Installation and Operation Manual
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Yacht Crane Assembly

Figure 1a: Standpipe Mounted

Figure 1b: Fiberglass Base Mounted
Figure 2a: Yacht Crane Cut-Away (Boom Body)

Figure 2b: Yacht Crane Aluminum Base Mount (Dia. 16" Base)
Throughout this publication, 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.

### Observe Them Carefully!

These “safety alerts” alone, cannot eliminate the hazards that they signal. Strict compliance to these special instructions when performing the installation and maintenance plus “common sense” operation are major accident prevention measures.

<table>
<thead>
<tr>
<th><strong>DANGER</strong></th>
<th><strong>WARNING</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediate hazards which WILL result in severe personal injury or death.</td>
<td>Hazards or unsafe practices which COULD result in severe personal injury or death.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>CAUTION</strong></th>
<th><strong>NOTICE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazards or unsafe practices which COULD result in minor injury or product or property damage.</td>
<td>Information which is important to proper installation or maintenance, but is not hazard-related.</td>
</tr>
</tbody>
</table>
This section describes the equipment and tools needed or recommended for the yacht crane installation.

**Supplied Equipment List**

Your yacht crane comes with the following standard equipment: Crane assembly, complete with:
- bearing assembly installed
- hydraulic and electrical system
- composite rope, hook and weight assembly installed
- Wireless controller
- Four-function, eight button, wireless control or wired pendant control c/w 15’ cable
- Owner’s Handbook and Installation Manual
- Hydraulic hoses

**Optional Equipment List**

- **Customized base assembly** (built to your specification) or

**OR**

- **Standpipe assembly containing:**
  - 9’ standpipe (Or Custom)
  - Shear Transfer Collar
  - Standpipe Step
  - Trim Ring
  - Hydraulic power pack, available in 12V or 24V
  - ¼” Amsteel replacement rope kit c/w eye splices (includes installation instructions)

**Recommended Materials (not supplied)**

You will need all or most of the following materials for the crane installation:
- (6) x ½” Flat Socket Head screws for thru-bolting (shear transfer collar) *(See Appendix Exploded Drawing)*
- (8) x ½” Flat Socket Head screws for thru-bolting (standpipe step) *(See Appendix Exploded Drawing)*
- (6) x 5¼” Flathead screw (gasket clamp)
- (6) x #10 Oval head self-tapping screws (trim ring)
- (16) x ½” Flat Socket Head screws (base mounting) *(See Figure 2b)*
- Sikaflex 292, Sikaflex 210T primer
- anti-corrosion paste (Tef-Gel)
- marine corrosion control grease
- heat-shrink-type electrical connectors
- electrical breakers
Required Tools

You should have the following tools on hand for installation:

- tape measure
- masking tape
- caulk gun
- drill motor
- portable band saw, or reciprocating power saw
- Phillips screwdrivers
- utility knife
- level
- hole saw (5 1/2"
- assorted drill bits
- assorted metal-working files
- wire strippers/cutters
- heat shrink tubing and gun
- wet/dry vacuum
- safety goggles and/or face shield
- Allen wrenches
Choosing the Installation Method

There are three ways to install the crane:

1. **Standpipe Assembly (standard mounting option)** – to install the optional standpipe assembly *(see procedure on page 8)*, you must have a maximum deck-to-deck height of 96". Maximum standpipe length 108 3/4".

2. **HPU Pedestal Base** – the crane base can be bolted directly onto the deck if the yacht structure has been designed and built to accommodate the load. The fiberglass base, as an option, may contain the hydraulic power unit pre-plumbed and wired. A 20" x 30" paper template can be supplied if requested.

3. **Circular Base** – this mounting option is designed to be bolted directly to the deck (requiring the yacht structure to be built to accommodate). The mounting flange of the base is approximately 19 1/2" in diameter.

4. **Square Base** – this mounting option is designed to be bolted directly to deck (requiring the yacht structure to be built to accommodate). The mounting flange of the base is approximately 24" X 24".

