

Capilano inboard steering

Uncompromising Design. Capilano steering stands for ruggedness and reliability worldwide. Helms include a variable displacement feature enabling the helmsman to adjust the number of steering wheel turns to suit maneuvering and weather conditions. Capilano systems install easily and give years of dependable service.

SeaStar®
capilano

CAPILANO 1250V/1275V SYSTEM

Features:

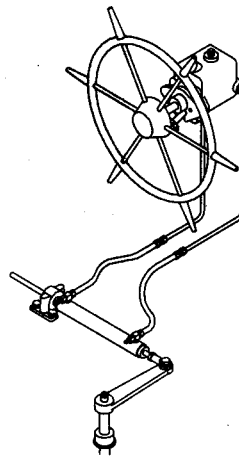
- Variable displacement helms for adjustable number of steering wheel turns.
- Heavy duty brass cylinders with bleed fittings; chrome-plated stainless steel rods.
- Stainless steel and bronze mounting hardware.
- Easy installation on single and dual rudder vessels.
- Systems are not air-pressurized; no air leaks or pressure drops; separate reservoir not needed.
- Built-in pressure relief in helm protects system from effects of thermal expansion.
- Standard 3/4" tapered steering shaft.
- Meets ABS/Lloyd/Det Norske Veritas specifications.

Applications:

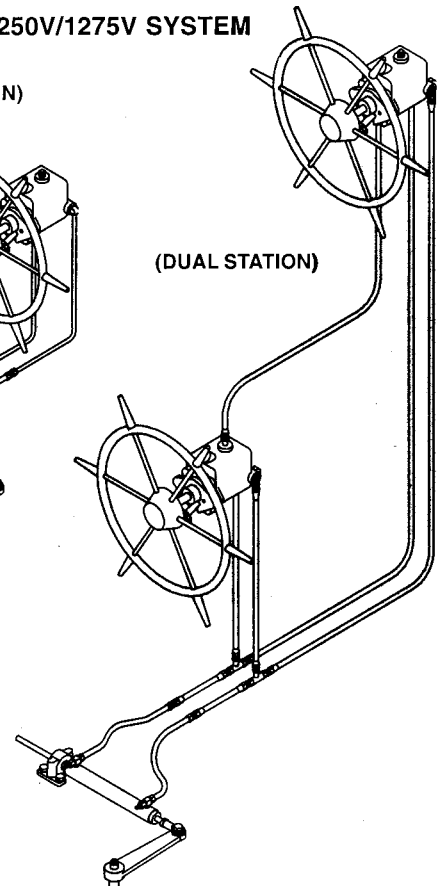
Most inboard powered boats with single or dual engines including planing/displacement hull craft from 30-55 feet in length. Suitable for dual station use with the purchase of extra helm, tubing/hose & fittings. Capilano systems use Dexron II® type ATF fluid.

(turns vary by system)

(SINGLE STATION)



(DUAL STATION)



How to Spec a System:

1. From the application guide select components appropriate for the vessel based on:
 - a) hull type — displacement or planing;
 - b) length of vessel; and
 - c) number of steering wheel turns desired.
2. Select the fitting and hose kits required, based on type of plumbing (1/2" or 5/8" tubing or hose) and based on number of steering stations.
3. Confirm that there is sufficient space available in the dash and engine compartment(s) for the steering components.

Capilano inboard steering

Components:

Capilano 1250V Helm HH5250 or
Capilano 1275V Helm HH5275
(See application guide.)

Inboard Cylinder HC53__
(See application guide.)

Copper Tubing 1/2" or 5/8" OD
(See application guide.)

Fitting Kit (for 1/2" Copper Tubing) ... HF5590 or
Fitting Kit (for 5/8" Copper Tubing) HF5592
(See application guide.)

These fitting kits are for one steering station (purchase add-a-station kit for 2nd station).

Hose Kit for Copper Tubing (2 hoses) .. HA5731
This hose kit contains two 18" (.45m) hoses for single-cylinder installations.

Options:

Dual Cylinder Hose 2' (.6m) HA5732
Dual Cylinder Hose 3' (.9m) HA5733
Dual Cylinder Hose 4' (1.2m) HA5734
Dual Cylinder Hose 5' (1.5m) HA5735
Dual Cylinder Hose 6' (1.8m) HA5736

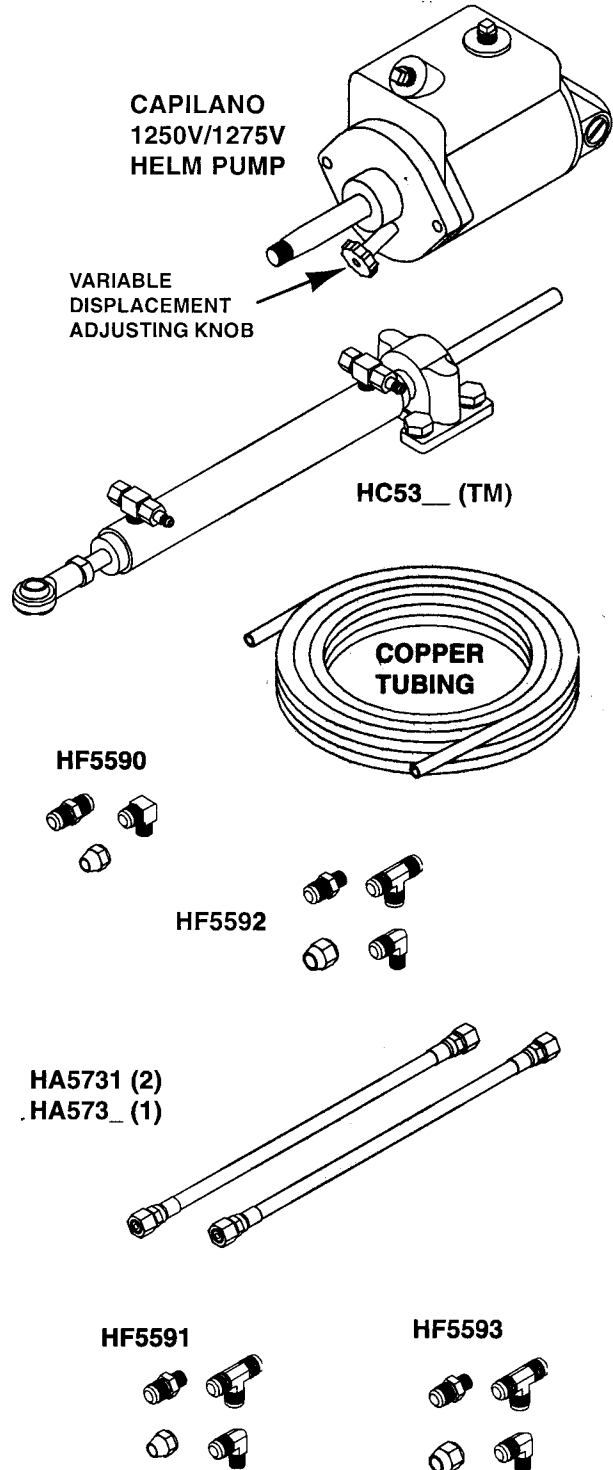
These hoses are sold individually (four are required for dual cylinder installations).

Fixed Mount Cylinder (13.3 cu. in.)
(one ball joint end) K-22
Fixed Mount Cylinder (13.3 cu. in.)
(two ball joint ends) K-27
Pivot Mount Cylinder (25.5 cu. in.) K-31
Universal Mount Cylinder (39.2 cu. in.) K-8
Universal Mount Cylinder (55 cu. in.) K-9

Add-A-Station Fitting Kit (1/2" tubing) .. HF5591
Add-A-Station Fitting Kit (5/8" tubing) .. HF5593
Helm Remote Fill Kit (through-dash) HA5450

Service Items:

Steering Fluid Dexron II® ATF
Steering Wheel Locknut 747521



Capilano inboard steering

Application Guide: Capilano 2-Line Inboard Steering

This application guide should be used with discretion. The chart below is only a guide to selecting a steering system.

A steering system manufacturer cannot anticipate all the variables in boat-rudder design that affect steering loads. It is the final responsibility of the boat designer/builder to specify maximum expected steering loads.



If the required information is not available, contact us with rudder dimensions, vessel size and anticipated maximum vessel speed for a recommendation.

Definitions of terms used in the charts on these pages:

Planing Hull: maximum hull speed normally exceeds 18 knots.

Displacement Hull: maximum hull speed does not normally exceed 18 knots.

Diameters: Copper tubing diameter shown is O.D. Hose diameter shown is I.D.

FOR VESSEL SIZES UP TO:	HELM PUMP MODEL	STEERING WHEEL TURNS ADJUST. RANGE Min.-Max.	REQUIRES CYLINDER MODEL (2x = 2 cylinders)	TUBING/HOSE DIAMETERS when distance from Cylinder to farthest Helm is:		MAXIMUM OUTPUT TORQUE FROM CYLINDER(S)	
				40 Feet or Less	40 Feet or More	In.-Lb.	Kg m
PLANING HULLS: 							
35' (11m)	1250V	3 - 6	BA150-7TM_	1/2"	N/A	6,548	75
40' (12m)	1250V	4 - 8	BA175-7TM_	1/2"	N/A	8,795	100
50' (15m)	1250V	5.5 - 11	BA200-7TM_	1/2"	5/8"	12,134	140
50' (15m)	1275V	3.5 - 7	BA200-7TM_	1/2"	5/8"	12,134	140
50' (15m)	1275V	4 - 8	2x BA150-7TM_	1/2"	5/8"	14,766	170
55' (17m)	1275V	5.5 - 11	BA200-11 TM_	1/2"	5/8"	19,900	230
55' (17m)	1275V	5.5 - 11	2x BA175-7TM_	1/2"	5/8"	19,902	230
60' (18m)	1275V	7.5 - 15	2x BA200-7TM_	1/2"	5/8"	26,322	300
DISPLACEMENT HULLS: 							
30' (9m)	1250V	3 - 6	BA150-7TM_	1/2"	N/A	6,548	75
38' (11.5m)	1250V	4 - 8	BA175-7TM_	1/2"	N/A	8,795	100
45' (14m)	1250V	5.5 - 11	BA200-7TM_	1/2"	5/8"	12,134	140
45' (14m)	1275V	3.5 - 7	BA200-7TM_	1/2"	5/8"	12,134	140
45' (14m)	1275V	4 - 8	2x BA150-7TM_	1/2"	5/8"	14,766	170
50' (15m)	1275V	5.5 - 11	BA200-11 TM_	1/2"	5/8"	19,900	230
50' (15m)	1275V	5.5 - 11	2x BA175-7TM_	1/2"	5/8"	19,902	230
50' (15m)	1275V	7.5 - 15	2x BA200-7TM_	1/2"	5/8"	26,322	300

NOTE: Theoretical torque about pivot point at 35 degree articulation with 1,000 PSI (70 BAR) system pressure.

Phone: 800-225-0004  Fax: 908-486-1056
e-mail: sales@sealandpower.com

Capilano inboard steering

Helm Options

A unique variable displacement feature on the helm allows the number of steering wheel turns to be adjusted by the helmsman to his preference within a pre-determined range.

Tubing/Hose Options

We recommend use of soft refrigeration type copper tubing for optimum performance. If hose must be used, select a hydraulic hose rated for 1000 PSI (70 bar) working pressure, and with a very low volumetric expansion rating. A hydraulic hose that expands too much at 500 PSI (35 bar) will make the steering spongy.

Cylinder Options

Cylinders are made from brass & stainless steel. Available with stainless rod & ball joint (TMB models) or stainless rod & bronze clevis (TMC models.) Cylinders with ball joints have 2-axis articulation.

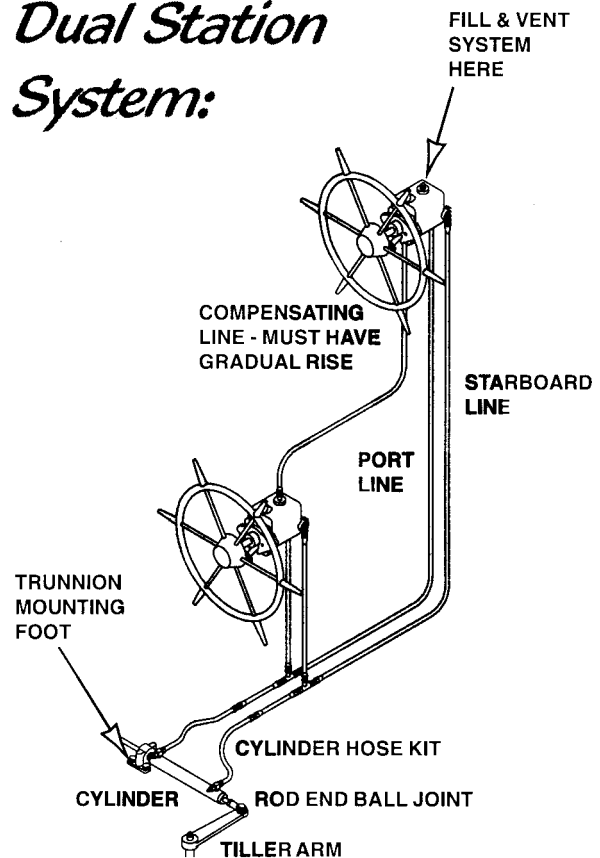
PART NO.	DESCRIPTION/MODEL/ROD END CONFIG.
7" STROKE MODELS:	
HC5349	Cylinder BA150-7TMB (rod end ball joint)
HC5350	Cylinder BA175-7TMB (rod end ball joint)
HC5351	Cylinder BA200-7TMB (rod end ball joint)
HC5355	Cylinder BA150-7TMC (rod end clevis)
HC5356	Cylinder BA175-7TMC (rod end clevis)
HC5357	Cylinder BA200-7TMC (rod end clevis)
11" STROKE MODELS:	
HC5378	Cylinder BA200-11TMB (rod end ball joint)
HC5379	Cylinder BA200-11TMC (rod end clevis)

Also available are fixed mount cylinders K-22/ K-27 (13.3 cu. in. displacement); pivot mount cylinder K-31 (25.5 cu. in.); and universal mount cylinders K-8 (39.2 cu. in.) and K-9 (55 cu.in.). Number of wheel turns is based on total cylinder displacement divided by helm displacement.

HELM PART #	MODEL	DISPLACEMENT ADJUSTMENT RANGE	RELIEF VALVE SETTING
HH5250	1250V	1.7-3.4 cu.in. (27.8-55.7 cc)	1000 PSI (70 BAR)
HH5275	1275V	2.7-5.4 cu.in. (44.2-88.4 cc)	1000 PSI (70 BAR)

HELM TYPE	DISTANCE — CYLINDER TO FURTHEST HELM	
	40 Feet or Less	More Than 40 Feet
1250V	1/2" O.D. Copper Tubing	5/8" O.D. Copper Tubing
	1/2" I.D. Hydraulic Hose	5/8" I.D. Hydraulic Hose
1275V	5/8" O.D. Copper Tubing	5/8" O.D. Copper Tubing
	5/8" I.D. Hydraulic Hose	5/8" I.D. Hydraulic Hose

Typical Capilano Dual Station System:



Phone: 800-225-0004 Fax: 908-486-1056
e-mail: sales@sealandpower.com

Hynautic inboard steering

SeaStar offers rugged 3-line Hynautic Heavy Duty steering systems for most work and pleasure vessels up to 70 feet.

Heavy Duty helms combine one or two bi-directional axial piston pumps with pilot check and make-up check valving. The result is a unit which prevents rudder feedback, is very efficient (even at low RPM), and is immediately adaptable to multi-station use.

A wide choice of helm displacements and cylinder configurations make it easy to spec a system which can handle a variety of large boat performance requirements and accommodate most user preferences.

Features:

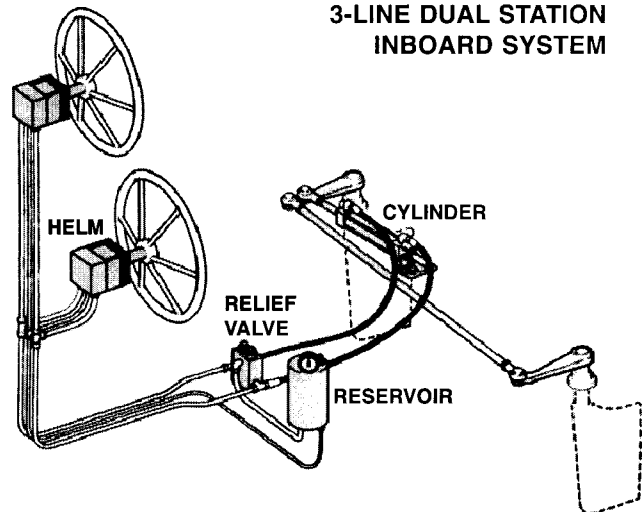
- Low friction heavy duty hydraulic steering.
- Helm/cylinder combinations for most inboards. Marine grade materials.
- Heavy duty helms available in three displacements, to accommodate most applications and user preferences.
- Helms available with 1" straight shaft or 3/4" tapered. Mount facing any direction.
- Quick air purge relief valve.
- Fluid fill at remote reservoir.
- Heavy duty brass cylinders. Two-axis articulation. Easy installation for single or dual rudder vessels.
- Meets or exceeds applicable standards.
- Accepts most steering wheels.

(turns vary by system)

SeaStar®

Hynautic®

**HYNAUTIC®
3-LINE DUAL STATION
INBOARD SYSTEM**



How to Spec a System:

1. From the application guide select components appropriate for the vessel based on:
 - a) hull type — displacement or planing;
 - b) length of vessel; and
 - d) number of steering wheel turns desired.
2. Select the fitting and hose kits required, based on type of plumbing (1/2" or 5/8" tubing or hose) and based on number of steering stations.
3. Confirm that there is sufficient space available in the dash and engine compartment(s) for the steering components.

Hynautic inboard steering

Components:

Hynautic 2.75 cu. in. helm (1" straight shaft)	H-21 or
Hynautic 2.75 cu. in. helm (3/4" tapered shaft)	H-25 or
Hynautic 4.0 cu. in. helm (1" straight shaft)	H-42 or
Hynautic 4.0 cu. in. helm (3/4" tapered shaft)	H-42-02 or
Hynautic 5.5 cu. in. helm (1" straight shaft)	H-41 or
Hynautic 5.5 cu. in. helm (3/4" tapered shaft)	H-41-02 or
<i>(See application guide on next page.)</i>	
H-20 Fittings Kit for Main Station	HF-10
H-40 Fittings Kit for Main Station	HF-21

Inboard Cylinder HC53__ or K__
(See application guide on next page. 1 or 2 required.)

Reservoir - Standard (2 quart) R06
Relief Valve (950 PSI) MSV-21
Relief Fittings (1150 & 1175-21-1)..... MSVF-07
Relief Fittings (1175-42-1 & up) MSVF-13
Copper Tubing 1/2" or 5/8" OD
(See application guide on next page.)

Fitting Kit (for 1/2" Copper Tubing) HF5590 or K-__
Fitting Kit (for 5/8" Copper Tubing) HF5592
(See application guide on next page. These fitting kits are for one steering station; purchase add-a-station kit for 2nd station.)

Hose Kit for Copper Tubing (2 hoses) HA5731
Contains two 18" (.45m) hoses for single-cylinder installations.

SeaStar Oil (1 Gallon) HA5440

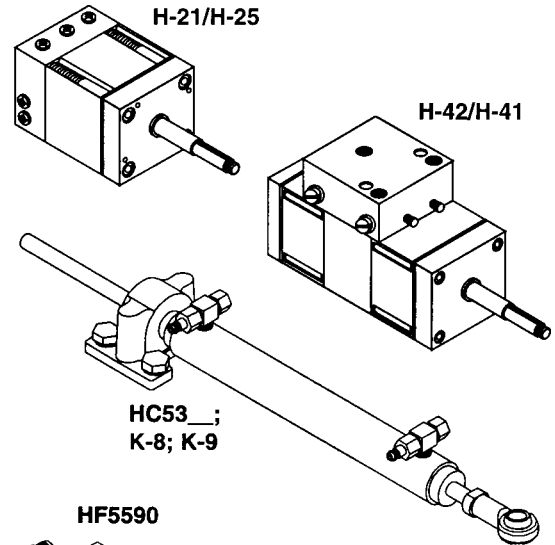
Options:

Pivot Mount Inboard Cylinder K-31
(Systems 8a & 8b; see "Cylinder Options" on p. 117.)

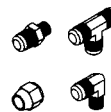
Dual Cylinder Hose 2' (.6m) HA5732
Dual Cylinder Hose 3' (.9m) HA5733
Dual Cylinder Hose 4' (1.2m) HA5734
Dual Cylinder Hose 5' (1.5m) HA5735
Dual Cylinder Hose 6' (1.8m) HA5736

These hoses are sold individually (four are required for dual cylinder installations).

