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.

---

**CAUTION**
-3 steering cylinders are fitted with ORB hose fittings. DO NOT use NPT fittings, irreparable damage to cylinder WILL occur.
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.

**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.

**WARNING**

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 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.

**WARNING**

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.

NOTICE

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.

WARNING

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


Splashwells of less than 30" in overall width may require engine removal in order to install the support rod (Part # HP6016).

**NOTICE**

Engine may need to be removed for proper cylinder maintenance.

---

**Dimensional Specifications**

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

![Diagram of Front Mount Cylinder](image)

**Figure 1.**

Ensure correct Torque at these points, see page 44 for Torque specifications.

---

**CAUTION**

-3 steering cylinders are fitted with ORB hose fittings. DO NOT use NPT fittings. irreparable damage to cylinder WILL occur.
Outboard recommendations made in this section are based on our experience with typical installations, applications and usage. Ensure you select the system which provides the best comfort versus performance. It is the boat manufacturer and the installer’s responsibility to ensure the components selected are sufficiently validated on the boat for safe and acceptable operation. DO NOT use SeaStar Solutions Steering in applications they are not intended for.

### Front Mount Outboard Installation Recommendations

Outboard recommendations made in this section are based on our experience with typical installations, applications and usage. Ensure you select the system which provides the best comfort versus performance. It is the boat manufacturer and the installer’s responsibility to ensure the components selected are sufficiently validated on the boat for safe and acceptable operation. DO NOT use SeaStar Solutions Steering in applications they are not intended for.

#### Table: Outboard Installation Recommendations

<table>
<thead>
<tr>
<th>Engine</th>
<th>Aggressive Use (see Note 1)</th>
<th>Normal Use</th>
<th>Hynautic K-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Engine</td>
<td>SeaStar Tournament Series</td>
<td>SeaStar Front Mount</td>
<td>Single Cylinder 300 HP Max</td>
</tr>
<tr>
<td>SINGLE CYLINDER</td>
<td>350 HP Max</td>
<td>Single Cylinder 350 HP Max</td>
<td>Single Cylinder 350 HP Max</td>
</tr>
<tr>
<td>or HC6845S</td>
<td>HC63xx-3 Pro Cylinder (See Notes 2 &amp; 3)</td>
<td>HC53xx-3 Cylinder (See Note 2)</td>
<td></td>
</tr>
<tr>
<td>Dual Engine Non Counter Rotating</td>
<td>SeaStar Tournament Cylinders</td>
<td>Single Cylinder 450 HP Max</td>
<td>Single Cylinder 400 HP Max</td>
</tr>
<tr>
<td>Tournament Cylinders</td>
<td>(Contact Technical Support)</td>
<td>55 MPH Max</td>
<td>55 MPH Max</td>
</tr>
<tr>
<td>Dual Engine Counter Rotating</td>
<td>SeaStar Tournament Cylinders</td>
<td>Single Cylinder 600 HP Max</td>
<td>Single Cylinder 500 HP Max</td>
</tr>
<tr>
<td>Tournament Cylinders</td>
<td>(Contact Technical Support)</td>
<td>55 MPH Max</td>
<td>55 MPH Max</td>
</tr>
<tr>
<td>Triple Engine One With Counter Rotating</td>
<td>SeaStar Tournament Cylinders</td>
<td>Single Cylinder 600 HP Max</td>
<td>Single Cylinder 500 HP Max</td>
</tr>
<tr>
<td>Tournament Cylinders</td>
<td>(Contact Technical Support)</td>
<td>55 MPH Max</td>
<td>55 MPH Max</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 # HA5822. 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 “SEASTAR 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 helms and PRO Hoses are recommended.

### Notes

1. **MAX center engine drop <.75”**

---

Outboard Powered Vessels
You will need the following tools to complete your installation.
• 7/16", 1/2", 9/16", 5/8” and 3/4” Open End type Wrench/Spanner

Additional tools needed
• 5/16" (8mm) dia. Drill Bit
• 15/16” Socket for SeaStar helms wheel shaft nut
• 1” Hole Saw for Rear Mount helms
• 3” Hole Saw for Front Mount, Sport and Sport Plus helms
• 4” Hole Saw for Classic Tilt helms

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

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

Additional tools may be required for the following;
• removal of existing steering components (mechanical steering systems).
• engine removal for installation of support rod.
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.

WARNING
- Ensure that you read and understand ALL cautions, notices and warnings that are noted in your helm pump installation instructions.
- Install SeaStar Steering Cylinder as outlined on page 9 of this manual.
- Install Ground Strap as outlined on page 11 of this manual.
- Install steering hoses as outlined on page 7 of this manual.

CAUTION
- 3 steering cylinders are fitted with ORB hose fittings. DO NOT use NPT fittings. Irreparable damage to cylinder WILL occur.

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 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.

WARNING
- Oil level and System check is critical to the safe operation of your boat, failure to follow this important step may lead to loss of steering control resulting in property damage, personal injury and/or death.

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.
Note: This page left blank intentionally.
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 or on either side of an ORB 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.

**CAUTION**
-3 steering cylinders are fitted with ORB hose fittings. DO NOT use NPT fittings. irreparable damage to cylinder WILL occur.

**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.
HYDRAULIC HOSE INSTALLATION

• 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. If orientation is required, see page 13 for ORB Hose fitting installation/realignment.
3. Hoses should be secured to the control cable harness if they enter the splashwell through the boot.

Figure 2.

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 must refer to the installation instructions included with the power assist and/or liquid tiebar valve.

Figure 3.

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
• blistered, soft, degraded, or loose cover.
INSTALLATION INSTRUCTIONS

Front Mount Cylinders

NOTICE
Installation of PRO and Catamaran cylinders are similar 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.

NOTICE
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.

CAUTION
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.

Single Engines

NOTICE
Please refer to the table below if using any PRO or Catamaran type cylinders. Installation will be the same as that shown, any changes will be noted when required.

<table>
<thead>
<tr>
<th>Cylinder Part #</th>
<th>Install as per Cylinder Part #</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC6345-3</td>
<td>HC5345-3</td>
</tr>
<tr>
<td>HC5375-3</td>
<td>HC5345-3</td>
</tr>
<tr>
<td>HC5445-3</td>
<td>HC5345-3</td>
</tr>
<tr>
<td>HC6358-3</td>
<td>HC5358-3</td>
</tr>
</tbody>
</table>

WARNING
Refer to page 44 for the correct torque specifications for your installation. Failure to correctly install your steering cylinder and torque all screws may result in steering failure causing property damage and/or personal injury.

WARNING
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.

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

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.

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

STEP 3: Select appropriate insert diagram from page 10 to page 22 to determine proper orientation of the cylinder assembly, the tiller bolt 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 on page 44.

WARNING
It is required that the tiller bolt head is held in place with a wrench while tightening the tiller nut to proper torque 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) all the way onto the tilt tube. b) Place the stainless washers (Item 11) and the plastic spacers (Items 7 & 8) on the support rod.

CAUTION
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. DO NOT TIGHTEN UNTIL ALL FASTENERS ARE TIGHTENED TO THE CORRECT TORQUE.

CAUTION
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>QTY</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</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>1</td>
<td>SS Fender Washer</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>Aluminum Spacer 1/2&quot;</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>3/16&quot; Spacer, Yamaha</td>
</tr>
<tr>
<td>5</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

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). 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 aggressive use, or, any boat that is rigged with engines that exceed 300 HP 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. See Recommendation Chart on page 3 of this manual.

**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) 14³⁄₄” (464mm)

![Figure 11.](image)

**HO6002**

Note: HO6001 Minimum Engine centers = 26” (660mm)

HO6002 Minimum Engine centers = 29” (737mm)
All other makes and models
HO6002 Minimum Engine centers = 27” (685mm)

![Figure 12.](image)
Note: H06003 Minimum Engine centers = 26” (660mm)

**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.

**Positional O-Ring Horizontal and Vertical Tee Fitting Installation/Realignment**

**CAUTION**

DO NOT attempt to install NPT pipe fittings into the cylinder hose fitting ports. Doing so will lead to irreparable damage to the cylinder. ONLY use ORB hose fittings provided by SeaStar Solutions.

