

MEMBER  
**ABYC**  
Setting Standards for Safer Boating



*BayStar*<sup>™</sup>

*Capitano*<sup>™</sup>  
and

*SeaStar*<sup>®</sup>

ARE MANUFACTURED BY

**Teleflex**<sup>®</sup>  
Teleflex Canada

**INTERNATIONAL**

**OWNERS MANUAL**

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



*SeaStar*<sup>®</sup>

Hydraulic Steering for Outboard  
Powered Vessels

Front Mount Cylinder HC5345, HC5347 HC5348  
Side Mount Cylinder HC5370 and  
Splashwell Mount Cylinder HC5380

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

# Notice to Boat Manufacturer or Installer

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

## Observe Them Carefully!

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

 <b>DANGER</b>	 <b>WARNING</b>	 <b>CAUTION</b>	<b>NOTICE</b>
<b>Immediate hazards which WILL result in severe personal injury or death.</b>	<b>Hazards or unsafe practices which COULD result in severe personal injury or death.</b>	<b>Hazards or unsafe practices which COULD result in minor injury or product or property damage.</b>	<b>Information which is important to proper installation or maintenance, but is not hazard-related.</b>

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# BEFORE OPERATING YOUR BOAT

Ensure that the following check list is carried out

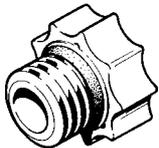
- 1 Perform system pressure test by turning helm all the way to hard over and then forcing the helm another 1/4 to 1/2 turn. This should be done in both directions. This will pressurize the system. Any weakness in the system should show up at this time.
- 2 Confirm that extruded nylon tubing has **NOT** been substituted for SeaStar Hydraulic Steering Hose.
- 3 Confirm that there is no interference between the steering cylinder and the transom, splashwell or jackplate or any combination of these parts by performing these simple steps:
  - With 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 also must 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 lift 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.
  - Stretched, kinked or chafed hose will fail over a period of time.

## ⚠ WARNING

**Failure to comply with above may result in loss of steering, causing property damage and/or personal injury**

## Fill Plugs for SeaStar Helms

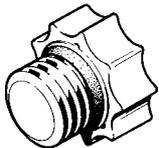
### VENT PLUG - Part No. HA5431



#### SUPPLIED WITH SEASTAR HELM PUMP

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

### NON-VENT PLUG - Part No. HA5432



- MUST BE USED ON ALL HELM PUMPS OTHER THAN UPPERMOST HELM PUMP ON MULTI STEERING STATION SYSTEMS.
- THIS NON-VENT PLUG IS SUPPLIED WITH ADDITIONAL STATION FITTING KIT NO. HF5501 AND HF5502.

## Hydraulic Fluid

Recommended oils for your steering system are:

SeaStar Hydraulic Fluid, part no. HA5430 (1 quart), HA5440 (1 Gal.)

Texaco HO15

Shell Aero 4

Esso Univis N15

Chevron Aviation Fluid A

Mobil Aero HFA

Fluids meeting Mil H5606 specifications.

Automatic transmission fluid Dexron II may be used in an emergency.

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

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

# FILLING AND PURGING THE SYSTEM

## Read First

These instructions show how to fill and purge a Single Station Front Mount Cylinder System. The same steps apply to Single Station Side Mount / Splashwell Mount Systems, the difference being which bleeder to open and close and the direction the cylinder rod moves. These variations are shown in inset diagrams at each step. For twin station and/or twin cylinder filling and purging instructions read instructions on Pages 6 and 7 first and then proceed with instructions on Page 3.

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

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

## Hydraulic Oil Requirements

2 bottles (2 quarts or liters) for single station and single cylinder systems.

1 additional bottle for each additional helm, cylinder, or auto pilot.

