



# SEASTAR™

## HOSE, TUBING, FITTINGS, AND ACCESSORIES

### SeaStar Steering Hose Introduction

SeaStar Steering hoses are a custom multi-layered composite design, engineered specifically for our systems. They are designed to exceed SAE and ABYC specifications and provide precise steering control not achievable with hydraulic industry standard hoses.

SeaStar Hoses are engineered to provide the system with very low thermal expansion properties and are kink and abrasion resistant. Our hoses also feature a swaged solid fitting connection with an O-ring seal and a metal to metal backup to the primary seal.

Due to performance and safety concerns, SeaStar Solutions recommends that **ONLY** SeaStar or SeaStar PRO steering hoses be used in SeaStar Steering Systems. It is recommended for hose lengths over 30ft that SeaStar PRO hose is used.

### Tubing/Hose

The tubing or hose requirements depend on the type of steering system being considered. Please double check the application in which you are using as in some cases Nylon or copper tube is not to be used.

#### ⚠ WARNING

**DO NOT cut outboard hydraulic hose.**

APPLICATION	TUBING/HOSE REQ.	PAGE #
OUTBOARDS, INBOARDS, SEASTAR POWER ASSIST, or STERNDRIVE CYLINDER # HC5332	OUTBOARD HOSE	Page 9-2 – Page 9-6
<b>CAUTION: DO NOT USE NYLON TUBING IN OUTBOARD AND/OR POWER ASSIST STEERING APPLICATIONS.</b>		

Table 9-1.

### General Considerations

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.

#### ⚠ WARNING

**DO NOT use extruded nylon tubing with SeaStar Outboard cylinder, HC5332 stern drive cylinders and/or SeaStar Power Assist Applications.**

# SeaStar Outboard Hose

## ⚠ WARNING

**SeaStar PRO Helm systems require the use of SeaStar PRO (1500 psi) reinforced Kevlar Hoses ONLY.**

SeaStar and SeaStar PRO steering hoses are available in kits (two, equal lengths of hose per kit). Before ordering you must consider the following areas to ensure that you order the correct length for the cleanest installation. In ALL applications, hydraulic hose/tubing should be secured along the routing path where possible and should not be allowed to hang free in any area where they may become a safety hazard. SeaStar Solutions recommends the use of a rigging tube, PVC piping or conduit for the safe installation and protection of the steering hose/tube. DO NOT install hoses in such a way that they become exposed to high heat areas such as engine components (i.e. manifolds or exhaust components), or in highly corrosive areas such as battery fumes or electrical connections. Each part number contains two hoses of equal length.

## NOTICE

*SeaStar Bulkhead hoses provide the cleanest hose routine.*

SeaStar Solutions offers two different types of steering hoses;

- Standard (straight line hoses, not passing through bulkheads) from 2' to 5' (1' increments), 6' to 30' (2' increments), both SeaStar standard and SeaStar PRO available.
- Bulkhead hoses (for use where the hose is required to pass through a bulkhead). Available from 2' to 5' (1' increments) 6' to 30' (2' increments), both SeaStar standard and SeaStar PRO available.

## Bulkhead Hose Kits

For the cleanest Installation.

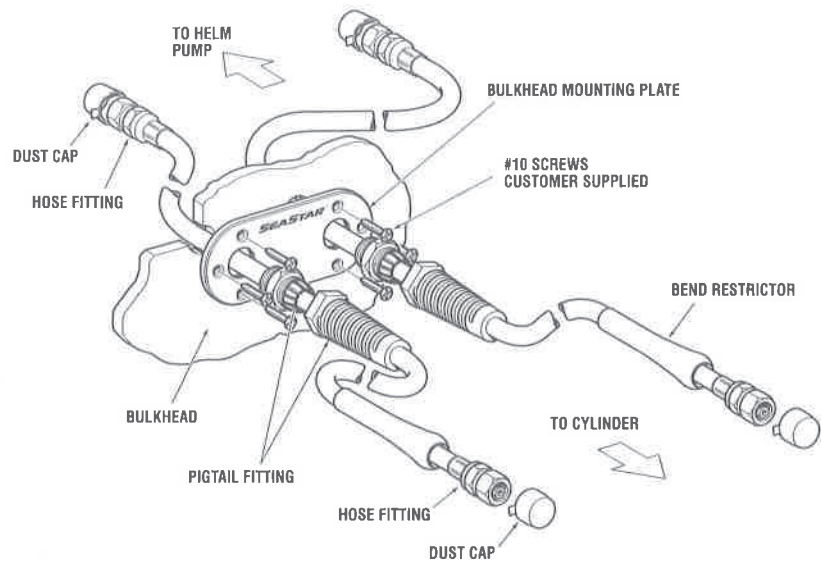


Figure 9-1. H088xx Dual Polished Plate shown.

## SeaStar Hose Kits: How to Order

Each part number contains two hoses of equal length.

- \* SeaStar Standard and Pro Hose Kits are available in lengths from 2' – 30'.
- \*\* SeaStar Standard and Pro Bulkhead Hose Kits are available in lengths from 4' – 30'.

PART NO.	KIT DESCRIPTION
* H051xx	SeaStar Standard Outboard Hose Kit (2 hoses)
* H057xx	SeaStar Pro Hose Kit (2 hoses)
** H081xx	SeaStar Bulkhead Hose Kit, Standard (2 hoses)
** H082xx	SeaStar Bulkhead Hose Kit, Pro (2 hoses)
** H086xx	SeaStar Bulkhead Hose Kit, Polished Plate (2 hoses)
** H087xx	SeaStar PRO Bulkhead Hose Kit, Polished Plate (2 hoses)
** H088xx	SeaStar Bulkhead Hose Kit, Polished Plate double (2 hoses)
** H089xx	SeaStar PRO Bulkhead Hose Kit, Polished Plate double (2 hoses)

Table Q-2

**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.

**NOTICE**

Correct hose length is crucial to the operation of your SeaStar steering system, please be sure that you take all the following measurements correctly to avoid damage to the steering hose.

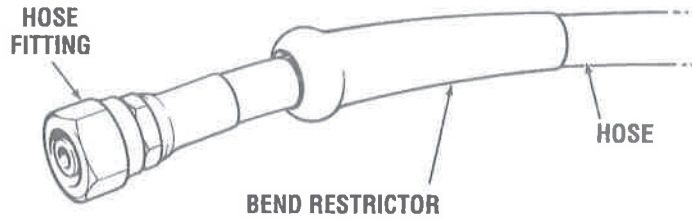


Figure 9-2. Standard Hose Kit.

**How to Measure Hoses**

Select from the illustrations that follow (figures A through I), the situation which best suits your application and note the:

- a) cylinder location,
- b) number of cylinders,
- c) type of cylinders,
- d) number of steering stations, and
- e) the number of hose and fitting kits required.

**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.**

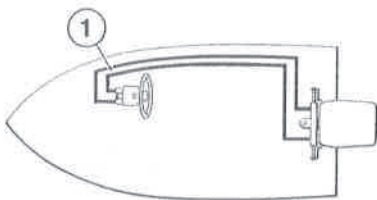
**How to Measure Hoses: Single Station, Single Cylinder, NO Bulkhead**

**Helm to Steering Cylinder. Using the illustrations below:**

1. Measure from center of steering wheel to the starboard side wall.
2. Measure the intended path of the hoses from the starboard side wall to the center of the engine.
3. Round UP the measurement to the nearest 'even' number and add 2 feet (0.6m). This is the length of hose kit required.
4. Order hose kit part no. H051xx (item 1). The last two digits correspond to the length of hose.

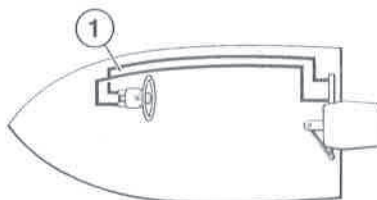
**Figure A**

Single Front Mount Cylinder  
**Note:** cylinder body moves.



**Figure B**

Single Side Mount Cylinder  
**Note:** cylinder body stationary.



**Figure C**

Single Splashwell Mount Cylinder  
**Note:** cylinder body stationary.

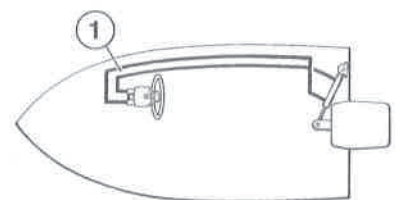


Figure 9-3.

