

Step 3 Filling & Purging the System

Read First

These instructions show how to fill and purge a SeaStar steering system with the SeaStar Autopilot pump installed. The same steps apply to ALL cylinders with the exception of which bleed fitting to open and close and the direction the cylinder rod moves. These variations are shown in inset diagrams at each step. For multiple steering stations, start with the lowest station while going through Steps 3.1.1 – 3.1.6, repeat at each higher station until complete. The use of a Power Purge kit (HA5445 or equivalent) is highly recommended and will improve the speed and quality of the purge procedure.

⚠ CAUTION

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 oil level to disappear into the helm pump, as this may introduce air into the system and increase your filling time.

Hydraulic Fluid

Due to recent upgrades in our steering system components, SeaStar Solutions recommends use of SeaStar Steering Fluid **ONLY** in our hydraulic steering systems. SeaStar Steering Systems have been engineered and validated using our proprietary SeaStar Hydraulic Steering Fluid. SeaStar Steering fluid is engineered with 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.

⚠ 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.

Use of any non-approved fluid may result in the following;

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

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

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

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

⚠ WARNING

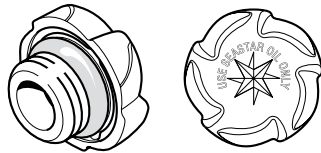
Never fill or mix brake fluids, triglycerides or polyalkylene glycols within a hydraulic steering system.

NOTICE

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

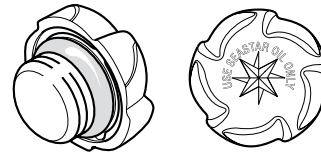
NOTICE

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

Fill Plugs for SeaStar Helms**VENT PLUG - Part No. HP6126**

SUPPLIED WITH SEASTAR HELM PUMP

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

NON-VENT PLUG - Part No. HP6000

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

Figure 7.

Step 3.1 Fill & Purge Manually

NOTICE

If using the SeaStar Power Purge JR/SR please refer to page 18.

The following procedure applies to a single helm and single cylinder installation.

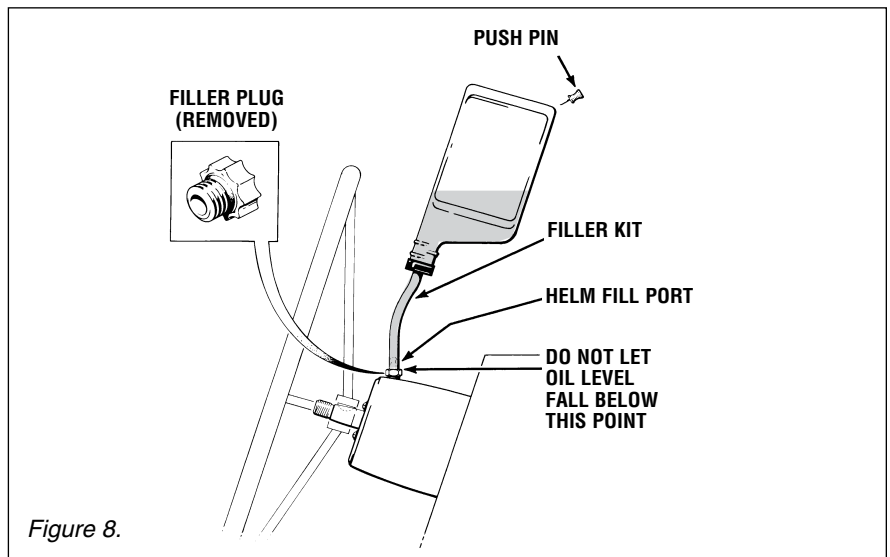
Other configurations will require this procedure plus the additional steps outlined on page 19.

3.1.1

- Attach helm filler kit (HA5438) and fluid bottle to the helm. Refer to figure 8.

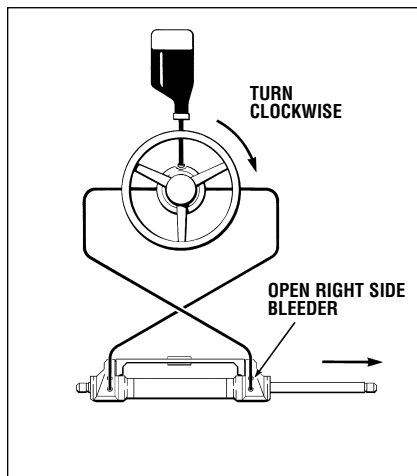
NOTICE

Filling the helm full of fluid prior to connecting the filler tube and oil bottle will decrease purge time.

