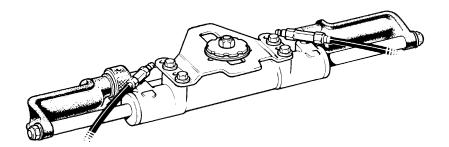


INSTALLATION INSTRUCTIONS

AND OWNER'S MANUAL

www.seastarsolutions.com





Hydraulic Steering for Outboard Powered Vessels

Standard Front Mount Cylinder HC5342, HC5343 and HC5344



Before you do it your way, please try it our way

ONE ISO 9001

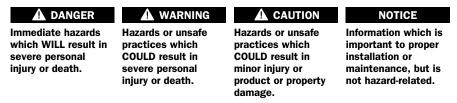
BAYSTAR[®] CAPILANO[®] SEASTAR[®]

To the Installer and End User (Owner)

Throughout this publication, Warnings and Cautions (accompanied by the International Hazard Symbol $(\underline{1})$) are used to alert the manufacturer or installer to special instructions concerning a particular service or operation that may be hazardous if performed incorrectly or carelessly.

Observe Them Carefully!

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



WARNING

Cleaning fluids containing ammonia, acids or any other corrosive ingredients <u>MUST NOT</u> be used for cleaning any part of this Hydraulic Steering System. Failure to comply will cause serious damage to the steering system, resulting in possible loss of steering, causing property damage, personal injury and/or death.

SAFETY INFORMATION

	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 dependent 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, fluid 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.
	3. Comply with all system ratings/regulations (boat/engine, U.S.C.G.).
	- 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 <u>independent</u> 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.
	 DO NOT use a wire ctype 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 System Check as outlined on page 26 of this manual.

A WARNING	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	 Check Fluid level in highest helm pump (see page 21 for proper fluid level setting). Verify immediate steering response when turning steering wheel(s). (Ensure engine turns when steering wheel is turned.) Visually inspect all steering hoses and fittings for wear, kinking and/or leaks. Check for binding, loose, worn or leaking steering components.
	DO NOT OPERATE BOAT IF ANY COMPONENT IS NOT IN PROPER WORKING CONDITION.
During use	 WEAR A COAST GUARD-APPROVED PERSONAL FLOTATION DEVICE (PFD). ATTACH ENGINE SHUT-OFF CORD (LANYARD) TO YOUR PFD. Never allow anyone not familiar with the operation of the steering system operate the boat at any time. Know and adhere to the operator restrictions for your area including; Federal Laws/Regulations, State Laws/Regulations and Municipal Laws/Regulations. DO NOT OPERATE BOAT IF ANY COMPONENT IS NOT IN PROPER WORKING CONDITION.
After use	 Rinse off steering system thoroughly using 'fresh, clean water only'. Cleaning fluids containing ammonia, acids or any other corrosive ingredients <u>MUST NOT</u> be used for cleaning any part of the hydraulic steering system.
Maintenance	 Maintain steering system at a minimum of twice per year. See Maintenance, on page 27 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.

NOTICEDue to a small amount of internal fluid 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 hydraulic steering eliminates the "need" for a steering
wheel mounted trim switch.Image: Marking the system with the steering wheel cannot be maintained with a hydraulic steering
wheel mounted trim switch.Image: Marking the system with the steering wheel cannot be maintained with a hydraulic steering
wheel mounted trim switch with a hydraulic steering
system. Wire coil can wind up tight around the steering wheel
shaft and prevent further steering!

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BEFORE OPERATING YOUR BOAT

Ensure that the following check list is carried out.

1. With the Autopilot pump turned OFF (ignition OFF) perform a system pressure test by turning the wheel all the way to hard over and then forcing the wheel another one quarter to one half turn past the stop point.

Inspect the following areas:

- Inspect helm fittings
- Inspect Power Assist/Autopilot interface (if installed) and Autopilot pump fittings
- Inspect cylinder and cylinder bleed fittings
- Inspect hoses

Look for evidence of a leak. This test is to be completed in BOTH directions. ANY leak that is noticed MUST be corrected prior to operation of the boat.

- 2. Confirm that extruded nylon tubing has NOT been substituted for SeaStar/SeaStar PRO Hydraulic Steering Hoses.
- **3.** Confirm that there is no interference between the steering cylinder and the transom, splashwell or jack plate or any combination of these parts by performing these simple steps:
 - If installed on an outboard engine, with the engine fully tilted, turn steering from hard over to hard over and confirm that NO interference occurs. If you are using a hydraulic jack plate this step must also be performed at the top and bottom position of the jack plate. If interference is present, it MUST be eliminated with trim limiting switches and/or jack plate restrictors. Contact jack plate manufacturer for advice if required.
 - Confirm that the steering cylinder can be stroked fully in both directions as well as full tilt and trim without stretching and/or kinking the hydraulic hoses.
 - Confirm that the hydraulic hoses are not subjected to chafing or rubbing.

Failure to comply with the above may result in loss of steering causing property damage and/or personal injury or death.

SEASTAR

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Things	You	Need	То	Know	
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	SeaStar/SeaStar PRO Steering hoses CANNOT be cut. Cutting these hoses will render them useless. Failing to comply may result in possible loss of steering causing property damage, personal injury and/or death.
A CAUTION	DO NOT use SeaStar nylon tubing with the Autopilot pump, other than for the compensating line. Use of SeaStar/ SeaStar PRO steering hose is the ONLY hose recommended for use in these systems.
A WARNING	Stretched, kinked or chafed hose will fail over a period of time. Check hoses frequently to avoid potential loss of steering causing property damage and/or personal injury or death.
	Take EXTREME care not to allow any foreign material or contaminant to enter the hydraulic steering system. Contamination is the main cause of hydraulic system wear and/or failure. Keep protective caps on hose ends until ready to thread onto a fitting.
A CAUTION	Confirm that ALL components needed to complete the installation are purchased, including helm pump, steering cylinder, hoses, fluid, fittings and pipe sealant such as Loctite [®] PST. NEVER USE TEFLON TAPE, ONLY USE A LIQUID, TEFLON BASED PIPE SEALANT.
NOTICE	If retrofitting onto an existing SPA installation a HA1205 retrofit kit will be required.
A WARNING	When working in an area where fumes from fuel are present, allow the fumes to disperse completely BEFORE doing any electrical connections of any kind. Failure to do so may result in an explosion or fire.

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

Minimum Splashwell Dimensions	# OF ENGINES 1 2	A 26" (660mm) 52" (1320mm)	B 9" (230mm) 9" (230mm)	C 5.5" (140mm) 6.5" (165mm)	MIN. ENGINE CENTER DISTANCE N/A 26" (660mm)
	to external b) Maximum for twin en (914mm) u Dimension	al restrictions also a motor mount bracke engine center distan gine applications is 3 sing the standard ti 'A' would have to b proportional to the th.	ce 36" bar.	B	

Front Mount Cylinder(s) (part # HC5342)

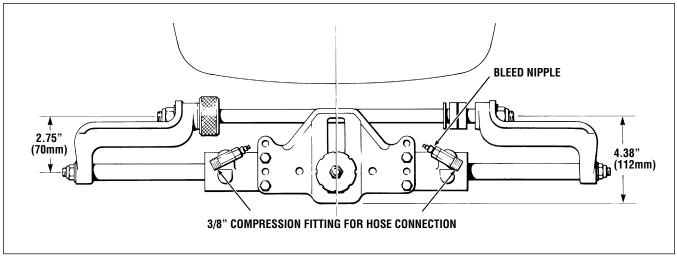


Figure 1.

Horse Power Limitations	Single Cylinder, Single Engine	300 HP
	Single Cylinder, Twin Engine	
	Non Counter Rotating	
	Front Mount	450 HP
	Counter Rotating	600 HP
	Twin Cylinders, Twin Engine	600 HP

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Tools

You will need the following tools to complete your installation.

- •3" (77 mm) diameter Hole Saw or Key Hole Saw and a
- •5/16" (8 mm) dia. Drill.
- •7/16", 9/16", 5/8" and 3/4" Open End type Wrench/Spanner.
- •15/16" Socket for SeaStar Helms.

Additional tools needed

20° Mount Wedge

- Key Hole or Sabre Saw
- •5/16" (8 mm) dia. Drill
- •1/2" Wrench/Spanner, Box or Open End type
- •7/16" Socket and Drive

Cylinder, Front Mount Type

- •3/4" Wrench/Spanner, Box or Open End type, 2 required.
- •3/32", 3/16" and 7/32" Allen Key/Wrench

CAUTION 4N

Lightly lubricate threaded fasteners before installing. This will prevent them from seizing.

Lubricate support rod and all moving parts with a quality marine grease such as OMC Triple Guard, Quicksilver Anti-corrosion, Yamaha Marine Grease or Equivalent.

DO NOT remove protective caps from fittings and fitting ports until hose or tube connections are made. Contaminants in the steering system may cause premature wear and steering malfunctions.

SYSTEM OVERVIEW

HELM 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.
CYLINDER	 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 13 of this manual. Install steering hoses as outlined on page 19 of this manual.
	This cylinder uses NPT fittings. Do not attempt to use replacement ORB fittings. Irreparable damage to cylinder <u>WILL</u> occur.
STEP 2	 Filling and Purging Procedure Refer to fill and purge procedures as outlined on page 21 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	 Fluid Level and System Check Refer to page 26 of this manual for setting fluid level in helm pump and performing the "system pressure test" to ensure steering system is ready for use.
	Fluid 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 27 of this manual to become familiar with the routine maintenance that MUST be carried out in the intervals noted.

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MOUNTING THE HELM

Mount the SeaStar/SeaStar Pro helm to the dash board as required

	for your model-application using the appropriate mounting template. The helm may be mounted with the helm shaft horizontal, vertical or any angle in between. The filler plug must always be in the uppermost position.
A CAUTION	If more than one steering station is installed, the fill-vent plug on all but the uppermost helm must be replaced with a non-vent plug which is included in a dual station fitting kit as shown on page 19. Determine desired mounting position. Ensure that the steering wheel will not interfere with other functional equipment. Check for adequate space behind dash for fitting and line connections.
	If a 20° mounting wedge is used, cut out dash as per mounting wedge template and mount helm directly to the 20° wedge.
	Use self-locking fasteners provided only; substituting non-self locking fasteners can result in loosening or separation of equipment and loss of steering control.
NOTICE	Do not exceed 110 in./lbs. (12 Nm) torque on helm and wedge nuts and bolts.
Tilt helm mounting instructions supplied separately with tilt helm.	 NPT fitting installations only. Apply a liquid, Teflon based pipe sealant onto the threads going into a helm pump and/or steering cylinder. Tighten fitting "hand-tight". Using a wrench tighten an additional 1–1/2 turns. Continue to tighten until desired orientation is met.
	Figure 2. SAE -5 ORB WITH 0-RING
A CAUTION	DO NOT attempt to install NPT pipe fittings into a cylinder and/or helm pump fitted with an ORB hose fitting port. Doing so will lead to irreparable damage to the cylinder and/or helm port. ONLY use ORB hose fittings provided by SeaStar Solutions.
NOTICE	Ports marked R are for the connection of additional helm and auto pilot compensating lines. Straight connectors may be substituted.
	Use a pipe sealant such as Loctite [®] P.S.T. or equivalent on all pipe threads. Do not use "tape" sealers.
	Mount helm to dashboard or console and lightly grease taper of helm shaft.
	Mount steering wheel to helm.
	Tighten steering wheel shaft nut before filling and purging the steering system. Tighten nut to 150 in./lbs. (17 Nm). Do not exceed 200 in./lbs. (22 Nm).

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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.

	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.
	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 4 on page 12 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.
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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 68 for NPT Hose fitting installation/realignment.
- 3. Hoses should be secured to the control cable harness if they enter the splashwell through the boot.

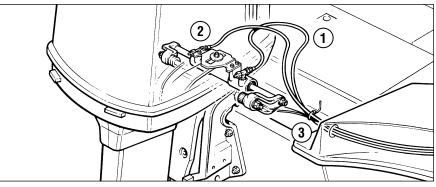


Figure 3.

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.

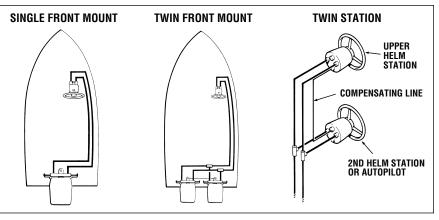


Figure 4.

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.

CYLINDER MOUNTING

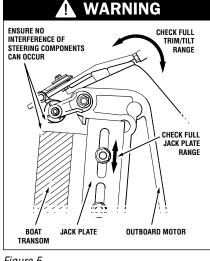


Figure 5.

Jackplate Warning

Operational interference of the steering cylinder/cylinder fittings and jackplates/transom/splashwell can occur under certain conditions. Check installation thoroughly throughout the full range of Motor Tilt, Jack Height and Trim before making final installation.

If interference does occur, contact:

SeaStar Solutions for additional information/options.

Telephone: (604) 270-6899 or (941) 488-6744

If interference is not eliminated total steering loss can occur, causing property damage and/or personal injury.

Front Mount Cylinder (Part# HC5342)

On page 31 to page 65 of this instruction booklet you will find the assembly drawing for your specific application.

NOTICE	Before beginning installation, verify that all mounting hardware is included and that the tiller arm bolt hole and tilt tube are clean and free of rust and or burrs. Grease all assemblies with quality marine grease prior to assembly.
	Only your specific application drawing will illustrate the correct placement and orientation of the support rod spacers.
Single Engines	Study your application drawing carefully. Items 1 through 20 are required for all applications. Slide the well greased support rod (item 12) into the thoroughly cleaned and rust free engine tilt tube.
	Grease item no.'s 1, 5, 6, 7 and 8 and assemble item no.'s 1 through 10 (except item 2), as illustrated on your application drawing.
NOTICE	Do not tighten the flat head socket cap screw (item 10) until the slider plate assembly is complete. This screw may have to be moved up and down during assembly of slider plate.
	Once the assembly is complete, continue as follows:
	Tighten flat head socket cap screw (item 10).
	Do not pinch slide washers (item 5) on slide bushing (item 7). Slide bushing must fit properly inside the holes of slide washers.
	Tighten the threaded notched washer (item 4) with a punch or screw driver.
	Do not create any burrs on the threaded notched washer while tightening with screw driver or punch.
	Tighten the 3/8" Nylok [®] nut (item 3) firmly against the threaded notched washer. Make certain that item 4 and 10 do not loosen while tightening the Nylok [®] nut.
	Connect the slider plate assembly to the cylinder (item 11) with the 4 hex head cap screws (item 2).

FRONT MOUNT TYPE

	Refer to your installation drawing for selecting the correct orientation and mounting holes on the slider plate.
	Mount the spacers and adjusting ring nut (items 13, 14 and 16) to the support rod (item 12).
	Refer to your installation drawing for the correct placements of spacers on both sides of engine tilt tube.
NOTICE	<i>Coat the support bracket (item 15) holes with a quality marine grease prior to assembly.</i>
	Attach and connect support brackets (item 15) to the support rod (item 12) and the cylinder rod, using the washers, nuts and bolts (items 17, 18, 19 and 20), as illustrated on your application drawing.
WARNING Do not substitute self locking type fasteners with non-locking	Eliminate support rod free play by turning the adjusting ring nut (item 16) counter clockwise. Do not use a wrench of any type on the adjusting ring nut. Turn by hand only. Lock the ring in place by securely tightening the set screw.
type fasteners, or loss of steering may occur.	Check the cylinder assembly for smooth operation, making certain that no binding or interference is present. For cylinders not yet connected to hydraulic hoses, etc., check cylinder assembly by moving engine from engine stop to engine stop. For cylinders already connected to hydraulic hoses, etc., check cylinder assembly by turning steering wheel from stop to stop.
WARNING	Tilt engine(s) fully up and down to ensure that no parts of the cylinder assembly contact any part of the splashwell surface or engine-transom mounting bolts. If the cylinder does contact the engine mounting bolts, try turning the engine mounting bolts around by placing mounting bolt inside the transom. If interference still occurs DO NOT OPERATE VESSEL and contact your local marine repair facility or SeaStar Solutions for the correct installation procedures. Failure to rectify or correct interference may result in cylinder, splashwell and or engine damage resulting in personal injury or property damage. FAILING TO CHECK FOR INTERFERENCE MAY RESULT IN CYLINDER, SPLASHWELL AND/OR ENGINE DAMAGE.
	Do not connect hose to bleed nipple end of the cylinder Tee fitting, unless bleed nipple is reinstalled on other side of the Tee fitting. Complete removal of bleed nipple will result in steering loss.
A CAUTION	With non feed back steering systems such as SeaStar, incorrect torque/trim tab setting can still have an adverse effect on the overall performance of your boat. It is highly recommended that the tab(s) be set to the optimum setting, ie: minimum torque at top speed. On high performance boats, where this tab has been removed or is out of the water, a skeg type torque eliminater may be required if high torque is causing a steering/performance type problem at top speed.

