AND SPECIFICATIONS

BRP reserves the right to make changes at any time, without notice, to features, specifications and model availability, and to change any specification or part at any time without incurring any obligation to update older models. The information in the Guide is based on the latest specifications available at the time of publication.

Photographs and illustrations used in this Guide might not depict actual models or equipment but are intended as representative views for reference only.

Certain features of systems discussed in this Guide might not be found on all models in all marketing areas.

### ***Owner's Identification***

**United States and Canada** — At the time of purchase, your Dealer will complete your outboard registration forms. Your portion provides proof of ownership and date of purchase.

**Outside United States and Canada** — See your Dealer or distributor for details.

### ***Model and Serial Numbers***

The model and serial numbers appear on a plate attached to the stern bracket or swivel bracket. Record your outboard's:

Model Number \_\_\_\_\_

Serial Number \_\_\_\_\_

Purchase Date \_\_\_\_\_

Ignition Key Number \_\_\_\_\_

### ***Stolen Outboards***

**United States and Canada** — Report stolen outboards to your local dealer or distributor.

**Outside United States and Canada** — Report the theft to the Bombardier Recreational Products distributor where the outboard was registered.

## Technical Literature

BRP offers technical literature specifically for your outboard. A service manual, a parts catalog, or an extra Operator's Guide can be purchased from your selling Dealer. For the name and location of the nearest *Evinrude* Dealer in the United States and Canada visit [www.evinrude.com](http://www.evinrude.com).

## Declaration of Conformity

- **Application of Council Directives:** Directive 2003/44/EC Recreational-Craft
- **Relevant Directive(s):** Directive 89/336/CEE Eletromagnetic Compatibility
- **Relevant Harmonized Standard(s):** As referenced by Council and Relevant Directives
- **Product Type:** Marine Outboard 2-Stroke Cycle SI Engine
- **Manufacturer:** BRP US Inc.  
10101 Science Drive  
Sturtevant, WI 53177

## EC Type Certificate:

Engine Model(s)	Exhaust Emissions Certificate Number	Sound Emissions Certificate Number
E75DPLSC, E90DPLSC, E90DPXSC, E90DSLSC, E90WDELSC, E90WDEXSC	EXBOMB003	SDBOBM014

I, the undersigned, hereby declare that the product specified above conforms to the above Directive(s) and Standard(s).



Fernando Garcia,  
Director of Regulatory Affairs and Public Relations

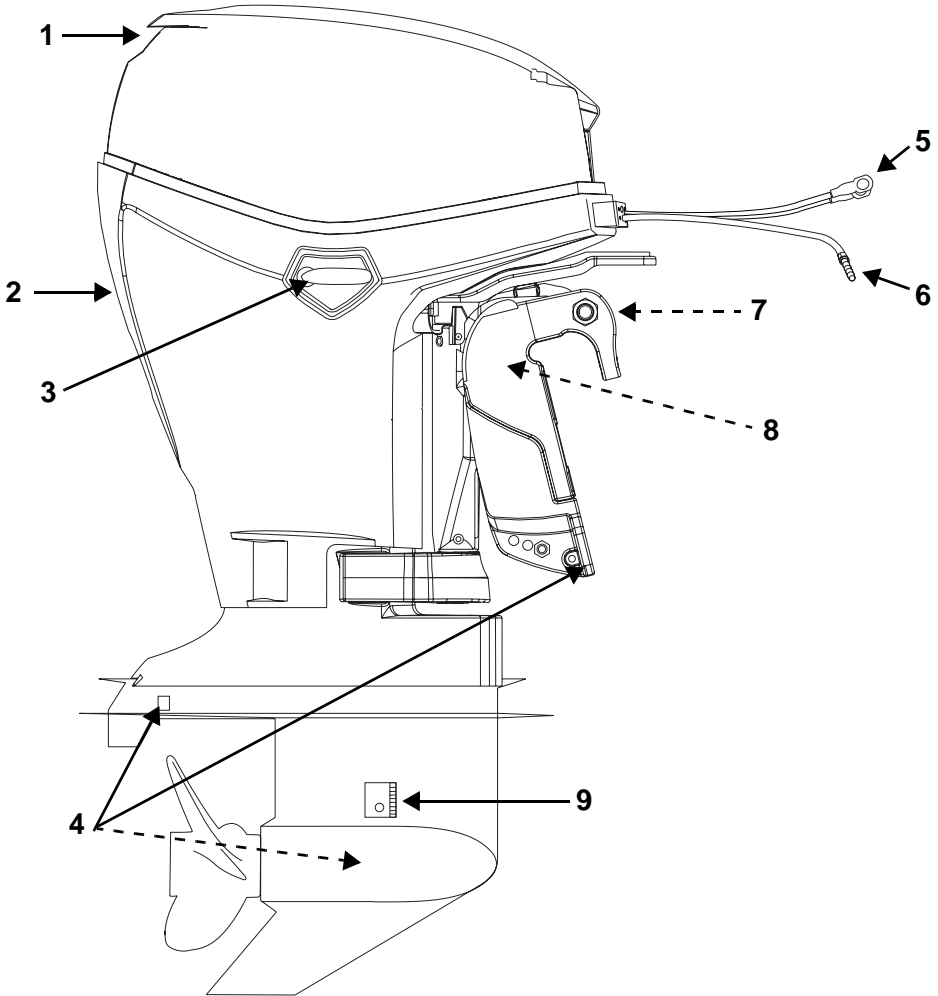


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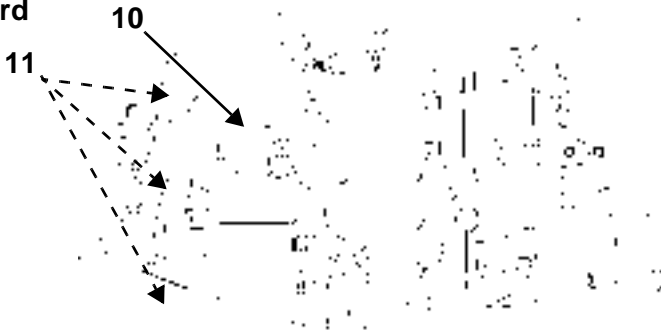
# **USING YOUR *EVINRUDE E-TEC* OUTBOARD**

## COMPONENT IDENTIFICATION

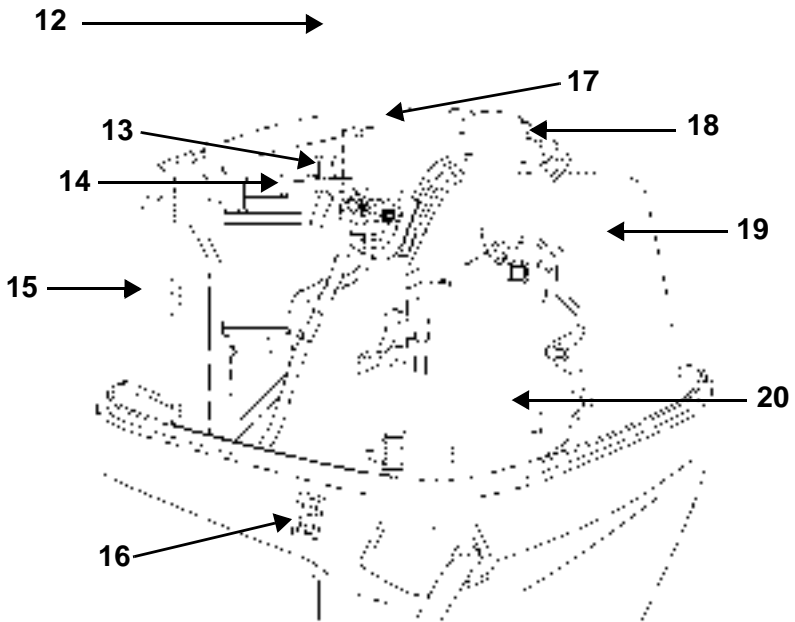


Item	Description	Item	Description
1	Air Inlet, Tilt Handle	6	Fuel Fitting
2	Water Pump Indicator, Flushing Port	7	Tilt Limiter Cam
3	Engine Cover Latch	8	Tilt Support
4	Anti-Corrosion Anodes	9	Water Intake Screens
5	Battery Cables		

Starboard



Port



Item	Description	Item	Description
10	Fuel Filter	16	Trailing Tilt Switch
11	Spark Plugs	17	Flywheel Guard
12	Engine Cover Latch	18	Oil Fill Cap
13	Fuse	19	Oil Tank
14	Spare Fuse	20	EMM (Engine Management Module)
15	Air Silencer		

## OIL AND FUEL

## OIL REQUIREMENTS

**Evinrude/Johnson Brand Oils**

*Evinrude/Johnson* outboard oils are formulated to give best engine performance while controlling piston and combustion chamber deposits, providing superior lubrication, and ensuring maximum spark plug life.

The following outboard oils are recommended for use in your *Evinrude E-TEC* outboard:

- *Evinrude/Johnson XD100*;
- *Evinrude/Johnson XD50*; or
- *Evinrude/Johnson XD30*.

**Evinrude/Johnson XD100 Oil**

*Evinrude/Johnson XD100* oil is preferred for your *Evinrude E-TEC* outboard. This synthetic formula oil provides uncompromised lubrication and superior performance, even in extreme conditions—especially in cold temperatures down to 0°F (-17°C).

If requested, an authorized dealer can program your *Evinrude E-TEC* outboard *EMM* for the exclusive use of *Evinrude/Johnson XD100*. **Only an authorized *Evinrude* dealer can program your outboard for this optional benefit.**

Oil consumption is reduced if the outboard is programmed for exclusive use of *Evinrude/Johnson XD100* as compared to using a conventional oil.

**IMPORTANT:** If your *EMM* has been programmed for *Evinrude/Johnson XD100*, **DO NOT** use any other oil unless in an emergency. If *Evinrude/Johnson XD100* is temporarily unavailable, a **one-time-only use** of an oil that meets NMMA TC-W3 certification standards is allowed. If you discontinue using *Evinrude/Johnson XD100*, you **MUST** first return to your Dealer to have the *EMM* reprogrammed back to the original factory setting.

**Other Oils**

If *Evinrude/Johnson* brand oils are not available, you must use an oil that meets NMMA TC-W3 certification standards.

**IMPORTANT:** Failure to follow oil specifications could void the engine warranty if a lubrication-related failure occurs.

## OILING SYSTEM



If the “LOW OIL” warning light illuminates, you have approximately five hours of normal operation before running out of oil. Refill the oil tank at next convenient opportunity.

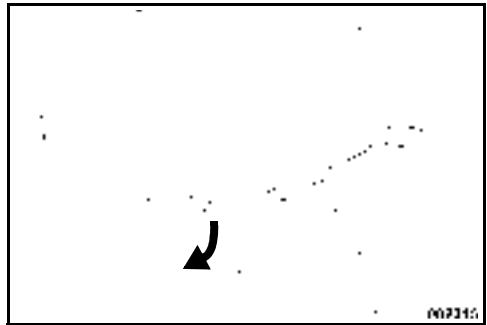
Always “top off” your oil tank prior to prolonged usage or long trips.

New outboards are programmed to use additional oil during the first two hours of operation above 2000 RPM.

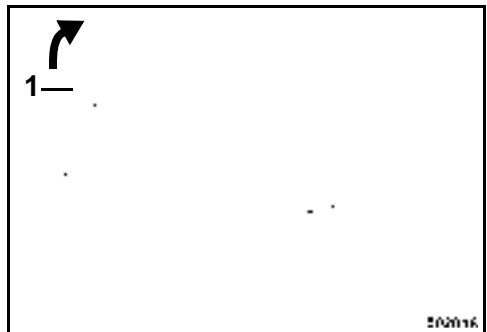
**IMPORTANT:** When operating in conditions under 32°F (0°C), *Evinrude/Johnson XD100* oil must be used.

## FILLING THE OIL TANK

Release the port and starboard engine cover latches by turning each handle downward.



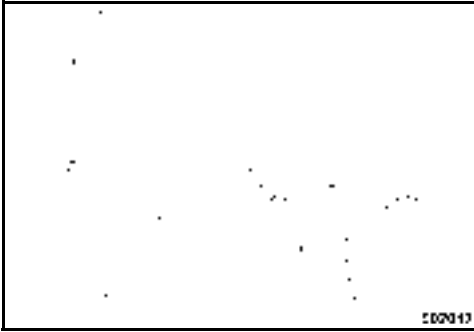
Pull up on the tilt handle to release the engine cover seal on the engine cover.



1. Tilt handle



Remove the engine cover to access the oil tank.



Remove the filler cap and fill the tank with the recommended outboard lubricant, as specified in **Oil Requirements** on page 14.



Replace the filler cap and tighten securely. Reinstall the engine cover.

**IMPORTANT:** The oil tank capacity is 3.0 quarts (2.8 liters).

## PRIMING THE OIL SYSTEM



The oiling system must be primed before using the outboard if:

- The outboard is new (check with your dealer to ensure oil system was primed);
- You run completely out of oil; or
- The outboard is laid down for transportation or storage.

Prime the oiling system by performing winterization. Refer to **Long-Term Storage (Winterization)** on page 39.

## FUEL REQUIREMENTS



### WARNING



Gasoline is extremely flammable and highly explosive under certain conditions. Follow the instructions in this section explicitly. Improper handling of fuel could result in property damage, serious injury or death.

Leaking fuel is a fire and explosion hazard. All parts in the fuel system should be inspected frequently and replaced if signs of deterioration or leakage are found. Inspect the fuel system each time you refuel, each time you remove the engine cover and annually.

Follow these instructions to ensure safety when handling fuel:

- Always turn off the engine before fueling.
- Never permit anyone other than an adult to refill the fuel tank.
- Do not fill the fuel tank all the way to the top or fuel may overflow when it expands due to heating by the sun.
- Remove portable fuel tanks from the boat before fueling.
- Always wipe off any fuel spillage.
- Do not smoke, or allow open flames, or sparks or use electrical devices such as cellular phones in the vicinity of a fuel leak or while fueling.
- Always work in a well ventilated area.

**IMPORTANT:** Always use fresh gasoline. Gasoline will oxidize; the result is loss of octane, volatile compounds, and the production of gum and varnish deposits which can degrade the fuel system.

### Minimum Octane

Your outboard is certified to operate on unleaded automotive gasoline with an octane rating equal to or higher than:

- 87 (R+M)/2 AKI — Inside the U.S.
- 90 RON — Outside the U.S.

Using unleaded gasoline that contains methyl tertiary butyl ether (MTBE) is acceptable **ONLY** if the MTBE content does not exceed 15% by volume.

### Alcohol Fuels

Your outboard has been designed to operate using the specified fuels; however, be aware of the following:

- The boat's fuel system may have different requirements regarding the use of alcohol fuels. Refer to the boat's owner guide.
- Alcohol attracts and holds moisture that can cause corrosion of metallic parts in the fuel system.
- Alcohol blended fuel may cause engine performance problems.

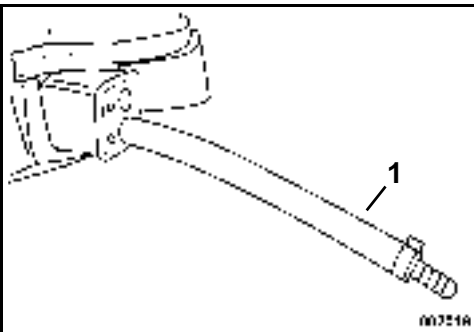
Using alcohol-extended fuels is acceptable **ONLY** if the alcohol content does not exceed:

- 10% ethanol by volume; or
- 5% methanol with 5% cosolvents by volume.

### FUEL SYSTEM OPERATION

#### Connecting the Fuel Hose

- 1) If the fuel hose is disconnected for any reason, seal it to prevent spillage. Cap the fuel fitting to prevent contamination.
- 2) Connect the fuel hose to the 3/8 in. (9 mm) fuel fitting. Fasten hose securely with clamp (18.5 mm) from owner's kit.



1. Fuel hose and fitting – 3/8 in. (9 mm)



### WARNING



Store fuel tanks in a well-ventilated area, away from heat and open flame. Prevent escape of liquid or vapors which could accidentally ignite.

Close the filler cap vent screw, if equipped.

Be sure the disconnected fuel hose does not drip.

**IMPORTANT:** Fuel distribution hoses in the boat must deliver fuel at the rate of flow needed by the outboard. Minimum inside diameter of fuel hoses must be 3/8 in. (9 mm).

Fuel systems with built-in tanks, particularly those that include antisiphon valves and filter/primer units, may have restrictions not allowing the engine fuel pump to deliver sufficient fuel under all conditions. This can result in a loss of performance. If a performance problem exists, see your Dealer.

### FUEL ADDITIVES

The only fuel additives approved for use in your *Evinrude E-TEC* outboard are:

- *Evinrude/Johnson 2+4 Fuel Conditioner*
- *Evinrude/Johnson Fuel System Cleaner*

**Use of other fuel additives can result in poor performance or engine damage.**

*Evinrude/Johnson 2+4 Fuel Conditioner* will help prevent gum and varnish deposits from forming in fuel system components and will remove moisture from the fuel system. It can be used continuously and should be used during any period when the outboard is not being operated on a regular basis. Its use will reduce spark plug fouling, fuel system icing, and fuel system component deterioration.

*Evinrude/Johnson Fuel System Cleaner* will help keep fuel injectors in optimal operating condition.

# ENGINE MONITORING

The engine monitoring system warns you of conditions that could damage your outboard. The monitoring system consists of a dash-mounted gauge, a warning horn, sensors on the engine and oil tank, and related wiring.

**IMPORTANT:** Your outboard must be equipped with an engine monitoring system such as *I-Command*, *SystemCheck*, or equivalent. Operating your outboard without an engine monitor will void your warranty for failures related to monitored functions.

The system is compatible with the *Evinrude* Modular Wiring System (MWS) or can be connected to an *I-Command* system, or other NMEA 2000 compliant CANbus instruments.

## GAUGES

Gauges are available in several styles, such as a digital *I-Command* gauge with LCD displays or a basic *SystemCheck* gauge.



1. Typical *I-Command* Digital gauge
2. Typical *SystemCheck* gauge

## Function

The *EMM* activates the warning horn and the gauge displays as follows:

- **LOW OIL** means that oil in the tank is at reserve level (about 1/4 full).
- **NO OIL** indicates an oil delivery problem such as an empty oil tank or damaged oil system.
- **WATER TEMP** or **HOT** indicates an engine or *EMM* overheat condition.
- **CHECK ENGINE** or **FAULT** is used to indicate other fault conditions identified by the *EMM*.

For *I-Command* and other gauges, refer to the gauge user's guide for gauge displays, operation, warnings, and monitoring instructions.

## SYSTEM SELF-TEST

During engine start-up, pause with the key switch in the ON position. The monitoring system self-tests by sounding a half-second beep. *SystemCheck* gauges self-test by turning the indicator lights on simultaneously, then off in sequence.

**IMPORTANT:** If the self-test does not happen as stated, see your Dealer.

## ENGINE MONITOR WARNINGS

Engine monitor system warnings activate the horn for 10 seconds and the appropriate gauge light for a minimum of 30 seconds, or until alarm is acknowledged. If the failure is momentary (for example, oil moving in the tank), the engine monitor gauge light or display may remain ON for a full 30 seconds before going out. If the unsafe operating condition continues, a light or display remains ON until the key is turned OFF or the failure is corrected.

The warning will reoccur at the next startup if the problem is not corrected.

If the *EMM* senses a problem could cause permanent engine damage, it will also limit engine speed to 1200 RPM. This additional protection feature is referred to as *S.A.F.E.* (Speed Adjusting Failsafe Electronics). If the engine was running faster than 1200 RPM when the *S.A.F.E.* mode activated, it will shake noticeably. Under certain operating conditions the *EMM* will shut OFF the engine.



## CAUTION



**In the *S.A.F.E.* mode, the engine speed is limited. Under certain conditions, the engine's limited speed may reduce maneuverability of your boat.**

**If the *S.A.F.E.* mode is activated and you are unable to correct the problem, seek assistance and/or return to safe harbor. Serious engine damage, engine shutoff, and/or reduced maneuverability may be imminent.**

## Using Your E-TEC Outboard

The following warnings may appear on the engine monitor gauge.

### “LOW OIL”

Symptom	Oil in the oil tank is at reserve level (about 1/4 full)
Result	<i>EMM</i> will activate low oil light or display warning
Action	<ul style="list-style-type: none"><li>• Fill the oil tank with recommended oil as soon as possible to avoid emptying the tank. The outboard has approximately five hours (ten hours if using <i>Evinrude/Johnson XD100</i> oil) of normal running time before “NO OIL” condition occurs. Refer to <b>Filling the Oil Tank</b> on page 14.</li></ul>

### “NO OIL”

Symptom	There is an oil delivery problem
Result	<i>EMM</i> will activate <i>S.A.F.E.</i> * mode
Action	<ul style="list-style-type: none"><li>• If the oil tank is empty, add the recommended oil.</li><li>• If the oil tank is not empty, seek assistance and/or return to safe harbor.</li></ul>

Your outboard is designed to run in “get home” mode for up to five hours in the event you run out of oil. Refill the oil tank. Prime oil system. Refer to **Priming the Oil System** on page 15.

### “WATER TEMP” or “HOT”

Symptom	The engine is overheating
Result	<i>EMM</i> will activate <i>S.A.F.E.</i> * mode
Action	<ul style="list-style-type: none"><li>• A <b>continuous</b> light with <i>S.A.F.E.</i> mode — The <i>EMM</i> has identified an overheating condition. Check the water pump indicator for a steady stream of water. Shut OFF the engine. Clear the water intake screens of any debris. If the overheat condition still exists, the engine will operate in “get home” mode. Return to harbor immediately.</li><li>• A <b>flashing</b> light — The <i>EMM</i> has identified a damaging overheating condition. The engine will not operate. Allow the engine to cool for 20 minutes and return to harbor immediately. See your Dealer.</li></ul>

### “CHECK ENGINE” or “CHK ENG”

Symptom	An abnormal operating condition
Result	<i>EMM</i> will activate check engine light or display warning
Action	<ul style="list-style-type: none"><li>• A <b>flashing</b> light — The <i>EMM</i> has identified an abnormal operating condition related to the fuel system. The engine will shut OFF and cannot be restarted.</li><li>• A <b>continuous</b> light with <i>S.A.F.E.</i> mode — The <i>EMM</i> has identified a problem with the outboard. Seek assistance and/or return to harbor. See your Dealer.</li><li>• A <b>continuous</b> light without <i>S.A.F.E.</i> mode — The <i>EMM</i> has identified a problem that should be addressed by your Dealer as soon as practical to avoid operational difficulties.</li></ul>



## WARNING



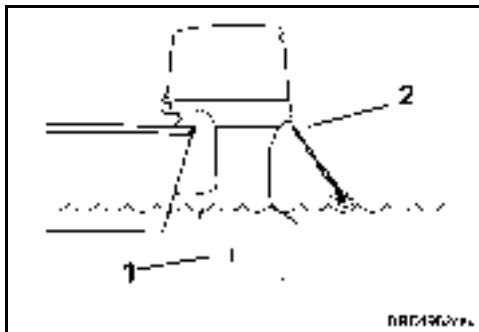
If the outboard shuts OFF and the “CHECK ENGINE” or “CHK ENG” light is flashing, the outboard cannot be restarted. A hazardous fuel condition may exist. Seek assistance to return to port.

\*Speed Adjusting Failsafe Electronics

## ENGINE OVERHEATING

**IMPORTANT:** Do not run your outboard—even for a brief start-up—without supplying water to it. Refer to **Flushing** on page 38.

While boating, the outboard's water intakes must stay completely submerged and unobstructed. Observe proper transom height and trim angle. While the outboard is running, the outboard's water pump indicator must discharge a steady stream of water. Check the indicator often, especially when operating in weeds, mud and debris-laden water, and at extreme trim angles.



1. Water intake screens
2. Water pump indicator

If the engine overheats, the engine monitor will sound the warning horn and turn on the "WATER TEMP" or "HOT" light. Also, the S.A.F.E. (Speed Adjusting Failsafe Electronics) mode will immediately limit the engine's speed to 1200 RPM. If the engine was running faster than 1200 RPM when the S.A.F.E. mode activated, it will shake noticeably. The protection system must be **RESET** before the engine will operate at speeds over 1200 RPM. Under certain conditions the *EMM* will shut off the engine.



To **RESET** the system:

- The engine must be shut off and the cooling temperature restored.

**IF** the S.A.F.E. mode activates and the stream from the water pump indicator becomes intermittent or stops, reduce speed to idle and:

- 1) Shift to NEUTRAL.
- 2) SHUT OFF the engine.
- 3) Tilt the outboard up.
- 4) Clean the intake screens of any blockage.
- 5) Clean the water pump indicator of any blockage.
- 6) Lower the outboard.
- 7) Restart the engine and run at idle.

**IF** cleaning the screens and indicator *does not* restore the water pump indicator's steady discharge, the engine will operate only in "get home" mode. Return to harbor immediately. See your Dealer.

**IF** cleaning the screens and indicator *does* restore the water pump indicator's steady discharge, you might have to run for two minutes in NEUTRAL to allow the engine to cool and the light to go off.

**IMPORTANT:** If cooling is not restored, the *EMM* will identify a progressive overheating condition and shut off the engine. The "WATER TEMP" or "HOT" light will flash. The engine will not restart until the engine is allowed to cool.

After any overheat causing engine shutdown, see your Dealer for:

- Inspection of the water pump for excessive wear or damage.
- Inspection of the thermostats.

**IMPORTANT:** Although the S.A.F.E. mode can help prevent engine damage, it does not guarantee you can run your engine indefinitely without engine damage.

## OPERATION

## SAFETY INFORMATION


**DANGER**


**DO NOT** run the engine indoors or without adequate ventilation or permit exhaust fumes to accumulate in confined areas. Engine exhaust contains carbon monoxide which, if inhaled, can cause serious brain damage or death.

Contact with a rotating propeller is likely to result in serious injury or death. Assure the engine and prop area is clear of people and objects before starting engine or operating boat. Do not allow anyone near a propeller, even when the engine is off. Blades can be sharp and the propeller can continue to turn even after the engine is off. Always shut off the engine when near people in the water.

**WARNING**

The engine cover is a machinery guard. **DO NOT** operate your outboard with the cover off unless you are performing maintenance or emergency starting, and then be careful to keep hands, hair, and clothing clear of all moving parts. Contact with moving parts could cause injury.

 Always shut off the outboard when your boat is near people who are in the water.

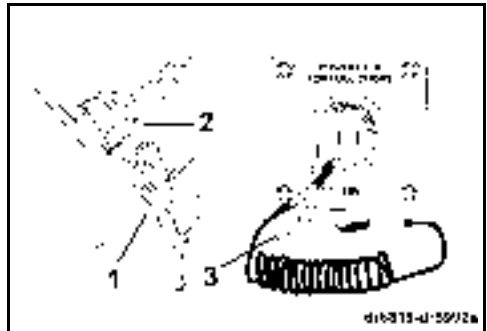
 Be familiar with the waters you are operating in. The gearcase of this outboard extends below the water surface and could potentially come in contact with underwater obstructions. Contact with underwater obstructions may result in loss of control and personal injury.

**Emergency Stop/Key Switch**

A combination emergency stop switch and key switch is a feature of *Evinrude* prewired remote controls and all *Evinrude* control wiring kits.

Connect the clip to the emergency stop/key switch. Snap the lanyard to a **secure** place on the operator's clothing or life vest — not where it might tear away instead of activating the stop switch. Disconnecting the clip and lanyard will stop the engine and prevent the boat from becoming a runaway if the driver moves beyond the range of the lanyard. If the lanyard is too long, it can be shortened by knotting or looping it. **DO NOT** cut and retie the lanyard. In an emergency situation, the engine can be started without the clip in place. Follow the normal starting procedure. Reinstall a clip as soon as possible.

**IMPORTANT:** Your emergency stop switch can be effective only when in good working condition. At each outing, inspect clip and lanyard for cuts, breaks, or wear. Replace worn or damaged parts.



1. Clip
2. Emergency stop / key switch
3. Lanyard

**DANGER**

**Always use the safety lanyard when operating your boat to help prevent a runaway boat and reduce the risk of personal injury or death.**

**WARNING**

Avoid knocking or pulling the clip off the stop switch during normal boating. Avoid bumping the key if operating without the clip on the switch. The resulting unexpected loss of forward motion can throw occupants forward, causing injury.

Keep the lanyard free from obstructions and entanglements.

At each outing, test the system's operation. With the engine running, remove the clip from the switch by pulling the lanyard. If the engine does not stop running, see your Dealer.

**ENGINE STARTING**

Refer to the **Routine Inspection Checklist** on page 34 for pre-launch checks before using your *Evinrude E-TEC* outboard.

You **MUST** supply water to the engine before attempting to start it. Engine damage can occur quickly.

Be sure the water intake screens are below the water surface.

Connect the clip to the emergency stop/key switch. Snap the lanyard to a **secure** place on the operator's clothing or life vest — not where it might tear away instead of activating the stop switch.



1. Clip
2. Emergency stop clip / key switch
3. Lanyard

**IMPORTANT:** In an emergency situation, the engine will start and run without the clip connected to the key switch. **The operator should always use the clip and lanyard anytime the engine is running.** Refer to **Emergency Stop/Key Switch** on page 20.

Move the remote control handle to NEUTRAL.

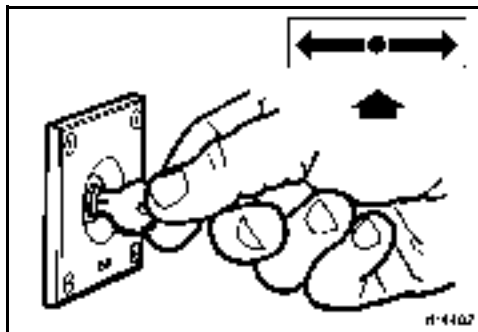
**WARNING**

If you are using a remote control that does not have start-in-gear prevention, the outboard can be started while it is in gear. **Protect against unexpected boat movement by always starting your outboard in NEUTRAL.**



**DO NOT** advance the throttle before start-up. Advancing the throttle overrides the electronic idle control system. After the engine starts, the engine management module (*EMM*) automatically increases idle speed slightly. Idle speed will decrease as the engine warms up. The engine monitor gauge lights or display will illuminate if the throttle is advanced.

Turn the key switch fully clockwise to the **START** position. Crank the engine no longer than 20 seconds.



**IMPORTANT:** The starter motor can be damaged if operated **continuously** for more than 20 seconds.

Upon start-up, release the key.

## Using Your E-TEC Outboard

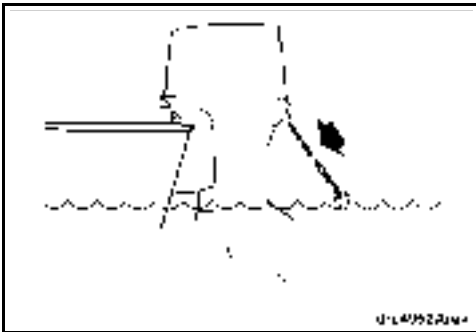
If the engine did not start, release the key momentarily, then try again.

Each time the key switch is turned from OFF to ON, the warning system will self-test. Refer to **Engine Monitoring** on page 17. If the warning system fails to self-test during start-up, see your Dealer.

If your outboard does not react normally to this starting procedure or if it fails to start, refer to **Troubleshooting** on page 44.

### After Engine Starts

Check the water pump indicator. A steady stream of water indicates the water pump is working. If a steady stream of water from the water pump indicator is not visible, stop the engine. Refer to **Engine Overheating** on page 19.



### ENGINE STOPPING

Move control handle to NEUTRAL.

Turn key switch counterclockwise to the OFF position. Remove the key when the boat will be unattended.

### REMOTE CONTROLS

When selecting the remote control system for your boat, specify *Evinrude* components. *Evinrude* controls deliver the cable stroke your outboard needs for positive shift and throttle control, and they incorporate such safety and convenience features as:

- Start-in-gear prevention
- Plug-in compatibility with *Evinrude* Modular Wiring System (MWS)

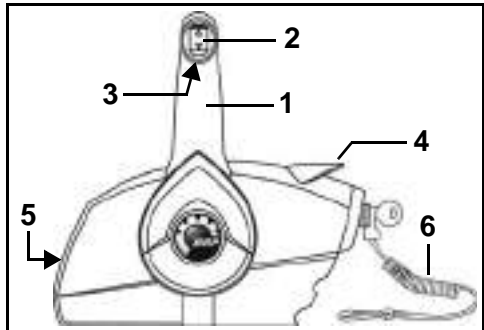


## WARNING



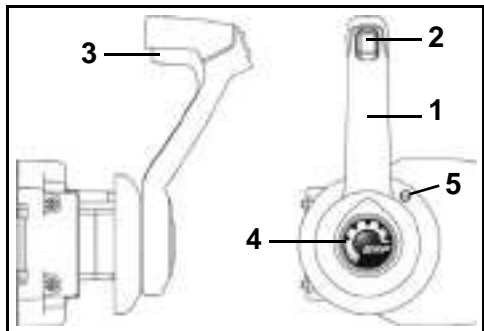
If you choose a non-*Evinrude* remote control, it must have a start-in-gear prevention feature. This feature can prevent injuries resulting from unexpected boat movement when the engine starts.

### Side Mount Control



1. Handle – shift and throttle
2. Trim/tilt switch (where equipped)
3. Neutral lock lever
4. Fast idle lever (warm-up)
5. Throttle friction adjusting screw
6. Emergency stop clip and lanyard

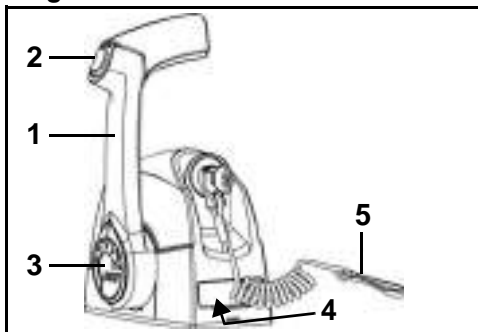
### Concealed Side Mount Control



1. Handle – shift and throttle
2. Trim/tilt switch (where equipped)
3. Neutral lock lever
4. Fast idle button (warm-up)
5. Throttle friction adjusting screw

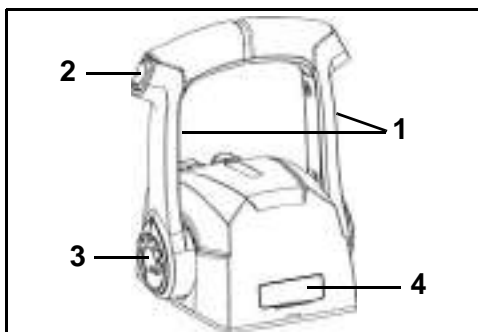


### Single Lever Binnacle Mount Control



1. Handle – shift and throttle
2. Trim/tilt switch (where equipped)
3. Fast idle button (warm-up)
4. Throttle friction adjusting screw (under cover)
5. Emergency stop clip and lanyard

### Dual Lever Binnacle Mount Control



1. Handle – shift and throttle
2. Trim/tilt switch (where equipped)
3. Fast idle button (warm-up)
4. Throttle friction adjusting screw (under cover)

## SHIFTING AND SPEED CONTROL

**IMPORTANT:** Carefully check the function of all control and engine systems before leaving the dock. DO NOT shift the engine into FORWARD or REVERSE while it is shut off.

If the following directions are not suitable for your boat's control, see your Dealer before proceeding.

### Shifting

**IMPORTANT:** When shifting from FORWARD to REVERSE or from REVERSE to FORWARD, pause at NEUTRAL until the engine is at idle speed and the boat has slowed.

With engine running and control handle in NEUTRAL:

**Side Mount Controls:** Unlock the control handle by lifting the neutral lock lever on the hand grip. With a firm, quick motion, move the control handle fore or aft until it engages the forward or reverse gear detent.

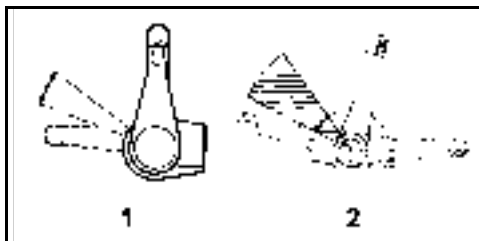
**Binnacle Mount Controls:** With a firm, quick motion, move the control handle fore or aft until it engages the forward or reverse gear detent.

### Speed Control

After gear engagement, move the control handle slowly in the same direction to increase speed.

## FUEL ECONOMY

Fuel economy can vary depending on boat load, hull design, and throttle setting. When boat reaches top speed, throttle back from FULL SPEED to a lower throttle setting. You will save fuel with a minimal loss of speed.



Typical Fuel Economy Throttle Range

1. Side mount control
2. Binnacle mount control

## POWER TRIM AND TILT



### WARNING



Any malfunction of the power trim and tilt unit could result in loss of shock absorber protection if an underwater obstruction is hit. Malfunction can also result in loss of reverse thrust capability.

Correct fluid level must be maintained to ensure operation of the impact protection on this unit.

When operating in rough water or crossing a wake, excessive bow-up trim may result in the boat's bow suddenly rising skyward, possibly ejecting or otherwise seriously injuring occupants.

Some boat/outboard/propeller combinations may encounter boat instability and/or high steering torque when operated at high speed at or near the outboard's trim range limits (full bow-up or bow-down). Boat stability and steering torque can also vary due to changing water conditions. If any adverse conditions occur, reduce throttle and/or adjust trim angle to maintain control. If you experience boat instability and/or high steering torque, see your dealer to correct these conditions.

Some boats plow, or are difficult to plane, when operated in the trim's lowest position. If your boat handles unsuitably when trimmed fully bow-down, set the angle adjusting rod or trim limiter rod to limit the travel of the power trim. If your outboard is not equipped with this rod, purchase one from your Dealer.



### WARNING



If the bow of the boat plows the water at high speeds, the boat may bow steer or spin suddenly, possibly ejecting or otherwise seriously injuring occupants.



### Trim

In most operating conditions, it is recommended to **trim** the outboard to the full down position when accelerating. Once on plane, trim the outboard up for best performance.

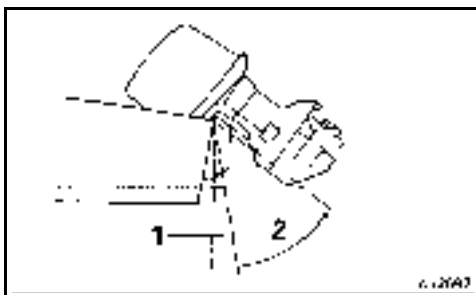
Over-trimming increases engine RPM while decreasing speed. The best trim setting is when the highest speed is achieved with the lowest engine RPM.

### Shallow Water Drive

You can **tilt** the outboard to any position within the tilt range but **DO NOT** run the engine faster than idle speed. If idling a tilted outboard, keep its water intakes submerged at all times.

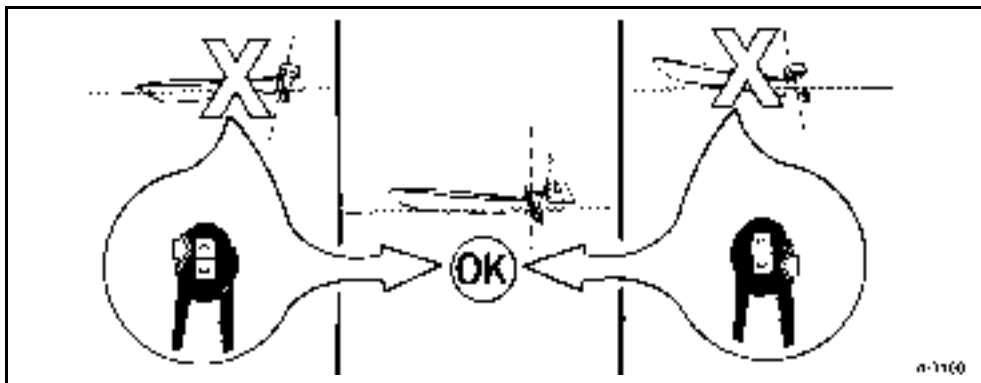
### Tilt

The full tilt is often used to tilt the outboard for clearance when beaching, mooring, or launching.



1. Trim range
2. Tilt range

If the tilted outboard's cover contacts the boat's motor well, limit the maximum tilt by following the procedures in **Tilt Limiter Cam** on page 50.



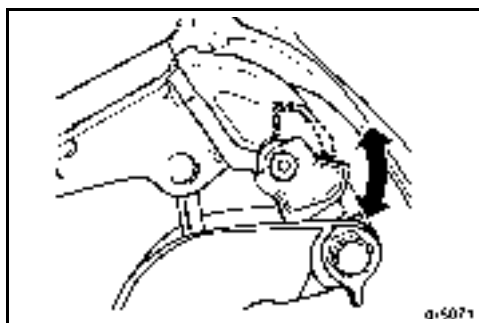
Trim angle adjustment

### Tilt Lock Lever

**IMPORTANT: DO NOT** use the tilt lock lever while trailering. Refer to **Trailering** on page 28.

If you intend to leave the outboard tilted for a period of time, engage the tilt lock lever:

- 1) Tilt the outboard UP using the trailering tilt switch.
- 2) Flip the tilt lock lever down.
- 3) Lower the outboard until the tilt lock lever rests solidly on the stern brackets.



When you are finished tilting the outboard, disengage the tilt lock lever:

- 1) Tilt the outboard UP.
- 2) Flip the tilt lock lever up.
- 3) Lower the outboard to operating position.

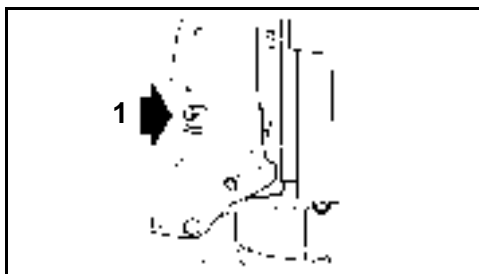
### Manual Release Valve

If needed, the outboard will tilt up or down manually, using the manual release valve.

⚠ **WARNING** ⚠

**Keep everyone clear of a tilted outboard when backing out the manual release screw. The outboard could drop suddenly and forcibly. Be sure to tighten the manual release screw after manually repositioning the outboard. Tightening the screw also reactivates the outboard's impact protection and reverse thrust capability.**

- 1) Turn the manual release valve counter-clockwise, slowly (about 3 1/2 turns), until it **lightly** contacts its retaining ring.
- 2) Reposition the outboard.
- 3) Tighten the manual release valve to hold the outboard in its new position.



1. Manual release valve

## MANUAL TILT



### WARNING



When operating in rough water or crossing a wake, excessive bow-up trim may result in the boat's bow suddenly rising skyward, possibly ejecting or otherwise seriously injuring occupants.

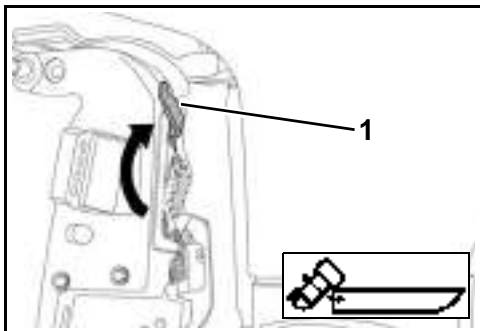
Some boat/outboard/propeller combinations may encounter boat instability and/or high steering torque when operated at high speed at or near the outboard's angle adjustment limits (full bow-up or bow-down). Boat stability and steering torque can also vary due to changing water conditions. If any adverse conditions occur, reduce throttle and/or adjust outboard angle adjustment trim angle to maintain control. If you experience boat instability and/or high steering torque, see your dealer to correct these conditions.

If the bow of the boat plows the water at high speeds, the boat may bow steer or spin suddenly, possibly ejecting or otherwise seriously injuring occupants.

### Tilting

**IMPORTANT:** Use the tilt grip to tilt your outboard.

**Tilt UP:** Move tilt/run lever to TILT position.



1. TILT position

Grasp tilt grip on engine cover and tilt outboard to the full tilt position.



1. Tilt grip

Tilt support brackets will automatically engage.

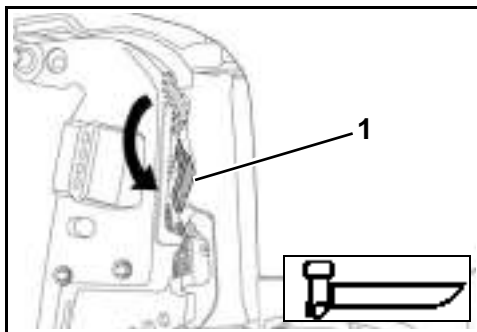


### WARNING



While outboard is tilted, leave tilt lock lever in the TILT position. When the tilt/run lever is in the RUN position, tilt support bracket can release unexpectedly and allow outboard to drop, creating a risk of serious personal injury or loss of control.

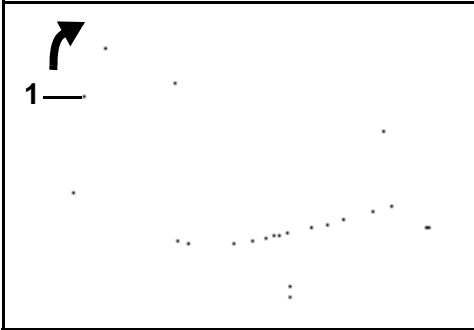
**Tilt DOWN:** Move tilt/run lever to RUN position.



1. RUN position

Grasp tilt grip on engine cover and raise outboard slightly. Tilt support brackets will auto-

matically disengage. Slowly lower outboard to its normal operating position.



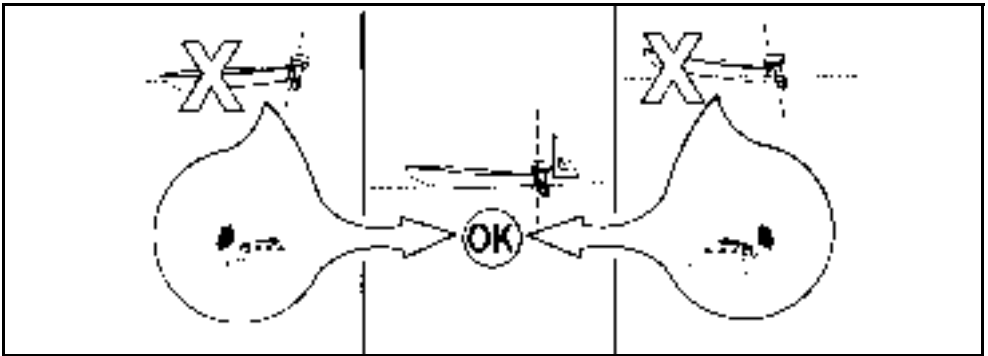
1. Tilt grip

## Outboard Angle Adjustment

The outboard should be perpendicular to the water when the boat is underway at full speed. This adjustment can only be determined by water testing the boat. Set angle adjustment for your normal load.

Place the outboard in full TILT position. Refer to **Trailing** on page 28.

- Turn the angle adjusting rod handle up. Push in against spring so retainer will release, then slide rod assembly all the way out.
- Insert rod in desired position. Make sure rod passes through both stern brackets.
- Push in against spring and turn rod handle down. Make sure the retainer dropped into lock position.



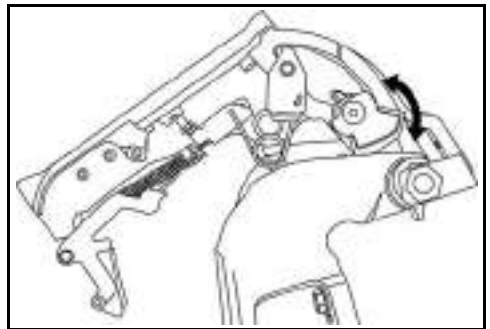
Outboard angle adjustment

## Tilt Lock Lever

**IMPORTANT: DO NOT** use the tilt lock lever while trailering. Refer to **Trailing** on page 28.

If you intend to leave the outboard tilted for a period of time, engage the tilt lock lever:

- 1) Tilt the outboard UP using the trailering tilt switch.
- 2) Flip the tilt lock lever down.
- 3) Lower the outboard until the tilt lock lever rests solidly on the stern brackets.



When you are finished tilting the outboard, disengage the tilt lock lever:

- 1) Tilt the outboard UP.
- 2) Flip the tilt lock lever up.
- 3) Lower the outboard to operating position.

## TRAILERING

### Power Trim and Tilt Models

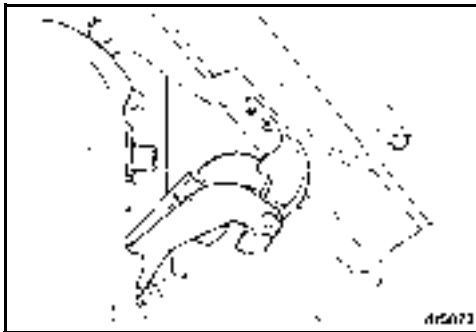


### WARNING

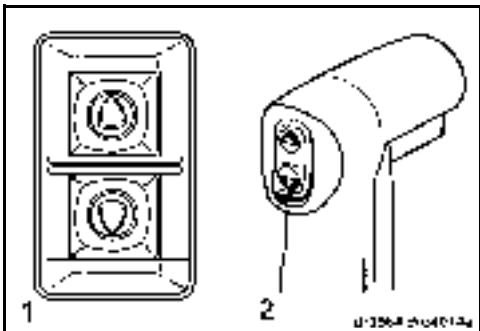


Keep everyone clear of stern area when raising or lowering the outboard. Personal injury or death can result from contact with moving parts of the outboard.

To engage trawling bracket, tilt the outboard fully using the tilt switch inside the boat or the trawling tilt switch (on port side of engine).

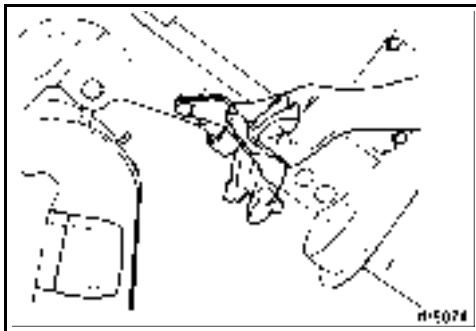


**To disengage bracket** — Tilt the outboard fully. Return the trawling bracket to its stowed position. Lower the outboard to its vertical position.



1. Trawling tilt switch
2. Tilt switch inside boat

Pull down the trawling bracket. A detent will hold the bracket in position. Lower the outboard until the trawling bracket locks into place in the stern brackets.

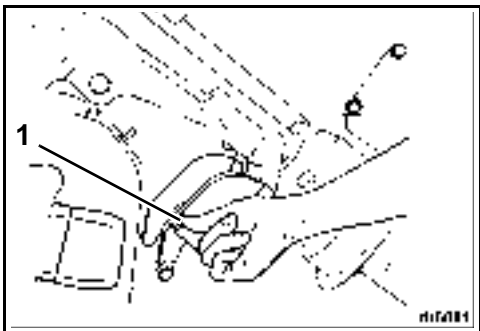


The outboard is designed to be trailered in a vertical position or tilted, using the trawling bracket. Use the position best suited for your boat.

### Manual Tilt Models

Trailer your boat with the outboard in a vertical position. If your trailer does not provide adequate road clearance, the outboard can be trailered by using an accessory trawling bracket.

**IMPORTANT:** Whenever using an accessory trawling bracket, the outboard must be restrained. Bouncing during transport will damage the outboard and boat's transom.



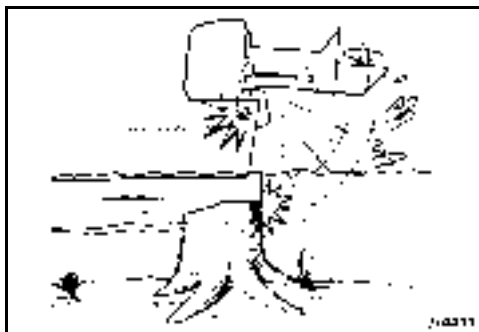
1. Trawling bracket

## IMPACT DAMAGE

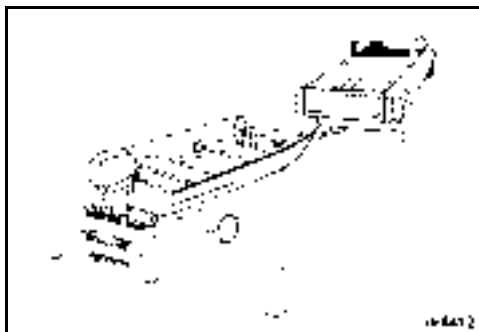
Your outboard has a shock absorption system designed to help withstand damage from impact with underwater objects at low to moderate speeds. High speed impacts with rigid underwater objects like pilings or boulders can be beyond the capability of the absorption system. Such impacts can result in serious damage to your outboard and injury to boat occupants from the outboard or its parts entering the boat. Occupants can also be ejected or injured by falling against portions of the boat as a result of rapid deceleration following impacts.

When boating in unfamiliar, shallow, or debris-laden waters, seek information on safe boating areas and navigation hazards from a reliable local source. Reduce your speed and keep a sharp lookout!

**IMPORTANT:** Impact damage is NOT covered by the outboard warranty.



The outboard's shock absorption system does not work while operating in reverse. If you back into an object, either in the water or while trailering, your boat and outboard can be seriously damaged.



If you hit any object:

- STOP immediately and examine the outboard for loosening of attaching hardware.
- INSPECT for damage to swivel and stern brackets, and steering components.
- EXAMINE the boat for structural damage.
- TIGHTEN any loosened hardware.

If the collision occurred in the water, proceed slowly to harbor. Before boating again, have your Dealer thoroughly inspect all components.



### WARNING



**Failure to inspect for damage after an accident or striking an object could result in sudden, unexpected component failure, loss of boat control, and personal injury. Unrepaired damage could reduce your boat and outboard's ability to resist future impacts.**

## EMERGENCY STARTING

If the starter fails, your engine can be started using a 1/4 in (6 mm) cord about 4 ft. (1.2 m) long.



### WARNING



Move the shift lever to **NEUTRAL** before performing emergency starting procedures. Failure to do so may result in unexpected boat movement.

The engine cover is a machinery guard. To prevent injury from moving engine components, keep hands, clothes, and hair clear of powerhead.

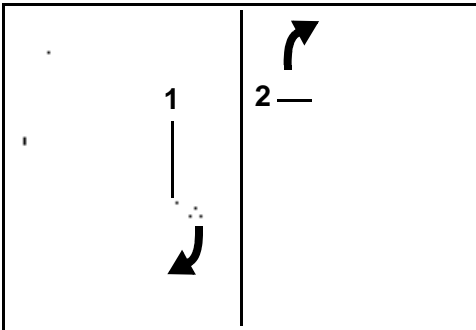
Prevent electric shock by keeping clear of the ignition coils and spark plug leads when the outboard is being started or is running. Shock can cause serious personal injury under certain conditions.

**DO NOT** turn flywheel by hand. Use starter cord only.

Be sure:

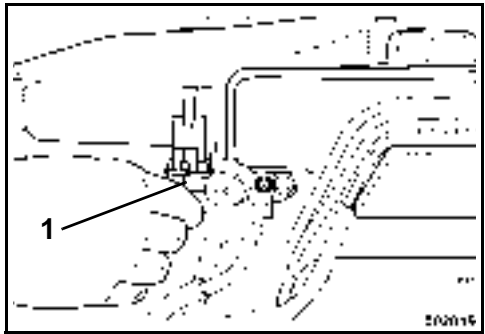
- Key switch is OFF.
- Engine is in normal operating position.
- Shift lever is in NEUTRAL.

- 1) Release port and starboard side engine cover latches downward. Pull up on the tilt handle to release the engine cover seal and remove the engine cover.



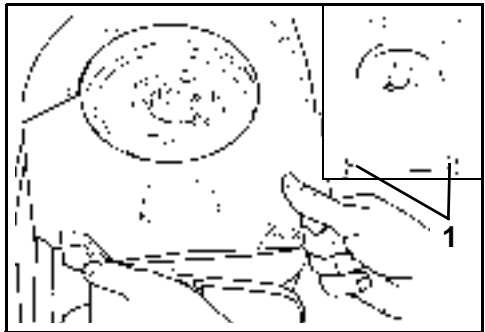
1. Engine cover latch
2. Tilt handle

- 2) Remove fuse holder from flywheel cover.



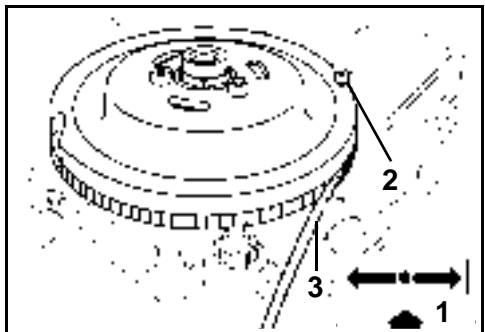
1. Fuse

- 3) Raise flywheel guard from the fittings by pulling up on the front two fastening tabs.



1. Fastening tabs

- 4) Holding the flywheel guard out of the way, hook the knot of your emergency start cord into the notch on the flywheel. Wind cord clockwise in the flywheel ridge, making one and a half full windings with the cord.



1. NEUTRAL
2. Knot
3. Rope in flywheel ridge



- 5) Turn key switch ON.
- 6) From a secure position in the boat, pull hard on emergency starting cord to start engine.



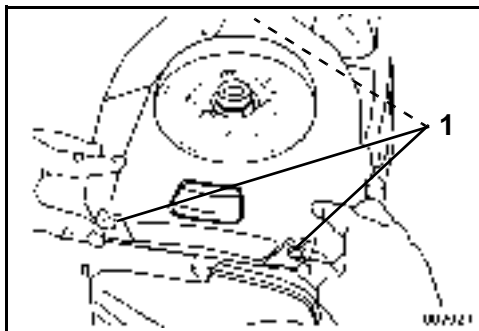
## CAUTION



**Keep everyone clear of your immediate area when pulling on emergency starting cord, especially behind you.**

Repeat procedure, if necessary, until engine starts.

- 7) Refasten flywheel guard in place by pushing the three fastening tabs back onto the fittings.



1. Fastening tabs



## DANGER



**Contact with a rotating flywheel can cause severe personal injury. Use extreme care in re-fastening the flywheel guard on the fastening tabs. Keep hands, hair, and clothing away from coming in direct contact with rotating parts.**

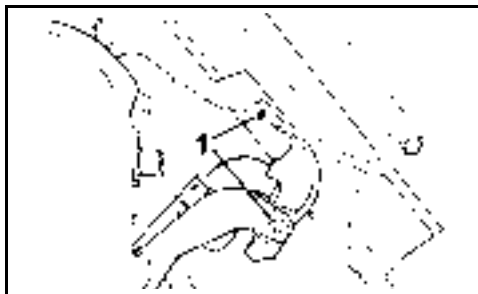
If equipped, snap emergency stop switch lanyard to secure place on clothing. Proceed immediately to nearest landing for service.

## SALT WATER

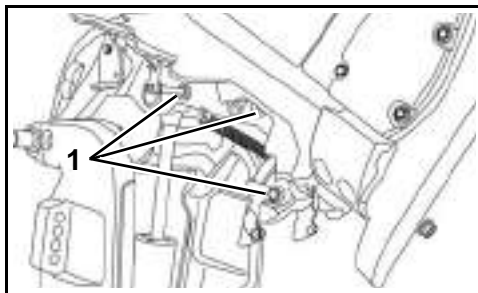
Additional anodic protection for the outboard has been provided for use in salt or brackish water.

Upon removal from salt water, leave outboard in a vertical position until its cooling system has drained. During long periods of mooring, tilt the gearcase out of the water, except in freezing temperatures. Flush the outboard, if desired. Refer to **Flushing** on page 38.

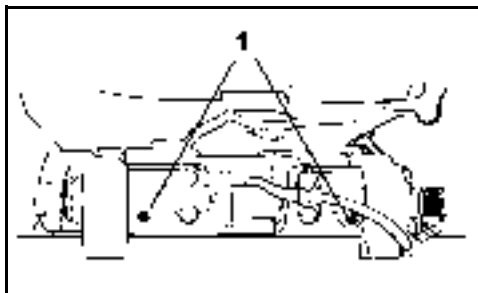
## Salt Water Lubrication Points



1. Power trim and tilt models, trawling bracket and swivel bracket lubrication points (annually)



1. Manual tilt models, swivel bracket lubrication points (annually)



1. Tilt tube lubrication points (annually)

### Anti-Corrosion Anodes

Your outboard is equipped with one or more anodes that protect it from galvanic corrosion. Disintegration of the anode is normal and indicates it is working. Check each anode periodically. Replace anodes smaller than 2/3 their original size. See your Dealer for replacements.



Galvanic corrosion destroys underwater metal parts and can occur in fresh or salt water; however, salt, brackish, and polluted waters will accelerate corrosion.

Metal-based antifouling paint on the boat or outboard and the use of improperly installed shore power in the area of your moored boat will also accelerate corrosion.

**IMPORTANT:** NEVER paint the anode, its fasteners, or its mounting surface. Painting will reduce its corrosion protection.

### WEEDY WATER

Weeds block water intakes and may cause your outboard to overheat. Weeds on the propeller create vibration and reduce boat speed.

When operating in weedy water, run at slow speeds and in REVERSE frequently to clear weeds from the propeller and water intakes. Check the water pump indicator often.

If REVERSE operation does not clear away weeds, SHUT OFF the engine. Remove weeds from propeller area and water intakes before operating at higher speed.

### HIGH ALTITUDE

Your outboard's *EMM* will automatically compensate for changes in altitude. However, if you boat above 3000 ft. (900 m), you will experience a slight loss of power due to reduced air density.

If your engine drops below the recommended RPM operating range at full throttle, have your Dealer select a lower pitch propeller.

If you return to sea level, have your Dealer install the original propeller and verify correct RPM operating range.

### FREEZING WEATHER

**IMPORTANT:** When operating in conditions under 32°F (0°C), *Evinrude/Johnson XD100* oil must be used.

During operation in freezing weather, keep the gearcase submerged at all times.

Upon removing your outboard from the water, leave it in a vertical position until its cooling system is drained. Store the outboard vertically.

If the outboard's gearcase is equipped with an integral speedometer pickup, all water must be cleared from the hose to prevent gearcase damage. Refer to **Storage** on page 38.



### WARNING



Water remaining in the gearcase, cooling system or other components can freeze, causing serious engine damage.

## SHALLOW WATER

Gearcase damage can occur if the gearcase is allowed to drag on the waterway bottom. Use caution when operating in shallow water.

**IMPORTANT:** Impact damage is NOT covered by the outboard warranty.

## DUAL OUTBOARD OPERATION

When in reverse above slow speed, be sure both outboards are running, even if one is in NEUTRAL.

If it is necessary to return to harbor with one outboard not running, tilt the inoperative outboard high enough to keep its propeller out of the water.

## UNDER TOW

Should you require a tow from another boat:

- Shift your engine to NEUTRAL;
- Tilt its gearcase out of the water;
- Off-load all persons into another boat; and
- Keep speed slower than planing speed.

## FUSE



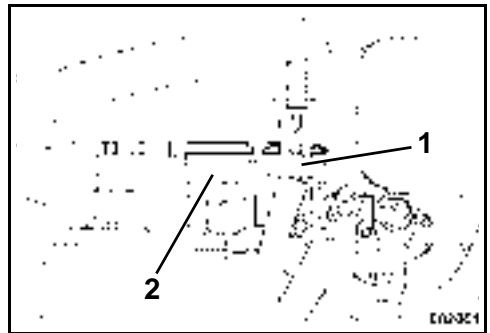
A blown fuse will not allow the engine to crank. Replace it with a fuse of the same rating. A spare fuse is provided.

Repeated fuse failures indicate a potentially serious problem. Do not replace it with higher rated fuse; see your Dealer for service.

### *Fuse Replacement*

**IMPORTANT:** Use only fuses of the same rating. Your *Evinrude E-TEC* outboard uses 10-amp fuses.

Remove engine cover. Install spare fuse in place of failed fuse.



1. Fuse
2. Spare fuse

**IMPORTANT:** Failure to install cover securely may cause electrical problems.

## ROUTINE INSPECTION CHECKLIST

### ***Pre-Launch Checks (Each Use)***

- Check fuel level.
- Check oil level.
- Check function of steering, throttle, shift, and emergency stop circuit and lanyard.
- Check condition of propeller.
- Confirm operation of engine monitor system self-test and warning horn.
- Confirm the cooling system is operational (water intake screens and water pump indicator).
- Confirm this Operator's Guide is onboard and readily accessible.

### ***Periodic Checks***

- Check condition of anti-corrosion anodes (annually or every 100 hours).
- Check for debris on propeller shaft (requires propeller removal).
- Clean and wax upper and lower engine covers (annually or every 100 hours).
- In salt water applications, check lubrication points and corrosion protection. Use *Evinrude* anti-corrosion spray or *Evinrude* "6 in 1" multi-purpose lubricant (annually or 100 hours).

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# MAINTENANCE

## ENGINE EMISSIONS INFORMATION

**Maintenance, replacement, or repair of the emission control devices and systems may be performed by any marine SI (spark ignition) engine repair establishments or individual.**

### ***Manufacturer's Responsibility***

Beginning with 1999 model year outboards, manufacturers of marine engines must determine the exhaust emission levels for each engine horsepower family and certify these outboards with the United States of America Environmental Protection Agency (EPA). An emissions control information label, showing emission levels and engine specifications, must be placed on each outboard at the time of manufacture.

### ***Dealer's Responsibility***

When performing service on all 1999 and more recent *Evinrude* outboards that carry an emissions control information label, adjustments must be kept within published factory specifications.

Replacement or repair of any emission related component must be executed in a manner that maintains emission levels within the prescribed certification standards.

Dealers are not to modify the outboard in any manner that would alter the horsepower or allow emission levels to exceed their predetermined factory specifications.

Exceptions include manufacturer's prescribed changes, such as altitude adjustments, for example.

### ***Owner Responsibility***

The owner/operator is required to have engine maintenance performed to maintain emission levels within prescribed certification standards.

The owner/operator is not to, and should not allow anyone to, modify the engine in any manner that would alter the horsepower or allow emissions levels to exceed their predetermined factory specifications.

Tampering with the fuel system to change horsepower or modify emission levels beyond factory settings or specifications will void the product warranty.

### **EPA Emission Regulations**

All new 1999 and more recent *Evinrude* outboards manufactured by BRP are certified to the EPA as conforming to the requirements of the regulations for the control of air pollution from new watercraft marine spark ignition engines. This certification is contingent on certain adjustments being set to factory standards. For this reason, the factory procedure for servicing the product must be strictly followed and, whenever practicable, returned to the original intent of the design. The responsibilities listed above are general and in no way a complete listing of the rules and regulations pertaining to the EPA requirements on exhaust emissions for marine products. For more detailed information on this subject, you may contact the following locations:

#### **VIA U.S. POSTAL SERVICE:**

Office of Mobile Sources  
Engine Programs and Compliance Division  
Engine Compliance Programs  
Group (6403J)  
401 M St. NW  
Washington, DC 20460

#### **VIA EXPRESS or COURIER MAIL:**

Office of Mobile Sources  
Engine Programs and Compliance Division  
Engine Compliance Programs  
Group (6403J)  
501 3rd St. NW  
Washington, DC 20001

#### **EPA INTERNET WEB SITE:**

[www.epa.gov](http://www.epa.gov)

# MAINTENANCE SCHEDULE

Routine inspection and maintenance is necessary to prolong outboard life. The following chart provides guidelines for inspection and maintenance to be performed by an authorized Dealer.

**IMPORTANT:** Outboards used in rental, commercial, or other high hour applications require more frequent inspections and maintenance. Adjust schedule for operating and environmental conditions.

Description	Engine Care Product	Every 300 Hours or Three Years <sup>(1)</sup>
Electrical and ignition wires, inspect for wear or chafing		✓
Engine to transom mounting hardware, re-torque (40 ft. lbs.)		✓
Fasteners, inspect any loosened components		✓
Fuel and oil system components, inspect and repair leaks <sup>(2)</sup>		✓
Fuel filter, replace		✓
Gearcase lubricant, replace	A	✓
Grease fittings, lubricate <sup>(3)</sup>	C	✓
Muffler foam, inspect and replace if necessary		✓
Power trim/tilt system and fluid level, inspect	B	✓
Propeller shaft splines, inspect and lubricate <sup>(3)</sup>	C	✓
Spark plugs, inspect and replace if necessary <sup>(2)</sup>		✓
Starter pinion shaft, inspect and lubricate	D	✓
Steering system, inspect and lubricate	C	✓
Thermostats, inspect <sup>(2)</sup>		✓
Throttle cable, inspect and re-tension		✓
Water pump, inspect or replace if necessary		✓

(1) Average recreational use. Commercial use, heavy use, or use in salt or polluted water requires more frequent inspection and maintenance (annual checks are recommended).

(2) Emission-related component – Refer to **Owner Responsibility** on page 36, **Product Warranty Information** on page 52 and, if applicable, **California Emission Control Warranty Statement** on page 55

(3) Annually in salt water applications – Refer to **Salt Water Lubrication Points** on page 31

## A. HPF XR Gearcase Lubricant

*HPF Pro* Gearcase Lubricant in high performance or commercial applications

## B. Evinrude/Johnson Biodegradable TNT Fluid

## C. Triple-Guard Grease

## D. Starter Bendix Lube ONLY, P/N 337016

## STORAGE

**DANGER**

**DO NOT run the engine indoors or without adequate ventilation or permit exhaust fumes to accumulate in confined areas. Engine exhaust contains carbon monoxide which, if inhaled, can cause serious brain damage or death.**

You must protect against natural environmental conditions that can be damaging to an outboard. Your warranty does not cover engine failure caused by these conditions.

Temperature and humidity changes during storage period can cause corrosion of internal engine components.

Winterization prepares your outboard for long-term off-season storage. During winterization, the engine is "fogged" and extra oil is used to coat internal engine components. Refer to **Long-Term Storage (Winterization)** on page 39.

**Stabilize the fuel supply.** Fuel remaining in your fuel tank can oxidize, resulting in loss of octane and fuel system deposits.

Use *Evinrude/Johnson 2+4 Fuel Conditioner* to prevent gum and varnish deposits from forming in fuel system components. Refer to **Fuel Additives** on page 16.

**WARNING**

**Prevent injury from moving engine components. Before starting the outboard:**

- Shift it to **NEUTRAL**.
- Keep hands, clothes, and hair clear of powerhead.
- Remove the propeller.

Store fuel tanks in a well-ventilated area, away from heat and open flame. Prevent escape of liquid or vapors which could accidentally ignite. Close filler cap vent screws (if equipped) and be sure any disconnected fuel hoses do not drip.

## TRANSPORTING THE OUTBOARD

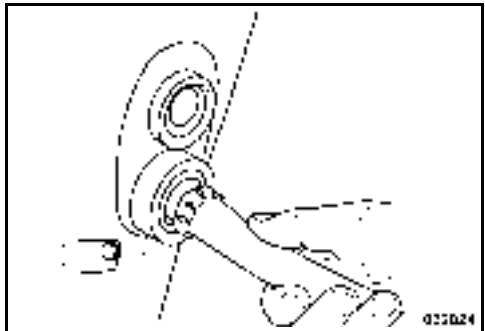


If the outboard is laid down for transportation or storage, the oiling system must be primed before reusing the outboard. Refer to **Priming the Oil System** on page 15.

## FLUSHING

If desired, the outboard can be flushed after each use on a trailer or at dockside while it is vertical.

- 1) Place the outboard in an area with good drainage.
- 2) Connect garden hose to flushing port.
- 3) Turn on the water. It is **not** necessary to run the engine for a good flushing.



- 4) Leave the outboard in vertical position long enough to completely drain the powerhead.

**IMPORTANT:** If you cannot store the outboard in the recommended vertical position, be sure the cooling system is drained completely. Never place the gearcase higher than the powerhead. Any water remaining in the exhaust passages can run into the cylinders and cause serious damage.

## SHORT-TERM STORAGE

If you must tilt the outboard to remove it from the water, lower it and allow the cooling system to drain completely as soon as you clear the launch area.

Between uses, store your outboard in a vertical position.



## LONG-TERM STORAGE (WINTERIZATION)



### WARNING



Outboard must be in **NEUTRAL** before performing winterization. Starting outboard in gear can cause personal injury.

If winterizing on a trailer, the propeller must be removed before performing procedure. Failure to remove propeller can cause personal injury or death.

Winterization prepares your outboard for long-term off-season storage. During winterization, the engine is “fogged” and extra oil is used to coat internal engine components.

Winterization requires a specific process of steps.

Closely follow the applicable winterization procedure for your outboard:

- Remote control
- Tiller control
- Remote control with foot throttle

If you are unsure which procedure is right for you, contact your Dealer for assistance.

You can confirm your outboard enters winterization mode when the engine runs at fast idle and:

- The *SystemCheck* gauge lights flash (if equipped).
- The *I-Command* gauge displays winterization message (if equipped).

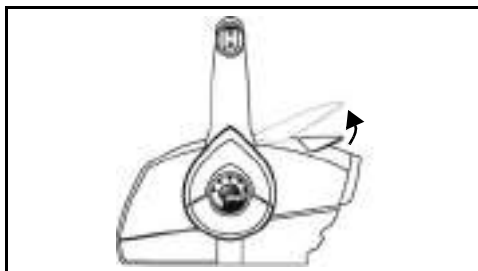
### Preparation – All Outboards

Your outboard can be winterized in the water. **If winterizing in water**, make sure the water intake screens are completely submerged.

- 1) Stabilize the engine’s fuel supply. Add 2+4 *Fuel Conditioner* following instructions on container. Fill fuel tank.
- 2) **If winterizing on a trailer**, remove the propeller. Attach a garden hose to flushing port and turn on the water. Refer to **Flushing** on page 38.
- 3) Outboard **must** be in **NEUTRAL**, and remote control and shift linkage must be in **NEUTRAL** position at all times during winterization procedure.

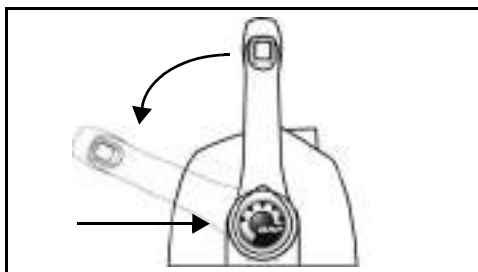
### Remote Control Outboards

- 1) **For side mount controls**, lift fast idle lever. Start the outboard. Outboard runs at slow idle speed.

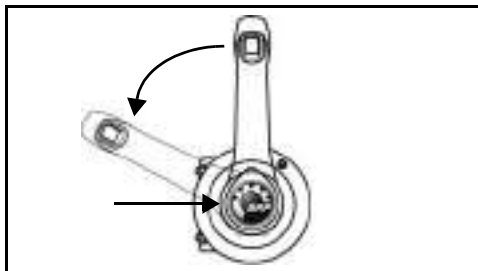


Side Mount Control – Typical

**For binnacle or concealed side mount controls**, press fast idle button and advance throttle handle to **HALF** throttle position. Start the outboard. Outboard runs at slow idle speed.



Binnacle Control – Typical



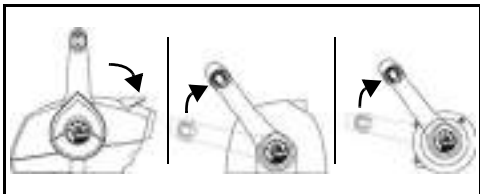
Concealed Side Mount Control – Typical

- 2) After outboard runs for about 15 seconds:

**For side mount controls,** lower fast idle lever.

**For binnacle or concealed side mount controls,** return throttle handle to IDLE position.

Outboard continues to run at slow idle speed.