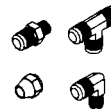
Reservoir (2 quart, with hand pump) R07
Reservoir (1 quart, with hand pump) R11
Reservoir (2 quart) R12
Relief Valve (500 PSI) MSV-19
Reservale (500 PSI, top read, 3/8) RV-55
Reservale (500 PSI, top read, 3/8, w/pump) .. RV-55P
Reservale (500 PSI, top read, 5/16, w/pump) RV-57
Reservale (950 PSI, top read, 5/16) RV-60
Reservale (950 PSI, frt.read, 5/16, w/pump) RV-67
H-20 Fittings Kit for Second Station HF-11
H-40 Fittings Kit for Second Station HF-22



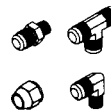
HF5590



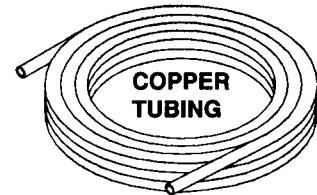
HF5592



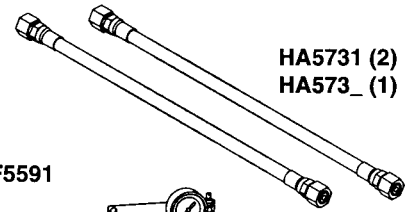
HF5591



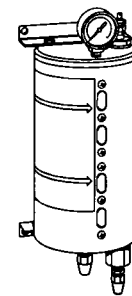
HF5593



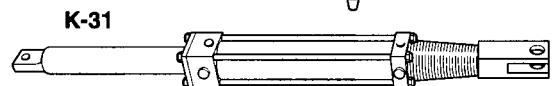
COPPER TUBING



HA5731 (2)
HA573 (1)

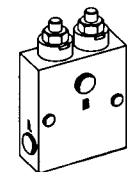
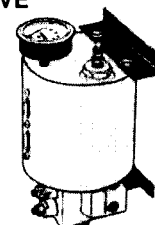


RESERVOIR
(R06 shown)








K-31

RESERVAVE
(RV55 shown)



RELIEF VALVE
(MSV-21 shown)

Application Guide: 3-Line Inboard Steering

FOR VESSEL SIZES UP TO:	HELM PUMP MODEL	STEERING WHEEL TURNS	REQUIRES CYLINDER MODEL (2x = 2 cylinders)	TUBING DIAMETERS		MAX. SUGG. H.P.	MAX. SUGG. AREA FEET (meters)
				when distance from Cylinder to farthest Helm is: 40 Feet or Less	40 Feet or More		
PLANING HULLS: 							
35-50' (11-15m)	H-21 or H-25	5.0	HC5350 or HC5356	1/2"	5/8"	450	—
40-50' (10-18m)	H-21 or H-25	6.8	HC5351 or HC5357	1/2"	5/8"	750	—
40-50' (10-18m)	H-42	4.7	HC5351 or HC5357	1/2"	5/8"	750	—
45-60' (14-18m)	H-42	7.4	HC5378 or HC5379	1/2"	5/8"	950	—
45-60' (14-18m)	H-41	5.4	HC5378 or HC5379	1/2"	5/8"	950	—
55-65' (17-20m)	H-41	5.4	HC5378 or HC5379	1/2"	5/8"	1200	—
to 70' (to 21m)	H-41	10.8	2x HC5378 or HC5379	1/2"	5/8"	1500	—
to 70' (to 21m)	H-41	14.2	2x K-8	1/2"	5/8"	1500	—
DISPLACEMENT HULLS — TUG BOATS, NET HAULERS: 							
to 30' (6-9m)	H-21 or H-25	5.0	HC5350 or HC5356	1/2"	5/8"	200	—
30-35' (6-11m)	H-21 or H-25	6.8	HC5351 or HC5357	1/2"	5/8"	250	—
30-35' (6-11m)	H-42	4.7	HC5351 or HC5357	1/2"	5/8"	250	—
26-40' (8-12m)	H-42	7.4	HC5378 or HC5379	1/2"	5/8"	400	—
26-40' (8-12m)	H-41	5.4	HC5378 or HC5379	1/2"	5/8"	400	—
30-45' (9-14m)	H-41	5.4	HC5378 or HC5379	1/2"	5/8"	450	—
to 50' (to 15m)	H-41	10.8	2x HC5378 or HC5379	1/2"	5/8"	500	—
to 50' (to 15m)	H-41	14.2	2x K-8	1/2"	5/8"	500	—
to 50' (to 15m)	H-41	20.0	2x K-9	1/2"	5/8"	500	—
DISPLACEMENT HULLS — WORK & PLEASURE BOATS: 							
to 40' (9-12m)	H-21 or H-25	5.0	HC5350 or HC5356	1/2"	5/8"	300	—
40-45' (12-14m)	H-21 or H-25	6.8	HC5351 or HC5357	1/2"	5/8"	350	—
40-45' (12-14m)	H-42	4.7	HC5351 or HC5357	1/2"	5/8"	350	—
40-55' (12-17m)	H-42	7.4	HC5378 or HC5379	1/2"	5/8"	500	—
40-55' (12-17m)	H-41	5.4	HC5378 or HC5379	1/2"	5/8"	500	—
45-65' (14-20m)	H-41	5.4	HC5378 or HC5379	1/2"	5/8"	650	—
to 75' (to 23m)	H-41	10.8	2x HC5378 or HC5379	1/2"	5/8"	750	—
to 75' (to 23m)	H-41	14.2	2x K-8	1/2"	5/8"	750	—
SAILBOATS — SKEG RUDDER: 							
to 40' (9-12m)	H-21 or H-25	5.0	HC5350 or HC5356	1/2"	5/8"	—	9 (.9)
40-45' (12-14m)	H-21 or H-25	6.8	HC5351 or HC5357	1/2"	5/8"	—	10 (1)
40-45' (12-14m)	H-42	4.7	HC5351 or HC5357	1/2"	5/8"	—	10 (1)
40-52' (12-16m)	H-42	7.4	HC5378 or HC5379	1/2"	5/8"	—	17 (1.6)
40-52' (12-16m)	H-41	5.4	HC5378 or HC5379	1/2"	5/8"	—	17 (1.6)
50-60' (15-18m)	H-41	5.4	HC5378 or HC5379	1/2"	5/8"	—	18 (1.7)
to 65' (to 20m)	H-41	10.8	2x HC5378 or HC5379	1/2"	5/8"	—	20 (1.9)
to 65' (to 20m)	H-41	14.2	2x K-8	1/2"	5/8"	—	20 (1.9)
SAILBOATS — SPADE RUDDER: 							
to 40' (9-12m)	H-21 or H-25	5.0	HC5350 or HC5356	1/2"	5/8"	—	7 (.6)
40-45' (12-14m)	H-21 or H-25	6.8	HC5351 or HC5357	1/2"	5/8"	—	8 (.7)
40-45' (12-14m)	H-42	4.7	HC5351 or HC5357	1/2"	5/8"	—	8 (.7)
35-46' (11-16m)	H-42	7.4	HC5378 or HC5379	1/2"	5/8"	—	15 (1.4)
35-46' (11-16m)	H-41	5.4	HC5378 or HC5379	1/2"	5/8"	—	15 (1.4)
40-50' (12-15m)	H-41	5.4	HC5378 or HC5379	1/2"	5/8"	—	15.5 (1.4)
to 60' (to 18m)	H-41	10.8	2x HC5378 or HC5379	1/2"	5/8"	—	16.5 (1.5)
to 60' (to 18m)	H-41	14.2	2x K-8	1/2"	5/8"	—	16.5 (1.5)

Hynautic inboard steering

Helm Options

Four helms are offered in 3 displacements, as noted in the chart at right. The H-21 helm has a 1" straight wheel shaft; H-25 has a 3/4" tapered shaft. The H-42 and H-41 helms both have a 1" straight wheel shaft.

HELM PART #	DISPLACEMENT RANGE	RELIEF VALVE SETTING
H-21	2.75 cu. in.	950 PSI
H-25	2.75 cu. in.	(66 BAR)
H-42	4.0 cu. in.	950 PSI
H-41	5.5 cu. in.	(66 BAR)

Tubing/Hose Options

Use soft refrigeration type copper tubing for optimum performance. For tube-to-cylinder flex hoses, select a hydraulic hose rated for 1000 PSI (70 bar) working pressure, and with a very low volumetric expansion rating.

HELM TYPE	DISTANCE — CYLINDER TO FURTHEST HELM	
	40 Feet or Less	More Than 40 Feet
ALL	1/2" O.D. Copper Tubing	5/8" O.D. Copper Tubing

Cylinder Options

Cylinders are made from brass & stainless steel. Available with stainless rod & ball joint (TMB models) or stainless rod & bronze clevis (TMC models.) Cylinders with ball joints have 2-axis articulation.

The K-31 is an optional pivot mount cylinder which can be used in the systems numbered "8a" and "8b" on the opposite page. With this cylinder, the number of wheel turns becomes 6.4 (using the H-42 helm) or 4.6 (H-41 helm).

PART NO.	DESCRIPTION/MODEL/ROD END CONFIG.
7" STROKE MODELS:	
HC5350	Cylinder BA175-7TMB (rod end ball joint)
HC5356	Cylinder BA175-7TMC (rod end clevis)
HC5351	Cylinder BA200-7TMB (rod end ball joint)
HC5357	Cylinder BA200-7TMC (rod end clevis)
9.5" STROKE MODEL:	
K-8	Hynautic Cylinder, 2.5" bore (rod end ball joint)
11" STROKE MODELS:	
HC5378	Cylinder BA200-11TMB (rod end ball joint)
HC5379	Cylinder BA200-11TMC (rod end clevis)

The application guide should be used with discretion. The chart is only a guide to selecting a steering system. A steering system manufacturer cannot anticipate all the variables in boat-rudder design that affect steering loads. It is the final responsibility of the boat designer/builder to specify maximum expected steering loads. If the required information is not available, contact our customer service department with rudder dimensions, vessel size and anticipated maximum vessel speed.

Definitions of terms used in the charts on these pages:

Planing Hull: maximum hull speed normally exceeds 18 knots.

Displacement Hull: maximum hull speed does not normally exceed 18 knots.

Diameters: Copper tubing diameter shown is O.D. Hose diameter shown is I.D.

SeaStar inboard steering

The most popular inboard hydraulic steering system offers unmatched comfort and control for today's inboards up to 50 feet. A wide range of helm and cylinder displacements covers most applications.

Features:

- Low friction hydraulic steering system.
- Configurations for most inboards.
- Compact helm has only a 4-7/16" footprint — needs only 3" dash hole (Tilt requires larger hole).
- Standard 3/4" tapered steering shaft.
- Easy installation on single or dual rudders.
- Cylinders supplied with bleeder fittings.
- Regular duty aluminum or heavy duty brass cylinders. Two-axis articulation.
- Meets A.B.Y.C. standards.
- Meets N.M.M.A. certification requirements.
- Accepts steering wheels to 28" (20" for Tilt)

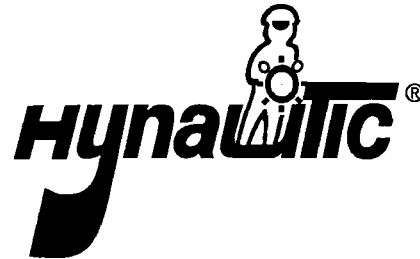
Applications:

Most inboard powered boats with single or dual engines: single engine planing/displacement hull craft from 26-44 feet; dual engine planing hull craft from 26-50 feet; dual engine displacement hull & sail craft from 26-44 feet. Suitable for dual station use with purchase of extra hardware.

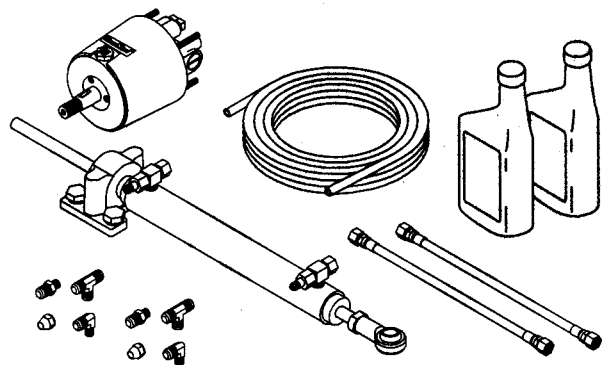
(turns vary by system)



SeaStar®



SEASTAR®
2-LINE
INBOARD SYSTEM



How to Spec a System:

1. From the application guide 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 ordering guide select the appropriate helm and accessory hardware for each steering station.
3. Select fitting/hose kits required from the ordering guide.
4. Confirm that there is sufficient space available in the dash and engine compartment(s) for the steering components. Review helm and cylinder dimensions

SeaStar inboard steering

Components:

- SeaStar 1.7 Helm HH5271 or
SeaStar 2.4 Helm HH5272
(See ordering guide.)
Inboard Cylinder HC53__ or K-?
(See ordering guide.)
3/8" Tubing HT5__ or copper
(See ordering guide.)
Fitting Kit (for Copper Tubing/1.7 helm) HF5507
Hose Kit for Copper Tubing (2 hoses) .. HF5508
SeaStar Oil (1 Quart Mil Spec H5606) . HA5430

Options:

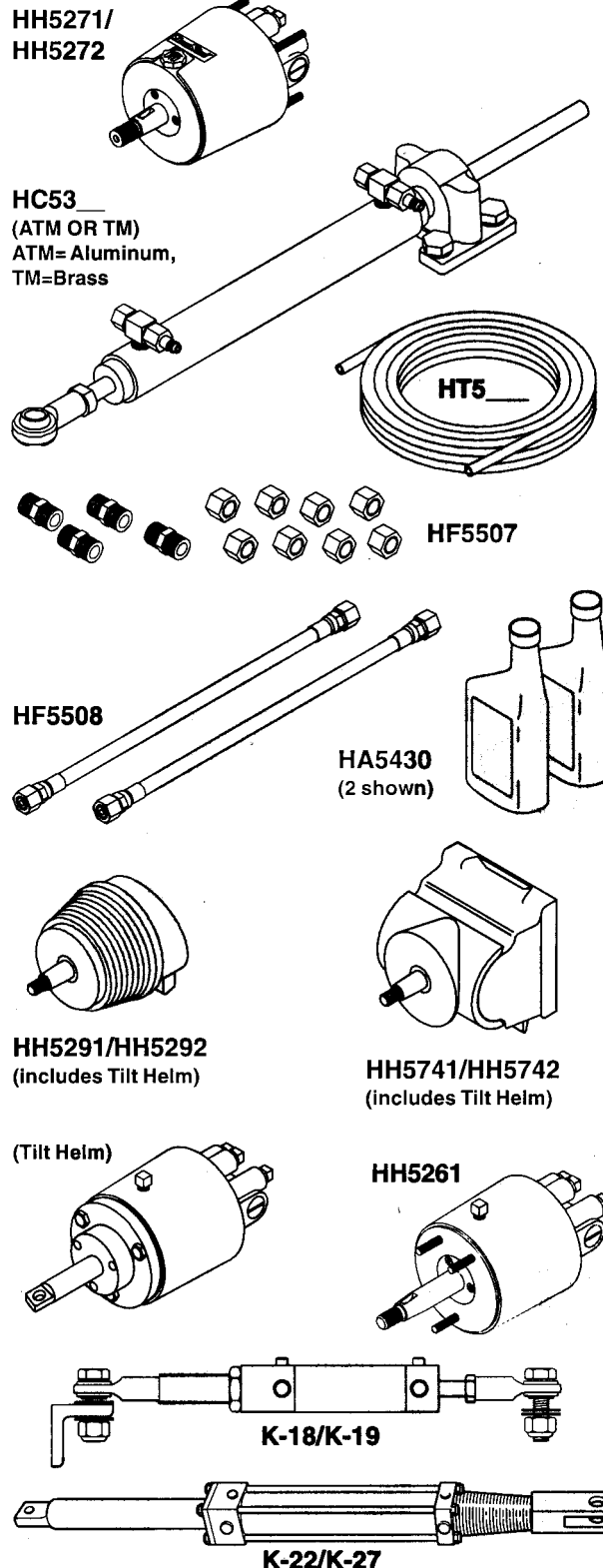
- SeaStar 1.7 Sport Tilt Helm/Mech. HH5291
SeaStar 1.7 Traditional Tilt Helm/Mech. . HH5741
SeaStar 2.4 Sport Tilt Helm/Mech. HH5292
SeaStar 2.4 Traditional Tilt Helm/Mech. . HH5742
SeaStar 1.7 Rear Mount Helm HH5261

- SeaStar 1.7 Commercial Duty Helm HH5217
SeaStar 2.4 Commercial Duty Helm HH5224
(Designed for small Lobster and Crabbing vessels, these helms have a stainless steel shaft with heavy duty seal and wiper, which help protect the helm from the abrasive effects of sediment brought on board with traps or pots.)

- SeaStar Round Bezel Kit HA5417
(Reduces helm protrusion by 3.75")
SeaStar Backplate Kit HA5418
(Reduces helm protrusion by dash thickness and allows clean retrofit of SeaStar helm where following helms were installed: pre-1991 SeaStar, SyTen, and mechanical rotary steering.)
SeaStar 20° Dash Wedge Kit HA5419
Ball Joint Mount Cylinder (7 cu. in.) K-18
Ball Joint Mount Cylinder (9 cu. in.) K-19
Fixed Mount Cylinder (13.3 cu. in.)
(one ball joint end) K-22
Fixed Mount Cylinder (13.3 cu. in.)
(two ball joint ends) K-27
Add-A-Station/Autopilot Fittings Kit HF5502
SeaStar Hose Kit (2 hoses) HO51__

Service Items:

- SeaStar Oil (1 Gallon) HA5440
Steering Wheel Locknut 747521



Application Guide

(inboard steering)

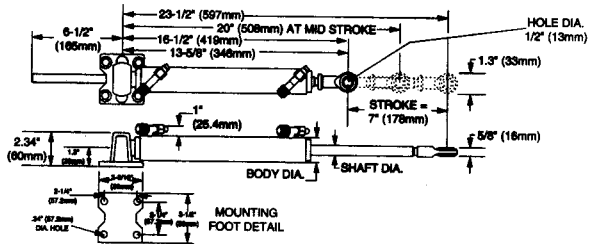
Use "System Numbers" in chart below to select the components from ordering guide on next page.

BOAT TYPE/ LENGTH	System Numbers 1 ENGINE		System Numbers 2 ENGINES	
	Pleasure	Work	Pleasure	Work
PLANING HULLS				
To 26 Ft. (8m)	1	4	1	4
To 32 Ft. (10m)	2	4	1	4
To 38 Ft. (11.5m)	3	5	2	5
To 44 Ft. (13.5m)	5	—	3	5
To 50 Ft. (15m)	—	—	5	—
DISPLACEMENT HULLS				
To 26 Ft. (8m)	2	4	2	4
To 32 Ft. (10m)	3	4	3	4
To 38 Ft. (11.5m)	5	5	3	5
To 44 Ft. (13.5m)	—	—	5	—
To 50 Ft. (15m)	—	—	—	—
SAIL				
To 26 Ft. (8m)	4	4	—	—
To 32 Ft. (10m)	4	4	—	—
To 38 Ft. (11.5m)	4	5	—	—
To 44 Ft. (13.5m)	5	—	—	—
To 50 Ft. (15m)	—	—	—	—

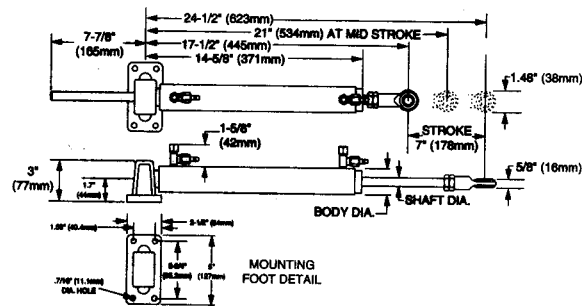
Inboard Cylinder

Dimensions

ATM (ALUMINUM BODY) INBOARD CYLINDERS
P/N HC5312/HC5313/HC5314 (MODEL BA1__7ATM):



TM (BRASS BODY) INBOARD CYLINDERS
P/N HC5318/HC5319 (MODEL BA1__7TM):



Planing Hull: maximum hull speed normally exceeds 18 knots.
Displacement Hull: maximum hull speed does not normally exceed 18 knots.