# Single Station

How to Measure Hoses:  
Single Station, Dual  
Cylinders, NO Bulkhead

**Helm to hose tee fittings. Using the illustrations below:**

1. Measure from center of steering wheel to the starboard side wall.
2. Measure from the starboard side wall to the transom.
3. Measure from the transom to your hose tee fittings (item 6).
4. Round UP the measurement to the nearest 'even' number. This is the length of hose kit required.
5. Order hose kit part no. HO51xx (item 1). The last two digits correspond to the length of hose.

**Hose tee fittings to steering cylinders. Using the illustrations below:**

1. Measure the intended path of the hoses from the tee fitting (item 6) to the center of the PORT side engine.
2. Round UP the measurement to the nearest 'even' number and add 2 feet (0.6m). This is the length of the hose kit required.
3. Order hose kits part no. HO51xx (items 2 & 3). The last two digits correspond to the length of hose.

## NOTICE

This configuration also requires the purchase of Tee fitting kit # HF5530.

Figure D

Dual Front Mount Cylinders

**Note:** cylinder body moves.

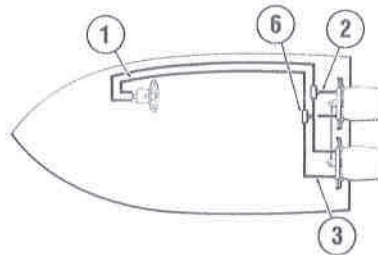


Figure E

Dual Side Mount Cylinders

**Note:** cylinder body stationary.

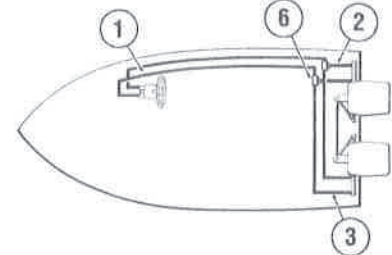


Figure 9-4.

How to Measure Hoses:  
Single Station, Single  
Cylinder, WITH Bulkhead

**Helm to Steering Cylinder. Using the illustrations below:**

1. Measure from center of steering wheel to the starboard side wall.
2. Measure the intended path of the hoses from the starboard side wall to the center of the engine.
3. Round UP the measurement to the nearest 'even' number and add 2 feet (0.6m). This is the length of the bulkhead hose kit required.
4. Order hose kit part no. HO81xx (item 4). The last two digits correspond to the length of hose.

Figure F

Single Front Mount Cylinder

**Note:** cylinder body moves.

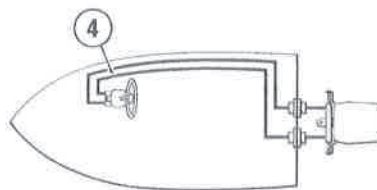


Figure G

Single Side Mount Cylinder

**Note:** cylinder body stationary.

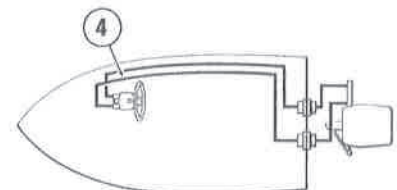


Figure 9-5.

## How to Measure Hoses: Single Station, Dual Cylinders, WITH Bulkhead

### Helm to hose tee fittings. Using the illustrations below:

1. Measure from center of steering wheel to the starboard side wall.
2. Measure from the starboard side wall to the transom.
3. Measure from the transom to your hose tee fittings (item 6).
4. Round UP the measurement to the nearest 'even' number. This is the length of hose kit required.
5. Order hose kit part no. H051xx (item 1). The last two digits correspond to the length of hose.

### Hose tee fittings to steering cylinders. Using the illustrations below:

1. Measure the intended path of the hoses from the tee fitting (item 6) to the center of the PORT side engine.
2. Round UP the measurement to the nearest 'even' number and add 2 feet (0.6m). This is the length of hose kit required.
3. Order bulkhead hose kits part no. H081xx (items 4 & 5). The last two digits correspond to the length of hose.

### NOTICE

*This configuration also requires the purchase of Tee fitting kit # HF5530.*

Figure H

Dual Front Mount Cylinders

**Note:** cylinder body moves.

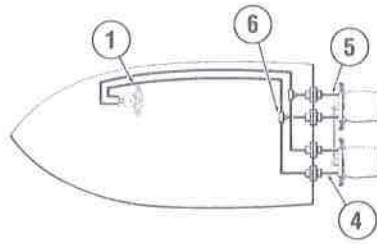


Figure I

Dual Side Mount Cylinders

**Note:** cylinder body stationary.

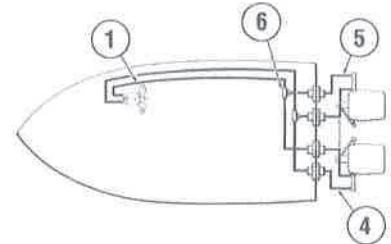


Figure 9-6.

## Part Numbers for Figures A, B, C, D, E, F, G, H & I

ITEM	PART #	DESCRIPTION
1	H051xx	Hose Kit
2	H051xx	Hose Kit
3	H051xx	Hose Kit
4	H081xx	Bulkhead Hose Kit
5	H081xx	Bulkhead Hose Kit
6	HF5530	Tee Fitting Kit (3 per Kit)

Table 9-3.

### NOTICE

*See page 9-9 'Fittings and Fitting Kits' for add a station and/or autopilot fitting kits.*

# Additional Stations or Autopilot Integration

## 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 H051xx 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.

### WARNING

**DO NOT cut hydraulic hose.**

Figure J  
2nd Steering Station or  
Autopilot Power Pack  
Installation

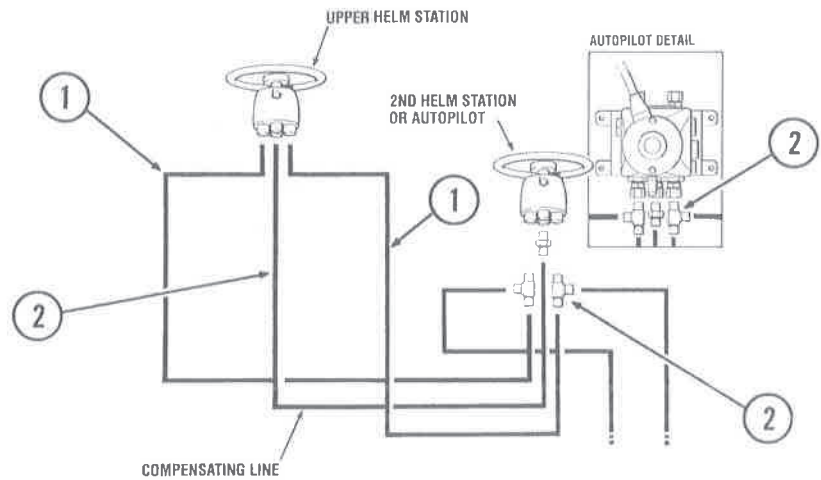


Figure 9-6.

### Parts list For figure J

ITEM #	DESCRIPTION	PART NUMBER	QUANTITY REQUIRED	REF PAGE #
1	HOSE KIT	H051xx	1	
2	FITTING KIT* (For use with -3 helms ONLY)	HF6007	1	9-12

Table 9-4. \* Includes 25' of 3/8" dia. Nylon tubing to be used for the compensating line ONLY.

**For NPT helm pumps use Kit # HF5501.**

# 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 (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

Table 9-5.

### NOTICE

*SeaStar 3/8" extruded nylon is NOT recommended for use in systems with SeaStar 2.4 or SeaStar PRO helm pumps. It is also not to be used in systems where total tubing runs exceed 100', in these cases SeaStar Outboard hoses and/or 3/8" copper tubing must be used.*

### WARNING

**SeaStar Solutions recommends the use of SeaStar PRO (1500 psi) reinforced Kevlar Hoses with SeaStar PRO Helm systems.**

## Copper Tubing

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

- a) inboard,
- b) sterndrive, and
- c) seadrive steering systems with SeaStar (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:

Soft annealed copper tubing, Type 'L' produced under ASTM B280.

