

BAYSTAR\*

CAPILANO\*

SEASTAR\*

## **OPERATING INSTRUCTIONS**

## **AND OWNER'S MANUAL**

www.seastarsolutions.com



Power Purge Sr. & Power Purge Jr. Bleeding Systems



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  $\widehat{\ \ }$ ) 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.

#### **A** DANGER

Immediate hazards which WILL result in severe personal injury or death.

### **▲** WARNING

Hazards or unsafe practices which COULD result in severe personal injury or death.

#### **A** CAUTION

Hazards or unsafe practices which COULD result in minor injury or product or property damage.

#### **NOTICE**

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 <u>MUST NOT</u> 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.

# Don't compromise performance... use genuine SeaStar parts only!

- SeaStar helms
- SeaStar Cylinders
- SeaStar hoses
- SeaStar Oil

Substituting non SeaStar parts in any part of the SeaStar hydraulic steering system, may seriously compromise system performance.

# INTRODUCTION

Before proceeding with the 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.

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# Hydraulic Fluid Requirements

SeaStar and BayStar hydraulic steering systems require special high quality hydraulic fluid meeting Mil specification H-5606. This fluid is available in bottles as:

SeaStar Hydraulic Fluid, part no. HA5430 1 Liter (33.8 fluid ounces) HA5440 4 liters (1 Gallon)

Alternate hydraulic fluids recommended for SeaStar/Capilano Steering Systems:

## **A** CAUTION

Substitution of non-recommended fluids may result in heavier steering loads, and/or irreparable damage to your steering system.

# HA5447 POWER PURGING SYSTEM

### NOTICE

Honda 225 4-Stroke Engines MUST have steering cylinder HC5345 disconnected from the tiller arm to be able to stroke the cylinder from hardover to hardover to complete the purging process.

## **SINGLE CYLINDER—Power Purge Operation**

## **NOTICE**

For Dual Cylinder installations please refer to page 9 of this manual.

## STEP 1. CONNECTION

- Starting with the lower of a multiple helm station boat, screw quick coupling adapter into the helm pump filler port HAND-TIGHT (See figure 1c on page 4).
- **2.** Install a non-venting cap into ALL other steering stations to prevent oil spillage during the purge procedure.
- **3.** Pull required length of **HELM** hose from the top of the power purger cart and connect both hoses to the helm pump coupling adapter. Push the quick connect fittings onto adapter ensuring they are locked in place.
- **4.** Pull the required length of **CYLINDER** hose from the bottom of the power purge cart and connect to both steering cylinder bleed fittings. Push the quick connect fittings onto adapter ensuring they are locked in place.
- **5.** OPEN both bleeder fittings 1/2 1 turn.

## STEP 2. PURGING

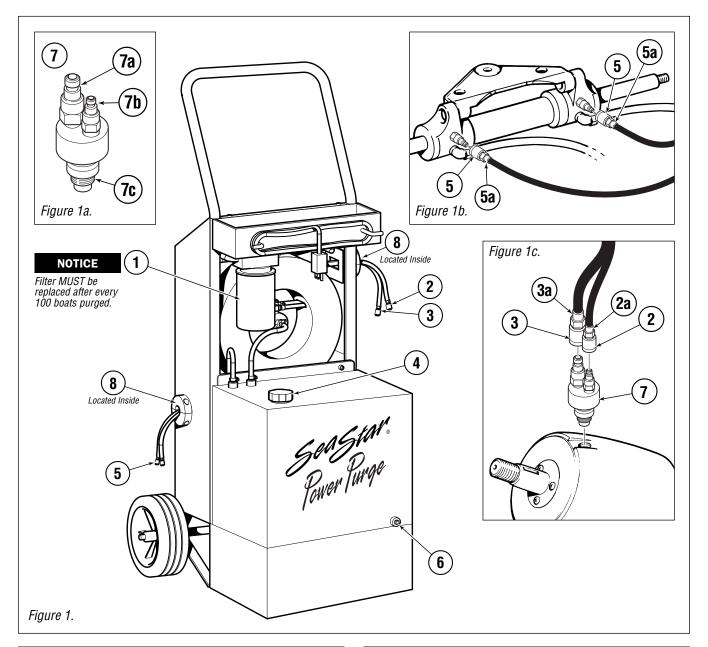
## **NOTICE**

For Dual Cylinder purging please refer to page 9.