**Cylinder Fitting Installation (If required.)**

1. Back off lock nut (item 1, Figure 14), counter-clockwise, until it stops.
2. Thread fitting into cylinder body until fitting washer (item 2, Figure 14) contacts the face of the cylinder port. Tighten hand tight, DO NOT TORQUE FITTING AT THIS TIME.
3. Position fitting to desired orientation by turning it counter-clockwise to a MAXIMUM of 1 full turn.
4. While holding fitting with a wrench, tighten the locknut (item 1, Figure 14) and torque to 40–43 ft-lb.
5. Purge system as per your cylinder instruction manual.

**WARNING**

Failure to properly tighten the locknut (item 1) may lead to loss of steering control. Loss of steering control may result in unpredictable boat behavior, collision with an obstacle and/or ejection from vessel, leading to property damage, personal injury and/or death.

**WARNING**

SeaStar Solutions recommends that the hose and hose fittings are checked on a regular basis to ensure the safe operation of the steering system.

Figure 13.

Figure 14.
1. Refer to steps 1–4 as shown on page 9 of this installation manual.
2. Place the supplied square 3/16” woodruff keys in both sides of the support rod.
3. Install support brackets onto the support rod ensuring the woodruff keys are in place.
4. continue with step 6 on page 9 of this manual.

Figure 15. (HC6345 Cylinder Shown.)
**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><strong>FORCE</strong></td>
<td>1985 TO 1995</td>
<td>90–150 HP</td>
<td>HC5345-3</td>
<td>(See Fig. 16a)</td>
</tr>
<tr>
<td><strong>HONDA</strong></td>
<td>1992 TO DATE</td>
<td>30–50 HP</td>
<td>HC5345-3</td>
<td>Requires Spacer Kit HO5090 (See Fig. 16a)</td>
</tr>
<tr>
<td></td>
<td>1996 TO DATE</td>
<td>75–90 HP</td>
<td>HC5345-3</td>
<td>(See Fig. 16a)</td>
</tr>
<tr>
<td></td>
<td>1998 TO 2009</td>
<td>115–130 HP</td>
<td>HC5347-3</td>
<td>Ref. page 22 for Installation Instructions</td>
</tr>
<tr>
<td></td>
<td>2001 TO DATE</td>
<td>BF200-250</td>
<td>HC5445-3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2003 TO DATE</td>
<td>BF135-150</td>
<td>HC5345-3</td>
<td>(See Fig. 16b)</td>
</tr>
<tr>
<td></td>
<td>2010 TO DATE</td>
<td>115 HP</td>
<td>HC5345-3</td>
<td></td>
</tr>
</tbody>
</table>

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

**Honda 75/90 to 1998**

**Honda 150–250 HP 4 STROKE**

**Force 150HP 2007 – Date**

**Figure 16a**

**Figure 16b**

**Figure 16c**

**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** | **QTY** | **DESCRIPTION**
---|---|---
*1* 1 | Nut, 3/8” NF Nylok® SS
*2* 1 | HHCS 3/8 UNJF x 1.35 HSS
3 2 | Washer Flat, 7/16” SS
4 2 | 7/16” NF Nylok® SS
5 2 | Washer, Flat 1/2” SS
*6* 2 | Nut 1/2” NF Nylok® Ni plated brass
7 2 | Spacer, Thick, Plastic
8 1 | Spacer, Thin, Plastic
9 1 | Support Rod
10 1 | Adjusting Nut & Screw SS, Teflon Coated
11 2 | Washer, Flat 5/8” SS
12 2 | Support Brackets
13 1 | Pivot Mount Cylinder
14 1 | Spacer, Medium (Not Used)
15 1 | HHCS 3/8” NF x 1-3/8” SS
INSTALLATION INSTRUCTIONS
SINGLE ENGINE

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

ENGINE MANUFACTURER | YEAR | MODEL | CYLINDER | NOTE
--- | --- | --- | --- | ---
MERCURY/MARINER | 1984-TO 1989 | 75–250 HP | HC5345-3 | (See Fig. 17a)
1990-TO DATE | 75–250 HP | HC5345-3 | Requires Spacer Kit HO5090
1995-TO 1997 | 40, 50 & 60 HP | HC5345-3 | Requires Spacer Kit HO5090 (See Fig. 17b)
1998-TO DATE | 40, 50 & 60 HP | HC5345-3
2002-TO DATE | 115XS–300XS | HC5345-3
2002-TO DATE | 90–225 HP Optimax | HC5345-3 | (See Fig. 17c)
2004-TO DATE | 150–200 HP Verado | HC5345-3 | (See Fig. 17d)
NISSAN | 1990-TO DATE | 120-140 HP | HC5345-3
TOHATSU | 1990-TO DATE | 120-140 HP | HC5345-3

ITEM | QTY | DESCRIPTION
--- | --- | ---
*1 | 1 | Nut, 3/8” NF Nylok® SS
*2 | 1 | HHCS 3/8UNJFX1.35 HSS
3 | 2 | Washer Flat, 7/16” SS
*4 | 2 | 7/16” NF Nylok® SS
5 | 2 | Washer, Flat 1/2” SS
*6 | 12 | Nut 1/2” NF Nylok® Ni plated brass
7 | 2 | Spacer, Thick, Plastic
8 | 1 | Spacer, Thin, Plastic
9 | 1 | Support Rod

ITEM | QTY | DESCRIPTION
--- | --- | ---
10 | 1 | Adjusting Nut & Screw SS, Teflon Coated
11 | 2 | Washer, Flat 5/8” SS
12 | 2 | Support Brackets
13 | 1 | Pivot Mount Cylinder
14 | 1 | Spacer, Medium (Not Used)
15 | 1 | HHCS, 3/8” NF x 1-3/8” SS
*16 | n/a | Refer to page 10 for specific spacer installation instructions.

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

**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>JOHNSON/EVINRUDE</td>
<td>1977 TO 1990</td>
<td>65–300 HP</td>
<td>HC5348-3</td>
<td>Refer Figure 18b.</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>
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<tr>
<td></td>
<td>1991 TO 2006</td>
<td>40–250 HP</td>
<td>HC5345-3</td>
<td>See Figure 18a.</td>
</tr>
<tr>
<td></td>
<td>1997 TO 2006</td>
<td>75–300 HP FICHT</td>
<td>HC5345-3</td>
<td>Refer to Figure 22d on page 21 for Installation Instructions. Requires Spacer Kit HO5090</td>
</tr>
<tr>
<td></td>
<td>1998 TO DATE</td>
<td>40–140 HP 4 Stroke</td>
<td>HC5354-3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2007 TO DATE</td>
<td>3.3L V6 200–250 HP</td>
<td>HC5345-3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.4L V6 250H.O.–300 HP</td>
<td>HC5345-3</td>
<td></td>
</tr>
</tbody>
</table>

**ITEM** | **QTY** | **DESCRIPTION**  
--- | --- | ---  
*1 | 1 | Nut, 3/8" NF Nylok® SS  
*2 | 1 | HHCS 3/8UNJFX1.35 HSS  
3 | 2 | Washer Flat, 7/16" SS  
*4 | 2 | 7/16" NF Nylok® SS  
5 | 2 | Washer, Flat 1/2" SS  
*6 | 2 | Nut 1/2" NF Nylok® Ni plated brass  
7 | 2 | Spacer, Thick, Plastic  
8 | 1 | Spacer, Thin, Plastic  
9 | 1 | Support Rod  

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

* 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>1998 TO 2007</td>
<td>40–90 HP 2 Stroke</td>
<td>HC5345-3</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. 19a &amp; 19c). See Fig. 19b. Requires spacer kit HO5090.</td>
</tr>
<tr>
<td></td>
<td>2002 TO DATE</td>
<td>25–70 HP 4 Stroke</td>
<td>HC5348-3</td>
<td></td>
</tr>
</tbody>
</table>

