



**SEASTAR™**

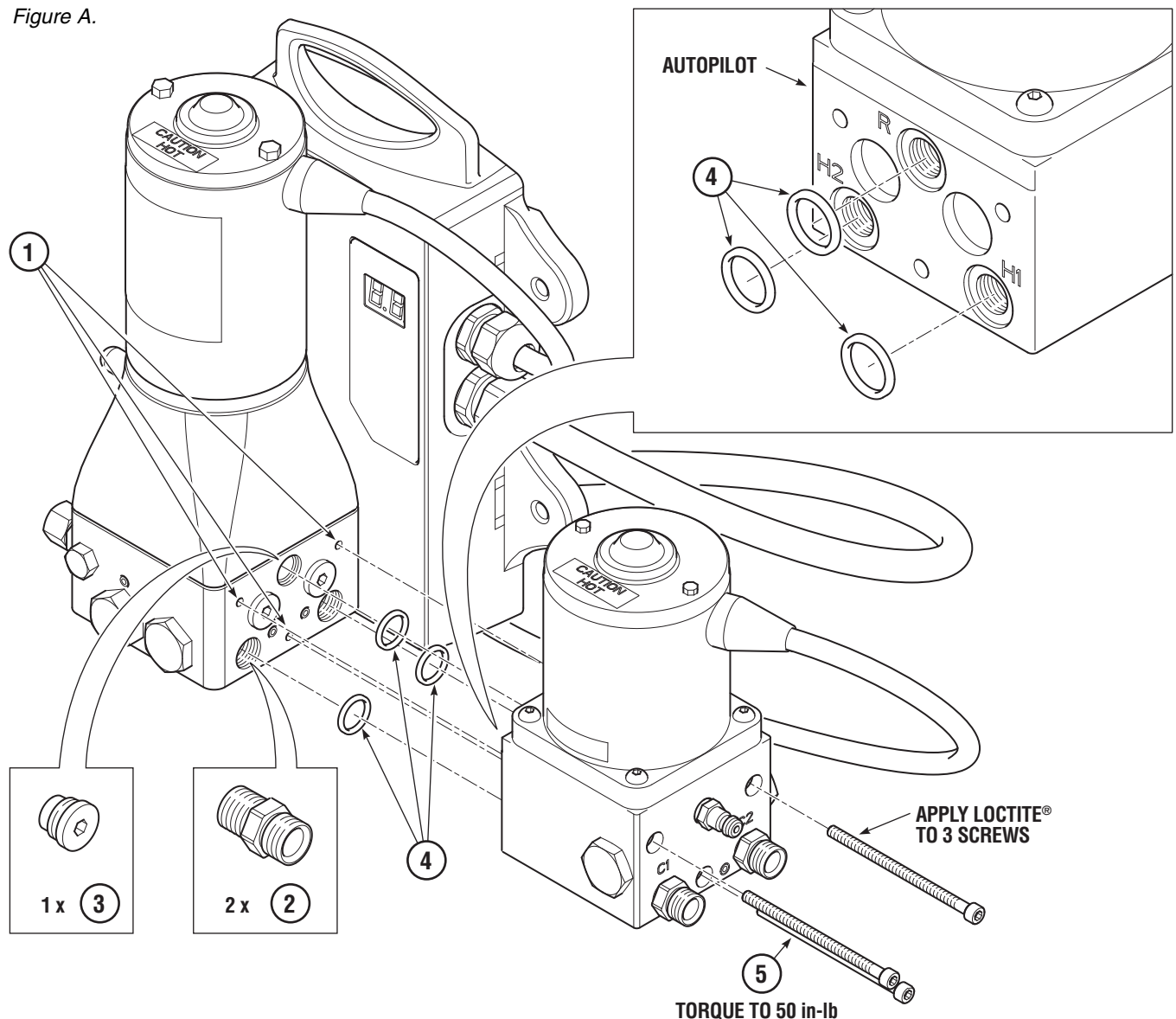
# STANDALONE AUTOPILOT TO SPA RETROFIT GUIDE

The following guide details the installation procedure for retrofitting a standalone autopilot onto an existing SPA.