CYLINDER MOUNTING

TWIN ENGINES

Front Mount Cylinder Twin Engines	The step-by-step instructions for twin engines are the same as those for single engines, with the exception of the additional Tie Bar Kit parts.
One or two cylinder applications	The countersunk washer, item 9, is not used for twin engine applications.
applications	Study your specific application drawing carefully. Item No.'s 1 through 22 (except items 8 & 9), and item No.'s 51 through 62, are required for all applications. When installing twin cylinders you will end up with spares of items 8 and 9.
	For twin engine, single cylinder applications the cylinder may be mounted on either the starboard or port engine.
	Slide the well greased support rod (item 12) into the thoroughly cleaned and rust free engine tilt tube.
	Assemble item No.'s 1 through 10, item No.'s 51 through 55, and item 62, to the tiller arm.
	Start the slider plate assembly by mounting the extension plate (item 55) to the underside of the tiller arm, using the flat head socket cap screw (item 63). Do not tighten the flat head socket cap screw at this time since this screw may have to be moved up and down during assembly of the slider plate. Next, mount the clamp (item 51), over the tiller arm and into the extension plate (item 55), as illustrated on drawing.
	Grease item no.'s 1, 5, 6, 7, and 8 before assembling.
	Stack item no.'s 8, 7, 5, 6, 1, 5, 4, and 3 on top of the tiller arm and secure to the flat head socket cap screw (item 10).
	Secure the slider plate assembly to the tiller arm as follows:
	Tighten flat head socket cap screw (item 10).
	Be absolutely certain that the bottom tiller arm surface contacts the extension plate slot surface squarely. Extension plate must not be slanted or cocked.
	Tighten the threaded notched washer (item 4) using a punch or screw driver.
	While tightening item 4, make certain that item 8 is fitted and seated squarely into the extension plate counter bore. Do not allow the bottom washer (item 52) to jam in the counter bore at an angle.
	Do not create any burrs on the threaded notched washer while tightening.
	Tighten the 3/8" Nylok [®] nut (item 3) firmly against the threaded notched washer (item 4).
	Tighten the clamp (item 51) to the extension plate with $1/4$ " Nylok® nuts (item 62).

TWIN ENGINES

A CAUTION	The extension plate (item 55) must fit properly onto the tiller arm. If the extension plate is slightly cocked or slanted (sideways) steering will be hard and damage to cylinder parts may occur. Connect the slider plate assembly to the cylinder (item 11) with the 4 hex. head screws (item 2).
	Refer to your installation drawing for selecting the correct mounting holes on the slider plate. Mount the spacers and adjusting ring nut (items 13, 14 and 16) to
	the support rod (item 12). Refer to your installation drawing for the correct placement of spacers on both sides of engine tilt tube.
NOTICE	Coat the support bracket holes with a quality marine grease prior to assembly. Attach and connect support brackets (item 15) to the support rod (item 12) and the cylinder rod, using the washers, nuts, and bolts (items 17, 18, 19 and 20), as illustrated on your application drawing.
	Do not substitute self locking type fasteners with non-locking type fasteners, or total loss of steering may occur. Eliminate support rod free play by turning the adjusting ring nut (item 16) counter clockwise. Do not use a wrench of any type on the adjusting ring nut. Turn by hand only. Lock the ring nut in place by securely tightening the set screw. Connect the tie bar (items 56, 57, 58, 59, 60 and 61) to extension plates as illustrated on drawings. Refer to page 17 for instructions on how to shorten tie bar. Check the cylinder assembly for smooth operation, making certain that no binding or interference is present. For cylinders not yet connected to hydraulic hoses, check cylinder assembly by moving engine from engine stop to engine stop. For cylinders already connected to hydraulic hoses, check cylinder assembly by turning steering wheel from stop to stop.
	Tilt engine(s) fully up and down to ensure that no parts of the cylinder assembly contacts any part of the splashwell surfaces or engine-transom mounting bolts. If the cylinder does contact the engine mounting bolts, try turning the engine mounting bolts around by placing mounting bolt inside the transom. If interference still occurs DO NOT OPERATE VESSEL and contact your local marine repair facility or SeaStar Solutions for the correct installation procedure's. Failure to rectify or correct interference may result in cylinder, splashwell and or engine damage resulting in personal injury or property damage. FAILING TO CHECK FOR INTERFERENCE MAY RESULT IN CYLINDER AND/OR SPLASHWELL, AND /OR ENGINE DAMAGE.

TIE BAR

Tie Bar Instructions

Cut the tie bar and tie bar tube to length using the following formula. X = CD - 1" (25 mm) Y = CD - 4" (101 mm)

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

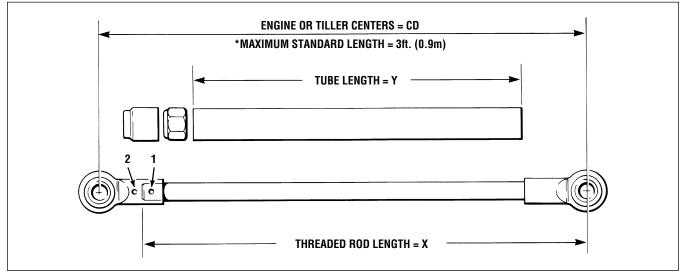


Figure 6.

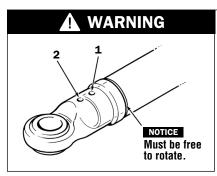


Figure 7.

Twin Engine, Tie Bar Systems

At the time of installation and any time thereafter, the threaded rod must always fully cover inspection hole 1, but never inspection hole No. 2. Failing to observe this warning may result in one engine becoming separated from the steering system and result in property damage and/or personal injury. This page left intentionally blank.

HOSE CONNECTION

WARNING

Do not connect hose to bleed nipple end of the cylinder Tee fitting, unless bleed nipple is reinstalled on other side of the Tee fitting. Complete removal of bleed nipple will result in steering loss. Refer to illustrations below for the correct connection of hoses from helm pump to cylinder.

CAUTION Start hose nut by hand. After a few turns, firmly tighten the hose fitting nut with a 3/4" wrench. Do not over tighten. Maximum 15 ft-lbs while supporting the fitting body with another wrench while tightening.

Move engine from engine stop to engine stop with engine(s) in the normal and tilt position to confirm that no binding or hang up of hoses occurs after the system is filled with fluid.

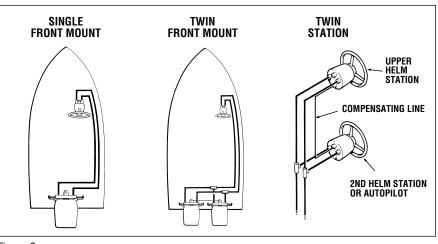


Figure 8.

Hydraulic Fluid

WARNING

Any non-approved fluid may cause serious damage to the steering system resulting in possible loss of steering, causing property damage, personal injury and/or death. Due to recent upgrades in our steering system components, SeaStar Solutions recommends use of SeaStar Steering Fluid **ONLY** in our hydraulic steering systems. <u>SeaStar Steering Systems have been</u> engineered and validated using our proprietary SeaStar Hydraulic <u>Steering Fluid</u>. SeaStar Steering fluid is engineered with a 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 recommended 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 fluid 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.

	NEVER FILL OR MIX BRAKE FLUIDS, TRIGYCERIDES OR POLYALKYLENE GLYCOLS WITHIN A HYDRAULIC STEERING SYSTEM.				
NOTICE	SeaStar Hydraulic Steering Fluid and BayStar Plus steering system	l can be used in Hynautic, BayStar ns.			
NOTICE	Help protect your boating environment by ensuring that all used fluid is disposed of properly.				
Fill Plugs for SeaStar Helms	VENT PLUG - Part No. HA5431	NON-VENT PLUG - Part No. HA5432			

MUST BE USED ON UPPERMOST HELM PUMP ON MULTI STEERING STATION SYSTEMS.

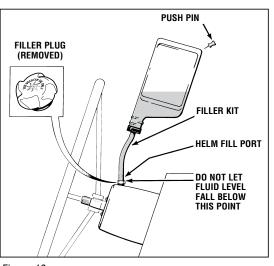
Figure 9.

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

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 read instructions on page 25 first and then proceed with instructions on page 22.				
	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, fluid must be visible in the filler tube. Do not allow the fluid level to disappear into the helm pump, as this may introduce air into the system and increase your filling time.				
Hydraulic Fluid Requirements	2 bottles (2 quarts or litres) for single station and single cylinder systems.				
•	1 additional bottle for each additional helm, cylinder, or autopilot.				
NOTICE	These instructions will result in hydraulic fluid flushed in and out of the system. Fluid can be re-used if filtered through a fine mesh screen such as used for gasoline. If unable to filter fluid, an additional bottle of fluid is required.				
NOTICE	"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.				
	If cylinder is fitted with bleed screws, open bleeder by removing bleed screw completely. Loosening bleed screw only, will not cause sufficient fluid flow to purge system.				
NOTICE Filling the helm full of fluid can	PUSH PIN FILLER PLUG				

be done faster if fluid is poured into the helm prior to connecting filler tube (Part #HA5438) and fluid bottle to the helm.



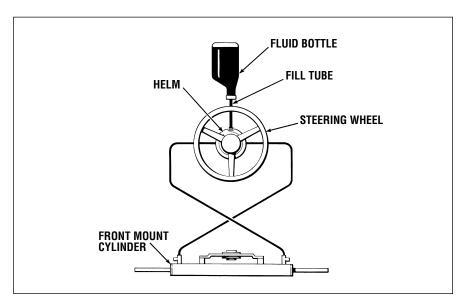
HYDRAULIC STEERING

FILLING AND PURGING

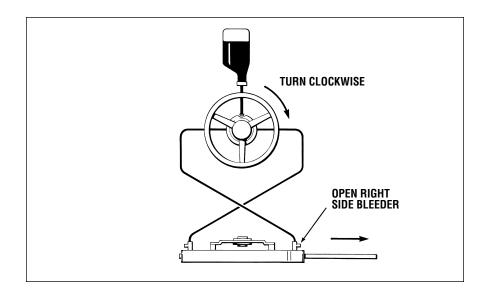
Single Station One Cylinder

Step 1

- Screw the threaded end of the filler tube into the helm filler hole.
 - Remove the cap from the fluid 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 fluid (fluid should always be visible in the filler tube). Use the next bottle at any time throughout the procedure when the fluid level drops in the filler tube. Do not proceed with step two until helm is full of fluid.



- **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.



SEASTAR Hydraulics

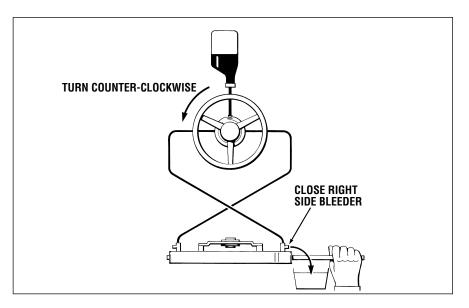
HYDRAULIC STEERING

FILLING AND PURGING

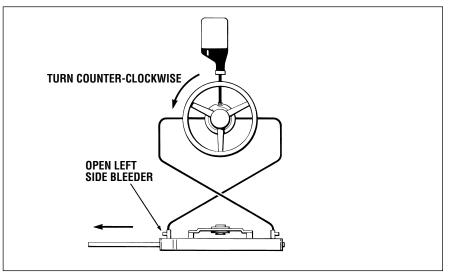
Step 3
 Holding the cylinder rod (to prevent it from moving back into the cylinder) turn the steering wheel counter-clockwise until a steady stream of air free fluid comes out of the bleeder. (Drain out approx. 1/2 bottle of fluid or as required)

Do not use vise grips to stop cylinder rod from moving

• While continuing to turn the wheel close the right side bleeder and let go of the cylinder rod.



- 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.

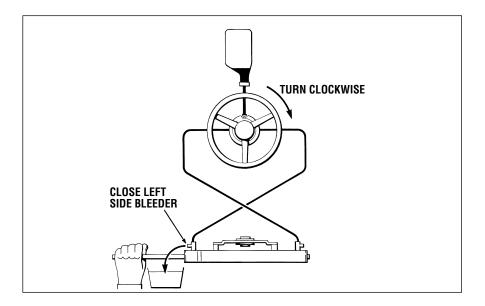


FILLING AND PURGING

Step 5

- Holding the cylinder rod to prevent it from moving back into the cylinder turn the steering wheel clockwise until a steady stream of air free fluid comes out of bleeder.
 - While continuing to turn the wheel close the left side bleeder and let go of the cylinder rod.

Fill and purge is now complete.



FILLING AND PURGING

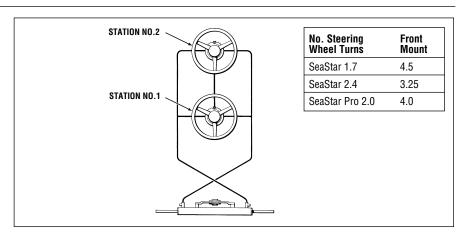
Twin Station Single Cylinder

Perform steps 1 through 5 at station no. 1. Then repeat steps 1-5 at station no. 2.

Fluid requirements 4–5 bottles.

Note: Refer to Fluid Level and System Check page 26.

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

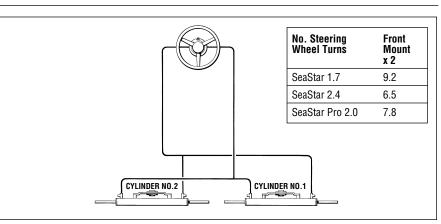


Single Station Twin Cylinder

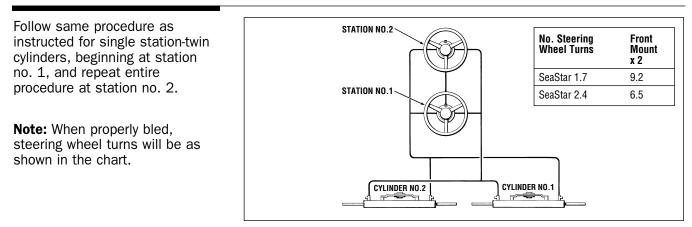
When performing steps 1 through 5, perform instructions in each step first on cylinder no. 1 and then on cylinder no. 2, before proceeding to the next step. ie: Perform instructions referring to right side of cylinder first on cylinder no. 1 and then on cylinder no. 2.

Fluid requirements 4–5 bottles.

Note: Refer to Fluid Level and System Check on page 26. Steering wheel turns will be as shown in the chart.



Twin Station Twin Cylinder



HYDRAULIC STEERING

FILLING AND PURGING

Fluid Level and System Check

Step 1 – Fluid Level Setting	A WARNING The fluid 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.
NOTICE	 For helms mounted with the wheel shaft completely horizontal MUST be filled to the bottom of filler hole AT ALL TIMES. DO NOT allow fluid level to drop more than 1/4" below filler threads. For helms mounted on a 20 degree angle, or, with wheel shaft in
lf the helm is overfilled fluid <u>WILL</u> leak out of the vent cap.	the vertical position, fluid level should be within $1/2$ " from the bottom of the filler hole.
Step 2 – System Check	WARNING The system check MUST be completed after installation. Doing so will ensure the safe operation of your steering system and will any fault/leak will show at this time. Failure to adhere to this warning/check may result in the loss of steering control leading to ejection from the vessel, or, collision with an obstacle resulting in property damage, personal injury and/or death.
	• Turn steering wheel hard over to hard over to confirm unrestricted movement of the steering system and hoses. Repeat this procedure in ALL trim/tilt positions of the engine(s). If interference occurs, or, hoses are being stretched this MUST be removed prior to operating your boat.
	• Confirm that engine(s) are deflecting to the proper direction when steering wheel is turned.
	• If no interference is noticed, or, any interference is corrected, go to next step.
	• Take steering wheel hard over to starboard (any helm can be used on a multi-station boat). Once the wheel reaches its stop point (cylinder is fully stroked out), continue to force the wheel one (1) full turn past stop. Leave wheel in this position while you check all PORT side connections, fittings, seals and hoses for leaks.
	NOTICE This step will NOT harm the system and any noise made during this step should not be considered a fault in the steering system.
	• If leaks are noticed they MUST be repaired prior to operating boat. After repair repeat bleeding procedures as outlined in this manual.
	 Repeat to the Port direction and inspect ALL starboard side connections, fittings, seals and hoses for leaks.
	NOTICE This step will NOT harm the system and any noise made during this step should not be considered a fault in the steering system.
	 If leaks are noticed they MUST be repaired prior to operating boat. After repair repeat bleeding procedures as outlined in this manual.
	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.

MAINTENANCE

Maintenance requirements will vary with usage and climate. Inspection by a qualified marine mechanic is required:

- **A** A minimum of two times a year.
- **B** At the first sign or indication that the steering system is not operating normally or correctly.
- **1.** Check the fluid level in the helm pump. This should always be within 1/2" of the bottom of the filler hole.

Note: The special hydraulic fluid is not available from your local service station. Order a spare bottle (HA5430) from your SeaStar Solutions dealer.