Locating the Crane System

1. Choose the best storage location for your tender considering the following factors:
   - clearance needs to allow for rotation and storage of crane (check walk-around space, hatch, railing, and other clearances)
   - deck strength
   - standpipe base location on lower deck
   - accessibility for easy operation and maintenance

2. Determine the balance point of the tender, and mark this balance spot on the deck. The reach requirement of the crane is a horizontal measurement from the optimum crane location to the balance point of the tender.

3. To ensure the tender does not hit the side of the vessel during a launch and retrieval, allow 9" more than the tender’s half beam measurement for clearance (i.e., half the width of the tender).

4. Check crane hook height vs. reach table *(see below)* at various luffing angles to ensure at least 8" of clearance between the tender and vessel (railings) during operation.

5. Double-check the reach and height requirements against the specifications of the crane to ensure the crane will meet your installation requirements.
Reach Table

Figure 3: Reach Table

<table>
<thead>
<tr>
<th>Angle</th>
<th>Length</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>0°</td>
<td>120.9&quot;</td>
<td>0&quot;</td>
</tr>
<tr>
<td>15°</td>
<td>117.0&quot;</td>
<td>27.6&quot;</td>
</tr>
<tr>
<td>30°</td>
<td>105.4&quot;</td>
<td>56.2&quot;</td>
</tr>
<tr>
<td>45°</td>
<td>86.7&quot;</td>
<td>80.8&quot;</td>
</tr>
<tr>
<td>60°</td>
<td>63.3&quot;</td>
<td>99.7&quot;</td>
</tr>
<tr>
<td>70°</td>
<td>43.9&quot;</td>
<td>108.4&quot;</td>
</tr>
</tbody>
</table>
Follow this procedure if you are installing the standard standpipe assembly.

**NOTICE**

There are three parts to the shear transfer collar: an 11” diameter base, a rubber gasket, and an 8” diameter gasket clamp.

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Figure 4a: Exploded View of Standpipe

Figure 4b: Gear Tab Alignment
1. Locate the standpipe in the chosen location for the tender and mark its centerline on both upper and lower decks. The standpipe must be installed vertically plumb without contacting the vessel between decks while flexing under load.

2. Drill 1/4" pilot hole in upper deck and re-check centers for clearance. The shear transfer collar will tolerate up to 3° of deck angle. If the deck to standpipe angle is greater than this, the deck should be leveled to 90° by creating a mounting platform.

3. Drill 5 1/2" hole through upper deck. Mount shear transfer collar to upper deck by drilling six 1/2" clearance holes for thru-bolting through the upper deck.

4. Clean deck surface and mount shear transfer collar by bedding with Sikaflex 292 and Sikaflex 210T Primer and installing fasteners through holes on 11" diameter base of collar (using bolts or screws as per Step 4).

5. Seal deck core material and clean off excess sealant.

6. With assistance from below, lower standpipe through collar to lower deck. Mark location of standpipe step on lower deck.

7. On Lower deck, drill 2 1/2" hole through center of standpipe step location for exit of hydraulic hoses.

8. Drill eight 1/2" mounting holes.

9. Seal deck core material as directed by shipyard and bed standpipe step with Sikaflex 292 and Sikaflex 210T Primer.

10. Install step fasteners to secure step onto deck floor.

11. With assistance from below, reinstall standpipe, sliding trim ring over bottom of standpipe before placing over step (the trim ring will attach to ceiling of lower deck). Ensure that the standpipe contacts standpipe step evenly all the way around, with outer lip of step protruding.

12. Install 3/8" bolt through standpipe into step to lock standpipe into position.

13. Secure collar clamp and gasket to shear transfer collar by tightening the six 5/16" bolts evenly. These bolts compress sealing gasket on collar and lock standpipe into position on upper deck.

14. Mount trim ring to ceiling of lower deck using four screws.

15. Fit fiberglass standpipe shroud over top of standpipe, trimming to fit deck contour.
   a. Glue gear assembly into top of standpipe with Plexus, as outlined on page 10 of this manual.
   b. Locate Crane and Base in desired location.