## NOTICE

All SeaStar Power Assists manufactured during or after August 2007 are compatible with the following retrofit procedure. In order to determine if your SeaStar Power Assist is compatible inspect the valve block face. It must have three tapped holes (item 1) as shown in figure A. If you have an older SeaStar Power Assist, the autopilot must be added separately to the steering system and will require additional hoses (refer to the Power Assist Installation Manual).

Figure A.



## Installation Procedure

Referring to Figure A on page 1:

- Remove the two NPT fittings (item 2) from the C1 and C2 ports on the back of the SeaStar Power Assist.
- Remove the top plug (item 3) located on the back face of the SeaStar Power Assist using a 5/32" allen wrench. Do not use a ball-end allen wrench.  
**Only remove the top middle plug (item 3). DO NOT disturb the other plugs!**
- Remove the three NPT fittings from the H1, H2, and R ports on the Autopilot.
- Remove the Autopilot mounting bracket using a 1/8" allen wrench.
- Inspect both valve block faces. They must be free of all contaminants, including thread sealant, debris, burrs, gouges or large scratches. Clean as required.
- Install the three square-cut o-rings (item 4) supplied with kit, into the Autopilot as shown in figure A (inset). Ensure they are correctly seated.
- Apply thread-locker supplied with kit to the mounting screws (item 5) and fasten the Autopilot to the SeaStar Power Assist as shown. Torque mounting screws (item 5) to 50 in-lb.

### WARNING

**Ensure that the square-cut o-rings remain seated in the counterbores and are not pinched and/or rolled between the Autopilot and the SeaStar Power Assist valve blocks. Failure to do so will result in fluid leaks causing property damage, personal injury and/or death.**

### CAUTION

**After 10 hours of operation, check torque spec. on bolts (item 5).**

### WARNING

**Failure to apply the thread-locker, or to meet the appropriate torque spec. may lead to loss of steering control resulting in property damage, personal injury and/or death.**

- Refer to your Autopilot Installation Manual for electrical connections before proceeding with the filling and purging instructions.

## Filling & Purging the System

### Read First

These instructions show how to fill and purge a SeaStar Steering System with the Power Assist Autopilot (PAA) unit 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 1.1.1 – 1.1.6, 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

**DO NOT turn ON PAA unit until manual portion is completed.**

**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 Oil Requirements

2 bottles (2 quarts or liters) for single station and single cylinder systems. One additional bottle for each cylinder or helm added to the system.

Recommended oils for your steering system are:

SeaStar Hydraulic Fluid, Part # HA5430 (1 quart), HA5440 (1 US gallons) and fluids meeting MIL H5606 Specifications.

Automatic transmission fluid, Dextron 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.

### NOTICE

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

### NOTICE

*"Bleeder" refers to cylinder or PAA unit fitted with bleed fittings. Bleed fittings can be opened by unscrewing bleed nipple nut two turns.*

### NOTICE

*Protect your boating environment by ensuring that all used oil is disposed of properly.*



## Step 1.1 Fill & Purge Manually

### NOTICE

If using the SeaStar Power Purge JR/SR please refer to page 7.

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 8.

### NOTICE

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

### 1.1.1

### NOTICE

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

- Attach fill tube and fluid bottle to helm pump as shown in Figure B.
- Open the manual bleed valve (see Figure B) and reservoir bleed fitting (see Figure B) on the power assist unit. The manual bleed valve should be opened two full turns. DO NOT open Autopilot pump reservoir bleed fitting at this time.
- Fill helm with fluid, then, turn steering wheel clockwise until a steady stream of 'air-free' fluid is seen coming out of the reservoir bleed fitting on the Power Assist pump.
- Close the Power Assist reservoir bleed fitting.
- Open reservoir bleed fitting on the Autopilot pump (see Figure A).
- Turn steering wheel clockwise again until an 'air-free' stream of fluid is seen leaving the Autopilot reservoir bleed fitting.
- Close the Autopilot reservoir bleed fitting.
- Continue to turn steering wheel clockwise another 15 turns after closing both reservoir bleeder fittings and PRIOR to closing the manual bleed valve.
- Close manual bleed valve and continue to steps 1.1.2–1.1.5.
- Torque all bleed fittings to 180 in-lbs.