ITEM QTY DESCRIPTION

1 1 Nut 3/8" NF Nylok® SS
2 1 HHCS 3/8UNJFX1.35 HSS (Not Used)
3 2 Washer, Flat, 7/16" SS
4 2 Nut 7/16" NF Nylok® SS
5 2 Washer, Flat 1/2" SS
6 2 Nut 1/2" NF Nylok® Ni plated brass
7 4 Spacer, Thick, Plastic
8 1 Spacer, Thin, Plastic
9 1 Support Rod

ITEM QTY DESCRIPTION

10 1 Adjusting Nut & Screw SS, Teflon Coated
11 2 Washer, Flat 5/8" SS
12 2 Support Brackets
13 1 Pivot Mount Cylinder
14 1 Spacer, Medium (Maybe Used)
15 1 HHCS 3/8" NF x 1-3/8" SS
16 Refer to page 10 for specific spacer installation instructions.
**SINGLE ENGINE INSTALLATION INSTRUCTIONS**

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

**ITEM** | **QTY** | **DESCRIPTION**
---|---|---
1 | 1 | Nut, 3/8" NF Nylok® SS
2 | 1 | HHCS 3/8UNJFX1.35 HSS
3 | 2 | Washer Flat, 7/16" SS
4 | 2 | Nut, 7/16" NF Nylok® SS
5 | 2 | Washer, Flat 1/2" SS
6 | 2 | Nut 1/2" NF Nylok® Ni plated brass
7 | 2 | Spacer, Thick
8 | 1 | Spacer, Thin

**ITEM** | **QTY** | **DESCRIPTION**
---|---|---
9 | 1 | Support Rod
10 | 1 | Adjusting Nut & Screw SS, Teflon Coated
11 | 2 | Washer, Flat 5/8" SS
12 | 2 | Support Brackets
13 | 1 | Pivot Mount Cylinder
14 | 1 | Spacer, Medium (Some 1996 to 1998)
15 | 1 | HHCS 3/8" NF x 1-1/2" SS

**ENGINE MANUFACTURER** | **YEAR** | **MODEL** | **CYLINDER** | **NOTE**
---|---|---|---|---
YAMAHA | 1986 TO 2004 | 100–200 HP 2 Stroke | HC5345-3 | 
| 1990 TO 2004 | 150–300 HP 2 Stroke | HC5345-3 | 
| 1997 TO DATE | F75–F300 HP Inc. 4.2 V6 | HC5345-3 | 1997 to Date 80–100HP 4 Stroke (See Fig. 20a) 2001 to 2004 115HP 4 Stroke (See Fig. 20b) MUST use high strength tiller bolt, Kit HA5822. Bolt head is marked with SEASTAR ARP. HC5358-3 will NOT work on 115B
| 2007 TO DATE | F300–F350 HP 5.3 V8 | HC5345-3 |
| 2014 TO DATE | F115B | HC5345-3 |

**Figure 20a**

**Figure 20b**

**NOTICE**

Steering clip mounting studs are to be removed and replaced with M-10 x 1.25 x 30 "BOLTS".

**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.

**CAUTION**

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

**Figure 20**

* Refer to page 44 for correct torque specifications.
Installation Instructions

SINGLE ENGINE

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

---

**TABLE:**

<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>2010 TO DATE</td>
<td>4.2L V6</td>
<td>HC5445-3</td>
<td>Stroke reduced cylinder.</td>
</tr>
</tbody>
</table>

---

**ITEMS & QTY DESCRIPTION:**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Nut, 3/8” NF Nylok® SS</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>HHCS 3/8” UNJF x 1.35” HSS</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>Washer Flat, 7/16” SS</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>7/16” NF Nylok SS</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>Washer, Flat 1/2” SS</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>Nut 1/2” NF Nylok® Ni plated brass</td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td>Spacer, Thick, Plastic</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>Spacer, Thin, Plastic</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>Support Rod</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>Adjusting Nut &amp; Screw SS, Teflon Coated</td>
</tr>
<tr>
<td>11</td>
<td>2</td>
<td>Washer, Flat 5/8” SS</td>
</tr>
<tr>
<td>12</td>
<td>2</td>
<td>Support Brackets</td>
</tr>
<tr>
<td>13</td>
<td>1</td>
<td>Pivot Mount Cylinder</td>
</tr>
<tr>
<td>14</td>
<td>1</td>
<td>Spacer, Medium (Not Used)</td>
</tr>
<tr>
<td>15</td>
<td>1</td>
<td>HHCS, 3/8” NF x 1-3/8” SS</td>
</tr>
</tbody>
</table>

---

**FIGURE 21:**

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

---

* Refer to page 44 for correct torque specifications.
SINGLE ENGINE

INSTALLATION INSTRUCTIONS

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>SUZUKI</td>
<td>1986 TO DATE</td>
<td>150–300 HP</td>
<td>HC5345-3</td>
<td>See Fig. 22c for locating on tiller.</td>
</tr>
<tr>
<td></td>
<td>1996 ONLY</td>
<td>115–140 HP</td>
<td>HC5348-3</td>
<td>May req. Spacer Kit HO5090 (See Fig. 22a &amp; 22b)</td>
</tr>
<tr>
<td></td>
<td>1987 TO 2002</td>
<td>115–140 HP</td>
<td>HC5345-3</td>
<td>Requires Spacer Kit HO5090 (See Fig. 22d)</td>
</tr>
<tr>
<td></td>
<td>1990 TO 2000</td>
<td>90–100 HP</td>
<td>HC5345-3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1998 TO DATE</td>
<td>40–140 HP</td>
<td>HC5358-3</td>
<td></td>
</tr>
</tbody>
</table>

**Warning**

Item | QTY | Description
--- | --- | --------------------------------------------------------------------------------------------------
1   | 1   | Nut, 3/8" NF Nylok® SS
2   | 1   | HHCS 3/8UNJFX1.35 HSS
3   | 2   | Washer Flat, 7/16" SS
4   | 2   | 7/16" NF Nylok® SS
5   | 2   | Washer, Flat 1/2" SS
6   | 2   | Nut 1/2" NF Nylok® Ni plated brass
7   | 2   | Spacer, Thick, Plastic
8   | 1   | Spacer, Thin, Plastic
9   | 1   | Support Rod
10  | 1   | Adjusting Nut & Screw SS, Teflon Coated
11  | 2   | Washer, Flat 5/8" SS
12  | 2   | Support Brackets
13  | 1   | Pivot Mount Cylinder
14  | 1   | Spacer, Medium (Not Used)
15  | 1   | HHCS 3/8" NF x 1-3/8" SS
16  | n/a | Refer to page 10 for specific spacer installation instructions.

Figure 22.

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.
For **HC5347-3 Cylinder Installation ONLY**

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

### ENGINE MANUFACTURER | YEAR | MODEL | CYLINDER | NOTE
--- | --- | --- | --- | ---
**HONDA** | 1998 TO 2009 | 115-130 HP | HC5347-3 | Refer to page 34 for Twin Engine Applications
| 2010 TO DATE | 115HP | HC5345-3 | Refer to page 15 for details

---

**Figure 23.**

**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.

**CAUTION**

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

---

**ITEM** | **QTY** | **DESCRIPTION**
--- | --- | ---
*1* | 1 | Nut, 3/8” NF Nylok® SS
*2* | 1 | HHCS 3/8UNJFX1.35 HSS
3 | 2 | Washer Flat, 7/16” SS
*4* | 2 | 7/16” NF Nylok® SS
5 | 2 | Washer, Flat 1/2” SS
*6* | 2 | Nut 1/2” NF Nylok® Ni plated brass
7 | 2 | Spacer, Thick, Plastic
8 | 1 | Spacer, Thin, Plastic
9 | 1 | Support Rod

---

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

---

SEASTAR Hydraulics
**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.