## NOTICE

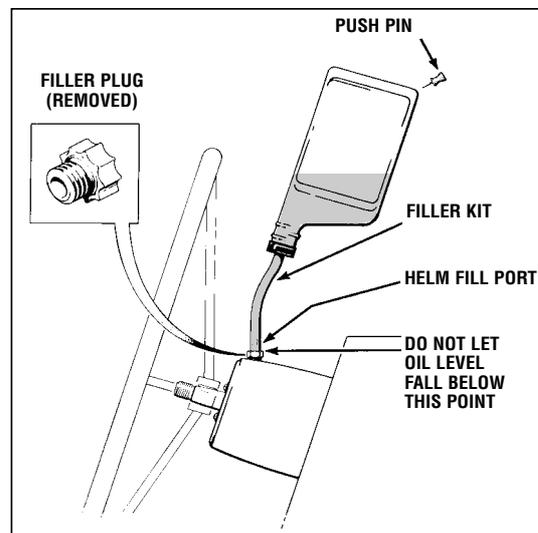
*Oil can be re-used if filtered through a fine mesh screen such as used for gasoline. If unable to filter oil, an additional bottle of oil is required.*

## 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.*

## NOTICE

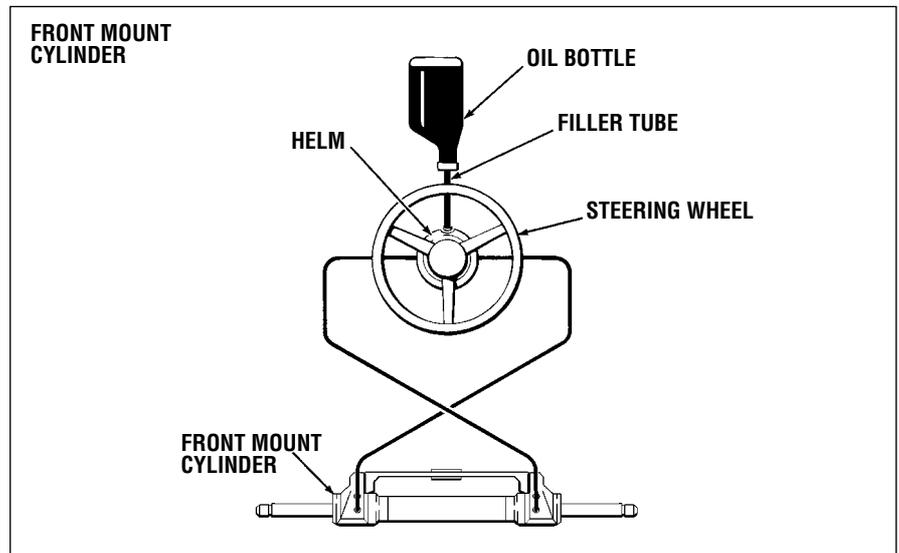
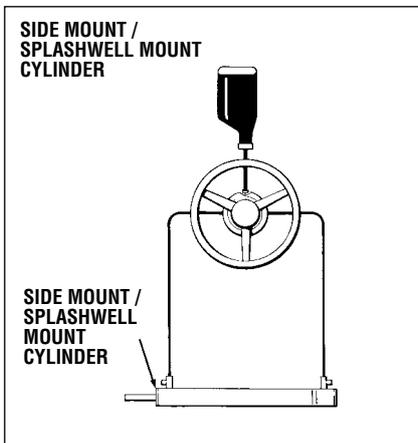
Filling the helm full of oil can be done faster if oil is poured into the helm prior to connecting filler tube and oil bottle to the helm. Part #HA5438.