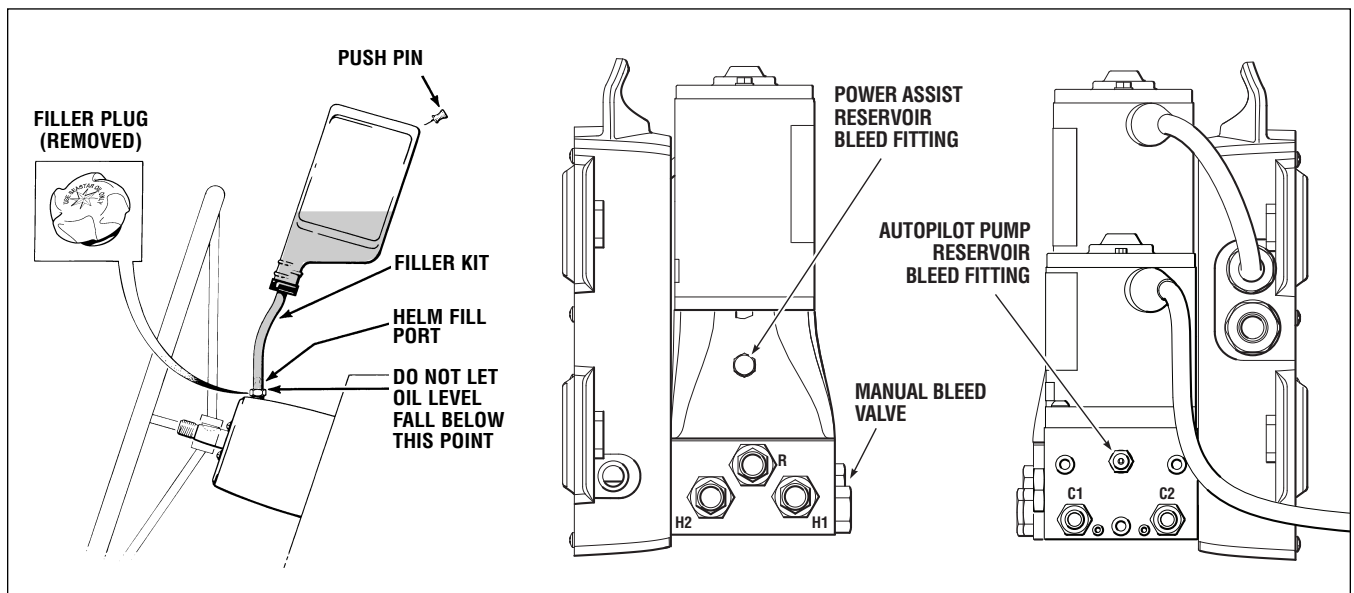
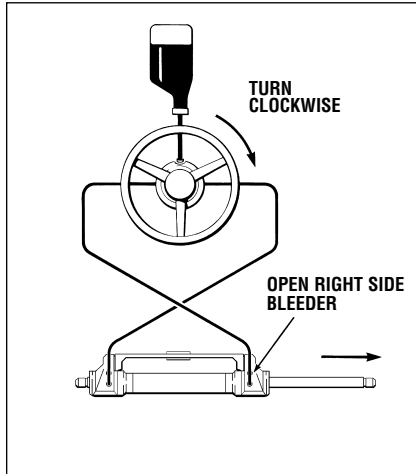


Figure B.

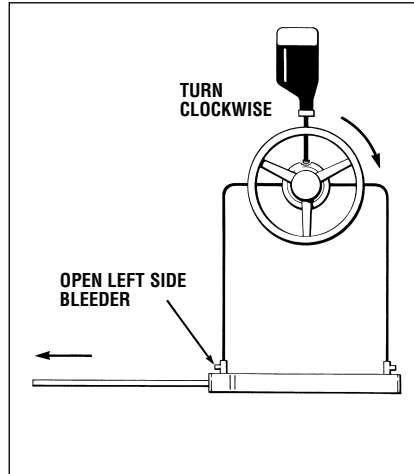


## 1.1.2

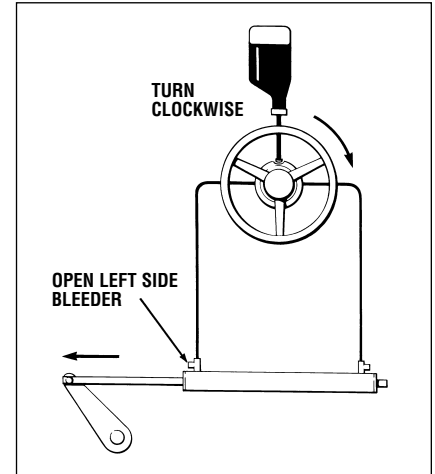
- Turn the steering wheel clockwise until the cylinder rod is fully extended as shown below.
- Open bleed fitting as per your installation as indicated below.