CYLINDER DIMENSIONS & MOUNTING CONFIGURATIONS SPECIFIC TO MODEL							
CYLINDER MODEL	PART NO.	BODY DIAMETER	SHAFT DIAMETER	DIM.		DIM. C	
				A	B		
BA125-7ATM	HC5312	1.38" (35mm)	.50" (12.7mm)	20" (508mm)	6.5" (165mm)	8.5" (216mm)	
BA135-7ATM	HC5313	1.50" (38mm)	.63" (15.9mm)	20" (508mm)	6.5" (165mm)	8.5" (216mm)	
BA150-7ATM	HC5314	1.75" (45mm)	.63" (15.9mm)	20" (508mm)	6.5" (165mm)	8.5" (216mm)	
BA150-7TM	HC5318	1.75" (45mm)	.63" (15.9mm)	21" (534mm)	8.0" (204mm)	10.0" (254mm)	
BA150-9TM	HC5369	1.75" (45mm)	.63" (15.9mm)	21" (534mm)	8.0" (204mm)	10.0" (254mm)	
BA175-7TM	HC5319	2.00" (45mm)	.75" (19.1mm)	21" (534mm)	8.0" (204mm)	10.0" (254mm)	

Ordering Guide: 2-Line Inboard Steering

ENGINE/CYLINDER CONFIGURATION	COMPONENT DESCRIPTION	QTY. REQ'D	MODEL	PART NO.	
SYSTEM #1 <u>NUMBER OF TURNS: 4.0</u>	CYLINDER	1	BA125-7ATM	HC5312	
	HELM	1	SEASTAR 1.7	HH5271	
	TUBING (SEE NOTES 1 & 3)		3/8" DIA. NYLON	HT5____	
	OIL	3	SEASTAR OIL (QT.)	HA5430	
	FOR EXTRA STEERING STATION, ADD:	HELM	1	SEASTAR 1.7	HH5271
	FITTING KIT	1	ADD A STATION	HF5502	
	EXTRA TUBING (SEE NOTES 1 & 3)		3/8" DIA. NYLON	HT5____	
OIL	1	SEASTAR OIL (QT.)	HA5430		
SYSTEM #2 <u>NUMBER OF TURNS: 5.0</u>	CYLINDER	1	BA135-7ATM	HC5313	
	HELM	1	SEASTAR 1.7	HH5271	
	TUBING (SEE NOTES 1 & 3)		3/8" DIA. NYLON	HT5____	
	OIL	3	SEASTAR OIL (QT.)	HA5430	
	FOR EXTRA STEERING STATION, ADD:	HELM	1	SEASTAR 1.7	HH5271
	FITTING KIT	1	ADD A STATION	HF5502	
	EXTRA TUBING (SEE NOTES 1 & 3)		3/8" DIA. NYLON	HT5____	
OIL	1	SEASTAR OIL (QT.)	HA5430		
SYSTEM #3 <u>NUMBER OF TURNS: 6.0</u>	CYLINDER	1	BA150-7ATM	HC5314	
	HELM	1	SEASTAR 1.7	HH5271	
	TUBING (SEE NOTES 1 & 3)		3/8" DIA. NYLON	HT5____	
	OIL	3	SEASTAR OIL (QT.)	HA5430	
	FOR EXTRA STEERING STATION, ADD:	HELM	1	SEASTAR 1.7	HH5271
	FITTING KIT	1	ADD A STATION	HF5502	
	EXTRA TUBING (SEE NOTES 1 & 3)		3/8" DIA. NYLON	HT5____	
OIL	1	SEASTAR OIL (QT.)	HA5430		
SYSTEM #4 <u>NUMBER OF TURNS: 4.25</u>	CYLINDER	1	BA150-7TM	HC5318	
	HELM	1	SEASTAR 2.4	HH5272	
	TUBING (SEE NOTES 1 & 3)		3/8" DIA. COPPER		
	HOSE KIT	1	SEASTAR HOSE KIT	HF5508	
	OIL	3	SEASTAR OIL (QT.)	HA5430	
	FOR EXTRA STEERING STATION, ADD:	HELM	1	SEASTAR 2.4	HH5272
	FITTING KIT	1	ADD A STATION	HF5502	
EXTRA TUBING (SEE NOTES 1 & 3)		3/8" DIA. COPPER			
OIL	1	SEASTAR OIL (QT.)	HA5430		
SYSTEM #5 <u>NUMBER OF TURNS: 5.5</u>	CYLINDER	1	BA175-7TM	HC5319	
	HELM	1	SEASTAR 2.4	HH5272	
	TUBING (SEE NOTES 1 & 3)		3/8" DIA. COPPER		
	HOSE KIT	1	SEASTAR HOSE KIT	HF5508	
	OIL	3	SEASTAR OIL (QT.)	HA5430	
	FOR EXTRA STEERING STATION, ADD:	HELM	1	SEASTAR 2.4	HH5272
	FITTING KIT	1	ADD A STATION	HF5502	
EXTRA TUBING (SEE NOTES 1 & 3)		3/8" DIA. COPPER			
OIL	1	SEASTAR OIL (QT.)	HA5430		
OPTIONAL EQUIPMENT	BACK PLATE KIT		(FOR STANDARD HELMS)	HA5418	
	20 DEGREE WEDGE		(FOR STANDARD HELMS)	HA5419	
	AUTOPILOT FITTING KIT		(FOR ALL HELMS)	HF5501	
	TILT HELM - SEASTAR 1.7		(TRADITIONAL: HH5741; SPORT:	HH5291)	
	REAR MOUNT HELM - SEASTAR 1.7			HH5261	
	TILT HELM - SEASTAR 2.4		(TRADITIONAL: HH5742; SPORT:	HH5292)	
	REAR MOUNT HELM - SEASTAR 2.4			HH5262	

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 by Fitting Kit HF5507 is required. For systems 4 & 5, copper tubing (3/8" diameter) is the standard requirement for plumbing the system. Fitting Kit HF5508 is required. 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.

Phone: 800-225-0004 ☎ Fax: 908-486-1056
e-mail: sales@sealandpower.com

BayStar outboard steering

With mechanical steering you sacrifice a degree of comfort, and traditional hydraulic systems may be more than is needed on lower horsepower outboard engines. The solution is finally here—BayStar!

Built in the tradition of SeaStar — the industry leading hydraulic steering — BayStar brings the same safety and comfort now common on larger outboards to boats with outboards up to 150 HP.

Features:

- Designed just for smaller outboards.
- Low friction hydraulic steering system.
- 4.5 turns from lock-to-lock.
- Balanced cylinder, featuring a compact design that fits most splashwells.
- Cylinder provides full engine movement.
- Optional five position tilt helm available.
- Compact helm has only a 5" footprint; needs only 3" dash hole (standard or Tilt).
- Packaged complete with helm, cylinder, fittings, tubing, oil, fill kit and detailed instructions.
- Standard 3/4" tapered steering shaft.
- Fast, easy installation.
- Meets A.B.Y.C. standards.
- Meets N.M.M.A. certification requirements.

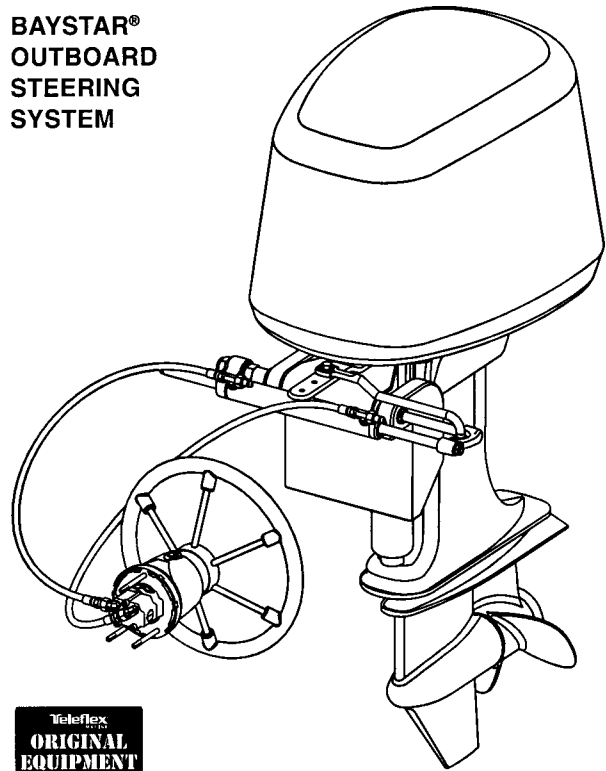
Note: BayStar is NOT suitable for smaller HP outboard engines that use wing nut type transom mount clamping screws.

Applications:

BayStar is for single-outboard powered boats rated up to 150 HP, including runabouts and inflatables — and outboard engines with ABYC standard engine tilt tubes up to 150 HP (total). For single station, single engine use only.

BayStar™

BAYSTAR®
OUTBOARD
STEERING
SYSTEM



(4.5 turns lock-to-lock)

Tilt
STEERING
available!

Phone: 800-225-0004 ☎ Fax: 908-486-1056
e-mail: sales@sealandpower.com

BayStar outboard steering

Complete Systems:

BayStar kits come complete with everything needed for an install: helm, cylinder, tubing, fittings and fluid. For your convenience two lengths of either 20' or 30' cut-to-fit tubing are supplied.

BayStar Steering Kit (20' tubing set) HK4200
BayStar Steering Kit (30' tubing set) HK4230



Components:

BayStar Front Mount Helm HH4016

BayStar Outboard Cylinder HC4600*

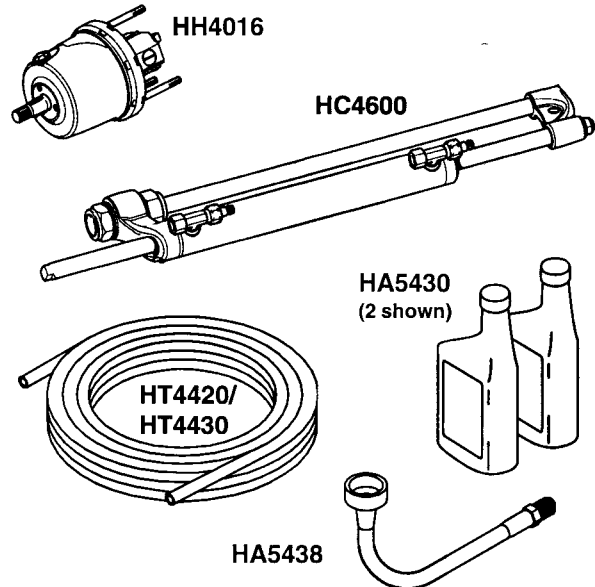
* The cylinder utilizes the outboard engine maker's factory supplied drag link for simplified installation. Please note cylinder dimension requirements. Is the splashwell wide enough? The standard cylinder requires 32" (813mm) splashwell width. Find the dimensions (A, B & C) of your splashwell (see chart and diagram on following pages). Check them against the minimum splashwell dimensions to ensure full movement of engine and cylinder.

HK4200 Tubing (2 x 20' lengths) HT4420

HK4230 Tubing (2 x 30' lengths) HT4430

SeaStar Oil (1 Quart) HA5430 (x2)

BayStar Filler Kit HA5438



Options:

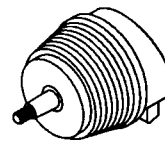
BayStar Sport Tilt Helm/Mech. HH4015

BayStar Compact Cylinder (optional) .. HC4645

BayStar Compact Cylinder (optional) .. HC4647

BayStar Compact Cylinder (optional) .. HC4658

HH4015
(includes
Tilt Helm)

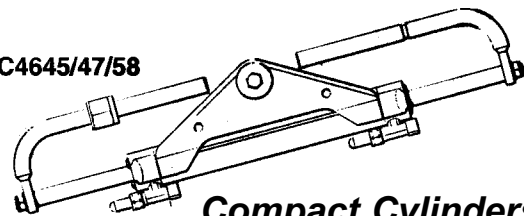


Service Items:

SeaStar Oil (1 Gallon) HA5440

Steering Wheel Locknut 747521

HC4645/47/58



Compact Cylinders

NOTE: HC4600 BayStar standard Cylinder is a universal cylinder, however, ensure it will fit you splashwell. If the splashwell measurements limit the engine to BayStar Compact Steering Cylinders HC4645, HC4647, HC4658, please view the application guide to determine which cylinder is to be used for your engine. BayStar Compact Cylinders are NOT available in kit form, all parts MUST be ordered separately.

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BayStar outboard steering

Compact Cylinders Application Guide:

ENGINE MAKER/ BRAND	YEAR	MODEL	CYLINDER PART NUMBER	NOTES
FORCE	1985 TO DATE	90-150 HP	HC4645	
HONDA	1992 TO DATE	30-90 HP	HC4645	
	1998 TO DATE	115-130 HP	HC4647	
JOHNSON/EVINRUDE <i>Note: Johnson 115 HP 2-stroke engines, required the pivot plate to be flipped. See note #4 below.</i>	1977 TO 1989	65-150 HP	Consult Factory	
	1991 TO DATE	40-150 HP	HC4645	
	1997 TO DATE	115 HP Ficht	HC4658	See note 4.
	1997 TO DATE	75-150 HP Ficht	HC4645	
MERCURY/MARINER	1984 TO DATE	75-150 HP	HC4645	See notes 1,4.
NISSAN	1990 TO DATE	120-140 HP	HC4645	
SUZUKI	1986 TO DATE	150 HP	HC4645	
	1996 ONLY	115-140 HP	N/A	
	1987 TO 2002	115-140 HP	HC4645	See note 1.
	1990 TO 2000	90-100 HP	HC4645	
	1998 TO DATE	40-70 HP 4-stroke	HC4645	See note 1.
TOHATSU	2001 TO DATE	115-140 HP 4-stroke	HC4658	See notes 1,4.
	1990 TO DATE	140-140 HP	HC4645	
YAMAHA	1998 TO DATE	40-50 HP	HC4645	See note 2.
	1998 TO DATE	60 HP	HC4645	See note 3.
	1986 TO DATE	70-90 HP	HC4645	See note 1.
	1997 TO DATE	80-150 HP 4-stroke	HC4645	
	2000 TO DATE	40 & 60 HP 4-stroke	Consult Factory	
YANMAR	1990 TO DATE	27-36 HP	HC4645	See note 1.

NOTES:

- Requires Spacer kit part # HO5090.
- Engine clamp brackets must be cut or ground, and the engine through bolted onto the transom, or interference will occur, restricting engine trim and tilt.
- Steering hook Yamaha Part # 63D-48511-00-4D must be installed.
- Cylinder HC4645 may be used in these applications. The pivot plate will need to be flipped before installation. Instructions provided with Owner's Manual.

Splashwell Size Requirements:

CYL MODEL NO.	NO. OF ENG.	SPLASHWELL DIAG. DIM.			MINIMUM ENGINE CENTER DISTANCE
		A	B	C	
HC4600	1	32" (813 mm)	5" (127 mm)	4" (102 mm)	N/A (N/A)
HC4645/47/58	1	21" (534 mm)	6" (153 mm)	5" (127 mm)	N/A (N/A)

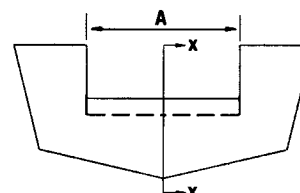
(Twin engine applications not available at this time.)

NOTES:

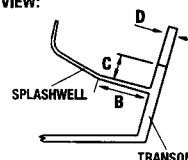
- Ensure there is no interference between the BayStar cylinder rod (starboard side) and the splashwell boot or engine controls & cables.
- Dimensional restrictions also apply to external motor mount brackets.
- Ensure dimension 'A' maintains 32" (813mm) through full trim/tilt range.
- Maximum transom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

REQUIRED SPLASHWELL DIMENSIONS/ MINIMUM ENGINE CENTER DISTANCES:
(refer to chart at left)

REAR VIEW:



SIDE VIEW:



"D" not to exceed 3"

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e-mail: sales@sealandpower.com

SeaStar outboard steering

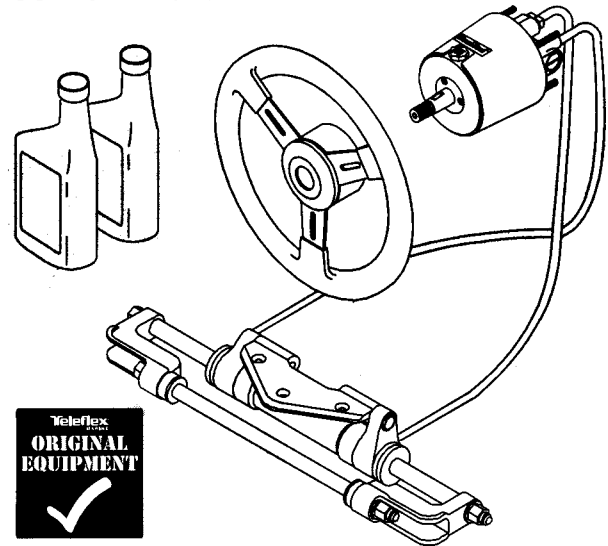
Unmatched comfort and control. Only with SeaStar steering. The world's most popular outboard hydraulic system offers smooth, super-efficient steering for today's high performance hulls with single or multiple outboards up to 600 HP combined. It's the OEM Choice for center consoles, cruisers and more.

SeaStar[®]

Features:

- Patented steering lock valves.
- Low friction hydraulic steering system.
- 5 turns from lock-to-lock (single cylinder).
- Compact helm has only a 4-7/16" footprint; needs only 3" dash hole (Tilt requires larger dash cut out).
- Packaged complete with helm, cylinder, fittings, oil, bleeder kit and detailed instructions.
- Standard 3/4" tapered steering shaft.
- Fast, easy installation.
- Meets A.B.Y.C. standards.
- Meets N.M.M.A. certification requirements.

SEASTAR[®]
FRONT MOUNT CYLINDER
OUTBOARD SYSTEM



Applications:

Single and dual non-power-assisted outboard engines up to 300 HP (600 combined HP for counter-rotating duals) that have ABYC standard engine tilt tube.

Ideal for cruisers, runabouts, center console boats, offshore fishing boats and many more.

Suitable for speeds up to 60 MPH and dual station use (with purchase of extra helm, hose & fittings).

Allows independent engine tilt in dual engine installations. Dual engines require purchase of a tie bar kit and extra hardware.

(5 turns lock-to-lock)

Tilt[™]
STEERING
available!

Note: Use only SeaStar outboard steering hoses (HO51/HO57 type) with SeaStar outboard steering systems. The use of nylon tubing is not recommended for SeaStar outboard steering.

SeaStar outboard steering

Complete Systems:

SeaStar 1.7 Steering Kit (with Hoses) HK63XX
SeaStar 1.7 Steering Kit (no Hoses) HK6400

Components:

SeaStar 1.7 Helm HH5271

Front Mount Outboard Cylinder HC5345*

(See application guide for some engines which may require HC5347, HC5348 or HC5358.)

SeaStar Hose Kit (2 hoses) HO51__

SeaStar Oil (1 Quart) HA5430 (x2)

Options:

SeaStar 2.4 Helm *(see ordering guide)* .. HH5272

SeaStar 1.7 Sport Tilt Helm/Mech. HH5291

SeaStar 1.7 Traditional Tilt Helm/Mech. . HH5741

SeaStar 2.4 Sport Tilt Helm/Mech. HH5292

SeaStar 2.4 Traditional Tilt Helm/Mech. . HH5742

SeaStar 1.7 Rear Mount Helm HH5261

SeaStar 1.7 Commercial Duty Helm HH5217

SeaStar 2.4 Commercial Duty Helm HH5224

(Designed for small Lobster and Crabbing vessels, these helms have a stainless steel shaft with heavy duty seal and wiper, which help protect the helm from the abrasive effects of sediment brought on board with traps or pots.)

SeaStar Round Bezel Kit HA5417

(Reduces helm protrusion by 3.75")

SeaStar Backplate Kit HA5418

(Reduces helm protrusion by thickness of dash and allows clean retrofit of SeaStar helm where following helms were previously installed: pre-1991 SeaStar, SyTen, and mechanical rotary steering)

SeaStar 20° Dash Wedge Kit HA5419

SeaStar Bulkhead Hose Kit (2 hoses) HO81__

(Allows installation through a bulkhead without additional fittings. See Page 14 for more information.)

SeaStar Twin Engine Tie Bar Kit HO5__

(See Application Guides on next two pages.)

Add-A-Station/Autopilot Fitting Kit HF5501

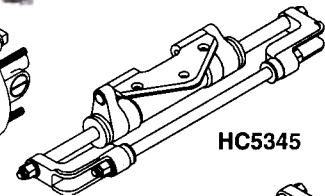
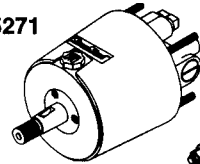
Service Items:

SeaStar Oil (1 Gallon) HA5440

Steering Wheel Locknut 747521

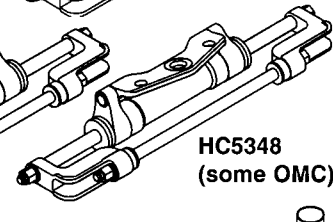
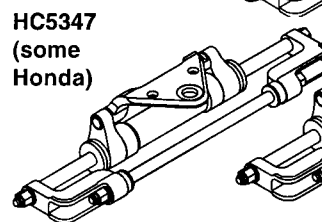


HH5271

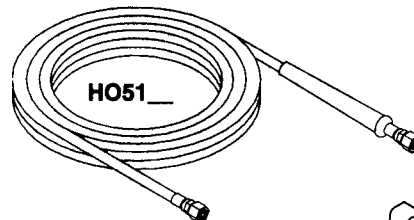


HC5345

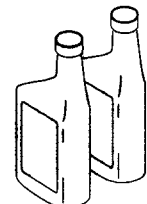
HC5347
(some
Honda)



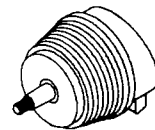
HC5348
(some OMC)



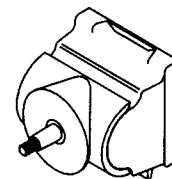
HO51__



HA5430
(2 shown)

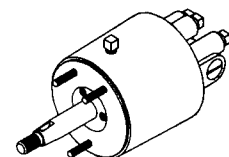
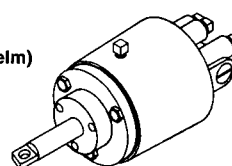


HH5291/HH5292
(includes Tilt Helm)



HH5741/HH5742
(includes Tilt Helm)

(Tilt Helm)



HH5261



HF5501

747521



SeaStar outboard steering

Single & Dual Engine Application Guide:

ENGINE MAKER/ BRAND	YEAR	MODEL	CYLINDER PART NUMBER	TWIN ENGINE 1 CYLINDER TIE BAR KIT (COMPLETE)	TWIN ENGINE 2 CYLINDERS TIE BAR KIT (COMPLETE)	NOTES
FORCE	1985 TO DATE	90-150 HP	HC5345	HO5008A	HO5008A	
HONDA	1996 TO DATE	75-90 HP	HC5345	HO6001	HO6002	See note 3.
	1998 TO DATE	115-130 HP	HC5347	HO5063	HO5064	See note 5.
	1998 TO DATE	30-50 HP	HC5345	HO6001	HO6002	See note 2.
	2001-DATE	150HP 4-stroke	HC5345	HO6003	HO6002	
	2001-DATE	200-225 HP 4-stroke	HC5345	HO6001	HO6002	
JOHNSON/EVINRUDE	1977-1990	65-300 HP	HC5348	HO6001	HO6002	
	1988-1997	250-300 HP V8	HC5342	HO5001A	HO5030	See note 5.
	1991-DATE	40-250 HP	HC5345	HO6003	HO6002	
	1996-DATE	75-250 HP Ficht	HC5345	HO6003	HO6002	
	1998-DATE	40-140 HP 4-stroke	HC5358	HO6003	HO6002	See note 2.
	2000-DATE	115HP Ficht	HC5358	HO6003	HO6002	See note 2.
MERCURY/MARINER	1984 TO 1994	2.4/2.5 EFI	HC5345	HO6001	HO6002	See note 4.
	1989 TO DATE	75-300 HP	HC5345	HO6001	HO6002	See note 3.
	1996-DATE	75-200 HP 2/4-stroke	HC5345	HO6001	HO6002	
	1998 TO DATE	30-60 HP	HC5345	HO6001	HO6002	See note 2.
	2002 TO DATE	225 HP 4-stroke	HC5358	HO6001	HO6002	See note 1.
2003 TO DATE	250 HP XS	HC6345	N/A	(See SKA next page)	See note 6.	
NISSAN/TOHATSU	1990 TO DATE	90-140 HP	HC5345	HO6001	HO6002	
SUZUKI	1986 TO DATE	100 HP	HC5345	HO6003	HO6002	
	1986-2002	115-140 HP	HC5345	HO6001	HO6002	NOT 1996
	1986-DATE	150-250HP 2/4-stroke	HC5345	HO6003	HO6002	
	1996 ONLY	115-140 HP	HC5348	HO6001	HO6002	
	1998 TO DATE	40-140 HP 4-stroke	HC5358	HO6003	HO6002	See note 2.
	2003 TO DATE	90 HP 4-stroke	HC5358	HO6003	HO6002	See note 2.
US MARINE (FORCE)	1996-DATE	90-120 HP	HC5345	HO6001	HO6002	
YAMAHA	1990 TO DATE	40-90 HP	HC5345	HO6003	HO6002	
	1986-DATE	100-250 HP 2-stroke	HC5345	HO6001	HO6002	
	1997-DATE	80-225 HP 4-stroke	HC5358	HO6001	HO6002	See note 1.
	2000-DATE	150-250 HP DI	HC5358	HO6001	HO6002	See note 1.
	2002-DATE	300 HP DI	HC5358	HO6001	HO6002	
	2003-DATE	40-60 HP 4-stroke	HC5348	HO6003	HO6002	See note 2.
YANMAR (DIESEL)	1994 TO DATE	27 & 36 HP	HC5345	HO6001	HO6002	

NOTES:

1. HC5345 is optional for Single Engine ONLY applications. DO NOT use HC5345 for twin engine applications as operational interference may occur.
2. Requires Kit HO5090.
3. Minimum Engine Center = 27"
4. May Require Extensive Cowling Modifications.
5. HO5030 and HO5064 comes without Tie Bar.
6. One cylinder per engine. Must use Mercury supplied tiller bolt for installation.