- **2.** Check the outboard engine tilt tube for salt deposits and corrosion. Clean and regrease as required.
- **3.** Clean and grease the cylinder slider assembly. Use a quality marine grease, (Quicksilver 2-4-C, OMC Triple Guard or equivalent). Slider assembly must be greased at all times. Do not operate boat if slider assembly is dry and free of grease. See below.
- **4.** Check mechanical linkages and connections. Tighten loose parts and replace badly worn parts.
- 5. Check for leaks. See page 26 for how to check for leaks.
- **6.** Check hoses for chafing/rubbing marks, and replace if required.
- 7. Check cylinder shaft for nicks and scratches. A damaged cylinder shaft can cause seal failure and leaks. Replacing seals to a damaged cylinder shaft will not stop leaks. A damaged cylinder shaft must be replaced immediately. Failure to comply with maintenance checks may result in loss of steering, causing property damage and/or personal injury.

FAILURE TO COMPLY WITH MAINTENANCE CHECKS MAY RESULT IN LOSS OF STEERING, CAUSING PROPERTY DAMAGE AND/OR PERSONAL INJURY

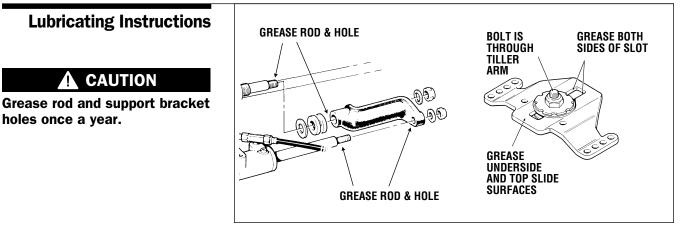
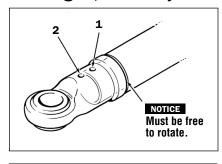


Figure 11.

Twin Engine, Tie Bar Systems



At the time of installation and any time thereafter, the threaded rod must always fully cover inspection hole 1, but never inspection hole No. 2. Failing to observe this warning may result in one engine becoming separated from the steering system and result in property damage and/or personal injury. This page left intentionally blank.

TROUBLESHOOTING GUIDE

A WARNING

Whenever in the following text, a solution calls for removal from vessel and/or dismantling of steering system components, such work must only be carried out by a qualified marine hydraulic mechanic. SeaStar Solutions offers the following as a guide only and is not responsible for any consequences resulting from incorrect dismantling repairs. SeaStar hydraulic steering will provide years of safe reliable performance with a minimum of service if properly installed with correct cylinder.

SeaStar steering systems have been designed with protection against over-pressure situations, by a pressure relief valve, to minimize the possibility of total loss of steering.

Most faults occur when the installation instructions are not followed and usually show up immediately upon filling the system. Provided below, are the most common faults encountered and their likely cause and solution.

Sometimes when returning the wheel from a hardover position, a slight resistance may be felt and a clicking noise may be heard. This should not be mistaken as a fault, as it is a completely normal situation caused by the releasing of the lockspool in the system.

FAULT	CAUSE	SOLUTION
1. During Filling,the helm becomes completely jammed.	Blockage in the line between the helm(s) and the cylinder(s).	Make certain that hose has not collapsed during installation. If so, the collapsed section must be removed and re-fitted with a new piece with the aid of tube connectors. Check fittings for incomplete holes. Fittings with incomplete holes, however, are not common.
2. System is very difficult to fill. Air keeps burping out top of helm even after system appears full.	Cylinder(s) has been mounted upside down. This causes air to be trapped in the cylinder(s). Air in system.	Mount cylinder(s) correctly, according to cylinder installation instruction. Ports should always be kept in uppermost position. Review filling instructions.
3. Steering is stiff and hard to turn, even when the vessel is not moving.	Knurled adjusting nut on tilt tube over tightened.	To test, disconnect cylinder(s) from the tiller arm and turn the steering wheel. If it turns easily, correct above-mentioned problems. Please note that excessively loose connections to tiller arm or tie-bar can also cause mechanical binding.
	Restrictions in hose, piping or fittings.	Find restriction and correct. Note: A kinked hose will cause restriction.
	Cylinder interfering with engine cowling.	Loosen adjusting nut. Check that the two piston shaft nuts and two support rod nuts are properly torqued. Confirm that the correct spacer set is used, then re-tighten adjusting nut.
	Air in fluid.	See filling instructions supplied with helm units.
	Wrong fluid has been used to fill steering system, like A.T.F. (automatic transmission fluid, or any other fluid with a high viscosity).	Drain system and fill with recommended fluids.

HYDRAULIC STEERING

TROUBLE SHOOTING

FAULT

CAUSE

4. Steering is easy to turn at the dock, but becomes hard to turn when vessel is underway. Steering wheel is too small.

Incorrect setting of trim tab(s) engine.

SOLUTION

Fit larger wheel if possible, see installation instructions. If the problem cannot be rectified by the above mentioned solution, proceed with next cause and solution or consult factory.

Adjust tab(s).

5. Seals will sometimes leak if steering system is not vented at uppermost helm. Volumetric expansion and contraction of steering fluid due to temperature change is vented through the uppermost fill port plug. Use of a solid fill port plug may force excess volume out through other sealing areas.

The SeaStar helm has a field replaceable wheel shaft seal which can readily be replaced by removing the steering wheel and seal cover held in place by three small screws. Quad ring no. 210 is found in SeaStar helm seal kit HS6037.

NOTE: Seal kits are available for SeaStar cylinders, however, these must only be used by a qualified marine mechanic.

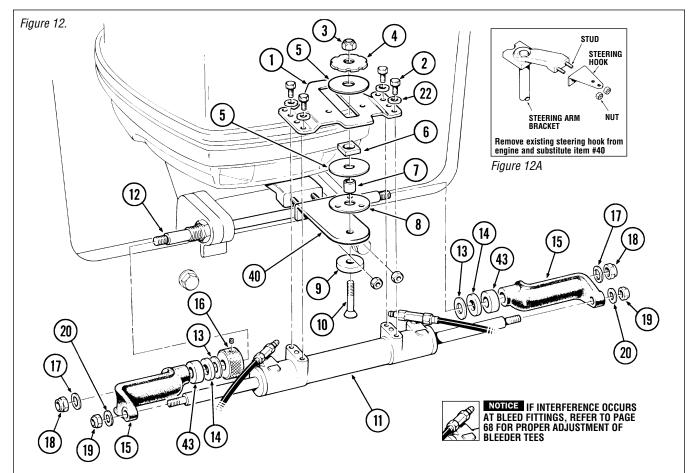
APPLICATIONS

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

APPLICATIONS

SINGLE ENGINE

ENGINE MANUFACTURER	YEAR	MODEL	CYLINDER	ENGINE Single	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
HONDA	1992-TO DATE	30-50 HP	HC5342	H05015	N/A	N/A	



ITEM	PART #	QTY	DESCRIPTION
1	722222	1	Slide Plate
2	742724	4	Screw 5/16" x 3/4" Hex Head
3	113529	1	Nut 3/8" NF Nylok®
4	721220	1	Notched Washer
5	727724	2	Slide Washer
6	729221	1	Slide Follower
7	721126	1	Follower Bush
8	736028	1	Bottom Washer (3 Hole)
9	721427	1	Countersunk Washer
10	185921	1	Screw 3/8" x 15/8" Flat Head
11	HC5344	1	Cylinder c/w Bleed Tee's
12	730229	1	Support Rod
13	202121	2	Washer 5/8" dia.
14	985876	2	Spacer

ITEM	PART #	QTY	DESCRIPTION			
15	809900	2	Support Bracket			
16	828085	1	Assembly, Adjusting Nut P/M			
17	202027	2	Washer 1/2" dia.			
18	192126	2	Nut 1/2" NF Nylok®			
19	731720	2	Nut 7/16" dia.			
20	731625	2	Washer 7/16" dia.			
22	010924	4	Washer 5/16" dia.			
ADAP	rer kit# H	05015				
40	815728	1	Adapter Plate Honda			
43	770423	2	Support Rod Spacer			
REPLACEMENT HARDWARE MOUNTING KIT# 724021						
Include	es all moun	ting ha	rdware excluding the Support			
Rod pa	art# 730229).				

Outboard Powered Vessels

APPLICATIONS

TWIN ENGINES

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE Manufacturer	YEAR	MODEL	CYLINDER	ENGINE ADAPTER PLATES SINGLE TWIN TWIN c/w tie-rod w/o tie-rod			
HONDA	1993-TO DATE	30-50 HP	HC5342	H05015	N/A	N/A	

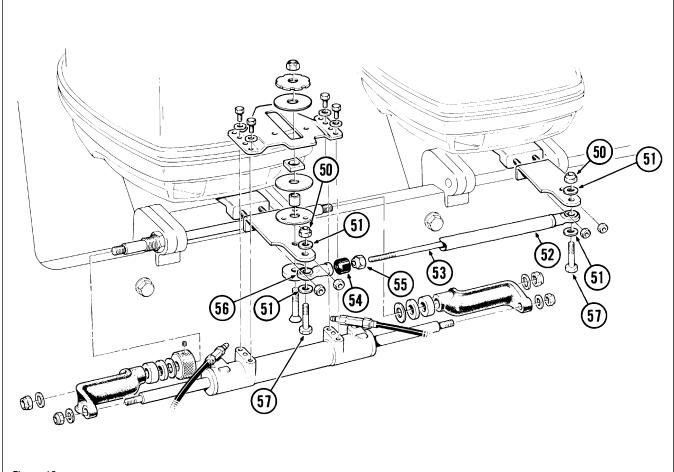


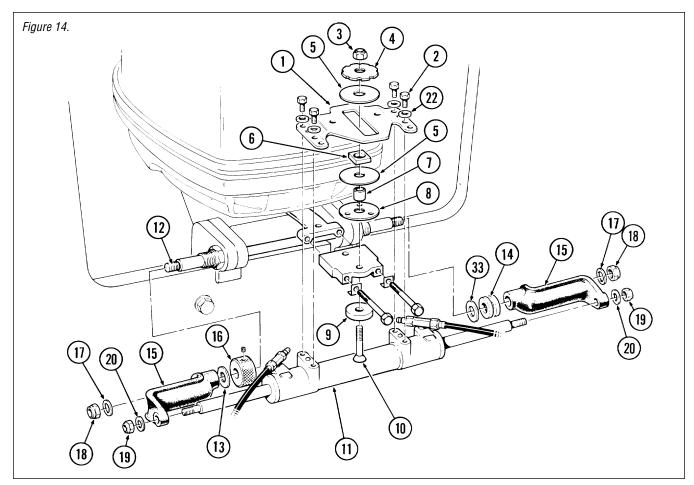
Figure 13.

ITEM	PART #	QTY	DESCRIPTION	ITEM	PART #	QTY	DESCRIPTION
ADAPT	'ER KIT# H	05009					
50	113529	2	Nut 3/8" NF Nylok®				
51	113622	4	Washer 3/8" dia.				
52	722721	1	Stringer Tube				
53	722523	1	Threaded Rod c/w Ball Joint				
54	N/A	1	Obsolete-No longer required				
55	192126	1	Nut 1/2" NF Nylok [®]				
56	116527	1	Ball Joint				
57	726825	2	Screw 3/8" NF x 1-3/4" Hex Head				

SINGLE ENGINE

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE MANUFACTURER	YEAR	MODEL	CYLINDER	ENGINE Single	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
HONDA	1996-TO DATE	75-90 HP	HC5342	H05044A	H05044A & H05009	H05044A	



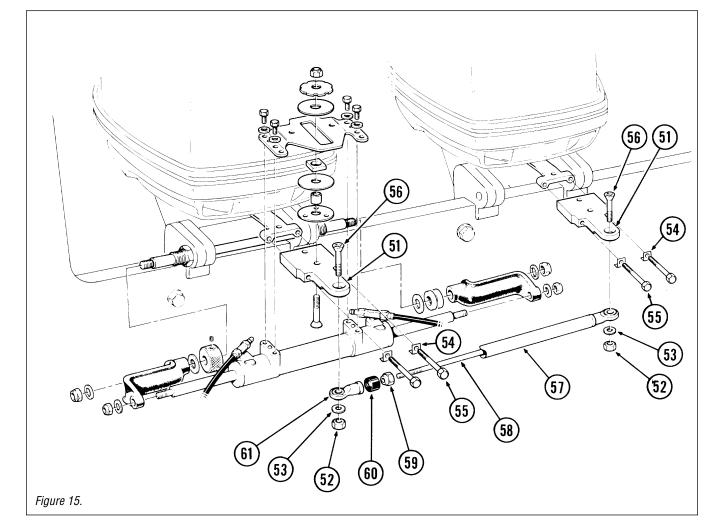
ITEM	PART #	QTY	DESCRIPTION
1	722222	1	Slide Plate
2	742724	4	Screw 5/16" x 3/4" Hex Head
3	113529	1	Nut 3/8" NF Nyloc
4	721220	1	Notched Washer
5	727724	2	Slide Washer
6	729221	1	Slide Follower
7	721126	1	Follower Bush
8	736028	1	Bottom Washer (3 Hole)
9	721427	1	Countersunk Washer
10	185921	1	Screw 3/8" x 15/8" Flat Head
11	HC5344	1	Cylinder c/w Bleed Tee's
12	730229	1	Support Rod
13	202121	2	Washer 5/8" dia.
14	728924	2	Spacer

ITEM	PART #	QTY	DESCRIPTION
15	809924	2	Support Bracket
16	828085	1	Assembly, Adjusting Nut P/M
17	202027	2	Washer 1/2" dia.
18	192126	2	Nut 1/2" NF Nyloc
19	731720	2	Nut 7/16" dia.
20	731625	2	Washer 7/16" dia.
22	010924	4	Washer 5/16" dia.

TWIN ENGINES

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE MANUFACTURER	YEAR	MODEL	CYLINDER	ENGINE Single	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
HONDA	1996-TO DATE	75-90 HP	HC5342	H05044A	H05044A & H05009	H05044A	

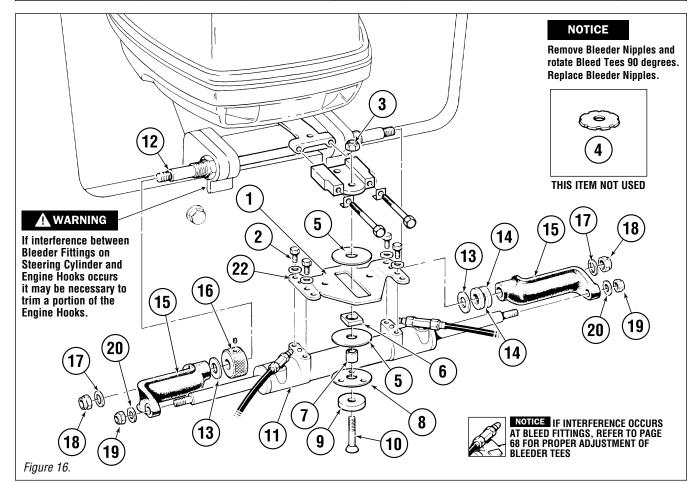


ITEM	PART #	QTY	DESCRIPTION		ITEM	PART #	QTY	DESCRIPTION
51	687723	2	Extension Plate Honda					
52	113529	2	Nut 3/8" NF Nyloc					
53	113622	4	Washer 3/8" dia.					
54	823673	4	Locking Tab Washer M10					
55	752927	4	Screw M10-1.25 x 90 HHCS NLP					
56	734925	2	Screw 3/8" x 13/4" Flat Head					
57	722721	1	Stringer Tube					
58	722523	1	Threaded Rod c/w Ball Joint					
59	192126	1	Nut 1/2" NF Nyloc					
60	746123	1	Plastic Cap					
61	116527	1	Ball Joint					

SINGLE ENGINE

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE MANUFACTURER	YEAR	MODEL	CYLINDER	ENG Single	NE ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
HONDA	1998-TO DATE	115-130 HP	HC5342	H05044A	H05044A & H05009	H05044A	



ITEM	PART #	QTY	DESCRIPTION		ITEM	PART #	QTY	DESCRIPTION	
1	722222	1	Slide Plate	1	16	828085	1	Assembly, Adjusting Nut P/M	
2	742724	4	Screw 5/16" x 3/4" Hex Head		17	202027	2	Washer 1/2" dia.	
3	113529	1	Nut 3/8" NF Nylok®	I	18	192126	2	Nut 1/2" NF Nylok®	
4	721220	1	Notched Washer (not used)	I	19	731720	2	Nut 7/16" dia.	
5	727724	2	Slide Washer	1	20	731625	2	Washer 7/16" dia.	
6	729221	1	Slide Follower	I	22	010924	4	Washer 5/16" dia.	
7	721126	1	Follower Bush	1					
8	736028	1	Bottom Washer (3 Hole)	I	REPLACEMENT HARDWARE MOUNTING KIT# 724021				
9	721427	1	Countersunk Washer						
10	185921	1	Screw 3/8" x 1-5/8" Flat Head	I	Includes all mounting hardware excluding the Support Rod part# 730229.				
11	HC5344	1	Cylinder c/w Bleed Tees	I	RUC	i part# 730	JZZ9.		
12	730229	1	Support Rod	1					
13	202121	2	Washer 5/8" dia.	1					
14	995876	2	Spacer	I					
15	809900	2	Support Bracket	1					

TWIN ENGINES

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE MANUFACTURER	YEAR MODEL		CYLINDER	ENGINE ADAPTER PLATES SINGLE TWIN TWIN c/w tie-rod w/o tie-rod			
HONDA	1998-TO DATE	115-130 HP	HC5342	H05044A	H05044A & H05009	H05044A	

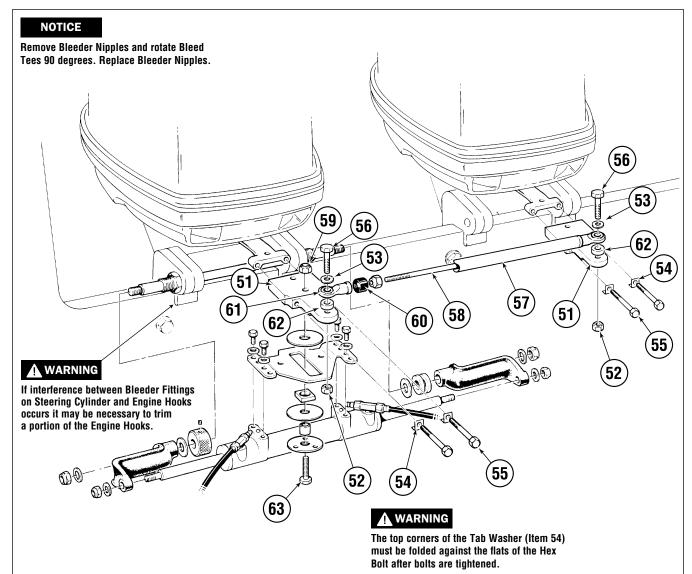


Figure 17.

