Before you do it your way, please try it our way.
To the Installer and End User (Owner)

Thank you for choosing SeaStar Steering Systems by SeaStar Solutions. This Installation and Owner’s Manual contains all the information that you and others will require for the safe installation and use of your steering system and MUST remain on board the boat. Throughout this manual, information for the safe installation and operation of the steering system will be distinguished in one of the following ways;

⚠️ WARNING ⚠️
Hazards or unsafe practices which could result in severe personal injury or death.
Failure to adhere to a warning may lead to loss of steering control. Loss of steering control may result in unpredictable boat behavior, leading to ejection from boat causing property damage, personal injury and/or death.

⚠️ CAUTION ⚠️
Hazards or unsafe practices which could result in minor injury or product or property damage.

NOTICE
Important information in regards to installation, use and maintenance of the steering components.

NOTICE
Marine Canada Acquisition Inc. DBA SeaStar Solutions is referred to as SeaStar Solutions throughout this publication.

These safety alerts alone cannot eliminate all of the hazards that may be present while on the water. SeaStar Solutions recommends that all users of the steering system take an accredited 'boating safety course', follow safe boating practices and are made aware of the environment that they will be in.
SAFETY INFORMATION

WARNING

The safety information provided below is intended to inform you of the dangers that may be present before, during and after the installation. It is critical that you read and understand ALL the points noted.

The safe operation of the steering system is dependant upon proper installation and maintenance, common sense, safe judgment and the knowledge/expertise of the operator. Every installer/user of the steering system should know the following requirements 'before' installing/using the steering system.

If you have any questions regarding any of these warnings, contact SeaStar Solutions.

To reduce risk of severe injury or death. Always wear a Coast Guard Approved personal flotation device (PFD) and use an engine shut-off cord (lanyard).

Before installation

1. Read and understand the Installation and Owner's Manuals provided with your steering components.
2. Ensure that all components required to complete the installation are on hand (including hoses, fittings, oil and the proper tools required for the installation).
3. SeaStar components are highly engineered and safety tested to ensure system integrity, DO NOT substitute any component with non-SeaStar components as this may compromise system performance/reliability.

Installation

1. Install components as directed in all Installation Manuals (including helm pumps, hoses and fitting kits).
2. DO NOT modify or substitute any component in any way without written consent from SeaStar Solutions.
   - Cylinder MUST be compatible with engine(s) installed.
   - Cylinder MUST be rated for use on the engine(s) installed.
4. Confirm that there is no interference between the steering cylinder(s), tiebars and the transom, splashwell, outboard engine or jackplate or any combination of these parts by performing the following steps;
   a) With engine fully tilted DOWN, turn steering wheel from hard over to hard over and confirm that no interference occurs.
      - if using a hydraulic jack plate the above must also be performed at all the positions of the jack plate.
   b) Repeat step 4a) with engines tilted UP.
   c) Perform step 4a) with each engine in DOWN/UP positions confirming that independent TRIM/TILT can be done without any interference.
5. Confirm that the steering cylinder can be fully stroked in both directions as well as full tilt and trim without stretching, chafing, rubbing and/or kinking of the hydraulic hoses.
6. Confirm that extruded nylon tubing has NOT been substituted for SeaStar Steering Hose.
7. DO NOT use a wire coil type trim switch with a hydraulic steering system as the wire can wind up tight around the steering wheel shaft and prevent further steering.
8. Conduct Oil Level and System Check as outlined on page 40 of this manual.
Safety Information Continued

The safety information provided below is intended to inform you of the dangers that may be present before, during and after use. It is critical that you read and understand ALL the points noted.

**WARNING**

Prior to every use

1. Check fluid level in highest helm pump (see page 35 for proper fluid level setting).
2. Verify immediate steering response when turning steering wheel(s). (Ensure engine turns when steering wheel is turned.)
3. Visually inspect all steering hoses and fittings for wear, kinking and/or leaks.
4. Check for binding, loose, worn or leaking steering components.

DO NOT OPERATE BOAT IF ANY COMPONENT IS NOT IN PROPER WORKING CONDITION.

During use

1. Wear a Coast Guard-Approved Personal Flotation Device (PFD).
2. Attach engine shut-off cord (lanyard) to your PFD.
3. Never allow anyone not familiar with the operation of the steering system to operate the boat at any time.
4. Know and adhere to the operator restrictions for your area including;
   - Federal Laws/Regulations,
   - State Laws/Regulations and
   - Municipal Laws/Regulations.

DO NOT OPERATE BOAT IF ANY COMPONENT IS NOT IN PROPER WORKING CONDITION.

After use

1. Rinse off steering system thoroughly using 'fresh, clean water only'.
   - Cleaning fluids containing ammonia, acids or any other corrosive ingredients MUST NOT be used for cleaning any part of the hydraulic steering system.

Maintenance

1. Maintain steering system at a minimum of twice per year.
   - See Maintenance, on page 41 of this manual.

*Keep our waters clean for all current and future users. Dispose of ALL fluids in accordance with your local regulations.*
INTRODUCTION

Before proceeding with the installation, read these instructions thoroughly. SeaStar Solutions cannot accept responsibility for installations where instructions have not been followed, where substitute parts have been used, or where modifications have been made to our products.

Due to a small amount of internal hydraulic slip, a “master spoke” or “centered” steering wheel cannot be maintained with a hydraulic steering system. For best results, use an equal distance spoke steering wheel. SeaStar Pro Helm Pumps are not 100% locking and therefore, a small amount of hydraulic drift is normal.

DO NOT use a wire coil type trim switch with a hydraulic steering system. Wire coil can wind up tight around the steering wheel shaft and prevent further steering!

Pro Trim offers fingertip trim or jackplate control with a column-mounted switch, enabling you to keep both hands on the steering wheel and concentrate on your driving. Pro Trim PT1000 controls trim or jackplate only. Pro Trim Dual PT2000 controls both functions.

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Before attempting installation, ensure that the splashwell of your boat has the following minimum dimensions.

### Minimum Splashwell Dimensions

<table>
<thead>
<tr>
<th># OF ENGINES</th>
<th>A (22&quot; (559mm) 44&quot; (1118mm))</th>
<th>B (6&quot; (152mm) 6&quot; (152mm))</th>
<th>C (5&quot; (127mm) 5&quot; (127mm))</th>
<th>MIN. ENGINE CENTER DISTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>26&quot; (660mm)</td>
</tr>
</tbody>
</table>

**NOTE:**

a) Dimensional restrictions also apply to external motor mount brackets.

b) Maximum engine center distance for twin engine applications is 36" (914mm) using the standard tie bar. Dimension 'A' would have to be increased proportional to the tie bar length.

### Front Mount Cylinder

Part # HC5345, HC5347, HC5348, HC5358, HC5375, HC5385, HC5445. Splashwells of less than 30" in overall width may require engine removal in order to install the support rod (Part # 730229).

### Dimensional Specifications

Dimensions shown in Figure 1 are the same for all part numbers. Pivot plate dimensions vary between part numbers.

**Figure 1.**

- Ensure correct Torque at these points.
With the introduction of heavier, higher horsepower engines producing more torque, SeaStar Solutions has updated its recommendations across various applications (single and multiple engines, different hull types, etc.) Please read carefully to ensure that your current steering system provides the best comfort versus performance available.

### NOTICE

For information on SeaStar Tournament Cylinders HC6845, please refer to Book #48 included with the steering cylinder or, www.seastarsolutions.com

<table>
<thead>
<tr>
<th>ENGINE</th>
<th>SEASTAR FRONT MOUNT (Normal Use)</th>
<th>SEASTAR TOURNAMENT SERIES (Aggressive Use – See Note 1)</th>
<th>HYNAUTIC K-6 (Normal Use ONLY)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SINGLE ENGINE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>350 HP Max</td>
<td>SINGLE CYLINDER 75 MPH Max</td>
<td>SINGLE CYLINDER 350 HP Max HC63xx Pro Cylinder See Notes 2 &amp; 3) or HC6845S Tournament Cylinder</td>
<td>SINGLE CYLINDER 300 HP Max 55 MPH Max</td>
</tr>
<tr>
<td></td>
<td>HC53xx Cylinder (See Note 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DUAL ENGINES</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NON COUNTER ROTATING</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>450 HP Max</td>
<td>SINGLE CYLINDER 55 MPH Max HC53xx Cylinder H060xx Tie Bar</td>
<td>SINGLE CYLINDER Tournament Cylinder HC6845 Cylinder HA6802 Hardware Kit H0682x Tiebar Kit</td>
<td>SINGLE CYLINDER 400 HP Max 55 MPH Max</td>
</tr>
<tr>
<td><strong>DUAL ENGINES</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>COUNTER ROTATING</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>600 HP Max</td>
<td>SINGLE CYLINDER 55 MPH Max HC53xx Cylinders H060xx Tie Bar</td>
<td>SINGLE CYLINDER Tournament Cylinders HC6845 Cylinders HA6804 Hardware Kit H0682x Tiebar Kit</td>
<td>SINGLE CYLINDER 500 HP Max 55 MPH Max</td>
</tr>
<tr>
<td><strong>TRIPLE ENGINES</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ONE WITH COUNTER ROTATING</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>900 HP Max</td>
<td>DUAL CYLINDERS 55 MPH Max HC53xx Cylinders H060xx Tie Bar</td>
<td>DUAL CYLINDERS Tournament Cylinders HC6845 Cylinders HA6806 Hardware Kit H0682x Tiebars</td>
<td>DUAL CYLINDERS 500 HP Max 55 MPH Max</td>
</tr>
<tr>
<td><strong>TRIPLE CYLINDERS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>900 HP Max</td>
<td>DUAL CYLINDERS 55 MPH Max HC53xx Cylinders H060xx Tie Bar</td>
<td>DUAL CYLINDERS Tournament Cylinders HC6845 Cylinders HA6806 Hardware Kit H0682x Tiebars</td>
<td></td>
</tr>
<tr>
<td><strong>QUAD ENGINE APPLICATIONS</strong></td>
<td>Contact SeaStar Technical Support</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. SeaStar Solutions has specific steering equipment for boats that are driven aggressively, used in severe conditions or with more than 300 HP per engine.
2. ALL ENGINES over 300 HP and all boats that are driven aggressively must use a high strength tiller bolt, kit part # HAS822. All front mount cylinders built after June 15, 2007 will have this high strength bolt included in the box. High strength tiller bolts can be identified by the marking “TFX –ARP” on the head of the bolt.
3. HC63xx PRO Cylinders are designed for all those critical high speed, single outboard engine boats, such as Bass, Flats combo Race/Ski and other performance orientated boats capable of speeds in excess of 65 mph. For optimal performance, the use of SeaStar PRO Kevlar Steering Hoses is recommended.
Tools
You will need the following tools to complete your installation.
• 3" (77mm) diameter Hole Saw or Key Hole Saw
• 5/16" (8mm) dia. Drill Bit
• 7/16", 9/16", 5/8" and 3/4" Open End type Wrench/Spanner
• 15/16" Socket for SeaStar Helms

Additional tools needed
20° Mount Wedge
• Key Hole or Sabre Saw
• 5/16" (8mm) dia. Drill Bit
• 1/2" Wrench/Spanner, Box or Open End type
• 7/16" Socket and Drive

Cylinder, Outboard Front Mount Type
• 5/8", 3/4", 1/2", 9/16" Wrench/Spanner, Box or Open End type, 2 required.
• 5/32" Allen Key/Wrench
**SYSTEM OVERVIEW**

### STEP 1  System Installation

- Install SeaStar helm pump onto dash using the installation instructions provided with your helm pump. To ease installation it is good practice to install hose fittings into helm pump prior to installing helm onto dash.

### STEP 3  Oil Level and System Check

- Refer to page 40 of this manual for setting oil level in helm pump and performing the “system pressure test” to ensure steering system is ready for use.

### STEP 2  Filling and Purging Procedure

- Refer to fill and purge procedures as outlined on page 35 of this manual.

**NOTE:** Power Assist and Catamaran users please use bleeding details included with your Power Assist or, Liquid Tiebar Installation Instructions.

### STEP 4  Routine Maintenance

- Refer to page 41 of this manual to become familiar with the routine maintenance that MUST be carried out in the intervals noted.
HYDRAULIC HOSE INSTALLATION

Steering hoses and how they are installed are critical to the safe operation of your steering system. SeaStar Solutions recommends the use of SeaStar Steering hoses ONLY. Use of any other hose may drastically reduce system performance and safety.

**WARNING**

DO NOT cut SeaStar steering hoses, cutting these hoses will render them useless.

Before continuing on with the installation of your steering hoses, please ensure that you read and understand the important points shown below;

- **DO NOT** install any pipe sealant onto the "hose" side of a fitting.
- **DO NOT** remove protective end covers until the hoses have been routed and are ready to be connected to the helm pump, hose fitting or steering cylinder(s).
- Before, during and after installation the hoses MUST be protected from chaffing, rubbing, and contact or interference with assembly screws or sharp edges of any type.
- **DO NOT** install hoses in an area where they will be exposed to high heat, such as engine manifolds, engine compartments or highly corrosive areas such as battery fumes or electrical connections.
- **If possible**, route hoses through a protective PVC cover.
- **Secure** hoses in minimum 2' increments.
- **DO NOT** bend hoses tighter than a 3-1/2" (89mm) radius.
- Provide sufficient hose lengths to allow for cylinder movement throughout the turning arc and UP/DOWN trim/tilt settings of the engine(s).
- **DO NOT** allow hoses to hang free in an area where they could become a safety hazard.
- **DO NOT** use extruded nylon tubing for plumbing an outboard system. Extruded nylon tubing can only be used for return/compensating lines between power assist and/or autopilot pumps and the helm pump.
- Where possible, route hoses in an area where they can be easily inspected for wear on a regular basis.