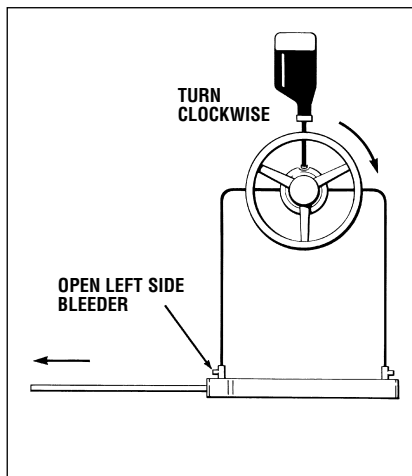


3.1.2

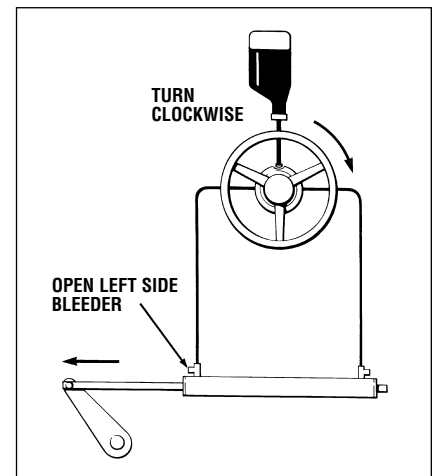
- Turn the steering wheel clockwise until the cylinder rod is fully extended as shown below.
- Open bleed fitting as per your installation.



Outboard Front Mount & HC5332-2 Cylinder



Side Mount / Splashwell Mount Cylinder



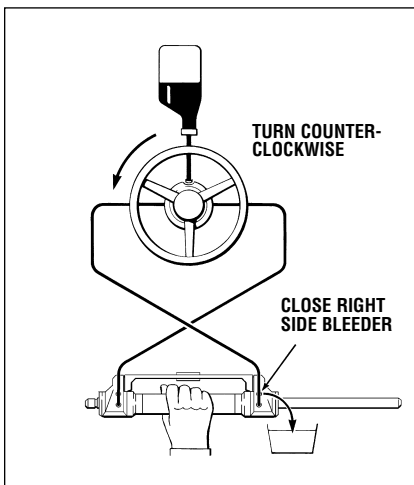
All Balanced Cylinder. Inboard & Sterndrive Cylinders

3.1.3

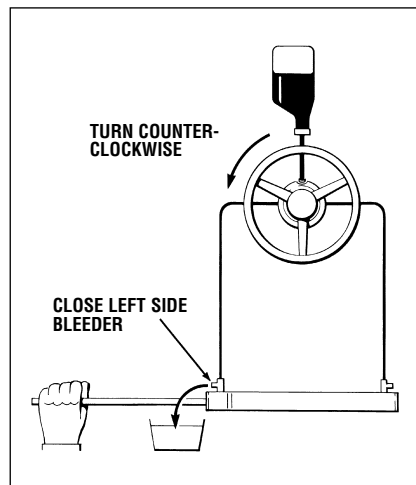
- Holding the cylinder body (Outboard Front Mount cylinder) or rod (Side Mount cylinder) to prevent the body/rod from moving, turn the steering wheel counter-clockwise until a steady stream of air free oil comes out of the bleeder. (Drain approx. 1/2 bottle of oil or as required).

Do not use anything other than your hands to restrain the cylinder body/rod.

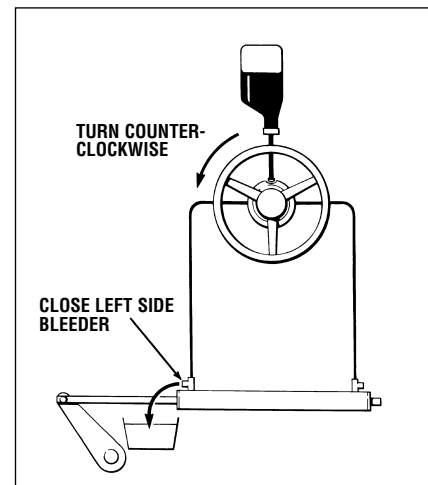
- **Run SeaStar Autopilot pump continuously in the same direction you have been turning for a minimum of 2 minutes.**
- While continuing to turn the wheel close the bleed fitting for your installation and let go of the cylinder body/rod.



