FILLING AND PURGING THE SYSTEM

Read First

NOTICE

If system is fitted with SeaStar Power Assist, please refer to your Power Assist Installation Manual for bleeding instructions.

NOTICE

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

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

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

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

Hydraulic Oil Requirements

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

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

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.

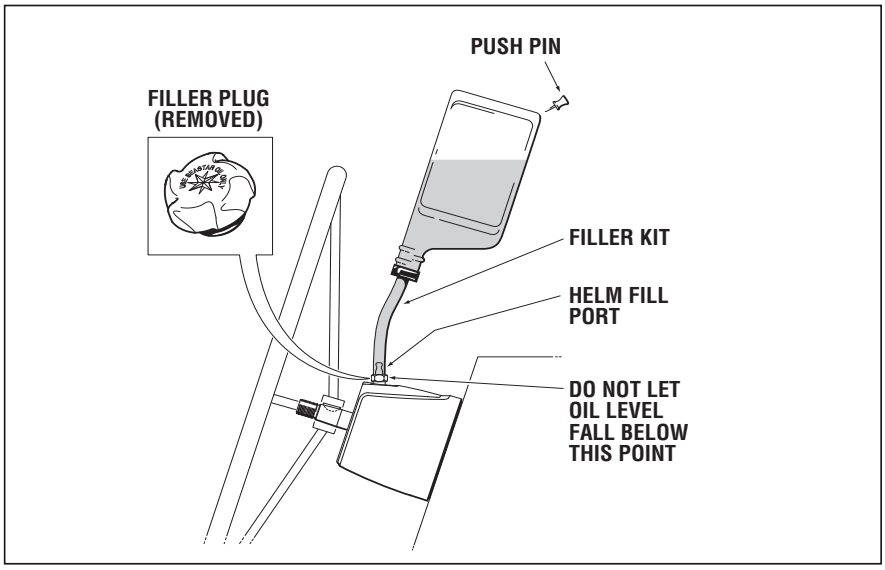


Figure 35.

NOTICE

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

Hydraulic Fluid

Recommended oils for your steering system are:

- SeaStar Hydraulic Fluid, part no. HA5430 (1 quart), HA5440 (1 Gal.)
- Texaco HO15
- Aero Shell Fluid #41
- Esso Univis N15
- Chevron Aviation Fluid A
- Mobil Aero HFA
- Fluids meeting Mil H5606 specifications.
- Automatic transmission fluid Dexron ll may be used in an emergency.

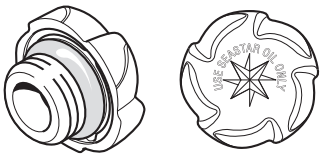
⚠ CAUTION

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

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

Fill Plugs for SeaStar Helms

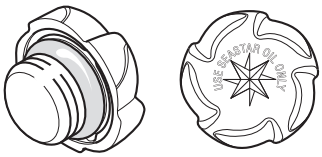
VENT PLUG - Part No. HA5431



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

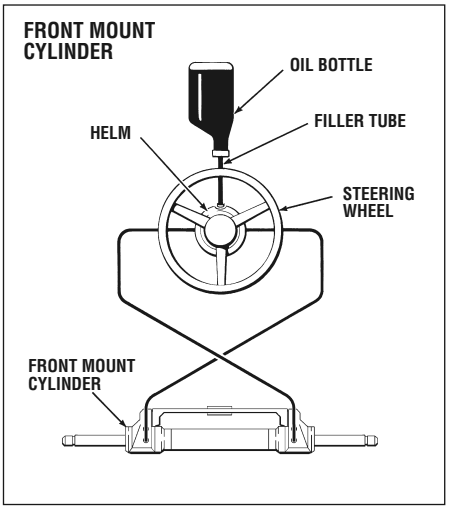


- MUST BE USED ON ALL HELM PUMPS OTHER THAN UPPERMOST HELM PUMP ON MULTI STEERING STATION SYSTEMS.
- THIS NON-VENT PLUG IS SUPPLIED WITH ADDITIONAL STATION FITTING KIT NO. HF5501 AND HF5502.