# Single Station One Cylinder

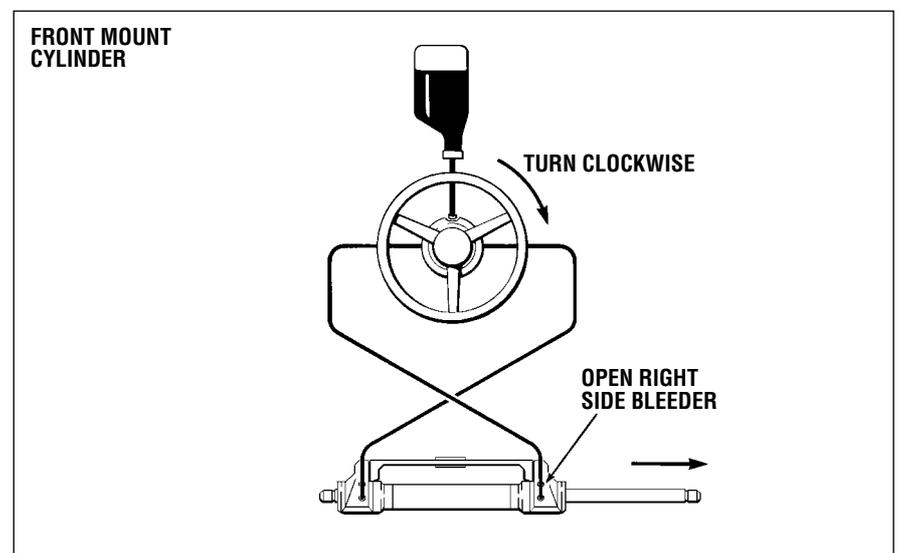
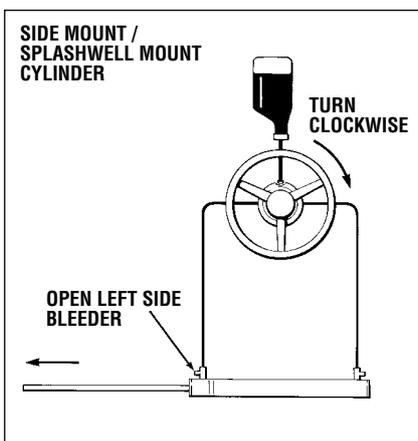
## Step 1

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



## Step 2

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

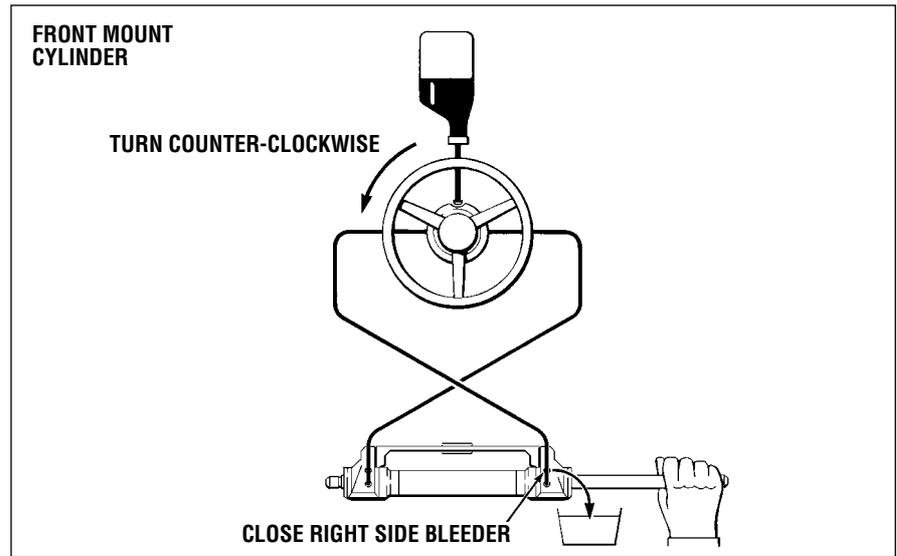
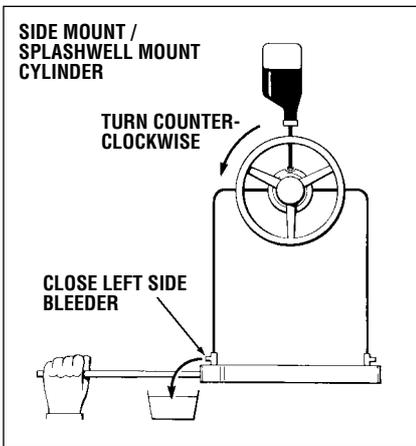