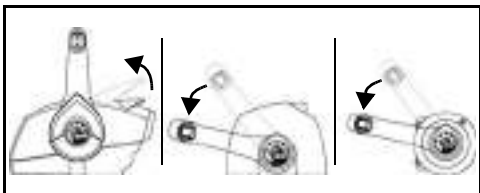


- 3) After outboard runs for another 15 seconds:

**For side mount controls,** raise fast idle lever again.

**For binnacle or concealed side mount controls,** advance throttle handle to HALF THROTTLE position.

Outboard will accelerate to fast idle speed and fog itself.



- 4) Allow outboard to run until it shuts itself OFF automatically (less than one minute).

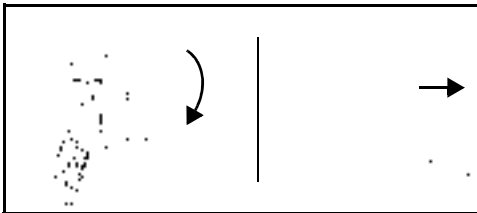
Winterization is complete when outboard shuts itself off.

- **If the outboard DOES NOT shut itself off,** you may not have used the fast idle lever or button and the outboard was shifted into gear.
- **If the engine exceeds 3000 RPM,** the outboard may have been shifted into gear.

In either event, immediately turn key switch OFF and re-start the procedure.

### Tiller Control Outboards

- 1) Advance throttle grip to HALF THROTTLE position. Start the outboard. Outboard runs at slow idle speed.



Tiller Control – Typical

- 2) After outboard runs for about 15 seconds, move throttle grip to IDLE position. Outboard continues to run at slow idle speed.



- 3) After outboard runs for another 15 seconds, advance throttle grip to HALF THROTTLE position. Outboard will accelerate to fast idle speed and fog itself.

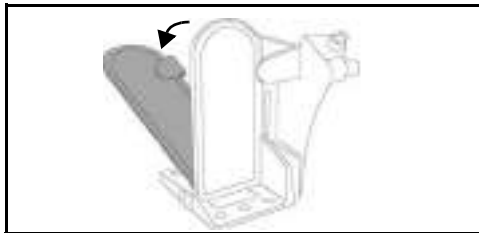
- 4) Allow outboard to run until it shuts itself OFF automatically (less than one minute).

Winterization is complete when outboard shuts itself off.

- **If the outboard DOES NOT shut itself off,** you may not have properly advanced throttle grip.
  - **If the engine exceeds 3000 RPM,** the outboard may have been shifted into gear.
- In either event, immediately press STOP button to turn outboard OFF and re-start the procedure.

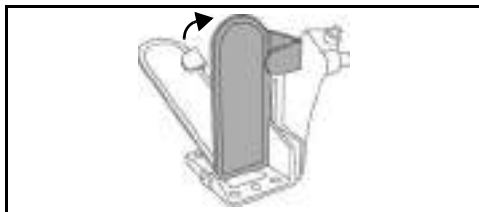
## Remote Control Outboards with Foot Throttle

- 1) Press foot throttle to HALF THROTTLE position. Start the outboard. Outboard runs at slow idle speed.

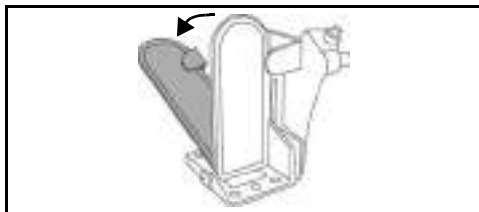


Foot Throttle – Typical

- 2) After outboard runs for about 15 seconds, remove foot from foot throttle and allow throttle to return to IDLE position. Outboard continues to run at slow idle speed.



- 3) After outboard runs for another 15 seconds, press foot throttle to HALF THROTTLE position. Outboard will accelerate to fast idle speed and fog itself.



- 4) Allow outboard to run until it shuts itself OFF automatically (less than one minute).

Winterization is complete when outboard shuts itself off.

- **If the outboard DOES NOT shut itself off**, you may not have allowed enough running time at a throttle position.
  - **If the engine exceeds 3000 RPM**, the outboard may have been shifted into gear.
- In either event, immediately turn key switch OFF and re-start the procedure.

## After Winterization – All Outboards

- 1) After the outboard shuts itself off, turn key switch OFF. (For tiller models, remove emergency stop clip / key switch.) Do not start the outboard again after winterization is completed.
- 2) **If winterizing on a trailer**, turn off water and detach garden hose. Grease propeller shaft splines with recommended lubricant, and re-install propeller.

**IMPORTANT:** When winterizing is finished, leave the outboard in vertical position long enough to completely drain the powerhead. If equipped, disconnect the speedometer pickup at the upper connection and blow all water out of the hose using air pressure of 25 psi or less. Reconnect speedometer pickup after all the water has been removed.

- 3) Top off oil tank.



Extra engine oil is used during the winterization procedure. Some excess oil may appear on the skeg below the gearcase area. **This is normal.**

Avoid potential oil stains by placing a shop towel or suitable container under the propeller and skeg for the duration of the storage.

### PRE-SEASON CHECK

Prepare your outboard for a season of reliable service by performing a general check and a few preventive maintenance procedures.

Examine all loosened or removed hardware. Replace damaged or missing parts with *Evinrude/Johnson Genuine Parts* or equivalent. Check the gearcase for leakage. If leakage is evident, the gearcase seals should be replaced. See your Dealer.

**IMPORTANT:** Gearcase lubricant is **thick and clear**. Do not confuse this with engine oil, which may normally appear on the skeg after performing the long-term (winterization) storage procedure.

**Anticorrosion anodes** — Check condition. Refer to **Anti-Corrosion Anodes** on page 32.

**Battery** — Charge fully. Refer to **Battery** on page 47.



### WARNING



**Do not use a booster battery and jumper cables to start the outboard. Gasoline fumes can cause explosion and fire, resulting in property damage, personal injury or death.**

Review your outboard's warning system self-test routine. During your preseason start-up, make sure the warning system self-tests properly. If it does not, see your Dealer.

**IMPORTANT:** Do not run your outboard—even for a brief start-up—without supplying water to it. Refer to **Flushing** on page 38.

Following **Engine Starting** on page 21, start the outboard. If the outboard was auto-winterized, it will smoke for a short time after the first start of the season.

Let engine idle and observe running quality. If poor, refer to **Troubleshooting** on page 44 or see your Dealer.

Let engine idle and confirm water pump operation. Water must flow from the water pump indicator in a steady stream. If it does not, shut off the outboard and investigate. Refer to **Engine Overheating** on page 19.

Stop the outboard and check the fuel system for leaks.



### WARNING



**Failure to check for fuel leakage could allow a leak to go undetected, resulting in fire or explosion.**

### OUTBOARD EXTERNAL FINISH



Your outboard's upper and lower engine covers use molded-in color technology, providing a deep, durable gloss with maximum ultraviolet (sunlight) protection.

The high gloss finish will show polish marks when viewed closely in certain light conditions. This glossing is **NORMAL**.

Periodically, wash the entire boat and outboard with soapy water and apply a coat of automotive wax. Leave the engine cover in place when washing the outboard.

**IMPORTANT:** When trailering your outboard, **DO NOT** cover the engine with canvas—it will dull the finish of the outboard's engine covers.

### HULL FINISH

The condition of your boat's bottom affects performance. Marine growth or bottom painting may reduce speed and fuel efficiency.

For maximum performance, keep the boat's running surface clean by rinsing it with fresh water and wiping it dry. Apply *Evinrude* anti-corrosion spray to any surface subject to corrosion, but avoid the anti-corrosion anode(s).

## SPARK PLUGS



### WARNING



**The ignition system presents a serious shock hazard. Use caution to avoid injury from shock or injury resulting from your reaction to shock. Do not handle primary or secondary ignition components while the engine is cranking or running.**

Spark plugs should be serviced by an *Evinrude E-TEC* Dealer. Incorrect spark plug maintenance can lead to engine damage.

**IMPORTANT:** Replacement spark plugs **MUST** be indexed correctly.

### **Marine Engine Duty Cycles**

The International Council of Marine Industry Associations (ICOMIA) Standard No. 36-88 specifies a marine engine duty cycle based on documented studies. A duty cycle is a profile of engine running and usage. This duty cycle is used to determine average spark plug longevity and maintenance requirements for *Evinrude E-TEC* outboards.

<b>ICOMIA Marine Engine Duty Cycle</b>	
<b>Engine Speed as Percentage of Rated Speed (RPM)</b>	<b>Time at Specified RPM (Percentage of total engine running time)</b>
IDLE	40%
40%	25%
60%	15%
80%	14%
100%	6%

**IMPORTANT:** Some running profiles and conditions can lead to spark plug wear sooner than expected. Depending on your specific usage, the spark plug maintenance schedule may require adjustment.

## SCRATCH REPAIR



Surface scratches on the upper and lower engine covers can be polished out with buffing compound.

Treat affected areas using these steps:

- 1) Sand the affected area with 800-grit sandpaper.
- 2) Wet sand the area with 1200-grit sandpaper.
- 3) Using a composite material buffing compound, polish the area, closely following the product directions.

**IMPORTANT:** Your Dealer has the professional materials to properly repair scratches. Do not attempt to paint over marks or scratches in the composite material. See your Dealer to repair any deep scratches or gouges.

## SUBMERGED OUTBOARD

If your outboard has been under water, **have it serviced immediately upon recovery**. If immediate service is unavailable, resubmerge it in fresh water to avoid prolonged exposure to the atmosphere.

After submersion, all boat and engine electrical, fuel, and oiling systems must be inspected for signs of water intrusion. Your Dealer should perform this service.

## TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE
Starter motor will not operate	<ul style="list-style-type: none"> <li>• Shift handle not in NEUTRAL.</li> <li>• Fuse blown.</li> <li>• Battery is dead.</li> </ul>
Engine will not start	<ul style="list-style-type: none"> <li>• Not following starting instructions. Refer to <b>Engine Starting</b> on page 21.</li> <li>• Fuel tank empty.</li> <li>• Fuel hose kinked.</li> <li>• Fuel system contaminated with water or dirt.</li> <li>• Fuel filter obstructed.</li> <li>• Throttle not at IDLE. Return throttle to IDLE.</li> <li>• Spark plugs incorrect. Refer to <b>Spark Plugs</b> on page 43.</li> <li>• Spark plugs improperly gapped, carboned, burned, or wet.</li> <li>• Fuse blown.</li> <li>• Flashing “Water Temp” or hot light, refer to <b>Engine Monitoring</b> on page 17 and <b>Engine Overheating</b> on page 19.</li> <li>• Flashing “Check Engine” or “Chk Eng” light, refer to <b>Engine Monitoring</b> on page 17.</li> </ul>
Engine will not idle properly	<ul style="list-style-type: none"> <li>• Debris on propeller.</li> <li>• Spark plugs damaged or incorrect. Refer to <b>Specifications</b> on page 51.</li> <li>• Fuel system contaminated with water or dirt.</li> </ul>
Engine loses power	<ul style="list-style-type: none"> <li>• Spark plugs damaged or incorrect. Refer to <b>Spark Plugs</b> on page 43.</li> <li>• Fuel filter obstructed.</li> <li>• Fuel system contaminated with water or dirt.</li> <li>• Water intakes obstructed and cooling system not operating correctly. Refer to <b>Engine Overheating</b> on page 19.</li> <li>• Oiling system malfunction.</li> <li>• S.A.F.E. protection mode activated. Refer to <b>Engine Monitoring</b> on page 17.</li> </ul>
Engine runs, but makes little or no progress	<ul style="list-style-type: none"> <li>• Propeller hub loose, slipping.</li> <li>• Propeller blades bent or missing.</li> <li>• Propeller shaft bent.</li> <li>• Propeller debris.</li> </ul>
Warning system activates	<ul style="list-style-type: none"> <li>• Refer to <b>Engine Monitoring</b> on page 17.</li> </ul>

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# PRODUCT INFORMATION

## RIGGING AND ACCESSORIES

### PROPELLER

#### Propeller Selection



#### WARNING



Be alert of people in the water. Always shift the outboard to **NEUTRAL** and shut off the engine immediately when your boat is in an area where there might be people in the water. Serious injury or death can result from contacting a rotating propeller or moving boat and outboard.

To select the correct propeller for your boating application, your boat and outboard **MUST** be water tested. See your Dealer for assistance.

**IMPORTANT:** The correct propeller for your boat, under normal load conditions, will allow the engine to run near the midpoint of the RPM operating range at full throttle. Refer to **Specifications** on page 51.



#### WARNING



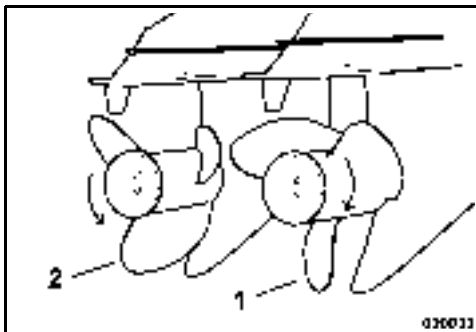
When servicing the propeller, always shift the outboard to **NEUTRAL** position, turn the key switch **OFF**, and twist and remove all spark plug wires so the outboard cannot be started accidentally.

**IMPORTANT:** Apply *Triple-Guard* grease to the entire propeller shaft before installing the propeller. At least annually, remove the propeller and check for debris. Clean the shaft and regrease it before reinstalling a propeller.

#### Standard vs. Counter Rotation

Right-hand propellers are considered standard rotation propellers. When propelling a boat forward, the propeller rotates in a right-hand (clockwise) direction as viewed from the rear.

Left-hand propellers are considered counter rotation propellers. When propelling a boat forward, the propeller rotates in a left-hand (counterclockwise) direction as viewed from the rear.



1. Right-Hand (clockwise)
2. Left-Hand (counterclockwise)



#### WARNING



In dual-outboard installations, check to make sure correct propellers are installed on each outboard before aggressively operating your boat. Shift each engine individually into **FORWARD** or **REVERSE**, at idle speed only. If the boat moves opposite the direction indicated by the remote control handle, the wrong propeller has been installed on the outboard being checked.



## Installation

Slide thrust washer onto shaft with shoulder facing aft.

Slide propeller onto shaft, engaging the splines and seating it on the thrust bushing.

Slide spacer onto the shaft and engage the propeller shaft splines.

Wedge a block of wood between the propeller blade and the anti-ventilation plate.

Install propeller nut and tighten to a torque of 120-144 in. lbs. (13.6-16.3 N·m).

Install keeper on propeller nut, align keeper slots and cotter pin hole.

Install new cotter pin and bend ends to secure.

Remove block of wood. Make sure engine is in NEUTRAL; give propeller a spin. It must turn freely.

## Repair

If your propeller hits a solid object, the impact is partially absorbed by the rubber bushing in the hub to help prevent damage to the outboard. A strong impact can damage the hub and propeller blades. Damage to blades can cause unusual and excessive vibration. Damage to the hub can cause excessive engine RPM with little forward movement.

**IMPORTANT:** Avoid or limit operation using a damaged propeller. Carry a spare propeller.

Keep your propeller in good condition. Use a file to smooth slight damage to blade edges. See your Dealer for repair of serious damage.

## BATTERY

### Requirements

- 12-volt, heavy-duty, designated for "marine" use;
- Vented/refillable or maintenance-free; and
- Rated according to the minimum requirements in **Specifications** on page 51.

Deep-cycle batteries are suitable **IF** they meet or exceed the minimum CCA requirements.

Ask your Dealer about your outboard's requirements before installing longer battery cables or a battery switch.

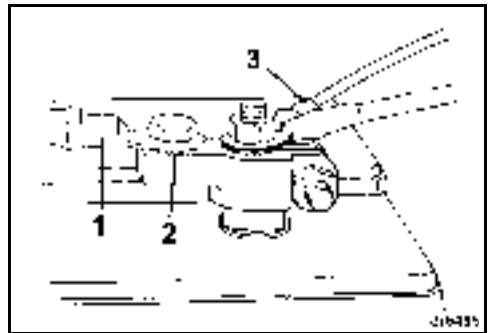
### Installation

Read and understand the safety information supplied with your battery BEFORE you begin installation.

**IMPORTANT:** Make sure all components are clean and free of corrosion.

Connect the RED (+) cable to the positive (+) battery post first. Connect the BLACK (-) cable to the negative (-) battery post last.

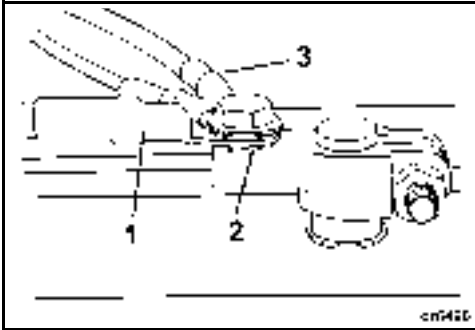
If you have marine battery posts, install each main cable on the clamp adapter with a starwasher below it. Install all wires from accessories on the threaded portion of the post.



1. Main cable
2. Starwasher
3. Accessory wires

## Product Information

If you have automotive battery posts, place a starwasher on the clamp adapter first, then the main cable, and then the wires from the accessories.



1. Main cable
2. Starwasher
3. Accessory wires

Tighten all connections securely and coat the installation with *Triple-Guard* grease.

## Service

Before servicing the battery or the outboard, remove both battery cables from the battery, battery negative (-) cable first. Keep metal objects from contacting either battery post.

**IMPORTANT:** Service electrical components only while the outboard is **NOT** running. Be careful when identifying positive and negative battery cables and posts.



## WARNING



Battery electrolyte is acidic — handle with care. If electrolyte contacts any part of the body, immediately flush with water and seek medical attention.

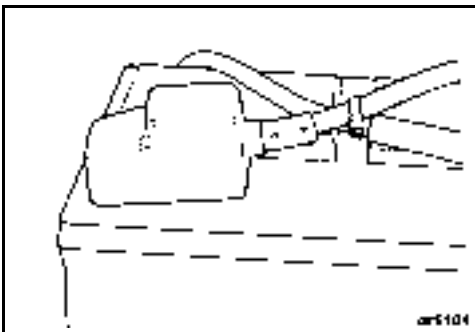
Do not use a booster battery and jumper cables to start the outboard. Gasoline fumes can cause explosion and fire, resulting in property damage, personal injury or death.



## WARNING



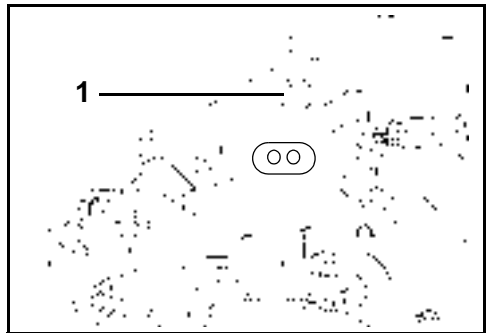
Keep the battery connections clean, tight, and insulated to prevent their shorting or arcing and causing an explosion. If the battery mounting system does not cover the connections, install covers. Check often to see that connections stay clean and tight.



**IMPORTANT: DO NOT** use wing nuts on battery connections even if they came with the battery. Wing nuts can loosen and cause errant warning signals or electrical system damage.

## WATER PRESSURE

An optional water pressure gauge is recommended to monitor cooling system pressures. Noticing changes in water pressure can help prevent engine overheating. The water pressure gauge must be connected at the correct point to ensure the most accurate pressure readings. Follow the installation instructions included with the water pressure gauge.



1. Water pressure port (starboard side)

# ADJUSTMENTS

## Idle RPM in Gear

The idle RPM in gear setting can be adjusted, if desired, to provide more idle control, steering, and quietness in certain applications.

**IMPORTANT:** Only your Dealer can adjust the idle RPM in gear setting.

## Trim Tab



### WARNING

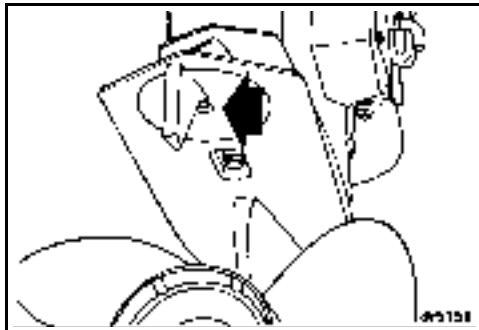


**Improper trim tab adjustment can cause difficult steering.**

A propeller will generate steering torque when the propeller shaft is not running parallel to the water's surface. The trim tab is adjustable to compensate for this steering torque.

**IMPORTANT:** A single trim tab adjustment will relieve steering effort under only one set of speed, outboard angle and load conditions. No single adjustment can relieve steering effort under all speed, outboard angle and load conditions. If the boat pulls to the left or right when its load is evenly distributed, adjust the trim tab as follows:

**With the outboard shut OFF**, loosen the trim tab screw. If the boat pulled to the right, move the rear of the trim tab slightly to the right. If the boat pulled to the left, move the rear of the trim tab slightly to the left.



Tighten the trim tab screw to a torque of 35-40 ft. lbs. (47-54 N·m).

Test the boat and, if needed, repeat the procedure until steering effort is as equal as possible.

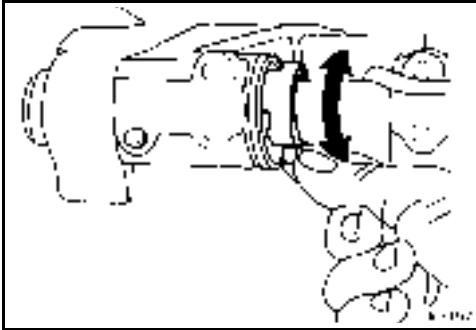
**High outboard installations** — The trim tab might be above the water when the outboard is trimmed out. Steering effort might increase. Steering effort will be reduced if you trim the outboard in and submerge the trim tab.

**Dual standard rotation outboards** — Move both trim tabs equally and in the same direction.

**Dual outboards (one counter and one standard rotation)** — Set both trim tabs to the center position.

### Tilt Limiter Cam

If your outboard contacts the boat's motor well while tilting, adjust the tilt limiter cam to limit maximum tilt-up.



Place the outboard in its normal operating position.

Rotate the tilt limiter cam — pull its tab forward and up to REDUCE the amount of tilt UP.

Check your adjustment — tilt the outboard fully and adjust further, if necessary. Return the outboard to vertical position for each adjustment, and repeat your check after each adjustment.



### WARNING



Adjusting the tilt limiter cam will **NOT** prevent the outboard from tilting fully and contacting the motor well if the gearcase hits an object at high speed. Such contact could damage the outboard and boat and injure boat occupants.

# SPECIFICATIONS

<b>75, 90 Models</b>	
Displacement	79.1 cu. in. (1296 cc)
Engine Type	In-line, 3 Cylinder, Two-Cycle, <i>E-TEC</i>
Full Throttle Operating Range	<b>75 HP</b> – 4500 to 5500 RPM <b>90 HP</b> – 4500 to 5500 RPM
Power <sup>(1)</sup>	<b>75 HP</b> – 75 HP (56 kw) @ 5000 RPM <b>90 HP</b> – 90 HP (67.1 kw) @ 5000 RPM
Idle RPM in Gear <sup>(2)</sup>	700 ± 50
Idle RPM in Neutral <sup>(2)</sup>	600 ± 50
Ignition Timing <sup>(2)</sup>	Not Adjustable
Emission Control System: per SAE J1930 <sup>(2)</sup>	ECM, <i>E-TEC</i> (Engine Control Module, <i>E-TEC</i> )
Fuel Requirements <sup>(2)</sup>	87 Pump Posted AKI (90 RON) – Refer to <b>Fuel Requirements</b> on page 15
Oil – Lubricant – Capacity	TC-W3 NMMA-certified oil or <i>Evinrude/Johnson XD100</i> oil – Refer to <b>Oil Requirements</b> on page 14 3.0 qt. (2.8 l)
Warning Signals	Controlled by the outboard's <i>EMM</i>
Battery, Minimum <sup>(3)</sup>	640 CCA (800 MCA) 12 volt or 800 CCA (1000 MCA) 12 volt below 32°F (0°C)
Spark Plug <sup>(2)</sup>	Refer to ECI Label
Fuses	Refer to <b>Fuse</b> on page 33
Fuel Filter	In-line Replaceable
Battery Charging	25-Amp, Fully Regulated
Gearcase – Lubricant <sup>(4)</sup> – Capacity	<i>Evinrude Ultra-HPF</i> <b>L Models</b> – 31.6 fl. oz. (935 ml) <b>X Models</b> – 32.8 fl. oz. (970 ml)
Power Trim/Tilt – Fluid Capacity	21 fl. oz. (622 ml)
Propeller	Refer to <b>Propeller Selection</b> on page 46
Weight	<b>L Models</b> – 320 lbs. (145 kg) <b>X Models</b> – 335 lbs. (152 kg)
Sound at Driver's Ear (LpA) ICOMIA 39.94	76.8 dB(A)
Transom Height	<b>L Models</b> – 19 1/2 to 20 in. (495 to 508 mm) <b>X Models</b> – 24 1/2 to 25 in. (622 to 635 mm)

(1) Rated following the standards of ICOMIA 28.83, ISO 3046 and NMMA.

(2) Emission Control Information.

(3) Use a 800 CCA (1000 MCA) battery when operating in temperatures below 32°F (0°C).

(4) Use *Evinrude/Johnson HPF Pro* Gearcase Lubricant for high performance outboards and commercial applications. *Evinrude/Johnson HPF Pro* Gearcase Lubricant delivers exceptional durability and reliability and promotes long gearcase life in marine use.

# PRODUCT WARRANTY INFORMATION

## BOMBARDIER RECREATIONAL PRODUCTS LIMITED WARRANTY FOR 2008 EVINRUDE OUTBOARD ENGINES SOLD IN THE UNITED STATES AND CANADA

### 1. SCOPE OF THE LIMITED WARRANTY

Bombardier Recreational Products\* ("BRP") warrants its 2008 *Evinrude*® outboard engines sold by authorized *Evinrude* dealers in the fifty United States and Canada ("Product") from defects in material or workmanship for the period and under the conditions described below.

### 2. EXCLUSIONS — *The following are not warranted under any circumstances:*

- Replacement of parts due to normal wear and tear;
- Routine maintenance parts and services including but not limited to: maintenance requirements, engine and lower unit oil changes, lubrication, valve and linkage adjustments and replacement of fuses, zinc anodes, thermostats, timing belts, starter motor bushings, trim motor brushes, filters, propellers, propeller bushings and spark plugs;
- Damage caused by improper or lack of installation, maintenance, winterization and/or storage, failure to follow the procedures and recommendations in the Operator's Guide;
- Damage resulting from removal of parts, improper repairs, service, maintenance, or modification, or use of parts or accessories not manufactured or approved by BRP, which in its reasonable judgment, are either incompatible with Product or adversely affect its operation, performance, or durability, or resulting from repairs done by a person that is not an authorized Dealer;
- Damage caused by abuse, misuse, abnormal use, neglect, racing, improper operation or operation of the Product in a manner inconsistent with the recommended operation described in the Operator's Guide;
- Damage resulting from external damage, accident, submersion, water ingestion, fire, theft, vandalism or any act of God;
- Operation without proper fuel, oil or lubrication, or with fuels, oils or lubricants which are not suitable for use with the Product (see the Operator's Guide);
- Damage resulting from rust or corrosion;
- Damage caused from cooling system blockage by foreign material;
- Damage resulting from sand or debris in the water pump;
- Cosmetic or paint changes due to exposure to the elements.

This warranty will be **voided in its entirety and rendered null and void** where:

- Product has been altered or modified in such a way so as to adversely affect its operation, performance or durability, or change its intended use, horsepower or emission levels; or
- Product is or has been used for racing at any point, even by a prior owner.

### 3. LIMITATIONS OF LIABILITY

**ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED IN DURATION TO THE LIFE OF THE EXPRESS LIMITED WARRANTY.**

**ALL INCIDENTAL, CONSEQUENTIAL, DIRECT, INDIRECT OR OTHER DAMAGES OF ANY KIND ARE EXCLUDED FROM COVERAGE UNDER THIS WARRANTY INCLUDING, BUT NOT LIMITED TO:** expense for gasoline, expense for transporting Product to and from Dealer, removal of Product from a boat and reinstallation, mechanic's travel time, in-and-out of water charges, slip or dock fees, trailering or towing, storage, telephone, cell phone, fax or telegram charges, rental of a like or replacement Product or boat during warranty services or down time, taxi, travel, lodging, loss of or damage to personal property, inconvenience, cost of insurance coverage, loan payments, loss of time, loss of income, revenue or profits, or loss of enjoyment or use of Product.

**SOME STATES, PROVINCES, OR JURISDICTIONS DO NOT ALLOW FOR THE DISCLAIMERS, LIMITATIONS OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, OR OTHER EXCLUSIONS IDENTIFIED ABOVE. AS A RESULT, THEY MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC RIGHTS, AND YOU MAY ALSO HAVE OTHER LEGAL RIGHTS WHICH MAY VARY FROM STATE TO STATE, OR PROVINCE TO PROVINCE.**

No distributor, Dealer or any other person is authorized to make any affirmation, representation or warranty regarding Product other than those contained in this limited warranty and, if made, shall not be enforceable against BRP. BRP reserves the right to modify this warranty at any time, being understood that such modification will not alter the warranty conditions applicable to the Products sold while this warranty is in effect.

#### 4. WARRANTY COVERAGE PERIOD

This limited warranty will be in effect from the date of delivery to the first retail consumer or the date the Product is first put to use, whichever occurs first, for a period of:

THIRTY-SIX (36) CONSECUTIVE MONTHS for private, recreational use; or

TWELVE (12) CONSECUTIVE MONTHS for commercial use, except that emission-related components providing input to emission controls (e.g. sensors) are warranted for twenty-four (24) months or two hundred (200) hours of engine use, whichever occurs first. The Product is used commercially when it is used in connection with any work or employment that generates income, during any part of the warranty period. The Product is also used commercially when, at any point during the warranty period, it is installed on a boat that has commercial tags or is licensed for commercial use.

In cases where the delivery date is not established to BRP's satisfaction, the date of sale will be used to determine the warranty start date.

The repair or replacement of parts or the performance of service to Product under this warranty does not extend the life of this limited warranty beyond its original expiration date. All *Evinrude/Johnson® Genuine Parts* and accessories installed by an authorized dealer at the time of sale, including but not limited to propellers, bear the standard BRP parts and accessories one-year limited warranty.

California residents who purchased or warranty-registered a Product in California should refer to BRP's California Emissions Control Warranty Statement.

#### 5. CONDITIONS TO HAVE WARRANTY COVERAGE

This warranty coverage is available only on *Evinrude* outboard engines purchased as new and unused from a dealer authorized to distribute *Evinrude* products in the country in which the sale occurred ("Dealer"), and then only after the BRP specified pre-delivery inspection process has been completed and documented by the purchaser and Dealer. Warranty coverage only becomes available upon proper registration of Product by Dealer or owner.

Only the original purchaser and any subsequent owners who reside in the United States and Canada and have purchased Product from a U.S. or Canadian Dealer are eligible for warranty registration and warranty coverage hereunder. Such limitations are necessary in order to allow BRP to protect the safety of its products, its consumers, and the general public.

As outlined in the Operator's Guide, timely routine required maintenance must be performed to maintain warranty coverage. BRP may require proof of proper maintenance prior to authorizing warranty coverage.

#### 6. WHAT TO DO TO OBTAIN WARRANTY COVERAGE

The registered owner must notify an authorized Dealer within two (2) days of the appearance of a defect. Owner must bring Product, including any defective part therein, to Dealer promptly after the appearance of the defect, and in any event, within the warranty period, and must provide Dealer with reasonable opportunity to repair the defect. The expenses of transporting Product to and from Dealer for warranty service are to be borne by the owner.

If the Product has not previously been registered, the owner may also be required to present proof of purchase to Dealer for warranty repairs. Owner is required to sign the repair/work order prior to the start of the repair in order to validate the warranty repair.

All parts replaced under this warranty become the property of BRP.

#### 7. WHAT BRP WILL DO

BRP's obligations under this warranty are limited to, at its sole discretion, repairing or replacing parts of Product found to be defective in material or workmanship, in the reasonable judgment of BRP. Such repair or replacement of parts will be done without charge for parts and labor, at any authorized Dealer. BRP's responsibility is limited to making the required repairs or replacements of parts with new or BRP-certified re-manufactured parts. No claim of breach of warranty shall be cause for cancellation or rescission of the sale of Product to owner.

In the event that warranty service is required outside of the fifty United States or Canada, owner will bear responsibility for any additional charges due to local practices and conditions, such as, but not limited to, freight, insurance, taxes, license fees, import duties, and any and all other financial charges, including those levied by governments, states, territories and their respective agencies.

BRP reserves the right to improve, modify or change Products from time to time without assuming any obligation to modify Products previously manufactured.

## **8. TRANSFER**

If the ownership of Product is transferred during the warranty coverage period, this warranty shall also be transferred and be valid for the remaining coverage period provided that the former or new owner promptly contacts BRP or Dealer and gives the name and address of the new owner.

## **9. CONSUMER ASSISTANCE**

- In the event of a controversy or dispute in connection with this BRP limited warranty, BRP recommends that you first try to resolve the issue at the dealership level by discussing the issue with Dealer's service manager or owner;
- If further assistance is required, please contact Bombardier Recreational Products Customer Support Services, 250 Sea Horse Drive, Waukegan, IL 60085, 1-847-689-7090.

## **BOMBARDIER RECREATIONAL PRODUCTS LIMITED WARRANTY FOR 2008 *EVINRUDE* OUTBOARD ENGINES SOLD OUTSIDE THE UNITED STATES AND CANADA**

For a copy of the Limited Warranty, see your Bombardier Recreational Products ("BRP") distributor/dealer authorized to distribute *Evinrude* products in the country in which the sale occurs.

If further assistance is required, please contact Bombardier Recreational Products Customer Support Services, 250 Sea Horse Drive, Waukegan, Illinois, 60085, or the affiliate of BRP where the Product was registered for warranty.

\* Engines sold in Canada are distributed and serviced by Bombardier Recreational Products Inc.  
Limited Warranty Revision February 2007



# CALIFORNIA EMISSION CONTROL WARRANTY STATEMENT

Your *Evinrude E-TEC* outboard has a special environmental label required by the California Air Resources Board. The label has one, two, three, or four stars. A hangtag, provided with your outboard, describes the meaning of the star rating system.

## *The Star Label Means Cleaner Marine Engines*



### **The Symbol for Cleaner Marine Engines:**

#### **Cleaner Air and Water**

For a healthier lifestyle and environment.

#### **Better Fuel Economy**

Burns up to 30 to 40 percent less gas and oil than conventional carbureted two-stroke engines, saving money and resources.

#### **Longer Emission Warranty**

Protects consumer for worry free operation.

### ***One Star – Low Emission***

The one-star label identifies Personal Watercraft, Outboard, Sterndrive and Inboard engines that meet the Air Resource Board's Personal Watercraft and Outboard marine engine 2001 exhaust emission standards. Engines meeting these standards have 75% lower emissions than conventional carbureted two-stroke engines. These engines are equivalent to the U.S. EPA's 2006 standards for marine engines.

### ***Two Stars – Very Low Emission***

The two-star label identifies Personal Watercraft, Outboard, Sterndrive and Inboard engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2004 exhaust emission standards. Engines meeting these standards have 20% lower emissions than One Star – Low Emission engines.

### ***Three Stars – Ultra Low Emission***

The three-star label identifies engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2008 exhaust emission standards or the Sterndrive and Inboard marine engine 2003 exhaust emission standards. Engines meeting these standards have 65% lower emissions than One Star – Low Emission engines.

### ***Four Stars – Super Ultra Low Emission***

The four-star label identifies engines that meet the Air Resources Board's Sterndrive and Inboard marine engine 2009 exhaust emission standards. Personal Watercraft and Outboard marine engines may also comply with these standards. Engines meeting these standards have 90% lower emission than One Star – Low Emission engines.

For more information: Cleaner Watercraft – Get the Facts

1-800-END-SMOG

[www.arb.ca.gov](http://www.arb.ca.gov)

## YOUR EMISSION CONTROL WARRANTY RIGHTS AND OBLIGATION

The California Air Resources Board and Bombardier Recreational Products ("BRP") are pleased to explain the emission control system warranty on your 2008 *Evinrude E-TEC* outboard. In California, new outboard engines must be designed, built, and equipped to meet the State's stringent anti-smog standards. BRP must warrant the emission control system on your outboard for the periods of time listed below provided there has been no abuse, neglect, or improper maintenance of your outboard.

Your emission control system may include parts such as the carburetor or fuel injection system, the ignition system, and catalytic converter. Also included may be hoses, belts, connectors, and other emission-related assemblies.

Where a warrantable condition exists, BRP will repair your outboard at no cost to you including diagnosis, parts, and labor provided that such work is performed by an authorized BRP dealer.

### Manufacturer's Limited Warranty Coverage

This emission limited warranty covers *Evinrude* outboards certified and produced by BRP for sale in California, that are originally sold in California to a California resident, or subsequently warranty-registered to a California resident. The BRP U.S. and Canada limited warranty conditions for *Evinrude* outboards are still applicable to these models with the necessary modifications.

Select emission control parts of your *Evinrude E-TEC* outboard are warranted from the date of purchase by the first retail consumer or the date the product is first put to use, whichever occurs first, for a period of: 4 years, or for 250 hours of use, whichever occurs first.

However, warranty coverage based on the hourly period is only permitted for outboards equipped with the appropriate hour meters or their equivalent. If any emission-related part on your engine is defective under warranty, the part will be repaired or replaced by BRP.

Parts covered are:

<b>1. Electrical System</b>	<b>4. Air Induction System</b>
A. EMM (Engine Management Module)	A. Reed Valves
B. Spark Plugs and Wires	B. Throttle Body Assembly
C. Ignition Coils	C. Intake Manifold
D. Wiring Harness	
	<b>5. Oil System</b>
<b>2. Exhaust System</b>	A. Oil Injector
A. Inner Exhaust Housing	B. Oil Lines, Fittings, and Clamps
B. Adaptor (Exhaust Manifold)	
C. Megaphone (Inner Exhaust)	<b>6. Sensors</b>
	A. Air Temperature Sensor
<b>3. Fuel System</b>	B. Crank Position Sensor
A. Fuel Lift Pump	C. Throttle Position Sensor
B. Fuel Supply Pump	D. Water Temperature Sensor
C. Fuel Injectors	E. Thermostat
D. Vapor Separator	
E. Fuel Lines, Fittings, and Clamps	<b>7. Gaskets</b>
	A. All Emission Component Gaskets

The emission warranty covers damage to other engine components that is caused by the failure of a warranted part.

The BRP Operator's Guide provided contains written instructions for the proper maintenance and use of your outboard. All emission warranty parts are warranted by BRP for the entire warranty period of the outboard, unless the part is scheduled for replacement as required maintenance in the Operator's Guide.

Emission warranty parts that are scheduled for replacement, as required maintenance, are warranted by BRP for the period of time before the first scheduled replacement date for that part. Emission warranty parts that are scheduled for regular inspection but not regular replacement are warranted by BRP for the entire warranty period of the outboard. Any emission warranty part repaired or replaced under the terms of this warranty statement is warranted by BRP for the remainder of the warranty period of the original part. All parts replaced under this limited warranty become the property of BRP.

Maintenance receipts and records should be transferred to each subsequent owner of the outboard.

### Owner's Warranty Responsibilities

As the outboard owner, you are responsible for the performance of the required maintenance listed in your Operator's Guide. BRP recommends that you retain all receipts covering maintenance on your outboard, but BRP cannot deny warranty solely for the lack of receipts or your failure to ensure the performance of all scheduled maintenance.

As the outboard owner, you should however be aware that BRP may deny you warranty coverage if your outboard or a part has failed due to abuse, neglect, improper maintenance, or unapproved modifications.

You are responsible for presenting your outboard to an authorized BRP dealer as soon as a problem exists. The warranty repairs will be completed in a reasonable amount of time, not to exceed 30 days.

For any questions regarding your warranty rights and responsibilities or for the name and location of the nearest authorized BRP dealer, contact Bombardier Recreational Products Customer Support Services, 250 Sea Horse Drive, Waukegan, IL 60085, 1-847-689-7090 or visit [www.evinrude.com](http://www.evinrude.com).



# Readiness Test

The Operator's Readiness Test...

1. Did you read this Guide from front cover to rear cover?
2. Are you ready to take responsibility for the safe operation of your boat and outboard?
3. Do you understand all the safety precautions and instructions contained in this Guide?
4. Do you understand that this Guide contains essential information to help prevent personal injury and damage to equipment?
5. Are you ready to follow the recommendations in this Guide and take a boating safety course before you operate your boat and outboard?
6. Do you know who to ask if you have any questions about your boat and outboard?
7. Do you know your local marine traffic laws?
8. Do you understand that human error can be caused by carelessness, fatigue, overload, preoccupation, unfamiliarity of operator with the product, drugs and alcohol, just to name a few?



## WARNING



**It is impossible for this Guide to cover every hazardous situation you may encounter; however, your understanding of and adherence to essential information contained in this Guide will build good judgment when boating. Always be alert and careful: a good foundation for safety.**

## FREQUENTLY ASKED QUESTIONS

*No dealer-scheduled maintenance for the first three years of normal recreational use? Really?*

- Yes! Bombardier Recreational Products knows you want to spend your time on the water, not servicing your *Evinrude E-TEC* outboard. There are no valves to adjust, belts to service, chains to replace, or oil to change. We do recommend pre-launch inspections of your outboard at each use and at regular intervals. Salt water applications require minimal additional inspections and lubrication.

*What kind of oil does my Evinrude E-TEC outboard require?*

- Any TC-W3 oil may be used. The outboard can be programmed by your Dealer to run on *Evinrude/Johnson XD100* oil for lower oil consumption. Refer to **Filling the Oil Tank** on page 14; see also **Oil Requirements** on page 14.

*Do I need to mix oil into my fuel?*

- No. *Evinrude E-TEC* outboards do not require any mixing of oil and fuel.

*What fuel octane is recommended for my Evinrude E-TEC outboard?*

- *Evinrude E-TEC* outboards require a minimum octane of 87 (U.S.). Use of higher octane fuels is not harmful, but also not necessary. The use of alcohol-extended fuels is acceptable ONLY if the alcohol content does not exceed 10% ethanol by volume; or 5% methanol with 5% cosolvents by volume. Refer to **Fuel Requirements** on page 15.

*What do I need to do before storing my Evinrude E-TEC outboard for the winter?*

- Winterization is minimal. Refer to **Storage** on page 38 for step-by-step instructions to store your *Evinrude E-TEC* outboard for the off-season.

*Where should I take my Evinrude E-TEC outboard for service?*

- For repairs covered under warranty, you must take your *Evinrude E-TEC* outboard to an authorized dealer. BRP-approved dealers and distributors have received the necessary training to properly service your outboard. Contact BRP for an authorized *Evinrude E-TEC* dealer near you.

*Can I order replacement parts and accessories for my Evinrude E-TEC outboard?*

- Yes. When replacement parts are required, use *Evinrude/Johnson* Genuine Parts or parts with equivalent characteristics, including type, strength, and material. Using substandard parts could result in injury or product malfunction. Your dealer can order the parts and accessories you desire.

*Do I need to complete any paperwork when I move or sell my Evinrude E-TEC outboard?*

- Yes. In order to maintain contact with you or the new *Evinrude E-TEC* outboard owner, BRP requests you complete the form outlining **Change of Address / Change of Ownership** on page 59. This will ensure you or the new owner is made aware of any product announcements and keep the warranty coverage up-to-date.

# CHANGE OF ADDRESS / CHANGE OF OWNERSHIP

If your address has changed or if there has been a change of ownership, be sure to fill out and mail the form provided on this page.

This notification is necessary for your own safety even after expiration of the original warranty, since BRP will be in a position to contact you if correction to your outboard is required. Outside the U.S. and Canada, this card should be sent to the Bombardier Recreational Products division where the outboard was registered. Please contact your Dealer or Distributor.



Change of Address

Change of Ownership

Model number

Serial Number

## Old Address / Previous Owner

Last name

First name  M.I.

Address

City  State

Zip code  Country

Phone number

Signature \_\_\_\_\_ Date \_\_\_\_\_

## New Address / New Owner

Last name

First name  M.I.

Address

City  State

Zip code  Country

Phone number

Signature \_\_\_\_\_ Date \_\_\_\_\_

## Dealer Information

Dealer name

Dealer number

Phone number

Contact name

In the U.S. or Canada, mail completed form to: Bombardier Recreational Products  
After Sales Support  
250 Seahorse Drive  
Waukegan, IL 60085

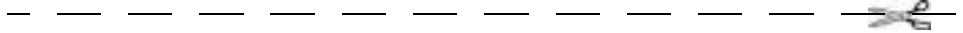


# CONFIRMATION OF RECEIPT

## Your Dealer

Name:	_____
	_____
Address:	_____
	_____

Upon delivery of your new *Evinrude/Johnson* outboard, complete and sign the form below. Your Dealer will take receipt of the form for their records.



## Receipt

Name:	_____
	_____
Address:	_____
	_____
Owner of Model No:	_____
Serial No:	_____
	(To be completed by customer or selling Dealer)
<p>The Dealer named on this document has instructed me on the operation, maintenance, safety features and warranty policy, all of which I understand and agree to be bound with. I am also satisfied with the predelivery set-up and inspection of my <i>Evinrude E-TEC</i> outboard. I have also received a copy of the Operator's Guide.</p>	
Signature:	_____
Date:	_____





**EVINRUDE**<sup>®</sup>  
**E-TEC**








## INSTALLATION INSTRUCTIONS

# Modular Wiring System Key Switch Kit

### SAFETY

These installation instructions contain information that can help prevent personal injury and damage to equipment. Understand the following symbols before proceeding:

 <b>Safety Warning</b>	Alerts you to the possibility of danger and identifies information that will help prevent injuries.
 <b>Note</b>	Identifies information that will help prevent damage to machinery.
 <b>Important</b>	Appears next to information that controls correct assembly and operation of the product.

### TO THE OWNER

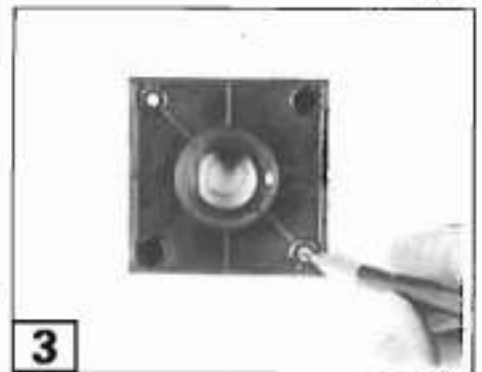
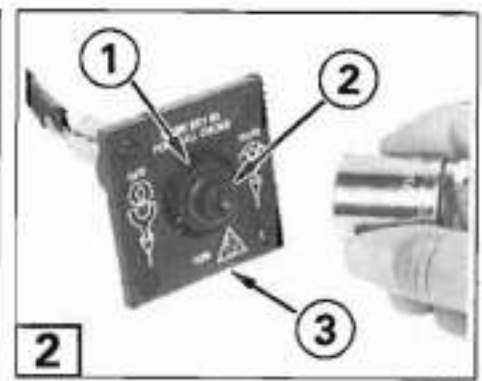
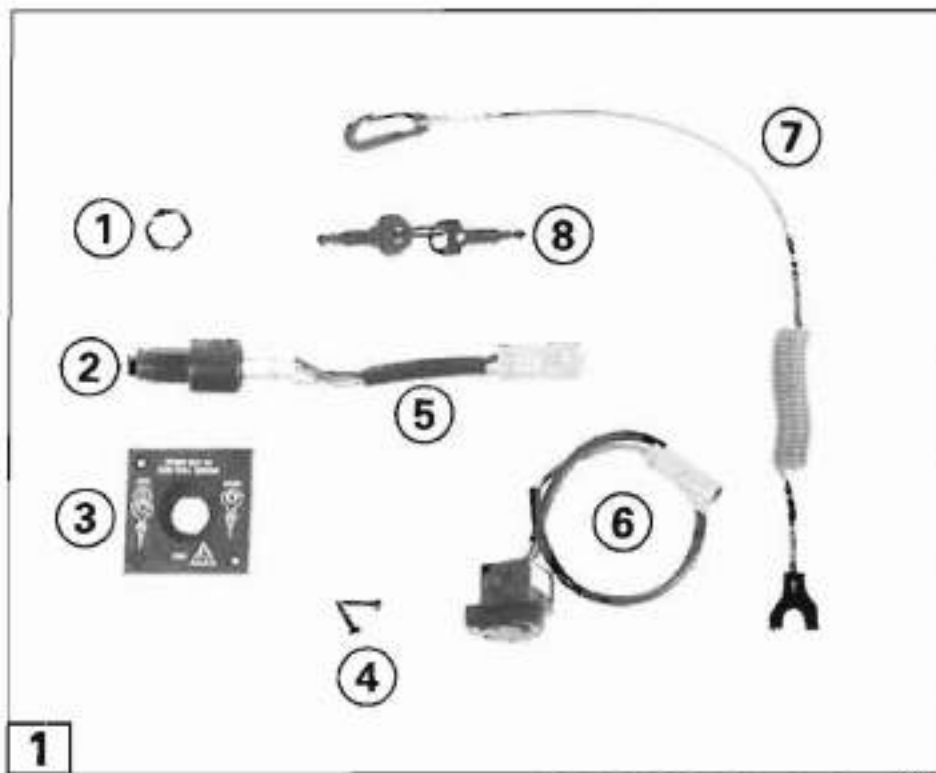
The assembly procedures outlined in this sheet should be performed by a skilled technician. If you have questions, see your DEALER. Save these instructions in your owner's kit. This sheet contains information important to the future use and maintenance of your engine.

### TO THE INSTALLER

Give this sheet to the owner. Advise the owner of any special operation or maintenance information contained in the instructions.

### PREFACE

This kit contains a bezel-mounted combination key switch and emergency stop switch. This kit is compatible with the 1996 (ED) and newer Modular Wiring System.

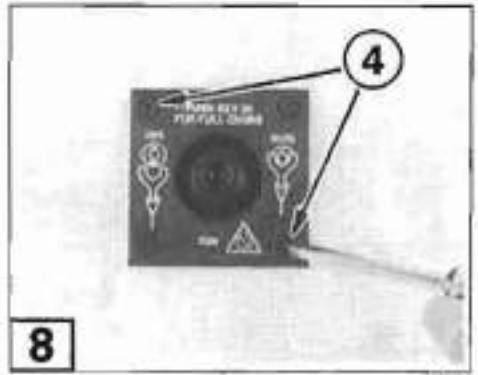
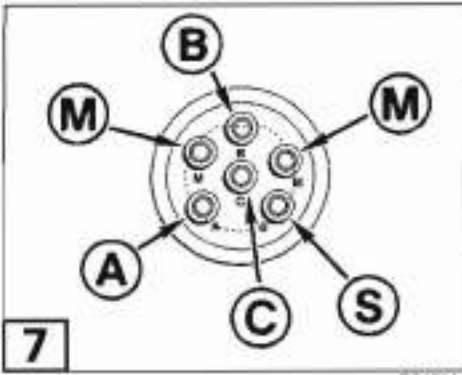
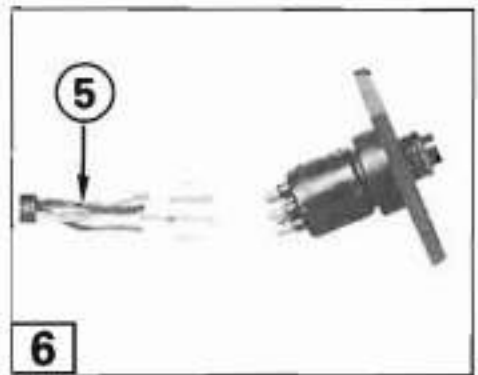
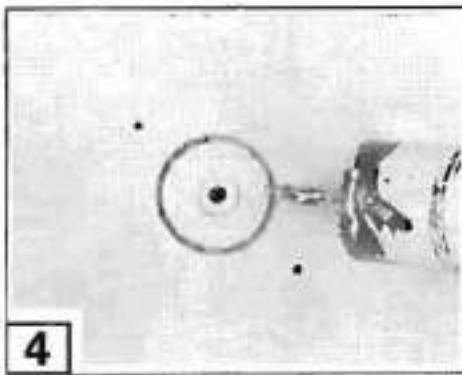


**1** Contents of Kit

Ref.	Name of Part	Qty.
①	Nut .....	1
②	Switch .....	1
③	Bezel .....	1
④	Screw .....	2
⑤	Cable .....	1
⑥	Warning Horn Kit .....	1
⑦	Lanyard .....	1
⑧	Key - one with molded grip .....	2

**2** Remove nut ① from switch ② with a 1 5/16 in. socket, if assembled. Remove bezel ③ from switch.

**3** Turn bezel over so mounting holes are at top-left and bottom-right. Mark mounting screw holes and switch hole using bezel as template.



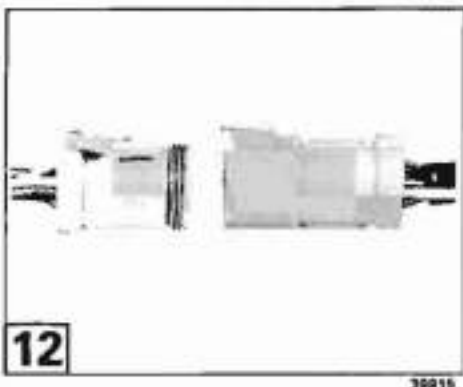
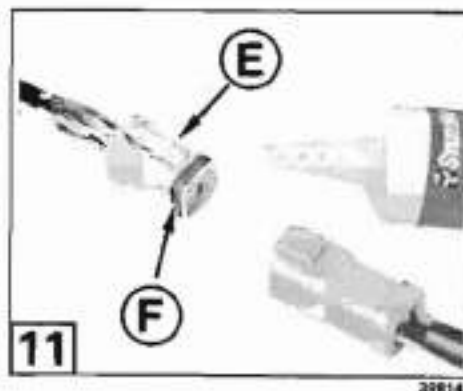
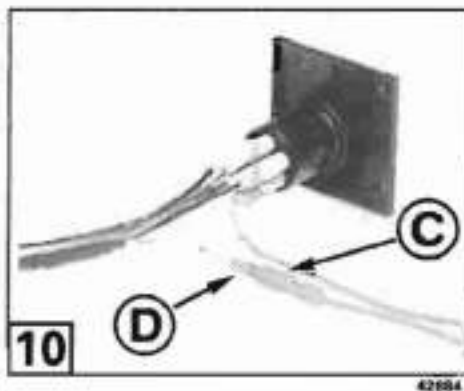
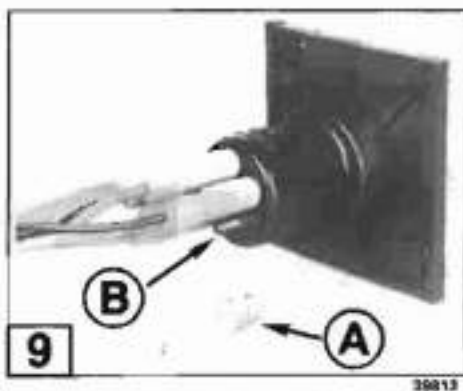
**4** Drill three  $\frac{3}{32}$  in. (2,4 mm) pilot holes. Enlarge switch hole to  $1\frac{1}{2}$  in. (38 mm) with a hole saw.

**5** Install switch in bezel and tighten plastic nut to 22 in. lbs. (2,5 N·m).

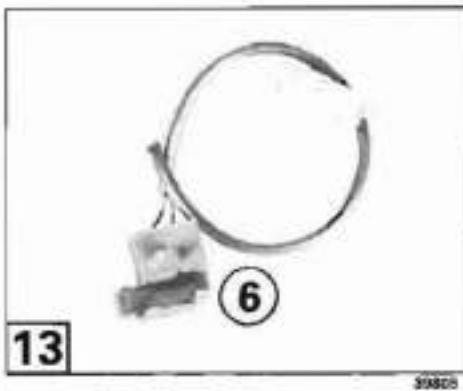
**6** **7** If cable **5** is disconnected from key switch, bring cable through hole in dash. The correct switch terminals, function, and wire colors are as follows:

"B"	BATTERY	Red/Purple stripe
"A"	ACCESSORY	Purple
"C"	PRIMER	Purple/White stripe
"S"	START	Yellow/Red stripe
"M"	MAGNETO	Black/Yellow stripe
"M"	GROUND	Black/White stripe

**8** Install switch in dash with mounting screws **4**. Do not use power screwdriver to avoid damage to bezel.



- 9** Connect one yellow/red neutral start switch wire (A) from remote control to key switch "S" terminal (B).
- 10** Connect second yellow/red neutral start switch wire (C) from remote control to key switch cable bullet connector (D).
- 11** Locate the six-socket plug (E) on instrument cable with the same color wires as the key switch cable. Before joining connectors, apply a small amount of *Electrical Grease* to the seal (F) on the plug.
- 12** Push the plug and receptacle together until latched.



**13** Install warning horn ⑥ following instructions included in kit.

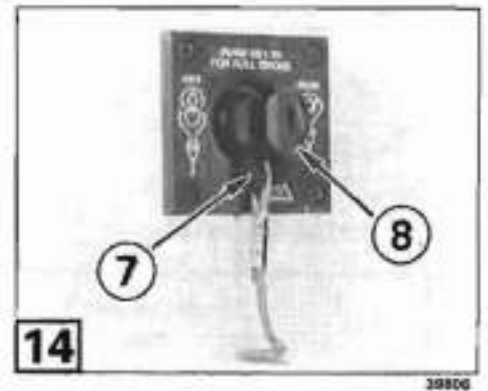
### Switch Operation

**14** ⚠ Attach lanyard to a secure place on clothing and push clip ⑦ onto switch. Insert key ⑧ in switch to start motor. This emergency stop switch will stop boat if operator is thrown from boat. In an emergency, a passenger can put remote control in NEUTRAL and restart motor without lanyard.

**Do not operate motor with clip removed from switch, except in an emergency.** If motor is operated without clip, and primer is used while motor is running; the starter and flywheel can be damaged by accidental starter engagement.

### Switch Test

**14** ⚠ Test emergency stop switch every 30 days. **To test, install lanyard clip ⑦ on the key switch.** Insert key ⑧ in switch and start motor, following procedure in **Operator's Manual.** **Pull lanyard and remove clip to verify that motor stops.** **Have switch checked by dealer if motor does not stop when clip is pulled off switch.**





SVENSKA

## MONTERINGSANVISNINGAR

### Tändningslås för modulärt kabelsystem

#### SÄKERHET

De här monteringsanvisningarna innehåller information som kan förhindra person- och utrustningskador. Följande symboler används i anvisningarna:

	<b>Säkerhetsvarning</b>	Varning! För ev. feler och står intill information som kan förhindra personskador.
	<b>Obs</b>	Står intill information som kan förhindra maskinskador.
	<b>Viktigt</b>	Står intill information som reglerar rätt ihopsättning och bruk av produkten.

#### TILL ÄGAREN

De monteringsprocedurer som beskrivs i dessa anvisningar bör utföras av en utbildad mekaniker. Om du har frågor, kontakta ÅTERFÖRSÄLJAREN. Förvara dessa anvisningar tillsammans med instruktionsboken. Anvisningarna innehåller information som är viktig för användning och underhåll av motorn.

#### TILL MONTÖREN

Ge dessa anvisningar till ägaren. Gör ägaren uppmärksam på ev. drift- eller underhållsinformation i dessa anvisningar.

#### FÖRORD

Denna sats innehåller ett kombinerat tändningslåsnödstopp med infattning. Satsen är kompatibel med modulära kabelsystem, 1996 (ED) och nyare.

FRANÇAIS

## INSTRUCTIONS D'INSTALLATION

### Kit de l'interrupteur à clé du Système de câblage modulaire

#### SÉCURITÉ

Ces instructions d'installation contiennent des informations qui peuvent aider à éviter des blessures corporelles et des dommages à l'équipement. Comprenez les symboles suivants avant de continuer:

	<b>Avertissement de sécurité</b>	Il vous avertit de la possibilité de danger, et identifie les informations qui vous aideront à éviter les blessures.
	<b>Note</b>	Il identifie les informations qui vous aideront à éviter des dommages à la machinerie.
	<b>Important</b>	Il apparaît près des informations contrôlant l'assemblage et le fonctionnement corrects du produit.

#### POUR LE PROPRIÉTAIRE

Les procédures d'assemblage décrites dans ce feuillet devraient être effectuées par un technicien qualifié. Si vous avez des questions, voyez votre CONCESSIONNAIRE. Conservez ces instructions dans votre kit du propriétaire. Ce feuillet contient des informations importantes concernant l'utilisation et l'entretien futurs de votre moteur.

#### POUR L'INSTALLATEUR

Donnez ce feuillet au propriétaire. Avertissez le propriétaire à propos de quelque information spéciale de fonctionnement ou d'entretien contenue dans les instructions.

#### PRÉFACE

Ce kit contient un interrupteur à clé, servant aussi d'interrupteur d'arrêt d'urgence, monté sur un socle. Ce kit est compatible avec le Système de câblage modulaire de 1996 (ED) et plus récents.

ESPAÑOL

## INSTRUCCIONES DE INSTALACIÓN

### Conjunto de Interruptor de Llave para el Sistema de Alambrado Modular

#### SEGURIDAD

Estas instrucciones de instalación contienen información que podrá evitar heridas personales o daños en los equipos. Comprenda los siguientes símbolos antes de continuar:

	<b>Advertencia de Seguridad</b>	Alerta la posibilidad de peligro e identifica la información que le ayudará a evitar heridas personales.
	<b>Nota</b>	Identifica la información que le ayudará a evitar dañar la maquinaria.
	<b>Importante</b>	Aparece al lado de la información que controla el ensamble correcto y la operación del producto.

#### AL PROPIETARIO

Los procedimientos de ensamble descritos en esta hoja de instrucciones deberán ser llevados a cabo por un técnico calificado. Si usted tiene alguna pregunta, vea a su AGENTE. Guarde estas instrucciones con el conjunto del propietario. Esta hoja de instrucciones contiene información importante para el uso y el mantenimiento futuros de su motor.

#### AL INSTALADOR

Entregue esta hoja de instrucciones al propietario. Aconseje al propietario en cuanto a cualquier información de mantenimiento u operación especiales contenidas en estas instrucciones.

#### PREFACIO

Este conjunto contiene una combinación de interruptor de llave e interruptor de parada de emergencia de montaje con luneta. Este conjunto es compatible con el Sistema de Alambrado Modular de 1996 (ED) y más recientes.

ITALIANO

## ISTRUZIONI DI INSTALLAZIONE

### Impianto elettrico modulare Kit interruttore a chiave

#### SICUREZZA

Queste istruzioni di installazione contengono informazioni che possono contribuire a prevenire danni a persone e/o attrezzature. Prima di procedere, assicurarsi di conoscere il significato dei seguenti simboli:

	<b>Avvertenza di sicurezza</b>	Avverte della possibilità di pericolo ed identifica informazioni che contribuiscono alla prevenzione di danni a persone.
	<b>Note</b>	Identifica le informazioni che contribuiscono alla prevenzione di danni alle attrezzature.
	<b>Importante</b>	Aparece accanto alle informazioni relative al corretto montaggio e funzionamento del prodotto.

#### PER IL PROPRIETARIO

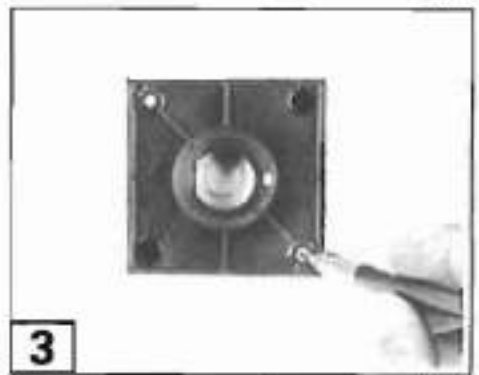
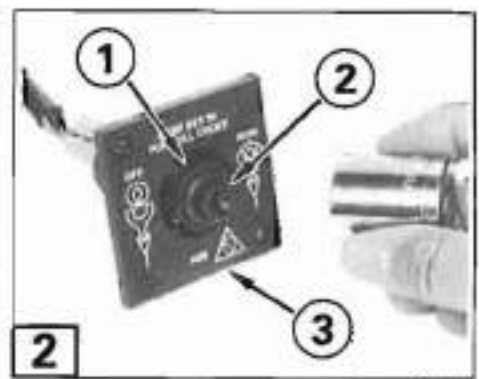
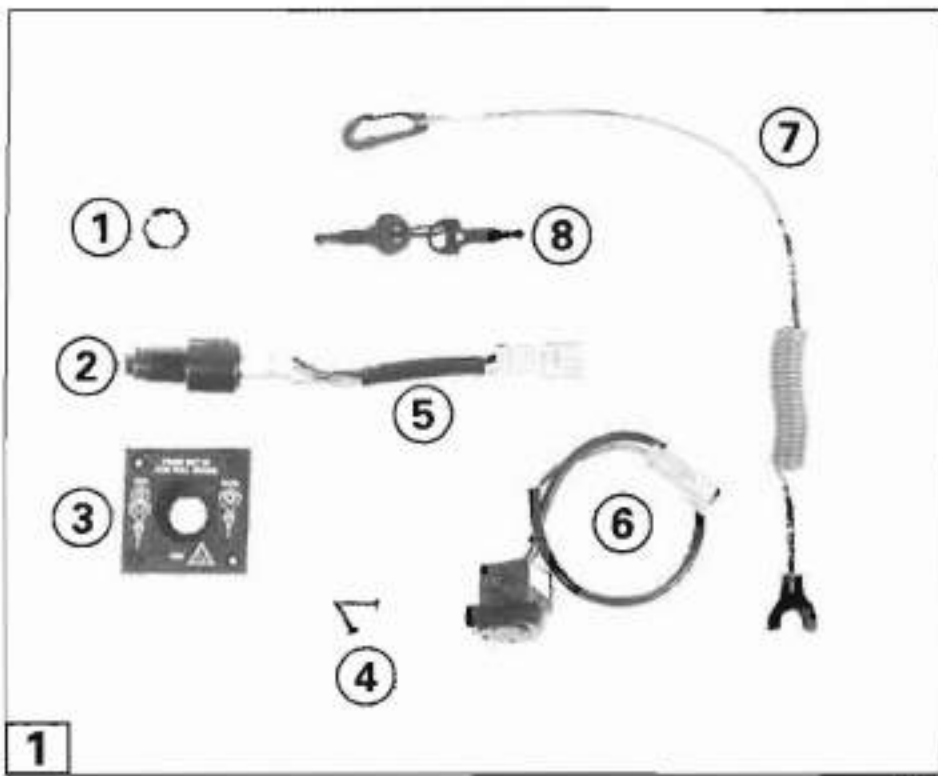
Di norma le procedure di montaggio descritte nel presente foglio devono essere eseguite da un tecnico addestrato. In caso di dubbio, rivolgersi al concessionario più vicino. Conservare le presenti istruzioni nel kit del proprietario. Questo foglio contiene informazioni importanti per l'uso e la manutenzione futura del motore.

#### PER L'INSTALLATORE

Consegnare questo foglio al proprietario. Informare il proprietario di eventuali operazioni speciali di manutenzione descritte nelle istruzioni.

#### PREFAZIONE

Questo kit contiene una combinazione a cornice di interruttore a chiave ed interruttore di arresto di emergenza. Questo kit è compatibile con gli impianti elettrici modulari del 1996 (ED) e successivi.



SVENSKA

1 Satsen innehåller:

Ref.	Benämning	Ant.
①	Mutter	1
②	Tändningslås/Nödstopp	1
③	Infattning	1
④	Skruv	2
⑤	Kabel	1
⑥	Varningshornssats	1
⑦	Linse	1
⑧	Nyckel - en med gjutet huvud	2

2 Om muttern ① är festsatt på tändningslåset ②, ta bort den med en 1/8 in. hylsa. Ta bort infattningen ③ från tändningslåset.

3 Vänd infattningen så att fästhålerna befinner sig uppe till vänster och nere till höger. Märk ut fästskruvhålen och tändningslåshålet med infattningen som mall.

FRANÇAIS

1 Contenu du kit

Ref.	Désignation	Qté
①	Écrou	1
②	Interrupteur	1
③	Socle	1
④	Vis	2
⑤	Câble	1
⑥	Kit d'avertisseur sonore	1
⑦	Goupille et cordon	1
⑧	Clé - une à prise moulée	2

2 Enlevez l'écrou ① de l'interrupteur ② à l'aide d'une clé à douille de 1/8 po, s'il est monté. Enlevez le socle ③ de l'interrupteur.

3 Retournez le socle de façon à ce que les trous de montage soient situés en haut à gauche et en bas à droite. Marquez les trous pour les vis de montage et pour l'interrupteur en employant le socle comme un gabarit.

ESPAÑOL

1 Contenido del Conjunto

Ref.	Nombre de la Pieza	Ctd.
①	Tuerca	1
②	Interruptor	1
③	Luneta	1
④	Tornillos	2
⑤	Cable	1
⑥	Conjunto de Bocina de Advertencia	1
⑦	Gancho y Cuerda	1
⑧	Llaves - una con agarredera moldeada	2

2 Remueva la tuerca ① del interruptor ② con una llave de cubo de 1/8 de pulgada, si está ensamblada. Remueva la luneta ③ del interruptor.

3 Déle la vuelta a la luneta de modo que los agujeros queden en la parte superior izquierda e inferior derecha. Marque los agujeros de montaje y el agujero para el interruptor usando la luneta como plantilla.

ITALIANO

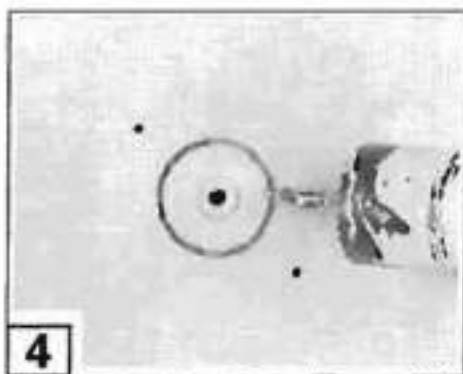
1 Contenuto del kit

Ref.	Descrizione	Qtà
①	Dado	1
②	Interruttore	1
③	Cornice	1
④	Vite	2
⑤	Cavo	1
⑥	Kit avvisatore acustico	1
⑦	Cordone	1
⑧	Chiave - una con impugnatura sagomata	2

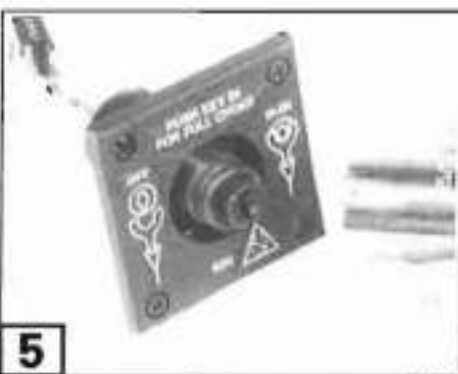
2 Togliere il dado ① dall'interruttore ② con una bussola da 1/8, se installato. Togliere la cornice ③ dall'interruttore.

3 Ruotare la cornice in modo che i fori di montaggio si trovino all'estremità superiore sinistra ed all'estremità inferiore destra. Segnare i fori per le viti di montaggio ed il foro per l'interruttore utilizzando la cornice come maschera.

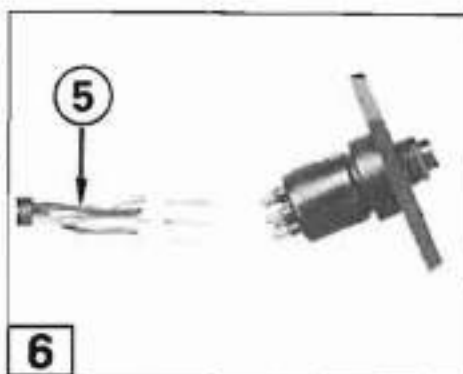




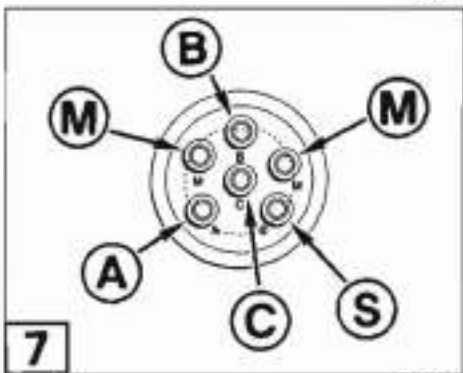
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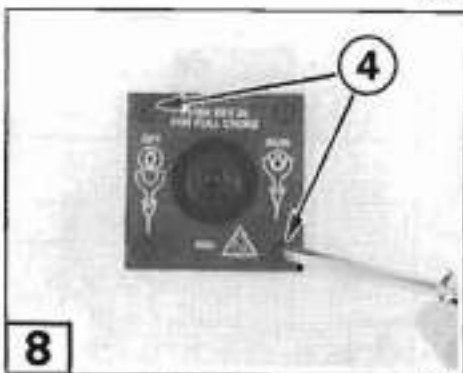
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## SVENSKA

**4** Borra tre  $\frac{3}{16}$  in. (2,4 mm) hål. Förstora tändningslåshålet till  $1\frac{1}{2}$  in. (38 mm) med en hålsåg.

**5** Montera tändningslåset i infattningen och dra åt plastmuttern till 22 in. lbs. (2,5 N·m).

**6 7** Om kabeln ③ är losskopplad från tändningslåset ska den föras in genom hålet i instrumentpanelen. Här följer uttag, funktioner och kabelfärger:

"B"	BATTERI	Röd/Lilarandig
"A"	TILLBEHÖR	Lila
"C"	PRIMER	Lila/Viträndig
"S"	START	Gul/Rödrandig
"M"	MAGNET	Svart/Gulrandig
"M"	JORD	Svart/Viträndig

**8** Montera tändningslåset på instrumentpanelen med fästskruvarna ④. Använd inte elskruvmejsel som kan skada infattningen.

## ESPAÑOL

**4** Perfore tres agujeros piloto de 2,4 mm ( $\frac{3}{16}$  pul.). Agrande el agujero del interruptor a 38 mm ( $1\frac{1}{2}$  pul.) con una sierra circular.

**5** Instale el interruptor en la luneta y apriete la tuerca de plástico a una torsión de 2,5 N·m (22 lbs. pul.).

**6 7** Si el cable ③ está desconectado del interruptor de la llave, pase el cable a través del agujero del tablero de instrumentos. Los terminales correctos del interruptor, su función y su código de colores son indicados a continuación:

"B"	BATERÍA	Rojo/Púrpura
"A"	ACCESORIOS	Púrpura
"C"	CEBADOR	Púrpura/Bianco
"S"	ARRANQUE	Amarillo/Rojo
"M"	MAGNETO	Negro/Amarillo
"M"	TIERRA	Negro/Bianco

**8** Instale el interruptor en el tablero de instrumentos con los tornillos de montaje ④. No utilice un destornillador de aire o eléctrico con el fin de evitar dañar la luneta.

## FRANÇAIS

**4** Percez trois avant-trous de 2,4 mm ( $\frac{3}{16}$  po). Élargissez le trou pour l'interrupteur jusqu'à 38 mm ( $1\frac{1}{2}$  po) à l'aide d'une scie cloche.

**5** Installez l'interrupteur dans le socle et serrez l'écrou en plastique à un couple de serrage de 2,5 N·m (22 in. lbs.).

**6 7** Si le câble ③ est débranché de l'interrupteur à clé, passez le câble à travers le trou dans le tableau de bord. Les bornes, fonctions et couleurs de fil correctes sont les suivantes:

"B"	BATTERIE	Strié rouge/mauve
"A"	ACCESSOIRE	Mauve
"C"	AMORÇAGE	Strié mauve/blanc
"S"	DÉMARRAGE	Strié jaune/rouge
"M"	MAGNETO	Strié noir/jaune
"M"	MASSE	Strié noir/blanc

**8** Installez l'interrupteur dans le tableau de bord avec les vis de montage ④. Afin d'éviter d'endommager le socle, n'utilisez pas un tournevis électrique ou pneumatique.