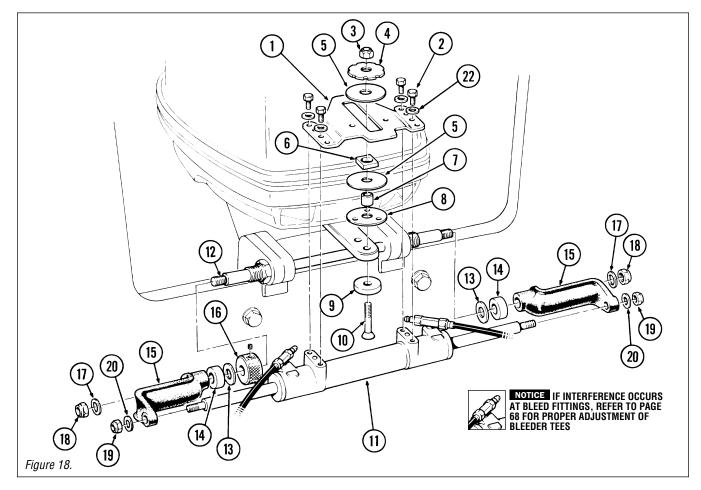
ITEM	PART #	QTY	DESCRIPTION	ITEM	PART #	QTY	DESCRIPTION
51	687723	2	Extension Plate Honda	58	722523	1	Threaded Rod c/w Ball Joint
52	113529	2	Nut 3/8" NF Nylok®	59	192126	1	Nut 1/2" NF Nylok®
53	113622	4	Washer 3/8" dia.	60	N/A	1	Obsolete-No longer required
54	823673	4	Locking Tab Washer M10	61	116527	1	Ball Joint
55	752927	4	Screw M10-1.25 x 90 HHCS NLP	62	710921	2	Spacer
56	726825	2	Screw, 3/8" NF x 1-3/4", HHCS	63	198767	1	HHCS, 3/8" NF x 1-5/8", SS,
57	722721	1	Stringer Tube				Fully Threaded

SEASTAR Hydraulics

SINGLE ENGINE

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE MANUFACTURER	YEAR	MODEL	CYLINDER	ENGINE Single	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
JOHNSON/EVINRUDE	1977 TO 1990 1977 TO 1990 1991-TO 1992 1991-TO DATE 1991-TO DATE	90-300 HP 65-155 HP 250HP 300HP 100-155 HP	HC5342 HC5342 HC5342 HC5342 HC5342 HC5342	NOT REQ NOT REQ. NOT REQ. NOT REQ. NOT REQ.	H05001A H05001A H05001A H05001A H05001A	N/A N/A N/A N/A N/A	Com. Eng. Com. Eng. Com. Eng.



ITEM	PART #	QTY	DESCRIPTION
1	722222	1	Slide Plate
2	742724	4	Screw 5/16" x 3/4" Hex Head
3	113529	1	Nut 3/8" NF Nylok®
4	721220	1	Notched Washer
5	727724	2	Slide Washer
6	729221	1	Slide Follower
7	721126	1	Follower Bush
8	736028	1	Bottom Washer (3 Hole)
9	721427	1	Countersunk Washer
10	185921	1	Screw 3/8" x 1 5/8" Flat Head
11	HC5344	1	Cylinder c/w Bleed Tee's
12	730229	1	Support Rod
13	202121	2	Washer 5/8" dia.

ITEM	PART #	QTY	DESCRIPTION			
14	985876	2	Spacer			
15	809900	2	Support Brackets			
16	828085	1	Assembly, Adjusting Nut P/M			
17	202027	2	Washer 1/2" dia.			
18	192126	2	Nut 1/2" NF Nylok®			
19	731720	2	Nut 7/16" dia.			
20	731625	2	Washer 7/16" dia.			
22	010924	4	Washer 5/16" dia.			
REPLACEMENT HARDWARE MOUNTING KIT# 724021						
Incl	udes all mo	ounting	hardware excluding the Support			
	d part# 730	•	5 11			

TWIN ENGINES

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE MANUFACTURER	YEAR	MODEL	CYLINDER	ENGINE Single	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
JOHNSON/EVINRUDE	1977 TO 1990 1977 TO 1990 1991-TO 1992 1991-TO DATE 1991-TO DATE	90-300 HP 65-155 HP 250HP 300HP 100-155 HP	HC5342 HC5342 HC5342 HC5342 HC5342 HC5342	NOT REQ NOT REQ. NOT REQ. NOT REQ. NOT REQ.	H05001A H05001A H05001A H05001A H05001A	N/A N/A N/A N/A N/A	Com. Eng. Com. Eng. Com. Eng.

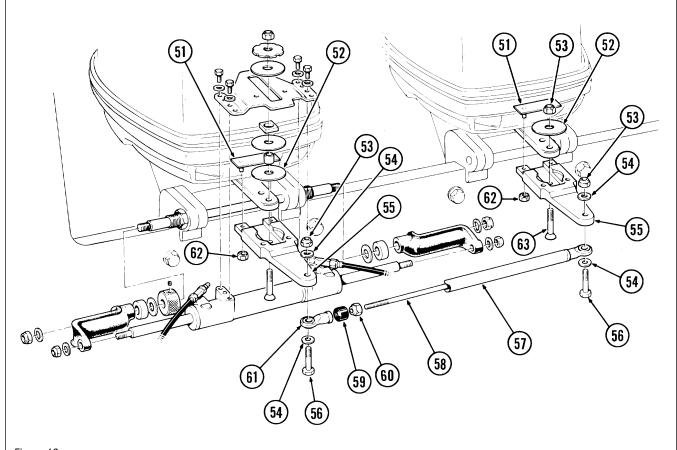


Figure 19.

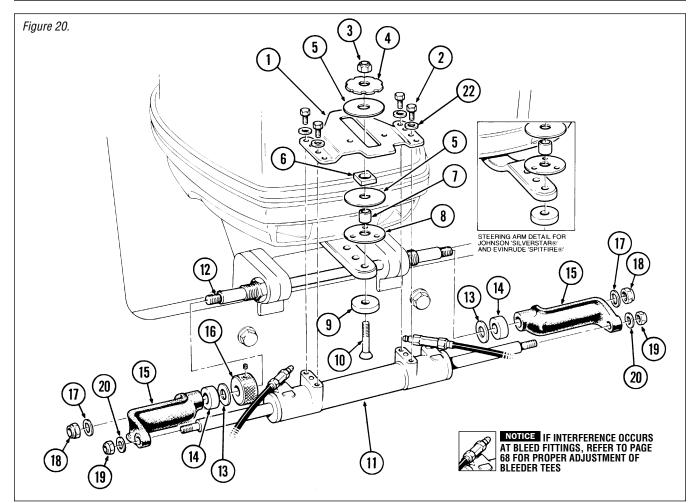
ITEM	PART #	QTY	DESCRIPTION
51	722829	2	Clamp Plate
52	753428	2	Bottom Washer (MC)
53	113529	3	Nut 3/8" NF Nylok®
54	113622	4	Washer 3/8" dia.
55	723028	2	Extension Plate
56	186426	2	Screw 3/8" x 21/4" Hex Head
57	722721	1	Stringer Tube
58	722627	1	Threaded Rod c/w Ball Joint
59	N/A	1	Obsolete–No longer required
60	192126	1	Nut 1/2" NF Nylok®

ITEM	PART #	QTY	DESCRIPTION
61	116527	1	Ball Joint
62	191424	4	Nut 1/4" NC Nylok®
63	185921	1	Screw 3/8" x 15/8" Flat Head

SINGLE ENGINE

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE Manufacturer	YEAR	MODEL	CYLINDER	ENGINE SINGLE	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
JOHNSON/EVINRUDE	1991-TO DATE 1991-TO DATE 1991-TO DATE	90-225 HP 150-175 HP 80-105 HP	HC5342 HC5342 HC5342	NOT REQ NOT REQ. NOT REQ.	H05071A H05071A H05071A	H05072A H05072A H05072A	Silverstar/Spitfire Jet Powered



ITEM	PART #	QTY	DESCRIPTION
1	722222	1	Slide Plate
2	742724	4	Screw 5/16" x 3/4" Hex Head
3	113529	1	Nut 3/8" NF Nylok®
4	721220	1	Notched Washer
5	727724	2	Slide Washer
6	729221	1	Slide Follower
7	721126	1	Follower Bush
8	736028	1	Bottom Washer (3 Hole)
9	721427	1	Countersunk Washer
10	185921	1	Screw 3/8" x 1 5/8" Flat Head
11	HC5344	1	Cylinder c/w Bleed Tee's
12	730229	1	Support Rod
13	202121	2	Washer 5/8" dia.

ITEM	PART #	QTY	DESCRIPTION			
14	985876	2	Spacer			
15	809900	2	Support Brackets			
16	828085	1	Assembly, Adjusting Nut P/M			
17	202027	2	Washer 1/2" dia.			
18	192126	2	Nut 1/2" NF Nylok®			
19	731720	2	Nut 7/16" dia.			
20	731625	2	Washer 7/16" dia.			
22	010924	4	Washer 5/16" dia.			
REPLACEMENT HARDWARE MOUNTING KIT# 724021						
Includes all mounting hardware excluding the Support						
Rod part# 730229.						

TWIN ENGINES

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE MANUFACTURER	YEAR	MODEL	CYLINDER	ENGINE SINGLE	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
JOHNSON/EVINRUDE	1991-TO DATE 1991-TO DATE 1991-TO DATE	90-225 HP 150-175 HP 80-105 HP	HC5342 HC5342 HC5342	NOT REQ NOT REQ. NOT REQ.	H05071A H05071A H05071A	H05072A H05072A H05072A	Silverstar/Spitfire Jet Powered

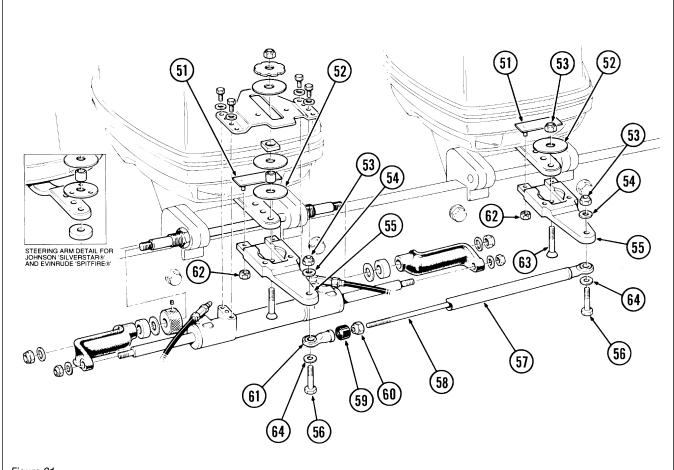


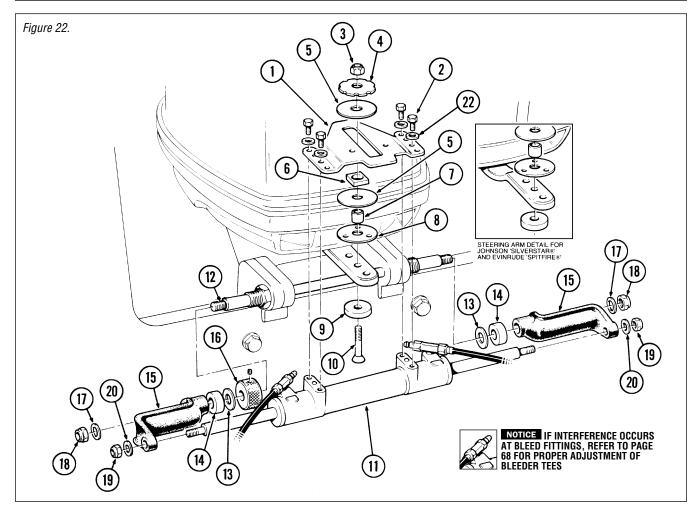
Figure 21.

ITEM	PART #	QTY	DESCRIPTION
51	722829	2	Clamp Plate
52	753428	2	Bottom Washer (MC)
53	113529	3	Nut 3/8" NF Nylok®
54	113622	2	Washer 3/8" dia.
55	739524	2	Extension Plate
56	186426	2	Screw 3/8" x 21/4" Hex Head
57	722721	1	Stringer Tube
58	722523	1	Threaded Rod c/w Ball Joint
59	746123	1	Obsolete–No longer required
60	192126	1	Nut 1/2" NF Nylok®
			-

SINGLE ENGINE

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE MANUFACTURER	YEAR	MODEL	CYLINDER	ENGINE SINGLE	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
JOHNSON/EVINRUDE	1993-TO DATE	250 HP	HC5342	NOT REQ	N/A	N/A	



ITEM	PART #	QTY	DESCRIPTION
1	722222	1	Slide Plate
2	742724	4	Screw 5/16" x 3/4" Hex Head
3	113529	1	Nut 3/8" NF Nylok®
4	721220	1	Notched Washer
5	727724	2	Slide Washer
6	729221	1	Slide Follower
7	721126	1	Follower Bush
8	736028	1	Bottom Washer (3 Hole)
9	721427	1	Countersunk Washer
10	185921	1	Screw 3/8" x 1 5/8" Flat Head
11	HC5344	1	Cylinder c/w Bleed Tee's
12	730229	1	Support Rod
13	202121	2	Washer 5/8" dia.

