



Seastar[®] BayStar[™]



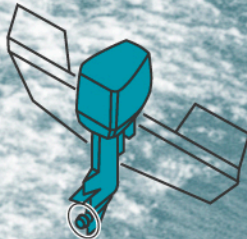
2002

HYDRAULIC STEERING SELECTION GUIDE

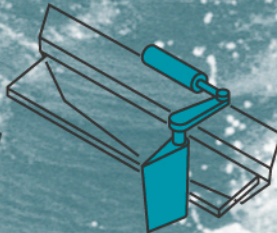
REVISION

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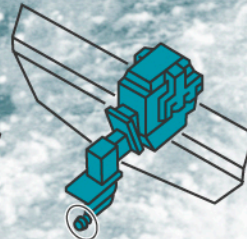
OUTBOARD



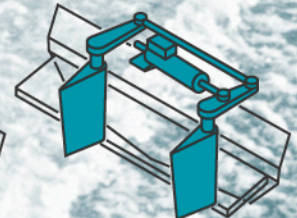
INBOARD



STERNDRIVE



POWER STEERING



www.seastarsteering.com

Boating safety is everyone's responsibility.

As a boater, you are responsible for having all required safety equipment, for operating your boat safely and for ensuring the safety of those on board your vessel as well as those sharing the waterways. Boaters exercising courtesy and common sense will not create a hazard, threat, stress or an irritant to themselves, to others, to the environment, or to wildlife.

1. Wear an approved Personal Flotation Device (PFD)
2. **Read your owner's manual.**
3. Attach engine stop switch securely to your body or PFD.
4. Respect the speed limits and other boating restrictions.
5. Be cautious and courteous.
6. Navigate with care.
7. Understand the behaviour characteristics of your vessel that might result from unexpected manoeuvres, such as sudden deceleration, high-speed obstacle avoidance, and other speed related issues.

Become informed and stay informed!

"Take an accredited boating safety course"

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.

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BayStar and SeaStar Hydraulic Steering Systems

The BayStar Hydraulic Steering System is designed to add safety, reliability and comfort to outboard powered boats to a maximum 150HP (Total). The SeaStar Hydraulic Steering System is designed to provide that extra margin of muscle when needed. The SeaStar system easily handles Outboard, Sterndrive and Inboard engines in boats up to 50 feet.

System selection, installation and service is substantially simplified with just three major components — helm, cylinder and tube or hose. SeaStar has a comprehensive range of available cylinders to handle the variety of Outboard, Sterndrive and Inboard steering applications. These are suitable for both pleasure and commercial applications. Extra steering stations and/or autopilots are easily added.

SeaStar hydraulic steering is a total commitment to quality, performance and simplicity.

BayStar & SeaStar, the hydraulic steering systems that are;

Easy to install...

- Only three components: helm, cylinder & tube or hose
- Compact and attractive helm design
- Variety of helm mounting configurations
- Simple tube/hose fitting connections
- Clear, complete installation instructions

Easy to fill and purge...

- Engineered bleed fittings on the cylinders
- A helm and lock valve design that enhances air removal
- A no-mess filler device
- A filling and purging time of normally less than 30 minutes
- Easy to check for proper installation
- Easy purging check via filler device
- No searching for difficult-to-find air leaks

Easy to turn...

- Anti-friction piston points

Designed to provide many years of service...

- Precision built
- Heavy-duty bearings instead of bushings
- No corrosive materials exposed to marine environment
- Field replaceable helm and cylinder shaft seals
- A no-hassle warranty — 2 years for pleasure use
— 1 year for commercial use (SeaStar)

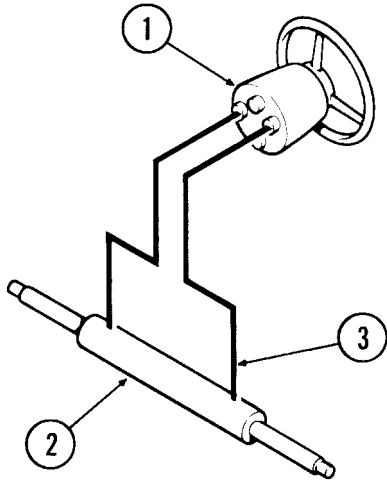
BayStar and SeaStar! Simply the best!

Teleflex Hydraulic Steering

Our manual hydraulic steering systems are simple and efficient. The basic system consists of three main components;

1) the helm pump, 2) the cylinder, and 3) the hose or tubing required to connect the cylinder to the helm pump.

These basic components are necessary in all applications. However as the system variables increase (ie: multiple engines, rudders, steering stations and autopilots), additional components may be required.



1. The Helm Unit.

The helm pump is an axial piston pump specifically designed for manual steering. It has a built-in lock valve to prevent the steering load from feeding back to the driver. The lock valve will not allow the rudder or drive unit to move until you move it with the steering wheel. The lock valve section of the helm also includes a relief valve. This relief valve provides over-pressure protection for mechanical components and hydraulic hoses and fittings.

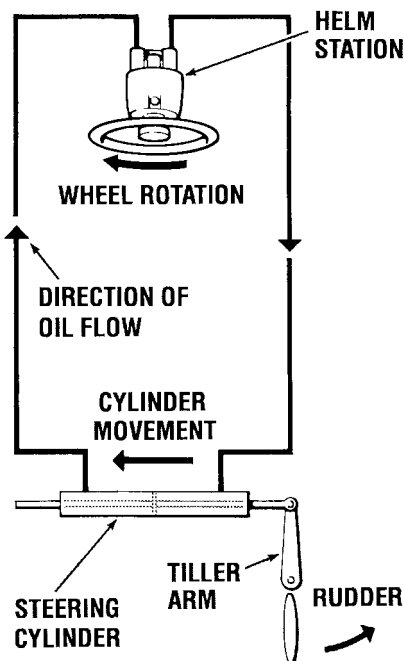
2. The Cylinder.

The most important differences between the variety of steering systems available is the cylinder selection. Both BayStar and SeaStar systems have a cylinder for most steering applications.

3. Hoses and Tubes.

Required to provide a path for the fluid to flow under pressure from the helm pump to the cylinder.

The System: How it works



The system is a two-line system. This makes operation very simple.

- 1) The steering wheel, which is attached to the helm pump, is rotated in the desired direction (ie: a turn to starboard or clockwise rotation).
- 2) Oil is pumped out the corresponding port from the rear of the helm into the starboard line and then into the cylinder.
- 3) This causes the cylinder rod, which is attached to the vessels rudder or drive unit, to move (ie: rod moves to port) thus causing the vessel to alter course.
- 4) Oil displaced from the opposite end (ie: the port end) of the cylinder flows (ie: into the port line) back to the helm pump.
- 5) For steering in the opposite direction, simply turn the helm the other way.
- 6) When no course corrections are required, the integral lock valve holds the rudder or drive unit stationary.

Selecting the System

The objective is to match the steering system to the requirements of the vessel. This depends on four things;

- 1) hull type (ie: planing or displacement),
- 2) type of propulsion system in the vessel (ie: inboard, outboard, sterndrive, etc.),
- 3) the number of engines or rudders,
- 4) the total power of the engines (ie: Horsepower).

Once the system and cylinder has been selected, the size of the helm pump is pre-determined. SeaStar systems also allow the following options to be specified;

- 1) the number of steering stations,
- 2) helm configuration (ie: standard or tilt helm),
- 3) additional features such as autopilots.

Notes on Steering Response versus Steering effort

Steering wheel effort is directly proportional to the number of wheel turns lock to lock. The number of wheel turns lock to lock is dependent on three things;

- 1) the volume of the cylinder,
- 2) the displacement of the helm pump,
- 3) the allowable movement of the rudder or drive unit.

Less wheel turns lock to lock results in more steering effort. More wheel turns lock to lock results in less steering effort.

However, additional factors that can influence steering effort are;

- 1) vessel speed,
- 2) rudder size,
- 3) unusual propellor selections,
- 4) hull type (ie: displacement, planing, etc.), and
- 5) improperly aligned counter balance skeg.

Syten Hydraulic Steering (Obsolete).

NOTICE

The Syten components were produced up until late 1984 when they were replaced by the SeaStar Steering systems. Teleflex (Canada) Ltd. no longer stocks any replacement parts, fittings or seal kits for this steering system or any component of this system.

Replacing or upgrading from a Syten inboard steering system to SeaStar Components.

Helms: The Syten helm pump should be replaced with the current model SeaStar Helm Pump HH5271 and Back mount kit HA5418. This should be done at each helm station.

Tube: The 5/16 nylon tube and fittings are obsolete and must be replaced with SeaStar 3/8" nylon extruded tube for all inboard applications.

Uniflow Valve: U-10 or Model 50: Obsolete, no replacement parts are available.

Cylinder: Adapter HA5425 is required for the conversion from a Syten steering cylinder to a current SeaStar Steering cylinder.

Recommendations made in this publication are guidelines based on average acceptance of steering effort.

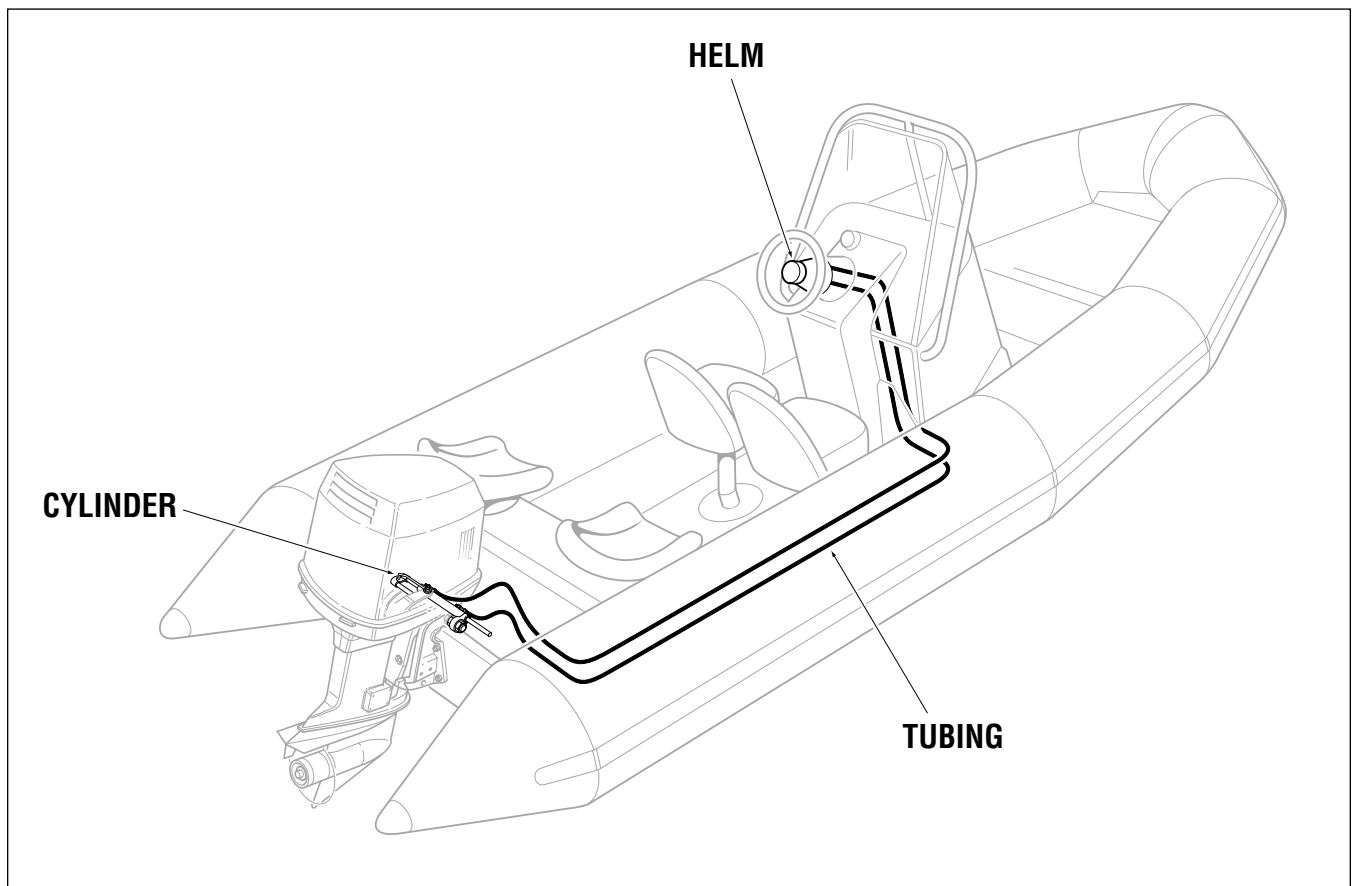
BayStar[™]**OUTBOARD STEERING**

BayStar[™] hydraulic steering is brought to you by the manufacturers of SeaStar[®], the most trusted name in pleasure boat steering. BayStar allows you to install all of the safety, reliability and comfort of hydraulic steering onto your boats rated up to **MAX. 150HP (Total)**. *Some high performance engines are exempt, call Teleflex (Canada) Ltd. for details.* Combine this with the superior Teleflex (Canada) design team, rigid ISO quality control and teamed with the finest materials and precision manufacturing—BayStar continues the tradition bringing comfort and safety to boating.

The BayStar steering system consists of a super low friction helm for smooth comfortable steering, a balanced cylinder—featuring a compact design that fits most splashwells. For your convenience two lengths of 20' cut to fit tubing are supplied (2 x 20' length), two bottles of hydraulic steering fluid, and one fill tube for easy fill and purge.

⚠ CAUTION

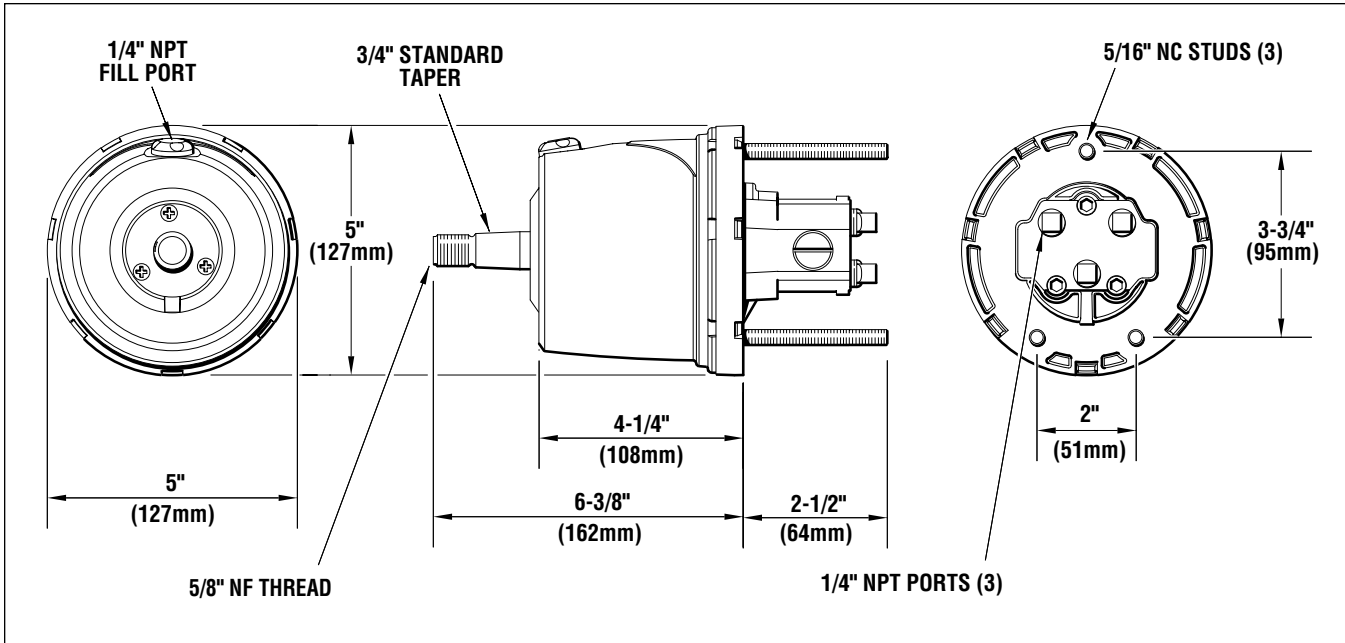
BayStar is ONLY applicable for single station steering.



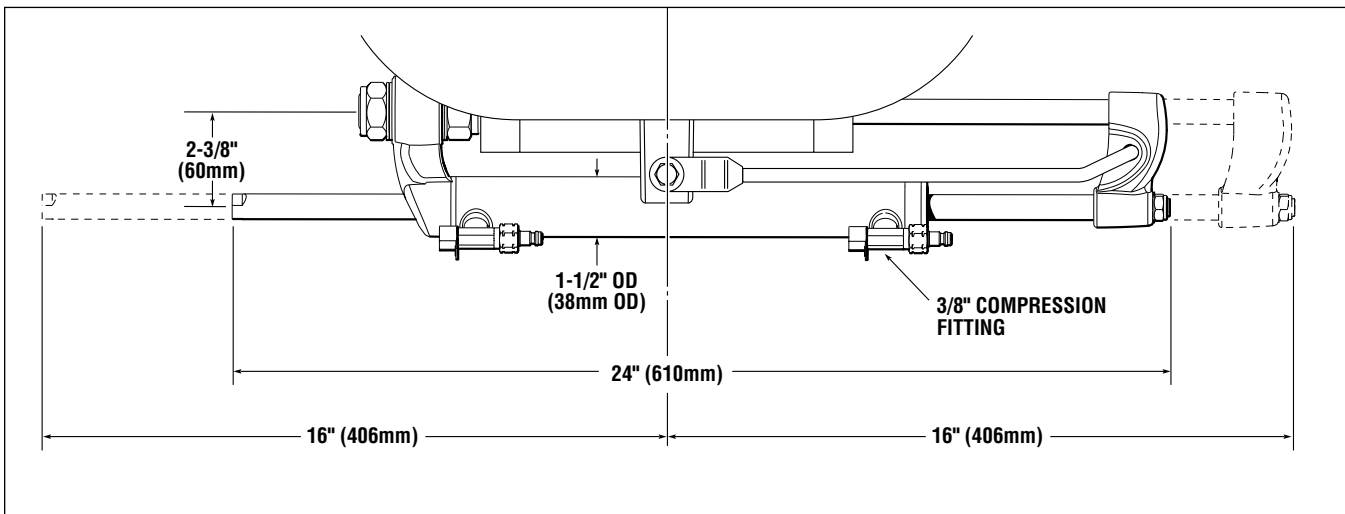
Typical BayStar Installation

Three easy steps to select your BayStar System:

- 1) Check helm dimension. Standard helm requires 3" (76mm) cut-out hole in dash.



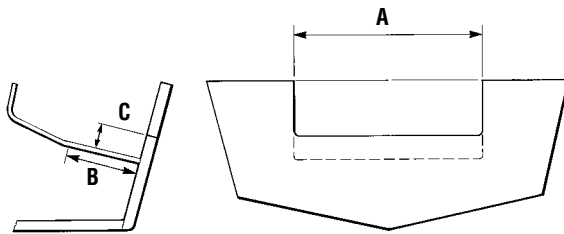
- 2) Check cylinder dimensions. **IS THE SPLASHWELL WIDE ENOUGH?** The BayStar cylinder requires 32" (813mm) splashwell width.



3) Is there enough room in the splashwell for full engine tilt?

Find the dimensions (A, B & C) of your splashwell. Check them against the minimum splashwell dimensions for full engine tilt for your engine and cylinder.

Motor Well dimensions required for Baystar front mount outboard steering systems



# OF ENGINES	A	B	C	MIN. ENGINE CENTER DISTANCE
1	32" (813mm)	5" (127mm)	4" (102mm)	N/A
2	Twin engine applications not available at this time.			

NOTICE

- a) Ensure there is no interference between the BayStar cylinder rod (starboard side) and the splashwell boot or engine controls & cables.
- b) Dimensional restrictions also apply to external motor mount brackets.
- c) Ensure dimension 'A' maintains 32" (813mm) through full trim/tilt range.
- d) Maximum transom thickness 3" (76mm).
- e) **Engines less than 70HP may require up to an additional 1" (25mm) of splashwell clearance.**

**BayStar Steering Kit
PID# HK4200**



BayStar kits come complete with everything needed for an install. The cylinder utilizes the factory outboard engine supplied drag link for simplified installation. For your convenience two lengths of 20' cut to fit tubing are supplied (2 x 20' length).

BayStar Steering Kit (HK4200)

includes:

- BayStar Helm Pump (HH4016)
- BayStar Cylinder (HC4600)
- BayStar Tubing Kit (HT4420)
- 2 Bottles of hydraulic steering fluid (HA5430)
- Filler Kit (HA5438)

OUTBOARD STEERING

SeaStar Outboard Hydraulic steering offers three models of steering cylinders to suit most applications. The standard and most commonly used model, Front Mount Pivot Cylinder part number HC5345, The Side Mount Cylinder part number HC5370 and the Splashwell Mount Cylinder part number HC5380. Review the following Order Guides, application charts and dimensional information for each cylinder to aid in your selection of the correct cylinder for your application needs.

Selecting the outboard steering system best suited for your boat:

- 1) Locate the type of boat you have in column A of the Outboard Steering Selection Guide below.
- 2) From the Guide, select the steering system best suited to your boat. You may want to review the specific features for each system.
- 3) Proceed to the appropriate section of the catalogue for a detailed component selection.
- 4) If your specific engine is not listed in the application charts, select the next alternative from the Steering System Selection Guide. Repeat step #3.

BOAT DESCRIPTION	FRONT MOUNT		SIDE MOUNT CYLINDER		SPLASHWELL MOUNT CYLINDER		NOTES CYLINDER
	SINGLE	TWIN	SINGLE	TWIN	SINGLE	TWIN	
COLUMN A							
CENTER CONSOLE*	A	A	B	B	B	B	A: Best Application B: Good Application N/A: Not Applicable
CRUISER*	A	A	B	B	B	B	
FISH 'N' SKI*	A	N/A	B	B	N/A	N/A	
OTHER FISHBOAT*	A	A	B	B	B	B	
RUNABOUT*	A	A	N/A	N/A	N/A	N/A	
BASS BOAT*	A	N/A	N/A	N/A	N/A	N/A	
INFLATABLES*	A	B	N/A	N/A	B	A	
WORK/COMMERCIAL/RESCUE*	A	A	B	B	B	B	

*Outboard engines featuring power steering require a steering input actuator.

PRODUCT REFERENCE TO TYPES OF OUTBOARD BOATS

BASS BOAT Single engine outboard powered boat designed specifically for fishing in protected waters. Typically performance oriented.

FISH 'N' SKI Single engine outboard powered boat designed for day fishing or skiing in protected waters.

RUNABOUT Intended for day boating. Typically a single engine but can be a dual engine boat. Includes tournament ski boats and performance outboards.

CENTER CONSOLE Boat with control station located on a centerline mounted console. Generally designed specifically for fishing. Boats may be single or dual engine.

FISH BOAT Boat primarily designed and equipped for offshore fishing. May be rigged with a second steering station. Boats may be single or dual engine.

CRUISER Cuddy/express/bridge cruiser primarily designed for cruising. It has overnight accommodations. Typically rigged with two steering stations. Boats may be single or dual engine.

INFLATABLES Boats manufactured of waterproofed fabric which are inflated with air in order to achieve their shape. The bottom of the hull may be made of fabric or fiberglass. They typically have narrow transoms. Boats may be single or dual engine.

WORK/COMMERCIAL/RESCUE Any of the previously listed applications involved in revenue producing or rescue activities. Typically a very severe service environment.

SEASTAR FRONT MOUNT OUTBOARD STEERING SYSTEM

Part# HC5345, HC5347, HC5348, HC5358

Features

- Independent engine tilt for twin engine installations.
- Easy steering.
- 5 turns lock to lock steering response.

Applications

- General purpose system.
- Single and multiple engine capability.
- Total power to 600 HP.
- Typical applications include center console fishboats and cruisers.

How to select a front mount outboard steering system

- 1) From the order guide (page 7) select the system configuration based on:
 - a) the number of engines, and
 - b) the total power of engine(s) to be installed.
- 2) From the application guide (page 8) confirm that the Front Mount cylinder will fit your specific make, model, and year of engine. Select the adapter kit for single engines or the tie bar kit for dual engines.
- 3) From the order guide select the appropriate helms and accessory hardware for each steering station.
- 4) From the order guide select the fitting and hose kits required for the installation.
- 5) Confirm that there is sufficient space available in the splashwell and dash areas for the steering components.

⚠ CAUTION

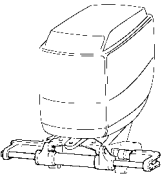
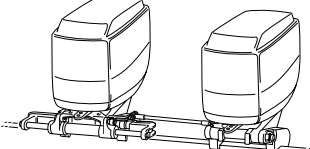
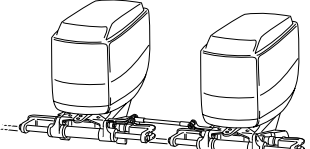
Not recommended for use in installations where;

- a) chopper, cleaver or surface piercing propellers are used,
- b) the engine is highly elevated on the transom,
- c) engine trim tabs have been removed,
- d) the boat speed exceeds 75 mph (120 km/h), or
- e) the power exceeds the maximum Coast Guard or M.O.T. recommendations for the boat.

HC5345



Order Guide

ENGINE/ CYLINDER CONFIGURATION	DESCRIPTION	QTY REQ	MODEL	PART NUMBER	REF. PAGE #	
SINGLE ENGINE (SINGLE CYLINDER) APPLICATIONS UP TO 300 HP MAX NUMBER OF TURNS 5 	CYLINDER	1	FRONT MOUNT	HC5345		
	HELM	1	* SEASTAR I- STANDARD	HH5271	5-3	
	HOSE KIT	1	OUTBOARD HOSE	HO51__	6-2	
	OIL	3	SEASTAR OIL	HA5430	8-1	
	FOR EXTRA STEERING STATION ADD:					
	HELM	1	* SEASTAR I- STANDARD	HH5271	5-3	
	FITTING KIT	1	ADD A STATION	HF5501	6-10	
	HOSE KIT	1	OUTBOARD HOSE	HO51__	6-2	
	OIL	1	SEASTAR OIL	HA5430	8-1	
	NOTICE HC5345 will not adapt to the 1998 Honda 115 & 130 as well as OMC 1977-1990 65-300HP (Refer to the Application Guide on page 2-4)					
DUAL ENGINE (SINGLE CYLINDER) NON-COUNTER ROTATING APPLICATIONS UP TO 450 HP MAX COUNTER ROTATING ENGINE APPLICATIONS UP TO 600 HP MAX NUMBER OF TURNS 5 	CYLINDER	1	FRONT MOUNT	HC5345		
	TIE BAR KIT	1		HO60__		
	HELM	1	* SEASTAR I- STANDARD	HH5271	5-3	
	HOSE KIT	1	OUTBOARD HOSE	HO51__	6-2	
	OIL	3	SEASTAR OIL	HA5430	8-1	
	FOR EXTRA STEERING STATION ADD:					
	HELM	1	* SEASTAR I- STANDARD	HH5271	5-3	
	FITTING KIT	1	ADD A STATION	HF5501	6-10	
	HOSE KIT	1	OUTBOARD HOSE	HO51__	6-2	
	OIL	1	SEASTAR OIL	HA5430	8-1	
DUAL ENGINE (DUAL CYLINDERS) NON-COUNTER ROTATING APPLICATIONS UP TO 600 HP MAX ALL COUNTER ROTATING ENGINE APPLICATIONS NUMBER OF TURNS 6.5 	CYLINDER	2	FRONT MOUNT	HC5345		
	TIE BAR KIT	1		HO60__		
	HELM	1	** SEASTAR II- STANDARD	HH5272	5-3	
	HOSE KIT	1	OUTBOARD HOSE	HO51__	6-2	
	HOSE KIT	1	OUTBOARD HOSE	HO51__	6-2	
	HOSE KIT	1	OUTBOARD HOSE	HO51__	6-2	
	FITTING KIT	1	TEE FITTINGS	HF5530	6-1	
	OIL	3	SEASTAR OIL	HA5430	8-1	
	FOR EXTRA STEERING STATION ADD:					
	HELM	1	** SEASTAR II- STANDARD	HH5272	5-3	
FITTING KIT	1	ADD A STATION	HF5501	6-10		
HOSE KIT	1	OUTBOARD HOSE	HO51__	6-2		
OIL	1	SEASTAR OIL	HA5430	8-1		
OPTIONAL EQUIPMENT	BACK PLATE KIT		(FOR STANDARD HELMS)	HA5418	5-5	
	20 DEGREE WEDGE		(FOR STANDARD HELMS)	HA5419	5-5	
	AUTOPILOT FITTING KIT		(FOR ALL HELMS)	HF5501	6-10	
	* TILT HELM- SEASTAR I			HH5741	5-4	
	REAR MOUNT HELM- SEASTAR I			HH5261	5-4	
	** TILT HELM- SEASTAR II			HH5742	5-4	
	REAR MOUNT HELM- SEASTAR II			HH5262	5-4	



OUTBOARD-FRONT MOUNT

Application Guides

ENGINE MANUFACTURER	YEAR	MODEL	CYLINDER	TIE BAR KITS		NOTES
				TWIN ENGINE SINGLE CYL.	TWIN ENGINE DUAL CYL.	
SeaStar Single & Twin Engine Applications						
FORCE	1985 TO DATE	90-150 HP	HC5345	HO5008A	HO5008A	
HONDA	1996 TO DATE 1998 TO DATE 1998 TO DATE 2001 TO DATE	75-90 HP 115-130 HP 30-50 HP 225 HP 4 STROKE	HC5345 HC5347 HC5345 HC5345	HO6001 HO5063 HO6001 HO6001	HO6002 HO5064 HO6002 HO6002	Min Eng Center 27" HO5064 comes w/o Tie Bar Req. Kit HO5090
JOHNSON/EVINRUDE	1997 TO 1990 1997 TO 1988 1991 TO DATE 1998 TO DATE 1996 TO DATE	65-300 HP 250-300 HP V8 40-250 HP 40-70 HP 4 STROKE 75-250 HP FICHT	HC5348 HC5342 HC5358 HC5358 HC5345	HO6001 HO5001A HO6003 HO6003 HO6001	HO6002 HO5030 HO6002 HO6002 HO6002	HO5030 comes w/o Tie Bar Req. Kit HO5090 Req. Kit HO5090
MERCURY/MARINER	1984 TO 1994 1989 TO DATE 1998 TO DATE	2.4 / 2.5 EFI 75-300 HP 30-60 HP	HC5345 HC5345 HC5345	HO6001 HO6001 HO6001	HO6002 HO6002 HO6002	May require extensive cowling modifications Min Eng Center 27" Req. Kit HO5090
NISSAN/TOHATSU	1990 TO DATE	90-140 HP	HC5345	HO6001	HO6002	
SUZUKI	1986 TO DATE 1986 TO 2002 1996 ONLY 1998 TO DATE 2002 TO DATE	100 HP 115-140 HP 115-140 HP 40-70 HP 4 STROKE 115-140 HP 4 STROKE	HC5345 HC5345 HC5348 HC5358 HC5358	HO6003 HO6001 HO6001 HO6003 HO6003	HO6002 HO6002 HO6002 HO6002 HO6002	NOT 1996 Req. Kit HO5090
US MARINE/FORCE	1996 TO DATE	90-120 HP	HC5345	HO6001	HO6002	
YAMAHA	1990 TO DATE 1986 TO DATE 1990 TO DATE 1997 TO DATE 2000 TO DATE	40-90 HP 100-200 HP 2 STROKE 225-250 HP 2 STROKE 80-225 HP 4 STROKE 225-200 HP DI	HC5345 HC5358 HC5358 HC5358 HC5358	HO6003 HO6001 HO6001 HO6001 HO6001	HO6002 HO6002 HO6002 HO6002 HO6002	
YANMAR	1994 TO DATE	27 & 36 HP	HC5345	HO6001	HO6002	