**WARNING**

Continuous kinking, rubbing, chafing or twisting of a steering hose may eventually weaken the hose(s) to a point where it could rupture. Rupture of a hose will lead to loss of steering control.

**STEP 1**  Set Up

- See Figure 3 on the next page to locate your plumbing diagram.
- **Mark** each end of the hose to ensure proper connection.

**NOTICE**

Hoses are crossed from the helm pump(s) to the steering cylinder(s). Port side helm connection will be installed onto the starboard fitting on the cylinder, and the Starboard side helm connection will be installed onto the port side fitting on the cylinder.

**STEP 2**  Routing

Throughout the hose installation, ensure the protective caps remain installed onto the end of the hoses. Doing so will prevent contamination from entering the system.

- Route steering hoses so that the hose bend restrictor will be located at the steering cylinder(s).
- Route steering hoses so that they have a gradual rise from the steering cylinder(s) to the helm pump.
• If routing hoses through a blind area, ensure that the area is free and clear of any sharp edge, screw or any other object that may damage the hose.
• Secure hoses every 2’.

**WARNING**

Substituting brass fittings into the steering cylinder will result in galvanic corrosion and irreparable damage to the cylinder as well as affect system integrity.

1. Minimum bend radius 3-1/2” (89mm).
2. DO NOT adjust angle of fittings without first consulting manufacturer.
3. Hoses should be secured to the control cable harness as they enter the splashwell through the boot.

**STEP 3**

**Hose to fitting installation**

• Remove protective covers.
• Install hose end fitting onto intended fitting, tighten hand tight.
• While holding the receiving fitting with a wrench, tighten hose fitting to 15ft-lb.

**WARNING**

When installed, confirm that the hoses are not being pulled or kinked over by pushing the engine(s) back and fourth. Hoses must NOT be pulled on at any time.

**NOTICE**

Power Assist and Catamaran Systems please refer to the installation instructions included with the power assist and/or liquid tiebar valve.

**Hose Inspection**

DO NOT operate the vessel if ANY of the following are observed:

• Fitting slippage on hose
• Damaged, cracked, cut or abraded cover (or any reinforcement exposed)
• Hard, stiff, heat cracked, or charred hoses;
• Cracked, damaged, or badly corroded fittings;
• Leaks at fitting, or in hose;
• kinked, crushed, flattened or twisted hose; and
• blistered, soft, degraded, or loose cover.
IN STALLATION INSTRUCTIONS

Front Mount Cylinders
HC5345, HC5347, HC5348, HC5358, HC5445, HC6345 & HC5375.

Installation of PRO and Catamaran cylinders are identical to that of the front mount cylinders. Notes will be made when differences occur. For Tournament Cylinders please refer to Installation Book 48 included with your tournament steering cylinder.

On the following pages of this instruction booklet you will find the assembly drawing for your specific application.

Before beginning installation make sure that all mounting hardware is included and that the tiller arm and tilt tube bolt holes are clean & free from rust or burrs.

Engines with rigid engine mounts have been shown to cause premature wear to the pivot cylinder—therefore, please perform a complete inspection of your steering system as outlined in the Maintenance Section at the back of this manual.

STEP 1: Using an approved quality marine grease (such as Johnson/Evinrude triple guard, Quicksilver anti-corrosion, Yamaha marine grease or equivalent), liberally lubricate the tilt tube and support rod (Item 9) and slide the support rod through the engine tilt tube.

STEP 2: Lightly grease the tiller bolt (Item 2) & partially screw into appropriate hole in the tiller arm to assure a proper fit. Remove and go to Step 3.

If the engine manufacturer has installed caps, plugs and/or screws into the tiller arm, these caps, plugs and/or screws MUST be removed prior to continuing on with installation.

STEP 3: Select appropriate insert diagram from Fig. 4 through 10 to determine proper orientation of the cylinder assembly, the tiller bolt and self locking nut (Items 13, 2 and 1). Grease tiller bolt as indicated and fully thread tiller bolt (Item 2) into the steering arm. While holding the head of the tiller bolt with a wrench, tighten and torque tiller nut (Item 1) as specified in this manual.

It is highly recommended that the tiller bolt head is held in place with a wrench while the tiller nut is torque to the proper specification, failure to do so may result in loss of steering control causing property damage, personal injury and/or death.

STEP 4: a) Screw the adjusting nut (Item 10) onto tilt tube. b) Place the stainless washers (Item 11) and the plastic spacers (Items 7 & 8) on the support rod.

Refer to your specific application figure for proper orientation of spacers on both sides of the engine tilt tube.

STEP 5: Attach and secure support brackets (Item 12) to the support rod and the cylinder shaft. Tighten using the nuts, bolts and washers (Items 3, 4, 5 & 6) as illustrated in application figures.

STEP 6: Eliminate the free play in the support rod by turning the adjusting nut (Item 10) counter clockwise until snug. Never use a wrench on the adjusting nut. Always hand tighten. Lock the adjusting nut in place by tightening the Hexagon set screw.

If installing a jack plate make sure that there isn’t any interference between the jack plate and your steering cylinder. If there is interference, it may occur during full tilt and you should install lift restrictors (Tilt Stop Switch). Some engine manufacturers supply these as standard equipment.
**HO5090 Spacer Kit**  For use with ALL SeaStar front mount cylinders.

<table>
<thead>
<tr>
<th>Item</th>
<th>Part #</th>
<th>Qty</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>688726</td>
<td>1</td>
<td>HHCS 3/8&quot; NF x 2-1/4&quot; SS (Tiller Bolt)</td>
</tr>
<tr>
<td>2</td>
<td>113600</td>
<td>1</td>
<td>SS Fender Washer</td>
</tr>
<tr>
<td>3</td>
<td>773421</td>
<td>1</td>
<td>Aluminum Spacer 1/2&quot;</td>
</tr>
<tr>
<td>4</td>
<td>728994-1</td>
<td>1</td>
<td>3/16&quot; Spacer, Yamaha</td>
</tr>
<tr>
<td>5</td>
<td>995876</td>
<td>2</td>
<td>Thick Nylon Spacer 3/8&quot;</td>
</tr>
</tbody>
</table>

**PLEASE NOTE:** Items are only available in Kit# HO5090, parts are not sold separately.

* Refer to page 44 for correct torque specifications.
Ground Strap Installation

**NOTICE**
FOR SALT WATER APPLICATIONS

SeaStar Solutions strongly recommends use of a ground strap on any outboard hydraulic steering cylinder with an exposed shaft (such as SeaStar front mount steering cylinders) where the vessel will be used in salt water. This ground strap will provide added protection against corrosion caused by stray current.

**Installation Details**
- Install ground strap to cylinder as per Figure 10.
- Reinstall cylinder and support rod nuts, torque to the following
  i) cylinder shaft nut = 33 ft.lb.
  ii) support rod shaft nut = 45 ft.lb.
- Route ground strap UNDER the tilt tube and attach loose end of strap to the starboard side lower midsection steering bracket bolts using the correct fasteners.
- Ensure there is enough slack in the strap to allow the engine to pivot freely in ALL trim/tilt positions and throughout the entire steering range of the engine.

**CAUTION**
Ensure ground strap is routed ‘under’ the tilt tube. Installation of the strap ‘above’ the tilt tube may lead to a hang up, or restriction.

---

**Figure 10. Ground Strap Installation.**
Tie Bar Installation

**NOTICE**
For Tournament Type Systems refer to Installation Book 48 included with your steering cylinder.

**WARNING**
The steering equipment shown is for use in boats that are used in a 'normal' fashion. For ALL performance orientated, or, any boat that is rigged with engines that exceed 300HP per engine, SeaStar recommends the use of the Tournament Type Steering Cylinders and Tie bars. If you have any questions in regards to your installation, please contact SeaStar Solutions.

**WARNING**
Refer to page 7 of your installation instructions for important warnings and information regarding the correct installation of your SeaStar hydraulic hose.

Cut the threaded end of the tie bar and tube to length using the following formulas below:

**CAUTION**
The CD dimension must include allowance for engine toe in/out as required, or recommended by the engine manufacturer.

Failing to observe toe in/out recommendations may result in harder than normal steering effort.

**WARNING**
At the time of installation and any other time thereafter, the threaded rod must always fully cover inspection hole '1' of the rod end, but never inspection hole '2'. Failing to observe this warning may result in one engine becoming separated from the steering system resulting in property damage and/or personal injury. The SeaStar tie bar is designed for use on SeaStar cylinders only. It may not be compatible with other cylinders.

*Note:* Maximum standard engine center = 3ft. (0.9m)

**HO6001**

*Note:* Engine or tiller centers=CD

Y=CD - (subtract) 18¼” (375mm)

X=CD - (subtract) 14½” (464mm)

**HO6002**

*Note:* OMC 200-225HP (1991-Date) & OMC FICHT 90-225HP (1996-Date)

HO6002 Minimum Engine centers = 29” (737mm)

All other makes and models

HO6002 Minimum Engine centers = 27” (685mm)

**Figure 11.**

**Figure 12.**

Ensure 1/8” - 3/4” GAP to allow rod-end ball joint to rotate.

Torque Nut to 3ft lbs.

Ensure 1/8” - 3/4” GAP to allow rod-end ball joint to rotate.

Torque Nut to 3ft lbs.
HO6003

Note: HO6003 Minimum Engine centers = 26” (660mm)

Y = CD - (subtract) 13¾” (340mm)
X = CD - (subtract) 10¼” (257mm)

**CAUTION**

Ensure that the steering cylinders are able to be fully stroked out. If the cylinders are not able to fully stroke out, the tiebar may have to be removed for bleeding.
**INSTALLATION INSTRUCTIONS**

**SINGLE ENGINE**

Refer to page 44 for correct torque specifications of all installation hardware.

<table>
<thead>
<tr>
<th>ENGINE MANUFACTURER</th>
<th>YEAR</th>
<th>MODEL</th>
<th>CYLINDER</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORCE</td>
<td>1985 TO 1994</td>
<td>90–150 HP</td>
<td>HC5345</td>
<td>(See Fig. 14a)</td>
</tr>
<tr>
<td></td>
<td>1995 TO DATE</td>
<td>90–120 HP</td>
<td>HC5345</td>
<td>(See Fig. 14a)</td>
</tr>
<tr>
<td></td>
<td>2007 TO DATE</td>
<td>150 HP</td>
<td>HC5348</td>
<td>(See Fig. 14c)</td>
</tr>
<tr>
<td>HONDA</td>
<td>1992 TO DATE</td>
<td>30–50 HP</td>
<td>HC5345</td>
<td>Requires Spacer Kit HO5090 (See Fig. 14a)</td>
</tr>
<tr>
<td></td>
<td>1996 TO DATE</td>
<td>75–90 HP</td>
<td>HC5345</td>
<td>(See Fig. 14a)</td>
</tr>
<tr>
<td></td>
<td>1998 TO 2009</td>
<td>115–130 HP</td>
<td>HC5345</td>
<td>Ref. page 21 for Installation Instructions</td>
</tr>
<tr>
<td></td>
<td>2001 TO 2009</td>
<td>150–250 HP 4 Stroke</td>
<td>HC5345</td>
<td>(See Fig. 14b)</td>
</tr>
<tr>
<td></td>
<td>2010 TO DATE</td>
<td>115 HP</td>
<td>HC5345</td>
<td>(See Fig. 14b)</td>
</tr>
</tbody>
</table>

**Figure 14.**

**Figure 14a.** May have to cut off part of transom hangers if cylinder assembly interferes when motor is tilted to trailer lock position.

**Figure 14b.** Honda 150–250HP 4 STROKE

**Figure 14c.** Honda 1992 TO 1998

**CAUTION**

Use plastic spacer to ensure there is no metal to metal contact.

**CAUTION**

Use plastic spacer to ensure there is no metal to metal contact.

**WARNING**

Fully tilting the engine may cause the steering cylinder to interfere with the transom and/or splashwell. Possible damage to the steering system can result. Ensure that the cylinder is free from interference at all times.

* Refer to page 44 for correct torque specifications.

---

**ITEM** | **PART #** | **QTY** | **DESCRIPTION**
--- | --- | --- | ---
*1 | 113529 | 1 | Nut, 3/8" NF Nylok® SS
*2 | 113225 | 1 | HHCS 3/8 UNJF x 1.35 HSS
3 | 731625 | 2 | Washer Flat, 7/16" SS
*4 | 731720 | 2 | 7/16" NF Nylok® SS
5 | 202027 | 2 | Washer, Flat 1/2" SS
*6 | 192126 | 2 | Nut 1/2" NF Nylok® NI PLT BR
7 | 995876 | 2 | Spacer, Thick, Plastic
8 | 996689 | 1 | Spacer, Thin, Plastic
9 | 730229 | 1 | Support Rod
10 | 828085 | 1 | Adjusting Nut & Screw SS, Teflon Coated
11 | 202300 | 2 | Washer, Flat 5/8" SS
12 | 839120 | 2 | Support Brackets
13 | 444005 | 1 | Pivot Mount Cylinder
14 | 728994 | 1 | Spacer, Medium (Not Used)
15 | 113330 | 1 | HHCS 3/8" NF x 1-3/8" SS
**SINGLE ENGINE**

**Installation Instructions**

**Outboard Powered Vessels**

Refer to page 44 for correct torque specifications of all installation hardware.