ITEM	PART #	QTY	DESCRIPTION			
14	985876	2	Spacer			
15	809900	2	Support Brackets			
16	828085	1	Assembly, Adjusting Nut P/M			
17	202027	2	Washer 1/2" dia.			
18	192126	2	Nut 1/2" NF Nylok®			
19	731720	2	Nut 7/16" dia.			
20	731625	2	Washer 7/16" dia.			
22	010924	4	Washer 5/16" dia.			
REPLACEMENT HARDWARE MOUNTING KIT# 724021						
Includes all mounting hardware excluding the Support						
Rod part# 730229.						
	14 15 16 17 18 19 20 22 REPLA Incl	14 985876 15 809900 16 828085 17 202027 18 192126 19 731720 20 731625 22 010924	14 985876 2 15 809900 2 16 828085 1 17 202027 2 18 192126 2 19 731720 2 20 731625 2 22 010924 4			

TWIN ENGINES

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE MANUFACTURER	YEAR	MODEL	CYLINDER	ENGINE Single	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
JOHNSON/EVINRUDE	1993-TO DATE	250 HP	HC5342	NOT REQ	N/A	N/A	

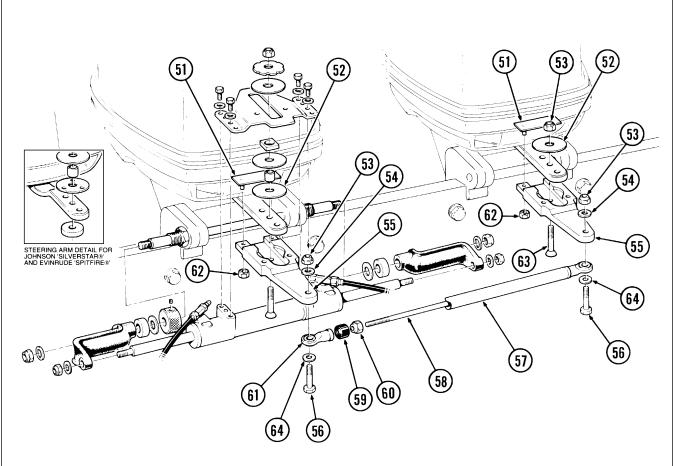


Figure 23

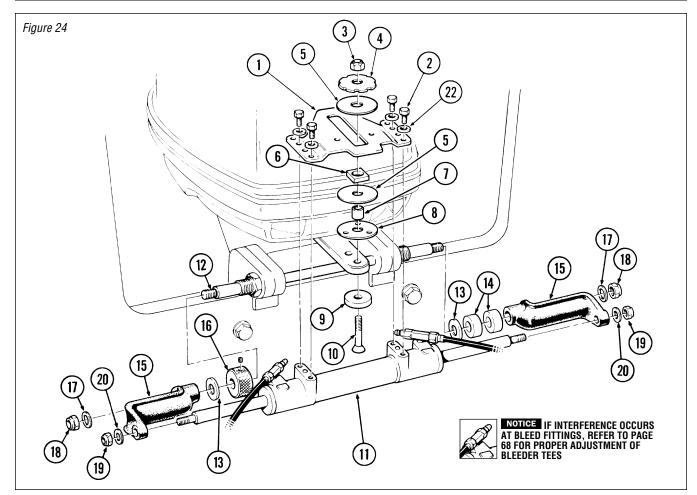
ITEM	PART #	QTY	DESCRIPTION
51	722829	2	Clamp Plate
52	753428	2	Bottom Washer (MC)
53	113529	3	Nut 3/8" NF Nylok®
54	113622	2	Washer 3/8" dia.
55	835120	2	Extension Plate
56	186426	2	Screw 3/8" x 21/4" Hex Head
57	722721	1	Stringer Tube
58	722523	1	Threaded Rod c/w Ball Joint
59	746123	1	Obsolete–No longer required
60	192126	1	Nut 1/2" NF Nylok®
			-

ITEM	PART #	QTY	DESCRIPTION
61	116527	1	Ball Joint
62	191424	4	Nut 1/4" NC Nylok®
63	185921	1	Screw 3/8" x 15/8" Flat Head
64	113600	2	Washer 3/8", Fender, SS

SINGLE ENGINE

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE MANUFACTURER	YEAR	MODEL	CYLINDER	ENGINE Single	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
MERCURY/MARINER	1984 ONLY	150-200 HP	HC5342	NOT REQ	N/A	N/A	



-			
ITEM	PART #	QTY	DESCRIPTION
1	722222	1	Slide Plate
2	742724	4	Screw 5/16" x 3/4" Hex Head
3	113529	1	Nut 3/8" NF Nylok®
4	721220	1	Notched Washer
5	727724	2	Slide Washer
6	729221	1	Slide Follower
7	721126	1	Follower Bush
8	736028	1	Bottom Washer (3 Hole)
9	721427	1	Countersunk Washer
10	185921	1	Screw 3/8" x 1 5/8" Flat Head
11	HC5344	1	Cylinder c/w Bleed Tee's
12	730229	1	Support Rod
13	202121	2	Washer 5/8" dia.

ITEM	PART #	QTY	DESCRIPTION				
14	985876	2	Spacer				
15	809900	2	Support Brackets				
16	828085	1	Assembly, Adjusting Nut P/M				
17	202027	2	Washer 1/2" dia.				
18	192126	2	Nut 1/2" NF Nylok®				
19	731720	2	Nut 7/16" dia.				
20	731625	2	Washer 7/16" dia.				
22	010924	4	Washer 5/16" dia.				
REPL	REPLACEMENT HARDWARE MOUNTING KIT# 724021						
Inc	ludes all mo	untina	hardware excluding the Support				

Includes all mounting hardware excluding the Support Rod part# 730229.

TWIN ENGINES

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE Manufacturer	YEAR	MODEL	CYLINDER	ENGINE Single	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
MERCURY/MARINER	1984 ONLY	150-200 HP	HC5342	NOT REQ	N/A	N/A	

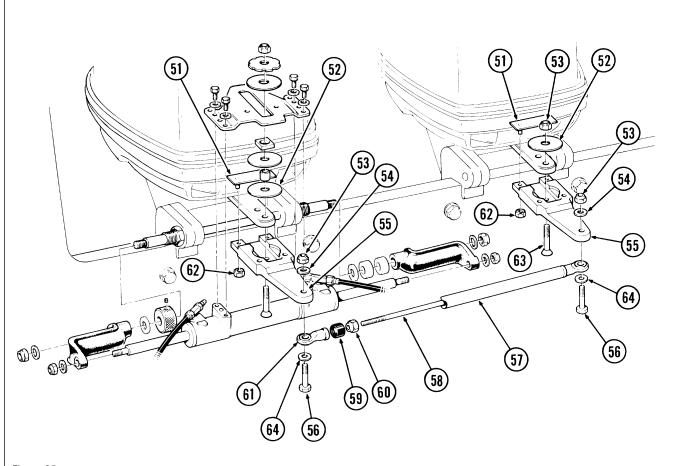


Figure 25.

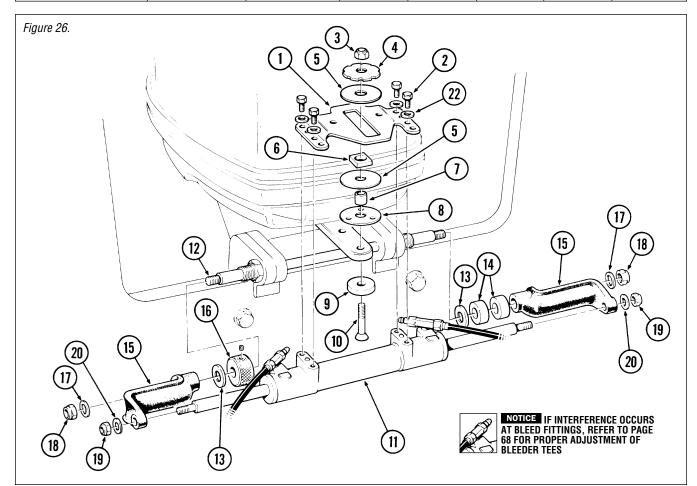
ITEM	PART #	QTY	DESCRIPTION
51	722928	2	Clamp Plate
52	753428	2	Bottom Washer (MC)
53	113529	3	Nut 3/8" NF Nylok®
54	113622	2	Washer 3/8" dia.
55	725324	2	Extension Plate
56	186520	2	Screw 3/8" x 21/4" Hex Head
57	722721	1	Stringer Tube
58	722627	1	Threaded Rod c/w Ball Joint
59	N/A	1	Obsolete–No longer required
60	192126	1	Nut 1/2" NF Nylok®
			-

ITEM	PART #	QTY	DESCRIPTION
61	116527	1	Ball Joint
62	191424	4	Nut 1/4" NC Nylok®
63	185921	1	Screw 3/8" x 15/8" Flat Head
64	113600	2	Washer 3/8", Fender, SS

SINGLE ENGINE

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE MANUFACTURER	YEAR	MODEL	CYLINDER	ENGINE SINGLE	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
MERCURY/MARINER	1984 ONLY 1985-1988 1989 ONLY	90-115 HP 115-220 HP 100-115 HP	HC5342 HC5342 HC5342	NOT REQ NOT REQ. NOT REQ.	H05071A H05071A H05071A	H05072A H05072A H05072A	



ITEM	PART #	QTY	DESCRIPTION
1	722222	1	Slide Plate
2	742724	4	Screw 5/16" x 3/4" Hex Head
3	113529	1	Nut 3/8" NF Nylok®
4	721220	1	Notched Washer
5	727724	2	Slide Washer
6	729221	1	Slide Follower
7	721126	1	Follower Bush
8	736028	1	Bottom Washer (3 Hole)
9	721427	1	Countersunk Washer
10	185921	1	Screw 3/8" x 1 5/8" Flat Head
11	HC5344	1	Cylinder c/w Bleed Tee's
12	730229	1	Support Rod
13	202121	2	Washer 5/8" dia.

ITEM	PART #	QTY	DESCRIPTION			
14	985876	2	Spacer			
15	809900	2	Support Brackets			
16	828085	1	Assembly, Adjusting Nut P/M			
17	202027	2	Washer 1/2" dia.			
18	192126	2	Nut 1/2" NF Nylok®			
19	731720	2	Nut 7/16" dia.			
20	731625	2	Washer 7/16" dia.			
22	010924	4	Washer 5/16" dia.			
REPLA	REPLACEMENT HARDWARE MOUNTING KIT# 724021					

Includes all mounting hardware excluding the Support Rod part# 730229.

TWIN ENGINES

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE MANUFACTURER	YEAR	MODEL	CYLINDER	ENGINE SINGLE	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
MERCURY/MARINER	1984 ONLY 1985-1988 1989 ONLY	90-115 HP 115-220 HP 100-115 HP	HC5342 HC5342 HC5342	NOT REQ NOT REQ. NOT REQ.	H05071A H05071A H05071A	H05072A H05072A H05072A	

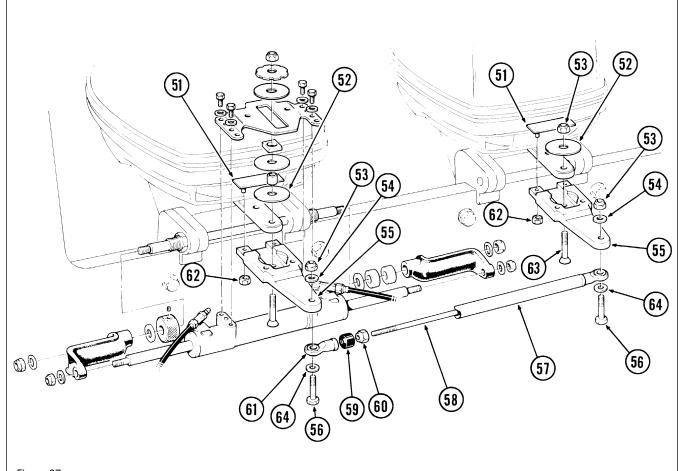


Figure 27.

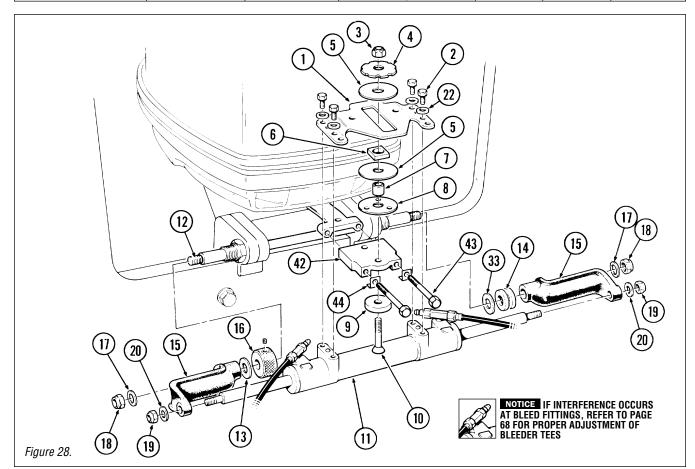
ITEM	PART #	QTY	DESCRIPTION
51	722829	2	Clamp Plate
52	753428	2	Bottom Washer (MC)
53	113529	3	Nut 3/8" NF Nylok®
54	113622	2	Washer 3/8" dia.
55	739524	2	Extension Plate
56	186426	2	Screw 3/8" x 21/4" Hex Head
57	722721	1	Stringer Tube
58	722523	1	Threaded Rod c/w Ball Joint
59	N/A	1	Obsolete–No longer required
60	192126	1	Nut 1/2" NF Nylok®

ITEM	PART #	QTY	DESCRIPTION
61	116527	1	Ball Joint
62	191424	4	Nut 1/4" NC Nylok®
63	185921	1	Screw 3/8" x 15/8" Flat Head
64	113600	2	Washer 3/8", Fender, SS

SINGLE ENGINE

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE Manufacturer	YEAR	MODEL	CYLINDER	ENGINE SINGLE	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
MERCURY/MARINER	1989 ONLY 1990 ONLY 1991-TO DATE	135-250 HP 75-250 HP 75-275 HP	HC5342 HC5342 HC5342	H05035 H05035 H05035	H05008A H05008A H05008A	H05038A H05038A H05038A	



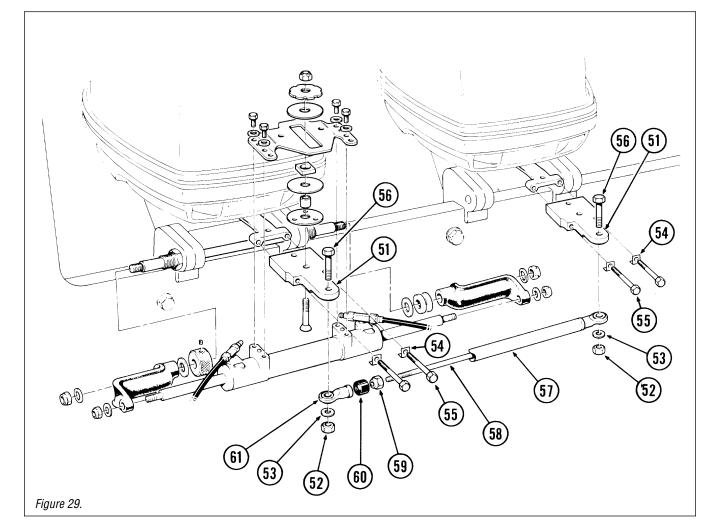
ITEM	PART #	QTY	DESCRIPTION
1	722222	1	Slide Plate
2	742724	4	Screw 5/16" x 3/4" Hex Head
3	113529	1	Nut 3/8" NF Nylok®
4	721220	1	Notched Washer
5	727724	2	Slide Washer
6	729221	1	Slide Follower
7	721126	1	Follower Bush
8	736028	1	Bottom Washer (3 Hole)
9	721427	1	Countersunk Washer
10	185921	1	Screw 3/8" x 15/8" Flat Head
11	HC5344	1	Cylinder c/w Bleed Tee's
12	730229	1	Support Rod
13	202121	2	Washer 5/8" dia.
14	985876	2	Spacer
15	809900	2	Support Bracket
16	828085	1	Assembly, Adjusting Nut P/M

ITEM	PART #	QTY	DESCRIPTION			
17	202027	2	Washer 1/2" dia.			
18	192126	2	Nut 1/2" NF Nylok®			
19	731720	2	Nut 7/16" dia.			
20	731625	2	Washer 7/16" dia.			
22	010924	4	Washer 5/16" dia.			
ADAPT	ER KIT# HO)5035.				
42	741327	1	Adapter Plate #MT			
43	752021	2	Screw 5/16" x 31/2" Hex Head			
44	203123	2	Locking Tab Washer			
REPLACEMENT HARDWARE MOUNTING KIT# 724021						
	Includes all mounting hardware excluding the Support Rod part# 730229.					

TWIN ENGINES

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE MANUFACTURER	YEAR	MODEL	CYLINDER	ENGINE SINGLE	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
MERCURY/MARINER	1989 ONLY 1990 ONLY 1991-TO DATE	135-250 HP 75-250 HP 75-275 HP	HC5342 HC5342 HC5342	H05035 H05035 H05035	H05008A H05008A H05008A	H05038A H05038A H05038A	



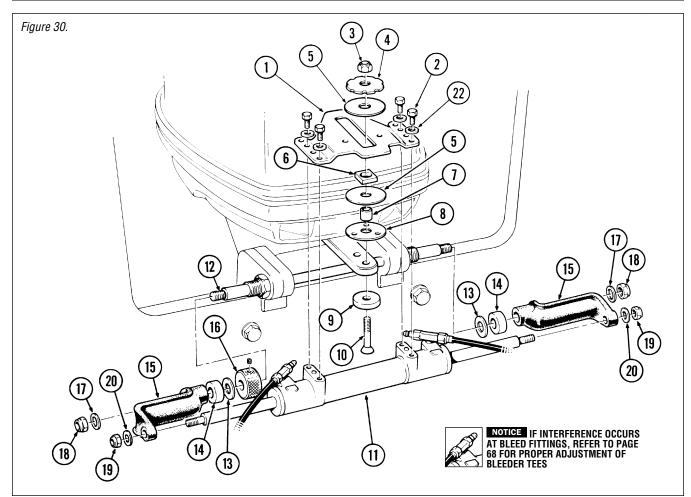
ITEM	PART #	QTY	DESCRIPTION
51	741127	2	Extension Plate MT
52	113529	2	Nut 3/8" NF Nylok®
53	113622	4	Washer 3/8" dia.
54	203123	4	Locking Tab Washer
55	752021	4	Screw 5/16" x 3-1/2" Hex Head
56	726826	2	HHCS 3/8" NF x 1-3/4" SS
57	722721	1	Stringer Tube
58	722523	1	Threaded Rod c/w Ball Joint
59	192126	1	Nut 1/2" NF Nylok®
60	N/A	1	Obsolete-No longer required
61	116527	1	Ball Joint

PART #	QTY	DESCRIPTION
	PART #	PART # QTY

SINGLE ENGINE

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE MANUFACTURER	YEAR	MODEL	CYLINDER	ENGINE SINGLE	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
SUZUKI	1986-TO DATE 1990-TO DATE	150-220 HP 100 HP	HC5342 HC5342	NOT REQ NOT REQ.	H05001A H05001A	N/A N/A	



ITEM	PART #	QTY	DESCRIPTION
1	722222	1	Slide Plate
2	742724	4	Screw 5/16" x 3/4" Hex Head
3	113529	1	Nut 3/8" NF Nylok®
4	721220	1	Notched Washer
5	727724	2	Slide Washer
6	729221	1	Slide Follower
7	721126	1	Follower Bush
8	736028	1	Bottom Washer (3 Hole)
9	721427	1	Countersunk Washer
10	185921	1	Screw 3/8" x 1 5/8" Flat Head
11	HC5344	1	Cylinder c/w Bleed Tee's
12	730229	1	Support Rod
13	202121	2	Washer 5/8" dia.