ENGINE MANUFACTURER	YEAR	MODEL	CYLINDER	TIE BAR KITS		NOTES
				PORT ENG. TO DRIVE CYL.	S/BOARD ENG. TO DRIVE CYL.	
SeaStar Triple Engine Applications						
FORCE	1995 TO DATE	90-120 HP	HC5345	HO6001	HO6002	
HONDA	1996 TO DATE	75-90 HP	HC5345	HO6001	HO6002	Min Eng Center 29"
MERCURY/MARINER	1989 TO DATE	75-275HP	HC5345	HO5081		
JOHNSON/EVINRUDE	1991 TO DATE 1991 TO DATE 1991 TO DATE 1996 TO DATE 1998 TO DATE	90-175 HP 250-300 HP 200-225 HP 90-225 HP FICHT 65-70 HP 4-STROKE	HC5345 HC5345 HC5345 HC5345 HC5345	HO508		Min Eng Center 29" Req. Kit HO5090
				HO6001 HO6003	HO6002 HO6002	
SUZUKI	1986 TO DATE 1986 TO DATE 1998 TO DATE	150-225 HP 115-140 HP 65-70 HP 4-STROKE	HC5345 HC5345 HC5345	HO6003 HO6003 HO6001	HO6002 HO6002 HO6002	Req. Kit HO5090
YAMAHA	1990 TO DATE 1990 TO DATE 1998 TO DATE	100-200 HP 225-250 HP 80-100 HP 4-STROKE	HC5345 HC5345 HC5345	HO6001 HO6001	HO6002 HO6002	
				HO5080		
				HO6001	HO6002	

REVISION DATE: MAR. 11TH 2002

SeaStar–Catamaran Outboard Steering System



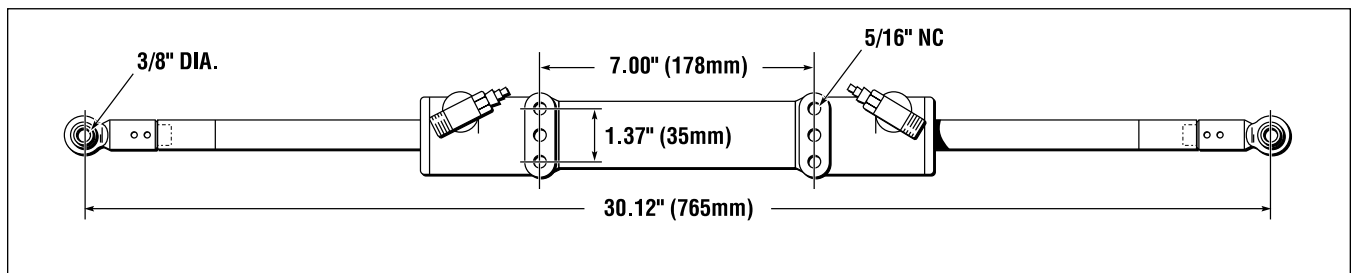
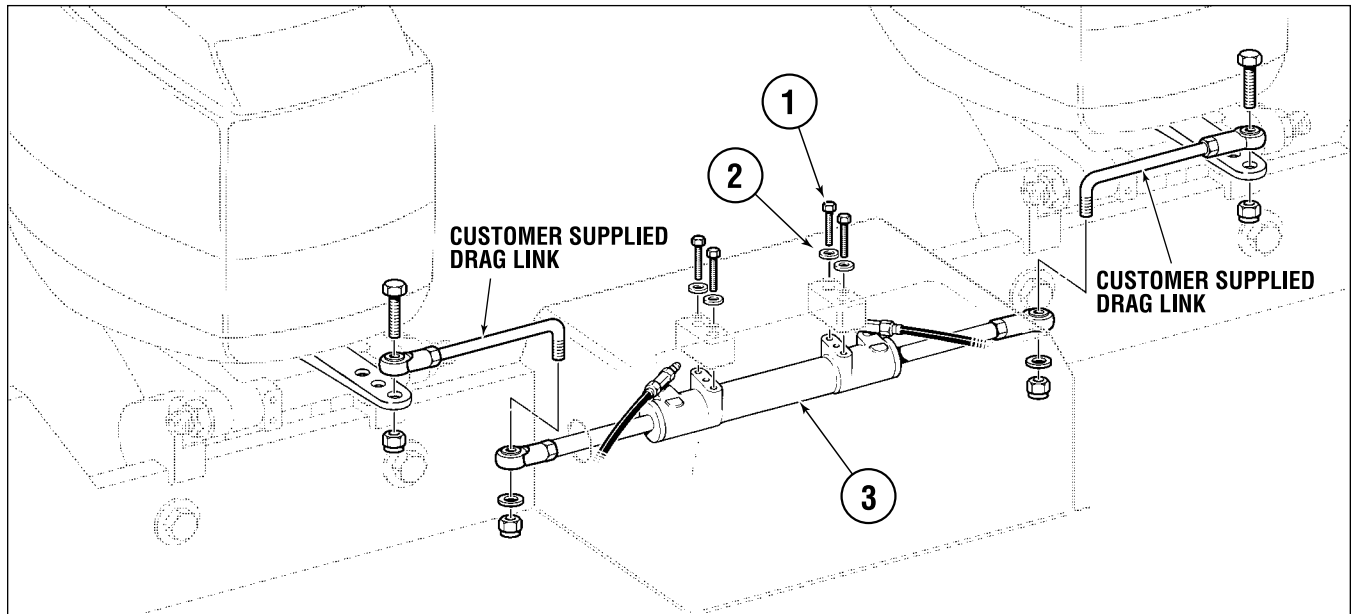
HORSEPOWER LIMITATIONS

ENGINE CONFIGURATIONS	MAXIMUM HORSEPOWER	CYLINDER	RECOMMENDED HELM PUMP	NO. OF STEERING WHEEL TURNS
NON COUNTER-ROTATING	UP TO 450HP	HC5343	HH5271	5
COUNTER-ROTATING	UP TO 600HP	HC5343	HH5271	5

CYLINDER PART #HC5343

To establish whether or not this cylinder is suitable for your application, the following points should be considered:

1. Fore and aft alignment of cylinder. If not mounted in line, motors will have a different turning radius.
2. Distance between motors.
3. Distance of travel in tilt arc.
4. Horizontal alignment of cylinder.



ITEM	PART #	QTY	DESCRIPTION
1	799865	4	Screw HHCS 5/16" NC x 1" SS
2	010924	4	Washer 5/16" dia.
3	HC5343	1	Tandem Catamaran Steering Cylinder

Technical Information

Seal Replacement Kit Part # HS5157
 Cylinder Volume 8.13 cu. in. (133.2cc)
 Cylinder Stroke 10"
 Fittings 3/8" compression
 Threads 9/16" x 24 extra fine

Cylinder Installation

⚠ WARNING

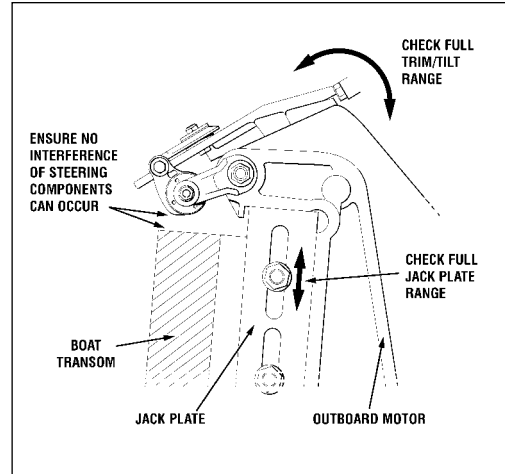
Operational interference of the steering cylinder/cylinder fittings and jackplates/transom/splashwell can occur under certain conditions. Check installation thoroughly throughout the full range of Motor Tilt, Jack Height and Trim before making final installation.

If interference does occur, contact:

Teleflex (Canada) Ltd. for additional information/options.

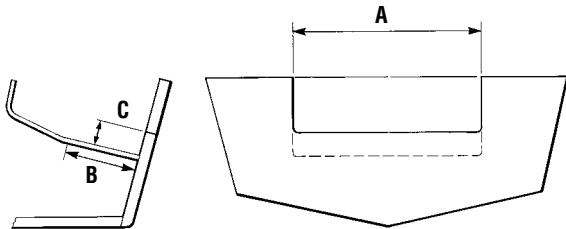
Telephone: **(604) 270-6899** or **(941) 488-6744**

If interference is not eliminated total steering loss can occur, causing property damage and/or personal injury.



General Dimensions

Motor Well dimensions required for front mount outboard steering systems



# OF ENGINES	A	B	C	MIN. ENGINE CENTER DISTANCE
1	22" (559mm)	6" (152mm)	5" (127mm)	N/A
2	49" (1244mm)	6" (152mm)	5" (127mm)	26" (660mm)

NOTICE

- a) Dimensional restrictions also apply to external motor mount brackets.
- b) Maximum engine center distance for twin engine applications is 36" (914mm) using the standard tiebar. Dimension 'A' would have to be increased proportional to the tiebar length.
- c) Minimum engine center distance is 26" unless engine manufacturer recommendation is greater.

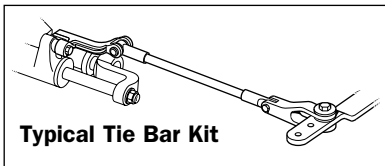
HC5345

3/8" COMPRESSION FITTING FOR HOSE CONNECTION

BLEED NIPPLE

2 5/8" (67mm)

4 7/8" (124mm)



21 3/4" (552mm)

SEASTAR SIDE MOUNT OUTBOARD STEERING SYSTEM

Part# HC5370

Features

- Ease of installation.
- Alternative to Front Mount Cylinder.
- Unbalanced cylinder with 4.8/5.7 turns lock to lock.
- Suitable for installation in shallow splashwells.
- Suitable for use on engines fitted with power steering.

Applications

- All engines with threaded tilt (steering) tubes complying with ABYC P17/ABYC P21/NMEA/BIA standards for mechanical steering.
- Cylinder attaches to the engine tilt tube as per ABYC/NMEA/BIA standard.
- Single and multiple outboard engine installations.
- Total power to 600 HP in counter rotating application. (see order guide)
- Typical applications include center console fishboats and cruisers.

How to select a side mount outboard steering system

⚠ WARNING

Not for use with SeaStar-Pro Helm Pumps.

NOTICE

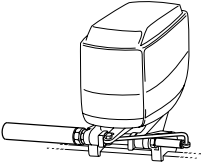
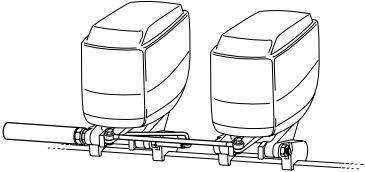
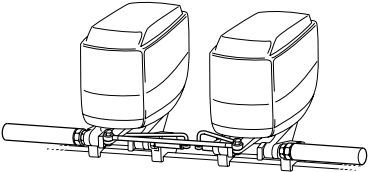
Not recommended for use in installations where;

- a) chopper, cleaver, or surfacing piercing propellers are used,*
- b) the engine is highly elevated on the transom,*
- c) engine trim tabs have been removed,*
- d) the boat speed exceeds 75 mph (120 km/h), or*
- e) the power exceeds maximum Coast Guard or M.O.T. recommendations for the boat.*

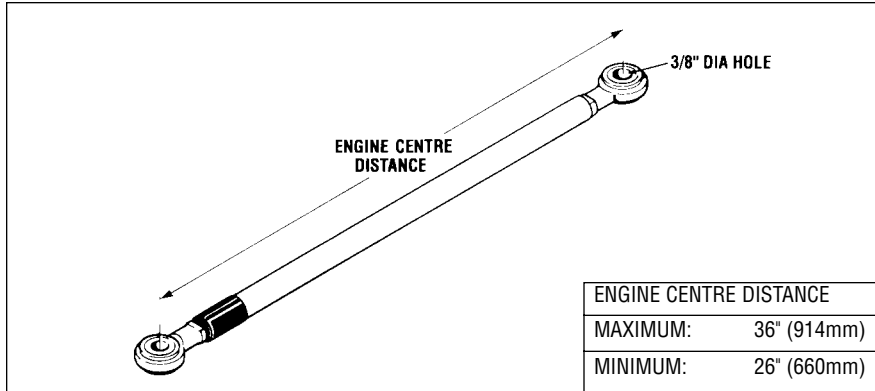
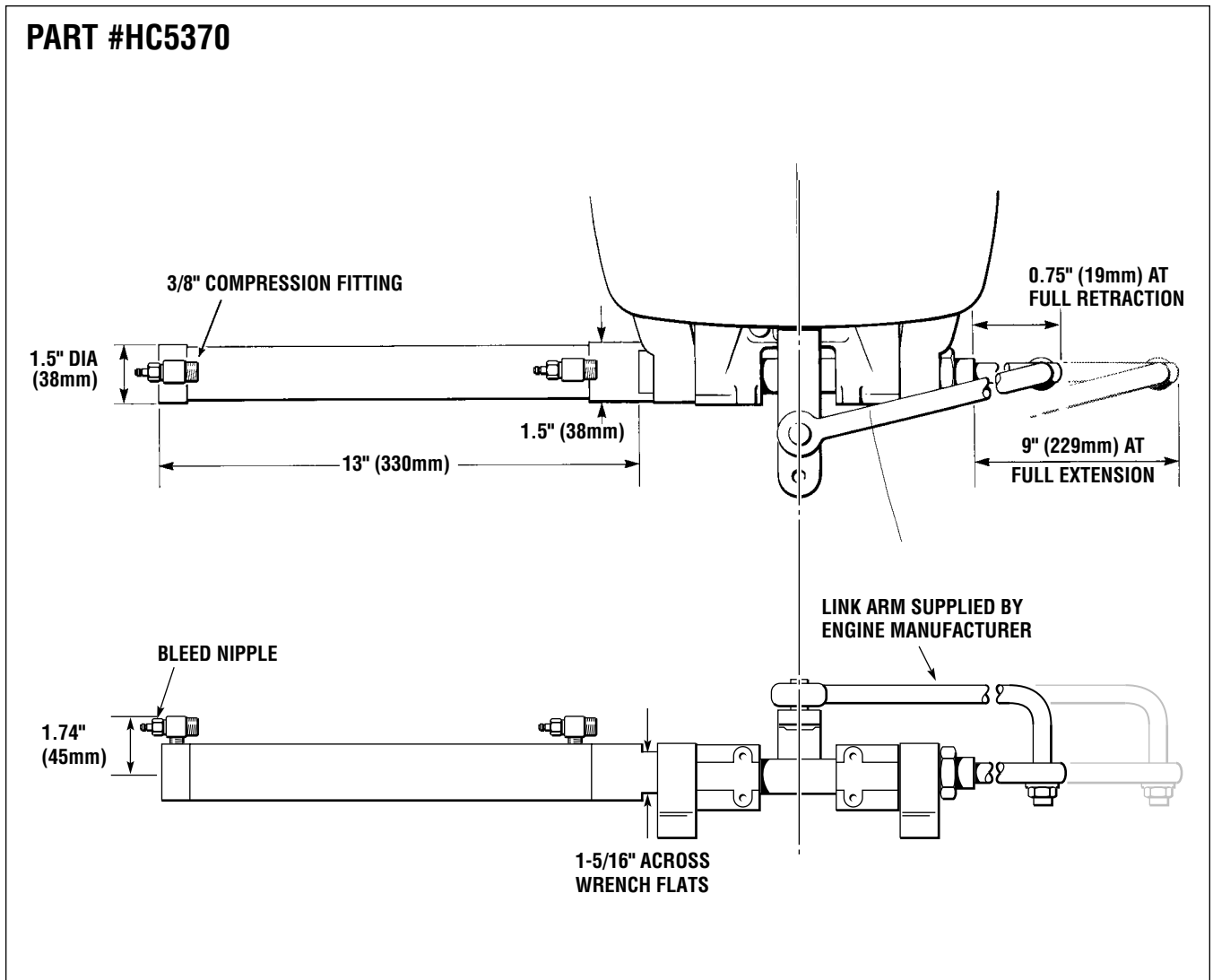
- 1) From the order guide on page 12 select the system configuration based on;
 - a) the number of engines, and
 - b) the total power of engine(s) to be installed.
- 2) From the order guide select the cylinder(s) and tie bar kits required.
- 3) From the order guide select the appropriate helms and accessory hardware for each steering station.
- 4) From the order guide select the fitting and hose kits required for the installation.
- 5) Confirm that there is sufficient space available in the splashwell and dash areas for the steering components.



Order Guide

ENGINE/ CYLINDER CONFIGURATION	DESCRIPTION	QTY REQ	MODEL	PART NUMBER	REF. PAGE #	
SINGLE ENGINE (SINGLE CYLINDER) APPLICATIONS UP TO 300 HP MAX NUMBER OF TURNS 4.8/5.7 	CYLINDER	1	SIDE MOUNT	HC5370		
	HELM	1	* SEASTAR I- STANDARD	HH5271	5-3	
	HOSE KIT	1	OUTBOARD HOSE	HO51__	6-2	
	OIL	3	SEASTAR OIL	HA5430	8-1	
	FOR EXTRA STEERING STATIONS ADD:					
	HELM	1	* SEASTAR I- STANDARD	HH5271	5-3	
	FITTING KIT	1	ADD A STATION	HF5501	6-10	
	HOSE KIT	1	OUTBOARD HOSE	HO51__	6-2	
	OIL	1	SEASTAR OIL	HA5430	8-1	
	DUAL ENGINE (SINGLE CYLINDER) NON-COUNTER ROTATING APPLICATIONS UP TO 300 HP MAX COUNTER ROTATING ENGINE APPLICATIONS UP TO 600 HP MAX NUMBER OF TURNS 4.8/5.7 	CYLINDER	1	SIDE MOUNT	HC5370	
TIE BAR KIT		1	TIE BAR ONLY	HO5009		
HELM		1	* SEASTAR I- STANDARD	HH5271	5-3	
HOSE KIT		1	OUTBOARD HOSE	HO51__	6-2	
OIL		3	SEASTAR OIL	HA5430	8-1	
FOR EXTRA STEERING STATIONS ADD:						
HELM		1	* SEASTAR I- STANDARD	HH5271	5-3	
FITTING KIT		1	ADD A STATION	HF5501	6-10	
HOSE KIT		1	OUTBOARD HOSE	HO51__	6-2	
OIL		1	SEASTAR OIL	HA5430	8-1	
DUAL ENGINE (DUAL CYLINDERS) NON-COUNTER ROTATING APPLICATIONS UP TO 600 HP MAX ALL COUNTER ROTATING ENGINE APPLICATIONS NUMBER OF TURNS 7.5 	CYLINDER	2	SIDE MOUNT	HC5370		
	TIE BAR KIT	1	TIE BAR ONLY	HO5009		
	HELM	1	** SEASTAR II- STANDARD	HH5272	5-3	
	HOSE KIT	1	OUTBOARD HOSE	HO51__	6-2	
	HOSE KIT	1	OUTBOARD HOSE	HO51__	6-2	
	HOSE KIT	1	OUTBOARD HOSE	HO51__	6-2	
	FITTING KIT	1	TEE FITTINGS	HF5530	6-1	
	OIL	3	SEASTAR OIL	HA5430	8-1	
	FOR EXTRA STEERING STATIONS ADD:					
	HELM	1	** SEASTAR II- STANDARD	HH5272	5-3	
FITTING KIT	1	ADD A STATION	HF5501	6-10		
HOSE KIT	1	OUTBOARD HOSE	HO51__	6-2		
OIL	1	SEASTAR OIL	HA5430	8-1		
OPTIONAL EQUIPMENT	BACK PLATE KIT		(FOR STANDARD HELMS)	HA5418	5-5	
	20 DEGREE WEDGE		(FOR STANDARD HELMS)	HA5419	5-5	
	AUTOPILOT FITTING KIT		(FOR ALL HELMS)	HF5501	6-10	
	* TILT HELM- SEASTAR I			HH5741	5-4	
	REAR MOUNT HELM- SEASTAR I			HH5261	5-4	
	** TILT HELM- SEASTAR II			HH5742	5-4	
	REAR MOUNT HELM- SEASTAR II			HH5262	5-4	

General Dimensions

Tie Bar for Side Mount Cylinders Part# H05009

PART #HC5370


SEASTAR SPLASHWELL MOUNT OUTBOARD STEERING SYSTEM

Part# HC5380

Features

- Light duty alternative to front & side mount cylinders.
- Unbalanced cylinder with 5.5/6.5 turns lock to lock.
- Fits engines with/without support (steering) tube.

Applications

- Single & multiple engine capability.
- Total power to 600 HP in counter rotating application. (see order guide)
- Transom or hull mounted cylinder.
- Speeds to 60 mph maximum (97 km/h).

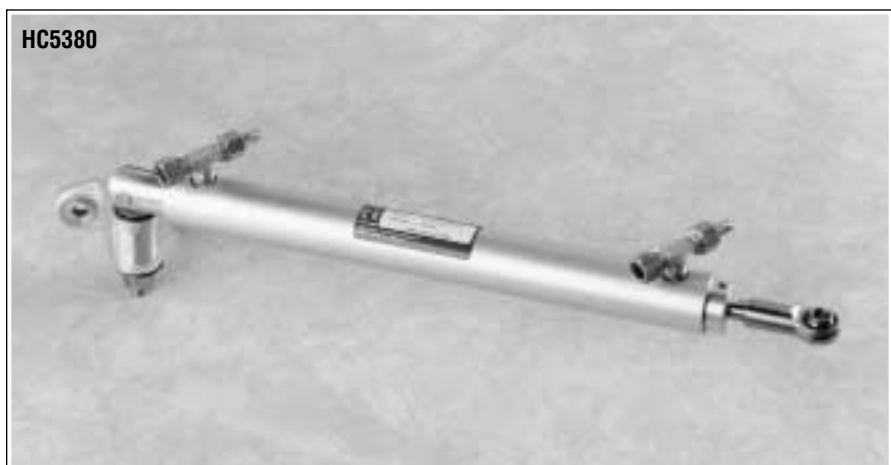
How to select a splashwell mount outboard steering system

- 1) From the order guide on page 15 select the system configuration based on;
 - a) the number of engines, and
 - b) the total power of engine(s) to be installed.
- 2) Select the cylinder and tie bar kit required.
- 3) From the order guide select the appropriate helms and accessory hardware for each steering station.
- 4) From the order guide select the fitting and hose kits required. You will have to determine the configuration, length, number of hose and fitting kits required for the installation (refer to page 6-2).
- 5) Confirm that there is sufficient space available in the splashwell and dash areas for the steering components.

Not recommended for use in installations where;

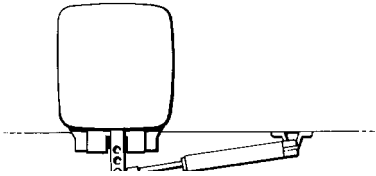
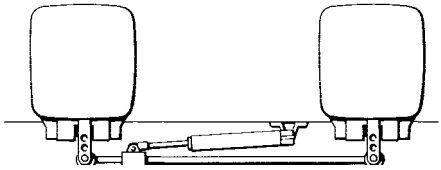
NOTICE

- a) chopper, cleaver or surfacing piercing propellers are used,
- b) the engine is highly elevated on the transom,
- c) engine trim tabs have been removed,
- d) the boat speed exceeds 60 mph (97 km/h), or
- e) the power exceeds maximum Coast Guard or M.O.T. recommendations for the boat.



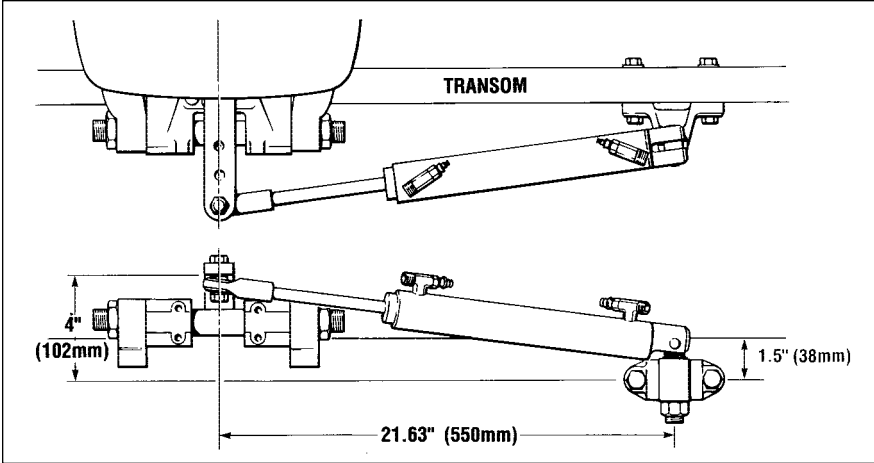
Order Guide

The splashwell mount cylinder (part no. HC5380) can be used on all engines complying with ABYC P17/NMEA/BIA standards provided they have a threaded attachment hole (3/8" - 24 UNF thread) in the steering arm. Not suitable for use on engines fitted with factory power steering.

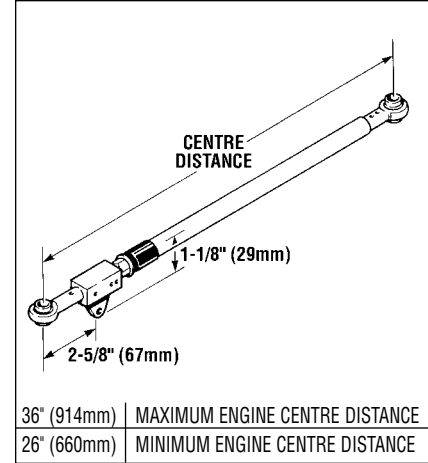
ENGINE/ CYLINDER CONFIGURATION	DESCRIPTION	QTY REQ	MODEL	PART NUMBER	REF. PAGE #	
SINGLE ENGINE (SINGLE CYLINDER) APPLICATIONS UP TO 300 HP MAX NUMBER OF TURNS 5.5/6.5 	CYLINDER	1	SPLASHWELL	HC5380		
	HELM	1	* SEASTAR I- STANDARD	HH5271	5-3	
	HOSE KIT	1	OUTBOARD HOSE	H051_ _	6-2	
	OIL	3	SEASTAR OIL	HA5430	8-1	
	FOR EXTRA STEERING STATIONS ADD:					
	HELM	1	* SEASTAR I- STANDARD	HH5271	5-3	
	FITTING KIT	1	ADD A STATION	HF5501	6-10	
	HOSE KIT	1	OUTBOARD HOSE	H051_ _	6-2	
	OIL	1	SEASTAR OIL	HA5430	8-1	
	DUAL ENGINE (SINGLE CYLINDER) NON-COUNTER ROTATING APPLICATIONS UP TO 300 HP MAX COUNTER ROTATING ENGINE APPLICATIONS UP TO 600 HP MAX NUMBER OF TURNS 5.6/6.5 	CYLINDER	1	SPLASHWELL	HC5380	
TIE BAR KIT		1	SPLASHWELL MOUNT TIE BAR	H05010		
HELM		1	* SEASTAR I- STANDARD	HH5271	5-3	
HOSE KIT		1	OUTBOARD HOSE	H051_ _	6-2	
OIL		3	SEASTAR OIL	HA5430	8-1	
FOR EXTRA STEERING STATIONS ADD:						
HELM		1	* SEASTAR I- STANDARD	HH5271	5-3	
FITTING KIT		1	ADD A STATION	HF5501	6-10	
HOSE KIT		1	OUTBOARD HOSE	H051_ _	6-2	
OIL		1	SEASTAR OIL	HA5430	8-1	
OPTIONAL EQUIPMENT	BACK PLATE KIT		(FOR STANDARD HELMS)	HA5418	5-5	
	20 DEGREE WEDGE		(FOR STANDARD HELMS)	HA5419	5-5	
	AUTOPILOT FITTING KIT		(FOR ALL HELMS)	HF5501	6-10	
	* TILT HELM- SEASTAR I			HH5741	5-4	
	REAR MOUNT HELM- SEASTAR I			HH5261	5-4	

General Dimensions

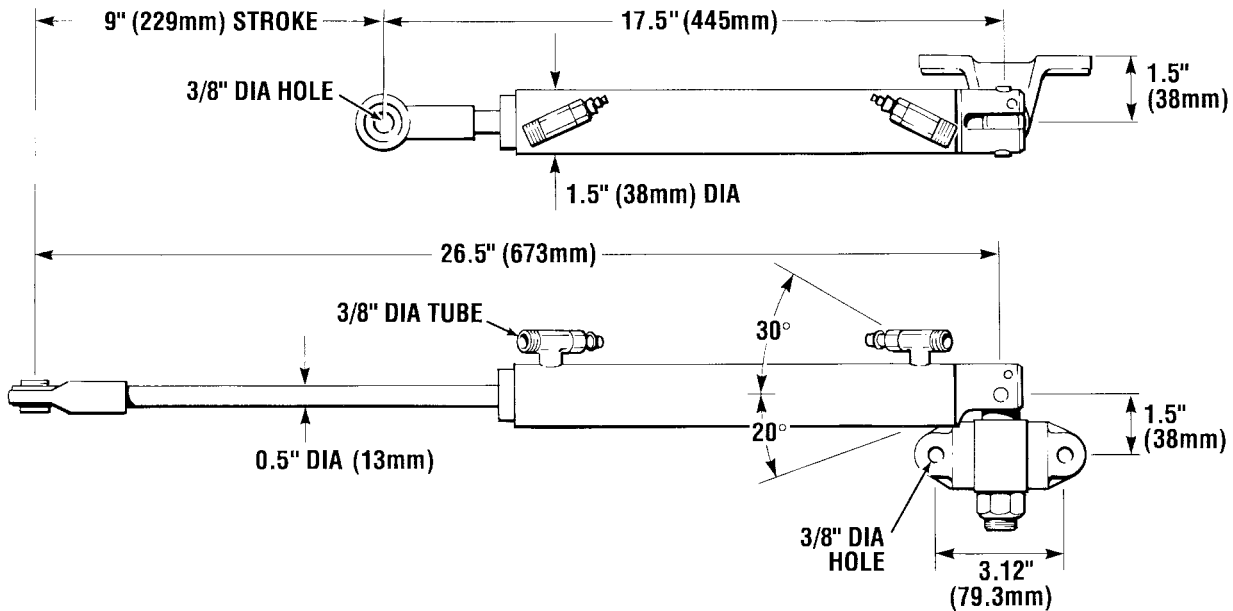
Mounting Configuration



Tie Bar Kit #H05010



PART #HC5380



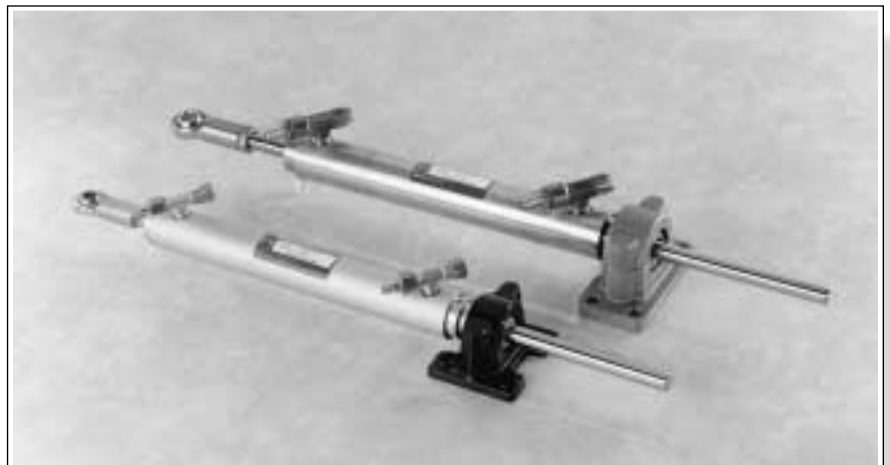
INBOARD STEERING

Features

- Regular duty aluminum cylinders.
- Heavy duty brass cylinders.
- Easy installation for single and dual rudder vessels.
- Cylinders supplied with bleeder fittings.
- Two axis articulation.
- Easy autopilot interface.