<table>
<thead>
<tr>
<th>Engine Manufacturer</th>
<th>Year</th>
<th>Model</th>
<th>Cylinder</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury/Mariner</td>
<td>1984-TO 1989</td>
<td>75–250 HP</td>
<td>HC5345</td>
<td>(See Fig. 15a)</td>
</tr>
<tr>
<td></td>
<td>1990-TO DATE</td>
<td>75–250 HP</td>
<td>HC5345</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1995-TO 1997</td>
<td>40, 50 &amp; 60 HP</td>
<td>HC5345</td>
<td>Requires Spacer Kit HO5090</td>
</tr>
<tr>
<td></td>
<td>1998-TO DATE</td>
<td>40, 50 &amp; 60 HP</td>
<td>HC5345</td>
<td>Requires Spacer Kit HO5090 (See Fig. 15b)</td>
</tr>
<tr>
<td></td>
<td>2002-TO DATE</td>
<td>115XS–300XS</td>
<td>HC6345</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2002-TO DATE</td>
<td>90–225 HP Optimax</td>
<td>HC5345</td>
<td>(See Fig. 15c)</td>
</tr>
<tr>
<td></td>
<td>2004-TO DATE</td>
<td>150–200 HP Verado</td>
<td>HC5345</td>
<td>(See Fig. 15d)</td>
</tr>
<tr>
<td>Nissan</td>
<td>1990-TO DATE</td>
<td>120–140 HP</td>
<td>HC5345</td>
<td></td>
</tr>
<tr>
<td>Tohatsu</td>
<td>1990-TO DATE</td>
<td>120–140 HP</td>
<td>HC5345</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 15a**

Mercury/Mariner 1984 to 1989

**CAUTION**

Use plastic spacer to ensure there is no metal to metal contact.

**Figure 15b**

Mercury 1998 to Date 40, 50 & 60HP 2 & 4 Stroke

**CAUTION**

Use plastic spacer to ensure there is no metal to metal contact.

**Figure 15c**

Mercury/Mariner 2002 to Date 90-225HP 4 stroke

**Figure 15d**

Mercury/Mariner 2004 to Date 150-200HP Verado

**Figure 15.**

* Refer to page 44 for correct torque specifications.

**Item Part # Qty Description**

<table>
<thead>
<tr>
<th>Item</th>
<th>Part #</th>
<th>Qty</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>113529</td>
<td>1</td>
<td>Nut, 3/8&quot; NF Nylok® SS</td>
</tr>
<tr>
<td>2</td>
<td>113225</td>
<td>1</td>
<td>HHCS 3/8UNJFX1.35 HSS</td>
</tr>
<tr>
<td>3</td>
<td>731625</td>
<td>2</td>
<td>Washer Flat, 7/16&quot; SS</td>
</tr>
<tr>
<td>4</td>
<td>731720</td>
<td>2</td>
<td>7/16&quot; NF Nylok® SS</td>
</tr>
<tr>
<td>5</td>
<td>202027</td>
<td>2</td>
<td>Washer, Flat 1/2&quot; SS</td>
</tr>
<tr>
<td>6</td>
<td>192126</td>
<td>2</td>
<td>Nut 1/2&quot; NF Nylok® ni plt br</td>
</tr>
<tr>
<td>7</td>
<td>995876</td>
<td>2</td>
<td>Spacer, Thick, Plastic</td>
</tr>
<tr>
<td>8</td>
<td>996689</td>
<td>1</td>
<td>Spacer, Thin, Plastic</td>
</tr>
<tr>
<td>9</td>
<td>730229</td>
<td>1</td>
<td>Support Rod</td>
</tr>
</tbody>
</table>

**Item Part # Qty Description**

<table>
<thead>
<tr>
<th>Item</th>
<th>Part #</th>
<th>Qty</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>10</td>
<td>828085</td>
<td>1</td>
<td>Adjusting Nut &amp; Screw SS, Teflon Coated</td>
</tr>
<tr>
<td>11</td>
<td>202300</td>
<td>2</td>
<td>Washer, Flat 5/8&quot; SS</td>
</tr>
<tr>
<td>12</td>
<td>839120</td>
<td>2</td>
<td>Support Brackets</td>
</tr>
<tr>
<td>13</td>
<td>444005</td>
<td>1</td>
<td>Pivot Mount Cylinder</td>
</tr>
<tr>
<td>14</td>
<td>728994</td>
<td>1</td>
<td>Spacer, Medium (Not Used)</td>
</tr>
<tr>
<td>15</td>
<td>113330</td>
<td>1</td>
<td>HHCS, 3/8&quot; NF x 1-3/8&quot; SS</td>
</tr>
<tr>
<td>16</td>
<td>HO5090</td>
<td>n/a</td>
<td>Refer to page 10 for specific spacer installation instructions.</td>
</tr>
</tbody>
</table>
**INSTALLATION INSTRUCTIONS**

**SINGLE ENGINE**

Refer to page 44 for correct torque specifications of all installation hardware.

<table>
<thead>
<tr>
<th>ENGINE MANUFACTURER</th>
<th>YEAR</th>
<th>MODEL</th>
<th>CYLINDER</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>JOHNSON/EVINRUDE</td>
<td>1977 TO 1990</td>
<td>65–300 HP</td>
<td>HC5348</td>
<td>Refer to page 22 for Installation Instructions</td>
</tr>
<tr>
<td></td>
<td>1977 TO 1988</td>
<td>250–300 HP, V8</td>
<td>HC5342</td>
<td>Refer to SeaStar Book 1</td>
</tr>
<tr>
<td></td>
<td>1991 TO DATE</td>
<td>40–250 HP</td>
<td>HC5345</td>
<td>See Fig. 16a.</td>
</tr>
<tr>
<td></td>
<td>1997 TO 2006</td>
<td>75–300 HP FICHT</td>
<td>HC5345</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1998 TO 2006</td>
<td>40–140 HP 4 Stroke</td>
<td>HC5358</td>
<td>Refer to Figure 20d on page 20 for Installation Instructions. Requires Spacer Kit HO5090</td>
</tr>
<tr>
<td></td>
<td>2007 TO DATE</td>
<td>3.3L V6 200–250 HP</td>
<td>HC5345</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.4L V6 250H.O.–300 HP</td>
<td>HC5345</td>
<td></td>
</tr>
</tbody>
</table>

**WARNING**

**ITEM PART # QTY DESCRIPTION**

*1 113529 1 Nut, 3/8” NF Nylok® SS
*2 113225 1 HHCS 3/8UNJFX1.35 HSS
3 731625 2 Washer Flat, 7/16” SS
*4 731720 2 7/16” NF Nylok® SS
5 202027 2 Washer, Flat 1/2” SS
*6 192126 2 Nut 1/2” NF Nylok® ni plt br
7 995876 2 Spacer, Thick, Plastic
8 996689 1 Spacer, Thin, Plastic
9 730229 1 Support Rod

**ITEM PART # QTY DESCRIPTION**

10 828085 1 Adjusting Nut & Screw SS, Teflon Coated
11 202300 2 Washer, Flat 5/8” SS
12 839120 2 Support Brackets
13 444005 1 Pivot Mount Cylinder
14 728994 1 Spacer, Medium (Not Used)
15 113330 1 HHCS, 3/8” NF x 1-3/8” SS

---

**CAUTION**

Use plastic spacer to ensure there is no metal to metal contact.

---

Figure 16.

* Refer to page 44 for correct torque specifications.
**INSTALLATION INSTRUCTIONS**

**SINGLE ENGINE**

Outboard Powered Vessels

---

**WARNING** Refer to page 44 for correct torque specifications of all installation hardware.

<table>
<thead>
<tr>
<th>ENGINE MANUFACTURER</th>
<th>YEAR</th>
<th>MODEL</th>
<th>CYLINDER</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>YAMAHA</td>
<td>1998 TO 2007</td>
<td>40–90 HP 2 Stroke</td>
<td>HC5345</td>
<td>Engine clamp brackets must be modified (cut or ground) and the engine through bolted onto transom or interference will occur restricting engine trim and tilt. Requires spacer kit HO5090. (See Fig. 17a &amp; 17c). See Fig. 17b. Requires spacer kit HO5090.</td>
</tr>
<tr>
<td></td>
<td>2002 TO DATE</td>
<td>25–70 HP 4 Stroke</td>
<td>HC5348</td>
<td></td>
</tr>
</tbody>
</table>

---

**ITEM** | **PART #** | **QTY** | **DESCRIPTION**
--- | --- | --- | ---
*1  | 113529  | 1  | Nut 3/8" NF Nylok® SS
*2  | 113225  | 1  | HHCS 3/8UNJFX1.35 HSS (Not Used)
3  | 731625  | 2  | Washer Flat, 7/16" SS
*4  | 731720  | 2  | Nut 7/16" NF Nylok® SS
5  | 202027  | 2  | Washer, Flat 1/2" SS
*6  | 192126  | 2  | Nut 1/2" NF Nylok® ni plt br
7  | 995876  | 4  | Spacer, Thick, Plastic
8  | 996689  | 1  | Spacer, Thin, Plastic
9  | 730229  | 1  | Support Rod

---

**ITEM** | **PART #** | **QTY** | **DESCRIPTION**
--- | --- | --- | ---
10  | 828085  | 1  | Adjusting Nut & Screw SS, Teflon Coated
11  | 202300  | 2  | Washer, Flat 5/8" SS
12  | 839120  | 2  | Support Brackets
13  | 444005  | 1  | Pivot Mount Cylinder
14  | 728994  | 1  | Spacer, Medium (Maybe Used)
15  | 113330  | 1  | HHCS 3/8" NF x 1-3/8" SS
16  | HO5090   |  | Refer to page 10 for specific spacer installation instructions.

---

Use plastic spacer to ensure there is no metal to metal contact.

**WARNING**

For Yamaha 1996 to 1998 models, Tilt Tube may be longer than ABYC specified 12" by 3/16" to 1/4". If Tilt Tube is 12" use two of item 7
If Tilt Tube is greater than 12", use one item 7 and one item 14.

---

Yamaha 1998 to Date 40–50HP

**CAUTION**

Yamaha 2002 to Date 25–70 HP 4-Stroke

---

**CAUTION**

Use plastic spacer to ensure there is no metal to metal contact.

---

For Yamaha 1996 to 1998 models, Tilt Tube may be longer than ABYC specified 12" by 3/16" to 1/4". If Tilt Tube is 12" use two of item 7
If Tilt Tube is greater than 12", use one item 7 and one item 14.

---

Yamaha 1998 to Date 40–50HP

---

* Refer to page 44 for correct torque specifications.
**INSTALLATION INSTRUCTIONS**

**SINGLE ENGINE**

Refer to page 44 for correct torque specifications of all installation hardware.

<table>
<thead>
<tr>
<th>ENGINE MANUFACTURER</th>
<th>YEAR</th>
<th>MODEL</th>
<th>CYLINDER</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>YAMAHA</td>
<td>1986 TO DATE</td>
<td>100–200 HP 2 Stroke</td>
<td>HC5345</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1990 TO DATE</td>
<td>150–300 HP 2 Stroke</td>
<td>HC5345</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1997 TO DATE</td>
<td>F75–F300 HP Inc. 4.2 V6</td>
<td>HC5345</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1997 TO DATE</td>
<td>F75–F250 HP 4 Stroke</td>
<td>HC5358</td>
<td>1997 to Date 80–100 HP 4 Stroke (See Fig. 18a)</td>
</tr>
<tr>
<td></td>
<td>2007 TO DATE</td>
<td>F300–F350 HP 5.3 V8</td>
<td>HC5345</td>
<td>2001 to Date 115 HP 4 Stroke (See Fig. 18b)</td>
</tr>
<tr>
<td></td>
<td>2007 TO DATE</td>
<td>F300–F350 HP 5.3 V8</td>
<td>HC5358**</td>
<td>Optional Cylinder (See Fig. 18c).</td>
</tr>
</tbody>
</table>

**WARNING**

Use plasticspacer provided to ensure there is no metal to metal contact.

**CAUTION**

* Interference MAY occur when engine is positioned in lowest mounting hole on transom. HC5345 will allow more space for unrestricted mounting.

**CAUTION**

* For Yamaha 1996 to 1998 models, Tilt Tube may be longer than ABYC specified 12" by 3/16" to 1/4".
If Tilt Tube is 12" use two of item 7
If Tilt Tube is greater than 12", use one item 7 and one item 14.

**WARNING**

Refertopage 44 forcorrecttorquespecifications.

---

**ITEM** | **PART #** | **QTY** | **DESCRIPTION**
--- | --- | --- | ---
1 | 113529 | 1 | Nut, 3/8" NF Nylok® SS
2 | 113225 | 1 | HHCS 3/8UNSFX1.35 HSS
3 | 731625 | 2 | Washer Flat, 7/16" SS
4 | 731720 | 2 | Nut, 7/16" NF Nylok® SS
5 | 202027 | 2 | Washer, Flat 1/2" SS
6 | 192126 | 2 | Nut 1/2" NF Nylok® ni plt br
7 | 995876 | 2 | Spacer, Thick
8 | 996689 | 1 | Spacer, Thin
9 | 730229 | 1 | Support Rod
10 | 828085 | 1 | Adjusting Nut & Screw SS, Teflon Coated
11 | 202300 | 2 | Washer, Flat 5/8" SS
12 | 839120 | 2 | Support Brackets
13 | 828009 | 1 | Pivot Mount Cylinder
14 | 728994 | 1 | Spacer, Medium (Some 1996 to 1998)
15 | 113350 | 1 | HHCS 3/8" NF x 1-1/2" SS

---

**SEASTAR Hydraulics**
Refer to page 44 for correct torque specifications of all installation hardware.

**ENGINE INSTALLATION INSTRUCTIONS**

**SINGLE ENGINE**

---

**WARNING**

Use plastic spacer provided to ensure there is no metal to metal contact.

---

**CAUTION**

Use plastic spacer provided to ensure there is no metal to metal contact.