## ITALIANO

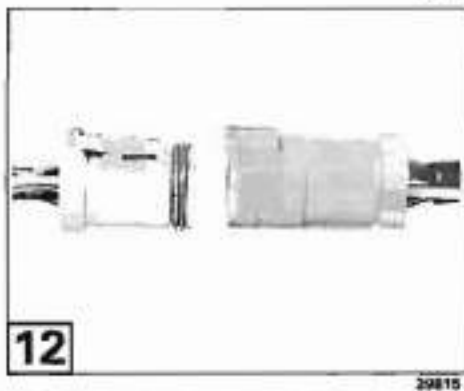
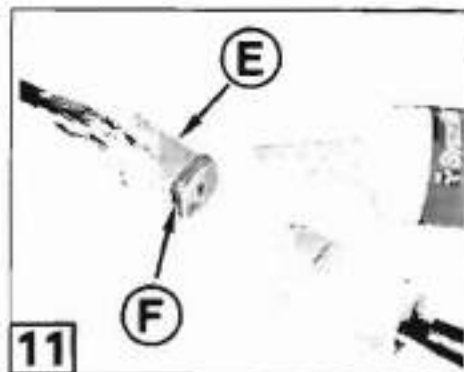
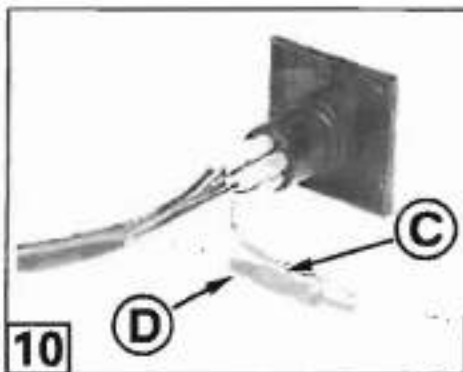
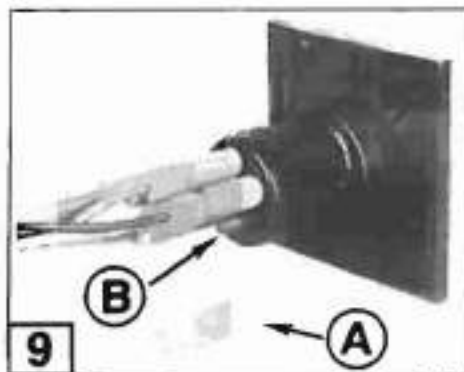
**4** Eseguire tre fori guide da  $\frac{3}{16}$  in. (2,4 mm). Allargare il foro dell'interruttore a  $1\frac{1}{2}$  in. (38 mm) con una sega a tazza.

**5** Installare l'interruttore nella cornice e serrare il dado di plastica a 22 in. lbs. (2,5 N·m).

**6 7** Se il cavo ③ è disinserito dall'interruttore a chiave, infilare il cavo nel foro del cruscotto. I terminali corretti dell'interruttore, la loro funzione ed il colore dei cavi sono i seguenti:

"B"	BATTERIA	Rosso/Violetto a strisce
"A"	ACCESSORI	Violetto
"C"	ADESCATORE	Violetto/Bianco a strisce
"S"	AVVIAMENTO	Giallo/Rosso a strisce
"M"	MAGNETE	Nero/Giallo a strisce
"M"	TERRA	Nero/Bianco a strisce

**8** Installare l'interruttore nel cruscotto utilizzando le viti di montaggio ④. Non utilizzare avvitatori elettrici onde evitare di danneggiare la cornice.



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## SVENSKA

- 9** Anslut fjärregelagets ena gulrödbrändiga neutralstartskabel **A** till tändningslåsets "S"-uttag **B**.
- 10** Anslut fjärregelagets andra gulrödbrändiga neutralstartskabel **C** till tändningslåsets kulkoppling **D**.
- 11** Lokalisera 6-polssluggen **E** på instrumentkabeln med samma kabelfärger som tändningslåskabeln. Precis innan du sätter ihop kopplingarna lägger du lite *Electrical Grease* på tätningen **F** på sluggen.
- 12** Tryck ihop plugg och uttag.

## ESPAÑOL

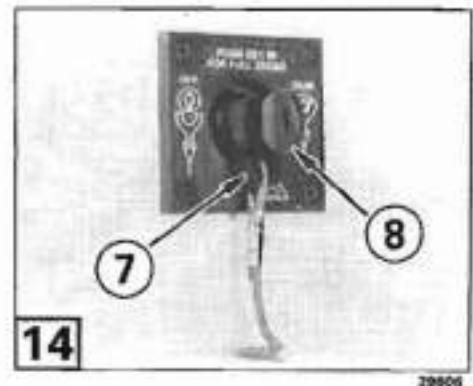
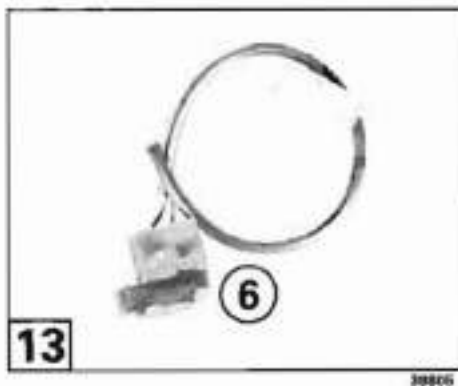
- 9** Conecte un cable amarillo/rojo del interruptor de arranque en neutro **A** del control remoto al terminal "S" del interruptor de la llave **B**.
- 10** Conecte el otro cable amarillo/rojo del interruptor de arranque en neutro **C** del control remoto al conector de bola del interruptor de la llave **D**.
- 11** Localice el enchufe de seis terminales hembras **E** en el cable de instrumentos con los cables del mismo color que los del interruptor de la llave. Inmediatamente antes de juntar los conectores, aplíquese una pequeña cantidad de *Electrical Grease* al sello **F** situado en el enchufe.
- 12** Empuje el enchufe y el receptáculo entre sí hasta que el cerrojo enganche.

## FRANÇAIS

- 9** Branchez un câble jaune/rouge **A** d'interrupteur de démarrage au point mort de la commande à distance à la borne "S" **B** de l'interrupteur à clé.
- 10** Branchez le deuxième câble jaune/rouge **C** d'interrupteur de démarrage au point mort de la commande à distance au connecteur à bille **D** du câble de l'interrupteur à clé.
- 11** Cherchez la fiche à six douilles **E** sur le câble d'instrument ayant les fils de même couleur que les fils de l'interrupteur à clé. Enduisez le joint d'étanchéité **F** sur la fiche d'une petite quantité de graisse *Electrical Grease*, juste avant de la raccorder.
- 12** Enfoncez la fiche dans la prise jusqu'à ce qu'elle s'enclenche.

## ITALIANO

- 9** Collegare un cavo giallo/rosso dell'interruttore di avviamento in folle **A** dal telecomando al terminale "S" dell'interruttore a chiave **B**.
- 10** Collegare il secondo cavo giallo/rosso dell'interruttore di avviamento in folle **C** dal telecomando al connettore del cavo dell'interruttore a chiave **D**.
- 11** Posizionare la spina a sei prese **E** sul cavo degli strumenti con i cavi dello stesso colore del cavo dell'interruttore a chiave. Prima di unire i connettori, applicare un leggero strato di *Electrical Grease* alla tenuta **F** sulla spina.
- 12** Premere la spina e la presa finché non si uniscono.



SVENSKA

**13** Montera varningshornet ⑥ enligt anvisningarna i satsen.

**Bruksanvisning**

**14** ⚠ Fäst linan på en säker plats på kläderna och skjut på klämman ⑦ på nödstoppet. Sätt in nyckeln ⑧ i tändningslåset för att starta motorn. Detta nödstopp stoppar motorn om föraren kastas överbord. I en nödsituation kan en passagerare lägga fjärreglaget i NEUTRAL och starta motorn utan linan.

Kör inte motorn med klämman borttagen från nödstoppet, utom i nödfall. Om motorn körs utan klämman, och primern används medan motorn går, kan startmotor och svänghjul skadas om startmotorn av misstag sätts igång.

**Test**

**14** ⚠ Testa nödstoppet var 30:e dag. Sätt fast klämman ⑦ på nödstoppet. Sätt in nyckeln ⑧ i tändningslåset och starta motorn; följ proceduren i Bruksanvisning. Dra i linan och ta bort klämman för att kontrollera att motorn stannar. Låt återförsäljaren kontrollera nödstoppet om motorn inte stannar när klämman dras av.



Säkerhetsvarning

ESPAÑOL

**13** Instale la bocina de advertencia ⑥ siguiendo las instrucciones incluidas con el conjunto.

**Operación del Interruptor**

**14** ⚠ Conecte la cuerda en un lugar seguro de la ropa y empuje el gancho ⑦ en el interruptor. Inserte la llave ⑧ en el interruptor para arrancar el motor. Este interruptor de emergencia parará la embarcación en el caso que el operador sea lanzado al agua. En una emergencia, un pasajero puede colocar el control en neutro y prender el motor sin tener la cuerda.

No opere el motor con el gancho fuera del interruptor, excepto en una emergencia. Si el motor es operado sin el gancho, y el cebador es usado mientras el motor está funcionando; el arranque y el volante podrán ser dañados al enganchar el arranque accidentalmente.

**Prueba del interruptor**

**14** ⚠ Pruebe el interruptor de parada cada 30 días. Para hacer la prueba, instale el gancho de la cuerda ⑦ en el interruptor de la llave. Inserte la llave ⑧ en el interruptor y arranque el motor siguiendo el procedimiento que se encuentra en el manual de operación. Hala la cuerda y remueva el gancho para verificar si el motor se apaga. Haga que su agente revise el interruptor si el motor no se apaga cuando el gancho es retirado del interruptor.



Relativo a Seguridad

FRANÇAIS

**13** Installez l'avertisseur sonore ⑥ en suivant les instructions comprises dans le kit.

**Fonctionnement de l'interrupteur**

**14** ⚠ Attachez le cordon sur un endroit sûr de vos vêtements et enfoncez l'agrafe ⑦ dans l'interrupteur. Insérez la clé ⑧ dans l'interrupteur pour démarrer le moteur. Cet interrupteur d'arrêt d'urgence arrêtera le bateau si le pilote en est éjecté. En cas d'urgence, un passager peut passer la commande à distance au POINT MORT et redémarrer le moteur sans le cordon.

N'utilisez pas le moteur si l'agrafe n'est pas dans l'interrupteur, sauf en cas d'urgence. Si le moteur est employé sans cette agrafe, et que l'amorçage est utilisé alors que le moteur tourne; le démarreur et le volant magnétique peuvent être endommagés par des emplois accidentels du démarreur.

**Essai de l'interrupteur**

**14** ⚠ Essayez l'interrupteur d'arrêt tous les 30 jours. Pour essayer, installez l'agrafe ⑦ du cordon dans l'interrupteur à clé. Insérez la clé ⑧ dans l'interrupteur et démarrez le moteur, en suivant la procédure dans le manuel de l'utilisateur. Tirez le cordon et enlevez l'agrafe afin de vérifier que le moteur s'arrête. Demandez à votre concessionnaire de vérifier l'interrupteur si le moteur ne s'arrête pas quand l'agrafe est retirée.



Point de Sécurité

ITALIANO

**13** Installare l'avvisatore acustico ⑥ rispettando le istruzioni contenute nel kit.

**Funzionamento dell'interruttore**

**14** ⚠ Fissare il cordone ad un punto sicuro del giubbotto e premere il fermaglio ⑦ sull'interruttore. Inserire la chiave ⑧ nell'interruttore per avviare il motore. L'interruttore di arresto di emergenza fermerà l'imbarcazione nel caso in cui l'operatore cadesse all'esterno dell'imbarcazione. In caso di emergenza, un passeggero può portare il telecomando nella posizione di FOLLE e riavviare il motore senza utilizzare il cordone.

Non far funzionare il motore con il fermaglio rimosso dall'interruttore, tranne che nei casi di emergenza. Se il motore viene utilizzato senza fermaglio e si utilizza l'adescatore durante la marcia, l'avviatore ed il volante possono danneggiarsi a causa di un avviamento involontario.

**Prova dell'interruttore**

**14** ⚠ Controllare l'interruttore di arresto di emergenza ogni 30 giorni. Per eseguire il controllo, installare il fermaglio del cordone ⑦ sull'interruttore a chiave. Inserire la chiave ⑧ nell'interruttore ed avviare il motore, rispettando la procedura contenuta nel manuale dell'operatore. Tirare il cordone e togliere il fermaglio per verificare che il motore si spenga. Se il motore non dovesse fermarsi quando viene estratto il fermaglio, fare controllare l'interruttore da un concessionario.



Siurezza d'Uso



# EVINRUDE Johnson




NEDERLANDS

## INSTALLATIE-INSTRUCTIES

### Modulair bedradingsysteem Contactschakelaarkit

#### VEILIGHEID

Deze installatie-instructies bevatten informatie die letsel en beschadiging van het materiaal kan helpen voorkomen. Zorg dat u de volgende symbolen goed begrijpt, vóór u verder gaat:

 <b>Veiligheidsaanschuiving</b>	Wijst u op mogelijke gevaren en geeft informatie om letsel te voorkomen.
 <b>Nood</b>	Duidt op informatie die helpt voorkomen dat de machine beschadigd raakt.
 <b>Belangrijk</b>	Staat bij informatie die betrekking heeft op de juiste montage en bediening van het product.

#### AAN DE EIGENAAR

De montageprocedures, zoals op dit blad zijn beschreven, moeten worden gevolgd door een ervaren monteur. Heeft u vragen, ga dan naar uw DEALER. Bewaar deze instructies bij de overige papieren van uw motor. Ze bevatten informatie die belangrijk is voor het gebruik en het onderhoud van uw motor in de toekomst.

#### AAN DE MONTEUR

Geef deze instructies aan de eigenaar. Adviseer de eigenaar met betrekking tot eventuele speciale bedienings- of onderhoudsinformatie in de instructies.

#### INLEIDING

Deze kit bevat een combinatie van een contactschakelaar en een noodstop-schakelaar die in een houder zijn gemonteerd. Deze kit is compatibel met het modulaire bedradingsysteem uit 1996 (ED) en nieuwere systemen.




SIJOM

## ASENNUSOHJEET

### Moduulijohdostojärjestelmä Virtalukkosarja

#### TURVALLISUUS

Nämä asennusohjeet sisältävät tietoja, jotka voivat auttaa estämään henkilö- ja esinevahingot. Tutustu seuraaviin symboleihin ennen kuin jatkat:

 <b>Varoitus</b>	Tämä varoittaa sinua vaaran mahdollisuudesta ja on merkkinä tiedoista, jotka auttavat estämään vahingot.
 <b>Huom</b>	Tämä on merkkinä tiedoista, jotka auttavat estämään laitteiden vahingoittumisen.
 <b>Tärkeää</b>	Nämä tiedot varmistavat tuotteen oikean asennuksen ja toiminnan.

#### OMISTAJALLE

Tässä ohjeessa esitetyt asennusohjeet tulisi antaa pätevän asentajan tehtäväksi. Jos sinulla on kysyttävää, ota yhteys JÄLLEENMYYJÄÄN. Säilytä nämä ohjeet omistajan pakkeuksen yhteydessä. Tämä ohje sisältää tietoja, jotka ovat tärkeitä moottorin myöhemmän käytön ja huollon kannalta.

#### ASENTAJALLE

Anna nämä ohjeet omistajalle. Nouva omistajaa ohjeiden sisältämien erityisten käyttö- tai hoito-ohjeiden suhteen.

#### JOHDANTO

Tämä sarja sisältää kehukseen asennettavan virtalukon ja hätäkatkaisimen yhdistelmän. Tämä sarja on yhteensopiva vuoden 1996 (ED) ja sitä uudemmien moduulijohdostojärjestelmän kanssa.




NORGE

## MONTERINGSANVISNINGER

### Modulledningsystem Nøkklebryter-sett

#### SIKKERHET

Dessa monteringsanvisningarna innehåller information som kan vara behjlpelig till å hindra att personer eller utstyr skadas. Vær sikker på et du forstår betydningen av symbolene nedenunder før du går videre:

 <b>Advarsel</b>	Gjør deg oppmerksom på at det kan oppstå en farlig situasjon og gir opplysninger om hvordan man kan unngå skade.
 <b>Obs!</b>	Står ved siden av opplysninger som er viktige for å unngå at maskineriet skades.
 <b>Viktig</b>	Står ved siden av opplysninger som er viktige for å sikre riktig sammenmontering og bruk av produktet.

#### TIL EIEREN

Sammenmonteringen som står forklart på dette arkat bør utføres av en erfaren mekaniker. Henvend deg til din FORHANDLER hvis det er noe du ikke er sikker på. Legg disse anvisningene i ditt Eierens sett. Dette arkat inneholder informasjon som er viktig for bruk og vedlikehold av motoren i fremtiden.

#### TIL MONTØREN

Gi dette arkat til eieren. Gjør eieren oppmerksom på alle spesielle opplysninger i anvisningene som gjelder bruk eller vedlikehold.

#### FORORD

Deette settet inneholder en kombinert nøkklebryter og nødstoppbryter som er montert i en innfatning. Settet kan brukes til 1996 (ED) og nyere modulledningsystem.




DEUTSCH

## MONTAGEANWEISUNGEN

### Modulares Verdrahtungssystem Zündschalter-Bausatz

#### SICHERHEIT

Diese Anleitung enthält Informationen, die Verletzungen und Sachschäden vermeiden sollen. Machen Sie sich vor Beginn der Arbeit mit den folgenden Symbolen vertraut:

 <b>Sicherheitshinweise</b>	Macht auf mögliche Gefahren aufmerksam und kennzeichnet Hinweise, die Verletzungen vermeiden sollen.
 <b>Hinweis</b>	Kennzeichnet Hinweise, die Sachschäden vermeiden sollen.
 <b>Wichtig</b>	Steht neben Hinweisen, die für korrekte Montage und Betrieb des Produktes sorgen.

#### AN DEN BESITZER

Die in dieser Anleitung dargestellten Montageverfahren sollten von einem ausgebildeten Techniker durchgeführt werden. Falls Sie Fragen haben, wenden Sie sich bitte an Ihren HÄNDLER. Bewahren Sie diese Anleitung in Ihrem Besitzerbausatz auf. Die Anleitung enthält Informationen, die für Betrieb und Wartung Ihres Motors wichtig sind.

#### AN DEN MONTEUR

Geben Sie diese Anleitung dem Besitzer. Machen Sie den Besitzer auf spezielle Informationen zu Betrieb und Wartung aufmerksam, die in dieser Anleitung enthalten sind.

#### Einleitung

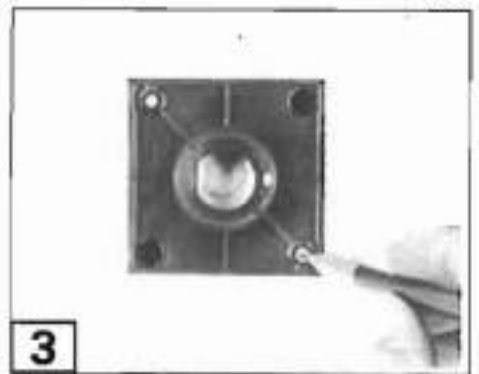
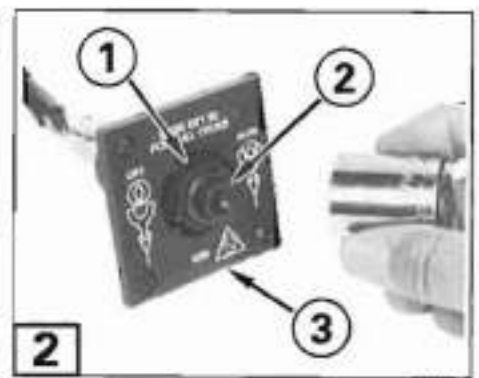
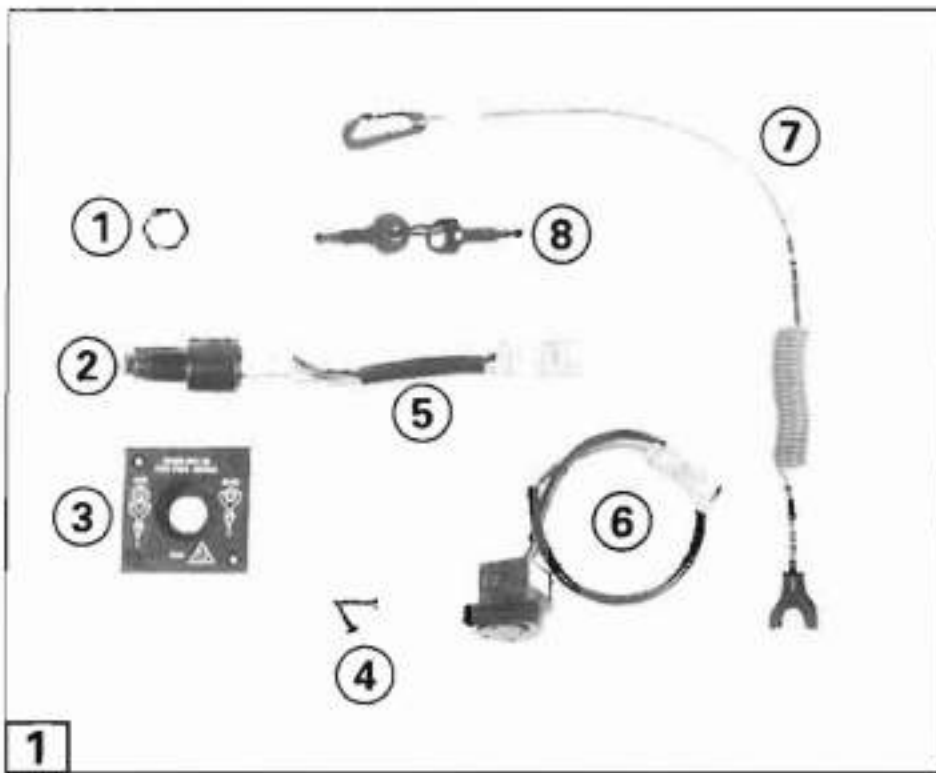
Dieser Bausatz enthält einen kombinierten Zündschalter/Notstoppschalter mit Abschlussring. Der Bausatz ist kompatibel mit dem modularen Verdrahtungssystem ab 1996 (ED).

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NEDERLANDS

## 1 Inhoud van de kit

Ref.	Omschrijving	St.
1	Moer	1
2	Schakelaar	1
3	Houder	1
4	Schroef	2
5	Kabel	1
6	Claxonkit	1
7	Veiligheidskoord	1
8	Sleutel - een stuks met gegoten kop	2

2 Haal de moer 1 van de schakelaar 2 met een 1/16 in. dopsleutel, als deze aan elkaar zijn bevestigd. Verwijder de houder 3 van de schakelaar.

3 Draai de houder om, zodat de montagegaten linksboven en rechts-onder zitten. Markeer de gaten voor de montageschroeven en voor de schakelaar en gebruik daarbij de houder als sjabloon.

NORGE

## 1 Settets innhold

Ref.	Beskrivelse	Ant.
1	Mutter	1
2	Bryter	1
3	Innfatning	1
4	Skrue	2
5	Kabel	1
6	Varselhorn-gett	1
7	Utløsernor	1
8	Nøkkel - en stk. med utformet grep	2

2 Ta mutteren 1 ut av bryteren 2 ved hjelp av en 1/16 in. pipengkel, hvis den er sammenmontert. Ta innfatningen 3 av bryteren.

3 Snu innfatningen slik at monteringshullene er plassert øverst til venstre og nederst til høyre. Bruk innfatningen som sjablon og sett et merke der monteringshullene skal være.

SUOMI

## 1 Sarjan sisältö

Viite	Osen nimi	Kpl
1	Mutteri	1
2	Kytin	1
3	Kehys	1
4	Ruuvi	2
5	Kaapeli	1
6	Varoitussäänkorviserija	1
7	Naru	1
8	Avain - muotoillu	2

2 Irrota mutteri 1 kytkimestä 2 1/16 tuuman hylsillä, jos se on koottu. Irrota kehys 3 kytkimestä.

3 Käännä kehys ympäri siten, että asennusreiät ovat vasemmalla ylhäällä ja oikealla alhaalla. Merkitse asennusruuvien reiät ja kytkimen reikä käyttämällä kehystä mallina.

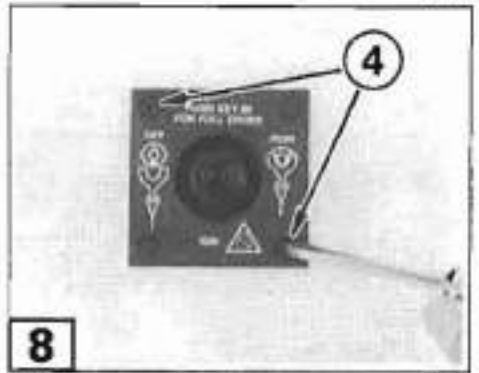
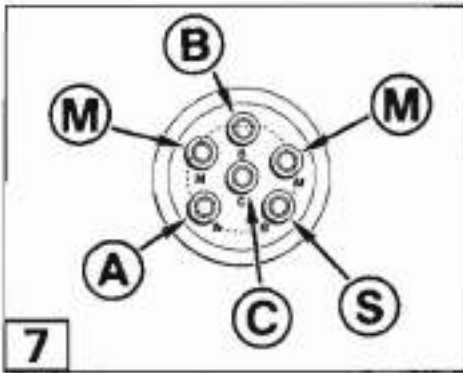
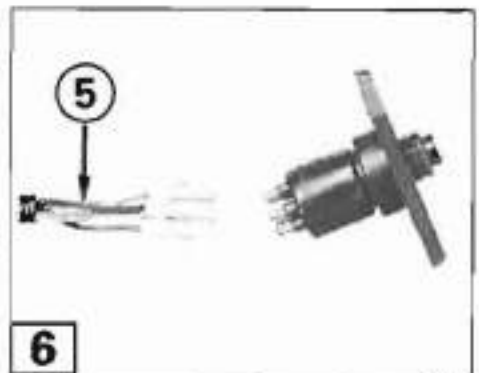
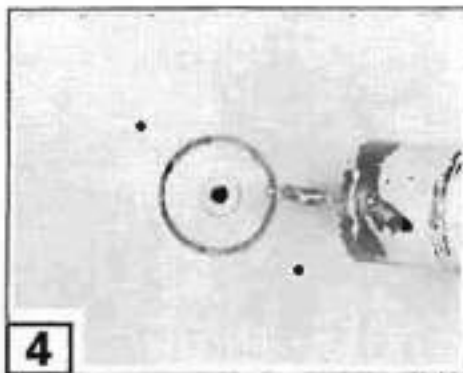
DEUTSCH

## 1 Der Bausatzinhalt

Ref.	Bezeichnung	St.
1	Mutter	1
2	Schalter	1
3	Abschlußring	1
4	Schraube	2
5	Kabel	1
6	Signalhorn-Bausatz	1
7	Leine	1
8	Schlüssel - mit Formgriff	2

2 Die Mutter 1 mit einem 1/16 in.-Steckschlüssel vom Schalter 2 entfernen. Den Abschlußring 3 vom Schalter entfernen.

3 Den Abschlußring so umdrehen, daß sich die Montageöffnungen oben links und unten rechts befinden. Die Halteschraubenbohrungen und die Schalteröffnung markieren. Dabei den Abschlußring als Schablone verwenden.



NEEDERLANDS

**4** Boor drie gaatjes voor van  $\frac{3}{16}$  in. (2,4 mm). Vergroot met een decoupeerzaag het gat voor de schakelaar tot  $1\frac{1}{2}$  in. (38 mm).

**5** Installeer de schakelaar in de houder en draai de kunststof moer aan tot 22 in. lbs. (2,5 N-m).

**6 7** Als de kabel **3** niet vastzit aan de contactschakelaar, voer de kabel dan door het gat in het dashboard. De juiste schakelaarklemmen, functies en draadkleuren zijn als volgt:

"B"	ACCU	rood/paars gestreept
"A"	ACCESSOIRE	paars
"C"	STARTINSPUITING	paars/wit gestreept
"S"	START	geel/rood gestreept
"M"	MAGNEET	zwart/geel gestreept
"M"	MASSA	zwart/wit gestreept

**8** Installeer met de montageschroeven **4** de schakelaar in het dashboard. Geen elektrische schroevendraaier gebruiken, om te voorkomen dat u de houder beschadigt.

NORGE

**4** Forbor tre  $\frac{3}{16}$  in. (2,4 mm) hull. Forstørr bryterhullet til  $1\frac{1}{2}$  in. (38 mm) ved hjelp av en hullsag.

**5** Sett bryteren i innfatningen og stram plastmutteren til et moment på 22 in. lbs. (2,5 N-m).

**6 7** Hvis kabelen **3** ble tatt av nøkkelbryteren, stikk kabelen gjennom hullet i dashboardet. De riktige terminalene, funksjonene og ledningsfargene vil være:

"B"	BATTERI	Rød/lilla stripe
"A"	EKSTRAUTSTYR	Lilla
"C"	PRIMER	Lilla/hvit stripe
"S"	START	Gul/rød stripe
"M"	MAGNETO	Svart/gul stripe
"M"	JORD	Svart/hvit stripe

**8** Monter bryteren på dashboardet med monteringskruene **4**. Ikke bruk en elektrisk skrutrekker da dette kan skade innfatningen.

SUOMI

**4** Poraa kolme  $\frac{3}{16}$  tuuman (2,4 mm) ohjousreikä. Suurena kyt-kimen reikä  $1\frac{1}{2}$  tuuman (38 mm) kokoiseksi reikäsaahalla.

**5** Asenna kytkin kehukseen ja kiristä muovimutteri momenttiin 22 in. lbs. (2,5 N-m).

**6 7** Jos kaapeli **3** on irrotettu virtalukosta, vie kaapeli kojelau-dassa olevasta reiästä. Oikeat kytkennät, toiminnot ja johtojen värit ovat seuraavat:

"B"	AKKU	Punainen/violetti raita
"A"	VARUSTE	Violetti
"C"	RIKASTIN	Violetti/valkoinen raita
"S"	KÄYNNISTYS	Keltainen/punainen raita
"M"	MAGNEETTO	Musta/keltainen raita
"M"	MAATTO	Musta/valkoinen raita

**8** Asenna kytkin kojelautaan asennusruuveilla **4**. Älä käytä sähköruuvimeisseliä, jotta et vahingoita kehystä.

DEUTSCH

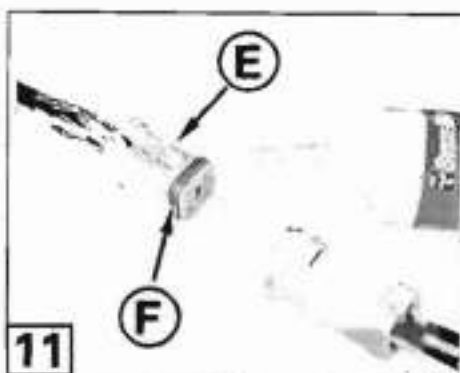
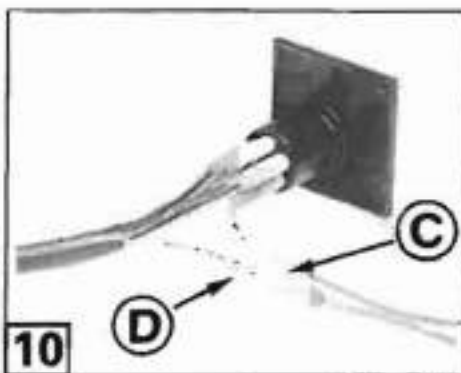
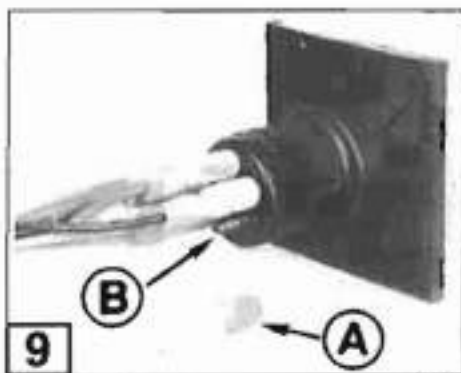
**4** Drei  $\frac{3}{16}$  in. (2,4 mm) Führungslöcher bohren. Die Schalteröffnung mit einer Lochsäge auf  $1\frac{1}{2}$  in. (38 mm) erweitern.

**5** Den Schalter im Abschlußring anbringen und die Plastikmutter auf 22 in. lbs. (2,5 N-m) anziehen.

**6 7** Wenn das Kabel **3** vom Zündschalter gelöst wird, das Kabel durch die Bohrung im Armaturenbrett führen. Die Schalterklemmen haben folgende Funktionen und Drahtfarben:

"B"	BATTERIE	Rot-dunkelrot gestreift
"A"	ZUBEHÖR	Dunkelrot
"C"	PRIMER	Dunkelrot-weiß gestreift
"S"	START	Gelb-rot gestreift
"M"	MAGNET	Schwarz-gelb gestreift
"M"	MASSE	Schwarz-weiß gestreift

**8** Den Schalter mit Halteschrauben **4** im Armaturenbrett installieren. Um den Abschlußring nicht zu beschädigen, keinen elektrischen Schraubendreher verwenden.



#### NEDERLANDS

**9** Sluit de ene geel/rood gestreepte draad van de vrijloopstartschakelaar **A** van de afstandsbediening aan op de "S"-klem **B** van het contactslot.

**10** Sluit de andere geel/rood gestreepte draad van de vrijloopstartschakelaar **C** van de afstandsbediening aan op de kogelconnector **D** van de kabel van het contactslot.

**11** Kijk waar de zesvoudige plug **E** met dezelfde kleuren draden als de contactschakelaarkabel zit bij de instrumentenkabel. Breng voor het verbinden van de connectoren een beetje *Electrical Grease* aan op de dichting **F** op de plug.

**12** Druk de plug en de contrasteker samen, tot ze vastzitten.

#### NORGE

**9** Kopl en gul/rød startbryterledning **A** fra fjernstyringen og til nøkkelbryter "S" tilkopplingskontakt **B**.

**10** Kopl den andre gul/røde startbryterledningen **C** fra fjernstyringen og til nøkkelbryterkabelens kuletilkopling **D**.

**11** Finn pluggen med 6 hull **E** på instrumentkabelen som har de samme fargene som nøkkelbryterkabelen. Before joining connectors, apply a small amount of *Electrical Grease* to the seal **F** on the plug.

**12** Trykk pluggen inn i stikkontakten helt til de er sammenlåst.

#### SUOMI

**9** Liitä yksi vapaakäynnistyskytkimen punakeltainen johto **A** kauko-ohjaintalaitteesta virtalukon "S"-liittimeen **B**.

**10** Liitä toinen vapaakäynnistyskytkimen punakeltainen johto **C** kauko-ohjaintalaitteesta virtalukon kaapelin vastakappaleeseen **D**.

**11** Etsi mittarikaapelin kuusi-istukkainen pistoke **E**, jossa on samanväriset johdot kuin virtalukon kaapelissa. Sivele ennen liittinten kytkemistä pieni määrä *Electrical Grease* -rasvaa tulpan tilvisteeseen **F**.

**12** Työnnä kosketinta ja vastakappaletta yhteen, kunnes ne lukittuvat.

#### DEUTSCH

**9** Einen gelb/roten Leerlaufstartschalterdraht **A** von der Fernsteuerung an Zündschalterklemme "S" anschließen **B**.

**10** Den zweiten gelb/roten Leerlaufstartschalterdraht **C** von der Fernsteuerung an Zündschalterkabel-Kugelstecker anschließen **D**.

**11** Den Sechsfach-Stecker **E** am Instrumentenkabel mit den Drähten derselben Farbe wie das Zündschalterkabel ausfindig machen. Bevor die Steckerhälften zusammengesteckt werden, eine kleine Menge *Electrical Grease* auf den Dichtring **F** am Stecker geben.

**12** Stecker und Fassung zusammendrücken, bis sie fest sitzen.



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NEDERLANDS

**13** Installeer de claxon ⑥ en volg daarbij de instructies die bij de kit zitten.

#### Bediening van de schakelaar

**14** ⚠ Bevestig het veiligheidskoord aan een stevige en veilige plaats aan uw kleding en druk de clip ⑦ op de schakelaar. Steek de sleutel ⑧ in de schakelaar en start de motor. Deze noodstoppschakelaar laat de boot stoppen als de bestuurder overboord slaat. In een noodgeval kan een passagier de afstandsbediening in de VRIJLOOP zetten en de motor weer starten zonder veiligheidskoord.

De motor niet bedienen als de clip verwijderd is uit de schakelaar, behalve in een noodgeval. Als de motor zonder clip wordt bediend, en er insputting is terwijl de motor draait, dan kunnen de starter en het vliegwiel beschadigd raken doordat de starter per ongeluk wordt aangezet.

#### De schakelaar testen

**14** ⚠ Test de noodstoppschakelaar om de 30 dagen. Installeer voor de test de veiligheidsclip ⑦ op de contactschakelaar. Steek de sleutel ⑧ in de schakelaar en start de motor; volg hierbij de procedure in de Handleiding voor de bestuurder. Trek aan het veiligheidskoord en verwijder zo de clip; controleer of de motor ook daadwerkelijk afslaat. Laat de schakelaar door uw dealer nakijken als de motor niet afslaat als de clip van de schakelaar wordt afgetrokken.



Opgelet

SUOMI

**13** Asenna varoitusäänitorvi ⑥ sarjaan sisältyvien ohjeiden mukaisesti.

#### Kytkimen käyttö

**14** ⚠ Kiinnitä naru tukevaan vaatekappaleeseen ja paina haka ⑦ kytkimeen. Työnnä avain ⑧ virtalukkoon moottorin käynnistämiseksi. Tämä hätäkatkaisin pysäyttää veneen, jos kuljettaja putoaa veneestä. Hätätilanteessa matkustaja voi siirtää hallintakahvan VAPAALLE ja käynnistää moottorin ilman naru.

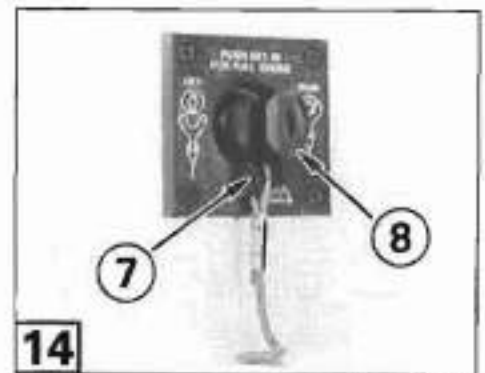
Älä käytä moottoria haan ollessa irti kytkimestä muutoin kuin hätätilassa. Jos moottoria käytetään ilman haka, ja jos rikastinta käytetään moottorin käydessä, käynnistin ja vauhtipyörä voivat vahingoittua, jos käynnistin vahingossa kytkeytyy.

#### Kytkimen testaus

**14** ⚠ Testaa hätäkatkaisin kerran kuussa. Kun testaat, asenna haka ⑦ virtalukkoon. Työnnä avain ⑧ lukkoon ja käynnistä moottoria omistajan käsikirjassa esitetyn menettelyn mukaisesti. Vedä narusta ja irrota haka, jotta voit tarkastaa, että moottori sammuu. Anna jälleennyjään tarkastaa kytkin, jos moottori ei sammuu, kun haka vedetään kytkimestä.



Varoitus



39806

NORGE

**13** Monter varselhornet ⑥ i samsvar med anvisningene som følger med settet.

#### Bruk av bryteren

**14** ⚠ Fest utløersnoren til et sikkert sted på kledselen og press klemmen ⑦ fast på bryteren. Sett nøkkelen ⑧ i bryteren for å starte motoren. Denne nødstoppbryteren vil stoppe båten hvis føreren blir kastet overbord. En av passasjerene kan sette kontrollen i NEUTRAL (fri) og starte motoren uten utløersnoren i et nødtilfelle.

Ikke kjør motoren når klemmen er tatt av bryteren, bortsett fra i nødtilfeller. Hvis motoren kjøres uten klemmen, og primeren blir brukt mens motoren er i gang, kan starteren og svinghjulet bli skadet ved at starteren tilfeldigvis blir aktivisert.

#### Testing av bryteren

**14** ⚠ Test nødstoppbryteren hver 30. dag. Test ved å sette utløersnorens klemme ⑦ på nøkkelbryteren. Sett nøkkelen ⑧ i bryteren og start motoren slik det står forklart i Eierens håndbok. Trekk i utløersnoren og fjern klemmen for å bekrefte at motoren stopper når klemmen blir trukket av bryteren.



Gjelder Sikkerhet

DEUTSCH

**13** Das Signalhorn ⑥ entsprechend der dem Bausatz beiliegenden Anweisungen installieren.

#### Schalterfunktion

**14** ⚠ Die Leine an einem sicheren Teil der Kleidung befestigen und die Klemme ⑦ auf den Schalter drücken. Den Schlüssel ⑧ in den Schalter stecken, um den Motor zu starten. Dieser Notstoppschalter stoppt das Boot, wenn der Skipper über Bord geworfen wird. Im Notfall kann ein Passagier die Fernsteuerung auf NEUTRAL stellen und den Motor ohne Leine wieder starten.

Den Motor nicht laufen lassen, wenn die Klemme vom Schalter entfernt wurde, außer im Notfall. Wenn der Motor ohne Klemme läuft und der Primer bei laufendem Motor verwendet wird, können Starter und Schwungrad durch ungewollte Aktivierung des Starters beschädigt werden.

#### Schaltertest

**14** ⚠ Den Notstoppschalter alle 30 Tage kontrollieren. Zum Test die Klemme ⑦ der Leine am Zündschalter anbringen. Den Schlüssel ⑧ in den Schalter stecken und den Motor entsprechend den Anweisungen in der Technischen Bedienungsanleitung starten. Durch Zug an der Leine die Klemme abziehen, um zu überprüfen, ob der Motor stoppt. Wenn der Motor nicht stoppt, muß der Schalter vom Händler überprüft werden.



Sicherheitshinweis







ENGLISH

FRANCAIS

## INSTALLATION INSTRUCTIONS

## INSTRUCTIONS DE MONTAGE

### SystemCheck™ Tachometer


### Tachymetre du SystemCheck™


#### SAFETY

#### SÉCURITÉ

These installation instructions contain information that can help prevent personal injury and damage to equipment. Understand the following symbols before proceeding:

Ces instructions d'installation contiennent de l'information qui peut aider à prévenir des blessures corporelles et des dommages à l'équipement. Comprendre les symboles suivant avant de procéder:

 <b>Safety Warning</b>	Alerts you to the possibility of danger and identifies information that will help prevent injuries.
	Identifies information that will help prevent damage to machinery.
<b>Important</b>	Appears next to information that controls correct assembly and operation of the product.

 <b>Avertissement de Sécurité</b>	Vous alerte à la possibilité de danger et identifie l'information qui vous aidera à prévenir les blessures.
<u>INotal</u>	Identifie l'information qui aidera à prévenir les dommages au mecanisme.
<b>Important</b>	Apparait près de l'information qui contrôle l'assemblage correct et le fonctionnement du produit.

#### TO THE OWNER

#### AU PROPRIETAIRE

The assembly procedures outlined in this sheet should be performed by a skilled technician. If you have questions, see your DEALER. Save these instructions in your owner's kit. This sheet contains information important to the future use and maintenance of your engine.

Les **procédés** d'assemblage soulignes sur cette feuille doivent être fait par un technicien **spécialisé**. Si vous avez des questions, voir votre CONCESSIONNAIRE. Gardez ces instructions dans votre kit du propriétaire. Cette feuille contient de l'information importante pour l'usage et l'entretien futur de votre moteur.

#### TO THE INSTALLER

#### À L'INSTALLATEUR

Give this sheet to the owner. Advise the owner of any special operation or maintenance information contained in the instructions.

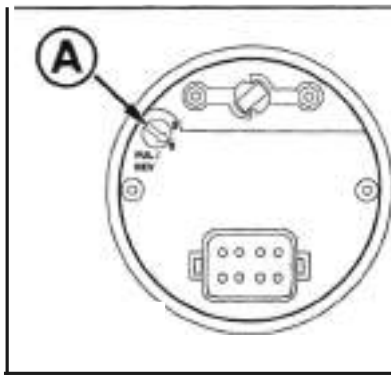
Donnez cette feuille au propriétaire. Avisez le propriétaire de l'information de tout fonctionnement ou d'entretien speciaux contenu dans ces instructions.

#### PREFACE

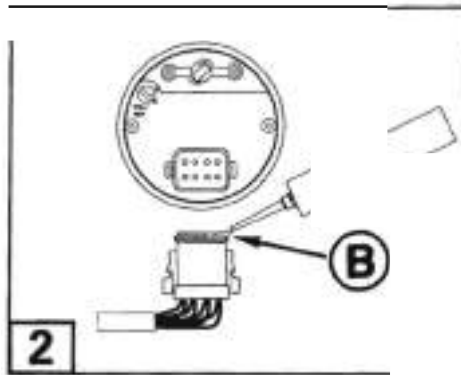
#### PREFACE

This tachometer is compatible with the 1996 (ED) and newer Modular Wiring System. This tachometer completes SystemCheck™ engine monitor. The complete system constantly monitors several engine functions and warns the operator of possible problems.

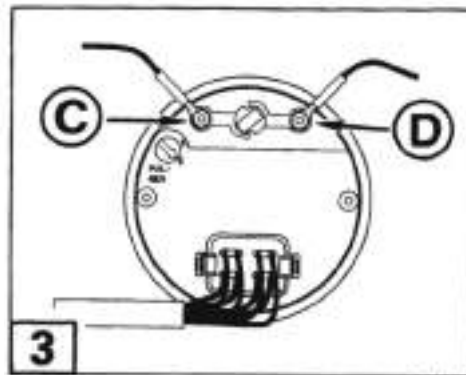
Ce tachymetre est compatible avec le Systeme de cablage modulaire de 1996 (ED) et plus recent. Ce tachymetre complete le **contrôleur** SystemCheck™ du moteur. Le systeme complet surveille constamment plusieurs fonctions du moteur et avertit le pilote des problemes possibles.



DR5959



DR5960



DR5961

## ENGLISH

### Set Pulse Selector Switch

**Note!** Disconnect battery cables at battery before working on electrical system.

**1** Align the arrow on the PUUREV (pulses-per-revolution) switch **A** with appropriate number:

- Engines with two yellow stator wires (yellow and yellow/gray) set switch to "6".
- Engines with three yellow stator wires (yellow, yellow/gray, and yellow/blue) set switch to "5".

### Install Gauge

Choose a gauge mounting location that is in full sight of the operator. Mount the gauge on a secure, flat surface.

Drill a 3<sup>3</sup>/<sub>8</sub> in. (86 mm) diameter hole in the dashboard.

**2** Route the Modular Wiring System cable and accessory light switch wires through the 3<sup>3</sup>/<sub>8</sub> in. (86 mm) hole in the dashboard.

**Note!** If the Modular Wiring System is already equipped with an audible warning adapter, disconnect it and discard the adapter.

**2** Before plugging the 8-pin connector into the gauge, apply a light coat of *Electrical Grease* around the connector seal **@**. Align connector with gauge socket, push in until both latches lock in gauge.

**3** Attach No. 16 AW.G. Dark Blue wire from accessory light switch to the tachometer terminal **@**. Attach No. 16 A.W.G. Black wire from the tachometer terminal **@** to a good ground. Secure both ring terminals with star lock washers and nuts.

## FRANCAIS

### Reglage de l'interrupteur sélecteur d'impulsion

**Note!** Debranchez les câbles de batterie de la batterie avant de travailler sur le système électrique.

**1** Alignez la fleche sur l'interrupteur "PUUREV" (impulsions par revolution) **A** par rapport au nombre approprié:

- pour les moteurs ayant deux câbles jaune (jaune et jaune/gris) de stator, reglez l'interrupteur sur "6".
- pour les moteurs ayant trois câbles jaune (jaune, jaune/gris et jaune/bleu) de stator, reglez l'interrupteur sur "5".

### Installation de l'indicateur

Choisissez un emplacement de montage pour l'indicateur qui soit en pleine vue du pilote. Montez l'indicateur sur une surface sOre et plate.

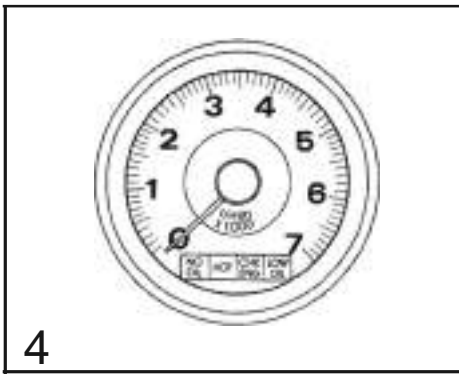
Percez un trou de 86 mm (3<sup>3</sup>/<sub>8</sub> po) de diamètre dans le tableau de bordo

**2** Acheminez les câbles électriques du Systeme de câblage modulaire et de l'interrupteur de la lampe accessoire à travers le trou de 86 mm (3<sup>3</sup>/<sub>8</sub> po) du tableau de bordo

**Note!** Si le Systeme de câblage modulaire est d'un adaptateur d'avertisseur sonore, debranchez et jetez l'adaptateur.

**2** Avant de brancher le connecteur à 8 broches dans l'indicateur, enduisez le joint d'étanchéité **@** du connecteur d'une légère couche de graisse *Electrical Grease*. Alignez le connecteur avec la prise de l'indicateur et enfoncez-le jusqu'à ce que les deux loquets se bloquent dans l'indicateur.

**3** Raccordez un câble de calibre N° 16 AW.G., bleu partir de l'interrupteur de la lampe accessoire jusqu'à la borne **©** du tachymetre. Raccordez un câble de calibre N° 16 AW.G., noir, de la borne **@** du tachymetre jusqu'à une bonne masse. Fixez les deux cosses à anneau à l'aide de rondelles étoilées et d'écrous.



085962

ENGLISH

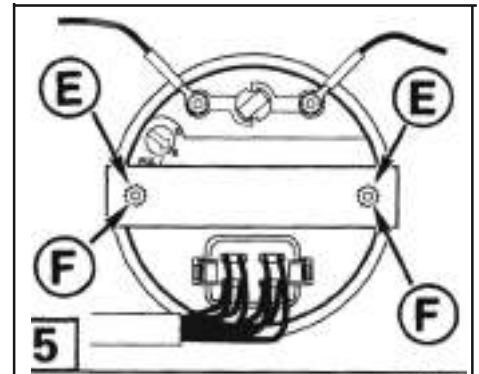
**4** Insert gauge into the dashboard with face positioned as shown.

**5** Hold gauge in position and install mounting bracket. Install star washers (E) and mounting nuts (R). If necessary, spread mounting bracket to engage in dashboard. Tighten nuts evenly and securely.

**Note** Do not overtighten the mounting nuts as you could permanently damage the gauge.

**Important** Use tie straps or electrical tape to support instrument electrical cable within 12 in. (30 cm) of gauge.

**⚠** Tape and insulate any ring terminals not used in this installation to prevent arcing. Arcing could cause a fire.



085963

FRANCAIS

**4** Inserez l'indicateur dans le tableau de bord, la face positionnée telle qu'illustrée.

**5** Maintenez l'indicateur en place et installez le support de montage. Installez les rondelles étoilées (E) et les écrous de montage (R). Si besoin est, écartez le support de montage pour l'engager dans le tableau de bord. Serrez les écrous également et sûrement.

**Note** Ne serrez pas excessivement les écrous de montage où vous pourriez endommager l'indicateur d'une façon permanente.

**Important** Employez des brides d'attache ou du scotch électrique pour soutenir le câble d'instrument électrique sur ses 30 premiers centimètres (12 po) à partir de l'indicateur.

**⚠** Scotchez et isolez toute cosse à anneau n'étant pas utilisée dans cette installation, afin d'éviter des arcs électriques. Les arcs électriques pourraient provoquer un incendie.



Safety Related





# ThinkSafe



## Choose the Right Personal Flotation Device (PFD)

This package contains a **Throwable Device (Type IV PFD)**. Other available types are described within.

### A Throwable Device (Type IV PFD) is:

- Designed to be grasped and held by the user until rescued.
- Provides enough buoyancy for users to hold their heads out of the water.

### Intended Uses

- For use on small boats in calm, inland water with heavy boat traffic, where help is always nearby.
- For use on larger boats as an extra device to aid persons who have fallen overboard. May be used with a lanyard, "man-overboard" pole, locator light, or smoke signal.

### Advantages

- Can be thrown to someone within 40 feet.
- Can be used as a seat cushion, or some types can be placed in a bracket mounted above deck, where they are immediately available.
- Good back-up buoyancy for use with a wearable PFD.

### Disadvantages

- Not for an unconscious or exhausted person.
- Not for non-swimmers or children.
- Not for rough water survival.



NOTE: Do not remove this booklet. No person may sell or offer for sale a PFD unless this booklet is provided with it.

## **Do NOT ATTACH PFDS To BOAT!**

Each PFO has straps, hooks, buckles, or other means for securing the device in place on the wearer. Some PFOs also incorporate decorative O-rings or tabs. Such items are not to be used to attach the device to the boat. Attaching the device to the boat will not permit it to perform as intended.

Test this device in the water with all intended accessories attached to determine if performance is adversely affected.



## How MANY PFDs Do You NEED?

The United States Coast Guard\* says you must have USCG *approved* Personal Flotation Devices (PFDs) on your recreational boat. How many and what type PFDs you'll need depends on the number of people on board, the size and type of your boat, and the kind of boating you do.

You must have one of any of these wearable PFDs for each person on board:

- D Off-Shore Life Jacket (Type I PFD).
- D Near-Shore Buoyant Vest (Type II PFD).
- D Flotation Aid (Type III PFD).
- D Special Use Device (Type V PFD).

Additionally, if your boat is 16 feet or longer, and is not a canoe or kayak, you must also have at least one:

- D Throwable Device (Type IV PFD).

For example, if there are four people on your 16-foot boat, you must have at least five PFDs-four wearable PFDs and one throwable PFD.



## THE RIGHT PFD FOR You

PFDs come in a variety of shapes, colors, and materials. Some are made to be more rugged and last longer. Some are made to protect you from cold water. But no matter which PFD you choose, be sure to get one that's right for you and the water conditions you expect to encounter. Remember, spending a little time now can save you a lifetime later. Always look for the United States Coast Guard approval number on any PFD you buy.

\* U.S. Coast Guard Regulation Title 33, Chapter 1, Part 175, Subpart B.





# OFF-SHORE LIFE JACKET (TYPE I PFD)

Best for open, rough or remote water, where rescue may be slow coming.

## Advantages

- D Floats you the best.
- D Turns most unconscious wearers face-up in water.
- D Highly visible color.

## Disadvantages

- D Bulky.

## Sizes

- D Two sizes to fit most children and adults.





## NEAR-SHORE BUOYANT VEST (TYPE II PFD)

Good for calm, inland water, or where there is good chance of fast rescue.

### Advantages

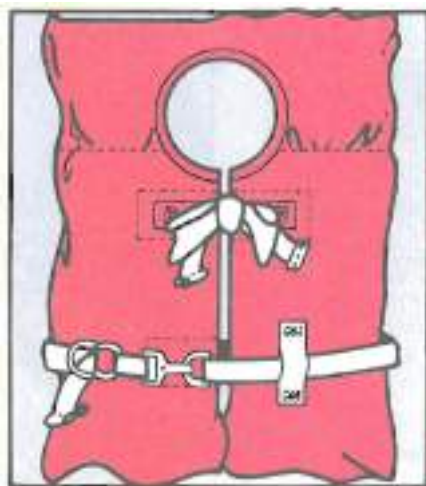
- Turns some unconscious wearers face-up in water.
- Less bulky, more comfortable than Off-Shore Life Jacket (Type I PFD).

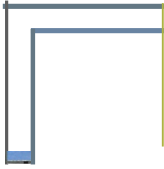
### Disadvantages

- Not for long hours in rough water.
- Will not turn some unconscious wearers face-up in water.

### Sizes

- Infant, Child-Small, Child-Medium, and Adult.





## FLOTATION AID (TYPE III PFD)

Good for calm, inland water, or where there is good chance of fast rescue.

### Advantages

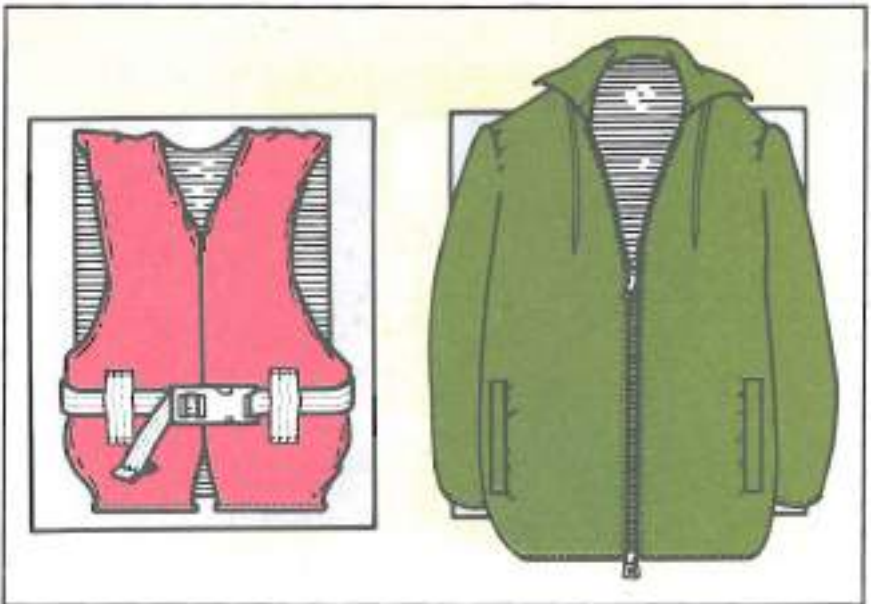
- Generally the most comfortable type for continuous wear.
- Designed for General Boating or the activity that is marked on the device.
- Available in many styles, including vests and flotation coats.

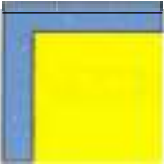
### Disadvantages

- Wearer may have to tilt head back to avoid going face-down.
- In rough water, a wearer's face may often be covered by waves.
- Not for extended survival in rough water.

### Sizes

- Many individual sizes from Child-Small through Adult.





## THROWABLE DEVICE (TYPE IV PFD)

For calm, inland water with heavy boat traffic, where help is always nearby.

### Advantages

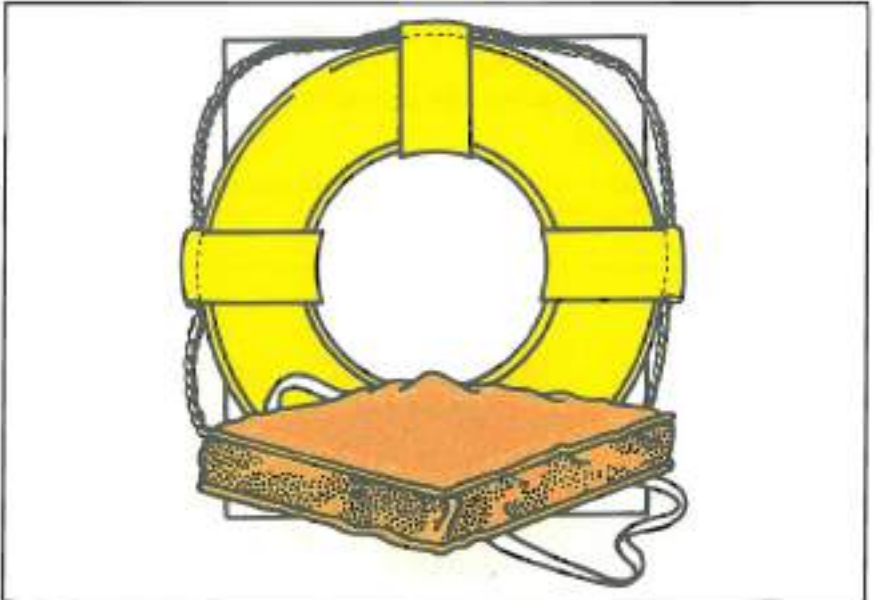
- D Can be thrown to someone.
- D Good back-up to wearable PFDs.
- D Some can be used as seat cushion.

### Disadvantages

- D Not for unconscious persons.
- D Not for nonswimmers or children.
- D Not for many hours in rough water.

### Kinds

- D Cushions, ring, and horseshoe buoys.





## SPECIAL USE DEVICES (TYPE V PFD)

- D Only for special uses or conditions.
- D See label for limits of use.
- D Varieties include boardsailing vests, deck suits, work vests, hybrid PFDs, and others.

### Advantages

- D Made for specific activities.

## TYPE V HYBRID INFLATABLE DEVICE

Required to be worn to be counted as a regulation PFD.

### Advantages

- D Least bulky of all types.
- D High flotation when inflated.
- D Good for continuous wear.

### Disadvantages

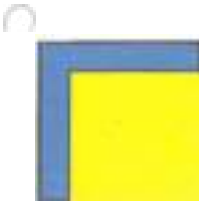
- D May not adequately float some wearers unless partially inflated.
- D Requires active use and care of inflation chamber.

### Performance Level

- D Equal to either Type I, II, or III performance as noted on the label.



*Inflated Hybrid*



# BE SAFE- WEARING PFDs

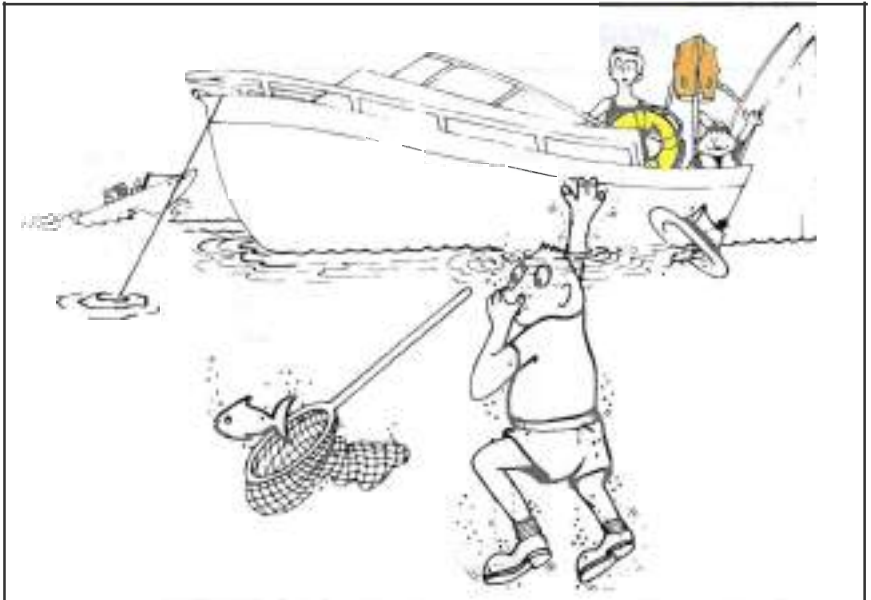
## Beat the Odds - Choose the Right PFD and Wear It

Most drownings occur way out at sea, right? Wrong! Fact is, 9 out of 10 drownings occur in inland waters, most within a few feet of safety. Most of the victims owned PFDs, but they died without them. A wearable PFD can save your life, if you wear it.

If you haven't been wearing your PFD because of the way it makes you look or feel, there's good news. Today's PFDs fit better, look better, and are easy to move around in. A PFD with bright colors is easier to see and may increase your chances of rescue.

One more thing. Before you shove off, make sure all on board are wearing PFDs. To work best, PFDs must be worn with all straps, zippers, and ties fastened. Tuck in any loose strap ends to avoid getting hung-up.

**When you don't wear your PFD, the odds are against you. You're taking a chance on your life.**




## Staying on Top

Most adults only need an extra seven to 12 pounds of buoyancy to keep their heads above water. A PFD can give that "extra lift," and it's made to keep you floating until help comes. But a PFD is a *personal* flotation device and it's important to get the right one for you.

Your weight isn't the only factor in finding out how much "extra lift" you need in water. Body fat, lung size, clothing, and whether the water is rough or calm, all play a part in staying on top. In general, the more physically fit you are, the more "lift" you need.

Read the label on your PFD to be sure it's made for people your weight and size. Test it as shown in the next section. Then in an emergency, don't panic. Relax, put your head back and let your PFD help you come out on top.

HIGHER BUOYANCY MEANS HIGHER LIFT		
Type PFDs	Minimum Adult Buoyancy (Pounds)	
I	22.0	
II	15.5	
III	15.5	
IV Ring Buoy	16.5	
IV Boat Cushions	18.0	
V Hybrids	22.0 (fully inflated) 7.5 (deflated)	
V Special Use Device	15.5 to 22.0	

## Trying Your PFD

Try on your PFD to see if it fits comfortably snug. Then test it in shallow water to see how it handles.

To check the buoyancy of your PFD in the water, relax your body and let your head tilt back. Make sure your PFD keeps your chin above water and you can breathe easily.

Be aware: your PFD may not act the same in swift or rough water as in calm water. The clothes you wear and the items in your pockets may also change the way your PFD works.

If your mouth is not well above the water, get a new PFD or one with more buoyancy.

A PFD is designed not to ride-up on the body when in the water. But, when a wearer's stomach is larger than the chest, ride-up may occur. Before use, test this PFD in the water to establish that excessive ride-up does not impair PFD performance.





## Caring for your PFD

Follow these points to be sure your PFD stays in good condition:

1. Don't alter your PFD. If yours doesn't fit, get one that does. Play it safe. An altered PFD may not save your life.
2. Don't put heavy objects on your PFD or use it for a kneeling pad or boat fender. PFDs lose buoyancy when crushed.
3. Let your PFD drip dry thoroughly before putting it away. Always stow it in a well-ventilated place.
4. Don't leave your PFD on board for long periods when the boat is not in use.
5. Never dry your PFD on a radiator, heater, or any other direct heat source.
6. Put your name on your PFD if you're the only wearer.
7. Practice throwing your Type IV PFD. Cushions throw best underhand.



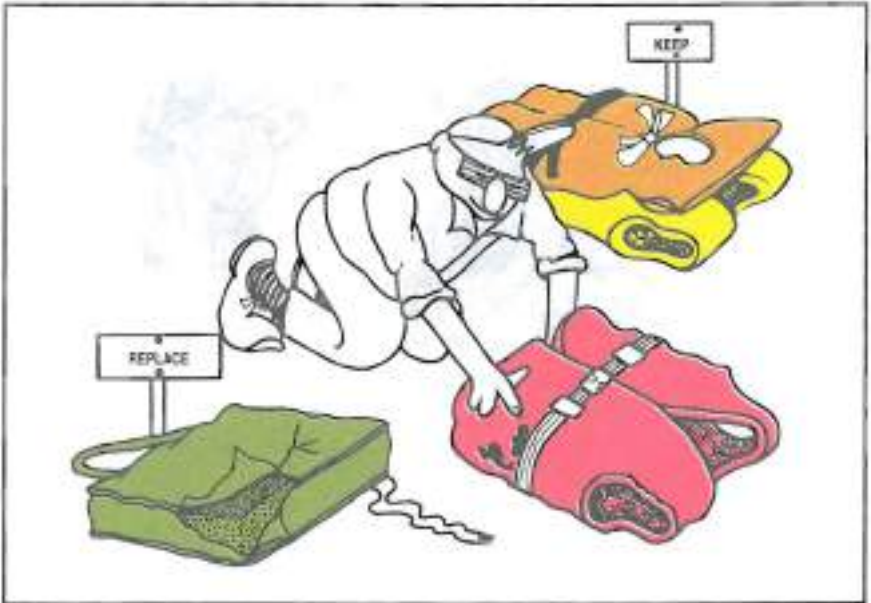
## Checking Your PFD

Check your PFD often for rips, tears, and holes, and to see that seams, fabric straps, and hardware are okay. Give your PFD belts and tie tapes a quick, hard pull to make sure they are secure. There should be no signs of waterlogging, mildew odor, or shrinkage of the buoyant materials.

If your PFD uses bags of kapok (a naturally buoyant material), gently squeeze the bag to check for air leaks. If it leaks, it should be thrown away. When kapok gets wet, it can get stiff or waterlogged and can lose some of its buoyancy.

Fading can indicate loss of strength. Store your PFD in a dry, cool, dark place. A weathered PFD could tear easily, resulting in loss of flotation material. If faded, check strength or throw the PFD away and buy a new one.

Don't forget to test each PFD at the start of each season. Remember, the law says your PFDs must be in good shape before you use your boat. Ones that are not in good shape should be cut up and thrown away.



## Teach Your Children Well

Children panic when they fall into the water suddenly. This causes them to move their arms and legs violently, making it hard to float safely in a PFO. A PFO will keep a child afloat, but may not keep a struggling child face-up. That's why it's so important to teach children how to put on a PFO and to help them get used to wearing one in the water.

To work right, a PFO must fit snugly on a child. To check for a good fit, pick the child up by the shoulders of the PFO. If the PFO fits right, the child's chin and ears will not slip through.

PFOs are not babysitters. Even though a child wears a PFO when on or near the water, an adult should always be there, too. Parents should remember that inflatable toys and rafts should not be used in place of PFOs.

While some children in the 30-50 pound weight range who can swim may like the extra freedom of movement that a Flotation Aid (Type III PFO) provides, most children in this weight range, especially those who can't swim, should wear a Near Shore Buoyant Vest (Type II PFO).



## Skipper - Skip the Drink

Alcohol slows you down and keeps you from thinking clearly. Don't drive if you've been drinking.

As many as 80 percent of boating accidents involve alcohol. Drive your boat defensively. Watch out for others who have been drinking. They're accidents waiting to happen.

Alcohol works to lower your body temperature faster when you're in the water. If you've been drinking, you will not survive as long in cold water.



## The Cold Facts

Be aware that cold water (less than 70 degrees F) can lower your body temperature. This is called hypothermia. If your body temperature goes too low, you may pass out and then drown. Even if you're wearing a PFD, your body can cool down 25 times faster in cold water than in air.

Water temperature, body size, amount of body fat, and movement in the water all play a part in cold water survival. Small people cool faster than large people. Children cool faster than adults.

But PFDs can still help you stay alive longer in cold water. They let you float without using energy and they protect part of your body from cold water. A snug-fitting PFD is better than one that's loose-fitting. When you boat in cold water, use a flotation coat or deck-suit style PFD. In cold water they're better than vests because they cover more of your body.

<b>HOW HYPOTHERMIA AFFECTS MOST ADULTS</b>		
<b>Water Temperature (Degrees Fahrenheit)</b>	<b>Exhaustion or Unconsciousness</b>	<b>Expected Time of Survival</b>
32.5	Under 15 min.	Under 15 to 45 min.
32.5 to 40	15 to 30 min.	30 to 90 min.
40 to 50	30 to 60 min.	1 to 3 hrs.
50 to 60	1 to 2 hrs.	1 to 6 hrs.
60 to 70	2 to 7 hrs.	2 to 40 hrs.
70 to 80	2 to 12 hrs.	3 hrs. to indefinite
Over 80	Indefinite	Indefinite

## Cold Water Survival

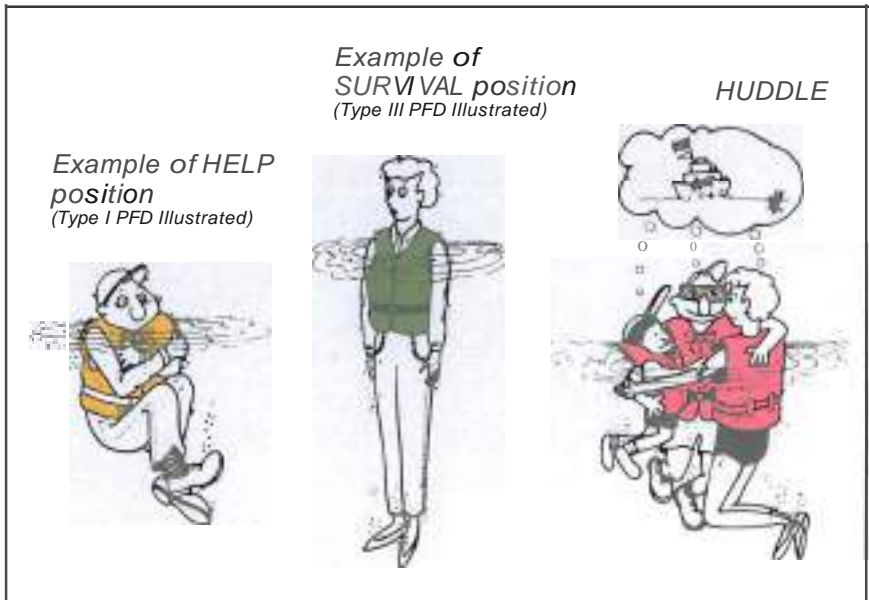
When you're in cold water, don't swim unless you can reach a nearby boat, fellow survivor, or floating object. Even good swimmers drown while swimming in cold water. Swimming lowers your body temperature.

If a nearby floating object is large, pull yourself up on it. The more your body is out of water, the warmer you'll be. Don't use drownproofing methods that call for putting your face in the water. Keep your head out of the water to lessen heat loss and increase survival time.

Use of the HELP position will lessen heat loss. However, if you're wearing a Type III PFD, or if the HELP position turns you face down, bring your legs together tight and your arms tight to your sides and your head back. See SURVIVAL position.

If there are others in the water, HUDDLE together for warmth. Keep a positive outlook. It will improve your chances of survival.

Always wear your PFD. Even if you become helpless from hypothermia, your PFD will keep you afloat.



## **Remember - Safe Boating is No Accident**

Keep this pamphlet in a convenient spot on your boat. Read it often.

If you need more information about PFDs and safe boating, contact your state boating authority, U.S. Coast Guard Auxiliary, U.S. Power Squadron, Red Cross, your nearest unit of the U.S. Coast Guard, or call the toll-free Boating Safety Hotline: 1-800-368-5647. To find out about free boating courses in your area call 1-800-336-BOAT (in Virginia, call 800-245-BOAT).





## Flotation Wear For The Whole Family

### PFD Checklist

When you're on or near the water and you're ready to wear your PFD, ask yourself the following questions:

- Have you read this pamphlet to increase your chances of survival?
- Have you selected the proper PFD?
- Does your PFD fit and is it the right size according to the label?
- Have you trial tested your PFD in shallow water?
- Does your PFD keep your chin above water and can you breathe easily?
- If you're a boat operator, have you checked the PFDs for your passengers?

# Think Safe



## Choose the Right Personal Flotation Device (PFD)

This package contains a Near-Shore Buoyant Vest (Type II PFD). Other available types are described within.

### A Near-Shore Buoyant Vest (Type II PFD) -

- D Will turn some unconscious wearers face-up in water.
- D Sizes: Infant, child-small, child-medium, and adult.
- D Compromise between Type I PFD performance and wearer comfort.

#### Intended Uses

- D General boating activities.
- D Good for calm, inland waters, or where there is a good chance for fast rescue.

#### Advantages

- D More comfortable to wear than a Type I PFD.
- D Keeps most unconscious wearers face-up in water.

#### Disadvantages

- D May be uncomfortable after wearing for extended periods.
- D Will not turn as many people face-up as a Type I PFD will.
- D In rough water, a wearer's face may often be covered by waves.
- D Not for extended survival in rough water.

**PLEASE READ IMPORTANT MESSAGE ON  
BACK COVER FOR INFANT DEVICES.**



NOTE: Do not remove this booklet. No person may sell or offer for sale a PFD unless this booklet is provided with it.

## **Do NOT ATTACH PFDS To BOAT!**

Each PFO has straps, hooks, buckles, or other means for securing the device in place on the wearer. Some PFOs also incorporate decorative O-rings or tabs. Such items are not to be used to attach the device to the boat. Attaching the device to the boat will not permit it to perform as intended.



# How MANY PFDs Do You NEED?

The United States Coast Guard\* says you must have USCG *approved* Personal Flotation Devices (PFDs) on your recreational boat. How many and what type PFDs you'll need depends on the number of people on board, the size and type of your boat, and the kind of boating you do.