## 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 SINGLE CYL.</th>
<th>ENGINE TIE BAR KITS DUAL CYL.</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORCE</td>
<td>1995 TO DATE</td>
<td>90-120 HP</td>
<td>HC5345-3</td>
<td>HO6001</td>
<td>HO6002</td>
<td></td>
</tr>
<tr>
<td>HONDA</td>
<td>1996 TO DATE</td>
<td>75-90 HP</td>
<td>HC5345-3</td>
<td>HO6001</td>
<td>HO6002</td>
<td>Port Cylinder install ONLY. (see Figure 24C)</td>
</tr>
<tr>
<td></td>
<td>1998 TO DATE</td>
<td>30-50 HP</td>
<td>HC5345-3</td>
<td>HO6001</td>
<td>HO6002</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2001 TO DATE</td>
<td>BF200-250 4 Stroke</td>
<td>HC5445-3</td>
<td>HO6001</td>
<td>HO6002</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2003 TO DATE</td>
<td>BF135-150 4 Stroke</td>
<td>HC5345-3</td>
<td>HO6001</td>
<td>HO6002</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2010 TO DATE</td>
<td>115 HP 4 Stroke</td>
<td>HC5345-3</td>
<td>HO6001</td>
<td>HO6002</td>
<td></td>
</tr>
<tr>
<td>MERCURY/MARINER</td>
<td>1989 TO DATE</td>
<td>75-275 HP</td>
<td>HC5345-3</td>
<td>HO6001</td>
<td>HO6002</td>
<td>(See page 26 for Dual Cylinder)</td>
</tr>
<tr>
<td></td>
<td>2002 TO DATE</td>
<td>90-225 HP 4 Stroke</td>
<td>HC5358-3</td>
<td>HO6001</td>
<td>HO6002</td>
<td>(See Figure 24D)</td>
</tr>
<tr>
<td></td>
<td>2002 TO DATE</td>
<td>115XS–300XS</td>
<td>HC6345-3</td>
<td>N/A</td>
<td>N/A</td>
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</table>

### Item List

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<tr>
<th>ITEM</th>
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<th>DESCRIPTION</th>
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<tr>
<td>51</td>
<td>1</td>
<td>Drive Bracket Assembly</td>
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<tr>
<td>52</td>
<td>1</td>
<td>Spacer</td>
</tr>
<tr>
<td>53</td>
<td>1</td>
<td>Shoulder Bolt, 3/8&quot; x 1-1/4&quot;, SS</td>
</tr>
<tr>
<td>54</td>
<td>1</td>
<td>Washer 5/16&quot; x 3/4&quot; OD SS</td>
</tr>
<tr>
<td>55</td>
<td>1</td>
<td>HHCS 5/16&quot; NC x 2&quot; SS</td>
</tr>
<tr>
<td>56</td>
<td>1</td>
<td>Nut, Nylok®, 3/8&quot; NF, SS (Not used)</td>
</tr>
<tr>
<td>57</td>
<td>2</td>
<td>Nut, Nylok®, 5/16&quot; NC SS</td>
</tr>
<tr>
<td>58</td>
<td>1</td>
<td>Tie Bar c/w Ball Joint</td>
</tr>
<tr>
<td>59</td>
<td>1</td>
<td>Nut, Nylok®, 1/2&quot; NF, Ni plated brass</td>
</tr>
<tr>
<td>60</td>
<td>1</td>
<td>Stringer Tube, SS</td>
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<tr>
<td>61</td>
<td>1</td>
<td>HHCS, 3/8&quot; NF 1-1/4&quot;, SS</td>
</tr>
</tbody>
</table>

**HO6000-Single Cylinder Tie Bar Kit**

**HO6002-Dual Cylinder Tie Bar Kit**

![Figure 24A](remove_screw_and_stem_washer)

**Figure 24A**

![Figure 24B](honda_225hp_4_stroke)

**Figure 24B**

![Figure 24C](tiller_arm)

**Figure 24C**

![Figure 24D](2002_to_date_mercury_mariner_port_cylinder_install_only)

**Figure 24D**

---

**Outboard Powered Vessels**  

---

23
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.

**HO6001-Single Cylinder Tie Bar Kit**

<table>
<thead>
<tr>
<th>ENGINE MANUFACTURER</th>
<th>YEAR</th>
<th>MODEL</th>
<th>CYLINDER</th>
<th>CYLINDER SINGLE CYL.</th>
<th>CYLINDER DUAL CYL.</th>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>YAMAHA</td>
<td>1986 TO 2004</td>
<td>75–300 HP (2 &amp; 4 Stroke)</td>
<td>HC5358-3</td>
<td>HO6001</td>
<td>HO6002</td>
<td>See Fig 25b Must use Tournament Cylinders</td>
</tr>
<tr>
<td></td>
<td>2004 TO DATE</td>
<td>3.3L 75–300 HP</td>
<td>HC5358-3</td>
<td>HO6001</td>
<td>HO6002</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2006 TO DATE</td>
<td>4.2L 75–300HP</td>
<td>HC5345-3</td>
<td>HO6001</td>
<td>HO6002</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2007 TO DATE</td>
<td>F350 HP</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2007 TO DATE</td>
<td>F115B</td>
<td>HC5345-3</td>
<td>HO6001</td>
<td>HO6002</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2014 TO DATE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUZUKI</td>
<td>2015 TO DATE</td>
<td>DF200A, DF175A , DF150(SS)</td>
<td>HC5358-3</td>
<td>HO6001</td>
<td>HO6002</td>
<td></td>
</tr>
</tbody>
</table>

**ITEM** | **QTY** | **DESCRIPTION**                        | **ITEM** | **QTY** | **DESCRIPTION**                        |
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>51</td>
<td>1</td>
<td>Drive Bracket Assembly</td>
<td>*61</td>
<td>1</td>
<td>HHCS, 3/8” NF 1-1/4”, SS (Not Used)</td>
</tr>
<tr>
<td>52</td>
<td>1</td>
<td>Spacer</td>
<td>62</td>
<td>1</td>
<td>Slave Bracket Assembly</td>
</tr>
<tr>
<td>*53</td>
<td>1</td>
<td>Shoulder Bolt, 3/8” x 1-1/4”, SS</td>
<td>*63</td>
<td>1</td>
<td>Shoulder Bolt, 3/8” x 1”, SS</td>
</tr>
<tr>
<td>54</td>
<td>1</td>
<td>Washer 5/16” x 3/4” OD, SS</td>
<td>64</td>
<td>1</td>
<td>Rod End SS 1/2” NF</td>
</tr>
<tr>
<td>*55</td>
<td>1</td>
<td>HHCS 5/16” NC x 2-1/2”, SS</td>
<td>65</td>
<td>1</td>
<td>Threaded Bushing (Not Used)</td>
</tr>
<tr>
<td>*56</td>
<td>1</td>
<td>Nut, Nylok®, 3/8” NF, SS</td>
<td>*66</td>
<td>1</td>
<td>Nut, Nylok®, 5/16” NC, SS, Thin</td>
</tr>
<tr>
<td>*57</td>
<td>2</td>
<td>Nut, Nylok®, 5/16” NC, SS</td>
<td>*67</td>
<td>1</td>
<td>FHCS, 5/16” NC x 3/4”, SS</td>
</tr>
<tr>
<td>58</td>
<td>1</td>
<td>Tie Bar c/w Ball Joint</td>
<td>69</td>
<td>1</td>
<td>Bush, 1/2” OD x 3/8”, SS</td>
</tr>
<tr>
<td>*59</td>
<td>1</td>
<td>Nut, Nylok®, 1/2” NF, Ni plated brass</td>
<td>*70</td>
<td>1</td>
<td>HHCS 3/8” NF x 1-5/8”, SS</td>
</tr>
<tr>
<td>60</td>
<td>1</td>
<td>Stringer Tube, SS</td>
<td>71</td>
<td>1</td>
<td>Washer, 3/8” x 1-1/4” OD, SS (Not Used)</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>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORC</td>
<td>1995 TO DATE</td>
<td>90–120 HP</td>
<td>HC5345-3</td>
<td>H06001</td>
<td>H06002</td>
</tr>
<tr>
<td>HONDA</td>
<td>1996 TO DATE</td>
<td>75–90 HP</td>
<td>HC5345-3</td>
<td>H06001</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>2001 TO DATE</td>
<td>85–150 HP</td>
<td>HC5445-3</td>
<td>H06001</td>
<td>H06002</td>
</tr>
<tr>
<td></td>
<td>2001 TO DATE</td>
<td>200 HP</td>
<td>N/A</td>
<td></td>
<td>See Fig. 26b</td>
</tr>
</tbody>
</table>

* Refer to page 44 for correct torque specifications.