16. Lead hoses through center of standpipe step to power pack and connect hoses to marked ports on power pack (See Figure 5a).

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**NOTICE**

The Yacht deck structure at the desired location of the Crane and Base must be designed to handle this load.
Rotation Gear Installation

Each ES series Steelhead Marine Crane is shipped with a 50ml tube of Plexus MA310. This is to be applied to the gear prior to the installation to the standpipe or base. See details below for correct application procedures.

1. Dry fit and check gear to standpipe or base tube. The gear should slide into the pipe section and bottom to allow the tabs to match.

2. Steelhead Marine supplies the Plexus and mixing tube. Applying the entire tube will be required to ensure correct adhesion of the gear to the pipe section.

3. Apply Plexus to area shown below.

4. Once the Plexus has been applied you have a 10 minute working time so be sure to install the gear into the pipe section as soon as the Plexus adhesive has been applied.
5. Clean any excess Plexus adhesive with mineral spirits or Acetone.
Figure 5a: Electrical and Hydraulic Connections
Figure 5b: Pump Motor Solenoid Wiring

Figure 5c: Color Coded Hoses on Manifold
Completing and Testing the Installation

To complete and test the installation of the crane:

1. Retract all hydraulic cylinders. (ie. rope all the way out, boom horizontal and retracted.)

2. Fill hydraulic reservoir tank with AW 32 Hydraulic Oil, 1” from top of tank. Test crane as follows:
   - Turn breakers on momentarily.
   - Ensure power unit turns on, by pressing a function on controller.
   - Turn breakers off.
   - Check all wiring.
   - Turn control breaker on.
   - Lightly touch each button on the wireless control or pendant hand control to make sure crane moves appropriately.

3. Check entire system for leaks and tighten fittings if necessary.

4. During shipment, air may have collected in hydraulic system. To bleed, operate all hydraulic functions through their full travel capacity 3 or 4 times, using pendant hand control. This will remove any air in the system.

5. Recheck oil level in reservoir to ensure 1” from top has been maintained.

Figure 6a: 4-Function HPU Electrical/Hydraulic
Fig 6b: 4-Function HPU Dimensional Information
Operating Instructions

**Misuse of the crane may result in injury or death.**

Always follow carefully these safety cautions:
- Never load the crane system beyond its capacity of 1000 lb.
- Be sure the area around and under the tender is clear of people and obstacles before lowering, including lower decks and water level.
- Remove all cargo and excess water from the tender before raising or lowering.
- Ensure all passengers leave tender before raising and lowering.
- This crane is not a personnel lift.
- Position the crane directly over the load when operating.
- The crane is designed for vertical hoisting only.
- Do not launch or retrieve a tender in rough sea conditions, or while underway.
- Be aware that yachts tend to list when launching a tender. Use caution when rotating a load.
- Do not allow children to operate the crane.
- Keep hands away from all moving parts.
- Turn the crane’s power supply off when not in use.
- Detach crane from tender and retract boom to stow.
- Detach (optional) pendant control and STORE IN A DRY LOCATION when not in use.

**Operating Instructions**

1. Unlock the rotation brake by turning knob CCW (See Figure 8).
2. Turn on hydraulic supply by turning on the crane’s DC breaker to supply the crane’s power pack.
3. Turn on wireless controller or remove waterproof plug on crane body and plug in pendant control.
4. Disconnect weighted hook from storage mount and allow it to hang freely.
5. Attach the tender’s lifting bridle to the weighted hook. Using the controller (Figure 7a/7c), position the lifting bridle to enable attachment to the tender.
6. Raise the lifting bridle just enough to remove any slack from the cables. Check all attachments to the tender.
7. Remove the tender’s attachments to the deck, and ensure the tender’s drain plug is installed.
8. Attach the handling lines to the bow and stern of the tender.
9. Raise the tender high enough to clear all deck obstructions and railings.
10. Rotate the load outboard, controlling the tender position with bow and stern lines.
11. Lower the load to the water. Pay out enough cable so that the tender does not load the cable and crane as it rides waves or swells.
12. Using the load-handling lines, pull the tender to a point near the vessel where it may be boarded. Disconnect the lifting bridle from the tender.
13. Secure the weighted hook so that it does not swing into the side of the vessel.
Figure 7a: Pendant Control

Figure 7b: Wireless Receiver
Figure 7c: Wireless Controller


**Crane Storage**

The crane must be stored with the boom extension fully retracted to prevent corrosion to the linear winch rod, which would result in damage to the cylinder seals.