Outboard Front Mount & HC5332-2 Cylinder



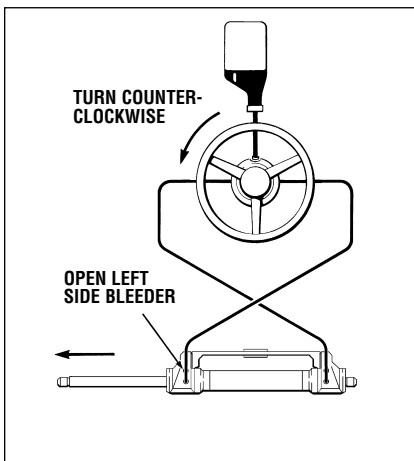
Side Mount / Splashwell Mount Cylinder



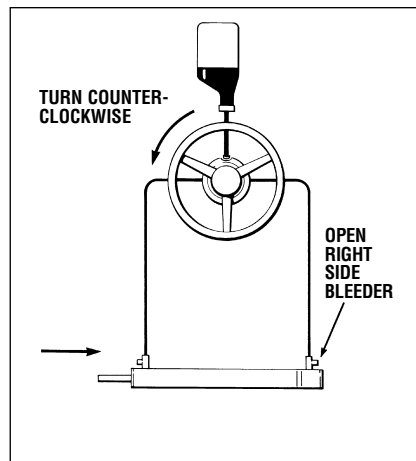
All Balanced Cylinder, Inboard & Sterndrive Cylinders

3.1.4

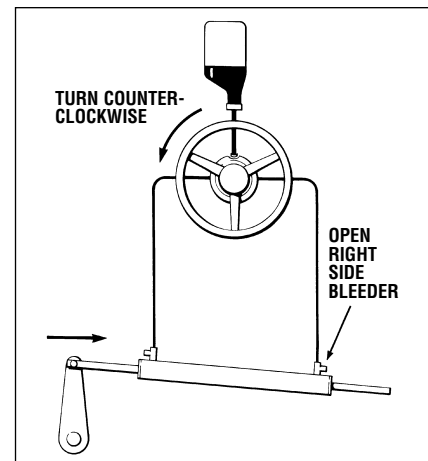
- Continue turning the steering wheel counter-clockwise until the cylinder rod is fully extended as shown below. Steering wheel will come to a stop.
- Open bleed fitting as per your installation.



Outboard Front Mount & HC5332-2 Cylinder



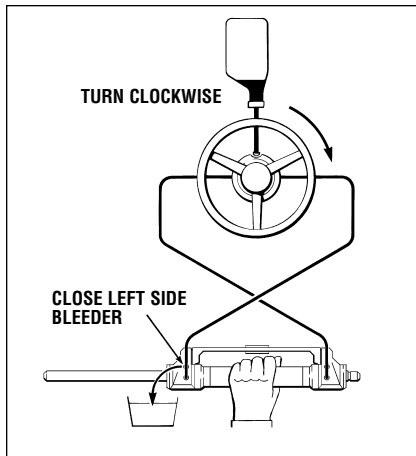
Side Mount / Splashwell Mount Cylinder



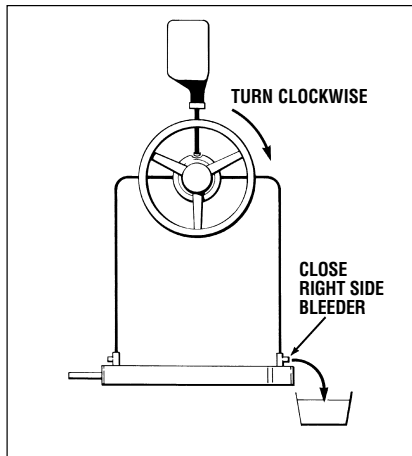
All Balanced Cylinder, Inboard & Sterndrive Cylinders