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

From the illustrations (figures A and B), 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 & cylinder

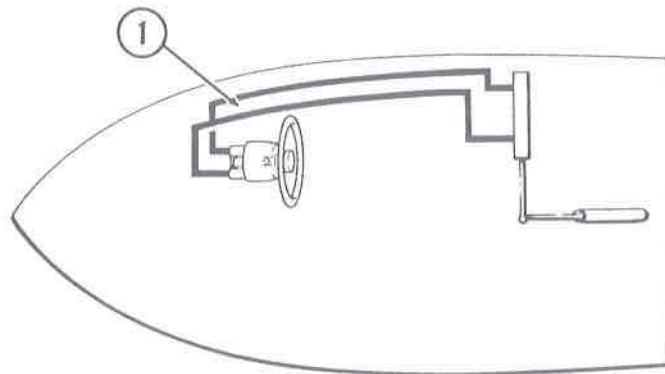


Figure 9-7.

**Figure B**

Single Sterndrive Cylinder

- fittings required supplied with helm & cylinder

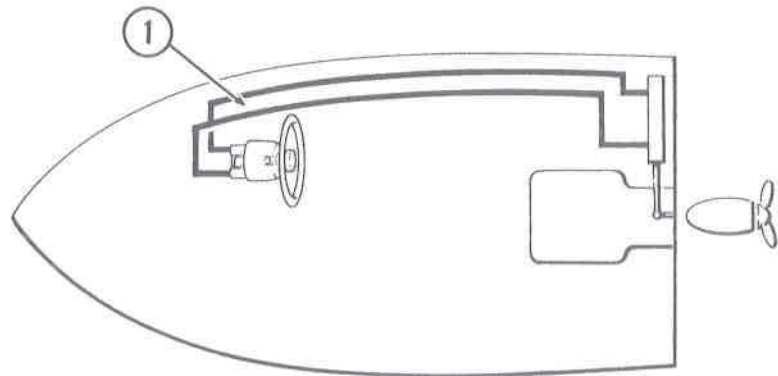


Figure 9-8.

## Parts list

For figures A & B

ITEM #	DESCRIPTION	PART NUMBER	QUANTITY REQUIRED
1	3/8" DIA NYLON OR COPPER TUBE (or SeaStar hose)		AS MEASURED

Table 9-6.



# Fittings and Fitting Kits

## 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. See page 9-10 for NPT fitting details.

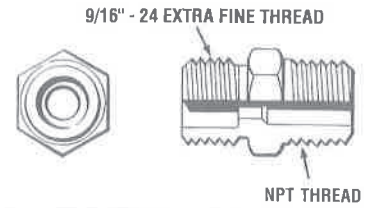


Figure 9-9. Typical NPT fitting.



## ORB Fittings

These fittings are made of corrosion resistant stainless steel and now thread into the cylinders/helms via Positionable O-ring hose ports. Fittings can be easily orientated in any direction to accommodate tube routing. see this page through page 9-13 for details.

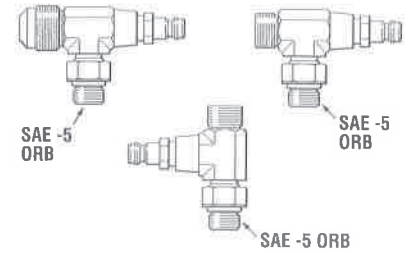


Figure 9-10.

### CAUTION

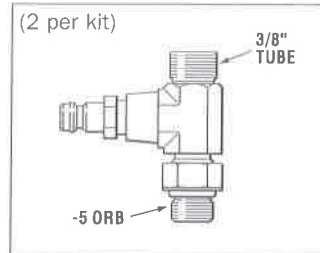
For use with -3 helms and cylinders only.

## Positionable O-Ring Hose Fittings (ORB)

### CAUTION

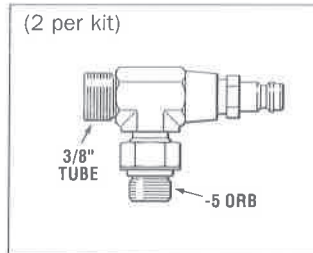
NOT for use in an NPT helm/cylinder hose fitting port.

### HF6001 Vertical Bleeder Tee



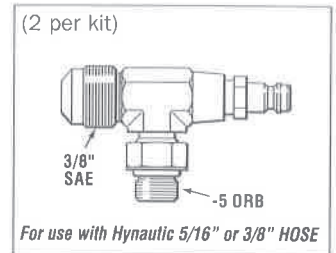
ORB, -3 cylinders/helms ONLY.

### HF6002 Horizontal Bleeder Tee



ORB, -3 cylinders/helms ONLY.

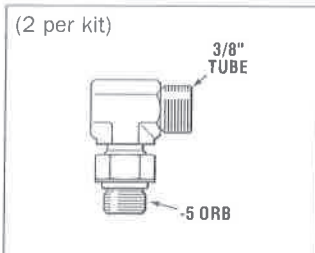
### HF6003 Hydraulic Bleeder Tee



ORB, -3 cylinders/helms ONLY.

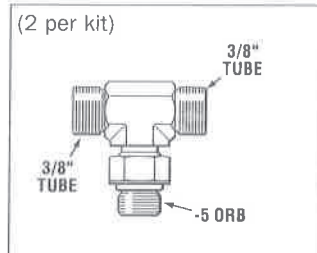
For use with Hynautic 5/16" or 3/8" HOSE

### HF6004 Elbow Fitting



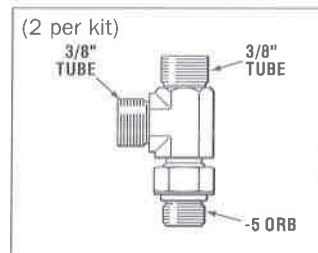
ORB, -3 cylinders/helms ONLY.

### HF6005 Tee Fitting



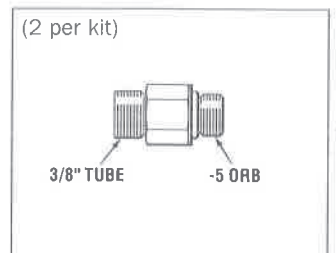
ORB, -3 cylinders/helms ONLY.

### HF6006 Tee Fitting



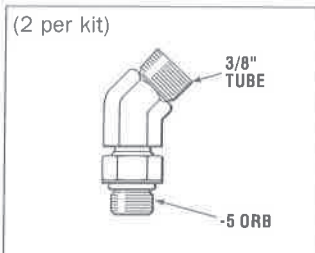
ORB, -3 cylinders/helms ONLY.

### HF6009 Straight Fitting



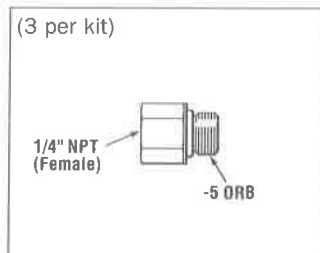
ORB, -3 cylinders/helms ONLY.

### HF6011 45° Fitting



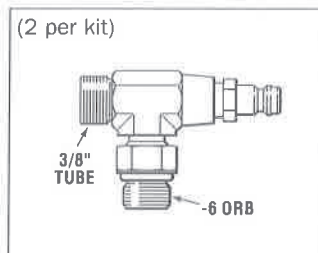
ORB, -3 cylinders/helms ONLY.

### HF6012 -5 ORB (M) - 1/4 NPT (F)



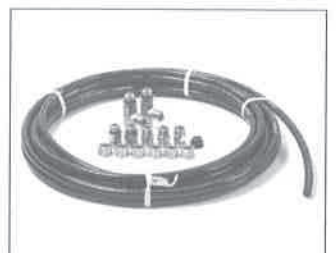
ORB, -3 cylinders/helms ONLY.

### HF6013 Horizontal Bleeder Tee



ORB, Mercury Verado ONLY.

### HF6007 Fitting Kit



ORB, add autopilot or second station.

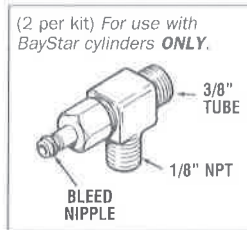
## NPT Fittings

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 9-9.

