

About this Book

This book contains:

- the user's manual for the SeaStar Power Assist (P/A) system.
- installation instructions for the SeaStar Power Assist (P/A) system.
- information for the following models: PA1200-2, PA1200-2HP, PA1206-2, PA1225-2, PA1315-2.

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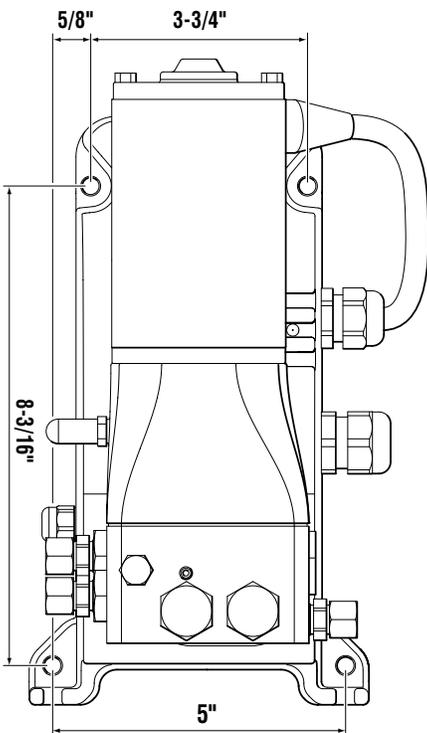
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Specifications



Models	All
Operating voltage	12/24V (automatically detected)
Working pressure	1000psi (6.9 MPa)
Maximum pressure	2000psi (13.8 MPa)
Relief pressure	2000psi (13.8 MPa)
Maximum pump flow rate	240 in ³ /min (3930 cc/min)
Average current draw	~3A
Maximum current draw, 12V (24V)	50A (25A)
Internal fuse rating	40A x2 (80A)
Recommended external use/breaker rating, 12V (24V)	50A (25A)
Ignition wire maximum current draw	1A
Weight (w/o harness)	11.5lb (5.2kg)
Dimensions (w/o harness) H x W x D	11.1" x 6.2" x 6.5" (28 cm x 15.7 cm x 16.5 cm)
Ignition harness length	25' (7.6m)

Models	PA1200-2 PA1200-2HP PA1315-2	PA1206-2	PA1225-2
Power harness length	15' (4.5m)	6' (1.8m)	25' (7.6m)
Power harness wire gauge	10AWG	10AWG	8AWG

1 Important Safety Information

Safe operation of SeaStar steering with Power Assist (P/A) depends on proper installation and maintenance of the system, as well as the operator's safe judgment, boating knowledge, and expertise.

The installer and operator must read and understand the safety requirements in this section before installing or using the steering system. If you have any questions about safe installation or operation of this system, contact Dometic Marine. Please don't guess.

1.1 Explanation of symbols

The symbols below are used throughout this publication to alert you to potential hazards involved with the operation and installation of this product. Observe these warnings and notices carefully. The safety alerts alone cannot eliminate hazards; strict compliance with any special instructions during installation, operation, and maintenance, along with common sense operation, are important measures to prevent hazardous situations.



DANGER!

Safety instruction: Indicates a hazardous situation that, if not avoided, will result in death or serious injury.



WARNING!

Safety instruction: Indicates a hazardous situation that, if not avoided, could result in death or serious injury.



CAUTION!

Safety instruction: Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.



NOTICE!

Indicates a situation that, if not avoided, can result in property damage.



NOTE

Supplementary information for operating the product.

1.2 Safe operation



WARNING!

The safety information below is intended to inform you of hazards that may be present when operating a boat equipped with electronic controls. Read and understand this information.

General

- Read and understand this manual and any other documentation provided with your steering system.
- Know and obey all applicable federal, state, and municipal laws and regulations that govern boating in your area. Dometic recommends all boat operators take a boating safety course.
- Never operate a boat while under the influence of drugs or alcohol.

Before every use

- Perform the pre-trip inspection described in section 2.1.



WARNING!

Do not operate the boat if any component is not in proper working order. It may result in a loss of steering control, which could lead to a collision and/or ejection from the boat, causing property damage, personal injury, and/or death.

During use

- Wear a Coast Guard-approved personal flotation device (PFD).
- Attach the engine shut-off lanyard to your PFD.
- Do not allow anyone not familiar with the controls (steering, shift/throttle) to operate the boat.

After use

- Rinse the steering cylinders thoroughly, using only fresh, clean water.
- Do not use acetone, or cleaners containing ammonia, acids, or any other corrosive ingredients, on any hydraulic steering components.
- Some products formulated for cleaning fiberglass hulls are known to aggressively corrode stainless steel shafts. If using a hull cleaner, avoid overspray on the cylinders. Rinse off any overspray immediately with fresh, clean water.

1.3 Safety considerations for installers



CAUTION!

We recommend that installation of the SeaStar Power Assist is performed by a certified marine technician.

Before installation

- Read and understand this manual, and any other manuals supplied with this system.
- Ensure you have all the required components on hand before you start.
- Do not use a wheel-mounted trim switch with coiled cord. The cord can wrap around the steering wheel shaft and inhibit steering.

During installation

- Install components as instructed in this manual. Some component parts and kits may contain additional installation instructions – refer also to those instructions.
- Do not substitute any component of the system without written authorization from Dometic. Dometic parts are rigorously engineered and tested to ensure system integrity. Substitution of components may compromise safety, performance, and reliability.
- The steering cylinder must be compatible with, and rated for, the engine(s) installed on the boat.
- If an instruction is unclear, contradictory, or you are otherwise unsure how to proceed, do not guess. Contact Dometic Marine technical support.

After installation

- Perform the system inspection checks described in section 4.3.
- Correct any interference issues before handing the boat to the owner.



WARNING!

Failure to comply with these instructions may result in loss of steering control, which could lead to a collision and/or ejection from the boat, causing property damage, personal injury, and/or death.

1.4 Safety labels

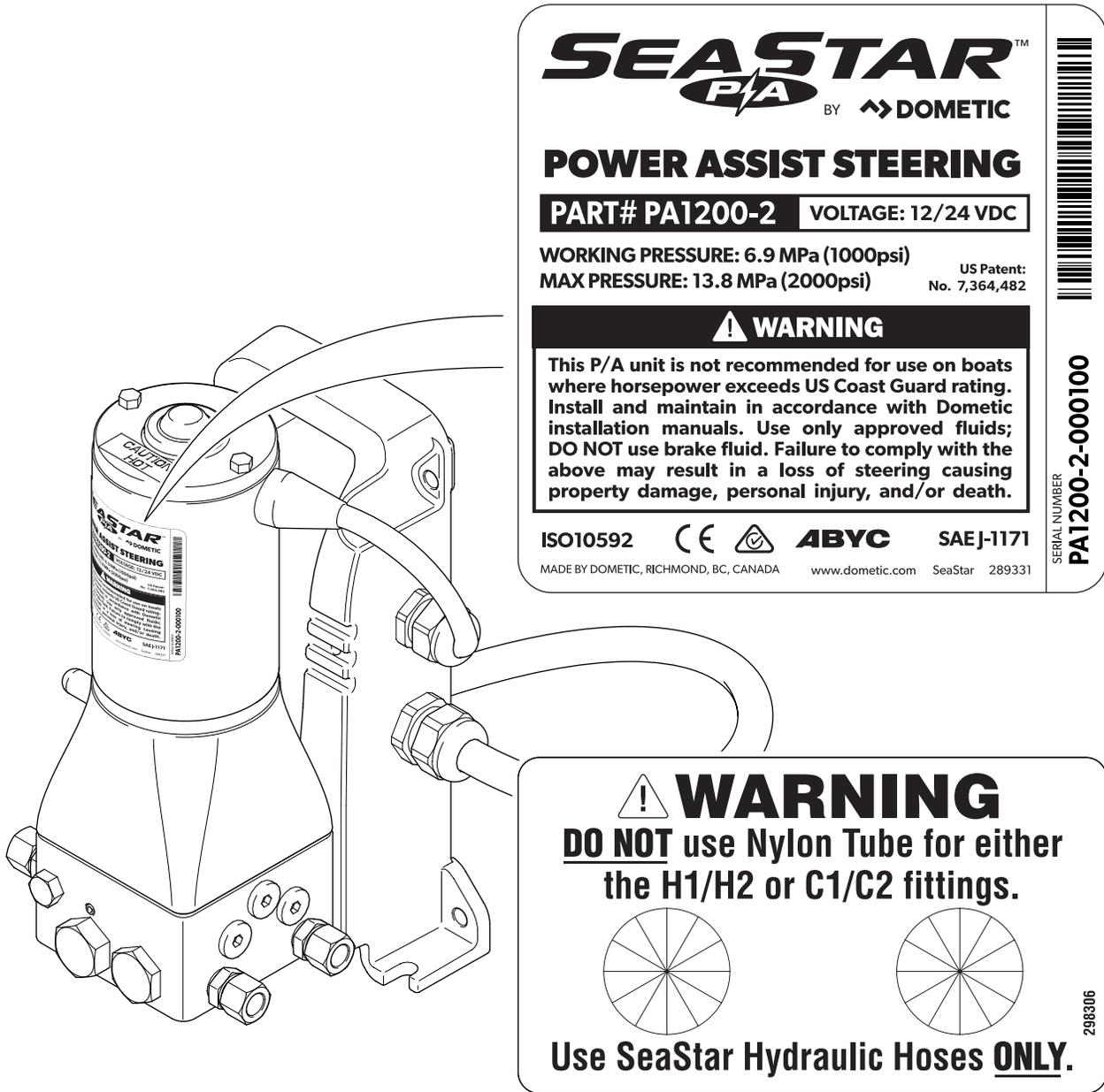


Figure 1-1. Safety labels.



WARNING!

If a decal is missing or becomes illegible, it must be replaced. Contact Dometic technical support for a replacement copy.

2 System Operation

How it works

The Dometic SeaStar Power Assist (P/A) is an electronically controlled gear pump that is added into the hydraulic steering circuit between the helm and steering cylinder. Fluid circulated by the helm pump enters the power assist and is routed through the gear pump to the steering cylinder(s). The helm becomes the control element, controlling speed and direction, while the P/A is the working element, adding power to the steering fluid.

The helm pump controls the pump speed – the faster you turn the wheel, the faster the gear pump will run. When you aren't steering the P/A is stopped, drawing only standby power.

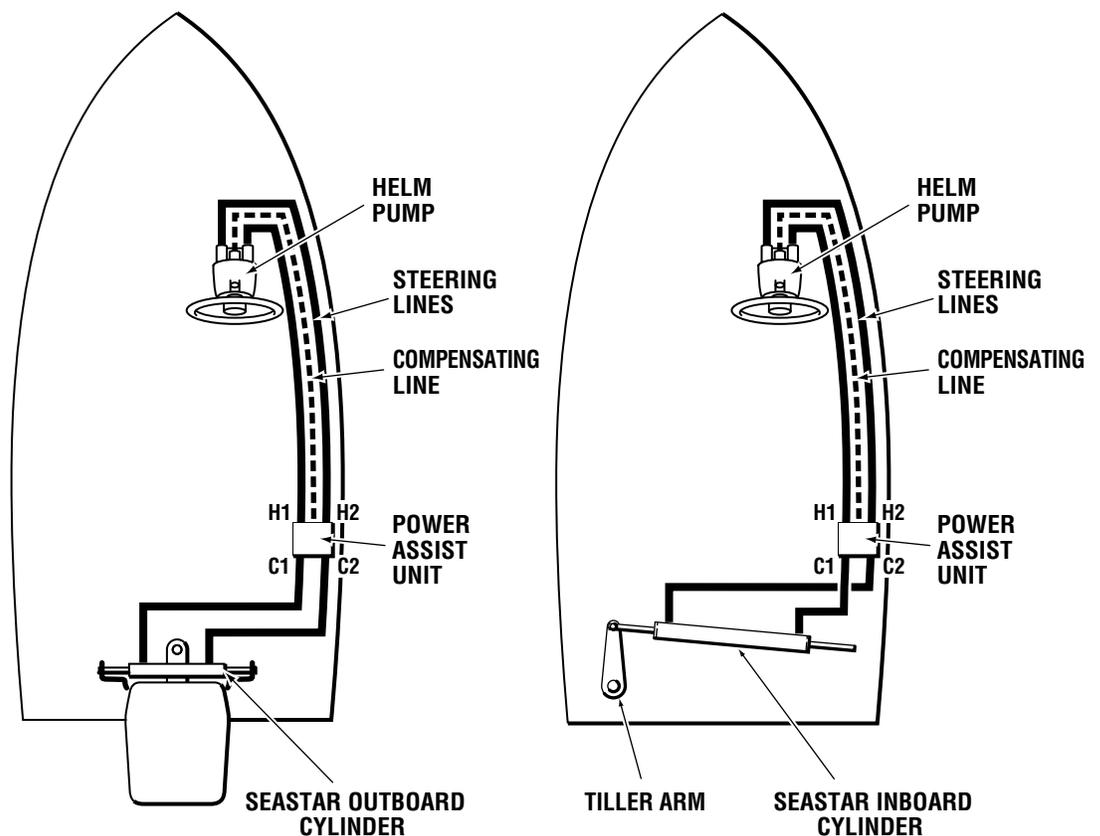


Figure 2-1.