**ITEM** | **QTY** | **DESCRIPTION**
---|---|---
51 | 2 | Drive Bracket Assembly
52 | 2 | Spacer
*53 | 2 | Shoulder Bolt, 3/8” x 1-1/4”, SS
54 | 2 | Washer 5/16” x 3/4” OD SS
*55 | 2 | HHCS 5/16” NC x 2-1/2” SS
*57 | 2 | Nut, Nylok®, 5/16” NC, SS

**ITEM** | **QTY** | **DESCRIPTION**
---|---|---
58 | 1 | Tie bar c/w Ball Joint
*59 | 1 | Nut, Nylok® 1/2” NF, Ni plated brass
60 | 1 | Stringer Tube, SS
61 | 1 | Rod End Ball 1/2” SS
*66 | 2 | Nut, Nylok®, 5/16” NC, SS, Thin
*67 | 2 | FHSCS, 5/16” NC x 3/4”, 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.

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>HC5345-3</td>
<td>HO6001</td>
<td>Cylinder required on every engine. MUST use Tournament Cylinders. Must use high strength tiller bolt, Kit HA5822. Bolt Head is marked with SEASTAR ARP.</td>
</tr>
<tr>
<td></td>
<td>2002-TO DATE</td>
<td>225 HP 4 Stroke</td>
<td>HC5358-3</td>
<td>HO6001</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2002-TO DATE</td>
<td>250 XS HP</td>
<td>HC6345-3</td>
<td>HO6002</td>
<td></td>
</tr>
</tbody>
</table>

* Refer to page 44 for correct torque specifications.

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

ITEM  QTY  DESCRIPTION
58 1  Tie bar c/w Ball Joint
*59 1  Nut, Nylok® 1/2" NF, Ni plated brass
60 1  Stringer Tube, SS
61 1  Rod End Ball 1/2" SS
*66 2  Nut, Nylok®, 5/16" NC, SS, Thin
*67 2  FHSCS, 5/16" NC x 3/4", SS

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

Figure 27

Figure 27A

REMOVE SCREW AND STEM WASHER

SEE Fig. 27A

SEE Fig. 27A

* 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.

**TWIN ENGINES**

**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>JOHNSON/EVINRUDE</td>
<td>1991 TO DATE</td>
<td>40–250 HP 2 Stroke</td>
<td>HC5345-3</td>
<td>HO6003</td>
<td>See Fig. 28d</td>
</tr>
<tr>
<td></td>
<td>1997 TO DATE</td>
<td>75–250 HP Ficht</td>
<td>HC5345-3</td>
<td>HO6003</td>
<td>See Fig. 28d</td>
</tr>
<tr>
<td></td>
<td>1998 TO DATE</td>
<td>40–140 HP 4 Stroke</td>
<td>HC5358-3</td>
<td>HO6003</td>
<td>See Fig. 28e Req Spacer Kit HO5090</td>
</tr>
<tr>
<td></td>
<td>2004 TO DATE</td>
<td>75–250 ETech</td>
<td>HC5345-3</td>
<td>HO6003</td>
<td>See Fig. 28d</td>
</tr>
<tr>
<td></td>
<td>2007 TO DATE</td>
<td>3.3L V6 200–250 HP</td>
<td>HC5345-3</td>
<td>HO6003</td>
<td>See Fig. 28d</td>
</tr>
<tr>
<td>SUZUKI</td>
<td>1986 TO DATE</td>
<td>150–300 HP 2 Stroke</td>
<td>HC5345-3</td>
<td>HO6003</td>
<td>See Fig. 28d</td>
</tr>
<tr>
<td></td>
<td>1986 TO 2002</td>
<td>115–140 HP 2 Stroke</td>
<td>HC5345-3</td>
<td>HO6003</td>
<td>See Fig. 28c</td>
</tr>
<tr>
<td></td>
<td>1998 TO DATE</td>
<td>40–140 HP 4 Stroke</td>
<td>HC5358-3</td>
<td>HO6003</td>
<td>Req. 2 x Spacer Kit HO5090 Fig. 28e</td>
</tr>
</tbody>
</table>

**ITEM** | **QTY** | **DESCRIPTION**
--- | --- | ---
51 | 2 | Drive Bracket Assembly
52 | 2 | Spacer
*53 | 2 | Shoulder Bolt, 3/8” x 1-1/4”, SS
54 | 2 | Washer 5/16” x 3/4” OD SS
*55 | 2 | HHCS 5/16” NC x 2-1/2” SS
*57 | 2 | Nut, Nylok®, 5/16” NC, SS

---

**ITEM** | **QTY** | **DESCRIPTION**
--- | --- | ---
58 | 1 | Tie bar c/w Ball Joint
*59 | 1 | Nut, Nylok®, 1/2” NF, Ni plated brass
60 | 1 | Stringer Tube, SS
61 | 1 | Rod End Ball 1/2” SS
*66 | 2 | Nut, Nylok®, 5/16” NC, SS, Thin
*67 | 2 | FHCS, 5/16” NC x 3/4”, 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.

**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>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>HC5345-3</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. 29b).</td>
</tr>
<tr>
<td></td>
<td>2007 TO DATE</td>
<td>25–75 HP</td>
<td>HC5348-3</td>
<td>HO6001</td>
<td>HO6002</td>
<td>Requires Spacer Kit HO5090.</td>
</tr>
</tbody>
</table>

**ITEM** | **QTY** | **DESCRIPTION** |
-------|--------|-----------------|
51     | 2      | Drive Bracket Assembly  
52     | 2      | Spacer  
*53   | 2      | Shoulder Bolt, 3/8" x 1-1/4", SS  
54     | 2      | Washer 5/16" x 3/4" OD SS  
*55   | 2      | HHCS 5/16" NC x 2-1/2" SS  
*57   | 2      | Nut, Nylok®, 5/16" NC, SS  
58     | 1      | Tie bar c/w Ball Joint  
*59   | 1      | Nut, Nylok®, 1/2" NF, Ni plated brass  
60     | 1      | Stringer Tube, SS  
61     | 1      | Rod End Ball 1/2" SS  
*66   | 2      | Nut, Nylok®, 5/16" NC, SS, Thin  
*67   | 2      | FHSCS, 5/16" NC x 3/4", SS  

**WARNING**

See Fig. 29a

![Remove Screw and Stem Washer](image)

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

See Fig. 29a

* 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

<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>1986 TO 2004</td>
<td>75–300 HP (2 &amp; 4 Stroke)</td>
<td>HC5358-3</td>
<td>HO6001</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2004 TO DATE</td>
<td>3.3L 75–300 HP</td>
<td>HC5358-3</td>
<td>HO6002</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2006 TO DATE</td>
<td>4.2L 75–300 HP</td>
<td>HC5345-3</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></td>
</tr>
<tr>
<td>MERCURY/MARINER</td>
<td>2002-TO DATE</td>
<td>225 HP (4 Stroke)</td>
<td>HC5358-3</td>
<td>HO6001</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>HO6002</td>
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<td></td>
</tr>
</tbody>
</table>

Figure 30.