---

**ITEM** | **PART #** | **QTY** | **DESCRIPTION**
--- | --- | --- | ---
1 | 113529 | 1 | Nut, 3/8" NF Nylok® SS
2 | 113225 | 1 | HHC S 3/8" UNJ F x 1.35" HSS
3 | 731625 | 2 | Washer Flat, 7/16" SS
4 | 731720 | 2 | 7/16" NF Nylok SS
5 | 202027 | 2 | Washer, Flat 1/2" SS
6 | 192126 | 2 | Nut 1/2" NF Nylok® ni plt br
7 | 995876 | 2 | Spacer, Thick, Plastic
8 | 996689 | 1 | Spacer, Thin, Plastic
9 | 730229 | 1 | Support Rod

<table>
<thead>
<tr>
<th>ITEM</th>
<th><strong>PART #</strong></th>
<th><strong>QTY</strong></th>
<th><strong>DESCRIPTION</strong></th>
</tr>
</thead>
</table>
10 | 828085 | 1 | Adjusting Nut and Screw SS, Teflon Coated
11 | 202300 | 2 | Washer, Flat 5/8" SS
12 | 839120 | 2 | Support Brackets
13 | HC5445 | 1 | Pivot Mount Cylinder
14 | 728994 | 1 | Spacer, Medium (Not Used)
15 | 113330 | 1 | HHC S, 3/8" NF x 1-3/8" SS

---

**ENGINE MANUFACTURER** | **YEAR** | **MODEL** | **CYLINDER** | **NOTE**
--- | --- | --- | --- | ---
YAMAHA | 2010 TO DATE | 4.2L V6 | HC5445 | Stroke reduced cylinder.

---

**Figure 19.**

---

* Refer to page 44 for correct torque specifications.
**WARNING** Refer to page 44 for correct torque specifications of all installation hardware.

### ENGINE MANUFACTURER

<table>
<thead>
<tr>
<th>YEAR</th>
<th>MODEL</th>
<th>CYLINDER</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUZUKI</td>
<td>1986 TO DATE</td>
<td>HC5345</td>
<td>See Fig. 20c for locating on tiller.</td>
</tr>
<tr>
<td>1996 ONLY</td>
<td>115–140 HP</td>
<td>HC5348</td>
<td>May req. Spacer Kit HO5090 (See Fig. 20a &amp; 20b)</td>
</tr>
<tr>
<td>1987 TO 2002</td>
<td>115–140 HP</td>
<td>HC5345</td>
<td>Requires Spacer Kit HO5090 (See Fig. 20d)</td>
</tr>
<tr>
<td>1990 TO 2000</td>
<td>90–100 HP</td>
<td>HC5345</td>
<td></td>
</tr>
<tr>
<td>1998 TO DATE</td>
<td>40–140 HP 4 Stroke</td>
<td>HC5358</td>
<td></td>
</tr>
</tbody>
</table>

**SAFETY PRECAUTIONS**

- Use plastic spacer to ensure there is no metal to metal contact.
- Fully tilting the engine may cause the steering cylinder to interfere with the transom and/or splashwell. Possible damage to the steering system can result. Ensure that the cylinder is free from interference at all times.
- For ALL Johnson/Evinrude and Suzuki 40–140 HP 4 stroke use tiller bolt supplied in spacer kit HO5090.

**PARTS LIST**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART #</th>
<th>QTY</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>113529</td>
<td>1</td>
<td>Nut, 3/8&quot; NF Nylok® SS</td>
</tr>
<tr>
<td>2</td>
<td>113225</td>
<td>1</td>
<td>HHCS 3/8UNJFx1.35 HSS</td>
</tr>
<tr>
<td>3</td>
<td>731625</td>
<td>2</td>
<td>Washer Flat, 7/16&quot; SS</td>
</tr>
<tr>
<td>4</td>
<td>731720</td>
<td>2</td>
<td>7/16&quot; NF Nylok® SS</td>
</tr>
<tr>
<td>5</td>
<td>202027</td>
<td>2</td>
<td>Washer, Flat 1/2&quot; SS</td>
</tr>
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<td>6</td>
<td>192126</td>
<td>2</td>
<td>Nut 1/2&quot; NF Nylok® ni plt br</td>
</tr>
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<td>7</td>
<td>995876</td>
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<td>Spacer, Thick, Plastic</td>
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<td>996689</td>
<td>1</td>
<td>Spacer, Thin, Plastic</td>
</tr>
<tr>
<td>9</td>
<td>730229</td>
<td>1</td>
<td>Support Rod</td>
</tr>
<tr>
<td>10</td>
<td>828085</td>
<td>1</td>
<td>Adjusting Nut &amp; Screw SS, Teflon Coated</td>
</tr>
<tr>
<td>11</td>
<td>202300</td>
<td>2</td>
<td>Washer, Flat 5/8&quot; SS</td>
</tr>
<tr>
<td>12</td>
<td>839120</td>
<td>2</td>
<td>Support Brackets</td>
</tr>
<tr>
<td>13</td>
<td>444005</td>
<td>1</td>
<td>Pivot Mount Cylinder</td>
</tr>
<tr>
<td>14</td>
<td>728994</td>
<td>1</td>
<td>Spacer, Medium (Not Used)</td>
</tr>
<tr>
<td>15</td>
<td>113330</td>
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<td>HHCS 3/8&quot; NF x 1-3/8&quot; SS</td>
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<tr>
<td>16</td>
<td>HO5090</td>
<td>n/a</td>
<td>Refer to page 10 for specific spacer installation instructions.</td>
</tr>
</tbody>
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---

**For ALL Johnson/Evinrude and Suzuki 40–140 HP 4 stroke use tiller bolt supplied in spacer kit HO5090.**

---

**SAFETY PRECAUTIONS**

- Use plastic spacer to ensure there is no metal to metal contact.

---

**PARTS LIST**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART #</th>
<th>QTY</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>828085</td>
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<td>Adjusting Nut &amp; Screw SS, Teflon Coated</td>
</tr>
<tr>
<td>11</td>
<td>202300</td>
<td>2</td>
<td>Washer, Flat 5/8&quot; SS</td>
</tr>
<tr>
<td>12</td>
<td>839120</td>
<td>2</td>
<td>Support Brackets</td>
</tr>
<tr>
<td>13</td>
<td>444005</td>
<td>1</td>
<td>Pivot Mount Cylinder</td>
</tr>
<tr>
<td>14</td>
<td>728994</td>
<td>1</td>
<td>Spacer, Medium (Not Used)</td>
</tr>
<tr>
<td>15</td>
<td>113330</td>
<td>1</td>
<td>HHCS 3/8&quot; NF x 1-3/8&quot; SS</td>
</tr>
<tr>
<td>16</td>
<td>HO5090</td>
<td>n/a</td>
<td>Refer to page 10 for specific spacer installation instructions.</td>
</tr>
</tbody>
</table>

---

**SAFETY PRECAUTIONS**

- Fully tilting the engine may cause the steering cylinder to interfere with the transom and/or splashwell. Possible damage to the steering system can result. Ensure that the cylinder is free from interference at all times.

---

**PARTS LIST**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART #</th>
<th>QTY</th>
<th>DESCRIPTION</th>
</tr>
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<tbody>
<tr>
<td>10</td>
<td>828085</td>
<td>1</td>
<td>Adjusting Nut &amp; Screw SS, Teflon Coated</td>
</tr>
<tr>
<td>11</td>
<td>202300</td>
<td>2</td>
<td>Washer, Flat 5/8&quot; SS</td>
</tr>
<tr>
<td>12</td>
<td>839120</td>
<td>2</td>
<td>Support Brackets</td>
</tr>
<tr>
<td>13</td>
<td>444005</td>
<td>1</td>
<td>Pivot Mount Cylinder</td>
</tr>
<tr>
<td>14</td>
<td>728994</td>
<td>1</td>
<td>Spacer, Medium (Not Used)</td>
</tr>
<tr>
<td>15</td>
<td>113330</td>
<td>1</td>
<td>HHCS 3/8&quot; NF x 1-3/8&quot; SS</td>
</tr>
<tr>
<td>16</td>
<td>HO5090</td>
<td>n/a</td>
<td>Refer to page 10 for specific spacer installation instructions.</td>
</tr>
</tbody>
</table>

---

**SAFETY PRECAUTIONS**

- Use plastic spacer to ensure there is no metal to metal contact.

---

**PARTS LIST**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART #</th>
<th>QTY</th>
<th>DESCRIPTION</th>
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<td>Adjusting Nut &amp; Screw SS, Teflon Coated</td>
</tr>
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<td>11</td>
<td>202300</td>
<td>2</td>
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<td>12</td>
<td>839120</td>
<td>2</td>
<td>Support Brackets</td>
</tr>
<tr>
<td>13</td>
<td>444005</td>
<td>1</td>
<td>Pivot Mount Cylinder</td>
</tr>
<tr>
<td>14</td>
<td>728994</td>
<td>1</td>
<td>Spacer, Medium (Not Used)</td>
</tr>
<tr>
<td>15</td>
<td>113330</td>
<td>1</td>
<td>HHCS 3/8&quot; NF x 1-3/8&quot; SS</td>
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<tr>
<td>16</td>
<td>HO5090</td>
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<td>Refer to page 10 for specific spacer installation instructions.</td>
</tr>
</tbody>
</table>

---

**SAFETY PRECAUTIONS**

- Fully tilting the engine may cause the steering cylinder to interfere with the transom and/or splashwell. Possible damage to the steering system can result. Ensure that the cylinder is free from interference at all times.
For **HC5347** Cylinder Installation **ONLY**

Refer to page 44 for correct torque specifications of all installation hardware.

### Engine Manufacturer

<table>
<thead>
<tr>
<th>YEAR</th>
<th>MODEL</th>
<th>CYLINDER</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998-2009</td>
<td>115-130 HP</td>
<td>HC5347</td>
<td>Refer to page 34 for Twin Engine Applications</td>
</tr>
<tr>
<td>2010 TO DATE</td>
<td>115 HP</td>
<td>HC5345</td>
<td>Refer to page 14 for details</td>
</tr>
</tbody>
</table>

---

**CAUTION**

Use plastic spacer to ensure there is no metal to metal contact.

---

**WARNING**

Fully tilting the engine may cause the steering cylinder to interfere with the transom and/or splashwell. Possible damage to the steering system can result. Ensure that the cylinder is free from interference at all times.

---

**ITEM** | **PART #** | **QTY** | **DESCRIPTION**
---|---|---|---
*1 | 113529 | 1 | Nut, 3/8" NF Nylok® SS
*2 | 113225 | 1 | HHCS 3/8UNJFX1.35 HSS
3 | 731625 | 2 | Washer Flat, 7/16" SS
*4 | 731720 | 2 | 7/16" NF Nylok® SS
5 | 202027 | 2 | Washer, Flat 1/2" SS
*6 | 192126 | 2 | Nut 1/2" NF Nylok® ni plt br
7 | 995876 | 2 | Spacer, Thick, Plastic
8 | 996689 | 1 | Spacer, Thin, Plastic
9 | 730229 | 1 | Support Rod

**ITEM** | **PART #** | **QTY** | **DESCRIPTION**
---|---|---|---
10 | 828085 | 1 | Adjusting Nut & Screw SS, Teflon Coated
11 | 202300 | 2 | Washer, Flat 5/8" SS
12 | 839120 | 2 | Support Brackets
13 | 828003 | 1 | Pivot Mount Cylinder
14 | 728994 | 1 | Spacer, Medium (Not Used)
15 | 113330 | 1 | HHCS 3/8" NF x 1-3/8" SS

* Refer to page 44 for correct torque specifications.
For HC5348 Cylinder Installation ONLY

Refer to page 44 for correct torque specifications of all installation hardware.

**WARNING**

JOHNSON/EVINRUDE

<table>
<thead>
<tr>
<th>ENGINE MANUFACTURER</th>
<th>YEAR</th>
<th>MODEL</th>
<th>CYLINDER</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>JOHNSON/EVINRUDE</td>
<td>1977 TO 1990</td>
<td>65-300 HP</td>
<td>HC5348</td>
<td></td>
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</table>

**CAUTION**

Use plastic spacer to ensure there is no metal to metal contact.

**WARNING**

For 1977 to 1990 models, maximum transom thickness is 2-3/4". Thicker transom will limit engine tilt.

**CAUTION**

For HC5348 Cylinder Installation ONLY

---

**Figure 22.**

**ITEM** | **PART #** | **QTY** | **DESCRIPTION**
---|---|---|---
*1 | 113529 | 1 | Nut, 3/8" NF Nylok® SS
*2 | 113225 | 1 | HHCS 3/8UNJFX1.35 HSS
3 | 731625 | 2 | Washer Flat, 7/16" SS
*4 | 731720 | 2 | 7/16" NF Nylok® SS
5 | 202027 | 2 | Washer, Flat 1/2" SS
*6 | 192126 | 2 | Nut 1/2" NF Nylok® ni ptbr
7 | 995876 | 2 | Spacer, Thick
8 | 996689 | 1 | Spacer, Thin
9 | 730229 | 1 | Support Rod
10 | 828085 | 1 | Adjusting Nut & Screw SS, Teflon Coated
11 | 202300 | 2 | Washer, Flat 5/8" SS
12 | 839120 | 2 | Support Brackets
13 | 828005 | 1 | Pivot Mount Cylinder
14 | 728994 | 1 | Spacer, Medium (Not Used)
15 | 113350 | 1 | HHCS 3/8" NF x 1-1/2" SS

* Refer to page 44 for correct torque specifications.
The steering equipment noted below is for use in boats that are used in a 'normal' fashion. For ALL performance orientated, or, any boat that is rigged with engines that exceed 300HP per engine, SeaStar Solutions recommends the use of the Tournament Type Steering Cylinders and Tie bars. If you have any questions in regards to your installation, please contact SeaStar Solutions. Refer to page 44 for correct torque specifications of all installation hardware.