Using the power assist

The P/A is usually wired to turn on with engine ignition, in which case you simply start your engine(s) and enjoy effortless steering from any helm on your boat. The LED on the P/A will illuminate green when power is on.



WARNING!

Always perform a pre-trip inspection of the steering system, as shown in section 2.1, before use.

Some installers or builders will wire the P/A to turn on with an accessory switch, or they may wire the accessory switch in series with the engine ignition signal. In this case you will need to turn the P/A on with a switch. This feature allows you to turn the power assist off and steer manually in the event batteries are very low.

In multi-engine setups the P/A can be wired to turn on if any engine is running, but some installers may elect not to wire it that way. Check with the installer or builder.

**NOTE**

When steering loads are high it is possible to turn the helm faster than the power assist can pump, in which case you will notice an increase in steering effort. This won't hurt the pump, but it won't make the boat steer any faster. Simply reduce your steering effort until you just feel an increased resistance, at which point you'll be steering at the maximum rate of the P/A pump.

**NOTE**

Moderate pump noise when steering is normal. The location of the pump and the material to which it is mounted will affect the volume.

Loss of power assist

If the P/A loses power the steering will revert to a manual hydraulic system. You will be able to steer the boat normally, but with higher effort. In the event you lose power assist, slow the boat to reduce steering load and effort. Refer to the troubleshooting section for assistance.

Autopilot use

The P/A can be used with any hydraulic autopilot system. Simply engage your autopilot as you normally would. There is no need to turn off the power assist.

2.1 Pre-trip inspection

Perform the following inspection prior to every use:

1. Check the steering fluid level in the helm.

See section 4.3.2.

2. Verify immediate steering response when turning steering wheel(s).

Turn the steering wheel slowly to port and to starboard through the full range of motion and make sure the engines or rudders respond immediately. Watch that the hoses move freely without snags or hang-ups. Perform this check with and without the P/A turned on.

3. Inspect all steering hoses and fittings for wear, kinks, or leaks.

Check all steering hoses and fittings between the helm, power assist, and cylinders for any signs of leakage, kinking, wear, or chafing. Check that the fittings are tight.

4. Check for binding, loose, or worn steering components.



WARNING!

Failure to comply with these instructions may result in loss of steering control, leading to collision with obstacle(s), ejection from vessel resulting in property damage and/or personal injury or death.



WARNING!

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

2.2 Maintenance inspection

Perform a thorough system inspection as described in section 4.3:

- Every two months or 20 operating hours, whichever comes first.
- After any service that touches the steering system.

Ensure that any issues are corrected before using the boat.



WARNING!

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

3 Installation

3.1 Before you start

Installation of the SeaStar P/A should be performed by a qualified marine technician. To ensure proper installation of the steering system:

- Familiarize yourself with the system and review the entire installation procedure before you start installing components.
- Make sure you read and understand all the safety information in this manual, and in any other manual included with the system.
- Check that you have all the components and tools you need.

If you need technical assistance, or wish to report an error in our documentation, please contact Dometic technical support.

Email: seastar@dometic.com

Phone: 604.248.3858



WARNING!

The SeaStar P/A unit has been designed and tested for use with marine hydraulic steering only. Use in any other application may result in property damage and/or personal injury or death.



WARNING!

Do not use a wheel-mounted trim switch with coiled cord. The cord can wrap around the steering wheel shaft and inhibit steering.



CAUTION!

The SeaStar power assist is designed and validated for use with SeaStar helms, steering cylinders, and hoses. Warranty may be void if products from other manufacturers are used in the system.



NOTE

Due to a small amount of internal hydraulic 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.



NOTE

Where a fastener torque is specified in this manual, the standard tolerance is $\pm 5\%$ unless a range is given.

3.1.1 Compatibility

The SeaStar P/A and P/A PRO are designed for use in recreational marine applications. See the matrix below for helm, cylinder, P/A, and hose compatibility.



NOTE

The power assist can be used with helms of any displacement, but we recommend 1.4, 1.7, and 2.0 helm pumps for optimal performance.

Helm compatibility	Power Assist Model	
	PA12XX-2, PA1200-2HP	PA1315-2 (PRO)
SeaStar	✓	✗
SeaStar PRO	✗	✓

Hose compatibility		
SeaStar	✓	✗
SeaStar PRO	✓	✓
Nylon tube	✗ (may be used for compensating line only)	

Cylinder compatibility		
All SeaStar front mount outboard cylinders	✓	✓
All SeaStar inboard and sterndrive cylinders (except power steering cylinders)	✓	✓
HC5380(-3), HC5370(-3) or any other unbalanced cylinder*	✓	✗

Table 3-1.

* An unbalanced cylinder is one in which the shaft exits one end of the barrel only.



WARNING!

Do not use with Baystar steering cylinders. The P/A can output enough pressure to damage the Baystar support rods.

3.1.2 Tools required

You will need the following tools to complete your installation.

- 1/2", 5/8", and 3/4" open end wrench.
- Electrical cut and crimp pliers.
- All other tools noted with your helm pump and steering cylinder installation instructions.

3.1.3 Installation overview

STEP 1 – Install system components

- Install the SeaStar helm(s) and steering cylinder(s) according to the installation instructions provided with the components.
- Install the compensating line fitting to the helm as shown in section 3.2.
- Install the SeaStar power assist pump as shown in section 3.3.
- Review the system plumbing requirements in section 3.4, then find your configuration in sections 3.5 to 3.7 and make the required hose connections.
- If you have an autopilot pump, plumb it into the system as shown in section 3.8.
- Make the electrical connections as shown in section 3.9, but do not turn on the power assist yet.



NOTICE!

Do not run the P/A unit until the SeaStar steering system has been bled free of air. Failure to do so may result in non-repairable damage to the P/A unit.

STEP 2 – Fill and purge the system

- Fill and purge the hydraulic system as shown in section 4.

STEP 3 – System check

- To complete the installation, perform the system checks outlined in section 4.3 before using the boat.

3.2 Compensating line fitting installation

The helm, power assist, and autopilot (if equipped) each have a small fluid reservoir. The compensating line (also called a reservoir line or return line) connects these reservoirs together so that they act as a single, larger reservoir. This connection can be made with hose or with SeaStar nylon tubing.

The helm has two reservoir ports, marked 'R,' on the rear cover. These ports are shipped plugged from the factory, so you will need to install a fitting. An ORB fitting is supplied with the power assist for installation on helms with a '-3' suffix in the part number. If you have an older helm with NPT fittings you will need to order an NPT fitting kit, HF5540.



NOTICE!

Do not attempt to install an NPT fitting into a -3 helm hose fitting port. Doing so will lead to irreparable damage to the helm. Only use SeaStar ORB hose fittings.

ORB fittings:

- Remove the plug from the bottom-most R port.
- Thread the 45° fitting (supplied with the P/A) into the helm port until the fitting washer (item 2) contacts the face of the helm port. Tighten hand tight. Do not use a wrench.
- Re-position the fitting to the desired orientation by turning it counterclockwise to a maximum of one full turn.
- While holding the fitting body securely with a wrench, torque the lock nut (item 1) to 18 ft-lbs (24.4 Nm).

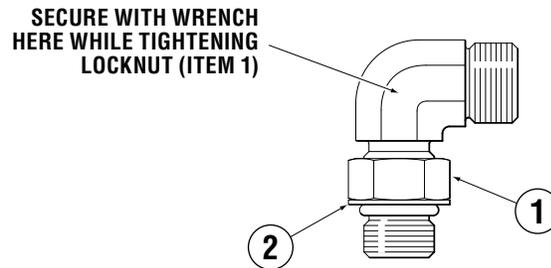


Figure 3-1.

NPT fittings:

- Remove the plug from the bottom-most R port, taking care to keep any sealant residue out of the pump.
- Clean sealant residue from the threads in the helm cover as thoroughly as possible. Clean from inside out, and with threads facing down, to avoid contaminating the helm.
- Apply a liquid thread sealant, such as Loctite® 565 PST, to the tapered pipe thread of fitting, following the sealant manufacturer's application directions. Do not apply sealant to the straight-threaded portion of the fitting.
- Install the fitting in the pump body hand tight, then use a wrench to tighten one turn. Tighten no more than one additional turn to align the fitting to the desired orientation. Do not overtighten, as you may damage the helm.

3.3 Pump installation

The SeaStar P/A can be wall-mounted to a bulkhead or transom, or floor-mounted with the accessory mounting foot (included). Mounting templates for wall and floor mounting are provided in section 7.

When determining where to mount the pump, consider the following:

- The P/A must be mounted in a dry location.
- The P/A must be mounted within 10° of vertical. Mounting in any other orientation will result in a poor purge of air from the system, leading to poor performance and possible safety hazard.
- The pump motor will get hot during heavy use. Do not mount the pump in an area where fabrics or other flammable materials may contact the motor.
- The P/A will make noise comparable to an autopilot pump; consider this if installing the pump in a center console, or in an area where you wish to limit noise.
- The pump motor contains strong magnets that may affect a magnetic compass. Ensure the power assist is at least 24" (60 cm) from a compass.
- The pump's electronics may be affected by strong magnetic fields. Do not mount the power assist within 12" (30 cm) of devices that generate magnetic fields, such as electric motors (e.g. bilge pump).
- The straight fittings installed in the pump may limit where you can place the pump while respecting the minimum bend radius of the hose. To mount the pump closer to a bulkhead you can install 90° fittings in place of the straight fittings. See section 3.3.1.

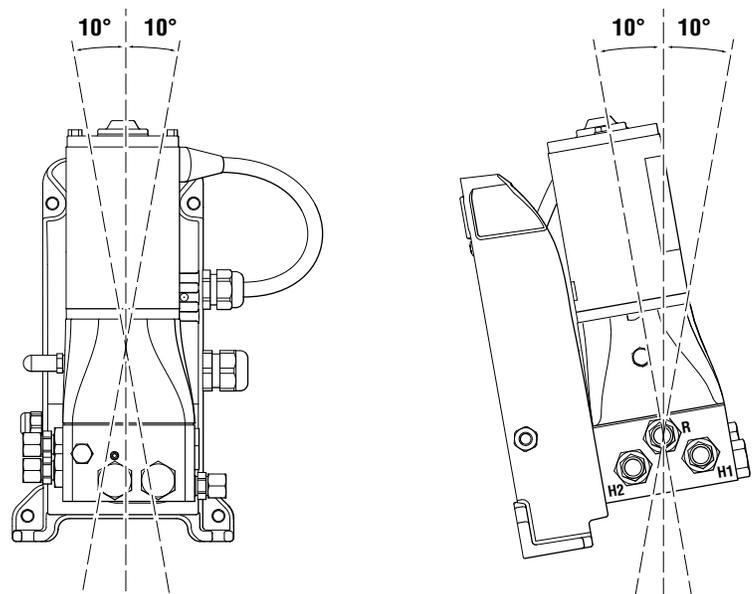


Figure 3-2.



WARNING!

Failure to correctly mount the P/A within 10° of vertical may lead to excessive air in the steering system, leading to poor steering performance and/or the potential loss of steering control, leading to a collision and/or ejection from the boat leading to property damage, personal injury, and/or death.

3.3.1 Installing 90° fittings

The minimum bend radius for SeaStar and SeaStar PRO hose is 3.5" (9 cm). If you are installing the pump with the hose exit close to a bulkhead or other obstruction that won't allow a suitable bend radius, you can replace the straight fittings at the pump output (labeled C1 and C2) with 90° fittings. These are sold separately in kits of three fittings, part number HF5529.