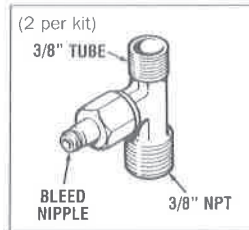
### ⚠ CAUTION

**NPT fittings are not to be used in a -3 helm and/or cylinder. Doing so will result in irreparable damage to the helm/cylinder. ONLY use a SeaStar Solutions ORB Hose Fitting in a -3 helm and/or cylinder.**

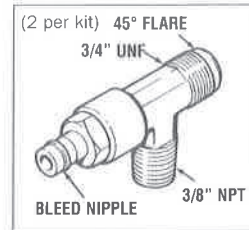
**HF4202** Horiz. Bleeder Tee



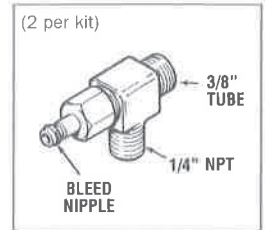
**HF5518** Vertical Bleeder Tee



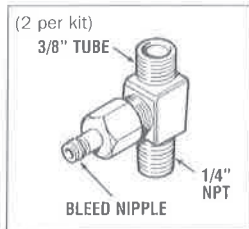
**HF5519** Bleed Tee (TM Cylinders)



**HF5520** Horiz. Bleeder Tee



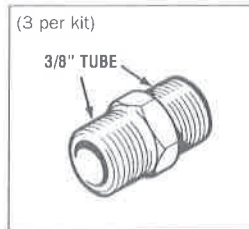
**HF5521** Vertical Bleeder Tee



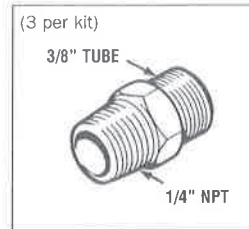
**HF5548** Bleed Nipple



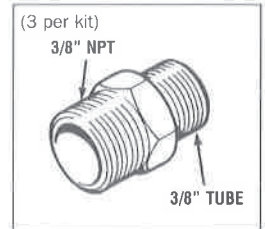
**HF5527** Union Coupling Fitting



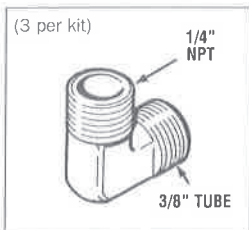
**HF5528** Straight Fitting



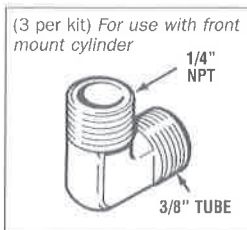
**HF5532** Connector Fitting



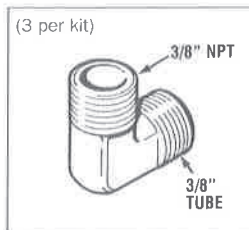
**HF5529** Elbow Fitting



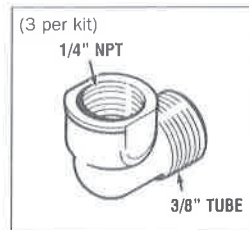
**HF6145** SS Elbow Fitting



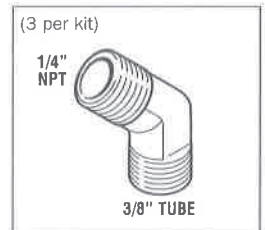
**HF5534** Elbow Fitting



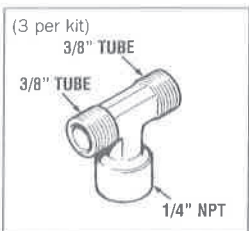
**HF5538** Street Elbow



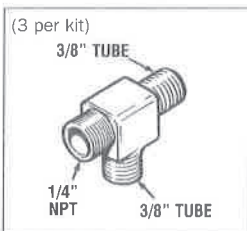
**HF5540** 45° Fitting



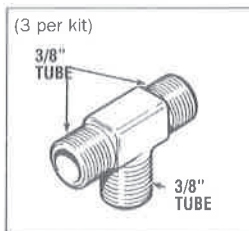
**HF5533** Tee Fitting



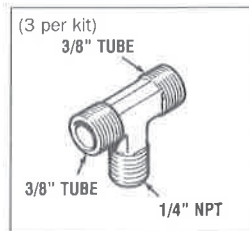
**HF5531** Tee Fitting



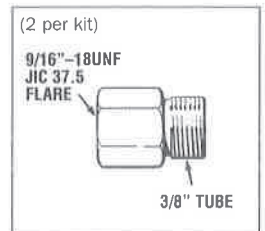
**HF5530** Tee Fitting



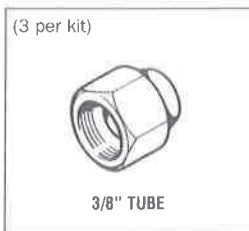
**HF5536** Tee Fitting



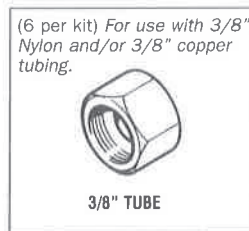
**HF5566** Adapter Fitting



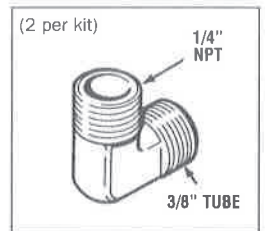
**HF5524** Cap Plug Nut



**HF5526** Tube Nut



**HF6145** Hose Fitting (Pivot Cyl.)



# 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.

## ⚠ WARNING

**DO NOT** cut SeaStar steering hose.

Figure E

2nd Steering Station/autopilot when using 3/8" nylon tubing, or, 3/8" copper tubing.

## 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.

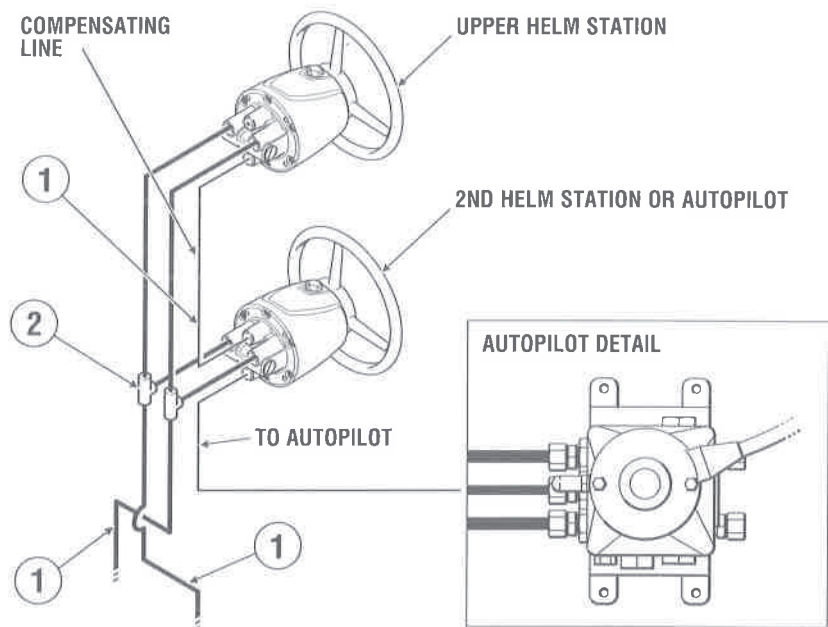


Figure 9-11.

ITEM #	DESCRIPTION	PART NUMBER	QUANTITY REQUIRED	REF PAGE #
1	3/8" DIA NYLON OR COPPER TUBE	HT5_	AS MEASURED	Page 9-13
2	FITTING KIT*	HF6010	1	

Table 9-7. \* For NPT helms use HF5502.

## Required details for the addition of an autopilot.

1. SeaStar Helm pumps are fitted with a built in check valve which are required for installations of additional steering stations and/or autopilot pumps. If your helm pump is not fitted with an internal check valve an external valve will be required.
2. Autopilot mfg. requires the volume of your steering cylinder(s) to provide an adequate autopilot pump, refer to page 12-6 for cylinder specifications.

## HF6007

### Application

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

ITEM NO.	DESCRIPTION	QUANTITY PER KIT	PART NO.
1	<b>Tee Fitting</b> 1 End - -5 ORB 1 End - 3/8" Tube Center - 3/8" Tube	2	343196
2A	<b>Connector Fitting</b> -5ORB - 3/8" Tube	2	343088
2B	<b>Connector Fitting</b> 1/4" NPT - 3/8" Tube	3	600602
3	<b>Tube Nut - 3/8" Dia.</b>	6	280327
4	<b>Non-Vented Filler Plug</b>	1	HA5432
5	<b>SeaStar Nylon Tube</b> 3/8" Dia.	25ft	HT5092
A*	<b>Elbow 3/8" Tube (M) - -5 ORB</b>	2	

Table 9-8. \* Supplied with helm pump.