* Refer to page 44 for correct torque specifications.

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

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>58</td>
<td>1</td>
<td>Tie bar c/w Ball Joint</td>
</tr>
<tr>
<td>*59</td>
<td>1</td>
<td>Nut, Nylok® 1/2” NF, Ni plated brass</td>
</tr>
<tr>
<td>60</td>
<td>1</td>
<td>Stringer Tube, SS</td>
</tr>
<tr>
<td>61</td>
<td>1</td>
<td>Rod End Ball 1/2” SS</td>
</tr>
<tr>
<td>*66</td>
<td>2</td>
<td>Nut, Nylok®, 5/16” NC, SS, Thin</td>
</tr>
<tr>
<td>*67</td>
<td>2</td>
<td>FHSCS, 5/16” NC x 3/4”, SS</td>
</tr>
</tbody>
</table>

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 for HC5348-3 Cylinder Installation ONLY

<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</td>
<td>1977 TO 1990</td>
<td>65–300 HP</td>
<td>HC5348-3</td>
<td>HO6001</td>
<td></td>
</tr>
<tr>
<td>EVINRUDE</td>
<td></td>
<td></td>
<td></td>
<td>HO6002</td>
<td></td>
</tr>
</tbody>
</table>

**(Figure 31a)**

**WARNING**

**ITEM** | **QTY** | **DESCRIPTION**
--- | --- | ---
51 | 2 | Drive Bracket Assembly
52 | 2 | Spacer
*53 | 2 | Shoulder Bolt, 3/8” x 1-1/4”, SS
54 | 2 | Washer 5/16” x 3/4” OD SS
*55 | 2 | HHCS 5/16” NC x 2-1/2” SS
*57 | 2 | Nut, Nylok®, 5/16” NC, SS
58 | 1 | Tie bar c/w Ball Joint
*59 | 1 | Nut, Nylok® 1/2” NF, Ni plated brass

**ITEM** | **QTY** | **DESCRIPTION**
--- | --- | ---
60 | 1 | Stringer Tube, SS
61 | 1 | Rod End Ball 1/2” SS
*66 | 2 | Nut, Nylok®, 5/16” NC, SS, Thin
*67 | 2 | FHCS, 5/16” NC x 1”, SS

* 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>HC5348-3</td>
<td>HO6003</td>
<td>See Fig. 32d, Includes ETech</td>
</tr>
<tr>
<td></td>
<td>1991 TO DATE</td>
<td>40–250 HP</td>
<td>HC5345-3</td>
<td>HO6003</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1996 TO DATE</td>
<td>75–250 HP FIGHT</td>
<td>HC5345-3</td>
<td>HO6003</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1998 TO DATE</td>
<td>40–140 HP 4 Stroke</td>
<td>HC5358-3</td>
<td>HO6003</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2007 TO DATE</td>
<td>3.3L V6 200–250 HP</td>
<td>HC5345-3</td>
<td>HO6003</td>
<td></td>
</tr>
<tr>
<td>SUZUKI</td>
<td>1986 TO DATE</td>
<td>150–300 HP</td>
<td>HC5345-3</td>
<td>HO6003</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1998 TO DATE</td>
<td>60–70 HP</td>
<td>HC5345-3</td>
<td>HO6003</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1998 TO DATE</td>
<td>40–140 HP 4 Stroke</td>
<td>HC5358-3</td>
<td>HO6003</td>
<td></td>
</tr>
</tbody>
</table>

† Req. 2 x HO5090. See Fig. 32b & 32c
‡ Req. 2 x HO5090. See Fig. 32b & 32c

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>DESCRIPTION</th>
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<tr>
<td>51</td>
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<td>Drive Bracket Assembly</td>
</tr>
<tr>
<td>52</td>
<td>1</td>
<td>Spacer</td>
</tr>
<tr>
<td>53</td>
<td>1</td>
<td>Shoulder Bolt, 3/8” x 1-1/4”, SS</td>
</tr>
<tr>
<td>54</td>
<td>1</td>
<td>Washer 5/16” Flat 3/4”, SS</td>
</tr>
<tr>
<td>55</td>
<td>1</td>
<td>HHCS 5/16” NC x 2-1/2”, SS</td>
</tr>
<tr>
<td>56</td>
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</tr>
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<td>Nut, Nylok®, 5/16” NC, SS</td>
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<td>58</td>
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<td>Tie bar c/w Ball Joint (HO6003)</td>
</tr>
<tr>
<td>59</td>
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<td>Nut, Nylok® 1/2” NF, Ni plated brass</td>
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<tr>
<td>61</td>
<td>1</td>
<td>HHCS, 3/8” NF x 1-1/2”, SS</td>
</tr>
<tr>
<td>64</td>
<td>1</td>
<td>Rod End SS 1/2” NF</td>
</tr>
<tr>
<td>65</td>
<td>1</td>
<td>Nut, Nylok®, 3/8” NF, SS</td>
</tr>
<tr>
<td>66</td>
<td>1</td>
<td>Nut, Nylok®, 5/16” NC, SS, Thin</td>
</tr>
<tr>
<td>67</td>
<td>1</td>
<td>FHSCS, 5/16” NC x 3/4”, SS</td>
</tr>
<tr>
<td>72</td>
<td>1</td>
<td>Washer, 3/8” Dia., SS</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.
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 300 HP 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>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>MERCURY</td>
<td>1998-TO DATE</td>
<td>40, 50 &amp; 60 HP 2</td>
<td>HC5345-3</td>
<td>HO6003</td>
<td>H06002</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&amp; 4 Stroke</td>
<td></td>
<td></td>
<td>Requires Kit H05090</td>
</tr>
<tr>
<td></td>
<td>2001-TO DATE</td>
<td>150 HP 4 Stroke</td>
<td>HC5345-3</td>
<td>HO6003</td>
<td>HO6002</td>
</tr>
<tr>
<td></td>
<td>2010 TO DATE</td>
<td>115-150 HP</td>
<td>HC5345-3</td>
<td>HO6003</td>
<td>HO6002</td>
</tr>
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</table>

**ITEM QTY DESCRIPTION**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>DESCRIPTION</th>
</tr>
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<tbody>
<tr>
<td>51</td>
<td>1</td>
<td>Drive Bracket Assembly</td>
</tr>
<tr>
<td>52</td>
<td>1</td>
<td>Spacer</td>
</tr>
<tr>
<td>*53</td>
<td>1</td>
<td>Shoulder Bolt, 3/8&quot; x 1-1/4&quot;, SS</td>
</tr>
<tr>
<td>54</td>
<td>1</td>
<td>Washer 5/16&quot; Flat 3/4&quot;, SS</td>
</tr>
<tr>
<td>*55</td>
<td>1</td>
<td>HHCS 5/16&quot; NC x 2-1/2&quot;, SS</td>
</tr>
<tr>
<td>*56</td>
<td>1</td>
<td>Nut, Nylok®, 3/8&quot; NF, SS</td>
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<td>Nut, Nylok®, 5/16&quot; NC, SS</td>
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<tr>
<td>58</td>
<td>1</td>
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<tr>
<td>*59</td>
<td>1</td>
<td>Nut, Nylok® 1/2&quot; NF, Ni plated brass</td>
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**ITEM QTY DESCRIPTION**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>60</td>
<td>1</td>
<td>Stringer Tube</td>
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<tr>
<td>*61</td>
<td>1</td>
<td>HHCS, 3/8&quot; NF x 1-1/2&quot;, SS</td>
</tr>
<tr>
<td>64</td>
<td>1</td>
<td>Rod End SS 1/2&quot; NF</td>
</tr>
<tr>
<td>*65</td>
<td>1</td>
<td>Nut, Nylok®, 3/8&quot; NF, SS</td>
</tr>
<tr>
<td>*66</td>
<td>1</td>
<td>Nut, Nylok®, 5/16&quot; NC, SS, Thin</td>
</tr>
<tr>
<td>*67</td>
<td>1</td>
<td>FHSCS, 5/16&quot; NC x 3/4&quot;, SS</td>
</tr>
<tr>
<td>72</td>
<td>1</td>
<td>Washer, 3/8&quot; Dia., SS</td>
</tr>
<tr>
<td>*73</td>
<td>1</td>
<td>1/8&quot; SS Spacer</td>
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</table>

**WARNING**

- SUPPLIED WITH KIT H05090
- 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.