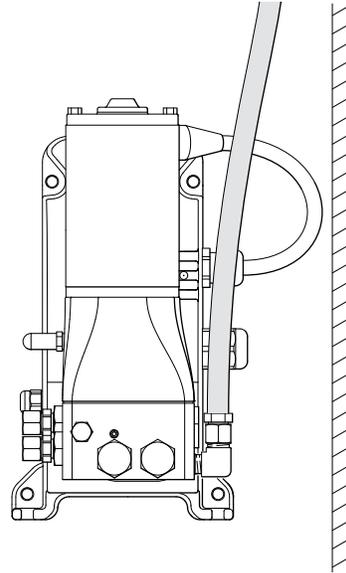


Figure 3-3.

To install:

- Remove the straight fittings, taking care to keep any sealant residue out of the pump.
- Clean sealant residue from the threads in the pump body as thoroughly as possible. Clean from inside out, and with threads facing down, to avoid contaminating the pump.
- Apply a liquid thread sealant, such as Loctite® 565 PST, to the tapered pipe thread of the 90° fittings, following the sealant manufacturer's application directions. Do not apply sealant to the straight-threaded portion of the fitting.
- Install the fitting in the pump body hand tight, then use a wrench to tighten an additional two turns. Tighten no more than one additional turn to align the fitting to the desired orientation. Do not overtighten, as you may damage the pump body or fitting.



CAUTION!

Adjust fitting orientation immediately. Once the sealant begins to cure any further adjustment will likely result in a leak, in which case you will need to remove the fitting and re-apply sealant.



CAUTION!

Never use Teflon tape to seal any fittings in a SeaStar hydraulic steering system. Use of Teflon tape will void the warranty.

3.4 Plumbing the system – general requirements



WARNING!

Do not cut the hose or attempt to install reusable fittings. Failure of the hose or fittings may lead to loss of steering control resulting in a collision and/or ejection from the boat leading to property damage, personal injury, and/or death.



WARNING!

Failure to comply with these plumbing requirements may lead to loss of steering control resulting in a collision and/or ejection from the boat leading to property damage, personal injury, and/or death.

Before installing the steering hoses, please read and understand the important DOs and DON'Ts below.

DO:

- ✓ Use only SeaStar or SeaStar PRO hose. Exception: you may use nylon tube plumb the compensating line only.
- ✓ Protect the hose from chafing, rubbing, and contact with assembly screws or sharp edges of any type.
- ✓ Route hoses through a protective PVC tube if possible. If not possible, attempt to route the hoses so that they can be periodically inspected for wear or damage.
- ✓ Secure exposed sections of hoses every 12" (30 cm) or less.
- ✓ Provide sufficient hose length in the splashwell to allow for cylinder movement throughout the turning arc and the entire tilt range of the engine(s).
- ✓ Torque hose fittings to 15 ft-lb (20.3 Nm).

DON'T:

- ✗ Use standard SeaStar hose with a SeaStar PRO power assist. Use only SeaStar PRO hose.
- ✗ Use hoses shorter than 6' (1.8m) in length in the system.
- ✗ Cut hose or attempt to install reusable fittings.
- ✗ Install pipe sealant onto the hose side of a fitting.
- ✗ Remove the protective end caps until the hoses have been routed and are ready to be connected to the pump or cylinder.
- ✗ Install hoses in an area where they will be exposed to high temperatures. Areas to avoid are near engine manifolds and in engine compartments.
- ✗ Install hoses such that they contact electrical connections or are exposed to battery acid or fumes from batteries.
- ✗ Bend hoses tighter than a 3.5" (90 mm) radius.
- ✗ Allow hoses to hang free in an area where they could become a safety hazard.



CAUTION!

Contamination is the most common cause of hydraulic system wear or failure. Take care to keep contamination out of the hoses and fittings.

3.5 SeaStar outboard front mount cylinders and I/O cylinder

Outboard front mount cylinder part #'s:

HC5345-3, HC5347-3, HC5348-3, HC5358-3, HC5375-3, HC5445-3, HC6345-3, HC6358-3, HC6845(S), HC6850



NOTE

Includes older models without -3 suffix.

I/O cylinder part #: HC5332

3.5.1 Single cylinder diagram

Helm pump model and Displacement	Wheel Turns
1.7 cu.in. per revolution	5
2.0 cu.in. per revolution	4
2.4 cu.in. per revolution	3.5

Table 3-3.

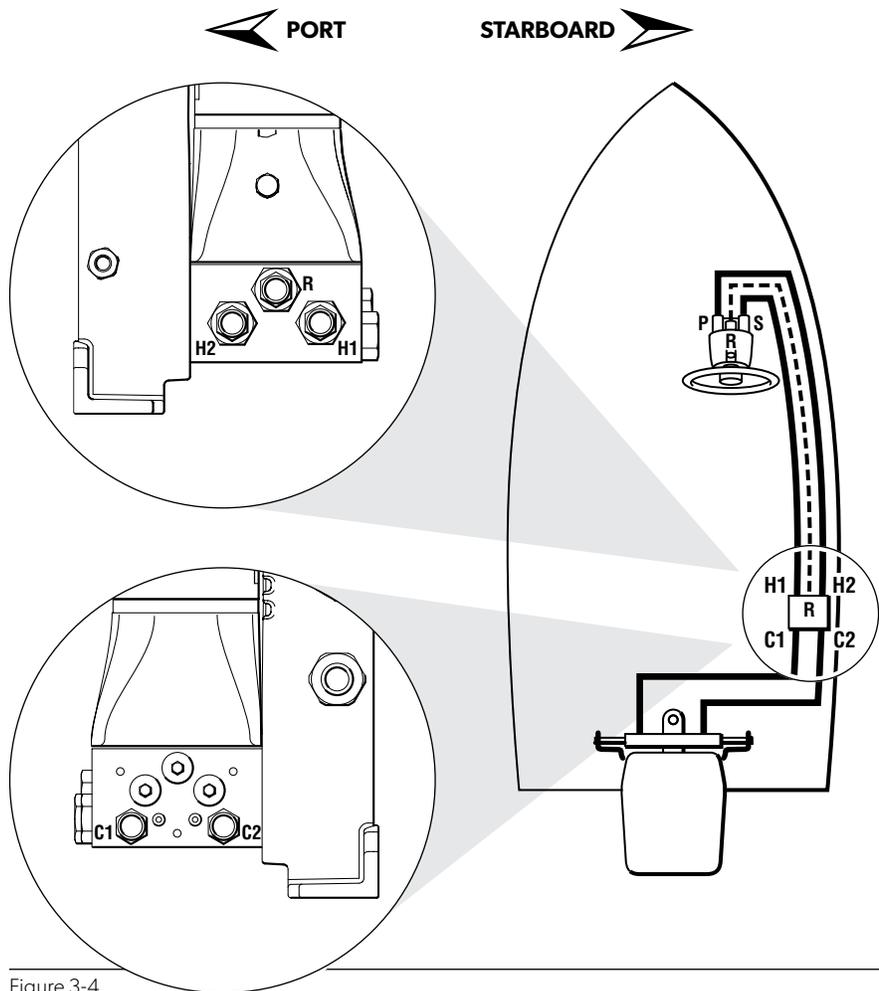


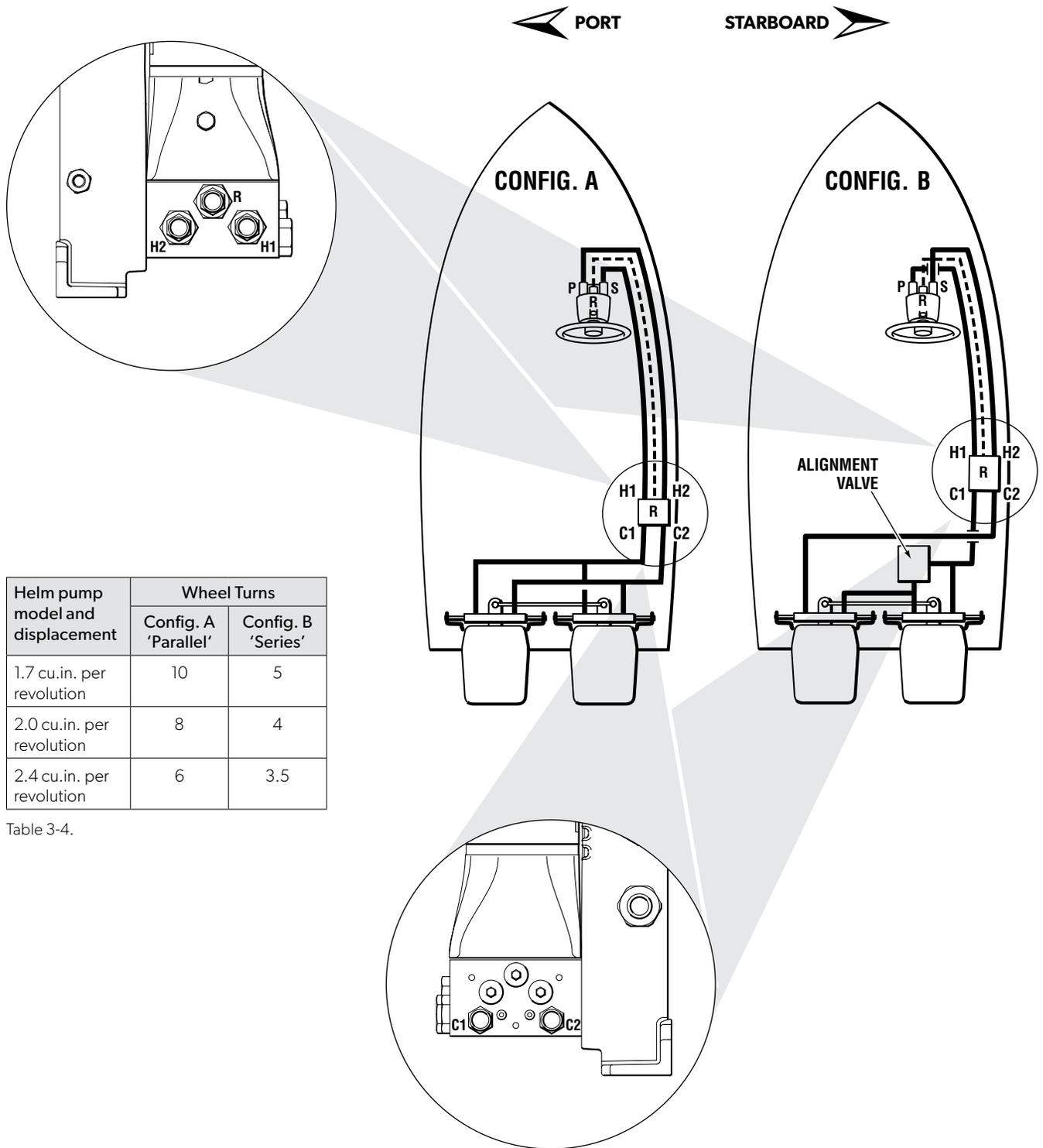
Figure 3-4.

Connect hoses as follows:

Helm	P/A	Cylinder
S → H1	C1 →	Port side
P → H2	C2 →	Starboard side
R →	R →	

Table 3-2.

3.5.2 Dual cylinder installations



Helm pump model and displacement	Wheel Turns	
	Config. A 'Parallel'	Config. B 'Series'
1.7 cu.in. per revolution	10	5
2.0 cu.in. per revolution	8	4
2.4 cu.in. per revolution	6	3.5

Table 3-4.

Figure 3-5.