3.1.5

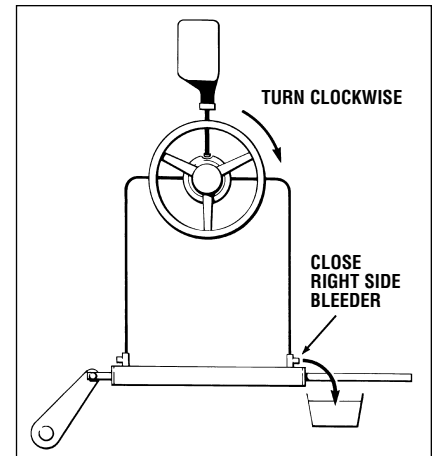
- Holding the cylinder body (Outboard Front Mount cylinder) or rod (Side Mount cylinder) to prevent the body/rod from moving, turn the steering wheel clockwise until a steady stream of air free oil comes out of the bleeder.
- **Run SeaStar Autopilot pump continuously in the same direction you have been turning for a minimum of 2 minutes.**
- While continuing to turn the wheel close the bleed fitting for your application and let go of the cylinder body/rod.
- Torque all cylinder bleed fittings to 180 in-lbs.



Outboard Front Mount & HC5332-2 Cylinder



Side Mount / Splashwell Mount Cylinder



All Balanced Cylinder. Inboard & Stern Drive Cylinders

3.1.6

- Open Autopilot pump reservoir bleed fitting. Refer to figure 9.
- Wait approximately 30 seconds while reservoir purges. Fluid may or may not exit bleeder at this time depending on individual configuration.
- Close reservoir bleed fitting and torque to 180 in-lbs.

CAUTION

Prior to operating system, perform Oil Level System Check, refer to page 20.

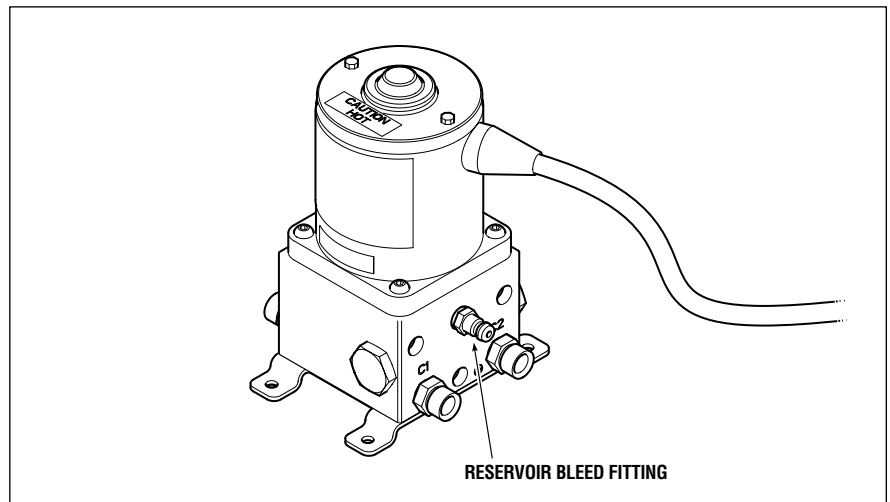


Figure 9.

Step 3.2 Fill & Purge using Power Purge**NOTICE**

BEFORE bleeding the main steering system (helm, hoses and cylinders), the RETURN line will need to be purged.

3.2.1

- Install the helm adapter into the helm pump and attach the helm hose from the power purge unit.
- Connect one of the fluid return hoses (cylinder lines) from the Power Purge unit to the reservoir bleed fitting on the SeaStar Autopilot pump (see figure 9 on page 17 for bleed fitting location).
- Open reservoir bleed fitting 1 turn.

⚠ CAUTION

Refer to your Power Purge installation manual for important Warnings and Notices while using the Power Purge Units.

- Turn ON the Power Purge unit and continue to run until NO air is visible leaving the SeaStar Autopilot pump.
- Turn OFF Power Purge unit.
- Close the reservoir bleed fitting and torque to 180 in-lbs.

3.2.2

- Remove the hose from the reservoir bleed fitting and connect to the bleeder fittings on the steering cylinder. Be sure that the quick connect is locked onto the fitting.
- Open ALL cylinder bleed fittings 1-1/2 turn.
- Turn Power Purge unit ON.
- Oil should flow into and out of the helm pump. Wait twenty seconds for the helm to fill with oil.
- Quickly turn the steering wheel clockwise until the cylinder rod is fully extended (you may have to manually push the cylinder rod). SLOWLY continue to turn the wheel to hold the cylinder in this position for approximately 30 seconds. Ensure there are NO air bubbles escaping through the cylinder hoses.
- Quickly turn the steering wheel counter-clockwise until the cylinder rod is fully extended (you may have to manually push the cylinder rod). SLOWLY continue to turn the wheel to hold the cylinder in this position for approximately 30 seconds. Ensure there are NO air bubbles escaping through the cylinder hoses.
- Turn OFF Power Purge unit.
- Remove hoses and replace helm vent cap.
- Tighten ALL bleed fittings on the steering cylinder(s) and torque to 180 in-lbs.