**NOTE:** HF6007 fitting kit is to be used when the system has been plumbed with SeaStar outboard steering hose only.

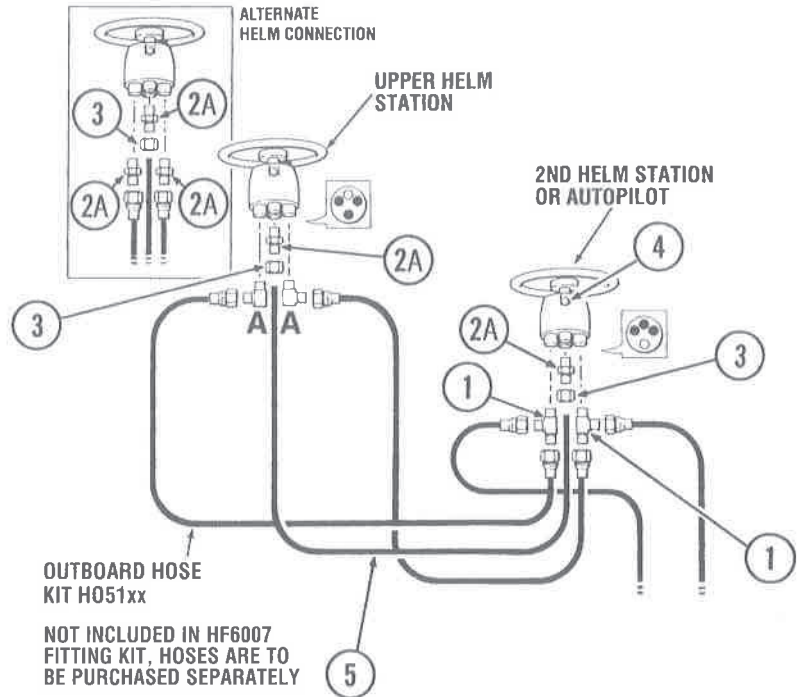


Figure 9-12.

### ⚠ CAUTION

For use with -3 helms ONLY.

### ⚠ WARNING

**DO NOT** cut SeaStar steering hose.

### Autopilot powerpack connection

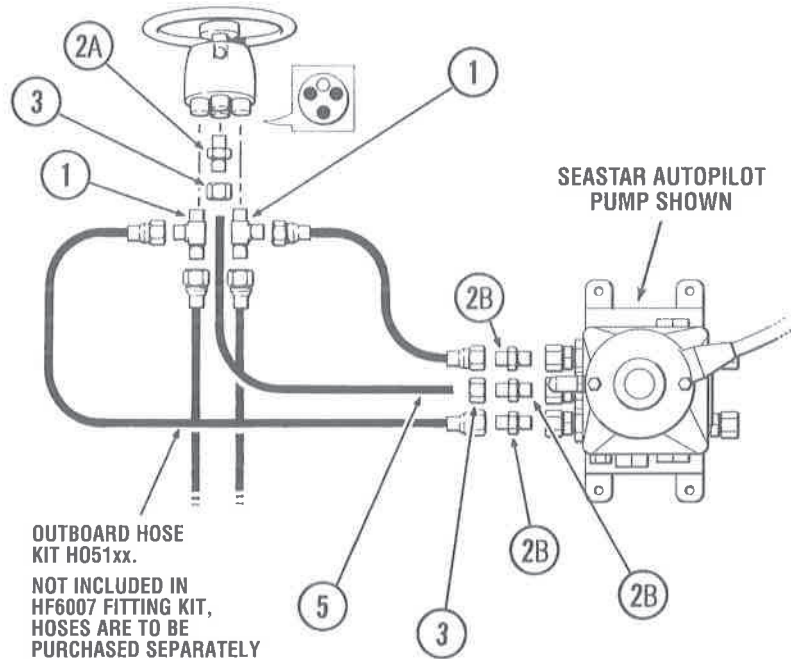


Figure 9-13.

### NOTICE

Typical plumbing layout shown. When using a SeaStar Autopilot Pump, **ALWAYS** refer to the Installation Manual shipped with your autopilot pump.

### ⚠ CAUTION

**DO NOT** cut SeaStar Outboard Steering hose. Once cut there is no means to field swage fittings to the ends of the hoses.

## HF6010

### 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.	12	280327
2A	Connector Fitting -5ORB – 3/8" Tube	2	343088
2B	Connector Fitting 1/4" NPT – 3/8" Tube	3	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 -5 ORB	2	

Table 9-9. \* Supplied with helm pump.

**NOTE:** used in systems plumbed with 3/8" diameter nylon or copper tube.

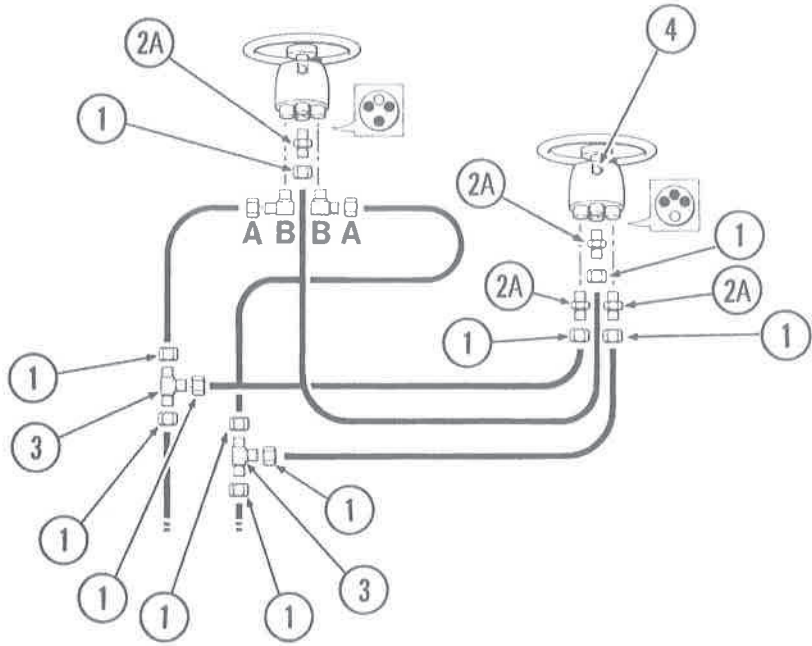


Figure 9-14.

### ⚠ CAUTION

For use with -3 helms ONLY.

## Autopilot powerpack connection

### NOTICE

Typical plumbing layout shown. When using a SeaStar Autopilot Pump, **ALWAYS** refer to the Installation Manual shipped with your autopilot pump.

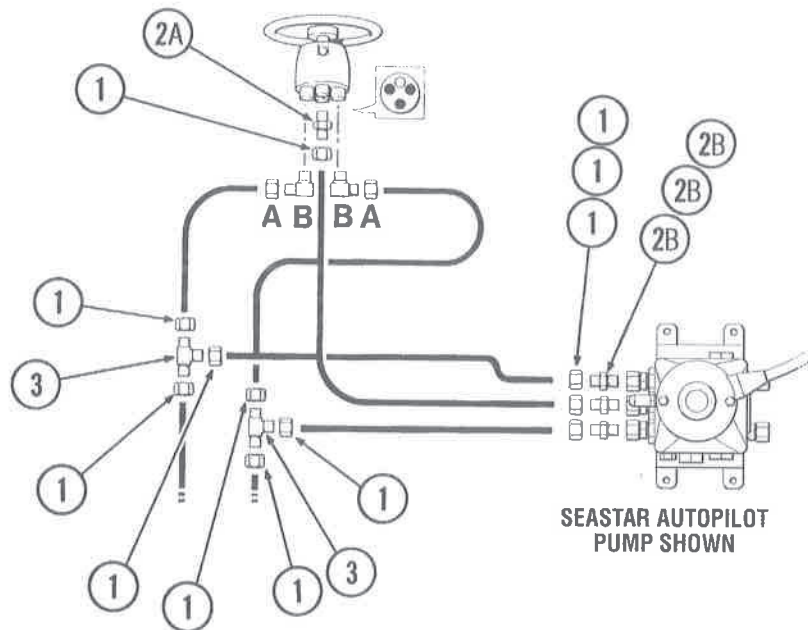


Figure 9-15.

## 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.	4	280327
2	Connector Fitting 3/8" Tube 3/8" Tube	2	280929
3	Nylon Tubing 3/8" Dia.	6ft	795628

Table 9-10.