3.5.3 Triple cylinder installations

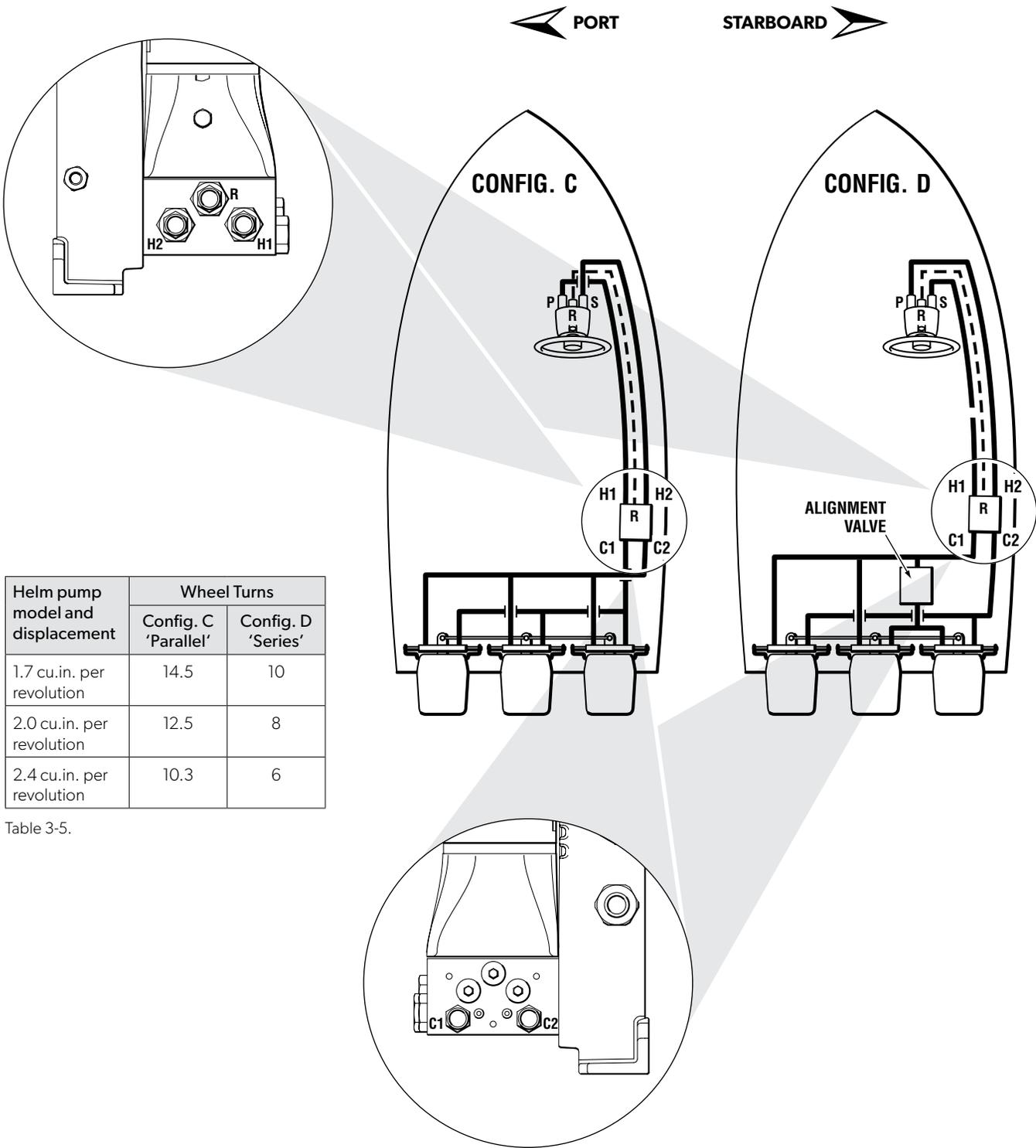


Figure 3-6.

3.6 SeaStar outboard side mount and splashwell mount cylinders

Side mount cylinder part #'s:
HC5370 and HC5370-3

Splashwell cylinder part #'s:
HC5380 and HC5380-3



NOTE

When using an unbalanced cylinder, the number of wheel turns will be different port to starboard.



NOTICE!

Do not use SeaStar PRO systems with HC5370 side mount and/or HC5380 Splashwell mount cylinders as SeaStar PRO systems are not compatible with any unbalanced cylinder.

Connect hoses as follows:

Helm	P/A	Cylinder
S →	H1	C1 → Starboard side
P →	H2	C2 → Port side
R →	R	

Table 3-6.

Helm pump model and displacement	Wheel Turns	
	HC5370	HC5380
1.7 cu.in. per revolution	4.8/5.7	5.5/6.5
2.0 cu.in. per revolution	4.0/4.8	4.6/5.5
2.4 cu.in. per revolution	3.5/4.0	3.9/4.6

Table 3-7.

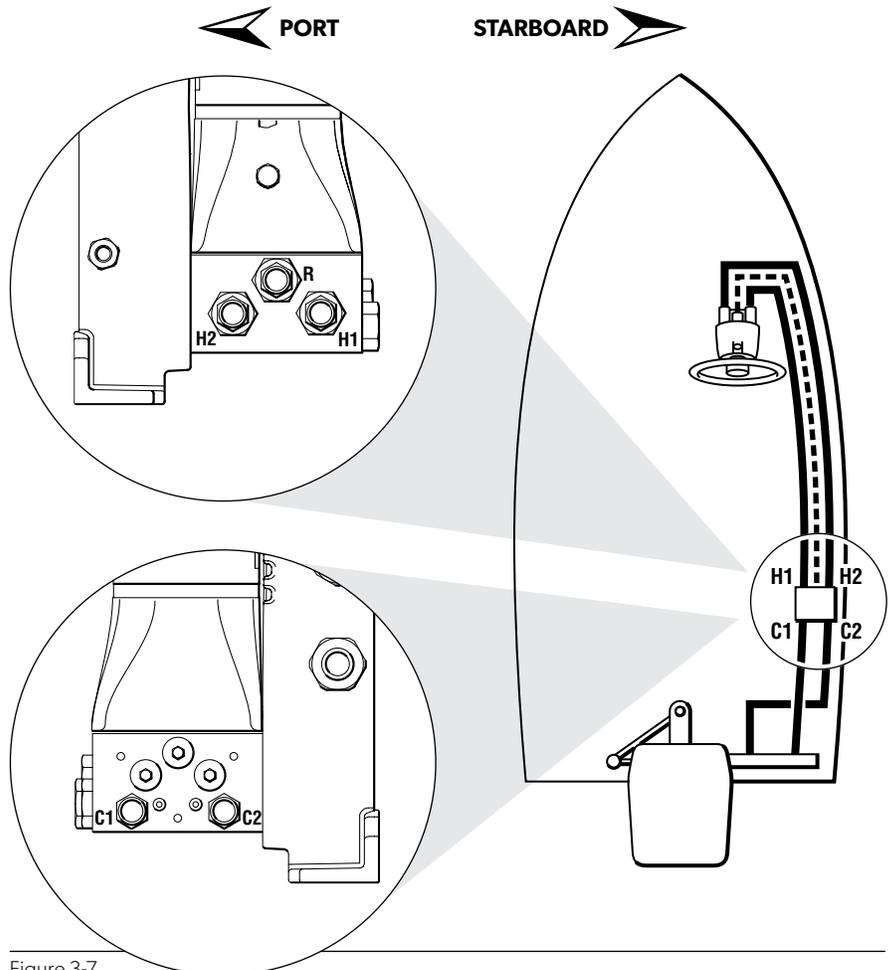


Figure 3-7.

3.7 SeaStar inboard and sterndrive cylinders

All inboard and sterndrive cylinder part #'s Except: HC5332

Connect hoses as follows:

Helm	P/A	Cylinder
S →	H1	C1 → Starboard side
P →	H2	C2 → Port side
R →	R	

Table 3-8.

Helm pump model and displacement	Wheel Turns	
	HC5312-3	HC5313-3
1.7 cu.in. per revolution	4.2	5
2.0 cu.in. per revolution	3.6	4
2.4 cu.in. per revolution	3	3.5

Table 3-9.

Helm pump model and displacement	Wheel Turns	
	HC5314-3 HC5318-3	HC5319-3
1.7 cu.in. per revolution	6	8
2.0 cu.in. per revolution	5	6.8
2.4 cu.in. per revolution	4.2	5.7

Table 3-10.

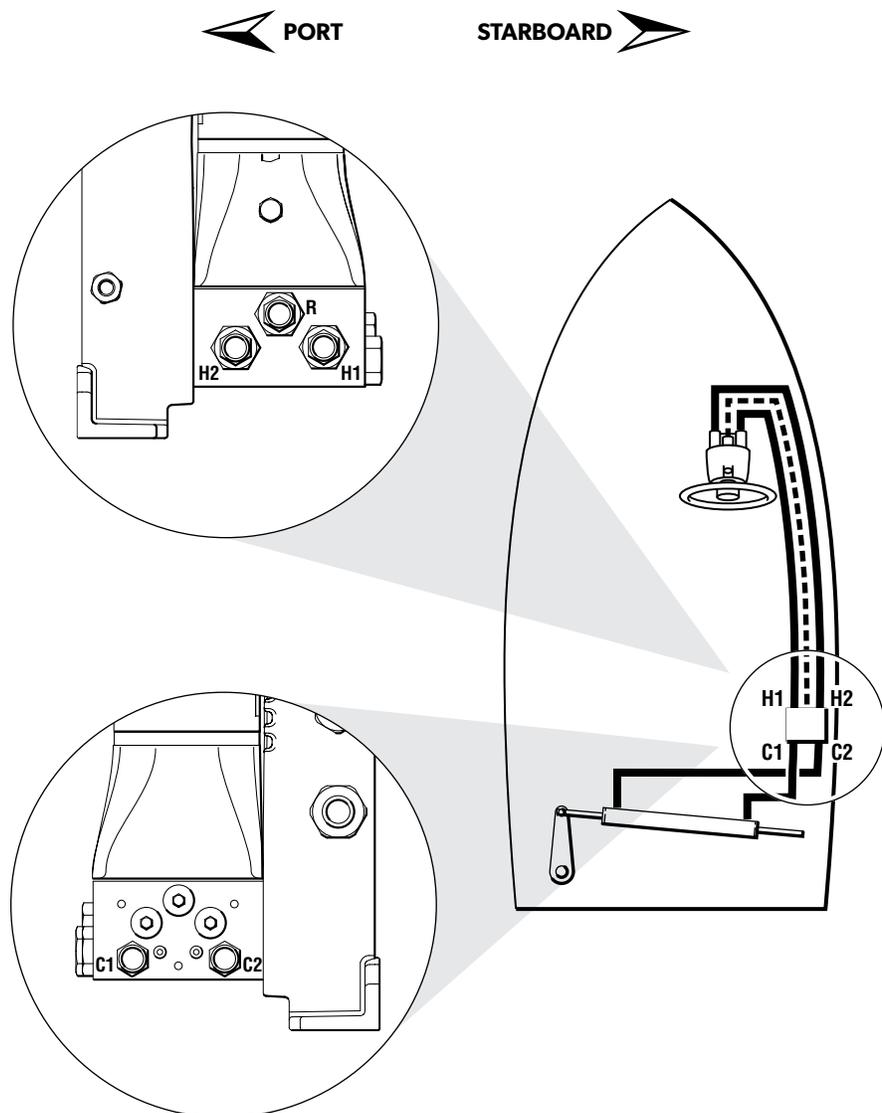


Figure 3-8.

3.8 Autopilot connection detail



NOTE

Installation and operation can be simplified with the purchase of a SeaStar Autopilot pump and adapter kit HA1205. Contact Dometic to ensure this will work with your autopilot controller.

When adding an autopilot to the system:

- Connect the A/P pump output to the steering lines between the power assist pump and the steering cylinder(s) as shown in figure 3-9.
- Connect the A/P pump's reservoir port to the compensating line between the helm pump and the power assist as shown.
- Purge the autopilot reservoir at the same time as the power assist reservoir.
- Run the autopilot pump in both directions during the purging process (see section 4 for more information).

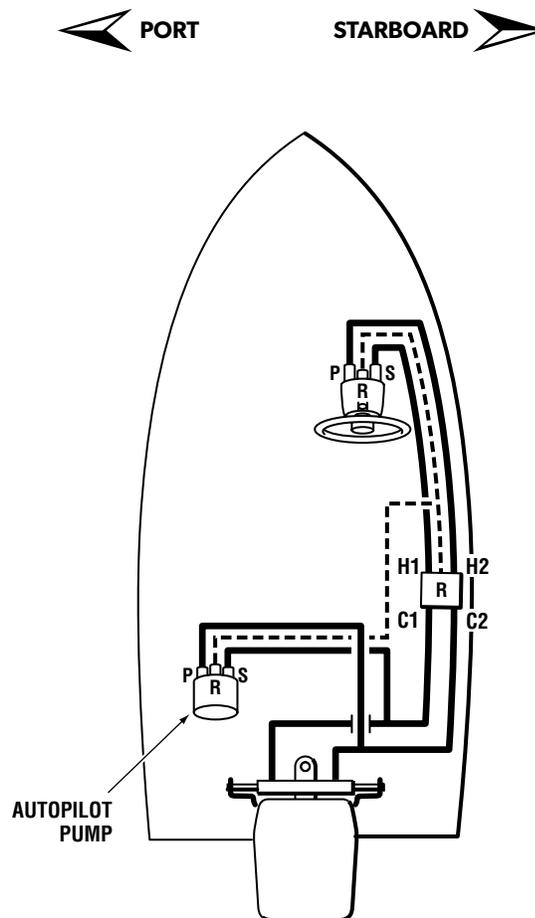


Figure 3-9.