- **1.** Turn Power Purge ON. At this time you should see fluid entering/exiting the helm purge lines.
- 2. Wait at least 30 seconds for helm to fill with oil.
- **3.** Quickly turn steering wheel "clockwise" until the steering cylinder shaft is fully extended (you may need to manually move steering cylinder shaft/body).
- **4.** Slowly continue to turn steering wheel "clockwise" while holding the steering cylinder shaft in this position for approximately 30 seconds or until you see NO Air bubbles escaping through the cylinder hoses.
- **5.** Quickly turn the steering wheel "counter-clockwise" until the cylinder shaft is fully extended on the opposite side (you may need to manually move the steering cylinder shaft/body).
- **6.** Slowly continue to turn steering wheel "counter-clockwise" while holding the steering cylinder shaft in this position for approximately 30 seconds or until you see NO Air bubbles escaping through the cylinder hoses.
- **7.** If fitted, manually jog autopilot pump to both directions for about 30 seconds per side.
- 8. Turn OFF Power Purge.
- 9. Tighten BOTH steering cylinder bleed fittings.
- **10.** Repeat at each and every steering station. **NOTE:** Ensure ALL stations NOT being purged are fitted with a non-venting cap to prevent oil leakage at these stations.

POWER PURGING SYSTEMS

**HA5447** Power Purge Sr. (SeaStar, SeaStar PRO & BayStar Systems **ONLY**)



ITEM	PART #	QTY	DESCRIPTION
1	HP6140	1	10 Micron Filter
2	800112	1	Fitting, QD 5/32" Barb-Series 20
2a	800117	1	Hose 'O' Clamp, 5/16"
3	800111	1	Fitting, QD 5/16" Barb-Series 21
3a	800116	2	Hose Clamp, 3/8"
4	800121	1	Filler Cap, Tethered
5	800113	2	Fitting, QD 1/4" Barb-Series 21
5a	800118	2	Hose '0' Clamp, 1/2"
6	430122	1	1/4" NPT Drain Plug
7	800136	1	Assembly Fitting, Power Purge Helm
7a	800114	1	Fitting QD 1/8" NPT, series 21
7b	800115	1	Fitting QD 1/8" NPT, series 20

ITEM	PART #	QTY DESCRIPTION		
7c 8	014925 903929	1 'O' Ring, 0.110 70 DUR N 2 Grommet, Base Assembly 1-1/2"		
SPARI	E PART KITS	S		
	HP6140	Oil Filter		
	HP6060	FULL KIT (Ships with all quick connect fittings, helm adapter and oil filter.)		
	HP6148	Helm Adapter ONLY		
	HP6170	Quick Connect Fittings ONLY		

# STEP 3. DISCONNECTION AND TESTING

- **1.** Disconnect ALL the hoses and retract them into the Power Purge cart.
- 2. Remove helm coupling adapter and replace the filler plug into the helm(s). **NOTE:** Install "venting" caps into all single station, or, the highest helm in a multi-station application. All other helm stations are to be fitted with a "non-venting" cap.
- **3.** Push on steering cylinder to ensure it does not move more than 1/16" 1/8" in either direction (if movement is greater than 1/8" further bleeding is required).
- **4.** Conduct Oil level and System Check as outlined on page 12 of this manual.

## HA5445-2 POWER PURGING SYSTEM

## **NOTICE**

Honda 225 4-Stroke Engines MUST have steering cylinder HC5345 disconnected from the tiller arm to be able to stroke the cylinder from hardover to hardover to complete the purging process.

## **SINGLE CYLINDER—Power Purge Operation**

## **STEP 1. CONNECTION**

- **1.** Starting with the lower of a multiple helm station boat, screw quick coupling adapter into the helm pump filler port **HAND-TIGHT** (See figure 2c on page 7).
- **2.** Install a non-venting cap into ALL other steering stations to prevent oil spillage during the purge procedure.
- **3.** Remove the blue, **HELM** hose from the Power Purge box and connect both hoses to the helm pump coupling adapter. Push the quick connect fittings onto adapter ensuring they are locked in place.
- **4.** Remove the clear, **CYLINDER** hose, from the Power Purge box and connect to both steering cylinder bleed fittings. Push the quick connect fittings onto adapter ensuring they are locked in place.
- **5.** OPEN both bleeder fittings 1/2 1 turn.