**HO6001-Single Cylinder tie bar Kit**

<table>
<thead>
<tr>
<th>ENGINE MANUFACTURER</th>
<th>YEAR</th>
<th>MODEL</th>
<th>CYLINDER</th>
<th>ENGINE TIE BAR KITS</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORCE</td>
<td>1995 TO DATE</td>
<td>90-120 HP</td>
<td>HC5345</td>
<td>HO6001  HO6002</td>
<td></td>
</tr>
<tr>
<td>HONDA</td>
<td>† 1996 TO DATE</td>
<td>75-90 HP</td>
<td>HC5345</td>
<td>HO6001  HO6002</td>
<td>Port Cylinder install ONLY. (See Figure 23C)</td>
</tr>
<tr>
<td></td>
<td>† 1998 TO DATE</td>
<td>30-50 HP</td>
<td>HC5345</td>
<td>HO6001  HO6002</td>
<td>(See Figure 23B)</td>
</tr>
<tr>
<td></td>
<td>† 2001 TO DATE</td>
<td>135-250 HP</td>
<td>HC5345</td>
<td>HO6001  HO6002</td>
<td>(See Figure 23B)</td>
</tr>
<tr>
<td></td>
<td>2010 TO DATE</td>
<td>115-250 HP</td>
<td>HC5345</td>
<td>HO6001  HO6002</td>
<td></td>
</tr>
<tr>
<td>MERCURY/MARINER</td>
<td>1989 TO DATE</td>
<td>75-275 HP</td>
<td>HC5345</td>
<td>HO6001  HO6002</td>
<td>(See page 26 for Dual Cylinder)</td>
</tr>
<tr>
<td></td>
<td>† 2002 TO DATE</td>
<td>90-225 HP</td>
<td>HC5358</td>
<td>HO6001  HO6002</td>
<td>(See Figure 23D)</td>
</tr>
<tr>
<td></td>
<td>† 2002 TO DATE</td>
<td>115XS–300XS</td>
<td>HC6345</td>
<td>N/A     N/A</td>
<td></td>
</tr>
</tbody>
</table>

**ITEM** | **PART #** | **QTY** | **DESCRIPTION**
---|---|---|---
51 | 961665 | 1 | Drive Bracket Assembly
52 | 961686 | 1 | Spacer
53 | 186540 | 1 | Shoulder Bolt, 3/8" x 1-1/4", SS
54 | 010924 | 1 | Washer 5/16" x 3/4" OD SS
55 | 961704 | 1 | HHCS 5/16" NC x 2", SS
56 | 113529 | 1 | Nut, Nylok®, 3/8" NF, SS (Not used)
57 | 704525 | 2 | Nut, Nylok®, 5/16" NC SS
58 | 722540 | 1 | Tie Bar c/w Ball Joint
59 | 192126 | 1 | Nut, Nylok® 1/2" NF, NI PL BR
60 | 722750 | 1 | Stringer Tube, SS
61 | 113222 | 1 | HHCS, 3/8" NF 1-1/4", SS

†† Use Item # 72 with MERCURY 225HP 4 stroke & all HONDA engines
* Refer to page 44 for correct torque specifications.

---

Outboard Powered Vessels
The steering equipment noted below is for use in boats that are used in a ‘normal’ fashion. For ALL performance orientated, or, any boat that is rigged with engines that exceed 300HP per engine, SeaStar Solutions recommends the use of the Tournament Type Steering Cylinders and Tie bars. If you have any questions in regards to your installation, please contact SeaStar Solutions. Refer to page 44 for correct torque specifications of all installation hardware.

### HO6001 - Single Cylinder Tie Bar Kit

**ITEM** | **PART #** | **QTY** | **DESCRIPTION**
--- | --- | --- | ---
51 | 961665 | 1 | Drive Bracket Assembly
52 | 961686 | 1 | Spacer
53 | 186540 | 1 | Shoulder Bolt, 3/8" x 1-1/4", SS
54 | 010924 | 1 | Washer 5/16" x 3/4" OD, SS
55 | 961704 | 1 | HHCS 5/16" NC x 2-1/2", SS
56 | 113529 | 1 | Nut, Nylok®, 3/8" NF, SS
57 | 704525 | 2 | Nut, Nylok®, 5/16" NC, SS
58 | 722540 | 1 | Tie Bar c/w Ball Joint
59 | 192126 | 1 | Nut, Nylok®, 1/2" NF, NI PL BR
60 | 722750 | 1 | Stringer Tube, SS

### Engine Manufacturer Year Model Cylinder Single Cyl. Dual Cyl. Note

<table>
<thead>
<tr>
<th>ENGINE MANUFACTURER</th>
<th>YEAR</th>
<th>MODEL</th>
<th>CYLINDER</th>
<th>ENGINE TIE BAR KITS</th>
<th>NOTE</th>
</tr>
</thead>
</table>
| YAMAHA | 1986 TO 2004 | 75–250 HP (2 & 4 Stroke) | HC5358 | HO6001 | See Fig. 24B Must use Tournament Cylinders
| | 2004 TO 2006 | 75–300 HP (2 & 4 Stroke) | HC5358 | HO6001 |
| | 2006 TO DATE | 75–300 HP (2 & 4 Stroke) | HC5345 | HO6001 |
| | 2007 TO DATE | F350 HP | N/A | N/A |

**Figure 24a**
Remove Screw and Stem Washer
Drive Bracket Side Only (Replaced by Items 51, 52, 54 & 55)

**Figure 24b**
Yamaha 2006 To Date 70–300 HP 2 & 4 Stroke

*Refer to page 44 for correct torque specifications.*
TWIN ENGINES

INSTALLATION INSTRUCTIONS

Outboard Powered Vessels

The steering equipment noted below is for use in boats that are used in a 'normal' fashion. For all performance orientated, or, any boat that is rigged with engines that exceed 300HP per engine, SeaStar Solutions recommends the use of the Tournament Type Steering Cylinders and Tie bars. If you have any questions in regards to your installation, please contact SeaStar Solutions. Refer to page 44 for correct torque specifications of all installation hardware.

HO6002-Dual Cylinder Tie Bar Kit

<table>
<thead>
<tr>
<th>ENGINE MANUFACTURER</th>
<th>YEAR</th>
<th>MODEL</th>
<th>CYLINDER</th>
<th>ENGINE TIE BAR KITS</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORC E</td>
<td>1995 TO DATE</td>
<td>90–120 HP</td>
<td>HC5345</td>
<td>HO6001</td>
<td>HO6002</td>
</tr>
<tr>
<td>HONDA</td>
<td>1996 TO DATE</td>
<td>75–90 HP</td>
<td>HC5345</td>
<td>HO6001</td>
<td>N/A</td>
</tr>
</tbody>
</table>
The steering equipment noted below is for use in boats that are used in a 'normal' fashion. For all performance orientated, or, any boat that is rigged with engines that exceed 300HP per engine, SeaStar Solutions recommends the use of the Tournament Type Steering Cylinders and Tie bars. If you have any questions in regards to your installation, please contact SeaStar Solutions. Refer to page 44 for correct torque specifications of all installation hardware.

## HO6002-Dual Cylinder Tie Bar Kit

<table>
<thead>
<tr>
<th>ENGINE MANUFACTURER</th>
<th>YEAR</th>
<th>MODEL</th>
<th>CYLINDER</th>
<th>ENGINE TIE BAR KITS</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>MERCURY/MARINER</td>
<td>1989 TO DATE</td>
<td>75–275 HP</td>
<td>HC5345</td>
<td>HO6001</td>
<td>(See page 29 for Dual Cylinder) Cylinder required on every engine. MUST use Tournament Cylinders. Must use high strength tiller bolt, Kit HA5822. Bolt Head is marked with TFX ARP.</td>
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<tr>
<td></td>
<td>2002-TO DATE</td>
<td>225 HP 4 Stroke</td>
<td>HC5358</td>
<td>HO6001</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2002-TO DATE</td>
<td>250 XS HP</td>
<td>HC6345</td>
<td>HO6001</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HO6002</td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>HO6002</td>
<td></td>
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###_warning_

**Figure 26A**

Remove Screw and Stem Washer

Drive Bracket Side Only
(Replaced by Items 51, 52, 54 & 55)

**Figure 26**

Refer to page 44 for correct torque specifications.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART #</th>
<th>QTY</th>
<th>DESCRIPTION</th>
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<td>961665</td>
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<td>Drive Bracket Assembly</td>
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<td>52</td>
<td>961666</td>
<td>2</td>
<td>Spacer</td>
</tr>
<tr>
<td>53</td>
<td>186540</td>
<td>2</td>
<td>Shoulder Bolt, 3/8&quot; x 1-1/4&quot;, SS</td>
</tr>
<tr>
<td></td>
<td>010924</td>
<td>2</td>
<td>Washer 5/16&quot; x 3/4&quot; OD SS</td>
</tr>
<tr>
<td>55</td>
<td>961704</td>
<td>2</td>
<td>HHCS 5/16&quot; NC x 2-1/2&quot; SS</td>
</tr>
<tr>
<td>57</td>
<td>704525</td>
<td>2</td>
<td>Nut, Nylok®, 5/16&quot; NC, SS</td>
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<table>
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<th>DESCRIPTION</th>
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<td></td>
<td>722543</td>
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<td>tie bar c/w Ball Joint</td>
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<tr>
<td>59</td>
<td>192126</td>
<td>1</td>
<td>Nut, Nylok® 1/2&quot; NF, NI PL BR</td>
</tr>
<tr>
<td>60</td>
<td>722753</td>
<td>1</td>
<td>Stringer Tube, SS</td>
</tr>
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<td>61</td>
<td>116527</td>
<td>1</td>
<td>Rod End Ball 1/2&quot; SS</td>
</tr>
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<td>66</td>
<td>113021</td>
<td>2</td>
<td>Nut, Nylok®, 5/16&quot; NC, SS, Thin</td>
</tr>
<tr>
<td>67</td>
<td>185901</td>
<td>2</td>
<td>FHSCS, 5/16&quot; NC x 3/4&quot;, SS</td>
</tr>
</tbody>
</table>
The steering equipment noted below is for use in boats that are used in a 'normal' fashion. For ALL performance orientated, or, any boat that is rigged with engines that exceed 300HP per engine, SeaStar Solutions recommends the use of the Tournament Type Steering Cylinders and Tie bars. If you have any questions in regards to your installation, please contact SeaStar Solutions. Refer to page 44 for correct torque specifications of all installation hardware.

**HO6002-Dual Cylinder Tie Bar Kit**

<table>
<thead>
<tr>
<th>ENGINE MANUFACTURER</th>
<th>YEAR</th>
<th>MODEL</th>
<th>CYLINDER</th>
<th>ENGINE TIE BAR KITS</th>
<th>BAR KITS</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>JOHNSON/EVINRUDE</td>
<td>1991 TO DATE</td>
<td>40–250 HP 2 Stroke</td>
<td>HC5345</td>
<td>HO6003</td>
<td>HO6002</td>
<td>See Fig. 27d</td>
</tr>
<tr>
<td></td>
<td>1997 TO DATE</td>
<td>75–250 HP Ficht</td>
<td>HC5345</td>
<td>HO6003</td>
<td>HO6002</td>
<td>See Fig. 27d</td>
</tr>
<tr>
<td></td>
<td>1998 TO DATE</td>
<td>40–140 HP 4 Stroke</td>
<td>HC5358</td>
<td>HO6003</td>
<td>HO6002</td>
<td>See Fig. 27d</td>
</tr>
<tr>
<td></td>
<td>2004 TO DATE</td>
<td>75–250 E Tech</td>
<td>HC5345</td>
<td>HO6003</td>
<td>HO6002</td>
<td>See Fig. 27d</td>
</tr>
<tr>
<td></td>
<td>2007 TO DATE</td>
<td>3.3L V6 200–250 HP</td>
<td>HC5345</td>
<td>HO6003</td>
<td>HO6002</td>
<td>3.4L V6 250H.D.–300HP</td>
</tr>
<tr>
<td>SUZUKI</td>
<td>1986 TO DATE</td>
<td>150–300 HP 2 Stroke</td>
<td>HC5345</td>
<td>HO6003</td>
<td>HO6002</td>
<td>See Fig. 27b</td>
</tr>
<tr>
<td></td>
<td>1986 TO 2002</td>
<td>115–140 HP 2 Stroke</td>
<td>HC5345</td>
<td>HO6003</td>
<td>HO6002</td>
<td>See Fig. 27c</td>
</tr>
<tr>
<td></td>
<td>1998 TO DATE</td>
<td>40–140 HP 4 Stroke</td>
<td>HC5358</td>
<td>HO6003</td>
<td>HO6002</td>
<td>Req. 2 x Spacer Kit HO5090</td>
</tr>
</tbody>
</table>

**Outboard Powered Vessels**

- **ITEM PART # QTY DESCRIPTION**
  - 51 961665 2 Drive Bracket Assembly
  - 52 961686 2 Spacer
  - *53 186540 2 Shoulder Bolt, 3/8" x 1-1/4", SS
  - 54 010924 2 Washer 5/16" x 3/4" OD SS
  - *55 961704 2 HHCS 5/16" NC x 2-1/2" SS
  - *57 704525 2 Nut, Nylok®, 5/16" NC, SS

- **ITEM PART # QTY DESCRIPTION**
  - 58 722543 1 tie bar c/w Ball Joint
  - *59 192126 1 Nut, Nylok® 1/2" NF, NI PL BR
  - 60 722753 1 Stringer Tube, SS
  - 61 116527 1 Rod End Ball 1/2" SS
  - *66 113021 2 Nut, Nylok®, 5/16" NC, SS, Thin
  - *67 185901 2 FHCS, 5/16" NC x 3/4", SS
HO6002-Dual Cylinder Tie Bar Kit

<table>
<thead>
<tr>
<th>ENGINE MANUFACTURER</th>
<th>YEAR</th>
<th>MODEL</th>
<th>CYLINDER</th>
<th>ENGINE TIE BAR KITS SINGLE CYL</th>
<th>ENGINE TIE BAR KITS DUAL CYL</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>YAMAHA</td>
<td>1998 TO 2007</td>
<td>40–90 HP 2 Stroke</td>
<td>HC5345</td>
<td>HO6001</td>
<td>HO6002</td>
<td>Engine clamp brackets must be modified (cut or ground) and the engine through bolted onto transom or interference will occur restricting engine trim and tilt. Requires spacer kit HO5090. (See Fig. 28b). Requires Spacer Kit HO5090.</td>
</tr>
<tr>
<td></td>
<td>2007 TO DATE</td>
<td>25–75 HP</td>
<td>HC5348</td>
<td>HO6001</td>
<td>HO6002</td>
<td></td>
</tr>
</tbody>
</table>

Figure 28a

Drive Bracket Side Only
(Replaced by Items 51, 52, 54 & 55)

Figure 28b

*Refer to page 44 for correct torque specifications.