# HYDRAULIC STEERING

## FILLING AND PURGING

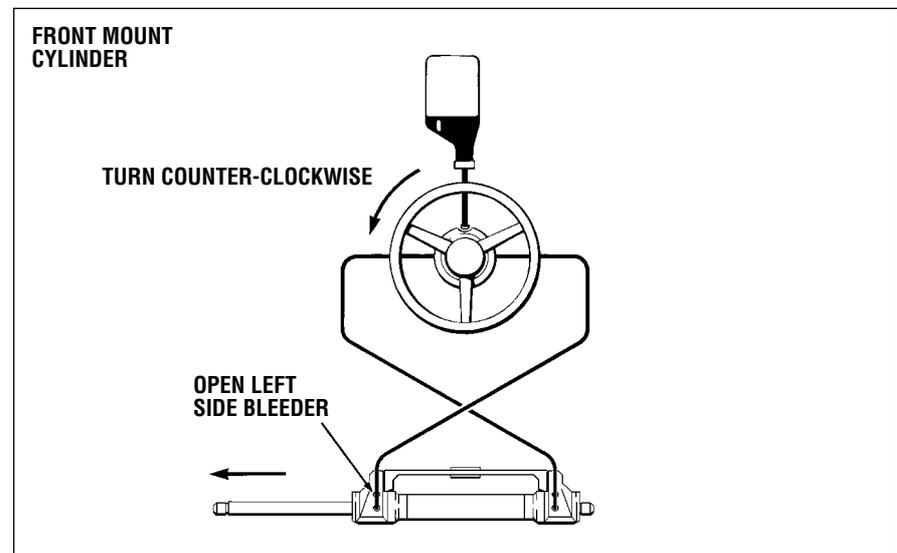
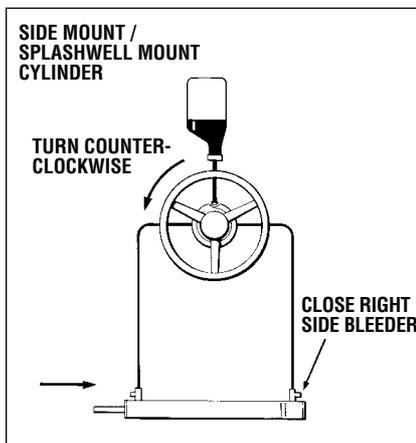
### Step 3

- 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 oil comes out of the bleeder. (Drain out approx. 1/2 bottle of oil or as required).
- Do not use anything other than your hands to restrain the cylinder rod.**
- While continuing to turn the wheel close the right side bleeder and let go of the cylinder rod.



### Step 4

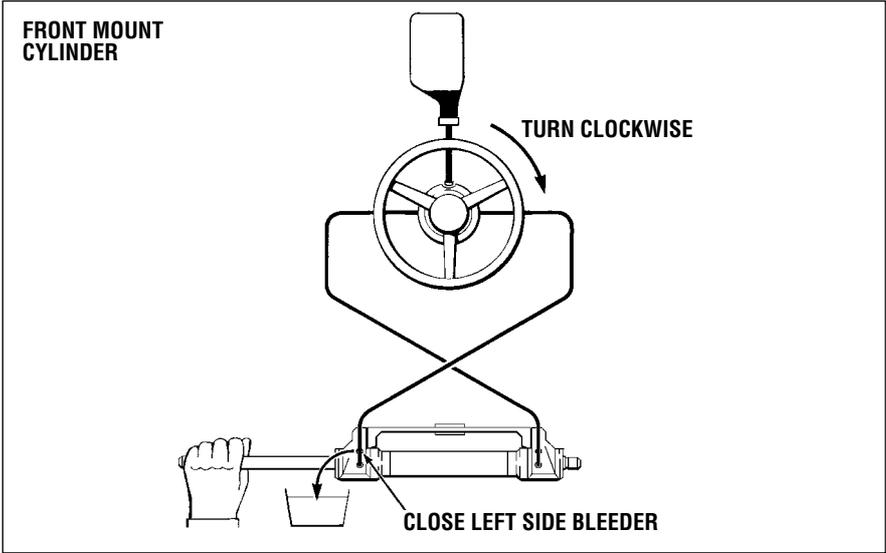
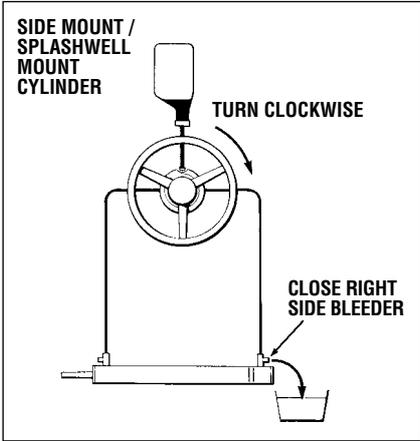
- Continue turning the steering wheel counter-clockwise until the cylinder rod is fully extended to the left. (Steering wheel will come to a stop).
- Open the left bleeder.