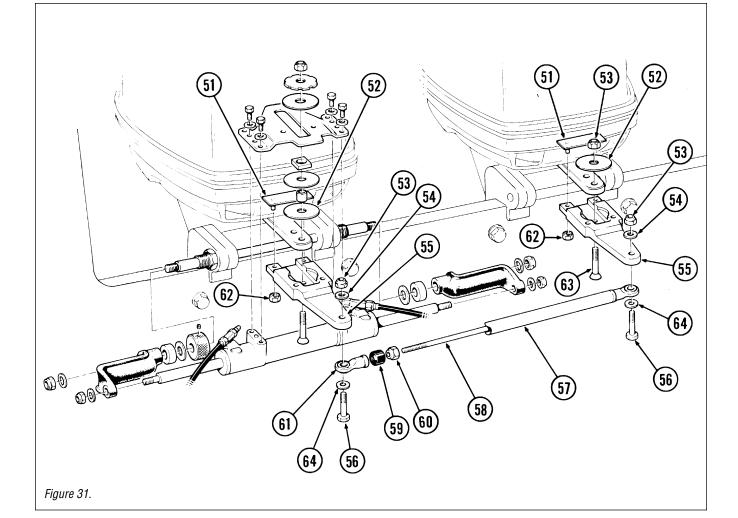
ITEM	PART #	QTY	DESCRIPTION
14	985876	2	Spacer
15	809900	2	Support Brackets
16	828085	1	Assembly, Adjusting Nut P/M
17	202027	2	Washer 1/2" dia.
18	192126	2	Nut 1/2" NF Nylok®
19	731720	2	Nut 7/16" dia.
20	731625	2	Washer 7/16" dia.
22	010924	4	Washer 5/16" dia.
REPLA	CEMENT H	ARDW	ARE MOUNTING KIT# 724021

Includes all mounting hardware excluding the Support Rod part# 730229.

TWIN ENGINES

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE MANUFACTURER	YEAR	MODEL	CYLINDER	ENGINE SINGLE	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
SUZUKI	1986-TO DATE 1990-TO DATE	150-220 HP 100 HP	HC5342 HC5342	NOT REQ NOT REQ.	H05001A H05001A	N/A N/A	



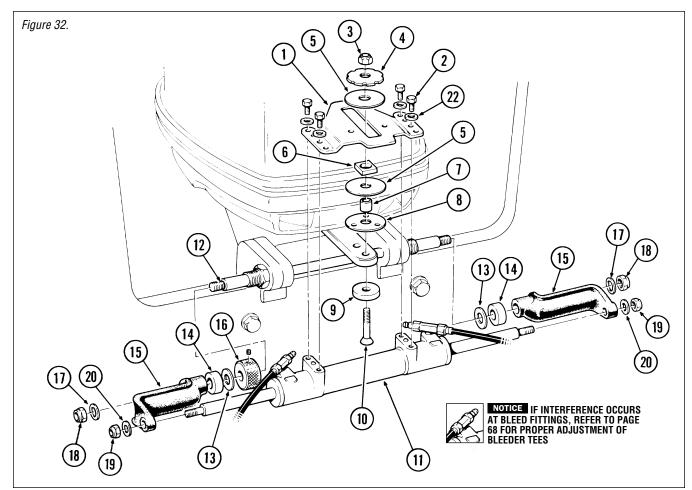
ITEM	PART #	QTY	DESCRIPTION
51	722829	2	Clamp Plate
52	753428	2	Bottom Washer (MC)
53	113529	3	Nut 3/8" NF Nylok®
54	113622	2	Washer 3/8" dia.
55	725625	2	Extension Plate
56	186426	2	Screw 3/8" x 21/4" Hex Head
57	722721	1	Stringer Tube
58	722523	1	Threaded Rod c/w Ball Joint
59	N/A	1	Obsolete–No longer required
60	192126	1	Nut 1/2" NF Nylok®
			-

ITEM	PART #	QTY	DESCRIPTION
61	116527	1	Ball Joint
62	191424	4	Nut 1/4" NC Nylok®
63	185921	1	Screw 3/8" x 15/8" Flat Head
64	113600	2	Washer 3/8", Fender, SS

SINGLE ENGINE

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE Manufacturer	YEAR	MODEL	CYLINDER	ENGINE SINGLE	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
TOHATSU	1990-TO DATE	120-140 HP	HC5342	NOT REQ.	N/A	N/A	
NISSAN	1990-TO DATE	120-140 HP	HC5342	NOT REQ.	N/A	N/A	



ITEM	PART #	QTY	DESCRIPTION
1	722222	1	Slide Plate
2	186021	4	Screw 5/16" x 3/4" Hex Head
3	113529	1	Nut 3/8" NF Nylok®
4	721220	1	Notched Washer
5	727724	2	Slide Washer
6	729221	1	Slide Follower
7	721126	1	Follower Bush
8	736028	1	Bottom Washer (3 Hole)
9	721427	1	Countersunk Washer
10	185921	1	Screw 3/8" x 15/8" Flat Head
11	HC5344	1	Cylinder c/w Bleed Tee's
12	730229	1	Support Rod
13	202121	2	Washer 5/8" dia.
14	985876	2	Spacer

ITEM	PART #	QTY	DESCRIPTION				
15	809900	2	Support Brackets				
16	828085	1	Assembly, Adjusting Nut P/M				
17	202027	2	Washer 1/2" dia.				
18	192126	2	Nut 1/2" NF Nylok®				
19	731720	2	Nut 7/16" dia.				
20	731625	2	Washer 7/16" dia.				
22	010924	4	Washer 5/16" dia.				
KEPLA	ACEIMENT H	AKDW	ARE MOUNTING KIT# 724021				

Includes all mounting hardware excluding the Support Rod part# 730229.

TWIN ENGINES

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE MANUFACTURER	YEAR	MODEL	CYLINDER	ENGINE	ADAPTER PLAT	TES I TWIN	
MANORAGIONEN	TLAN	MODEL	GILINDLA	SINGLE	c/w tie-rod	w/o tie-rod	
TOHATSU	1990-TO DATE	120-140 HP	HC5342	NOT REQ.	N/A	N/A	
NISSAN	1990-TO DATE	120-140 HP	HC5342	NOT REQ.	N/A	N/A	

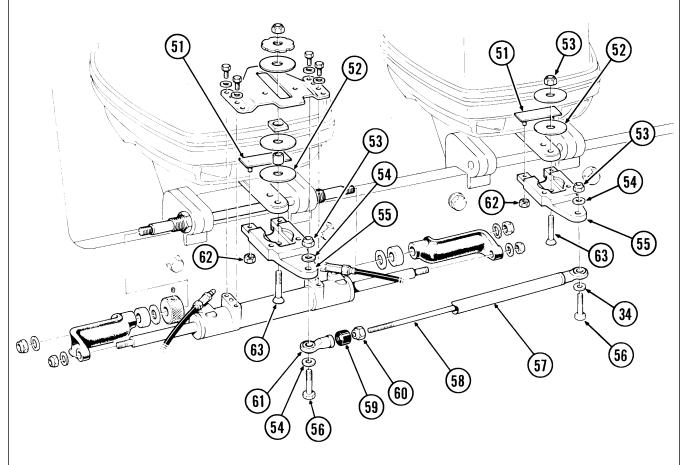


Figure 33.

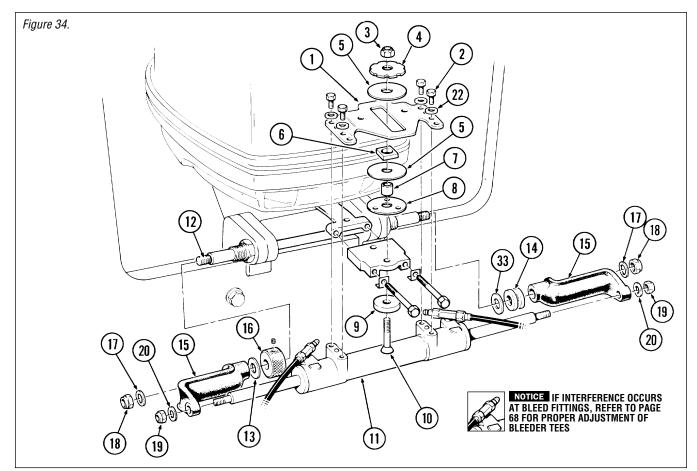
ITEM	PART #	QTY	DESCRIPTION
51	753428	2	Clamp Plate
52	721925	4	Bottom Washer (MC)
53	113529	2	Nut 3/8" NF Nylok®
54	113622	2	Washer 3/8" dia.
55	771727	2	Extension Plate
56	186426	2	Screw 3/8" x 21/4" Hex Head
57	722721	1	Stringer Tube
58	722627	1	Threaded Rod c/w Ball Joint
59	N/A	1	Obsolete–No longer required
60	192126	1	Nut 1/2" NF Nylok®

ITEM	PART #	QTY	DESCRIPTION
61	116527	1	Ball Joint
62	191424	4	Nut 1/4" NC Nylok®
63	185921	2	Screw 3/8" x 15/8" Flat Head

SINGLE ENGINE

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE MANUFACTURER	YEAR	MODEL	CYLINDER	ENGINE SINGLE	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
US MARINE (FORCE)	1995-TO DATE	120 HP	HC5342	H05035	H05009	N/A	



ITEM	PART #	QTY	DESCRIPTION
1	722222	1	Slide Plate
2	742724	4	Screw 5/16" x 3/4" Hex Head
3	113529	1	Nut 3/8" NF Nylok®
4	721220	1	Notched Washer
5	727724	2	Slide Washer
6	729221	1	Slide Follower
7	721126	1	Follower Bush
8	736028	1	Bottom Washer (3 Hole)
9	721427	1	Countersunk Washer
10	185921	1	Screw 3/8" x 15/8" Flat Head
11	HC5344	1	Cylinder c/w Bleed Tee's
12	730229	1	Support Rod
13	202121	2	Washer 5/8" dia.
14	985876	2	Spacer
15	809900	2	Support Bracket
			••

ITEM	PART #	QTY	DESCRIPTION				
16	828085	1	Assembly, Adjusting Nut P/M				
17	202027	2	Washer 1/2" dia.				
18	192126	2	Nut 1/2" NF Nylok®				
19	731720	2	Nut 7/16" dia.				
20	731625	2	Washer 7/16" dia.				
22	010924	4	Washer 5/16" dia.				
ADAPT	TER KIT# HO)5035.					
42	741327	1	Adapter Plate #MT				
43	752021	2	Screw 5/16" x 31/2" Hex Head				
44	203123	2	Locking Tab Washer				
REPLA	REPLACEMENT HARDWARE MOUNTING KIT# 724021						
	Includes all mounting hardware excluding the Support Rod part# 730229.						

TWIN ENGINES

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE MANUFACTURER	YEAR	MODEL	CYLINDER	ENGINE Single	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
US MARINE (FORCE)	1995-TO DATE	120 HP	HC5342	H05035	N/A	N/A	

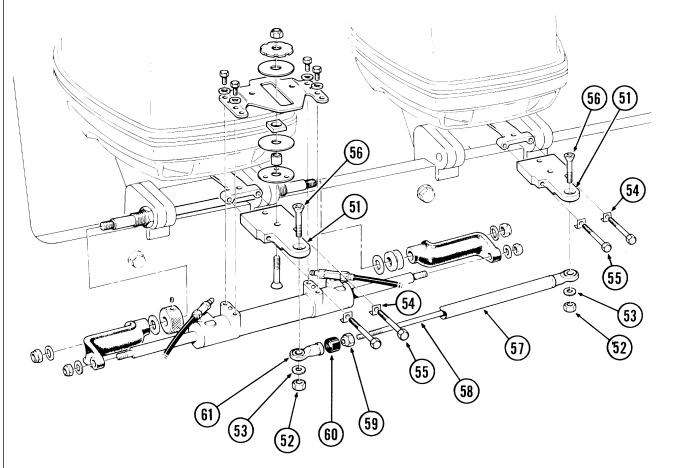


Figure 35.

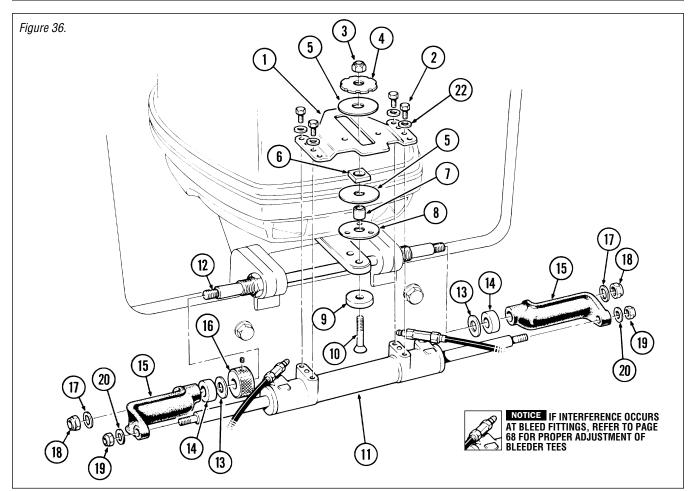
PART #	QTY	DESCRIPTION
ER KIT# HO)5009	
113529	2	Nut 3/8" NF Nylok®
113622	4	Washer 3/8" dia.
722721	1	Stringer Tube
722523	1	Threaded Rod c/w Ball Joint
192126	1	Nut 1/2" NF Nylok®
N/A	1	Obsolete-No longer required
116527	1	Ball Joint
726825	2	Screw 3/8" NF x 1-3/4" Hex Head (Not Used)
	ER KIT# HU 113529 113622 722721 722523 192126 N/A 116527	Terr Hostopy 113529 2 113622 4 722721 1 722523 1 192126 1 N/A 1 116527 1

ITEM	PART #	QTY	DESCRIPTION
ADAPT	'ER KIT# HO	05042	
51	680321	2	Adapter Plate Force
54	203123	4	Locking Tab Washer
55	752021	4	Screw 5/16" x 3-1/2" Hex Head
56	734925	2	Screw 3/8" x 1-3/4" Flat Head

SINGLE ENGINE

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE MANUFACTURER	YEAR	MODEL	CYLINDER	ENGINE SINGLE	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
YAMAHA	1984-1985	115-220 HP	HC5342	NOT REQ	H05005	N/A	



ITEM	PART #	QTY	DESCRIPTION
1	722222	1	Slide Plate
2	742724	4	Screw 5/16" x 3/4" Hex Head
3	113529	1	Nut 3/8" NF Nylok®
4	721220	1	Notched Washer
5	727724	2	Slide Washer
6	729221	1	Slide Follower
7	721126	1	Follower Bush
8	736028	1	Bottom Washer (3 Hole)
9	721427	1	Countersunk Washer
10	185921	1	Screw 3/8" x 1 5/8" Flat Head
11	HC5344	1	Cylinder c/w Bleed Tee's
12	730229	1	Support Rod
13	202121	2	Washer 5/8" dia.

ITEM	PART #	QTY	DESCRIPTION					
14	985876	2	Spacer					
15	809900	2	Support Brackets					
16	828085	1	Assembly, Adjusting Nut P/M					
17	202027	2	Washer 1/2" dia.					
18	192126	2	Nut 1/2" NF Nylok®					
19	731720	2	Nut 7/16" dia.					
20	731625	2	Washer 7/16" dia.					
22	010924	4	Washer 5/16" dia.					
REPL	REPLACEMENT HARDWARE MOUNTING KIT# 724021							

Includes all mounting hardware excluding the Support Rod part# 730229.