3.9 Electrical installation



WARNING!

All wiring must comply with ABYC E-11, ISO 10133, or any other standard required in your jurisdiction.

The SeaStar Power Assist requires a 12V or 24V power source and can draw up to 50A (25A with 24V source) when the steering is in heavy use. It is important that the power supply wires are correctly sized for the load.

Typical Source Connections

- Direct to the batteries.
- To battery switches. Never switch the negative wire.
- To a bus bar or power distribution panel. Ensure that the wire size from the bus to the batteries is sufficient to handle the peak current of all accessories connected to the bus. Many boats have a positive and/or negative bus behind the helm or in the center console. These are typically supplied to handle light accessory loads and usually do not have sufficient wire size to supply the P/A. In general, buses that supply power to vessel electronics such as radar and GPS are usually not acceptable power sources for the P/A.



NOTE

Avoid powering the P/A from the same distribution panel as equipment that may be sensitive to electrical noise. Use a separate distribution panel or connect directly to the battery.

ABYC E-11 and ISO 10133 require that all wires carrying positive voltage must be protected with an overcurrent protection device within 7" (ISO: 200 mm) of the power source. Use a fuse or circuit breaker rated for marine use, with a rating of 50A (25A in 24V installations). Dometic offers two ABYC-compliant fuse options that you can find listed with the available accessories in section 6.



WARNING!

Failure to use a circuit overprotection device may result in a fire and/or explosion leading to property damage, personal injury, and/or death.

Refer to the wiring diagram in figure 3-10:

- Connect the harness red wire to the positive (+ve) supply.
- Connect the harness black wire to the negative battery terminal or bus bar.
- Connect the purple ignition wire to a 1A fused engine ignition source. An additional switch can be wired into the circuit that will allow an operator to deactivate the P/A in a low-battery situation.
- Properly route and secure the power harness and ignition wires away from sources of heat (e.g. engine exhaust), battery acid, and mechanical damage.

**NOTE**

The power harness may be cut to length if required. Dometic recommends sealed, heat-shrink crimp terminals. Install according to manufacturer's recommendations.

**NOTE**

In multi-engine applications Dometic recommends the use of a Dual Ignition Control Kit (HA1201), which will ensure the P/A is on when any engine is running. See section 6 for more information.

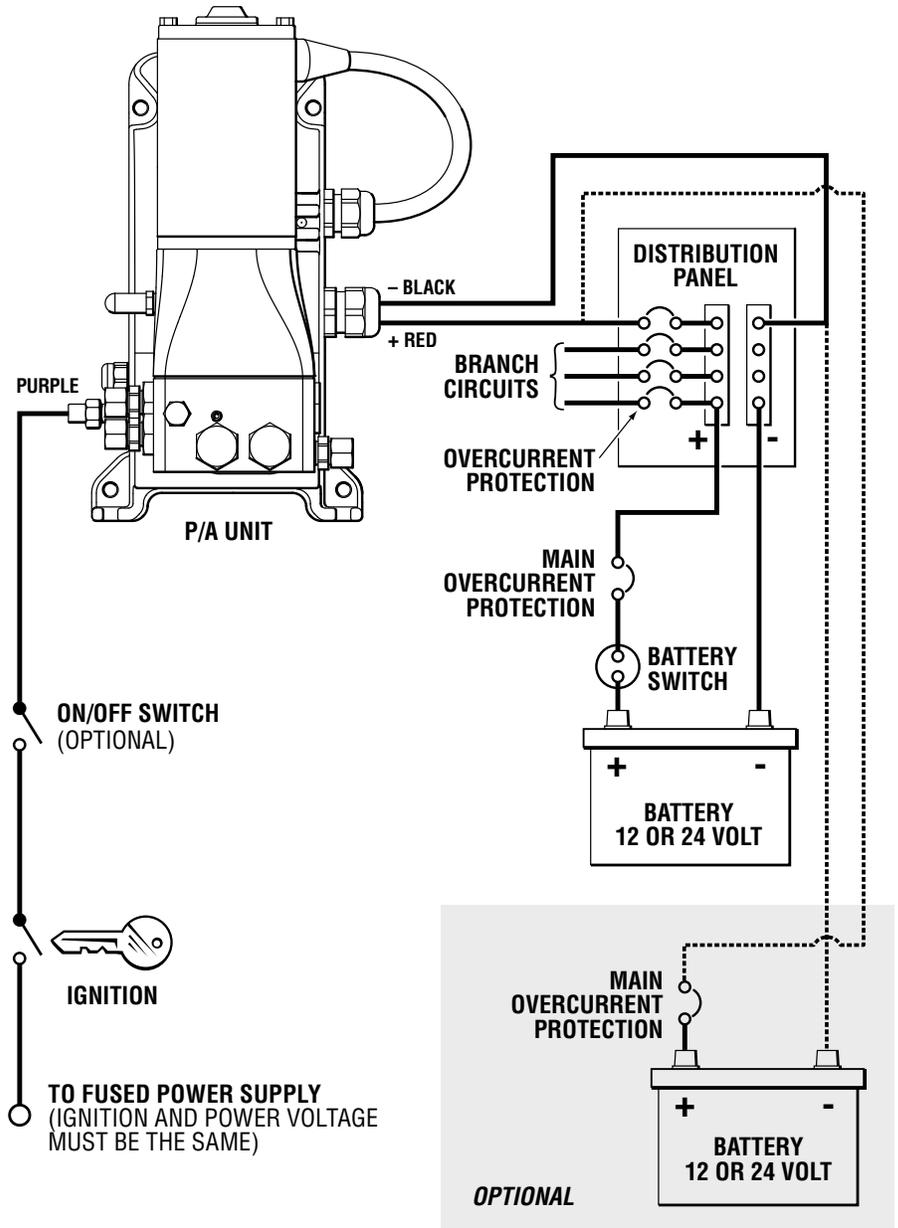


Figure 3-10.

4 Filling and Purging the System



NOTICE!

Do not turn on the power assist until you have filled the steering system and purged it with the P/A off. Running the power assist pump dry may cause irreparable damage.



NOTE

If the system is plumbed with a liquid alignment valve as shown in Config B (figure 3-5) and Config D (figure 3-6), refer to the instructions that came with the valve for additional bleeding instructions.

4.1 With Power Purge



NOTE

Refer to the Power Purge operating manual for additional instructions and for purge procedures for multiple-station installations.

STEP 1 — Remove air from compensating line

- Install the helm adapter fitting into the helm's fill port and attach the Power Purge supply line. Ensure the quick connect is locked onto the fitting.
- Connect one of the Power Purge's fluid return lines to the bleed fitting on the power assist reservoir (see figure 4-2).
- Open the bleed fitting one to two turns.
- Turn on the Power Purge and run it until no air bubbles can be seen leaving the bleed fitting.
- Turn off the Power Purge and close the bleed fitting.

STEP 2 — Purge the cylinder lines

- Connect the fluid return lines to the steering cylinder bleed fittings.
- Open the cylinder bleed fittings one and a half turns. Ensure the quick connect remains locked onto the fitting.
- Turn the Power Purge on and wait 20 seconds for the lines to fill with fluid.
- With the power assist off, slowly turn the steering wheel clockwise until the cylinder rod is fully extended. You may need to manually push the cylinder rod or engine.
- Continue turning slowly for thirty seconds, then check that there are no bubbles escaping in the purge lines.
- Repeat in the counterclockwise direction.
- Turn the power assist on and repeat the purge in both directions.
- Turn the Power Purge off.
- Tighten the cylinder bleed fittings.



NOTE

If there is an autopilot pump in your system you will need to purge it by running it for at least ten seconds in both directions. See the manufacturer's instructions for additional information.

STEP 3 — Check the purge

- Perform the system checks in section 4.3.

4.2 Manual fill and purge

You will need two people to thoroughly fill and purge the system. One person may not be able to remove all the air from the system, resulting in spongy and unresponsive steering.



NOTE

Ensure fluid is always visible in the helm fill tube when purging. If the fluid level disappears into the pump air may be drawn into the system, which will increase filling time.

4.2.1 Hydraulic fluid requirements

You will need two bottles of fluid (HA5430) for a single station, single cylinder system. You will need an additional bottle for each helm, cylinder, or autopilot added to the base system.



NOTE

If installing a PA1200-2HP pump, you must use SeaStar EPS steering fluid (HA5483) to get the full performance of the pump.

You will need a clean container to collect the fluid during the purge process. The fluid you collect can be re-used if filtered through a fine mesh screen.



NOTICE!

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

4.2.2 Fill and purge procedure

The procedures for other system configurations are shown at the end of this section.

Single station, single cylinder system configuration

Procedure: Perform steps 1–3.

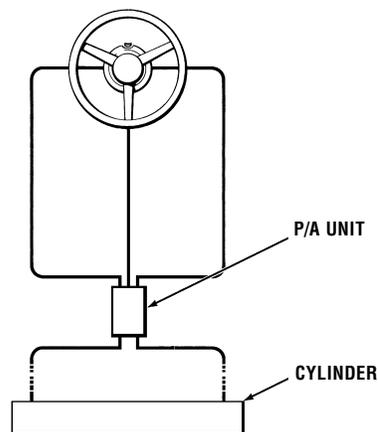


Figure 4-1.

STEP 1 — Remove air from compensating line

- Install the fill tube fitting into the helm's fill port and attach a bottle of steering fluid.



NOTE

Filling the helm reservoir with a funnel before you connect the fill tube will reduce the time it takes to purge.

- On the P/A, open the manual bleed valve two full turns (see figure 4-2) and the reservoir bleed fitting one to two turns.
- Connect the purge tube to the bleed fitting and direct it into a clean container.
- Pierce the top of the fluid bottle with the push pin several times to allow air into the container, then wait until the helm is filled and the fluid level no longer drops.
- Turn the steering wheel clockwise (to starboard) until a steady stream of fluid comes out of the reservoir bleed fitting. Continue turning until no air bubbles are seen.
- Close the reservoir bleed fitting.
- Continue turning the wheel clockwise another fifteen turns, then close the manual bleed valve.

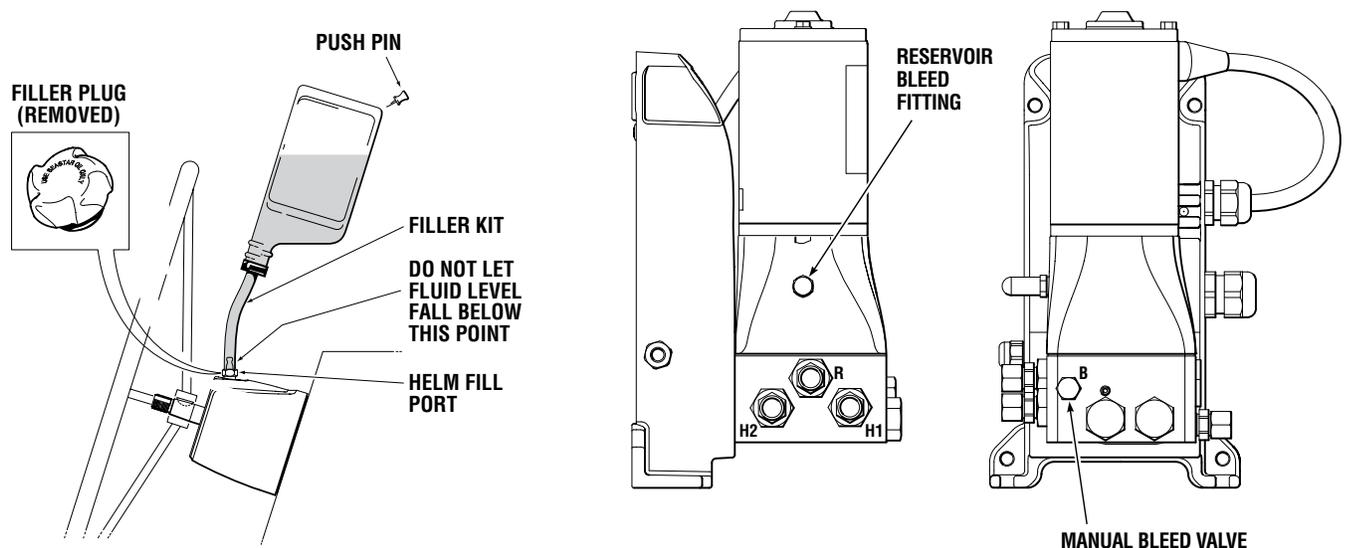


Figure 4-2.