3.2.3

Continue on with Oil Level and System Check on page 20.

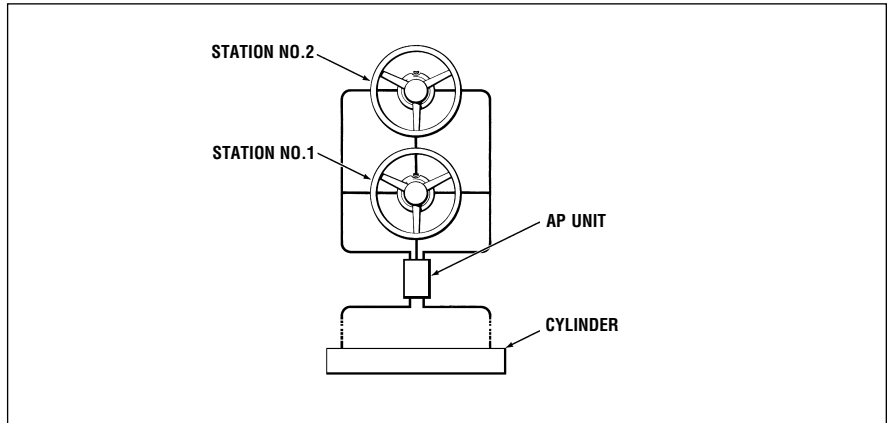
Step 3.3 Additional Purge Instructions

3.3.1

Twin Station Single Cylinder

Perform Steps 3.1.1 – 3.1.6 at station no. 1. Then repeat Steps 3.1.2 – 3.1.5 at station no. 2.

Note: Refer to Oil Level & System Check on page 20.

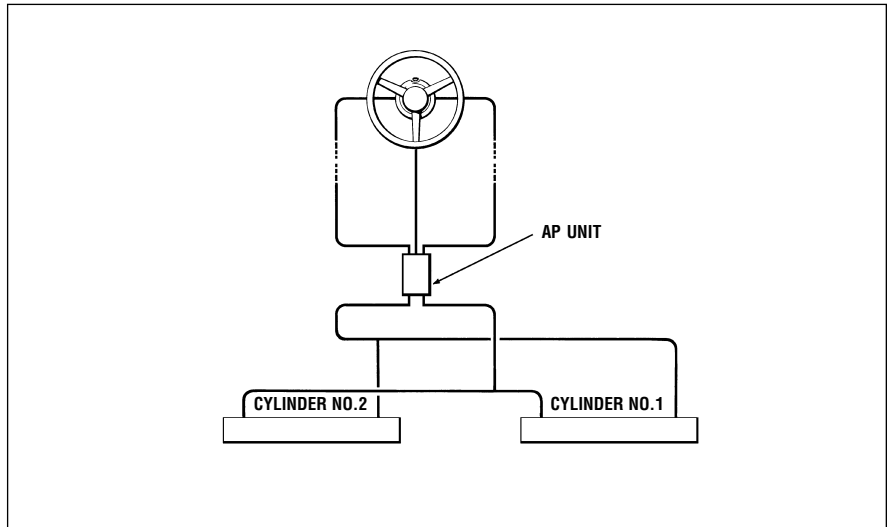


3.3.2

Single Station Twin Cylinder

When performing Steps 3.1.1 – 3.1.6, 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.

Note: Refer to Oil Level & System Check on page 20.