HO5090 SPACER KIT PARTS LIST

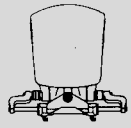
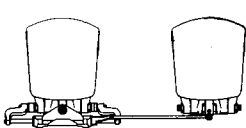
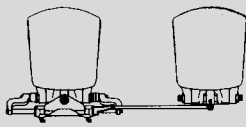
ITEM	P/N	QTY	DESCRIPTION
1	198767	1	Screw 3/8-24 x 1-5/8" Hex Head (Tiller Bolt)
2	113600	1	Fender Washer 3/8" I.D. (stainless steel)
3	773421	1	Spacer 1/2" (aluminum)
4	728994-1	1	Yamaha Spacer 3/16"
5	995876	2	Thick Spacer 3/8" (nylon)

*Interference between the cylinder and boat may occur under certain conditions. Check installation thoroughly throughout the full range of engine tilt and trim (and jackplate movement, if present).

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SeaStar outboard steering

Single & Dual Engine Ordering Guide: Front Mount Systems

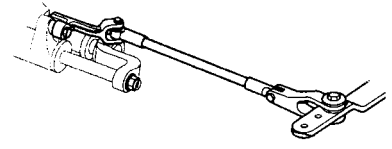
ENGINE/CYLINDER CONFIGURATION	COMPONENT DESCRIPTION	QTY. REQ'D	MODEL	PART NO.	
SINGLE ENGINE (SINGLE CYLINDER) Applications up to 300 HP maximum <u>NUMBER OF TURNS: 5</u> 	CYLINDER (See Application Guide)	1	PIVOT FRONT MOUNT	HC53__	
	HELM	1	SEASTAR 1.7	HH5271	
	HOSE KIT	1	OUTBOARD HOSE	H051__	
	OIL	3	SEASTAR OIL (QT.)	HA5430	
	FOR EXTRA STEERING STATION ADD:				
	HELM	1	SEASTAR 1.7	HH5271	
	FITTING KIT	1	ADD A STATION	HF5501	
	HOSE KIT	1	OUTBOARD HOSE	H051__	
	OIL	1	SEASTAR OIL (QT.)	HA5430	
	DUAL ENGINE (SINGLE CYLINDER) Non-Counter-Rotating Applications to 450 HP max; Counter-Rotating Applications to 600 HP maximum. <u>NUMBER OF TURNS: 5</u> 	CYLINDER (See Application Guide)	1	PIVOT FRONT MOUNT	HC53__
TIE BAR KIT		1	SEE APPLICATION GUIDE	H060__	
HELM		1	SEASTAR 1.7	HH5271	
HOSE KIT		1	OUTBOARD HOSE	H051__	
OIL		3	SEASTAR OIL (QT.)	HA5430	
FOR EXTRA STEERING STATION ADD:					
HELM		1	SEASTAR 1.7	HH5271	
FITTING KIT		1	ADD A STATION	HF5501	
HOSE KIT		1	OUTBOARD HOSE	H051__	
OIL		1	SEASTAR OIL (QT.)	HA5430	
DUAL ENGINE (DUAL CYLINDERS) Non-Counter-Rotating Applications to 450 HP max; All Counter-Rotating Engine Applications <u>NUMBER OF TURNS: 7</u> 	CYLINDER (See Application Guide)	2	PIVOT FRONT MOUNT	HC53__	
	TIE BAR KIT	1	SEE APPLICATION GUIDE	H060__	
	HELM	1	SEASTAR 2.4	HH5272	
	HOSE KIT	1	OUTBOARD HOSE	H051__	
	HOSE KIT	1	OUTBOARD HOSE	H051__	
	HOSE KIT	1	OUTBOARD HOSE	H051__	
	FITTING KIT	1	TEE FITTINGS	HF5530	
	OIL	3	SEASTAR OIL (QT.)	HA5430	
	FOR EXTRA STEERING STATION ADD:				
	HELM	1	SEASTAR 2.4	HH5272	
FITTING KIT	1	ADD A STATION	HF5501		
HOSE KIT	1	OUTBOARD HOSE	H051__		
OIL	1	SEASTAR OIL (QT.)	HA5430		

For all Seastar outboard systems: Use following option A or B:

A) Outboard hose: order in standard lengths (cannot be cut to length.)

B) Copper tube: 3/8" diameter copper tube and hose kit part No. HF5508.

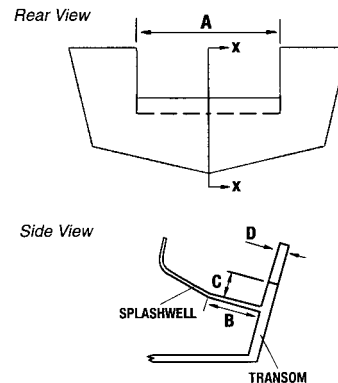
TYPICAL FRONT MOUNT TIE BAR KIT FOR HC5345 FRONT MOUNT CYLINDER (HO6001/HO6002/HO6003)



NUMBER OF ENGINES	SPLASHWELL DIAGRAM DIMENSION			MINIMUM ENGINE CENTER DISTANCE
	A	B	C	
1	22" (559mm)	6" (152mm)	5" (127mm)	N/A
2	44" (1118mm)	6" (152mm)	5" (127mm)	26" (660mm)
3	66" (1677mm)	6" (152mm)	5" (127mm)	29" (737mm)

NOTE: MAXIMUM ENGINE CENTER DISTANCE: 36" (914mm) USING THE STANDARD SEASTAR TIE BAR

REQUIRED SPLASHWELL DIMENSIONS/ MINIMUM ENGINE CENTER DISTANCES:
(refer to chart at lower left)



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Hynautic stern drive steering

This system is designed for stern drive, outboard and inboard boats requiring external cylinders of substantial size and strength. The K-5 cylinders are nickel plated for aesthetics and protection against the elements.

System components are sold separately. The required wing plates and hardware are not available from Teleflex.

Systems can be selected using either the easy-to-install Capilano 2-line systems (with variable-displacement helm) or the traditional Hynautic 3-line configurations.

Capilano Components:

- Capilano 1275V Helm HH5275
- External Stern Drive Cylinder K-5 (2 required)
- Copper Tubing 1/2" or 5/8" OD
- Fitting Kit (for 1/2" Copper Tubing) HF5590 or
- Fitting Kit (for 5/8" Copper Tubing) HF5592
- These fitting kits are for one steering station (purchase add-a-station kit for 2nd station).*
- Capilano Steering Fluid Dexron II® ATF

Options:

- Add-A-Station Fitting Kit (1/2" tubing) HF5591
- Add-A-Station Fitting Kit (5/8" tubing) HF5593
- Helm Remote Fill Kit (through-dash) HA5450

Service Items:

- Steering Fluid Dexron II® ATF
- Steering Wheel Locknut 747521

Tubing Diameters:

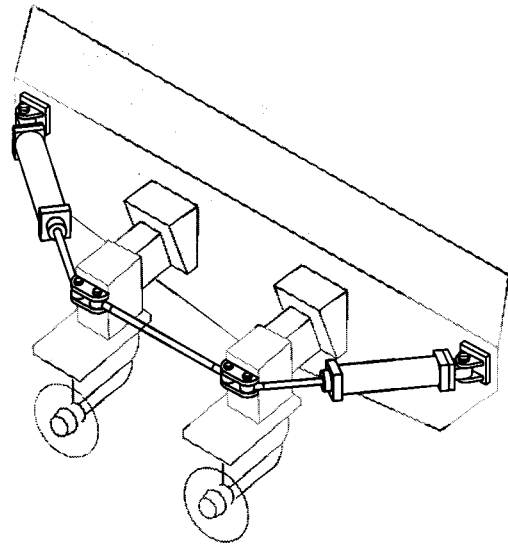
HELM TYPE	DISTANCE – CYLINDER TO FURTHEST HELM	
	40 Feet or Less	More Than 40 Feet
ALL	1/2" O.D. Copper Tubing	5/8" O.D. Copper Tubing

SeaStar

capilano

HynaUTIC

CAPILANO®/HYNAUTIC®
HEAVY DUTY STERN DRIVE SYSTEM



(turns vary by system)

Hynautic stern drive steering

Hynautic Components:

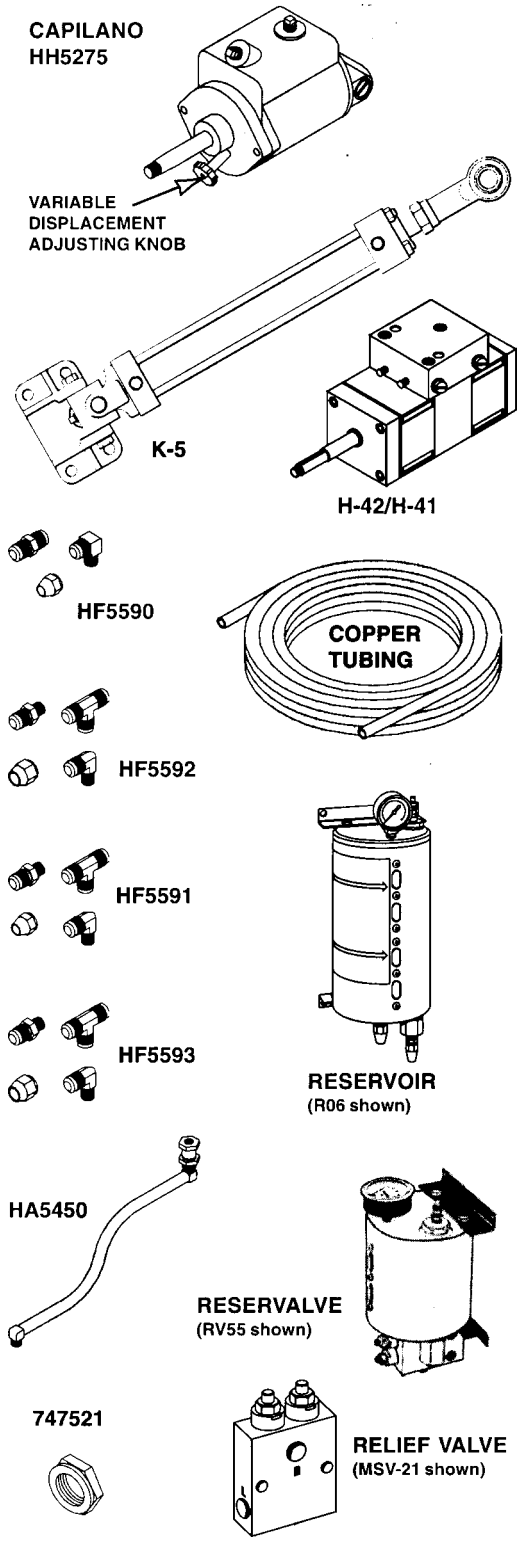
- Hynautic 4.0 cu. in. helm
(1" straight shaft) H-42 or
- Hynautic 4.0 cu. in. helm
(3/4" tapered shaft) H-42-02 or
- Hynautic 5.5 cu. in. helm
(1" straight shaft) H-41 or
- Hynautic 5.5 cu. in. helm
(3/4" tapered shaft) H-41-02 or
- (See application guide.)
- H-40 Fittings Kit for Main Station HF-21
- H-40 Fittings Kit for Second Station HF-22
- External Stern Drive Cylinder K-5 (2 required)
- (See application guide. Fittings available separately.)
- Reservoir - Standard (2 quart) R06
- Relief Valve (950 PSI) MSV-21
- Relief Fittings MSVF-07
- Relief Fittings MSVF-13
- Copper Tubing 1/2" or 5/8" OD
- Fitting Kit (for 1/2" Copper Tubing) HF5590 or
- Fitting Kit (for 5/8" Copper Tubing) HF5592
- These fitting kits are for one steering station (purchase add-a-station kit for 2nd station).*
- SeaStar Oil (1 Quart Mil Spec H5606) HA5430

Options:

- Reservoir (2 quart, with hand pump) R07
- Reservoir (1 quart, with hand pump) R11
- Reservoir (2 quart) R12
- Relief Valve (500 PSI) MSV-19
- Reservevalve (500 PSI, top read, 3/8) RV-55
- Reservevalve (500 PSI, top read, 3/8, w/pump) .. RV-55P
- Reservevalve (500 PSI, top read, 5/16, w/pump) RV-57
- Reservevalve (950 PSI, top read, 5/16) RV-60
- Reservevalve (950 PSI, frt.read, 5/16, w/pump) RV-67
- Add-A-Station Fitting Kit (1/2" tubing) HF5591
- Add-A-Station Fitting Kit (5/8" tubing) HF5593

Helm Options:

HELM PART #	HELM DISPLACEMENT RANGE	NUMBER OF WHEEL TURNS LOCK-TO-LOCK	RELIEF VALVE SETTING
USING CAPILANO (VARIABLE DISPLACEMENT) HELM:			
HH5275	2.7-5.4 cu.in.	10.3-5.2	1000 PSI
USING HYNAUTIC (FIXED DISPLACEMENT) HELMS:			
H-42	4.0 cu. in.	7.0	950 PSI
H-41	5.5 cu. in.	5.1	950 PSI



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SeaStar stern drive steering

SeaStar Stern Drive Steering is the best choice for non-power assisted stern drives and any stern drive boat with an autopilot. The system is based upon the SeaStar helm family, which allows for dual station and autopilot use. Cylinders are specific to drive brands and models.

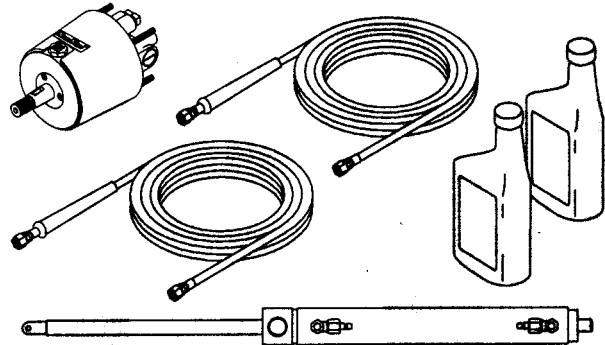
SeaStar®

SEASTAR®
STERN DRIVE SYSTEM



Features:

- Best and Most Economical autopilot interface for stern drives! Easy installation.
- Simple multiple steering station connection.
- Optional SeaStar 2.0 & 2.4 helms for quicker steering response.
- Standard 3/4" tapered steering shaft.
- Fast, easy installation.
- Meets A.B.Y.C. standards.
- Meets N.M.M.A. certification requirements.



Applications:

Ideal for most stern drives, especially non-power-assisted units, SeaStar is suitable for single and multiple drives and dual stations.

(turns vary by system)



How to Spec a System:

1. From the application guide, 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.
2. From the ordering guide, select the appropriate helm and accessory hardware. Note that three SeaStar helm displacements are available for power steered stern drives (1.7, 2.0 & 2.4 cu. in.) **The displacement of the helm affects the number of turns lock-to-lock. Lower helm displacement = more turns = less effort/slower response.** Select helm size on the basis of the desired steering response. *The 2.4 cu. in. version is not recommended for non-power-steered applications.*
3. Select the appropriate tube or hose and fitting kits required for the installation.
4. Confirm that there is sufficient space available in the dash and engine compartment(s) for the steering components.

SeaStar stern drive steering

Components:

- SeaStar 1.7 Helm HH5271
(See Ordering Guide to select helm.)
- Stern Drive Cylinder HC53___
(See Application Guide to select cylinder.)
- Hose Kit (2 hoses) HO51___
- SeaStar Oil (1 Quart) HA5430

Options:

- SeaStar 2.0 Helm HH5273
- SeaStar 2.4 Helm HH5272

- SeaStar 1.7 Sport Tilt Helm/Mech. HH5291
- SeaStar 1.7 Traditional Tilt Helm/Mech. . HH5741
- SeaStar 2.4 Sport Tilt Helm/Mech. HH5292
- SeaStar 2.4 Traditional Tilt Helm/Mech. . HH5742

- SeaStar 1.7 Rear Mount Helm HH5261
- SeaStar 2.4 Rear Mount Helm HH5262

- SeaStar 1.7 Commercial Duty Helm HH5217
- SeaStar 2.4 Commercial Duty Helm HH5224
(Designed for small Lobster and Crabbing vessels, these helms have a stainless steel shaft with heavy duty seal and wiper, which help protect the helm from the abrasive effects of sediment brought on board with traps or pots.)

- SeaStar Round Bezel Kit HA5417
(Reduces helm protrusion by 3.75")

- SeaStar Backplate Kit HA5418
(Reduces helm protrusion by dash thickness and allows clean retrofit of SeaStar helm where following helms were installed: pre-1991 SeaStar, SyTen, and mechanical rotary steering.)

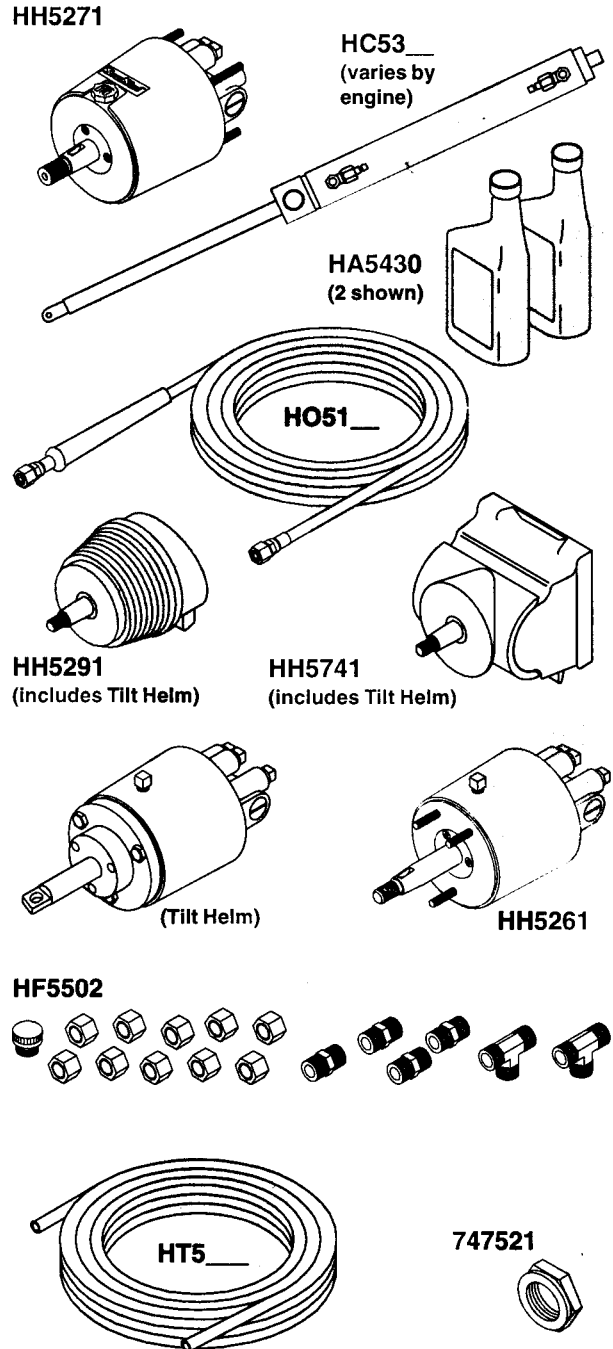
- SeaStar 20° Dash Wedge Kit HA5419

- SeaStar Bulkhead Hose Kit (2 hoses) HO81___
(Allows installation through a bulkhead without additional fittings.)

- Add-A-Station Kit (all helms) HF5502
- Autopilot Fittings Kit (all helms) HF5502
- 3/8" Tubing *(see ordering guide)* HT5___
(Nylon tube intended for use on Sterndrives and inboard steering systems using the SeaStar 1.7 helm ONLY.)