Four steps to select a steering system for an inboard powered boat

- 1) From the Application Guide on page 18 select the System Number appropriate for the vessel based on;
 - a) hull type - displacement or planing,
 - b) length of vessel,
 - c) number of rudders, and
 - d) usage of vessel.
- 2) From the Order Guide on page 18 select the appropriate helms and accessory hardware for each steering station.
- 3) From the Order Guide select the fitting and hose kits required for the installation.
- 4) Confirm that you have sufficient space available in;
 - a) the area the cylinder is to be mounted, and
 - b) the dash area for the steering components.



Application Guide

BOAT LENGTH UP TO	PLANING HULL				DISPLACEMENT HULL				SAIL	
	SINGLE ENGINE		TWIN ENGINE		SINGLE ENGINE		TWIN ENGINE		SINGLE ENGINE	
	PLEASURE	WORK	PLEASURE	WORK	PLEASURE	WORK	PLEASURE	WORK	PLEASURE	WORK
26FT (8m)	1	4	1	4	2	4	2	4	4	4
32FT (10m)	2	4	1	4	3	4	3	4	4	4
38FT (11.5m)	3	5	2	5	5	5	3	5	4	5
44FT (13.5m)	5	-	3	5	-	-	5	-	5	-
50FT (15m)	-	-	5	-	-	-	-	-	-	-

a) Displacement Hull - maximum hull speed does not normally exceed 18 knots.

b) Planing Hull - maximum hull speed normally exceeds 18 knots.

ORDER GUIDE

COMPONENT DESCRIPTION	QTY REQ	MODEL	PART #	PAGE REF
1	4 TURNS LOCK TO LOCK			
HELM	1	* SEASTAR I- STANDARD	HH5271	5-3
CYLINDER	1	BA125 - 7ATM	HC5312	
OIL	3	SEASTAR OIL	HA5430	8-1
TUBE	1	3/8" DIA NYLON (NOTE 1 & 3)	HT5_ _	6-6
FOR EXTRA STEERING STATION ADD:				
HELM	1	* SEASTAR I- STANDARD	HH5271	5-3
FITTING KIT	1	ADD A STATION	HF5502	6-11
OIL	1	SEASTAR	HA5430	8-1
EXTRA TUBE		3/8" DIA NYLON (NOTE 1 & 3)		6-6

COMPONENT DESCRIPTION	QTY REQ	MODEL	PART #	PAGE REF
4	4-1/4 TURNS LOCK TO LOCK			
HELM	1	** SEASTAR II- STANDARD	HH5272	5-3
CYLINDER	1	BA150 - 7TM	HC5318	
OIL	3	SEASTAR OIL	HA5430	8-1
HOSE KIT	1	HOSE KIT	HF5508	6-12
COPPER TUBE		3/8" DIA.(NOTE 2 & 3)		6-6
FOR EXTRA STEERING STATION ADD:				
HELM	1	** SEASTAR II- STANDARD	HH5272	5-3
FITTING KIT	1	ADD A STATION	HF5502	6-11
OIL	1	SEASTAR	HA5430	8-1
EXTRA TUBE		AS ABOVE (NOTE 2 & 3)		6-6

COMPONENT DESCRIPTION	QTY REQ	MODEL	PART #	PAGE REF
2	5 TURNS LOCK TO LOCK			
HELM	1	* SEASTAR I- STANDARD	HH5271	5-3
CYLINDER	1	BA135 - 7ATM	HC5313	
OIL	3	SEASTAR OIL	HA5430	8-1
TUBE	1	3/8" DIA NYLON (NOTE 1 & 3)	HT5_ _	6-6
FOR EXTRA STEERING STATION ADD:				
HELM	1	* SEASTAR I- STANDARD	HH5271	5-3
FITTING KIT	1	ADD A STATION	HF5502	6-11
OIL	1	SEASTAR	HA5430	8-1
EXTRA TUBE		3/8" DIA NYLON (NOTE 1 & 3)		6-6

COMPONENT DESCRIPTION	QTY REQ	MODEL	PART #	PAGE REF
5	5-1/2 TURNS LOCK TO LOCK			
HELM	1	** SEASTAR II- STANDARD	HH5272	5-3
CYLINDER	1	BA175 - 7TM	HC5319	
OIL	3	SEASTAR OIL	HA5430	8-1
HOSE KIT	1	HOSE KIT	HF5508	6-12
COPPER TUBE		3/8" DIA.(NOTE 2 & 3)		6-6
FOR EXTRA STEERING STATION ADD:				
HELM	1	** SEASTAR II- STANDARD	HH5272	5-3
6-11 OIL	1	SEASTAR	HA5430	8-1
EXTRA TUBE		AS ABOVE (NOTE 2 & 3)		6-6

COMPONENT DESCRIPTION	QTY REQ	MODEL	PART #	PAGE REF
3	6 TURNS LOCK TO LOCK			
HELM	1	* SEASTAR I- STANDARD	HH5271	5-3
CYLINDER	1	BA150 - 7ATM	HC5314	
OIL	3	SEASTAR OIL	HA5430	8-1
TUBE	1	3/8" DIA NYLON (NOTE 1 & 3)	HT5_ _	6-6
FOR EXTRA STEERING STATION ADD:				
HELM	1	* SEASTAR I- STANDARD	HH5271	5-3
FITTING KIT	1	ADD A STATION	HF5502	6-11
OIL	1	SEASTAR	HA5430	8-1
EXTRA TUBE		3/8" DIA NYLON (NOTE 1 & 3)		6-6

OPTIONAL EQUIPMENT				
BACK PLATE KIT (FOR STANDARD HELMS)	HA5418	5-5		
20 DEGREE WEDGE KIT (FOR STANDARD HELMS)	HA5419	5-5		
AUTOPILOT FITTING KIT (FOR ALL HELMS)	HF5502	6-11		
* TILT HELM-SEASTAR I	HH5741	5-4		
REAR MOUNT HELM-SEASTAR I	HH5261	5-4		
** TILT HELM-SEASTAR I	HH5742	5-4		
REAR MOUNT HELM-SEASTAR I	HH5262	5-4		

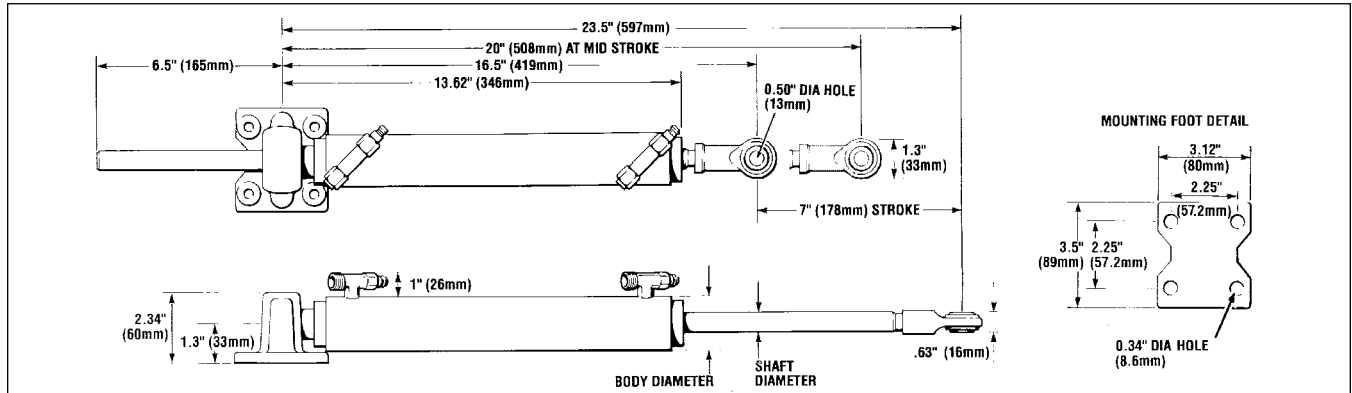
1. For systems 1, 2 & 3 - nylon tubing (3/8" diameter) is the standard requirement for plumbing the system. Copper tubing (3/8" diameter) can be substituted but Fitting Kit HF5507 is required. (Refer to page 6-12)

2. For systems 4 & 5 - copper tubing (3/8" diameter) is the standard requirement for plumbing the system. Fitting Kit HF5508 is required. (Refer to page 6-12)

3. For systems 1, 2, 3, 4, & 5 Seastar outboard hose can be substituted for nylon or copper tube. These hoses must be ordered in standard lengths. They cannot be cut to length. (Refer to page 6-2)

General Dimensions

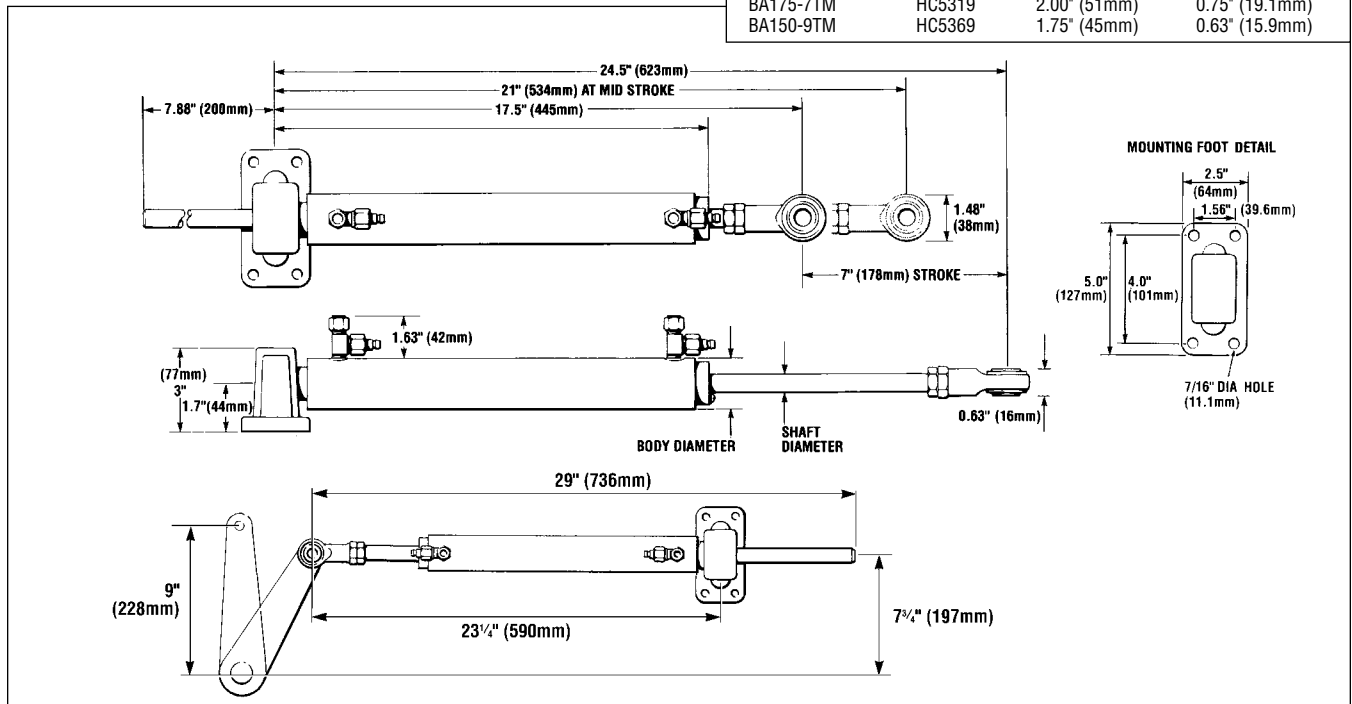
ATM CYLINDERS (ALUMINUM): HC5312/ HC5313/ HC5314



CYLINDER DIMENSIONS SPECIFIC TO MODEL

CYLINDER MODEL	PART #	BODY DIAMETER	SHAFT DIAMETER
BA125-7ATM	HC5312	1.38" (35mm)	0.50" (12.7mm)
BA135-7ATM	HC5313	1.50" (38mm)	0.63" (15.9mm)
BA150-7ATM	HC5314	1.75" (45mm)	0.63" (15.9mm)
BA150-7TM	HC5318	1.75" (45mm)	0.63" (15.9mm)
BA175-7TM	HC5319	2.00" (51mm)	0.75" (19.1mm)
BA150-9TM	HC5369	1.75" (45mm)	0.63" (15.9mm)

TM CYLINDERS (BRASS): HC5318/ HC5319/HC5369

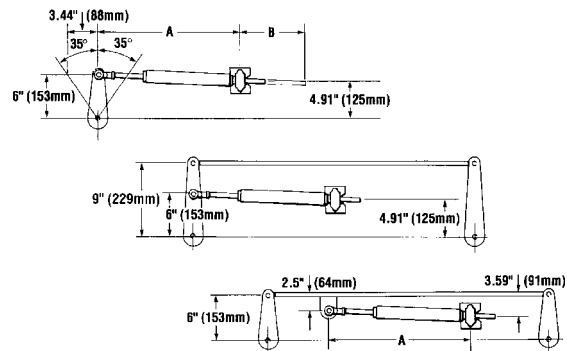


CYLINDER MOUNTING CONFIGURATIONS

MOUNTING CONFIGURATION DIMENSIONS

CYLINDER MODEL	PART #	A	B	C
BA125-7ATM	HC5312	20" (508)	6.5" (165)	8.5" (216)
BA135-7ATM	HC5313	20" (508)	6.5" (165)	8.5" (216)
BA150-7ATM	HC5314	20" (508)	6.5" (165)	8.5" (216)
BA150-7TM	HC5318	21" (534)	8" (204)	10" (254)
BA175-7TM	HC5319	21" (534)	8" (204)	10" (254)
BA150-9TM	HC5369	21" (534)	8" (204)	10" (254)

Figures in parenthesis are in millimetres



STERNDRIVE STEERING

Features

- Easy installation.
- Simple autopilot interface.
- Simple multiple steering station connection.

Applications

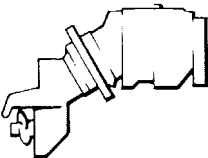
- Fits most power and non-power assist sterndrives.
- Single and multiple drives.

How to select a steering system for a stern drive

- 1) From the order guide on page 21 select the drive configuration based on the number of drives.
- 2) From the application guide on page 22 confirm that a cylinder is available for your specific make, model and year of drive unit. Select the cylinder that is appropriate for the drive.
- 3) From the order guide select the appropriate helm and accessory hardware. Note that two helm pumps of different displacements are available for power steered sterndrives. The displacement of the helm affects the number of turns lock to lock. Select the helm displacement on the basis of the desired steering response.
- 4) Select the appropriate tube or hose and fitting kits.
- 5) Confirm that sufficient space is available in the dash and engine compartments for the equipment.



Order Guide

SYSTEM CONFIGURATION	COMPONENT DESCRIPTION	QTY REQ	MODEL	PART #	PAGE REF #	
SINGLE & DUAL STERNDRIVE (For dual sterndrive applications use engine manufactures supplied tie bar.) 	CYLINDER	1	SEE APPLICATION GUIDE			
	HELM	1	* SEASTAR I STANDARD (SEE NOTE 1)	HH5271	5-3	
			** SEASTAR II-STANDARD (SEE NOTE 2)	HH5272	5-3	
	OIL	3	SEASTAR OIL	HA5430	8-1	
	TUBE/HOSE		SEE NOTE 3		6-6	
	FOR EXTRA STEERING STATION ADD:					
	HELM	1	* SEASTAR I STANDARD (SEE NOTE 1)	HH5271	5-3	
			** SEASTAR II-STANDARD (SEE NOTE 2)	HH5272	5-3	
	FITTING KIT	1	ADD A STATION			
			- FOR SEASTAR I HELMS	HF5502	6-11	
		- FOR SEASTAR II HELMS	HF5501	6-10		
	OIL	1	SEASTAR OIL		8-1	
	EXTRA TUBE/HOSE		SEE NOTE 3		6-6	
OPTIONAL EQUIPMENT						
	BACK PLATE KIT		(FOR STANDARD HELMS)	HA5418	5-5	
	20 DEGREE WEDGE KIT		(FOR STANDARD HELMS)	HA5419	5-5	
	AUTOPILOT FITTING KIT		(FOR ALL HELMS)	HF5502	6-11	
	* TILT HELM-SEASTAR I			HH5741	5-4	
	REAR MOUNT HELM-SEASTAR I			HH5261	5-4	
	** TILT HELM-SEASTAR II			HH5742	5-4	
	REAR MOUNT HELM-SEASTAR I			HH5262	5-4	

1. Seastar I helms are the standard recommendation for both non-power and power steered applications.
2. Seastar II helms can be specified for power steered applications where faster steering response is desired. Review the application chart on page 22 for recommendations.
3. * **For Seastar I systems:** use 3/8" dia nylon tubing ref part No. HT5__ (Refer to page 6-6)

- * **For Seastar II systems:** Use the following option **A** or **B**
- A)** Outboard hose:
Hoses must be ordered in standard lengths. They cannot be cut to length. (Refer to page 6-2)
- B)** Copper tube:
3/8" diameter copper tube and hose kit part No. HF5508 (Refer to page 6-6)
4. For dual stern drives – use the tie bar supplied by the engine manufacturer.

NOTICE

These recommendations apply to factory stock stern drives only. Modified installations may require a higher capacity steering system. If in doubt, contact our technical service for assistance.

Application Guide

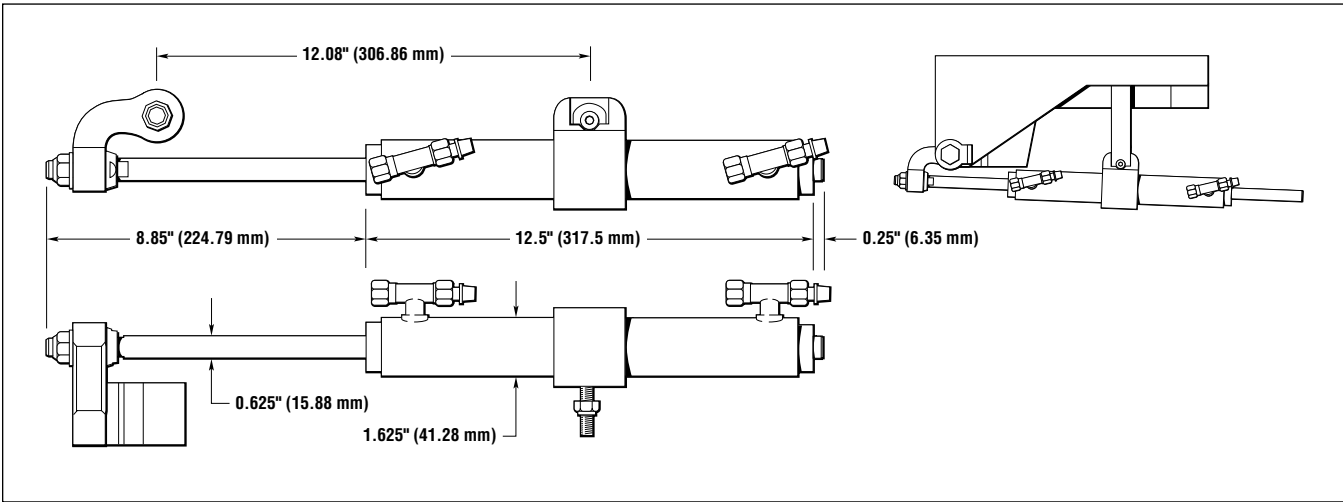


ENGINE MANUFACTURER	STEERING CONFIGURATION	ENGINE/DRIVE DESCRIPTION	YEAR	CYLINDER DESCRIPTION		NUMBER TURNS LOCK TO LOCK		NOTES	
				MODEL No.	PART No.	SEASTAR I HELM	SEASTAR II HELM		
BMW	NON POWER ASSIST	ALL	TO DATE	BA125-8EMV	HC5330	4.9	N/A	1	
	POWER ASSIST	ALL	TO DATE	125-8EM	HC5328	4.9/5.8	3.4/4.1	2	
MERCUISER	NON POWER ASSIST	MERCUISER 1	1983 & PRIOR	BA125-8EMV	HC5330	4.9	N/A	1	
		ALPHA I	1984 TO DATE	BA135-7EM	HC5332	5.0	3.5	1,5,6	
		BRAVO I	1984 TO DATE	BA135-7EM	HC5332	5.0	3.5	1,5,6	
		BRAVO II	1984 TO DATE	BA135-7EM	HC5332	5.0	3.5	1,5,6	
	POWER ASSIST	BRAVO III	1984 TO DATE	BA135-7EM	HC5332	5.0	3.5	1,5,6	
		MERCUISER I	1983 & PRIOR	125-8EM	HC5328	4.9/5.8	3.4/4.1	2	
		ALPHA I	1984 TO DATE	125-8EM	HC5328	4.9/5.8	3.4/4.1	2	
		BRAVO I	1984 TO DATE	125-8EM	HC5328	4.9/5.8	3.4/4.1	2	
POWER ASSIST	BRAVO II	1984 TO DATE	125-8EM	HC5328	4.9/5.8	3.4/4.1	2		
	BRAVO III	1984 TO DATE	125-8EM	HC5328	4.9/5.8	3.4/4.1	2		
	OMC	NON POWER ASSIST	400/800 SERIES	1985 & PRIOR	N/A	N/A	N/A	N/A	
			COBRA	1986 TO DATE	BA150-7EM	HC5326	6.0	N/A	1,4
POWER ASSIST	KING COBRA	1986 TO DATE	1985 & PRIOR	BA150-7EM	HC5326	6.0	N/A	1,4	
									400/800 SERIES
POWER ASSIST	COBRA	1986 TO DATE	1985 & PRIOR	125-8EM	HC5328	4.9/5.8	3.4/4.1	2	
									KING COBRA
VOLVO	NON POWER ASSIST	275	TO DATE	BA150-7ATM	HC5314	6.0	N/A	1	
		280	TO DATE	BA135-7EM	HC5332	5.0	3.5	1,5,6	
		290	TO DATE	BA135-7EM	HC5332	5.0	3.5	1,5,6	
		DIESEL	TO DATE	BA135-7EM	HC5332	5.0	3.5	1,5,6	
	POWER ASSIST	275	TO DATE	N/A	N/A	N/A	N/A		
		280	TO DATE	125-8EM	HC5328	4.8/5.8	3.4/4.1	2	
		290	TO DATE	125-8EM	HC5328	4.8/5.8	3.4/4.1	2	
		DIESEL	TO DATE	125-8VEM	HC5329	4.9/5.8	3.4/4.1	2	
		32, DIESEL	1997 TO DATE	92-VPS	HC5331	4.8/5.5	3.4/4.1	2	
		41-42, DIESEL	1992 TO DATE	92-VPS	HC5331	4.8/5.8	3.4/4.1	2	
DPS & SX	1996 TO DATE	92-VPS	92-VPS	HC5331	4.8/5.5	3.4/4.1	2		
YAMAHA	NON POWER ASSIST	ALL	1989 TO DATE	N/A	N/A	N/A	N/A		
	POWER ASSIST	ALL	1989 TO 1992	125-8EM	HC5328	4.9/5.8	3.4/4.1	2	

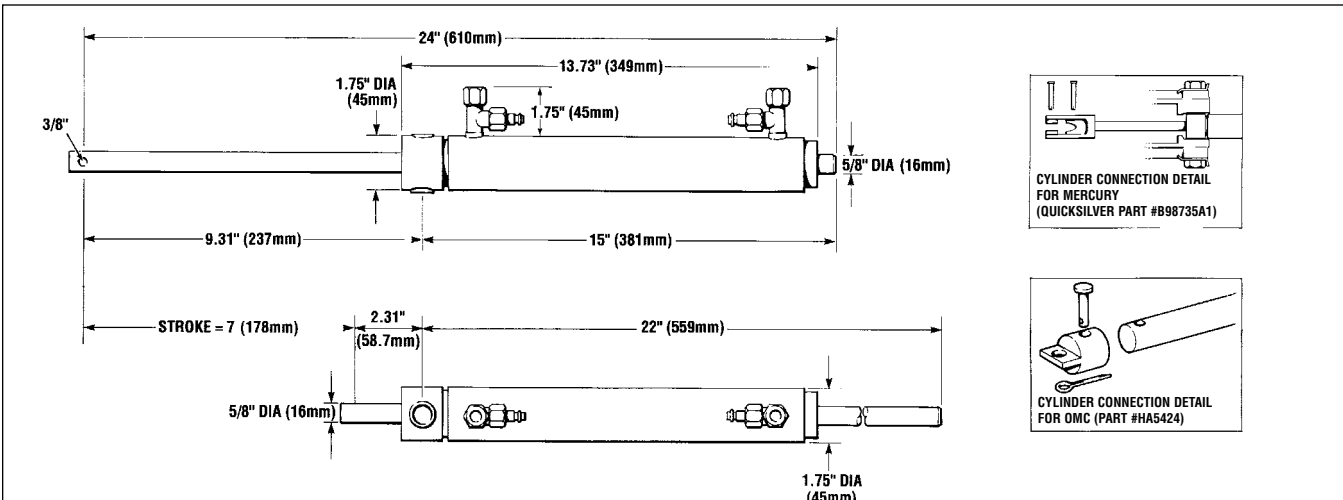
- Balanced system – ie: the number of turns lock to lock is equal port to starboard or vice-versa.
- Unbalanced system – ie: the number of turns lock to lock is not equal port to starboard or vice-versa.
- Requires additional clevis supplied by engine manufacturer. Reference Quicksilver part No. B98735A1. Refer to diagram on page 4-4.
- Requires cylinder rod end adapter HA5424 supplied by Teleflex. Refer to diagram on page 4-4.
- HC5332 replaces HC5326 as of January 2000.** If installing HC5326 additional clevis supplied by engine manufacturer required (part number B98735A1).
- The installation of the HC5332 sterndrive cylinder requires the use of SeaStar Outboard hose only. Do not use 3/8" copper or nylon tube.