To properly store the crane after use

1. Lower crane to horizontal position.
2. Slide weighted hook onto hook mount.
3. Retract hook line and boom extension until crane is stowed.
4. If the crane is wired control option, detach pendant control and attach waterproof cap.
5. Lock crane rotation by turning knob CW (See Figure 8).

*Figure 8: Crane Rotation Brake*
Maintenance

Maintenance Schedule *(please refer to Figure 1a)*

<table>
<thead>
<tr>
<th>Maintenance</th>
<th>Monthly</th>
<th>Quarterly</th>
<th>Annually</th>
<th>As Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspect main hoist cable. Replace upon first sign of frays, fish hooks, flattening, kinks, corrosion, audible pinging or snapping sounds.</td>
<td>✔</td>
<td></td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Inspect all cables and hydraulic hoses and fittings. Replace at first sign of corrosion or excessive wear.</td>
<td></td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inspect crane and its hardware components for signs of damage or malfunctioning parts.</td>
<td></td>
<td></td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Touch-up any paint damage to preserve the crane’s finish.</td>
<td></td>
<td></td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Wash crane with soap and water including top sheave and manifold area.</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When cleaning the crane, inspect for hydraulic leaks at the power unit and cylinders. Tighten the fittings as required to stop any leaks.</td>
<td></td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inspect and lubricate the crane rotation bearings.</td>
<td></td>
<td></td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Inspect the sheaves.</td>
<td></td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service the hydraulic system annually or after 50 hours of use, whichever comes first.</td>
<td></td>
<td></td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Maintain fluid levels at 1” below the top of the reservoir on the crane power unit. Use AW-32 or equivalent non-foaming hydraulic fluid only.</td>
<td></td>
<td></td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Apply white lithium grease between the rotation gear (ring gear) and pinion gear.</td>
<td></td>
<td></td>
<td></td>
<td>✔</td>
</tr>
</tbody>
</table>

⚠️ Safety Cautions

Death, injury, or damage may result if the crane’s cable is not inspected regularly, and replaced as needed.

Counter balances have been factory set for optimal performance; crane safety may be jeopardized by unauthorized adjustments.
## Troubleshooting

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>PROBABLE CAUSE</th>
<th>SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boom will not extend</td>
<td>Wrong button pressed</td>
<td>See Figure 7a and 7c on Page 15 and 16</td>
</tr>
<tr>
<td>Crane will not luff</td>
<td>No power (control)</td>
<td>Turn control breaker on</td>
</tr>
<tr>
<td>Linear winch does not raise or lower</td>
<td>Wrong button pressed</td>
<td>See Figure 7a and 7c on Page 15 and 16</td>
</tr>
<tr>
<td></td>
<td>Hook still attached to hook hanger</td>
<td>Connect</td>
</tr>
<tr>
<td></td>
<td>Tender not disconnected</td>
<td>Release tender tie downs</td>
</tr>
<tr>
<td></td>
<td>Overload on crane</td>
<td>Check tender for equipment and excess water</td>
</tr>
<tr>
<td></td>
<td>Hook travel exceeded</td>
<td>Max travel 20' hook retracts to within 8&quot; of outer sheave</td>
</tr>
<tr>
<td></td>
<td>Cable jammed inside linear winch</td>
<td>Call Dealer for service or instructions</td>
</tr>
<tr>
<td>Winch does not hold weight</td>
<td>Hydraulic components need servicing</td>
<td>Call Dealer for service or instructions</td>
</tr>
<tr>
<td>Boom settles under load</td>
<td>Hydraulic components need servicing</td>
<td>Call Dealer for service or instructions</td>
</tr>
<tr>
<td>Boom rotates when not under power</td>
<td>Hydraulic components need servicing</td>
<td>Call Dealer for service or instructions</td>
</tr>
</tbody>
</table>