## **MARNING**

If 12V power source is in an area where flammable fumes may be present, FULLY vent area BEFORE continuing to next step.

**6.** After area is fully vented free of fumes, attach the alligator type electrical connectors to your 12V power source.

## STEP 2. PURGING

- **1.** Turn Power Purge ON. At this time you should see fluid entering/exiting the helm purge lines.
- 2. Wait at least 30 seconds for helm to fill with oil.
- **3.** Quickly turn steering wheel "clockwise" until the steering cylinder shaft is fully extended (you may need to manually move steering cylinder shaft/body).
- **4.** Slowly continue to turn steering wheel "clockwise" while holding the steering cylinder shaft in this position for approximately 30 seconds or until you see NO Air bubbles escaping through the cylinder hoses.
- **5.** Quickly turn the steering wheel "counter-clockwise" until the cylinder shaft is fully extended on the opposite side (you may need to manually move the steering cylinder shaft/body).
- **6.** Slowly continue to turn steering wheel "counter-clockwise" while holding the steering cylinder shaft in this position for approximately 30 seconds or until you see NO Air bubbles escaping through the cylinder hoses.
- **7.** If fitted, manually jog autopilot pump to both directions for about 30 seconds per side.
- 8. Turn OFF Power Purge.
- **9.** Tighten BOTH steering cylinder bleed fittings.
- **10.** Repeat at each and every steering station. **NOTE:** Ensure ALL stations NOT being purged are fitted with a non-venting cap to prevent oil leakage at these stations.

# STEP 3. DISCONNECTION AND TESTING

- **1.** Disconnect ALL the hoses and return them to the Power Purge box.
- **2.** Remove helm coupling adapter and replace the filler plug into the helm(s). **NOTE:** Install "venting" caps into all single station, or, the highest helm in a multi-station application. All other helm stations are to be fitted with a "non-venting" cap.
- 3. Push on steering cylinder to ensure it does not move more than 1/16" 1/8" in either direction (if movement is greater than 1/8" further bleeding is required).
- **4.** Conduct Oil level and System Check as outlined on page 12 of this manual.

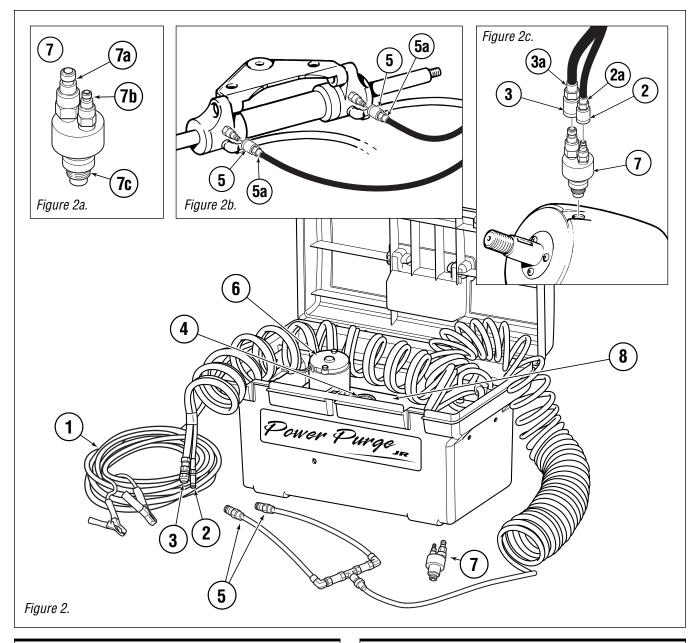
### **NOTICE**

For dual helm applications, install non-vent plug in upper helm and perform procedure described above on lower helm first. Once complete, install non-vent plug in lower helm and repeat procedure with upper helm.

#### **A** CAUTION

Failure to install non-vent plugs during this procedure will result in oil leakage from other helm.