ITEM  PART #  QTY  DESCRIPTION

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART #</th>
<th>QTY</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>51</td>
<td>961665</td>
<td>2</td>
<td>Drive Bracket Assembly</td>
</tr>
<tr>
<td>52</td>
<td>961686</td>
<td>2</td>
<td>Spacer</td>
</tr>
<tr>
<td>53</td>
<td>186540</td>
<td>2</td>
<td>Shoulder Bolt, 3/8” x 1-1/4”, SS</td>
</tr>
<tr>
<td>54</td>
<td>010924</td>
<td>2</td>
<td>Washer 5/16” x 3/4” OD SS</td>
</tr>
<tr>
<td>55</td>
<td>961704</td>
<td>2</td>
<td>HHCS 5/16” NC x 2-1/2” SS</td>
</tr>
<tr>
<td>57</td>
<td>704525</td>
<td>2</td>
<td>Nut, Nylok®, 5/16” NC, SS</td>
</tr>
</tbody>
</table>

ITEM  PART #  QTY  DESCRIPTION

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART #</th>
<th>QTY</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>58</td>
<td>722543</td>
<td>1</td>
<td>tie bar c/w Ball Joint</td>
</tr>
<tr>
<td>59</td>
<td>192126</td>
<td>1</td>
<td>Nut, Nylok® 1/2” NF, NI PL BR</td>
</tr>
<tr>
<td>60</td>
<td>722753</td>
<td>1</td>
<td>Stringer Tube, SS</td>
</tr>
<tr>
<td>61</td>
<td>116527</td>
<td>1</td>
<td>Rod End Ball 1/2” SS</td>
</tr>
<tr>
<td>66</td>
<td>113021</td>
<td>2</td>
<td>Nut, Nylok®, 5/16” NC, SS, Thin</td>
</tr>
<tr>
<td>67</td>
<td>185901</td>
<td>2</td>
<td>FHSCS, 5/16” NC x 3/4”, SS</td>
</tr>
</tbody>
</table>
The steering equipment noted below is for use in boats that are used in a 'normal' fashion. For all performance orientated, or, any boat that is rigged with engines that exceed 300HP per engine, SeaStar Solutions recommends the use of the Tournament Type Steering Cylinders and Tie bars. If you have any questions in regards to your installation, please contact SeaStar Solutions. Refer to page 44 for correct torque specifications of all installation hardware.

**HO6002-Dual Cylinder Tie Bar Kit**

<table>
<thead>
<tr>
<th>ENGINE MANUFACTURER</th>
<th>YEAR</th>
<th>MODEL</th>
<th>CYLINDER</th>
<th>ENGINE TIE BAR KITS</th>
<th>CYLINDER</th>
<th>CYLINDER</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>YAMAHA</strong></td>
<td>1986 TO 2004</td>
<td>75–250 HP (2 &amp; 4 Stroke)</td>
<td>HC5358</td>
<td>HO6001</td>
<td>HC5358</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2004 TO 2006</td>
<td>75–300 HP (2 &amp; 4 Stroke)</td>
<td>HC5358</td>
<td>HO6001</td>
<td>HC5358</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2006 TO DATE</td>
<td>75–300 HP (2 &amp; 4 Stroke)</td>
<td>HC5345</td>
<td>HO6001</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2007 TO DATE</td>
<td>350 HP</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>See Fig. 29b Must use Tournament Cylinders.</td>
</tr>
<tr>
<td><strong>MERCURY/MARINER</strong></td>
<td>2002-TO DATE</td>
<td>225 HP (4 Stroke)</td>
<td>HC5358</td>
<td>HO6001</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

*Refer to page 44 for correct torque specifications.*
The steering equipment noted below is for use in boats that are used in a 'normal' fashion. For ALL performance orientated, or, any boat that is rigged with engines that exceed 300HP per engine, SeaStar Solutions recommends the use of the Tournament Type Steering Cylinders and Tie bars. If you have any questions in regards to your installation, please contact SeaStar Solutions. Refer to page 44 for correct torque specifications of all installation hardware.

## HO6002-Dual Cylinder Tie Bar Kit for HC5348 Cylinder Installation ONLY

### WARNING

* Refer to page 44 for correct torque specifications.

### Item Part # QTY Description

<table>
<thead>
<tr>
<th>Item</th>
<th>Part #</th>
<th>QTY</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>51</td>
<td>961665</td>
<td>2</td>
<td>Drive Bracket Assembly</td>
</tr>
<tr>
<td>52</td>
<td>961686</td>
<td>2</td>
<td>Spacer</td>
</tr>
<tr>
<td>*53</td>
<td>186540</td>
<td>2</td>
<td>Shoulder Bolt, 3/8&quot; x 1-1/4&quot;, SS</td>
</tr>
<tr>
<td>54</td>
<td>010924</td>
<td>2</td>
<td>Washer 5/16&quot; x 3/4&quot; OD SS</td>
</tr>
<tr>
<td>*55</td>
<td>961704</td>
<td>2</td>
<td>HHCS 5/16&quot; NC x 2-1/2&quot; SS</td>
</tr>
<tr>
<td>*57</td>
<td>704525</td>
<td>2</td>
<td>Nut, Nylok®, 5/16&quot; NC, SS</td>
</tr>
<tr>
<td>58</td>
<td>722543</td>
<td>1</td>
<td>Tiebar c/w Ball Joint</td>
</tr>
<tr>
<td>*59</td>
<td>192126</td>
<td>1</td>
<td>Nut, Nylok® 1/2&quot; NF, NI PL BR</td>
</tr>
</tbody>
</table>

### Item Part # QTY Description

<table>
<thead>
<tr>
<th>Item</th>
<th>Part #</th>
<th>QTY</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>59</td>
<td>960516</td>
<td>2</td>
<td>FHCS, 5/16&quot; NC x 1&quot;, SS</td>
</tr>
<tr>
<td>*57</td>
<td>113021</td>
<td>2</td>
<td>Nut, Nylok®, 5/16&quot; NC, SS</td>
</tr>
<tr>
<td>60</td>
<td>722753</td>
<td>1</td>
<td>Stringer Tube, SS</td>
</tr>
<tr>
<td>61</td>
<td>116527</td>
<td>1</td>
<td>Rod End Ball 1/2&quot; SS</td>
</tr>
</tbody>
</table>

### Diagrams

- **Figure 30a**: Drive Bracket Side Only (Replaced by Items 51, 52, 54 & 55)
- **Figure 30**: SEE FIG. 30a

### Table

<table>
<thead>
<tr>
<th>Engine Manufacturer</th>
<th>Year</th>
<th>Model</th>
<th>Cylinder</th>
<th>Engine Tie Bar Kits</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>JOHNSON EVINRUDU</td>
<td>1977 TO 1990</td>
<td>65–300 HP</td>
<td>HC5348</td>
<td>HO6001</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HO6002</td>
<td></td>
</tr>
</tbody>
</table>

### Note

- See Figure 30a for the removal of screw and stem washer.
- Refer to page 44 for correct torque specifications.
Ho6003-Single Cylinder Tie Bar Kit, Johnson/Evinrude, Suzuki

<table>
<thead>
<tr>
<th>Engine Manufacturer</th>
<th>Year</th>
<th>Model</th>
<th>Cylinder</th>
<th>Engine Tie Bar Kits</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Johnson/Evinrude</td>
<td>1977 to 1990</td>
<td>65–300 HP</td>
<td>HC5348</td>
<td>Ho6003</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1991 to Date</td>
<td>40–250 HP</td>
<td>HC5345</td>
<td>Ho6003</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1996 to Date</td>
<td>75–250 HP</td>
<td>HC5345</td>
<td>Ho6003</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1998 to Date</td>
<td>40–140 HP</td>
<td>HC5358</td>
<td>Ho6003</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2007 to Date</td>
<td>3.3L V6 200–250 HP</td>
<td>HC5345</td>
<td>Ho6003</td>
<td></td>
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</tbody>
</table>

Suzuki

<table>
<thead>
<tr>
<th>Year</th>
<th>Model</th>
<th>Cylinder</th>
<th>Engine Tie Bar Kits</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986 to Date</td>
<td>150–300 HP</td>
<td>HC5345</td>
<td>Ho6003</td>
<td></td>
</tr>
<tr>
<td>1998 to Date</td>
<td>60–70 HP</td>
<td>HC5345</td>
<td>Ho6003</td>
<td></td>
</tr>
<tr>
<td>1998 to Date</td>
<td>40–140 HP 4 Stroke</td>
<td>HC5358</td>
<td>Ho6003</td>
<td></td>
</tr>
</tbody>
</table>

**WARNING** The steering equipment noted below is for use in boats that are used in a 'normal' fashion. For ALL performance orientated, or, any boat that is rigged with engines that exceed 300HP per engine, SeaStar Solutions recommends the use of the Tournament Type Steering Cylinders and Tie bars. If you have any questions in regards to your installation, please contact SeaStar Solutions. Refer to page 44 for correct torque specifications of all installation hardware.

**ITEM** | **PART #** | **QTY** | **DESCRIPTION**
---|---|--|---
51 | 961665 | 1 | Drive Bracket Assembly
52 | 961686 | 1 | Spacer
53 | 186540 | 1 | Shoulder Bolt, 3/8" x 1-1/4", SS
54 | 010924 | 1 | Washer 5/16" Flat 3/4", SS
55 | 961704 | 1 | HHCS 5/16" NC x 2-1/2", SS
56 | 113529 | 1 | Nut, Nylok®, 3/8" NF, SS
57 | 704525 | 1 | Nut, Nylok®, 5/16" NC, SS
58 | 722545 | 1 | Tie Bar c/w Ball Joint (HO6003)

**ITEM** | **PART #** | **QTY** | **DESCRIPTION**
---|---|--|---
59 | 192126 | 1 | Nut, Nylok® 1/2" NF, NI PL BR
60 | 722755 | 1 | Stringer Tube
61 | 116320 | 1 | HHCS, 3/8" NF x 1-1/2", SS
64 | 116527 | 1 | Rod End SS 1/2" NF
65 | 113529 | 1 | Nut, Nylok®, 3/8" NF, SS
66 | 113021 | 1 | Nut, Nylok®, 5/16" NC, SS, Thin
67 | 185901 | 1 | FHSCS, 5/16" NC x 3/4", SS
72 | 113622 | 1 | Washer, 3/8" Dia., SS
The steering equipment noted below is for use in boats that are used in a ‘normal’ fashion. For ALL performance orientated, or, any boat that is rigged with engines that exceed 300HP per engine, SeaStar Solutions recommends the use of the Tournament Type Steering Cylinders and Tie bars. If you have any questions in regards to your installation, please contact SeaStar Solutions. Refer to page 44 for correct torque specifications of all installation hardware.