TWIN ENGINES

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE Manufacturer	YEAR	MODEL	CYLINDER	ENGINE Single	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
YAMAHA	1984-1985	115-220 HP	HC5342	NOT REQ	H05005	N/A	

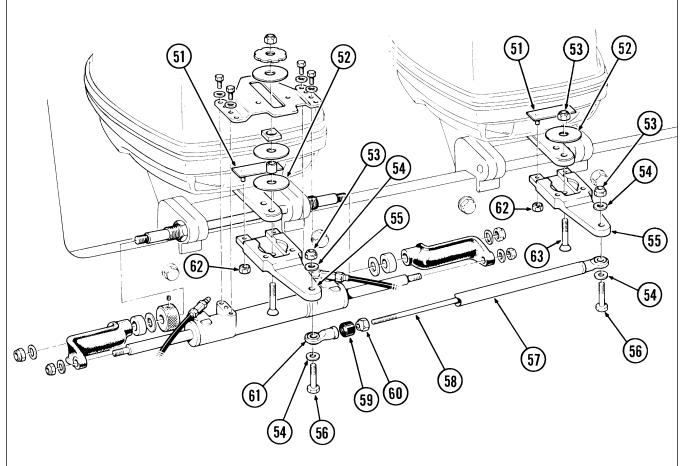


Figure 37.

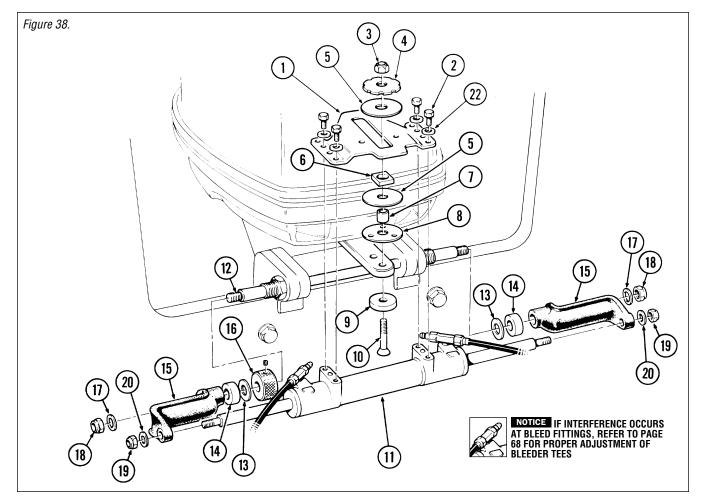
ITEM	PART #	QTY	DESCRIPTION
51	722928	2	Clamp Plate
52	753428	2	Bottom Washer (MC)
53	113529	3	Nut 3/8" NF Nylok®
54	113622	4	Washer 3/8" dia.
55	725729	2	Extension Plate
56	186426	2	Screw 3/8" x 21/4" Hex Head
57	722721	1	Stringer Tube
58	722627	1	Threaded Rod c/w Ball Joint
59	N/A	1	Obsolete–No longer required
60	192126	1	Nut 1/2" NF Nylok®

ITEM	PART #	QTY	DESCRIPTION
61	116527	1	Ball Joint
62	191424	4	Nut 1/4" NC Nylok®
63	185921	1	Screw 3/8" x 15/8" Flat Head

SINGLE ENGINE

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE MANUFACTURER	YEAR	MODEL	CYLINDER	ENGINE SINGLE	ADAPTER PLAT TWIN c/w tie-rod	T ES TWIN w/o tie-rod	
YAMAHA	1986 ONLY	115-220 HP	HC5342	NOT REQ	N/A	N/A	



ITEM	PART #	QTY	DESCRIPTION
1	722222	1	Slide Plate
2	742724	4	Screw 5/16" x 3/4" Hex Head
3	113529	1	Nut 3/8" NF Nylok®
4	721220	1	Notched Washer
5	727724	2	Slide Washer
6	729221	1	Slide Follower
7	721126	1	Follower Bush
8	736028	1	Bottom Washer (3 Hole)
9	721427	1	Countersunk Washer
10	185921	1	Screw 3/8" x 1 5/8" Flat Head
11	HC5344	1	Cylinder c/w Bleed Tee's
12	730229	1	Support Rod
13	202121	2	Washer 5/8" dia.

ITEM	PART #	QTY	DESCRIPTION					
14	985876	2	Spacer					
15	809900	2	Support Brackets					
16	828085	1	Assembly, Adjusting Nut P/M					
17	202027	2	Washer 1/2" dia.					
18	192126	2	Nut 1/2" NF Nylok®					
19	731720	2	Nut 7/16" dia.					
20	731625	2	Washer 7/16" dia.					
22	010924	4	Washer 5/16" dia.					
REPLACEMENT HARDWARE MOUNTING KIT# 724021								
Includes all mounting hardware excluding the Support Rod part# 730229.								

TWIN ENGINES

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE Manufacturer	YEAR	MODEL	CYLINDER	ENGINE Single	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
YAMAHA	1986 ONLY	115-220 HP	HC5342	NOT REQ	N/A	N/A	

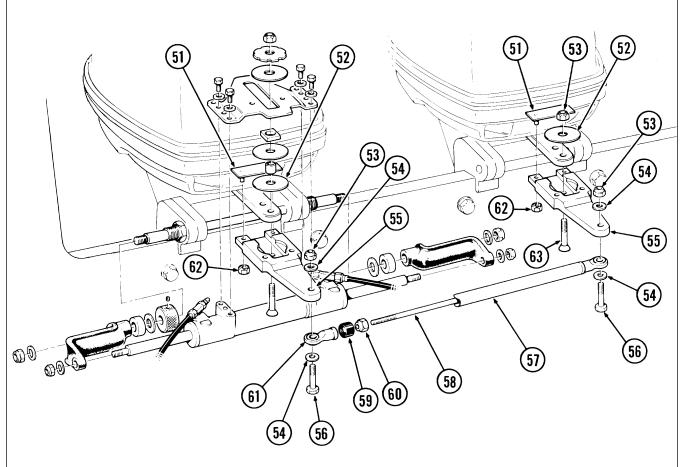


Figure 39.

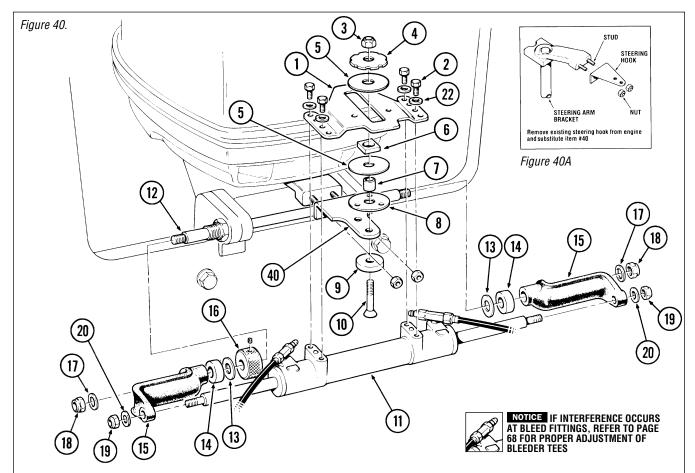
ITEM	PART #	QTY	DESCRIPTION
51	722829	2	Clamp Plate
52	753428	2	Bottom Washer (MC)
53	113529	3	Nut 3/8" NF Nylok®
54	113622	4	Washer 3/8" dia.
55	726026	2	Extension Plate
56	186426	2	Screw 3/8" x 21/4" Hex Head
57	722721	1	Stringer Tube
58	722627	1	Threaded Rod c/w Ball Joint
59	N/A	1	Obsolete–No longer required
60	192126	1	Nut 1/2" NF Nylok®

ITEM	PART #	QTY	DESCRIPTION
61	116527	1	Ball Joint
62	191424	4	Nut 1/4" NC Nylok®
63	185921	1	Screw 3/8" x 15/8" Flat Head

SINGLE ENGINE

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE MANUFACTURER	YEAR	MODEL	CYLINDER	ENGINE SINGLE	ADAPTER PLAT TWIN c/w tie-rod	T ES TWIN w/o tie-rod	
YAMAHA	1989-TO DATE	50-70 HP	HC5342	N/A	N/A	N/A	



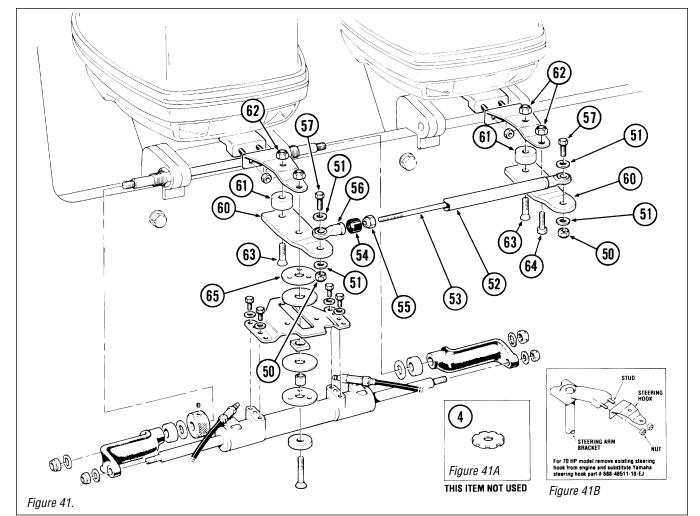
ITEM	PART #	QTY	DESCRIPTION
1	722222	1	Slide Plate
2	742724	4	Screw 5/16" x 3/4" Hex Head
3	113529	1	Nut 3/8" NF Nylok®
4	721220	1	Notched Washer
5	727724	2	Slide Washer
6	729221	1	Slide Follower
7	721126	1	Follower Bush
8	736078	1	Bottom Washer (3 Hole)
9	721427	1	Countersunk Washer
10	185921	1	Screw 3/8" x 15/8" Flat Head
11	HC5344	1	Cylinder c/w Bleed Tee's
12	730229	1	Support Rod
13	202121	2	Washer 5/8" dia.
14	985876	2	Spacer

ITEM	PART #	QTY	DESCRIPTION					
15	809900	2	Support Bracket					
16	828085	1	Assembly, Adjusting Nut P/M					
17	202027	2	Washer 1/2" dia.					
18	192126	2	Nut 1/2" NF Nylok®					
19	731720	2	Nut 7/16" dia.					
20	731625	2	Washer 7/16" dia.					
22	010924	4	Washer 5/16" dia.					
ADAPT	ADAPTER KIT# H05039							
40	772720	1	Extension Plate					
REPLACEMENT HARDWARE MOUNTING KIT# 724021								
Includes all mounting hardware excluding the Support Rod part# 730229.								

TWIN ENGINES

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE Manufacturer	YEAR	MODEL	CYLINDER	ENGINE Single	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
YAMAHA	1989-TO DATE	50-70 HP	HC5342	NOT REQ	H05009 & H05021	H05021	



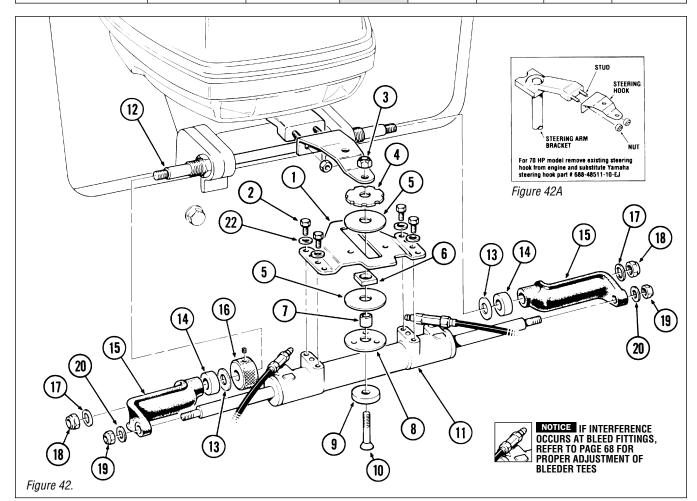
ITEM	PART #	∩т∨	DESCRIPTION				
	FANI#	uli					
ADAPTER KIT# H05009							
50	113529	2	Nut 3/8" NF Nylok®				
51	113622	4	Washer 3/8" dia.				
52	722721	1	Stringer Tube				
53	722523	1	Threaded Rod c/w Ball Joint				
54	N/A	1	Obsolete–No longer required				
55	192126	1	Nut 1/2" NF Nylok®				
56	116527	1	Ball Joint				
57	726825	2	Screw 3/8" NF x 1-3/4" Hex Head				

ITEM	PART #	QTY	DESCRIPTION
ADAPT	ER KIT# H	05046	
60	773328	2	Extension plate
61	773421	2	Spacer
62	113529	3	Nut 3/8" NF Nylok®
63	185921	2	Screw 3/8" NF x 1-5/8" Flat Head
64	113321	1	Screw 3/8" NF x 1-1/4" Hex Head
65	736028	1	Bottom Washer (3 Holes)

SINGLE ENGINE

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE MANUFACTURER	YEAR	MODEL	CYLINDER	ENGINE Single	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
ҮАМАНА	1989-TO DATE	90 HP	HC5342	NOT REQ	H05009 & H05021	H05021	



ITEM	PART #	QTY	DESCRIPTION
1	722222	1	Slide Plate
2	742724	4	Screw 5/16" x 3/4" Hex Head
3	113529	1	Nut 3/8" NF Nylok®
4	721220	1	Notched Washer
5	727724	2	Slide Washer
6	729221	1	Slide Follower
7	721126	1	Follower Bush
8	736028	1	Bottom Washer (3 Hole)
9	721427	1	Countersunk Washer
10	185921	1	Screw 3/8" x 1 5/8" Flat Head
11	HC5344	1	Cylinder c/w Bleed Tee's
12	730229	1	Support Rod
13	202121	2	Washer 5/8" dia.

ITEM	PART #	QTY	DESCRIPTION				
14	985876	2	Spacer				
15	809900	2	Support Brackets				
16	828085	1	Assembly, Adjusting Nut P/M				
17	202027	2	Washer 1/2" dia.				
18	192126	2	Nut 1/2" NF Nylok®				
19	731720	2	Nut 7/16" dia.				
20	731625	2	Washer 7/16" dia.				
22	010924	4	Washer 5/16" dia.				
REPLACEMENT HARDWARE MOUNTING KIT# 724021							
Includes all mounting hardware excluding the Support Rod part# 730229.							

TWIN ENGINES

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE MANUFACTURER	YEAR	MODEL	CYLINDER	ENGINE SINGLE	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
YAMAHA	1989-TO DATE	70-90 HP	HC5342	NOT REQ	H05009 & H05021	H05021	

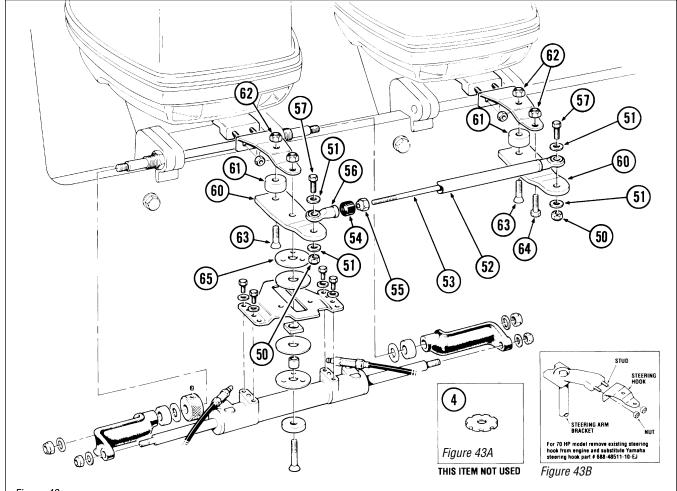


Figure 43.