**Step 5**

- Holding the cylinder rod to prevent it from moving back into the cylinder turn the steering wheel clockwise until a steady stream of air free oil 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.**



**Note:** Refer to Page 7 for oil level and system check, when properly bled, steering wheel turns will be;

	Front Mount	Side Mount	Splashwell Mount
SeaStar 1.7	4.5	4.9/5.8	5.5/6.5
SeaStar 2.4	3.25	3.5/4.1	3.9/4.6
SeaStar Pro 2.0	4.0	N/A	N/A

## HYDRAULIC STEERING

### FILLING AND PURGING

# Twin Station Single Cylinder

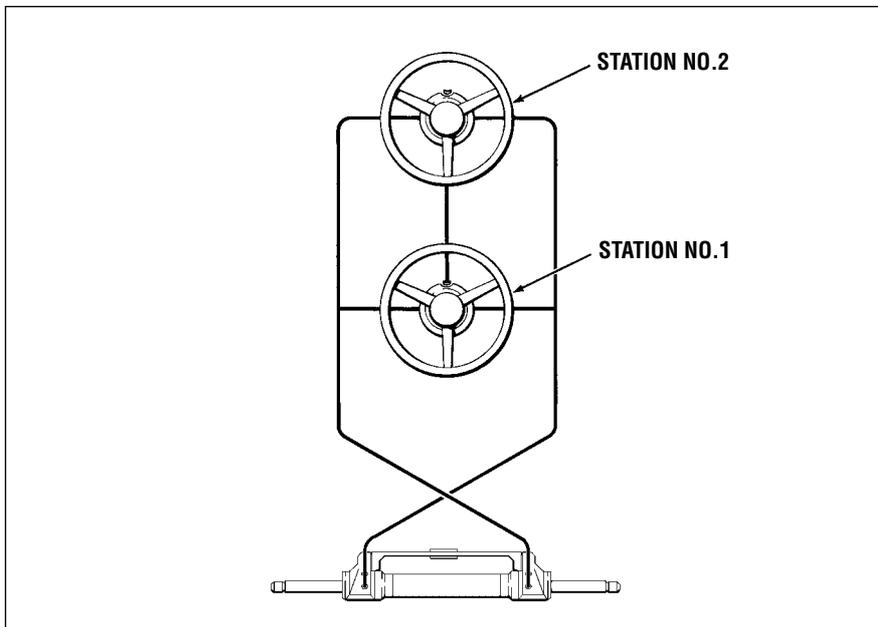
Perform steps 1 through 5 at station no. 1. Then repeat steps 1-5 at station no. 2.

Oil requirements 4-5 bottles.