**HO6003-Single Cylinder Tie Bar Kit, Mercury**

<table>
<thead>
<tr>
<th>ENGINE MANUFACTURER</th>
<th>YEAR</th>
<th>MODEL</th>
<th>CYLINDER</th>
<th>ENGINE TIE BAR KITS</th>
<th>SINGLE CYLINDER</th>
<th>DUAL CYLINDER</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>MERCURY</td>
<td>1998-TO DATE</td>
<td>40, 50 &amp; 60 HP</td>
<td>HC5345</td>
<td>HO6003</td>
<td>HO6002</td>
<td>Requires Kit HO5090</td>
<td></td>
</tr>
<tr>
<td>HONDA</td>
<td>2001-TO DATE</td>
<td>150 HP 4 Stroke</td>
<td>HC5345</td>
<td>HO6003</td>
<td>HO6002</td>
<td>See Fig. 32c &amp; 32d</td>
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**ITEM PART # QTY DESCRIPTION**

<table>
<thead>
<tr>
<th>Item</th>
<th>Part #</th>
<th>Qty</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>51</td>
<td>961665</td>
<td>1</td>
<td>Drive Bracket Assembly</td>
</tr>
<tr>
<td>52</td>
<td>961686</td>
<td>1</td>
<td>Spacer</td>
</tr>
<tr>
<td>*53</td>
<td>186540</td>
<td>1</td>
<td>Shoulder Bolt, 3/8&quot; x 1-1/4&quot;, SS</td>
</tr>
<tr>
<td>54</td>
<td>010924</td>
<td>1</td>
<td>Washer 5/16&quot; Flat 3/4&quot;, SS</td>
</tr>
<tr>
<td>*55</td>
<td>961704</td>
<td>1</td>
<td>HHCS 5/16&quot; NC x 2-1/2&quot;, SS</td>
</tr>
<tr>
<td>*56</td>
<td>113529</td>
<td>1</td>
<td>Nut, Nylok®, 3/8&quot; NF, SS</td>
</tr>
<tr>
<td>*57</td>
<td>704525</td>
<td>1</td>
<td>Nut, Nylok®, 5/16&quot; NC, SS</td>
</tr>
<tr>
<td>58</td>
<td>722545</td>
<td>1</td>
<td>Tie Bar c/w Ball Joint (HO6003)</td>
</tr>
<tr>
<td>*59</td>
<td>192126</td>
<td>1</td>
<td>Nut, Nylok® 1/2&quot; NF, NI PL BR</td>
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</tbody>
</table>

**ITEM PART # QTY DESCRIPTION**

<table>
<thead>
<tr>
<th>Item</th>
<th>Part #</th>
<th>Qty</th>
<th>Description</th>
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<tbody>
<tr>
<td>60</td>
<td>722755</td>
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<td>Stringer Tube</td>
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<tr>
<td>*61</td>
<td>116320</td>
<td>1</td>
<td>HHCS, 3/8&quot; NF x 1-1/2&quot;, SS</td>
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<tr>
<td>64</td>
<td>116527</td>
<td>1</td>
<td>Rod End SS 1/2&quot; NF</td>
</tr>
<tr>
<td>*65</td>
<td>113529</td>
<td>1</td>
<td>Nut, Nylok®, 3/8&quot; NF, SS</td>
</tr>
<tr>
<td>*66</td>
<td>113021</td>
<td>1</td>
<td>Nut, Nylok®, 5/16&quot; NC, SS, Thin</td>
</tr>
<tr>
<td>*67</td>
<td>185901</td>
<td>1</td>
<td>FHSCS, 5/16&quot; NC x 3/4&quot;, SS</td>
</tr>
<tr>
<td>72</td>
<td>113622</td>
<td>1</td>
<td>Washer, 3/8&quot; Dia., SS</td>
</tr>
<tr>
<td>‡73</td>
<td>710921</td>
<td>1</td>
<td>1/8&quot; SS Spacer</td>
</tr>
</tbody>
</table>
TWIN ENGINES

INSTALLATION INSTRUCTIONS

HO6003-Single Cylinder Tie Bar Kit, Yamaha

<table>
<thead>
<tr>
<th>ENGINE MANUFACTURER</th>
<th>YEAR</th>
<th>MODEL</th>
<th>CYLINDER</th>
<th>ENGINE TIE BAR KITS</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>YAMAHA</td>
<td>1998 TO DATE</td>
<td>40–50 HP</td>
<td>HC5345</td>
<td>HO6003</td>
<td>HO6002</td>
</tr>
<tr>
<td></td>
<td>1998 TO DATE</td>
<td>60 HP</td>
<td>HC5345</td>
<td>HO6003</td>
<td>HO6002</td>
</tr>
<tr>
<td></td>
<td>1998 TO DATE</td>
<td>70–90 HP</td>
<td>HC5345</td>
<td>HO6003</td>
<td>HO6002</td>
</tr>
<tr>
<td></td>
<td>1998 TO DATE</td>
<td>80–100 HP</td>
<td>HC5345</td>
<td>HO6003</td>
<td>HO6002</td>
</tr>
<tr>
<td></td>
<td>1998 TO DATE</td>
<td>115 HP 4 Stroke</td>
<td>HC5358</td>
<td>HO6003</td>
<td>HO6002</td>
</tr>
<tr>
<td></td>
<td>2002 TO DATE</td>
<td>40–60 HP</td>
<td>HC5348</td>
<td>HO6003</td>
<td>HO6002</td>
</tr>
</tbody>
</table>

- *51 961665 1* Drive Bracket Assembly
- 52 961686 1 Spacer
- 53 186540 1 Shoulder Bolt, 3/8" x 1-1/4", SS
- 54 010924 1 Washer 5/16" Flat 3/4", SS
- *55 961704 1* HC5345 Cylinder
- 56 113529 1 Nut, Nylok®, 3/8" NF, SS
- *57 704525 1* Nut, Nylok®, 5/16" NC, SS
- 58 722545 1 Tie Bar c/w Ball Joint (HO6003)
- *59 192126 1* Nut, Nylok® 1/2" NF, NI PL BR

† SUPPLIED WITH KIT HO5090 REFER TO PAGE 10.

Figure 33a REMOVE SCREW AND STEM WASHER

Drive Bracket Side Only (Replaced by Items 51, 52, 54 & 55)

Figure 33b

Yamaha 2000 To Date 80–100HP, 4 Stroke

SEE FIG. 33a

Figure 33c

Yamaha 2001 To Date 115HP, 4 Stroke HC5358 Cylinder

Figure 33d

Yamaha 2002 to Date 40–60HP, 4 Stroke

Figure 33e

Yamaha 1998 to Date 40–60HP

* Refer to page 44 for correct torque specifications.
**For HC5347 Cylinder Installation ONLY**

<table>
<thead>
<tr>
<th>ENGINE MANUFACTURER</th>
<th>YEAR</th>
<th>MODEL</th>
<th>CYLINDER</th>
<th>SINGLE</th>
<th>ENGINE ADAPTER PLATES</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>HONDA</td>
<td>1998 TO 2010</td>
<td>115-130 HP</td>
<td>HC5347</td>
<td>NOT REQ.</td>
<td>HO5063, HO5064</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 34.**

**WARNING**
Cylinder interference may occur if installed on transom exceeding Maximum recommended Transom Thickness 2-3/4" causing property damage and or personal injury.

**WARNING**

1. The top corners of the Tab Washer (item 54) must be folded against the flats of the Hex Bolt after bolts are tightened.
2. Fully tilting or independent tilting of the engine/engines may cause the steering cylinder to interfere with the transom and/or splashwell. Possible damage to the steering system can result. Ensure that the cylinder is free from interference at all times. Maximum Transom thickness 2-3/4".

**WARNING**
SeaStar Solutions is no longer manufacturing engine extension plates for any engine built after 2004. Please see pages 14-33 for cylinder and tiebar part numbers.

Refer to page 44 for correct torque specifications of all installation hardware.

### TWIN ENGINES INSTALLATION INSTRUCTIONS

#### PART # QTY DESCRIPTION

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART #</th>
<th>QTY</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>51</td>
<td>688725</td>
<td>2</td>
<td>Extension Plate</td>
</tr>
<tr>
<td>52</td>
<td>113529</td>
<td>2</td>
<td>Nut 3/8&quot; NF Nylok®</td>
</tr>
<tr>
<td>53</td>
<td>113622</td>
<td>4</td>
<td>Washer 3/8&quot; dia.</td>
</tr>
<tr>
<td>54</td>
<td>823673</td>
<td>4</td>
<td>Locking Tab Washer</td>
</tr>
<tr>
<td>55</td>
<td>752930</td>
<td>4</td>
<td>Screw M10 x 1.25 x 62mm HHCS</td>
</tr>
<tr>
<td>56</td>
<td>688726</td>
<td>2</td>
<td>Screw 3/8&quot; NF x 2-1/4&quot; HHCS, SS</td>
</tr>
<tr>
<td>57</td>
<td>722721</td>
<td>1</td>
<td>Stringer Tube</td>
</tr>
<tr>
<td>58</td>
<td>722523</td>
<td>1</td>
<td>Threaded Rod c/w Ball Joint</td>
</tr>
<tr>
<td>59</td>
<td>192126</td>
<td>1</td>
<td>Nut 1/2&quot; NF Nylok®</td>
</tr>
<tr>
<td>60</td>
<td>116527</td>
<td>2</td>
<td>Ball Joint</td>
</tr>
<tr>
<td>61</td>
<td>710921</td>
<td>2</td>
<td>Spacer</td>
</tr>
</tbody>
</table>
FILLING AND PURGING THE SYSTEM

Read First

These instructions show how to fill and purge a Single Station Front Mount Cylinder System. The same steps apply to Single Station Side Mount / Splashwell Mount Systems, the difference being which bleeder to open and close and the direction the cylinder rod moves. These variations are shown in inset diagrams at each step. For twin station and/or twin cylinder filling and purging instructions refer to instructions on page 39 first and then proceed with instructions on this page.

This procedure requires two people. One person may not be able to remove all the air from the system which will result in spongy, unresponsive steering.

During the entire filling procedure, oil must be visible in the filler tube. DO NOT allow the oil level to disappear into the helm pump, as this may introduce air into the system and increase your filling time.

Hydraulic Oil Requirements

2 bottles (2 quarts or liters) for single station and single cylinder systems. 1 additional bottle for each additional helm, cylinder, or auto pilot.

Oil can be re-used if filtered through a fine mesh screen such as used for gasoline. If unable to filter oil, an additional bottle of oil is required.

"Bleeder" may refer to cylinders fitted with bleed tee fittings or bleed screws. If fitted with bleed tee fitting, open bleeder by unscrewing bleed nipple nut two turns.

Filling the helm full of oil can be done faster if oil is poured into the helm prior to connecting filler tube and oil bottle to the helm. Part # HA5438.

In the following pages you are instructed to hold cylinder body with your hand, if the cylinder is mounted to an engine, use the engine to hold the body in position.
Hydraulic Fluid

Recommended oils for your steering system are:

- SeaStar Hydraulic Fluid, part no. HA5430 (1 quart), HA5440 (1 Gal.)
- Texaco HO15
- Aero Shell Fluid #41
- Esso Univis N15
- Chevron Aviation Fluid A
- Mobil Aero HFA

- Fluids meeting Mil H5606 specifications.
- Automatic transmission fluid Dexron II may be used in an emergency.

**CAUTION**

Never use brake fluid. Any non-approved fluid may cause irreparable damage, loss of steering, and cancellation of warranty.

In cases of extreme emergency any non-toxic, non-flammable fluid may provide temporary steering.

---

**Fill Plugs for SeaStar Helms**

<table>
<thead>
<tr>
<th>VENT PLUG - Part No. HA5431</th>
<th>NON-VENT PLUG - Part No. HA5432</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Vent Plug" /></td>
<td><img src="image" alt="Non-Vent Plug" /></td>
</tr>
</tbody>
</table>

**SUPPLIED WITH SEASTAR HELM PUMP**

- MUST BE USED WITH HELM PUMP ON ALL SINGLE STEERING STATION SYSTEMS.
- MUST BE USED ON UPPERMOST HELM PUMP ON MULTI STEERING STATION SYSTEMS.

**MUST BE USED ON ALL HELM PUMPS OTHER THAN UPPERMOST HELM PUMP ON MULTI STEERING STATION SYSTEMS.**

**THIS NON-VENT PLUG IS SUPPLIED WITH ADDITIONAL STATION FITTING KIT NO. HF5501 AND HF5502.**

Figure 36.
Single Station One Cylinder

**Step 1**
- Hold the cylinder body (Front Mount cylinder) or rod (Side Mount cylinder) to prevent the body/rod from moving, turn the steering wheel counter-clockwise until a steady stream of air free oil comes out of the bleeder. (Drain approx. 1/2 bottle of oil or as required).
- Do not use anything other than your hands to restrain the cylinder body/rod.
- While continuing to turn the wheel close the right side bleeder and let go of the cylinder body/rod.

**Step 2**
- Turn the steering wheel clockwise until the cylinder rod is fully extended on the right side of the cylinder.
- Open right side bleeder.

**Step 3**
- Screw the threaded end of the filler tube into the helm filler port.
- Remove the cap from the oil bottle and holding upright screw into the filler tube bottle cap. Poke hole in the bottom of the bottle.
- Fill the helm pump full of hydraulic oil so that it is visible in the filler tube. Oil should always be visible in the filler tube. Use the next bottle of fluid at any time during the procedure in order to maintain the oil level. Do not proceed with step two until helm is full.
Step 4

- Continue turning the steering wheel counter-clockwise until the cylinder rod is fully extended to the left. (Steering wheel will come to a stop).
- Open the left bleeder.

Step 5

- Holding the cylinder body (Front Mount cylinder) or rod (Side Mount cylinder) to prevent the body/rod from moving, turn the steering wheel clockwise until a steady stream of air free oil comes out of the bleeder.
- While continuing to turn the wheel close the left side bleeder and let go of the cylinder body/rod.

⚠️ CAUTION

Prior to operating system, perform Oil Level System Check, refer to page 40.

<table>
<thead>
<tr>
<th>No. Steering Wheel Turns</th>
<th>Front Mount</th>
<th>Side Mount</th>
<th>Splashwell Mount</th>
</tr>
</thead>
<tbody>
<tr>
<td>SeaStar 1.7</td>
<td>4.5</td>
<td>4.9/5.8</td>
<td>5.5/6.5</td>
</tr>
<tr>
<td>SeaStar 2.4</td>
<td>3.25</td>
<td>3.5/4.1</td>
<td>3.9/4.6</td>
</tr>
<tr>
<td>SeaStar Pro 2.0</td>
<td>4.0</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

When steering system has been properly bled, steering wheel turns will be as shown in the chart.
Perform steps 1 through 5 at station no. 1. Then repeat steps 1-5 at station no. 2.

Oil requirements 4-5 bottles.

**Note:** Refer to Oil Level and System Check page 40.

When properly bled, steering wheel turns will be as shown in the chart.

---

### Twin Station Single Cylinder

When performing steps 1 through 5, perform instructions in each step first on cylinder no. 1 and then on cylinder no. 2, before proceeding to the next step. ie: Perform instructions referring to right side of cylinder first on cylinder no. 1 and then on cylinder no. 2.

Oil requirements 4-5 bottles.

**Note:** Refer to Oil Level and System Check on page 40. Steering wheel turns will be as shown in the chart.

---

### Single Station Twin Cylinder

Follow same procedure as instructed for single station-twin cylinders, beginning at station no. 1, and repeat entire procedure at station no. 2.