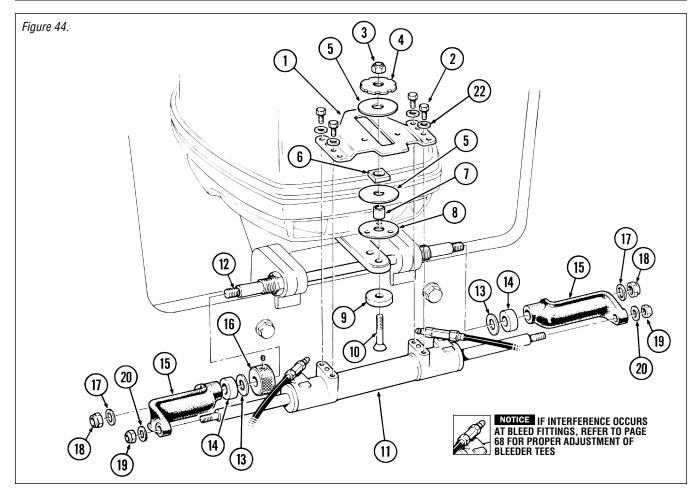
ΔΠΔΡΤΕ			
	R KIT# HO	5009	
50	113529	2	Nut 3/8" NF Nylok®
51	113622	4	Washer 3/8" dia.
52	722721	1	Stringer Tube
53	722523	1	Threaded Rod c/w Ball Joint
54	N/A	1	Obsolete–No longer required
55	192126	1	Nut 1/2" NF Nylok®
56	116527	1	Ball Joint
57	726825	2	Screw 3/8" NF x 1-3/4" Hex Head

ADAPTER KIT# H05046 60 773328 2 Extension plate 61 773421 2 Spacer 62 113529 3 Nut 3/8" NF Nylok® 63 185921 2 Screw 3/8" NF x 1-5/8" Flat Head 64 113321 1 Screw 3/8" NF x 1-1/4" Hex Head 65 736028 1 Bottom Washer (3 Holes)	ITEM	PART #	QTY	DESCRIPTION
61 773421 2 Spacer 62 113529 3 Nut 3/8" NF Nylok® 63 185921 2 Screw 3/8" NF x 1-5/8" Flat Head 64 113321 1 Screw 3/8" NF x 1-1/4" Hex Head	ADAPT	ER KIT# H	05046	
62 113529 3 Nut 3/8" NF Nylok® 63 185921 2 Screw 3/8" NF x 1-5/8" Flat Head 64 113321 1 Screw 3/8" NF x 1-1/4" Hex Head	60	773328	2	Extension plate
63 185921 2 Screw 3/8" NF x 1-5/8" Flat Head 64 113321 1 Screw 3/8" NF x 1-1/4" Hex Head	61	773421	2	Spacer
64 113321 1 Screw 3/8" NF x 1-1/4" Hex Head	62	113529	3	Nut 3/8" NF Nylok®
	63	185921	2	Screw 3/8" NF x 1-5/8" Flat Head
65 736028 1 Bottom Washer (3 Holes)	64	113321	1	Screw 3/8" NF x 1-1/4" Hex Head
	65	736028	1	Bottom Washer (3 Holes)

SINGLE ENGINE

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE Manufacturer	YEAR	MODEL	CYLINDER	ENGINE SINGLE	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
YAMAHA	1987-TO DATE 1990-TO DATE 1990-TO DATE	115-220 HP 250 HP 80-140 HP	HC5342 HC5342 HC5342	NOT REQ NOT REQ NOT REQ	H05006A N/A H05006A	H05036A H05047A H05036A	



ITEM	PART .	QTY	DESCRIPTION
1	722222	1	Slide Plate
2	742724	4	Screw 5/16" x 3/4" Hex Head
3	113529	1	Nut 3/8" NF Nylok®
4	721220	1	Notched Washer
5	727724	2	Slide Washer
6	729221	1	Slide Follower
7	721126	1	Follower Bush
8	736028	1	Bottom Washer (3 Hole)
9	721427	1	Countersunk Washer
10	185921	1	Screw 3/8" x 1 5/8" Flat Head
11	HC5344	1	Cylinder c/w Bleed Tee's
12	730229	1	Support Rod
13	202121	2	Washer 5/8" dia.
14	985876	2	Spacer

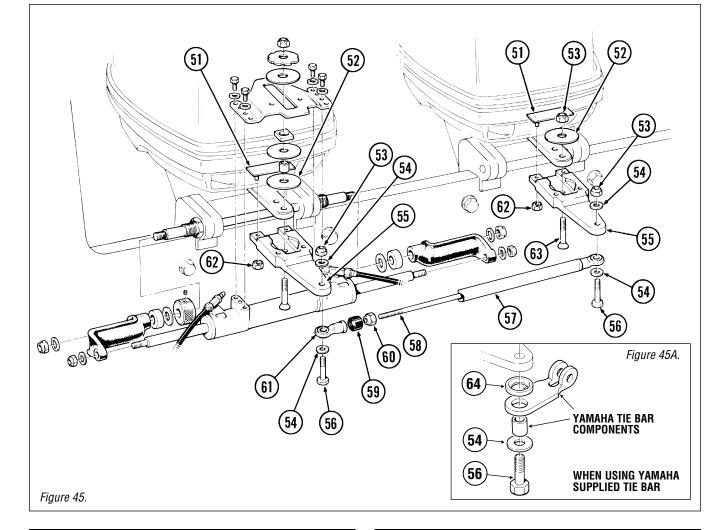
ITEM	PART #	QTY	DESCRIPTION
15	809900	2	Support Brackets
16	828085	1	Assembly, Adjusting Nut P/M
17	202027	2	Washer 1/2" dia.
18	192126	2	Nut 1/2" NF Nylok®
19	731720	2	Nut 7/16" dia.
20	731625	2	Washer 7/16" dia.
22	010924	4	Washer 5/16" dia.
REPLA	CEMENT H	ARDW	ARE MOUNTING KIT# 724021
1			hand and a state of the state o

Includes all mounting hardware excluding the Support Rod part# 730229.

TWIN ENGINES

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE Manufacturer	YEAR	MODEL	CYLINDER	ENGINE Single	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
YAMAHA	1987-TO DATE 1990-TO DATE 1990-TO DATE	115-225 HP 250 HP 80-140 HP	HC5342 HC5342 HC5342	NOT REQ NOT REQ NOT REQ	H05006A N/A H05006A	H05036A H05047A H05036A	



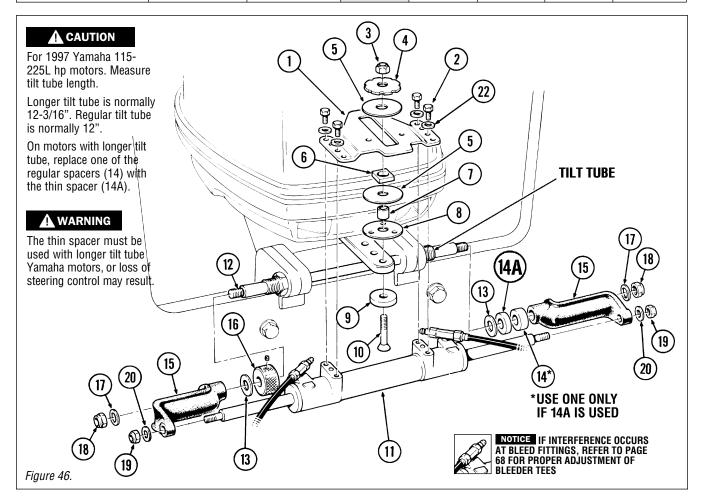
ITEM	PART #	QTY	DESCRIPTION
51	722928	2	Clamp Plate
52	753428	2	Bottom Washer (MC)
53	113529	3	Nut 3/8" NF Nylok®
54	113622	4	Washer 3/8" dia.
55	727122	2	Extension Plate
56	186426	2	Screw 3/8" x 21/4" Hex Head
57	722721	1	Stringer Tube
58	722523	1	Threaded Rod c/w Ball Joint
59	N/A	1	Obsolete–No longer required
60	192126	1	Nut 1/2" NF Nylok®

ITEM	PART #	QTY	DESCRIPTION		
61	116527	1	Ball Joint		
62	191424	4	Nut 1/4" NC Nylok®		
63	185921	1	Screw 3/8" x 15/8" Flat Head		
WHEN USING YAMAHA SUPPLIED TIE BAR					
64	468721	2	Spacer (for use with Yamaha Tie Bar)		

SINGLE ENGINE

A WARNING Refer to page 68 for correct torque specifications of all installation hardware.

ENGINE MANUFACTURER	YEAR	MODEL	CYLINDER	ENGINE Single	ADAPTER PLAT TWIN c/w tie-rod	ES TWIN w/o tie-rod	
YAMAHA	1997	115-225L HP 225X-250 HP	HC5342 HC5342	NOT REQ NOT REQ	H05047A N/A	H05036A H05047A	



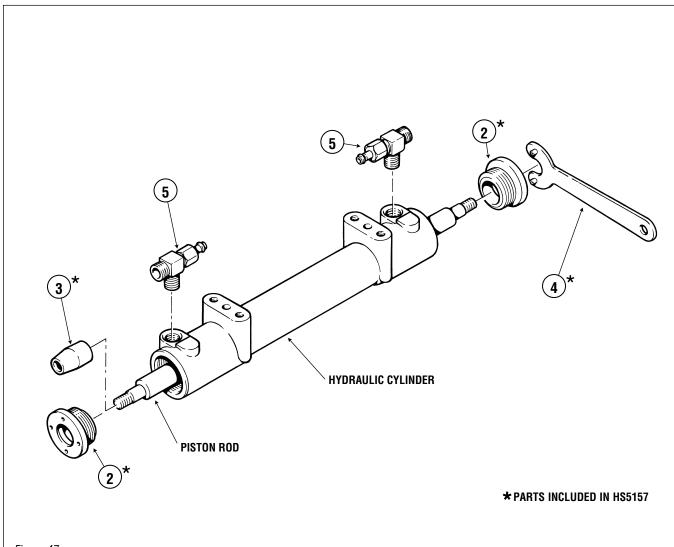
ITEM	PART #	QTY	DESCRIPTION
1	722222	1	Slide Plate
2	742724	4	Screw 5/16" x 3/4" Hex Head
3	113529	1	Nut 3/8" NF Nylok®
4	721220	1	Notched Washer
5	727724	2	Slide Washer
6	729221	1	Slide Follower
7	721126	1	Follower Bush
8	736028	1	Bottom Washer (3 Hole)
9	721427	1	Countersunk Washer
10	185921	1	Screw 3/8" x 1 5/8" Flat Head
11	HC5344	1	Cylinder c/w Bleed Tee's
12	730229	1	Support Rod
13	202121	2	Washer 5/8" dia.
14	985876	2	Spacer

ITEM	PART #	QTY	DESCRIPTION				
14A	728994	1	Spacer Thin				
15	809900	2	Support Brackets				
16	828085	1	Assembly, Adjusting Nut P/M				
17	202027	2	Washer 1/2" dia.				
18	192126	2	Nut 1/2" NF Nylok®				
19	731720	2	Nut 7/16" dia.				
20	731625	2	Washer 7/16" dia.				
22	010924	4	Washer 5/16" dia.				
REPLA	REPLACEMENT HARDWARE MOUNTING KIT# 724021						

Includes all mounting hardware excluding the Support Rod part# 730229.

SEAL REPLACEMENT KITS

Front Mount Cylinder (Part # HC5342/43/44)





ITEM	PART#	QTY	DESCRIPTION
1	HS5157	1	Seal Kit, c/w Two Seal Glands & Pin Wrench
2	797021	1	Seal Gland Only
3	745920	1	Seal Gland Assembly Guide Tool
4	745525	2	Pin Wrench Only
5	409620	2	Bleeder Tee Fitting (not included)
6	002222	2	O-Ring for Bleeder Fittings
7	222228	2	O-Ring for Bleeder Fittings

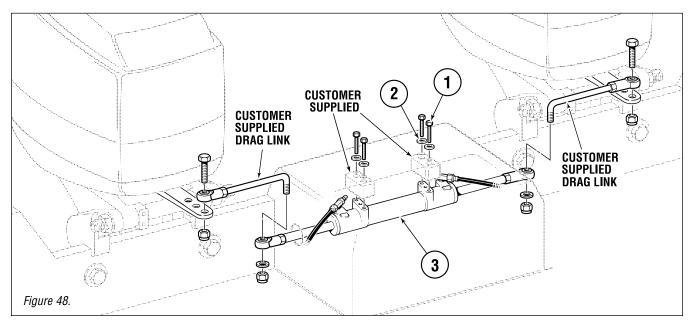
CATAMARAN OUTBOARD STEERING

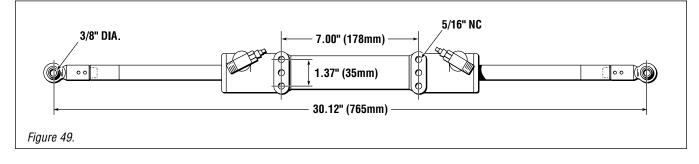
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Cylinder Part # HC5343

To establish whether or not this cylinder is suitable for your application, the following points should be considered:

- **1.** Fore and aft alignment of cylinder. If not mounted in line, motors will have a different turning radius.
- 2. Distance between motors.
- 3. Distance of travel in tilt arc.
- 4. Horizontal alignment of cylinder.





Technical Information

Seal Replacement Kit Part # HS5157 Cylinder Volume 8.13 cu. in. (133.2cc) Cylinder Stroke 10" Fittings 3/8" compression Threads 9/16" x 24 extra fine

ITEM	PART#	QTY	DESCRIPTION
1	799865	4	Screw HHCS 5/16" NC x 1" SS
2	010924	4	Washer 5/16" dia.
3	HC5343	1	Tandem Catamaran Steering Cylinder

TECHNICAL INFORMATION

Bolt Torque Specifications

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.

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

Bolt Size	18-8SS	Brass	Bolt Size	18-8SS	Brass	Bolt Size	18-8SS	Brass
2-56	2.5 (.282)	2.0 (.226)	6-32	9.6 (1.08)	4.9 (.554)	5/16"-18	132.0 (14.91)	107.0 (12.10)
2-64	3.0 (.338)	2.5 (.282)	6-40	12.0 (1.35)	9.9 (1.12)	5/16"-24	142.0 (16.04)	116.0 (13.11)
3-48	3.9 (.440)	3.2 (.361)	8-32	20.0 (2.25)	16.0 (1.81)	3/8"-16	236.0 (26.66)	192.0 (21.71)
3-56	4.4 (.497)	3.6 (.407)	8-36	22.0 (2.48)	18.0 (2.03)	3/8"-24	259.0 (29.20)	212.0 (23.97)
4-40	5.2 (.587)	4.3 (.486)	10-24	23.0 (2.59)	19.0 (2.14)			
4-48	6.6 (.740)	5.4 (.610)	10-32	32.0 (3.61)	26.0 (2.94)			
5-40	7.7 (.869)	6.3 (.712)	1/4"-20	75.0 (8.47)	62.0 (7.01)			
5-44	9.4 (1.06)	7.7 (.869)	1/4"-28	94.0 (10.6)	77.0 (8.70)			

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

Bolt Size	18-8SS	Brass	Bolt Size	18-8SS	Brass	Bolt Size	18-8SS	Brass
7/16"-14 7/16"-20	31.0 (42.00) 33.0 (44.74)	26.0 (35.25) 27.0 (36.61)	5/8"-11 5/8"-18	93.0 (126.09)	76.0 (103.04)	1"-8 1"-14	287.0 (389.12)	235.0 (318.62)
1/2"-13	()	. ,		104.0 (141.00)	85.0 (115.24)	1 - 14	259.0 (351.16)	212.0 (287.43)
1/2 -13	43.0 (58.30) 45.0 (61.01)	35.0 (47.45) 37.0 (50.17)	3/4"-10 3/4"-16	128.0 (173.55) 124.0 (168.12)	104.0 (141.00) 102.0 (138.29)			
9/16"-12	57.0 (77.28)	47.0 (63.72)	7/8"-9	194.0 (236.03)	159.0 (215.58)			
9/16"-18	63.0 (85.42)	51.0 (69.15)	7/8"-14	193.0 (261.67)	158.0 (214.22)			

NOTICE Torque values for 18-8 stainless steel and brass bolts are taken from a torque guide by ITT Harper. All results correspond well with basic bolt equations, using a bolt factor of 0.2 and a factor of 3/4 for a reusable connection.

Cylinder Front Mount	INSIDE DIAMETER 1.262" (32.56 mm)	STROKE 10" (254 mm)	
	VOLUME 8.13 cu. in. (133.2 cc)	TORQUE @ 1000 psi (70 Bar) H.O. N/A	
Fittings	SeaStar cylinders and all other fitting Threads are 9/16" x 24 extra fine. A available from SeaStar Solutions.	gs are 3/8" compression type fittings brochure on all SeaStar fittings is	
NOTICE Regarding adjustment of Bleeder Tee Fitting (part# 409620) on steering cylinder HC5342-44. If interference occurs between the splashwell and hydraulic hose or hose fitting the fittings can be adjusted but must be removed completely prior to	Solutions recommends that once a fitting has been backed off (turned in a counter rotational direction) it is important to remove the fitting completely to avoid leakage. Remove the fitting, clean the threads and re-apply PST (pipe sealant with Teflon). This will ensure that the fitting does not	leak once re-oriented to desired angle. The fitting must be torque to a min of 17-ft lbs. and then oriented to the desire angle. Max torque is 55-ft lbs. DO NOT adjust fitting so that it points to the Starboard or in the direction that the	

SeaStar I, II, & Pro Hose

Inside diameter - 5/16" (8 mm)

WARRANTY

Statement of Limited Warranty

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

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

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

Return Goods Procedure

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

Be sure to label the goods with: a) the name and address of the sender, and b) the return goods authorization number (claim number)

Please address the returned goods as follows:

From U.S.A.

RGA # ? SeaStar Solutions c/o UPS-SCS 19308 70th Ave S. Kent, WA 98032

From Canada

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

Technical Support

Phone: 604-248-3858

email: seastar@seastarsolutions.com

Hours: Monday - Friday 05:00 – 15:30 PST

Web: www.seastarsolutions.com

Notes	

Notes	



SEASTAR SOLUTIONS 3831 NO.6 ROAD RICHMOND, B.C. CANADA V6V 1P6

FAX 604-270-7172

www.seastarsolutions.com

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FORM NO. 296221 Rev. H

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PRINTED IN CANADA

05/16