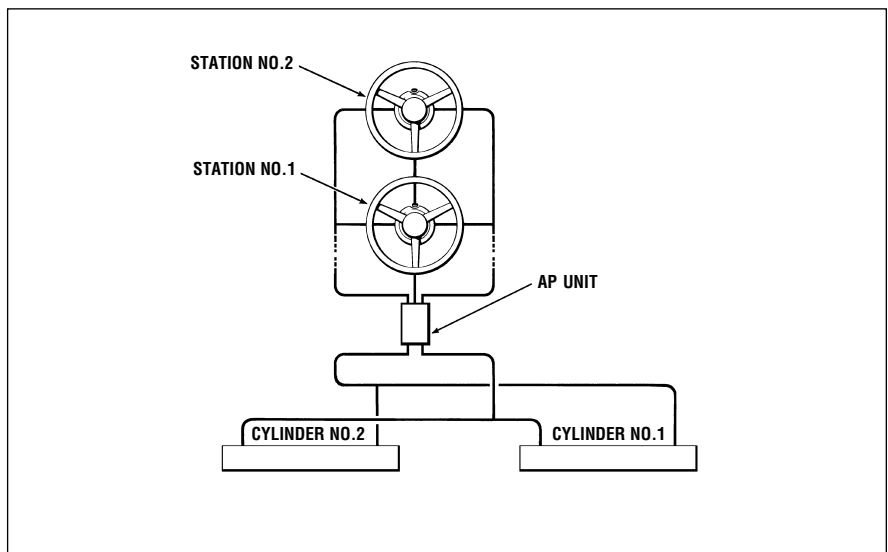


3.3.3

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: Refer to Oil Level & System Check on page 20.



Step 4 System Check

At this time the steering system must be checked for proper hose and fitting connections, possible leaks, and air removal. Please complete the following steps with the Autopilot pump OFF.

- Turn steering wheel to hard over, then force the wheel another one quarter to one half turn past the stop point. Check the following areas for evidence of a leak.
 - Inspect helm fittings
 - Inspect Power Assist/Autopilot interface (if installed) and Autopilot pump fittings
 - Inspect cylinder and cylinder bleed fittings
 - Inspect hoses
- Repeat above steps to the other steering direction.
- Any sign of a leak **MUST** be repaired prior to operating the boat.
- While turning steering wheel observe fluid level in the helm pump. If fluid level drops and rises significantly as the wheel is being turned there is still air in the system. Complete bleeding instructions again until no obvious fluid level change is noticed.

Consult with autopilot controller manual for the remainder of the autopilot check list.

NOTICE

Helms mounted with the wheel shaft completely horizontal must be filled to the bottom of the filler hole at all times. Do NOT allow the fluid level to drop more than one-quarter inch below the filler hole.

NOTICE

*Helms mounted on a 20 degree angle or with the wheel shaft vertical **MUST** have the fluid level within 1/2" of the filler hole, refer to the diagram below.*

⚠ WARNING

If a leak is noticed, it **MUST be corrected prior to using the boat. Failure to do so may lead to loss of steering causing property damage, personal injury or death.**

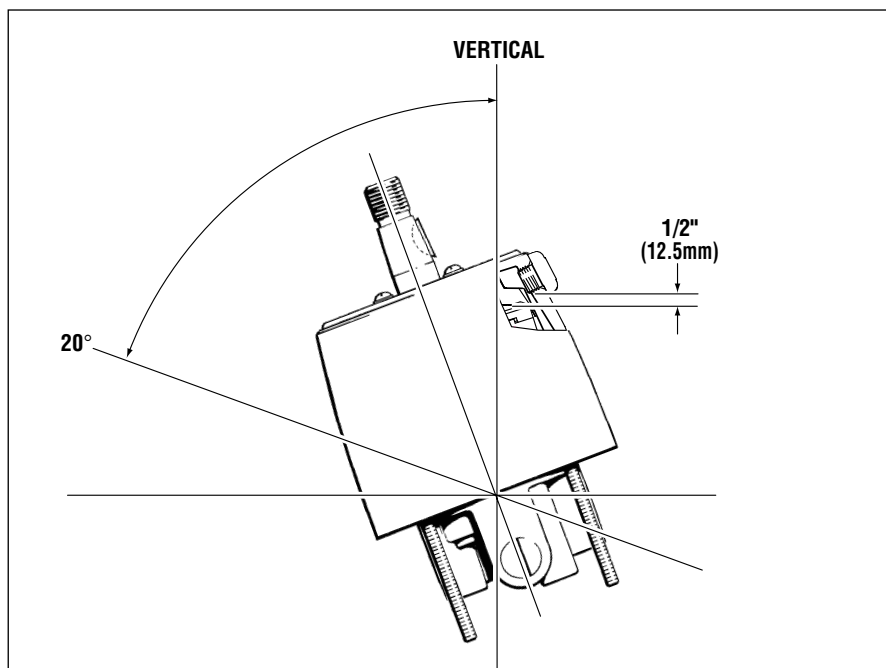


Figure 10.