### Customer Service

For service, contact the dealer from which you purchased the yacht crane. Contact information is on the last page of this manual.
Electrical System

- The control system is available in 2 voltages: 12 volt, 3.5 amps/ 24 volt, 2 amps
- Standard wireless control provides 2-way, 4-function control. Low voltage output from wireless receiver automatically starts hydraulic power pack or ship’s hydraulics.
- Optional hand held pendant with 15’ cord provides 2-way, 4-function control and connects to crane body with waterproof plug and cap. Low voltage output automatically starts hydraulic power pack or ship’s hydraulics.

Hydraulic System

- Operating pressure is 2,700 psi.
- Hydraulic power is supplied by ship’s hydraulics or Steelhead Marine power packs, which are available in the following voltages. 12 volt, 117 amps (160 AMP Breaker) 24 volt, 58 amps (80 AMP Breaker)
- **Luffing** - boom elevation, a counterbalance cylinder locks boom at any angle between 0 and 70 degrees
- **Winch** – 8 to 1 linear winch provides quiet lowering and hoisting
- 9:1 Safety Factor
- **Oil used** – AW 32 Hydraulic Oil or equivalent.

Fittings, Hardware, and Cables

- The hook and weight are an integrated assembly constructed of 316 stainless steel.
- The hoist rope is $\frac{1}{4}$” diameter and made of Amsteel composite.

Equipment Dimensions

<table>
<thead>
<tr>
<th></th>
<th>HEIGHT</th>
<th>WIDTH</th>
<th>LENGTH</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydraulic power pack, 4 Function</td>
<td>12”</td>
<td>7 1/4”</td>
<td>17”</td>
<td>30 lb</td>
</tr>
<tr>
<td>Standpipe assembly</td>
<td></td>
<td>5 1/4” diameter</td>
<td>108” std</td>
<td>90 lb</td>
</tr>
<tr>
<td>Crane assembly</td>
<td>14 1/2” at truck</td>
<td>9 1/4”</td>
<td>85” retracted</td>
<td>315 lb</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>133 1/2” extended</td>
<td></td>
</tr>
<tr>
<td>Control cable</td>
<td></td>
<td></td>
<td>15’</td>
<td></td>
</tr>
<tr>
<td>Shipping Crate</td>
<td></td>
<td></td>
<td></td>
<td>200 lb</td>
</tr>
</tbody>
</table>
Important Safety Notice

In an effort to offer additional flexibility for launching and retrieving please note there is no mechanical rotation stop with the Steelhead ES1000/ES1500 Yacht Cranes.

It is of critical importance that the crane operators not rotate the crane beyond 360° (one complete rotation).

Rotating the crane beyond its safe operating limits may damage the hydraulic system which could result in serious property damage and personal injury.

If the crane has been rotated in a complete circle during operation, rotate it back in the opposite direction to return it to the stowed position.

If the crane has rotated beyond 1 and 1/2 rotation (540°), the following steps should be completed after returning the crane to the stowed position in order to ensure damage has not occurred.

1. Check all hoses to ensure none of them have developed kinks, leaks, or damage at the connection points on the crane.
2. Check the connections to the Hydraulic Power Unit to ensure they are still properly connected and have not developed kinks, leaks, or damage to the fittings.

If you have any questions regarding this safety notice or the operation of your crane, please contact us at 604-607-0091.
Steelhead Marine Ltd. ("SML") warrants to the original end-user (the "Buyer") only that the "equipment" and its components are free from defective materials and workmanship for a period of two years from the date of purchase by the Buyer when purchased from SML. In the case of a new vessel, from the commissioning date of the vessel, or 2 years from the date the equipment leaves SML possession (whichever is less).

This Limited Warranty covers the cost of shop labor and materials when the defective equipment or its component(s) are delivered to SML.