You must have one of any of these wearable PFDs for each person on board:

- Off-Shore Life Jacket (Type I PFD).
- Near-Shore Buoyant Vest (Type II PFD).
- Flotation Aid (Type III PFD).
- Special Use Device (Type V PFD).

Additionally, if your boat is 16 feet or longer, and is not a canoe or kayak, you must also have at least one:

- Throwable Device (Type IV PFD).

For example, if there are four people on your 16-foot boat, you must have at least five PFDs-four wearable PFDs and one throwable PFD.



# THE RIGHT PFD FOR YOU

PFDs come in a variety of shapes, colors, and materials. Some are made to be more rugged and last longer. Some are made to protect you from cold water. But no matter which PFD you choose, be sure to get one that's right for you and the water conditions you expect to encounter. Remember, spending a little time now can save you a lifetime later. Always look for the United States Coast Guard approval number on any PFD you buy.

• U.S.Coast Guard Regulation Title 33, Chapter 1, Part 175, Subpart B.



# OFF-SHORE LIFE JACKET (TYPE I PFD)

Best for open, rough or remote water, where rescue may be slow coming.

## Advantages

- D Floats you the best.
- D Turns most unconscious wearers face-up in water.
- D Highly visible color.

## Disadvantages

- D Bulky.

## Sizes

- D Two sizes to fit most children and adults.





## NEAR-SHORE BUOYANT VEST (TYPE II PFD)

Good for calm, inland water, or where there is good chance of fast rescue.

### Advantages

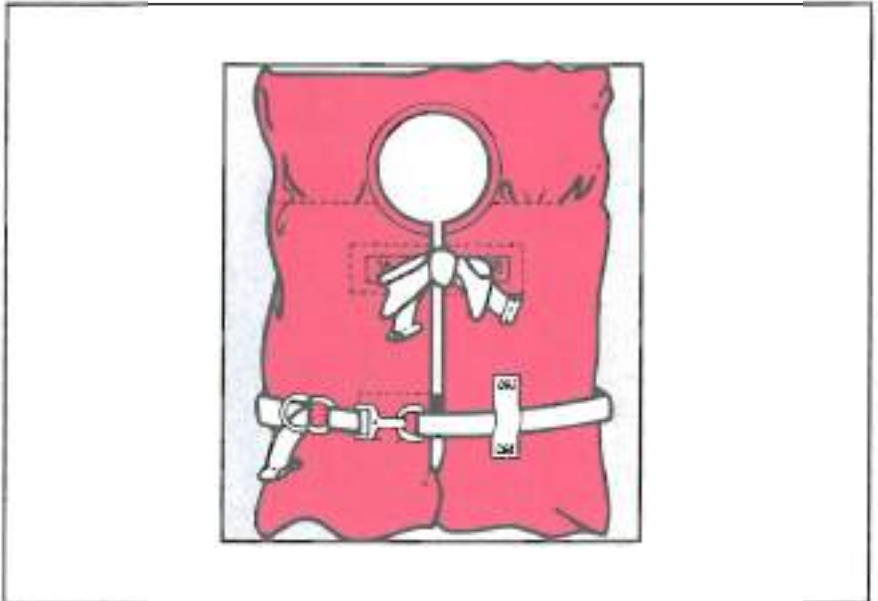
- Turns some unconscious wearers face-up in water.
- Less bulky, more comfortable than Off-Shore Life Jacket (Type I PFD).

### Disadvantages

- Not for long hours in rough water.
- Will not turn some unconscious wearers face-up in water.

### Sizes

- Infant, Child-Small, Child-Medium, and Adult.





## FLOTATION AID (TYPE III PFD)

Good for calm, inland water, or where there is good chance of fast rescue.

### Advantages

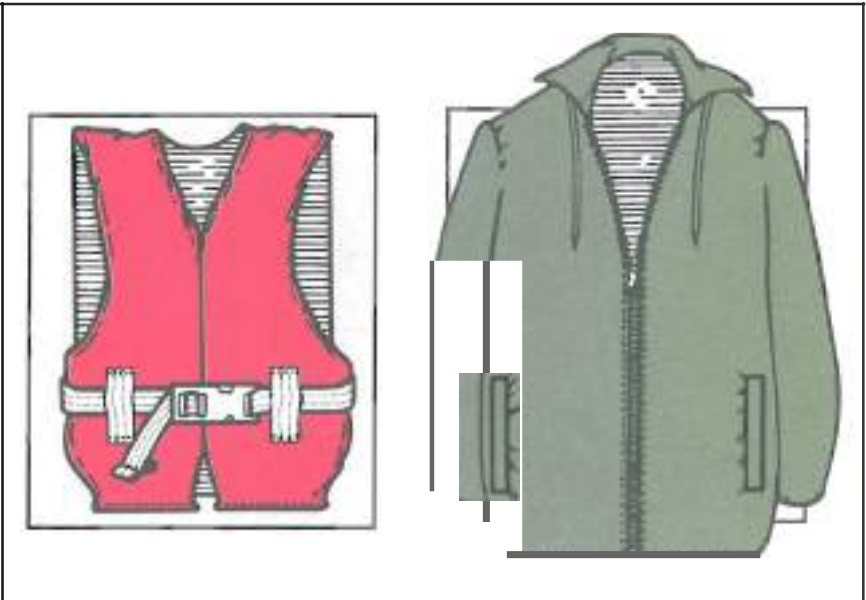
- Generally the most comfortable type for continuous wear.
- Designed for General Boating or the activity that is marked on the device.
- Available in many styles, including vests and flotation coats.

### Disadvantages

- Wearer may have to tilt head back to avoid going face-down.
- In rough water, a wearer's face may often be covered by waves.
- Not for extended survival in rough water.

### Sizes

- Many individual sizes from Child-Small through Adult.





## THROWABLE DEVICE (TYPE IV PFD)

For calm, inland water with heavy boat traffic, where help is always nearby.

### Advantages

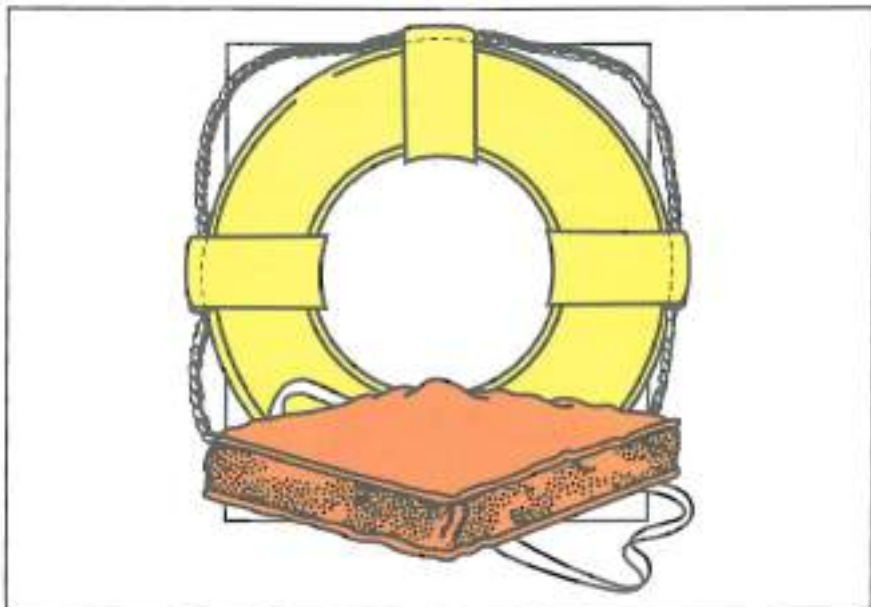
- Can be thrown to someone.
- Good back-up to wearable PFDs.
- Some can be used as seat cushion.

### Disadvantages

- Not for unconscious persons.
- Not for nonswimmers or children.
- Not for many hours in rough water.

### Kinds

- Cushions, ring, and horseshoe buoys.







## SPECIAL USE DEVICES (TYPE V PFD)

- Only for special uses or conditions.
- See label for limits of use.
- Varieties include boardsailing vests, deck suits, work vests, hybrid PFDs, and others.

### Advantages

- Made for specific activities.

## TYPE V HYBRID INFLATABLE DEVICE

Required to be worn to be counted as a regulation PFD.

### Advantages

- Least bulky of all types.
- High flotation when inflated.
- Good for continuous wear.

### Disadvantages

- May not adequately float some wearers unless partially inflated.
- Requires active use and care of inflation chamber.

### Performance Level

- Equal to either Type I, II, or III performance as noted on the label.



*Inflated Hybrid*



## BE SAFE- WEARING PFDs

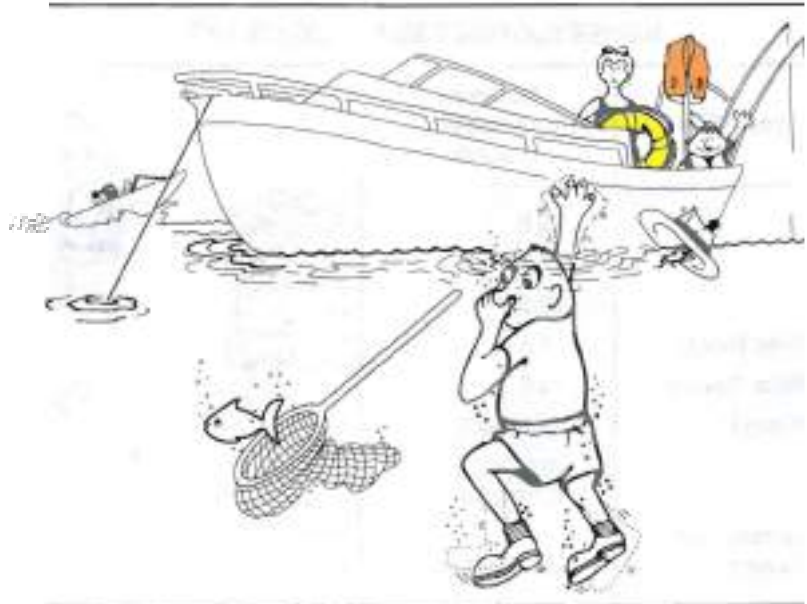
### Beat the Odds - Choose the Right PFD and Wear It

Most drownings occur way out at sea, right? Wrong! Fact is, 9 out of 10 drownings occur in inland waters, most within a few feet of safety. Most of the victims owned PFDs, but they died without them. A wearable **PFD** can save your life, if you wear it.

If you haven't been wearing your **PFD** because of the way it makes you look or feel, there's good news. Today's PFDs fit better, look better, and are easy to move around in. A **PFD** with bright colors is easier to see and may increase your chances of rescue.

One more thing. Before you shove off, make sure all on board are wearing PFDs. To work best, PFDs must be worn with all straps, zippers, and ties fastened. Tuck in any loose strap ends to avoid getting hung-up.

**When you don't wear your PFD, the odds are against you. You're taking a chance on your life.**




## Staying on Top

Most adults only need an extra seven to 12 pounds of buoyancy to keep their heads above water. A PFD can give that "extra lift:" and it's made to keep you floating until help comes. But a PFD is a *personal*/flotation device and it's important to get the right one for you.

Your weight isn't the only factor in finding out how much "extra lift" you need in water. Body fat, lung size, clothing, and whether the water is rough or calm, all play a part in staying on top. In general, the more physically fit you are, the more "lift" you need.

Read the label on your PFD to be sure it's made for people your weight and size. Test it as shown in the next section. Then in an emergency, don't panic. Relax, put your head back and let your PFD help you come out on top.

HIGHER BUOYANCY MEANS HIGHER LIFT		
Type PFDs	Minimum Adult Buoyancy (Pounds)	
I	22.0	
II	15.5	
III	15.5	
IV Ring Buoy	16.5	
IV Boat Cushions	18.0	
V Hybrids	22.0 (fully inflated) 7.5 (deflated)	
V Special Use Device	15.5 to 22.0	

## Trying Your PFD

Try on your PFD to see if it fits comfortably snug. Then test it in shallow water to see how it handles.

To check the buoyancy of your PFD in the water, relax your body and let your head tilt back. Make sure your PFD keeps your chin above water and you can breathe easily.

Be aware: your PFD may not act the same in swift or rough water as in calm water. The clothes you wear and the items in your pockets may also change the way your PFD works.

If your mouth is not well above the water, get a new PFD or one with more buoyancy.

A PFD is designed not to ride-up on the body when in the water. But, when a wearer's stomach is larger than the chest, ride-up may occur. Before use, test this PFD in the water to establish that excessive ride-up does not impair PFD performance.



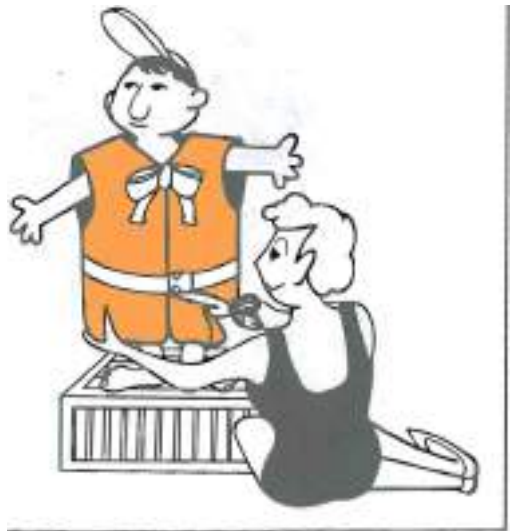
## Caring for your PFD

Follow these points to be sure your PFD stays in good condition:

1. Don't alter your PFD. If yours doesn't fit, get one that does. Play it safe. An altered PFD may not save your life.
2. Don't put heavy objects on your PFD or use it for a kneeling pad or boat fender. PFDs lose buoyancy when crushed.
3. Let your PFD drip dry thoroughly before putting it away. Always stow it in a well-ventilated place.
4. Don't leave your PFD on board for long periods when the boat is not in use.
5. Never dry your PFD on a radiator, heater, or any other direct heat source.
6. Put your name on your PFD if you're the only wearer.
7. Practice throwing your Type IV PFD. Cushions throw best underhand.



*Don't alter your PFD.*



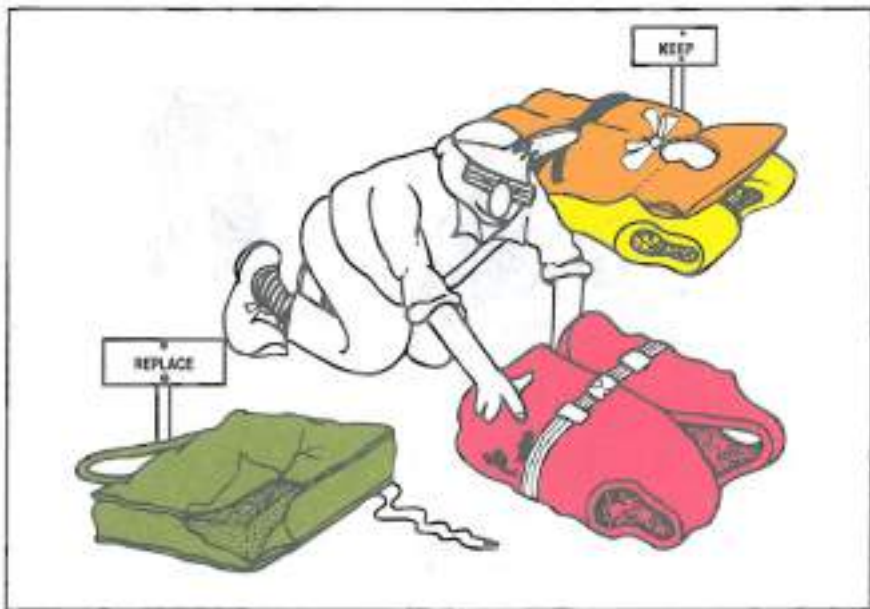
## Checking Your PFD

Check your **PFD** often for rips, tears, and holes, and to see that seams, fabric straps, and hardware are okay. Give your **PFD** belts and tie tapes a quick, hard pull to make sure they are secure. There should be no signs of waterlogging, mildew odor, or shrinkage of the buoyant materials.

If your **PFD** uses bags of kapok (a naturally buoyant material), gently squeeze the bag to check for air leaks. If it leaks, it should be thrown away. When kapok gets wet, it can get stiff or waterlogged and can lose some of its buoyancy.

Fading can indicate loss of strength. Store your **PFD** in a dry, cool, dark place. A weathered **PFD** could tear easily, resulting in loss of flotation material. If faded, check strength or throw the **PFD** away and buy a new one.

Don't forget to test each **PFD** at the start of each season. Remember, the law says your PFDs must be in good shape before you use your boat. Ones that are not in good shape should be cut up and thrown away.



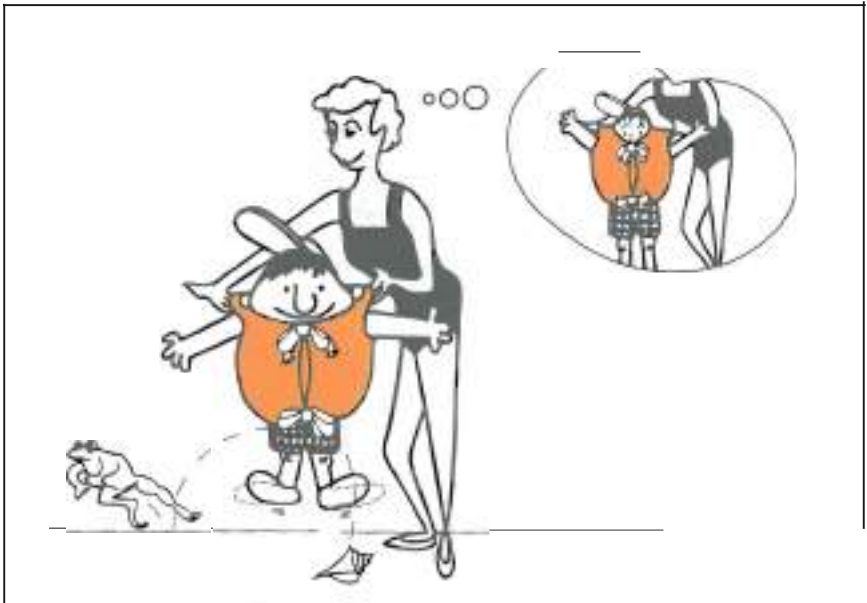
## Teach Your Children Well

Children panic when they fall into the water suddenly. This causes them to move their arms and legs violently, making it hard to float safely in a PFD. A PFD will keep a child afloat, but may not keep a struggling child face-up. That's why it's so important to teach children how to put on a PFD and to help them get used to wearing one in the water.

To work right, a PFD must fit snugly on a child. To check for a good fit, pick the child up by the shoulders of the PFD. If the PFD fits right, the child's chin and ears will not slip through.

PFDs are not babysitters. Even though a child wears a PFD when on or near the water, an adult should always be there, too. Parents should remember that inflatable toys and rafts should not be used in place of PFDs.

While some children in the 30- 50 pound weight range who can swim may like the extra freedom of movement that a Flotation Aid (Type III PFD) provides, most children in this weight range, especially those who can't swim, should wear a Near Shore Buoyant Vest (Type II PFD).



## kipper - Skip the Drink

Alcohol slows you down and keeps you from thinking clearly. Don't drive if you've been drinking.

As many as 80 percent of boating accidents involve alcohol. Drive your boat defensively. Watch out for others who have been drinking. They're accidents waiting to happen.

Alcohol works to lower your body temperature faster when you're in the water. If you've been drinking, you will not survive as long in cold water.





## The Cold Facts

Be aware that cold water (less than 70 degrees F) can lower your body temperature. This is called hypothermia. If your body temperature goes too low, you may pass out and then drown. Even if you're wearing a PFD, your body can cool down 25 times faster in cold water than in air.

Water temperature, body size, amount of body fat, and movement in the water all play a part in cold water survival. Small people cool faster than large people. Children cool faster than adults.

But PFDs can still help you stay alive longer in cold water. They let you float without using energy and they protect part of your body from cold water. A snug-fitting PFD is better than one that's loose-fitting. When you boat in cold water, use a flotation coat or deck-suit style PFD. In cold water they're better than vests because they cover more of your body.

<b>HOW HYPOTHERMIA AFFECTS MOST ADULTS</b>		
<b>Water Temperature (Degrees Fahrenheit)</b>	<b>Exhaustion or Unconsciousness</b>	<b>Expected Time of Survival</b>
32.5	Under 15 min.	Under 15 to 45 min.
32.5 to 40	15 to 30 min.	30 to 90 min.
40 to 50	30 to 60 min.	1 to 3 hrs.
50 to 60	1 to 2 hrs.	1 to 6 hrs.
60 to 70	2 to 7 hrs.	2 to 40 hrs.
70 to 80	2 to 12 hrs.	3 hrs. to indefinite
Over 80	Indefinite	Indefinite

## Cold Water Survival

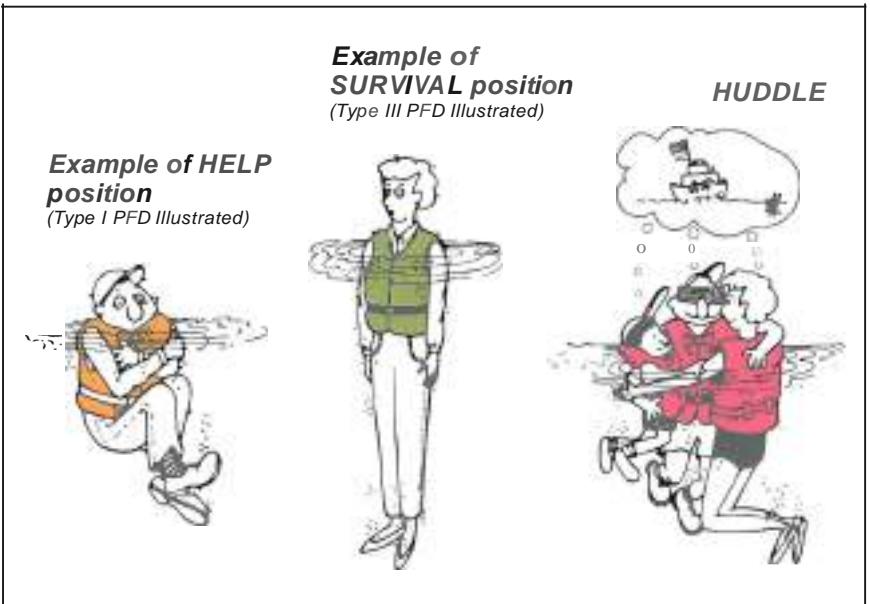
When you're in cold water, don't swim unless you can reach a nearby boat, fellow survivor, or floating object. Even good swimmers drown while swimming in cold water. Swimming lowers your body temperature.

If a nearby floating object is large, pull yourself up on it. The more your body is out of water, the warmer you'll be. Don't use drownproofing methods that call for putting your face in the water. Keep your head out of the water to lessen heat loss and increase survival time.

Use of the **HELP** position will lessen heat loss. However, if you're wearing a Type III PFD, or if the **HELP** position turns you face down, bring your legs together tight and your arms tight to your sides and your head back. See **SURVIVAL** position.

If there are others in the water, **HUDDLE** together for warmth. Keep a positive outlook. It will improve your chances of survival.

Always wear your PFD. Even if you become helpless from hypothermia, your **PFD** will keep you afloat.





## **Remember - Safe Boating is No Accident**

Keep this pamphlet in a convenient spot on your boat. Read it often.

If you need more information about PFDs and safe boating, contact your state boating authority, U.S. Coast Guard Auxiliary, U.S. Power Squadron, Red Cross, your nearest unit of the U.S. Coast Guard, or call the toll-free Boating Safety Hotline: 1-800-368-5647. To find out about free boating courses in your area call 1-800-336-BOAT (in Virginia, call 800-245-BOAT).

## **IMPORTANT MESSAGE-PLEASE READ NOW**

Since children come in many sizes and shapes, the U.S. Coast Guard and this PFD manufacturer urge that this device be tested immediately after purchase. Check for proper weight range, comfortable fit, and especially stable face-up position in the water.

A child is difficult to float in a face-up position because of the distribution of body weight and a child's tendency to struggle or attempt to climb out of the water. Some children float best in one style of vest, while others will float better in another. If one does not work well, try another style.

**Remember: Never leave children unattended in water even if they have a personal flotation device on.**

## **PFD Checklist**

**When you're on or near the water and you're ready to wear your PFD, ask yourself the following questions:**

- Have you read this pamphlet to increase your chances of survival?**
- Have you selected the proper PFD?**
- Does your PFD fit and is it the right size according to the label?**
- Have you trial tested your PFD in shallow water?**
- Does your PFD keep your chin above water and can you breathe easily?**
- If you're a boat operator, have you checked the PFDs for your passengers?**



MARINE  
CARBON MONOXIDE (CO) ALARM  
USER'S MANUAL  
MODELS 60-541 and 60-542

PATENTS PENDING      ALL RIGHTS RESERVED      60MCO-1106-11

**ATTENTION:** This user's manual contains important Carbon Monoxide (CO) alarm installation, operation, troubleshooting and warranty information. Read, follow, and keep this manual for future reference.

**NOTE:** If you install or purchase this alarm for another person, give this manual to that person.

**IMPORTANT:** This unit must be replaced within 5 years of its production date. See Owner's replacement Record in this manual. The replacement date indicates the date beyond which the device may no longer detect carbon monoxide accurately.

#### WHY EVERY BOAT NEEDS A SAFE-T-ALERT™ CO ALARM

Everyone is at risk for carbon monoxide poisoning! Particularly sensitive are children, pregnant women, the elderly and people with lung or heart disease or anemia! Carbon monoxide (CO) is an odorless, colorless gas that prevents the blood from carrying oxygen to vital organs. CO is 200 times more likely to replace oxygen in the blood. The Consumer Product Safety Commission (CPSC) recommends use of at least one carbon monoxide alarm located outside of sleeping areas. For best security locate an alarm in each sleeping area.

#### ABOUT CO GAS AND YOUR NEW CO ALARM

Because CO is a colorless, odorless, tasteless and highly poisonous gas, it can endanger lives even at low levels of concentration. Your CO alarm will alert you to potentially dangerous situations. The following symptoms may be related to CO POISONING and should be discussed with ALL members of your household and guests on your boat:

- **Mild Exposure:** Headaches, running nose, sore eyes, often described as "flu-like" symptoms.
- **Medium Exposure:** Dizziness, drowsiness, vomiting.
- **Extreme Exposure:** Unconsciousness, brain damage, death.

**NOTE:** Many cases of reported CO poisoning indicate that while victims are aware they are not well, they become disoriented. They are unable to save themselves by either exiting the building or calling for assistance. **Young children and pets may be affected first.**

Your SAFE-T-ALERT™ CO alarm helps protect your household members and guests in enclosed sleeping areas from CO produced while using your boat. CO gas is produced when any type of fuel is incompletely burned. Potential sources of CO in and around your boat can include gas or diesel engine exhaust, portable space heaters, galley gas stoves and ovens, defective engine exhaust systems, portable grills, other docked, moored and rafted boats. All produce CO.

The following are also sources of CO that may affect your boat:

- Extended operation of unvented fuel burning appliances can build up high CO levels.
- An idling boat next to your boat or idling vehicle near your boat can build up high levels of carbon monoxide.

- Temperature inversions can trap exhaust near the ground.
- CO build up can be caused by reverse/negative venting of fuel burning appliances including: 1) Clogged, loose or faulty stacks of (clothes dryers, furnaces and water heaters, etc.), 2) wind direction and/or velocity, 3) simultaneous operation of multiple fuel burning appliances, and/or exhaust fans.
- The electronic sensor in your SAFE-T-ALERT™ CO alarm is self-cleaning and very sensitive to CO gas. It will not react to non-hazardous levels of most other gas.
- **NOTE:** The TEST/RESET button on the SAFE-T-ALERT™ CO alarm accurately tests all alarm functions. It is the only way to test the alarm.



#### LIMITATIONS OF CARBON MONOXIDE ALARMS

**CO ALARMS WILL NOT WORK WITHOUT POWER.** Some examples causing no alarm power are a blown or missing fuse, broken wire, a faulty wire connection or circuit breaker, or a discharged battery.

**CAUTION-THIS ALARM WILL ONLY INDICATE THE PRESENCE OF CO GAS AT THE SENSOR.** CO gas may be present in other areas. MTI recommends that alarms be installed in all sleeping areas.

**CO ALARMS MAY NOT BE HEARD.** The alarm's loudness is designed to meet or exceed regulatory standards, however, the alarm may not be heard if alarms are located in remote locations or behind closed doors. Persons who are hard-of-hearing, have consumed alcoholic beverages, taken prescription, non-prescription or illegal drugs, may not hear the alarm.

**THIS CO ALARM IS DESIGNED TO DETECT CARBON MONOXIDE FROM ANY SOURCE OF COMBUSTION. IT IS NOT DESIGNED TO DETECT SMOKE, FIRE, OR ANY OTHER GAS.** This device may not alarm at low CO levels. This CO alarm is intended for use in ordinary indoor locations of family living units. It is not designed to measure compliance with the Occupational Safety Health Administration (OSHA) commercial or industrial standards. Individuals with medical problems may consider using warning devices, which provide audible and visual signals for CO concentrations under 30 ppm. See the section, Visual and Audible Alarm Signals, in this manual for further information.



**THIS PRODUCT IS INTENDED FOR USE IN ORDINARY INDOOR RESIDENTIAL, RV AND BOAT AREAS. IT IS NOT DESIGNED TO MEASURE COMPLIANCE WITH COMMERCIAL AND INDUSTRIAL STANDARDS.**

#### HOW TO PROTECT YOUR FAMILY FROM CO GAS

**CAUTION-** The SAFE-T-ALERT™ CO alarm is designed to protect individuals from acute effects of carbon monoxide exposure. It will not fully safeguard individuals with specific medical conditions. If in doubt, consult a medical practitioner.

To protect your family, you should:

- **INSTALL CO ALARMS PROPERLY.** Carefully read and follow ALL the instructions in this manual. Test your unit every week. Alarms that do not work will not alert you to hazardous levels of CO gas. See the section, Test Procedure, in this manual for further information.
- **MAKE REGULAR VISUAL INSPECTIONS.** Check all fuel burning equipment including gas water-heaters, kitchen gas stoves, space heaters, gas dryers and all pilot lights. Check the color of the pilot flame. The color should be blue.

- **MAKE REGULAR VISUAL INSPECTIONS OF THE ENGINE AND GENERATOR EXHAUST SYSTEMS.** Cracked exhaust systems can allow CO to enter the boat living area.

- **PROFESSIONALLY MAINTAIN YOUR ENGINE AND GENERATOR.** Although gas engines and generators produce CO, a poorly tuned engine and generator will produce greater amounts CO.

- **KEEP THE COCKPIT AND PASSENGER AREA WELL VENTILATED.** When idling, traveling at slow speeds or when the canvas is up at any speed, under certain conditions high CO levels can collect in the open air and can enter enclosed areas (station wagon effect).

#### WHERE TO INSTALL CO ALARMS

- **FOR MINIMUM PROTECTION,** install CO alarms near all sleeping areas.
- **FOR MAXIMUM PROTECTION,** install CO alarms in all sleeping areas. (See Figure 1)

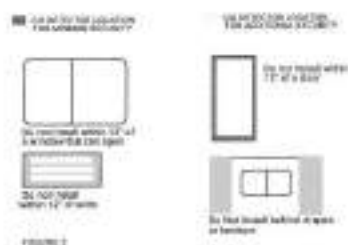
#### WHERE NOT TO INSTALL CO ALARMS

- **DO NOT INSTALL ALARMS** behind furniture, drapes, pillows, in closets or areas that will block air flow to the alarm.

- **DO NOT INSTALL ALARMS** within 12 inches (30cm) of opening windows, exterior doors, heating or return vents, or other drafty areas or 6" (15cm) of the wall/ceiling line.

- **DO NOT INSTALL ALARMS** within 5 feet (1.5m) of any cooking appliance.

The following diagrams provide additional alarm installation information:



## INSTALLATION INSTRUCTIONS

Models 60-541 and 60-542.



FAILURE TO FOLLOW THE FOLLOWING INSTRUCTIONS MAY RESULT IN A MALFUNCTION OF THE ALARM AND MAY VOID THE WARRANTY.



CONNECT ONLY TO WIRING THAT CANNOT BE TURNED OFF BY A SWITCH OR GROUND FAULT PROTECTOR. ONLY USE UL® OR RECOGNIZED CONNECTORS.



THESE ALARMS ARE DESIGNED TO BE MOUNTED ON A WALL OR CEILING 6" (15CM) FROM THE WALL/CEILING LINE. SEE WHERE TO AND NOT TO INSTALL CO ALARMS.



**SHOCK HAZARD:** TURN OFF POWER BEFORE INSTALLING. POWER SUPPLY 12 VDC. RECOMMENDED WIRE SIZE 14GA. CONNECT THE ALARM TO A PROPERLY FUSED CIRCUIT, MAXIMUM OVER PROTECTION DEVICE RATING 15 AMPS. ALL CONNECTIONS MUST BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.

Follow these directions when installing your SAFE-T-ALERT™ CO alarm:

1. Select a wall location and drill a 1/4" (6mm) hole for the 60-541. Cut a 4" (102mm) W x 3" (76mm) H hole for the 60-542. Note: The 60-542 requires 1 3/8" (35mm) clearance for the case inside the wall.
2. Connect Supply (+) to the Red wire lead. Ground to Black (-) to the Black wire lead.
3. Reconnect the power supply.

**NOTE:** ALL WIRING METHODS SHALL BE IN COMPLIANCE WITH THE NATIONAL ELECTRIC CODE OR CANADIAN ELECTRIC CODE.

#### TEST PROCEDURE



TO REDUCE THE RISK OF CARBON MONOXIDE POISONING, TEST THE ALARM'S OPERATION AFTER THE BOAT HAS BEEN IN STORAGE, BEFORE EACH TRIP AND AT LEAST ONCE PER WEEK DURING USE.



DO NOT attempt to test the alarm by any other means than by using the TEST/RESET button. DO NOT attempt to produce CO to test the alarm. The TEST/RESET button tests all functions of the alarm and is the ONLY safe way to be sure the alarm is working properly.

The alarm may be tested at any time after power is applied by pressing the

TEST/RESET button, located on the front of the alarm. The alarm is working properly

if the GREEN indicator light changes color to RED and the horn sounds.

## OPERATION

Each SAFE-T-ALERT™ CO alarm is equipped with a self-cleaning CO sensor and requires a ten (10) minute initial warm-up period to clean the sensor element and achieve stabilization. The GREEN indicator will flash on and off during the 10 minute warm up period.

The GREEN power ON indicator should glow continuously after the warm up period. If the ON indicator light does not light, see the section, Trouble-Shooting Guide, in this manual for further information. **Do not attempt to fix it yourself.**

### VISUAL AND AUDIBLE ALARM SIGNALS

This SAFE-T-ALERT™ CO alarm is designed to be easy-to-operate. The alarm has an indicator light that displays a specific color for each monitored condition. There also is a matching sound pattern for alarm conditions.

1. **LOW CO ALARM** - is indicated by a **FLASHING RED LIGHT AND 4 AUDIBLE "BEEPS" THEN OFF FOR 5 SECONDS**. These signals indicate the presence of 70 ppm or more of CO. **IMMEDIATE ACTION IS REQUIRED.** See the section, Procedures To Take During An Alarm, in this manual for further information. This cycle will continue until the TEST/RESET button on the front of your unit is pressed. The TEST/RESET button temporarily silences the CO alarm. Ventilate the area. The RED light will continue to flash until the CO has cleared, or the alarm will reactivate in approximately 6 minutes in the event CO is still present. If the level of CO continued to rise above 100 ppm, the FLASHING RED LED will change to **STEADY RED**.

2. **HIGH CO ALARM** - is indicated by a **STEADY RED LIGHT AND 4 AUDIBLE "BEEPS" THEN OFF FOR 5 SECONDS**. These signals indicate that the CO level is over 100 ppm. **IMMEDIATE ACTION IS REQUIRED.** See Procedures To Take During An Alarm. This cycle will continue until the TEST/RESET button on the front of your unit is pressed. Ventilate the area. The RED light will stay ON until the CO has cleared, or the alarm will reactivate in approximately 6 minutes if the CO is still present.

3. **MALEFUNCTION/SERVICE SIGNAL** - is indicated by **ALTERNATING RED AND GREEN LIGHTS AND ONE AUDIBLE BEEP EVERY 30 SECONDS**. If this signal sounds, press the TEST/RESET button. If the TEST/RESET button does not clear the signals, check the battery voltage. If the battery voltage is not low, immediately remove the alarm and return for service. See the section, Warranty Return Procedures.

**SPECIAL MEMORY FEATURE** - This SAFE-T-ALERT™ CO alarm has a Peak Level Memory feature that remembers the approximate amount of CO that activated the alarm.

To activate alarm level memory, press the TEST/RESET button for less than 1 second. You can repeat this feature at any time.

The following memory signals indicate the approximate amount of CO present when the alarm was activated:

- (1) "BEEP" and 1 GREEN FLASH indicate the memory is clear.
- (2) "BEEPS" and 2 RED FLASHES indicate less than 100 ppm.
- (3) "BEEPS" and 3 RED FLASHES indicate less than 200 ppm.
- (4) "BEEPS" and 4 RED FLASHES indicate over 200 ppm.

You can only erase memory by disconnecting power for 15 seconds.

### REPLACEMENT DATE

**IMPORTANT:** Replace this Safe-T-Alert™ CO alarm in accordance with the replace date on the front of the CO alarm.

## TROUBLE-SHOOTING GUIDE

Use this chart to trouble-shoot problems with your CO alarm.

PROBLEM	CAUSE/SOLUTION
GREEN LIGHT OFF	1. Wire Connection 2. Reversed Wiring 3. Main Power Off 4. Missing or Blown Fuse 5. Contact Customer Service
NO SOUND IN TEST	Contact Customer Service
NO RED LED IN TEST	Contact Customer Service
LOCKED IN RED ALARM	Contact Customer Service
ALARM WITH RED/GREEN LED AND WILL NOT RESET	Contact Customer Service

### HOW TO TAKE CARE OF YOUR ALARM


Your CO alarm is designed to be as maintenance free as possible. To keep your alarm in good working order, you must:

- **TEST THE ALARM WEEKLY.** See the section, Test Procedure, in this manual for further information.
- **VACUUM THE DUST OFF THE ALARM COVER.** At least once a year (more frequently in dusty locations), use the soft brush attachment of your vacuum to clean the alarm cover.
- **CLEAN THE ALARM COVER WHEN DIRTY.** Wash the alarm cover by hand. Use a cloth dampened in clean water. Dry with a soft cloth.
- **DO NOT SPRAY CLEANING AGENTS OR WAXES DIRECTLY ONTO THE FRONT PANEL.** The alarm area should be well ventilated when household cleaning supplies or similar contaminants are used.
- **OBSERVE THE COLOR OF THE INDICATOR LIGHT.** At frequent intervals and during your weekly test, check the indicator light on the front panel of the alarm. See the section, Operation, in this manual for further information.

### PROCEDURES TO TAKE DURING AN ALARM

Follow the alarm procedures for your country. The emergency number depends on your travel location.

#### PROCEDURES TO TAKE DURING AN ALARM IN CANADA

 **WARNING:** Activation of this device indicates the presence of carbon monoxide (CO) which can KILL YOU. If signal sounds (4 beeps and flashing or solid red light: 1) Immediately move to fresh air - outdoors or by an open door/window. Check that all persons are accounted for. Do not reenter the premises or move away from the open door/window until the emergency responders have arrived, the premises have been aired out, and your alarm remains in its normal condition; 2) call your emergency local service (telephone number \_\_\_\_\_) ( fire department or 911).



**PROCEDURES TO TAKE  
DURING AN ALARM IN THE USA**

**⚠ WARNING:** Activation of this device indicates the presence of carbon monoxide (CO), which can KILL YOU. If signal sounds (4 beeps and flashing or solid red light): 1) Operate the reset/silence button; 2) Call your emergency local service (Phone Number \_\_\_\_\_) (fire department or 911); 3) Immediately move to fresh air - outdoors or by an open door/window. Check that all persons are accounted for. Do not reenter the premises or move away from the open door / window until the emergency responders have arrived, the premises have been aired out and your alarm remains in its normal operation. 4) After following steps 1-3, if your alarm reactivates within a 24-hour period, repeat steps 1-3 and call a qualified appliance technician. (Phone Number \_\_\_\_\_) to investigate for sources of CO from fuel burning equipment and appliances, and inspect for proper operation of this equipment. If problems are identified during this inspection have the equipment serviced immediately. Note any combustion equipment not inspected by the technician and consult the manufacturers' instructions, or contact the manufacturer directly, for more information about CO safety and this equipment. Make sure that the motor vehicles are not, and have not been, operating in an attached garage or adjacent to the residence.

**LIMITED PRODUCTS WARRANTY**

MTI INDUSTRIES, INC. warrants to the original retail purchaser that its products will be free from defects of material or workmanship for a period of One (1) year from the date of retail purchase. If proven to have been defective in original materials or workmanship and returned, delivery costs prepaid, MTI INDUSTRIES, INC. will replace this product free of charge.

**LIMITS OF WARRANTY**

Replacement is your exclusive remedy under this limited warranty or any other warranty (including any implied warranty of merchantability for a particular purpose). Any and all implied warranties or merchantability or fitness for a particular purpose shall be limited to the warranty period from the original date of retail purchase. MTI INDUSTRIES, INC., its dealers and distributors shall in no case be responsible or in any way liable for any incidental or consequential damages for any reason. Some states do not allow the limitation or exclusion of incidental or consequential damages, or allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you. This warranty gives you specific rights, and you may also have other rights, which may vary, from state to state.

**PRODUCT NOT WARRANTED**

**NOTE-** There are no user serviceable parts inside the case. Opening any SAFE-T-ALERT™ product for any reason voids the warranty. This warranty does not cover damage or failure resulting from acts of God, abuse, misuse, neglect, or faulty installation.

**WARRANTY RETURN PROCEDURES**

It is MTI's experience that a Carbon Monoxide alarm is sounding for a reason. Call, ask your dealer to call, or e-mail our Customer Service Department (as listed below) to trouble shoot the situation.

Customer Service Phone No. - 800-383-0269  
Fax No. 847-546-9007  
E-mail Service@mtiindustries.com  
Web Site: www.mtiindustries.com

If Customer Service determines that the unit is defective, a Replacement Authorization (RA) number will be issued. No product will be accepted for service or replacement without first obtaining a RA number.

If authorized, return this product to:

MTI Industries, Inc.  
Warranty Dept. RA # (INSERT RA NUMBER HERE)  
31632 N. Ellis Drive Unit 301  
Volo, IL 60073

NOTE: Mark the RA number in the area shown on the outside of the box!

**SPECIFICATIONS**

<b>SAFE-T-ALERT™</b>	60-541 and 60-542	
Power Supply	12 vDC	
Operating Voltage	7 - 16 vDC	
Average Standby Current Draw	60 mA @ 12 vDC	
Operational Temperature	-40°F to +158°F -40° C to +66° C	
Relative Humidity	15% (+/- 5%) to 95% (+/- 4%)	
Gas Detected	Carbon Monoxide	
CO Alarm Level	OVER 100 PPM	
Low CO Alarm	70 to 100 PPM	
No Alarm	30 ppm for 30 Days	
Warm Up Time	10 Minutes	
Alarm Silence Time	Under 6 Minutes	
Case Dimensions	60-541: 5" x 3" x 1.5" 60-542: 6.5" x 3.5" x 1.5"	
Audible Alarm	85 dB @ 10 Feet	
<b>OPERATION</b>	<b>AUDIBLE SIGNAL</b>	<b>VISUAL SIGNAL</b>
NORMAL	NONE	STEADY GREEN
LOW CO ALARM	4 "BEEPS" 5 SECONDS OFF	FLASHING RED
CO ALARM	4 "BEEPS" 5 SECONDS OFF	STEADY RED
ALARM MALFUNCTION	"BEEP" EVERY 30 SECONDS	ALTERNATING RED/GREEN
UL® 2034 Rev. November 14, 2003 UL-CSA 5-19-01	Single Station Residential, Recreational Vehicle and Marine Use	

© MTI INDUSTRIES 2004

**Warranty Registration Card**  
**ON LINE REGISTRATION [www.safe-t-alert.com](http://www.safe-t-alert.com)**

Purchase Date \_\_\_\_\_  
Safe-T-Alert™ Gasoline Alarm \_\_\_\_\_ Carbon Monoxide Alarm \_\_\_\_\_  
Your Name \_\_\_\_\_  
Street Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_  
Boat Manufacturer \_\_\_\_\_ Model Name \_\_\_\_\_  
Boat Serial Number \_\_\_\_\_  
Dealer Name \_\_\_\_\_  
Street Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

Return this card within 30 days of purchase in order for MTI to inform you of new products, updated products and technical updates. Form ew 1039-2 © MTI 99



SIGNALING



MODEL SA-775/SA-775B **SMOKE & FIRE ALARM**  
*with Alarm Mute*

### READ ALL INSTRUCTIONS

The smoke alarm has a recommended service life of at least 10 years under normal conditions. The smoke alarm uses an extremely small amount of a radioactive element in the ionization chamber. Do not tamper with radioactive sealed source or try to repair the smoke alarm yourself. Refer to instructions for repairs.

#### SMOKE ALARM LIMITATIONS AND FUNCTIONS

- THERE ARE TWO BASIC SMOKE ALARM TYPES - IONIZATION AND PHOTOELECTRIC. Ionization smoke alarms are your best overall choice for reliability and fast response time, since they quickly sense small "invisible" smoke particles and will also sense larger "visible" smoke particles. Photoelectric smoke alarms may respond more quickly in certain types of fires, for example - slow smoldering fires with large "visible" smoke particles. ALL TYPES OF SMOKE ALARMS HAVE LIMITATIONS. NO TYPE OF SMOKE ALARM CAN SENSE EVERY KIND OF FIRE OR SMOKE EVERY TIME.
- WARNING - SMOKE ALARMS WILL NOT WORK DURING A LOSS OF POWER. SINCE A SMOKE ALARM WILL NOT WORK WITHOUT POWER, having an alarm(s) that works from two completely different power sources, such as an AC direct wire with battery backup smoke alarm, can give you an extra measure of protection in case of an AC power failure or a dead battery.
- USING A SMOKE ALARM IN A SMOKY AREA LIKE A KITCHEN, OR IN A HIGH HUMIDITY AREA NEAR A SHOWER, CAN CAUSE FALSE ALARMS. DO NOT TURN OFF THE AC POWER TO QUIET THE ALARM. A SMOKE ALARM WILL NOT HELP PROTECT YOU IF IT IS NOT POWERED. Properly locate your alarm to avoid alarms.
- A SMOKE ALARM MAY NOT ALWAYS WARN YOU ABOUT FIRES CAUSED BY CARELESSNESS AND SAFETY HAZARDS LIKE SMOKING IN BED, VIOLENT EXPLOSIONS, ESCAPING GAS, IMPROPER STORAGE OF FLAMMABLE MATERIALS, OVERLOADED ELECTRICAL CIRCUITS, CHILDREN PLAYING WITH MATCHES, NATURAL CAUSES SUCH AS LIGHTNING, OR ARSON. FIRE PREVENTION IS YOUR BEST SAFEGUARD.
- INSTALLING SMOKE ALARMS MAY MAKE YOU ELIGIBLE FOR LOWER INSURANCE RATES, but SMOKE ALARMS ARE NOT A SUBSTITUTE FOR INSURANCE. Homeowners and renters alike should continue to insure their lives and properties.
- SMOKE ALARMS CANNOT WORK WITHOUT POWER. Battery operated units cannot work if the batteries are missing, disconnected or dead, if the wrong type of batteries are used or if the batteries are not installed correctly. AC (only) powered units cannot work if the AC power is cut off for any reason. If you are concerned about the limitations of battery or AC power, install both types of units.
- SMOKE ALARMS CANNOT DETECT FIRES IF THE SMOKE DOES NOT REACH THEM. Smoke from fires may not reach the sensing chamber and set off the alarm. One unit should be installed inside each bedroom or sleeping area. DO NOT RESTRICT AIRFLOW AROUND THE SMOKE ALARM OR PLACE IN AREAS OF OBSTRUCTED AIRFLOW.
- SMOKE ALARMS MAY NOT DETECT FIRE ON ANOTHER FLOOR OR AREA OF THE HOME. Recommended minimum protection is at least one unit in every sleeping area and every bedroom on every level of your home. Interconnected units may provide earlier warning than stand-alone units since all units alarm when one detects smoke.
- SMOKE ALARMS MAY NOT BE HEARD. The alarm horn in this unit meets or exceeds current standards, but it may not be heard if: (1) the unit is located outside a closed or partially closed door; (2) residents recently consumed alcohol or drugs; (3) the alarm is drowned out by noise from stereos, TV's, air conditioners or other appliances or (4) if residents are hearing impaired or (5) residents are sleeping.
- CURRENT STUDIES HAVE SHOWN SMOKE ALARMS MAY NOT AWAKEN ALL SLEEPING INDIVIDUALS AND THAT IT IS THE RESPONSIBILITY OF INDIVIDUALS IN THE HOUSEHOLD WHO ARE CAPABLE OF ASSISTING OTHERS TO PROVIDE ASSISTANCE TO THOSE WHO MAY NOT BE AWAKENED BY THE ALARM SOUND OR TO THOSE WHO MAY BE INCAPABLE OF SAFELY EVACUATING THE AREA UNASSISTED.
- SMOKE ALARMS ARE NOT FOOLPROOF. You must test the unit weekly to ensure your continued protection. Smoke alarms cannot prevent or extinguish fires.
- SMOKE ALARMS HAVE A LIMITED LIFE. The unit should be replaced immediately if it is not operating properly. You should always replace a smoke alarm after 10 years.
- SMOKE ALARMS ARE NOT TO BE USED WITH DETECTOR GUARDS UNLESS THE COMBINATION HAS BEEN EVALUATED AND FOUND SUITABLE FOR THAT PURPOSE.

## RECOMMENDED LOCATION OF ALARMS

- Locate the first smoke alarm in the immediate area of the bedrooms. Try to protect the exit path as the bedrooms are usually farthest from an exit. If more than one sleeping area exists, locate additional smoke alarms in each sleeping area. If a hall is more than 40 feet (12 meters) long, install a smoke alarm at each end.
- Locate additional smoke alarms to protect any stairway as stairways act like chimneys for smoke and heat.
- Locate at least one smoke alarm on every floor level.
- Locate a smoke alarm in any area where a smoker sleeps or where electrical appliances are operated in sleeping areas.
- Smoke, heat and other combustion products rise to the ceiling and spread horizontally. Mounting the smoke alarm on the ceiling in the center of the room places it closest to all points in the room. Ceiling mounting is preferred in ordinary residential construction. However, in mobile homes, wall mounting on an inside partition is preferred to avoid the thermal barrier that may form at the ceiling.
- When mounting smoke alarm on the ceiling, locate it a minimum of 4" (10cm) from a side wall or corner (see Diagram A).
- When mounting smoke alarm on a wall, if local codes allow, use an inside wall with the top edge of the smoke alarm a minimum of 4" (10cm) and a maximum of 12" (30.5cm) below the ceiling/wall intersections (See Diagram A).

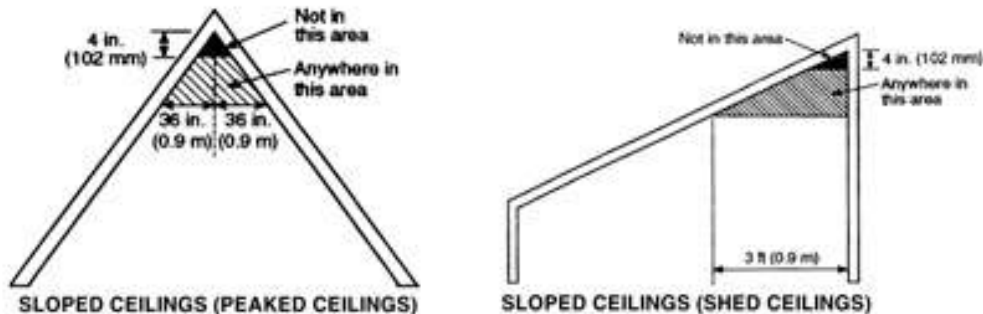


### Existing Homes:

The NFPA requires a smoke alarm on every level and outside each sleeping area in existing construction. An existing household with one level and one sleeping area is required to have one smoke alarm.

### New Construction Homes and Manufactured Homes:

The NFPA requires AC-powered, interconnected smoke alarms to be installed inside each bedroom, outside each bedroom area, and on every level of the home. They also require a minimum of two AC-powered, interconnected smoke alarms in any new construction home.



### Sloped Ceilings (Peaked Ceilings)

Smoke alarms or smoke detectors mounted on a peaked ceiling shall be located within 36 in. (914 mm) horizontally of the peak, but not closer than 4 in. (102 mm) vertically to the peak.

### Sloped Ceilings (Shed Ceilings)

Smoke alarms or smoke detectors mounted on a sloped ceiling having a rise greater than 1 ft. in 8 ft. (1 m in 8 m) horizontally shall be located within 36 in. (914 mm) of the high side of the ceiling, but not closer than 4 in. (102 mm) from the adjoining wall surface.

### Mobile Home Installation:

For minimum protection, smoke alarms should be installed in compliance with H.U.D. Manufactured Home Construction Safety Standards, Title 24 CFR, Section 3280.208 and Section 3282. For additional protection, see Single Story Residence smoke alarm requirements/recommendations for Existing Homes and New Construction Homes.

**Note:** For mobile homes built before 1978, install smoke alarms on inside walls between 4" and 12" from the ceiling (older mobile homes have little or no insulation in the ceiling). This is especially important if the ceiling is unusually hot or cold.

Install a smoke alarm inside each bedroom and in the hallway outside each separate sleeping area.

## AVOID THESE LOCATIONS

- the garage – products of combustion are present when you start your automobile.
- near appliances or areas where normal combustion regularly occurs (kitchens, near furnaces, gas hot water heaters). Use smoke alarms with "Alarm Mute" Control for these areas.
- in areas with high humidity, like bathrooms or areas near dishwashers or washing machines. Install at least 3 feet (0.9 meters) away from these areas.
- in areas of turbulent air such as air returns or heating and cooling supply vents, smoke alarms shall not be located where airflow prevents operation of the alarms.
- in extremely dusty, dirty or insect-infested areas. Loose particles interfere with smoke alarm operation.
- in areas where temperature may fall below 40°F (4.4°C) or rise above 100°F (37.8°C).
- closer than 1 foot (0.3m) from fluorescent lights, electrical "noise" and flickering may affect the alarm's operation.
- closer than 3 feet (0.9m) horizontal path from the tip of the blade of a ceiling suspended (paddle) fan.
- on a poorly insulated ceiling or exterior wall (mount smoke alarm on an inside wall).

**THIS SMOKE ALARM WILL NOT OPERATE WITHOUT A BATTERY INSTALLED. PROPER BATTERY MUST BE INSTALLED IMMEDIATELY WHEN LOW BATTERY SIGNAL IS GIVEN OR THE UNIT WILL FAIL. TEST WEEKLY. READ AND FOLLOW ALL INSTRUCTIONS OR UNIT WILL NOT OPERATE PROPERLY.**

## FALSE ALARMS (SEE "Alarm Mute" CONTROL)

The smoke alarm is designed to minimize false alarms. Smoking will not normally set off the alarm unless smoke is blown directly into the smoke alarm. Combustion particles from cooking may set off the alarm if the smoke alarm is located close to the kitchen cooking surface. Large quantities of combustion particles are generated from spills or broiling.

If the smoke alarm does alarm, check for fires first. If a fire is discovered, get out and call the fire department. If no fire is present, check to see if one of the reasons listed above may have caused the alarm. Use the "Alarm Mute" feature if it is a false alarm.

## INSTALLATION

Your smoke alarm is designed for easy mounting on wall or ceiling. A complete mounting kit is included with the smoke alarm. First, attach the mounting bracket on the wall or ceiling with the screws provided. Second, push and turn the smoke alarm clockwise on the mounting bracket. (Note: Your smoke alarm is equipped with a safety device which prevents mounting unless a battery is installed. If your smoke alarm will not lock into the mounting bracket, check to make sure a battery is installed.)

### **CAUTION!**

*Early warning fire detection is best achieved by the installation of fire detection equipment in all rooms and areas of the household as follows: A smoke alarm installed in each separate sleeping area (in the vicinity of, but outside of, the bedrooms) and heat or smoke alarms in living rooms, dining rooms, kitchens, hallways, attics, furnace rooms, closets, utility storage rooms, basements and attached garages. Test the smoke alarm weekly to assure proper operation.*

## OPERATION, TESTING & MAINTENANCE

**OPERATION:** The smoke alarm is operating once the battery is connected. When products of combustion are sensed, the unit sounds a loud alarm which continues until the air is cleared.

This alarm incorporates the internationally recognized horn signal for evacuation. During alarm mode, the horn produces three short beeps followed by a two second pause and then repeats.

**FALSE ALARMS "Alarm Mute" Feature:** Units with the "Mute" feature have the capability of temporarily reducing the sensitivity of the alarm circuit for approximately 8 minutes. This feature is to be used only when a known alarm condition such as smoke from cooking activates the smoke alarm. The smoke alarm is deactivated by pushing the test button on the smoke alarm cover for at least three seconds. The smoke alarm will automatically reduce sensitivity and "beep" every 30-40 seconds for approximately 8 minutes to indicate the alarm is in the temporary silent condition. The smoke alarm will gradually reactivate during the 8 minutes and sound the alarm if particles of combustion are still present. The "Mute" feature may be used repeatedly until the air has cleared.

**CAUTION: Before using the "Alarm Mute" feature, identify the source of smoke and be certain that safe conditions exist.**

**TESTING:** Test by pushing the test button on the smoke alarm cover until the alarm sounds, then release. The alarm sounds if all electronic circuitry, horn and battery are working. The alarm may continue to sound for up to 10 seconds after the button is released. If no alarm sounds, the unit may have a defective battery or other failure. Test the smoke alarm weekly to assure proper operation.

### **⚠️WARNING!**

***NEVER use an open flame of any kind to test this unit. You might accidentally damage or set fire to the unit or to your home. The built-in test switch accurately tests the unit's operation as required by Underwriters Laboratories Inc. (UL).***

### **⚠️CAUTION!**

***If you choose to use an aerosol smoke product to test the smoke alarm, be certain to use one that has been Listed to Underwriters Laboratories, Inc. Safety Standards and use it only as directed. Use of non-UL Listed products or improper use of UL Listed products may affect the smoke alarm's sensitivity.***

#### **RV INSTALLATION -**

**WARNING:** TEST SMOKE ALARM OPERATION AFTER VEHICLE HAS BEEN IN STORAGE, BEFORE EACH TRIP, AND AT LEAST ONCE PER WEEK DURING USE. An identical marking is to be provided by the recreational vehicle manufacturer that shall be permanent and located, visibly, within 24 inches (610mm) of the smoke alarm.

**MAINTENANCE:** The smoke alarm is virtually maintenance free. However, under dusty conditions, a vacuum hose may be used to clear the sensing chamber of dust.

## BATTERY REPLACEMENT

The smoke alarm comes with a 9 Volt battery. The battery should last for at least one year under normal operating conditions. The smoke alarm has a low battery indicator, an audible "beep." It will operate at 30-40 second intervals for a minimum of 7 days. When this indication occurs, replace the battery with an Alkaline type (Eveready Energizer #522, Duracell #MN1604).

## REPAIRS AND SERVICES

The smoke alarm contains less than 1 microcurie (37 kilobecquerel) of Americium 241, a radioactive material. **The distribution of these ionization-type smoke alarms is licensed by the U.S. Nuclear Regulatory Commission; the consumer is exempt from any licensing or requirements.** If the smoke alarm is defective in any way, do not tamper with the unit. Return the unit for servicing. (See warranty for instructions or in-warranty returns.) There will be a service charge for repairing out of warranty units.

## DEVELOP AND PRACTICE A PLAN OF ESCAPE

### BASICS OF ESCAPE PLAN

- o Make a floor plan indicating all doors and windows and at least two escape routes from each room. Second story windows may need a rope or chain ladder.
- o Have a family meeting and discuss your escape plan, showing everyone what to do in case of fire.
- o Determine a place outside your home where all of you can meet if a fire occurs.
- o Familiarize everyone with the sound of the smoke alarm and train them to leave your home when they hear the sound.
- o Identify children's bedrooms with red stickers placed in the upper left corner of the windows. They are available from your local fire department.
- o Practice a fire drill at least every six months. Practice allows you to test your plan before an emergency. You may not be able to reach your children. It is important they know what to do!

### WHAT TO DO WHEN THE ALARM SOUNDS

- o Leave immediately by your plan of escape. Every second counts, so don't waste time getting dressed or picking up valuables.
- o In leaving, don't open any inside door without first feeling its surface. If hot, or if you see smoke seeping through cracks, **don't open that door!** Instead, use your alternate exit. If inside door is cool, place your shoulder against it, open it slightly and be ready to slam it shut if heat and smoke rush in.
- o Stay close to the floor if air is smoky. Breathe shallowly through a cloth, wet if possible.
- o Once outside, go to your selected meeting place and make sure everyone is there.
- o Call the fire department from your neighbor's home – **not from yours!**
- o Don't return to your home until fire officials say that it is all right to do so.

### NATIONAL FIRE PROTECTION ASSOCIATION REQUIRED PROTECTION

For your information, the National Fire Protection Association's Standard 72, reads as follows:

"11.5.1 One- and Two-Family Dwelling Units. 11.5.1.1 Smoke Detection. Where required by applicable laws, codes, or standards for the specified occupancy, approved single- and multiple-station smoke alarms shall be installed as follows: (1) In all sleeping rooms. Exception: Smoke alarms shall not be required in sleeping rooms in existing one- and two-family dwelling units. (2) Outside of each separate sleeping area, in immediate vicinity of the sleeping rooms. (3) On each level of the dwelling unit, including basements. Exception: In existing one- and two-family dwelling units, approved smoke alarms powered by batteries are permitted.

"A.11.8.3 Are More Smoke Detectors Desirable? The required number of smoke detectors might not provide reliable early warning protection for those areas separated by a door from the areas protected by the required smoke detectors. For this reason, it is recommended that the householder consider the use of additional smoke detectors for those areas for increased protection. The additional areas include the basement, bedrooms, dining room, furnace room, utility room, and hallways not protected by the required smoke detectors. The installation of smoke detectors in kitchens, attics (finished or unfinished), or garages is not normally recommended, as these locations occasionally experience conditions that can result in improper operation."

The equipment should be installed using wiring methods in accordance with the National Fire Protection Association's Standard 72, Chapter 11. (National Fire Protection Association, Batterymarch Park, Quincy, MA 02269).

**THIS PRODUCT IS LISTED TO UL STANDARD FOR SAFETY,  
UL217, BY UNDERWRITERS LABORATORIES Inc.**

Note:

NFPA 1192 requires the primary smoke alarm installed in RV's to be located "not within the separate sleeping areas." For additional protection install a smoke alarm in each sleeping area of your RV.

**NFPA 1192: 6.3.3 Installation of Smoke Alarm. The required smoke alarm shall be installed in accordance with its listing but not within the separate sleeping areas.**

## ***Five Year Limited Warranty***

MTI Industries, Inc. (MTI) warrants your MTI smoke alarm against all defects in material and workmanship for (5) years from the date of purchase. This warranty applies only to the original consumer purchaser and only to equipment used in normal use and service. If this product is found to be defective, MTI's only obligation, and your exclusive remedy, is the repair or replacement of the product at MTI's discretion, provided that the product has not been damaged through misuse, abuse, accident, modifications, alteration, neglect or mishandling. This warranty shall not apply to any equipment that is found to have been improperly installed, set-up, or used in any way not in accordance with the detailed instructions supplied with the product. This warranty shall not apply to any batteries used in the product or to any damage that may be caused by such batteries.

For repair or replacement, send the defective product to MTI Industries, Inc 31632 N. Ellis Drive, Unit 301, Volo, IL 60073, postage prepaid with a payment of \$8.00 to cover the costs of return postage and handling. You must include a proof of purchase (receipt) along with the returned product.

**MTI DOES NOT WARRANT AND SPECIFICALLY DISCLAIMS ANY WARRANTY, WHETHER EXPRESS OR IMPLIED OF FITNESS FOR A PARTICULAR PURPOSE OTHER THAN THE WARRANTY CONTAINED HEREIN. NO IMPLIED WARRANTY UNLESS SUCH LAW OTHERWISE PROVIDES. MTI SPECIFICALLY DISCLAIMS ANY LIABILITY AND SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL OR INCIDENTAL LOSS OR DAMAGE, INCLUDING, BUT NOT LIMITED TO, DAMAGES TO ANY EQUIPMENT, WITH WHICH THIS PRODUCT IS APART.**

Some states do not allow the exclusion or limitation of incidental or consequential damages so the above limitations or exclusions may not apply to you. No agent, representative, dealer, or employee of the company has the authority to increase or alter the obligations or terms of this Warranty. This warranty gives you specific legal rights and you may also have other rights that vary from state to state. This Warranty is only valid for merchandise purchased from retail outlets in the United States and Canada.



MTI Industries, Inc.  
31632 N. Ellis Dr., Unit 301  
Volo, IL 60073  
1-800-383-0269 email [info@mtiindustries.com](mailto:info@mtiindustries.com)



# How To Use Your Kidde Extinguisher

Follow instructions shown on the front label of your fire extinguisher.

After the fire is out, clean up dry chemical powder immediately to avoid corrosion.

**CAUTION:** Under certain fire and heat conditions, the dry chemical powder in ABC type extinguishers will cause damage or prove extremely difficult to remove from oven surfaces, including self-cleaning models. Do not use self-cleaning feature to remove ABC Powder. BC type extinguishers are recommended for cooking areas.

**CAUTION:** The agent contained in this extinguisher is not toxic, but may cause skin irritation. Avoid inhaling the dry chemical agent. In case of contact, flush affected area with clean, cool water. If irritation persists, contact a physician immediately. Chemical name of agent is printed on extinguisher label. For more information on fire fighting, contact your local fire department or the U.S. Coast Guard. Additional information on extinguishers can be found in the National Fire Protection Association (NFPA) pamphlet No. 10, "Portable Fire Extinguishers."

## Mounting Your Extinguisher

Please follow the instructions and diagrams below for mounting the bracket that was supplied with your fire extinguisher.

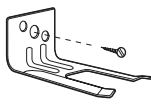
U.S. Coast Guard approval is valid only with the marine mounting bracket specified on the instruction label of your extinguisher.



Metal strap bracket



Plastic wall hanger



Metal wall hanger

# Cómo Usar Su Extinguidor Kidde

Siga las instrucciones en la etiqueta del frente de su extinguidor.

Una vez que el fuego ha sido extinguido, limpie el polvo residual inmediatamente para evitar corrosión.

**ATENCIÓN:** Ante ciertas condiciones de temperatura, el polvo ABC contenido en este extinguidor (y otras unidades similares) puede producir daño y ser muy difícil de remover en la superficie del horno, incluyendo los que son auto-limpiantes. No use la función de auto-limpieza para eliminar el polvo ABC. Extinguidores con polvo químico BC son recomendados en las áreas de cocina.

**ATENCIÓN:** Procure no respirar este polvo. Los ingredientes del mismo no son tóxicos, pero pueden producir irritación en la piel. En caso de contacto con el mismo, lave la parte afectada con agua fría. Si la irritación persiste, consulte a su médico inmediatamente. El nombre del agente químico está impreso en la etiqueta.

Para más información sobre el combate contra incendio, consulte a su Departamento de Bomberos local, o a la Guardia Costera de los EEUU. Información adicional sobre extinguidores contra incendio puede recabarse en el boletín #10 de la Asociación Nacional de Protección contra Incendios (NFPA), denominado "Extinguidores contra Incendio Portátiles"

## Colocación de su Extinguidor

La aprobación de la Marina de los EEUU es válida sólo con el soporte especificado en la etiqueta ubicada en la parte posterior de su extinguidor. Los Modelos de KIDDE (5, 10, 110) están equipados con un soporte de plástico que es aceptado por La Marina de Los EEUU.

Guardia Costera favor de seguir las instrucciones y diagramas indicados abajo para montar el soporte que fue enviado con su extinguidor.

## Plastic Strap Bracket Instructions

Instrucciones del soporte con bandas plasticas en español

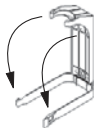
1



1. Fasten bracket to wall with appropriate fasteners (not included).

1. Fije el soporte en la pared con los sujetadores apropiados (no están incluidos).

2



2. Place extinguisher into bracket. Buckle straps together to lock in place.

2. Coloque el extinguidor en el soporte. Enganche las abrazaderas hasta unirse en sitio.

**IF YOUR EXTINGUISHER WAS SHIPPED WITH A PLASTIC BRACKET AND METAL STRAP** then mount your extinguisher as follows:

1. Fasten bracket to suitable surface using a screw in the upper bracket mounting hole.
2. Mount the metal strap provided with your extinguisher in the lower bracket mounting hole using another screw.
3. Place extinguisher into bracket and latch the strap to hold the extinguisher securely in place.

**SI SU EXTINGUIDOR FUE ENVIADO CON UNA BANDA DE METAL**, entonces monte su extinguidor de la siguiente manera:

1. Ponga el soporte en una superficie apropiada usando un tornillo de 1/4 de pulgada en diametro, ponga este en el agujero de arriba de la montura.
2. Monte la banda de metal que le ha sido proveida con su extinguidor en el agujero de abajo de la montura usando otro tornillo de 1/4 de pulgada en diametro.
3. Ponga el extinguidor en la montura y apriete la banda para que aguante el extinguidor seguro en su lugar.

**IF YOUR EXTINGUISHER WAS SHIPPED WITH A HOSE AND HOSE STRAP**, then slide the hose strap over the bottom of the cylinder, and secure the nozzle end of the hose to the hose strap before placing your extinguisher in service.

**SI SU EXTINGUIDOR FUE ENVIADO CON UNA MANGUERA Y UNA ABRAZADERA DE MANGUERA**, entonces, favor de sacar la abrazadera por la parte de abajo del cilindro, ajuste la manguera a la válvula del cuerpo y coloque la punta de la boquilla de la manguera a la abrazadera de la manguera antes de poner su extinguidor en servicio.

366224M

TEAR ALONG PERFORATIONS AND REMOVE

SERVICE/INSPECTION RECORD TAG  
(REQUIRED FOR UL LISTING)

MODEL NO.: \_\_\_\_\_  
SERIAL NO.: \_\_\_\_\_  
MFG. DATE: \_\_\_\_\_



REPLACE OR RECHARGE IMMEDIATELY AFTER USE

FOR RECHARGE INFORMATION  
CALL 1-800-880-6788

**IMPORTANT:** To ensure fire extinguisher will be ready when needed follow inspection and maintenance instructions in manual and familiarize yourself with operating instructions on the nameplate. Protect tag and extinguisher if exposed to weather.

DO NOT REMOVE OR ALTER THIS TAG





## Marine Safety Signals: Tips and Instructions

- What are the basic principles of signaling?
- What are the four main rules of signaling?
- How do I use an aerial signal?
- How do I use hand-held signal flares?
- When should I signal?
- What are USCG requirements for visual distress signals?

### The principles of signaling.

The first purpose of distress signaling is to attract attention. And second, to provide a homing signal to guide the responding party to your boat. Remember, nothing can happen until someone's attention is attracted.

The most effective distress signals for attracting attention are Orion® aerial flares and parachute flares because they are moving, spectacular, and cover a large sighting area.

Once help is on the way, hand-held red signal flares, orange smoke signals and orange distress flags serve as beacons to help rescuers pinpoint your position and keep them on course.

### What are the four main rules of signaling?

1. Conserve your aerial signals until you are reasonably sure of being sighted. Wait until you see or hear a vessel or aircraft before using "one-time" signals.
2. Stay with your boat if it is safe to do so. A boat is easier to spot than a swimmer!
3. Using U.S. Coast Guard approved marine signals such as Orion products will improve your chances, but anything that works is worth trying. USE COMMON SENSE! Shout, flash your running lights, wave a piece of clothing, use your windshield as a mirror, flash a flashlight ... or ANYTHING ELSE that's available to attract attention. Above all, DON'T PANIC!

4. Familiarize yourself with your signals before you leave shore. Time is important in any emergency and shouldn't be spent reading instructions.

## Using aerial signals.

Aerial flares should be fired after sighting or hearing a potential rescue vessel. To attract attention to your distress situation, the U.S. Coast Guard recommends that you fire two aerial flares – one immediately after the other – so rescuers can **confirm** the sighting and the direction of the signal.

Parachute flares do not need to be fired in two's, since a single parachute flare has an adequate burn time (25 to 30 seconds) to confirm sighting and position.

## Using hand-held signal flares.

Orion hand-held signal flares are intended as homing signals to pinpoint your position. The surface-to-surface sighting range on water is approximately 3 to 5 miles, depending on boat elevation. If a rescuer is 5 miles away and running at 20 miles per hour, it will take 15 minutes to reach you. Therefore, you should have at least 12 minutes (total burn time) of signals onboard to maintain a strong homing signal until help arrives.

## When should I signal?

Orion aerial flares and other "one-time" signals should be fired only after sighting or hearing a potential rescuer. Experts recommend that once an aircraft has been sighted, one flare should be fired ... then a second flare fired immediately after the first one to let search teams confirm the sighting and direction of the signal.

Remember, search and rescue missions often establish grid search patterns, which means you may see the same aircraft two or three times coming from different directions. Do not waste aerial flares if the aircraft has initially passed by you. Carrying extra pyrotechnic signals onboard will improve your chances of being sighted.

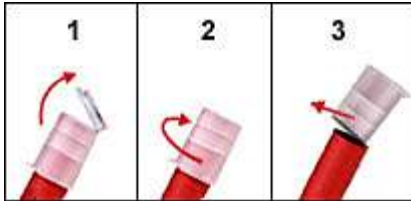
## What are USCG requirements for visual distress signals?

Visual distress signals must be carried on all boats that are operated on the high seas, coastal waters (including the Great Lakes), the territorial seas, and all waters directly connected to the Great Lakes or the territorial seas up to a point where the waters are less than two miles wide.

# Guidelines for Proper Emergency Flare Usage

- How do I use emergency flares?
- What are mistakes to avoid when using flares?
- How do I properly store and handle my emergency flares?

## Orion Emergency flares are easy and safe to use.



First, remove plastic lid to expose scratch surface on cap. Next, twist and remove cap, exposing the black flare igniter button. Last, gently strike the scratch surface of cap against the black button of the flare (similar to striking a match), while pointing away from face and body. Once flare is ignited, carefully place on the ground (do not drop). Do not hold flare in upright position as molten residue from the combustion process will burn if dripped on hand. We recommend carefully reading all instructions first.

## Mistakes to avoid when using flares

Striking the igniter button with the scratch surface too hard. This is unnecessary and can cause the prime to "pop," much like a match-head.

Improper positioning of flare during ignition process (i.e., near stomach and below face). The flare should be held in front of and away from body. Then, even if prime is struck too hard and pops, the ignited prime will not touch the operator.

Carrying lighted flares with the burning end straight up so that the molten residue drips on hand of operator. If the flare must be carried, be sure to keep the burning end down towards the ground.

Not "placing" the flare on ground after ignition, but dropping it. This practice can cause the burning portion of the flare to break off, extinguishing the flare.

Trying to extinguish the flare by smothering the flame. The flare is designed to produce oxygen independent of the outside air. Flares should be allowed to burn completely, thereby consuming all chemicals within the flare.

## Emergency Flare Safe Storage and Handling Procedures

Flares are a safe and stable item to store. The U.S. Department of Transportation classifies flares as a flammable solid, but they are not particularly sensitive to initiation. There is no threat of mass explosion, nor is there any threat of an individual flare exploding.