General Dimensions

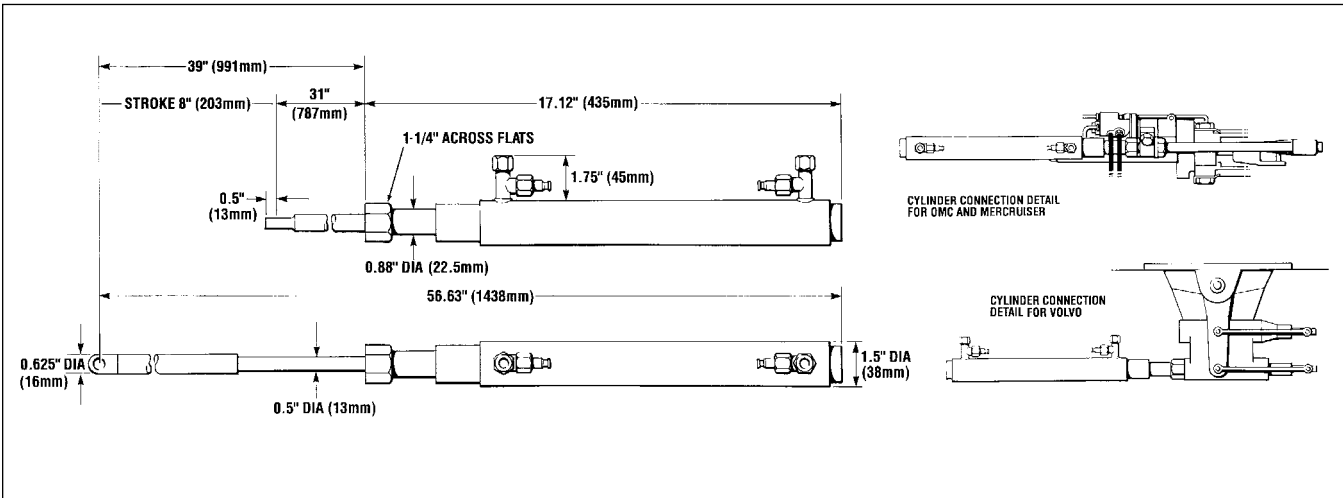
HC5332 135-7EM



HC5326 BA150-7EM



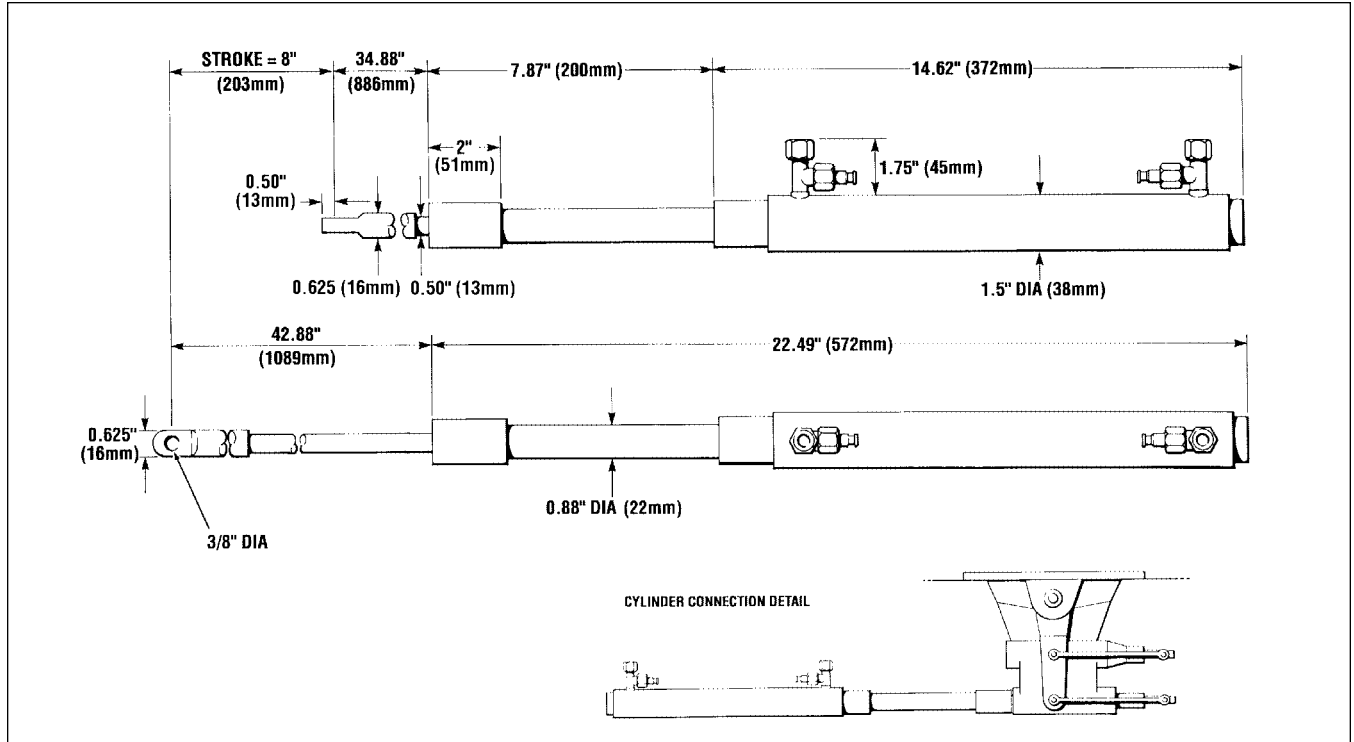
HC5328 125-8EM



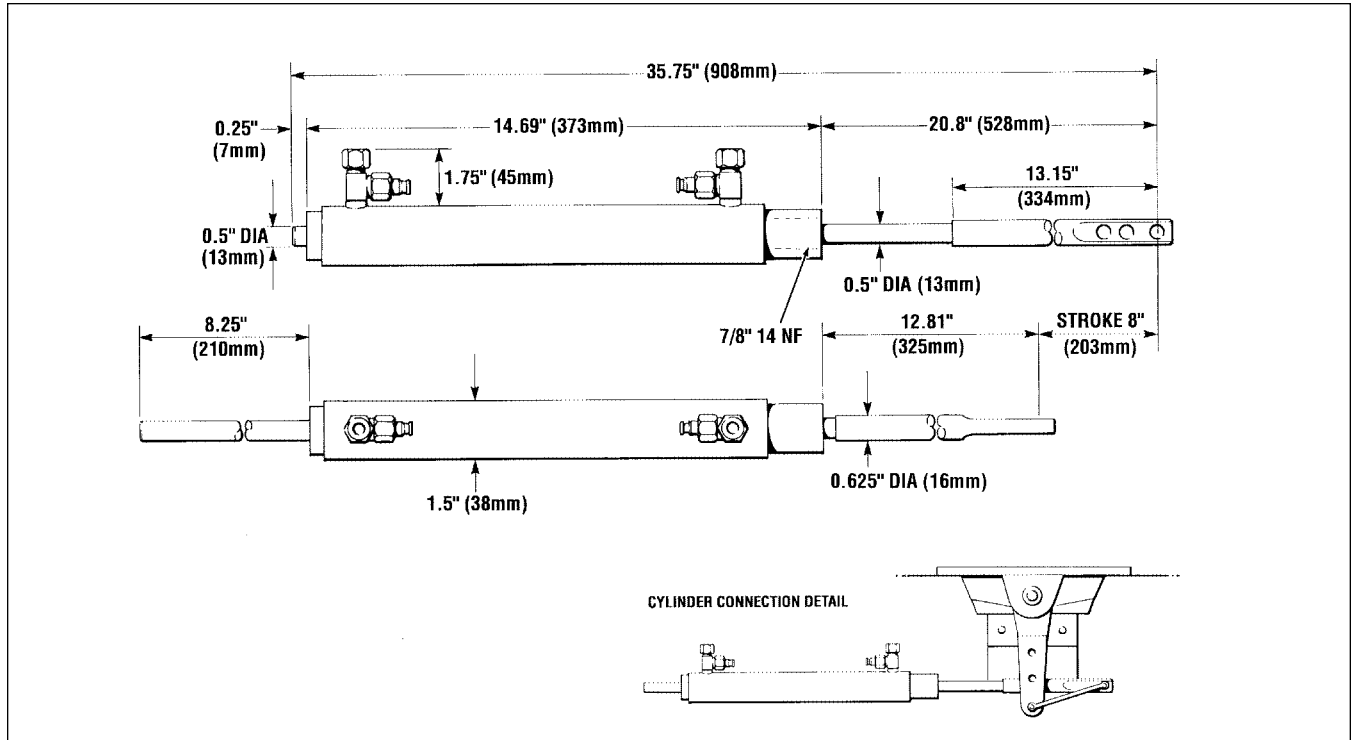
General Dimensions



HC5329 125-8VEM

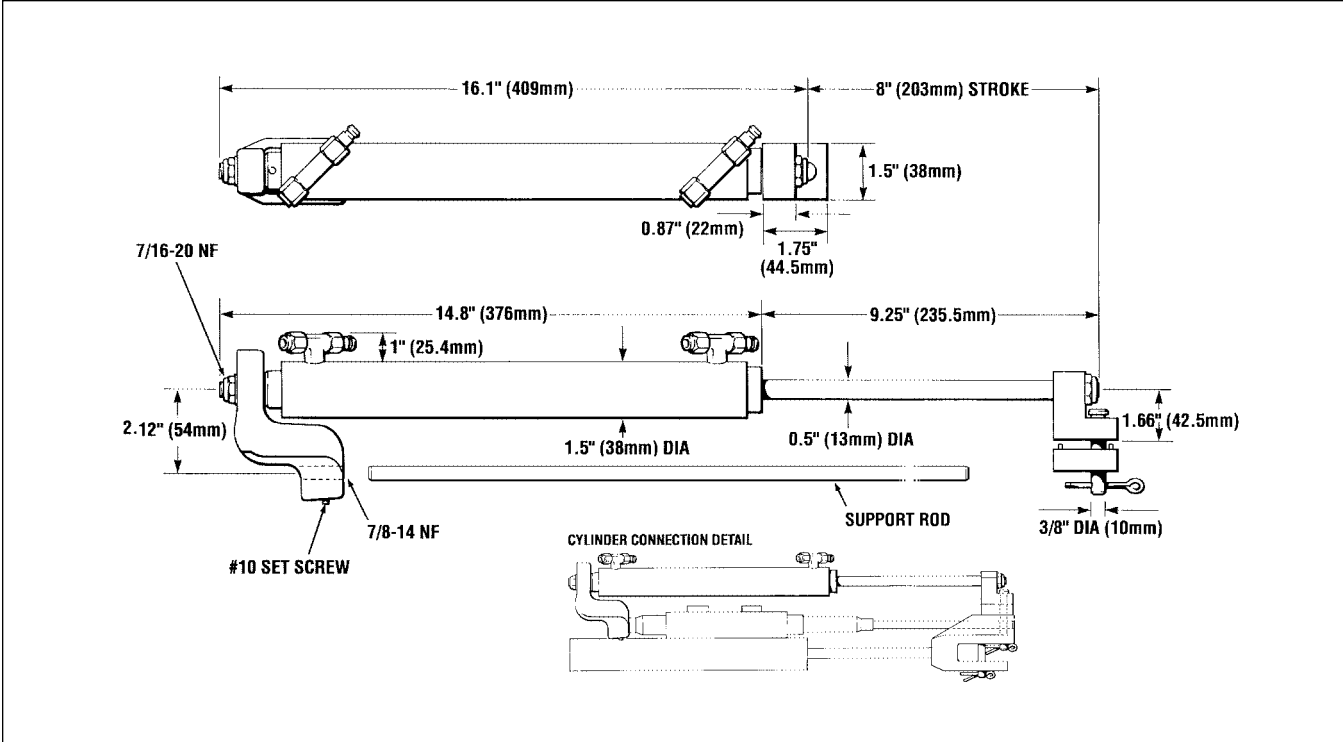


HC5330 BA125-8EMV

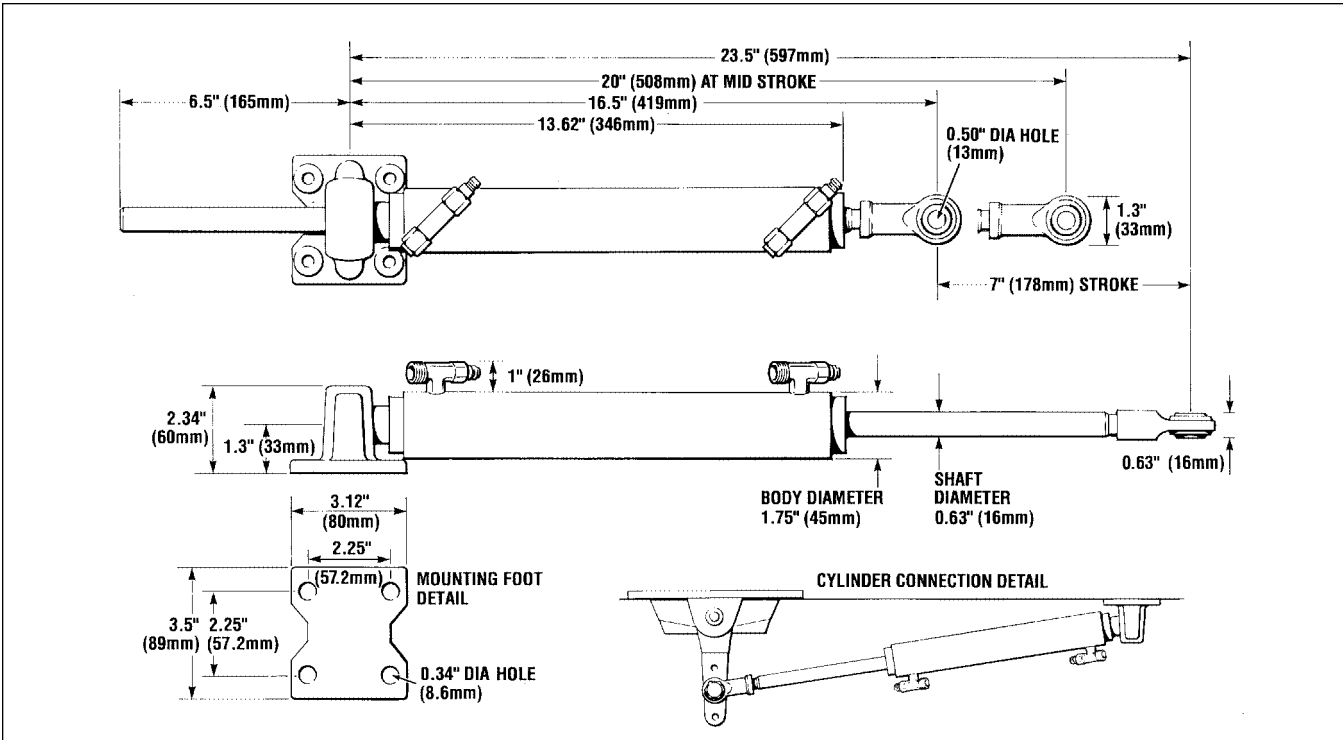


General Dimensions

HC5331 92-VPS



HC5314 BA150-7ATM



SeaStar® HELMS

The SeaStar helm pump is the heart of the hydraulic steering system. SeaStar helm pumps are the product of many years of research and experience by the world's foremost builder of manual hydraulic steering systems. Our efforts have resulted in a design which represents the ultimate in efficiency, safety and reliability, yet is easy to install and maintain. Superior design, teamed with the finest materials, precision manufacturing and rigid quality control all add up to an outstanding product which is certain to set industry standards for years to come.



Standard helm features

- Compact, stylish design.
- Available in 1.7, 2.0 and 2.4 cubic inch displacements.
- Convenient front of dash fill.
- Small 3.0" hole cutout on dash.
- Can be retrofitted into old SeaStar 4.5" hole cutout.
- Complete with elbow fittings.



Rear mount helm features (CONTACT TELEFLEX FOR AVAILABILITY)

- Behind dash mounting configuration.
- Available in 1.4, 1.7 and 2.4 cubic inch displacements.
- Top of dash fill point.
- Complete with elbow fittings.



Sport Tilt helm features

- 5 wheel positions allow adjustment to most comfortable steering position.
- 48 degree tilt range (12 down - 36 up).
- Available in 1.7, 2.0 and 2.4 cubic inch displacements.
- Remote fill point.
- Complete with elbow fittings.

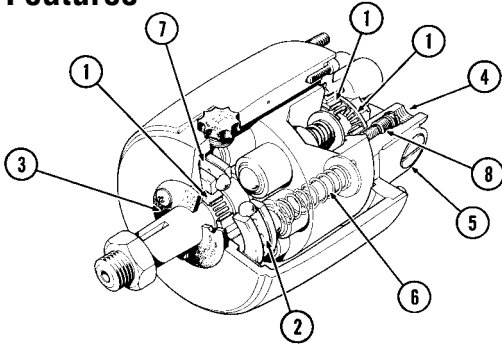


Traditional Tilt helm features

- 5 wheel positions allow adjustment to most comfortable steering position.
- 48 degree tilt range (18 down - 30 up).
- Available in 1.7, 2.0 and 2.4 cubic inch displacements.
- Convenient front of dash fill.
- Complete with elbow fittings.

Features Common to all SeaStar Helms

Features



- 1 Helm rotor supported by three roller bearings.
- 2 Ball bearing piston race.
- 3 Field replaceable shaft seal.
- 4 1/4" NPT ports.
- 5 Built-in lock valve for positive rudder lock.
- 6 Patented bleed tubes.
- 7 Internal air pocket eliminates oil expansion overflow.
- 8 Integral relief valve.

Order Guide

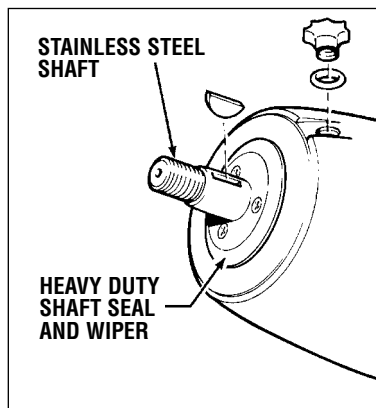
HELM DESCRIPTION	PART NUMBER	DISPLACEMENT		RELIEF VALVE SETTING	
		CU. IN./REV	(CC/REV)	PSI	(BAR)
* SEASTAR 1.7 – STANDARD MOUNT	HH5271	1.7	(27.8)	1000	(70)
* SEASTAR 2.4 – STANDARD MOUNT	HH5272	2.4	(39.3)	1000	(70)
* SEASTAR 2.0 – STANDARD MOUNT	HH5273	2.0	(33.0)	1000	(70)
SEASTAR PRO – STANDARD MOUNT	HH5770	2.0	(33.0)	1500	(103)
SEASTAR 1.7 – TILT	HH5741	1.7	(27.8)	1000	(70)
SEASTAR 2.4 – TILT	HH5742	2.4	(39.3)	1000	(70)
SEASTAR PRO – TILT	HH5774	2.0	(33.0)	1500	(103)
SEASTAR 1.4 – REAR MOUNT	HH5260	1.4	(23.0)	1000	(70)
SEASTAR 1.7 – REAR MOUNT	HH5261	1.7	(27.8)	1000	(70)
SEASTAR 2.4 – REAR MOUNT	HH5262	2.4	(39.3)	1000	(70)
SEASTAR 1.7 – SPORT TILT	HH5291	1.7	(27.8)	1000	(70)
SEASTAR 2.0 – SPORT TILT PRO	HH5290	2.0	(33.0)	1500	(103)
SEASTAR 2.4 – SPORT TILT	HH5292	2.4	(39.3)	1000	(70)
* SEASTAR 1.7 – COMMERCIAL, STD. MOUNT	HH5217	1.7	(27.8)	1000	(70)
* SEASTAR 2.4 – COMMERCIAL, STD. MOUNT	HH5224	2.4	(39.3)	1000	(70)
* OPTIONAL EQUIPMENT		BACK PLATE KIT	HA5418	REF. PAGE # 30	
		20 DEGREE WEDGE	HA5419	REF. PAGE # 30	
		ROUND BEZEL KIT	HA5417	REF. PAGE # 30	

Commercial Helms

Part# HH5217, HH5224

NOTICE

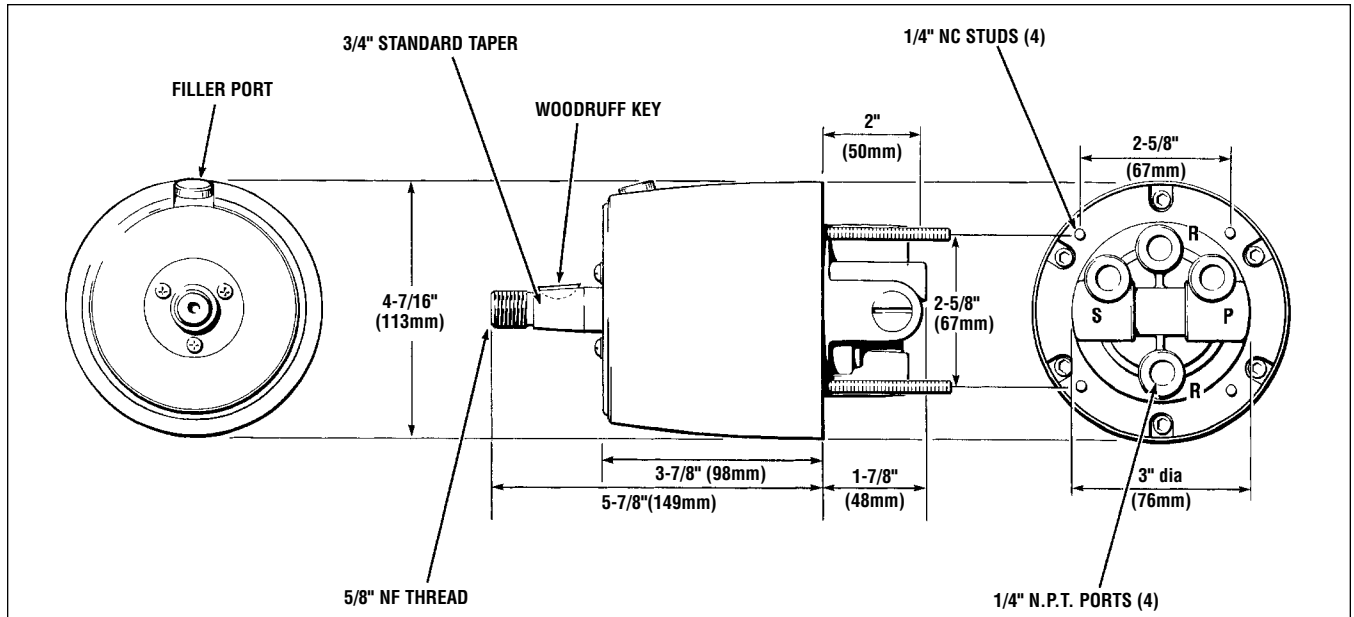
For Commercial Use ONLY.



Specifically designed to be used on smaller fishing vessels involved in the Lobster and Crabbing Industries. The Commercial Helm Pumps are designed with a stainless steel shaft and heavy duty shaft seal and wiper. This new shaft and seal help protect the Helm Pump from the abrasive effects of sediment that is brought on board by the operator handling Traps or Pots.

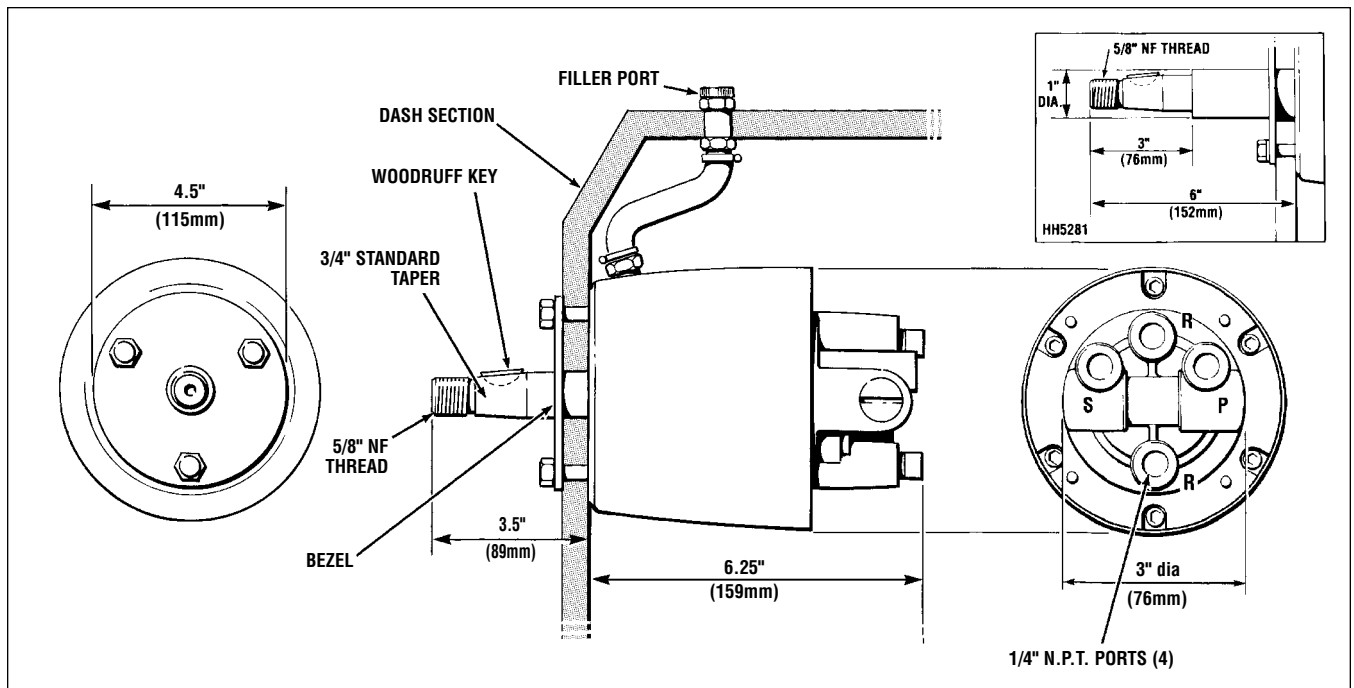
STANDARD HELM DIMENSIONS

REF. PART #: HH5271/ HH5272/ HH5273/ HH5770



NOTICE Max. steering wheel diameter 28" (711mm).

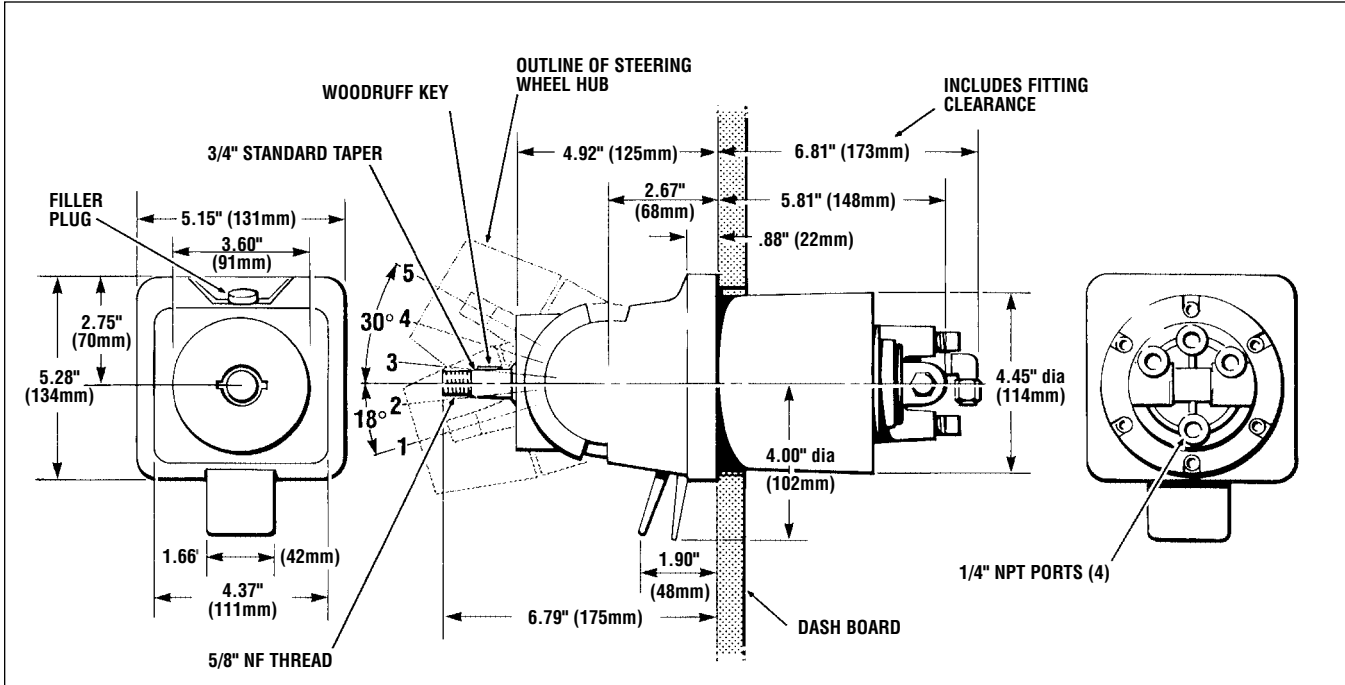
REAR MOUNT HELMS REF. PART #: HH5260/ HH5261/ HH5262/ HH5281 (P/S Helm)



NOTICE Max. steering wheel diameter 28" (711mm). Min. dash thickness 1" (25.5mm), Max. dash thickness 1.5" (38mm).

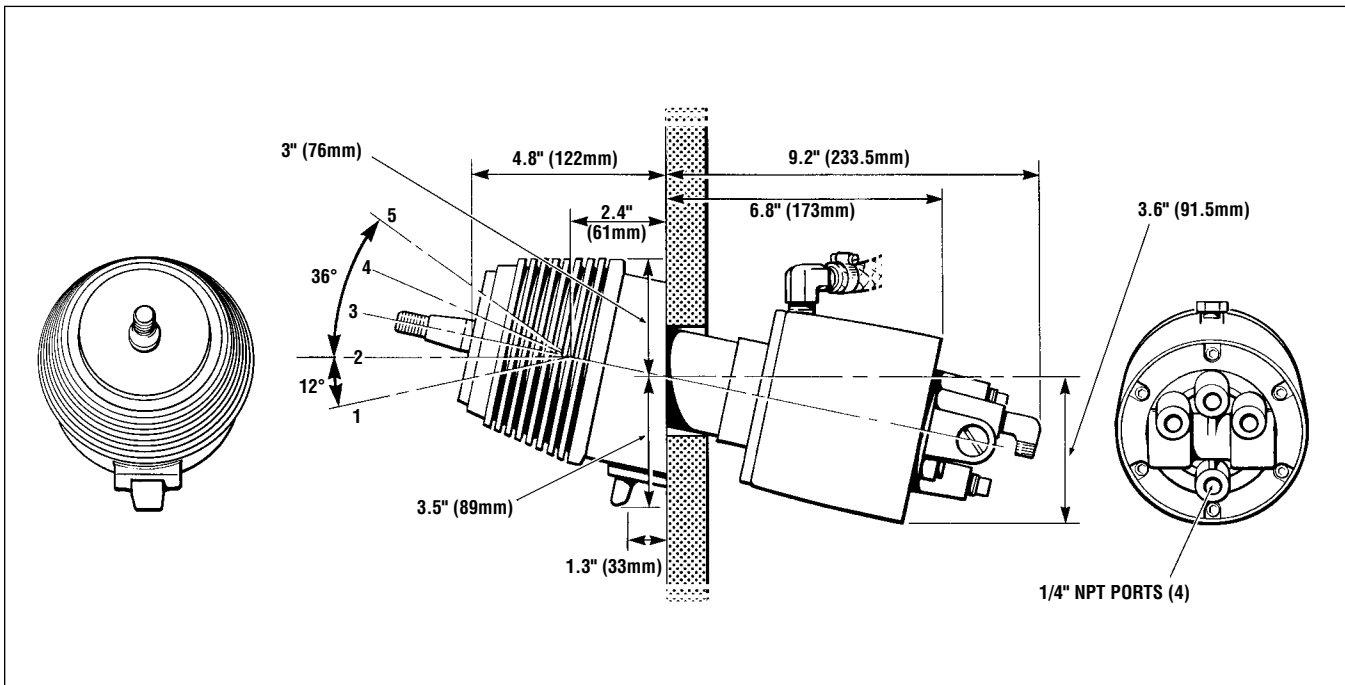
TILT HELM/REAR MOUNT DIMENSIONS

TRADITIONAL TILT HELMS REF. PART #: HH5741/ HH5742/ HH5774



NOTICE Max. steering wheel diameter 20" (508mm)

SPORT TILT HELMS REF. PART #: HH5290/ HH5291/ HH5292



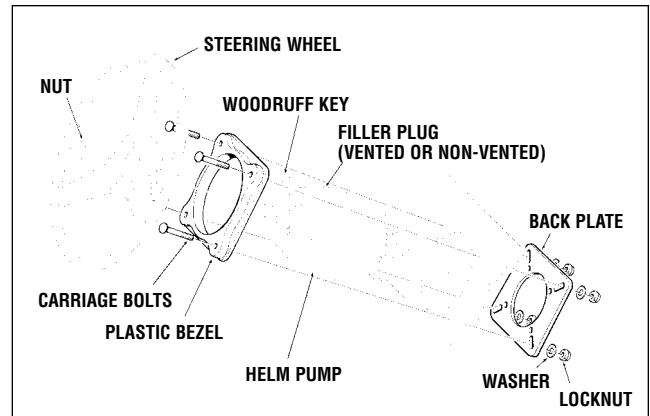
NOTICE Max. steering wheel diameter 20" (508mm)

Accessories

Backplate Kit (part # HA5418)

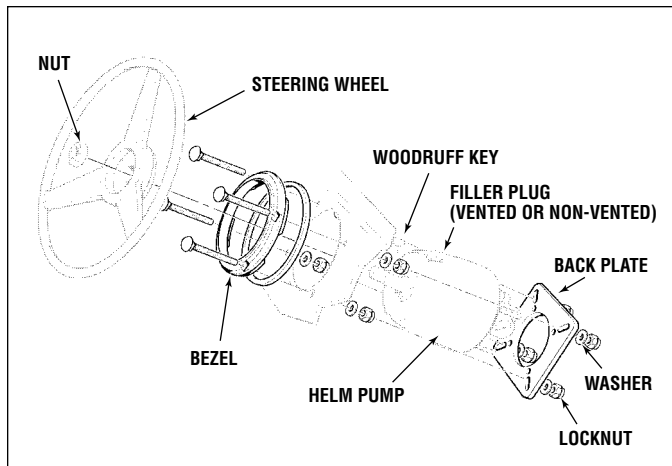
- a) Used to retrofit a new Seastar standard helm in the old 4.5" (115mm) diameter hole, or
- b) reduce the helm protrusion from the dash by the thickness of the dash, or
- c) retrofit new SEASTAR standard helm into hole cutouts for mechanical and hydraulic steering as per chart.