Service Items:

- SeaStar Oil (1 Gallon) HA5440
- Steering Wheel Locknut 747521



SeaStar stern drive steering

Application Guide: Stern Drive Steering

ENGINE MAKER/ BRAND	STEERING CONFIG.	ENGINE/ DRIVE MODEL	YEAR	(CYLINDER USED)		(NUMBER OF WHEEL TURNS)		NOTES
				MODEL	PART #	SEASTAR (1.7 cu.in.)	SEASTAR (2.4 cu.in.)	
BMW	Non Power	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	MerCruiser I	TO 1983	BA125-8EMV	HC5330	4.9	N/A	1,7
	Non Power	Alpha I	1984 TO DATE	BA135-7EM	HC5332	5.0	3.5	1,5,6,7
	Non Power	Bravo I, II, III	1984 TO DATE	BA135-7EM	HC5332	5.0	3.5	1,5,6,7
	Power Assist	MerCruiser I	TO 1983	125-8EM	HC5328	4.9/5.8	3.4/4.1	2
	Power Assist	Alpha I	1984 TO DATE	125-8EM	HC5328	4.9/5.8	3.4/4.1	2
	Power Assist	Bravo I, II	1984 TO DATE	125-8EM	HC5328	4.9/5.8	3.4/4.1	2
	Power Assist	Bravo III	1984 TO DATE	125-8EM	HC5328	4.9/5.8	3.4/4.1	2,8
OMC	Non Power	400/800 Series	TO 1985	N/A	N/A	N/A	N/A	
	Non Power	Cobra	1986 TO DATE	BA150-7EM	HC5326	6.0	N/A	1,4
	Non Power	King Cobra	1986 TO DATE	BA150-7EM	HC5326	6.0	N/A	1,4
	Power Assist	400/800 Series	TO 1985	N/A	N/A	N/A	N/A	
	Power Assist	Cobra	1986 TO DATE	125-8EM	HC5328	4.9/5.8	3.4/4.1	2
	Power Assist	King Cobra	1986 TO DATE	125-8EM	HC5328	4.9/5.8	3.4/4.1	2
VOLVO	Non Power	275	TO DATE	BA150-7ATM	HC5314	6.0	N/A	1,7
	Non Power	280, 290	TO DATE	BA135-7EM	HC5332	5.0	3.5	1,5,6,7
	Non Power	Diesel	TO DATE	BA135-7EM	HC5332	5.0	3.5	1,5,6,7
	Power Assist	275	TO DATE	N/A	N/A	N/A	N/A	
	Power Assist	280, 290	TO DATE	125-8EM	HC5328	4.8/5.8	3.4/4.1	2
	Power Assist	Diesel	TO DATE	125-8VEM	HC5329	4.9/5.8	3.4/4.1	2
	Power Assist	32, Diesel	1997 TO DATE	92-VPS	HC5331	4.8/5.5	3.4/4.1	2
	Power Assist	41-42, Diesel	1992 TO DATE	92-VPS	HC5331	4.8/5.8	3.4/4.1	2
	Power Assist	DPS & SX	1996 TO DATE	92-VPS	HC5331	4.9/5.5	3.4/4.1	2
YAMAHA	Non Power	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

NOTES:


N/A = Not Available.

- Balanced system - number of steering wheel turns lock-to-lock is equal port to starboard or vice-versa.
- Unbalanced system - number of steering wheel turns lock-to-lock is unequal port to starboard or vice-versa.
- Requires additional clevis supplied by engine manufacturer. Reference Quicksilver Part No. B98735A1.
- Requires cylinder rod end adapter HA5424 from Teleflex Canada Limited Partnership.
- 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.
- If engine outdrive is NOT equipped with a torque tab on the underside of the lower leg one must be installed to reduce prop torque.
- Yanmar Engines using the Bravo III drives require the use of cylinder HC5326.

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SeaStar stern drive steering

Ordering Guide: Stern Drive Steering

ENGINE/CYLINDER CONFIGURATION	COMPONENT DESCRIPTION	QTY. REQ'D	MODEL	PART NO.
SINGLE & DUAL STERN DRIVES (Number of Turns varies by Helm & Cylinder. See Application Guide.) For dual sterndrive applications use engine manufacturers supplied tie bar.	CYLINDER	1	SEE APPLICATION GUIDE	HC53__
	HELM	1	SEASTAR 1.7 (SEE NOTE 1)	HH5271
	HELM (OPTIONAL)		SEASTAR 2.4 (SEE NOTE 2)	HH5272
	TUBING/HOSE		(SEE NOTE 3)	
	OIL	3	SEASTAR OIL (QT.)	HA5430
	FOR EXTRA STEERING STATION ADD:			
	HELM	1	SEASTAR 1.7 (SEE NOTE 1) SEASTAR 2.4 (SEE NOTE 2)	HH5271 HH5272
	FITTING KIT	1	ADD A STATION • FOR SEASTAR 1.7 HELM • FOR SEASTAR 2.4 HELM	HF5502 HF5501
	OIL	1	SEASTAR OIL	
	EXTRA TUBE/HOSE		(SEE NOTE 3)	
OPTIONAL EQUIPMENT	BACK PLATE KIT		(FRONT MOUNT HELMS)	HA5418
	20 DEGREE WEDGE		(FRONT MOUNT HELMS)	HA5419
	AUTOPILOT FITTING KIT		(FOR ALL HELMS)	HF5502
	TILT HELM - SEASTAR 1.7			HH5741
	REAR MOUNT HELM - SEASTAR 1.7			HH5261
	TILT HELM - SEASTAR 2.4			HH5742
	REAR MOUNT HELM - SEASTAR 2.4			HH5262

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

- SeaStar 1.7 helms are the standard recommendation for both non-power and power steered applications.
- SeaStar 2.4 helms can be specified for power steered applications where faster steering response is desired. Review the Application Guide on the previous page for recommendations.
- For SeaStar 1.7 systems, use 3/8" diameter nylon tubing (Part No. HT5___).
For SeaStar 2.4 systems, use the following option A or B:
A. **Outboard Hose:** hoses must be ordered in standard lengths. They cannot be cut to length.
B. **Copper tube:** 3/8" diameter copper tube and hose kit (Part No. HF5508).
- For dual stern drives: use the tie bar supplied by the engine manufacturer.

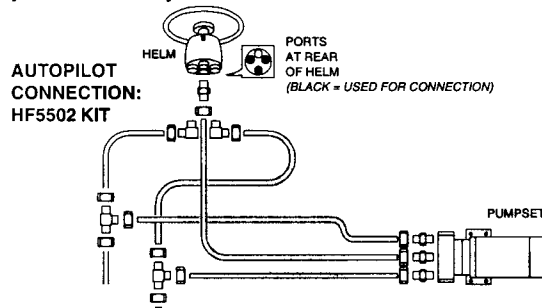
SeaStar Autopilot Interface

SeaStar is the best steering choice to interface with most autopilots. If you are installing an autopilot on a mechanically steered boat, we recommend you upgrade to SeaStar for performance reasons.

If you're upgrading to SeaStar, plan ahead: future installation of an autopilot or extra steering station can be simplified by installing two pairs of shorter hose kits. Connect them with union coupling fittings, part no. HF5530. Tee fittings can be installed with ease at a later date. Bulkhead union fitting kits are available to facilitate hose runs through transoms and splashwells:

- HF5512 up to 3/4" (19mm) splashwell, 1 cylinder
- HF5513 up to 3" (76mm) transom, 1 cylinder
- HF5514 up to 3/4" (19mm) splashwell, 2 cylinders
- HF5515 up to 3" (76mm) transom, 2 cylinders

For an autopilot installation, a third (compensating) line must be installed and identified. (SeaStar helm Ports marked "R" are for connection of additional helm and/or autopilot compensating lines.) Use HF5501 (outboards) or HF5502 (stern drives and inboards) fitting kits when adding an autopilot to your SeaStar system.



Tech Reference: Hydraulic Steering

SeaStar/BayStar/Hynautic Helm Specifications:

HELM DESCRIPTION	PART NUMBER	DISPLACEMENT CU. IN. (cc) PER REVOLUTION	RELIEF VALVE SETTING PSI (BAR)	MAXIMUM WHEEL DIA. Inches (mm)	TUBE/HOSE CONNECTION PORT SIZE
BAYSTAR - FRONT MOUNT	HH4016	1.6 (23.0)	1000 (70)	22 (558)	1/4 NPT
BAYSTAR - SPORT TILT	HH4015	1.6 (23.0)	1000 (70)	20 (508)	1/4 NPT
CAPILANO 1250V	HH5250	1.7-3.4 (27.8-55.7)	1000 (70)	36 (914)	3/8 NPT
CAPILANO 1275V	HH5275	2.7-5.4 (44.2-88.4)	1000 (70)	36 (914)	3/8 NPT
HYNAUTIC H-20 (3/4" SHAFT)	H-26	2.0 (33)	500 (35) or 950 (66)	32 (812)	3/8 & 1/4 NPT
HYNAUTIC H-20 (3/4" SHAFT)	H-25	2.75 (45)	500 (35) or 950 (66)	34 (863)	3/8 & 1/4 NPT
HYNAUTIC H-20 (1" SHAFT)	H-21	2.75 (45)	500 (35) or 950 (66)	34 (863)	3/8 & 1/4 NPT
HYNAUTIC H-40 (3/4" SHAFT)	H-42-02	4.0 (65.5)	500 (35) or 950 (66)	36 (914)	1/2 & 3/8 NPT
HYNAUTIC H-40 (1" SHAFT)	H-42	4.0 (65.5)	500 (35) or 950 (66)	36 (914)	1/2 & 3/8 NPT
HYNAUTIC H-40 (3/4" SHAFT)	H-41-02	5.5 (90.1)	500 (35) or 950 (66)	48 (1219)	1/2 & 3/8 NPT
HYNAUTIC H-40 (1" SHAFT)	H-41	5.5 (90.1)	500 (35) or 950 (66)	48 (1219)	1/2 & 3/8 NPT
SEASTAR 1.4 - FRONT MOUNT	HH5269	1.4 (23.0)	1000 (70)	26 (660)	1/4 NPT
SEASTAR 1.4 - REAR MOUNT	HH5260	1.4 (23.0)	1000 (70)	26 (660)	1/4 NPT
SEASTAR 1.4 - R. MT FULL FEEDBACK	HH5231	1.4 (23.0)	1000 (70)	26 (660)	1/4 NPT
SEASTAR 1.4 - R. MT. 1" STRT. SHAFT	HH5279	1.4 (23.0)	1000 (70)	26 (660)	1/4 NPT
SEASTAR 1.4 - R. MT. 1" TAPER. SHAFT	HH5280	1.4 (23.0)	1000 (70)	26 (660)	1/4 NPT
SEASTAR 1.4 - TILT	HH5744	1.4 (23.0)	1000 (70)	20 (508)	1/4 NPT
SEASTAR 1.7 - FRONT MOUNT	HH5271	1.7 (27.8)	1000 (70)	26 (660)	1/4 NPT
SEASTAR 1.7 - FT. MT. FULL FEEDBACK	HH5761	1.7 (27.8)	1000 (70)	26 (660)	1/4 NPT
SEASTAR 1.7 - REAR MOUNT	HH5261	1.7 (27.8)	1000 (70)	26 (660)	1/4 NPT
SEASTAR 1.7 - R. MT. 1" TAPER. SHAFT	HH5281	1.7 (27.8)	1000 (70)	26 (660)	1/4 NPT
SEASTAR 1.7 - SPORT TILT	HH5291	1.7 (27.8)	1000 (70)	20 (508)	1/4 NPT
SEASTAR 1.7 - TRADITIONAL TILT	HH5741	1.7 (27.8)	1000 (70)	20 (508)	1/4 NPT
SEASTAR 2.0 - FRONT MOUNT	HH5273	2.0 (33.0)	1000 (70)	26 (660)	1/4 NPT
SEASTAR 2.0 - FT. MT. FULL FEEDBACK	HH5260	2.0 (33.0)	1000 (70)	26 (660)	1/4 NPT
SEASTAR 2.0 - SPORT TILT	HH5745	2.0 (33.0)	1000 (70)	20 (508)	1/4 NPT
SEASTAR 2.0 - TRADITIONAL TILT	HH5743	2.0 (33.0)	1000 (70)	20 (508)	1/4 NPT
SEASTAR 2.4 - FRONT MOUNT	HH5272	2.4 (39.3)	1000 (70)	26 (660)	1/4 NPT
SEASTAR 2.4 - FT. MT. FULL FEEDBACK	HH5762	2.4 (39.3)	1000 (70)	26 (660)	1/4 NPT
SEASTAR 2.4 - REAR MOUNT	HH5262	2.4 (39.3)	1000 (70)	26 (660)	1/4 NPT
SEASTAR 2.4 - R. MT. 1" TAPER. SHAFT	HH5282	2.4 (39.3)	1000 (70)	26 (660)	1/4 NPT
SEASTAR 2.4 - SPORT TILT	HH5292	2.4 (39.3)	1000 (70)	20 (508)	1/4 NPT
SEASTAR 2.4 - TRADITIONAL TILT	HH5742	2.4 (39.3)	1000 (70)	20 (508)	1/4 NPT
SEASTAR PRO 1.7 - FRONT MOUNT*	HH5779	1.7 (27.8)	1500 (103)	26 (660)	1/4 NPT
SEASTAR PRO 1.7 - REAR MOUNT*	HH5778	1.7 (27.8)	1500 (103)	26 (660)	1/4 NPT
SEASTAR PRO 1.7 - SPORT TILT*	HH5773	1.7 (27.8)	1500 (103)	20 (508)	1/4 NPT
SEASTAR PRO 2.0 - FRONT MOUNT*	HH5770	2.0 (33.0)	1500 (103)	26 (660)	1/4 NPT
SEASTAR PRO 2.0 - REAR MOUNT*	HH5771	2.0 (33.0)	1500 (103)	26 (660)	1/4 NPT
SEASTAR PRO 2.0 - SPORT TILT*	HH5290	2.0 (33.0)	1500 (103)	20 (508)	1/4 NPT
SEASTAR PRO 2.0 - TRADITIONAL TILT*	HH5774	2.0 (33.0)	1500 (103)	20 (508)	1/4 NPT
SEASTAR PRO 2.4 - FRONT MOUNT	HH5772	2.4 (39.3)	1500 (103)	26 (660)	1/4 NPT

* SeaStar PRO helms cannot be used with an unbalanced cylinder. SeaStar PRO Kevlar® reinforced outboard hose MUST be used with ALL SeaStar PRO helms.

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Tech Reference: Hydraulic Steering

SeaStar/BayStar/Hynautic Cylinder Specifications:

CYLINDER MODEL	PART NUMBER	BORE DIA. Inches (mm)	NOM. SHAFT DIA. Inches (mm)	STROKE Inches (mm)	AREA SQUARE Sq.In.(cm)	VOLUME CUBIC IN. (cc)	TORQUE* (SEE NOTE) In.-Lb. (Kg-M)
HYNAUTIC INBOARD UNITS (USED IN SEASTAR, CAPILANO & HYNAUTIC SYSTEMS):							
Hynautic Ball Joint Mount	K-18	1.25 (31.7)	.625 (15.9)	7 (178)	1.0 (6.5)	7.0 (147.4)	N/A
Hynautic Ball Joint Mount	K-19	1.25 (31.7)	.625 (15.9)	9 (229)	1.0 (6.5)	9.0 (114.7)	N/A
Hynautic Fixed Mount	K-22****	1.50 (38.1)	.75 (19.0)	10 (254)	1.33 (8.6)	13.3 (217.9)	8990 (103.5)
Hynautic Fixed Mount	K-27****	1.50 (38.1)	.75 (19.0)	10 (254)	1.33 (8.6)	13.3 (217.9)	8990 (103.5)
Hynautic Univ. Mt. (rod side)	K-5****	1.50 (38.1)	.875 (22.2)	9 (229)	1.32 (8.6)	11.9 (194.9)	10790 (124.3)
Hynautic (piston-only side)***					1.77 (11.5)	15.9 (260.5)	10790 (124.3)
Hynautic Pivot Mount	K-31****	2.00 (50.8)	.875 (22.2)	10 (254)	2.55 (16.6)	25.5 (417.9)	17230 (198.4)
Hynautic Universal Mount	K-8****	2.50 (63.5)	1.00 (25.4)	9.5 (241)	4.13 (26.8)	39.2 (642.4)	26575 (306.0)
Hynautic Universal Mount	K-9****	2.50 (63.5)	1.00 (25.4)	14.5 (368)	4.13 (26.8)	55.0 (901.3)	39850 (458.9)
CAPILANO INBOARD UNITS:							
BA150-7 (TMB/TMC)	HC5349/HC5355	1.50 (38.1)	.625 (15.9)	7 (178)	1.46 (9.4)	10.2 (167.5)	7117 (82.0)
BA175-7 (TMB/TMC)	HC5350/HC5356	1.75 (44.4)	.625 (15.9)	7 (178)	1.96 (12.7)	13.7 (225.4)	9569 (110.2)
BA200-7 (TMB/TMC)	HC5351/HC5357	2.00 (50.8)	.625 (15.9)	7 (178)	3.14 (20.2)	18.9 (310.0)	13200 (151.0)
BA200-11 (TMB/TMC)	HC5378/HC5379	2.00 (50.8)	.625 (15.9)	11 (279)	3.14 (20.2)	29.7 (486.0)	19900 (228.0)
SEASTAR INBOARD UNITS:							
BA125-7ATM	HC5312	1.25 (31.7)	.50 (12.7)	7 (178)	1.03 (6.7)	7.2 (118.2)	5025 (57.9)
BA135-7ATM	HC5313	1.375 (34.9)	.625 (15.9)	7 (178)	1.18 (7.6)	8.3 (135.2)	5741 (66.1)
BA150-7ATM	HC5314**	1.50 (38.1)	.625 (15.9)	7 (178)	1.46 (9.4)	10.2 (167.5)	7117 (82.0)
BA150-7TM	HC5318	1.50 (38.1)	.625 (15.9)	7 (178)	1.46 (9.4)	10.2 (167.5)	7117 (82.0)
BA150-9TM	HC5369	1.50 (38.1)	.625 (15.9)	9 (229)	1.46 (9.4)	13.1 (214.7)	9375 (107.7)
BA175-7TM	HC5319	1.75 (44.4)	.75 (19.0)	7 (178)	1.96 (12.7)	13.7 (225.4)	9569 (110.2)
SEASTAR & HYNAUTIC STERN DRIVE UNITS:							
BA150-7EM	HC5326	1.50 (38.1)	.625 (15.9)	7 (178)	1.46 (9.4)	10.2 (167.5)	8853 (102.0)
125-8EM (rod side)	HC5328***	1.25 (31.7)	.50 (12.7)	8 (203)	1.03 (6.7)	8.3 (135.2)	7142 (82.3)
(125-8EM) (piston-only side)	HC5329***	1.25 (31.7)	.50 (12.7)	8 (203)	1.23 (7.9)	9.8 (160.8)	8505 (98.0)
92VPS	HC5331***	1.25 (31.7)	.50 (12.7)	8 (203)	1.23 (7.9)	8.3 (135.2)	N/A
BA-125-EMV	HC5330	1.25 (31.7)	.50 (12.7)	8 (203)	1.03 (6.7)	8.3 (135.2)	7142 (82.3)
BA-135-7EM	HC5332	1.375 (34.9)	.625 (15.9)	7 (178)	1.18 (7.6)	8.3 (135.2)	5741 (66.1)
Hynautic Univ. Mt. (rod side)	K-5****	1.50 (38.1)	.875 (22.2)	9 (229)	1.32 (8.6)	11.9 (194.9)	10790 (124.3)
Hynautic (piston-only side)					1.77 (11.5)	15.9 (260.5)	10790 (124.3)
SEASTAR OUTBOARD UNITS:							
PIVOT FRONT MOUNT	HC5345/47/48/58	1.375 (35)	.75 (19.0)	8 (203)	0.82 (5.3)	8.34 (136.6)	N/A
PIVOT FRONT MOUNT (PRO)	HC6345/HC6358	1.375 (35)	.75 (19.0)	8 (203)	0.82 (5.3)	8.34 (136.6)	N/A
CATAMARAN (FIXED MOUNT)	HC5343	1.262 (32.6)	.75 (19.0)	10 (254)	0.82 (5.3)	8.13 (133.2)	N/A
SIDE MOUNT (rod side)	HC5370***	1.25 (31.7)	.50 (12.7)	8 (203)	1.03 (6.7)	8.3 (135.2)	N/A
SIDE MOUNT (piston-only side)					1.23 (7.9)	9.8 (160.8)	N/A
SPLASHWELL MT. (rod side)	HC5380***	1.25 (31.7)	.50 (12.7)	9 (228)	1.03 (6.7)	9.3 (152.1)	N/A
SPLASHWELL MOUNT (piston-only side)					1.23 (7.9)	11.0 (180.9)	N/A
FRONT MT.-STD. (OBS.)	HC5340/42	1.262 (32.6)	.75 (19.0)	10 (254)	0.82 (5.3)	8.13 (133.2)	N/A
FRONT MT.-COMPACT (OBS.)	HC5365	1.338 (34.0)	.75 (19.0)	7 (178)	0.97 (6.3)	6.87 (111.0)	N/A

Theoretical torque about pivot point at 35 degrees articulation with 1,000 PSI (70 BAR) system pressure, except as noted (****).

** Also used in some stern drive applications.

*** These area and volume calculations are for unbalanced cylinders. The piston surface areas/displacements are different on each side of the cylinder, since one end has a rod and piston (less surface area) and the other end has only a piston (more surface area). The lower sets of numbers are for the cylinder side with piston and rod (shaft). The higher sets of numbers are for the piston-only side of the cylinder.