STEP 2 — Purge the steering lines and cylinder

- Turn the steering wheel clockwise until the cylinder rod is fully extended as shown.
- Open the indicated bleed fitting.
- Connect the purge tube to the bleed fitting and direct it into a clean container.

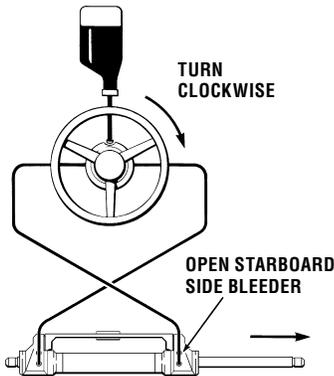


Figure 4-3. Outboard front mount and HC5332 cylinder.

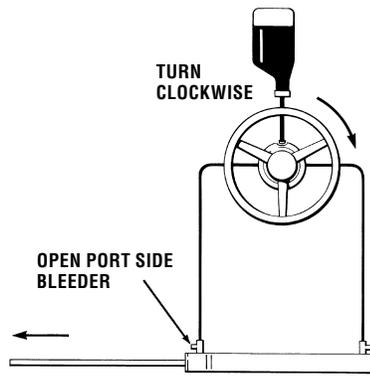


Figure 4-4. Side mount / Splashwell mount cylinder.

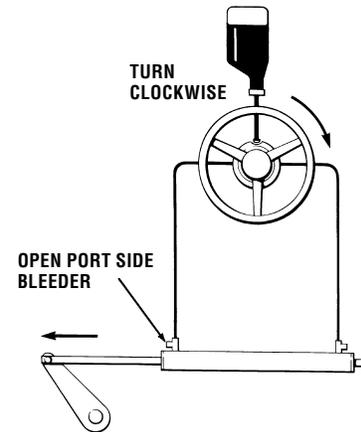


Figure 4-5. All balanced cylinder. Inboard and Sterndrive cylinders.

- Hold the cylinder body (front mount cylinder) or rod (side mount and inboard cylinders) to prevent it from moving. Do not use anything other than your hands to hold the cylinder or rod, or you may damage the cylinder.
- Slowly turn the wheel (no faster than two seconds per turn) **counterclockwise** until a steady stream of fluid with no air bubbles comes out of the bleed fitting.
- If there is an autopilot pump in the system, manually run the pump to **port** for at least ten seconds, longer if bubbles are still coming out of the bleed fitting. Refer to the installation instructions with your pump.
- Close the bleed fitting and let go of the cylinder or rod. Move the purge tube to the other bleed fitting.

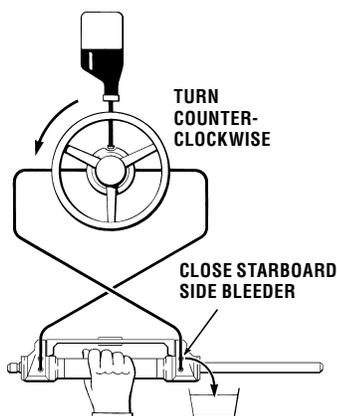


Figure 4-6. Outboard front mount and HC5332 cylinder.

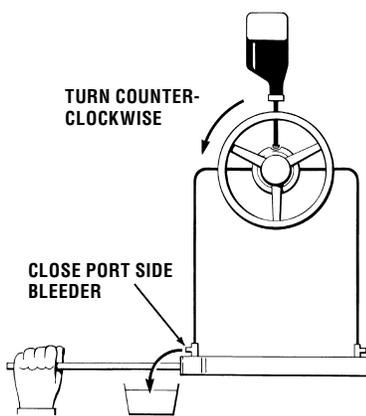


Figure 4-7. Side Mount / Splashwell mount cylinder.

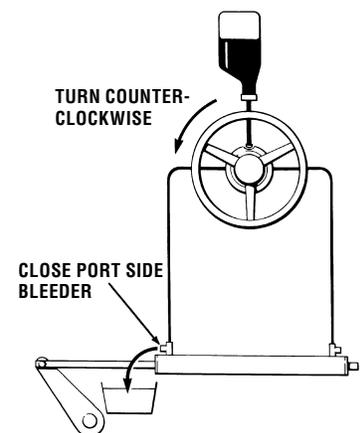


Figure 4-8. All balanced cylinder. Inboard and Sterndrive cylinders.

- Continue turning the steering wheel counterclockwise until the cylinder rod is fully extended in the other direction.
- Open the bleed fitting and direct the purge tube into a container.

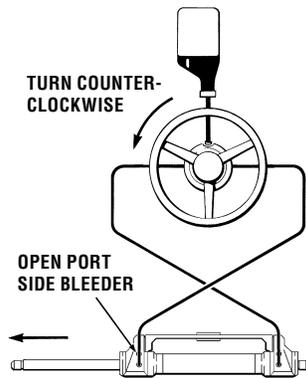


Figure 4-9. Outboard front mount and HC5332 cylinder.

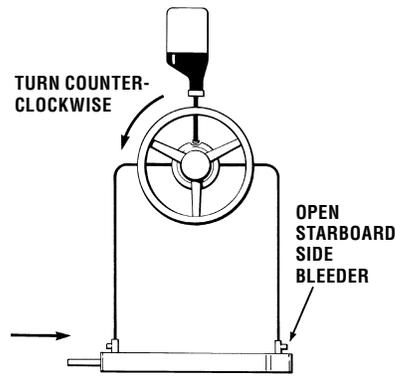


Figure 4-10. Side mount / Splashwell mount cylinder.

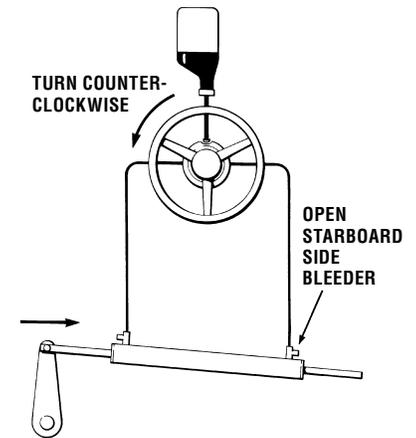


Figure 4-11. All balanced cylinder. Inboard and Sterndrive cylinders.

- Hold the cylinder body or rod to keep it from moving, then slowly turn the wheel **clockwise** until a steady stream of fluid with no air bubbles comes out of the bleed fitting.
- If there is an autopilot in the system, manually run the pump to **starboard** for at least ten seconds.
- Close the bleed fitting.

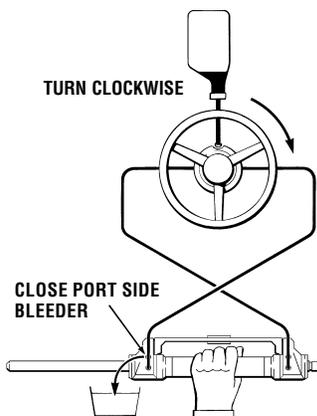


Figure 4-12. Outboard front mount and HC5332 cylinder.

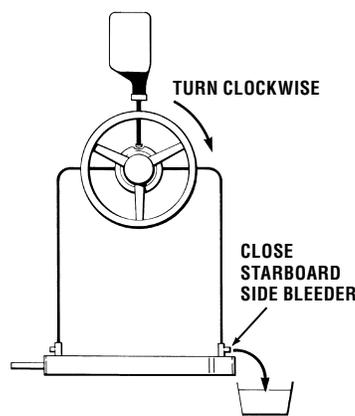


Figure 4-13. Side mount / Splashwell mount cylinder.

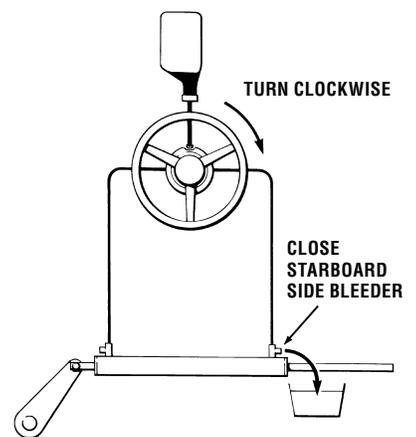


Figure 4-14. All balanced cylinder. Inboard and Sterndrive cylinders.

STEP 3 — Finish

- Repeat step 2 with the power assist on.
- Remove the fill tube and bottle from the helm and install the port cap.

Once you have finished at all helm stations, perform the system checks in section 4.3.

Twin station, single cylinder system configuration

Procedure: Perform steps 1–3 at station number 1. Move the helm fill tube to station number 2 and repeat steps 2 and 3 from there.

Repeat for any additional stations.

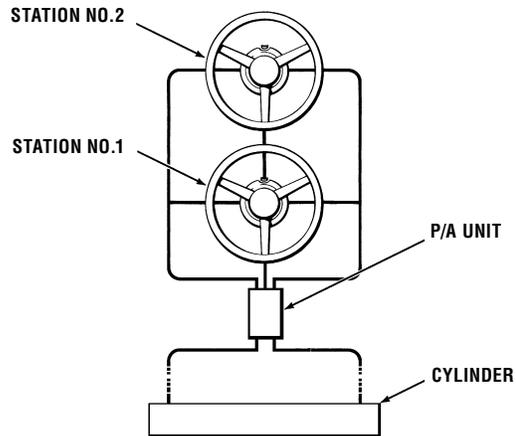


Figure 4-15.

Single station, twin cylinder system configuration

Procedure: Perform steps 1–3. In steps 2–3, perform each instruction on both cylinder 1 and cylinder 2 before proceeding to the next instruction.

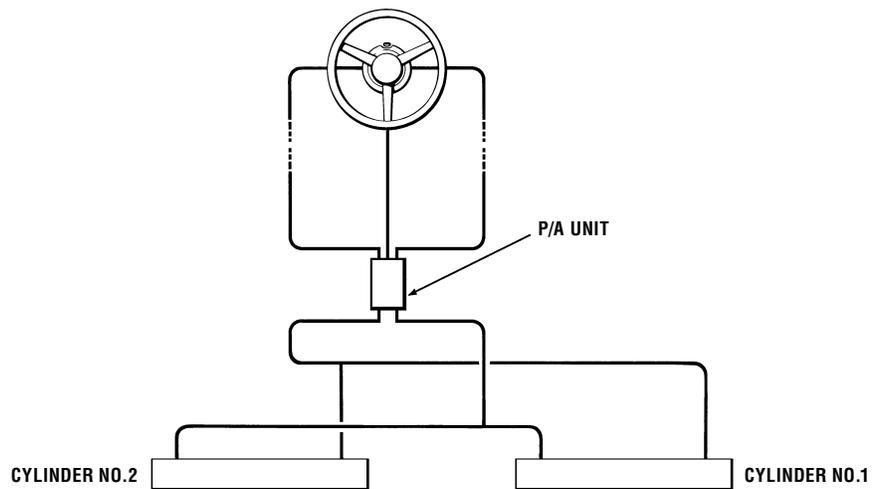


Figure 4-16.

Twin station, twin cylinder system configuration

Procedure: Perform steps 1–3 at station number 1. In steps 2–3 perform each instruction on both cylinder 1 and cylinder 2 before proceeding to the next instruction.

Repeat at station number 2.