STEERING MANUFACTURER	HELM MODEL TYPE	SYSTEM	BACKPLATE KIT REQ
TELEFLEX	SAFE-T	MECHANICAL	YES
	BIG-T	MECHANICAL	YES
	ROTARY	MECHANICAL	NO
	RACK AND PINION	MECHANICAL	NO
	SYTEN	HYDRAULIC	YES
MORSE	ROTARY	MECHANICAL	NO
	RACK AND PINION	MECHANICAL	NO



Round Bezel (part # HA5417)

Reduces the distance the helm protrudes from the front of the dash to 3.75" (93mm).

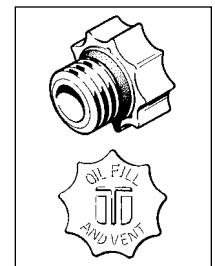


Vent Plug (part # HA5431)

Supplied with SeaStar Helm Pump

Must Be used with Helm Pump on all single steering station systems.

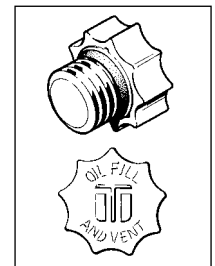
Must be used on uppermost Helm Pump on multi steering station systems.



Non-Vent Plug (part # HA5432)

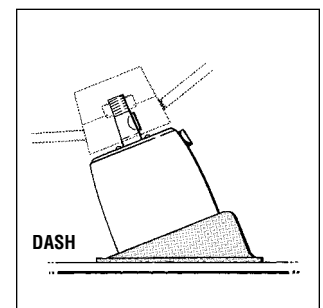
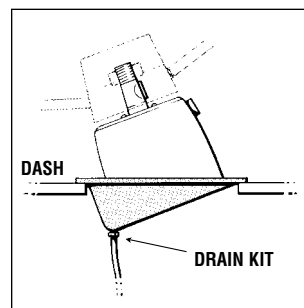
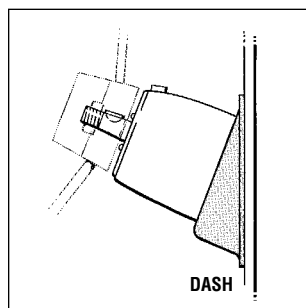
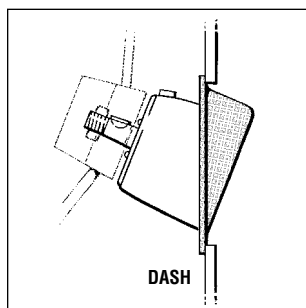
Must be used on all Helm Pumps other than uppermost Helm Pump on multi steering station systems.

This Non-Vent Plug is supplied with additional Fitting Kit No. HF5501 & HF5502



20° Wedge (part # HA5419 & HA5408 c/w Drain kit)

This kit is designed to mount the helm at a 20° angle to the mounting surface. 4 possible mounting configurations are available.



▲ For this configuration use HA5408

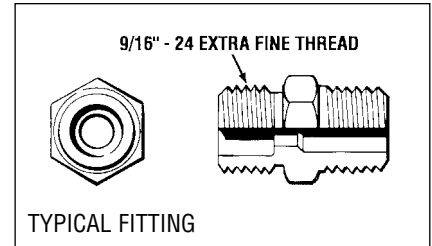
CHAPTER
6

SeaStar[®]

HOSE, TUBING, FITTINGS AND ACCESSORIES

Fittings

All SeaStar Manual Hydraulic steering systems utilize the same style of fittings for all applications. These are 3/8" compression fittings which utilize a 9/16" - 24 extra fine thread.



Tubing/Hose

The tubing or hose requirements depend on the type of steering system being considered.

⚠ WARNING
DO NOT CUT OUTBOARD HYDRAULIC HOSE.

APPLICATION	TUBING/HOSE REQUIREMENTS	PAGE #
OUTBOARDS INBOARDS, SSII	OUTBOARD HOSE	34-37
STERNDRIVES SEADRIVES INBOARDS, SSI	3/8" DIA. NYLON OR COPPER TUBE	38-40
CAUTION: DO NOT USE NYLON TUBING IN OUTBOARD STEERING INSTALLATIONS.		

General Considerations

⚠ WARNING
DO NOT use extruded nylon tube for outboard installations.

In most hydraulic steering installations the cylinder body moves as the motor, outdrive or tiller arm is articulated. Provide sufficient hose length to allow full-uninterrupted steering motion including trim and tilt. If your splashwell is rated for a dual engine application or you are mounting the engines on a gill bracket you must provide enough steering hose to rig either twin or single engines. Inboard or Sterndrive steering installations that use 3/8" copper or extruded nylon tube must have a swaged hydraulic hose kit (HF5508) between the steering cylinder and the rigid tube to provide a flexible connection.

SEASTAR OUTBOARD HOSE

SeaStar Outboard hoses are available in kit's (includes two hoses) ranging in length from 2' - 30'. Hydraulic Hose must be protected from chaffing and any possible contact or interference with assembly screws or sharp edges of any type.

The Hydraulic hoses should be secured along the routing path wherever possible and should not be allowed to hang free in any area where they could become a safety hazard. Teleflex recommends the use of a rigging tube, PVC piping or conduit for the safe secure installation of hydraulic hoses. Do not install hoses in such a way that they may become exposed to high heat areas such as engine components (i.e.; manifold or exhaust components) or highly corrosive areas such as battery fumes or electrical connections.

Continuous kinking, chaffing, rubbing or twisting may eventually weaken hose(s) to a point where it could rupture from normal steering pressure causing loss of steering, resulting in personal or property damage. Visually inspect all hoses and fittings for wear and or damage as part of your regular annual maintenance. Replace any hose or components suspect of excessive wear.

Available SeaStar Hose Kits: How to order

Each part number contains two hoses of equal length.

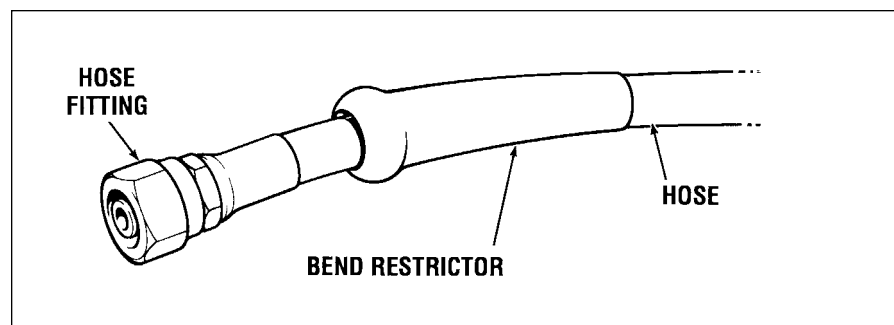
PART NUMBER	KIT DESCRIPTION
* HO51XX	SeaStar Standard Outboard Hose Kit (2 hoses)
* HO57XX	SeaStar Pro Hose Kit (2 hoses)
** HO81XX	SeaStar Bulkhead Hose Kit, Standard (2 hoses)
** HO82XX	SeaStar Bulkhead Hose Kit, Pro(2 hoses)

NOTICE

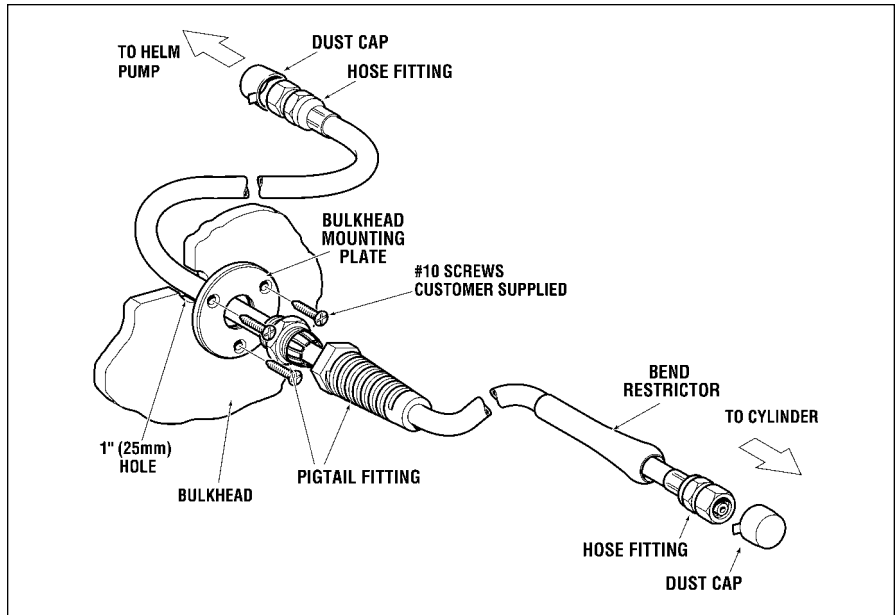
Outboard hoses are supplied with pre-attached hose fittings on both ends.

In order to prevent hose kinking, bend restrictors are supplied on one end of each hose in the kit. The end of the hose with the bend restrictor is to be attached to the cylinder.

- * SeaStar Standard and Pro Hose Kits are available in lengths from 2' - 30'. 40' Hose Kits are available by special order only.
- ** SeaStar Standard and Pro Bulkhead Hose Kits are available in lengths from 12' - 30'. 40' Hose Kits are available by special order only.



Standard Hose Kit

Bulkhead Hose Kit:**To determine the required hose lengths for outboard steering installations.**

From the illustrations on the following pages (figures A through I), select the situation which best suits your application and note the:

- cylinder location,
- number of cylinders,
- type of cylinders,
- number of steering stations, and
- the number of hose and fitting kits required.

Single Station System

- From the illustration that suits your application note the number of hose and fitting kits required.
- Measure along the intended path of the hose routing for each of the required hose kits.
- Round up the measurement to the next even digit and add 2 feet (0.6m). This is the length of hose kit required.
- Order hose kit(s) part no. HO51_ _ . The last two digits correspond to the length of hose kit.

NOTICE

- Measure from center of the cylinder(s) and helm(s)
- Some installations require more than 1 hose kit and additional fitting kits (see parts list for each figure).
- Minimum bend radius for outboard hose is 2-1/2" (6 cm).
- Outboard cylinders move. They are subject to engine trim & tilt. Enough slack must be left in the hoses to prevent kinking.

⚠ CAUTION

DO NOT cut the hose. This will destroy the hose. Once cut there is no means to field swage fittings to the ends of the hose.

Single Station

Figure A: HC5345
Single Front Mount Cylinder
Note: cylinder body moves

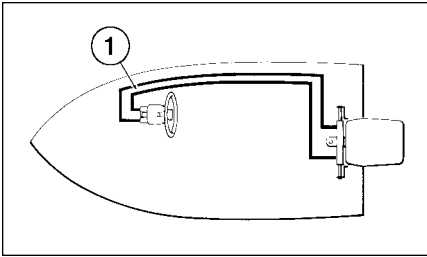


Figure B: HC5370
Single Side Mount Cylinder
Note: cylinder body stationary

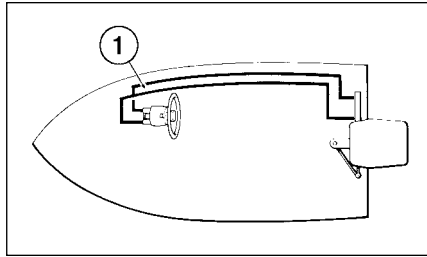


Figure C: HC5380
Single Splashwell Mount Cylinder
Note: cylinder body stationary

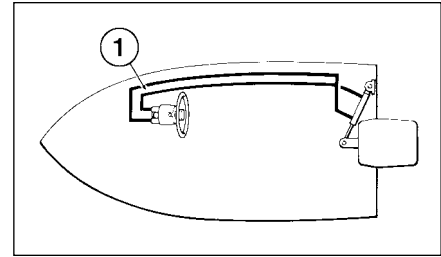


Figure D: HC5345
Dual Front Mount Cylinders
Note: cylinder body moves

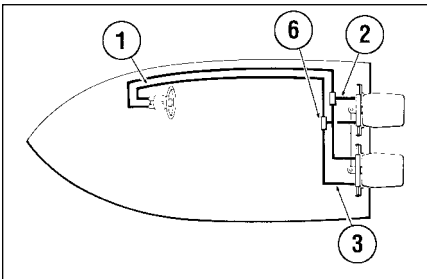


Figure E: HC5370
Dual Side Mount Cylinders
Note: cylinder body stationary

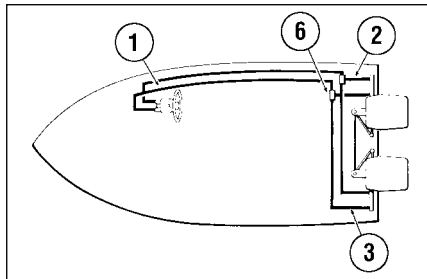


Figure F: HC535
Single Front Mount Cylinder
c/w bulkhead fittings
Note: cylinder body moves

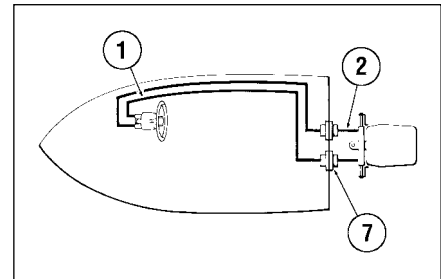


Figure G: HC5370
Single Side Mount Cylinder
c/w bulkhead fittings
Note: cylinder body stationary

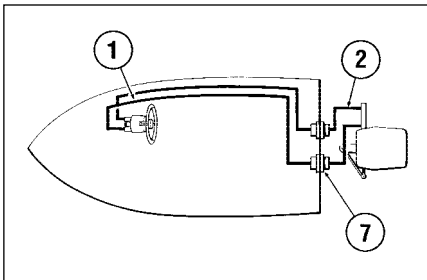


Figure H: HC5345
Dual Front Mount Cylinders
c/w bulkhead fittings

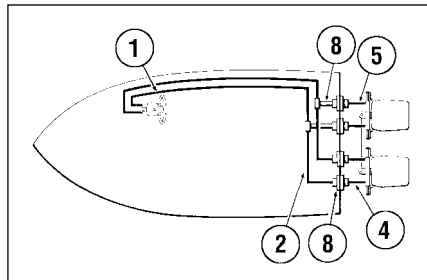
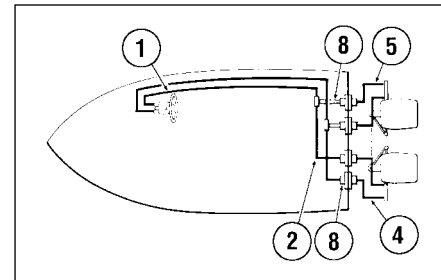


Figure I: HC5370
Dual Side Mount Cylinders
c/w bulkhead fittings



ITEM	PART #	QTY	DESCRIPTION
1	H051__	1	Hose Kit
2	H051__	1	Hose Kit
3	H051__	1	Hose Kit
4	H051__	2	Hose Kit
5	H051__	2	Hose Kit
6	HF5530	1	Tee Fitting (3 per Kit)

ITEM	PART #	QTY	DESCRIPTION
7			Bulkhead Fitting Kit (2 fittings per Kit)
	HF5512	1	3/4" Thick Bulkhead
	HF5513	1	3" Thick Bulkhead
8			Bulkhead Fitting Kit (4 fittings per Kit)
	HF5514	1	3/4" Thick Bulkhead
	HF5515	1	3" Thick Bulkhead

Additional Station

Additional Steering Station or Autopilot Power pack

- 1) Determine the location of the 2nd station or power pack.
- 2) Measure along the intended path of the hose routing from the upper helm pump to the 2nd station or autopilot power pack.
- 3) Round up the measurement to the next even digit. This is the length of hose kit required.
- 4) Order hose kit(s) part number H051_ _ the last two digits correspond to the length of hose.

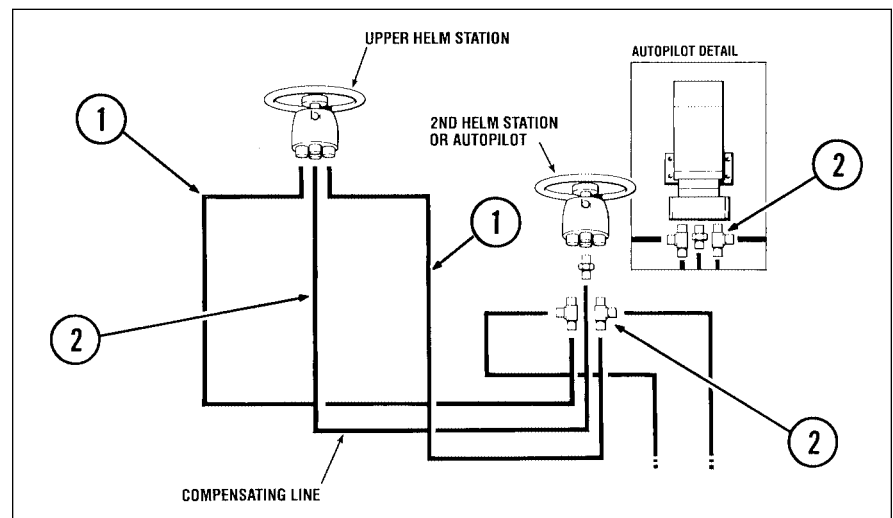
Note:

- a) **All hoses should be routed with a gradual rise so that air will not be trapped in the lower station.**
- b) Some installations require more than 1 hose kit and additional fitting kits.
- c) Minimum bend radius for outboard hose is 2-1/2" (6 cm).
- d) A compensating line is required between helm stations or the helm and autopilot power pack.

Figure J

2nd Steering Station or Autopilot Power Pack Installation

⚠ WARNING
DO NOT CUT HYDRAULIC HOSE.



Parts list

For Figure J

ITEM #	DESCRIPTION	PART NUMBER	QUANTITY REQUIRED	REF PAGE #
1	HOSE KIT	H051_ _	1	
2	FITTING KIT*	HF5501	1	42

* Includes 3/8" dia. Nylon tube for compensating line

SEASTAR INBOARD/STERNDRIVE TUBING

Two types of tubing materials are available for plumbing Inboards and Sterndrives.

- 1) SeaStar 3/8" outside diameter nylon tubing
- 2) 3/8" outside diameter copper refrigeration tubing

Nylon Tubing

SeaStar 3/8" outside diameter nylon tubing is recommended for;

- a) Inboard,
- b) Sterndrive, and
- c) Seadrive steering systems with SeaStar I (1.7 cubic inch/rev displacement) helms only.

SeaStar 3/8" outside diameter nylon tubing is available in the following lengths:

LENGTH FEET	(METERS)	TUBING PART #S
25'	(7.6m)	HT5092
50'	(15.2m)	HT5095
75'	(22.8m)	HT5097
100'	(30.5m)	HT5100
1000'	(305.0m)	HT5101

NOTICE

SeaStar 3/8" nylon tubing is not recommended for use in systems with SeaStar II helms or SeaStar HP helms. It is also not recommended for use in SeaStar I systems where the total tubing run exceeds 100 feet. In these cases outboard hose or 3/8" dia. copper tubing must be used.

Copper Tubing

3/8" outside diameter copper tubing is recommended for;

- a) inboard,
- b) sterndrive, and
- c) seadrive steering systems with SeaStar II (2.4 cubic inch/rev displacement) helms only, or where the length of tubing run exceeds 100 feet (30.5m).

Additional SeaStar hose kit part number HF5508 is required to connect the tubing to the cylinder.

3/8" copper tubing should be obtained through a local vendor based on the following tubing specifications.

Specification for copper tubing:

Annealed Copper Refrigeration Tubing
0.032 wall thickness
3/8" outside diameter

To determine the required length of tubing for single and dual configurations:

From the illustrations (figures A through E), select the situation which best suits your application and note;

- a) the type of drive system, and
- b) the number of steering stations.

Single Station

- 1) From the illustration which best suits your application note the number of lengths of tubing and fitting kits required.
- 2) Measure along the intended path of tube routing for each of the tubing runs.
- 3) Determine if 3/8" nylon tube can be used or if copper tubing is required based on lengths of tubing runs required.
- 4) Total up the entire length of tubing required and round up to the next available tube kit length.

Figure A

Single Inboard Cylinder
 - fittings required supplied with helm and cylinder

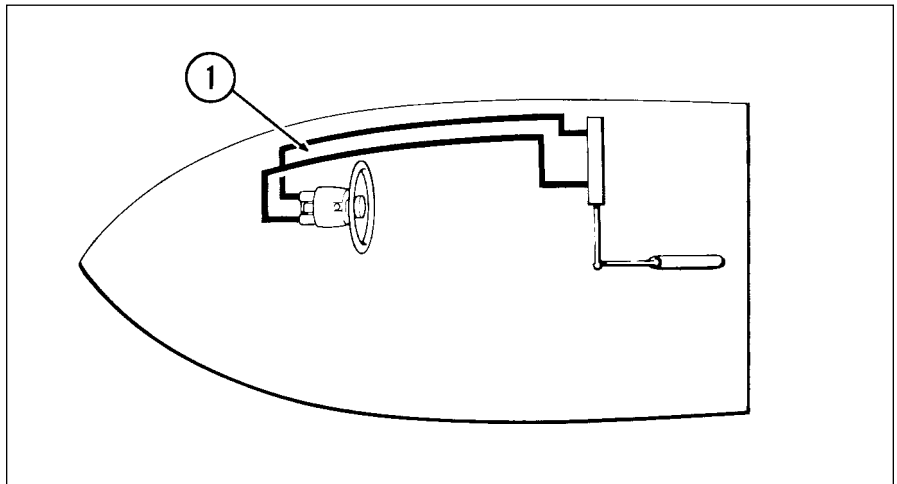
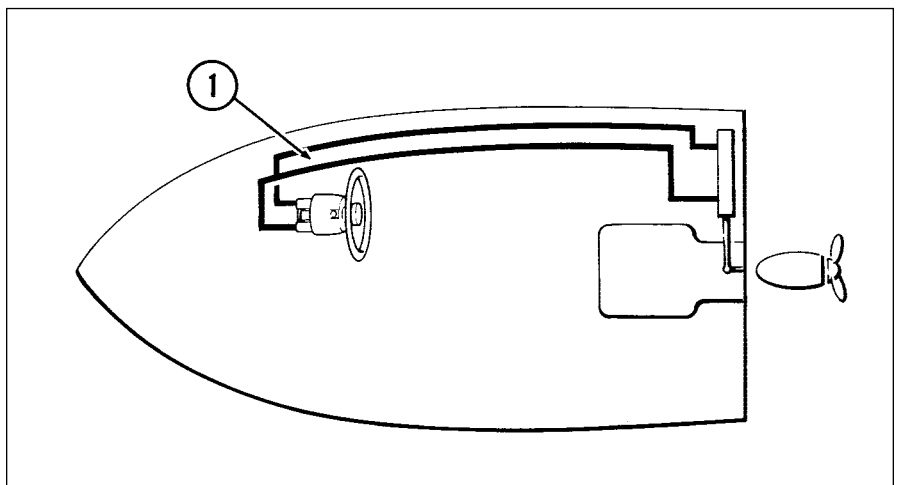


Figure B

Single Sterndrive Cylinder
 - fittings required supplied with helm and cylinder



Parts list

For Figures A, B

ITEM #	DESCRIPTION	PART NUMBER	QUANTITY REQUIRED
1	3/8" DIA NYLON OR COPPER TUBE		AS MEASURED

ADDITIONAL SEASTAR STEERING STATION OR AUTOPILOT KIT

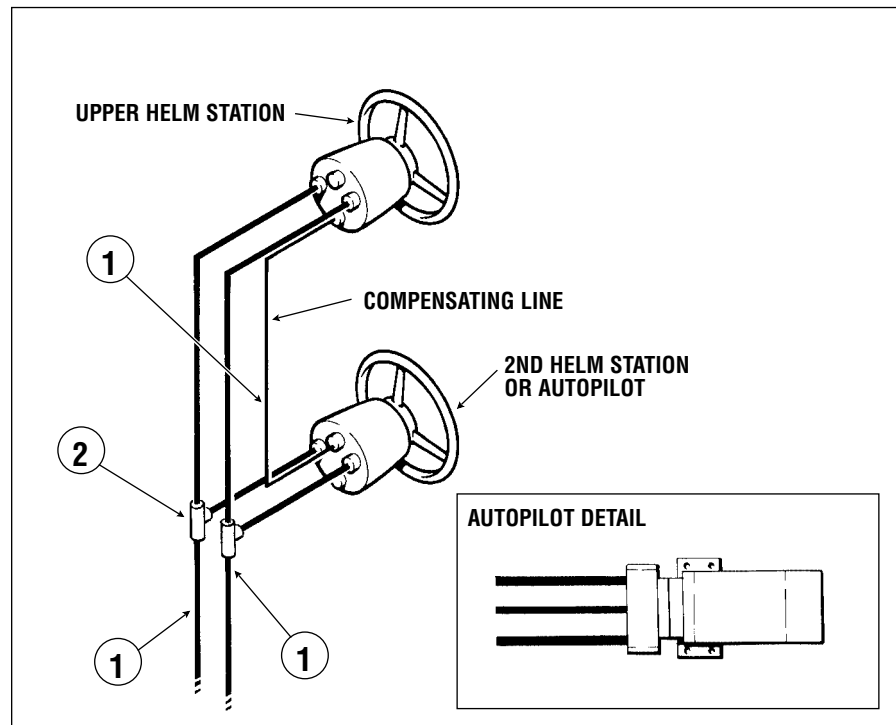
- 1) Refer to illustration Figure E.
- 2) Determine the location of the second station or autopilot power pack.
- 3) Measure along the path of the tube routing from the upper helm pump to the second station or autopilot power pack. Multiply this length by three for the amount of tubing required.
- 4) Select the tubing kit based on the total system tubing requirement.

Figure E

2nd Steering Station or Autopilot

NOTICE

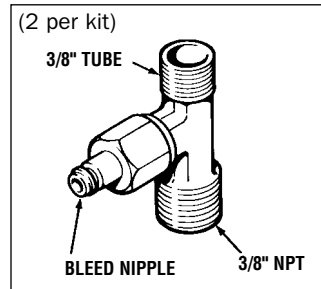
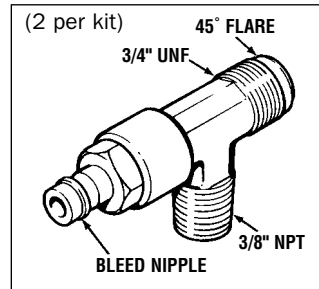
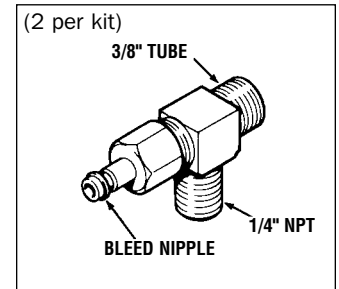
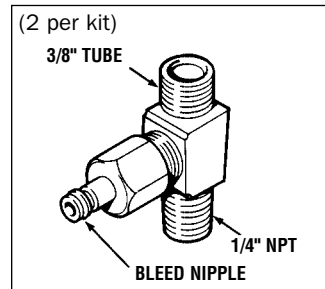
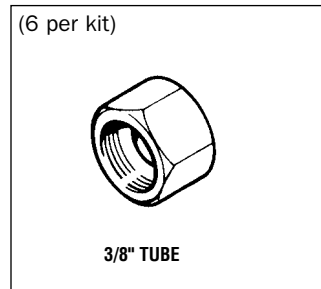
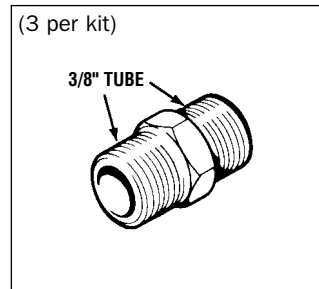
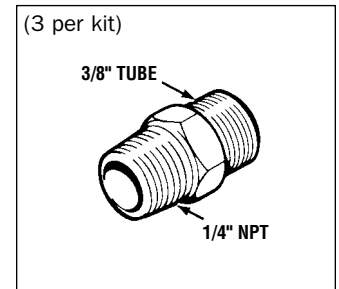
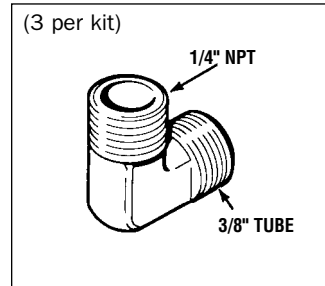
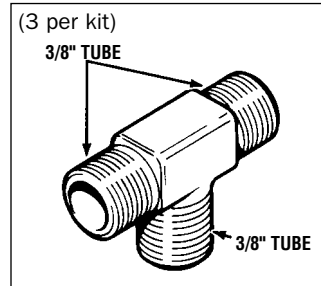
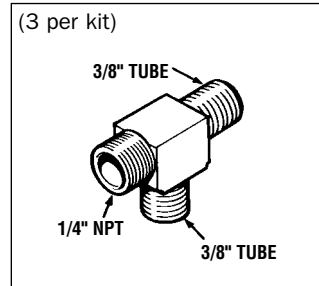
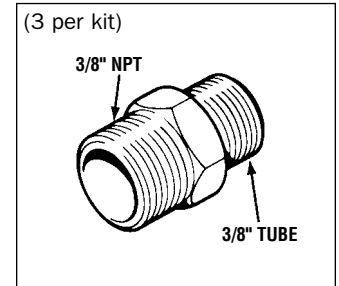
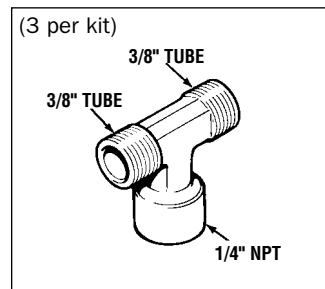
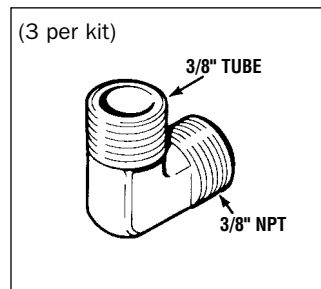
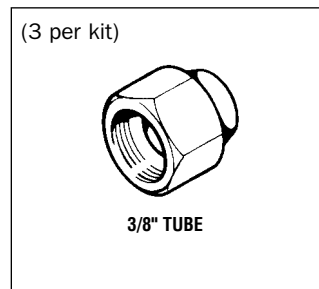
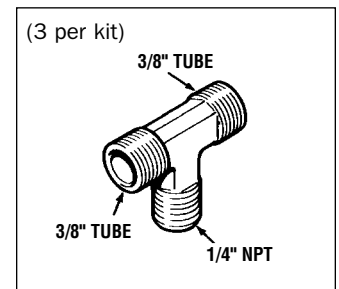
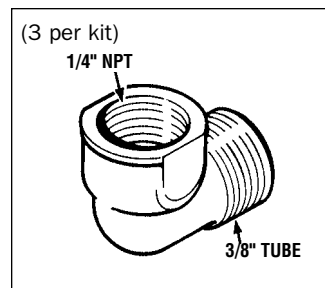
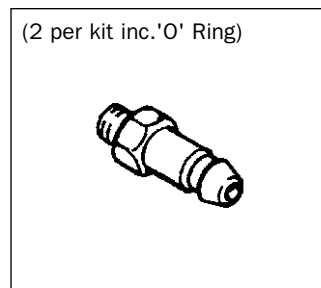
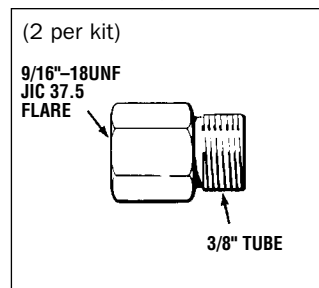
- a) A compensating line is required between helm stations or the helm and autopilot power pack.
- b) All hoses should be routed with a gradual rise (particularly the compensating line) so that air will not be trapped in the lower helm station.
- c) The second helm station or autopilot power pack may be connected at any location between the upper helm station and the cylinder. For existing single station installations the nylon or copper tubing may be cut and the tee fittings installed at any convenient location.