**** Theoretical torque about pivot point at 35 degrees articulation with 950 PSI (66 BAR) system pressure.

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Tech Reference: Hydraulic Steering

Power Steering Cylinder Specifications:

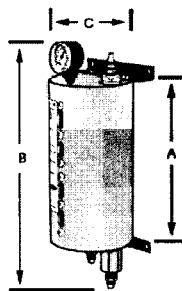
CYLINDER MODEL	PART NUMBER	BORE	NOMINAL SHAFT		VOLUME	OUTPUT	TORQUE
		DIAMETER	DIAMETER	STROKE	CUBIC IN.	FORCE	(SEE NOTE)
		Inches (mm)	Inches (mm)	Inches (mm)	(cc)	Ft.-Lbs. (N)	In.-Lb. (Nm)
SINGLE 9" STROKE x1	HC5801-2	2.00 (51)	1.00 (25.4)	9 (229)	21.25 (348)	2,946 (13090)	18,900 (2,130)
SINGLE 11" STROKE x1	HC5803-2	2.00 (51)	1.00 (25.4)	11 (280)	26.00 (426)	2,946 (13090)	23,140 (2,610)
SINGLE 9" STROKE x1	HC5805	2.50 (64)	1.00 (25.4)	9 (229)	37.11 (608)	5,154 (22926)	33,065 (3,736)
TWIN 9" STROKE x2	HC5802	2.00 (51)	1.00 (25.4)	9 (229)	42.50 (697)	5,892 (26,190)	37,800 (4,260)
TWIN 11" STROKE x2	HC5804	2.00 (51)	1.00 (25.4)	11 (280)	52.00 (853)	5,892 (26,190)	46,280 (5,220)
TWIN 9" STROKE x2	HC5806	2.50 (64)	1.00 (25.4)	9 (229)	74.33 (1216)	10,308 (45,852)	66,130 (7,472)

NOTE: Theoretical torque about pivot point at 35 degrees articulation with 1,000 PSI (70 BAR) system pressure.

Hydraulic Reservoir & Relief Valve Specifications:

Reservoirs

Made of T-6061 aluminum, reservoirs are pressure tested for a minimum of 100 hours, and shipped complete with front-reading pressure gauge, fluid level indicator, and return line filter.



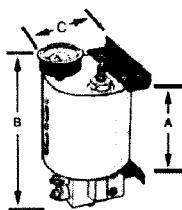
(R06 shown)

RESERVOIR DIMENSIONS & SPECIFICATIONS:

Model No.	DIMENSIONS			SPECIFICATIONS		
	A	B	C	Capacity (Qt)	Optl. Hand Pump	Special Notes
R-06	9-1/2"	13-5/8"	4-7/8"	2	No	Standard Model
R-07	9-1/2"	14-5/8"	4-7/8"	2	Yes	-
R-11	6"	10-5/8"	4-7/8"	1	Yes	-
R-12	9-1/2"	13-5/8"	4-7/8"	2	No	-

Reservales

The reservale combines the function of a reservoir and relief valve into a single component.



(RV55 shown)

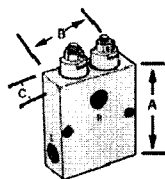
RESERVALE DIMENSIONS & SPECIFICATIONS:

Model No.	DIMENSIONS			SPECIFICATIONS				
	A	B	C	Capacity (Qt)	Relief Setting (psi)	Optional Gauge Style	Hand Pump	Special Notes
RV-55	6"	9-1/4"	4-7/8"	1	500	Top Read	No	3/8" O.D. Tubing
RV-55P	6"	10-1/4"	4-7/8"	1	500	Top Read	Yes	3/8" O.D. Tubing
RV-57	6"	10-3/8"	4-7/8"	1	500	Top Read	Yes	5/16" O.D. Tubing
RV-60	6"	9-1/4"	4-7/8"	1	950	Top Read	No	5/16", 3/8" I.D. Hose
RV-67	6"	10-1/4"	4-7/8"	1	950	Front Read	Yes	5/16", 3/8" I.D. Hose

The relief portion of the reservale is factory set at either 500 psi or 950 psi. Made of T-6061 aluminum, the reservale is complete with front or top-reading gauge, fluid level indicator, and return filter. Relief valve is flow-thru style from either direction to accommodate either portside or starboard mounting.

Relief Valves

These special relief valves are factory set for either 500 psi or 950 psi. They are intended to protect the system's components and assist in purging air.



(MSV-21 shown)

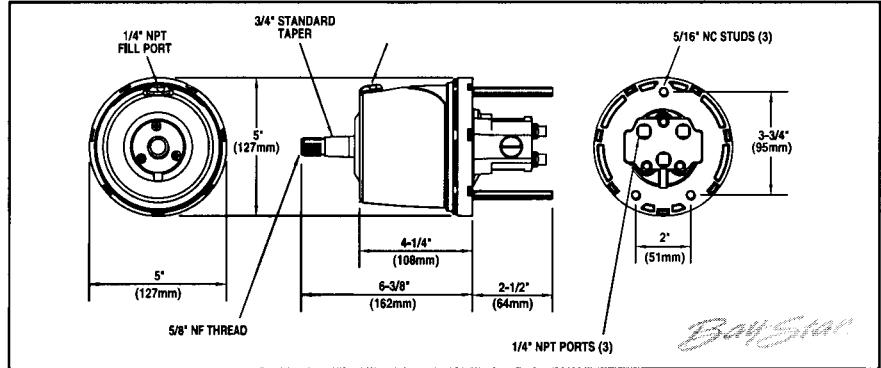
RELIEF VALVE DIMENSIONS & SPECIFICATIONS:

Model No.	DIMENSIONS			SPECIFICATIONS		
	A	B	C	Relief Setting (psi)	Port Size	Special Notes
MSV-19	3-7/8"	2-1/2"	1"	500	1/4-20 NPT	-
MSV-21	3-7/8"	2-1/2"	1"	950	1/4-20 NPT	Standard model

SeaStar steering dimensions

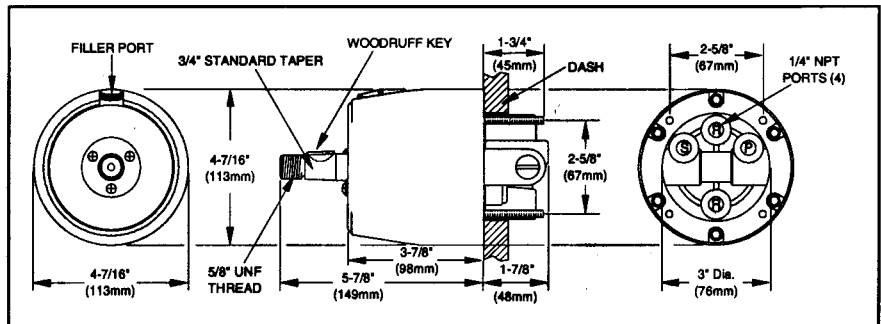
Helms:

BayStar

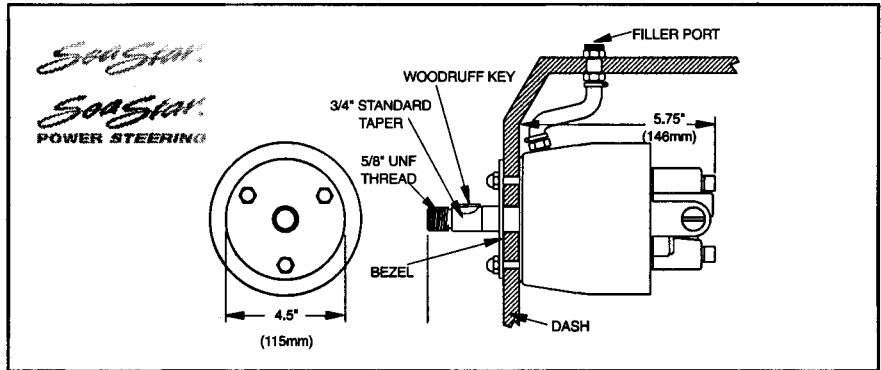


SeaStar & SeaStar PRO Front Mount

SEASTAR
SEASTAR PRO
POWER STEERING



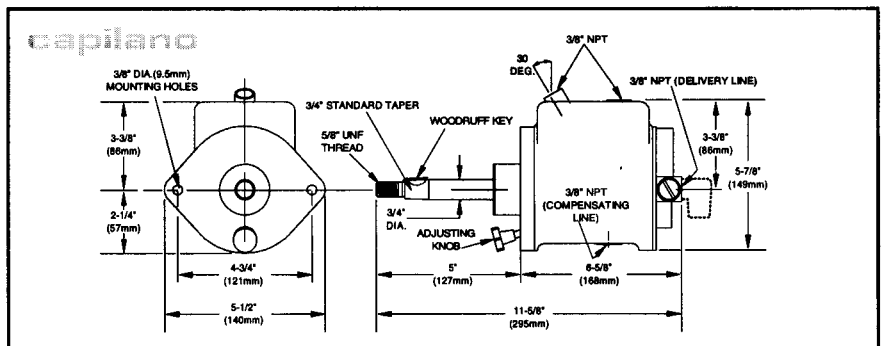
SeaStar Rear Mount



Hynautic Rear Mount

HELM SERIES	HELM MODEL/ PART NO.	DIMENSIONS (INCHES)			SHAFT KEY TYPE
		A	B	C	
H-20	H-21	6.125	10.75	3.5	1/4" square
	H-25	5.5	10.125	3.5	#9 Woodruff
	H-26	5.5	10.125	3.5	#9 Woodruff
H-40	H-41	6.125	13.625	5.125	1/4" square
	H-41-02	5.5	13.0	5.125	#9 Woodruff
	H-41	6.125	13.625	5.125	1/4" square
	H-42-02	5.5	13.0	5.125	#9 Woodruff

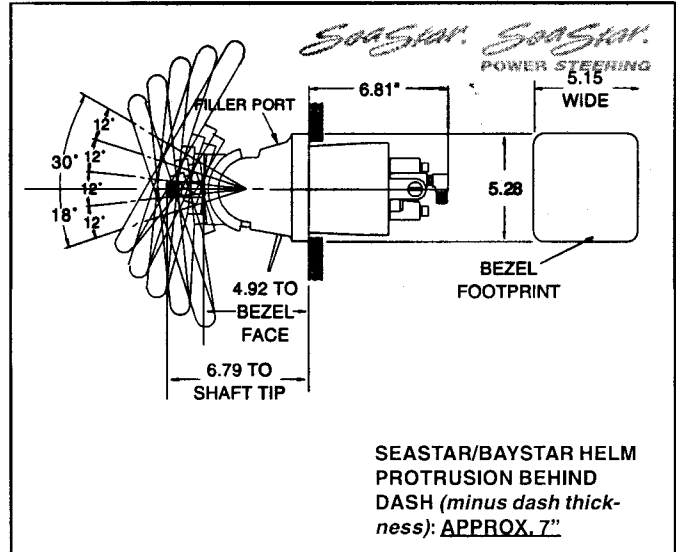
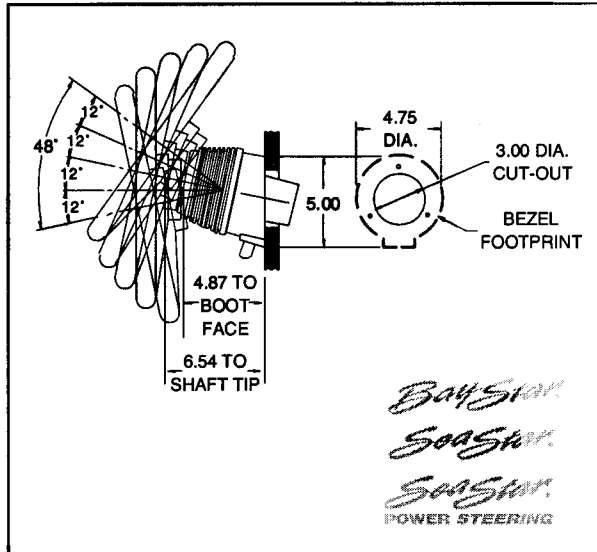
Capilano



SeaStar steering dimensions

Performance Tilt:

Traditional Tilt:

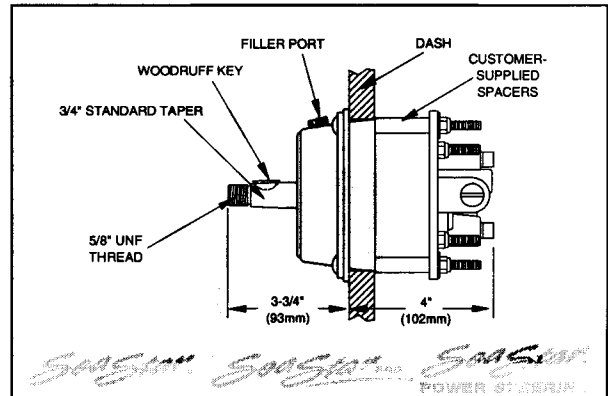


SEASTAR/BAYSTAR HELM PROTRUSION BEHIND DASH (minus dash thickness): APPROX. 7"

SeaStar Helm Mounting Options:

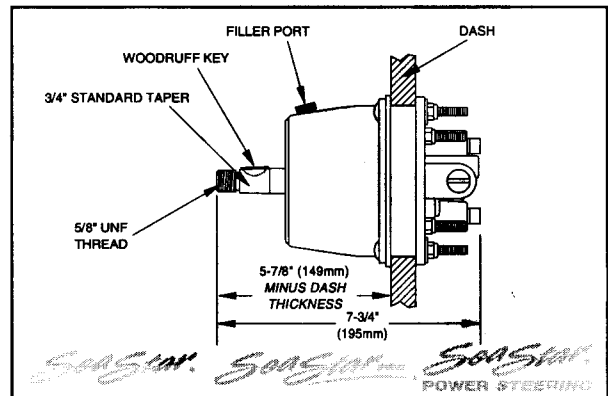
(for SeaStar front mount helms only)

Round Bezel Kit HA5417

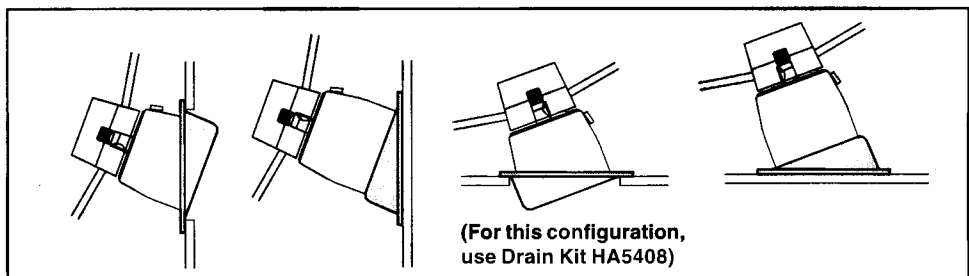


Square Backplate kit HA5418

Required when retrofitting SeaStar front mount helms into dashboard holes from the following steering systems:
Teleflex Mechanical steering: Big-T, Safe-T and most other rotary.
Teleflex Hydraulic steering: SyTen
Hynautic Hydraulic steering helms: H-50, H60, H-80, H-300.



Dash 20° Wedge Kit HA5419

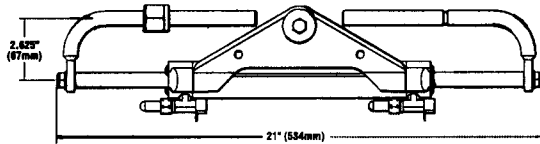


SeaStar steering dimensions

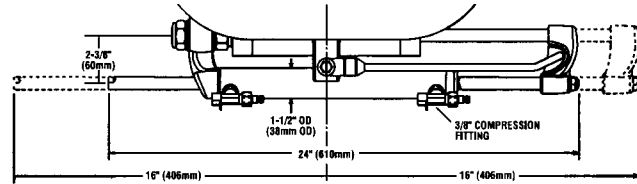
Cylinders: Outboard

BayStar

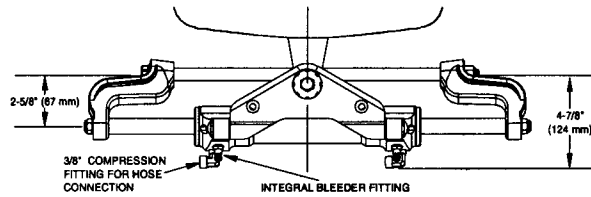
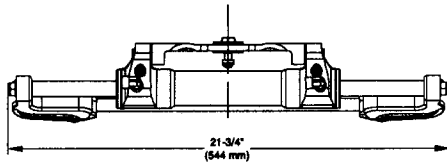
HC4645, HC4647, HC4658



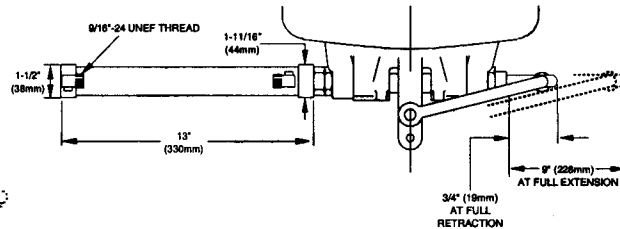
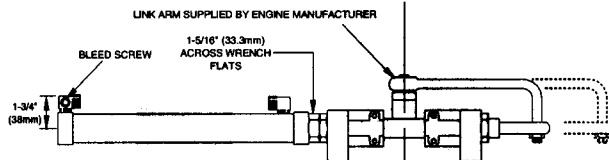
HC4600



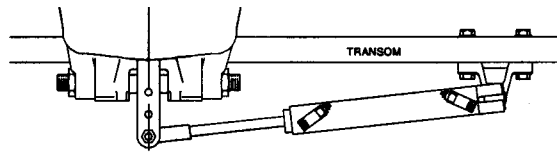
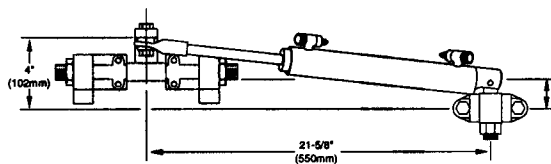
SeaStar Front Mount (HC5345 shown)



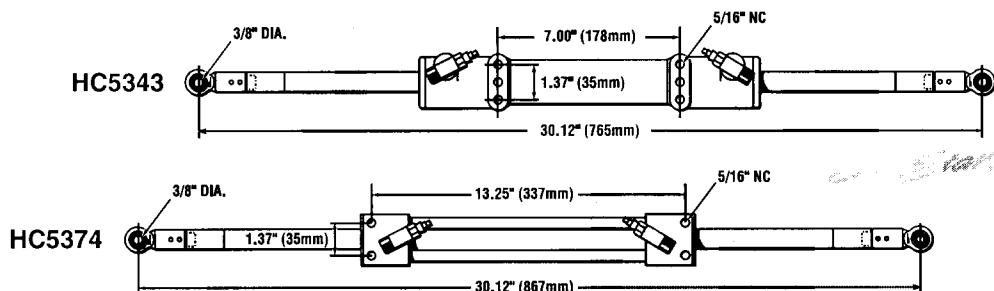
SeaStar Side Mount (HC5370)



SeaStar Splashwell Mount (HC5380)



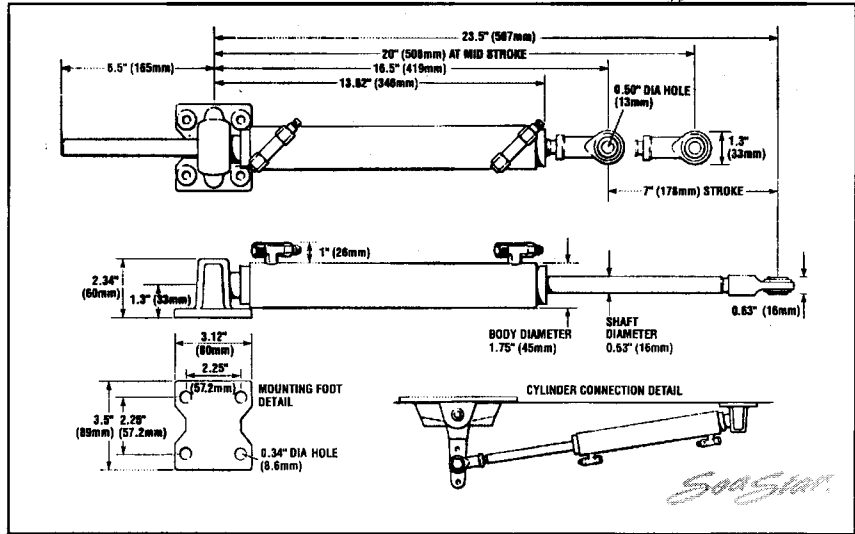
SeaStar Catamaran/ Pontoon (HC5343 & HC5374)



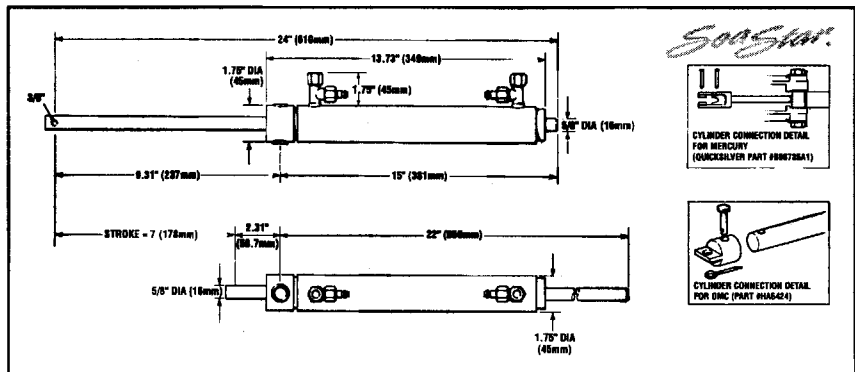
SeaStar steering dimensions

Cylinders: Stern Drive (I/O) Internal Mount

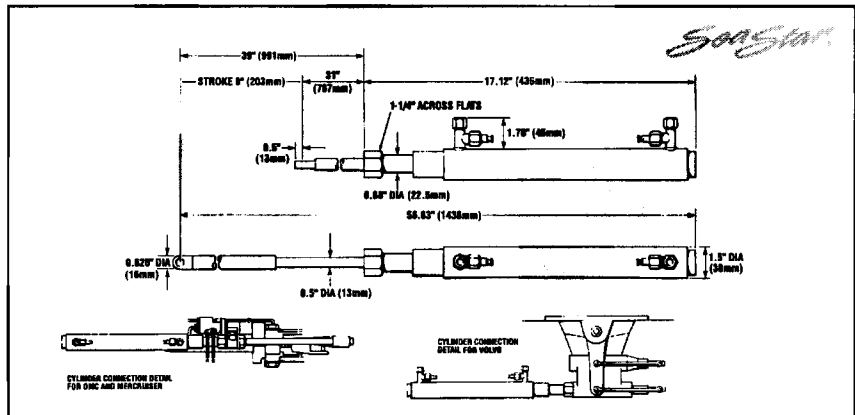
STERN DRIVE CYLINDER:
P/N HC5314
(MODEL BA150-7ATM)
Marine Drive Systems®
Series 1000
(Non Power Assisted, TO DATE)
Volvo® 275
(Non Power Assisted TO DATE)