Outboard Front Mount & HC5332 Cylinder



Side Mount / Splashwell Mount Cylinder



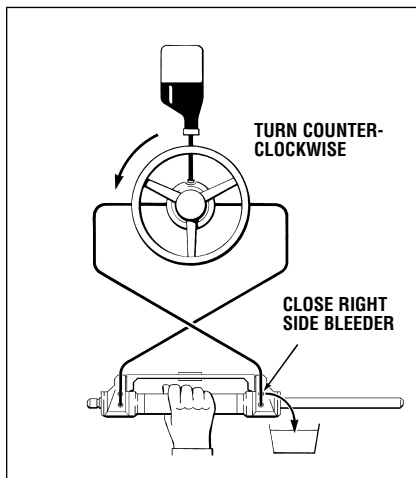
All Balanced Cylinder. Inboard & Sterndrive Cylinders

## 1.1.3

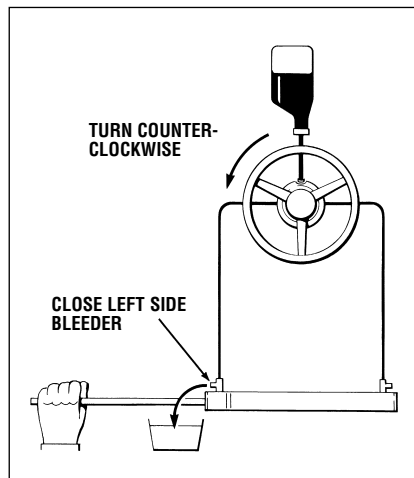
- Holding the cylinder body (Outboard Front Mount cylinder) or rod (Side Mount cylinder) to prevent the body/rod from moving, turn the steering wheel counter-clockwise until a steady stream of air free oil comes out of the bleeder. (Drain approx. 1/2 bottle of oil or as required).

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

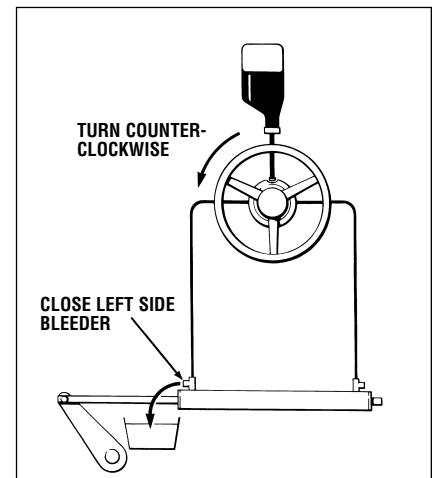
- Run Autopilot pump in the same direction you have been turning for at least 10 seconds.
- While continuing to turn the wheel close the bleed fitting for your installation and let go of the cylinder body/rod.



Outboard Front Mount & HC5332 Cylinder



Side Mount / Splashwell Mount Cylinder

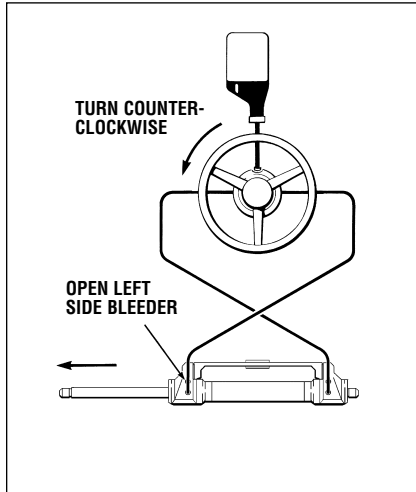


All Balanced Cylinder. Inboard & Sterndrive Cylinders

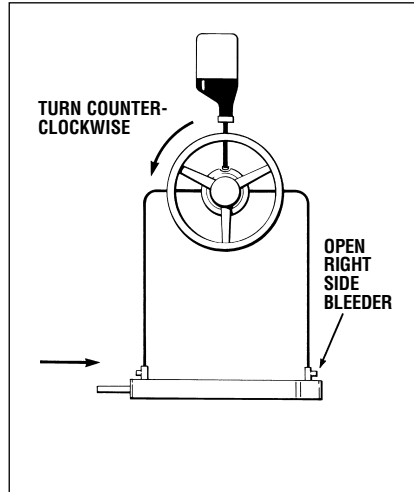


### 1.1.4

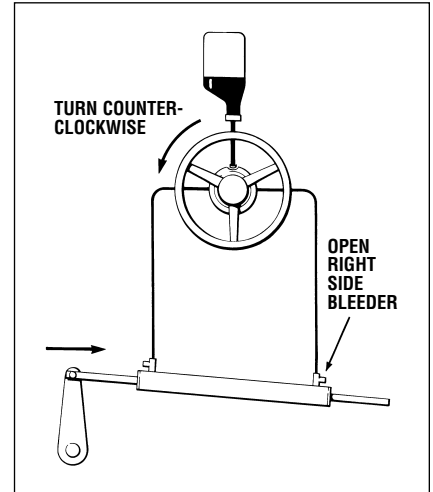
- Continue turning the steering wheel counter-clockwise until the cylinder rod is fully extended as shown below. Steering wheel will come to a stop.
- Open bleed fitting as per your installation.



Outboard Front Mount & HC5332 Cylinder



Side Mount / Splashwell Mount Cylinder



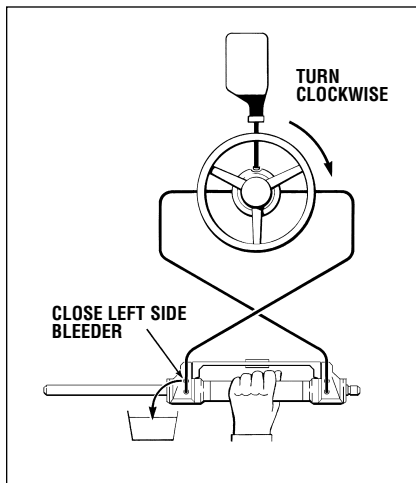
All Balanced Cylinder, Inboard & Sterndrive Cylinders

### 1.1.5

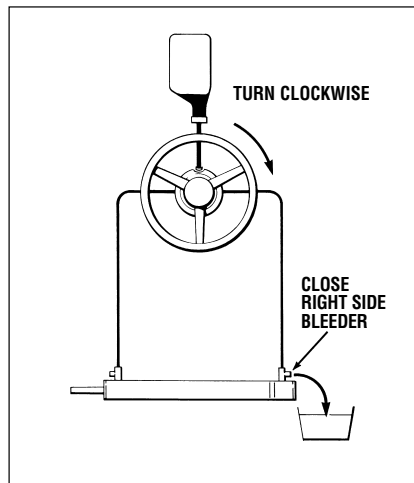
#### **CAUTION**

**Prior to operating system, perform Oil Level System Check, refer to page 9.**

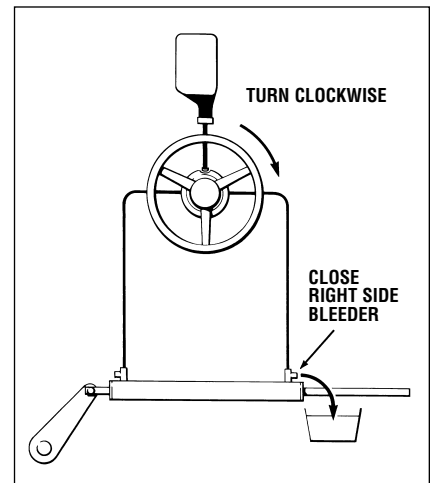
- Holding the cylinder body (Outboard Front Mount cylinder) or rod (Side Mount cylinder) to prevent the body/rod from moving, turn the steering wheel clockwise until a steady stream of air free oil comes out of the bleeder.
- Run Autopilot pump in the same direction you have been turning for at least 10 seconds.
- While continuing to turn the wheel close the bleed fitting for your application and let go of the cylinder body/rod.



Outboard Front Mount & HC5332 Cylinder



Side Mount / Splashwell Mount Cylinder



All Balanced Cylinder, Inboard & Sterndrive Cylinders

### 1.1.6

- Repeat Steps 1.1.2 through 1.1.5 with the PAA unit 'ON'.
- Torque all cylinder bleed fittings to 180 in-lbs.

## Step 1.2 Fill & Purge Using Power Purge

### NOTICE

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

### NOTICE

**DO NOT** open the manual bleed valve when bleeding with a Power Purge Unit.

### 1.2.1

### ⚠ CAUTION

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

- 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 Power Assist reservoir bleed fitting and the other fluid return hose (cylinder lines) to the Autopilot pump reservoir bleed fitting (refer to Figure B on page 4 of this manual for bleed fitting location).
- OPEN both reservoir bleed fittings 1 full turn.
- Turn ON the Power Purge Unit and continue to run until NO air is visible leaving the Power Assist pump or Autopilot pump reservoir bleed fitting. Turn off Power Purge unit.
- Close both the Power Assist pump and Autopilot pump reservoir bleed fittings.
- Torque all bleed fittings to 180 in-lbs.

### 1.2.2

- Remove the hoses from the reservoir bleed fittings 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.
- Repeat above steps with the SeaStar Power Assist Autopilot unit ON.
- Tighten ALL bleed fittings on the steering cylinder(s) and torque to 180 in-lbs.

### 1.2.3

Continue on with Oil Level and System Check on page 9.



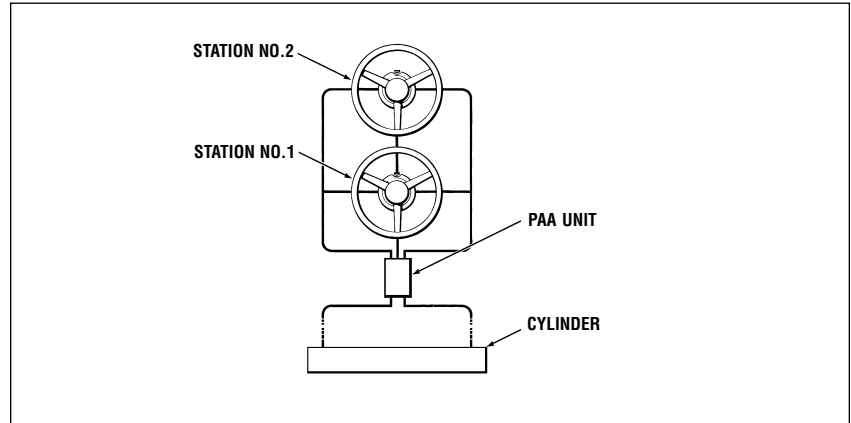
## Step 1.3 Additional Purge Instructions

### 1.3.1

#### Twin Station Single Cylinder

Perform Steps 1.1.1 – 1.1.6 at station no. 1. Then repeat Steps 1.1.2 – 1.1.5 at station no. 2.

**Note:** Refer to Oil Level & System Check on page 9.

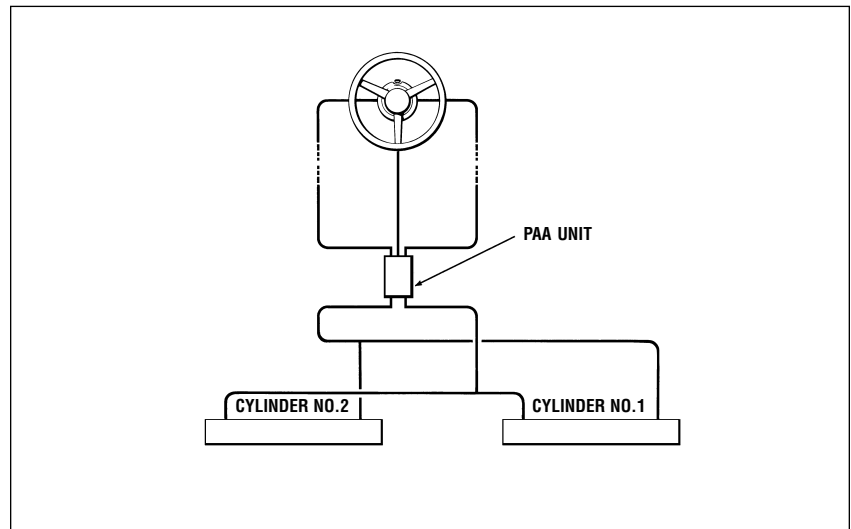


### 1.3.2

#### Single Station Twin Cylinder

When performing Steps 1.1.1 – 1.1.6, 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 9.

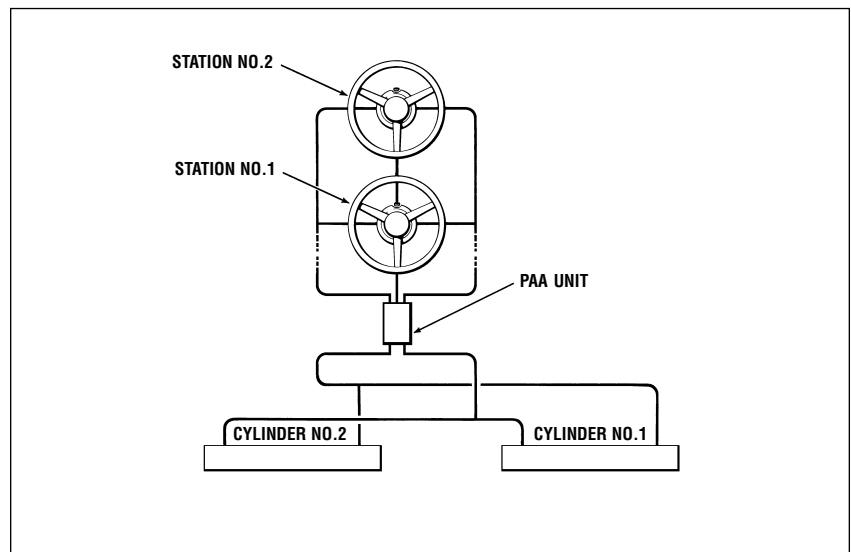


### 1.3.3

#### 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 9.





## 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 PAA 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 and Autopilot pump fittings
  - Inspect cylinder
  - Inspect hoses and cylinder bleed fittings
- 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.

### 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.*

**Refer to your Autopilot Installation Manual for maintenance, troubleshooting and other important information.**

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

### 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.**

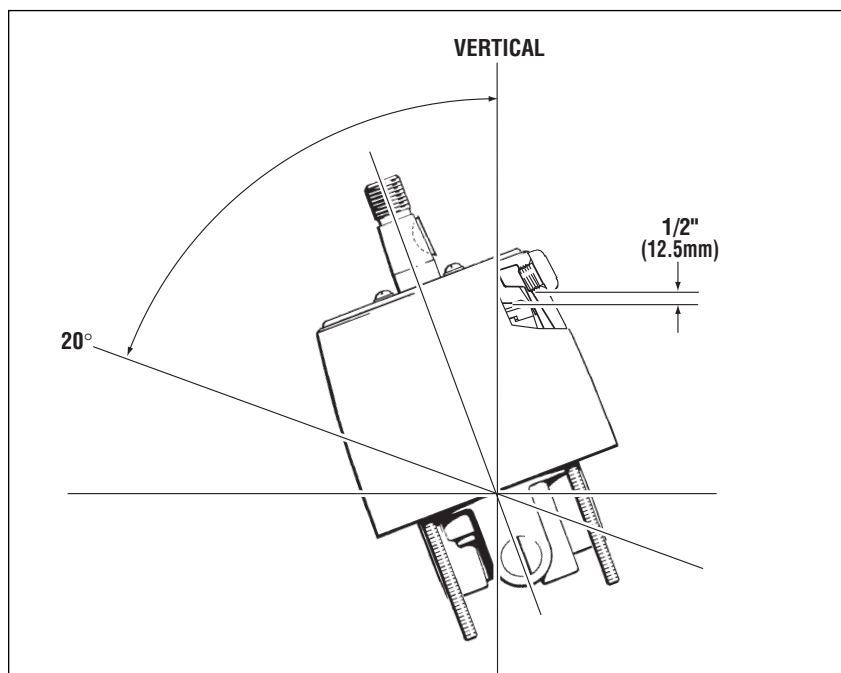


Figure C.