# **HA5445-2** Power Purge Jr. (SeaStar and BayStar Systems)



ITEM	PART #	QTY	DESCRIPTION
1	Harness	1	Harness, electrical inc switch & clamps
2	800112	1	Fitting, QD 5/32 Barb-series 20
2a	800117	1	Hose O clamp, 5/16"
3	800111	1	Fitting, QD
3a	800116	1	Hose Clamp, 3/8"
4	470220	1	Tank Cap with gauge
5	800113	1	Fitting, QD 1/4" Barb-series 21
5a	800118	1	hose O clamp, 1/2"
6	470500	1	Pump set
7	800136	1	Assembly fitting, helm/hose connector
7a	800114	1	Fitting QD 1/8" NPT, series 21
1			

ITEM	PART #	QTY	DESCRIPTION	
7b	800115	1	Fitting QD 1/8" NPT, series 20	
7c	014925	1	'0' Ring 0.110 70 DUR N	
8	470200	1	Tank	
CDADE	DADT VIT	•		
SPARE	PART KITS	•		
	HP6060	FULL KIT (Ships with all quick connect fittings, helm adapter and oil filter.)		
	HP6148	Helm Adapter ONLY		
	HP6170	Quick Connect Fittings ONLY		

# HA5461 DUAL CYLINDER PURGE KIT

### NOTICE

Honda 225 4-Stroke Engines MUST have steering cylinder HC5345 disconnected from the tiller arm to be able to stroke the cylinder from hardover to hardover to complete the purging process.

## **DUAL CYLINDER—Power Purge Operation**

## STEP 1. CONNECTION

- **1.** Starting with the lower of a multiple helm station boat, screw quick coupling adapter into the helm pump filler port **HAND-TIGHT** (See figure 1c on page 4).
- **2.** Install a non-venting cap into ALL other steering stations to prevent oil spillage during the purge procedure.
- **3.** Remove the blue, **HELM** hose from the Power Purge box and connect both hoses to the helm pump coupling adapter. Push the quick connect fittings onto adapter ensuring they are locked in place.
- **4.** Remove the clear, **CYLINDER** hose, from the Power Purge box and connect to one of the Dual Cylinder Purge Kit hoses, then connect both Dual Cylinder Purge lines to the port side bleeders of "both" steering cylinders. Repeat to the starboard side of "both" cylinders. Push the quick connect fittings onto adapter ensuring they are locked in place.
- **5.** OPEN both bleeder fittings 1/2 1 turn.

## **A** WARNING

If 12V power source is in an area where flammable fumes may be present, FULLY vent area BEFORE continuing to next step.

**6.** After area is fully vented free of fumes, attach the alligator type electrical connectors to your 12V power source.

#### NOTICE

For dual helm applications, install non-vent plug in upper helm and perform procedure described below on lower helm first. Once complete, install non-vent plug in lower helm and repeat procedure with upper helm.

## **A** CAUTION

Failure to install non-vent plugs during this procedure will result in oil leakage from other helm.

## STEP 2. PURGING

- **1.** Turn Power Purge ON. At this time you should see fluid entering/exiting the helm purge lines.
- 2. Wait at least 30 seconds for helm to fill with oil.
- **3.** Quickly turn steering wheel "clockwise" until the steering cylinder shaft is fully extended (you may need to manually move steering cylinder shaft/body).
- **4.** Slowly continue to turn steering wheel "clockwise" while holding the steering cylinder shaft in this position for approximately 30 seconds or until you see NO Air bubbles escaping through the cylinder hoses.

#### POWER PURGING SYSTEMS

- **5.** Quickly turn the steering wheel "counter-clockwise" until the cylinder shaft is fully extended on the opposite side (you may need to manually move the steering cylinder shaft/body).
- **6.** Slowly continue to turn steering wheel "counter-clockwise" while holding the steering cylinder shaft in this position for approximately 30 seconds or until you see NO Air bubbles escaping through the cylinder hoses.
- **7.** If fitted, manually jog autopilot pump to both directions for about 30 seconds per side.
- 8. Turn OFF Power Purge.
- 9. Tighten BOTH steering cylinder bleed fittings.
- **10.** Repeat at each and every steering station. **NOTE:** Ensure ALL stations NOT being purged are fitted with a non-venting cap to prevent oil leakage at these stations.