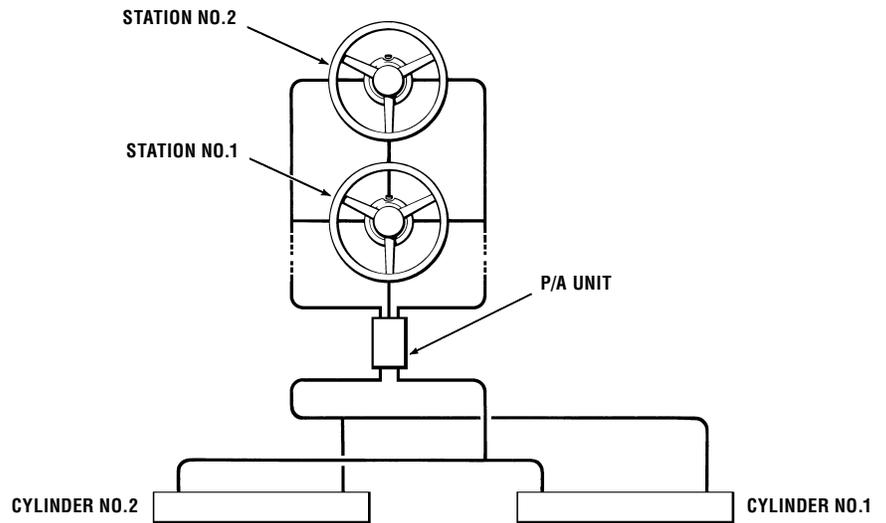


Figure 4-17.

4.3 System checks

At this point the system must be checked for fluid level, possible leaks, air removal, and possible interference. Perform all the checks in this section and correct any deficiencies before considering the installation to be complete.



NOTICE!

All these checks should be performed with the power assist off to avoid any potential damage due to high steering forces.



WARNING!

Failure to perform these checks and correct deficiencies may result in loss of steering control, leading to a collision and/or ejection from the boat resulting in property damage and/or personal injury or death.

4.3.1 Air removal check

- Remove the fluid fill cap from the helm.
- While turning the steering wheel, observe the fluid level in the helm pump. If the level rises and falls as you turn the wheel there is still air in the system. Repeat the purge procedure until there is no obvious fluid level change in the helm.
- Pull on the rudder, engine leg, or anti-cavitation plate to manually move the engine/rudder side to side. You should not be able to move the steering cylinder more than 1/4" (1/8" is ideal). If you can, repeat the purge procedure until you can't.

4.3.2 Fluid level check

- Helms mounted with the wheel shaft horizontal must be filled to the bottom of the fill port.
- Helms mounted with the wheel shaft between 20° and vertical must be filled to within 1/2" of the fill port as shown in figure 4-18.

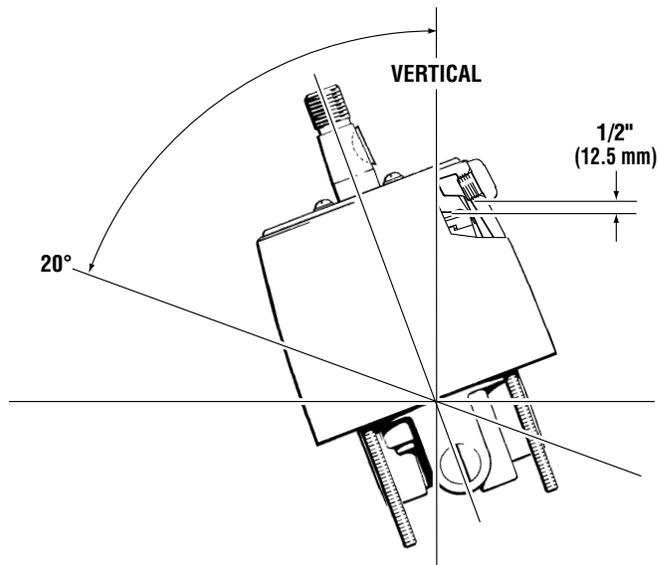


Figure 4-18.

4.3.3 System pressure test

- Turn the helm to hard over, then force the helm another quarter to half turn past the stop point.
- ✓ This will pressurize one side of the system to the helm relief pressure. The helm relief will make noise when the relief valve operates — this is normal and not harmful to the helm.
- Look for any evidence of leaks at the helm fittings, P/A fittings, and cylinder fittings.
- Repeat this test in the other direction.

4.3.4 Interference checks

All systems

- Check that the steering cylinder can be fully stroked lock-to-lock in both directions.
- Check there is no stretching, chafing, rubbing, or kinking of the hydraulic hoses.
- Confirm that nylon tubing has not been used in place of SeaStar or SeaStar PRO hydraulic steering hose (tube is only acceptable in the compensating line between the helm and P/A).



WARNING!

Stretched, kinked or chafed hose will fail over a period of time.

Outboard systems

Check that there is no interference between the steering cylinder(s) and the transom, splashwell, jackplate, tiebars, or any combination of these.

- With the engine fully tilted down, turn the steering wheel from hard over to hard over and confirm there is no interference.
- Repeat with the engine(s) tilted up, and with engines in alternate tilt positions.
- If your engine(s) are mounted to jackplate(s), repeat these checks at the top and bottom positions of the jackplate.

5 Troubleshooting Guide

Most faults occur when installation instructions have not been followed and in most cases will present themselves immediately upon filling the system. Below are the most common faults and their likely cause and solution. Use caution when diagnosing and correcting a fault. Troubleshooting should be done by a qualified marine mechanic with a working knowledge of the steering system.



NOTICE!

Dometic does not recommend disassembly of a Power Assist, a helm pump or removing a steering cylinder rod/shaft at any time. Doing so may cause more damage, leading to irreparable damage and costly replacements.

FAULT	CAUSE	SOLUTION
1. P/A unit does not turn on.	Blown Fuse/Breaker	Check external fuse or circuit breaker and replace or reset if blown. If red light on the P/A is on steady, the internal fuse is blown. Contact Dometic technical support for assistance.
	Wrong electrical connections	Refer to wiring diagram (figure 3-10).
2. Turns the wrong way	Lines reversed.	Review the plumbing diagrams for your system and check that your hoses are hooked up correctly.
3. Wheel is bumpy	Air in system.	Purge the system again. Concentrate on remaining air in the P/A unit. Ensure autopilot is correctly bled per instructions.
4. Helm locks up in both directions	Hoses installed in the wrong ports.	Review the plumbing diagrams for your system and check that your hoses are hooked up correctly.
	Kinked or collapsed line.	Check all lines for sign of a collapsed or kinked line.
5. Helm only turns in one direction and free wheels in the other	Port or Starboard line is connected to the reservoir R port on the P/A unit.	Review the plumbing diagrams for your system and check that your hoses are hooked up correctly.

FAULT	CAUSE	SOLUTION
6. Steering is very hard (stiff)	P/A unit is not turned on.	See fault #1
	Partially kinked or collapsed line.	Check all lines for a sign of a collapsed or kinked line
	H1, H2 or R port screen filters are plugged with contamination.	Remove H1, H2 and R hose and fittings. Clean screens located in the adapter fittings.
	Helm lines plumbed with tube.	Replace tube with SeaStar hose.
7. No Power Assist, lights are blinking	Note sequence of blinking lights	See section 5.1.
8. After hitting hard over and/or running at high loads with the SeaStar PRO Power Assist, the effort at the wheel increasing dramatically	Helm is super charging.	Super charging is a normal occurrence with PRO systems when running at higher loads or hitting the hard over point. This should not be taken as a fault in the system.
9. The power assist unit is really hot to the touch	Motor operating.	This is a normal occurrence with the Power Assist unit; mount the P/A in an area where it can not easily be handled and away from flammable materials.
10. Lock to lock wheel turns are different with the power assist "off" than with the power assist "on"	Hitting hard-over causing hose expansion.	This is a normal occurrence when using the power assist system.
	Power assist is pressurizing system.	This is a normal occurrence when using a power assist.
11. Noise interference through radio, VHF, stereo or sonar devices when the power assist is turned ON and operating	Power Assist wired to same distribution panel as noise sensitive equipment.	Wire Power Assist to separate distribution panel or direct to the battery.
	Sensitive equipment is not meeting immunity standards.	Add noise suppression/isolation between power source and sensitive equipment.

5.1 Warning lights

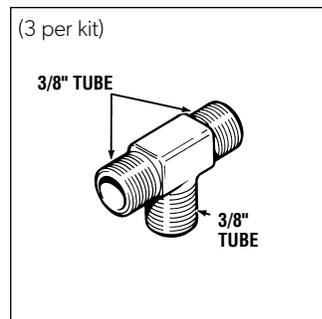
Green and red lights indicate the status of the SeaStar Power Assist.

- **Green. Steady (no flash)**
Normal operation.
- **Red. Steady (no flash)**
Internal fuse blown.
Solution: Contact Dometic.
- **Red. Two flashes, long pause**
Standby mode, lack of calibration.
Solution: Contact Dometic.
- **Red. Three flashes, long pause**
Calibration mode.
Solution: Turn off ignition, after one minute, turn ignition on. If problem persists, contact Dometic.
- **Red. Four flashes, long pause**
Tuning mode.
Solution: Turn off ignition, after one minute, turn ignition on. If problem persists, contact Dometic.
- **Red. Five flashes, long pause**
Over-voltage mode.
Solution: Check ignition and battery voltage. must be less than 32 Volts, correct as required.

6 Accessories

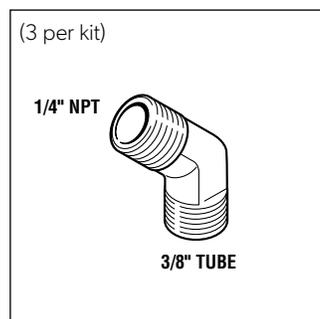
6.1 Fitting kits

HF5530 Tee Fitting



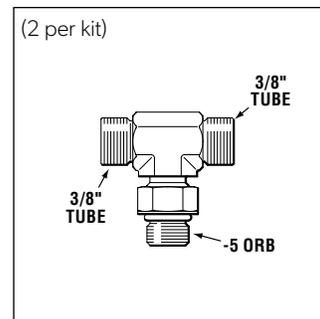
NPT fittings.

HF5540 45° Fitting



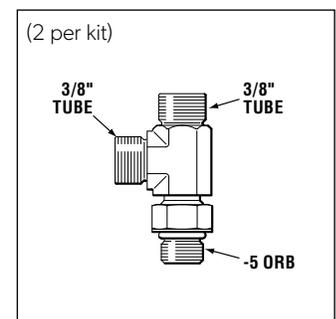
NPT fittings.

HF6005 Tee Fitting



ORB, -3 cylinders/helms ONLY.

HF6006 Tee Fitting



ORB, -3 cylinders/helms ONLY.

Figure 6-1.

6.2 Dual ignition control kit part# HA1201



NOTE

You will need one HA1201 kit for a twin, and another kit for each additional engine.

Many newer engines use a single ignition switch for multiple engines. If you have such engines you will not need this kit.

The Dual Ignition Control Kit is designed to connect the P/A unit's ignition wire to two ignition switches, ensuring the power assist is active when at least one engine is on. Refer to the instructions included with the kit for more information.

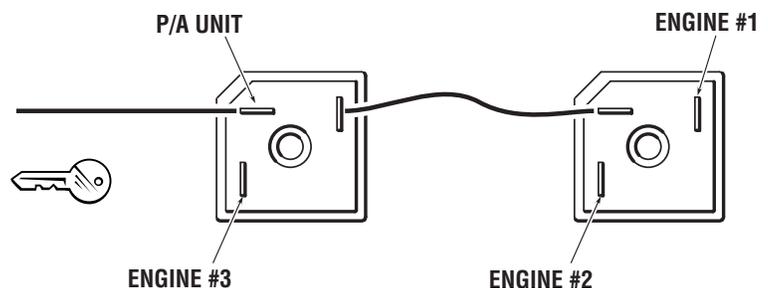


Figure 6-2. Sample triple-engine schematic.

6.3 Power harness fuse kits

HA1206: Inline maxi fuse kit, 50A.

HA1207: Battery mount fuse kit, 50A.

6.4 SeaStar Power Purge JR part# HA5445-2

SeaStar/BayStar Power Purge Jr. is the quickest way to bleed a SeaStar/BayStar system in the field and assure a rock-solid steering feel every time!