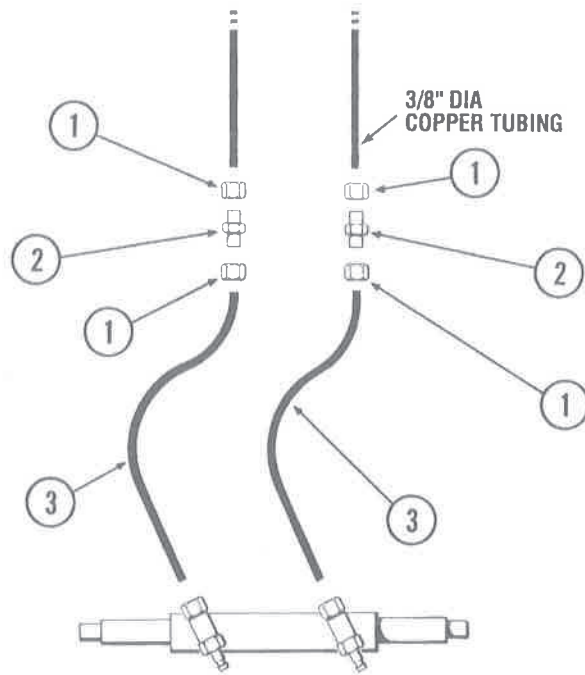


Figure 9-16.

## NOTICE

**DO NOT** use with SeaStar Outboard Cylinders and/or SeaStar Sterndrive cylinder # HC5332.

## 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.	2	280327
2	Connector Fitting 3/8" Tube 3/8" Tube	2	280929
3	18" Hose c/w Fittings	2	338621

Table 9-11.

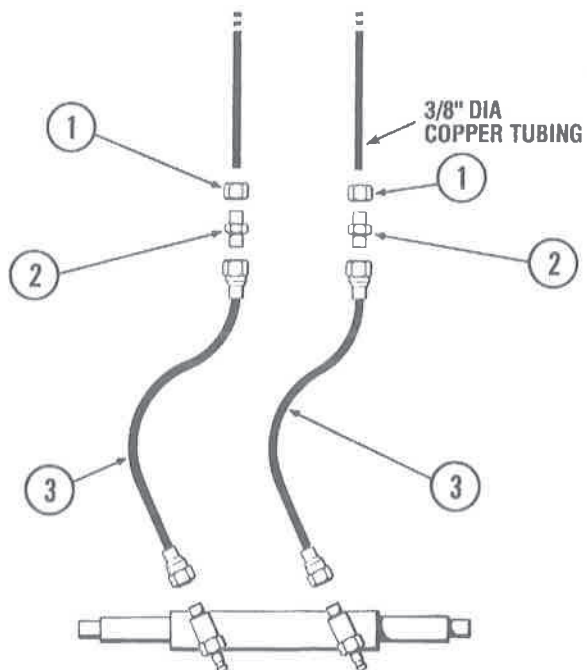


Figure 9-17.

## CAUTION

**DO NOT** cut SeaStar Outboard Steering hose. Once cut there is no means to field swage fittings to the ends of the hoses.

# SeaStar Kicker Cable Tie Bar



This new member of the SeaStar family allows users to manually steer an auxiliary engine (kicker/trolling motor) using their existing SeaStar Hydraulic Steering system. This is accomplished with a variety of solid mechanical linkages between the main steering cylinder and the auxiliary engine. SeaStar Solutions has developed a patent pending design that incorporates a XTREME cable as the linkage between the two engines.

## Key Features

- Flexible cable allows for adjustable locations of kicker motor.
- Allows independent trim/tilt of both engines.
- Allows full steering stroke of both engines.
- Simplified installation using universal ABYC steering connection (as per ABYC P17 & P21 standards) on kicker motors.
- Retrofitable to SeaStar Front Mount Cylinders, part numbers HC5345, HC5358, HC5348, HC5345-3, HC5358-3 and HC5348-3 ONLY or the HC5445-3.
- Incorporates unique patented cable technology.
- Kicker can be mounted on either side of the main engine(s).

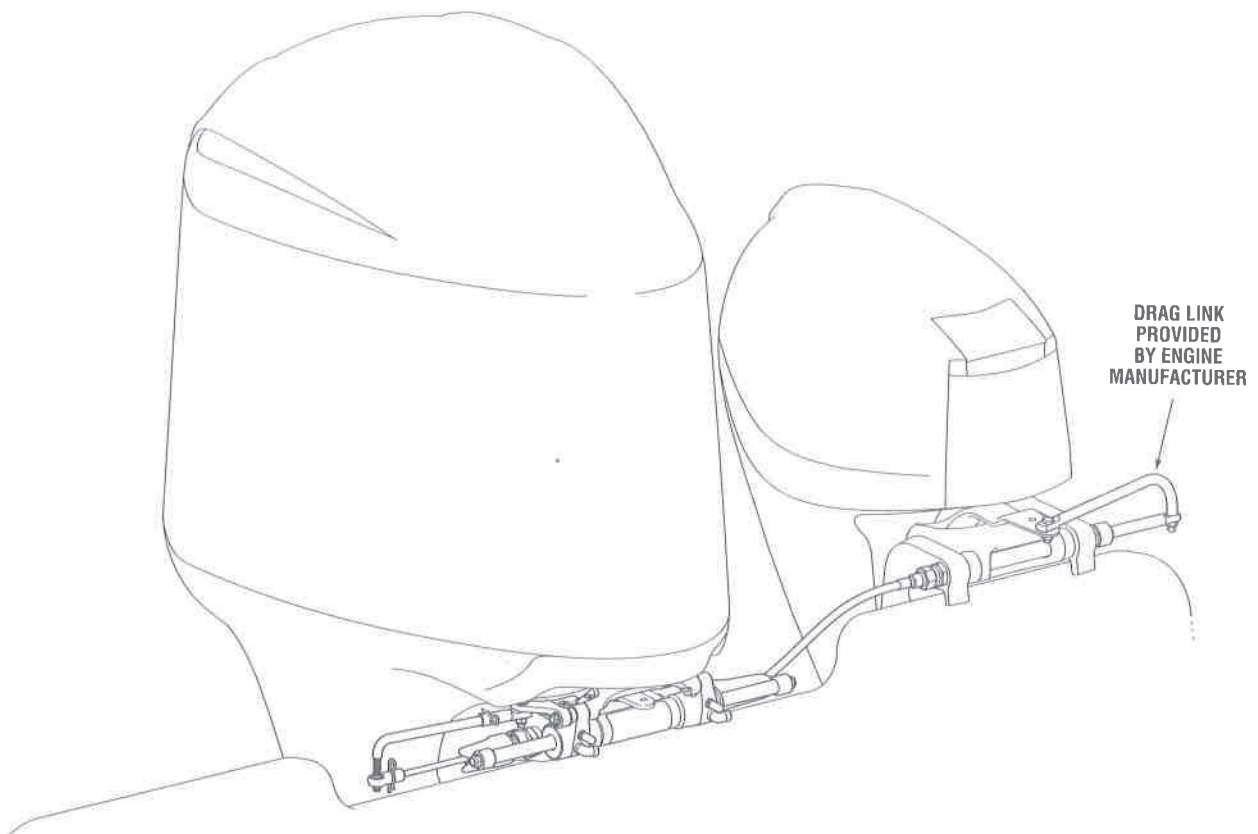


Figure 9-18.