**Examination of the Crane:** The Buyer (or representative) must examine the Crane upon delivery, and must report all defects to SML within ten (10) days of said delivery, failing which it shall be conclusively agreed between SML and the Buyer that the Crane has been delivered as specified in the contract. The Buyer shall report all visible shipping damage to the delivering shipping agent forthwith upon delivery. Failure to report shipping damage as provided above shall result in any and all shipping damage repair costs becoming the responsibility of the Buyer without recourse to SML or the shipping agent.

**Making a Warranty Claim:** The Buyer shall establish its warranty claim by delivering to SML, within the period of this Limited Warranty, a statement in clear and concise terms, setting forth the basis of the warranty claim together with proof of purchase, the make and model of the equipment, the date on which the equipment was installed, the name and return address of the party making the claim, and the name of the person or company installing the equipment.

Upon receipt of a valid warranty claim, SML reserves the right to either repair or replace the equipment or its components on board the vessel upon which it is installed, or require the Buyer to return the defective equipment or component(s) to SML transportation prepaid.

This Limited Warranty shall include the cost of materials and labor for the repair or replacement of the equipment or its components. This Limited Warranty also covers the equipment or its components to be repaired or replaced on board the vessel upon which it is installed, however, all expenses associated with transportation of product(s), transportation of field service technician(s), and all in-the-field collateral support (equipment service, welding service, painting service) are the Buyer’s responsibility.

Repaired or replaced products are warranted for the remaining portion of this original Limited warranty period as outlined above.

Exclusions: This Limited Warranty shall not be effective and shall be void, if the equipment or its components are:

(i) Not installed or used under normal conditions and as recommended by SML;
(ii) Subjected to abuse, neglect, or carelessness;
(iii) Altered or repaired by anyone not authorized by Steelhead during the term of this Limited warranty;
(iv) Subjected to lift weight in excess of rated capacity.; or
(v) Subjected to persons being the load or part of the load during operation of the equipment.

This Limited Warranty does not cover, and SML is in no way responsible for any supporting or structural elements of the vessel upon which the Crane is installed, or any hoses, hydraulic fluids, filters, paint, or anodized finishes not supplied by SML.
Except as expressly provided in this Limited Warranty, SML is not responsible for the proper installation of the equipment or its supporting elements. It is the responsibility of the Buyer to ensure that the supporting and structural elements, and the equipment’s connection thereto, are properly engineered and can withstand the loads of the equipment while in operation. The Buyer shall periodically inspect all structural and supporting elements of the vessel and equipment, all hoses and hydraulic assemblies for signs of wear, corrosion, and/or visible deterioration. The Buyer shall cease operation of the equipment at the first indication of deterioration.

This Limited Warranty shall not be valid except when delivered by an authorized representative of SML or installing shipyard, and the Buyer shall not be entitled to rely on any other representations or warranties, whether oral or written, except as provided in this limited warranty.

THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER EXPRESS OR IMPLIED WARRANTIES. ANY WARRANTY IMPLIED BY STATUTE AND NOT EXCLUDED HEREIN, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, IS IN EFFECT ONLY DURING THE DURATION OF THE EXPRESS WARRANTY SET FORTH HEREIN.

This warranty gives the Buyer specific legal rights, and the Buyer may also have other rights which may vary from country to country or state to state. This warranty shall be construed pursuant to the laws of the Province of British Columbia.
Contact Information

Steelhead Marine Service Representatives

For distribution enquiries, please contact Jake Burns

Worldwide / Canada / USA

Jake Burns – Steelhead Marine Ltd.
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Cell: (604) 855 5822
Fax: (604) 607-0092
Email: jake@steelheadmarine.net
Web: www.advancedmarinetechnologies.com

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Appendix - Emergency Rotation

Emergency Rotation Drawing

ES1000/ES1500

Step 1: Remove the cover cap and screws.
Step 2: Remove the truck cover.
Step 3: Remove the locking screw all the way out.

**WARNING:** Please replace all screws after removing the cover to prevent further damage.

Step 4: Remove the bracket using a 5/8" wrench.

Step 5: Double-check the counterbalance by tightening the 5/8" wrench.

Countersbalance Valve.