**Note:** Refer to Oil Level and System Check Page 7.

When properly bled, steering wheel turns will be;

	Front Mount	Side Mount	Splashwell Mount
SeaStar 1.7	4.5	4.9/5.8	5.5/6.5
SeaStar 2.4	3.25	3.5/4.1	3.9/4.6
SeaStar Pro 2.0	4.0	N/A	N/A



# Single Station Twin Cylinder

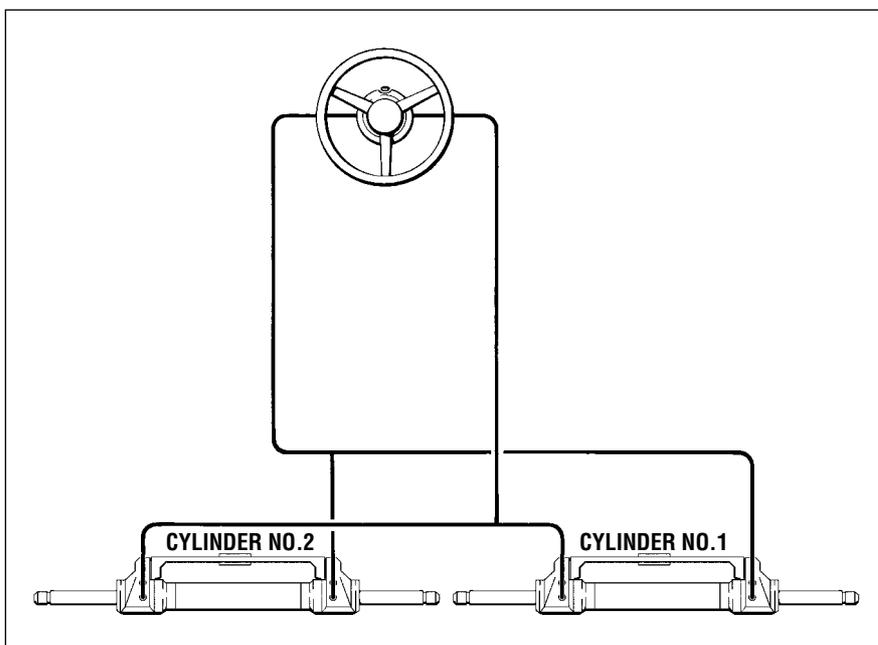
When performing steps 1 through 5, perform instructions in each step first on cylinder no. 1 and then on cylinder no. 2, before proceeding to the next step. ie: Perform instructions referring to right side of cylinder first on cylinder no. 1 and then on cylinder no. 2.

Oil requirements 4-5 bottles.

**Note:** Refer to Oil Level and System Check on Page 7.

Steering wheel turns should be;

	Front Mount x 2	Side Mount x 2	Splashwell Mount x 2
SeaStar 1.7	9.2	10.7	10.7
SeaStar 2.4	6.5	7.5	7.75
SeaStar Pro 2.0	7.8	9	N/A