Flares should be stored in a cool, dry place away from excessive heat (above 167 degrees F), and away from sparks or flames. Also, do not expose flares to water for periods longer than 10 minutes.

While flares have no expiration date when properly stored, storage above 120 degrees F for a long period of time (more than 1 week) should be avoided. The normal recommended storage temperatures are 40 degrees to 90 degrees F.

## DO NOT OPERATE YOUR BOAT WITHOUT DOING THE FOLLOWING:

### TRIP CHECKLIST FOR CARBON MONOXIDE

- Make sure you know where exhaust outlets are located on your vessel.
- Educate all passengers about the symptoms of CO poisoning and where CO may accumulate.
- When docked, or rafted with another boat or boats, be aware of exhaust emissions from the other boat(s).
- Confirm that water flows from the exhaust outlet when the engines and generator are started.
- Listen for any change in exhaust sound, which could indicate an exhaust component failure.
- Test the operation of each CO detector by pressing the test button.

### BOATER'S MONTHLY MAINTENANCE CHECKLIST

- Make sure all exhaust clamps are in place and secure.
- Look for exhaust leaking from exhaust system components. Signs include rust and/or black streaking, water leaks, or corroded or cracked fittings.
- Inspect rubber exhaust hoses for burned, cracked, or deteriorated sections. All rubber hoses should be pliable and free of kinks.

### ANNUAL CHECKLIST

#### HAVE A QUALIFIED MARINE TECHNICIAN:

- Replace exhaust hoses if cracking, charring, or deterioration is found.
- Ensure that your engines and generators are properly tuned, and well maintained.
- Inspect each water pump impeller and the water pump housing. Replace if worn. Make sure cooling systems are in working condition.
- Inspect all metallic exhaust components, including the cylinder head gasket, exhaust manifold, water injection elbow, and the threaded adapter nipple between the manifold and the elbow, for cracking, rusting, leaking, or loosening.
- Clean, inspect, and confirm proper operation of the generator cooling water anti-siphon valve (if so equipped).

## want to know more?

For more information about how you can prevent carbon monoxide poisoning on recreational boats and other boating safety information, contact:

#### United States Coast Guard

Office of Boating Safety (G-OPB-3)  
2100 Second Street SW  
Washington, DC 20593  
[www.uscgboating.org](http://www.uscgboating.org)  
1-800-368-5647



#### National Marine Manufacturers Association

200 East Randolph Drive, Suite 5100  
Chicago, IL 60601-9301  
[www.nmma.org](http://www.nmma.org)  
312-946-6200

#### American Boat & Yacht Council, Inc.

3069 Solomon's Island Road  
Edgewater, MD 21037-1416  
[www.abycinc.org](http://www.abycinc.org)  
410-956-1050

For information on how to get a  
**free VESSEL SAFETY CHECK**, visit  
[www.vesselsafetycheck.org](http://www.vesselsafetycheck.org)  
or contact your local U.S. Coast Guard Auxiliary  
or United States Power Squadrons®.



Brought to you by the U.S. Coast Guard.

CARBON MONOXIDE POISONING:  
what you  
can't see...



<https://www.boat-manuals.com/>

# ...can harm you.



*If you could see carbon monoxide accumulating around your boat, it might look like this.*

## WHAT IS CARBON MONOXIDE?

Carbon monoxide (CO) is a colorless, odorless, and tasteless gas. It is produced when a carbon-based fuel—such as gasoline, propane, charcoal, or oil—burns.

Sources on your boat may include engines, gas generators, cooking ranges, space and water heaters.

## WHY IS IT SO DANGEROUS?

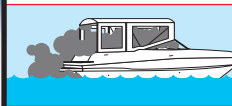
Carbon monoxide (CO) enters your bloodstream through the lungs, blocking the oxygen your body needs. Prolonged exposure to low concentrations or very quick exposure to high concentrations can kill you.

Early symptoms of CO poisoning include irritated eyes, headache, nausea, weakness, and dizziness. These symptoms are often confused with seasickness or intoxication, so those affected may not receive the medical attention they need.

# where can CO accumulate?

**ANYWHERE** in or around your boat.

# how can CO accumulate?



Inadequately ventilated canvas enclosures.



Exhaust gas trapped in enclosed places.



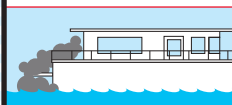
Blocked exhaust outlets.



Another vessel's exhaust.  
CO from the boat positioned next to you can be just as deadly.



“Station wagon effect” or back drafting.



At slow speeds, while idling, or stopped.  
Be aware that CO can remain in or around your boat at dangerous levels even if your engine or the other boat's engine is no longer running!

## THE U.S. COAST GUARD

# wants you to know...

- CO can harm and even kill you inside or outside your boat.
- CO symptoms are similar to seasickness or alcohol intoxication.
- CO can affect you whether you're underway, moored, or anchored.
- You cannot see, smell, or taste CO, but if you smell exhaust fumes, CO is present.
- CO can make you sick in seconds. In high enough concentrations, even a few breaths can be fatal.

**...CO poisonings are preventable!!**

## HOW CAN YOU protect others and yourself?

- Know where and how CO may accumulate in and around your boat.
- If you can smell engine exhaust, you are inhaling CO.
- Follow all warnings and instructions for canvas, engine operations, etc.
- Maintain fresh air circulation throughout the boat at all times.
- Know where your engine and generator exhaust outlets are located and keep everyone away from these areas.
- Stay off the back deck and the swim platforms while the engines are running.
- Never enter areas under swim platforms where exhaust outlets are located unless the area has been properly ventilated.
- Although CO can be present without the smell of exhaust fumes, if exhaust fumes are detected on the boat, take immediate action to ventilate these fumes.
- Treat symptoms of seasickness as possible CO poisoning. Get the person into fresh air immediately. Seek medical attention—unless you're sure it's not CO.
- Install and maintain marine grade approved CO detectors.
  - Every alarm requires immediate action.
  - Replace detectors as recommended by the manufacturer.
- If CO is suspected, open all hatches, windows and ports to ventilate
  - Changing course and speed to place boat heading into the wind can improve ventilation.
- Maintain your engine in accordance with manufacturers' recommendations. Engines that are not tuned properly produce more CO.
- Follow the checklists provided in this pamphlet.
- Get a Vessel Safety Check.

<https://www.boat-manuals.com/>





N15 W24983 Bluemound Road | Pewaukee, WI 53072 | USA | Tel: (262) 691-3320 | Fax: (262) 691-3008 | Website: [www.harken.com](http://www.harken.com)

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## General Warnings and Instructions

Sailing is an exciting sport that can provide hours of enjoyment for you, your family, and friends. However, there are risks inherent in the sport, as well as with the equipment involved, that must be respected in order to avoid an accident, damage to your vessel, personal injury or death.

**WARNINGS AND INSTRUCTIONS.** You must carefully read, understand, and follow all of the warnings and instructions provided by Harken in order to avoid an accident. These warnings and instructions can be found on the equipment, in its packaging, in our brochures, on our website, or through our customer service department.

**HYDRAULIC EQUIPMENT WARNING.** Pressurized hydraulic cylinders can be dangerous and if handled improperly may explode, possibly causing an accident, damage to your vessel, personal injury or death. Cylinders should only be serviced by a thoroughly-trained and equipped hydraulic technician following the instructions in the manual.

**TRAINING AND EXPERIENCE.** Even though Harken equipment appears simple and easy to operate (as intended by our design), our equipment should never be used unless you have a sufficient level of training and experience in sailing in general and with the equipment in particular. The amount of training and experience depends on a number of factors, including the size and type of your vessel, the weather conditions, and the task you are trying to complete. If you have any doubt whatsoever about your training or experience, please do not use the equipment. Please contact Harken or seek additional training.

**AVOID ACCIDENT OR INJURY.** Regardless of your skill level, in order to avoid an accident, damage to your vessel, personal injury, or death:

1. Loads on equipment can be significant, and shock loading from heavy winds or seas can quickly multiply that load to extremely high levels. All persons selecting, installing, using or maintaining Harken equipment must be aware and cautious of such loads.

Select appropriate Harken equipment by using the loading formulas and charts provided in the Harken [catalog](#) or online at [www.harken.com](http://www.harken.com). You can also use Compu-Spec, Harken's online software that can help you select equipment for your boat. Always [confirm](#) your selection with a rigging professional or contact Harken directly.

2. Never, under any circumstances, exceed the capacity or **Maximum Working Load (MWL)** of any piece of equipment. The maximum working load may be found in our catalog, on our website, or through our technical service department. Loads above the MWL can cause the equipment to fail suddenly and unexpectedly. The Breaking Load (BL) is the load at which equipment is likely to fail. It is much higher than the highest load equipment should ever experience, and should not, under any circumstances, ever be considered in selecting equipment. It is published for informational purposes only.
3. Harken equipment is for use exclusively on sailing boats for normal sailboat applications for running rigging. Do not use Harken equipment for human suspension. Aloft rigging and maintenance must be left to rigging professionals only.
4. Keep fingers, hands, hair, loose clothing, gloves, and tools away from moving parts.
5. If you are securing any equipment to the vessel with screws or other fasteners, be sure you are installing the screw into solid structure, or that you use anchor bolts, and that the attachment is sufficient to hold the anticipated load. Otherwise, the screw could become loose over time, or otherwise fail unexpectedly, resulting in an accident.
6. NYLOCK® nuts must not be used after being removed three times. When you replace shackles and fasteners, use the correct Harken parts to maintain the proper strength.
7. Always have all components of your vessel, down to the smallest pulleys, inspected for wear, corrosion or deterioration at least yearly, and replace as necessary.
8. Before manipulating any piece of equipment, be sure that all persons and objects are clear of the path of movement of all reacting components.
9. As part of your maintenance procedures, and to keep your equipment in optimum working order, frequently flush it with fresh water.
10. Always wear a personal flotation device and/or harness while on board any vessel, and especially while manipulating equipment.
11. Always be sure all safety equipment and electronics are in good working order before you set out on your journey. 12. For general boating safety information, visit the maritime organization in your sailing destination country (such as the United States Coast Guard at [www.uscgboating.org](http://www.uscgboating.org)).

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## MAINTENANCE

Harken equipment is designed for minimal maintenance, but some maintenance is required to give the best service and comply with the Harken limited warranty.

In general, the most important aspect of maintenance is to keep your equipment clean by frequently flushing with fresh water. In corrosive atmospheres, stainless parts may show discoloration around holes, rivets, and screws. This is not serious and may be removed with a fine abrasive.

With the exception of winches, do not use grease unless specifically recommended in the instruction manual. Many Harken products are provided with specific instruction manuals that detail maintenance procedures. Manuals are available at no charge by contacting Harken or a Harken distributor.

**Small Boat/Midrange Blocks**—The plastic sideplates and sheave of Small Boat/Midrange blocks are UV stabilized, but they may turn gray after exposure to the sun. This discoloration may be removed with a fine abrasive, but will not reduce the strength of the blocks. Flush Small Boat/Midrange blocks frequently with fresh water. Periodically clean blocks with detergent and water to remove salt and dirt. Dry lubricants such as McLube®, which will not attract dirt, may be used. Inspect blocks periodically for damage. In particular, inspect shackles and swivel posts for cracks, corrosion, or elongation. When replacing shackles, be sure to use Harken parts to prevent snagging. Do not leave heavy loads on Small Boat/Midrange blocks when not being used. This may slightly deform the bearings. Normally they will return to their proper shape after being rotated, but an initial resistance to rolling may be felt.

**Big Boat Blocks**—Flush blocks thoroughly with fresh water. Periodically, disassemble the blocks and clean with detergent and fresh water. Lubricants, which will not attract dirt, may be used. Examples are McLube®, dry Teflon®, or dry silicone sprays. Inspect shackles and shackle posts for signs of corrosion or deformation. Mylar® washers should always be used between stainless fasteners and aluminum sideplates. Stainless fasteners that pass through aluminum blocks should be coated with an anti-seize compound. Nylock® nuts should not be used after being removed three times. When replacing shackles and fasteners, use Harken parts to maintain the proper strength. Big Boat bearings are resistant to deformation, but it is not advisable to leave heavy loads on any hardware when the boat is not sailing.

**Traveler Cars**—Keep traveler cars clean by flushing frequently with freshwater. Periodically clean cars and tracks with detergent and freshwater to remove deposits of salt and dirt. This is particularly important when cars have not been used for long periods of time. Light machine oil such as 3-in-1 may be used. Use only a single drop in each ball race; too much will attract dirt. Frequently inspect shackles and control block fittings for signs of fatigue. Be sure that every installation includes Harken track end stops and arrange control tackles so that cars do not hit the end stops under load, but are stopped by the rope.

**Jib Reefing and Furling Systems**—Keep furling units clean by flushing frequently with freshwater. Periodically clean the lower unit and the halyard swivel with detergent and fresh water to remove deposits of salt and dirt. Lubricants such as McLube®, dry Teflon® and dry silicone sprays which will not attract dirt may be used. Wash foils with soap and water. Foils may be lubricated with dry sprays to ease the raising and lowering sails. Inspect swage fittings, shackles and the lower turnbuckle assembly for signs of corrosion or fatigue. Refer to the owner's manual for detailed maintenance instructions.

**Winches**—Winches should be flushed frequently with fresh water. Periodically break down winches and service. Check pawls and springs for signs of wear and inspect bearings, gears, and spindles for wear and corrosion. Winches should be lubricated with grease, but over application of grease can cause salt and water deposits to become trapped in the winch. Use care to ensure that drain ports are unobstructed by sealants or grease. Pawls should be lubricated only with light oil. Refer to the owner's manual for detailed maintenance instructions.

**Shoes**—Remove insoles and wash and dry separately. Wash shoes by hand using mild soap; do not bleach. Rinse thoroughly. Air dry.

**Warning**— Any use of Harken® equipment for human suspension must follow a safety factor of 10:1 safe working load to actual load. A secondary safety line of an equivalent safety factor ratio must also be used. We strongly advise that aloft rigging maintenance and installation be left to rigging professionals.

1251 East Wisconsin Ave., Pewaukee, Wisconsin 53072

Tel: (262) 691-3320 Fax: (262) 691-3008 Email: harken@harken.com



*Sea* *lex*<sup>TM</sup>

# Installation Instructions

**HOOD Yacht Systems, Pompanette LLC**

7712 Cheri Court

Tampa, Florida 33634

Tel: (813) 885-2182 [www.pompanette.com](http://www.pompanette.com) <https://www.boat-manuals.com/>

SEA FLEX  
Installation Manual

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## SEA FLEX

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The technical information in these instructions, to the best of our knowledge, was correct as it went to press. However, the Hood Yacht Systems policy of continuous improvement and updating can change product specifications without prior notice. As a result, unavoidable differences between the product and instructions could happen from time to time, for which liability cannot be accepted by Hood Yacht Systems.

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For information on Hood Yacht System products, contact your local dealer or

Hood Yacht Systems  
Pompanette LLC  
7712 Cheri Court  
Tampa, FL 33634 USA  
Customer Service (603) 826-5791  
Tel: (813) 885-2182  
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[www.pompanette.com](http://www.pompanette.com)



## SEA FLEX

Congratulations and thank you for purchasing the SEA FLEX furling system. The SEA FLEX offers a flexible, easy to tit plastic ruder, ideal for smaller hoats. Incorporating all the design experience of Hood Yacht Systems, the SEA FLEX offers a low weight, low cost resolution to smaller day boat sailing. These instructions walk you step hy step through installing your SEA FLEX. time. be careful, check your measurements twice. familiarize yourself with all the parts. and enjoy the installation proce s. Remember, around a boat, it's always SAFETY FIRST. Good sailing. and thanks again for choosing the SEA FLEX by Hood Yacht Systems.

### SAFETY AND PLANNING

Hond Yacht Systems strongly suggests that you inspect the condition of your mast littings and attempting installation. If your headstay has been in a saltwater environment for more than four years. shows any fraying or rust contamination, you should consider replacing it prior to installation.

Read through all the instructions. familiarize yourself with the parts. and make sure you understand thcm before beginning.

The quality of your installation is heavily dependent on prior planning. Therefore it is critical that you make sure the drive unit will have adequate clearance over deck hardware, how pulpits. anchor lockers doors. bow anchors, bow anchor rollers, etc.. Inadequate clearance can be remedi d with the addition of stay extension hardware available from rigging uppliers. Hood Yacht S. stems recommends using as short an extension as possihle due to the los: of perlonnance of the unit and sail as extensions become longer.

Installing the unit during inclement weather or without adequate work space is heavily discouraged.

Remember, anytime you're on or around a boat, it's always SAFETY FIRST.

HOOD YACHT SYSTEMS  
Pompanette LLC  
7712 Cheri Court  
Tampa, FL 33634 USA  
Customer Service: (603) 826-5791  
Tel:  
Fax: (813) 888-5793  
Email: seafurI@aol.com  
www.pompanette.com

## READ THIS PAGE

In order to ensure continued satisfaction and trouble-free operation it is necessary to follow the simple guidelines listed below.

- 1) Watch for halyard wrap. Look up!
- 2) If it jams - find out why -  
Don't force it.
- 3) Treat this unit like any other equipment - inspect it regularly.
- 4) If any problem persists, call your dealer.



## SEAFLEX KIT CHECK LIST

### SEAFLEX DRUM KIT H9198-1

QTY.	PART NO.	DESCRIPTION	
2	H9202-TOP	TOP DRUM HALVES	_____
2	H9202-BOTTOM	BOTTOM DRUM HALVES	_____
2	HI0008	CAGE ASSEMBLY HALVES LEFT & RIGHT	_____
1	H9208 MARK II	SS LOWER BEARING	_____
2	H8-32X11TSHCS	8-32 SOCKET HEAD CAP SCREWS	_____
2	H8-32 STOP NUTS	8-32 STOP NUTS W/NYLON INSERTS	_____
4	H10-24X112SHCS	10-24 SOCKET HEAD CAP SCREWS	_____
4	H10-24-NUT-SS	10-24 NUTS SS	_____

### SEA FLEX TOP CAP KIT H9199-1

QTY.	PART NO.	DESCRIPTION	
2	H9199	TOP CAP HALVES	_____
2	H10-24X112RHMS	ROUND HEAD MACHINE SCREWS	_____
2	H10-24-NUT-SS	10-24 NUTS SS	_____

### SEAFLEX EXTRUSION KIT HI0001-33-1

QTY.	PART NO.	DESCRIPTION	
1	HI0001	SEA FLEX EXTRUSION 33 FT	_____
1	H9201-L	FURLER HOUSING LEFT	_____
1	H9201-R	FURLER HOUSING-RIGHT	_____
10	H10-24X112RHMS	ROUND HEAD MACHINE SCREWS	_____
1	H9210	SHACKLE 3/16	_____

### SEA FLEX HALYARD SWIVEL KIT HI10002-1

QTY.	PART NO.	DESCRIPTION	
1	HI0002	HALYARD SWIVEL ASSEMBLY	_____

### SEA FLEX RIGGING PIN KIT H9209








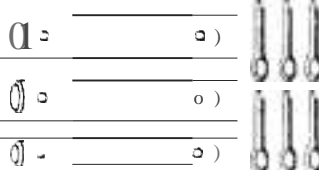
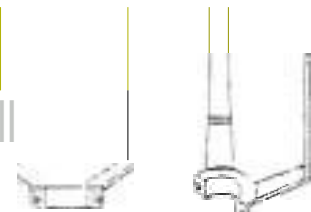





QTY.	PART NO.	DESCRIPTION	
1	114" RIGGING PIN	114" RIGGING PIN	_____
1	5/16" RIGGING PIN	5/16" RIGGING PIN	_____
1	3/8" RIGGING PIN	3/8" RIGGING PIN	_____
6	COTTER PINS	COTTER PINS	_____

QTY.	PART NO.	DESCRIPTION	
1	H9200	INSTALLATION MANUAL	_____
1	6850-3000	WARRANTY CARD	_____

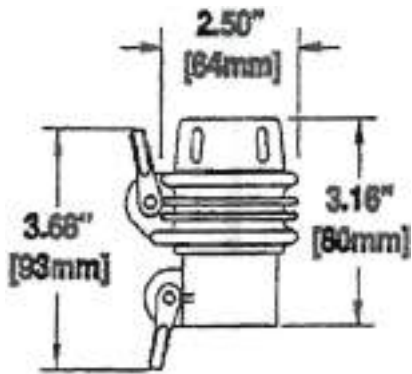
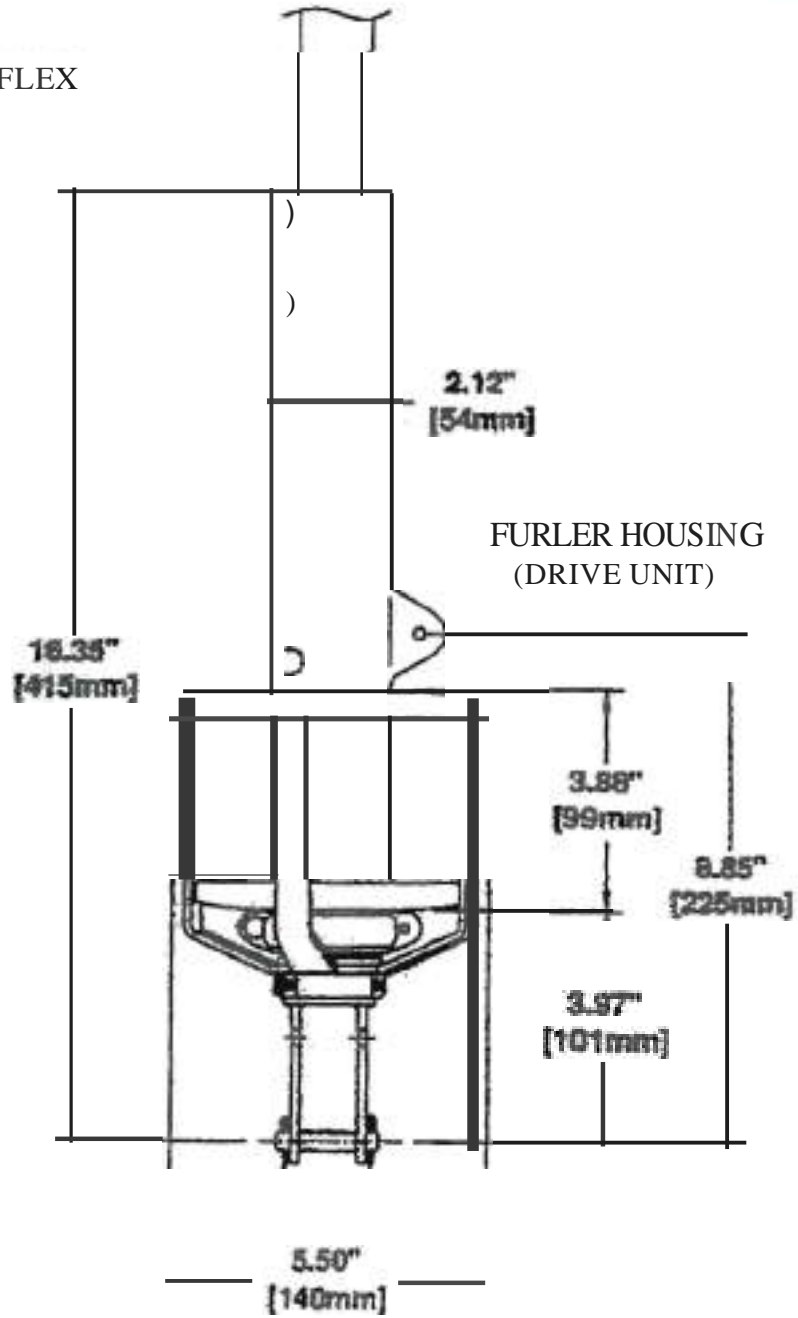
PACKAGED BY \_\_\_\_\_ DATE \_\_\_\_\_

**CHECK COMPONENTS**

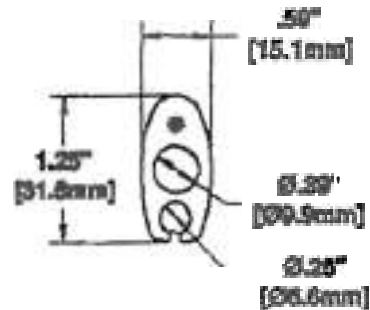
Before starting to install your furling system, check to see that your **SEA FLEX** package includes the following items.

	Description / and		Part Number / and Description
	<p>H9201 Furler Housing Left and Right</p>		<p>HiOOOI Extrusion (33')</p>
	<p>H9208 MARK II Lower Bearing</p>		<p>HI0002 Halyard Swivel Assembly</p>
	<p>H9206 Low-friction bearing liner, (2 PRE-INSTALLED in furler housing halves)</p>		<p>H9210 3/16" Shackle 3 required per assembly</p>
	<p>H9202 Top &amp; Bottom Drum Cover Halves 2 Top . 2 Bottom</p>		<p>H9209 Rigging Pin Kit (1/4", 5/16", 3/8") 6 cotter pins</p>
	<p>HI0008 Cage Assembly Left and right</p>		<p>H9211 Bushing 2 Required per assembly (1/4")</p>
	<p>H9199 Top Cap Halves</p>		<p>10-24X3/8" Screws 8 required per assembly (furler housing)</p>
	<p>8/32X1/2" Screws 8/32X1/2" Nuts 2 each required per assembly (drum halves)</p>		<p>10-24X1/2" Screws 10-24X1/2" Hex nuts 2 each (Cage Halves) 2 each (Top Cap)</p>

SEA FLEX



HALYARD SWIVEL



EXTRUSION  
#5 Luff Tape

## SEA FLEX INSTALLATION INSTRUCTIONS

### WARNING!! READ THIS NOW!!!

USE EXTREME CAUTION WHEN CUTTING THE WIRE TIES AND UNCOILING THE EXTRUSION.

THE EXTRUSION IS COILED UNDER TENSION AND HELD IN PLACE BY THE WIRE TIES.

WEAR EYE PROTECTION!!! HAVE SOMEONE ASSIST IN CUTTING AND UNCOILING THIS EXTRUSION.

The plastic Luff Extrusion (Part #H10001) comes coiled in a box. After removing it, be very careful cutting the ties holding the luff extrusion in a coiled position (**SEE ABOVE**). There is enough tension in the coiled luff extrusion that will cause it to uncoil with force.

Some memory of it being coiled is retained when the coil is unwrapped. To reverse the effects of the coil the luff extrusion must be gently bent in the opposite direction to how the coil was formed.

- 1) Unwrap the extrusion in an area where there is 30 feet of uninterrupted surface to layout the extrusion.
- 2) Starting at either end, hold the extrusion at waist height, slowly and gently walk along until you reach the other end having flexed the entire extrusion.
- 3) At this point the extrusion has gently long curves in it but no kinks or sharp curves. When it has been installed, the tension of the headstay will eliminate the remaining curvature.

### INSTALLATION OF THE LUFF EXTRUSION

- 1) Determine the length of the luff extrusion required. The upper end of the extrusion should terminate approximately 4 inches from the masthead crane or halyard sheave. Hoist a tape measure aloft with the jib halyard. Measure down to the center of the hole where the headstay stemhead clevis pin is mounted. With the tape about 4 inches from the mast, length. Subtract 14 3/8 inches. This is the length to cut the extrusion. 14 3/8 inches is the distance from the clevis pin to the bottom of the extrusion when mounted in the furler body.

NOTE: The upper end of the luff extrusion should be close to the mast without making contact. Masthead designs vary greatly. Fractional rigs need to have greater clearance at the top of the extrusion. If a fractional rig has an external tang and external halyard block, the extrusion must terminate even further away.

## INSTALLATION OF THE LUFF EXTRUSION (CONT.)

- 2) Cut the top of the extrusion with a fine tooth hacksaw. DO NOT cut the end that is machined to mate to the Furler Housing.

### WARNING! DO NOT USE A POWER SAW!

There is a stainless steel cable inside the luff **extrusion**, it is DANGEROUS to use anything other than a fine tooth hacksaw!

- 3) Using the template provided, wrap it around the extrusion top as indicated (or use the measurements in the instructions), and drill at least a  $\frac{1}{4}$  inch hole completely through the top of the extrusion for the tabs inside the top cap halves to fit into. Note that the hole can be slightly oversized.
- 4) Run a light messenger line through the extrusion. You may use a wire or plumbers snake to feed it through, or you can tie a weighted object to the line and drop it down through the extrusion.
- 5) Secure the jib halyard to the stemhead. Be sure the jib halyard is secured properly and capable of supporting the mast. Exercising extreme caution and keeping SAFETY in mind, disconnect the headstay (slackening the backstay if required) and disassemble the stemhead turnbuckle. Tape the messenger line to the to the swaged stud at the bottom of the headstay and begin to feed the extrusion over the wire. Lift the extrusion over the headstay as high as possible with another person pushing on the extrusion and pulling the messenger line. At this point, by alternately lifting the extrusion and pulling on the messenger line, the headstay will come through the extrusion.
- 6) Assemble the two Top Cap Halves (Part #H9199) together on to the top of the extrusion, using two Round Head Machine Screws and Hex Nuts. The tabs inside the Top Cap Halves should fit into the holes drilled through the top of the extrusion.

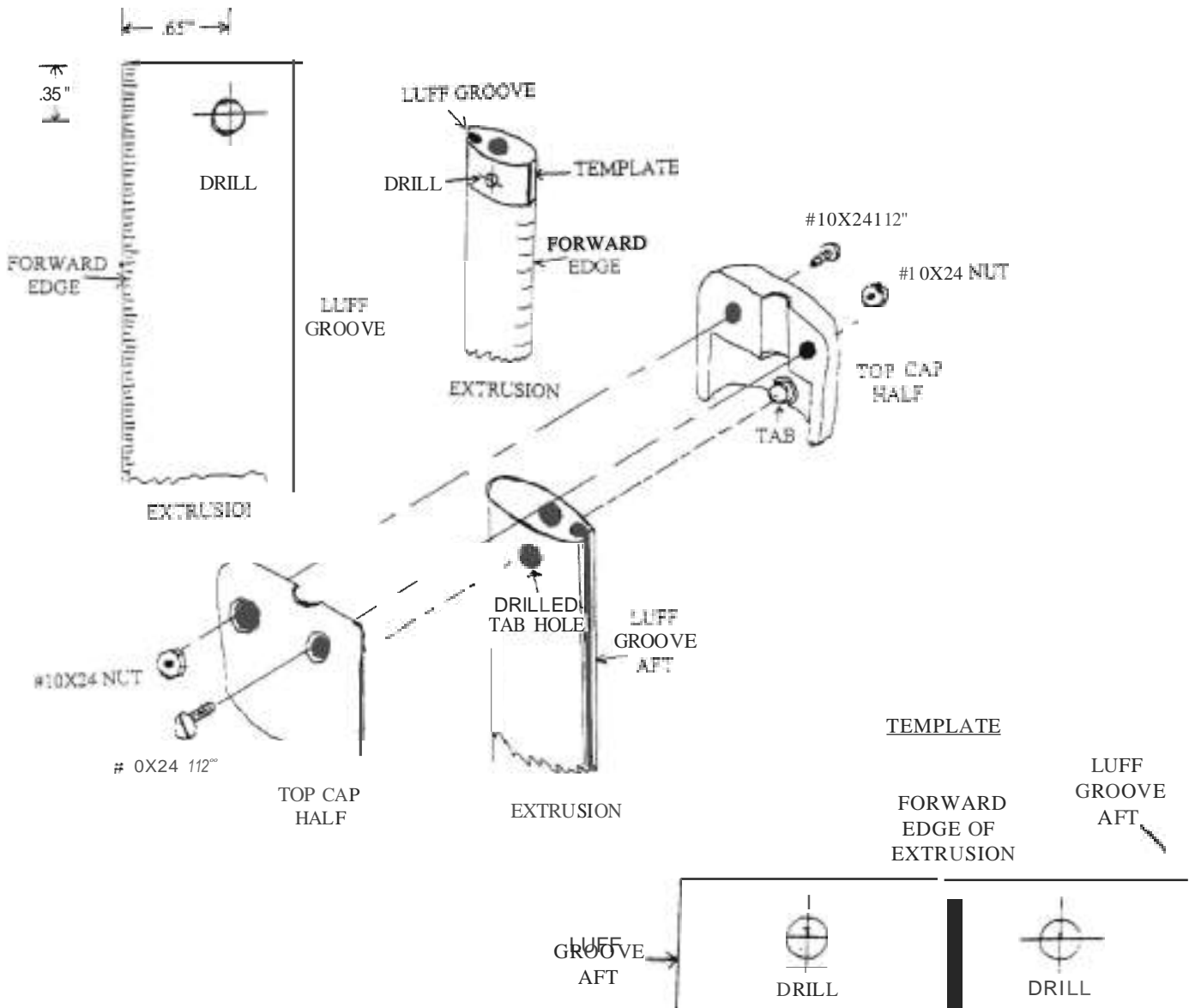
## PARTS LIST AND ASSEMBLY INSTRUCTIONS

### SEA FLEX

#### TOP CAP KIT H9199-1

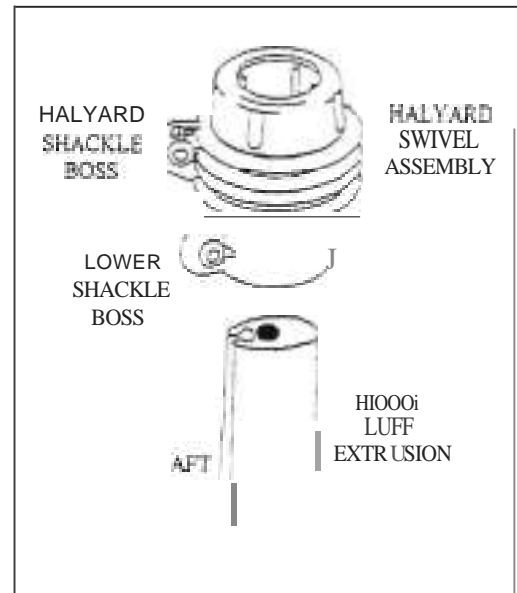
QTY.	PART NO.	DESCRIPTION
2	H9199	TOP CAP HALVES LEFT AND RIGHT
2	H10-24X1/2RHMS	10-24X1/2 ROD HEAD MACHINE SCR WS
2	H10-24-KUT-SS	10-24 NUTS SS

1. Cut out the template provided and wrap it around the extrusion top as indicated (or use the measurements in the instructions). At the mark indicated (⊕) drill a 1/4 inch hole completely through the extrusion. (Note that the hole can be slightly oversized).
2. Assemble the two H9199 Top Cap halves together on to the top of the extrusion, using the two #10-24 1/2 inch screws and hex nuts. The tabs inside the top cap halves should fit into the holes drilled through the extrusion.

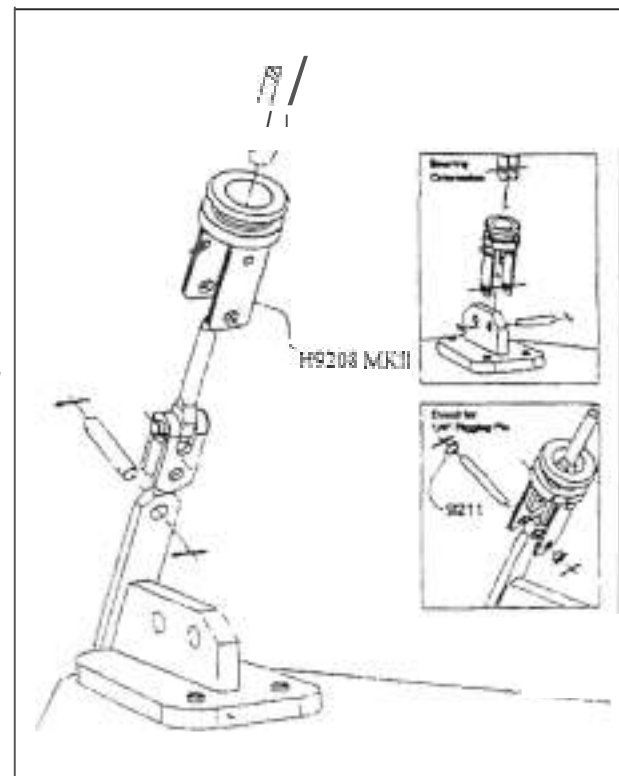


## ASSEMBLY OF THE LOWER UNIT

- 1) Align the lower shackle boss on the Halyard Swivel Assembly (Part #H1O002) with the aft side of the luff extrusion (side with the groove in it) and slide the Halyard Swivel Assembly over the luff extrusion with the upper shackle boss on top. (**marked UP**)

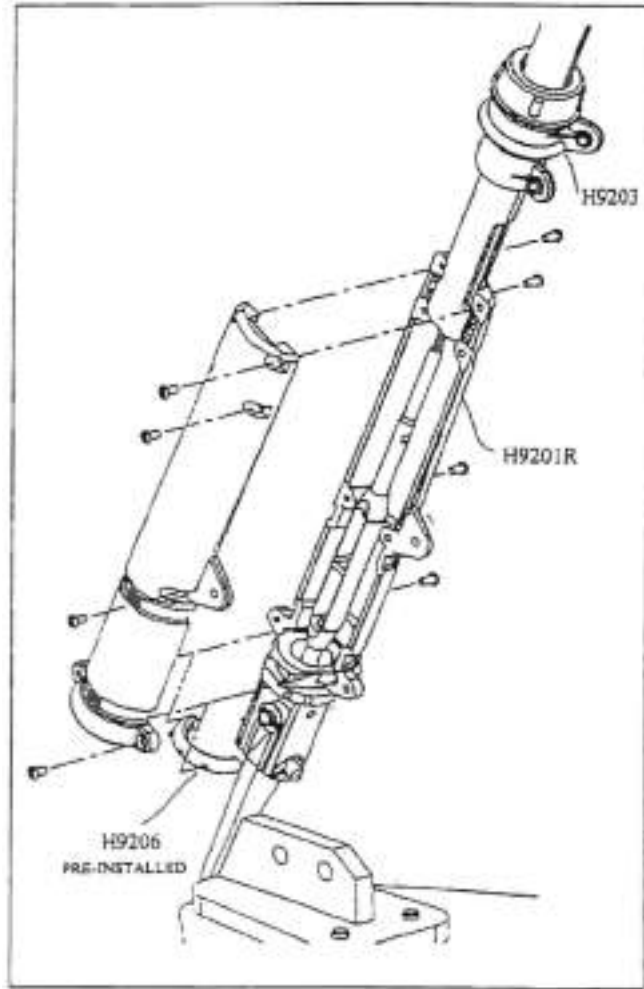


- 2) Pass the threaded portion of the toggle end of the turnbuckle up through the Lower Bearing (Part #H9208 MKII). Then thread the lower portion of the turnbuckle into the turnbuckle body. If your boat has a 1/4" diameter clevis pin you need to use the Bushings (Part #9211). The shoulder on the bushing goes into the 3/8" diameter hole in the bearing. Now the turnbuckle must be tightened to the original position.

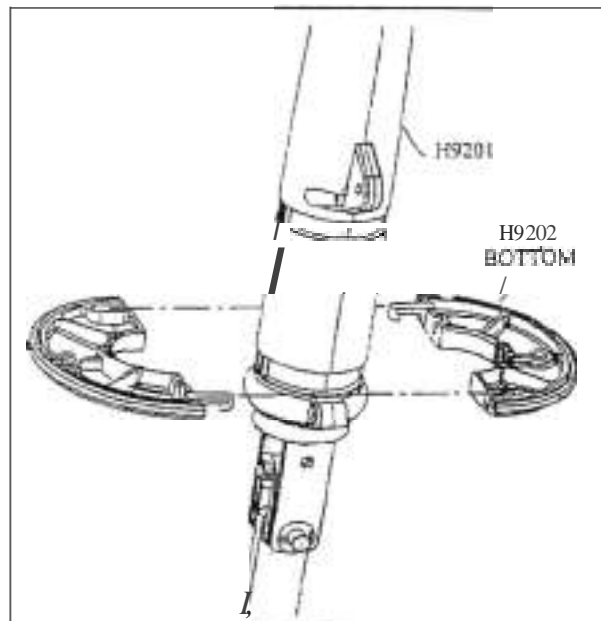


ASSEMBLY OF THE LOWER UNIT (CONT.)

- 3) Be sure that the PRE-INSTALLED Bearing Liners (Part #H9206) are firmly pressed into the Furler Housing Halves (Part #H9201).
- 4) Align the aft side of the luff extrusion with the tack shackle boss of the furler housing. With the eight Round Head Machine Screws (Part #H10-24X1/2RHMS) provided, screw the two halves of the furler housing together beginning at the bottom. At this point the tack shackle boss on the aft side of the furler housing and the tack shackle boss on the halyard swivel should be aligned.



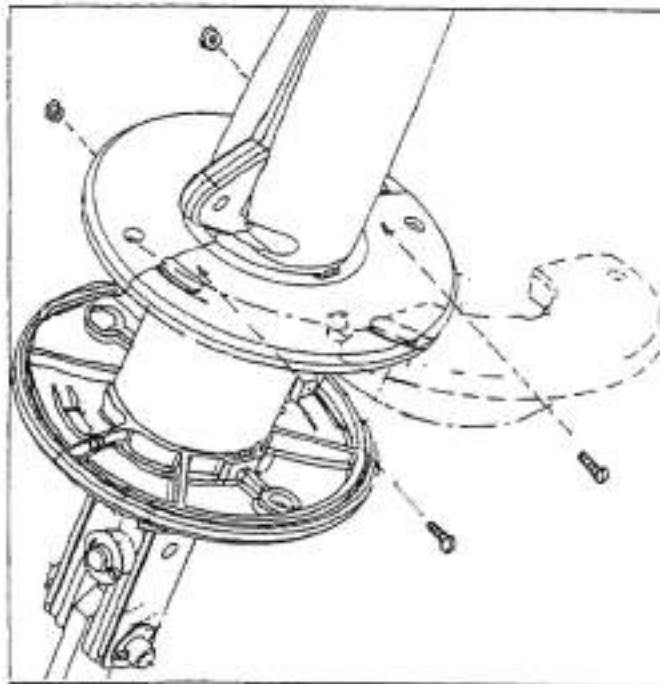
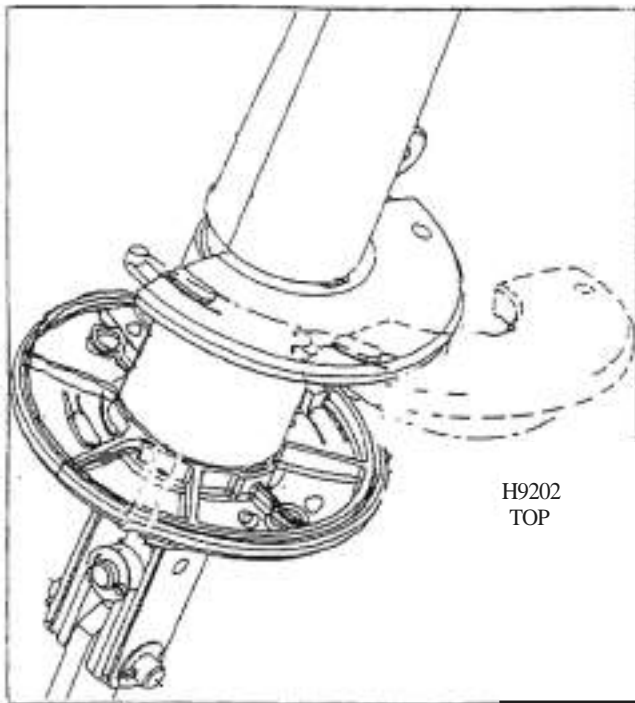
- 5) Snap on the Bottom Drum Covers (Part #H9202) (smaller diameter than the top drum covers) and lock them together in the lower position on the furler housing. Install two Socket Head Cap Screws (Part #H10-24X1/2SHCS) and Nuts (Part #H10-24-NUT-SS) inside the Bottom Drum Covers.





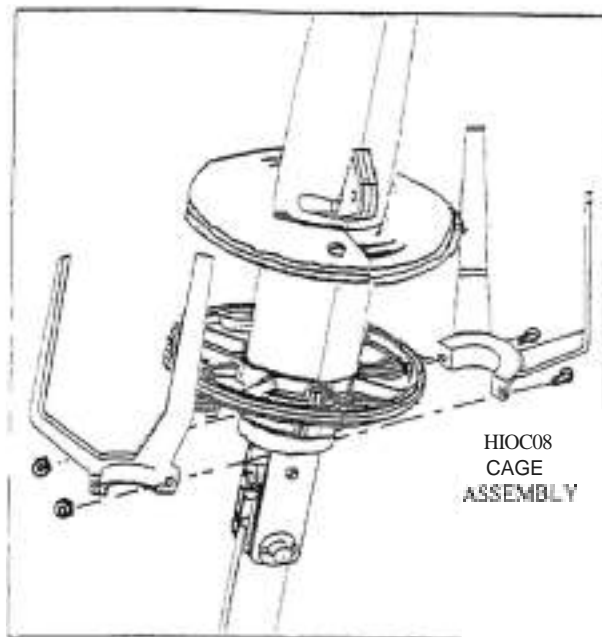
ASSEMBLY OF THE LOWER UNIT (CONT.)

- 6) Attach the two remaining drum covers (Part #H9202 Drum Covers Halves, Top) to the furler housing. Lock them together and then install the two screws and nuts inside the covers.



- 7) Slide the two Cage Assembly Halves (Part #H10008 Left and Right) around the Lower Bearing below the bottom drum cover. Secure with two Socket Head Cap Screws (Part #H8-32X1I2"SHCS) and Stop Nuts (Part #H8-32-STOPNUTS).

NOTE: Align the cage assembly with one arm pointing aft along the centerline

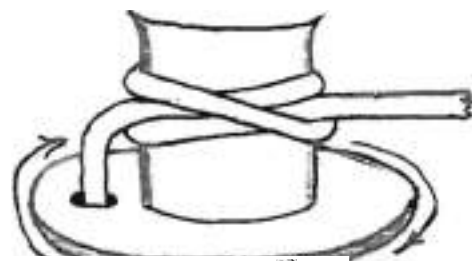
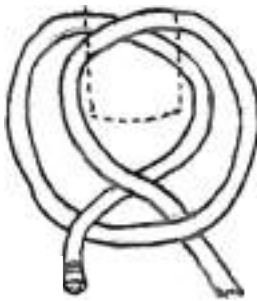


## ATTACHING THE FURLING LINE AND THE SAIL

- 1) Boat length and sail LP determine the length of the furling line needed. An average 25' boat will require a 35 foot line while a 20 foot boat could use a 30 foot line. Do not use a line larger than ¼ inch. It's better to have a little too much line than not enough.
- 2) Begin with inserting the end of the furling line into the hole in the bottom drum cover and tie an "overhand bend" stopper knot. Make sure the stopper knot is secure and not too large so it won't interfere with the cage halves. Make sure the end of the line is short enough that it won't become snagged on anything as the drum/furler housing must rotate freely.

NOTE: Due to the great variation in masthead construction, sail stretch and individual halyard loads, the following sail installation instructions should be carefully followed. If you install your Sea Flex as follows, a smoothly operating system will be assured.

- 3) Pass the line around the drum part of the furler housing and bend on a clove hitch. Tie it as shown if you're going to wind your furling line on clockwise, and just the opposite if you're winding it on counterclockwise. The drawing of the clove hitch itself is exaggerated. The clove hitch actually should be lower on the drum, tied closely up to the end of the line going through the hole in the bottom drum cover.



- 4) Rotating the drum/furler housing, feed the line onto it. Try to avoid inducing "twist" into the line. If the UV cover is on the port side of your sail, rotate the drum/furler housing counter clockwise, and if the UV cover is on the starboard side rotate the drum/furler housing clockwise.
- 5) Attach the head of the sail to the lower shackle boss on the halyard swivel with a 3/16" Shackle (Part #H9210), but do not attach the tack of the sail.
- 6) Feed the luff tape of your sail into the luff groove in the extrusion as you hoist it.
- 7) After attaching the halyard to halyard swivel, hoist the sail and swivel as far as it will go, without straining, and secure the halyard.
- 8) Down haul the sail, utilizing a spare line temporarily attached to the sail tack, and lead through the tack sheave shackle until the maximum desired luff tension is achieved.
- 9) Furl and unfurl the sail several times while watching the halyard swivel, to see if it is rotating smoothly and that there are no restrictions in it's operation.
- 10) Remove the temporary spare line attached to the tack and attach your sail as normal.
- 11) Check that you have enough furling line on the drum. (Too much is better than not enough)

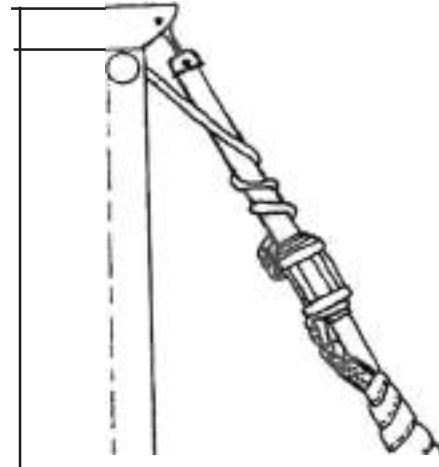
NOTE: IMPORTANT -There should always be at least three wraps of furling line around the drum even when the sail is tightly furled with several wraps of sheet around the furled sail.

## FURLING THE SAIL UNDERWAY

When reefing or furling your sail underway it is important to luff your sailor head up into the wind and ease the sheets. If reefing, advance your lead forward to keep the trim stripe (on a Hood sail) lined up with the sheet. Keep minimum sheet tension to hold a tight furl. If you have your halyard tightened up to maintain luff shape, ease the halyard to help prevent "halyard wrap" and to free up the movement in the system.

### HALYARD WRAP

Halyard wrap is a situation that arises during the furling and unfurling of your jib, when the halyard swivel does not "spin" allowing the jib halyard to remain stationary. As the sail is rolled in or out, the halyard and swivel assembly roll with it, winding itself around the headstay.



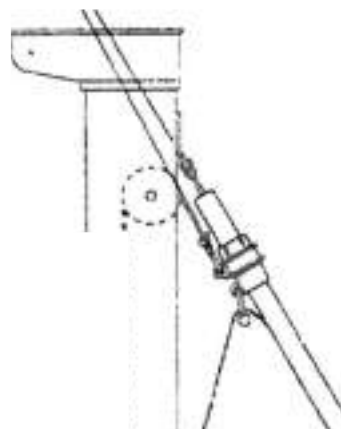
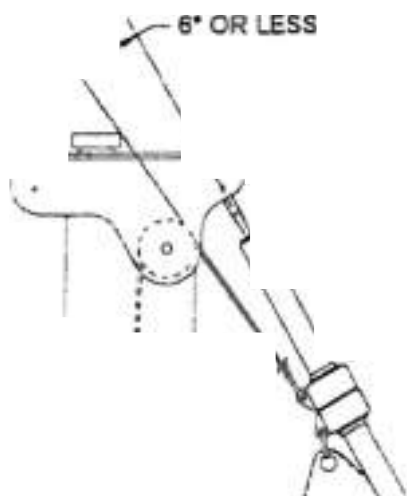
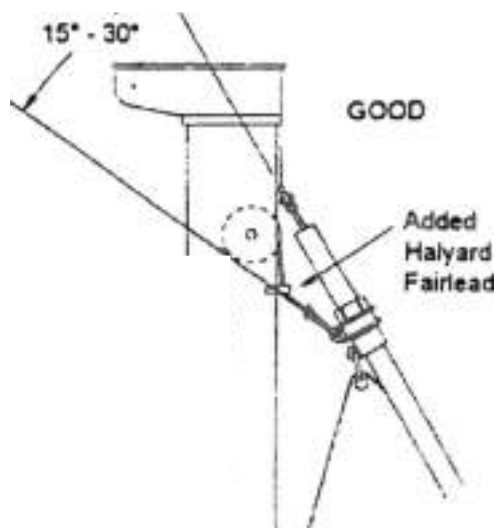
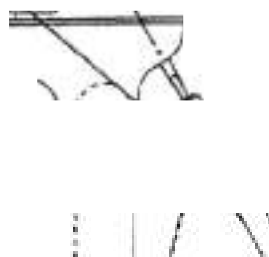
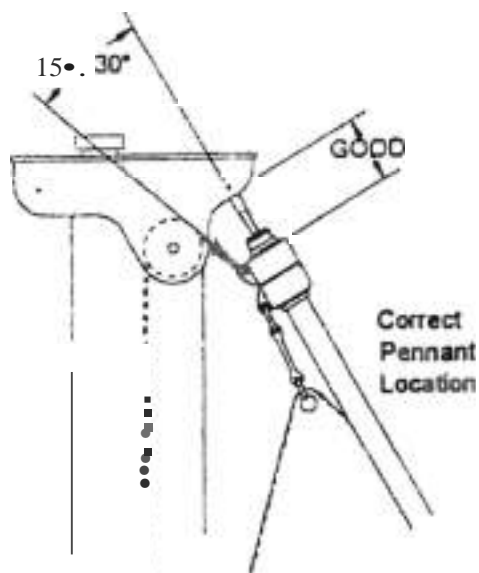
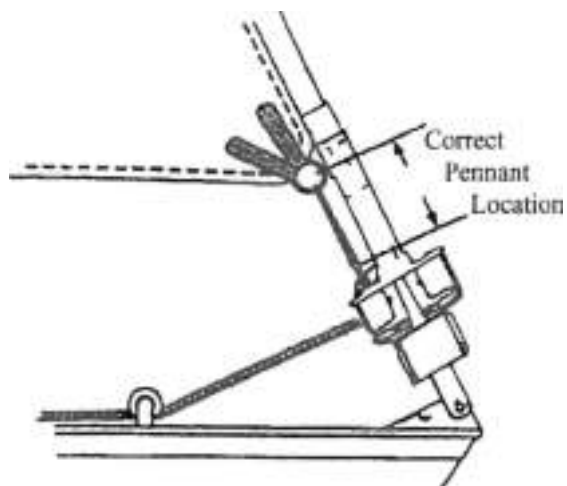
**NOTE:** Halyard wrap is probably the most common problem associated with furling systems. It's also the easiest to correct through proper installation.

- 1) The key to avoiding halyard wrap is the angle created between the halyard swivel (With sail fully hoisted) and the halyard exit box.
- 2) Do not over tighten the jib halyard. The force to furl the sail increases with tension on the halyard. Tighten the halyard just enough to eliminate wrinkles along the luff. To extend the life of the sail, it is always a good idea to ease the jib halyard tension when not sailing.
- 3) The halyard swivel should be within 8 inches of the halyard sheave in most instances. This is achieved (when required) by using a pennant on either the head or tack of the sail.
- 4) The halyard must pull up parallel or away from the headstay to achieve the correct angle or halyard wrap will occur. This condition can most easily happen on fractional rigged boats with internal halyards.

### PENNANTS

If the final distance between the sail tack and tack shackle is greater than 6 inches (152mm) a temporary lashing should be replaced with a permanent wire pennant. If this distance is less than 6 inches a pennant lashing with a minimum of three round turns of lin can be used. You may choose to leave the pennant at the tack or place it between the halyard swivel and the head of the sail.

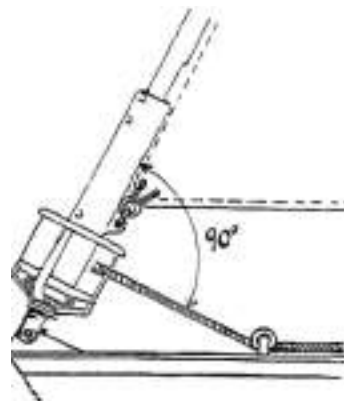
### CORRECT PENNANT LOCATION



## LOCATE THE FIRST LEAD BLOCK

In determining which side of the boat you want to install the first lead block, a port or starboard exit of the furling line from the drum is optional. There are an infinite number of ways to lead your furling line aft to a position of convenient and efficient operation. It is most important to set up the proper 90 degree lead angle from the furler housing to the first swivel lead block.

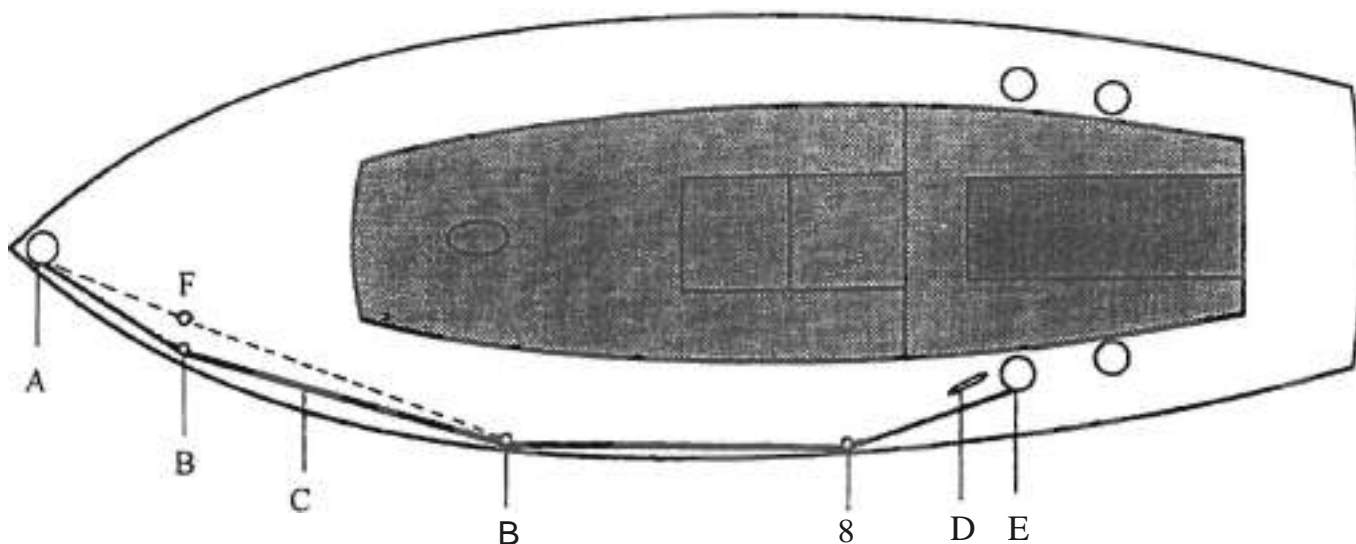
- 1) With one hand, tension the furling line while you position the lead block with the other hand until a 90 degree angle is achieved between the headstay and the furling line as it leaves the drum.
- 2) When the proper position has been determined, mark the position and securely install the first lead block. A stand-up type block works well.
- 3) Stanchion bases (if one is in the right location) or a padeye may also be used to attach the lead block.



## DECK LAYOUT

- 1) When placing the additional lead blocks, try to use as few as possible to minimize line friction. Very often these blocks can be shackled to stanchion bases. If not, padeyes may be used. One alternate method is to run the furling line down the side of the cabin through Padeyes. Choose the most efficient and convenient deck layout to suit your boat.

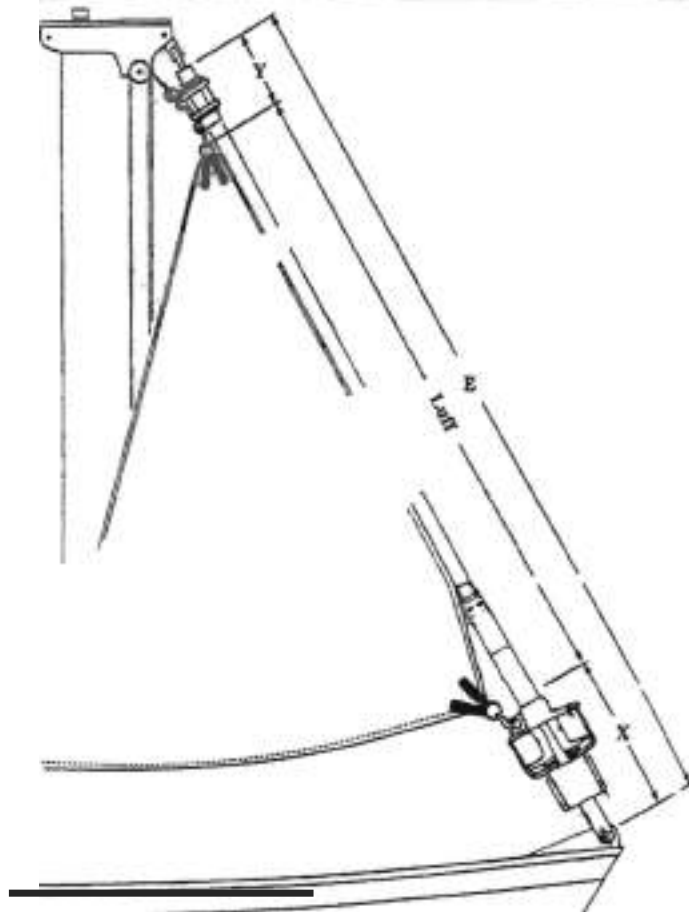
- |                    |                            |
|--------------------|----------------------------|
| A- Drive Unit      | D- Standard Cleat          |
| B- Stanchion Block | E- Standard Winch          |
| C- Yacht Braid     | F- Optional Stand-up Block |



## SAILMAKER INSTRUCTIONS

- 1) Precisely measure the distance from the bottom of the halyard shackle (at the masthead) to the center of the stemhead pin (Dimension E).
- 2) From Dimension E, subtract drum and halyard swivel measurement using the table. This will give you the maximum luff dimension for your sail, when it is fully stretched.

Overall length from sheave top to stemhead pin		E	—
Halyard swivel deduction including shackles	- Y	—	
Drum assembly deduction including shackle and toggle	- X	—	
Maximum sail luff length		=	_____



- 3) Number 5 luff tape should be used so that the sail slides easily up and down, yet doesn't pull out in heavy air.
- 4) Any other sailmaking considerations, such as webbing loops at the head and tack of the sail for a tighter furl and improved sail shape, UV covers, and where to terminate the luff tape, etc., you should consult your sailmaker.
- 5) If extreme halyard tension has been applied to alter sail shape underway, it is advisable to ease the halyard once the sail is furled to relieve the static load on the swivel bearings. This is especially true if the boat is moored for days at a time.

## MAINTENANCE

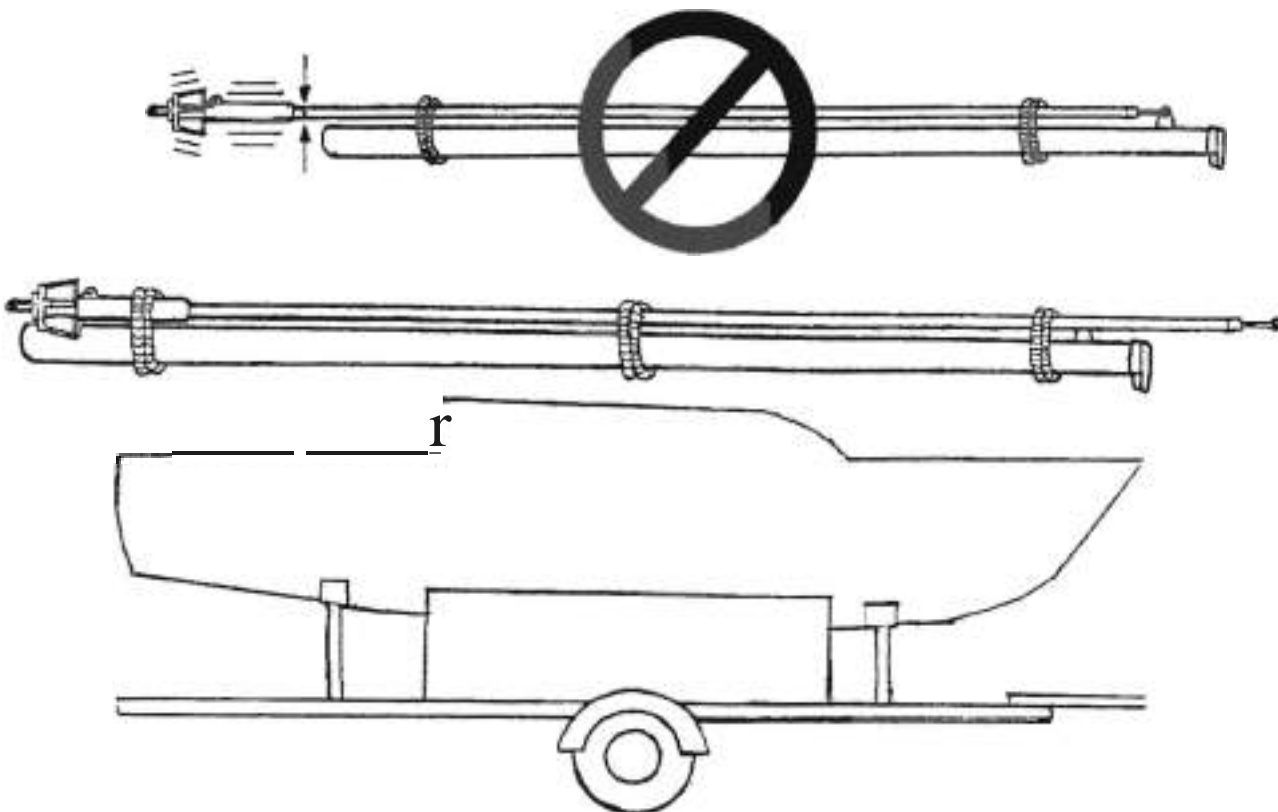
The Sea Flex is designed to be virtually maintenance-free. However, occasionally it might be necessary to rinse the halyard swivel with fresh water due to dirt/grime from trailering and/or bird guano.

The halyard swivel assembly in your Sea Flex has been equipped with Delrin balls. Delrin is self lubricating therefore it is not necessary to use any additional lubricants. In fact, many commercially available lubricants will be absorbed by the Delrin bearings making the balls enlarge, negatively affecting the operation of the system

If after extensive use or at anytime stickiness or friction become excessive, such that the bearings are not functioning acceptably, remove the entire offending assembly and return it to a Hood Yacht Systems Dealer or Distributor for servicing. At no time attempt to disassemble the halyard swivel assembly by yourself.

## TRAILERING

When trailering your boat it is advisable to disconnect your headstay completely from your mast so you can secure the drive unit and extrusion to your mast instead of having it extended beyond your mast. Unsupported it will move up and down and damage the luff extrusion. It should be supported properly. An alternative would be to entirely remove the drive unit from the headstay/extrusion for transport. You also want to keep the headstay/extrusion as straight as possible, and again, properly supported and lashed securely.



## STORAGE

When rigging or unrigging your Sea Flex for storage, any other reason, every attempt should be made to keep the headstay extrusion as straight as possible. When storing, the entire unit can be lashed to the mast or supported on a mast rack.

### WINTER STORAGE

Remove the drive unit and halyard swivel and store them in a dry compartment onboard or at home. It isn't good practice to completely cover the drive unit and halyard swivel with plastic as this will trap any condensation that occurs. During re-commissioning in the spring, it is recommended to rinse both the drive unit and halyard swivel with fresh water before installation.





## HOOD LIMITED WARRANTY FOR SEA FURL PRODUCTS

### I) WARRANTY

Hood Yacht Systems warrants that the Hood Sea Flex and Sea Furl products will be free from defects in material and workmanship for a period of five years. That period shall commence upon the receipt of the Hood warranty card within thirty days upon receipt of the goods. Any part which proves defective in normal usage during the five year period will be repaired or replaced by Hood Yacht Systems.

This warranty is subject to the following conditions and limitations:

- A) Hood Yacht Systems' liability shall be limited to repair or replacement at Hood Yacht Systems discretion. This shall be the buyers' exclusive remedy.
- B) Except where otherwise specified, quality shall be in accordance with Hood Yacht Systems specifications.
- C) The Hood Sea Flex and Sea Furl must be installed and maintained properly and used under normal conditions in the application for which they were intended.
- D) This warranty does not apply to **any** products that were improperly installed and maintained, or subject to misuse or negligence during normal operation and storage.
- E) Hood Yacht Systems shall not be responsible for shipping charges or installation labor associated with any warranty claims.
- F) Terms of this limited warranty shall be one year if the product is used in commercial, rental, or charter operations as well as with respect to any swaged attachments to wire, either standing or running rigging.
- I) Failure to obtain an owner's manual or otherwise be aware of the information contained in the owner's manual may void this warranty.
- II) The limited warranty is in lieu of all other warranties, any implied warranties are limited in duration to the duration of the warranty stated here.
- III) Hood is not responsible for consequential damages of **any** sort to the extent that such exclusion is permitted by applicable law.





## Warranty Activation Card

*To be completed and returned to Hood Yacht Systems by Owner*

Owner name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

Phone Home \_\_\_\_\_

State \_\_\_\_\_

Zip \_\_\_\_\_

Business \_\_\_\_\_

Boat Type \_\_\_\_\_

Wire Size \_\_\_\_\_

Model Purchased \_\_\_\_\_

Bought From \_\_\_\_\_

Installed By \_\_\_\_\_

Date \_\_\_\_\_

Did you receive an owner manual?     Yes     No

I have read the owner[s] manual and understand my system[s] operation and maintenance requirements.

---

Signature



**Hood Yacht Systems**

7712 Cheri Court

Tampa, FL 33634



## Our Guarantee:

Schaefer Marine, Inc. warrants its standard catalog products to be free from factory defects in material and workmanship for a period of five (5) years from the date of purchase, unless otherwise stated in this catalog or any other Schaefer Marine catalog.

At any time within five years of the demonstrated date of purchase, Schaefer Marine, Inc. will remedy any factory defect in material or workmanship (at no charge to the original purchaser) if the product is returned to Schaefer Marine, Inc. The buyer shall be responsible for shipping and insurance charges, if any, on the products returned for repair under the terms of this [warranty](#). Schaefer Marine, Inc. will pay shipping for products returned to the buyer. Return of defective products must be accompanied by a letter giving name, address, proof of purchase, type of boat, and description of malfunction of the gear.

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## SAIL FABRIC GLOSSARY

**ASPECT RATIO** The luff length of the sail divided by the foot length.

**BIAS** The direction diagonally across a piece of fabric at 45 degrees to the warp and fill.

**COUNT** The number of fibers per inch in the warp or fill.

**CREEP** Permanent, continuous elongation of a fiber under a sustained load.

**CRIMP** The "waviness" of the fiber or yarn when it is laid over and under fibers or yarns in a fabric. Crimp can contribute to the elongation of a fabric under load as it is "pulled out" of the loaded direction and "pushed into" the less heavily loaded direction.

**CROSS-CUT** A sail panel layout in which the seams run roughly parallel to one another, typically perpendicular to the leech.

**DENIER** A measure of the weight of a continuous fiber filament. It is the weight in grams of 9,000 meters of a given fiber. The lower the number, the finer the fiber. Higher denier, heavier fibers are generally more rugged and durable.

**DENIER PER INCH (DPI)** A measure of the fabric's relative weight and strength, expressed as the number of fibers per inch, generally in the primary yarn direction.

**ELONGATION** The difference between the initial length of a fabric sample and its length after stretching, expressed in 1/100ths of an inch.

**FIBER** The basic entity that is twisted into yarns and then used in the production of a fabric.

**FILAMENT** A single fibril of natural or synthetic textile fiber. Filaments are twisted or bunched to form fibers.

**FILL (WEFT)** The yarns or fibers that run across the width of the roll of fabric, perpendicular to the warp direction.

**FILM** An extruded sheet of plastic, most often Mylar® polyester film. Film's desirable properties include low stretch, good bias stability, low porosity and good adhesion. Less desirable properties include low tear strength and relatively high physical shrinkage (due to creases and folds in the film).

**FLEX STRENGTH** The ability of a fiber to retain its strength after being folded back and forth, commonly expressed as percent loss in breaking strength after flutter or fold testing.

**GSM** Weight expressed in grams per square meter.

**HAND** A subjective term for the way the fabric feels when touched. Terms like softness, crispness, dryness and silkiness all describe the hand of the fabric.

**INITIAL MODULUS/MODULUS** A measure of a material's ability to resist stretch. Initial modulus is usually expressed as grams of load per unit stretch for a certain fiber denier. The higher the initial modulus, the less the fiber will stretch.

**INSERT** A yarn or fiber laid directly into a fabric without first being woven or put into a scrim.

**LAMINATE** Fabric constructed from layers of film, scrim and/or taffeta glued together under high pressure and/or heat to form a composite sail material.

**PRIMARY YARN DIRECTION** The direction that is most resistant to stretch, typically due to a higher yarn count or a higher modulus fiber.

**RADIAL** A panel layout where the seams and panels radiate from the corners of the sail in the direction of the highest load.

**SAILMAKERS WEIGHT (SM-oz)** Weight in ounces of a piece of fabric measuring 28.5" x 36".

**SCRIM** A base fabric component created by laying out fibers in a grid pattern with the fibers joined at their intersection. A scrim can be constructed by passing fill and warp yarns over and under one another, by knitting, in which the fibers and "tied" at each intersection; or by laying the fibers straight across one another and connecting them at the intersections with glue.

**TAFFETA** An unfinished fabric employed as a covering, usually in laminate sailcloth, often enhancing durability and chafe resistance

**TENACITY** The tensile stress at rupture of a fiber expressed in grams of force per denier. Tenacity relates to the breaking strength of fibers and should not be confused with modulus, which relates more directly with a fiber's ability to resist stretch.

**TENSILE STRENGTH** A measure of the ability of a fiber, yarn or fabric to withstand pulling stresses.

**THREADLINE** The direction of the fibers or yarns in the warp, fill or bias.

**UV RESISTANCE** A measure of the effect of sunlight on cloth. UV resistance is usually expressed as the time it would take for a material exposed to sunlight to lose half of its breaking strength.

**WARP** The yarns or fibers in a fabric that run the length of a roll of cloth and, in a woven fabric, are interlaced with the fill (weft) yarns.

**WOVEN** Material made by interlacing fibers over and under each other in a regular pattern. Types of weaves include plain, leno and basket, among others.

**YARN** A continuous strand of fibers created when a cluster of individual fibers are twisted together. Yarns are used to create fabrics.

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## Sail Care & Maintenance

Your guide to extending the life and performance of your new sail through regular inspection, washing, proper use of sail cleaners, and protection from ultraviolet rays, overloading, and flogging.



[www.doylesails.com](http://www.doylesails.com)

BETTER ENGINEERED SAILS  
<https://www.boat-manuals.com/>

## PREVENTATIVE MAINTENANCE

Diligent sail care and maintenance will insure that your new Doyle sail lasts as long as possible. We recommend that your sails be inspected and serviced once a year. The sooner any chafe, mildew, or other problems are detected, the easier it is to take care of them. Your local Doyle loft will inspect all stitching and hardware. For winter storage, your sails should be stored dry and free of salt. They should be folded without any wrinkles and kept at room temperature.

## UV PROTECTION

Ultraviolet rays are the number one enemy of your sails. Left exposed to the sun when not being used, your sails will deteriorate rapidly. All mainsails, mizzens, and club staysails should have sail covers that protect them. All roller-furling genoas should have leech and foot sun covers to protect the sail fabric from the sun when the sail is furled on the headstay. (Be sure that your sail is rolled correctly—with the sun cover on the outside.)

## FLOGGING & OVERLOADING

Sail care starts with learning how to properly set and trim your sails. If you let your sails flog and flap in the breeze, the sailcloth will be broken down quickly and become prone to tearing.

Understanding where to correctly position your genoa leads and how to maintain proper halyard and sheet tension will lead to a properly set sail. Be sure to keep the leech line adjusted so that the leech does not flutter. Properly set sails last longer, and you will experience improved performance. With correctly set sails, your boat will have a better chance of sailing up to its potential. For more information on proper genoa leads, halyard tension, and sheet tension, please read the Doyle Sails Genoa and Mainsail Trim Guides.

## WASHING YOUR SAILS

Depending on the number of hours and type of use, it will become necessary to wash your sails. Washing serves two purposes: First, it rids sails of salt, dirt, and other contaminants. Salt-encrusted sails are harder to handle, and because salt is a crystal it will shorten the life of your sails. Second, washing helps remove unsightly oil, grease, rust, and mildew stains.