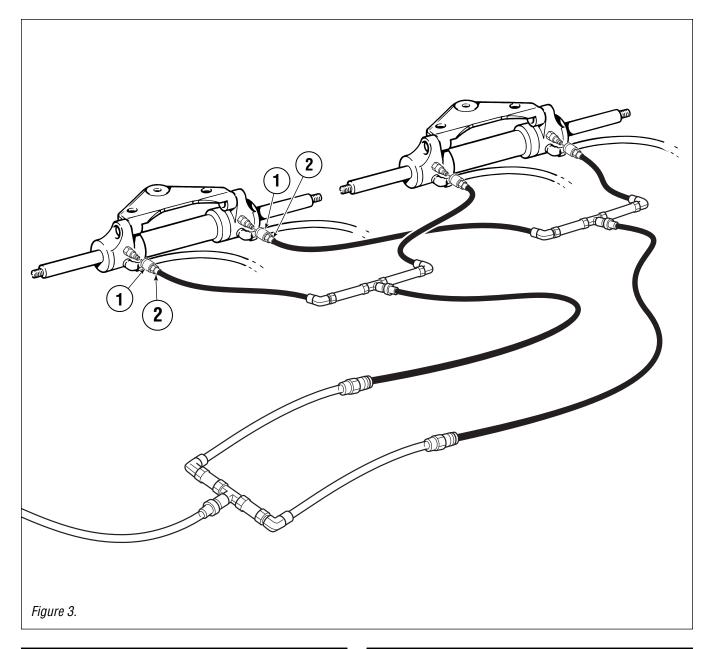
# STEP 3. DISCONNECTION AND TESTING

- **1.** Disconnect ALL the hoses and return them to the Power Purge box.
- **2.** remove helm coupling adapter and replace the filler plug into the helm(s). **NOTE:** Install "venting" caps into all single station, or, the highest helm in a multi-station application. All other helm stations are to be fitted with a "non-venting" cap.
- **3.** Push on steering cylinder to ensure it does not move more than 1/16" 1/8" in either direction (if movement is greater than 1/8" further bleeding is required).
- **4.** Conduct Oil level and System Check as outlined on page 12 of this manual.

## **A** WARNING

DO NOT store Dual Cylinder Adapter Kit (HA5461) in Power Purge Jr. Carrying Case. This may cause irreparable damage to the reservoir tank resulting in the failure of the pumpset.

# **HA5461** Dual Cylinder Purge Kit (SeaStar Systems **ONLY**)



ITEM	PART#	QTY	DESCRIPTION
1	800113	4	Fitting, QD 1/4" Barb-Series 21
2	800118	4	Hose O Clamp, 1/2"
3	470714	1	Decal (Not Shown)

ITEM	PART#	QTY	DESCRIPTION

# OIL LEVEL & SYSTEM CHECK

## STEP 1 – OIL LEVEL SETTING

A 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.

## **A** 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

A 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.

## **A** 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.

# **MAINTENANCE**

Maintenance schedules vary drastically with the Power Purge SR/JR units. In some cases maintenance will need to be performed after each use, whereas in other areas maintenance will be very limited. The maintenance is all dependent on how and what systems are being bled. As an example. A Power Purge SR unit that is only used to fill new steering systems and never used for steering systems that have been in use, maintenance will be limited, whereas a Power Purge JR unit that is used frequently on existing/older steering systems may have to have maintenance performed on a regular basis. It is good mechanical practice to "always" inspect the Power Purge Units to ensure performance and to avoid contaminating other steering systems with bad, or incorrect fluid.

## **A** WARNING

Failure to comply with maintenance and inspection procedures noted below may lead to contamination of a steering system resulting in loss of steering control. Loss of steering control may result in unpredictable boat behavior, collision with an obstacle and/or ejection from vessel, leading to property damage, personal injury and/or death

## INSPECTION

To be performed every 3-6 months, or, after each use if using to purge "older/existing steering systems"

- Inspect tanks and fittings for oil leakage or damage. Replace if damage or wear is noted.
- Inspect hoses and grommets for any signs of wear, kinking or damage. Replace if damage or wear is noted.
- Inspect ALL electrical connections to ensure wires are secure and show no signs of abrasion or chaffing. Replace or repair if outer jacket is damaged.
- Inspect fluid "inside" of power purge for cleanliness. If fluid is contaminated or fluid is not the recommended type the unit MUST be flushed and cleaned prior to use (see flushing details below).
- Oil filter change recommendations (Power Purge SR. models ONLY).
  - Every 3 months if pump is used more than 5 times per day.
  - Every 6 months if pump is used less frequently (3 times a day or less).