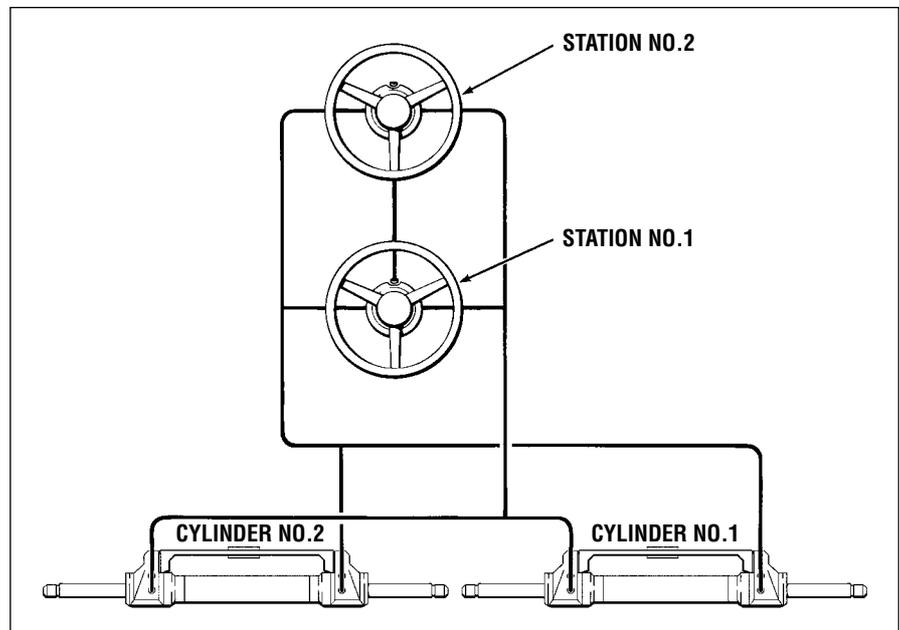


## Twin Station Twin Cylinder

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

**Note:** When properly bled, steering wheel turns will be;

	Front Mount x 2	Side Mount x 2	Splashwell Mount x 2
SeaStar 1.7	9.2	10.7	10.7
SeaStar 2.4	6.5	7.5	7.75



## OIL LEVEL AND SYSTEM CHECK

Helm mounted with wheel shaft completely horizontal must be filled to bottom of filler hole at all times. Do not allow oil level to drop more than 1/4" (6.3mm)

Helms mounted on a 20° angle or with wheel shaft vertical, oil level should be within 1/2" (12.7mm) of hole. Check oil level periodically.

**At this time the steering system must be checked for proper connections of hose, tube and fittings, possible leaks, and air removal. To do so, turn steering wheel (any one on a multi-steering station) and pressurize very hard to port. Apply enough force to the wheel to exceed pressure relief valve pressure.** You will not harm the helm of the system. While pressure is maintained on steering wheel, check all port (left) fittings and line connections for leaks. If no leaks are obvious your steering system is ready for use. If leaks are found, correct before using. Failure to correct leak will lower oil level in system and could result in loss of steering. Repeat procedure by turning wheel to starboard. Watch the oil level in the helm pump when the steering wheel reaches either hard over positions. If there is no obvious drop in oil level, air has been removed. If there is an obvious drop in oil level, you are compressing air and further filling and purging is required. Repeat Steps 1 through 5.

If interference occurs during engine tilt or trim between steering cylinder and splashwell or jackplate, contact your engine manufacturer for trim restrictors or a Tilt Stop Switch.

### ⚠ CAUTION

Side mount / splashwell mount cylinders are unbalanced. The oil level in the helm must be set with the cylinder rod fully retracted. Failing to observe this caution will result in a oil spill at the helm. Turning the wheel to port (left) will retract the cylinder rod.

### ⚠ CAUTION

Ensure that the cylinder can be fully stroked in both directions and in all tilt and trim positions without stretching or kinking the hydraulic hoses.

### ⚠ CAUTION

Failure to check for interference may result in cylinder, splashwell and/or engine damage.

# MAINTENANCE

**Maintenance requirements will vary depending on usage and climate. Bi-annual inspection by a qualified marine mechanic is required.**

**Remove, clean and grease the support tube annually with quality marine grease.**

Check the steering fluid level in the helm, it should be maintained at no less than 1/2" below the bottom of the filler cap threads.

Replace any hoses showing signs of wear and remove the cause or re-route hoses.

Check fittings and seal locations for leaks or damage and service as necessary.

If you have installed a jack plate make sure that there isn't any interference between the jack plate and your steering cylinder. If there is interference, it may occur during full tilt. Lift restrictors or a Tilt Stop Switch should be installed. Please consult your engine manufacturer.