## USING SAIL CLEANERS

Be sure to read, understand, and follow directions on any cleaning product you may choose to use.

**Oil and Grease.** Sometimes sails pick up oil from touching various parts of the boat such as the mast, boom, spreaders, bow pulpit, and

stanchions. The removal of these types of stains starts with trying to emulsify the stain. An automotive degreaser such as Simple Green® will help to break down the stain. Follow with a mild soap and a thorough rinsing. How long the stain has been left on the sail will dictate how much elbow grease you'll have to use.

**Rust.** Rust is an iron oxide. This substance gets on sails because of oxidation of stainless-steel wire or shackles that come in contact with sails. There is only one chemical that removes rust: hydrofluoric acid. While this acid does not alter sailcloth, it is extremely dangerous to humans. We do not recommend that you try to use this acid; let your sailmaker treat any rust stains.

**Mildew.** Most sails will eventually end up with mildew stains. The most common chemical used to remove mildew is sodium hypochlorite—commonly known as bleach. Most mildew disappears quickly when bleach is applied—if doesn't, the stain probably will not come off. A thorough rinsing is needed after applying bleach.

Note: Bleach will not affect polyester (Dacron), Spectra, or Vectran fabrics. DO NOT use bleach on nylon, aramids (such as Kevlar or Twaron), or Technora. Bleach will destroy these fabrics.





**DOYLE**  
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## Mainsail Trim Guide

Your new Doyle mainsail is designed and engineered to be easy to set and trim. Fundamental principles of mainsail trim are outlined in this guide.

### Mast Tune

To achieve the best performance, your mast needs to be tuned correctly. The three major steps are:

1. set the right amount of pre-bend
2. insure athwartships straightness
3. establish the correct amount of rake

Talk to your Doyle sail consultant for mast tuning advice.

### Mainsheet and Vang: (Leech) Tension

The mainsheet is the most important single sail trim control on the boat – easing enables the boat to bear off, trimming forces the boat up into the wind. Second, the mainsheet controls the angle of attack (the sail's angle to the wind). Basic trim is achieved by simply easing the sail until it luffs, and trimming just enough to fill the sail. Be sure to ease far enough when off the wind. Many sailors over trim. It's okay for the sail to go out perpendicular to the boat on a run (providing it's not luffing), as long as the vang is on to keep the sail from wrapping around the spreader.

Up wind, the mainsheet has another critical function. It controls leech tension. Trimming the sheet when the boom is over the boat, pulls down on the leech, tightening it and removing twist. Trim the sheet until the top batten is parallel to, or pointing on the same direction as the boom. The sail's top telltale will be on the verge of stall, disappearing occasionally behind the leech. The stronger the breeze the harder you'll have to trim. If you trim too hard, the top batten will poke to windward. In light air, ease the sheet until the top telltale flows, but be careful not to give away the whole sail (no more than 20% of the sail should be lightly backwinding). It may not be possible to get the top telltale flowing.

There are exceptions to the golden rule of keeping the top batten parallel to the boom. In light air, or when acceleration is critical (out of tacks, in lumpy seas, etc.) ease the mainsheet

for extra twist. Also, when overpowered, or when in breezy, choppy conditions, use more twist than normal. In flat water, with good boat speed, pointing can be increased by over tensioning until the top batten pokes slightly to weather of the centerline.

### Boom Vang

The vang takes over the job of tensioning the mainsail leech from the sheet, once the boom is eased outboard. Tighten until the top batten is parallel or until the top telltale just begins to stall.

### Mast Bend

Mast bend, achieved with backstay and/or babystay tension, flattens (depowers) the upper 2/3 of the mainsail. Bending the mast also opens the leech and moves the draft aft. So, when adding bend, you probably need to tension the mainsheet to tighten the leech, and use Cunningham or halyard tension to pull the draft forward. When straightening the mast for more fullness (power), ease the mainsheet and luff tension. As a rule of thumb, the harder it blows, the more mast bend is needed. Super light air is somewhat an exception. Bend is needed to open the leech and to keep the main from having too deep an entry. A properly designed main should "blade out" or become practically board flat when the mast is fully bent. Use the following table as a guide to setting mast bend upwind:

Kts	0-4	5-10	11-14	15-18	18+
Bend	25%	25%	50%	80%	100%

Off the wind, use a straight mast for maximum power.

### Outhaul

This flattens the lower third of the mainsail. Use some outhaul when sailing upwind, even in light air. Ease fully off the wind only. Outhaul is applied much like the backstay to depower and reduce backwinding as the breeze increases. Upwind the outhaul can be set in three basic positions:

- Light Air -- outhaul eased, shelf partially opened
- Medium-Heavy Air -- outhaul tight, shelf closed
- Heavy Air: Outhaul tight, foot super flat

For extra power in light spots, out of tacks, in waves, etc. ease the outhaul slightly.

### Luff Tension: Cunningham & Halyard

Cunningham, halyard and gooseneck downhulls tension the luff, pulling cloth (camber) forward in the sail. The golden rule: tension luff just enough to smooth out horizontal wrinkles. As the breeze increases, luff tension should also increase. Mast bend will also require an increase in luff tension. It is usually better to under do, rather than overdo luff tension, particularly in light to moderate air.

### Traveler

The traveler controls the mainsail's angle to the wind when beating and helm balance in moderate to heavy air. For maximum power and pointing ability the boom should be on or very close to the centerline when sailing upwind. Set the leech tension with the mainsheet and/or boom vang first, then center the boom with the traveler to control helm. There are telltales on the leech. The main should be trimmed so the upper one stalls only occasionally.

### Mainsail Care

- Do not over tension the halyard.
- Flake the mainsail before bagging or putting on the boom cover. Do not stuff. Do not store wet for extended periods.
- Rinse with fresh water periodically to remove salt and heavy dirt.
- Do not leave the mainsail in the sun unnecessarily. A boom cover will extend the life of your sail significantly.
- Have your sailmaker periodically inspect your mainsail for areas of chafe and wear. Preventative maintenance will also extend the life of your mainsail.

For more detailed information specific to your sailboat, talk to your Doyle sail consultant.



## Genoa Care

- Spreaders are a genoa's worst enemy. NEVER BACK A GENOA AGAINST THE SPREADER! (90% of all structural and shape repairs are related to spreader abuse.) Tape and pad spreader ends and cotter pins carefully. Make sure the genoa has spreader and stanchion patches as necessary.
- Do not over tension the halyard. A tight luff creates a gutter, or trough along the leading edge of the sail. This is slow and will permanently distort the sail's shape. Remember to ease halyard when apparent wind velocity drops.
- Flake genoa before turtling or bagging. Do not stuff. Store dry whenever possible. Do not store wet for extended periods.
- Do your genoa a favor. Rinse with fresh water periodically to remove salt and heavy dirt. Do not leave it in the sun unnecessarily.
- Have your sailmaker periodically inspect your genoa for areas of chafe and wear. Preventative maintenance will significantly extend the life of your genoa.

For more detailed information specific to your sailboat, talk to your Doyle sail consultant.



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## Genoa Trim Guide

Your new Doyle genoa is designed and engineered to be easy to set and trim. Fundamental principles of genoa sail trim are outlined in this guide. The genoa is the primary driving force. Set the genoa trim first, then work the main.

### Mast Tune

To achieve the best performance, your mast needs to be tuned correctly. The three major steps are:

1. set the right amount of rig tension
2. insure athwartships straightness
3. establish the correct amount of rake

Talk to your Doyle sail consultant for mast tuning advice.

### Halyard (Luff) Tension

Hoist the sail initially with minimum (hand tight) halyard tension. Next, sheet in to proper trim for your point of sail. If there are horizontal wrinkles, ease the sheet and tighten the halyard just enough so when sheeted in properly there are only small, if any, horizontal wrinkles. Never start with vertical wrinkles in the luff. It is slow and the excess luff tension can damage your sail. With the sail loaded up, tension the halyard just enough to remove any horizontal wrinkles emanating from the luff. For record keeping purposes and to aid in setting the initial tension, mark the halyard and use numbering stripes as a reference.

**IMPORTANT:** Always ease the sheet when adding halyard tension. As the luff is tensioned, the leech will move closer to the spreader tip making it necessary to ease the sheet. When hoisting, don't sheet in until the sail is all the way up.

### Lead Position

Most Doyle genoas are equipped with a "trim line" at the clew to be used as an aid and starting point for lead position. Simply lining up the genoa sheet with the trim line will get you very close to the ideal position. The magic of the trim line is that it will remain accurate as the sheet is eased or a turn is taken on the roller furling. Fore and aft lead position controls leech twist and foot depth. Moving the lead forward increases leech tension, thereby reducing twist and adding depth to the foot.

Set properly, the foot of the genoa should just touch the shrouds at the chainplates and be slightly creased when the upper part of the sail is 2-4 inches off the top spreader. Do not be concerned by the crease along the foot when trimmed hard, or if the top breaks slightly early. It is better to have the lead too far aft, rather than forward! To depower the sail at the upper end of its range, move the lead aft 4-8 inches from its normal setting. To power up, move lead forward from median position 2-5 inches, in conjunction with easing the sheet.

Sheeting inboard sometimes helps pointing. Sheet as far inboard as possible in ideal conditions: smooth water, medium air, experienced helmsperson and when pointing is the objective. Sheet further outboard if: the wind is very strong or very light, when using a genoa at the top of its range, or you need to foot, not point.

When reaching, the sheet lead should move forward and outboard. A barberhauler, set up with a short sheet and snatch block on the toe rail, will do the job.

### Backstay Tension (Headstay Sag)

Tension on the backstay (masthead rigs) or runners (fractional rig), tightens the headstay and reduces headstay sag. Headstay sag controls overall depth in the genoa and in particular, makes the entry rounder and more powerful. Sagging the headstay is analogous to stepping on the gas pedal. Use sag for power hungry conditions – light air, choppy water, off the starting line, out of tacks or when you need to foot. Use a tight headstay whenever you are going fast and are looking to point. Reducing headstay sag flattens the headsail for maximum close windedness. For a more powerful sail, sag the headstay.

Set up a system for marking the "throw" or range of your backstay. A numbered batten taped to the hydraulic cylinder works well on boats so equipped. For split backstays, use the squeezer position relative to the stern pulpit. Keeping in mind the basic concept of increasing sag for power and acceleration, use the following table as a guideline for upwind trim:

Wind	0-5 app	5-12 app	12-16 app	16+
Backstay tension (% max)	10-20%	20-60%	60-90%	90-100%

### Sheet Tension

Sheet tension affects every characteristic of the sail proportionately. Trimming the sheet reduces twist, reduces depth and narrows the sheeting angle. These changes combine to produce better pointing. Easing the sheet has the opposite effect – more speed, but less pointing ability. More than any other control, you will need to change sheet tension substantially as the wind velocity and sea state change, to achieve optimum performance.

Primary responsibility of the genoa trimmer is to keep the sail's leech the same median distance off the spreader (see table below) trimming in the puffs, easing in the lulls. Secondary responsibility is to work with the helmsperson, easing for waves, lulls or whenever the boat is slow; trimming harder when the boat is up to speed and pointing is desirable. To achieve top performance, the trimmer and helmsperson must communicate.

Use the distance of the genoa leech off the spreader as a guide upwind. Without knowing the specific characteristics of your boat, it is impossible to prescribe an exact distance off the spreaders. The following table will serve as a guide for your #1 genoa:

Wind	0-5 app	6-12	13-17	17+
Distance from spreader	8-12"	4-8"	2-4"	Lead aft 4-12"

### Jib Reaching

Make sure the sheet is eased as far as possible (until the telltales flow). You should ease in every puff. Do not overtrim. Move the lead outboard to the rail and forward, so that the telltales luff as evenly as possible.



## DOYLE/PLOCH SAILMAKERS WARRANTY

The Doyle Sails you received for your yacht come with a three-year warranty against defects in materials or workmanship. The warranty pertains to sails that have received reasonable use and not damage due to abuse, neglect, chafe and or wear.

This warranty is in lieu of any other warranty expressed or implied and does not cover any incidental damage or transportation costs.

Please mail or fax back to:

Doyle/Ploch Sailmakers  
2233 3<sup>rd</sup> Ave. S.  
St. Petersburg, FL 33712  
Ph. 727-471-2040  
Fax 727-471-2041

Purchase Date: \_\_\_\_\_

Sail Type: \_\_\_\_\_

Boat Model  
& Year: \_\_\_\_\_

Owners Name: \_\_\_\_\_

Address: \_\_\_\_\_

City, State  
& Zip: \_\_\_\_\_

Email: \_\_\_\_\_



## Steering Connector Kit PIN 175125


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3



### Safety Considerations

These instructions will alert you to certain things you should do very carefully. If you don't, you could ...

- hurt yourself or bystanders
- hurt boat operator, passengers
- damage the machinery

Safety symbol, , appears next to information important to prevent you and others from being hurt.

Note symbol, Note 1, appears next to information important to keep machinery from being damaged.

**IMPORTANT:** The important safeguards and instructions appearing in these directions cannot cover all possible conditions or situations that occur. The person following these directions must use common sense, caution and care.

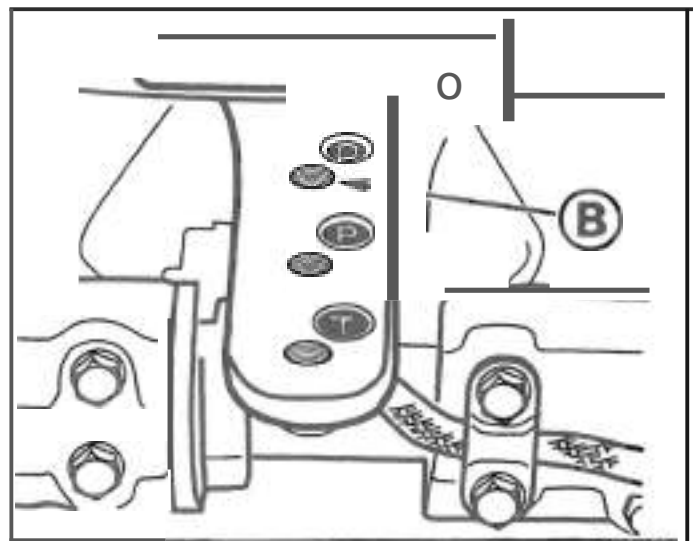
### Product Reference & Illustration

When reference is made to a brand name, product or specific tool, an equivalent product may be used in place of the referred to product. Substitute products used must have equivalent characteristics, including type, strength, and material. Incorrect substitution may result in product malfunction and possible injury to the operator and/or passengers.

All photographs and illustrations used may not necessarily depict actual models or equipment, but are intended only for reference. Specifications used are based on the latest product information available at the time of publication.



OR5076



DHC7162


## Preface

This kit connects the boat steering cable to the steering arm of E1 and newer 56 cu. in. (913 cm<sup>3</sup>) 3-cylinder, 4-cylinder, and 6-cylinder *Evinrude*® and *Johnson*® outboards with *FasTrak*™ mid-section. The *FasTrak* outboard can be identified by the six trim limiter rod holes **A** in the stern brackets, and three threaded holes **B** in the steering arm.

## To the Installer

**Important** The Installation of this kit requires the use of Special Service Tools and complex service procedures.

This kit should be installed by a trained service technician using current technical literature. These instructions are not intended for consumer use.

 Give these installation instructions to the future owner. The instructions contain safety warnings and other information vital to the continued safe use of the product.

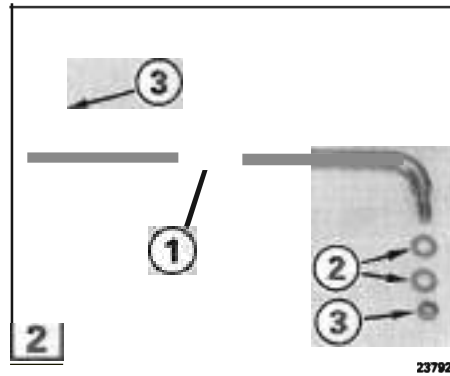
## To the New Owner


**Important** Retain these instructions with your Owner's/Operator's Manual. They contain information for future reference.

Read installation instructions prior to starting work.



Safety Related




**1**  All mechanical steering cables used with this kit should meet the current A.B.Y.C safety standard (P-17).


**2** Contents of kit:


Ref.	Name of Part	Qty.
1	Steering Connector Rod .....	1
2	Washer .....	2
-3	Locknut .....	2

Check the boats' mechanical steering: Turn steering wheel to starboard. If steering cable enters the starboard side of the motor tilt tube, the ram should extend. If steering cable enters the port side of the motor tilt tube, the ram should retract.



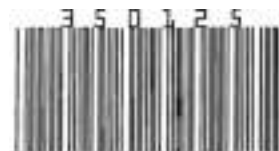
 Check for possible interference between steering system parts and any portion of motor, boat, or accessories. To do this, turn motor fully from side to side in both the running and full tilt positions. Interference may result in steering system being jammed or severed should the motor strike an underwater object and the motor tilt rapidly.

 Failure to regrease steering cable as recommended (see owner's manual) could result in steering system corrosion which may effect steering effort.

 If you remove the motor from the boat, save the special locking type screws and nuts used to fasten the steering system to the motor. When reattaching, use only the original fasteners and tighten carefully to the torque values given in these instructions. Replace any locking type fastener (example: lock nut or patch screw) whose locking feature becomes weak. Definite resistance to tightening must be felt or locking fastener is not suitable for continued use. Replace only with authorized replacement part or equivalent.



Safety Related



SVENSKA


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### Sikkerhetssynpunkter

Dessa instruktioner avser ell gör dig uppmärksam på vissa åtgärder som bör foretas med största omsorg. I annat fall riskerar du all

- skada dig själv eller någon i din omgivning
- skada båten förare eller passagerare
- skada maskineriet

Sakerhetssymbolen, anges intill sådan viktig information som avser all förhindra all du eller andra ska skada.

Observera-symbolen, , anges intill sådan viktig information som avser all förhindra all maskineriet skadas.

OBSERVERA: De skyddsanordningarna och anvisningarna kan inte ge all information om beträffar omständigheter eller situationer. Den som följer dessa föreskrifter måste ta bruk av Sill sunnda förnuft, försiktighet samt omsorg.

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När hänvisning görs till märkesnamnen, produkt eller visst verktyg, kan en motsvarande produkt användas. De ersättningsprodukter måste ha likvärdiga egenskaper, inklusive styrka, typ och material. Felskiktigt utbyte kan medföra att produkten blir defekt och ev. orsaker skador på förare och/ eller passagerare.

Alla fotografier och illustrationer behöver nödvändigtvis inte vara av den aktuella modellen eller utrustningen, men är avsedda som referens och baseras på den senaste tillgängliga produktinformationen vid tiden för publiceringen.

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
## Conjunto de Conexion de la Direccion PIN 175125

### Consideraciones de Seguridad

Estas instrucciones le alertarán hacia ciertas cosas que usted debera hacer muy cuidadosamente. Si usted no las hace, podda

- herirse o herir a los espectadores
- herir al operador de la embarcación o a los pasajeros
- danar la maquinaria

El simbolo de seguridad , que aparece junto a informaci6n importante, es para evitar que usted u otras personas se hieran.

El simbolo,  NO LA, que aparece junto a informaci6n importante, es para evitar danar la maquinaria.

IMPORTANTE: Las importantes salvaguardas e instrucciones que aparecen en estas direcciones no pueden abarcar todas las condiciones o situaciones posibles que ocurran. La persona que siga estas direcciones debe utilizar el sentido comun, precauci6n y cuidado.

### Referencia a Productos e Ilustraciones

Quando nos referimos a una marca, producto o herramienta especifica, un equivalente podrá ser usado en lugar del producto referido. Los productos usados como sustitutos deberan tener caractedsticas equivalentes, incluyendo tipo, resistencia y material. El substituir incorrectamente podrá resultar en el mal funcionamiento del producto y en posibles heridas al operador y/ o a los pasajeros.

Todas las fotografias, ilustraciones y especificaciones empleadas, puede que de hecho no representen los modelos o equipos reales; su empleo lleva la intenci6n de usarlos unicamente como referencia. Las especificaciones usadas están basadas en las ultimas informaci6nes disponibles en el momento de la publicaci6n.

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FRAŒAN


## Necessaire de connecteur pour direction PIN 175125

### Instructions de sécurité

Ces instructions alliront votre attention sur certains points devant être exécutés avec precaution. Respectez-les, pour éviter

- de vous blesser ou de blesser votre entourage
- de blesser le pilote ou les passagers du bateau
- d'endommager des pieces mecaniques

Le symbole de Sécurité, , signale des informations importantes destinees à éviter des blessures à vous-meme et à votre entourage.

Le symbole  NO LA signale des informations importantes destinees à éviter des dommages aux pieces mecaniques.

IMPORTANT: Les precautions et instructions décrites dans ce document ne peuvent couvrir toutes les situations possibles. Le lecteur devra faire preuve de bon sens, de prudence et d'attention.

### Références produits et illustrations

Pour toute une marque déposée, à un produit ou à un outil spécifique, il vous est loisible d'utiliser un produit equivalent. Les produits de substitution doivent presenter des caracteristiques identiques quant au type, à la resistance et au materiau. Une substitution incorrecte peut causer des dommages et mettre en danger le pilote et/ ou les passagers.

Les photographies et illustrations ne correspondent pas necessairement aux modeles ou à l'équipement en service; elles sont donnees au seul titre de référence et sont basees sur les informations les plus recentes disponibles à la date de la publication.

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ITALIANO


## Kit connettore della sterzo PIN 175125

### Norme di sicurezza

Le presenti istruzioni richiamano l'attenzione sulla necessita di procedere a determinate operazioni con estrema cautela. In easo contrario, si potrebbe

- rimanere feriti, o ferire i presenti
- provocare fette al pilota del motoscafo o ai passeggeri
- danneggiare le apparecchiature

Il simbolo di pericolo, , accompagna, le informazioni alle ad evitare di rimanere feriti.

Il simbolo  NO LA compare accanto alle informazioni alle a prevenire danni ai motore e alle apparecchiature.

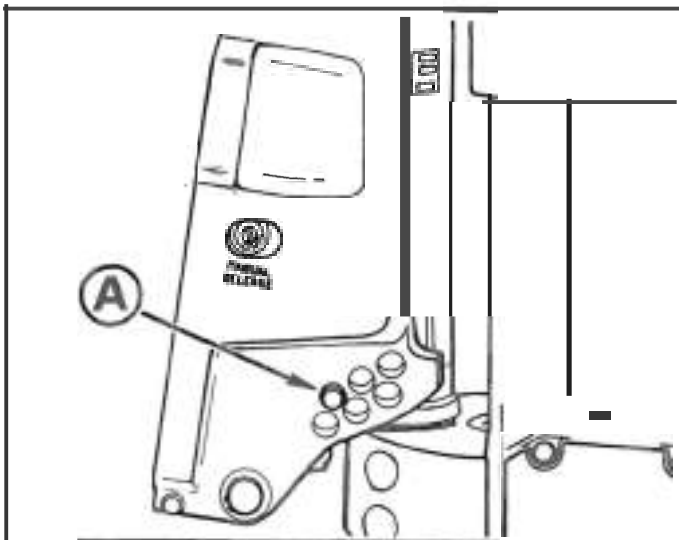
IMPORTANTE: Le norme di sicurezza e istruzioni non possono ricoprire tutte le condizioni possibili. Per cui la persona che si riferisce a queste spiegazioni dovrà fare prova di buon senso, di cautela e di attenzione.

### Riferimenti a prodotti e illustrazioni

Ogni qualvolta viene fatto riferimento ad un marchio di fabbrica, ad un prodotto ad un particolare utensile, al posto del prodotto menzionato si può utilizzarne uno equivalente. I prodotti devono presentare caratteristiche analoghe in fatto di tipo, resistenza, materiale. L'uso di prodotti inadeguati può dar luogo a malfunzionamento dei medesimi, con conseguente pericolo di ferite per il pilota e/ o i passeggeri.

Le fotografie e illustrazioni non si riferiscono necessariamente a modelli o attrezzature esistenti, ma sono intese a scopo di riferimento. Si basano sulle ultime informazioni disponibili al momento della pubblicazione.

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DR5076

SVENSKA

**Förord**

Med denna sats ansluts **hållarna** styrkabel till styrarmen på El och nyare 56 cu. in. (913 em<sup>3</sup>) 3-cylindriga, 4-cylindriga och 6-cylindriga **Evinrude**® och **Johnson**® utombordare med **FasTrak**™-rigg. FasTrak-utombordaren kännetecknas av de sex **åttingslösningshål** A i upphängningsbyglarna och de tre gangade **hålen** B i styrarmen.

Till motoren

**Viktigt** Montering av denna sats kräver användning av specialverktyg och invecklade serviceprocedurer.

Denna sats **bör** monteras av en utbildad mekaniker med tillgång till gällande teknisk Utteratur. Dessa anvisningar **är** inte avsedda **för** konsumenten.

**⚠** Ge dessa monteringsanvisningar till agaren. Anvisningarna innehåller säkerhetsvarningar och annan information som **är** viktig **för** fortsatt säker användning av produkten.

Till agaren

**Viktigt** Förvara dessa monteringsanvisningar tillsammans med din instruktionsbok. De innehåller information för framtida service.

Läs igenom dessa anvisningar fullständigt innan du börjar arbeta.

**⚠** Sakerhetsvarning

FRANCAIS

**Préface**

Ce **nécessaire** sert à raccorder le **câble** de direction du bateau au bras de direction des moteurs hors-bord, modèles El et plus récents, à 3 cylindres de 913 em<sup>3</sup> (56 pu<sup>3</sup>), à 4 et à 6 cylindres **Evinrude**® et **Johnson**® équipés de section intermédiaire **FasTrak**™. Le moteur hors-bord **FasTrak** peut être identifié par les six trous A de la tige de limitation d'angle d'assiette se trouvant dans les supports arrière et par les trois trous taraudés B situés dans le bras de direction.

À l'installateur

**Important** L'installation de ce nécessaire exige l'utilisation d'outils d'entretien **spéciaux** et des **procédures** complexes d'entretien.

Ce **nécessaire** devrait être installé par un technicien qualifié pour l'entretien qui utilise des documents techniques qui sont à jour. Ces instructions ne sont pas destinées pour le consommateur.

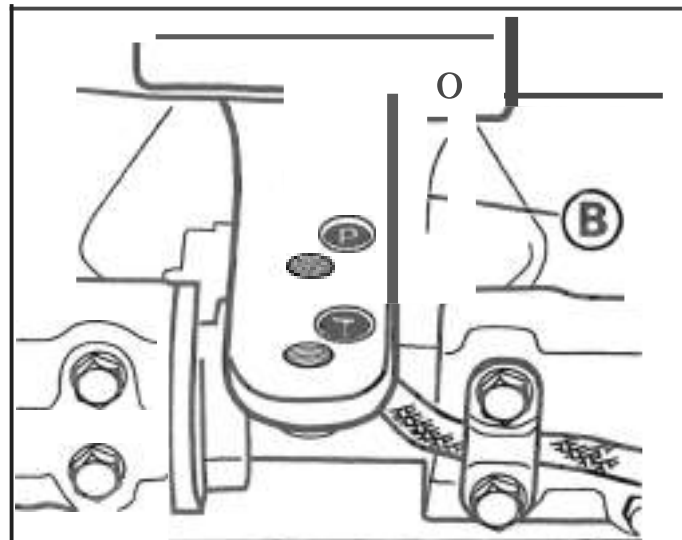
**⚠** Donnez ces instructions concernant l'installation au futur propriétaire. Celles-ci contiennent des avertissements de **sécurité** et d'autres informations vitales pour l'utilisation sécuritaire et continue du produit.

Au nouveau propriétaire

**Important** Gardez ces instructions avec votre manuel du propriétaire et de l'opérateur. Elles contiennent l'information nécessaire pour une **référence** future.

Lisez attentivement les instructions concernant l'installation avant de commencer votre travail.

**⚠** Point de Sécurité



DRC7162

ESPAÑOL

**Prefacio**

Este conjunto conecta el cable de dirección de la embarcación al brazo de dirección en los motores fuera de borda El y **más recientes** de 56 pul.<sup>3</sup> (913 em<sup>3</sup>) de 3 cilindros, los de 4 cilindros y los de 6 cilindros **Evinrude**® y **Johnson**® con sección intermedia **FasTrak**™. El motor fuera de borda **FasTrak** puede ser identificado por los seis agujeros de la varilla limitadora de compensación A situados en los soportes de papa y por los tres agujeros roscados B situados en el brazo de dirección.

Al Instalador

**Importante** La instalación de este conjunto requiere el uso de Herramientas Especiales y de procedimientos de servicio complejos.

Este conjunto deben; ser instalado por un **mecánico** entrenado por la usando la literatura de servicio actual. Estas instrucciones no fueron intentadas para ser usadas por el consumidor.

**⚠** Entregue estas instrucciones al futuro propietario. Las instrucciones contienen advertencias de seguridad y otras informaciones vitales para el uso segura y continuo de este producto.

Al Nuevo Propietario

**Importante** Guarde estas instrucciones con su Manual del Propietario/Operador. Elías contienen información para referencia futura.

Lea las instrucciones antes de comenzar el trabajo.

**⚠** Relativo a Seguridad

ITALIANO

**Prefazione**

Questo kit permette di collegare il cavo della sterzo dell'imbarcazione al braccio dello sterzo dei fuoribordo **Evinrude**® e **Johnson**® El e successivi 3 cilindri, 4 cilindri e 6 cilindri da 56 cu. in. (913 em<sup>3</sup>) con sezione intermedia **FasTrak**™. I fuoribordo **FasTrak** sana contraddistinti dai sei fori dell'asta reggispinta dell'limitatore di assetto @ nelle staffe di poppa e dai tre fori filettati B nel braccio della sterzo.

Per l'installatore

**Importante** L'installazione di questa kit richiede l'impiego di utensili speciali **QW** e compiesse procedure di manutenzione.

Questo kit va installato da un tecnico specializzato con l'ausilio della documentazione tecnica Queste istruzioni non sono destinate al cliente.

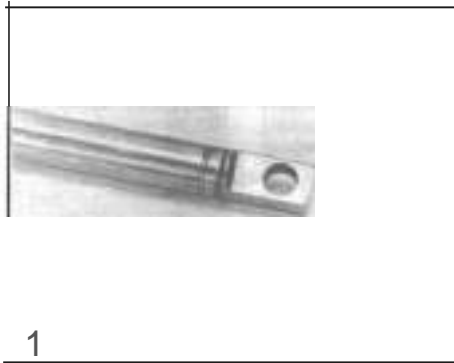
**⚠** Consegnare queste istruzioni di installazione al futuro proprietario. Contengono avvertenze di sicurezza e informazioni essenziali per l'uso continuo e sicuro di questa prodotto.

Per il nuovo proprietario

**Importante** Conservare queste istruzioni di installazione con il manuale del proprietario/utente. Contengono informazioni importanti che possono rivelarsi utili in futuro.

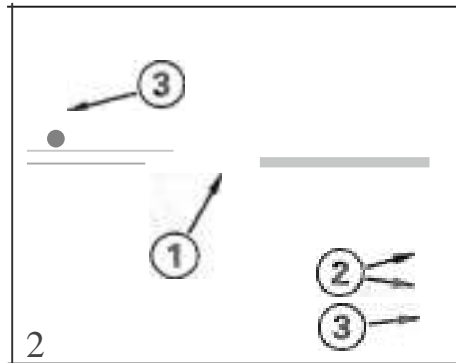
Leggere attentamente le istruzioni di installazione prima di iniziare il lavoro.

**⚠** Sicurezza d'Uso



1

23812



2

23792

SVENSKA

**1** Alla mekaniska styrkablar som används med denna sats bör uppfylla A.B.Y.C.s gällande säkerhetsnorm (P-17).

**2** Satsen innehåller:

Ref.	Benämning	Ant.
1	Styrstag	1
2	Bricka	2
3	Låsmutter	2

Kontrollera båtens mekaniska styrning: vrid ratten åt styrbord. Om styrkabeln går in i styrbords sida av motortiltroret, ska kolven gå ut. Om styrkabeln går in i babords sida av motortiltroret, ska kolven dras in.



Säkerhetsvarning

FRANCAIS

**1** Tous les câbles de direction mécanique utilisés avec ce nécessaire doivent se conformer aux présents standards de sécurité de l'A.B.Y.C (American Boat and Yacht Council) (P-17).

**2** Contenu du nécessaire:

Réf.	Designation	Qté
1	Bielle du connecteur de la direction	1
2	Rondelle	2
3	Contre-écrou	2

Verifiez la direction mécanique du bateau: Tournez le volant vers tribord. Si le câble de direction pénètre le côté tribord du tube du relevage du moteur, le tirant de direction doit s'allonger. Si le câble pénètre le côté babord du tube du relevage du moteur, le tirant doit alors se rétracter.



Point de Sécurité

ESPAÑOL

**1** Todos los cables de dirección mecánicos usados con este conjunto deberán estar de acuerdo con el estándar (P-17) de la A.B.Y.C.

**2** Contenido del Conjunto:

Ref.	Nombre de la Pieza	Ctd.
1	Varilla de Conexión de la Dirección	1
2	Arandela	2
3	Tuerca de Seguridad	2

Compruebe la dirección mecánica de la embarcación: Gire el volante de la dirección hacia estribor. Si el cable de dirección entra por el lado estribor del tubo de inclinación del motor, la corredera se deberá extender. Si el cable de dirección entra por el lado babor del tubo de inclinación del motor, la corredera se deberá retractar.



Relativo a Seguridad

ITALIANO

**1** Tutti i cavi di sterzo meccanico utilizzati con questo kit devono essere conformi alle norme di sicurezza A.B.Y.C (P-17).

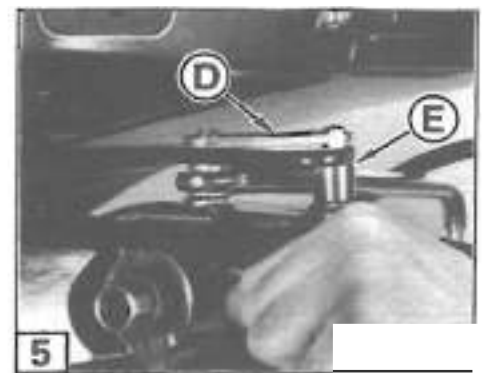
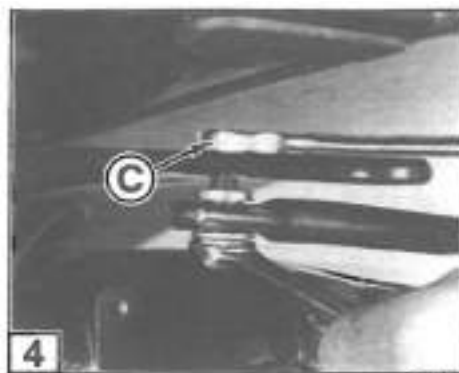
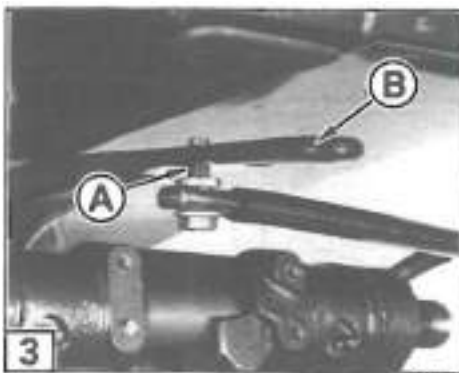
**2** Contenuto del kit:

Rif.	Descrizione	Qtà
1	Asta di connessione delle sterzo	1
2	Rondella	2
3	Dado di bloccaggio	2

Controllare lo sterzo meccanico della barca: girare il volante a tribordo. Se il cavo della sterzo entra dal lato tribordo del tubo di ribaltamento del motore, il pistone deve fuoriuscire. Se il cavo della sterzo entra dal lato babordo del tubo di ribaltamento, il pistone deve essere represso.



Sicurezza d'Uso



SVENSKA

#### Montering av styrstaget

- 3 Skruva i styrstagsskruven (A) i styrarmens @ bakre gangade hål. Använd en vridhuvudsdrivare.
- 4 Börja skruva på låsmuttern (C) på skruven så fort du har tillräckligt med gangor ovanför styrarmen.
- 4 ⚠ Ora åt styrstagsskruven tills pivåmuttern (C) kommer i kontakt med styrarmens undersida. Ora sedan åt skruven ytterligare 1/6 varv.
- 5 ⚠ Momentdra låsmuttern till 18-21 ft. lbs. (25-28 N·m) med specialverktyg PIN 912031 (D) fäst i 90° vinkel mot momentnyckeln @. Håll fast styrstagsskruven medan du drar åt låsmuttern.

#### Montering av styrkabeln

- 6 Vrid ratten så att styrkabelkolven är helt utdragen. Lägga Triple-Guard® på kolvens hela utdragna langd.



Sakerhetsvarning

FRANCAIS

#### Installation de la bielle du connecteur de la direction

- 3 Enfillez la vis (A) de la bielle du connecteur de la direction à l'orifice taraudé postérieur du bras de direction @. Utilisez un tourne-vis Torx® pour debuter.
- 4 Commencez à enfiler le contre-ecrou (C) aussitôt qu'il y a suffisamment de filets visible au-dessus du bras de direction.
- 4 ⚠ Serrez la vis de la bielle du connecteur de la direction jusqu'à ce que l'écrou pivotant (C) soit en contact avec le dessous du bras de direction. Serrez la vis d'1/6 de tour additionnel.
- 5 ⚠ Serrez le contre-ecrou à un couple de 25-28 N·m (18-21 ft. lbs.) en utilisant l'outil special PIN 912031 (D) attaché à la clé dynamométrique @ à un angle de 90°. Tenez la vis de la bielle du connecteur de la direction lorsque vous resserrez le contre-ecrou.

#### Installation du câble de la direction

- 6 Tournez le volant afin d'allonger au maximum le tirant de la direction. Enduisez toute partie visible du tirant de la direction de graisse Triple-Guard®.



Point de Sécurité

ESPAÑOL

#### Instalacion de la Varilla de Conexion de la Direccion

- 3 Enrosque el tornillo de la varilla de conexion de la direccion (A) dentro del agujero roscado trasero del braze de la direccion @. Use una llave de cuba con punta Torx para iniciar el tornillo.
- 4 Inicie la tuerca de seguridad (C) en el tornillo tan pronto como suficientes hilos de rosca salgan por encima del brazo de direccion.
- 4 ⚠ Apriete el tornillo de la varilla de conexion de la direccion hasta que la tuerca de pivote (C) entre en contacto con la parte inferior del brazo de direccion. Apriete el tornillo 1/6 de vuelta adicional.
- 5 ⚠ Apriete la tuerca de seguridad a una torsion de 25-28 N·m (18-21 lbs. pie) usando la Herramienta Especial PIN 912031 (D) sujeta en un ángulo de 90° con relacion al torsimetro @. Sujete el tornillo de la varilla de conexion de la direccion al apretar la tuerca de seguridad.

#### Instalacion del Cable de Direccion

- 6 Gire el volante de direccion para extender la corredera a su extension maxima. Apliquele grasa Triple-Guard® a toda la corredera de direccion expuesta.



Relativo a Seguridad

ITALIANO

#### Installazione dell'asta di connessione della sterzo

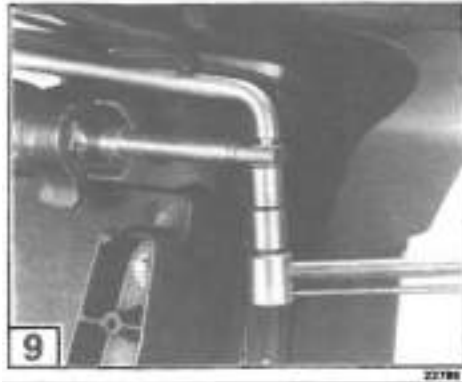
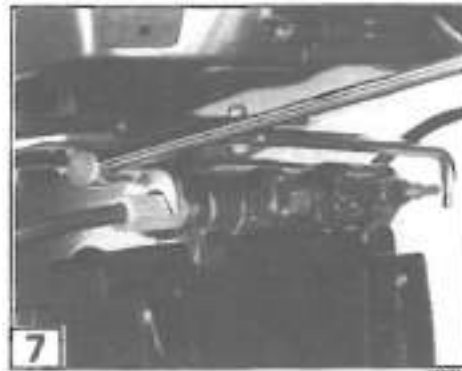
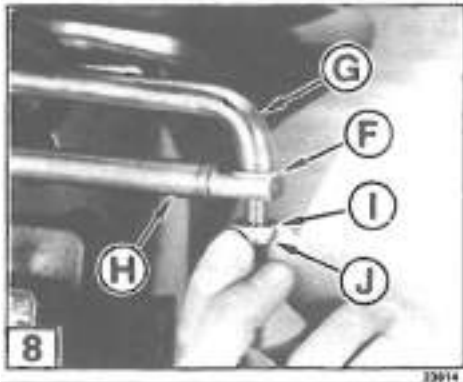
- 3 Avvitare la vite dell'asta di connessione della sterzo (A) nel foro maschiato posteriore del braccio della sterzo @. Usare un dispositivo di guida a testa esagonale per iniziare la procedura.
- 4 Iniziare ad avvitare il dado di bloccaggio (C) sulla vite appena il filetto fuoriesce dal braccio della sterzo.
- 4 ⚠ Stringere la vite di connessione della sterzo finché il dado del perno di articolazione (C) viene a contatto con la parte inferiore del braccio della sterzo. Stringere ancora la vite di 1/6 di giro.
- 5 ⚠ Stringere il dado di bloccaggio a 18-21 ft. lbs. (25-28 N·m) con l'attrezzo speciale PIN 912031 (D) fissato con un angolo di 90° alla chiave torsionometrica @. Tenere ferma la vite di connessione dello sterzo quando si stringe il dado di bloccaggio.

#### Installazione del cavo dello sterzo

- 6 Girare il volante per fare fuoriuscire al massimo il pistone dello sterzo. Applicare grasso Triple-Guard® su tutta la parte esposta del pistone dello sterzo.



Sicurezza d'Uso



SVENSKA

Sätt in styrkabelkolven genom tiltr6ret. Skruva p  kabelankarmuttern p  tiltr6ret och avlagsna d dg ng i kabeln genom att dra  t muttern ordentligt.

**Ob** Tvinga eller b j inte styrkabeln vid ihops tningen. Dra vid behov s bort motorn fr m akterspeglenn.

**7** Tryck styrkabelns mantel f rskruvning mot tiltr6ret och skruva p  styrkabelns ankarmutter p  tiltr6ret. Dra  t muttern till det av kabeltillverkaren rekommenderade momentet.

**8** Montera flatbrickan   p  styrstaget   och f st styrstaget p  styrkabelkolven  .

**8** Montera flatbrickan   och lasmuttern   p  styrstaget.

**9** Momentdra lasmuttern till 7-8 ft. lbs. (8-11 N-m) och lossa den sedan 1/8 varv.

Sakerhetsvarning

FRANCAIS

Installez le tirant du cable de la direction   travers le tube du relevage. Enflez l'ecrou d'ancrage du cable au tube du relevage et eliminez le jeu en bout du cable en resserrant fermement l'ecrou.

**Nota** Ne forcez et ne courbez pas le cable de la direction lors de l'assemblage. Si necessaire, éloignez le moteur du tableau arriere.

**7** Serrez le raccord de la gaine du cable de direction contre le tube de relevage et vissez l'ecrou d'ancrage du cable de direction sur le tube de relevage. Serrez l'ecrou d'ancrage au couple de serrage recommande par le fabricant de cable.

**8** Installez la rondelle plate   sur la bielle du connecteur de la direction   et coulissez au tirant de la direction  .

**8** Installez la rondelle plate   et le contre-ecrou   sur la bielle du connecteur de la direction.

**9** Resserrez le contre-ecrou   un couple de 8-11 N-m (7-8 ft. lbs.) et puis desserrez l'ecrou d'1/8 de tour.

Point de S curit 

ESPA OL

Instale la corredera del cable de direcci n a trav s del tubo de inclinaci n. Enrosque la tuerca de anclaje del cable en el tubo de inclinaci n y remueva el juego libre del cable apretando firmemente la tuerca.

**Nota** No fuerce o doble el cable de direcci n durante el ensamblaje. Si es necesario, separe el motor de la popa.

**7** Oprima la manga del cable de direcci n contra el tubo de inclinaci n y enrosque la tuerca de anclaje del cable de direcci n en el tubo de inclinaci n. Apriete la tuerca de anclaje a la torsi n recomendada por el fabricante del cable.

**8** Instale la arandela plana   en la varilla de conexi n de la direcci n   y sujete la corredera del cable de direcci n  .

**8** Instale la arandela plana   y la tuerca de seguridad   en la varilla de conexi n de la direcci n.

**9** Apriete la tuerca de seguridad a una torsi n de 8-11 N-m (7-8 lbs. pie) y luego afloje la 1/8 de vuelta.

Relativo a Seguridad

ITALIANO

Installare il pistone del cavo dello sterzo attraverso il tubo di ribaltamento. Avvitare il dado di ancoraggio del cavo sul tubo di ribaltamento ed eliminare il gioco sui cavo stringendo accuratamente il dado.

**Nota** Non forzare o piegare il cavo della sterzo durante il mantaggio. Se necessario, togliere il motore dalla specchio di poppa.


**7** Premere il raccordo della guaina del cavo della sterzo contro il tubo di ribaltamento ed avvitare il dado di ancoraggio del cavo della sterzo al tubo di ribaltamento. Stringere il dado di ancoraggio alla coppia indicata dal fabbricante del cavo.


**8** Installare la rondella piatta   sull'asta di connessione dello sterzo   e fissarla al pistone del cavo della sterzo  .


**8** Installare la rondella piatta   e il dado di bloccaggio   sull'asta di connessione della sterzo.


**9** Stringere il dado di bloccaggio a 7-8 ft. lbs. (8-11 N-m) e quindi allentare il dado di 1/8 di giro.

Sicurezza d'Uso


 Kontrollera om det färeligger lasningar mellan styrsystemsdelarna och delar av motor, **båt** eller tillbehär. Vrid motorn från sida till sida i som helt upptippat läge. **Låsningar** kan resultera i att styrsystemet hakar upp sig eller **går** sander om motorn skulle **stöta** emot ett **föremål** under vattnet och snabbt tippas in i baten.


 Utebliven smörjning av styrkabeln **så** som rekommenderas (se instruktionsboken) kan medföra att styrsystemet rostar vilket kan påverka den kraft det tar att styra.


 Om du demonterar motorn från båten bör du spara de speciella skruvar och muttrar av lasande typ som används för att fästa styrsystemet på motorn. Vid återmontering ska du endast använda originalfastena och dra åt dem till de momentvärden som anges i dessa anvisningar. Byt ut lasfasten (t.ex. lasmuttrar och lasskruvar) vars **låsande** egenskaper har försvagats. Om du inte känner ett definitivt motstånd vid adragning, **är låsfästet** inte lampat för fortsatt användning. Byt endast ut mot auktoriserade utbytesdelar eller motsvarande delar.

 **Siikerhetsvarning**


FRANCAIS


 Vérifiez s'il y a possibilité d'obstruction entre les pièces du système de la direction et toute partie du moteur, du bateau ou des accessoires. Pour ce faire, tournez complètement le moteur d'un l'autre en position de marche et en position de relevage complet. S'il y a obstruction, il pourrait s'ensuivre un blocage ou une rupture du système de la direction dans le cas où le moteur viendrait heurter un objet sous la surface de l'eau et qu'il se releverait rapidement.


 Manquer d'appliquer de la graisse au **câble** de direction comme recommande (voir le manuel du propriétaire) pourrait occasionner de la corrosion dans le système de la direction, ce qui pourrait rendre la direction difficile.


 Si vous retirez le moteur du bateau, réservez les vis et les écrous spéciaux de type bloquants utilisés pour la fixation du système de la direction au moteur. Lorsque vous rattachez, utilisez seulement les attaches d'origine et resserrez-les soigneusement aux valeurs de serrage indiquées dans ces instructions. Remplacez toute attache de type bloquante (exemple: contre-écrou or vis de connexion) dont la particularité de blocage a perdue de son efficacité. L'obtention d'une résistance définie au resserrement est nécessaire sinon l'attache bloquante n'est plus appropriée pour l'utilisation. Remplacez seulement avec une **pièce** de remplacement autorisée ou équivalente.

 Point de **Sécurité**


 Existe la posibilidad de interferencias entre las piezas del sistema de dirección y cualquier porción del motor, de la embarcación, o de los accesorios. Para efectuar esta revisión, gire el motor totalmente de lado a lado tanto ella posición de navegación como en la posición total de inclinación. Tales interferencias **podrá** resultar en que el sistema de dirección se trabo o se rompa, en el caso dado de que el motor se golpee contra **algún** objeto sumergido y el motor se incline rápidamente.


 El no reengrasar el cable de dirección tal como es recomendado (vea el manual de propietario) **podrá** resultar en que el sistema de dirección se oxide, lo cual **podrá** afectar el esfuerzo de dirección.


 Si Usted remueve el motor de la embarcación, guarde los tornillos de tipo traba especiales y las tuercas usadas para sujetar el sistema de dirección al motor. Al reconectar, use únicamente los sujetadores originales y apriételes cuidadosamente al las torsiones especificadas en estas instrucciones. Reemplace cualquier sujetador de tipo traba (ejemplo: tuerca de seguridad o tornillo de parche) que su característica de traba se haya debilitado. Una resistencia definitiva al apriete debora ser sentida o el sujetador no es apto para seguir en uso. Reemplacelos únicamente por las piezas de repuesto autorizadas o su equivalente.


 Relativo a **Seguridad**

ITALIANO

 Verificare che non vi siano interferenze fra gli elementi del sistema di sterzata e gli accessori o qualsiasi parte del motore o del motoscafo. Sterzare completamente da un'estremità all'altra col motore in posizione di funzionamento e in posizione di massimo ribaltamento. Le interferenze possono rovinare o bloccare il motore se questi urta un oggetto sommerso e si ribalta improvvisamente nella barca.

 Se non si lubrifica il cavo della sterzo come consigliato (vedere il manuale del proprietario) si **può** avere la corrosione del sistema di sterzo, influenzando lo sforzo di sterzata.

 Se si toglie il motore dalla barca, mettere da parte le viti e i dadi bloccanti utilizzati per fissare il sistema di sterzo al motore. Quando si rimonta il motore, utilizzare solo i dispositivi di fissaggio originali e stringerli attentamente ai valori indicati nelle istruzioni. Sostituire qualsiasi dispositivo di bloccaggio (esempio: dadi o viti bloccanti) di diminuito potere bloccante. Questi dispositivi devono opporre una forte resistenza al serraggio per poterli riutilizzare. Se sono richiesti pezzi di ricambio, utilizzare solo quelli autorizzati o equivalenti.

 Sicurezza d'Uso



NEDERLANDS


## Stuuraansluitingskit PIN 175125

### Veiligheidsvoorschriften

Deze instructies maken u attent op aanwijzingen die u zorgvuldig in acht moet nemen. Zoniet kan het gebeuren dat

- uzelf of omstanders verwondingen oplopen
- de bestuurder of passagiers verwondingen oplopen
- de motor of onderdelen daarvan beschadigd worden

Het veiligheidssymbool  staat bij belangrijke informatie die moet voorkomen dat zelf en/of anderen verwondingen kunnen oplopen.

Het symbool  staat bij belangrijke informatie die moet voorkomen dat de motor of onderdelen daarvan beschadigd kunnen worden.

**BELANGRIJK:** De voorzorgen en aanwijzingen in deze richtlijnen kunnen niet alle situaties voorzien. Bij het opvolgen van deze richtlijnen zijn gezond verstand, voorzichtigheid en zorgvuldigheid geboden.

### Produktreferenties en illustraties

Ais verwezen wordt naar een merknaam, produkt of specifiek gereedschap, kunt u eenzelfde soort produkt gebruiken. In dat geval echter moet het produkt precies dezelfde eigenschappen hebben wat betreft type, sterkte en materiaal. Zoniet kan dat leiden tot een slechte werking van het produkt en kunnen bestuurderen/of passagiers verwondingen oplopen.

Foto's en illustraties beelden niet noodzakelijk bestaande modellen of apparatuur af maar dienen uitsluitend als referentie. De gebruikte specificaties zijn gebaseerd op de meest recente produktinformatie op het moment van publicatie.

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NORGE


## Styretilkopplings-sett PIN 175125

### Sikkerhetshensyn

Disse anvisningene må fliggjes meget nøye. Hvis ikke kan

- du selv eller folk i nærheten bli skadet
- båtkører eller passasjerer bli skadet
- motoren bli skadet

Sikkerhetssymbolet, , står angitt ved siden av opplysningsom er viktige for å hindre at du selv eller andre blir skadet.

Symbolet, , står angitt ved siden av opplysninger som er viktige for å hindre at maskineriet blir skadet.

**VIKTIG:** De sikkerhetsforanstaltninger og anvisninger kan ikke dekke alle mulige forhold og situasjoner. Den som følger veiledningen, må bruke sunn sans og være forsiktig og omhyggelig.

### Produkt referanse og illustrasjon

Hvor det gjøres henvisning til et et varenavn, produkt eller spesifikt verktøy, kan det brukes et tilsvarende produkt. Slike produkter må ha nøyaktig samme egenskaper, inkludert type, styrke og materiale. En feilaktig erstatning kan resultere i at produktet fungerer dårlig med fare for at fører og/eller passasjerer kan komme til skade.

Aile fotografier og illustrasjoner som anvendes stemmer ikke alltid med de aktuelle modeller eller utstyr, men er bare ment som referanse basert på siste tilgjengelige produktinformasjon før utgivelsen.

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SUOMI


## Ohjausliitinsarja PIN 175125

### Turvallisuusohjeet

Nämä ohjeet on tarkoitettu saamaan sinut suorittamaan tietyt tehtävät erittäin huolellisesti. Ellet tee näin, saatat

- vahingoittaa itseäsi tai sivullisia
- vahingoittaa veneen ohjaajaa tai matkustajia
- vaurioittaa konetta

Variotusmerkki, , tiedotuksen vieressä, joka on erittäin tarpeellinen estämään sinua ja toisia vahingoittumasta.

Huomiomerkki, , tiedotuksen vieressä, joka on erittäin tärkeä koneen vaurioitumisen estämiseksi.

**TARKEAA:** Näissä ojeissa annetuissa turvavaroituksissa ja ohjeissa ei voida ennakoita kaikkia mahdollisia olosuhteita tai tilanteita. Nämä ohjeita noudattavan henkilön on käytettävä harkintaa, huolellisuutta ja varovaisuutta.

### Viitaukset tuotteeseen & kuvat

Tuotteen merkkiin, tuotteeseen tai erityiseen työkaluun viitattaessa vastaavanlaista tuotetta voidaan käyttää viitteessa mainitun tuotteen sijasta. Vastaavanlaisia tuotteita käytettäessä niiden ominaisuuksien tyyppi, vahvuus ja materiaali mukaanluettuina on vastattava alkuperäisiä tuotteita. Väärin tarvikkeiden käyttö voi johtaa tuotteen vaurioitumiseen ja mahdollisesti koneen käyttäjän ja/tai matkustajien loukkaantumiseen.

Valokuvat, piirrokset ja erittelyt, joita on käytetty, eivät välttämättä kuvaa olemassa olevia malleja tai laitteita, vaan ne on tarkoitettu ainoastaan viitteeksi perustuen viimeisiin painatusten aikana saatavissa oleviin tuotetietoihin.

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DEUTSCH


## l enkanschluB-Bausatz PIN 175125

### Hinweise für die Sicherheit

Diese Anleitungen sollen Sie auf bestimmte Dinge aufmerksam machen, die Sie mit

- sich selbst oder Umstehende verletzen
- den Skipper oder Bootsinsassen verletzen
- mechanische Teile beschädigen

Das Sicherheitssymbol, , steht neben wichtigen Hinweisen, die Sie und andere vor Verletzungen bewahren sollen.

Das Symbol, , steht neben wichtigen Hinweisen, die die mechanischen Teile vor Beschädigung bewahren sollen.

**WICHTIG:** Die Schutzmassnahmen und Anweisungen können nicht alle Umstände oder Situationen decken. Die Person, die diese Richtlinien befolgt, muß vernünftig, vorsichtig und sorgfältig vorgehen.


### Verweise auf Produkte und Abbildungen


Wenn auf einen Markennamen, ein Markenerzeugnis oder ein Spezialwerkzeug hingewiesen wird, kann ein gleichwertiges Erzeugnis verwendet werden. Die Ersatzprodukte müssen jedoch die gleichen Eigenschaften (Type, Stärke und Material) aufweisen. Die Verwendung eines falschen Teils kann zu Verletzungen des Skippers und/oder der Boots-insassen führen.


Photos und Abbildungen zeigen nicht unbedingt das jeweilige Modell bzw. die Ausrüstung, sondern dienen lediglich zur Erklärung. Die technischen Daten beziehen sich auf die letzte gültige Produktinformation zum Zeitpunkt der Veröffentlichung.

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 Controleer of er geen fricties zijn tussen onderdelen van het besturingssysteem en een deel van de motor, boot of accessoires. Doe dit door de motor zowel in de vaar- als in de uiterste tiltstand helemaal van de ene naar de andere kant te draaien. Door fricties kan het besturingssysteem geblokkeerd raken of het begeven als de motor een voorwerp onder water mocht raken en snel in de boot kantelt.


 Als u nalaat de stuurkabel te smeren zoals aanbevolen (zie Handleiding voor de gebruiker) kan het besturingssysteem gaan roesten waardoor het sturen wordt bemoeilijkt.


 Als u de motor uit de boot haalt, bewaar dan de speciale klem-schroeven en moeren die gebruikt worden om het besturingssysteem aan de motor te bevestigen. Gebruik als u de motor weer vastzet alleen de originele bevestigingsonderdelen en houd u bij het bevestigen zorgvuldig aan de torsiewaarden die in deze instructies worden gegeven. Vervang elk bevestigingsonderdeel (zoals borgmoeren of zelfklemmende schroeven) die niet meer goed functioneren. Er moet duidelijk weerstand worden gevoeld bij het aandraaien, anders is het klemonderdeel niet meer geschikt voor gebruik. Vervang alleen door een erkend vervangingsonderdeel of een equivalent.

 Opgelet


SUOMI


 Tarkista koskettavatko ohjausjärjestelman osat mahdollisesti joitakin moottorin, veneen tai liisivarusteiden osia. **Käännä** moottoria taysin laidasta laitaan ~~selvä~~ ajoasennossa **että** taysin kipatussa asennossa. Kosketusten vaikutuksesta ohjausjärjestelmä saattaa jumittua tai vahingoittua. Jos moottori osuu vedenalaiseseen esteeseen ja kippautuu akisti veneeseen.


 Jos ohjausvaijeria ei rasvata suositusten mukaisesti (katso omistajan kiisikirja), ohjausjärjestelmä saattaa ruostua, **mikä** voi vaikuttaa tarvittavaan ohjausvoimaan.


 Jos poistat moottorin veneesta, pane talteen erityiset lukkoruuvit ja -mutterit, joilla ohjausjärjestelmä on kiinnitetty moottoriin. Kun **kiinnität** moottoria uudelleen, **käytä** vain ja kiristä ne huolellisesti **näissä** ohjeissa määritettyihin kiristysarvoihin. Vaihda kaikki lukkotyyppiset kiinnikkeet lesim. lukkomutterit tai ruuvit, joiden lukitusominaisuudet heikenevät. Jos et kiristaessasi tunne **selvää** vastusta, lukkokiinnike ei **enää** sovellu **käytettäväksi**. **Käytä** vain suositeltua varaosaa tai vastaavaa.

 Varoitus


 Kontroller om noen av styresystemets deler hemmes av noen del av motoren, **båten** eller tilbeheeret. Dette **gjøres** ved å dreie motoren i ytterstilling fra den ene siden til den andre ~~både~~ mens den ~~står~~ i ~~kjørstilling~~ og i full tiltstilling. Hvis noen av disse delene hemmes kan styresystemet ~~lase~~ seg fast eller ~~adlogges~~ hvis motoren skulle **slå** mot en gjenstand under vannet slik at den tiltes raskt opp.


 Hvis ikke styrekabelen smeres som anbefalt (se eierens håndbok) kan resultatet bli at styresystemet blir angrepet av korrosjon med vanskelig styring som følge.


 Hvis du tar motoren av **båten**, **må** du ta vare på de spesielle skruene og mutrene av den lasbare typen som fester styresystemet på motoren. **Når** motoren monteres tilbake, **må** du kun bruke det originale monteringsutstyret som **må** strammes med omhu til momentet som er gitt i denne anvisningen. Alt lasbart monteringsutstyr (f.eks. kontramuttere eller lappeskruer) som har svekket laseevne, **må** skiftes ut. Du **må** kjenne at det er god motstand **når** du strammer disse skruene og mutrene ellers er de ikke brukbare. Du **må** kun bruke godkjente reservedeler eller tilsvarende produkter.

 Gjelder Sikkerhet

DEUTSCH

 Überprüfen, ob zwischen Teilen des Lenksystems und irgendeinem Teil von Motor, Boot oder Zubehör Beeinträchtigungen vorliegen. Dazu den Motor in Fahrposition und in vollständig gekippter Position vollständig von einer Seite zur anderen drehen. Beeinträchtigungen können dazu ~~das~~ Lenksystem blockiert oder **beschädigt** wird, falls der Motor auf ein Unterwasserobjekt trifft und schnell hochkippt.

 Wird das Lenkkabel nicht entsprechend den Empfehlungen geschmiert (siehe Technische Bedienungsanleitung), kann es zu Korrosion des Lenksystems kommen, wodurch der Lenkwiderstand beeinträchtigt werden konnte.

 Wenn der Motor vom Boot abgenommen wird, die speziellen Sicherungsschrauben und Muttern alJbewahren, mit denen das Lenksystem am Motor befestigt wird. Zur Befestigung nur die originalen Befestigungselemente verwenden und korrekt auf die in dieser Anleitung angegebenen Drehmomente anziehen. Befestigungselemente (z.B. Sicherungsmuttern und Sicherungsschrauben) austauschen, wenn ihre Befestigungseigenschaften nachlassen. Beim Anziehen muß ein deutlicher Widerstand gespürt werden. Andernfalls ist das Teil zum weiteren Gebrauch nicht mehr geeignet. Zum Austausch nur zugelassene Ersatzteile oder gleichwertiges Material verwenden.

 Sicherheitshinweis






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**INSTALLER: THESE INSTRUCTIONS CONTAIN IMPORTANT SAFETY INFORMATION AND MUST BE FORWARDED TO BOAT OWNER.**

These instructions describe how to install the following Bezel Kits and Steering Helms for **Safe-T™**, **NFB™**, and **NFB Safe-T II™** Steering Systems.

BEZEL KIT P/N	DESCRIPTION
SB 27150	BEZEL KIT, NFB; SAFE-T II ( 90°)
SB 27483	BEZEL KIT, ALL SYSTEMS (20°)
SB 27484	BEZEL KIT, SAFE-T (90°)

 NOTE: The SB 27150 kit is for use with SH5150, SH4910, and SH4920 helms only. IT MAY NOT BE USED WITH ANY OTHER HELM.

In addition to this kit, the following components are required for a complete **Safe-T™**, **NFB™**, or **NFB Safe-T II™** system.

- (1) Steering Helm (see catalog)
- (1) SSC 62-length Cable (two required for dual helm)
- (1) Steering Wheel (see catalog, max. 16 inch diameter)
- (1) Engine Connection Kit (see catalog)

**WARNING**

**BEFORE STARTING INSTALLATION READ THESE INSTRUCTIONS THOROUGHLY. FAILURE TO FOLLOW THESE INSTRUCTIONS OR INCORRECT ASSEMBLY CAN RESULT IN LOSS OF CONTROL AND CAUSE PROPERTY DAMAGE OR INJURY.**

**DO NOT SUBSTITUTE PARTS FROM OTHER MANUFACTURERS, THEY MAY CAUSE A SAFETY HAZARD FOR WHICH TELEFLEX INC., USA CANNOT ACCEPT RESPONSIBILITY.**

**TO AVOID EXCESSIVE STEERING LOADS, AND TO GET THE BEST STEERING PERFORMANCE, THE OUTBOARD MOTOR OR OUTDRIVE TRIM TABS AND TILT POSITION MUST BE ADJUSTED AS INSTRUCTED IN THE MOTOR MANUFACTURERS OPERATION MANUAL. FAILURE TO DO SO CAN EFFECT THE PERFORMANCE OF THE BOAT AND ITS SAFE OPERATION.**

**PREPARATION FOR INSTALLATION**

- Steering cables must be routed to the starboard side of the boat. (SH 5023 and 5075 can be routed to port side but starboard side is preferred in order to balance engine torque). A minimum horizontal clearance of 12" is required from the gunwale to the center of the helm steering shaft (see Figure 1). This dimension controls the minimum acceptable bend radius of 8". A smaller bend radius will reduce steering performance and may result in premature cable failure.

**NOTE:** Dimensions shown in Figure 2 or 3 and in the Template must be maintained to provide proper clearance for the helm.

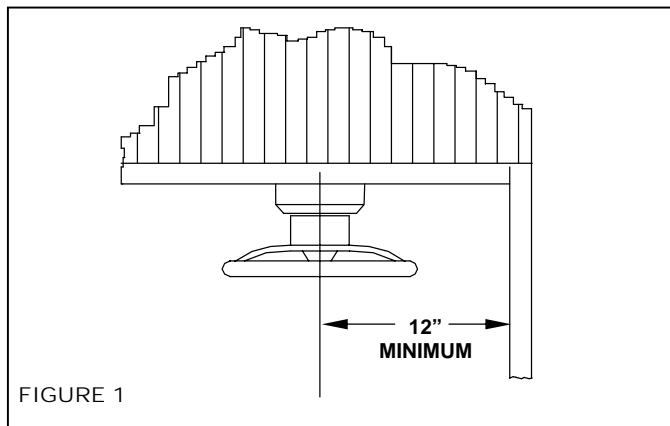


FIGURE 1

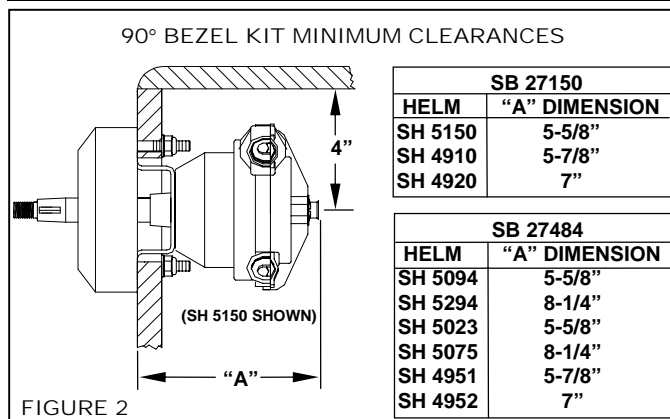


FIGURE 2

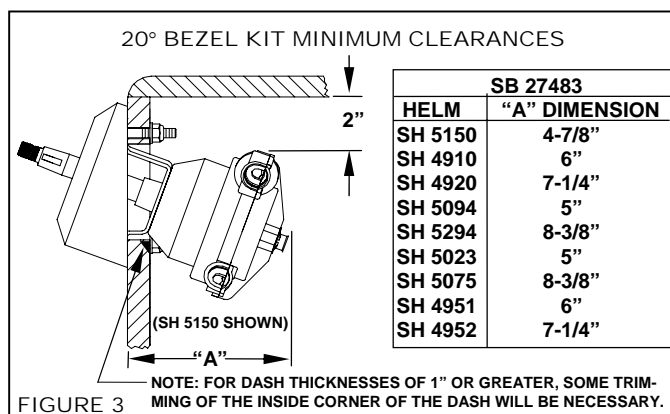


FIGURE 3

- Locate the approximate position for the bezel on the console or dashboard. Using template provided (Figure 7) mark the location of the holes. Drill three (3) holes 3/8" diameter and one (1) 3-1/4" diameter hole through the dash.

## HELM MOUNTING BRACKET INSTALLATION

1. Place helm mounting bracket (Item 1) in position on dash as shown in Figure 4. Insert hex bolts (Item 3) through mounting holes in bracket and dash. Add a flat washer (Item 2) to each bolt and thread a locknut (Item 4) on each. Torque to 110 inch-pounds minimum. DO NOT EXCEED 145 INCH-POUNDS.

## HELM INSTALLATION

1. Insert helm steering shaft through hole in mounting bracket (see Figure 5), orienting in the proper direction for steering cable entry, and align mounting holes. Insert the three (3) hex bolts supplied with the helm through the mounting bracket and thread into the helm. Torque to 75 inch-pounds minimum. DO NOT EXCEED 120 INCH-POUNDS.

## BEZEL MOUNTING

1. Center bezel (Item 5) around shaft and fasten in place using two (2) self-tapping screws (Item 6) as shown in Figure 6. Tighten snugly, taking care not to over-torque which may crack the bezel or strip screw threads.

## STEERING WHEEL INSTALLATION

1. Insert Woodruff key (Item 7) into slot in helm steering shaft. Slide steering wheel over shaft, aligning keyway with Woodruff key. Add flat washer (Item 8) and thread on locknut (Item 9). Torque to 240 inch-pounds minimum. DO NOT EXCEED 320 INCH-POUNDS.

The installation is now complete.

## MAINTENANCE NOTES

1. AFTER A FEW HOURS OF OPERATION AND PERIODICALLY THEREAFTER, RETORQUE ALL FASTENERS AND CHECK THE STEERING SYSTEM FOR SECURITY AND INTEGRITY. LOOSENING OR SEPARATION OF ONE OR MORE FASTENERS MAY CAUSE FAILURE OF THE STEERING SYSTEM, RESULTING IN PROPERTY DAMAGE AND PERSONAL INJURY.

2. KEEP ALL MOVING PARTS FREE OF SALT BUILDUP OR OTHER FOREIGN MATTER WHICH MIGHT AFFECT THEIR OPERATION.

3. INSPECT PERIODICALLY FOR CORROSION. ALL PARTS WHICH ARE AFFECTED BY CORROSION MUST BE REPLACED. WHEN REPLACING HARDWARE, SELF-LOCKING HARDWARE MUST BE USED.

4. INSPECT OUTER COVERING OF CABLE FOR CRACKS OR OTHER DAMAGE. IF ANY IS FOUND THE CABLE MUST BE REPLACED.

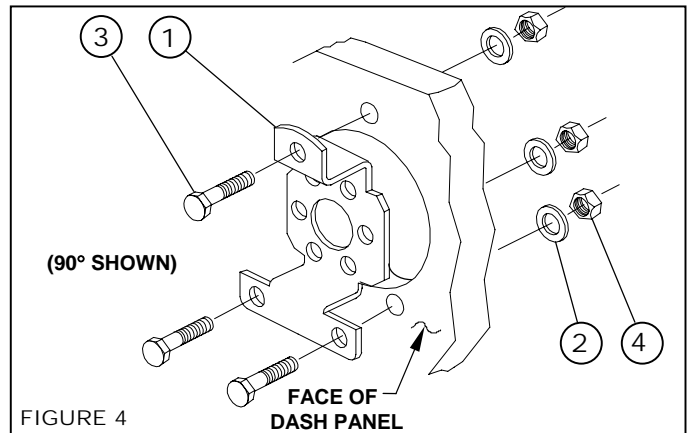


FIGURE 4

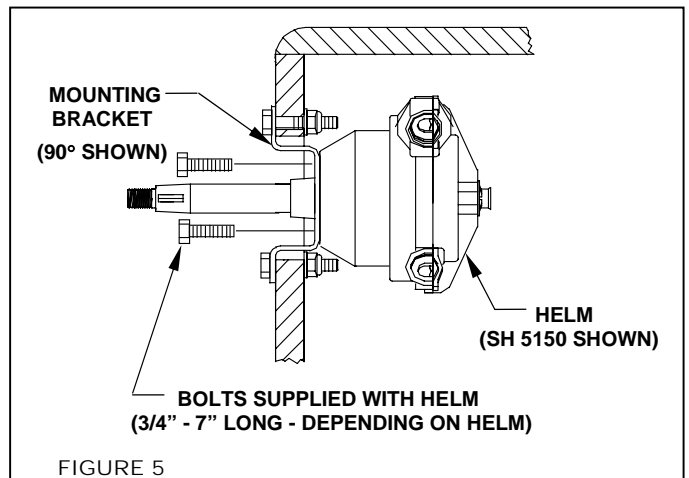


FIGURE 5

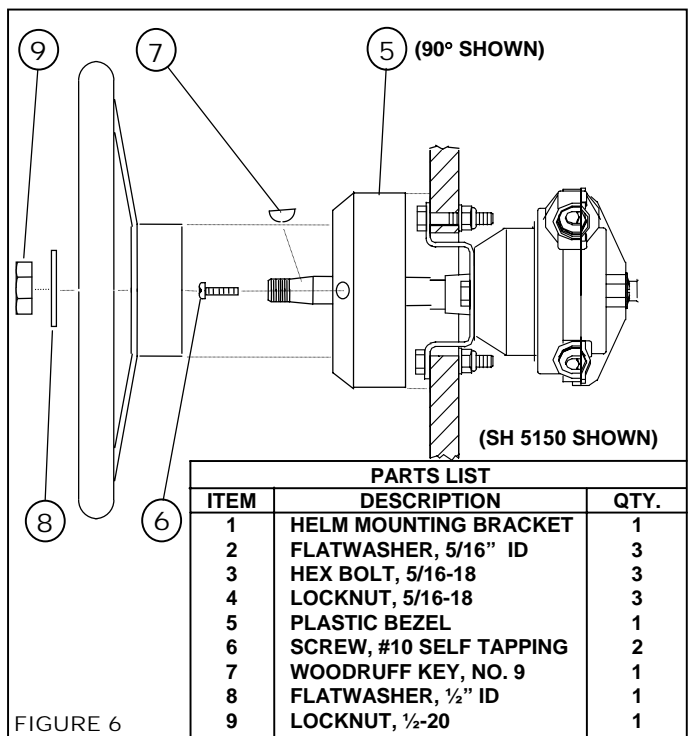


FIGURE 6

Insert Template  
Here  
(See SB27150.dwg)

**KEEP THESE INSTRUCTIONS WITH YOUR BOAT FOR FUTURE REFERENCE.**

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**INSTALLER: THESE INSTRUCTIONS CONTAIN IMPORTANT SAFETY INFORMATION AND MUST BE FORWARDED TO BOAT OWNER!**

These instructions show you how to install SSC61, SSC62, and SSC72 steering cables into the following helms:

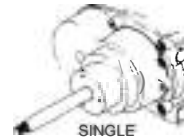
**SSC62xx Cables** (  ) (  ) (  )  
**Fit these Helms (both tilt and non-tilt versions):**



Safe-T@Quick Connect®



NFB® Safe-T II



NFB® 4.2

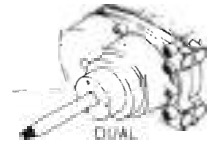







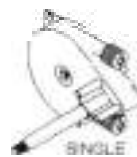


Figure 1

**SSC72xx Cables** (  ) (  ) (  )  
**and SSC61 Cables** (SSC62 wi SA27620P CONVERTER) (  ) (  ) (  ) +  )  
**Fit these Helms (both tilt and non-tilt versions):**



Big-T®



Safe-T® w/ Threaded Spigot



Figure 2



### WARNING

BEFORE STARTING INSTALLATION READ THESE INSTRUCTIONS AND ENGINE MAKERS INSTRUCTIONS THOROUGHLY. FAILURE TO FOLLOW EITHER OF THESE INSTRUCTIONS OR INCORRECT ASSEMBLY CAN RESULT IN LOSS OF CONTROL AND CAUSE PROPERTY DAMAGE OR INJURY.

DO NOT SUBSTITUTE PARTS FROM OTHER MANUFACTURERS, THEY MAY CAUSE A SAFETY HAZARD FOR WHICH TELEFLEX INC., USA CANNOT ACCEPT RESPONSIBILITY. USE TELEFLEX STEERING CABLES ONLY WITH TELEFLEX HELMS.