ITEM #	DESCRIPTION	PART NUMBER	QUANTITY REQUIRED	REF PAGE #
1	3/8" DIA NYLON OR COPPER TUBE	HT5_ _ _	AS MEASURED	43
2	FITTING KIT	HF5502	1	

FITTINGS

All SeaStar Manual Hydraulic steering systems utilize the same style of fittings for all applications. These are 3/8" compression fittings which utilize a 9/16"-24 extra fine thread. Refer to page 6-1.

HF5518 Vertical Bleeder Tee

HF5519 Bleed Tee (TM Cylinders)

HF5520 Horiz. Bleeder Tee

HF5521 Vertical Bleeder Tee

HF5526 Tube Nut

HF5527 Union Coupling Fitting

HF5528 Straight Fitting

HF5529 Elbow Fitting

HF5530 Tee Fitting

HF5531 Tee Fitting

HF5532 Connector Fitting

HF5533 Tee Fitting

HF5534 Elbow Fitting

HF5524 Cap Plug Nut

HF5536 Tee Fitting

HF5538 Street Elbow

HF5548 Bleed Nipple

HF5566 Adapter Fitting


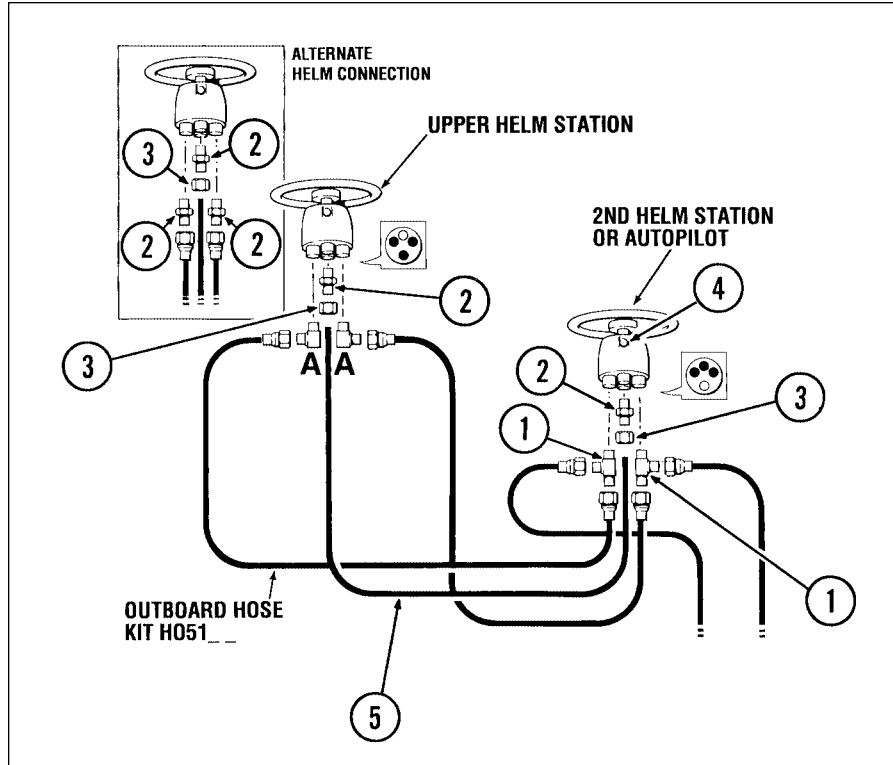
HF5501

Application

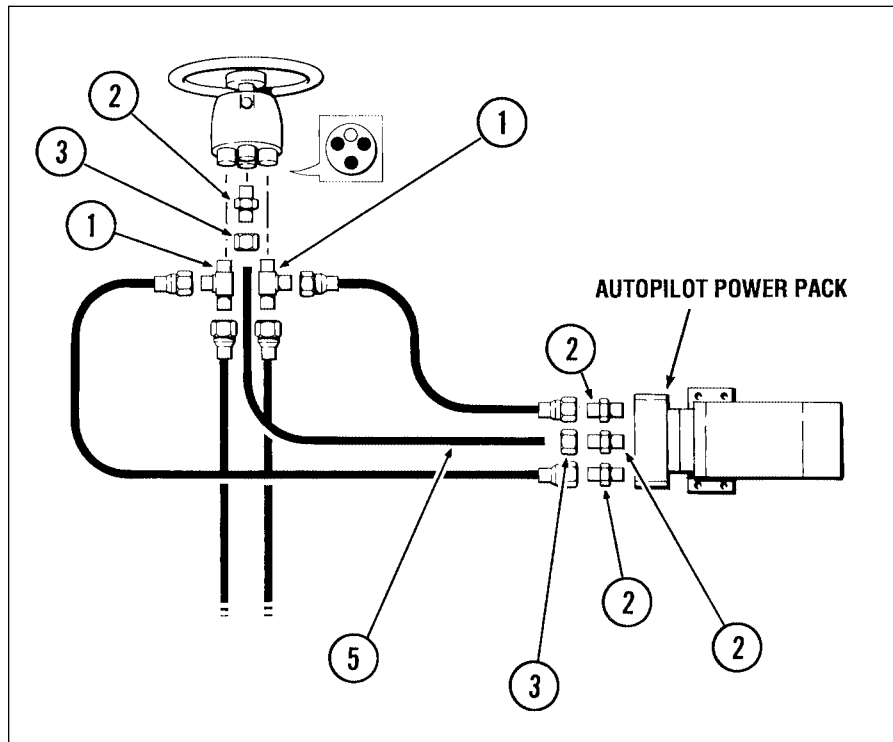
Fitting kit to add a 2nd station or autopilot to an outboard system.

ITEM NO.	DESCRIPTION	QUANTITY PER KIT	PART NO.
1	Tee Fitting 1 End - 3/8" NPT (M) 1 End - 1/4" NPT (M) Center - 3/8" Tube (M)	2	600603
2	Connector Fitting 3/8" Tube (M) - 1/4" NPT (M)	4	600602
3	Tube Nut - 3/8" Dia.	4	280327
4	Non-Vented Filler Plug	1	HA5432
5	SeaStar Nylon Tube 3/8" Dia.	25ft	HT5092
A*	Elbow 3/8" Tube (M) - 1/4" NPT (M)	2	

* SUPPLIED WITH HELM PUMP
NOTE: USED IN SYSTEMS PLUMBED WITH
OUTBOARD HOSE



Autopilot powerpack connection



HF5502

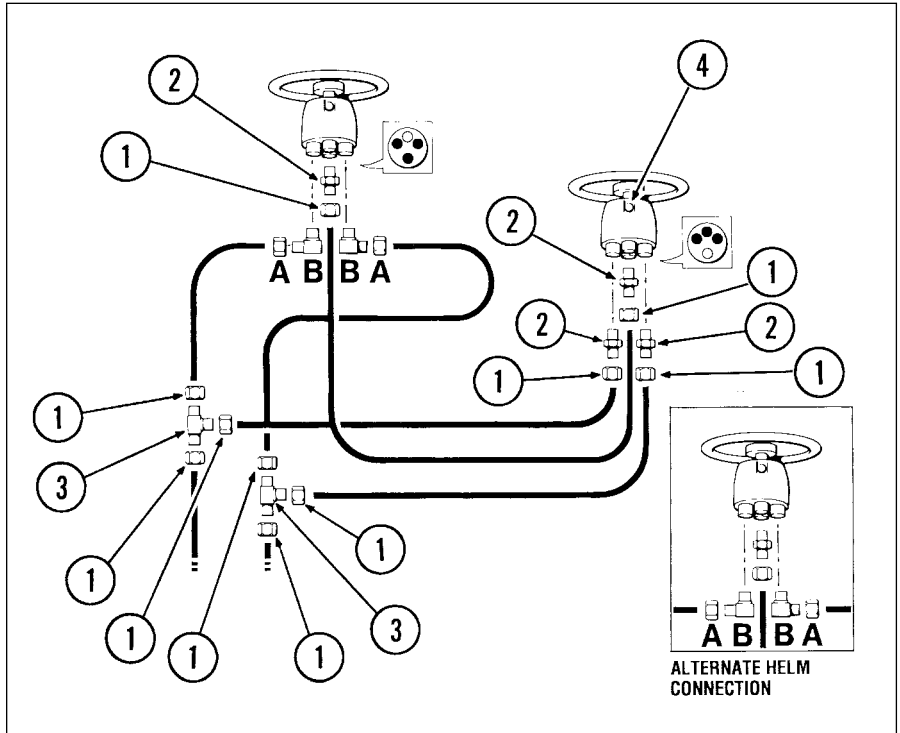
Application

Fitting kit to add a 2nd station or autopilot to an inboard or sterndrive system

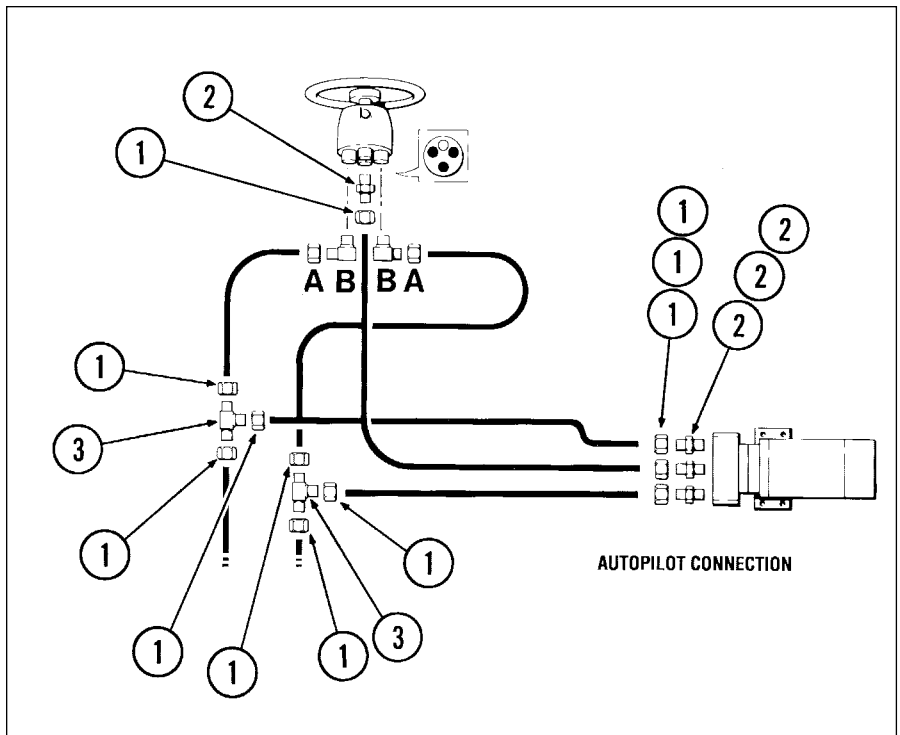
ITEM NO.	DESCRIPTION	QUANTITY PER KIT	PART NO.
1	Tube Nut – 3/8" Dia.	10	280327
2	Connector Fitting 3/8" Tube (M) – 1/4" NPT (M)	4	600602
3	Tee Fitting 3 Ends – 3/8" Tube	2	600605
4	Non-Vented Filler Plug	1	HA5432
A*	Tube Nut – 3/8" +Dia.	2	
B*	3/8" Elbow 1/4" NPT (M)	2	

* SUPPLIED WITH HELM

NOTE: USED IN SYSTEMS PLUMBED WITH 3/8" DIAMETER NYLON OR COPPER TUBE



Autopilot powerpack connection

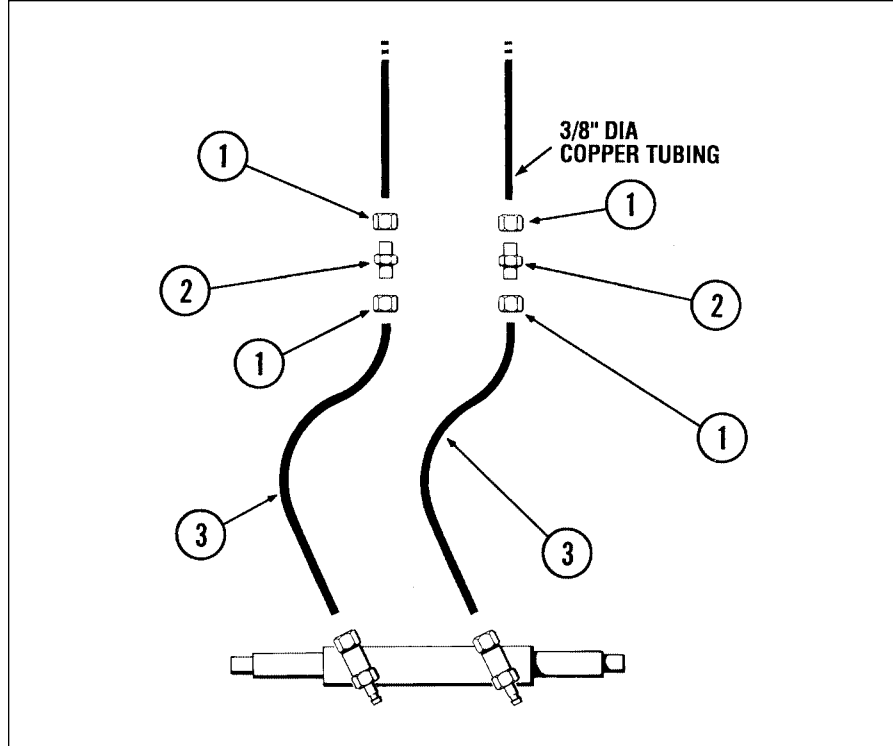


HF5507

Application

Kit to connect 3/8" diameter copper tubing to SeaStar cylinders (using 3/8" diameter nylon tubing)

ITEM NO.	DESCRIPTION	QUANTITY PER KIT	PART NO.
1	Tube Nut – 3/8" Dia.	10	280327
2	Connector Fitting 3/8" Tube (M) – 3/8" Tube (M)	2	280929
3	Nylon Tubing 3/8" Dia.	6ft	795628

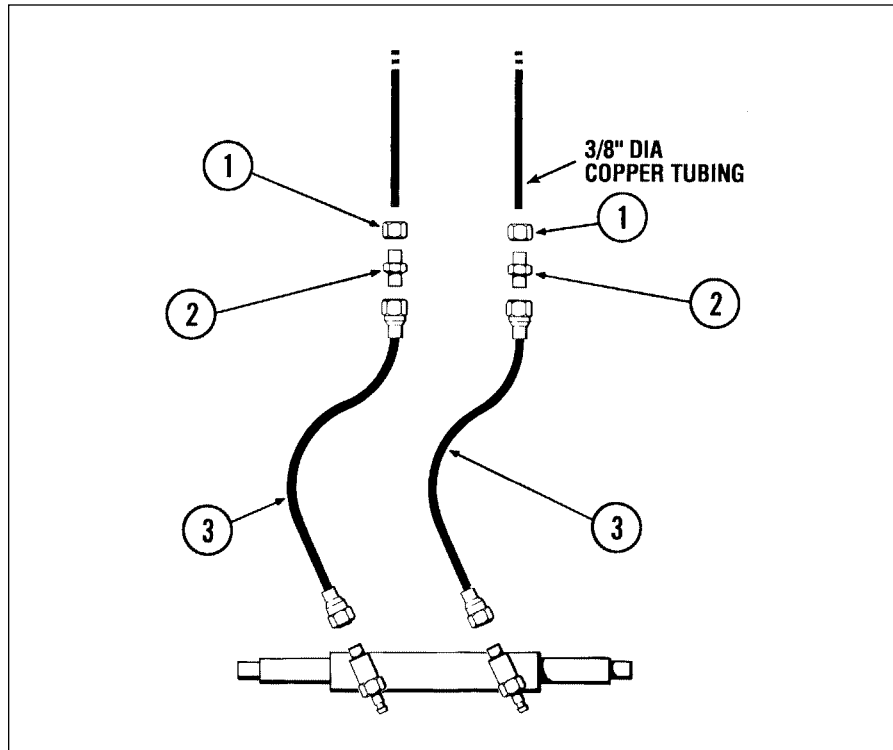


HF5508

Application

Kit to connect 3/8" diameter copper tubing to SeaStar cylinders (using SeaStar outboard hose)

ITEM NO.	DESCRIPTION	QUANTITY PER KIT	PART NO.
1	Tube Nut – 3/8" Dia.	10	280327
2	Connector Fitting 3/8" Tube (M) – 3/8" Tube (M)	2	280929
3	18" Hose c/w Fittings	2	338621



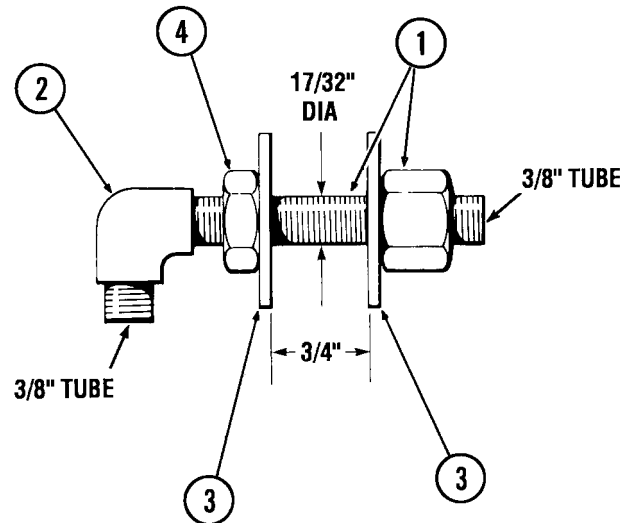
HF5512

3/4" bulkhead fitting kit

Application: Single cylinder installations

2 Assemblies per kit

ITEM NO.	DESCRIPTION	QUANTITY PER KIT	PART NO.
1	Connector Fitting and Nipple	2	286323
		2	286521
2	Street Elbow 3/8" Tube (M) – 1/4" NPT(F)	2	600606
3	Washer	4	202224
4	Nut	4	191621



2 OF EACH ILLUSTRATED INCLUDED IN KIT

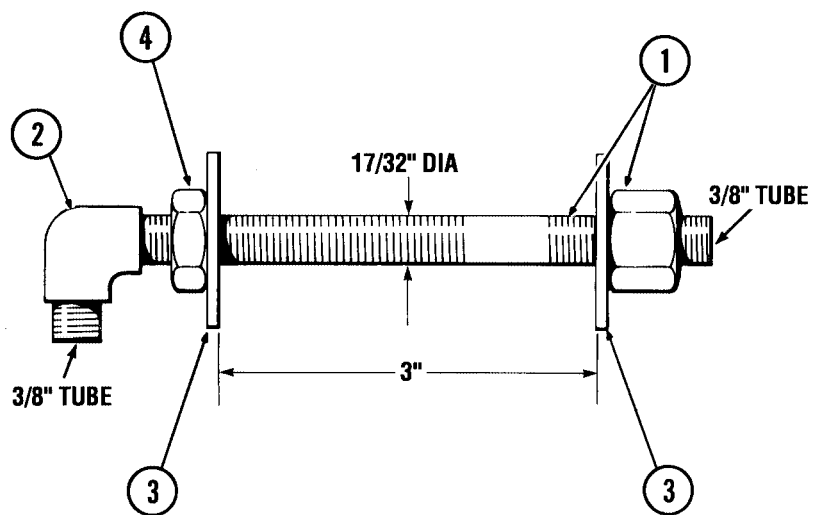
HF5513

3" bulkhead fitting kit

Application: Single cylinder installations

2 Assemblies per kit

ITEM NO.	DESCRIPTION	QUANTITY PER KIT	PART NO.
1	Connector Fitting and Nipple	2	600608
		2	286521
2	Street Elbow 3/8" Tube (M) – 1/4" NPT(F)	2	600606
3	Washer	4	202224
4	Nut	4	191621



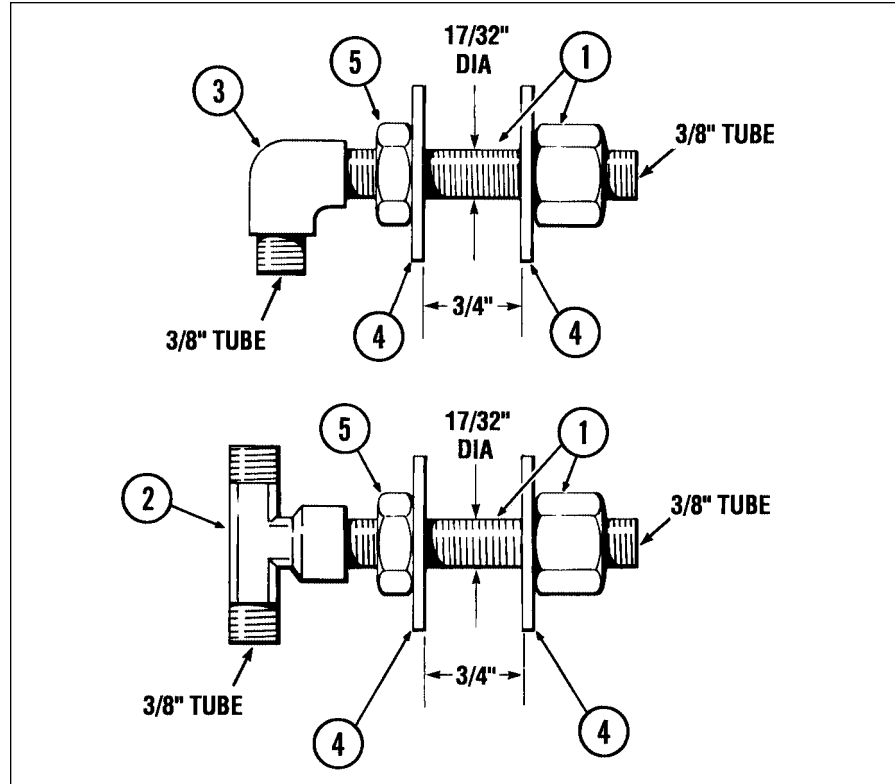
2 OF EACH ILLUSTRATED INCLUDED IN KIT

HF5514

3/4" bulkhead fitting kit
Application: Dual cylinder installations

ITEM NO.	DESCRIPTION	QUANTITY PER KIT	PART NO.
1	Connector Fitting and Nipple	4	286323
		4	286521
2	Tee Fitting 2 Ends - 3/8" Tube (M) Center - 1/4" NPT (F)	2	284826
3	Street Elbow 3/8" Tube (M) - 1/4" NPT (F)	2	600606
4	Washer	8	202224
5	Nut	4	191621

2 OF EACH ILLUSTRATED INCLUDED IN KIT

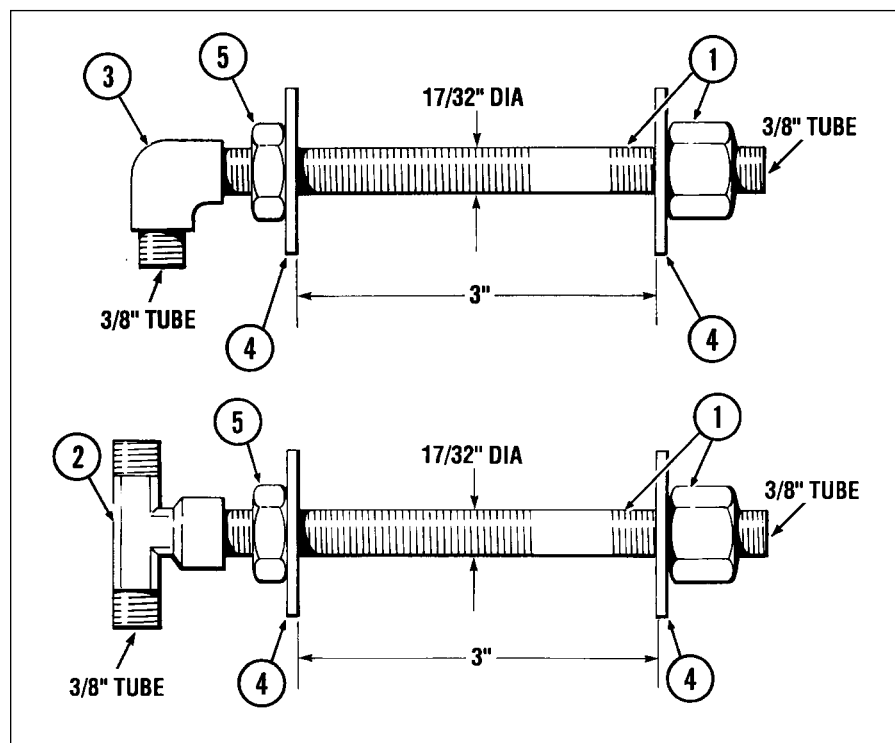


HF5515

3" bulkhead fitting kit
Application: Dual cylinder installations

ITEM NO.	DESCRIPTION	QUANTITY PER KIT	PART NO.
1	Connector Fitting and Nipple	4	286323
		4	286427
2	Tee Fitting 2 Ends - 3/8" Tube (M) Center - 1/4" NPT (F)	2	284826
3	Street Elbow 3/8" Tube (M) - 1/4" NPT (F)	2	600606
4	Washer	8	202224
5	Nut	4	191621

2 OF EACH ILLUSTRATED INCLUDED IN KIT

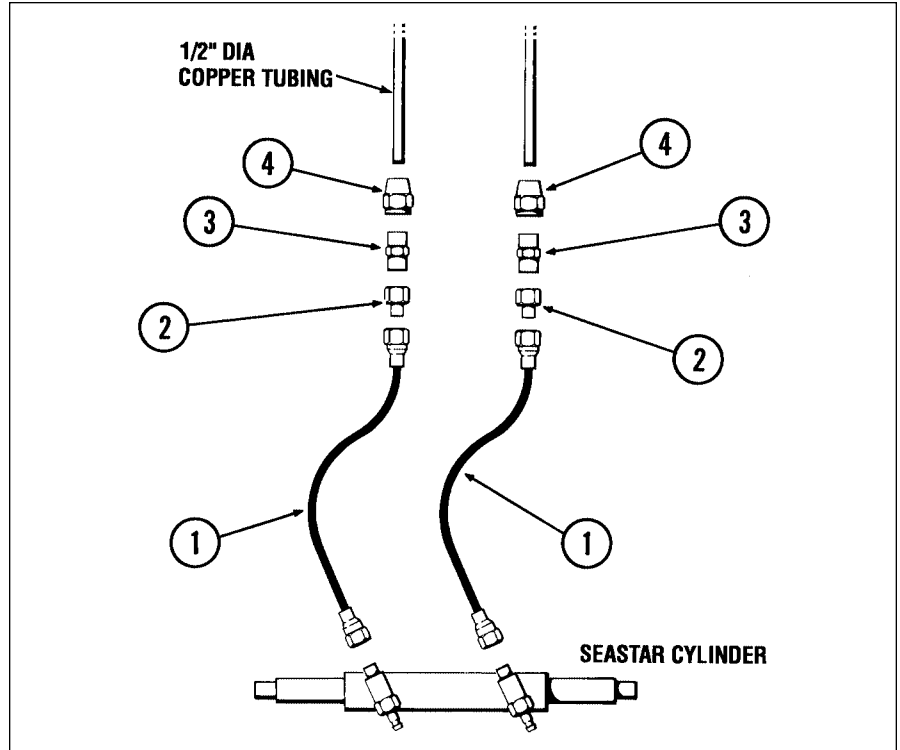


HF5568

Application

Kit to connect 1/2" diameter copper tubing to SeaStar cylinders

ITEM NO.	DESCRIPTION	QUANTITY PER KIT	PART NO.
1	18" Hose Kit	2	338621
2	Connector Fitting 3/8" NPT(F) – 3/8" Tube (M)	2	653624
3	Connector Fitting 1 End – 3/8" NPT(M) 1 End – 1/2" Dia. 45° Flare	2	555421
4	Tube Nut 1/2" Dia. Flare	2	555027

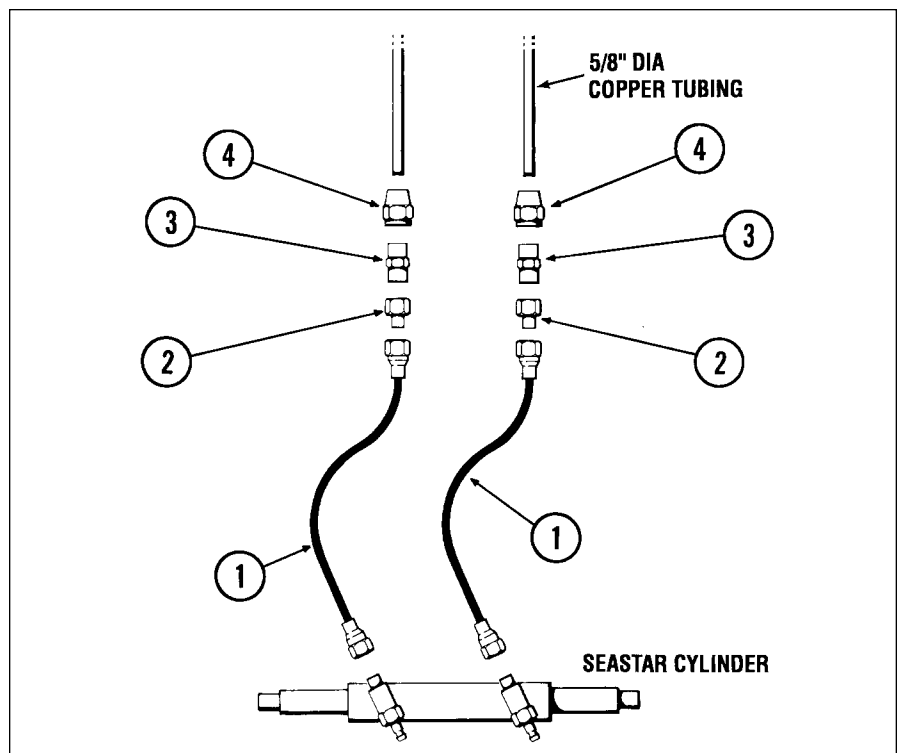


HF5569

Application

Kit to connect 5/8" diameter copper tubing to SeaStar cylinders

ITEM NO.	DESCRIPTION	QUANTITY PER KIT	PART NO.
1	18" Hose Kit	2	338621
2	Connector Fitting 3/8" NPT(F) – 3/8" Tube (M)	2	653624
3	Connector Fitting 1 End – 3/8" NPT(M) 1 End – 5/8" Dia. 45° Flare	2	288028
4	Tube Nut 5/8" Dia. Flare	2	555121

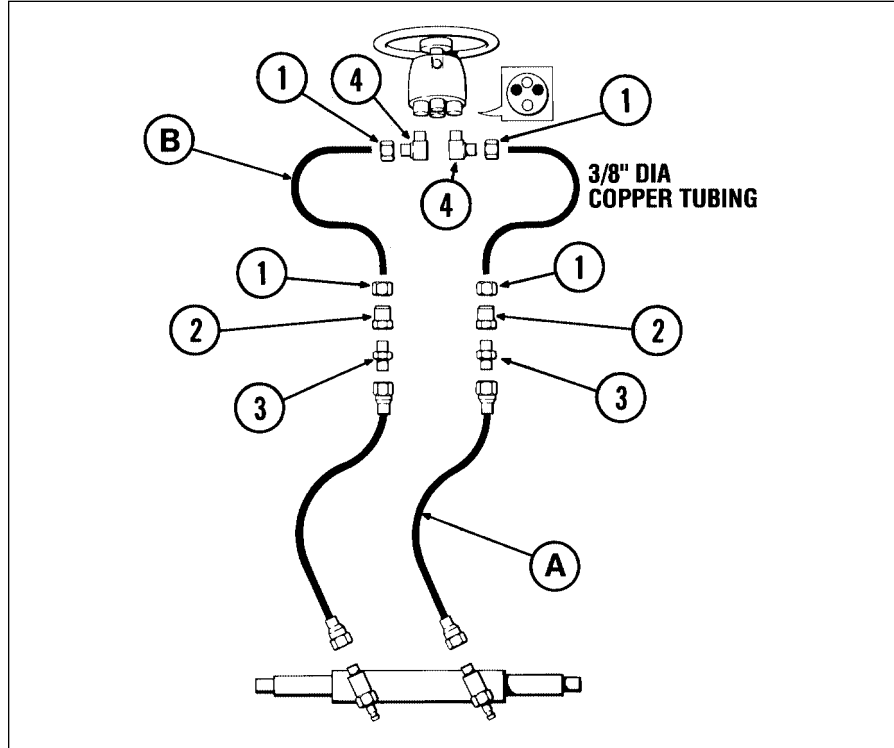


HF5581

Application
45° flare fitting connection kit
for SeaStar systems

ITEM NO.	DESCRIPTION	QUANTITY PER KIT	PART NO.
1	Tube Nut 3/8" Dia. 45° Flare	4	653022
2	Connector Fitting 1 End - 3/8" Dia. 45° Flare (M) 1 End - 3/8" NPT (F)	2	653126
3	Connector Fitting 3/8" Tube (M) - 3/8" NPT (F)	2	600602
4	Elbow 1 End - 1/4" NPT (M) 1 End - 3/8" Dia. 45° Flare (M)	2	288526
A*	Outboard Hose Kit		H051__
B*	Copper Tube 3/8" Dia.		