## 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>
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<tbody>
<tr>
<td>YAMAHA</td>
<td>1998 TO DATE</td>
<td>40–50 HP</td>
<td>HC5345-3</td>
<td>HO6003</td>
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<td>1998 TO DATE</td>
<td>60 HP</td>
<td>HC5345-3</td>
<td>HO6002</td>
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<tr>
<td></td>
<td>1998 TO DATE</td>
<td>70–90 HP</td>
<td>HC5345-3</td>
<td>HO6003</td>
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<tr>
<td></td>
<td>1998 TO DATE</td>
<td>80–100 HP</td>
<td>HC5345-3</td>
<td>HO6002</td>
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<tr>
<td></td>
<td>1998 TO DATE</td>
<td>115 HP 4 Stroke</td>
<td>HC5358-3</td>
<td>HO6003</td>
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<tr>
<td></td>
<td>2002 TO DATE</td>
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### ITEM QTY DESCRIPTION

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<thead>
<tr>
<th>ITEM</th>
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<tr>
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<td>Drive Bracket Assembly</td>
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<tr>
<td>52</td>
<td>1</td>
<td>Spacer</td>
</tr>
<tr>
<td>*53</td>
<td>1</td>
<td>Shoulder Bolt, 3/8&quot; x 1-1/4&quot;, SS</td>
</tr>
<tr>
<td>54</td>
<td>1</td>
<td>Washer 5/16&quot; Flat 3/4&quot;, SS</td>
</tr>
<tr>
<td>*55</td>
<td>1</td>
<td>HHCS 5/16&quot; NC x 2-1/2&quot;, SS</td>
</tr>
<tr>
<td>*56</td>
<td>1</td>
<td>Nut, Nylok®, 3/8&quot; NF, SS</td>
</tr>
<tr>
<td>*57</td>
<td>1</td>
<td>Nut, Nylok®, 5/16&quot; NC, SS</td>
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<tr>
<td>58</td>
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<td>Tie bar c/w Ball Joint (HO6003)</td>
</tr>
<tr>
<td>*59</td>
<td>1</td>
<td>Nut, Nylok® 1/2&quot; NF, Ni plated brass</td>
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### ITEM QTY DESCRIPTION

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>60</td>
<td>1</td>
<td>Stringer Tube</td>
</tr>
<tr>
<td>*61</td>
<td>1</td>
<td>HHCS, 3/8&quot; NF x 1-1/2&quot;, SS</td>
</tr>
<tr>
<td>64</td>
<td>1</td>
<td>Rod End SS 1/2&quot; NF</td>
</tr>
<tr>
<td>*65</td>
<td>1</td>
<td>Nut, Nylok®, 3/8&quot; NF, SS</td>
</tr>
<tr>
<td>*66</td>
<td>1</td>
<td>Nut, Nylok®, 5/16&quot; NC, SS, Thin</td>
</tr>
<tr>
<td>*67</td>
<td>1</td>
<td>FH5CS, 5/16&quot; NC x 3/4&quot;, SS</td>
</tr>
<tr>
<td>72</td>
<td>1</td>
<td>Washer, 3/8&quot; Dia., SS</td>
</tr>
<tr>
<td>‡73</td>
<td>1</td>
<td>1/8&quot; SS Spacer</td>
</tr>
<tr>
<td>‡74</td>
<td>1</td>
<td>Spacer (For use with 90HP only)</td>
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</tbody>
</table>

Figure 34.

* Refer to page 44 for correct torque specifications.
For **HC5347-3** Cylinder Installation **ONLY**

<table>
<thead>
<tr>
<th>ENGINE MANUFACTURER</th>
<th>YEAR</th>
<th>MODEL</th>
<th>CYLINDER</th>
<th>SINGLE ENGINE ADAPTER PLATES</th>
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<tbody>
<tr>
<td><strong>HONDA</strong></td>
<td>1998 TO 2010</td>
<td>115-130 HP</td>
<td>HC5347-3</td>
<td>NOT REQ. HO5063</td>
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</tbody>
</table>

**NOTES**
- *55 4 Screw M10 x 1.25 x 62 mm HHCS*
- *56 2 Screw 3/8" NF x 2-1/4" HHCS, SS*
- 57 1 Stringer Tube

**WARNING**
- If interference occurs between hose elbow or tee fitting, SeaStar Solutions recommends:
  1. Remove the fitting from the cylinder body.
  2. Clean threads of fitting and re-apply Loctite® with PST. Thread the fitting back into the port and refer to page 44 for correct torque specifications. Adjust fitting to desired angle.
- If interference re-occurs please contact SeaStar Solutions (ref. rear cover for contact info.).

*Refer to page 44 for correct torque specifications.*

**WARNING**
- If interference occurs, SeaStar Solutions recommends:
  1. Remove the fitting from the cylinder body.
  2. Clean threads of fitting and re-apply Loctite® with PST. Thread the fitting back into the port and refer to page 44 for correct torque specifications. Adjust fitting to desired angle.

**NOTICE**
- Port Installation Only

**WARNING**
- The top corners of the Tab Washer (item 54) must be folded against the flats of the Hex Bolt after bolts are tightened.

**WARNING**
- 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".

**NOTICE**
- 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.**

---

<table>
<thead>
<tr>
<th>ITEM</th>
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<th>DESCRIPTION</th>
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<td>2</td>
<td>Nut 3/8&quot; NF Nylok®</td>
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<td>53</td>
<td>4</td>
<td>Washer 3/8&quot; dia.</td>
</tr>
<tr>
<td>54</td>
<td>4</td>
<td>Locking Tab Washer</td>
</tr>
<tr>
<td>*55</td>
<td>4</td>
<td>Screw M10 x 1.25 x 62 mm HHCS</td>
</tr>
<tr>
<td>*56</td>
<td>2</td>
<td>Screw 3/8&quot; NF x 2-1/4&quot; HHCS, SS</td>
</tr>
<tr>
<td>57</td>
<td>1</td>
<td>Stringer Tube</td>
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<th>DESCRIPTION</th>
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<td>58</td>
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<td>Threaded Rod c/w Ball Joint</td>
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<tr>
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<td>1</td>
<td>Nut 1/2&quot; NF Nylok®</td>
</tr>
<tr>
<td>61</td>
<td>2</td>
<td>Ball Joint</td>
</tr>
<tr>
<td>62</td>
<td>2</td>
<td>Spacer</td>
</tr>
</tbody>
</table>

---

**Figure 35.**

- **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**
  - The top corners of the Tab Washer (item 54) must be folded against the flats of the Hex Bolt after bolts are tightened.

---

**Notice**
- Port Installation Only
FILLING AND PURGING THE SYSTEM

Read First

These instructions show how to fill and purge a Single Station Front Mount Cylinder System. 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.

If using a Liquid Tie bar Valve, part # HA5471-2, please refer to the bleeding instructions included with the liquid tie bar valve.

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 STEERING
FILLING AND PURGING

Hydraulic Fluid

Due to recent upgrades in our steering system components, SeaStar Solutions recommends use of SeaStar Steering Fluid ONLY in our hydraulic steering systems. SeaStar Steering Systems have been engineered and validated using our proprietary SeaStar Hydraulic Steering Fluid. SeaStar Steering fluid is engineered with special additive package that contains anti-foaming and anti-rusting agents, anti-oxidants, viscosity stabilizers, corrosion inhibitors, wear additives as well as water emulsification additives. It is highly recommend that SeaStar Steering Fluid be used to ensure optimum system performance and safety.