# FLUSHING THE POWER PURGE

If flushing is required it is recommend to use Dexron ATF. Fluid being flushed out is NOT to be reused.

#### **POWER PURGE SR.**

- OPEN drain plug on front of unit (see page 4, item 6).
- Drain fluid into a catch can.
- OPEN fluid filler cap.
- Using a wet/dry vacuum, clean internal reservoir.
- Install reservoir drain plug.
- Fill reservoir with 4 bottles of Dexron ATF.
- Attach helm lines to helm adapter.
- Direct helm adapter into a catch can.
- Turn power purge ON.
- Pump all Dexron ATF out of reservoir.
- Discard flushed fluid properly.
- Refill with SeaStar Steering fluid and continue use.

## POWER PURGING SYSTEMS

#### **POWER PURGE JR.**

- Remove power purge motor (see page 7, item 6).
- Tilt power purge on its side, draining out fluid.
- Add 1-2 bottles of Dexron ATF to reservoir.
- Rotate reservoir swishing the Dexron ATF on the inside.
- Tilt power purge on its side, draining out fluid.
- Using a wet/dry vacuum, clean internal reservoir.
- Add 1–2 bottles of Dexron ATF.
- Attach helm lines to helm adapter.
- Direct helm adapter into a catch can.
- Turn power purge ON.
- Pump all Dexron ATF out of reservoir.
- Discard flushed fluid properly.
- Clean mesh filters located on bottom of power purge motor.
- Replace motor into reservoir.
- Fill with SeaStar Steering Fluid and continue use.

# **TROUBLESHOOTING**

If properly maintained, your SeaStar Power Purge will provide years of safe and reliable performance. Most fault occur when installation instructions have not been followed, unit has not been stored with care or maintenance schedules have not been followed. Below are the most common faults and their likely cause and solution.

FAULT	CAUSE	SOLUTION	
Flow from power purge seems weak.	Low voltage from power supply.	<ul> <li>Confirm ample power is being supplied to unit (load test batteries, or, connect to known good battery).</li> </ul>	
	Restriction is oil supply line.	<ul> <li>Confirm helm quick connect fittings are "clicked" into place.</li> </ul>	
	Clogged or dirty filters.	<ul> <li>Change filter (Power Purge SR.), or, clean mesh filters (Power Purge JR).</li> </ul>	
		<b>NOTE:</b> Power Purge JR. filters are located underneath the power purge motor.	
	Faulty Power Purge motor.	Replace Purge motor.	
2. Power Purge does NOT turn ON.	Low/weak voltage from power supply.	<ul> <li>Confirm ample power is being supplied to unit (load test batteries, or, connect to known good battery).</li> </ul>	
	Faulty power purge switch.	<ul> <li>Confirm switch harness is in good working order and all connections are tight.</li> </ul>	
	<ul> <li>NEG/POS clamps attached to wrong side of battery.</li> </ul>	<ul> <li>Confirm that you are connected to the correct side of the battery terminals.</li> </ul>	
3. Air is seen leaving the helm return	Low fluid in power purge reservoir.	<ul> <li>Confirm that there is ample amount of fluid in power purge reservoir.</li> </ul>	
side of the power purge helm lines (smaller 'blue' line).	Clogged/dirty filters.	<ul> <li>Change filter (Power Purge SR.), or, clean mesh filters (Power Purge JR).</li> </ul>	
		<b>NOTE:</b> Power Purge JR. filters are located underneath the power purge motor.	
	<ul> <li>Low/weak voltage from power supply.</li> </ul>	<ul> <li>Confirm ample power is being supplied to unit (load test batteries, or, connect to known good battery).</li> </ul>	

## **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** F

Phone: 604-248-3858

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