**Note:** When properly bled, steering wheel turns will be as shown in the chart.
Oil Level and System Check

Step 1 – Oil level Setting

⚠️ **WARNING** The oil level MUST be checked and maintained BEFORE EACH use to ensure safe steering operation. Failure to adhere to this warning may lead to loss of steering control resulting in persons being ejected from vessel or collision with an obstacle, leading to property damage, personal injury and/or death.

⚠️ **CAUTION** Side mount and Splashwell mount cylinder are unbalanced. To set the oil level in the helm pump the cylinder rod MUST be fully “retracted (cylinder shaft all the way in the cylinder body). Failure to adhere to this caution WILL result in oil spillage at the helm filler port and/or stiff steering operation.

- For helms mounted with the wheel shaft completely horizontal MUST be filled to the bottom of filler hole AT ALL TIMES. DO NOT allow oil level to drop more than 1/4” below filler threads.
- For helms mounted on a 20 degree angle, or, with wheel shaft in the vertical position, oil level should be within 1/2” of filler hole.

Step 2 – System Check

⚠️ **WARNING** The system check MUST be completed after installation. Doing so will ensure the safe operation of your steering system and will any fault/leak will show at this time. Failure to adhere to this warning/check may result in the loss of steering control leading to ejection from the vessel, or, collision with an obstacle resulting in property damage, personal injury and/or death.

- Turn steering wheel hard over to hard over to confirm unrestricted movement of the steering system and hoses. Repeat this procedure in ALL trim/tilt positions of the engine(s). If interference occurs, or, hoses are being stretched this MUST be removed prior to operating your boat.
- Confirm that engine(s) are deflecting to the proper direction when steering wheel is turned.
- If no interference is noticed, or, any interference is corrected, go to next step.
- Take steering wheel hard over to starboard (any helm can be used on a multi-station boat). Once the wheel reaches its stop point (cylinder is fully stroked out), continue to force the wheel one (1) full turn past stop. Leave wheel in this position while you check all PORT side connections, fittings, seals and hoses for leaks.

**NOTICE** This step will NOT harm the system and any noise made during this step should not be considered a fault in the steering system.

- If leaks are noticed they MUST be repaired prior to operating boat. After repair repeat bleeding procedures as outlined in this manual
- Repeat to the Port direction and inspect ALL starboard side connections, fittings, seals and hoses for leaks.

**NOTICE** This step will NOT harm the system and any noise made during this step should not be considered a fault in the steering system.

- If leaks are noticed they MUST be repaired prior to operating boat. After repair repeat bleeding procedures as outlined in this manual.

⚠️ **WARNING** Failure to complete the above noted step or, failure to correct a problem may result in loss of steering control leading to ejection from the vessel or collision with an obstacle resulting in property damage, personal injury and/or death.
ROUTINE MAINTENANCE

WARNING

Following the routine maintenance schedules as outlined below, in the time frame noted will ensure years of service from your SeaStar Steering System, as well as keep you and your passengers safe from the dangers that are present on and off the water.

1. Owner(s) (End Users)

Prio to every use.
1. Check Fluid level in highest helm pump (see page 35 for proper fluid level setting).
2. Verify immediate steering response when turning steering wheel(s). (Ensure engine turns when steering wheel is turned.)
3. Visually inspect all steering hoses and fittings for wear, kinking and/or leaks.
4. Check for binding, loose, worn or leaking steering components.

WARNING

DO NOT operate boat if any component is not in proper working condition.

2. Qualified Marine Mechanic

After first 20 hours, then every 100 hours or 6 months thereafter (which ever comes first).
1. All points noted above.
2. Check tightness of ALL fasteners/fittings throughout the steering system. Tighten to correct torque specifications as required.
3. Check for mechanical play or slop throughout steering system, correct as required.
4. Check for signs of corrosion. If corrosion is present contact your dealer or SeaStar Solutions.

After every 200 hours or 12 months (which ever comes first).
1. All points noted above.
2. Remove support rod from engine steering/tilt tube. Clean engine steering/tilt tube and re-grease using a good quality marine grease.
3. Grease support rod liberally
4. Grease all contact points shown in Figure 37. DO NOT remove tiller bolt to re-grease.
5. Remove steering wheel and re-grease wheel shaft using a good quality marine grease.
6. Inspect hydraulic oil for cleanliness, flush if required.

Any work being performed with the steering system MUST be completed by a qualified mechanic with the working knowledge of the system.

Figure 37.
If properly installed and maintained, your SeaStar Steering System will provide years of safe and reliable performance. Our systems have been designed with protection against over-pressure situations by a pressure relief valve. Most faults occur when installation instructions have not been followed and in most cases will present themselves immediately upon filling the system. Below are the most common faults and their likely cause and solution. Extreme caution must be exercised when diagnosing and correcting a fault. These troubleshooting guides may seem simple in text, however these MUST be completed by a qualified marine mechanic that has working knowledge of the steering system.

### WARNING

SeaStar Solutions does NOT recommend disassembly of a helm pump, or, removing a steering cylinder rod/shaft at any time. Doing so may cause more damage, leading to irreparable damage and costly replacements.

<table>
<thead>
<tr>
<th>FAULT</th>
<th>CAUSE</th>
<th>SOLUTION</th>
</tr>
</thead>
</table>
| **1. During filling, helm becomes completely locked up.** | • Mechanical interference with other components.  
• Blockage in the steering lines.  
• Tilting mechanism not installed properly.  
• Engine(s) are restricted.  
• Power Assist H1, or H2 line crossed with R line. | • Check ALL areas for interference, correct as required.  
• Remove all steering lines. Blow air through lines. Any line not allowing good airflow may should be replaced.  
• Confirm tilt mechanism is installed correctly.  
• Confirm that engines are able to be moved freely with cylinder not connected.  
• Confirm system is plumbed correctly. |
| **2. System is very difficult to fill, air keeps burping out top of helm, even after system appears full.** | • Air remaining in system.  
• Bleed fitting leaking.  
• Coiled hose.  
• Reservoir/compensating lines not purged free of air. | • Bleed steering system again.  
• Tighten bleeder, replace if leak continues.  
• DO NOT cut hoses. Lessen coil, or, replace with shorter lines.  
• Bleed air from reservoir/compensating lines. |
| **3. Steering is hard to turn even when boat is not moving and engines are OFF.** | • Adjusting nut on support rod is over tightened.  
• Restrictions on hoses (see Fault 1).  
• Mechanical interference with other components (see Fault 1).  
• Air in system (yes, air will lead to heavy steering).  
• Incorrect fluid has been used to fill system. | • Nut should be hand-tight.  
• See fault 1.  
• See fault 1.  
• Bleed Steering System.  
• Drain and flush, fill and bleed with SeaStar fluid. |
3. **Continued.**  
Steering is hard to turn even when boat is not moving and engines are OFF.

- Damaged steering cylinder body.
- Too small of a steering hoses being used.
- Steering wheel is too small.
- Tilt bellows interference.
- Cylinder installation procedure not followed correctly.
- Cylinder mounting plate is too tight.

- Replace steering cylinder(s) completely.
- Remove and re-plumb system using SeaStar outboard hoses.
- Wheel should be 15" & larger (MAX 26").
- Confirm no interference with rubber tilt bellows on steering wheel hub.
- Remove cylinder, re-install as per the steps noted.
- With cylinder not connected, the plate must move UP/DOWN freely. Replace if hard to move.

4. **One helm in system is very bumpy and requires too many turns.**

- Air in system.
- Dirt/debris in system.
- Dirt/debris in autopilot (if fitted).

- Bleed system.
- Replace helm pump, flush system (DO NOT attempt repair of helm).
- Replace autopilot pump.
Bolt Torque Specifications

Values are stated in: in/lbs (N.m)

<table>
<thead>
<tr>
<th>Bolt Size</th>
<th>18-8SS</th>
<th>Brass</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-56</td>
<td>2.5 (.282)</td>
<td>2.0 (.226)</td>
</tr>
<tr>
<td>2-64</td>
<td>3.0 (.338)</td>
<td>2.5 (.282)</td>
</tr>
<tr>
<td>3-48</td>
<td>3.9 (.440)</td>
<td>3.2 (.361)</td>
</tr>
<tr>
<td>3-56</td>
<td>4.4 (.497)</td>
<td>3.6 (.407)</td>
</tr>
<tr>
<td>4-40</td>
<td>5.2 (.587)</td>
<td>4.3 (.486)</td>
</tr>
<tr>
<td>4-48</td>
<td>6.6 (.740)</td>
<td>5.4 (.610)</td>
</tr>
<tr>
<td>5-40</td>
<td>7.7 (.869)</td>
<td>6.3 (.712)</td>
</tr>
<tr>
<td>5-44</td>
<td>9.4 (1.06)</td>
<td>7.7 (.869)</td>
</tr>
</tbody>
</table>

Values are stated in: ft/lbs (N.m)

<table>
<thead>
<tr>
<th>Bolt Size</th>
<th>18-8SS</th>
<th>Brass</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/16*14</td>
<td>31.0 (42.00)</td>
<td>26.0 (35.25)</td>
</tr>
<tr>
<td>7/16*20</td>
<td>33.0 (44.74)</td>
<td>27.0 (36.61)</td>
</tr>
<tr>
<td>1/2*13</td>
<td>43.0 (58.30)</td>
<td>35.0 (47.45)</td>
</tr>
<tr>
<td>1/2*20</td>
<td>45.0 (61.01)</td>
<td>37.0 (50.17)</td>
</tr>
<tr>
<td>9/16*12</td>
<td>57.0 (77.28)</td>
<td>47.0 (63.72)</td>
</tr>
<tr>
<td>9/16*18</td>
<td>63.0 (85.42)</td>
<td>51.0 (69.15)</td>
</tr>
</tbody>
</table>

These are the recommended maximum torque values for reusable dry bolts. Bolts should be torqued to this value +0% -20%. For lubricated bolts, multiply the dry bolt torque values by .75.

Helm Pump (Pivot, PRO Pivot, Tournament Pivot)

- **DISPLACEMENT**: 1.7 cu. in. (27.8 cc)
- **RELIEF VALVE**: 1000 PSI (68 Bar)
- **PORTS**: 1/4" NPT

Cylinder (Front Mount, Pivot, Tournament Pivot)

- **INSIDE DIAMETER**: 1.375" (34.93 mm)
- **STROKE**: 8" (203 mm)
- **VOLUME**: 8.34 cu. in. (136.6 cc)
- **TORQUE @ 1000 psi (70 Bar) H.O.**: N/A

Fittings

SeaStar cylinders and all other fittings are 3/8" compression type fittings. Threads are 9/16" x 24 UNEF. A brochure on all SeaStar fittings is available from SeaStar Solutions.

Inside diameter – 5/16" (8 mm)
SEAL/REPLACEMENT PARTS

SEASTAR, FRONT MOUNT
PIVOT CYLINDERS

Part # HC5345, HC5347, HC5348, HC5358, HC5375, HC5445,
HC6750, HC6751, HC6752, HC6753, HC6754 and HC6755

Specifications
OUTBOARD USE ONLY

Volume: 8.3 cu.in.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART #</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HS5157</td>
<td>Seal Kit c/w wrench, does NOT include center/internal seal)</td>
</tr>
<tr>
<td>2</td>
<td>HF5548</td>
<td>Bleeder Fittings, 2 per kit, covers NOT inc.</td>
</tr>
<tr>
<td>3</td>
<td>HP6018</td>
<td>Support Brackets, 2 per kit</td>
</tr>
<tr>
<td>4</td>
<td>HP6016</td>
<td>Support Rod</td>
</tr>
<tr>
<td>5</td>
<td>HF6145</td>
<td>Hose Elbow Fittings</td>
</tr>
<tr>
<td>6</td>
<td>HA5820</td>
<td>Tiller Bushing Kit, c/w high strength tiller bolt</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART #</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>N/A</td>
<td>Pivot Mount Plate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If damaged cylinder is to be replaced</td>
</tr>
<tr>
<td>8</td>
<td>HP6033</td>
<td>Spacer/Adjusting Nut Kit</td>
</tr>
</tbody>
</table>

Figure 38.
Statement of Limited Warranty

We warrant to the original retail purchaser that Marine Canada Acquisition Inc. DBA SEASTAR SOLUTIONS (herein forward referred to as SeaStar Solutions) products have been manufactured free from defects in materials and workmanship. This warranty is effective for two years from date of purchase, excepting that where SeaStar Solutions products are used commercially or in any rental or income producing activity, then this warranty is limited to one year from the date of purchase.

We will provide replacement product without charge, for any SeaStar Solutions product meeting this warranty, which is returned (freight prepaid) within the warranty period to the dealer from whom such product were purchased, or to us at the appropriate address. In such a case SeaStar Solutions products found to be defective and covered by this warranty, will be replaced at SeaStar Solutions option, and returned to the customer.

The above quoted statement is an extract from the complete SeaStar Solutions products warranty statement. A complete warranty policy is available in our SeaStar Solutions products catalogue.

Return Goods Procedure

Prior to returning product to SeaStar Solutions under warranty, please obtain a Return Goods Authorization number (claim number).

Be sure to label the goods with:

a) the name and address of the sender, and
b) the return goods authorization number (claim number)

Please address the returned goods as follows:

From U.S.A.

RGA # ?
SeaStar Solutions
c/o UPS–Supply Chain Solutions Inc.
Door A37
1201 C Street NW, Auburn, WA, 98001

From Canada

RGA # ?
SeaStar Solutions
3831 No. 6 Road
Richmond, B.C.
Canada V6V 1P6

Technical Support

Phone: 604-248-3858
email: seastar@seastarsolutions.com
Hours: Monday - Friday 05:00 – 15:30 PST
Web: www.seastarsolutions.com