TO AVOID EXCESSIVE STEERING LOADS, AND TO GET THE BEST STEERING PERFORMANCE, THE OUTBOARD MOTOR OR OUTDRIVE TRIM TABS AND TILT POSITION MUST BE ADJUSTED AS INSTRUCTED IN THE MOTOR MANUFACTURERS OPERATION MANUAL. FAILURE TO DO SO CAN EFFECT THE PERFORMANCE OF THE BOAT AND ITS SAFE OPERATION.

Helms MUST NOT BE DISASSEMBLED FOR ANY REASON. REMOVAL AND REPLACEMENT OF THE HARDWARE WHICH LOCKS THE STEERING SHAFT TO THE HELM ASSEMBLY MAY LEAD TO TOTAL FAILURE OF THE SYSTEM, WHICH COULD RESULT IN PERSONAL INJURY OR PROPERTY DAMAGE.

**NOTE** Helms and cable assemblies are supplied lubricated ready for installation, do not add any lubricant to either assembly. Use of other lubricants can cause damage to the steering cable, resulting in the cable seizing or premature wear. Keep the cable and drive assembly clean during installation. Dirt will damage the system and cause premature wear. Do not take the plastic sleeve off the end of the cable until you are ready to install it into the helm.

### PREPARATION FOR INSTALLATION

Before the steering cable can be installed, the helm, bezel, and steering wheel must be fully installed as shown in the bezel kit instructions.

### REMOVAL OF OLD CABLE

If replacing a cable, disconnect the old cable completely from the engine, noting carefully how the connection to the engine is made. For engine-mounted cables it may be necessary to remove the engine from the boat to avoid bending the cable output end. Disconnect the cable from the helm spigot (see Figures 1 and 2 to identify your helm and follow the appropriate procedure below).

SAFE-T® QUICK CONNECT™, NFB™  
SAFE-T II HELMS (AND HELMS WITH  
SA 27520P CONVERTER)

**STEP 1.** Remove hitch pin from helm (See Figure 3)

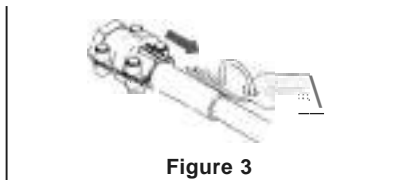


Figure 3

**STEP 2.** Place end of hitch pin in hole as shown and apply pressure while pulling the cable body away from the helm (See Figure 4)

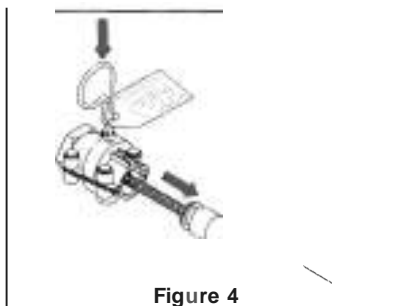


Figure 4

**STEP 3.** Rotate the steering wheel until the helical core of the cable is free from the helm

BIG-T® SAFE-T® WITH THREADED  
SPIGOT

**STEP 1.** Disconnect the cable body from helm by turning the cable-retaining nut counterclockwise until free (See Figure 5)

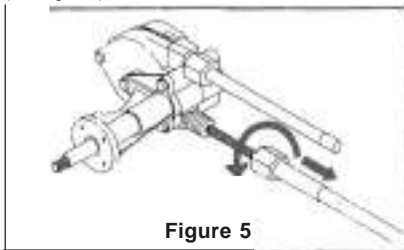


Figure 5

**STEP 2.** Rotate the steering wheel until the helical core of the cable is free from the helm.

NFB™ 4.2 HELMS ONLY

**STEP 1.** Disconnect the cable body from helm by removing the two retaining bolts in the back of the helm (See Figure 6)

**NOTE:** Save these two bolts for reinstallation. Do not discard.

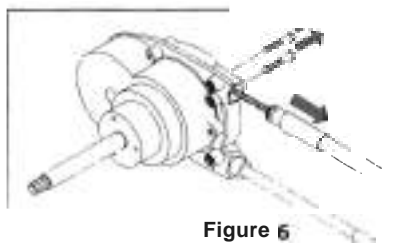


Figure 6

**STEP 2.** Rotate steering wheel until the helical core of the cable is free from the helm.

### CABLE ROUTING

Steering cables, if possible, should be routed to the starboard side of the boat in order to balance engine torque. When routing steering cables, select a path with the minimum number of bends, making the bends as large a radius as possible. **DO NOT MAKE BENDS OF LESS THAN 8" RADIUS.** Sharp or frequent bends will result in hard steering and premature cable wear. When it is necessary to pass through a bulkhead, a 1-1/2" diameter hole is required. Cables should be clamped or tied for support at regular intervals.

#### CAUTION

**THE CABLE MUST NOT BE BUNDLED TOGETHER WITH ELECTRICAL WIRING. THE CABLE MUST NOT REST ON SHARP EDGES WHICH CAN CAUSE CHAFING.**

### NEW CABLE INSTALLATION

Before the steering cable is installed the wheel should be positioned as shown in Figure 7, so that it is in the correct orientation when installation is completed. See Figures 1 and 2 to identify your helm and follow the appropriate procedure on the following page.



NFB 4.2 Single/Dual



Safe-T® (all)  
Big-T®  
NFB Safe-T II

Figure 7



SAFE TO QUICK CONNECT™ AND HELMS WITH SA 3/8" ODP CONVERTER (SINGLE HELMS ONLY)

**STEP 1.** If not removed already, remove hitch pin from cable entry spigot of helm (DO NOT REMOVE TAG FROM PIN).

**STEP 2.** Remove protective sleeve from cable end, making sure that dirt does not get onto the lubricated cable end. Feed cable end into LOWER helm entry spigot until it contacts the internal gear, then turn steering wheel counterclockwise to draw cable fully into the helm (see Figure 8). Continue turning wheel until end fitting of cable is entered into the entry spigot, and wheel cannot be turned further. During this you may hear a click as the backing mechanism engages. Turn steering wheel fully in the other direction until it cannot be turned any further, and check that cable end fitting is retained inside the entry spigot.

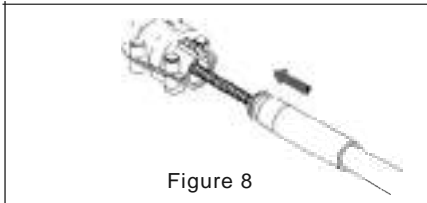


Figure 8

**STEP 3.** Replace pin as shown in Figure 9, making sure that it is fully seated. DO NOT REMOVE TAG FROM PIN.

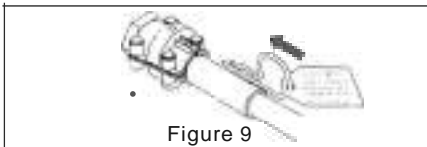


Figure 9

**STEP 4.** Turn steering wheel fully to both extremes of rotation and check that the cable fitting is retained in the entry spigot.

NEED SAFETY!

**STEP 1.** If not removed already, remove pin from cable entry spigot of helm (DO NOT REMOVE TAG FROM PIN).

**STEP 2.** Remove protective sleeve from cable end, making sure that dirt does not get onto the lubricated cable end. Feed cable end into UPPER helm entry spigot until it contacts the internal gear, then turn steering wheel counterclockwise to draw cable fully into the helm (see Figure 10). Continue turning wheel until end fitting of cable is entered into the entry spigot, and wheel cannot be turned further. During this you may hear a click as the backing mechanism engages. Turn steering wheel fully in the other direction until it cannot be turned any further, and check that the cable end fitting is retained inside the entry spigot.

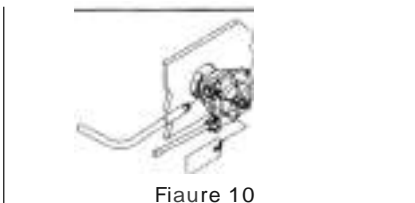


Figure 10

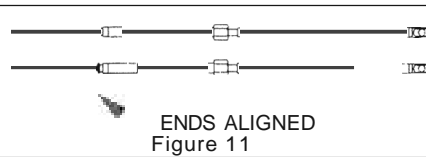
**STEP 3.** Replace pin as shown in Figures 9 and 10, making sure that it is fully seated. DO NOT REMOVE TAG FROM PIN.

**STEP 4.** Turn steering wheel fully to both extremes of rotation and check that the cable fitting is retained in the entry spigot.

SAFE TO QUICK CONNECT™ AND HELMS WITH SA 3/8" ODP CONVERTER (DUAL HELMS ONLY)

**STEP 1.** If not removed already, remove hitch pins from cable entry spigots of helm (DO NOT REMOVE TAGS FROM PINS).

**STEP 2.** Push both output rams of the cables to the fully retracted position. Make sure that they stay fully retracted during installation into the helm. Remove the protective sleeves from the steering cables, and make sure that dirt does not get onto the lubricated cable ends. Hold both cables together at the helm end with the faces of the conduit fittings flush, as shown in Figure 11.



**STEP 3.** Feed the cables into the LOWER helm entry spigots, keeping the conduit fittings aligned, until they contact the internal gears. Then turn the steering wheel to draw the cables fully into the helm (see Figure 12). Continue turning the wheel until the end fittings of the cables are entered into the entry spigots, and the wheel cannot be turned further. During this you may hear a click as the backing mechanism engages. Turn the steering wheel fully in the other direction until it cannot be turned any further and check that the cable end fittings are retained inside the entry spigots.

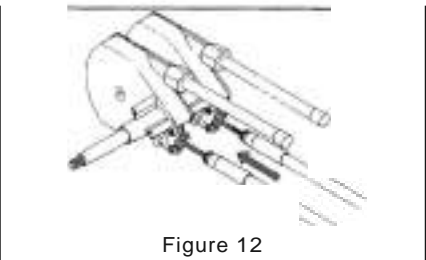


Figure 12

WARNING

IT IS POSSIBLE THAT ONE CABLE MAY NOT BE FULLY ENGAGED AT THIS TIME, CHECK THAT BOTH CABLES ARE FULLY ENGAGED BY PUSHING EACH CABLE FULLY HOME TO SEAT THEM PROPERLY.

**STEP 4.** Replace the pins as shown in Figure 9, making sure that they are fully seated. If one pin cannot be inserted, that cable is not fully seated in the helm. Push on the cable to ensure that it is fully home. DO NOT REMOVE TAGS FROM HITCH PINS.

**STEP 5.** Rotate the steering wheel several times from stop to stop, and watch the movement of the steering cable output rams. Turning the wheel clockwise should cause the ram to extend.

SAFE TO WITH THREADED SPIGOT (SINGLE HELMS ONLY)

**STEP 1.** Remove the protective sleeve from the steering cable, making sure that dirt does not get onto the lubricated cable end. Feed the cable end into the LOWER helm entry spigot until it contacts the internal gear. Then turn the steering wheel to draw the cable fully into the helm (see Figure 13). Continue turning the steering wheel until the end fitting of the cable is flush with the entry spigot.

**STEP 2.** Thread the steering cable coupler nut onto the lower entry spigot and tighten securely. NOTE: The coupler nut has a backing ring in the threads. Make sure the nut is drawn up fully and the backing ring is engaged. Threads will not be visible when correctly installed. If you do not tighten this nut fully there will be excessive play in the steering wheel.

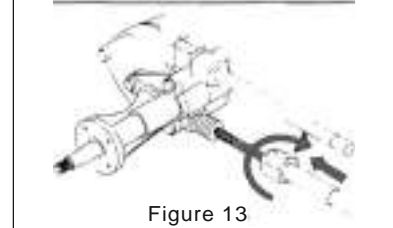
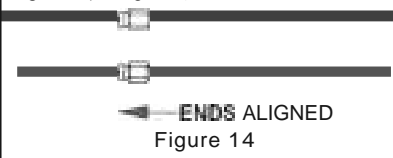


Figure 13

**STEP 3.** Rotate the steering wheel several times from stop to stop, and watch the movement of the steering cable output ram. Turning the wheel clockwise should cause the ram to extend.

SAFE TO WITH THREADED SPIGOT (DUAL HELMS ONLY)

**STEP 1.** Push both output rams of the cable to the fully retracted position. Make sure that they stay fully retracted during installation into the helm. Remove the protective sleeves from the steering cables, making sure that dirt does not get onto the lubricated cable ends. Hold both cables together at the helm end with the faces of the conduit fittings flush (see Figure 14).



**STEP 2.** Feed the cable ends into the LOWER entry spigots, keeping the conduit fittings aligned, until they contact the internal gears. Then turn the steering wheel to draw the cables fully into the helm. Continue turning the steering wheel until the conduit end fittings are flush with the entry spigots (see Figure 15).

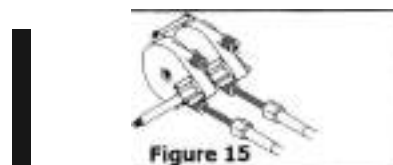


Figure 15

**STEP 3.** Thread the steering cable coupler nuts onto the LOWER entry spigots and tighten securely. NOTE: The coupler nuts have backing rings in the threads. Make sure the nuts are drawn up fully and the backing rings are engaged. Threads will not be visible when correctly installed. If you do not tighten these nuts fully, there will be excessive play in the steering wheel.

**STEP 4.** Rotate the steering wheel several times from stop to stop, and watch the movement of the steering cable output rams. For starboard mounted helms turning the steering wheel clockwise should cause the ram to extend.

### FIGURE 16 (SINGLE HELMS ONLY)

**STEP 1.** Remove the protective sleeve from the steering cable, making sure that dirt does not get onto the lubricated cable end.

**STEP 2.** Feed the cable end into the UPPER helm entry spigot until it contacts the internal gear then turn the steering wheel to draw the cable fully into the helm (see Figure 6). Continue turning the steering wheel until the end fitting of the cable is fully inserted into the entry spigot.

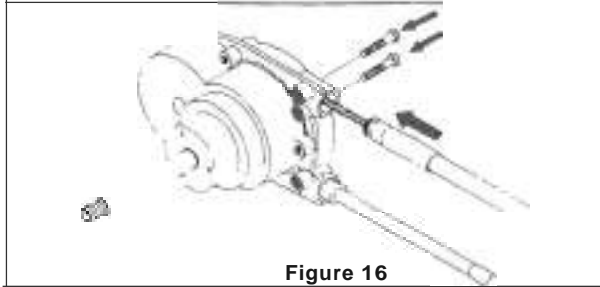


Figure 16

**STEP 3.** Insert the two bolts saved during cable removal (see page 2, step 1 of 'Removal of Old Cable - NFB 4.2 Helms Only') into the helm and tighten fully, making sure that the bolt is in the retaining groove of the cable fitting.

**STEP 4.** Rotate the steering wheel several times from stop to stop, and watch the movement of the steering cable output ram. On starboard mounted helms turning the wheel clockwise should cause the ram to extend.

### FIGURE 17 (DUAL HELMS ONLY)

**STEP 1.** Push both output rams of the cables to the fully retracted position. Make sure that they stay fully retracted during installation into the helm. Remove the protective sleeve from the steering cables, and make sure that dirt does not get onto the lubricated cable ends. Hold both cables together at the helm end with the laces of the conduit fittings flush as shown in Figure 10.

**STEP 2.** Feed the cable ends into the UPPER entry spigots, keeping the conduit fittings aligned, until they contact the internal gears. Then turn the steering wheel to draw the cables fully into the helm. Continue turning the wheel until both conduit end fittings are fully inserted into the entry spigots (see Figure 17).

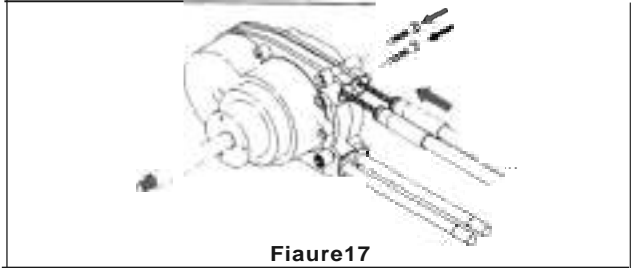


Figure 17

**STEP 3.** Insert the two bolts saved during cable removal (see page 2, step 1 of 'Removal of Old Cable - NFB 4.2 Helms Only') into the helm and tighten fully, making sure that the bolt is in the retaining groove of the cable fitting.

**STEP 4.** Rotate the steering wheel several times from stop to stop, and watch the movement of the steering cable output ram. On starboard mounted helms turning the wheel clockwise should cause the ram to extend.

## CONNECTION TO ENGINE (SINGLE CABLE SYSTEMS)

For engine-mounted steering systems, slide the output ram through the engine support tube. Thread the cable coupling nut fully onto the support tube. **NOTE:** The coupling nut has a backing ring in the threads. Make sure the nut is drawn up fully and its internal backing ring is engaged. If you do not tighten this nut fully there will be excessive play in the steering system. Connect the cable output ram to the engine tiller arm as shown in the instructions packed with the connection kit.

### CAUTION

**ENSURE THAT THE CABLE OUTPUT END IS NOT BENT WHEN INSTALLING. IF NECESSARY, THE ENGINE MUST BE REMOVED FROM THE BOAT.**

For a boat-mounted steering system, attach the cable to the boat and engine in accordance with the instructions furnished with the connection kit.

## CONNECTION TO ENGINE (DUAL CABLE SYSTEM)

The steering cables can now be connected to the engine, using a connection kit available from the engine maker or an approved equivalent. The adjustment of dual cable connection kits is critical for smooth easy steering. The instructions provided by the kit maker **MUST** be followed.

### CAUTION

**ENSURE THAT THE CABLE OUTPUT END IS NOT BENT WHEN INSTALLING. IF NECESSARY, THE ENGINE MUST BE REMOVED FROM THE BOAT.**

To fine tune the steering, install the connection kit without adjusting the second cable tube. Turn the steering wheel so that you get a feel of the load to move the engine. Move the engine from side to side and check the amount of free play in the cables. Adjust the connection kit tube until as much of the free play is removed as possible.

**WITHOUT INCREASING THE LOAD AT THE STEERING WHEEL.** There may be a small amount of free play at the steering wheel. This is normal and cannot be removed by adjusting the connection kit. Tighten both adjusting nuts and test drive the boat. Readjust the connection kit if necessary.

## OPERATION & MAINTENANCE NOTES

### CAUTION

**IT IS POSSIBLE TO OVERTRIM THE ENGINE AND INCREASE THE STEERING TORQUE TO THE POINT THAT THE STEERING WHEEL CANNOT BE TURNED, EVEN THOUGH THE TORQUE IS NOT FELT AT THE WHEEL. THIS MAY GIVE THE IMPRESSION THAT THE STEERING IS "LOCKED". THIS CONDITION CAN OCCUR MORE WHEN JACK PLATES ARE USED TO RAISE THE ENGINE ON THE TRANSOM, AND CAN ONLY BE OVERCOME BY REDUCING THE BOAT SPEED OR ENGINE TRIM OUT POSITION. UNTIL YOU ARE COMPLETELY FAMILIAR WITH THE BOAT AND THE EFFECTS OF POWER TRIM, MAKE ALL ADJUSTMENTS OF TRIM WITH EXTREME CAUTION.**

**1.** After a few hours of operation and at frequent intervals thereafter, check all fasteners and the complete steering system for security and integrity.

### DANGER

**LOOSENING OR LOSS OF ONE OR MORE FASTENERS MAY CAUSE FAILURE OF THE STEERING SYSTEM, RESULTING IN LOSS OF STEERING CONTROL AND COULD CAUSE PERSONAL INJURY OR PROPERTY DAMAGE.**

**2.** Keep all moving parts free from build-up of salt and other foreign material. This will affect their operation and create steering problems. Pay particular attention to the hinge tube of outboard motors. Periodically remove the cable, clean hinge tube thoroughly and lubricate both the hinge tube and telescopic end of the cable with a waterproof grease.

**3.** Periodically inspect all visible parts for corrosion. Any parts affected by corrosion must be replaced. When replacing hardware, self-locking hardware must be used.

**4.** Inspect steering cable periodically for cracks or other damage. If any is found the cable must be replaced.

**NOTE:** If steering gets harder (stiffer) to operate the cable must be replaced.

### DANGER

**DO NOT COVER CRACKS WITH TAPE OR OTHER SEALANTS, THIS WILL CREATE A HAZARD IN WHICH THE CABLE CAN FAIL SUDDENLY WITHOUT WARNING.**

**KEEP THESE INSTRUCTIONS WITH YOUR BOAT FOR FUTURE REFERENCE.**

## INSTRUCTIONS

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**INSTALLER: THESE INSTRUCTIONS CONTAIN IMPORTANT SAFETY INFORMATION AND MUST BE FORWARDED TO THE BOAT OWNER.**

These instructions show you how to install SSC62 steering cables into **SAFE-T QUICK CONNECT HELMS**. The instructions for mounting the helm to the bezel are given in the bezel kit instructions.

For a complete **SAFE-T QUICK CONNECT SYSTEM** steering system the following additional components are required.

- **Bezel kit**, see Teleflex catalog.
- **SSC62-length steering cable**. (Two required for dual helm)
- **Engine connection kit**, see Teleflex catalog.
- **Steering Wheel**, (maximum diameter 16 inches) see Teleflex catalog.

### WARNING

BEFORE STARTING INSTALLATION READ THESE INSTRUCTIONS AND ENGINE MAKERS INSTRUCTIONS THOROUGHLY. FAILURE TO FOLLOW EITHER OF THESE INSTRUCTIONS OR INCORRECT ASSEMBLY CAN RESULT IN LOSS OF CONTROL AND CAUSE PROPERTY DAMAGE OR INJURY.

DO NOT SUBSTITUTE PARTS FROM OTHER MANUFACTURERS, THEY MAY CAUSE A SAFETY HAZARD FOR WHICH TELEFLEX INC., USA CANNOT ACCEPT RESPONSIBILITY. USE TELEFLEX STEERING CABLES ONLY WITH THIS HELM.

TO AVOID EXCESSIVE STEERING LOADS, AND TO GET THE BEST STEERING PERFORMANCE, THE OUTBOARD MOTOR OR OUTDRIVE TRIM TABS AND TILT POSITION MUST BE ADJUSTED AS INSTRUCTED IN THE MOTOR MANUFACTURERS OPERATION MANUAL. FAILURE TO DO SO CAN EFFECT THE PERFORMANCE OF THE BOAT AND ITS SAFE OPERATION.

DO NOT ATTACH ANY ELECTRICAL GROUND WIRES TO THE HELM. THIS WOULD RESULT IN AN ELECTROLYTIC REACTION TO THE STEERING CABLE THAT MAY RESULT IN CABLE FAILURE OR GREATLY REDUCED SERVICE LIFE.

**NOTE:** Helms and cable assemblies are supplied lubricated ready for installation, do not add any lubricant to either assembly. Use of other lubricants can cause damage to the steering cable, resulting in the cable seizing or premature wear. Keep the cable clean during installation. Dirt will damage the system and cause premature wear. *Do not take the plastic sleeve off the end of the cable until you are ready to install it into the helm.*

### WARNING

HELMS MUST NOT BE DISASSEMBLED FOR ANY REASON, REMOVAL AND REPLACEMENT OF THE HARDWARE WHICH LOCKS THE STEERING SHAFT TO THE HELM ASSEMBLY MAY LEAD TO TOTAL FAILURE OF THE SYSTEM, WHICH COULD RESULT IN PERSONAL INJURY OR PROPERTY DAMAGE.

### PREPARATION FOR INSTALLATION.

Before the steering cable can be installed, the helm, bezel, and steering wheel must be fully installed as shown in the bezel kit instructions.

**CABLE ROUTING.** The Steering cables, must be routed to the starboard side of the boat. When routing the steering cable, select a path with the minimum number of bends, making the bends as large a radius as possible. **DO NOT MAKE BENDS OF LESS THAN 8" RADIUS.** Sharp or frequent bends will result in hard steering and premature cable wear. When it is necessary to pass through a bulkhead, a 1-1/2" Dia. hole is required. Cable should be clamped or tied for support at regular intervals.

### CAUTION

*CABLE MUST NOT BE BUNDLED TOGETHER WITH ELECTRICAL WIRING. CABLE MUST NOT REST ON SHARP EDGES WHICH CAN CAUSE CHAFING.*

### STEERING CABLE INSTALLATION - SINGLE HELM.

Before the steering cables are installed the steering wheel should be positioned as shown in Figure 1, so that it is in the correct orientation when installation is completed.



Figure 1

**STEP 1.** Remove pin from cable entry of helm, **DO NOT REMOVE TAG FROM PIN.**

**STEP 2.** Remove protective sleeve from cable end, making sure that dirt does not get onto the lubricated cable end. Feed cable end into **LOWER** helm entry spigot until it contacts the internal gear, then turn steering wheel to draw cable fully into the helm, (see Figure 2). Continue turning wheel until end fitting of cable is entered into the entry spigot, and wheel cannot be turned further. During this you may hear a click as the locking mechanism engages. Turn steering wheel fully in the other direction until it cannot be turned any further, check that cable end fitting is retained inside the entry spigot.

**STEP 3.** Replace pin as shown in Figure 3, making sure that it is fully seated. **DO NOT REMOVE TAG FROM PIN.**

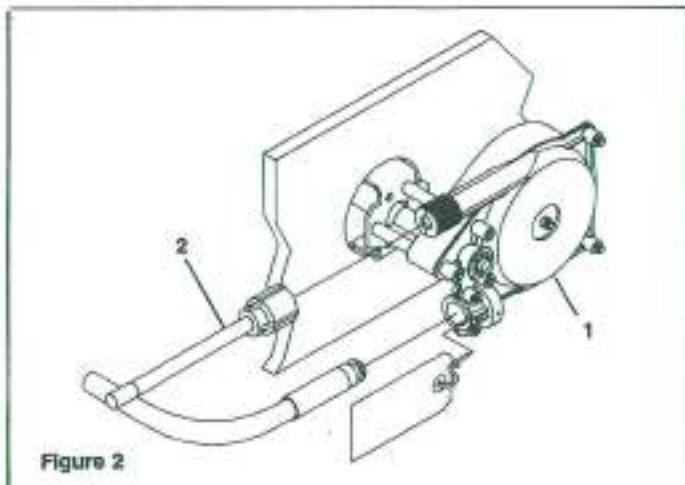


Figure 2

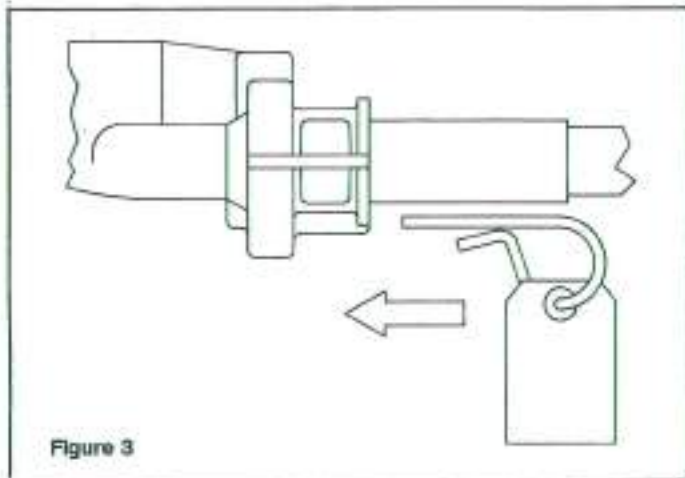


Figure 3

**STEP 4.** Turn steering wheel fully to both extremes of rotation and check that the cable fitting is retained in the entry spigot.

**STEP 5.** Feed Spent Travel Tube (Item 2) over exposed cable and thread Retaining Nut onto spigot. Tighten nut hand tight.

**STEP 6.** Rotate steering wheel several times from stop to stop, and watch the movement of the Steering Cable output ram. Turning the wheel clockwise should cause the ram to extend.

#### CONNECTION TO ENGINE.

For engine-mounted steering systems, slide the output ram through the engine support tube. Thread the Cable Coupler Nut fully onto the support tube. **NOTE:** The Coupler Nut has a locking ring in the threads. Make sure the Nut is drawn up fully and the locking ring is engaged. If you do not tighten this nut fully there will be excessive play in the steering system. Connect the cable output ram to the engine tiller arm as shown in the instructions packed with the connection kit.

#### CAUTION

**ENSURE THAT THE CABLE OUTPUT END IS NOT BENT WHEN INSTALLING. IF NECESSARY THE ENGINE MUST BE REMOVED FROM THE BOAT.**

For a boat-mounted steering system, attach the cable to the boat and engine in accordance with the instructions furnished with the connection kit.

#### STEERING CABLE INSTALLATION - DUAL HELM.

Before the steering cables are installed the steering wheel should be positioned as shown in Figure 1, so that it is in the correct orientation when installation is completed.

**STEP 1.** Remove pins from cable entries of helm. **DO NOT REMOVE TAGS FROM PINS.**

**STEP 2.** Push both output rams of the cables to the fully retracted position. Make sure that they stay fully retracted during installation into the helm. Remove the protective sleeves from Steering Cables, make sure that dirt does not get onto the lubricated cable ends. Hold both cables together at the helm end with the faces of the conduit fittings flush, as shown in Figure 4.

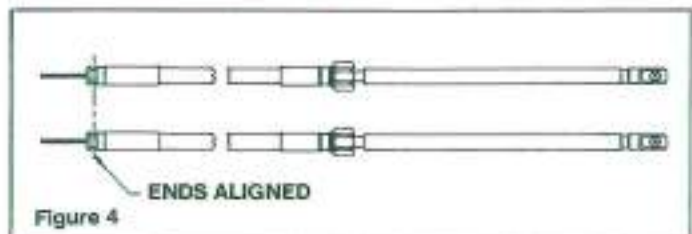


Figure 4

**STEP 3.** Feed the cable ends into the **LOWER** helm entry spigots, keeping the conduit fittings aligned, until they contact the internal gears. Then turn the steering wheel to draw the cables fully into the helm (see Figure 5). Continue turning wheel until end fittings of cables are entered into the entry spigots, and wheel cannot be turned further. During this you may hear a click as the locking mechanism engages. Turn steering wheel fully in the other direction until it cannot be turned any further, check that cable end fittings are retained inside the entry spigot.

#### WARNING

**IT IS POSSIBLE THAT ONE CABLE MAY NOT BE FULLY ENGAGED AT THIS TIME. CHECK THAT BOTH CABLE ARE FULLY ENGAGED BY PUSHING EACH CABLE FULLY HOME, TO SEAT THEM PROPERLY.**

**STEP 4.** Replace pins as shown in Figure 2, making sure that they are fully seated. If one pin cannot be inserted, that cable is not fully seated in the helm. Push on cable to ensure that it is fully home. **DO NOT REMOVE TAGS FROM PINS.**

**STEP 5.** Feed the Spent Travel Tubes (Item 2) over the exposed cable ends and insert bolt (Item 4) into the helm. Tighten fully.

**STEP 6.** Rotate the steering wheel several times from stop to stop, and watch the movement of the Steering Cable output ram. Turning the wheel clockwise should cause the ram to retract.

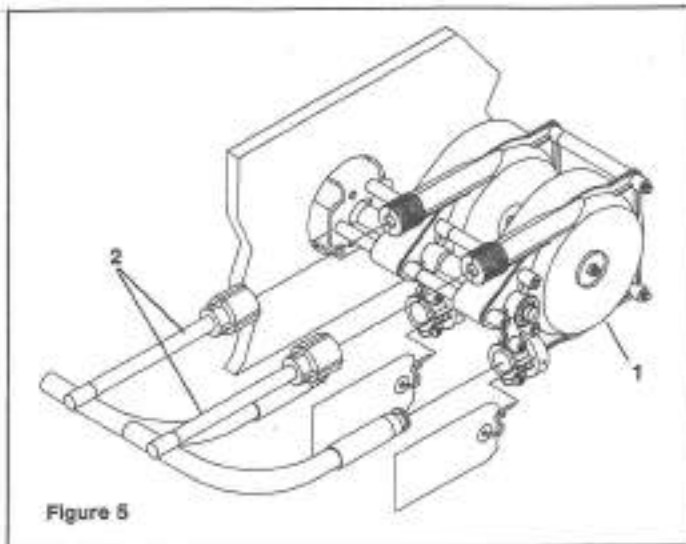


Figure 5

### CONNECTION TO ENGINE.

The steering cables can now be connected to the engine, using a connection kit available from the engine maker or an approved equivalent.

#### CAUTION

*ENSURE THAT CABLE ENDS ARE NOT BENT WHEN INSTALLING THEM INTO THE ENGINE. IF NECESSARY REMOVE ENGINE FROM THE BOAT.*

To fine tune the steering, install the connection kit without adjusting the second cable tube. Turn the steering wheel so that you get a feel of the load to move the engine. Move the engine from side to side and check the amount of free play in the cables. Adjust the connection kit tube until as much of the free play is removed as possible **WITHOUT INCREASING THE LOAD AT THE STEERING WHEEL.** Tighten both adjusting nuts and test drive the boat. Readjust the connection kit if necessary.

### MAINTENANCE NOTES

1. After a few hours of operation and at frequent intervals thereafter, check all fasteners and the complete steering system for security and integrity.

#### DANGER

**LOOSENING OR LOSS OF ONE OR MORE FASTENERS MAY CAUSE FAILURE OF THE STEERING SYSTEM RESULTING IN LOSS OF STEERING CONTROL AND COULD CAUSE PERSONAL INJURY OR PROPERTY DAMAGE.**

2. Keep all moving parts free from build-up of salt and other foreign material. This will affect their operation and create steering problems. Pay particular attention to the hinge tube of outboard motors. Periodically remove the cable, clean hinge tube thoroughly and lubricate with a waterproof grease.

3. Inspect periodically for corrosion. Any parts affected by corrosion must be replaced. When replacing hardware, self-locking hardware **MUST** be used.

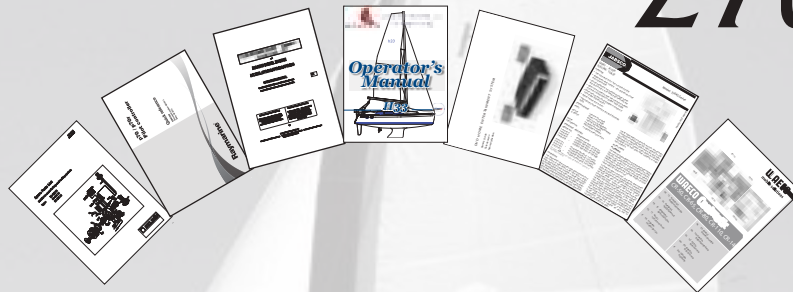
4. Inspect steering cable periodically for cracks or other damage. If any are found the cable must be replaced.

#### DANGER

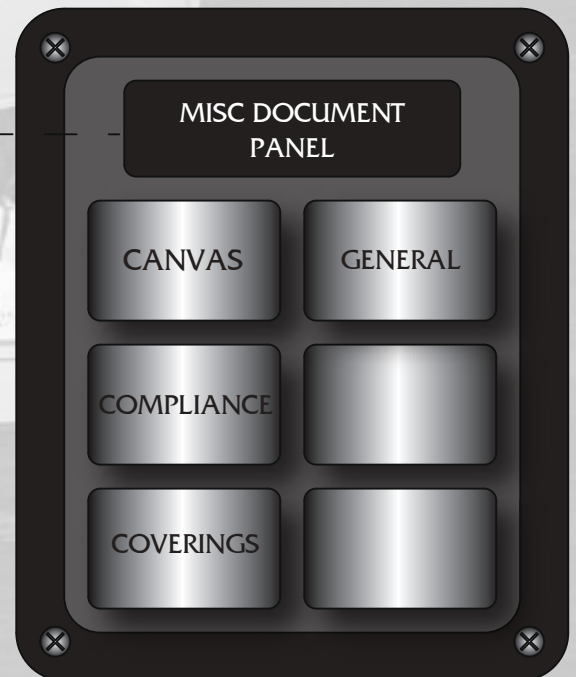
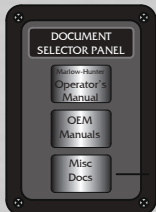
**DO NOT COVER CRACKS WITH TAPE OR OTHER SEALANTS, THIS WILL CREATE A HAZARD IN WHICH THE CABLE CAN FAIL SUDDENLY WITHOUT WARNING.**

KEEP THESE INSTRUCTIONS WITH YOUR BOAT FOR FUTURE REFERENCE.





# DOCUMENT FINDER





# MARINE TOPS AND COVERS

care and cleaning for Sunbrella, Sunbrella Supreme and Sunbrella Plus

One of the best ways to keep Sunbrella® fabrics looking good and to delay the need for deep or vigorous cleaning is to hose fabrics off on a monthly basis with clear water. This practice will help prevent dirt from becoming deeply embedded in the fabric and eliminate the need for more frequent vigorous cleaning. In most environments, a thorough cleaning will be needed every two to three years.

When it's time for a thorough cleaning, Sunbrella fabrics can be cleaned while still on a boat or, size permitting, they can be removed for cleaning in a washing machine or dock side. When cleaning Sunbrella fabrics, it is important to observe the following:

- Always use a mild detergent such as Woolite or Dawn dishwashing liquid.
- Water should be cold to lukewarm.
- Rinse thoroughly to remove all detergent residue.
- Air dry only. Never apply heat to Sunbrella fabrics.

## General or light cleaning

To clean Sunbrella while still on a boat, follow these simple steps:

- Brush off loose dirt.
- Hose down.
- Prepare a cleaning solution of water and mild detergent such as Woolite or Dawn.
- Use a soft bristle brush to clean.
- Allow cleaning solution to soak into the fabric.
- Rinse thoroughly until all detergent residue is removed.
- Air dry.
- May not require re-treatment depending on the age of the fabric.

If stubborn stains persist, you can use a diluted chlorine bleach/detergent mixture for spot cleaning of mildew, roof run-off or other similar stains (see our Stain Chart for specific recommendations).

## Heavy cleaning for stubborn stains and mildew

Sunbrella fabric does not promote mildew growth, however, mildew may grow on dirt and other foreign substances that are not removed from the fabric. To clean mildew, or other stubborn stains:

- Prepare a solution of 1 cup bleach and 1/4 cup of mild detergent per gallon of clean water.
- Soak affected area in solution for 15 minutes.
- Remove stain with a sponge or clean towel.
- Rinse thoroughly to remove all detergent residue.
- Air dry.

Remember to protect the area around your Sunbrella fabric if using a bleach solution. Carpet or other fabrics that are not Sunbrella may have an adverse reaction to the bleach. If a boat cover is suitable in size for a washing machine, these steps should be followed:

- Use mild detergent.
- For heavier stains add 1 cup of bleach to wash.
- Wash and rinse in cold water.
- Air dry. Never apply heat to Sunbrella.
- Re-treatment for water and stain resistance will be necessary after machine washing.

## Re-treating the fabric

As part of the finishing process, Sunbrella fabrics are treated with a fluorocarbon finish, which enhances water repellency. This finish is designed to last for several years, but must be replenished after a thorough cleaning. Based on test results, Glen Raven recommends 303 High Tech Fabric Guard™ as the preferred re-treatment product for Sunbrella fabrics. Fabrics should be re-treated after thorough cleaning or after five years of use.

For more information on re-treatment products, please visit [www.303products.com](http://www.303products.com).

## Applying 303 High Tech Fabric Guard

303 should be applied to Sunbrella fabrics after each thorough cleaning, which typically removes the original finish and reduces the fabric's water repellency.

- Clean Sunbrella fabric, using one of the cleaning methods.
- Allow Sunbrella to completely air dry.
- Apply 303 Fabric Guard in a well ventilated area following instructions on the container.
- Apply 303 in a thin, even coat and allow fabric to dry completely.
- Apply a second thin, even coating of 303. (Two light coatings are more effective in restoring fabric water resistance than a single heavy coating. A 15-ounce bottle provides coverage of up to 50 square feet of fabric.)

## Professional cleaners

You may have access to professional cleaning firms. In evaluating the services of a professional firm, you should inquire about a firm's experience in working with Sunbrella fabrics and knowledge of cleaning and re-treatment requirements.

**DO NOT** dry clean Sunbrella fabrics.

## Helpful hints

Protect the area around the Sunbrella fabric when using a bleach solution – bleach may discolor non-Sunbrella fabrics. Always rinse Sunbrella thoroughly to completely remove bleach.

Please be aware of the environment when cleaning with bleach. Bleach can have harmful effects on the natural environment around you. We do not advise using bleach if you are surrounded by a body of water or other environment that could be affected.

Sunbrella air dries very quickly. Machine drying is not necessary.

If fabric has some wrinkling, use an iron, if necessary, but only on the synthetic setting. As some irons exceed the recommended temperature on the synthetic setting, test a small inconspicuous area before ironing entire piece.

**DO NOT** use a steamer or iron set to steam setting.

Use of bleach and/or advanced age of the fabric application may impact the deterioration of the sewing thread and other non-Sunbrella components.



Glen Raven Custom Fabrics, LLC  
1831 North Park Avenue, Glen Raven, NC 27217 USA

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[www.sunbrella.com](http://www.sunbrella.com)



REVISED 3/2/12

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<https://www.boat-manuals.com/>



MARLOW-HUNTER, LLC

*"Life Begins at 40"*  
1973-2013

## COMPLIANCE SECTION

# NO DOCUMENTS

27TE



## Vinyl Care and Cleaning Guide

Type of Stain	Steps: 1	2	3	Legend
General Care	A	B		<b>A</b> Medium-soft brush, warm soapy water, Rinse / Dry
Dirt Build-up	A	B		
Ballpoint ink*	B	A		<b>B</b> 303 Fabric and Vinyl Cleaner®, Rinse / Dry
Chewing gum	B	A		
Coffee, tea, chocolate	B	A		<b>C</b> Wipe or scrape off excess (chill gum with ice before hand)
Grease	C	B	A	
Household soil	A	B		
Ketchup	A	B		<p><b>All cleaning methods must be followed by a thorough rinse with clean warm water.</b></p> <p><b>Failure to care for your vinyl properly, or use of improper cleaners may void your warranty &amp; damage your vinyl!</b></p>
Latex paint	A	B		
Lipstick	C	A	B	
Mildew or wet leaves*	B	A		
Motor oil	C	B	A	
Oil-based paint	C	B	A	
Permanent marker*	B	A		
Spray paint	B	A		
Suntan lotion*	A	B		
Tar / Asphalt	C	B	A	
Yellow mustard	A	B		

**\*Always remove stains immediately. Upholstery must be kept CLEAN & DRY!**

Certain household cleaners, powdered abrasives, steel wool, and industrial cleaners can cause damage and discoloration and are not recommended. Dry cleaning fluids and lacquer solvents should not be used as they will remove printed pattern and gloss. Waxes should be used with caution as many contain dyes or solvents that can permanently damage the protective coating.

\*Suntan lotion, tree pollen, wet leaves, and some other products can contain dyes that stain permanently.

Do not clean with power washers, as they can generate 3500 PSI and could damage the surface of your interior. Do not use kerosene, gasoline, or acetone, as they will remove the protective marine top coat. Do not use any silicone based protectants. They will extract the plasticizer, leaving vinyl hard and brittle, and eventually cracking will occur.

### Recommended Products

- Mild Dish Soap
- 303 Fabric & Vinyl Cleaner

### Non-Recommended Products

- ArmorAll
- Bleach
- Baking Soda
- Fantastik
- Formula 409
- Murphy's Oil Soap
- Simple Green
- Son-of-a-Gun

**Customer satisfaction is directly related to regular care of the upholstery!**

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The information published in this care guide refers to the performance of Spradling International Marine products in specific tests conducted under laboratory conditions. Results may vary under actual conditions.

This information is not a guarantee and does not relieve the user from the responsibility of the proper and safe use of the product and all cleaning agents. The use of certain agents can be harmful to the surface appearance and lifespan of vinyl. Spradling, its agents, and assigns assume no responsibility resulting from the use of such cleaning agents to the vinyl.

Please check compatibility when using this product in combination with painted or varnished surfaces.



Spradling International  
**M A R I N E**

# MAJILITE USER'S GUIDE

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**THE MAJILITE CORPORATION**  
**NYTEK® PRODUCTS USER'S GUIDE**

This user's manual and installation guide will help you use NYTEK® products as easily and effectively as possible. Our tips and suggestions are based on laboratory tests, actual fieldwork, and the most customer relevant recommendations. While there may be exceptions, we encourage you to refer to this publication as a general guide for all your upholstery applications.

Please contact us if you need more information than this manual provides. If desired, we can arrange a personal consultation to help resolve any difficulties.

Thank you for selecting NYTEK® to enhance the beauty of your designs and products. We are confident it will meet and exceed your expectations and give your customers years of satisfied use.

MAJILITE CORPORATION  
1530 Broadway Road • Dracut, MA 01826  
Tel: 978.441.6800 Fax: 978.441.0835

# IMPORTANT FACTS ABOUT NYTEK® PRODUCTS

## Similarities to Natural Leather

- NYTEK® absorbs moisture, resulting in expansion and greater elasticity.
- To achieve optimal results, use the same upholstery methods and techniques as used for leather. Most upholstery applications are a skilled craft rather than an exact science.
- Like natural leathers, errors cannot be covered up during the upholstering process. Operators need time and patience to learn the techniques unique to our products.
- Proper prepping is critical to achieve the best results. Because of the smooth finish and weight of the cover, flaws and errors made during the prepping process may show by not filling out the cover properly or from telegraphing.

## Basic Information about Stretch

- Stretch in the width direction is greater and easier to manipulate than stretch in the length.
- Stretch is not uniform with all colors and is greater with lighter colors than with darker ones with less dye penetration.

## Grain and Nap

- Please consider the direction of the design when cutting patterns, such as with NYTEK® Products like MOCCASIN, BABY OSTRICH, CANE, etc.,
- The nap of NOVASUEDE® is a non-directional design.

## Time and Process Requirements

- Calculate the same sewing time allowances as needed for natural leather or a fabric pattern match. Although NYTEK® is easier to work with than natural leather, operators may need time to develop the techniques to work as quickly as they do with other upholstery fabrics of a similar grade.

### **Static Electricity**

- NYTEK® Products easily generate static electricity, which is an early warning indicator of dry conditions in the shop. Increasing the humidity levels should help control this.

### **Orienting Patterns Properly**

- When sewing cut pieces together, orient the patterns on the roll to accommodate the stretch in relation to the design.
- Clearly mark the optimal orientation on the patterns and follow it consistently.

## **ABOUT OUR PRODUCTS: THE NYTEK® ADVANTAGE**

Emulating leather from their appearance to their cell structure, NYTEK® products work like leather but are much thinner, more durable, and as soft as the finest kid glove leather.

Natural leathers run from 45 to 65 square feet per hide with a 33% standard scrap factor due to barbwire scars, bug bites, and a variety of other defects that produce unpredictable yields, and inconsistent quality. The usable portion of natural leather will be inconsistent in thickness, stretch, and hand depending where it is cut on the hide. All these factors translate into a very expensive product.

NYTEK® products come in 45-50 yard rolls of 100% usable cover. Coloration is very consistent from roll to roll. Surface wear, care, and maintenance also are superior to natural leather. No exotic or domestic animals are used to manufacture NYTEK® designs.

## NOVASUEDE®

Distinctive and unique NOVASUEDE® possesses the luxurious hand of fine kid suede and the soft surface feel of Nubuk leather, offering exceptional performance, comfort, durability and an elegant appearance. This specially engineered product is both lightweight and inherently strong and is an ideal material for upholstery seating, wallcovering and panel applications.

To produce NOVASUEDE®, super fine nylon microfibers, one thousand times finer than silk, are intricately formed into a triaxial matrix that simulates the natural structure of leather. This microfiber matrix formation results in a soft and pliant material that is stronger than leather on a strength to weight ratio.

The multidirectional surface fibers give the product its distinguishing tracking effect. Billions of micropores within the NOVASUEDE® matrix transmit air and moisture vapor, allowing for complete breathability. NOVASUEDE® feels cool in the summer and warm in the winter.



## NYTEK®

NYTEK® has the elegant appearance and touch of fine, soft glove leather with the durability and inherent stain resistance achieved through advanced technology.

The Majilite Corporation has successfully applied the same space-age chemistry used to develop bullet-proof glass and high performance aircraft components to fiber and textile engineering to produce the outstanding characteristics of the materials in the NYTEK® collection.

The nylon fibers in NYTEK® are laid down in a three-directional axis similar to the natural structure of collagen found in leather, resulting in superior durability. One ounce of this nylon microfiber would be long enough to wrap around the equator several times.

NYTEK® is remarkably comfortable to sit on during any season. Its porous structure breathes by transmitting moisture vapor through billions of tiny micropores. Excess heat is dissipated in the heat and retained in the cold.

The intrinsic strength of NYTEK® makes Majilite products tear and puncture resistant, thus creating a material with considerable versatility. NYTEK® products can be used for upholstery, desk inlays, or wall and panel applications. Because of Majilite's special finishing system, the colors stay fresh, not fading or losing its beauty over time.

# MAJILITE

## PHYSICAL PROPERTIES

Material	ACTION FINESSE	AMBIANCE	ATTACHE	BABY CANE	BABY OSTRICH
<b>Composition</b>	Nylon Fiber Matrix	Nylon Fiber Matrix	Nylon Fiber Matrix	Nylon Fiber Matrix	Nylon Fiber Matrix
<b>Width</b>	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm
<b>Weight</b>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	9.5 oz/sq yd, 320 g/m <sup>2</sup>
<b>Thickness</b>	28 mils; 0.7 mm	28 mils; 0.7 mm	28 mils; 0.7 mm	28 mils; 0.7 mm	30 mils; 0.8 mm
<b>Cleanability Code</b>	S/W	S/W	S/W	S/W	S/W
<b>Wear</b>	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*
<b>Crock</b>	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)
<b>Trap Tear Strength</b>	30 lbs x 30 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)
<b>Grab Tensile Strength</b>	100 lbs x 100 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)
<b>Seam Strength</b>	100 lbs x 100 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)
<b>Resistance To Urine</b>	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining
<b>Colorfastness: Gas fumes</b>	(AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change	AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change
<b>Colorfastness: I</b>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>
<b>Colorfastness: II</b>	• Sulfide Staining (ASTM D-1712-89) No staining	• Sulfide Staining (ASTM D-1712-89) No staining	• Sulfide Staining (ASTM D-1712-89) No staining	• Sulfide Staining (ASTM D-1712-89) No staining	• Sulfide Staining (ASTM D-1712-89) No staining
<b>Flammability Class I</b>	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989
<b>Flammability Pass</b>	California 117 Section E	California 117 Section E	California 117 Section E	California 117 Section E	California 117 Section E
<b>Flammability Class A Rated</b>	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**
<b>Flame Compatibility</b>	Furniture upholstered with Finesse and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Ambiance and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Attache and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Baby Cane and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Baby Ostrich and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.

\*Failure in Wyzenbeek abrasion was defined as wear to expose the microfiber.

\*\*Tested as NYTEK with sheeting backing by adhered method.

# MAJILITE

## PHYSICAL PROPERTIES

Material	BOMBAY	BRUSHED FINESSE	BURNISHED METAL	CANE	CHINCHILLA
<b>Composition</b>	Polyester Fiber Matrix	Nylon Fiber Matrix	Nylon Fiber Matrix	Nylon Fiber Matrix	Nylon Fiber Matrix
<b>Width</b>	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm
<b>Weight</b>	9.8 oz/sq yd, 330 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>
<b>Thickness</b>	24 mils; 0.6 mm	28 mils; 0.7 mm	28 mils; 0.7 mm	28 mils; 0.7 mm	28 mils; 0.7 mm
<b>Cleanability Code</b>	S/W	S/W	S/W	S/W	S/W
<b>Wear</b>	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*
<b>Crock</b>	Wet 5/Dry 5 AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)
<b>Trap Tear Strength</b>	35 lbs x 25 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)
<b>Grab Tensile Strength</b>	130 lbs x 130 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)
<b>Seam Strength</b>	NA	100 lbs x 100 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)
<b>Resistance To Urine</b>	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining
<b>Colorfastness: Gas fumes</b>	(AATCC-23, 5 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change	AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change
<b>Colorfastness: I</b>	<ul style="list-style-type: none"> <li>• Weather-O-Meter (Xenon Arc, SAE J-1960), 1140 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>
<b>Colorfastness: II</b>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>
<b>Flammability Class I</b>	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989
<b>Flammability Pass</b>	California 117 Section E	California 117 Section E	California 117 Section E	California 117 Section E	California 117 Section E
<b>Flammability Class A Rated</b>	NA	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**
<b>Flame Compatibility</b>	NA	Furniture upholstered with Brushed Finesse and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Burnished Metal and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Cane and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Chinchilla and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.

\*Failure in Wyzenbeek abrasion was defined as wear to expose the microfiber.

\*\*Tested as NYTEK with sheeting backing by adhered method.

# MAJILITE

## PHYSICAL PROPERTIES

Material	COURIER	DECO	DESTINY	DRIZZLE	ECHO
<b>Composition</b>	Nylon Fiber Matrix	Nylon Fiber Matrix	Nylon Fiber Matrix	Nylon Fiber Matrix	Nylon Fiber Matrix
<b>Width</b>	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm
<b>Weight</b>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>
<b>Thickness</b>	28 mils; 0.7 mm	28 mils; 0.7 mm	28 mils; 0.7 mm	28 mils; 0.7 mm	28 mils; 0.7 mm
<b>Cleanability Code</b>	S/W	S/W	S/W	S/W	S/W
<b>Wear</b>	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*
<b>Crock</b>	Wet 5/Dry 5 AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)
<b>Trap Tear Strength</b>	30 lbs x 30 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)
<b>Grab Tensile Strength</b>	100 lbs x 100 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)
<b>Seam Strength</b>	100 lbs x 100 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)
<b>Resistance To Urine</b>	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining
<b>Colorfastness: Gas fumes</b>	(AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change	AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change
<b>Colorfastness: I</b>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>
<b>Colorfastness: II</b>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>
<b>Flammability Class I</b>	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989
<b>Flammability Pass</b>	California 117 Section E	California 117 Section E	California 117 Section E	California 117 Section E	California 117 Section E
<b>Flammability Class A Rated</b>	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**
<b>Flame Compatibility</b>	Furniture upholstered with Courier and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Deco and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Destiny and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Drizzle and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Echo and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.

\*Failure in Wyzenbeek abrasion was defined as wear to expose the microfiber.

\*\*Tested as NYTEK with sheeting backing by adhered method.

# MAJILITE

## PHYSICAL PROPERTIES

Material	ELEGANCE	FINESSE	GLAZED FINESSE	GRANDEUR	LEGACY
<b>Composition</b>	Nylon Fiber Matrix	Nylon Fiber Matrix	Nylon Fiber Matrix	Nylon Fiber Matrix	Nylon Fiber Matrix
<b>Width</b>	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm
<b>Weight</b>	11 oz/sq yd, 375 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>
<b>Thickness</b>	38 mils; 1.0 mm	28 mils; 0.7 mm	28 mils; 0.7 mm	28 mils; 0.7 mm	28 mils; 0.7 mm
<b>Cleanability Code</b>	S/W	S/W	S/W	S/W	S/W
<b>Wear</b>	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*
<b>Crock</b>	Wet 5/Dry 5 AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)
<b>Trap Tear Strength</b>	35 lbs x 35 lbs ASTM D-1117-80)	30 lbs x 30 lbs ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)
<b>Grab Tensile Strength</b>	90 lbs x 90 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)
<b>Seam Strength</b>	90 lbs x 90 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)
<b>Resistance To Urine</b>	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining
<b>Colorfastness: Gas fumes</b>	(AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change	AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change
<b>Colorfastness: I</b>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>
<b>Colorfastness: II</b>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>
<b>Flammability Class I</b>	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989
<b>Flammability Pass</b>	California 117 Section E	California 117 Section E	California 117 Section E	California 117 Section E	California 117 Section E
<b>Flammability Class A Rated</b>	NA	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**
<b>Flame Compatibility</b>	NA	Furniture upholstered with Finesse and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Glazed Finesse and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Grandeur and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Legacy and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.

\*Failure in Wyzenbeek abrasion was defined as wear to expose the microfiber.

\*\*Tested as NYTEK with sheeting backing by adhered method.

# MAJILITE

## PHYSICAL PROPERTIES

Material	LUMINA	METALLIC PARAGON	METALS & PEARLS	METALLIC RAINDROP	MILLENIUM
<b>Composition</b>	Polyester Fiber Matrix	Nylon Fiber Matrix	Nylon Fiber Matrix	Nylon Fiber Matrix	Nylon Fiber Matrix
<b>Width</b>	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm
<b>Weight</b>	9.8 oz/sq yd, 330 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>
<b>Thickness</b>	24 mils; 0.7 mm	28 mils; 0.7 mm	28 mils; 0.7 mm	28 mils; 0.7 mm	28 mils; 0.7 mm
<b>Cleanability Code</b>	S/W	S/W	S/W	S/W	S/W
<b>Wear</b>	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*
<b>Crock</b>	Wet 5/Dry 5 AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)
<b>Trap Tear Strength</b>	3 lbs x 25 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)
<b>Grab Tensile Strength</b>	130 lbs x 130 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)
<b>Seam Strength</b>	NA	100 lbs x 100 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)
<b>Resistance To Urine</b>	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining
<b>Colorfastness: Gas fumes</b>	(AATCC-23, 5 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change	AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change
<b>Colorfastness: I</b>	• Weather-O-Meter (Xenon Arc, SAE J-1960), 1140 kj/m <sup>2</sup> . Little to no color change	• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change • Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m <sup>2</sup> . Little to no color change	• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change • Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m <sup>2</sup> . Little to no color change	• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change • Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m <sup>2</sup> . Little to no color change	• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change • Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m <sup>2</sup> . Little to no color change
<b>Colorfastness: II</b>	• Sulfide Staining (ASTM D-1712-89) No staining	• Sulfide Staining (ASTM D-1712-89) No staining	• Sulfide Staining (ASTM D-1712-89) No staining	• Sulfide Staining (ASTM D-1712-89) No staining	• Sulfide Staining (ASTM D-1712-89) No staining
<b>Flammability Class I</b>	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989
<b>Flammability Pass</b>	California 117 Section E	California 117 Section E	California 117 Section E	California 117 Section E	California 117 Section E
<b>Flammability Class A Rated</b>	NA	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**
<b>Flame Compatibility</b>	NA	Furniture upholstered with Metallic Paragon and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Metals & Pearls and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Metallic Raindrop and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Millenium and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.

\*Failure in Wyzenbeek abrasion was defined as wear to expose the microfiber.

\*\*Tested as NYTEK with sheeting backing by adhered method.

# MAJILITE

## PHYSICAL PROPERTIES

Material	MILLWORK	MOCCASIN	MOSAIC	NOVASUEDE	NUANCE
<b>Composition</b>	Nylon Fiber Matrix	Nylon Fiber Matrix	Nylon Fiber Matrix	Nylon Fiber Matrix	Nylon Fiber Matrix
<b>Width</b>	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm	54 inch/134-137 cm	54 inch/137 cm
<b>Weight</b>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	9.5 oz/sq yd, 320 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	5.8 oz/sq yd, 197 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>
<b>Thickness</b>	28 mils; 0.7 mm	30 mils; 0.8 mm	28 mils; 0.7 mm	N/A	28 mils; 0.7 mm
<b>Cleanability Code</b>	S/W	S/W	S/W	S/W	S/W
<b>Wear</b>	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*
<b>Crock</b>	Wet 5/Dry 5 AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 3-4/Dry4-5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)
<b>Trap Tear Strength</b>	30 lbs x 30 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)	35 lbs x 35 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)
<b>Grab Tensile Strength</b>	100 lbs x 100 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)	90 lbs x 110 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)
<b>Seam Strength</b>	100 lbs x 100 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)	90 lbs x 135 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)
<b>Resistance To Urine</b>	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining	N/A	(ASTM D-543) No Staining
<b>Colorfastness: Gas fumes</b>	(AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 5 cycles) Class 4-5/Little to no color change	AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change
<b>Colorfastness: I</b>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Light Stability (AATCC Method 16A-82) Class 4-5/40 hrs. min.</li> <li>• Water (AATCC 107-1981) Class 4-5</li> <li>• Perspiration (AATCC 15-1979) Class 4-5</li> <li>• Dry Cleaning (AATCC 132-1979) Class 4-5</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>
<b>Colorfastness: II</b>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	N/A	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>
<b>Flammability Class I</b>	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-A	UFAC/NFPA 260-1989
<b>Flammability Pass</b>	California 117 Section E	California 117 Section E	California 117 Section E	California 117 Section E	California 117 Section E
<b>Flammability Class A Rated</b>	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**
<b>Flame Compatibility</b>	Furniture upholstered with Millwork and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Moccasin and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Mosaic and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Novasuede and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Nuance and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.

\*Failure in Wyzenbeek abrasion was defined as wear to expose the microfiber.

\*\*Tested as NYTEK with sheeting backing by adhered method.

# MAJILITE

## PHYSICAL PROPERTIES

Material	OVATION	OVATION PLUS	PANACHE	PONY	PRESTIGE
<b>Composition</b>	Nylon Fiber Matrix	Polyester Fiber Matrix	Nylon Fiber Matrix	Nylon Fiber Matrix	Nylon Fiber Matrix
<b>Width</b>	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm
<b>Weight</b>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	9.8 oz/sq yd, 330 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	9.5 oz/sq yd, 320 g/m <sup>2</sup>
<b>Thickness</b>	28 mils; 0.7 mm	24 mils; 0.7 mm	28 mils; 0.7 mm	28 mils; 0.7 mm	30 mils; 0.8 mm
<b>Cleanability Code</b>	S/W	S/W	S/W	S/W	S/W
<b>Wear</b>	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*
<b>Crock</b>	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)
<b>Trap Tear Strength</b>	30 lbs x 30 lbs (ASTM D-1117-80)	35 lbs x 25 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)	30 lbs x 25 lbs (ASTM D-1117-80)
<b>Grab Tensile Strength</b>	100 lbs x 100 lbs (ASTM D-5034-90)	130 lbs x 130 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)
<b>Seam Strength</b>	100 lbs x 100 lbs (ASTM D-1683-90A)	NA	100 lbs x 100 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)
<b>Resistance To Urine</b>	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining
<b>Colorfastness: Gas fumes</b>	(AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 5 cycles) Class 4-5/Little to no color change	AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change
<b>Colorfastness: I</b>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Weather-O-Meter (Xenon Arc, SAE J-1960), 1140 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>
<b>Colorfastness: II</b>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>
<b>Flammability Class I</b>	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989
<b>Flammability Pass</b>	California 117 Section E	California 117 Section E	California 117 Section E	California 117 Section E	California 117 Section E
<b>Flammability Class A Rated</b>	Tunnel Test: (ASTM E84)**	NA	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**
<b>Flame Compatibility</b>	Furniture upholstered with Ovation and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	NA	Furniture upholstered with Panache and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Pony and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Prestige and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.

\*Failure in Wyzenbeek abrasion was defined as wear to expose the microfiber.

\*\*Tested as NYTEK with sheeting backing by adhered method.



# MAJILITE

## PHYSICAL PROPERTIES

Material	PRESTO	RADIANCE	RAINDROP	REFLECTION	REPTILE
<b>Composition</b>	Nylon Fiber Matrix	Nylon Fiber Matrix	Polyester Fiber Matrix	Nylon Fiber Matrix	Nylon Fiber Matrix
<b>Width</b>	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm
<b>Weight</b>	9.5 oz/sq yd, 320 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	9.8 oz/sq yd, 330 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>
<b>Thickness</b>	30 mils; 0.8 mm	28 mils; 0.7 mm	24 mils; 0.6 mm	28 mils; 0.7 mm	30 mils; 0.8 mm
<b>Cleanability Code</b>	S/W	S/W	S/W	S/W	S/W
<b>Wear</b>	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*
<b>Crock</b>	Wet 5/Dry 5 AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)
<b>Trap Tear Strength</b>	30 lbs x 25 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)	35 lbs x 25lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)
<b>Grab Tensile Strength</b>	100 lbs x 100 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)	130 lbs x 130 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)
<b>Seam Strength</b>	100 lbs x 100 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)	NA	100 lbs x 100 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)
<b>Resistance To Urine</b>	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining
<b>Colorfastness: Gas fumes</b>	(AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change	AATCC-23, 5 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change
<b>Colorfastness: I</b>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Weather-O-Meter (Xenon Arc, SAE J-1960), 1140 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>
<b>Colorfastness: II</b>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>
<b>Flammability Class I</b>	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989
<b>Flammability Pass</b>	California 117 Section E	California 117 Section E	California 117 Section E	California 117 Section E	California 117 Section E
<b>Flammability Class A Rated</b>	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**	NA	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**
<b>Flame Compatibility</b>	Furniture upholstered with Presto and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Metals & Pearls and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	NA	Furniture upholstered with Millwork and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Mosaic and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.

\*Failure in Wyzenbeek abrasion was defined as wear to expose the microfiber.

\*\*Tested as NYTEK with sheeting backing by adhered method.

# MAJILITE

## PHYSICAL PROPERTIES

Material	SACHEL	SHIMMER	SONIC WAVE	STARLITE	STATUS
<b>Composition</b>	Nylon Fiber Matrix	Nylon Fiber Matrix	Polyester Fiber	Nylon Fiber Matrix	Nylon Fiber Matrix
<b>Width</b>	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm
<b>Weight</b>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	9.5 oz/sq yd, 320 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>
<b>Thickness</b>	28 mils; 0.7 mm	28 mils; 0.7 mm	43 mils; 1.1 mm	28 mils; 0.7 mm	28 mils; 0.7 mm
<b>Cleanability Code</b>	S/W	S/W	S/W	S/W	S/W
<b>Wear</b>	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*
<b>Crock</b>	Wet 5/Dry 5 AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)
<b>Trap Tear Strength</b>	30 lbs x 30 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)	15 lbs x 10 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)
<b>Grab Tensile Strength</b>	100 lbs x 100 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)	55 lbs x 45 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)
<b>Seam Strength</b>	100 lbs x 100 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)	110 lbs x 80 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)
<b>Resistance To Urine</b>	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining
<b>Colorfastness: Gas fumes</b>	(AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change
<b>Colorfastness: I</b>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16, Option 3, 120 hrs) Class 4-5/Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>
<b>Colorfastness: II</b>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>
<b>Flammability Class I</b>	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989
<b>Flammability Pass</b>	California 117 Section E	California 117 Section E	California 117 Section E	California 117 Section E	California 117 Section E
<b>Flammability Class A Rated</b>	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**	NA	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**
<b>Flame Compatibility</b>	Furniture upholstered with Ovation and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Metals & Pearls and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	NA	Furniture upholstered with Millwork and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Mosaic and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.

\*Failure in Wyzenbeek abrasion was defined as wear to expose the microfiber.

\*\*Tested as NYTEK with sheeting backing by adhered method.

# MAJILITE

## PHYSICAL PROPERTIES

Material	TECHNO	UNDERGLASS	VISTA	WEATHERED METAL	WOVEN FINESSE
<b>Composition</b>	Nylon Fiber Matrix	Polyester Fiber	Nylon Fiber Matrix	Nylon Fiber Matrix	Nylon Fiber Matrix
<b>Width</b>	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm	54 inch/137 cm
<b>Weight</b>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	9.5 oz/sq yd, 320 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>	8.8 oz/sq yd, 300 g/m <sup>2</sup>
<b>Thickness</b>	28 mils; 0.7 mm	43 mils; 1.1 mm	28 mils; 0.7 mm	28 mils; 0.7 mm	28 mils; 0.7 mm
<b>Cleanability Code</b>	S/W	S/W	S/W	S/W	S/W
<b>Wear</b>	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*	100,000+ double rubs Wyzenbeek Wire screen (ASTM D-4157-82)*
<b>Crock</b>	Wet 5/Dry 5 AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)	Wet 5/Dry 5 (AATCC-8-1988)
<b>Trap Tear Strength</b>	30 lbs x 30 lbs (ASTM D-1117-80)	15 lbs x 10 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)	30 lbs x 30 lbs (ASTM D-1117-80)
<b>Grab Tensile Strength</b>	100 lbs x 100 lbs (ASTM D-5034-90)	55 lbs x 45 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)	100 lbs x 100 lbs (ASTM D-5034-90)
<b>Seam Strength</b>	100 lbs x 100 lbs (ASTM D-1683-90A)	110 lbs x 80 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)	100 lbs x 100 lbs (ASTM D-1683-90A)
<b>Resistance To Urine</b>	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining	(ASTM D-543) No Staining
<b>Colorfastness: Gas fumes</b>	(AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change	AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change	(AATCC-23, 3 cycles) Class 4-5/Little to no color change
<b>Colorfastness: I</b>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16, Option 3, 120 hrs) Class 4-5/Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>	<ul style="list-style-type: none"> <li>• Fadeometer Test (AATCC-16A-90, 100 hrs) Class 5/No color change</li> <li>• Weather-O-Meter (Xenon Arc, SAE J-1885), 225 kj/m<sup>2</sup>: Little to no color change</li> </ul>
<b>Colorfastness: II</b>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>	<ul style="list-style-type: none"> <li>• Sulfide Staining (ASTM D-1712-89) No staining</li> </ul>
<b>Flammability Class I</b>	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989	UFAC/NFPA 260-1989
<b>Flammability Pass</b>	California 117 Section E	California 117 Section E	California 117 Section E	California 117 Section E	California 117 Section E
<b>Flammability Class A Rated</b>	Tunnel Test: (ASTM E84)**	NA	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**	Tunnel Test: (ASTM E84)**
<b>Flame Compatibility</b>	Furniture upholstered with Ovation and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	NA	Furniture upholstered with Millenium and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Millwork and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.	Furniture upholstered with Mosaic and constructed with other suitable components can comply with Cal 133. Can also be treated to meet many international flammability codes.

\*Failure in Wyzenbeek abrasion was defined as wear to expose the microfiber.

\*\*Tested as NYTEK with sheeting backing by adhered method.

## **STORAGE AND HANDLING**

### **Storing and Hanging**

- Store in a moist, climate-controlled environment to allow for maximum stretch and flexibility. Avoid extremes in humidity or temperature.
- Keep NYTEK® products in their delivery box before they are used.
- Avoid standing rolls on their ends or overcrowding rolls in storage bins, which can create bunching, wrinkling or pressure marks.

### **Preventing Exposure to Foreign Materials**

- During processing, prevent dirt or foreign objects from adhering to the backside of NYTEK® products, which may leave pressure marks or bumps visible on the face.
- In winter the material is more susceptible to static and dirt because of dry conditions.

### **Removing Wrinkles and Pressure Marks**

- Use steam or heat to remove wrinkles and pressure marks.
- Try either technique on a small swatch first to establish the appropriate temperature.
- For steam, use a hand held steamer or flat iron with a damp, clean white cotton presser cloth between the iron and the material's backside. Steam is less likely to cause burning.
- A heat gun or flat iron can be used to generate dry heat, which is best for removing stubborn wrinkles.

## SUMMARY

### For Best Storage Results:

#### Do

- Store in a climate-controlled environment that is not too dry and helps the material retain moisture.
- Keep the backside of the material clean and unexposed to dirt and other contaminants.
- Use steam or dry heat to remove wrinkles and pressure marks.

#### Don't

- Stand rolls on their ends.
- Overcrowd rolls in storage bins, which causes bunching and wrinkling
- Expose the backside to static or dirt.

# CUTTING

## Before Cutting

- Run a test sample of each design to see how the material is going to perform and that the pattern and layout are correct.
- Expose NYTEK® products, especially NOVASUEDE®, to humidity prior to being cut to allow the micro-fibers to absorb moisture and expand.
- Keep cut goods in a humid state throughout the upholstery process.
- Prevent static electricity by increasing the plant's humidity levels. However, placing grounded metal strips on the cutting table should discharge the energy as it develops.

## Pattern Development

- Test the pattern by evaluating the upholstered product in both humid and dry environments.
- If the fabric is loose fitting or sagging in humid conditions, then cut down the pattern.
- Replace patterns as often as required to assure their accuracy, always referring to the master pattern.
- Correctly fitting the patterns while the cover is in an expanded state will negate the effects of humidity in the future.
- Apply steam to a test cover and tailor the cover to fit the job.
- Remove the test cover and allow the moisture on it to dry.
- Deconstruct the cover; the dry state is the size to use for the master pattern.
- Model the subsequent patterns from the test cover.

## Orienting Patterns Properly

- Orient the patterns properly based on the stretch requirements.

## **Preventing Drag**

- Drag or clinging occurs if the material is not laying out smoothly on cutting surfaces.
- Drag can be reduced by top coating the tables with Teflon adhesive-backed films laminated to the work surfaces. Many upholsterers use Kraft underlay papers. The Singer Sewing Company ([www.singerco.com](http://www.singerco.com)), Material Concepts ([www.materialconcepts.com](http://www.materialconcepts.com)), Cansew Inc., ([www.cansew.ca](http://www.cansew.ca)) and M.J. Foley Company ([www.mjfoleyco.com](http://www.mjfoleyco.com)) sell these and other surface treatments. Call Technical Services if additional assistance is needed.

## **Cutting the Fabric**

- Cut entire orders from the same roll of fabric or dye lot.
- Make sure the material has time to settle back into its natural state if the material has been stretched. Putting Kraft papers between layers should facilitate this.
- Use a fine felt or ballpoint pen or a sharp carbon pencil to mark the backside of the cover.
- Keep precise markings on pieces to be sewn together to prevent later problems.

## **Precision, Multi-Layer and Single Layer Cutting**

- Multi-layer cutting works best with a straight blade cutter equipped with an automatic sharpening device to reduce friction between the blade and cutting edge. Avoid slippage by not over stacking.
- Use any single layer cutting method preferred by the shop.
- Blade speed should be no higher than 1600-3200 rpm to avoid fusing the edges together because of knives over-heating.

## **Notches**

- Notches may need to be cut in the selvages to help prevent puckering or bunching during sewing and upholstery.
- Make notches either in the pattern or during sewing.

## **SUMMARY**

### **Before Cutting**

- Run a test sample.
- Understand how stretch and the fabric pattern will affect the design and layout.
- Cut in a climate-controlled environment.
- Orient patterns properly.
- Prevent drag.

### **During Cutting**

- Cut the entire order from the same dye lot.
- Insert notches in the selvages to prevent puckering or bunching.
- Mark precisely.



# SEWING

## Before Sewing

- Run a sample of each style before running an entire job to see how the material is going to perform and to make sure the patterns are correct.
- Calculate the same sewing time allowances for NYTEK® products as allowed for natural leather.
- Allow machine operators time to develop the techniques necessary to work efficiently with NYTEK® products, which are easier to work with than natural leather.

## Similarities to Natural Leather

- NYTEK® absorbs moisture, resulting in expansion and greater elasticity.
- To achieve optimal results, use the same upholstery methods and techniques as used for leather. Most upholstery applications are a skilled craft rather than an exact science.
- Like natural leathers, errors cannot be covered up during the upholstering process. Operators need time and patience to learn the techniques unique to our products.
- Proper prepping is critical to achieve the best results. Because of the smooth finish and weight of the cover, flaws and errors made during the prepping process may show by not filling out the cover properly or from telegraphing.

## Machine Requirements

- Shops may use any brand name light industrial sewing machine that satisfies their production needs. Both walking foot machines, which prevent puckering, or flat foot machines produce excellent results.
- Each shop should determine how to set thread tension and foot pressure. For best results, keep as loose as possible.

- Fine feed dogs provide the best results and do not damage the surface of the covers.

### **Reducing Drag**

- Use a Teflon presser foot and laminate adhesive-backed Teflon film to the machine table and bed.
- Majilite can add backing material to our products. Contact us for recommendations and pricing.

### **Needle and Thread Sizes**

- Use a Schmetz Nm 120, normal round point needle with a Nymo size D nylon thread. The sewing machine model determines the needle length.
- Thread should move freely through the eye of the needle and the needle should make a hole in the cover large enough for the thread to pass through without dragging and causing wrinkling, gathering or puckering. Needles with cutting points are not advised.
- Thread and needle size must match. Threads often are selected by size, color, and appearance. Nylon threads will perform better with NYTEK® Products than other thread fibers. Properly sized thread should fill the hole created by the needle.
- Needle holes in the cover are permanent, just like with natural leather.