Figure 36.

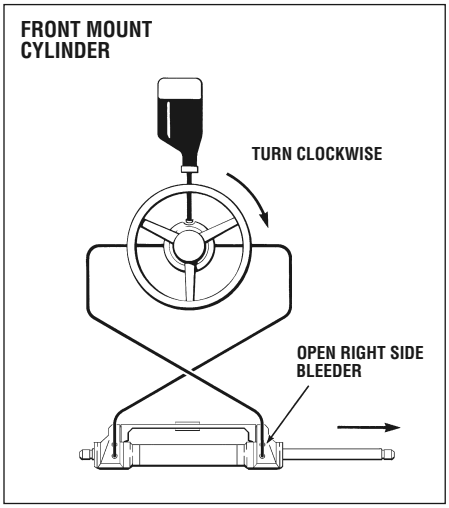
Single Station One Cylinder

Step 1



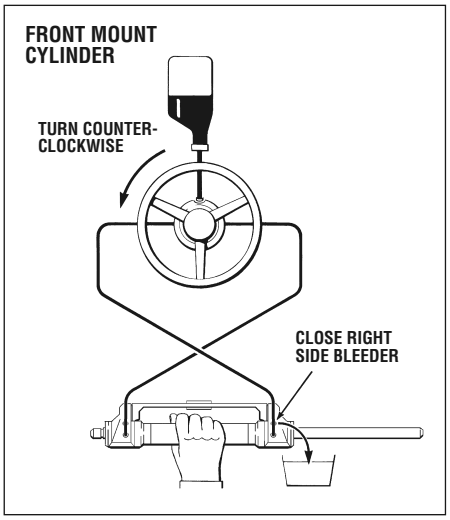
- Screw the threaded end of the filler tube into the helm filler port.
- Remove the cap from the oil bottle and holding upright screw into the filler tube bottle cap. Poke hole in the bottom of the bottle.
- Fill the helm pump full of hydraulic oil so that it is visible in the filler tube. Oil should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

Step 2



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

Step 3

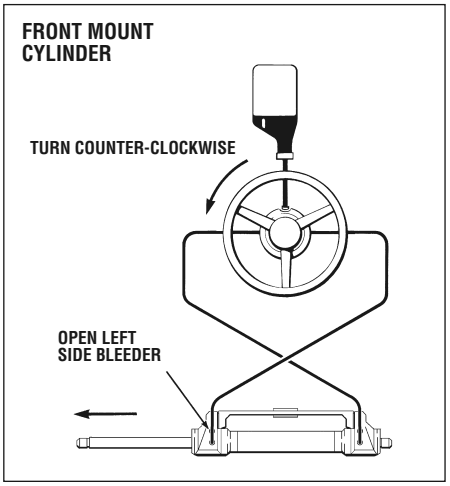


- Holding the cylinder body (Front Mount cylinder) or rod (Side Mount cylinder) to prevent the body/rod from moving, turn the steering wheel counter-clockwise until a steady stream of air free oil comes out of the bleeder. (Drain approx. 1/2 bottle of oil or as required).

  DO NOT use anything other than your hands to restrain the cylinder body/rod.

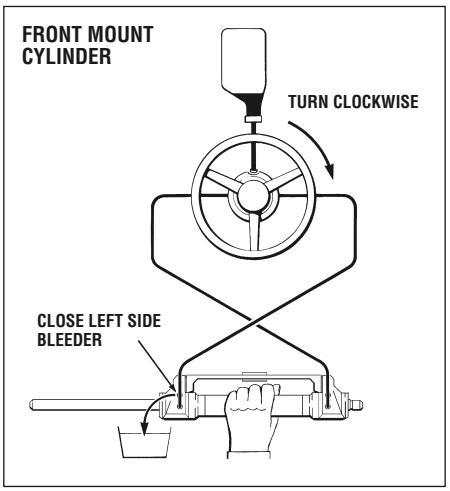
- While continuing to turn the wheel close the right side bleeder and let go of the cylinder body/rod.