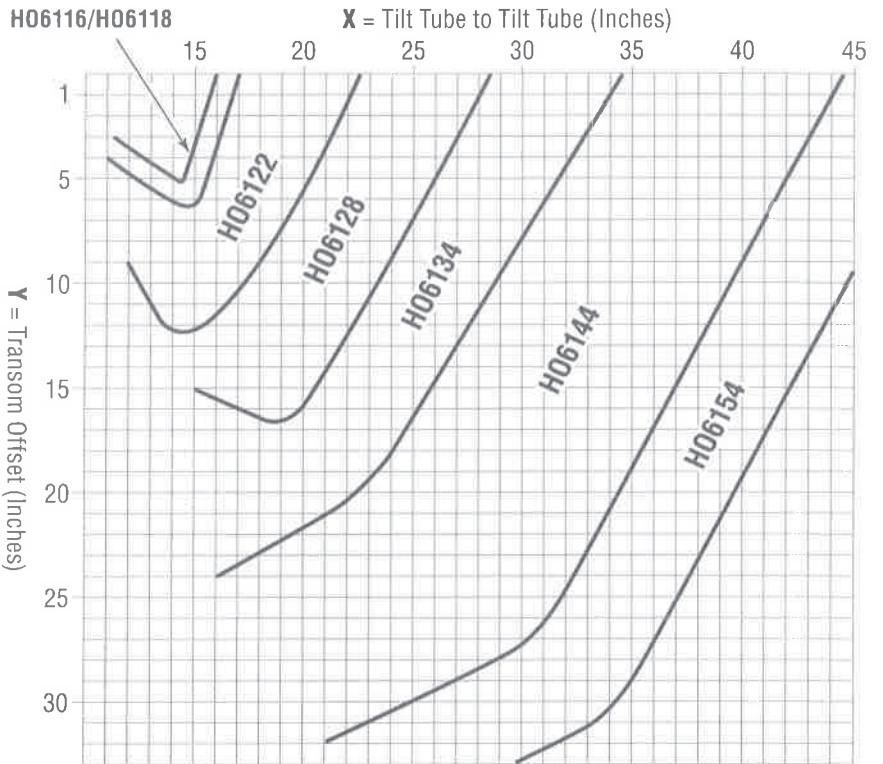
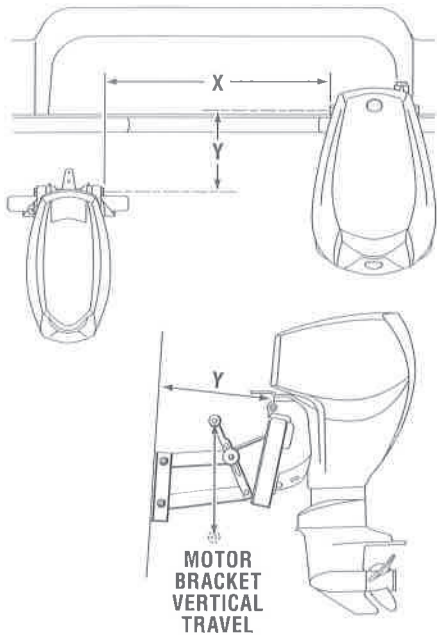
### CAUTION

Contact Seastar technical support when using on BF200–BF250 engines.

## Measuring Cable Length

Jackplate Vertical Travel	Add to 'X' Dimension
10" — 12"	X + 3"
13"	X + 4"
14" — 15"	X + 5"
16" — 20"	X + 6"

Table 9-12.



1. For a Kicker installed on a motor bracket, add additional length to X dimension.
2. For Main engine installed on a motor bracket add an additional 2" to X dimension.
3. Kicker cable tie bar systems require a minimum clearance of 14" from the end of the tilt tube towards the motor side well gunnel.
4. Longer cable lengths are available. Contact SeaStar Solutions for more information.

Figure 9-19.

### ⚠ CAUTION

**DO NOT install on applications that are outside of the cable ranges. Doing so may lead to irreparable damage to the Kicker Cable Tie Bar.**

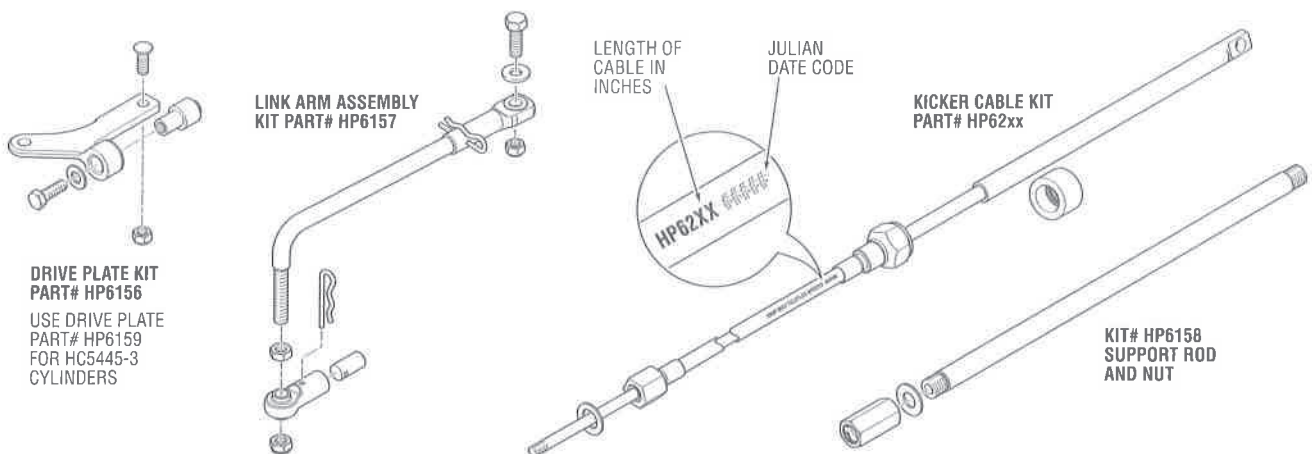


Figure 9-20.



# SeaStar Autopilot Pumps and SmartSticks

## SeaStar Autopilot Pump

Part# AP1219, AP1233  
AP2419, AP2433

The SeaStar Autopilot pump is a fixed flow, reversible type set that uses an internal hydraulic gear pump, producing very little vibration or noise. It is offered in 12 and 24 volt configurations, as well as two different pump sizes (type 1 & type 2). It can be used as a stand alone pilot pump or can be mounted to a previously installed SeaStar Power Assist unit and can prevent the need to break into the hydraulic lines.

### Features

**SEASTAR**  
P/A



Figure 9-21.

- Long life DC Motor (i.e. long life brushes)
- Compact design
- Simplified installation
- Low power consumption
- ABYC, CE and J1171 compliant
- Superior corrosion resistance
- Quiet operation
- Mounting bracket included
- Stand alone or mounts to SeaStar Power Assist unit
- Replaces other 12 and 24 volt pumps

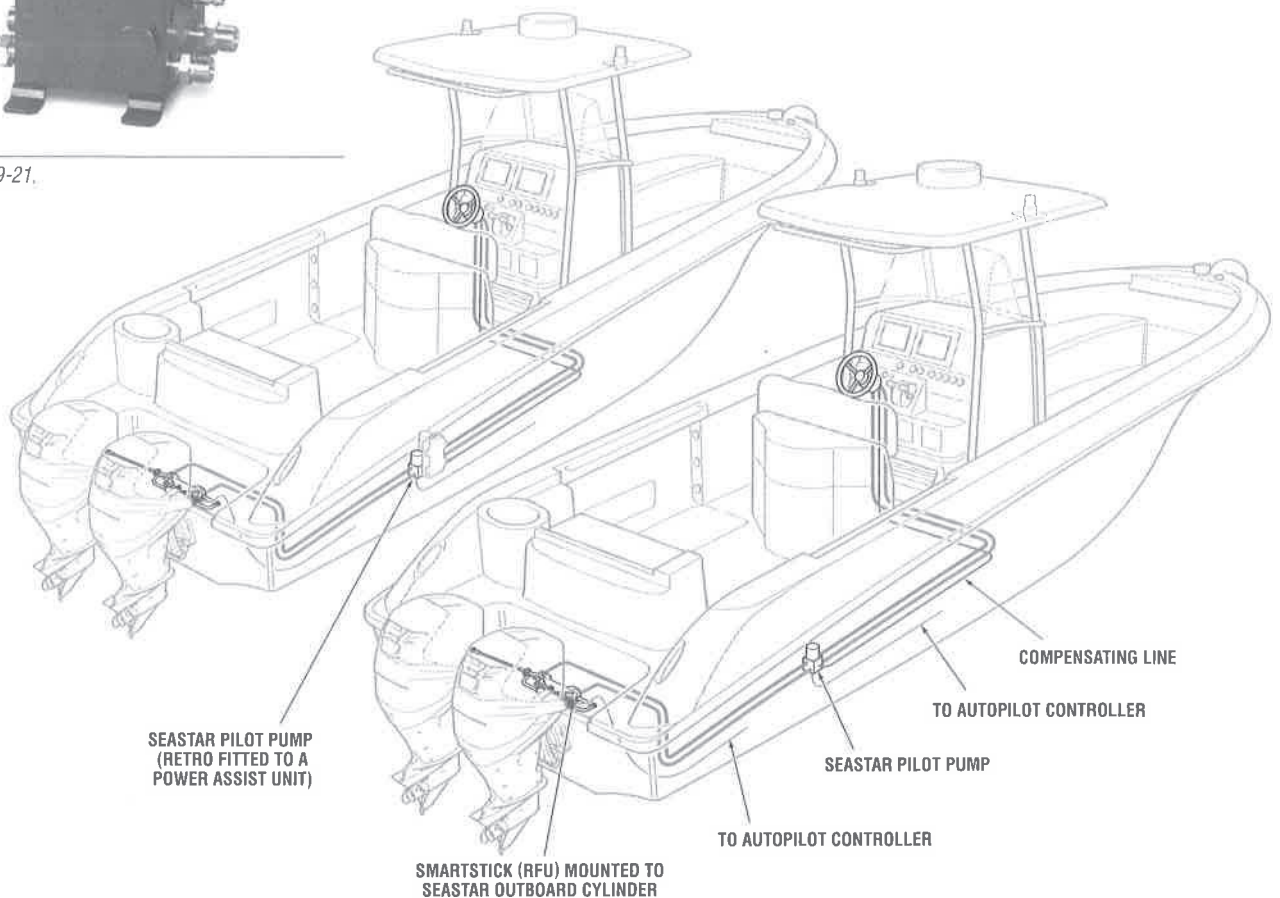


Figure 9-22.

## Technical Data

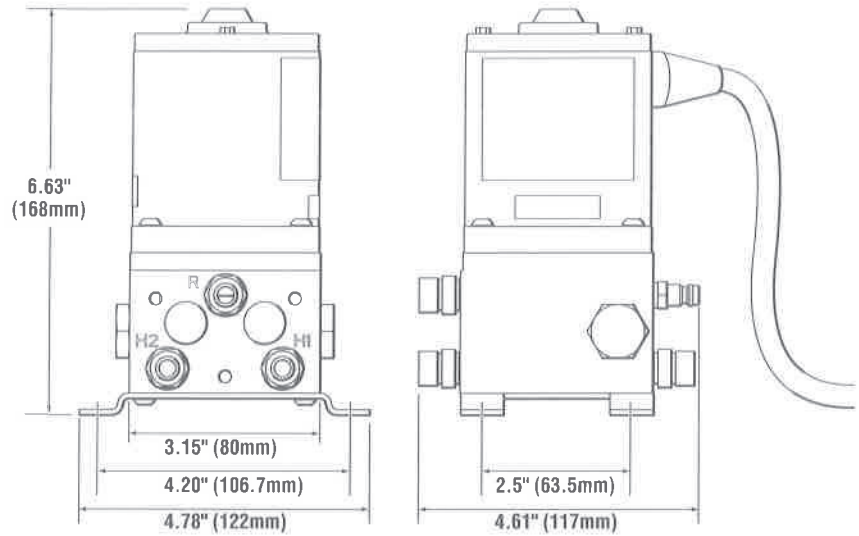


Figure 9-23.

## Technical Specifications

<b>Voltage</b>	12 Volt or 24 Volt
<b>Fittings</b>	Compatible with Standard SeaStar Hoses (H051xx etc)
<b>Wire: Length / Gauge / Connector</b>	24" / 12 awg / None-Bare Leads
<b>Oil Compatibility</b>	SeaStar Steering Fluid (MIL 5606)
<b>Weight</b>	4.9 lbs (2.2 kg)
<b>Autopilot Pump Size</b>	Type 1: 60 in <sup>3</sup> /min (no-load) Type 2: 100 in <sup>3</sup> /min (no-load)
<b>Maximum Pressure</b>	1000 psi
<b>Typical Current Draw</b> (Depending on Application)	12V Type 1: 4 – 8 amps 12V Type 2: 5 – 11 amps 24V Type 1: 2 – 4 amps 24V Type 2: 3 – 6 amps
<b>Autopilot Cylinder Capacity</b>	Type 1 4.9 in <sup>3</sup> - 12.5 in <sup>3</sup> Type 2 12.5 in <sup>3</sup> - 21 in <sup>3</sup>

Table 9-12.

## Ordering Information

Description	Part #
Type 1 – 12V – 60cu.in/min	AP1219
Type 2 – 12V – 100cu.in/min	AP1233
Type 1 – 24V – 60cu.in/min	AP2419
Type 2 – 24V – 100cu.in/min	AP2433

Table 9-13.

**NOTE:** Retrofit kit part # HA1205 will be required to mount to a PA1200-2 Power Assist Pump.

## SeaStar SmartStick

Part # AR4502RM, AR4502SI  
AR4502

SmartStick is a non-contact autopilot position sensor that mounts to SeaStar Solutions outboard front mount cylinders (HC5345-3, HC5358-3\*).

The new SmartStick models replace the previous generation AR4102 and AR4202 models. There are three new SmartStick models available.

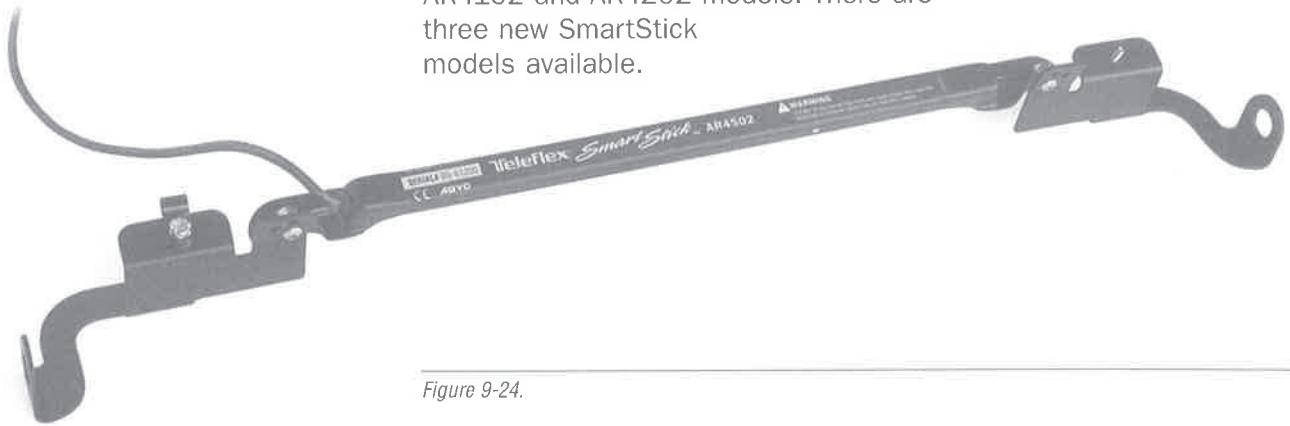


Figure 9-24.

\* HC5358-3 must be installed on Yamaha and Evinrude engines with AR4502 series SmartSticks to ensure adequate clearance. Installing AR4502 series with HC5345 on Yamaha and Evinrude outboards may result in interference between the sensor and the cylinder.

## Applications

- Non-contact sensing – no moving parts to wear
- Convenient installation – no linkages or external parts to mount
- Electrical components sealed in potting – corrosion resistant

## SmartStick Enhancements Include:

- No external black box – electronics integrated into sensor body, making cable easy to route through rigging with no splicing
- 35' of cable can be trimmed to any length and jacket is labelled
- Digital Electronics are more immune to electromagnetic interference (EMI) – cleaner signal allows autopilot to perform better
- Installation of sensor is more convenient and faster
- Part Numbers are autopilot specific, no jumpers to cut
- Lower cost

## Technical Specifications

AR4502 SERIES	
<b>Range</b>	8.0"
<b>Resolution</b>	0.012"
<b>Linearity</b>	0.048"
<b>Repeatability</b>	0.024"
<b>Environmental Resistance</b>	<ul style="list-style-type: none"> <li>• Salt Spray 1000 hours</li> <li>• IEC IP67 (Submersible to 1m)</li> <li>• Immune to dirt, oil, SAE Fluids</li> <li>• Thermal Shock and Vibration Resistant (MIL-STD810F)</li> </ul>

Table 9-14.

## Ordering Information

Model	Autopilot	Output
AR4502RM	Ray Marine Installations Only	2.2V to 2.8V
AR4502SI	SimRad Installations Only	2.8kHz to 4.0kHz
AR4502	Generic	0.5V to 4.5V

Table 9-15. HA5479 – Low Profile Magnet is required for -3 cylinders.