* NOT SUPPLIED WITH FITTING KIT



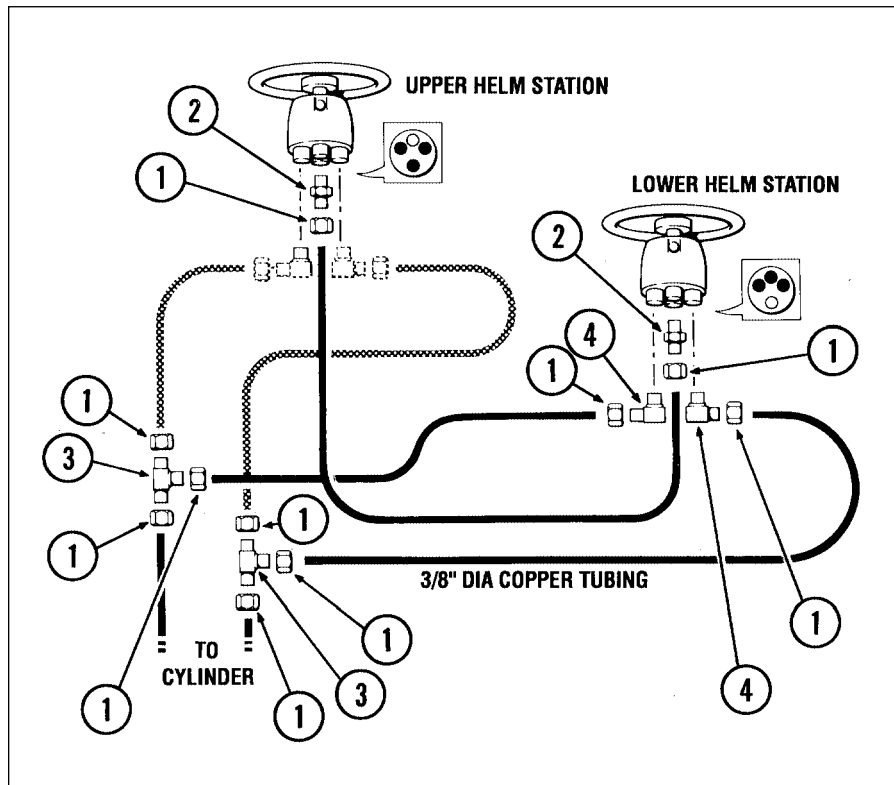
HF5582

Application
Add a station or autopilot kit
using 3/8" 45° flare fittings

ITEM NO.	DESCRIPTION	QUANTITY PER KIT	PART NO.
1	Tube Nut 3/8" Dia. 45° Flare	10	653022
2	Connector Fitting 1 End - 3/8" Dia. 45° Flare (M) 1 End - 1/4" NPT (M)	2	653323
3	Tee Fitting Both Ends - 3/8" Dia. 45° Flare (M)	2	653220
4	Elbow 1 End - 1/4" NPT (M) 1 End - 3/8" Dia. 45° Flare (M)	2	288526

NOTICE

Fittings for port and starboard lines in upper station not included.



SEASTAR LIQUID TIE BAR ALIGNMENT VALVE Part# HA5471

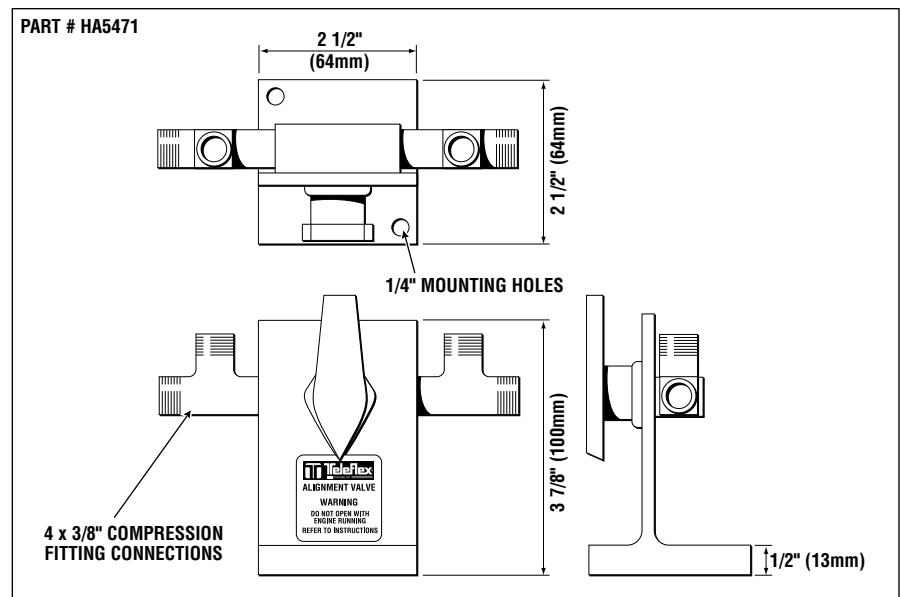
General

The Cylinder Alignment Valve (part# HA5471) will allow for the periodic required realignment of two outboard motors or rudders that are not linked together with a mechanical tie bar.

A standard helm and SeaStar hoses may be used on vessels not exceeding speeds of 55 mph.

For vessels exceeding speeds of 55 mph a SeaStar Pro helm and Pro hoses must be used.

CAUTION
Side mount cylinders, such as SeaStar cylinder HC5370 can only be used with the valve by re-orienting the port engine tilt tube, to allow for mounting cylinder on the port (left) side of the port engine. Cylinder rods must face each other.



WARNING

The use of a standard helm under high speed (55mph +) and a high load, ie: full throttle forward/reverse, may cause a vacuum in the liquid tie bar and cause engine/rudders to misalign, resulting in momentary loss of steering control. This will be less likely to occur if a SeaStar pro Helm Pump is used.

Catamaran Bleeding Instructions

WARNING
Do Not open bleed screw with engines/boat running. Loss of steering will result.

CAUTION

Referencing the cylinder alignment valve installation schematic.

- Fill helm with oil and attach filler device/container to helm
- Open valve
- Open bleed fitting no. 1 and pull cylinder shaft all the way out on fitting no. 1 side of cylinder
- Turn steering wheel clockwise until an air free stream of oil comes from bleed fitting no. 1

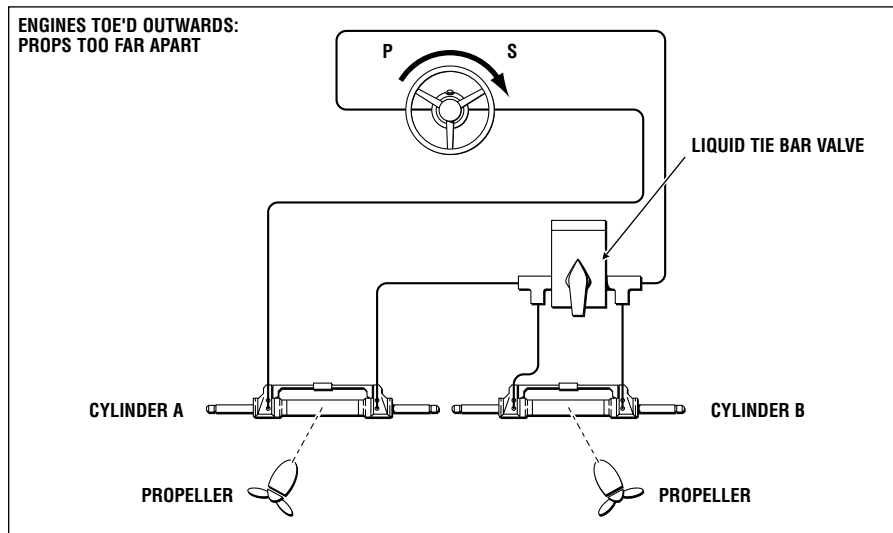
DO NOT ALLOW SHAFT TO MOVE BACK INTO CYLINDER. DO NOT USE A WRENCH TO HOLD SHAFT.

- Close bleed fitting no. 1
- Open bleed fitting no. 2 and pull cylinder shaft all the way out on fitting no. 2 side of cylinder

- Turn steering wheel counter-clockwise until an air free stream of oil comes from bleed fitting no. 2, then close bleed fitting no. 2
- Open bleed fitting no. 3 and pull cylinder shaft all the way out on fitting no. 3 side of cylinder
- Turn steering wheel counter-clockwise until an air free stream of oil comes from bleed fitting no. 3, then close bleed fitting no. 3
- Open bleed fitting no. 4 and pull cylinder shaft all the way out on fitting no. 4 side of cylinder
- Turn steering wheel counter-clockwise until an air free stream of oil comes from bleed fitting no. 4, then close bleed fitting no. 4
- Turn steering wheel back and forth from hardover to hardover a couple of times. Align cylinders by pulling cylinder rod all the way out on the same side of each cylinder and close valve

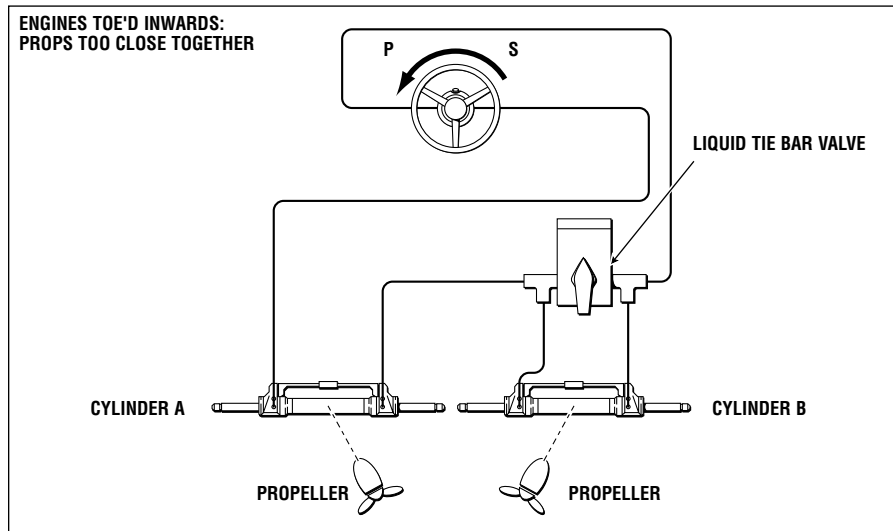
Realignment Instructions

- 1 Turn the wheel hard over to Starboard. (Both cylinders move; cylinder B reaches hard over first)
- 2 Open the valve
- 3 Continue to turn the wheel hard over to Starboard. (Only cylinder A moves and reaches hard over)
- 4 Close the valve

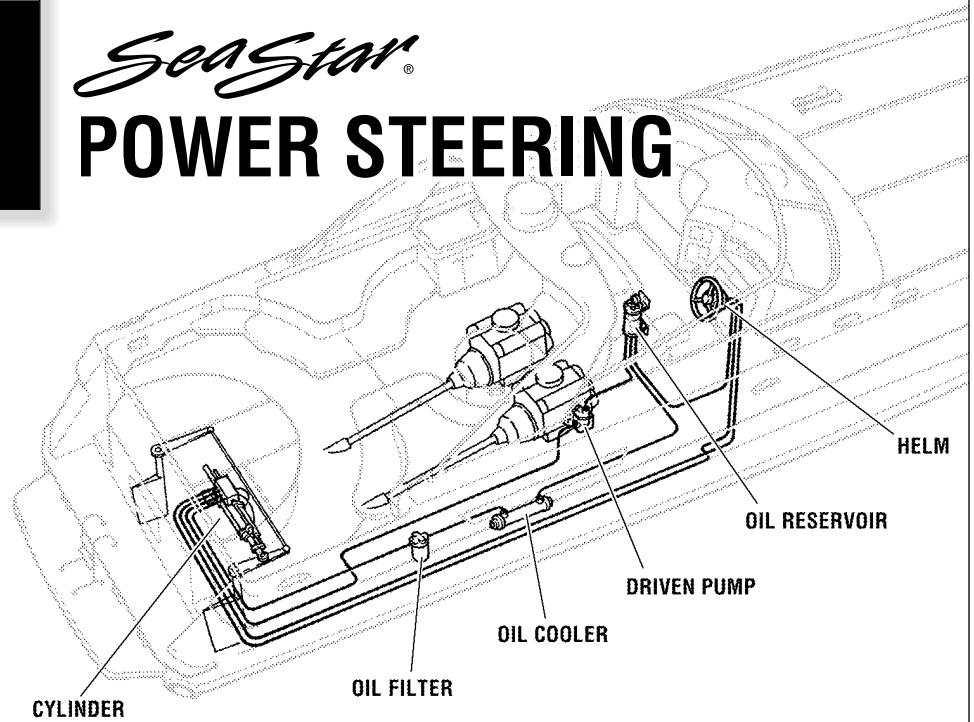


Realignment Instructions

- 1 Turn the wheel hard over to Port. (Both cylinders move; cylinder B reaches hard over first)
- 2 Open the valve
- 3 Continue to turn the wheel hard over to Port. (Only cylinder A moves and reaches hard over)
- 4 Close the valve



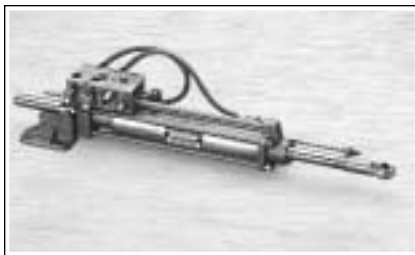
SeaStar® POWER STEERING



Features:

- Effortless steering from docking to top speed
- Responsive steering 3-1/2, turns lock to lock (or to suit)
- Automatic manual back up steering
- Simplified installation
- Multiple steering stations
- Easy autopilot interface

How it works:



SeaStar hydraulic power steering uses the ship's engine(s) to provide the "power" for the steering system, via an engine or electric motor driven hydraulic pump.

A manual hydraulic steering system, consisting of a standard SeaStar helm and a hydraulic steering cylinder, (fitted with an integral servo cylinder and a power steering valve) supplies the "control" portion of the steering system.

Under normal conditions, with engines running, a hydraulic oil supply is in a stand-by mode, ready to be directed to the steering cylinder as dictated by the steering wheel, servo cylinder and power steering valve. Turning the steering wheel left or right makes the system go from stand-by into operating mode and move the steering cylinder accordingly.

In the event of a power source failure, hydraulic oil, from the steering helm, is automatically diverted directly into the servo and steering cylinder, providing the helmsman with manual back-up steering.

An engine room mounted oil reservoir allows easy system fill and assists the in-line oil cooler in cooling the hydraulic oil. An in-line oil filter helps to protect the steering system components against contaminants.

Hose, Tube and Hydraulic Fluid:

Recommend 100R1 for power circuit, 5/16"ID hose or tube for manual circuit.
*If using 1/4"ID tube, runs should be short and SeaStar oil must be used.

System designed to use SeaStar oil (Mil spec H5606) or Dexron II (ATF) if using 1250V or 1275V helms.

Cylinder Seleccion Guide:

* All boats over 70' should have steering loads reviewed by factory.

CYLINDER PART NUMBER	DISPLACEMENT HULLS (standard)	DISPLACEMENT HULLS (heavy duty)	PLANING HULLS
SINGLE 9" x 1 CYLINDER (HC5801)	UP TO50' (15m)	UP TO40' (12m)	UP TO65' (20m)
SINGLE 11" x 1 CYLINDER (HC5803)	UP TO60' (18m)	UP TO50' (15m)	UP TO75' (23m)
TWIN 9" x 2 CYLINDER (HC5802)	UP TO75' (22m)	UP TO55' (17m)	UP TO85' (26m)
TWIN 11" x 2 CYLINDER (HC5804)	UP TO85' (26m)	UP TO60' (18m)	UP TO100' (31m)

Technical Data:

CYLINDER PART NUMBER	DISPLACEMENT	BORE	STROKE	OUTPUT FORCE	MAX. TORQUE (35° from centre)
SINGLE 9" x 1 CYLINDER (HC5801)	21.25 in ³ (348cc)	2" (51mm)	9" (229mm)	2946 lbs _f (13,090 N)	18,900 in-lbs (2130 Nm)
SINGLE 11" x 1 CYLINDER (HC5803)	26.00 in ³ (426cc)	2" (51mm)	11" (280mm)	2946 lbs _f (13,090 N)	23,140 in-lbs (2610 Nm)
TWIN 9" x 2 CYLINDER (HC5802)	42.50 in ³ (697cc)	2" (51mm)	9" (229mm)	5892 lbs _f (26,190 N)	37,800 in-lbs (4260 Nm)
TWIN 11" x 2 CYLINDER (HC5804)	52.00 in ³ (853cc)	2" (51mm)	11" (280mm)	5892 lbs _f (26,190 N)	46,280 in-lbs (5220 Nm)

Basic System Selection Guide:

Power Steering Cylinders

Part #

9" (228mm) Stroke, for vessels under 75' (22m)HC5801

11" (279mm) Stroke, for vessels over 75' (22m)HC5803

9" (228mm) Stroke, additional cylinder optionHC5802

11" (279mm) Stroke, additional cylinder optionHC5804

Steering Helms (For 3-1/2 Turn System)

SSI Helm, Standard MountHH5271

SSI Helm, Rear MountHH5261

SSI Helm, TiltHH5741

SSI Helm, Rear Mount, 1" ShaftHH5281

Power Steering Pumps

Part #

Outlet Check Power PumpHP5820

Press Relief Twin PumpHP5822

Belt Drive, Right Rotation (Universal)HP5830

Belt Drive, Left Rotation (Universal)HP5831

Direct Drive, Right Rotation (for Detroit Diesel)HP5832

Direct Drive, Right Rotation (for Caterpillar – special order)HP5833

Direct Drive, Right Rotation (Spline)HP5833

Direct Drive, Right Rotation (2 GPM)HP5834

Direct Drive, (for Twin Disk)HP5835

Oil Reservoir, Cooler & Filter

Part #

Oil ReservoirHP5810

Oil Cooler, 2.25 Kw, 1" water linesHP5825

Oil Cooler, 6.25 Kw, 2" water linesHP5826

Oil FilterHP5815

Miscellaneous

Outlet Check Valve (Power Pump)HP5820

Auto Flow Control (Twin Pump)HP5821

Crossover Pressure ReliefHP5822

System Pressure Gauge KitHA5821

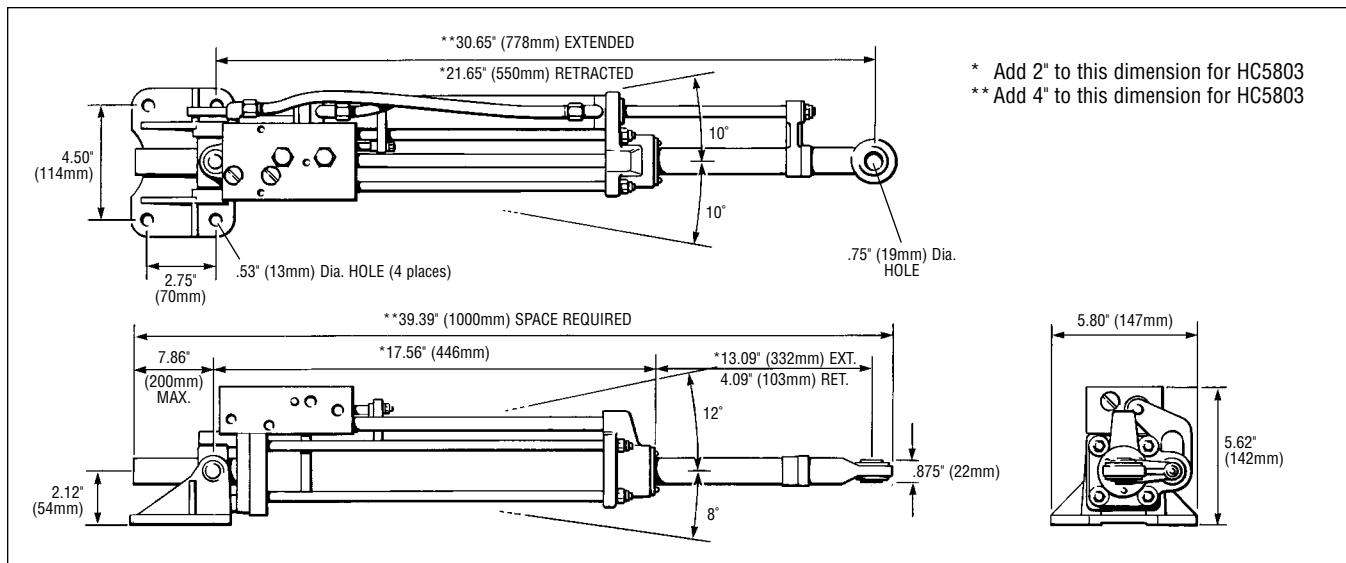
Adapter Kit, Twin Disk #5050HA5823

Adapter Kit, Twin Disk #5061HA5824

Adapter Kit, MAN to V10 PumpHA5827

SeaStar Oil, 1 literHA5430

SeaStar Oil, 4 literHA5440



SeaStar® HYDRAULIC FLUID

SeaStar hydraulic steering systems require the use of a special high quality hydraulic fluid meeting MIL SPEC H-5606 G. This fluid is available in 1 liter (33.8 US fluid ounce) bottles as:

SeaStar Hydraulic Fluid: **Part Number HA5430 - 1 Litre**
HA5440 - 4 Litres

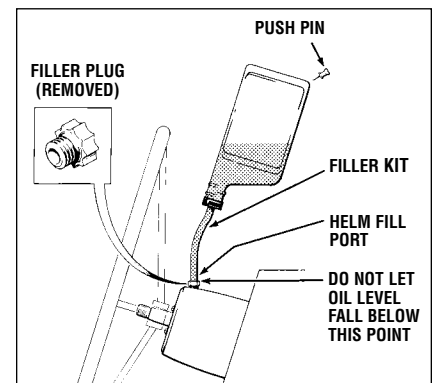


Alternate recommended hydraulic fluids for SeaStar steering systems.

Oil Manuf.	Brand Name
SeaStar	SeaStar oil part# HA5430
Shell	Aero Shell Fluid #4
Esso	Univis N15 or J13
Texaco	H015
Chevron	Aviation Hydraulic Fluid A
Mobil	Aero HFA
Petro Canada	Harmony HV115 (In Canada Only)

Optional Filler Kit

Part# HA5438



⚠ CAUTION

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

VOLUMES & CAPACITIES

NOTICE

Contact your nearest dealer or distributor to order replacement parts.

Pump Shaft Details:

Taper: 3/4" Standard Taper (1" PER FOOT), **Wheelshaft Threads:** 5/8" - 18 UNF,
Key: #606 Woodruff Key (3/16"), **PORT SIZES:** 1/4" NPT (F)

SeaStar Helm Pumps *Table A.*

HELM DESCRIPTION	PART NUMBER	DISPLACEMENT CU. IN./REV (cc)	RELIEF VALVE SETTING PSI (BAR)	MAXIMUM WHEEL DIA. INCHES (mm)	SEAL KIT	SHAFT SEAL
SEASTAR STANDARD FRONT MOUNT	HH5271	1.7 (27.8)	1000 (70)	26 (660)	HS5176*	225226*
SEASTAR 2 - STANDARD FRONT MOUNT	HH5272	2.4 (39.3)	1000 (70)	26 (660)	HS5176*	225226*
SEASTAR STANDARD FRONT MOUNT	HH5273	2.0 (33.0)	1000 (70)	26 (660)	HS5176*	225226*
SEASTAR REAR MOUNT	HH5260	1.4 (22.9)	1000 (70)	26 (660)	HS5176*	225226*
SEASTAR REAR MOUNT	HH5261	1.7 (27.8)	1000 (70)	26 (660)	HS5176*	225226*
SEASTAR 2 REAR MOUNT	HH5262	2.4 (39.3)	1000 (70)	26 (660)	HS5176*	225226*
SEASTAR STANDARD FRONT MOUNT PRO	HH5770	2.0 (33.0)	1500 (103)	26 (660)	HS5176*	225226*
SEASTAR 2 STANDARD FRONT MOUNT PRO	HH5772	2.4 (39.3)	1500 (103)	26 (660)	HS5176*	225226*
SEASTAR TRADITIONAL TILT PRO	HH5774	2.0 (33.0)	1500 (103)	20 (508)	HS5176*	225226*
SEASTAR SPORT TILT PRO	HH5290	2.0 (33.0)	1500 (103)	20 (508)	HS5176*	225226*
SEASTAR TRADITIONAL TILT	HH5741	1.7 (27.8)	1000 (70)	20 (508)	HS5176*	225226*
SEASTAR 2 TRADITIONAL TILT	HH5742	2.4 (39.3)	1000 (70)	20 (508)	HS5176*	225226*
SEASTAR SPORT TILT	HH5291	1.7 (27.8)	1000 (70)	26 (660)	HS5176*	225226*
SEASTAR 2 SPORT TILT	HH5292	2.4 (39.3)	1000 (70)	26 (660)	HS5176*	225226*

* SeaStar Helm Pumps manufactured from 1984 through 1990 require Seal Kit #HS5151 or individual shaft Seal #225320

SeaStar Cylinders *Table B.*

CYLINDER MODEL	PART NUMBER	BORE DIAMETER IN (mm)	NOMINAL SHAFT DIA IN (mm)	STROKE IN (mm)	SEAL KIT	VOLUME CUBIC IN (cc)	TORQUE (See Notice) IN-LB (KG-M)
BA135-7	HC5332	1.37 (34.9)	.625 (15.9)	7 (178)	HS5155	8.3 (135.2)	5741 (66.1)
BA125-7ATM	HC5312	1.25 (31.7)	.50 (12.7)	7 (178)	HS5154	7.2 (118.2)	5025 (57.9)
BA135-7ATM	HC5313	1.375 (34.9)	.625 (15.9)	7 (178)	HS5155	8.3 (135.2)	5741 (66.1)
BA150-7ATM	HC5314	1.50 (38.1)	.625 (15.9)	7 (178)	HS5156	10.2 (167.5)	7117 (82.0)
BA150-7TM	HC5318	1.50 (38.1)	.625 (15.9)	7 (178)	HS5182	10.2 (167.5)	7117 (82.0)
BA175-7TM	HC5319	1.75 (44.4)	.75 (19.0)	7 (178)	HS5183	13.7 (225.4)	9569 (110.2)
BA135-7EM	HC5332	1.375 (34.9)	.625 (15.9)	7 (178)	HS5155	8.3 (135.2)	5741 (66.1)
BA150-7EM	HC5326	1.50 (38.1)	.625 (15.9)	7 (178)	HS5156	10.2 (167.5)	8853 (102.0)
BA150-9TM	HC5369	1.50 (38.1)	.625 (15.9)	9 (229)	HS5182	13.1 (214.7)	9375 (107.7)
125-8EM	HC5328	1.25 (31.7)	.50 (12.7)	8 (203)	HS5154	8.3 (135.2)	7142 (82.3)
92VPS	HC5331	1.25 (31.7)	.50 (12.7)	8 (203)	HS5153	8.3 (135.2)	N/A
BA125-8EMV	HC5330	1.25 (31.7)	.50 (12.7)	8 (203)	HS5154	8.3 (135.2)	7142 (82.3)
PIVOT MOUNT	HC5345	1.375 (35)	.75 (19.0)	8 (203)	HS5157	8.34 (136.6)	N/A
PIVOT MOUNT	HC5347	1.375 (35)	.75 (19.0)	8 (203)	HS5157	8.34 (136.6)	N/A
PIVOT MOUNT	HC5348	1.375 (35)	.75 (19.0)	8 (203)	HS5157	8.34 (136.6)	N/A
FRONT MOUNT	HC5342	1.262 (32.56)	.75 (19.0)	10 (254)	HS5157	8.13 (133.2)	N/A
SIDE MOUNT	HC5370	1.25 (31.7)	.50 (12.7)	8 (203)	HS5153	8.3 (135.2)	N/A
SPLASHWELL MOUNT	HC5380	1.25 (31.7)	.50 (12.7)	9 (228)	HS5155	9.3 (152.1)	N/A

NOTICE

Theoretical torque about pivot point at 35 degrees articulation with 1000 psi (70 bar) system pressure.