Step 4



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

Step 5



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

⚠ CAUTION

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

No. Steering Wheel Turns	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

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

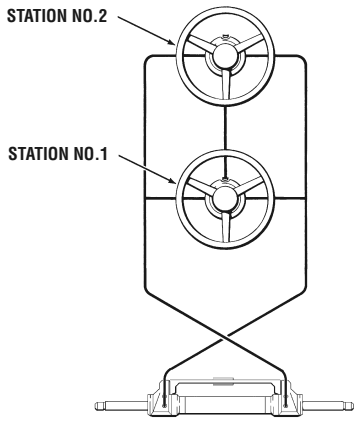
Twin Station Single Cylinder

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 40.

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



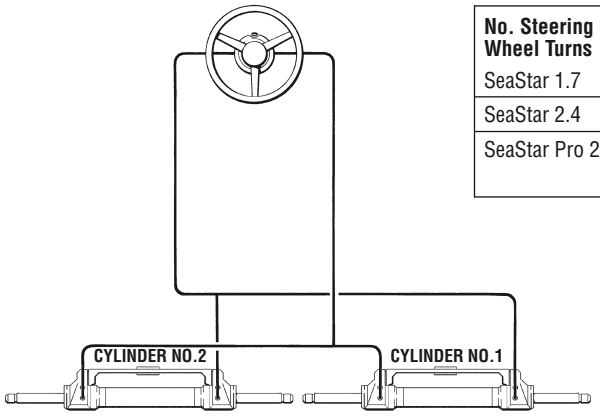
No. Steering Wheel Turns	Front Mount
SeaStar 1.7	4.5
SeaStar 2.4	3.25
SeaStar Pro 2.0	4.0

Single Station Twin Cylinder

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

Oil requirements 4-5 bottles.

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

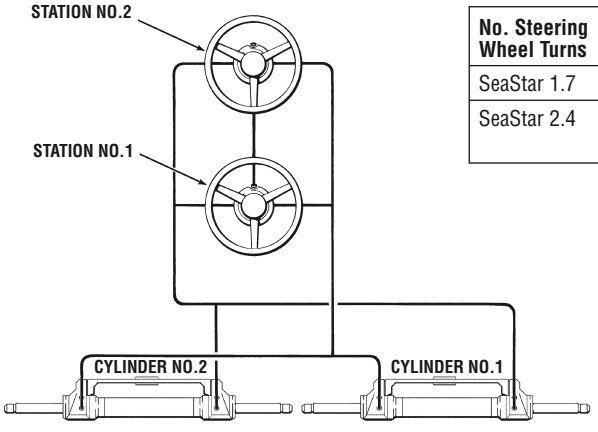


No. Steering Wheel Turns	Front Mount x 2
SeaStar 1.7	9.2
SeaStar 2.4	6.5
SeaStar Pro 2.0	7.8

Twin Station Twin Cylinder

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

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



No. Steering Wheel Turns	Front Mount x 2
SeaStar 1.7	9.2
SeaStar 2.4	6.5

Oil Level and System Check

Step 1 – Oil level Setting

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

⚠ CAUTION

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

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

Step 2 – System Check

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

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

  NOTICE *This step will NOT harm the system and any noise made during this step should not be considered a fault in the steering system.*
- If leaks are noticed they MUST be repaired prior to operating boat. After repair repeat bleeding procedures as outlined in this manual
- Repeat to the Port direction and inspect ALL starboard side connections, fittings, seals and hoses for leaks.

  NOTICE *This step will NOT harm the system and any noise made during this step should not be considered a fault in the steering system.*
- If leaks are noticed they MUST be repaired prior to operating boat. After repair repeat bleeding procedures as outlined in this manual.

⚠ WARNING

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