Use of any non-approved fluid may result in the following:
- higher steering effort, particularly at ambient or lower temperatures and/or over time due to oil degradation and breakdown
- increased steering slip and/or drift resulting in lost motion
- foaming or air entrapment causing a bumpy feel during steering
- high rates of moisture absorption causing internal component corrosion
- scratched steering cylinder bores and shafts due to contamination or elevated wear rates
- seal degradation – incompatibility with various proprietary seal compounds used in our products.

In an emergency, SeaStar EPS Fluid, any MD-3/4 rated ATF or MIL-PRF-5606H equivalent fluid that is filtered through a fine mesh screen can be used. The system MUST be thoroughly flushed as soon as possible with genuine SeaStar Steering Fluid after using an emergency fluid.

In an EXTREME emergency, any non-toxic, non-flammable fluid that is filtered through a fine mesh screen may provide temporary steering.

Use of non-standard fluids will require an immediate and complete system flush using approved fluids, by an approved steering technician.

WARNING
NEVER FILL OR MIX BRAKE FLUIDS, TRIGYCERIDES OR POLYALKYLENE GLYCOLS WITHIN A HYDRAULIC STEERING SYSTEM.

NOTICE
SeaStar Hydraulic Steering Fluid can be used in Hynautic, BayStar and BayStar Plus steering systems.

NOTICE
Help protect your boating environment by ensuring that all used oil is disposed of properly.

Fill Plugs for SeaStar Helms

VENT PLUG - Part No. HP6126
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.

NON-VENT PLUG - Part No. HP6000
• 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 37.
Single Station One Cylinder

Step 1

- 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 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

- Holding 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 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.

Number of Steering Wheel Turns

When steering system has been properly bled, steering wheel turns from hard over to hard over will be as shown in the chart.

<table>
<thead>
<tr>
<th>Helm Displacement</th>
<th>Single Cylinder</th>
<th>Twin Cylinder with Mechanical Tiebar</th>
<th>Twin Cylinder with Liquid Tiebar</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.4</td>
<td>5.90</td>
<td>11.8</td>
<td>5.90</td>
</tr>
<tr>
<td>1.7</td>
<td>4.90</td>
<td>9.76</td>
<td>4.90</td>
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<td>2.0</td>
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<td>2.4</td>
<td>3.45</td>
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</tr>
<tr>
<td>3.0</td>
<td>2.76</td>
<td>5.50</td>
<td>2.76</td>
</tr>
</tbody>
</table>
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.

---

**Single Station Twin 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.

---

**Twin 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.

- 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” from the bottom of the filler hole.

**NOTICE** If the helm is overfilled fluid **WILL** leak out of the vent cap.

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

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)

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.

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 38. 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.

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

Figure 38.
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 air flow 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 utilizing bleeder fittings fitted on the steering cylinder.  
• 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.

- Engine rigging tube is restricting engine movement.
- 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.

- Consult with Engine Installation Manual for proper rigging tube installations.
- 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.

NOTICE
See page 47 for Technical Support and Authorized Service Centers information.
**TECHNICAL INFORMATION**

### 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>5/32&quot;</td>
<td>2.0 (.226)</td>
<td>1.6 (.181)</td>
</tr>
<tr>
<td>3/32&quot;</td>
<td>2.5 (.282)</td>
<td>2.1 (.233)</td>
</tr>
<tr>
<td>7/32&quot;</td>
<td>3.2 (.356)</td>
<td>2.8 (.309)</td>
</tr>
<tr>
<td>1/8&quot;</td>
<td>3.9 (.438)</td>
<td>3.5 (.380)</td>
</tr>
<tr>
<td>5/32&quot;</td>
<td>5.2 (.587)</td>
<td>4.8 (.541)</td>
</tr>
<tr>
<td>3/16&quot;</td>
<td>6.6 (.750)</td>
<td>6.2 (.682)</td>
</tr>
<tr>
<td>7/32&quot;</td>
<td>7.7 (.869)</td>
<td>7.3 (.831)</td>
</tr>
<tr>
<td>1/4&quot;</td>
<td>9.4 (1.06)</td>
<td>9.0 (.993)</td>
</tr>
</tbody>
</table>

Bolt Size 18-8SS Brass

<table>
<thead>
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<th>Bolt Size</th>
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<td>2.8 (.309)</td>
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<tr>
<td>1/8&quot;</td>
<td>3.9 (.438)</td>
<td>3.5 (.380)</td>
</tr>
<tr>
<td>5/32&quot;</td>
<td>4.4 (.497)</td>
<td>4.0 (.440)</td>
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<tr>
<td>3/16&quot;</td>
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<td>6.2 (.682)</td>
</tr>
<tr>
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<td>7.7 (.869)</td>
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</tr>
<tr>
<td>1/4&quot;</td>
<td>9.4 (1.06)</td>
<td>9.0 (.993)</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.

### Cylinder

**Inside Diameter**

1.375" (34.93 mm)

**Volume**

8.34 cu. in. (136.6 cc)

**Stroke**

8" (203 mm)

**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.

### SeaStar and SeaStar Pro Hose

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

**SEASTAR, FRONT MOUNT PIVOT CYLINDERS**

Part # HC5345-3, HC5347-3, HC5348-3, HC5358-3, HC5375-3, HC5445-3, HC6750, HC6751 and HC6345-3

**Specifications**

OUTBOARD USE ONLY

**Volume:** 8.3 cu.in.

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**Figure 39.**

<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>HP6014</td>
<td>Support Bracket Kit <em>(Brackets, Rod and Hardware)</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pro Support Bracket Kit <em>(Brackets and Hardware only)</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pro Support Rod Kit <em>(Rod and Hardware only)</em></td>
</tr>
<tr>
<td>4</td>
<td>HF6004</td>
<td>Hose Elbow Fittings</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PART #</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>HA5829</td>
<td>Tiller Bushing Kit, c/w high strength tiller bolt</td>
</tr>
<tr>
<td>6</td>
<td>N/A</td>
<td>Pivot Mount Plate <em>(If damaged cylinder is to be replaced)</em></td>
</tr>
<tr>
<td>7</td>
<td>HP6033</td>
<td>Spacer/Adjusting Nut Kit</td>
</tr>
<tr>
<td>8</td>
<td>HF6005</td>
<td>Hose Tee Fitting <em>(Not shown)</em></td>
</tr>
<tr>
<td>9</td>
<td>HA5477</td>
<td>Grounding Strap <em>(Not shown)</em></td>
</tr>
</tbody>
</table>

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Outboard Powered Vessels
SeaStar Power Purge JR.
Part# HA5445-2

SeaStar®/BayStar™ Power Purge Jr. is the quickest way to bleed a SeaStar®/BayStar™ system in the field and assure a rock-solid steering feel every time!

Figure 40.

Advantages:
- Steering feel is solid every time
- Complete Fill & Purge in 10 minutes or less
- Fast and efficient
- Easy to operate
- Screens contaminants from oil
- Quick connect fittings
- Convenient portable size
- Convenient electrical hook-up utilizing 12 volt boat battery
- Optional Dual Cylinder Purging Kit HA5461 available
- Optional 50' Hose Extension Kit HA5462, for longer runs
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:

<table>
<thead>
<tr>
<th>From U.S.A.</th>
<th>From Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td>RGA # ?</td>
<td>RGA # ?</td>
</tr>
<tr>
<td>SeaStar Solutions</td>
<td>SeaStar Solutions</td>
</tr>
<tr>
<td>c/o UPS-SCS</td>
<td>3831 No. 6 Road</td>
</tr>
<tr>
<td>19308 70th Ave S.</td>
<td>Richmond, B.C.</td>
</tr>
<tr>
<td>Kent, WA 98032</td>
<td>Canada V6V 1P6</td>
</tr>
</tbody>
</table>

Technical Support

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

Authorized Service Centers & Distributors

For a current listing of all our authorized service centers and distributors please visit our website: www.seastarsolutions.com