DISTRIBUTOR LIST

CANADA

ALBERTA

Coast Distribution
707 Barlow Trail SE, Bay C
Calgary, Alberta
zipcode

Tel (403) 273-9066 Wats 877-332-0777
Fax (403) 273-8340 Wats 877-332-9777

BRITISH COLUMBIA

Anchorage Holdings / Marine Parts Supply
1520 Stewart Avenue
Nanaimo, B.C.
V9S 4E1

Tel (250) 754-5587 Fax (250) 754-9471
Toll Free 1-800-661-5353
Wats 800-661-5353

Chimo Marine Co. Ltd.
1660 Powell St.
Vancouver, B.C.
V5L 1H4

Tel (604) 253-4125 Fax (604) 253-7679
E-mail chimo@smarrt.com

Payne's Marine Supply Inc.
3765 East 1st Ave.
Burnaby, B.C.
V5C 3V8

Tel (604) 299-7771 Fax (604) 299-3417
Wats 1-800-663-0857

Payne's Marine Supply Inc.
1853 Meredith Rd.
Campbell River, B.C.
V9W 4R7

Tel (250) 286-6263 Fax (250) 286-0171

Payne's Marine Supply Inc.
2120 Quadra St.
Victoria, B.C.
V8T 4B9

Tel (250) 382-7722 Fax (250) 382-4043

Western Marine Ltd.
1494 Powell St.
Vancouver, B.C.
V5L 5B5

Tel (604) 253-7721 Fax (604) 253-2656

Westport Sales Ltd.
201-3765 East First Ave.
Burnaby, B.C.
V5C 3V8

Tel (604) 299-7771 Fax (604) 299-3417

MANITOBA

First Choice Wholesale
214 De Bafts St.
Winnipeg
R2J 3W6

Tel (204) 661-6950

NEW FOUNDLAND

IMP Group Ltd.
Pippy Place
St. John's, Newfoundland
A1B 3P4

Tel (902) 469-0222

Mercer's Marine Equipment
Marine Drive
Clareville, Newfoundland
A0E 1J0

Tel (709) 466-7430 Fax (709) 466-3279

NOVA SCOTIA

IMP Group Ltd.
400-2651 Dutch Village Rd.
Halifax, Nova Scotia
B3L 4T1

Tel (902) 453-2400 Fax (902) 453-6674

IMP Group Ltd.
44 Hawthorne St.
Yarmouth, Nova Scotia
V5A 1N7

Tel (902) 742-9283 Fax (902) 742-0982

Stright-MacKay Ltd.
Harbour Dr. P.O. Box 1030
Pictou, Nova Scotia
B0K 1H0

Tel (902) 485-4307 Fax (902) 485-8779

ONTARIO

Barclay's Marine
131 Caldari Road
Vaughan, Ontario
L4K 3Z9

Tel (905) 669-0090 Fax 1-800-959-1696

C.C. Marine Dist Ltd.
300 Enford Road
Richmond Hill, Ontario
L4C 3E8

Tel (905) 883-4300 Fax (905) 883-5455

Kimpex Action
311 Soversion Road
London, Ontario
N6M 1A6

Tel (519) 659-0508 Fax (519) 659-6428

Payne's Marine Distributors
1173 North Service Road West
Unit D1
Oakville, Ontario
L6M 2V9

Tel (905) 825-0200 Fax (905) 825-0202
Toll Free 1-800-668-8223

Wheelhouse Marine Supply
1730 McPherson Ave., Unit 13
Pickering, Ontario
L1W 3E6

Tel/Fax (905) 831-4164

PRINCE EDWARD ISLAND

IMP Group Ltd.
West Royalty Ind. Park
Charlottetown, P.E.I.

Tel (902) 892-1942 Fax (902) 566-9753

Mermaid Marine Engines
West Royalty Industrial Park
Charlottetown, P.E.I.
C1E 1B0

Tel (902) 566-1220 Fax (902) 368-3660

QUEBEC

Coast Distribution
1545 Marie-Vicorin
St. Bruno, Quebec
J3V 6B7

Tel (514) 866-3613 Fax (514) 441-2708

U.S.A

ALASKA

Redden-Kachemak Gear
41955 Kachemak Drive
Homer, AK 99603
Tel (907) 235-8617 Fax (907) 235-2605

LFS Inc. (Retail)
PO Box 920523
2315 Airport Beach
Dutch Harbor AK 99692
Tel (907) 581-2178 Fax (907) 581-2188
e-mail: dutch@lfsinc.com
web: www.lfsinc.com

LFS Inc. (Retail)
PO Box 3010
Dillingham AK 99576
Tel (907) 842-5376 Fax (907) 842-2350
e-mail: bellingham@lfsinc.com
web: www.lfsinc.com

LFS Inc. (Retail)
PO Box 215
Naknek AK 99633
Tel (907) 246-4490 Fax (907) 246-4446
e-mail: bellingham@lfsinc.com
web: www.lfsinc.com

Redden Marine - Kachemak Gear Shed
(Retail)
41955 Kachemak Drive
Homer AK 99603
Tel (907) 235-8617 Fax (907) 235-2605
Toll Free 800-478-8612 AK Only
e-mail: reddeninc@worldnet.att.net
web: www.reddenmarine.com

Redden Marine (Retail)
PO Box 2323
Cordova AK 99574
Tel (907) 424-3188 Fax (907) 424-3788
e-mail: reddeninc@worldnet.att.net
web: www.reddenmarine.com

VIP Distributors (Wholesale)
1220 East 68th Avenue Unit 101
Anchorage AK 99518
Tel (907) 349-8924 Fax (907) 349-2628
Toll Free 800-770-8924
e-mail: vipdist@alaska.net email

ALABAMA

Hardware & Marine Co. (Wholesale)
1875 North Conception Street Road
Mobile, AL 36610
Tel (334) 452-3423 Fax (334) 452-3425
Toll Free 800-452-3423
e-mail: hsales@beaconsupply.com
www.beaconsupply.com

ARKANSAS

Benrock Inc. (Wholesale)
6900 Alcoa Road
Benton, AR 72015
Tel (501) 778-2002 Fax (501) 778-3360
Toll Free 800-643-9762
e-mail: N/A
web: www.benrock.com

ARIZONA

Arizona Marine Specialties
1926 W. Acoma,
Lake Havaso City, AZ 92705
Tel (602) 453-1113 Fax (602) 453-2927

Benrock Inc.
6900 Alcoa Rd.
Benton, AZ 72015
Tel (501) 778-2002 Fax (501) 778-3360

Coast Distribution System
1400 N Fiesta Blvd.
Gilbert, AZ 85234
Tel (602) 497-0083 Fax (602) 497-0635

CALIFORNIA

Boatech Inc.
795 Miraflores Ave.
San Pedro, CA 90731
Tel (310) 519-1114 Fax (310) 519-8982

Coast Distribution System
350 Woodview Avenue
Morgan Hill, CA 95037
Tel (408) 782-6686 Fax (408) 782-7790

Diversified Product Co.
1914 S. Mateo St.
Los Angeles, CA 90021
Tel (213) 624-5595 Fax (213) 689-0986

Englund Marine Supply
2 Commercial Street
Eureka, CA 95501
Tel (707) 444-9266 Fax (707) 444) 9268
Toll Free 800-228-7051
e-mail: englund@pacifier.com
web: www.englundmarine.com

Englund Marine Supply
201 Citizens Dock Road
Crescent City, CA 95531
Tel (707) 464-1650 Fax (707) 464-3708
Toll Free 800-228-7051
e-mail: englund@pacifier.com
web: www.englundmarine.com

Fox Marine Specialties
646W. Esther Street
Long beach, CA 90813
Tel (562) 983-6500 Fax (562) 983-6766

L & L Marine Distributors
3160 E. Lapalma Ave., Unit K
Anaheim, CA 92806
Tel (714) 630-5831 Fax (714) 630-3188

Mercury Marine Mart
619 Lindero Street
San Rafael, CA 94901
Tel (415) 457-7070 Fax (415) 457-5938

Port Supply/West Marine
500 Westridge Drive
Watsonville, CA 95076
Tel (831) 761-4286 Fax (831) 728-3014
Port Supply/West Marine
2450 17th Ave.
Nedder, CA 90731
Tel (408) 476-1900

CONNECTICUT

Kellogg Marine
Mill Rock Rd.
Old Saybrook, CT 06475
Tel (860) 388-4477 Fax (860) 388-0260

FLORIDA

Byfield Marine Supply (Wholesale)
175 Olive Road
Pensacola, FL 32514
Tel (850) 477-8011 Fax (850) 478-3077
Toll Free: 800-237-3741

Coast Distribution System
203 A Kelsey Lane
Tampa, FL 33619
Tel (813) 622-7611 Fax (813) 621-6346
Wats 800-538-7973

Donovan Marine Inc. (Wholesale)
6454 Trade Center Drive
Jacksonville, FL 32256
Tel (904) 786-3008 Fax (904) 786-2995
Toll Free: 800-582-9749
e-mail: N/A
web: www.donovanmarine.com

Donovan Marine Inc. (Wholesale)
1342 NW 78th Avenue
Miami, FL 33126
Tel (813) 572-0192 Fax 800-780-5627
Toll Free 800-226-4562
web: www.donovanmarine.com

Donovan Marine Inc. (Wholesale)
3636 B North L Street
Pensacola, FL 32505
Tel (850) 432-7775 Fax (850) 432-4509
Toll Free 800-347-4464
web: www.donovanmarine.com

Donovan Marine Inc. (Wholesale)
3071 118th Avenue North
St. Petersburg, FL 33716
Tel (813) 572-0192 Fax (813) 573-1930
Toll Free 800-226-4562
web: www.donovanmarine.com

Glenn Mar Incorporated
6870 - 142nd Ave.
Largo, FL 34641
Tel (727) 536-1955 Fax (727) 539-1248
Wats 800-282-0123

Land 'N' Sea Distributors
12355 State Road 769
Lake Suzy, FL 34266
Tel (941) 764-0722 Fax (941) 764-0832
Toll Free 1-800-521-3744

Land 'N' Sea (East) Dist.
3131 N. Andrews Ave.
Pompano Beach, FL 33064
Tel 800-432-7652 Fax 800-942-1947
web: www.landnsea.net

U.S.A

Lewis Marine Supply Inc.
221 S.W. 32nd Court
Ft. Lauderdale, FL 33335
Tel (954) 523-4371 Fax (954) 764-0185
Wats 800-327-3792
e-mail: lms@lewismarine.com
web: www.lewismarine.com

Lewis Marine Supply Inc.
175 Olive Road
Pensacola, FL 32514
Tel (850) 477-8011 Fax (850) 478-3077
Wats 800-237-3741

Lewis Marine Supply of Central Florida
709 Clearlake Rd.
Cocoa, FL 32922
Tel (321) 632-8484 Fax (321) 631-4431

GEORGIA

Coast Distribution System
1795 Continental Way
Atlanta, GA 30316
Tel 1-800-495-5858 Fax (404) 241-9985

Benrock Inc. (Wholesale)
4841 Lewis Road
Stone Mountain, GA 30083
Tel (770) 934-0477 Fax (770) 513-9122
Toll Free: 800-643-9762
e-mail: N/A
web: www.benrock.com

Land N Sea
3105 Sweetwater Road
Building 300, Suite N
Lawrenceville, Ga 30644
Tel (877) 469-0104 Fax 800-942-1947
web: www.landnsea.net

HAWAII

Servco Marine Supply
1125 Ala Moana Blvd.
Honolulu, HI 96814
Tel (808) 524-6150

West Marine
111 Sand Island Access Rd.
Honolulu, HI 96819
Tel (808) 845-9900 Fax (808) 842-0454

IOWA

Lorenz & Jones
1920 Delaware Ave.
Ankeny, IA 50021
Tel (515) 964-4205 Fax (515) 964-0678

ILLINOIS

Barclay Marine Dist. Corp.
2323 West Fulton St.
Chicago, IL 60612
Tel (810) 469-0500 Fax (312) 829-6533

INDIANA

* Charman Enterprises
107 West Harris,
Eaton, IN 47338
Tel 1-800-247-6324 Fax 1-800-647-8449

Coast Distribution System
3002 Coast Court
Elkhart, IN 46514
Tel (219) 262-1551 Fax (219) 264-9743

KANSAS

Medart Marine
2644 South 96th Ave.
Edwardsville, KS 66111
Tel (913) 422-3175 Fax (913) 422-3133

LOUISIANA

Beacon Supply Co. (Wholesale)
821 Industry Road.
Kenner, LA 70062
Tel (504) 467-9000 Fax (504) 467-7888
Toll Free 800-462-9500
e-mail: sales@beaconsupply.com
web: www.beaconsupply.com

Benrock Inc. (Wholesale)
1041 Hawn Ave.
Shreveport, LA 71107
Tel (504) 778-2002 Fax 800-544-5697
Toll Free 800-643-9762
e-mail: N/A
web: www.benrock.com

Donovan Marine Inc. (Wholesale)
6317 Humphreys Street
Harahan, LA 70123
Tel (504) 733-2301 Fax (504) 734-2653
Toll Free 800-347-4464
e-mail: N/A
web: www.donovanmarine.com

Lewis Marine
189 Commercial Square Blvd.
Slidell, LA 70461
Tel (850) 477-8011 Fax (850) 478-3077
Tel 1-800-237-3741

MASSACHUSETTS

C E Beckman Co.
11-35 Commercial St.
New Bedford, MA 02741
Tel (508) 994-9674 Fax (508) 990-2785

Lady Bea Industries
360 Eastern Ave. P.O. 98
Malden, MA 02148
Tel (617) 324-7111 Fax (617) 324-6620

MARYLAND

Fawcett Boat Supplies
2017 Renard Court
Annapolis, MD 21401
Tel (410) 267-8681 Fax (410) 224-0979

MAINE

Manset Marine Supply Co.
50 New County Road
Rockland, ME 04841
Tel (207) 596-6464 Fax (207) 596-5615

MICHIGAN

Barclay Marine Dist. Corp.
24600 Maplehurst Dr.
Mt. Clemons, MI 48403
Tel (810) 469-9910 Fax (810) 469-9918

Barclay Marine Dist. Corp.
3513 Lousma Dr. S.E.
Grand Rapids, MI 49508
Tel (616) 243-6464 Fax (616) 243-3750

Midwest Marine Supply Co.
24300 Jefferson Ave.
St. Clair Shores, MI 48080
TEL (810) 778-8950 Fax (810) 778-6108

MINNESOTA

Barclay Marine Dist. Corp.
1755 Buerkle Rd.
White Bear Lake, MN 55110
Tel (651) 770-8515 Fax (651) 770-1575

Bell Industries Inc.
500 Hardman Ave.
South St. Paul, MN 55075
Tel (612) 450-9020 Fax (612) 450-0844

Hannay's Inc.
1708 Central Ave. NE
Minneapolis, MN 55413
Tel (612) 781-7416 Fax (612) 781-4325

Northern Wholesale Supply
6800 Otter Lakes Road
Lino Lakes, MN 55038
Tel (651) 429-1515 Fax (651) 429-5757

MISSOURI

Barclay Marine Dist. Corp.
1102 Fayette Street
North Kansas City
MO 64116
Tel (815) 472-8100 Fax (815) 472-8111

Medart Marine
124 Manufacturers Drive
St. Louis, MO 63010
Tel (636) 282-2300 Fax (800) 695-9530

Medart Marine
100 Larkin Williams Industrial Court
Fenton, MO 63026
Tel (314) 343-0505 Fax (314) 343-0780

O'Reilly Marine
233 South Patterson
Springfield, MO 65802
Tel (417) 862-6708 Fax (417) 874-7101

* REPLACEMENT PARTS FOR SEASTAR HYDRAULIC STEERING MAY BE ORDERED DIRECTLY FROM THESE STOCKING DISTRIBUTORS

U.S.A

NEW JERSEY

Marine Equipment & Supply
1401 Metropolitan Avenue
Thorofare, NJ 08086
Tel (609) 853-8320 Fax (609) 853-9732
E-mail mesco@bellatlantic.net

Shoreway Marine, Inc.
313 State Hwy., 73
Berlin, NJ 08009
Tel (609) 768-8102 Fax (609) 768-2409

NEW YORK

Eastend Marine/Eastend Marine Supply
230 Corwin St.
Greenport, NY 11944
Tel (631) 477-1900 Fax (631) 477-1215

Freeport Marine Supply Co.
47 West Merrick Road
Freeport Long Island, NY 11520
Tel (516) 379-2610 Fax (516) 379-2909

Morgan Recreational Supply
7263 Victor Pittsford Rd.
Victor, NY 14564
Tel (716) 924-7188 Fax (716) 924-4410

* Seacoast Distributors
105 Wartburg Ave.
Copiague, NY 11726
Tel (516) 842-2338 Fax (516) 842-2021
Toll Free 1-800-645-5857

NORTH CAROLINA

Donovan Marine Inc. (Wholesale)
115 West South Street
Albermarle, NC 28001
Tel (704) 983-5050 Fax 800-807-7267
Toll Free 800-222-0174
e-mail: N/A
web: www.donovanmarine.com

Lighthouse Marine Supply Inc.
291 North Greenmeadow Dr.
Wilmington, NC 28405
Tel (910) 392-5005 Fax (910) 392-5004

Paxton Company
301 B North Greenmeadows Drive
Wilmington, NC 28405
Tel 800-475-8889 Fax 800-475-0096

OHIO

Barclay Marine Dist. Corp.
3027 Detroit Avenue
Cleveland, OH 44113
Tel (216) 621-1030 Fax (216) 621-1075

Vita-Plate Battery Inc.
304 Buckeye Blvd., P.O. 727
Port Clinton, OH 43452
Tel (419) 732-3181 Fax (419) 732-3167

OKLAHOMA

Benrock Inc. (Wholesale)
15233 East Skelly Drive
Tulsa, OK 74116
Tel (918) 437-2371 Fax 800-544-5697
Toll Free 800-643-9762
e-mail: N/A
web: www.benrock.com

OREGON

Coast Distribution System
7914 S.E. 82nd St.
Portland, OR 97266
Tel (503) 777-3991 Fax (503) 775-4989

Englund Marine Supply (Retail)
Foot of 15th Street
Astoria OR 97103
Tel (503) 325-4341 Fax (503) 325-6421
800-228-7051
e-mail: englund@pacifier.com
web: www.englundmarine.com

Englund Marine Supply(Retail)
880 SE Bay Blvd.
Newport OR 97365
Tel (541) 265-9275 Fax (541) 265-3515
Toll Free 800-228-7051
e-mail: englund@pacifier.com
web: www.englundmarine.com

Englund Marine Supply (Retail)
5080 Cape Arago Highway
Charleston OR 97420
Tel (541) 888-6623 Fax (541) 888-9332
Toll Free 800-228-7051
e-mail: englund@pacifier.com
web: www.englundmarine.com

Fisherman's Marine Supply (Retail)
901 N. Columbia Blvd.
Portland OR 97217
Tel (503) 283-8310 Fax (503) 285-9461

US Distributing (Wholesale)
7911 NE 33rd. Drive Unit 140
Portland OR 97211
Tel (503) 284-7245 Fax (503) 281-2127
Toll Free 800-621-3454

PENNSYLVANIA

Coast Distribution System
175 Greenfield Rd.
Lancaster, PA 17601
Tel (717) 299-2501 Fax (717) 295-7490

Keller Marine Service
Routes 11 & 15
Port Treverton, PA 17864
Tel (717) 374-8169 Fax (717) 374-5356

SOUTH CAROLINA

Ellett Brothers
267 Columbia Ave.
Chapin, SC 29036
Tel (803) 345-3751 Fax (803) 932-5102

Lewis Marine Supply of Charleston Inc.
PO Box 1803
Mt. Pleasant, SC 29465
Tel (843) 856-1414 Fax (843) 856-2544

McGill Distributing
1903 Longstreet St
Kingstree, SC 29556
Tel (843) 354-7404 Fax (843) 354-3263

TENNESSEE

Mid South Marine Supply
500 Allied Drive
Nashville, TN 37211
Tel (615) 834-5401 Fax (615) 834-2841
E-mail berry@bellsouth.net
Web www.midsouthmarine.com

TEXAS

Coast Distribution System
7133 Burns St.
Fort. Worth, TX 76118
Tel (817) 595-0158 Fax (817) 284-1833

Donovan Marine Inc. (Wholesale)
4757 South Loop East
Houston, TX 77003
Tel (713) 734-4171 Fax (713) 734-1674
Toll Free: 800-669-8392
e-mail: N/A
web: www.donovanmarine.com

Gunderland Marine Supply
1221 Cantwell Lane
Corpus Christi, TX 78469
Tel (512) 882-4231 Fax (512) 888-5622

Houston Marine Supply (Wholesale)
1707 Velasco
Houston, TX 77003
Tel (713) 236-8190 Fax (713) 236-0831

Marine & Industrial Supply
8330 Harry Hines Blvd.
Dallas, TX 75235
Tel (214) 631-2300 Fax (214) 631-5124

V & V Marine Products
6642 Baker Blvd.
Fort Worth, TX 76118
Tel (817) 284-1125 Fax (817) 284-1219
Wats 800-899-2323
E-mail robertvititow@e-mail.msn.com

UTAH

Coast Distribution System
3800 W 2100 S
Salt Lake City, UT 84120
Tel (801) 973-4900 Fax (801) 977-0727

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USA & INTERNATIONAL

VIRGINIA

Land 'N' Sea
1340 Azalea Garden Road
Norfolk, VA 23502
Tel (757) 853-7658 Fax (757) 857-3726

Paxton Company
1111 Ingleside Road
Norfolk, VA 23502
Tel (800) 234-7290 Fax (800) 853-7709
web: www.paxtonco.com

WASHINGTON

Englund Marine Supply (Retail)
280 East Wilson
Westport WA 98595
Tel (360) 268-9311 Fax (360) 268-9752
Toll Free 800-228-7051
e-mail: englund@pacifier.com
web: www.englundmarine.com

Englund Marine Supply (Retail)
123 Howerton Way
Ilwaco WA 98624
Tel (360) 642-2308 Fax (360) 642-0210
Toll Free 800-228-7051
e-mail: englund@pacifier.com
web: www.englundmarine.com

★ Doc Freeman's (Retail)
P.O. Box 70729
1401 NW Leary Way
Seattle, WA 98107
Tel (206) 633-1500 Fax (206) 789-5800
Toll Free 800-423-8641
e-mail: docfreemans@seanet.com
web: www.docfreemans.com

Fisheries Supply
1900 N. Northlake Way
Seattle, WA 98103
Tel (206) 632-4462 Fax (206) 634-4600

Kolstrand Marine Supply (Retail)
4733 Ballard Avenue NW
Seattle WA 98107
Tel (206) 784-2500 Fax (206) 789-1105
Toll Free 800-334-3224
e-mail: kolstrand@msn.com
web: www.kolstrand.com

LFS Inc. (Retail)
851 Coho Way
Bellingham WA 98226
Tel (360) 734-3336 Fax (360) 734-4058
Toll Free 800-426-8860
e-mail: bellingham@lfsinc.com
web: www.lfsinc.com

LFS Inc.(Retail)
908 NW Ballard Way
Seattle WA 98107
Tel (206) 789-8110 Fax (206) 789-7834
Toll Free 800-647-2135
e-mail: seattle@lfsinc.com
web: www.lfsinc.com

Marine Distributors, Inc.
5301 Shilshole Ave., N.W.
Seattle, WA 98107
Tel (206) 789-1500 Fax (206) 784-6393

Redden Marine (Retail)
1411 Roeder Avenue
Bellingham, WA 98225-2916
Tel (360) 733-0250 Fax (360) 671-1255
Toll Free 800-826-9284
e-mail: redder@worldnet.att.net
web: www.reddenmarine.com

WISCONSIN

Bell Industries
N117 W18456 Fulton Dr.
Germantown, WI 53022
Tel (262) 253-0450 Fax (262) 253-0220

INTERNATIONAL

BLA
Australia
web: www.bla.com.au

Boven Marine Technology,
Hong Kong
web: www.boven.com

Lusty & Blundell
N.Zealand
web: www.lusty-blundell.co.nz

Krautli
Portugal
web: www.krautli.com

Boating
S.Africa
web: www.waterworld.com

US Parts
Finland
web: www.usparts.fi

Comstedt,
Sweden
web: www.comstedt.se

Belgarda
Italy
web: www.belgarda.it

Svama
Italy
web: www.svama-nautica.com

* REPLACEMENT PARTS FOR SEASTAR HYDRAULIC STEERING MAY BE ORDERED DIRECTLY FROM THESE STOCKING DISTRIBUTORS

USA RETAILERS

CALIFORNIA

West Marine Prod.
203 N. Harbor Blvd.
San Pedro, CA 90731
Tel (408) 728-2700

CONNECTICUT

Boat America - Norwalk
9 Washington Street
So. Norwalk, CT 06854
Tel (860) 866-4426

FLORIDA

Boat America - Clearwater
11477 U.S. Highway 19
Clearwater, FL 34624
Tel (813) 573-2678

Boat America - Ft. Lauderdale
505 W. Broward Blvd.
Ft. Lauderdale, FL 33312
Tel (954) 523-7993

Boat America - Ft. Myers
12901 McGregor Blvd.
Ft. Myers, FL 33919
Tel (941) 481-7447

Boat America - Palm Beach
1900-B Okeechobee Blvd.
West Palm Beach, FL 33409
Tel (407) 684-4900

Boat America - Tampa
8203 N. Dale Mabry Hwy.
Tampa, FL 33614
Tel (941) 933-5515

MASSACHUSETTS

Boat America - Boston
411 Waverly Oaks Road
Waltham, MA 02154
Tel (617) 899-2000

MARYLAND

Boat America
27 W Long Meadow Rd.
Hagerstown, MD 21740
Tel (301) 739-2606

Boat America - Glen
6651-20 Ritchie Hwy. Rt. 2
Glen Burnie, MD 21061
Tel (301) 761-5901

Boat America - Maryland
5640-E Sunnyside Ave.
Beltsville, MD 20705
Tel (301) 474-0150

Boat America - Towson
6863 Loch Raven Blvd.
Towson, MD 21204
Tel (301) 296-0451

MICHIGAN

Boat America - Detroit
2212 E. 14 Mile Road
Warren, MI 48092
Tel (313) 939-5050

NEW JERSEY

Boat America - Holmdel
2145 Rte. 35 North
Holmdel, NJ 07733
Tel (201) 739-8890

West Marine

201 Meadow Rd.
Edison, NJ 08818
Tel (908) 819-7400 Fax (908) 819-4771

NORTH CAROLINA

Overton's Sport Center
111 Red Banks Rd.
Greenville, NC 27835
Tel (919) 355-7600 Fax (919) 355-2923

OHIO

Boat America - Cleveland
3419 Carnegie Ave.
Cleveland, OH 44115
Tel (216) 391-2922

TEXAS

Boat America - Houston
7280 Wynnwood
Houston, TX 77008
Tel (713) 880-2160

VIRGINIA

Boat America
880S Pickett St.
Alexandria, VA 22304
Tel (703) 370-4202 Fax (703) 461-2847

Boat America - Norfolk
6600 Virginia Beach Blvd.
Norfolk, VA 23502
Tel (757) 461-3601

2 YEAR LIMITED WARRANTY

We warrant to the original retail purchaser that Teleflex (Canada) Ltd. products have been manufactured free from defects in materials and workmanship. This warranty is effective for two years from the date of original retail purchase, excepting that where Teleflex (Canada) Ltd. products are used commercially or in any rental or other income producing activity, then this warranty is limited to 1 year from the date of original purchase.

We will provide replacement product without charge, for any Teleflex (Canada) Ltd. product not meeting 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 Teleflex (Canada) Ltd. products found to be defective and covered by this warranty, will be replaced or repaired at Teleflex's option, and returned to the customer.

Teleflex's sole responsibility under this warranty is limited to the repair or replacement of product which is, in Teleflex's opinion, defective. Teleflex 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.
- which has been used in an installation other than as recommended in our installation or operation instructions or specifications.
- Which has failed or has been damaged due to an accident or abnormal operation including racing, misuse or alterations outside our factory.
- Which has been repaired or modified by other than Teleflex.
- Which has been used on an engine/boat combination where the engine horsepower exceeds the boat horsepower rating established by the boat manufacturer.
- Which has been used with other products which, in Teleflex's opinion, are incompatible with the Teleflex product.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES, OBLIGATIONS OR LIABILITIES ON THE PART OF TELEFLEX AND WILL BE THE CUSTOMER'S EXCLUSIVE REMEDY EXCEPT FOR ANY APPLICABLE IMPLIED WARRANTIES UNDER STATE LAW WHICH ARE HEREBY LIMITED IN DURATION TO TWO YEARS FROM THE DATE OF ORIGINAL PURCHASE. IN NO EVENT WILL TELEFLEX 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 have other rights which vary from state to state.

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- 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 # ?
Teleflex (Canada) Ltd.
c/o Panalpina
#8 – 14th Street
Blaine, WA 98230

From CANADA and Overseas:

RGA # ?
Teleflex (Canada) Ltd.
3831 No. 6 Road
Richmond, B.C.
Canada V6V 1P6



A Division of Teleflex Incorporated

TELEFLEX (CANADA) LIMITED
3831 NO.6 ROAD
RICHMOND, B.C.
CANADA V6V 1P6

FAX (604) 270-7172

www.seastarsteering.com

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