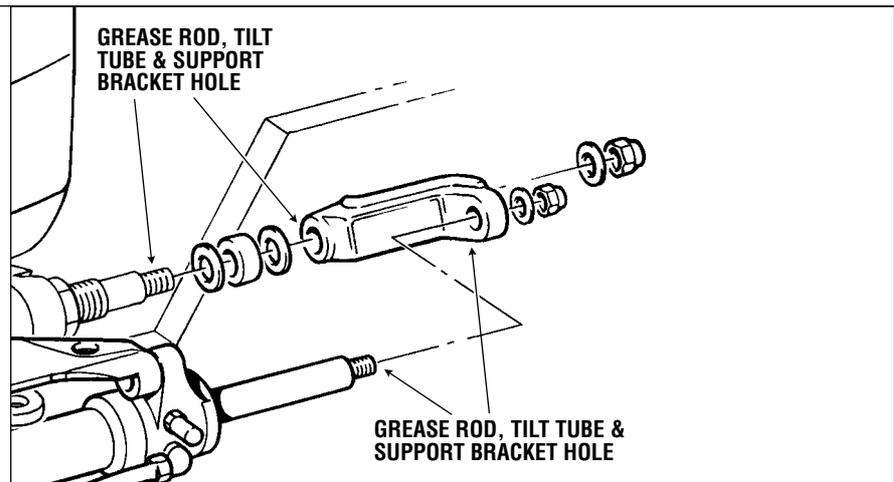
## ⚠ WARNING

**Failure to comply with maintenance checks may result in loss of steering, causing property damage and/or personal injury.**

**Maintenance requirements will vary depending on usage and climate. Bi-annual inspection by a qualified marine mechanic is required.**

**Remove, clean and grease the support tube annually with quality marine grease.**

## LUBRICATING INSTRUCTIONS



## ⚠ CAUTION

*Grease rod, tilt tube and support bracket holes once a year.*

# TROUBLE SHOOTING GUIDE

## 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. Teleflex 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.

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

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

FAULT	CAUSE	SOLUTION
<b>1. During Filling, the helm becomes completely jammed.</b>	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.
	Using unbalanced (side mount/splashwell mount) cylinder with SeaStar Pro Helm.	Use balanced cylinder or Standard SeaStar Helm.
<b>2. System is very difficult to fill. Air keeps burping out top of helm even after system appears full.</b>	Cylinder(s) has been mounted upside down. This causes air to be trapped in the cylinder(s).	Mount cylinder(s) correctly, according to cylinder installation instruction. Ports should always be kept in uppermost position.
	Air in system.	Review filling instructions.
	Bleed fitting leaking. Coiled hose.	Tighten bleed fitting. Uncoil or straighten the hydraulic hose.
<b>3. Steering is stiff and hard to turn, even when the vessel is not moving.</b>	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, tubing or fittings.	Find restriction and correct. <b>Note:</b> A kinked hose will cause stiff steering and should be replaced.
	Cylinder interfering with engine cowling.	Loose adjusting nut.

## HYDRAULIC STEERING

### TROUBLE SHOOTING

FAULT	CAUSE	SOLUTION
<b>3. Continued</b>	Air in oil.  Wrong oil has been used to fill steering system, like A.T.F. (automatic transmission fluid, or any other oil with a high viscosity factor).	See filling instructions supplied with helm units.  Drain system and fill with recommended oils.
<b>4. One helm unit in system is very bumpy and requires too many turns from hardover to hardover.</b>	Dirt in inlet check of helm pump.	Dismantle check valves and remove contaminant.  Refer to Fault #6.
<b>5. Steering is easy to turn at the dock, but becomes hard to turn when vessel is underway.</b>	Steering wheel is too small.  Incorrect setting of trim tab(s) engine.	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).
<b>6. Engine drifts to port or starboard while vessel is underway, even when wheel is not being turned.</b>	Dirt in check valves.	Remove check valve plugs. These are the larger plugs on either side on rear of helm. Clean ball seats and balls and re-assemble.  <b>Note:</b> Be prepared to lose a certain amount of oil during this procedure. Have a small can available. Refill and purge system when check valves have been re-assembled.
<b>7. Turning one wheel causes second steering wheel to rotate.</b>	See fault No. 6.	See fault No. 6.
<b>8. Seals will sometimes leak if steering system is not vented at uppermost helm.</b>		The SeaStar helm has a field replaceable wheel shaft seal which can be readily 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 HS5151.  <b>NOTE:</b> Seal kits are available for SeaStar cylinders, however, these must only be used by a qualified marine mechanic.



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