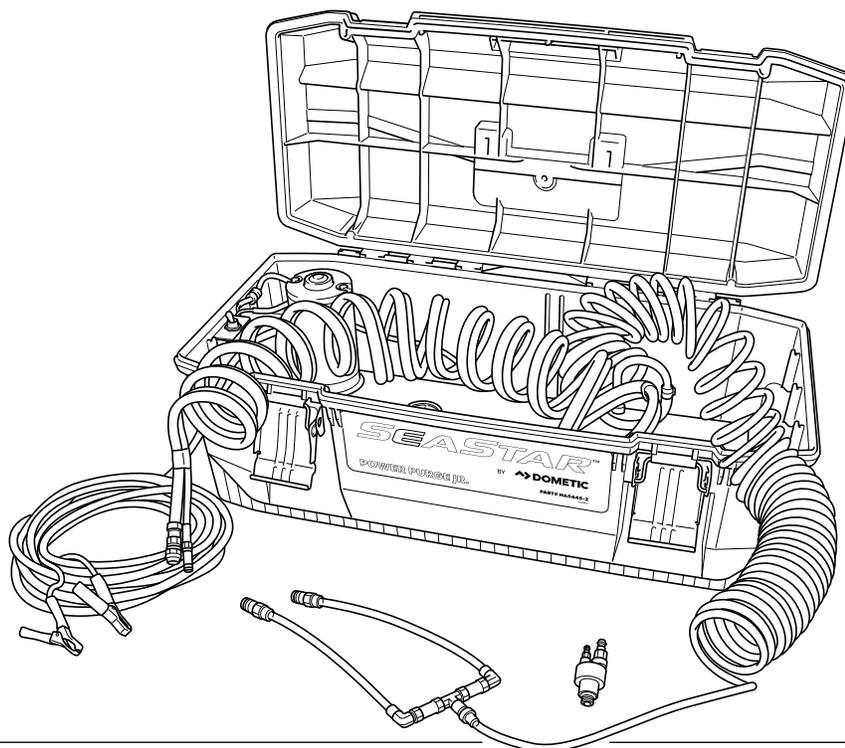


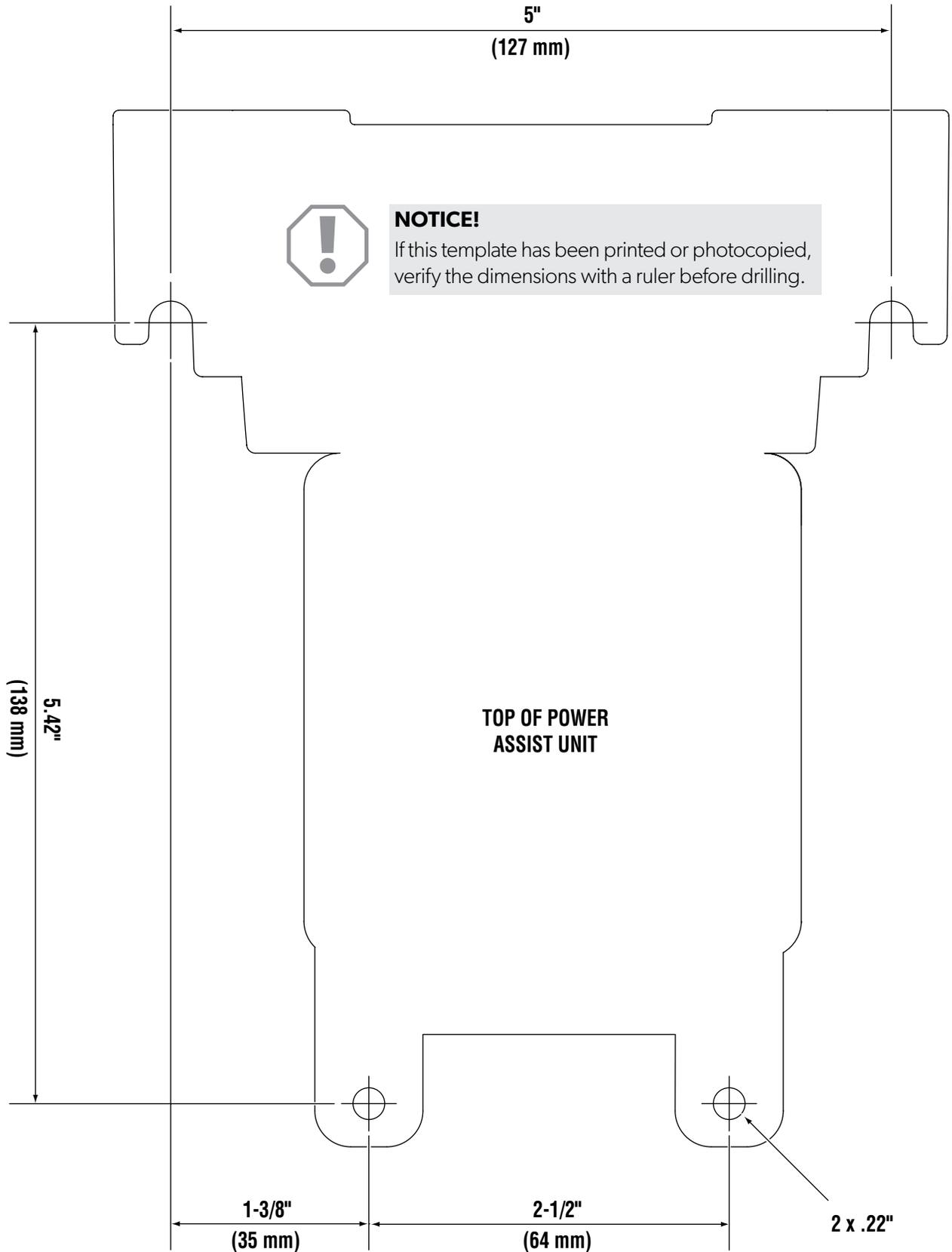
Figure 6-3.

Advantages:

- Steering feel is solid every time
- Complete Fill and Purge in 10 minutes or less
- Fast and efficient
- Easy to operate
- Screens contaminants from fluid
- Quick connect fittings
- Convenient portable size
- Convenient electrical hook-up utilizing 12 volt boat battery
- Optional dual cylinder purging kit HA5461 available
- Optional 50' hose extension kit HA5462, for longer runs

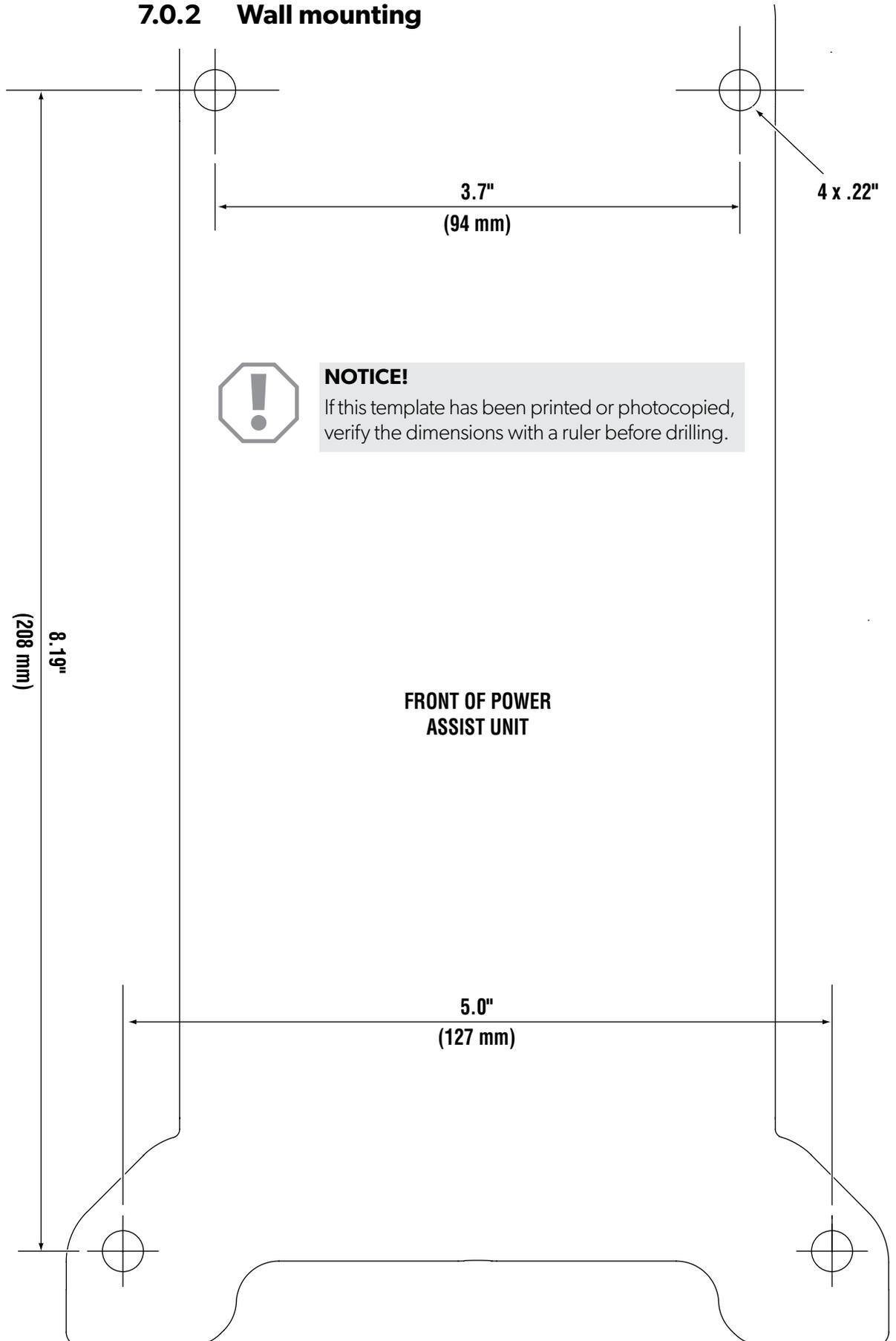
7 Mounting Templates

7.0.1 Floor mounting



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7.0.2 Wall mounting



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8 Warranty

8.1 2-Year limited warranty

The SeaStar Solutions® warrants its products to be free from defects in materials and workmanship for a period of two years from the date of original retail purchase, provided, however, the warranty period for SeaStar Solutions® products used commercially or in any rental or other income producing activity shall be as follows:

- Ninety days from the date of original purchase for mechanical and electrical products; and
- One year from the date of original purchase for hydraulic products.

We will provide replacement product without charge for any SeaStar Solutions® product covered by this warranty, which is returned (freight prepaid) within the warranty period to the dealer from whom such products were purchased, or to us at the appropriate address. In any such case, SeaStar Solutions® products found to be defective and covered by this warranty will be replaced or repaired at SeaStar Solutions® option, and returned to the customer.

SeaStar Solutions® sole responsibility under this warranty is limited to the repair or replacement of product which is, in SeaStar Solutions® opinion, defective. SeaStar Solutions® is not responsible for charges connected with the removal of such product or re-installation of replacement or repaired parts.

We will have no obligations under this warranty for any product which:

- has been improperly installed;
- has been used in an installation other than as recommended in our installation or operation instructions or specifications;
- has failed or has been damaged due to an accident or abnormal operation including racing, misuse or alterations outside our factory;
- has been repaired or modified by entities other than SeaStar Solutions®;
- has been used on an engine/boat combination where the engine horsepower exceeds the rating established by the boat manufacturer;
- has been used with other product(s) which, in SeaStar Solutions® opinion, are incompatible with the SeaStar Solutions® product.

THE EXPRESS WARRANTY SET FORTH ABOVE IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. SEASTAR SOLUTIONS® EMPLOYEES OR REPRESENTATIVES' ORAL OR OTHER WRITTEN STATEMENTS DO NOT CONSTITUTE WARRANTIES, SHALL NOT BE RELIED UPON BY CUSTOMER, AND ARE NOT A PART OF THE WARRANTY STATED HEREIN. THIS WARRANTY WILL BE THE CUSTOMER'S EXCLUSIVE REMEDY. IN NO EVENT WILL SEASTAR SOLUTIONS® BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY RELATING TO THE PRODUCTS. Some states do not allow limitations on an implied warranty, or the exclusion of incidental or consequential damages, so the above exclusions may not apply to you. You may also have other rights which vary from state to state.

If any part of this Limited Warranty is determined to be void or illegal, the remainder shall remain in full force and effect.

SeaStar Solutions® products returned under this warranty must be tagged with the customer's name, street address, and phone number to ensure proper handling, and returned freight prepaid to the selling dealer or to the appropriate SeaStar Solutions® manufacturing facility.

8.2 Return goods procedure

Contact our warranty department at Marine.Warranty@dometic.com for instructions.

8.3 Technical support

Phone: 604.248.3858

email: seastar@dometic.com

Hours: Monday to Friday 05:00 – 15:30 PST

8.4 Authorized service centers and distributors

For a current listing of all our authorized service centers and distributors please visit our website: www.dometic.com

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