### **Stitches Per Inch, Seam Allowance, and Notches**

- Seven to eight (7 to 8) stitches per inch is adequate. Five to six (5 to 6) stitches per inch is common for decorative topstitching. The industry standard for seam allowances is three-eighths to one-half ( $3/8$ " to  $1/2$ " ) inches.
- Seams often need to be trimmed after being sewn for proper tailoring and to prevent telegraphing through the cover.
- Wetting the seams with hand steamers, spray water bottles or wet rags will help the two covers stretch and work together.
- Cut sufficient notches into the seam allowances to prevent

puckering and other defects during sewing. Pattern notching tools work well for this and can be purchased through the Singer Sewing Company, Cutters Exchange, M.J. Foley Company, and other manufacturers.

## **SUMMARY**

- Run a sample before cutting the entire job.
- Sewing time allowances will be similar to what is required for leather.
- Use brand name light industrial sewing machines.
- Utilize various techniques to control drag.
- Follow specified seam allowances and stitch requirements.

# UPHOLSTERY

## Basic Information about Stretch

- Stretch in the width direction is greater and easier to manipulate than stretch in the length.
- Stretch is not uniform with all colors and is greater with lighter colors than with darker ones with less dye penetration.

## Grain and Nap

- Please consider the direction of the design when cutting patterns, such as with NYTEK® Products like MOCCASIN, BABY OSTRICH, CANE, etc.,
- The nap of NOVASUEDE® is a non-directional design.

## Seam Allowances

- Trim excess selvages to prevent them from showing through the cover or creating bunching or wrinkling.
- Add notches to eliminate gathering of selvages under the cover.

## Wrinkle Removal and Moisture

- Remove wrinkles by pulling the excess cover taut in all directions. Mist steam or water on the back of the cover to assist in this process.
- If excessive wrinkles are present, check for correct pattern size, accurate orientation of the patterns in relationship to the stretch of the goods, proper fillers and a correctly sewn cover.
- Use foam to provide enough support to keep the cover filled for a tight look.

## Bagging Prevention: Moisture and Humidity

- Moisture will absorb into the micro-fiber matrix of NYTEK® products, especially NOVASUEDE®, resulting in expansion and greater elasticity similar to natural leather.
- To prevent bagging, the cover needs to be exposed to an adequate

amount of humidity, the cutting patterns should be properly sized and the cover needs to be pulled tight. Be sure to use adequate and appropriate cushion filling materials.

- NYTEK® products should be exposed to humidity before and after being cut to allow for expansion as their micro-fibers absorb water. If the shop is not climatically controlled to regulate humidity, steam the cover well both during pattern development and upholstering. Correctly fitting the patterns and placing the cover properly in an expanded state will negate the effects of humidity in the future. All excess bagging or stretch should be eliminated at this time.

### **Why Bagging Occurs After Upholstering**

- The covers were sewn and/or applied loosely in low humidity conditions. Bagging occurs after the cover sets for a few days and the temperature and humidity have increased dramatically.
- Bagging also can occur if the cushion breaks down. NYTEK®, like leather, is not totally elastic. It should be properly supported to prevent “puddling.” Puddling is a special type of bagging or sagging that occurs on the chair seat. It is a mark remaining after the sitter rises, but the chair’s foam does not recover. The material on the chair now looks too big because the cover is not properly supported, e.g., like a director’s chair. The upholsterer needs to properly support the cover material with foam or springs to prevent this.

### **Drag**

- The backside of NYTEK® products tend to grab or cling to foam.
- Apply a thin layer of spun polyester fiber batting over the foam to reduce drag.
- Spray slickeners can be used to reduce drag and are available through most upholstery supply houses. Avoid slickeners containing silicone that can disburse small particles into finishing areas. Some shops are reporting success using talcum powder on exposed foam surfaces. Steaming or misting water onto the back

of the cover also may help. Excess wrinkles should be pulled out while the cover is expanded.

- Majilite can add a backer to NYTEK® products to provide a slicker surface during the manufacturing process. Contact Majilite for feasibility and pricing.

### **Cushion Construction**

- Specify appropriate cushion filling materials.
- The back of the cover tends to cling to foam so placing something between the cover and the foam will reduce this problem.
- If the cover creeps on the cushion during sitting, it will resist returning to the proper position if it is restricted from sliding freely. Add a layer of spun polyester fiber batting to remedy this problem.
- Avoid bonded polyester batting, which sets at low temperatures and doesn't spring back quickly, and shows unattractively through the covers.
- Foam quality also is a factor in the performance of the cushion; 3 lb/ft<sup>3</sup> HR foams achieve the best results. 1.8 lb/ft<sup>3</sup> foams are frequently used as a cost saving measure but they must be able to fill out the cover and retain the shape of the cushion.
- There are a number of products designed to be used as cushion fillers. As with natural leather, any bunching or wrinkling of materials under the cover may telegraph through and be visible on the surface. NYTEK® products can also be backed with a variety of materials. See APPLICATIONS.
- Vent cushions for proper functioning.

### **Vents**

- Air exchange should occur quickly and freely when the cushion is used so air does not become trapped, which prevents the cushion from functioning properly. A poorly vented pillow will seem hard when it is first sat on and will usually be noisy as it expends the trapped air. After someone leaves the seat, a poorly vented cushion will appear deflated and take time to recover.

- Include air evacuation holes or panels when constructing cushions or pillows to allow for the free movement of air caused by the compression and expansion of foam.
- Add a complimenting breathable fabric in the zipper boxing for double-faced cushions. Many manufacturers only face one side of the cushion and use a complimenting fabric for the bottom and back, which should negate any airflow problems.

### **Slipping Cushions**

- Loose pillows have a tendency to slide. NYTEK® products like FINESSE® have a smooth finish that will slide freely against itself or a similar surface.
- Using a complimenting cover that has more grip or friction on the underside of the cushion and/or the deck of the seat should restrict this. Cushion ties are frequently used on loose pillow seat construction. Other NYTEK® products like NOVASUEDE® are naturally resistant to sliding. Someone slipping out of the seat is symptomatic of underlying problems with the cushion construction and/or the relationship of the pitch between the seat and back.

### **Staple Cutting of Material**

- This can occur if the plunger extends beyond the tip of the staple gun when it is discharged during a tight pull or bridged cover.
- Try eliminating any bridging of the cover and regulate the air down on the gun. The staple plungers on the staple guns also can be trimmed shorter so they are flush or just shorter than the nose of the gun.

### **Regulating With Heat or Steam**

- Carefully make adjustments with heat or steam after upholstering. Spun polyester fiber batting used in cushion padding will melt easily if exposed to heat. Adhesives used in prepping may also release under heat.
- High temperature heat guns should be used carefully and sparingly

to shrink small wrinkles out of the cover. Experiment with pieces of scrap first. Steam may be most effective when applied to the backside of the cover to give it more stretch prior to application, making it easier to pull tightly.

### **Mistakes**

- Holes and cuts cannot be repaired. To avoid future problems, use experienced operators to work on complex designs.
- Re-upholstering involves the same skills as general upholstery and the same cautionary measures should be followed.
- Expedient short cuts will produce unsatisfactory results. This can include trying to upholster over existing covers, not refurbishing or replacing worn or broken down padding or fillers, not carefully inspecting the job for foreign materials, not removing old tacks or staples, and not repairing substrate materials.

### **Vertical Panels**

- Back vertical panels with Majilite's light weight polycotton sheeting backer or foam/tricot backer. They help provide stability and prevent sagging in humid conditions. Stapled covers should be pulled down as tightly as possible. Steaming the cover first is recommended.
- If the operator wants to glue the cover to the panel, please refer to the section on DIRECT LAMINATION and/or the section on PANELS AND WALLCOVERING that appears later in this guide.

## **SUMMARY**

- Expose cushions to humidity to prevent bagging.
- Apply slickeners and a thin layer of spun polyester fiber to prevent drag.
- Use proven techniques in cushion construction.
- Include air evacuation holes or panels when constructing cushions or pillows.



## **TIPS FOR USING NOVASUEDE®, FINESSE® AND NYTEK® AS WALLCOVERING**

- Majilite provides a light-weight polyester/cotton sheeting backer for wall applications. Backing provides dimensional stability that helps prevent seam separation, minimizes the risk of wallpaper paste bleed through, and allows NYTEK® products to be used with standard adhesives and hanging techniques.
- Experienced installers should test a small sample to see how the fabric hangs.
- Use recommended vinyl adhesives such as standard or heavy-duty vinyl premixed cement. Refer to the manufacturer's instructions for use and suitability of the adhesives.
- Prepare all surfaces as directed by the adhesive manufacturer and inspect them for foreign objects or contamination.
- Ensure complete surface coverage on all glued areas to achieve proper bonding; missed area will blister.
- Smooth by hand after laying material to ensure 100% bond and to work out bubbles.
- Double cut seams using sharp blades.
- Lightly brush as required.
- If a padded effect is desired, use NYTEK® products backed with a Majilite foam. Please refer to the MARINE LINER INSTALLATION section.
- For applications requiring direct cementing to wood, fiberglass, aluminum, and other materials, please refer to the DIRECT CEMENT METHOD section.

### **SUMMARY**

- Use Majilite backers.
- Employ experienced installers.
- Use recommended vinyl adhesives.
- Prepare surfaces and ensure complete coverage.
- Smooth by hand and double cut seams.
- Lightly brush.

## **NOVASUEDE®, FINESSE® and NYTEK®**

### **DIRECT CEMENT APPLICATION**

Direct cement application is used for components with molded shapes such as cowls, dashboards, door panels, and horizontal surfaces like desktops and tables made of laminate, chipboard, aluminum, and fiberglass.

This procedure applies to NYTEK® products with and without Majilite's foam/tricot, knit, or sheeting backings. If installing as a wallcovering with standard vinyl wall cements, please see the section on TIPS FOR USING NOVASUEDE®-NYTEK® AS A WALLCOVERING.

- Inspect all surfaces for foreign materials and defects and prepare them according to the adhesive's instructions. For instance, particleboard is porous and may need to be sealed, primed, or doubled adhesive coated.
- Use either a spray contact adhesive or one that can be brushed to coat substrates such as laminate, chipboard, and aluminum. Brushing wets the coated surface well.
- Only use a spray adhesive on NOVASUEDE® or NYTEK® to keep the adhesive on top of the fibers and not push it through to the face through brushing.
- Thoroughly cover both surfaces with adhesive. Missed areas or places where there are voids or gaps in the adhered material may swell and bubble when exposed to high humidity.
- Contact adhesives must be appropriate for the specific application and the material to which they will be applied; i.e. aluminum, wood, etc. The container label, technical literature, or adhesive manufacturer should provide that information.
- Some water-based adhesives swell NYTEK® products, making the cover difficult to handle. Run samples and contact the adhesive dealer for further guidance.
- Do not use pressure sensitive adhesives that tend to creep with

time and can result in thumb printing, loss of bond, or wicking of the adhesive up to the face of the material.

- After applying adhesive to the substrate and NYTEK®, allow the solvent to evaporate and laminate the material before the adhesives open times have expired.
- Start at the center of the piece and work out to the edges to stick the cover down. To get extra stretch at difficult corners, apply a little steam to the face of the NYTEK® as it is being stretched.

## STRETCHWALL AND PANELS

### **Solid Panels: Cemented**

**For solid, smooth panels**, apply NYTEK® without backing with contact cement following the suggestions in the DIRECT CEMENT APPLICATIONS section of this User's Guide.

**For wood, gypsum board or other compatible substrates**, use standard water-based wallcovering cements with NYTEK® with the polycotton sheeting backing. Follow the suggestions in the WALLCOVERING section.

### **Solid Panels: Upholstered**

**For a padded look**, follow the stretch and staple and/or direct cement method using the foam/tricot backing as described in the MARINE APPLICATIONS section.

**For a padded look without foam tricot backing**, the panel should be upholstered using techniques discussed in the UPHOLSTERY section. The foam padding is glued to the panel and covered with a Dacron or other appropriate batting.

### **Not Recommended**

- Gluing the NYTEK® directly to the foam may cause spots to appear where the adhesive coverage is low, resulting in areas where the foam to NYTEK® bond is low. These low bond areas may bubble in high humidity.
- Using too much adhesive will saturate the foam and result in thumb printing where the foam takes a permanent set after compression.
- Upholstering over foam alone is also not recommended. The cover will not sufficiently compress the foam, especially in the center of a large panel. Batting, however, is compressed by the stretching of the cover during upholstering and will push back the cover to help keep it tight and smooth.

- The NYTEK® cover must be stretched tightly and evenly over the panel before stapling in the back, especially with large panels. Ideally, the NYTEK® should be steamed or misted on the back, making it easier to stretch. After upholstering, the NYTEK® will contract and tighten with less humidity in the panel.
- Foam tricot backing can be used to help stabilize NYTEK® for applications where padding will not push the cover.
- Knit backed NYTEK® is an alternative. NYTEK® without backing is not as stable in humid conditions as the backed materials, but has been stretched over open panels.
- Stretching the NYTEK® is extremely critical in these applications since the cover will not be pushed out and kept smooth by battings and foams.
- The NYTEK® should be steamed or misted lightly on the back and then stretched evenly as much as possible in both directions to avoid wrinkles. The cross machine direction generally has more stretch than the machine direction.
- Attach the NYTEK® securely after stretching, remembering that it will contract and get very tight in a dry environment. If the clips in the panel are inadequate, the tension produced by this contraction could pull the NYTEK® out of the clip or track. Stretching the NYTEK® in a humid environment will help it remain tight in these conditions.

## MARINE LINER INSTALLATION GUIDELINES

NOVASUEDE® and FINESSE® are made of NYTEK®, a specially engineered nylon fiber matrix. These luxurious materials are very much like natural leather, not just in the way they look and feel but in the way they react to atmospheric conditions.

NYTEK®, like leather, will expand and contract slightly with changes in moisture content, although it will not retain much water. It regulates absorbed moisture so that it never holds more than 8 to 10 percent of its own weight.

NYTEK® products with a Majilite foam/tricot knit package are more dimensionally stable to changes in atmospheric conditions. The 1/8" foam package is the most common construction and is the standard for headliners and panels with most major manufacturers and custom refurbishers. The foam/tricot package increases acoustical properties and gives a more luxurious padded effect. It will also mask defects and soften rough surfaces.

For best results, NYTEK® products should be installed in a humid environment. With more moisture, NYTEK® is easier to work with it and will remain tighter after installation. These fabrics are softened by moisture, making them more elastic and easier to stretch. Additionally, the fabrics are in their most expanded state when moist and by pulling them tightly, they will get even tighter as the moisture decreases. They will then remain unaffected with future changes in moisture level.

Controlling atmospheric conditions in a production environment may not always be practical. Many installers keep a humidifier or steamer in the installation area. Installers can also use a water spray bottle and apply it to the backside of the material (even on the foam back) during installation.

This technique can be used if conditions are dry or whenever a tight, crease-free wrap around a tough curve or corner is desired.

In order to create a tight appearance, pull the NYTEK® product as tightly as practically possible. Also be sure to pull evenly to avoid rippling. Since NYTEK® has such high tensile strength, installers should not worry about pulling too hard.

For a stretch and staple overhead, we recommend keeping the spacing between ribs to 24 inches or less to prevent sagging. To achieve even tension, follow these steps:

1. Tack or staple the material to one end of one rib or batten. Pull the material the length of the batten down to the other end to the maximum stretch possible and tack down this end.
2. Lightly mist the back (foam/tricot) side of the material with water. Restretch from one end and staple. Staple along the rib without further stretching.
3. Starting on one end, stretch this material straight across to the other rib or batten and staple. Use appropriate leather stretching tools for maximum stretch. Water mist if conditions have dried the material. As the material dries it will further contract and tighten.

Use a good quality clear spray contact adhesive for cementing to a flat surface. For cement bonding to wood or other porous surfaces with water-based cements, back the NYTEK® to a Majilite sheeting.

The information contained in this guide is based on laboratory tests and actual field experience. The suggestions are intended as an installation guide only without guarantee. Since applications will vary, the exact method of installation is beyond our control. It is the buyer's responsibility to assess the suitability of these products for the specific application.

## AIRCRAFT INSTALLATION GUIDELINES

NOVASUEDE® and FINESSE® are made of NYTEK®, a specially engineered nylon microfiber matrix. These luxurious materials are very much like natural leather, not just in the way they look and feel but in the way they react to atmospheric conditions.

NYTEK®, like leather, will expand and contract slightly with changes in moisture content, although it will not retain much water. It regulates absorbed moisture in such a way that it never holds more than 8 to 10 percent of its own weight.

To avoid sagging problems, we recommend installation by direct cement method. NYTEK® materials should be adhered to solid continuous surfaces that have been properly prepared according to the manufacturer's instructions for the adhesive being used. The adhesive should be a contact, solvent type that is recommended for the material to which it will be applied, (i.e. aluminum, etc.).

- Apply the adhesive by spray gun to both the NYTEK® and the panel. Spray a light to moderate coat in each direction.
- Allow the solvent to evaporate and recoat each piece. Apply enough coats to assure complete coverage of both the NYTEK® and the panel.
- Laminate the NYTEK® to the panel within the recommended open time as specified by the adhesive manufacturer.
- Roll or press the fabric by roll or other convenient means to assure good contact between the two surfaces.
- It is important that both the NYTEK® and the material to which it is being adhered are thoroughly covered by adhesive. Missed areas or places where there are voids or gaps in the adhered material may swell and bubble in high humidity.



- Do not use pressure sensitive adhesives as they tend to creep with time and can result in thumbprinting, loss of bond, or wicking of the adhesive up to the face of the material.
- It is best to adhere the NYTEK® to the center of the piece and work out to the edges. To get extra stretch at difficult corners, apply a little steam to the face of the NYTEK® as it is being stretched.

**For upholstered applications**, we recommend that NYTEK® be stretched as much as possible in both directions. To achieve this, the material may be moistened by steaming or by conditioning and upholstering in a humid environment. NYTEK® has more stretch in the cross roll direction than in the roll direction. Pull evenly to avoid wrinkles. To help maintain a tight appearance, it is advisable to provide some push behind the cover from foam or appropriate battings that have been compressed during the upholstering operation.

We do not recommend NYTEK® for stretch and clip headliners unless backed by a Majilite approved backing.

If you have not used NYTEK® before or would like to evaluate it on your application prior to an installation, we have sample cuts available approximately 23" x 18" in size that we can send to you free of charge. Please contact your Majilite representative or call Majilite at 978-441-6800.

This information is based on laboratory tests and actual field experience.

The suggestions are intended as an installation guide only without guarantee. Since applications will vary, the exact method of installation is beyond our control. It is the buyer's responsibility to assess the suitability of these products for the specific application,

## FLAMMABILITY

NOVASUEDE® and NYTEK® faux leather products pass the following flammability tests without additional flame retardant (FR) treatment:

- **Cal 117E-Pass:** Novasuede®, Nytek® (nylon and polyester microfiber composites)
- **UFAC/NFPA260-** Class 1: Novasuede®, Nytek® (nylon and polyester microfiber composites)

To meet other flammability specifications, it may be necessary to apply a flame retardant (FR) treatment to Novasuede® or Nytek®. Majilite can be treated to the following standards; please contact us with any questions:

- **ASTM E84**-(glue down method) Class A: Novasuede®/sheeting, Nytek® (nylon)/poplin
- **I.M.O. 652 (16), Sections 8.2 and 8.3:** Novasuede® ☉, Novasuede®/knit, Novasuede®/sheeting, Novasuede®/FR foam and tricot, Nytek® (nylon and polyester microfiber composites) ☉, Nytek®/knit, Nytek®/sheeting, Nytek®/FR foam and tricot, Indoor/Outdoor ☉
- **I.M.O. 653 (IMO Fire Test Procedure Code, Annex 1, Part 2 and Part 5):** Novasuede® ☉
- **I.M.O. 653 (IMO Fire Test Procedure Code, Annex 1, Part 5 and Annex 2):** Nytek® (special construction, minimums required) ☉
- **B.S. 5852, Part 1, Ignition sources #0 and #1:** Novasuede®, Novasuede®/knit, Novasuede®/sheeting, Nytek®, Nytek®/knit, Nytek®/sheeting
- **B.S. 5852, Part 2, Ignition source #5 (crib 5):** Novasuede®, Novasuede®/knit, Novasuede®/sheeting, Nytek®, Nytek®/knit, Nytek®/sheeting
- **EN 1021:** Novasuede®, Novasuede®/knit, Novasuede®/sheeting,

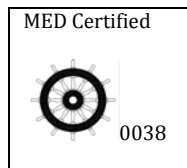
Nytek®, Nytek®/knit, Nytek®/sheeting

- **BS 476, Part 7, Class 1:** Novasuede®/sheeting, Nytek® (special construction)
- **FAR 25.853 (a) Appendix F Part I (a)(1)(ii)** (12 second vertical burn): Novasuede®, Novasuede®/knit, Nytek®, Nytek®/knit
- **MVSS302** Novasuede®, Nytek®

⊙ Denotes conformance to European Marine Equipment Directive (MED), modules B and D and is also available with Lloyd's Register "Certificate of Fire Approval"

Unless otherwise noted, Nytek® faux leathers are nylon microfiber composites.

Independent laboratories have tested sample lots of flame retardant-treated Novasuede® and Nytek® using the previously described methods. The test reports are available upon request. Majilite manufactures new orders using these methods, which undergo quality control testing. Majilite must acknowledge a customer request in writing before performing or certifying these tests on individual orders.



## TECHNICAL BULLETIN 133 AND CALIFORNIA 133 NYTEK®

Since March 1, 1992, the state of California has required upholstered seating furniture sold for use in certain public occupancies (as defined in the bulletin) to meet the requirements of the State of California, Bureau of Home Furnishings and Thermal Insulating Technical Bulletin 133, better known as "Cal 133."

The city of Boston, the New York/New Jersey Port Authority, and other city and state governments adopted Cal 133 as the standard for drafting their own legislation.

Cal 133 is a full-scale test involving a piece of furniture or a suitable mock-up. A suitable mock-up consists of a seat, back cushion and arms, if applicable, which are configured into a metal frame made of slotted "L" angle iron and slotted flat iron as described in the Cal 133 Technical Bulletin. The cushions will be constructed using the same methods and materials (cover, barrier, foam, threads, etc.) to be used in the final finished piece of furniture. The purpose of the mock-up is to give a predictable indication of how the furniture will perform in an actual chair test.

**No cover material can pass Cal 133** since it is a composite, not a component test. It considers the effect of the individual components and their influence on each other as they relate to the design of the seating furniture being tested. The methods and materials that pass with one design may not pass on another.

**Cal 133 does not specify fire barrier materials**, however most manufacturers have reported that the best results are obtained when adequate fire barrier materials are used.

**Fire retarding foams** are not a requirement of Cal 133. In fact, no components are specified. The law's goal is the construction of safer furniture. Manufacturers have the flexibility to select their own methods and materials as long as their chair passes the test.

**NYTEK® products** are used successfully throughout the industry on Cal 133 furniture when used in conjunction with a suitable fire barrier and Cal 117 rated foam and other components.

The California Department of Consumers Affairs, Bureau of Home Furnishings and Thermal Insulation (BHFTI) has literature on barrier fabrics and foam components, Cal 133 question and answer booklets, and copies of the regulation. If you need assistance contact the following numbers or website:

**The New York/New Jersey Port Authority:** 212-435-7000

**The City of Boston Fire Department Chemist Office:** 617-343-3527

**BHFTI** – [www.bhfti.ca.gov](http://www.bhfti.ca.gov)

For further guidance or for technical assistance, call Majilite at 978-441-6800.

## CITY OF BOSTON

The City of Boston's BFD IX Component Test has been one of the toughest flammability tests for upholstery fabrics. It requires a vertical flame test with a large flame and a short after-flame time requirement. Because of Boston's reputation for tough fire standards, many specifiers request that upholstery fabrics pass the Boston test even though the fabric might not be used there.

Often a flame retardant compliance treatment would change the hand of the fabric and, in some cases, the color and texture. Some of these treatments were water-soluble and could be washed out, limiting their effectiveness. Sometimes a chair built with approved components (fabric cover, foam, etc.) did not perform well in a full-scale burn test.

The City of Boston discontinued component testing in January 1995. In its place, Boston adopted the Cal 133 full-scale burn test. Its emphasis has shifted to total chair performance in a fire and allows the chair manufacturer to select component combinations to successfully meet the test requirements.

NYTEK® products are used in the city of Boston by incorporating them into chairs designed to pass Cal 133. Often it is necessary to use a barrier fabric between the NYTEK® cover and the foam or fiberfill. Please refer to the section on Cal 133 and contact your Majilite representative if you have any questions.

Boston regulations differ in some respects from Cal133. They do not exempt buildings with sprinklers and then cover more occupancy use groups than Cal 133.

For more information on the City of Boston regulations, contact the Boston Fire Department, Chemist Office at 617-343-3527.

<http://www.cityofboston.gov/fire/PGA.asp>

## **NOVASUEDE® CLEANING INSTRUCTIONS**

- NOVASUEDE®'s special technology allows for easy care and cleaning.
- Liquid spills tend to "bead up" on the surface; often all that is needed is quick action with a dry cloth to absorb the liquid.
- Remove dust deposits, prevent soil build-up, and keep the suede surface looking crisp and new with normal, regular vacuuming with a soft brush attachment.
- Novasuede can be cleaned and groomed with a Magik brush, Miracle brush, or similar lint removal brush.
- Use Scotch tape or a soft eraser to remove light stains and smudge marks.

### **Water-soluble Stains**

- Water-soluble stains from coffee, tea, juice, soft drinks, milk, beer, wine, and other drinks can be removed by dabbing the affected area with clean water, mild soapy water, or a 50/50 solution of water and white vinegar.
- Blotting is always preferable to rubbing for stain removal.
- Remove excess soap or vinegar solution by dabbing with clean water and blotting with a clean cloth.
- Allow the material to dry naturally or dry quickly with a hair dryer using the warm setting.
- "Rings" noticed after drying are usually the result of some residual soap or cleaning solution remaining on the fabric and can be removed by cleaning again with water.

### **Non Water-soluble Stains**

- Use a petroleum solvent such as naphtha (lighter fluid) or mineral spirits to remove non-water soluble stains such as grease, oil, and shoe polish.

- Dab the stained area with a clean cloth moistened with solvent and then blot with a clean, dry cloth. Repeat if necessary.
- Work from the edges of the stain toward the center to avoid enlarging it.
- Rubbing the area carefully with fine sandpaper usually can repair surface damage and minor cigarette burns.

### **Cleaning Removable Covers**

- Machine wash separately, using the cool or warm water setting on the delicate cycle.
- Use mild detergent without pouring it directly onto the material and no bleach. Spin and tumble dry on a low setting, or spin and hang to dry in a shady area. Do not twist or wring.
- NOVASUEDE® covers also can be professionally dry cleaned using a clean perchloroethylene solvent and these settings: short cycle, tumble dry warm, steam followed by brushing to restore nap.

A wet extraction process, available through most professional cleaning services, is recommended to clean widespread dirt or for an overall cleaning of upholstered pieces.

Although NOVASUEDE® is spill resistant, supplementary treatments such as Scotchgard can be used for further protection. Test a sample to ensure that the texture or color of the material will not be affected.

### **Restoring the Nap**

After cleaning, it is important to restore the nap by lightly brushing with a soft bristle brush after the NOVASUEDE® is completely dry. Regular routine vacuuming, immediate attention to accidental spills, and occasional brushing generally are all that is required to maintain the luxurious feel and appearance of NOVASUEDE®.



## SUEDE STAIN REMOVAL INSTRUCTIONS

1. Remove as much of the stain as possible before applying cleaners.  
For dry stains, try brushing with a Magik or Miracle brush. Remove wet residue with a spoon, a butter knife or absorb with a soft cloth.
2. Select the appropriate cleaner according to the chart below.
3. Begin with the cleaner listed first, allowing the spot to dry.
4. If the stain remains, proceed to the next recommended cleaner.

<b>STAINS</b>	<b>CLEANERS</b>		
Coffee, Tea, Milk	1	2	3
Juice, Soft Drinks	1	2	3
Wine, Beer	1	2	3
Mustard	2	3	
Catsup, Chocolate	1	2	
Cooking Oil, Mayonnaise	1	2	3
Crayon, Lipstick	4	5	2
Urine	1	2	3
Blood	1	2	
Body Oils	1	2	5
Furniture Polish, Ink	2	5	
Grease, Shoe Polish, Motor Oil	4	5	2

### **CLEANERS**

- 1 Cold to lukewarm, never hot, water.
- 2 Mix one teaspoon of a mild soap (Woolite®, Joy®, Ivory Liquid®, or Tide® powder) to a pint of cold or warm water.
- 3 Pure white vinegar mixed 50/50 with water. Use vinegar full strength for stubborn stains.
- 4 A petroleum distillate such as mineral spirits or naphtha.

- 5 A dry cleaning solvent such as perchloroethylene, or Blue Coral® “Dri-Clean” Carpet and Upholstery Cleaner in a clear plastic bottle with a spray trigger.

NOTE: Exercise proper care when using solvents or solvent cleaners since some are flammable. Read and follow the manufacturer’s directions and use with adequate ventilation while wearing protective gloves.

## **NOVASUEDE®: COMMONLY ASKED CARE AND CLEANING QUESTIONS**

### **How should I take care of NOVASUEDE® furniture?**

Periodic cleaning of airborne dust and dirt is the key to long life for carpets, draperies, and upholstery fabrics. Brush NOVASUEDE® with a soft nylon lint brush, similar to a Magik or Miracle brush, avoiding metal brushes or those with stiff bristles. Normal, regular vacuuming for a few minutes a week also will remove dust deposits, prevent soil build-up, and keep your NOVASUEDE® furniture looking fresh and new.

### **What about spills?**

NOVASUEDE®'s microfiber structure causes many spills to "bead up" on the surface. Often all that is needed is quick action with a dry cloth to absorb the liquid.

### **What do I do about stains?**

Don't be alarmed about a dried spill on NOVASUEDE®. The fabric easily "releases" most stains with normal cleaning techniques. Blot (if still sticky) or brush out (if dry) any excess staining material. Water-soluble stains can be removed by dabbing the affected area with mild soapy water using Woolite, Joy, Dove or any mild dishwashing soap. Avoid soaking the suede to prevent soap build-up; rather dab the stain with soapy water and blot with a clean cloth like a soft absorbent terry cloth towel. For more stubborn stains, brush with a soft toothbrush and blot. A 50/50 mixture of white vinegar and water is another good cleaning agent.

For non water-soluble stains such as grease, use a petroleum solvent (mineral spirits, naphtha, or a spot remover with perchloroethylene). Moisten a clean cloth with the solvent, dab the stained area, and blot with a clean dry cloth.

After cleaning, allow the suede to air dry or dry quickly on the warm setting of a hair dryer. Brush to restore the nap.

### **What do I do about rings?**

"Rings" remaining after cleaning or drying usually are the result of some residual soap or cleaning solution remaining in the fabric. Even water can leave a ring of minerals, salts, dust or other contaminants. Rings or spots also may be areas where the suede microfibers have clumped together. Many rings can be brushed out.

For a more stubborn ring, try cleaning the area again with clear water using a sponge or soft clean cloth. A "feathering" technique (working from the center out) will help prevent the ring from reappearing. Blot as much of the water as possible with a dry towel. Quick drying with a hair dryer (or fan) set at the warm setting can help prevent ring formation. When dry, always brush to restore the nap.

### **What about stains or soiled areas too large to spot clean?**

For large areas, a wet extraction process, available through most professional cleaning services, is recommended. These large stains also can be removed using a home wet vacuum system, such as a Bissell carpet cleaner with small upholstery attachment. Use a mild soap and cool to lukewarm water. Do not soak the suede. Spray and vacuum; lightly brushing if necessary. Use water to remove soap residue. Allow the suede to dry completely then lightly brush to restore the nap. Removable cushion covers also may be washed on a gentle cycle in a washing machine using cold water and Woolite followed by a cold rinse. Air-dry the suede or lightly tumble the cover in a dryer on a cool setting. Brush the suede lightly after drying.

**Can I treat my NOVASUEDE® furniture with Scotchgard or other fabric protectors?**

Professionals should apply Scotchgard, Fiberseal, Soilshield, and other commercial fabric protectors on NOVASUEDE® to ensure adequate and complete coverage. With any treatment, we recommend a preliminary test to make sure that the hand, texture, or color of the material will not be affected.

**What are the advantages of using fabric treatment?**

Good quality fabric treatments can enhance the water repellency and stain release characteristics of NOVASUEDE®. Many fabric protection applicators guarantee their products and provide care and cleaning guides for customers. Professional cleaners also can provide quick and timely local service. Buyers also might be more comfortable knowing a fabric treatment has been applied, especially one with a warranty.

## **“COLOR TRANSFER” FROM NOVASUEDE®**

### **Color Transfer from Buffing Dust**

Occasionally upholstery shops report a transfer of colored buffing dust from NOVASUEDE® to another fabric, usually occurring in warm weather when the upholsterer is more likely to pick up color on his hands, arms and shirt through sweat. However, dye bleeding might be suspected initially.

### **How Buffing Dust is Created**

One of the final steps in manufacturing NOVASUEDE® is buffing its surface to achieve uniform fiber and nap length with a very fine abrasive which generates very tiny dust particles that are difficult to distinguish as individual particles. NOVASUEDE® dust on clothing may look like a dye bleed.

After buffing, the dust is vacuumed out of the NOVASUEDE®, but sporadically some dust can remain in a few yards within a bolt. Most furniture manufacturers simply blow off the dust with a stream of dry compressed air from an air hose at the final inspection just before wrapping for shipment. This also cleans off sawdust, metal shavings, or other types of airborne dust. Most of the dust on clothing can be removed with masking tape, a lint brush or washed and rinsed with cold water.

Infrequently an end user will think the fabric's color is bleeding. Regular vacuuming and occasional light brushing with a soft bristle lint brush, similar to a Magik or Miracle brush, is recommended for normal maintenance of NOVASUEDE® regardless of buffing dust. Airborne dirt, dust, household sprays, and air pollution can settle on the suede during use.

NOVASUEDE® furniture also should be periodically "dusted" by vacuuming. Dirt can act as an abrasive, shortening the life of any fabric.

Foreign material may cause the nylon microfibers in NOVASUEDE® to cling together, reducing the "tracking" effect of the nap. Through regular use and vacuuming, the buffing dust should diminish to where it is no longer a concern.

### **Color Transfer from Dye Bleed**

A dye bleed might cause color to transfer from certain dark colors of NOVASUEDE® (black, dark or bright reds, and purples) to lighter NOVASUEDE® colors or to other lighter fabrics or leathers. This can occur especially if the contrasting materials are washed together or if the suede becomes wet. A small amount of this dye bleed usually does not change the suede color, but it can stain other materials.

Therefore care should be taken in the selection of the combination of NOVASUEDE® colors used in the same piece when they will be cleaned or washed together. For example, a black or a wine NOVASUEDE® should not be used in appliqué with Gelato as some bleeding of the dye in the darker suedes will occur when the piece is washed. Care should also be taken when certain dark colors of NOVASUEDE® are used for throw pillows on light colored sofas, especially if the pillows may become wet during use.

Other materials such as vinyls, natural leathers, and some synthetic leathers can extract dye from NOVASUEDE® when wet or in elevated temperatures. Vinyls and leathers contain oils that can extract dye from many textiles. Also, some natural and synthetic leathers have top finishes that can become soft and tacky when very warm, causing them to stick to other materials.

### **Evaluating Color Compatibility**

- Before fabrication, NOVASUEDE® users should test color compatibility when using dark colors with lighter colored suede, fabrics or leathers.

- Wet a piece of the NOVASUEDE® thoroughly and squeeze out excess water. Put the fabric in contact with a piece of the light colored fabric or leather glass and insert it between two pieces of safety glass or other clean, flat water impermeable surface.
- Place a small weight on the top plate glass. After 24 hours, separate the NOVASUEDE® from the light colored fabric and note any color changes.
- For vinyls and natural or synthetic leathers, you should check for dye extraction by oils. Repeat the above procedure using dry NOVASUEDE® with vinyl or leather between plate glass, compressed with a small weight. Place overnight in an oven at 158F or 70C.

Please contact the company if you want Majilite to conduct the testing.



## **NOVASUEDE® STAIN REMOVAL: WET EXTRACTION METHOD**

Large dirt or stains on NOVASUEDE® may be too labor intensive to clean by spot cleaning. Removing ground-in or soaked-in stains by wetting and blotting is also not practical and is time-consuming.

The wet extraction technique, used by professional cleaners, is an alternative cleaning method. Individuals can use a Bissell carpet machine with a small upholstery attachment or a wet/dry vacuum. The cleaning technique involves spraying the suede with water and vacuuming the suspended dirt. The best technique to use with extraction equipment is to wet and vacuum in one motion rather than soak.

Remove dry dirt by brushing and vacuuming. Blot wet stains as much as possible. Excess dried stains should be scraped off with a spoon. Some materials may be partially removed by lightly applying and removing scotch tape.

Prepare a soap solution as follows:

- 1 gallon of water
- 1/4 cup Woolite
- 2 cup Vivid detergent with non-chlorine bleach

Transfer some of the soap solution to a 1-pint bottle equipped with a trigger or pump spray top similar to those used for many household cleaners.

Spray the soap solution onto the stained area. Lightly wet the area, but avoid over soaking. Brush the soap solution into the suede with a soft brush such as a soft toothbrush. Do not scrub or rub excessively. Lightly work the soap into the suede to soften the stain.

Extract the soap solution with cold water. Several rinses may be necessary. The suede will darken when wet and may mask the stain. To determine whether another washing is necessary, dry a small portion of the cleaned area with a hair dryer to determine if any of the stain remains. Once the stains have been removed, clean the entire panel or piece of furniture to maintain a consistent appearance. Allow the piece to dry at room temperature overnight, and then brush lightly to restore the nap.

## **CLEANING PROCEDURES FOR EMBOSSED NOVASUEDE® AND NOVASUEDE® PERF**

- Clean EMBOSSED NOVASUEDE® and NOVASUEDE® PERF using the same procedures as the standard NOVASUEDE® line. Lightly brush and vacuum these materials regularly. Brush only with a soft bristle brush with the same stiffness as a soft toothbrush.
- Spots and stains can be removed using water or Woolite and water for water-based stains. Use mineral spirits or perchloroethylene for oil-based stains.
- Machine wash EMBOSSED NOVASUEDE® and NOVASUEDE® PERF in Woolite using cold water, a cold rinse and tumble dry only, then air dry. Lightly brush the nap once the suede has completely dried.
- Use extraction equipment for sofa and chairs.
- Avoid scrubbing, picking, or digging the suede surface when cleaning EMBOSSED NOVASUEDE® or NOVASUEDE® PERF. Doing so can pull some of the microfiber into the embossed areas or the individual perforations can reduce the overall embossed or perforated effect of the product. Let the soap and water or cleaning solvent loosen the stains, then remove them by blotting with a clean absorbent cloth.
- For further instructions, please refer to the sections NOVASUEDE®: COMMONLY ASKED CARE AND CLEANING QUESTIONS and PROCEDURE FOR REMOVAL OF STAINS FROM NOVASUEDE®: - WET EXTRACTION METHOD.

## NOVASUEDE® CLEANING

### INK

- Cleaning techniques will vary because different inks are composed of different materials.
- The chances for success are greater the sooner the ink spot is cleaned. Begin working with small areas, starting with the least visible area to test the cleaning technique's success.
- Blue Coral Dri-Clean Upholstery Cleaner has worked well in cleaning ink from NOVASUEDE®. It can be purchased at auto parts stores as either a clear liquid in a trigger spray bottle or as an aerosol, which is not as effective.
- Follow the directions on the bottle and use the dab and blot technique. Blue Coral Dri-Clean also can be used as a spot cleaner or as a soap for wet extraction. Blue Coral is manufactured by Blue Coral, Inc. Cleveland, Ohio 44105; 1-800-844-1080, Technical Assistance 1-800-416-1600.

## NOVASUEDE® CLEANING

### BLOOD

- Take appropriate precautions to prevent the spread of disease when handling blood or blood products.
- Most fresh blood stains can be removed with cold water
- For fresh blood, pat the stain with a cloth dabbed in cold water and then blot the stain with a clean dry cloth. Repeat the process until no more blood transfers to the cloth.
- Dried blood may be more difficult to soften and remove.
- Before washing, gently scrape the dried blood with a fingernail file or similar object. Avoid bruising the suede. Use a soft toothbrush to break up the blood, then use the cold water and cloth method discussed above.
- If water alone does not work, try a diluted solution of a mild soap such as Woolite, Joy, Dove, or Ivory in cold water.
- Do not use warm or hot water as it may set the blood into the suede.

# NOVASUEDE® CLEANING

## OIL AND GREASE

Oil and grease do not respond well to cleaning with water alone or even water and soap. Instead, dissolve the oil or grease with a solvent and blot.

### Mineral Spirits for Oil Stains

Mineral spirits is a clear water-white solvent sold in hardware and paint stores, often as paint thinner for oil-based paints. A combustible liquid, it is a distillate of petroleum and has a mild odor similar to kerosene. Keep it away from ignition sources, use with adequate ventilation, and follow the manufacturer's label instructions. Avoid alcohols, ketones such as acetone, and nail polish removers.

### Grease: Tougher to Dissolve

Try mineral spirits first to remove grease stains, then if necessary, perchloroethylene, which is a better grease solvent and dries fast. However, its strong odor and fumes can be a safety problem if the area is not well ventilated. Follow all manufacturer's label instructions and the Material Safety Data Sheet (M.S.D.S.):

- Before applying solvent to the stain, scrape off any excess grease or oil with a knife. If the grease is heavy and stiff, gently loosen it with a soft toothbrush.
- Being more fluid, oil may be partially blotted up with a clean dry cloth. Avoid spreading the stain.
- Wet a clean white cloth with solvent and dab the grease or oil stain with it.
- Quickly blot the stain with a dry portion of the cloth.
- Repeat this process several times until the stain is gone and the cloth shows no more oil is being picked up.
- Be careful not to over wet the stain with solvent, especially in the beginning of the cleaning process, because the stain will spread out as the solvent begins to dissolve it.

- If a ring remains after the spot dissolves, there is probably a small amount of stain remaining that has been pushed out to the edges of the wetted area. Rewet the spot with solvent and blot again with a clean cloth. Using a hair dryer on a warm setting, blow air across the spot. As the wet area shrinks, lightly brush it with a soft cloth or use your hand to feather out the boundary between the wet area and the dry, dispersing the ring.
- Stains such as shoe polish have oil soluble and water soluble components. They require cleaning with a solvent followed by soap and water.

## **NOVASUEDE® CLEANING**

### **CHALK**

Some upholsters use chalk to mark their patterns, which is easier to remove than ballpoint pens, china markers, and crayons. A soft, non-dusting variety of chalk, such as Crayola Anti-dust white chalk, will mark suede relatively easily. Occasionally, chalk may get on the face of the suede or chalk marks will need to be removed if the pattern is marked incorrectly.

For best results, brush the suede with a soft brush such as a soft toothbrush. The brush loosens the chalk and should be followed by brushing or fluffing the suede with a soft clean cloth to disperse it. In the upholstery shop, use clean dry compressed air from an air hose to accomplish this. Mineral spirits also are effective but are messier and more time consuming. Brushing suede also works.



# NOVASUEDE® CLEANING

## MASKING TAPE

### Using Masking Tape to Clean NOVASUEDE®

- Masking tape can be used to clean NOVASUEDE® like a lint brush. However, it should only lightly touch the suede and then be removed.
- NEVER RUB THE TAPE INTO THE SUEDE or leave FOR ANY PERIOD OF TIME.
- NEVER USE TAPE TO MARK OR LABEL NOVASUEDE® IF THE TAPE WILL NEED TO BE REMOVED TO USE THE SUEDE.

### Leaving Tape on NOVASUEDE®

There will be occasions when certain tapes will remain on NOVASUEDE® for a period of time, e.g., when a plastic cover is inadvertently taped to the chair's upholstery during packaging. Masking tapes have rubber adhesives that with time tend to increase their peel adhesions to the surface of the material to which they have been applied. So when the tape is removed, some of the adhesive remains on the surface of the material. With NOVASUEDE®, the tape may pull out some of the microfiber and raise the nap above the rest of the suede. The result may be a dark area where the suede does not track with the rest of the piece.

These rubbery adhesives do not clean well with soap and water. Even some of the more popular spray cleaners do little more than soften the adhesive and "chase" it around.

If masking tape has been applied to suede for a period of time, the tape will have established a good bond to the microfibers. If this is the case, DO NOT PULL THE TAPE OFF THE SUEDE. The best way to remove the tape safely is to soften the tape adhesive and then remove it and the tape at the same time. A minimum of adhesive will remain on the suede.

Mineral spirits is a clear water-white solvent sold in hardware and paint stores, often as paint thinner for oil-based paints. A combustible liquid, it is a distillate of petroleum and has a mild odor similar to kerosene. Keep it away from ignition sources, use with adequate ventilation, and follow the manufacturer's label instructions. Avoid alcohols, ketones such as acetone, and nail polish removers. It works well with clean white cloths to remove masking tape. Follow these instructions:

- Starting with a small piece of tape, wet a cloth with the mineral spirits and wet the edge of the masking tape at the bond line.
- The solvent will penetrate the suede, spread under the tape, and soften the tape.
- Using light tension, gently lift the tape and slowly pull it back to where the solvent spot ends, a quarter-inch at a time. You should feel the tape grab to the dry suede. DO NOT PULL ON THE SUEDE!!!
- Repeat the procedure until the tape has been completely removed.
- It is important to work with a small area at a time and to be patient.
- Over-wetting the tape with mineral spirits or leaving it too long on the suede after wetting will soften the adhesive too much. When the tape is removed, the adhesive will remain on the suede.
- Too little mineral spirits on the tape or too little wetting time will not allow the adhesive to soften adequately. When the tape is removed, some suede fibers also will be removed.
- If any adhesive remains after the tape is removed, wet it with mineral spirits, roll it into a ball and pick it off the suede surface. Avoid pushing it down into the suede.
- If the suede is dark or tacky, some adhesive may have been pushed into the microfiber. Wet the spot with mineral spirits and blot with a clean cloth. Brush the suede with a soft toothbrush. After drying, lightly brush the suede.

## NOVASUEDE® CLEANING

### GLUES

Some upholsterers use fabric spray adhesives that may be sprayed onto foam, frame parts, or cardboard. Occasionally, a part covered with glue may bump up against a piece of furniture covered in NOVASUEDE® and some of the glue transfers to the suede surface.

Several solvents including perchloroethylene and mineral spirits can loosen adhesives without damaging the suede but require adequate ventilation. Perchloroethylene is fast drying but has a strong odor and can be a safety problem. If the solvent is flammable or combustible, keep it away from ignition sources. Follow the manufacturer's label instructions and all precautions. Consult the Material Safety Data Sheet (M.S.D.S.).

- Dab a clean white cloth in mineral spirits, getting it damp but not dripping wet.
- Dab the edge of the adhesive mark, wetting the adhesive and a small area around it.
- Lightly rub or brush the adhesive to get it to form a ball and roll off the suede.
- Avoid pushing the softened adhesive into the suede. After the adhesive is gone, brush the suede, still moistened with mineral spirits, with a soft brush to break up any residual adhesive and blot with a clean dry cloth.
- Mineral spirits dry slowly so it may be necessary to speed up the process by blowing warm dry air over the spot. If the spot appears dark when dry, there may be a little adhesive left in the suede. Rewet with mineral spirits, brush, and blot.
- Sometimes the mineral spirits may leave a ring. If this happens, lightly brush the ring with a cloth dampened with mineral spirits, then brush the suede lightly as you dry it with a hair dryer.

## **CLEANING INSTRUCTIONS**

### **FAUX LEATHER MATERIALS**

NYTEK®, a specially engineered nylon fiber matrix, is designed with a built-in stain resistant finish that will not wash or wear off and does not require a topically applied spray. The following simple cleaning methods will ensure the long-lasting beauty and elegance of these NYTEK® products.

#### **Ordinary Cleaning**

Ordinary dirt, smudges and water-soluble stains such as coffee, tea, juice, soft drinks, milk, beer, and wine can be removed with mild soap and water. Use a clean cloth or soft sponge to dab the stain with soapy water. Remove the soap solution by wiping the area with a cloth and clean water. Dry with a soft lint-free cloth or towel.

#### **Stubborn Stains**

Very stubborn stains or non-water soluble stains can be removed with a mild solvent such as naphtha (lighter fluid, paint thinner). Lightly wipe the stain with a clean cloth moistened with solvent. Blot the area with a dry cloth and dry.

#### **Ink and Magic Marker Stains**

Many ink and magic marker stains can be removed using a solution of one part Wisk detergent and one part rubbing alcohol. Dab lightly with a moist cloth, but do not rub. As the ink loosens, blot the area with a dry cloth. Repeat if necessary. Rinse with a cloth dampened in clean water, and dry with a soft cloth.

#### **Commercial Installations**

For general cleaning of commercial installations, use mild soap and water. Avoid using cleaners containing abrasives or bleach. Disinfectants can be used provided they are evaluated beforehand. Technical bulletins

outlining specific cleaning and disinfecting procedures for NYTEK® products used in health care applications are available.

## NON-SUEDE CLEANING INSTRUCTIONS

### To Remove Stains:

1. Select the appropriate cleaner according to the chart below.
2. Begin with the cleaner listed first and allow spot to dry.
3. If stain remains, proceed to the next recommended cleaner.

STAINS	CLEANERS
Coffee, Tea, Milk	1
Juice, Soft Drinks	1
Wine, Beer	1
Mustard, Catsup, Chocolate	1
Cooking Oil, Mayonnaise	1 2
Crayon, Lipstick	1 2
Urine, Blood	1
Body Oils	1
Ink	3
Grease, Shoe Polish, Motor Oil	2 1
Furniture Polish	2 1

### CLEANERS

- 1 *Mild soap (such as Joy, Dove, Ivory or other hand-dishwashing liquids) and water.* Use a clean cloth or soft sponge to dab the stain with soapy water. Remove the soap solution by wiping the area with a cloth and clean water. Dry with a soft lint-free cloth or towel.
- 2 *Mild petroleum solvent such as naphtha (lighter fluid) or mineral spirits (paint thinner).* Lightly wipe the stain with a clean cloth that has been moistened with solvent. Blot the area and allow to dry.
- 3 *One part Wisk detergent and one part rubbing alcohol.* Dab lightly with a cloth that has been moistened with the solution. Do not rub. As the ink loosens, blot the area with a dry cloth. Repeat if

necessary. Rinse with a cloth dampened in clean water and dry with a soft cloth. Ballpoint pen ink can be removed with Maji-Clean Ink Sticks that are available through Majilite.

NOTE: Exercise proper care when using solvents or solvent cleaners. Some solvents are flammable. Read and follow manufacturer's directions on labels. Use with adequate ventilation and wear protective gloves.

## CARE AND CLEANING GUIDE FOR NYTEK® PRODUCTS USED IN HEALTH CARE APPLICATIONS

NYTEK® faux leathers are used in dental chairs, examination tables, hospital furniture, and other health care products that should be cleaned and disinfected frequently. Majilite has evaluated several cleaners/disinfectants and recommends the following:

**Cleaning:** Wipe the NYTEK® with a mild soap and water solution using a soft clean cloth or sponge. Avoid cleaners containing abrasives. Rinse with clean water, dry with a soft cloth or towel.

**Disinfecting with bleach:** Clean the faux leather of gross filth (loose dirt and debris). Prepare a bleach solution at the desired concentration up to 10% (5000ppm available chlorine). Use an EPA registered product whenever possible and follow the manufacturer's label instructions. Spray to wet the surface with the bleach solution. Allow it to remain for no longer than 10 minutes. Thoroughly rinse with clean water. Allow to dry before use.

**Disinfecting:** The following products are acceptable based on testing: Dilute as directed and apply according to the manufacturers label instructions.

PRODUCT	TYPE	MANUFACTURER
Birex se	Phenol	Biotrol International
MaxiSpray	Phenol/Glutaraldehyde	Henry Schein
Omni II	Phenol	Certol International, Inc.
Precise Hospital Foam cleaner	Phenol	CalTech Industries, Inc.
ProSpray & ProSpray Wipes	Phenol	Certol International
Sporicidin Antimicrobial Solution	Phenol	Contec, Inc.
Sporicidin Antimicrobial Towlettes	Phenol	Contec, Inc.



Procide Spray	Phenol	Certol International, Inc.
Cetylcide II	Quaternary compounds	Cetylite Ind. Inc.
Madacide IFD	Quaternary compounds	Mada Medical Products, Inc.
Cavicide	Quaternary compounds 17% isopropanol	Metrex Research Corp.
Maxi Spray Plus	Quaternary compounds 17% isopropanol	Metrex Research Corp.
Sani-Cloth Plus	Quaternary compounds 10-12% isopropanol	PDI
Sani-cloth HB	Quaternary compounds	PDI

Majilite does not include Iodophors, such as Biocide, Wescodyne, ProMedyne and Iodofive, on the acceptable list at this time due to concerns about possible staining of the NYTEK® surface.

The company does not recommend use the following products on NYTEK®:

- Alcohols such as isopropyl alcohol and ethanol
- Products with levels of alcohols above 20% such as: Coe Spray II “The Pump,” DisCide Ultra Disinfectant Spray, Citrex Hospital Spray Disinfectant, Super Sani-Cloth, DisCide Ultra Towelettes, Lysol, Lysol II, Lysol Professional

Majilite does not endorse any particular product’s specific ability to clean and/or disinfect; we only verify that the approved products have been shown not to harm the NYTEK® finish. Our evaluations were based upon the disinfectants as currently formulated and may not reflect possible future reformulations or modifications by the manufacturers.

Majilite continues to examine the effects of various commercial disinfectants on NYTEK®. Our laboratories are available to test specific products upon a customer’s request.

The NYTEK® faux leather collection includes: Action, Attaché, Baby Ostrich, Brushed Finesse, Burnished Metal, Cane, Courier, Deco, Destiny, Finesse, Glazed Finesse, Grandeur, Metals & Pearls Finesse, Moccasin, Nuance, Panache, Pearl Raindrop, Prestige, Satchel, Starlite, Vista etc.

## NYTEK® CLEANING

### REMOVAL OF BALL POINT PEN INK FROM NYTEK® FAUX LEATHER

Cleaning ink stains varies because different inks are composed of different materials. However, clean any ink spot as soon as possible to increase the chances of removal. Begin working with small areas, starting with the least visible area to test the cleaning technique's success.

**Majilite's Ink Removal Stick** is designed for removal of ink, lipstick, and other stains. It can be used on any of our faux leather products. It is not recommended for NOVASUEDE®. Use the stick as directed on the label. Rub some onto the stain, wait thirty seconds and remove the stain with a clean cloth. Repeat if necessary. For stubborn stains, allow the Ink Removal Stick gel to remain on the material overnight. Ink Removal Sticks can be ordered from Majilite Customer Service for a nominal fee at 978-441-6800.

In place of the stick, use the following procedure with common ingredients:

1. In a small cup, mix one-part full-strength Wisk detergent with one part rubbing alcohol, which is commonly composed of 70% isopropyl alcohol and 30% water.
2. Wet a small portion of a soft white cloth and apply the cleaning solution to the ink stain and blot up the stain. Do not rub. Blot the cleaning solution with a dry cloth and repeat step 2 several times to extract as much of the stain as possible. This will keep the ink from spreading unnecessarily.
3. Dab a soft or medium bristle toothbrush into the cleaning solution and gently brush the stain in a swirling motion. As the ink loosens, blot the cleaning solution with a dry cloth and repeat step 3 until the stain is gone (usually about 3 or 4 times). Use the least amount of solution possible and clean and dry in several steps

rather than saturate the NYTEK® material and attempt to extract the stain all at once.

4. Extract the cleaning solution from the NYTEK® with a damp cloth. Several rinses will be necessary to extract all the soap. Wisk has a characteristic blue color and may impart a blush tinge to lighter colors but this will disappear as the Wisk is extracted with a damp cloth.
5. Allow the fabric to air dry or dry with a hair dryer on a warm setting.
6. Check for residual soap evidenced by a bluish color or a soapy feel. If necessary, repeat steps 4 and 5.

For general cleaning, use water and a mild soap such as Woolite following the manufacturers directions.

## NYTEK® CLEANING

### BLOOD

- Take appropriate precautions to prevent the spread of disease when handling blood or blood products.
- Most fresh blood stains can be removed by wiping with a damp cloth or sponge with cold water
- For fresh blood, pat the stain with a cloth dabbed in cold water and then blot the stain with a clean dry cloth. Repeat the process until no more blood transfers to the cloth.
- Dried blood may be more difficult to soften and remove.
- Before washing, gently scrape the dried blood with a fingernail file or similar object. Avoid bruising the suede. Use a soft toothbrush to break up the blood, then use the cold water and cloth method discussed above.
- If the water alone does not work, try a diluted solution of a mild soap, such as Woolite, Joy, Dove, or Ivory, in cold water.
- The rest of the blood should flake off fairly easily once some is removed. Follow the washing with an appropriate disinfectant.
- Do not use warm or hot water as it may set the blood stain into the suede.

Please see our discussion of disinfectants in the section on CARE AND CLEANING GUIDE FOR FINESSE® IN HEALTH CARE APPLICATIONS.

## NYTEK® CLEANING

### PAINT

#### **Wet Paint: Water Based:**

Blot up as much of the wet paint as possible; avoid spreading it. Wash the material with warm soapy water, then follow with warm water to remove the soap residue. Use a soft toothbrush to extricate paint worked into the valleys of the leather grain. Do not scrub the material; rather use a soft swirling motion to loosen the paint.

#### **Wet Paint: Oil Based:**

Blot up as much of the wet paint as possible; avoid spreading it. Wet a soft cloth or sponge with mineral spirits and wipe up the paint residue. Mineral spirits is a clear water-white solvent sold in hardware and paint stores, often as paint thinner for oil-based paints. A combustible liquid, it is a distillate of petroleum and has a mild odor similar to kerosene. Keep it away from ignition sources, use with adequate ventilation, and follow the manufacturer's label instructions. Avoid alcohols, ketones such as acetone, and nail polish removers.

Several cleanings may be necessary to remove the last of the paint and to avoid a hazy or chalky appearance on the NYTEK® surface once the solvent has evaporated. In the final cleanings, be sure to use a new, clean cloth to avoid transferring paint back to the NYTEK® surface.

#### **Dried Paint: Water Based or Oil Based:**

If the paint has dried, work on small areas. Wet the paint with mineral spirits. The mineral spirits will help to loosen the dried paint from the NYTEK® surface. The dried paint must be gently scraped off using a fingernail or a fingernail file to get under the edge of the paint.

# NYTEK® CLEANING

## MASKING TAPE

One of the side effects of masking tape being left on NYTEK ® for a period of time, e.g., when a plastic cover is inadvertently taped to a chair's upholstery during packaging, is that some of the adhesive remains on the surface of the material after removal. These rubbery adhesives do not clean well with soap and water or spray cleaners.

## Cleaning the Tape Adhesive

- Remove as much adhesive as possible by applying fresh masking tape to the affected area, rubbing it lightly, and then pulling it off rapidly.
- The new tape will not form a strong bond to the NYTEK® surface, but will stick to the adhesive residue on it and will pull some of it off.
- Working with a small area at a time, wet the edge of the adhesive with a clean white cloth with mineral spirits.\*
- Gently roll the adhesive into a ball and pull it off the NYTEK® surface.
- After the adhesive has been removed, clean the affected area with mineral spirits and a new clean white cloth. Wipe off any excess and allow the piece to air dry. Some adhesive remains if the affected area still feels sticky or has a hazy appearance. Repeat the process until the NYTEK® is restored to its original color and gloss.

*\* Mineral spirits is a clear water-white solvent sold in hardware and paint stores, often as paint thinner for oil-based paints. A combustible liquid, it is a distillate of petroleum and has a mild odor similar to kerosene. Keep it away from ignition sources, use with adequate ventilation and follow the manufacturer's instructions. Avoid alcohols, ketones such as acetone, and nail polish removers.*

## NYTEK® CLEANING

### WHITE-OUT, LIQUID PAPER OR SIMILAR CORRECTION FLUIDS

#### Wet White-Out

Correction fluids will dry in one to two minutes, so quick action is necessary. If the White-Out is still wet, blot it with a cloth, sponge or paper towel. Avoid spreading.

#### Dried White-Out

Rub masking tape on the dried spot, pulling it off quickly. Push the tape down into the grain with the wooden handle of a kitchen utensil . Repeat three or four times until White-Out no longer transfers to the tape.

To clean a large spill or several spots:

- Work with a small area or one spot at a time.
- Dip a soft toothbrush into mineral spirits,\* shake off the excess, and brush the remainder of the stain in a circular motion. The White-Out will fade as it begins to dissolve.
- Blot it up quickly with a clean, dry soft cloth to avoid spreading. Several cleanings may be necessary to remove all of the White-Out and to avoid a hazy or chalky appearance on the NYTEK® surface once the solvent has evaporated.
- In the final cleaning, use a new, clean cloth to avoid re-transferring the White-Out. If necessary, lightly scrape the last of the White-Out from the valleys of the leather grain with fingernails.
- Allow to air dry. If odor is a problem, wash out the mineral spirits with soapy water or a dilute solution of Woolite or a mild dishwashing liquid.

*\*Mineral spirits is a clear water-white solvent sold in hardware and paint stores, often as paint thinner for oil-based paints. A combustible liquid, it is a distillate of petroleum and has a mild odor similar to kerosene. Keep it away from ignition sources, use with adequate ventilation, and follow the manufacturer's instructions. Avoid alcohols, ketones such as acetone, and nail polish removers.*



## NYTEK® CLEANING

### GLUES

The chemical composition of glues varies widely and it may not be possible to remove every glue from NYTEK® products. For water-based or rubber-based (in petroleum solvent) glues, the following procedure may be helpful:

- Working with a small area, wet a clean white cloth with mineral spirits.\*
- Wet the edge of the adhesive with the mineral spirits, and gently roll it into a ball, pulling it off the NYTEK® surface.
- After the adhesive has been removed, clean the affected area with mineral spirits on a new clean white cloth.
- Wipe off any excess solvent and allow the piece to air dry. If the affected area still feels sticky or has a hazy appearance, then some adhesive remains.
- Repeat the process until the NYTEK® is restored to its original color and gloss.

*\*Mineral spirits is a clear water-white solvent sold in hardware and paint stores, often as paint thinner for oil-based paints. A combustible liquid, it is a distillate of petroleum and has a mild odor similar to kerosene. Keep it away from ignition sources, use with adequate ventilation, and follow the manufacturer's instructions. Avoid alcohols, ketones such as acetone, and nail polish removers.*

## **TOPICAL FINISHES: SCOTCHGARD AND TEFLON:**

Majilite does not recommend using stain treatment products like Scotchgard or Teflon on any of the finished leather grains of the NYTEK® line. Refer to the CARE AND CLEANING section on NOVASUEDE® for a discussion of these finishes.

These finishes change the fabric fibers' surface tension by coating them with a Teflon fluorocarbon resin or silicone that prevents dirt and liquid spills from penetrating. The resin is applied via a spray, pad, or other similar process. When the volatiles evaporate, the respective resins are left behind, coated onto the fabric fibers.

NYTEK® products already have an inherently stain resistant finish. Liquids bead up on them and are easily wiped up. Coating this finish with these topical finishes will not cause water to bead up more. Also the Teflon resin will not penetrate through the leather finish to coat the nylon microfibers.

### **NYTEK® Does Not Need Vinyl Dressings and Leather Conditioners**

Since NYTEK® does not contain oils or plasticizers like leather or vinyl, it does not "dry out" or become stiff with time. It is not necessary to apply anything to its surface to "restore it." Periodic cleaning with soap and water and sensible care and use are all that are needed.

### **Proper Cleaning Methods for NYTEK's® Gloss and Simulated Leather Surface**

One of NYTEK's® most appealing features is how it mimics leather's gloss and surface feel. Plus it's easy to clean with water and a soft cloth or sponge. If necessary, use a dilute solution of a mild neutral soap such as Woolite, or a hand dishwashing liquid like Joy, Ivory Liquid, or Dove. Then rinse the cloth in warm water, wipe the material and let it air dry. Once dry, the original look and feel of the material should be restored.

NYTEK® does not need special products like Armor All to restore its surface since it does not contain oils or plasticizers that make it "dry out" or become stiff with time. While our laboratory studies have not shown them to be damaging to NYTEK®, they alter the gloss and surface feel of the material, diminish its similarity to leather, and make it feel more like plastic or vinyl.

## REPAIRING CUTS

Although resistant to most punctures and tears, there may be rare occasions when NYTEK® grains are cut or bruised through abuse or an accident. Because of the high tear strength of NYTEK® products, the cuts don't tend to spread but can be difficult to repair. Tape inserted behind the cover to hold the thin material in place and close the cut will show as an outline or ridge, known as "x-raying."

Leather repair experts can remedy the problem if the cut or bruise has not penetrated the nylon microfiber. They can be found on the Internet and or through a referral from a leather upholsterer. They will apply waxes and other coatings to match the color, grain, and gloss of damaged NYTEK® products.

## **IS BACKING NECESSARY?**

NYTEK® products have good tensile and tear strength without backing. However for some of NYTEK®'s applications, backing such as foam tricot may facilitate easier installation and provide softness, acoustical properties, and additional thickness. Polycotton sheeting backing may be used to reduce stretch. Foam tricot or knit provides dimensional stability in high humidity. All backings are made to order and add a week or two to the delivery.

### **STANDARD BACKINGS**

#### **Poly/cotton Sheeting**

NOVASUEDE® and all faux leather NYTEK® products being used for wallcovering applications where standard or heavy duty water based wall cements are applied can be backed with a polyester/cotton plain weave sheeting. This takes out the stretch and provides dimensional stability. Without the backing, the NYTEK® could be stretched during hanging and then shrink after the adhesive dries, resulting in seam separation. The cement used to adhere the sheeting to the NYTEK® also reduces the tendency of the nylon microfiber matrix to absorb the wall cement. Refer to the discussion in the WALLCOVERING section of this guide.

Poly/cotton sheeting backed NYTEK® also can be used in direct contact cement applications when there are no rounded or complex shapes involved and where maximum stretch is necessary. The polycotton sheeting firms the hand of the NYTEK®, so it is generally not recommended for upholstery applications.

#### **1/8 Inch Foam and Tricot**

The standard backing for a marine headliner is 1/8 inch polyurethane foam with a nylon tricot knit. The foam has acoustical properties and a soft cushiony feel. The tricot knit supports the foam and provides a smooth,

slippery surface to slide across a plywood panel when covering, and prevents the foam from grabbing the wood and bunching when stretching the material. Together the foam and tricot help stabilize the NYTEK® in high humidity. If a customer wants foam padding under NYTEK® for a headliner application, the installer should not glue NYTEK® to their own foam. Spots can form if there is low bond of the cement causing bubbles in high humidity conditions. If too much cement is applied, it could saturate the foam resulting in thumbprinting. Majilite uses a special process to ensure a strong bond between the foam and the entire roll of NYTEK®.

NYTEK® products with foam tricot can be used in stretch and staple applications and must be stretched properly. Please see the suggestions in the MARINE APPLICATIONS section of this User's Guide. These backings also can be used in direct cement applications with contact cements. Please refer to the suggestions in the DIRECT CEMENT APPLICATION section of this User's Guide.

### **1/16 Inch Foam and Tricot**

Constructed the same as the 1/8 inch foam but thinner, this backing can be used similarly. A thinner package may be necessary due to space constraints, such as tightly fitting panels. A thinner foam will have less tendency to form folds or creases on tight concave curves.

### **1/4 Inch Foam and Tricot**

This version is available for special applications where a thicker material is desired. It also is constructed the same way as the 1/8 inch package.

### **Cotton Knit**

A cotton knit backing is available for special upholstery and other applications. It provides dimensional stability while still allowing plenty of stretch.

NOVASUEDE® and NYTEK® products are used primarily in upholstery applications that generally do not need backing. Consult a Majilite representative to determine whether a knit backing is advisable for a particular project.



MARLOW-HUNTER, LLC

*"Life Begins at 40"*  
1973-2013

## GENERAL SECTION

# NO DOCUMENTS

27TE





Dear Hunter Owner,

*Congratulations and welcome to the Hunter family! As a Hunter owner, you will enjoy the quality and the attention to detail for which Hunter Boats are renowned. Marlow-Hunter and your dealer are committed to your service and total satisfaction.*

*This Operator's Manual will acquaint you with the proper operation and maintenance of your new Hunter boat, as well as boating safety, which is our primary concern, whether in ports or at sea.*

*The new boat warranty registration form you signed at the time of delivery will be sent to us by your dealer. This registers the one year warranty and establishes your contact information in our system. It will also activate Marlow-Hunter's Customer Satisfaction program (CSS), our effort to insure the highest level of satisfaction and enjoyment with your new Hunter. Within a few weeks of delivery you will receive a letter asking you to complete an online questionnaire primarily about your experience with the dealer. Several months later you will receive a second letter asking you to evaluate the boat. We value your opinion and hope that you will take the time to complete both surveys.*

*As you already know, we work with the highest quality equipment manufacturers to supply the components for your boat. To receive full warranty coverage on all the individual components, such as engine, electronics and appliances, be sure to complete and return to the Original Equipment Manufacturers (OEM) warranty cards to activate the individual warranties for these important components. You will find them in the owner's packet that also contains the OEM manuals for this equipment. Please remember all the information contained in the OEM manuals supersedes the information contained in this manual.*

*Finally, if you are new to boating, be certain to learn the proper rules of seamanship to ensure the safety of your passengers. Refer to Chapman's Piloting, Seamanship, and Small Boat Handling Manual for important and useful information concerning this aspect of boating. Attend a safe boating course offered by the United States Coast Guard Auxiliary, United States Power Squadron, or any enterprise experienced in conducting safe boating courses.*

*Thank you for choosing Marlow-Hunter. I am confident your new boat will provide you and your family with years of enjoyable boating.*

Thanks from Marlow-Hunter President,

A handwritten signature in black ink, appearing to read 'J. T. Peterson'.

John T. Peterson

# HUNTER OWNER SURVEY

Greetings and thank you for being a Hunter owner. We gratefully acknowledge your confidence and trust in our ability to provide you a worthy and pleasurable vessel. Our continued focus is on your experience from initial purchase to your next model upgrade. As such, we at Marlow-Hunter request your feed back to continue honing our methods and procedures. Please take a moment and fill out the following survey and fax (386-462-4077) or email ([customerservice@marlow-hunter.com](mailto:customerservice@marlow-hunter.com)) to us, or navigate to our website ([www.spotonsurvey.com](http://www.spotonsurvey.com)) to fill in on-line. As we value you, we also value your time and will put your input to effective use. Thanks again for being a Hunter owner.

## ABOUT YOUR PURCHASING DECISION

1. How did you hear about HUNTER?

- Friend
- Magazines(s)
- Saw one at dock or under way
- Boat Show(s)
- Dealer
- Previously owned a HUNTER
- Yellow Pages
- Website

2. Is this your first boat?

- Yes
- No

3. Please number your reasons for purchasing this boat, beginning with the primary reason (1) and continuing through all that apply:

Value 	Performance 	Quality 	Brochures & Advertising 	Demo Ride 	Dealer Reputation 
Interior Layout 	HUNTER Reputation 	Exterior Styling 	Recommended by Another Owner 	Price 	Other 

4. What other boat brands did you most seriously consider before purchasing your HUNTER boat?

- I only consider HUNTER
- I also considered: (Please list by priority)

Manufacturer	Size/Model
1.	
2.	
3.	

5. Did you trade in a boat for your new HUNTER?

- Yes
- No

If yes, what brand?

## ABOUT YOUR DEALER

6. How did you hear about your dealer?

- Previously purchased a boat
- Recommended by others
- Previously had service work performed
- Yellow Pages
- Drove by location
- Factory inquiry
- Advertisement
- Boat show
- Website
- Other

7. Please rate your experience with your HUNTER dealership in the following areas:

	Satisfied -----Dissatisfied					
AT TIME OF PURCHASE	4	3	2	2	1	N/A
Product knowledge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Professionalism	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Courteous & helpful dealer personnel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Questions responded to in a timely manner	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Explanation of warranty coverage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Explanation of options and accessories	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Service & repair facilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall appearance of dealership	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Satisfied -----Dissatisfied

AT TIME OF DELIVERY	4	3	2	2	1	N/A
Delivered the boat on the agreed date	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Delivered a full operational boat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Delivered a clean boat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Completed & reviewed pre-deliver service	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recorded & signed pre-delivery service	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reviewed & presented the owner's manual to you	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Explained all operating controls	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reviewed the electrical systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reviewed the mechanical systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Demonstrated how to operate & handle the boat.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Offered you a demonstration ride	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Introduced you to service personnel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Contacted you at any time after delivery	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Service & repair facilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall appearance of dealership	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. Would a demonstration ride have simplified your purchase decision?

Yes

No

## OVERALL SATISFACTION

9. Overall, how would you rate your satisfaction in the following areas?  
[IMPORTANT]

	Satisfied -----Dissatisfied					
	4	3	2	2	1	N/A
Overall satisfaction with boat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall satisfaction with engine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall satisfaction with dealer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## ABOUT YOU AND YOUR INTERESTS

10. Which of the following magazines do you subscribe to or read often?  
(Check all that apply)

- Boating
- Motorboating
- Saltwater Sportsman
- Power & Motoryacht
- Southern Boating
- Lakeland Boating
- Sea
- Other

11. Which of the following magazines do you subscribe to or read often?  
(Check all that apply)

- Male
- Female

12. Marital status:

- Married
- Single
- Divorced
- Widowed

13. Your age:

- Under 20
- 20-24
- 25-34
- 35-44
- 45-54
- 55-59
- 60-64
- 65-74
- 75-84
- 85 or older

14. Please indicate how many children under the age of 18 are living in your household:

- None
- 1
- 2
- 3
- 4
- 5 or more

15. Please indicate the combined annual income (before taxes) of your household:

- Less than \$50,000
- \$50,000 - \$149,000
- More than \$150,000

16. Please indicate your occupation: (check all that apply)

- |   |   |
|---|---|
| <input type="checkbox"/> Administrative Support | <input type="checkbox"/> Blue Collar        |
| <input type="checkbox"/> Computer Programmer    | <input type="checkbox"/> Consultant         |
| <input type="checkbox"/> Educator               | <input type="checkbox"/> Executive          |
| <input type="checkbox"/> Middle Management      | <input type="checkbox"/> Homemaker          |
| <input type="checkbox"/> Manager/Director       | <input type="checkbox"/> Professional       |
| <input type="checkbox"/> Retired                | <input type="checkbox"/> Sales              |
| <input type="checkbox"/> Self-employed          | <input type="checkbox"/> Service Occupation |
| <input type="checkbox"/> Student                | <input type="checkbox"/> Scientific         |

17. What other interest do you enjoy? (check all that apply)

- |   |   |
|---|---|
| <input type="checkbox"/> Golf             | <input type="checkbox"/> Tennis                     |
| <input type="checkbox"/> Scuba/snorkeling | <input type="checkbox"/> Fishing                    |
| <input type="checkbox"/> Photography      | <input type="checkbox"/> Flying                     |
| <input type="checkbox"/> Skiing           | <input type="checkbox"/> Other <input type="text"/> |

18. Please note any final comments regarding your initial sales experience:



19. May we contact you for further explanations?

Yes

No

20. Please submit and completely fill out the following fields: [IMPORTANT]

Name: (First & Last)

Address:

City:

State:

Province/Section/Region

Postal/Zip Code:

Country:

Phone:

Email Address:

Name of Dealership:

Dealer's Name:

Boat HIN: (Serial #)

Boat Model: