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Setting Standards for Safer Boating

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FIFTEEN POINT ONE
ISO 9001

BAYSTAR™

CAPILANO™

SEASTAR™

INSTALLATION INSTRUCTIONS

AND OWNER'S MANUAL

www.seastarsolutions.com



BAYSTAR™

BAYSTAR™ PLUS Sport & Sport Plus


Hydraulic Tilt Helm Pumps



SEASTAR
SOLUTIONS®




*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.

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

WARNING

Cleaning fluids containing ammonia, acids or any other corrosive ingredients MUST NOT 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.

WARNING

DO NOT use BayStar on vessels that exceed a **MAXIMUM horsepower rating of **150HP*** (Total), or on smaller HP outboard engines that use wing nut type transom mount clamping screws. Warranty will be void if combined with any other product. Steering failure may occur causing property damage and/or personal injury or death.**

*** NOT recommended for use on high performance, 150HP Engines.**

NOTICE

Marine Canada Acquisition Limited Partnership DBA SEASTAR SOLUTIONS is referred to as SeaStar Solutions throughout this publication.

NOTICE

Use of BayStar in the following applications is NOT recommended by SeaStar Solutions. Installation of BayStar on any of the applications may lead to excessive steering wheel effort;

- *Commercial use (use SeaStar Steering)*
- *Bass/Flats or Race/Ski combo boats (use SeaStar PRO Steering)*
- *Pontoon boats (use SeaStar Steering)*
- *High Performance 150HP Engines (use SeaStar or SeaStar PRO, consult Technical Support)*

SAFETY INFORMATION

WARNING

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 dependant 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, oil and the proper tools required for the installation).
3. BayStar components are highly engineered and safety tested to ensure system integrity, DO NOT substitute any component with non-BayStar 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)/rudder(s) and/or outdrive(s) installed.
 - Cylinder MUST be rated for use on the engine(s) installed (outboard applications).
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 independent 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 BayStar Steering Hose. Outboard applications only.
7. DO NOT use a wire coil type 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 Oil Level and System Check as outlined in your steering cylinder manual.

Safety Information Continued

WARNING

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.

Prior to every use

1. Check Fluid level in highest helm pump (refer to your steering cylinder manual for proper fluid level setting).
2. Verify immediate steering response when turning steering wheel(s). (Ensure engine turns when steering wheel is turned.)
3. Visually inspect all steering hoses and fittings for wear, kinking and/or leaks.
4. Check for binding, loose, worn or leaking steering components.

DO NOT OPERATE BOAT IF ANY COMPONENT IS NOT IN PROPER WORKING CONDITION

During use

1. WEAR A COAST GUARD-APPROVED PERSONAL FLOTATION DEVICE (PFD).
2. ATTACH ENGINE SHUT-OFF CORD (LANYARD) TO YOUR PFD.
3. Never allow anyone not familiar with the operation of the steering system operate the boat at any time.
4. 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

1. Rinse off steering system thoroughly using 'fresh, clean water only'.
 - Cleaning fluids containing ammonia, acids or any other corrosive ingredients MUST NOT be used for cleaning any part of the hydraulic steering system.

Maintenance

1. Maintain steering system at a minimum of twice per year.
 - See Maintenance section in your steering cylinder manual.

Keep our waters clean for all current and future users. Dispose of ALL fluids in accordance with your local regulations.

INTRODUCTION

BayStar, Sport Tilt hydraulic steering is designed for normal pleasure and commercial boat use where standard rigging arrangements are used. Before proceeding with 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. This precision built product may not function properly if dirt or contaminants are allowed to enter the system.

NOTICE

Due to a small amount of internal oil 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.

NOTICE

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

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To assist in future troubleshooting, note your helm pump part number here:

HH_____.

Hynautic Hose Applications

If using 3/8" ID or 5/16" ID Hynautic Hose with a SeaStar Helm Pump Please be aware of the following

The fittings enclosed with this SeaStar Helm Pump are for use with a **5/16" ID SeaStar Hose or 3/8" OD Nylon Tubing ONLY.**

If using 5/16" ID or 3/8" ID Hynautic hose, a separate Hynautic fitting kit is required (purchased separately).

Examples of a typical Hynautic installations are shown in Figure 1 and Figure 2. Installations may vary, please confirm what parts are required for your application before proceeding.

HYNAUTIC FITTING KIT#	QTY.	PART#	DESCRIPTION	REFER TO DIAGRAM
HF-05	2	690051	Elbow: For use with the "P" and "S" ports and either the 3/8" or 5/16" ID Hynautic Hose.	A & B
	1	690011	Straight Fitting: For use with 3/8" ID or 5/16" ID Hynautic Hose Return Line.	B
	1	691061	Straight Fitting: For use with 3/8" OD Tubing Return Line.	B
	1	285621	Straight Fitting: For use with 1/4" Copper Tube Return Line.	B

Installation of new fittings

Remove plugs from helm pump. Apply a PST based Teflon pipe sealant.

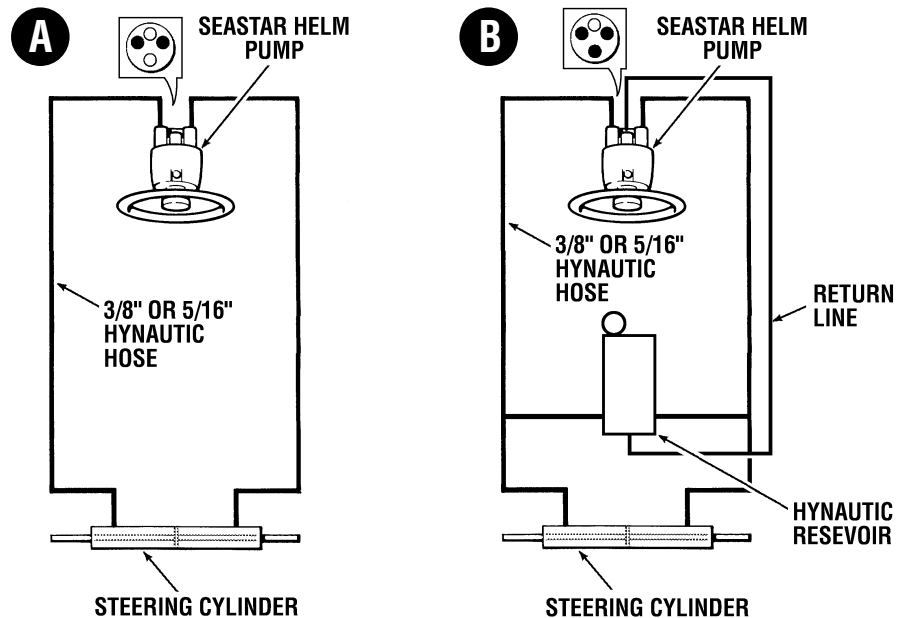
DO NOT USE TEFLON TAPE.

Torque new fittings to 140in-lb (16.18Nm).

Attach Hynautic hoses.

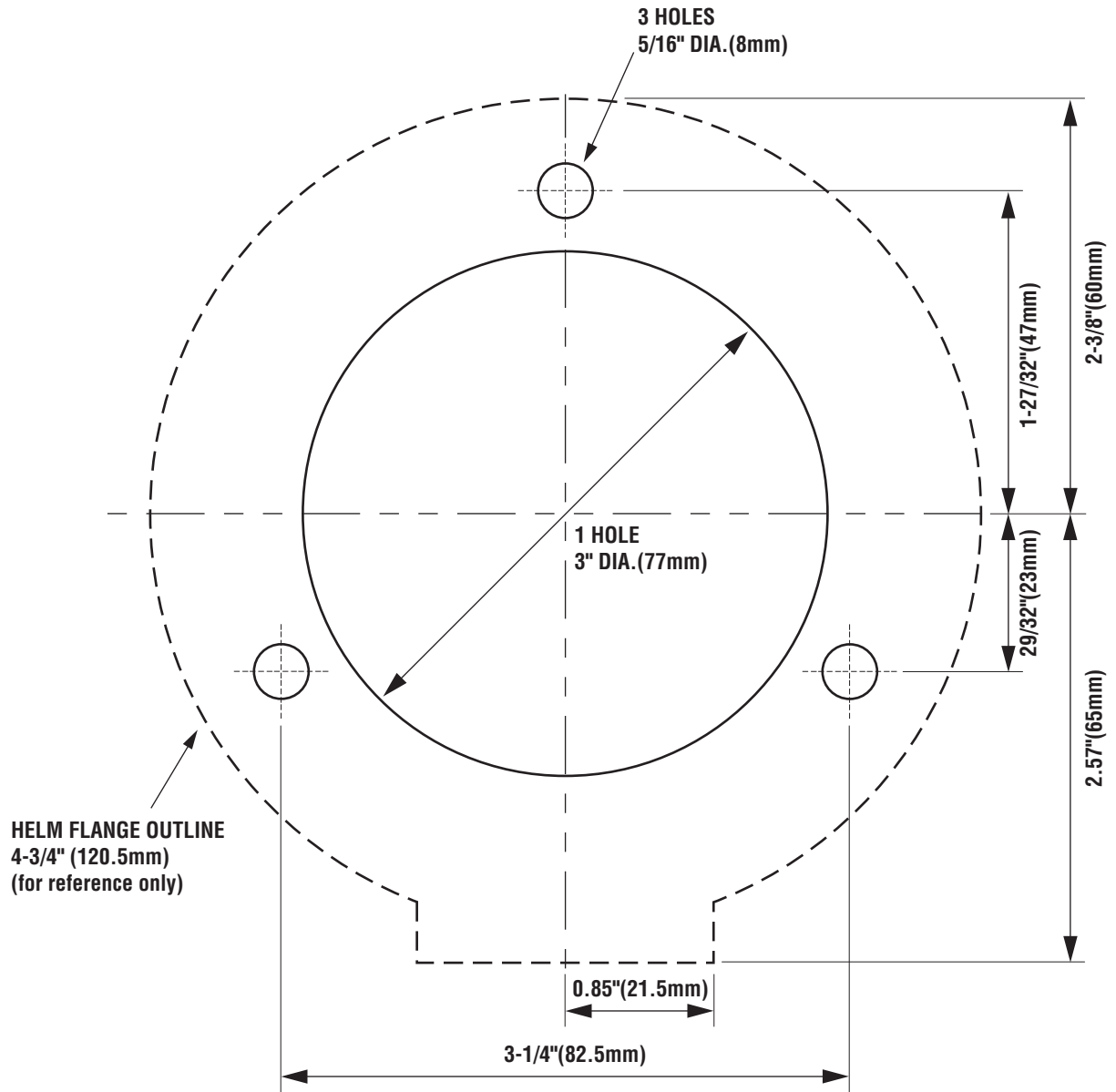
! WARNING

DO NOT use ANY Hynautic hose or tubing with SeaStar Pro Helms. DO NOT attempt to connect 45° flare hydraulic hose fittings with the fittings supplied with the SeaStar Helm Pump. Failure to comply with the above may result in loss of steering causing property damage and/or personal injury.



MOUNTING TEMPLATE

**Sport Tilt & Sport Plus
Tilt Helms HH4315,
HH4513 & HH4316**



NOTICE

If you must photocopy this mounting template for use, check ALL measurements using a measuring device prior to using as a template.

Note: *This page left blank intentionally.*

SYSTEM INSTALLATION

Overview

STEP 1

STEERING CYLINDER INSTALLATION:

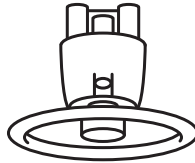
Install your steering cylinder as per the Installation manual provided with your cylinder.



STEP 2

TILT HELM INSTALLATION:

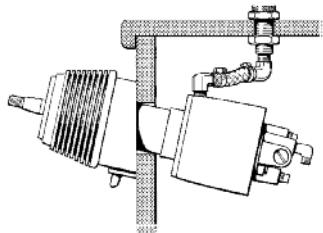
Install your Tilt Helm as per the detailed installation instructions on page 6 to page 9 of this manual.



STEP 3

REMOTE FILL AND VENT KIT INSTALLATION:

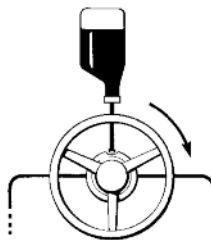
Using page 10 In this manual, install the helm fill and vent kit.



STEP 4

FILLING AND PURGING OF STEERING SYSTEM:

Using the Fill and Purge instructions provided in your steering cylinder manual, fill and purge the steering system.



STEP 5

OIL LEVEL AND SYSTEM CHECK:

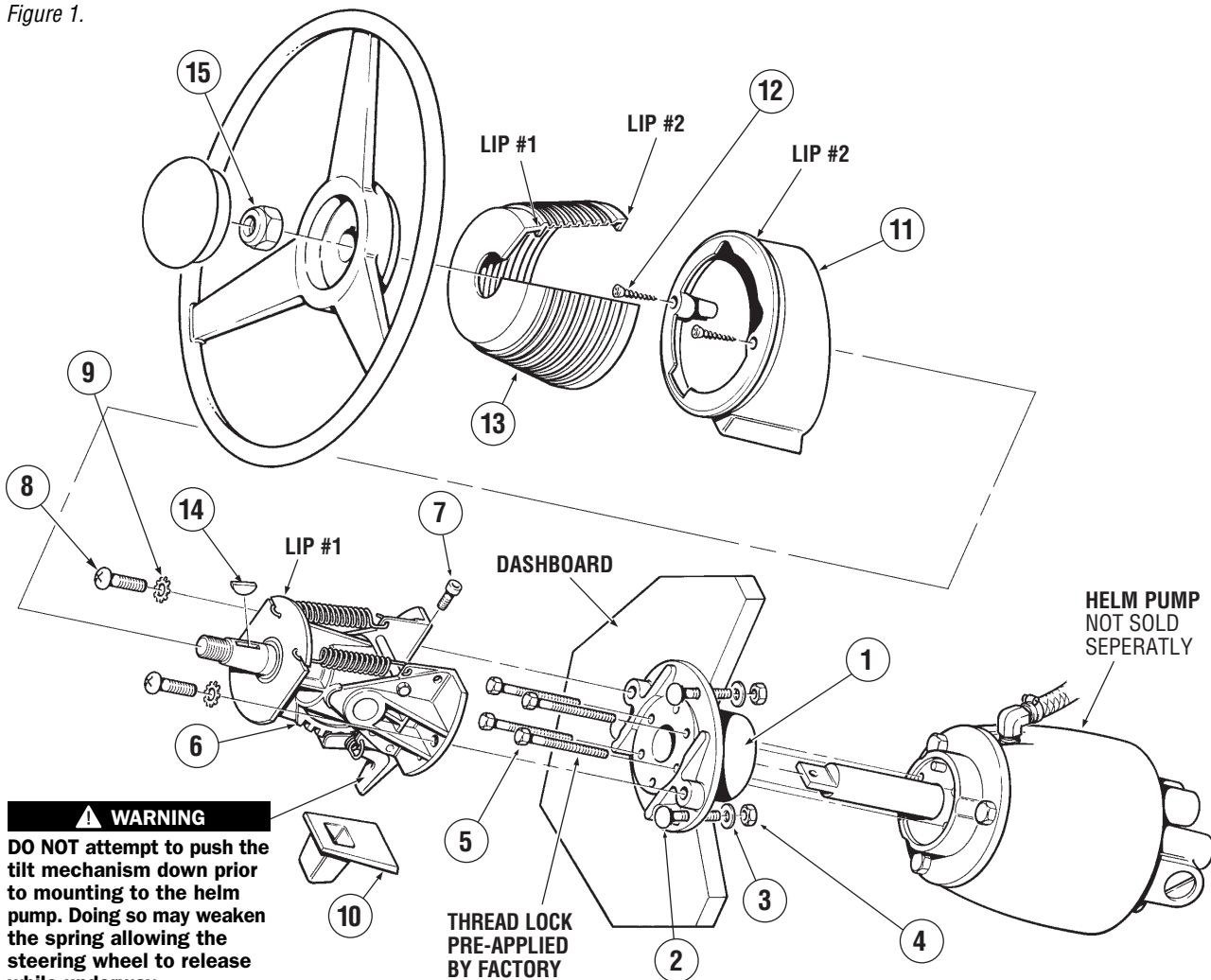
Using the “Oil level and system checks” provided in your steering cylinder manual, confirm proper operation of your steering system.

Sport Tilt Helm Mounting

⚠ WARNING

Use the self-locking fasteners provided **ONLY**; substituting non-self locking fasteners can result in loosening or separation of equipment leading to loss of steering control causing property damage and/or personal injury.

Figure 1.



⚠ WARNING
DO NOT attempt to push the tilt mechanism down prior to mounting to the helm pump. Doing so may weaken the spring allowing the steering wheel to release while underway.

ITEM	PART #	QTY	DESCRIPTION
1	279068	1	Tilt Plate
2	984829	3	CB 1/4" NC x 2"
3	201429	3	Washer, 1/4" Flat SS
4	067424	3	Nut, 1/4" NC, Nyloc®
5	007279	4	HHCS 1/4" NC x 2-1/2" SS
6	182110	1	Tilt Mechanism
7	757927	1	SCHS #10-24 x 7/8"SS
8	958627	2	PHMS 5/16" NC x 3/4"
9	957725	2	Washer, Star

ITEM	PART #	QTY	DESCRIPTION
10	157616	1	Boot, Latch
11	183818	1	Bezel, Lower
12	952623	2	#8-32 x 1"
13	279047	1	Bellows
14	260130	1	Shaft Key
15	747521	1	Wheel Shaft Nut

NOTE: All items included in kit part # HA6123. No components are sold individually.

Sport Tilt Helm Installation

⚠ WARNING

DO NOT attempt to push the tilt mechanism down prior to mounting to the helm pump. Doing so may weaken the spring allowing the steering wheel to release while underway.

⚠ WARNING

Use self-locking fasteners provided ONLY; substituting non-self locking fasteners can result in loosening or separation of equipment leading to loss of steering control causing property damage and/or personal injury. DO NOT exceed 110 in.lb. (12Nm) torque on helm nuts and bolts.

NOTICE

*If the helm pump shaft is difficult to locate into the tilt mechanism coupling, loosen the **TOP** screw in the coupling by **NO MORE** than 1/4 of a turn. Ensure that this screw is fully tightened before installing the bezel.*

STEP 1. Use the Mounting Template provided on page 3. Determine the desired mounting position ensuring that the position of the helm will not interfere with any other functional equipment. Check for adequate space behind the dash to allow for unrestricted hose connections.

STEP 2. Tape the template to the dash and use a center punch for locating the holes on the dash. Double check to ensure unrestricted operation of the steering wheel in **ALL** tilting positions.

STEP 3. Drill the required diameter center hole and the specified number and size of mounting bolts as shown in the template.

STEP 4. Mount Tilt Plate (Item 1) to the dash using the three 1/4" NC x 2" carriage bolts (Item 2), washers (Item 3) and self locking nuts (Item 4).

STEP 5. Prior to mounting helm pump to the dash plate, install desired fittings into the rear of the helm pump using Teflon based pipe sealant. **DO NOT** use Teflon Tape, **ONLY** use paste style Teflon based pipe sealant.

STEP 6. Mount the helm pump from behind the dash to the tilt mounting plate (Item 1) so that the four helm mounting holes align with the applicable holes in the tilt mounting plate. Apply a small amount of the supplied Loctite on **ALL** four of the 1/4 x 2-1/2" hex head bolts (Item 5) and secure them to the helm pump.

STEP 7. Attach the helm shaft to the tilt mechanism (Item 6) by lining up the coupling slot with the helm shaft tongue and secure with the no. 10 - 24 x 7/8" (Item 7).

STEP 8. Tighten the two PHMS 5/16" NC x 3/4" screws (Item 8), and star washers (Item 9) to secure the tilt mechanism to the dash plate.

STEP 9. Install boot latch (Item 10) onto the tilt latch of tilt mechanism.

STEP 10. Position the tilt unit in the middle position and mount the lower bezel (Item 11) to the tilt mechanism ensuring that the boot latch (Item 10) is held into the slots provided in the lower bezel (Item 11). Secure the bezel with the two PHMS #8-32 x 1" (Item 12).

STEP 11. Install boot cover (Item 13) over lip 1 of the tilt mechanism and around lip 2 of the lower bezel. (shown in Figure 1).

STEP 12. Grease steering shaft with a good quality marine grease.

STEP 13. Install woodruff key (Item 14) and wheel shaft nut (Item 15). Tighten wheel shaft nut prior to continuing on with instructions. Torque wheel shaft nut to 150 in/lb, **DO NOT** exceed 200 in.lb.

STEP 14. Confirm proper function of the tilt mechanism:

- Push the tilt latch forward to unlock the tilt mechanism.
- Check **ALL** positions of the tilt and confirm that the latch locks in place for each position, tilt lever will click back into the locked position.

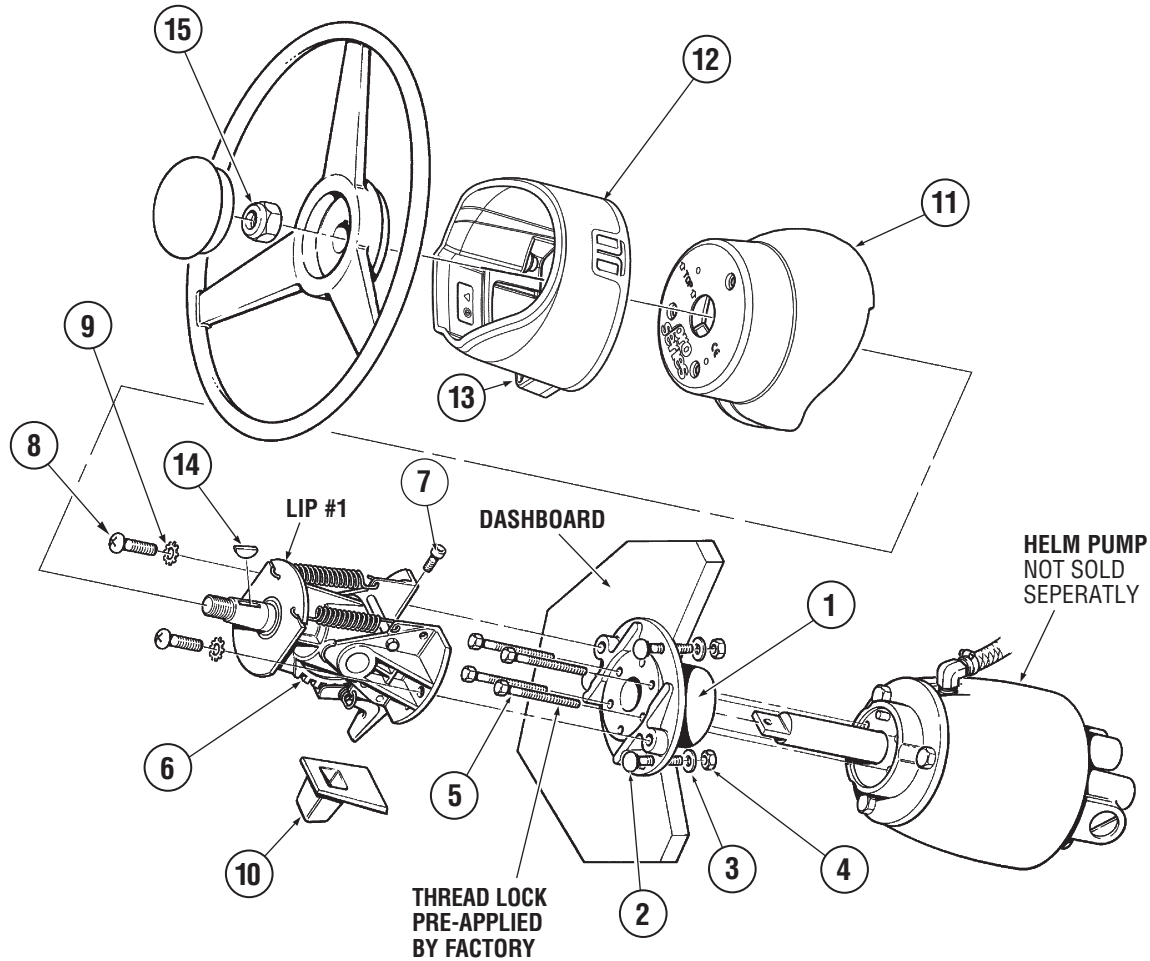
STEP 15. ONLY if it is confirmed that the tilt is functioning properly, continue to the 'remote fill and vent' installation instructions shown on page 10.

Sport Plus Tilt Helm Mounting

⚠ WARNING

Use the self-locking fasteners provided **ONLY**; substituting non-self locking fasteners can result in loosening or separation of equipment leading to loss of steering control causing property damage and/or personal injury.

Figure 2.



ITEM	PART #	QTY	DESCRIPTION
1	279064	1	Tilt Plate
2	984829	3	CB 1/4" NC x 2"
3	201429	3	Washer 1/4" Flat SS
4	067424	3	Nut, 1/4" NC, Nyloc®
5	007279	4	HHCS 1/4" NC x 2-1/2" SS
6	182110	1	Tilt Mechanism
7	757927	1	SCHS #10-24 x 7/8" SS
8	958627	2	PHMS 5/16" NC x 3/4"
9	957725	2	Washer, Star

ITEM	PART #	QTY	DESCRIPTION
10	279049	1	Latch Boot
11	279041	1	Upper Bezel
12	279045	1	Lower Bezel
13	279082	5	BHSCS 8-32 x 1/2" SS
14	260130	1	Shaft Key
15	747521	1	Wheel Shaft Nut

NOTE: All items included in kit part # HA6423. No components are sold individually.

Sport Plus Tilt Helm Installation

STEP 1. Using the template provided on page 3. Confirm that the location of the helm will allow unrestricted operation of the steering wheel in ALL tilting positions and will NOT interfere with any other functional equipment.

STEP 2. Tape the template to the dash and use a center punch for locating the holes on the dash. Double check to ensure unrestricted operation of the steering wheel in ALL tilting positions.

STEP 3. Drill required diameter center hole and the specified number and size of the mounting bolts as shown in the template.

STEP 4. Mount Tilt plate (Item 1) to the dash using the three 1/4" NC x 2" carriage bolts (Item 2, washers (Item 3) and self locking nuts (item 4). Torque to 110 in/lb.

STEP 5. Prior to mounting the helm pump to the dash plate, install desired fittings into the rear of the helm pump using a Teflon Based pipe sealant. DO NOT use Teflon tape, ONLY use a paste style Teflon based pipe sealant.

STEP 6. Mount the helm pump from behind the dash to the tilt mounting plate (Item 1) so that the four helm mounting holes align with the applicable holes in the tilt mount plate. Install the four 1/4" x 2-1/2" hex head bolts (Item 5) and secure them to the helm pump. Torque to 110 in/lb.

STEP 7. Attach the helm shaft to the tilt mechanism (Item 6) by lining up the coupling slot with the helm shaft tongue and secure with the one 10-24 NC x 7/8" bolt (Item 7). Torque to 20-24 in/lb.

STEP 8. Install and tighten the two PHMS 5/16" NC x 3/4" screws (Item 8) and the star washers (Item 9) to secure the tilt mechanism to the dash plate. Torque to 160-180 in/lb.

STEP 9. Install the boot latch (Item 10) onto the tilt latch of the tilt mechanism.

STEP 10. Fit the upper bezel (Item 11) into the lower bezel (Item 12) and position two parts over the tilt mechanism. Install the 5 x BHSCS 8-32 x 1/2" SS (Item 13) screws into the position show.

STEP 11. Grease steering shaft with good quality marine grade grease.

STEP 12. Install the woodruff key (Item 14) and wheel shaft nut (Item 15), Tighten steering wheel shaft nut prior to continuing with installation instructions. Torque wheel shaft nut to 150 in/lb. DO NOT exceed 200 in/lb.

STEP 13. Confirm proper function of the tilt mechanism using the following points.

Push tilt latch forward to 'unlock' the tilt mechanism.

Check ALL positions of the tilt and confirm that the latch 'locks' in place for each position, tilt lever will click back into the locked position.

STEP 14. ONLY if the tilting function is confirmed to function, continue with the 'Remote Fill and Vent Installation' as shown in the installation manual included with the helm pump.

NOTICE

*If the helm pump shaft is difficult to locate into the tilt mechanism coupling, loosen the **TOP** screw in the coupling by **NO MORE** than 1/4 of a turn. Ensure that this screw is fully tightened before installing the bezel.*

NOTICE

Ensure that tilt latch boot (Item 10) is properly fitted into the slots provided in the lower bezel.

Remote Fill and Vent Kit part # HA6450

This kit will provide the means of filling and venting a Sport Tilt pump (refer to figure 5) from a remote location.

⚠ CAUTION

ITEM 1: DO NOT use plastic elbow fitting in this location.

ITEM 6: Ensure a 'Liquid' Teflon® based pipe sealant is used on this fitting, failure to do so will allow fluid to leak at this point. DO NOT use Teflon® Tape.

ITEM	PART #	QTY	DESCRIPTION
1	652123	1	Elbow Ftg. Metal
2	405027	1	Hose Clamp
3	631221	1	5" Length Nylon Tubing
4	381022	1	Washer, Rubber
5	192324	1	Nut, Plastic
6	652134	1	Plastic Elbow
7	381021	2	Dash Ftg.
8	HA5431	1	Vent Plug Assembly

1. Apply a Teflon based pipe sealant to the threads of the metal elbow fitting (Item 1) and insert fitting into the helm pump fill port (see figure 5). **DO NOT USE TEFLON® TAPE.**
2. Attach vinyl tubing (Item 3) to elbow fitting that has been installed into the helm pump and secure with hose clamp (Item 2). A small amount of oil applied inside the vinyl tubing will help slide the tubing over the elbow barb fitting.
3. Direct the other end of the vinyl tubing to a preferred location under the dash to determine the length of hose required that will allow a slight, constant gradual rise from the helm fitting to the fill fitting. Cut tubing to desired length. *Tip: Measure twice, cut once.*
4. Drill a 7/8" (22mm) hole through the dash at the desired location. Prior to drilling confirm that you will **NOT** be drilling into any functional equipment.
5. Install rubber washer (Item 4) onto dash fill fitting (Item 7) and insert dash fill fitting through the dash.

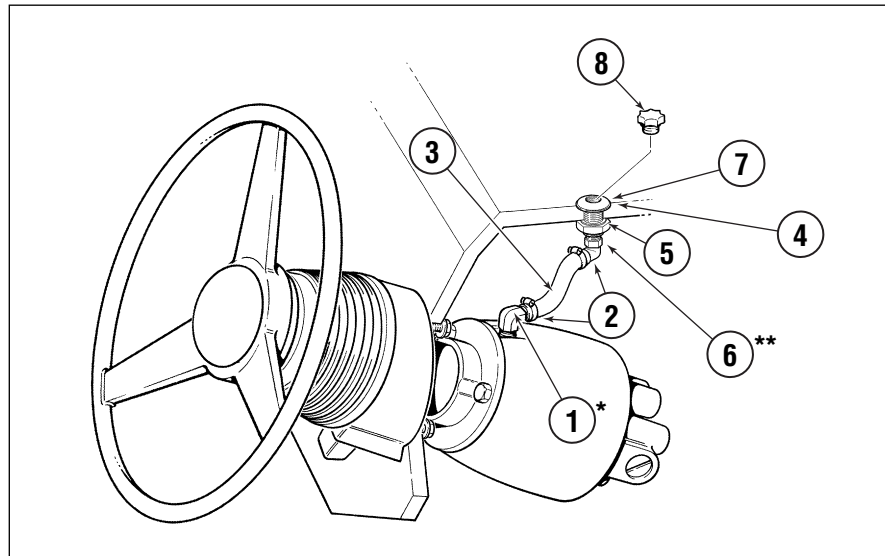


Figure 3. Sport Tilt shown, Sport Plus Tilt similar.

⚠ WARNING

Make certain that you do not drill into any functional equipment or electrical wires.

⚠ CAUTION

Vinyl tubing must have a slight constant gradual rise from helm fitting to fill fitting.

6. Using your hand, thread plastic nut (Item 5) onto the dash fitting until snug, then tighten an additional 1/4 turn.
7. Apply a Teflon® based 'Liquid' pipe sealant to the threads of the plastic elbow fitting (Item 6). **DO NOT** use Teflon® Tape. Thread the plastic elbow fitting into the bottom of the dash fitting (Item 7), tighten fitting by hand until snug, turn an additional 1-1/2 turns with a wrench. **DO NOT** loosen the fitting to orientate with the tube.
8. Slide hose clamp (Item 2) over the tubing and install hose onto barb fitting securing with the hose clamp.
9. Bleed system as per your purging details included with your helm pump. If a leak is noticed, it must be repaired prior to operating boat.

FILLING AND PURGING THE SYSTEM

Read First

These instructions show how to fill and purge a **Single Station, Single Cylinder System**. Refer to diagrams A for BayStar front mount **pivot** cylinder, part numbers, HC4645H, HC4658H, HC4647H and HC4648H. Diagrams B refer to **drag-link** type cylinders, part # HC4600 and HC4600H (obsolete).

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** always 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 purging 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.

⚠ CAUTION

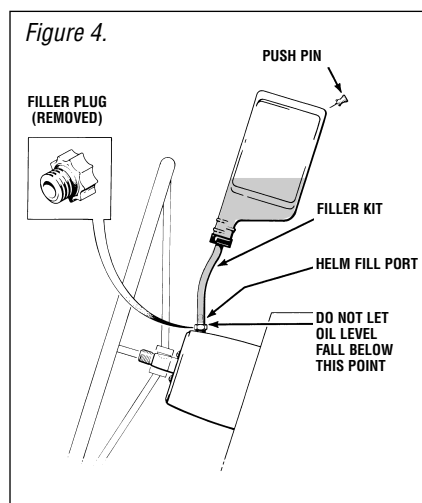
These instructions will result in hydraulic oil flushed in and out of the system. Oil can be re-used if filtered through a fine mesh screen such as used for gasoline. If unable to filter oil, an additional bottle of oil is required.

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.

If cylinder is fitted with bleed screws, open bleeder by removing bleed screw completely. Loosening bleed screw only will not cause sufficient oil flow to purge system.

Hydraulic Fluid



Recommended oils for your steering system are;

- BayStar Hydraulic Fluid, part# HA5430
- Texaco H015
- Aero Shell Fluid #41
- Esso Univil N15
- Chevron Aviation Fluid A
- Mobil Aero HFA
- Fluids meeting Mil H5606C specifications.
- Automatic transmission fluid Dexron II may be used in an emergency.

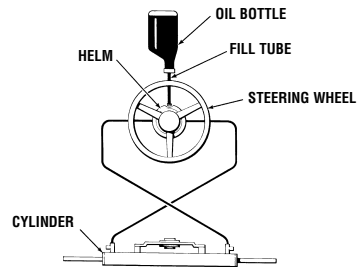
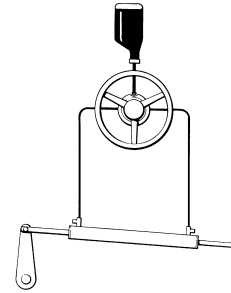
⚠ CAUTION Never use brake fluid. Any non-approved fluid may cause irreparable damage, loss of steering, and cancellation of warranty.

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

Note: Filling the helm full of oil can be accomplished faster if oil is poured into the helm prior to connecting filler tube and oil bottle to the helm.

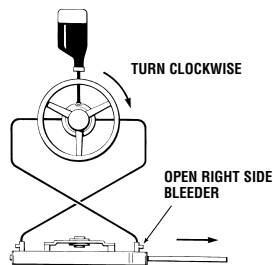
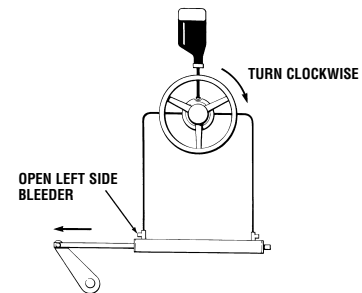
Step 1

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

Diagram A (HC4645 Cylinder)**Diagram B (HC4600 Cylinder)**

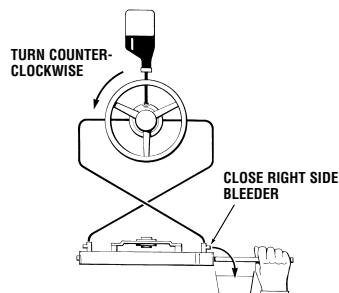
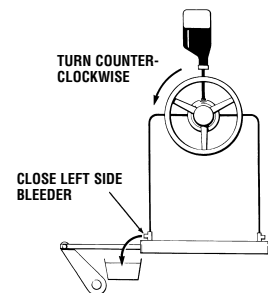
Step 2

- When air bubbles have stopped coming out of the helm, turn the steering wheel clockwise until the cylinder rod is fully extended on one side of the cylinder.
- Open bleeder as indicated on your applicable diagram (A or B).

Diagram A (HC4645 Cylinder)**Diagram B (HC4600 Cylinder)**

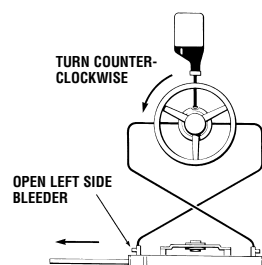
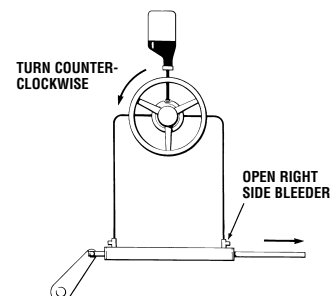
Step 3

- 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.)
- While continuing to turn the wheel, close the bleeder and let go of the cylinder rod.

Diagram A (HC4645 Cylinder)**Diagram B (HC4600 Cylinder)**

Step 4

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

Diagram A (HC4645 Cylinder)**Diagram B (HC4600 Cylinder)**

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 bleeder and let go of the cylinder rod.

Fill and purge is now complete.

Diagram A (HC4645 Cylinder)

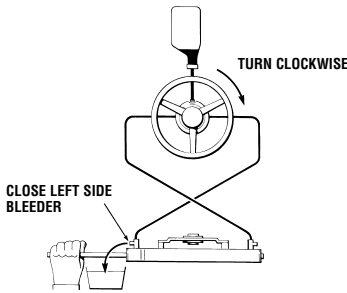
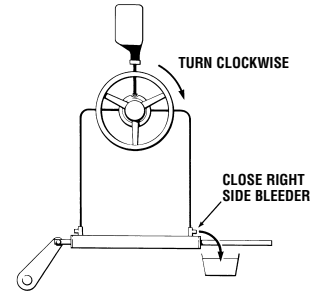


Diagram B (HC4600 Cylinder)



Oil Level Set

Proper oil level set can be obtained by opening bleeder and turning steering wheel until fluid level reaches top of plastic filler fitting and then turning wheel one more full turn.

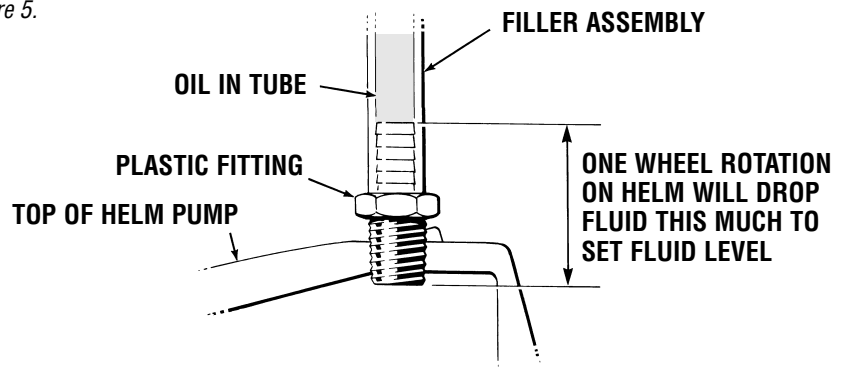
As indicated in applicable diagram (A or B) in step 5.

⚠ CAUTION

For unbalanced cylinders the oil level in the helm must be set with the cylinder rod fully retracted. Failing to observe this caution will result in an oil spill at the helm.

Turning the wheel port (left) will retract the cylinder rod.

Figure 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.

ROUTINE MAINTENANCE

⚠ WARNING

Following the routine maintenance schedules as outlined below, in the time frame noted will ensure years of service from your SeaStar Steering System, as well as keep you and your passengers safe from the dangers that are present on and off the water.

1. Owner(s) (End Users)

Prior to every use.

1. Check Fluid level in highest helm pump (see page 11 for proper fluid level setting).
2. Verify immediate steering response when turning steering wheel(s). (Ensure engine turns when steering wheel is turned.)
3. Visually inspect all steering hoses and fittings for wear, kinking and/or leaks.
4. Check for binding, loose, worn or leaking steering components.

⚠ WARNING

DO NOT operate boat if any component is not in proper working condition.

2. Qualified Marine Mechanic

After first 20 hours, then every 100 hours or 6 months thereafter (which ever comes first).

1. All points noted above.
2. Check tightness of ALL fasteners/fittings throughout the steering system. Tighten to correct torque specifications as required.
3. Check for mechanical play or slop throughout steering system, correct as required.
4. Check for signs of corrosion. If corrosion is present contact your dealer or SeaStar Solutions.

After every 200 hours or 12 months (which ever comes first).

1. All points noted above.
2. Remove support rod from engine steering/tilt tube. Clean engine steering/tilt tube and re-grease using a good quality marine grease.
3. Grease support rod liberally
4. Grease all contact points shown in Figure 6. DO NOT remove tiller bolt to re-grease.
5. Remove steering wheel and re-grease wheel shaft using a good quality marine grease.
6. Inspect hydraulic oil for cleanliness, flush if required.

⚠ WARNING

Any work being performed with the steering system **MUST** be completed by a qualified mechanic with the working knowledge of the system.

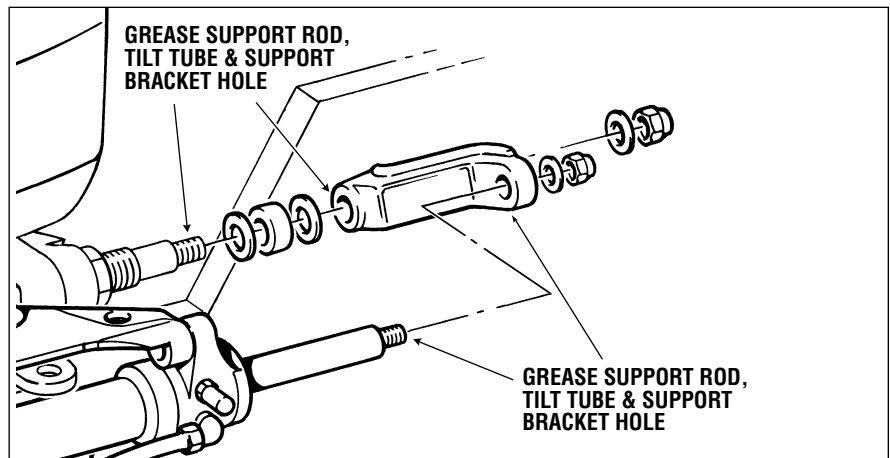


Figure 6.

TROUBLESHOOTING 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. SeaStar Solutions offers the following as a guide only and is not responsible for any consequences resulting from incorrect dismantling repairs.

BayStar hydraulic steering will provide years of safe reliable performance with a minimum of service if properly installed with correct cylinder.

BayStar 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. The term “Rudder” also applies to stern drives, when applicable.

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 lock spool in the system.

FAULT	CAUSE	SOLUTION
1. During Filling, the helm becomes completely jammed.	<ul style="list-style-type: none">• Blockage in the line between the helm(s) and the cylinder(s).	<ul style="list-style-type: none">• Make certain that hose/tubing 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.	<ul style="list-style-type: none">• Cylinder(s) has been mounted upside down. This causes air to be trapped in the cylinder(s).• Air in system.	<ul style="list-style-type: none">• Mount cylinder(s) correctly, according to cylinder installation instruction. Ports should always be kept in uppermost position.• Review purging instructions.

FAULT	CAUSE	SOLUTION
<p>3. Steering is stiff and hard to turn, even when the vessel is not moving.</p>	<ul style="list-style-type: none"> • Rudder post glands are too tight or rudder post is bent, causing mechanical binding. The same applies to tiller arm and linkage on outdrives and outboard engines. Cylinder interfering with engine cowling. • Restrictions in hose, copper tubing, piping or fittings. • 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). • To test, disconnect cylinder(s) 	<p>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.</p> <ul style="list-style-type: none"> • Find restriction and correct. Note: A kinked hose or collapsing of copper tubing during bending is enough to cause restrictions. • See filling instructions supplied with helm units. • Drain system and fill with recommended oils.
<p>4. One helm unit in system is very bumpy and requires too many turns from hardover to hardover.</p>	<ul style="list-style-type: none"> • Dirt/Debris in System. 	<ul style="list-style-type: none"> • Flush system completely. If problem persists the helm pump must be repaired and/or replaced (DO NOT attempt repair of helm pump).
<p>5. Steering is easy to turn at the dock, but becomes hard to turn when vessel is under way.</p>	<ul style="list-style-type: none"> • Steering wheel is too small. • cylinder(s) too small. • incorrect setting of trim tab(s) on stern drive/engine. • incorrectly designed or adjusted rudders, causing binding on rudder post and/or tie bar at cruising speeds. 	<ul style="list-style-type: none"> • 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. • replace with larger cylinder(s). • adjust tab(s). • seek professional help. Have competent, qualified marine mechanic correct problem.

FAULT

6. Rudder/Engine drifts to port or starboard while vessel is under way, even when wheel is not being turned.

CAUSE

- Dirt/Debris in system.

SOLUTION

- Flush system completely. If problem persists the helm pump must be repaired and/or replaced (DO NOT attempt repair of helm pump).

7. Turning one wheel causes second steering wheel to rotate.

- See fault No. 6.

- See fault No. 6.

8. Seals will sometimes leak if steering system is not vented at uppermost helm.

- The BayStar 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 BayStar helm seal kit HP6032.

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

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-Supply Chain Solutions Inc.
Door A37
1201 C Street NW, Auburn, WA,
98001

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



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