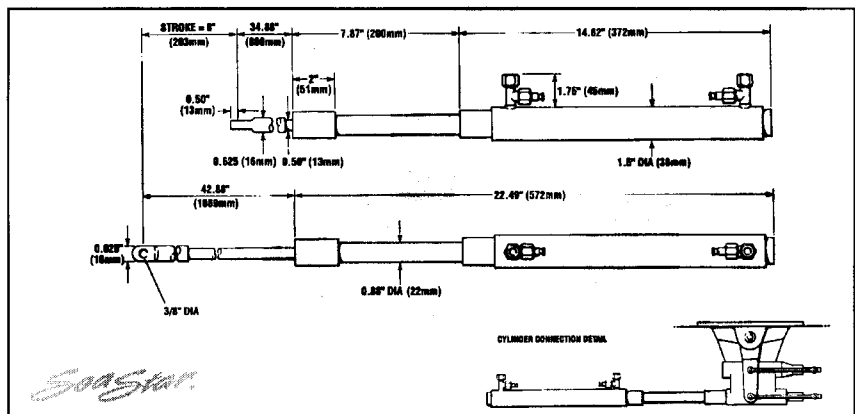
STERN DRIVE CYLINDER:
P/N HC5326
(MODEL BA150-7EM)
MerCruiser® ALPHA I;
MerCruiser® BRAVO I & II
(Non Power Assisted, 1984-DATE)
OMC® King Cobra
(Non Power Assisted; 1986-DATE)



STERN DRIVE CYLINDER:
P/N HC5328 (MODEL 125-8EM)
BMW® All Models
(Power Assisted, TO DATE)
MerCruiser® MERCUISER I
(Power Assisted TO 1983)
MerCruiser® ALPHA I;
MerCruiser® BRAVO I & II
Power Assisted (1984-DATE)
OMC® King Cobra
(Power Assisted 1986-DATE)
Volvo® 280, 290
(Power Assisted TO DATE)
Yamaha® All Models
(Power Assisted 1989-DATE)



STERN DRIVE CYLINDER:
P/N HC5329
(MODEL 125-8VEM)
Volvo® Diesel
(Power Assisted, TO DATE)



SeaStar steering dimensions

Stern Drive (I/O): Internal Mount

STERN DRIVE CYLINDER:

P/N HC5330

(MODEL BA125-8EMV)

BMW® All Models

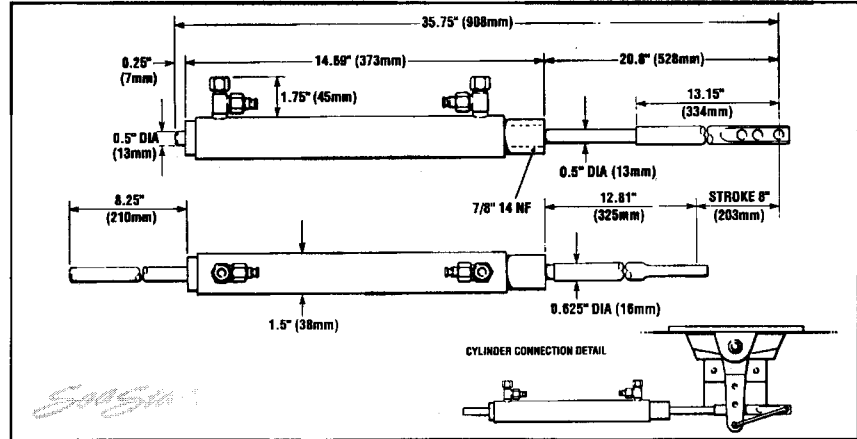
(Non Power Assisted, TO DATE)

MerCruiser®, MerCruiser I

(Non Power Assisted, TO 1983)

Volvo® 280, 290 & Volvo® Diesel

(Non Power Assisted, TO DATE)



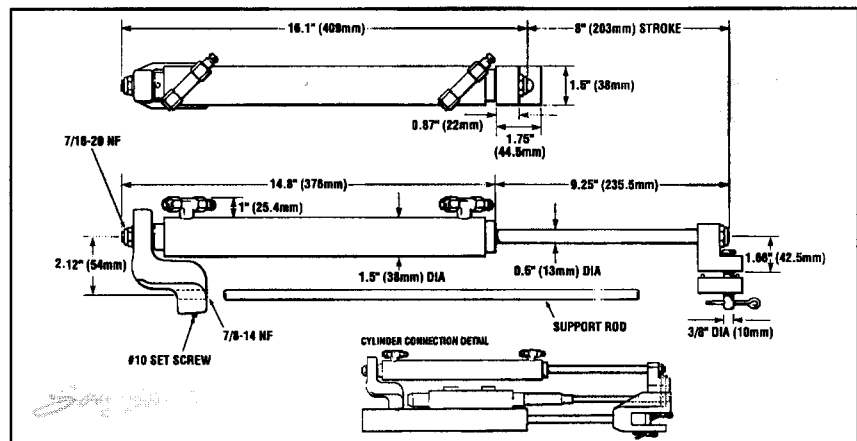
STERN DRIVE CYLINDER:

P/N HC5331

(MODEL 92-VPS)

Volvo® All Models

(Power Assisted, 1992)



STERN DRIVE CYLINDER:

P/N HC5332

(MODEL 135-7EM)

MerCruiser® Alpha 1;

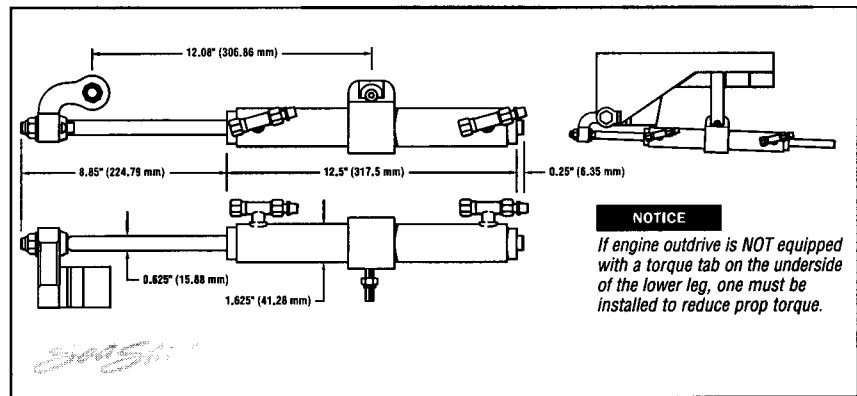
MerCruiser® Bravo I, II, III

(Non Power Assisted, TO DATE)

Volvo® 280, 290, Diesel

(Non Power Assisted, TO DATE)

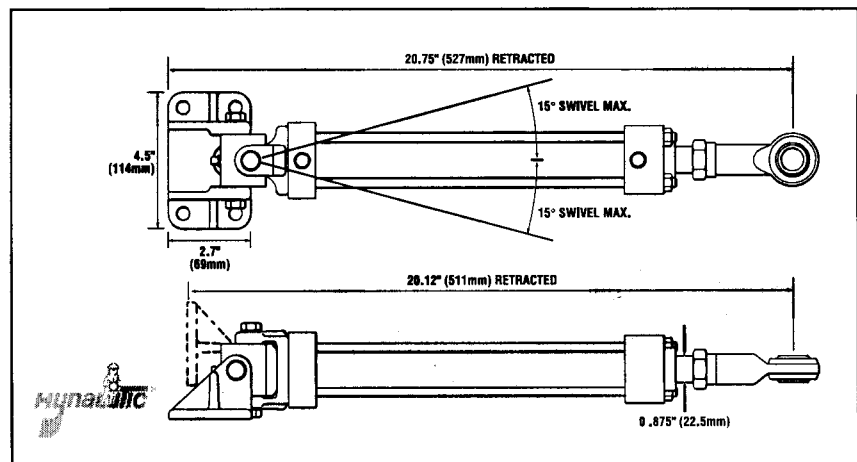
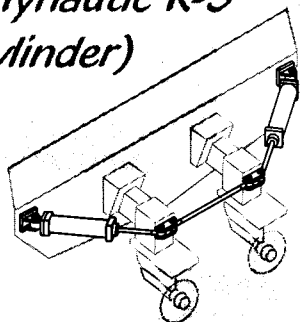
NOTE: If engine outdrive is not equipped with a torque tab on the underside of the lower leg, one must be installed to reduce prop torque.



NOTICE

If engine outdrive is NOT equipped with a torque tab on the underside of the lower leg, one must be installed to reduce prop torque.

Heavy Duty External Mount (Hynautic K-5 cylinder)



SeaStar steering dimensions

Cylinders:

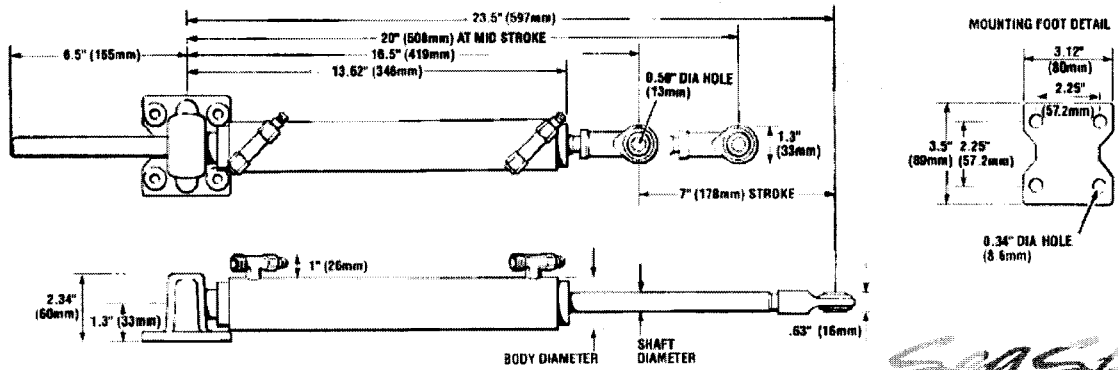
Inboard - Manual

Aluminum

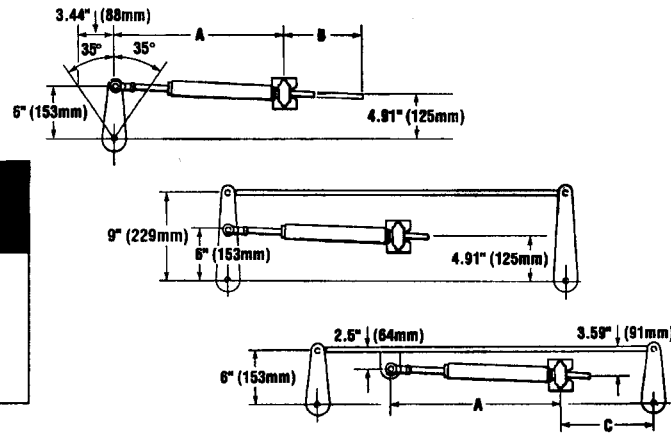
DIMENSIONS

ATM (ALUMINUM BODY) INBOARD CYLINDERS
P/N HC5312/HC5313/HC5314 (MODEL BA1__-7ATM):

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)



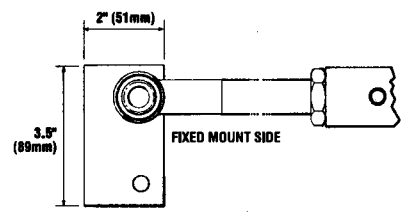
MOUNTING CONFIGURATION DIMENSIONS
ATM (ALUMINUM BODY) INBOARD CYLINDERS
P/N HC5312/HC5313/HC5314 (MODEL BA1__-7ATM):



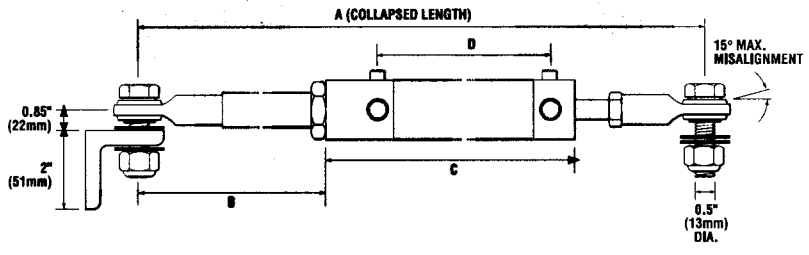
CYLINDER MODEL	PART #	MOUNTING DIMENSIONS		
		A	B	C
BA125-7ATM	HC5312	20" (508)	6.5" (165)	8.5" (216)
BA135-7ATM	HC5313	20" (508)	6.5" (165)	8.5" (216)
BA150-7ATM	HC5314	20" (508)	6.5" (165)	8.5" (216)

(Figures in parenthesis are in millimeters)

BALL JOINT MOUNT CYLINDERS (K-18/K-19)



CYL MODEL	DIMENSIONS				BORE	STROKE	DISP
	A	B	C	D			
K-18	24.5" (622mm)	9.31" (237mm)	11.75" (299mm)	9.875" (251mm)	1.25" (32mm)	7" (178mm)	7cu in
K-19	28.5" (724mm)	11.31" (287mm)	13.75" (350mm)	11.875" (302mm)	1.25" (32mm)	9" (229mm)	9cu in



SeaStar steering dimensions

Cylinders:

Inboard - Manual

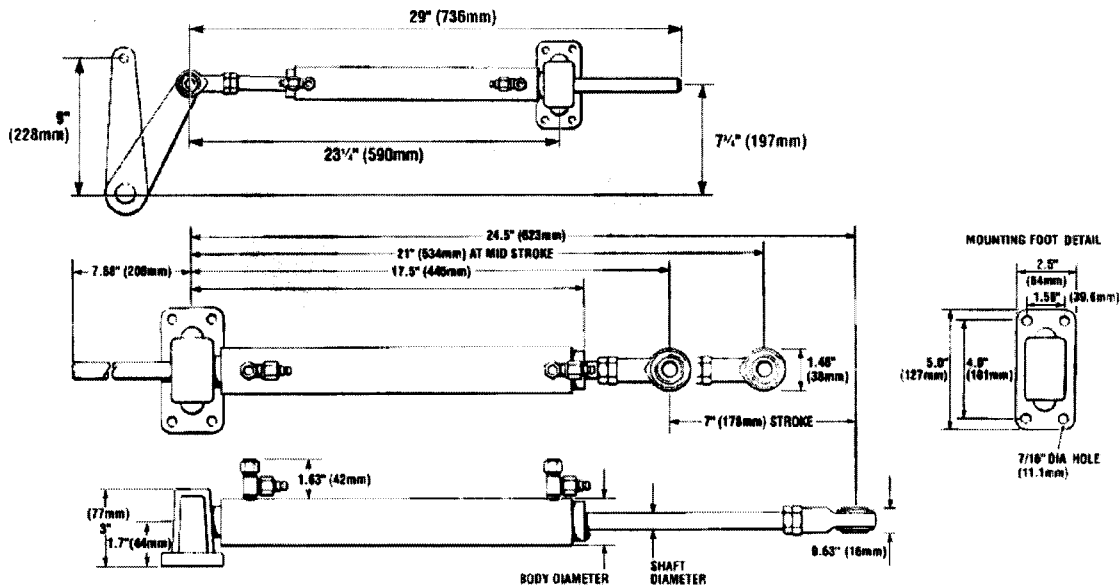
Brass - SeaStar



CYLINDER DIMENSIONS SPECIFIC TO MODEL			
CYLINDER MODEL	PART #	BODY DIAMETER	SHAFT DIAMETER
BA150-7TM	HC5318	1.75" (45mm)	0.63" (15.9mm)
BA150-9TM	HC5369	1.75" (45mm)	0.63" (15.9mm)
BA175-7TM	HC5319	2.00" (51mm)	0.75" (19.1mm)

DIMENSIONS

TM (BRASS BODY) INBOARD CYLINDERS
P/N HC5318/HC5319 (MODEL BA1__-7TM):

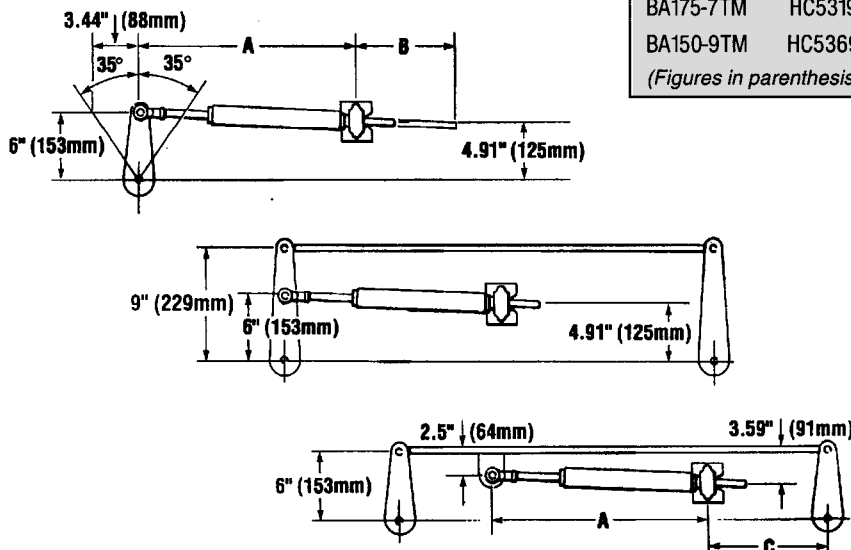


MOUNTING CONFIGURATION DIMENSIONS

TM (BRASS BODY) INBOARD CYLINDERS
P/N HC5318/HC5319 (MODEL BA1__-7TM):

CYLINDER			MOUNTING DIMENSIONS		
MODEL	PART #		A	B	C
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 millimeters)



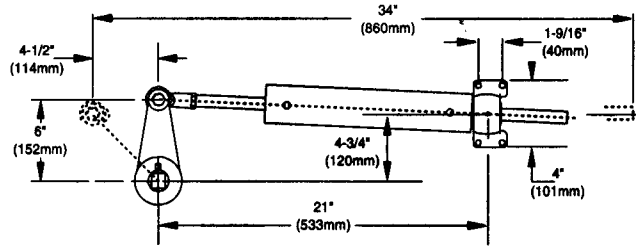
SeaStar steering dimensions

Cylinders:

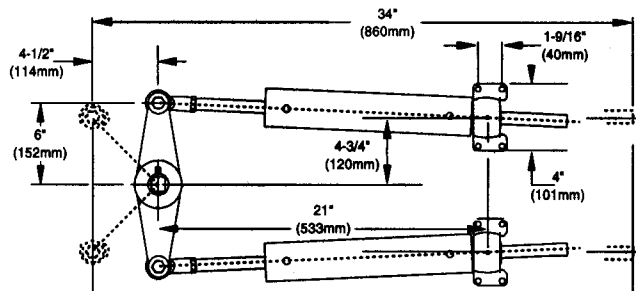
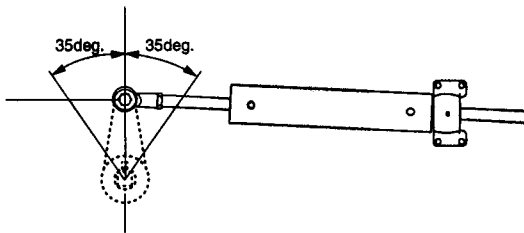
Inboard - Manual

Brass - Capilano

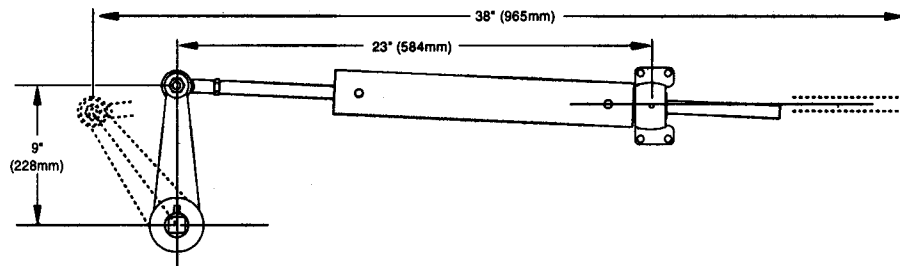
DIMENSIONS & MOUNTING CONFIGURATIONS
CAPILANO (BRASS BODY) INBOARD CYLINDERS
BALANCED 7" STROKE MODELS
P/N's HC5349/HC5350/HC5351/HC5355/HC5356/HC5357
(MODEL BA__-7TM_):



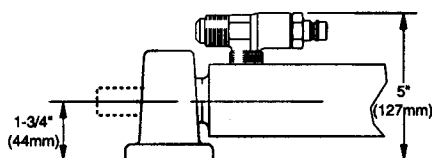
TYPICAL CYLINDER STROKE ARC:



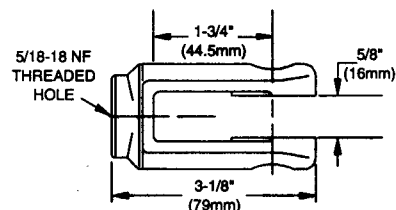
DIMENSIONS & MOUNTING CONFIGURATIONS
CAPILANO (BRASS BODY) INBOARD CYLINDERS
BALANCED 11" STROKE MODELS
P/N's HC5378/HC5379
(MODEL BA__-11TM_):



CYLINDER MOUNTING FOOT DETAIL - ALL 7" STROKE MODELS



CYLINDER ROD END CLEVIS DIMENSIONS

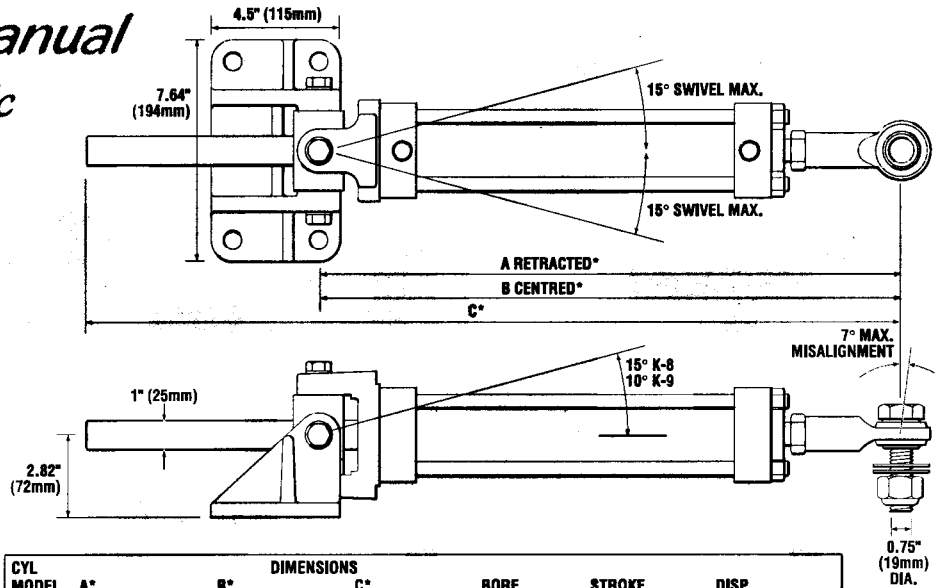


SeaStar steering dimensions

Cylinders:

Inboard - Manual Brass - Hynautic

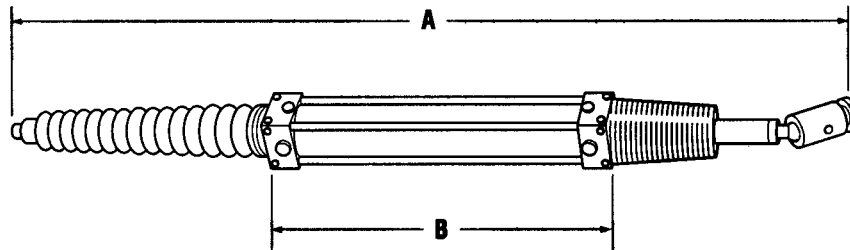
"UNIVERSAL MOUNT"
MODELS:
P/N K-8/K-9



CYL MODEL	DIMENSIONS			BORE	STROKE	DISP
	A*	B*	C*			
K-8	19.74" (502mm)	24.47" (622mm)	27.92" (710mm)	2.5" (64mm)	9.5" (242mm)	39.2cu in
K-9	24.74" (629mm)	31.99" (813mm)	37.92" (962mm)	2.5" (64mm)	14.5" (369mm)	59.8cu in

* Clevis option increases length by 0.44" (12mm)

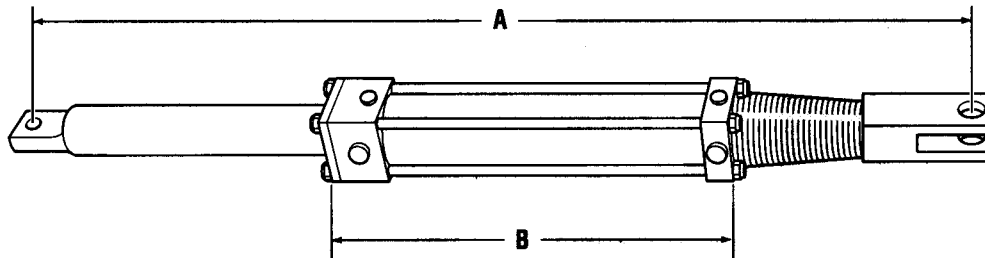
"FIXED MOUNT"
MODELS:
P/N K-22/K-27



CYL MODEL	DIMENSIONS		BORE	STROKE	DISP
	A	B			
K-22	*34.12" (867mm)	13.25" (337mm)	1.5" (38mm)	10" (254mm)	13.20cu in
K-27	*36.75" (934mm)	13.25" (337mm)	1.5" (38mm)	10" (254mm)	13.20cu in

* Dimensions are with the cylinder rod centered.

"PIVOT MOUNT"
MODEL:
P/N K-31



CYL MODEL	DIMENSIONS		BORE	STROKE	DISP
	A	B			
K-31	*38.37" (975mm)	14.12" (359mm)	2.0" (51mm)	10" (254mm)	25.5cu in

* Dimensions are with the cylinder rod centered.

NFB™ Rack outboard steering

The easy-to-sell, easy-to-install upgrade to the most popular Rack and Pinion steering system in boating. Teleflex has applied its patented No FeedBack technology to the incredible precision of a rack and pinion system, and engineered-in serious advances in steering comfort and control. The NFB Rack is the rack and pinion steering system of tomorrow, and it's available today in single cable configuration for outboards up to V-6.



Features:

- Patented No FeedBack™ Steering mechanism.
- Precise feel of 4 turns from lock-to-lock.
- Minimal clutch free play.
- Standard 3/4" tapered steering shaft.
- Stainless steel cable output ends.
- Fast, easy installation; back mount design allows quick placement in dash *PLUS* mounting hardware fits industry-standard Teleflex and Morse rack holes.
- Meets A.B.Y.C. standards.
- Meets N.M.M.A. certification requirements.

Applications:

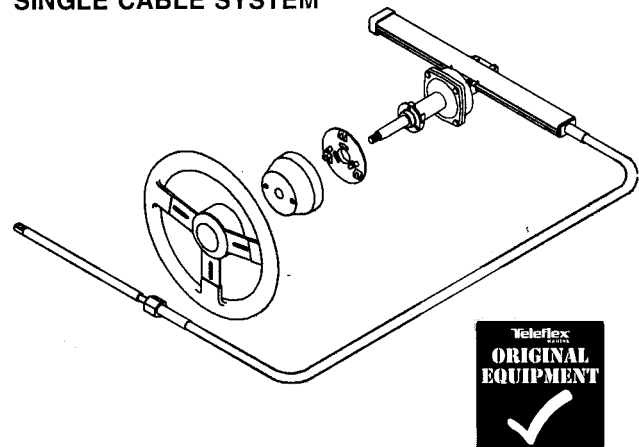
NFB Rack is suitable for most boats with single non-power assisted outboard engines up to V-6 and minimal engine flutter or steering instability.

New Back Mount design means easy installation; helm & cable are installed as a unit from behind dash and replace standard Teleflex rack steering without dash modifications.

For single station use only.

****Replaces most MORSE CONTROLS and older TELEFLEX rack and pinion steering systems for non-power-assist outboards & I/Os.**

NFB™ RACK
SINGLE CABLE SYSTEM



(4 turns lock-to-lock)

Tilt
STEERING
available!

Phone: 800-225-0004 ☎ Fax: 908-486-1056
e-mail: sales@sealandpower.com

NFB™ Rack outboard steering

Complete System:

NFB Rack Steering Kit
(Single Cable) SS151XX

Components:

NFB Rack Helm (single/dual) SH5230P

Rack Single Cable SSC134XX
(XX = cable length in feet. A 14' SSC134 would be SSC13414.)

Rack NFB Bezel (90°) SB39544P

Options:

NFB Rack Tilt Dash Module SH1535230
Includes tilt helm and mechanism. Easy way to upgrade to Tilt or replace older Tilt systems. Requires SSC134 cable.

NFB Rack Tilt Helm (single/dual) ... SH91630P*
** Requires SH91500/SH91700 tilt mechanism to complete Tilt Steering system installation.*

Performance Tilt Mechanism SH91500P
TFXtreme Tilt Mechanism SH91700P

Dash Wedge Kit (10°) SB27448P
Dash Wedge Kit (20°) SB27449P

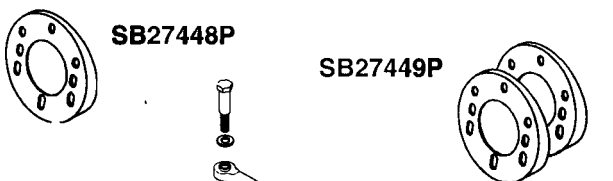
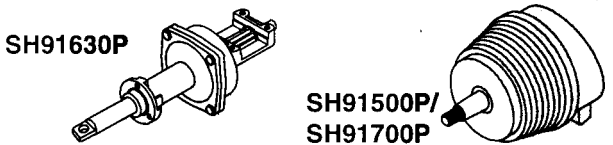
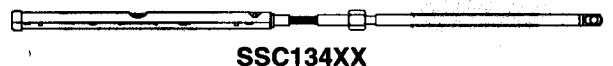
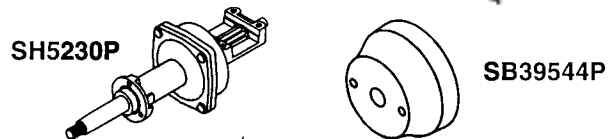
TFXTREME Rack Single Cable SSC154XX
Use this cable for minimal backlash & superior steering response. (XX = cable length in feet. A 14' SSC134 would be SSC15414.)

Universal Tie Bar SA27252P
(NOTE: Maximum tie bar length: 25-1/2")

Cable Gard (fits most tilt tubes) SA39329P

Service Items:

Steering Wheel Hardware Kit 2745417P



NOTE: Teleflex rack cables SSC134XX, SSC135XX and SSC154XX DO NOT replace the SSC124XX or any Morse Rack & Pinion cables and can only be used with current generation Teleflex Rack & Pinion helms.

The Rack sterndrive steering

Traditional Teleflex mechanical steering is still the choice for stern drives, inboards and other power assisted applications. It's just right for power steered boats in which No FeedBack™ systems are not required. Our new Rack features the precision and comfort of four turns lock-to-lock. In single cable configurations, this is the best 4-turn choice for power-steered boats.

Features:

- Precise, easy 4 turns lock-to-lock.
- Kits include: cable, helm, bezel and hardware.
- Standard 3/4" tapered steering shaft.
- Stainless steel cable output ends.
- Fast, easy installation: back mount design allows quick placement in dash *PLUS* mounting hardware fits industry-standard Teleflex and Morse rack holes.
- Meets A.B.Y.C. standards.
- Meets N.M.M.A. certification requirements.

Applications:

Virtually all power-assisted stern drive boats with wheels up to 16" diameter.

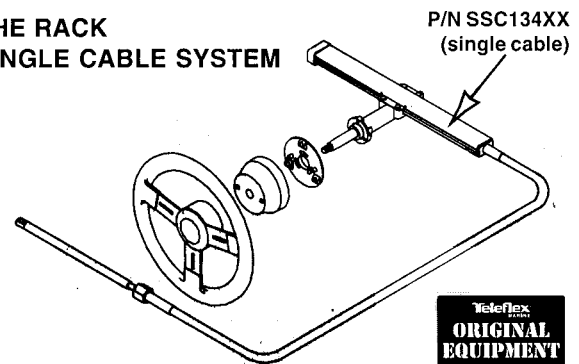
Back Mount Rack Replaces 1984-date Teleflex "The Rack" steering without dash modification. (Requires use of SSC134 Back Mount Rack cable.)

For single station use only.

**** Replaces most MORSE CONTROLS and older TELEFLEX rack and pinion steering systems for power-assist outboards, I/Os and small inboards.**

Teleflex
MARINE

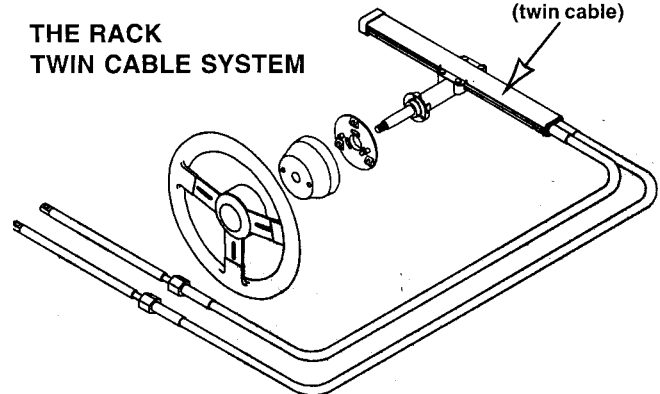
THE RACK SINGLE CABLE SYSTEM



P/N SSC134XX
(single cable)



THE RACK TWIN CABLE SYSTEM



P/N SSC135XX
(twin cable)

(4 turns lock-to-lock)

Tilt
STEERING
available!

The Rack sterndrive steering

Complete System:

BM Rack Steering Kit
(single cable) SS141XX

Components:

Back Mount Rack Helm (single/dual) SH5210P

Back Mount Rack Single Cable SSC134XX
(XX = cable length in feet. A 14' SSC134 would be SSC13414.)

Back Mount Bezel (90°) SB39526P

Options:

BM Rack Tilt Dash Module SH1535210
Includes tilt helm and mechanism. Easy way to upgrade to Tilt or replace older Tilt systems. Requires SSC134 or SSC135 cable.

BM Rack Tilt Helm (single/dual) SH91610P*
** Requires SH91500/SH91700 tilt mechanism to complete Tilt Steering system installation.*

Performance Tilt Mechanism SH91500P
TFXtreme Tilt Mechanism SH91700P

TFXTREME Rack Single Cable SSC154XX
Use this cable for minimal backlash & superior steering response. (XX = cable length in feet. A 14' SSC134 would be SSC15414.)

Back Mount Rack Dual Cable SSC135XX†
† For dual rack & pinion steered stern drives.

Dash Wedge Kit (10°) SB27448P
Dash Wedge Kit (20°) SB27449P

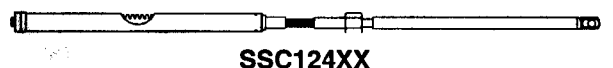
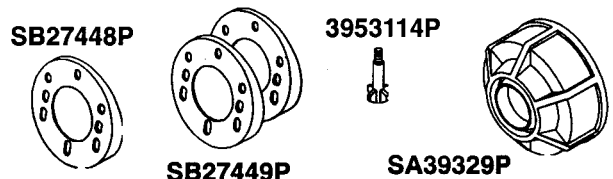
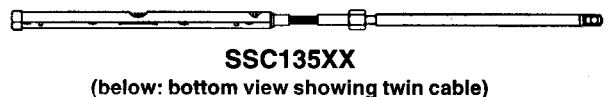
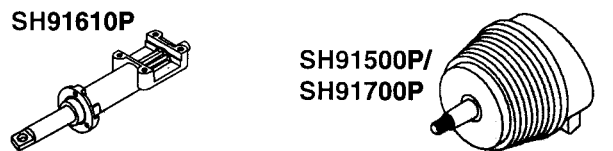
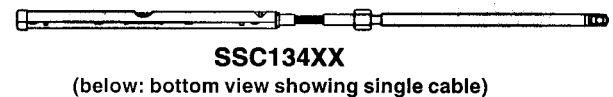
Back Mount Rack Friction Device 3953114P

Cable Gard (fits most tilt tubes) SA39329P

Service Items:

Old Style "The Rack" Cable
(1984-date) SSC124XX**

** For 1984-1996 "Old Style" The Rack rack & pinion systems. Does not fit "New Style" ("Back Mount") rack systems and is not interchangeable with SSC134.



NOTE: Teleflex rack cables SSC134XX, SSC135XX and SSC154XX DO NOT replace the SSC124XX or any Morse Rack & Pinion cables and can only be used with current generation Teleflex Rack & Pinion helms.

Morse Command 290

Morse®

Morse Controls mechanical steering systems are no longer being produced. Many items, such as the Command 290 components shown here, are still available. Contact us when replacing Morse steering components for current availability or a recommendation for an upgrade to a new Teleflex steering system.

**MORSE COMMAND 290
SINGLE CABLE
ROTARY SYSTEM**



**MORSE COMMAND 290
TWIN CABLE
ROTARY SYSTEM**

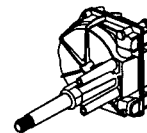
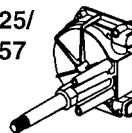


(3 turns lock-to-lock)

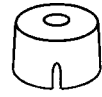
Components:

- Command 290 helm (no brake)292525
- Command 290 twin cable helm (with brake)305015
- 90° Black Bezel (replaces 292521)308559
- Command 290 Rotary Steering Cable (replaces 304411-000-XXX) **SSC61XX**

292525/
304857



305015



308559
(replaces
292521)



SSC61XX
(replaces 304411-000-XXX)

Options:

- Command 290 helm (with brake)304857
- 20° Black Bezel (replaces 293090)308561
- Adjustable Brake (Friction Device)292522

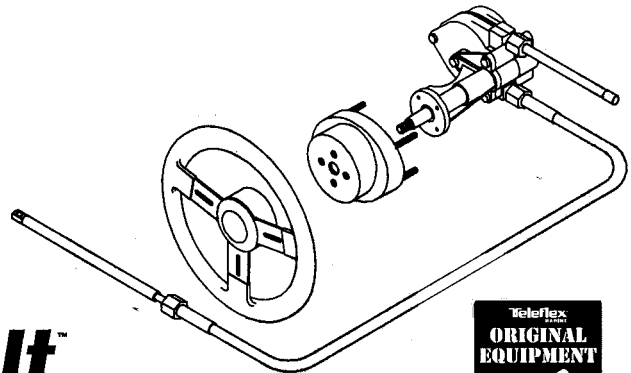
Service Items:

- Command 290 Helm Cable Take-up Tube (Spent Travel Tube)301098
- Command 290 Helm Hardware Kit.....305002

Big-T[®] inboard steering

The Original Teleflex Steering System!
For over 35 years, Big-T[®] has been the most durable, versatile mechanical steering system made, with both single and dual station capability. The heavy duty helm incorporates a strong steel pinion, dual diecast gears and meaty shaft bearing supports, all encased in a rugged gear housing. It's no wonder owners of small inboards have counted on the Teleflex Big-T since 1963!

**BIG-T[®]
SINGLE STATION SYSTEM**



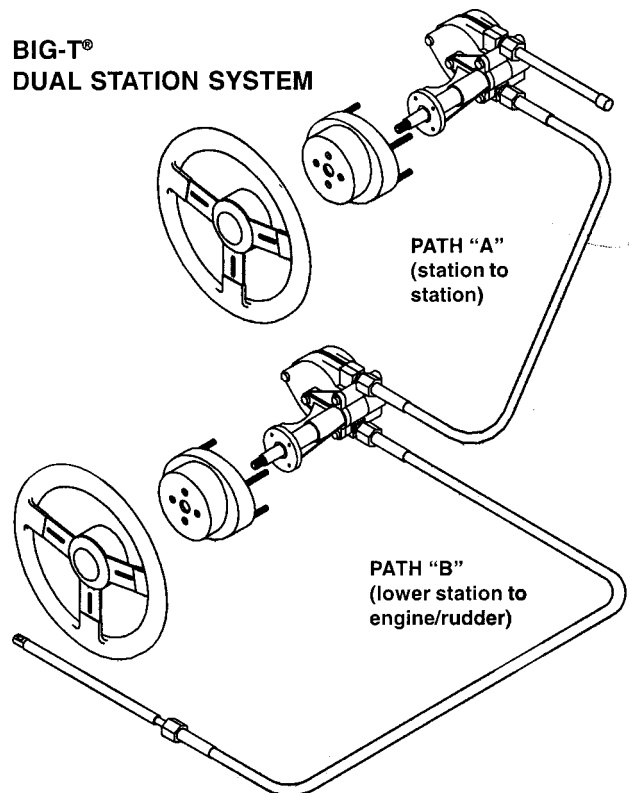
Tilt
STEERING
available!

Features:

- Available in single or dual station versions.
- Responsive 3 turns from lock-to-lock.†
- Standard 3/4" tapered steering shaft.
- Stainless steel cable output ends.
- 2-piece bezel for 90° or 20° helm mount to dash.
- Optional 1-piece 90° bezel for compact mounting.
- Uses Teleflex SSC72 type cable.‡
- Meets A.B.Y.C. standards.
- Meets N.M.M.A. certification requirements.

(3 turns lock-to-lock)

**BIG-T[®]
DUAL STATION SYSTEM**



† 3.0 turns when all of standard steering cable travel is utilized.

‡ Tension and dual station require purchase of different cables.

Applications:

Inboards to 34 feet with one or two engines. Also suitable for stern drive boats with power-assisted steering.

****Replaces most MORSE CONTROLS rotary steering systems.**

Big-T[®] inboard steering

Components:

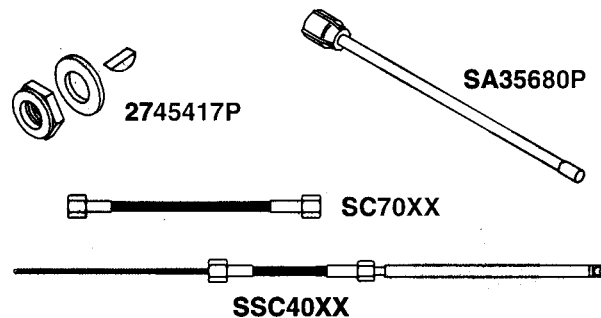
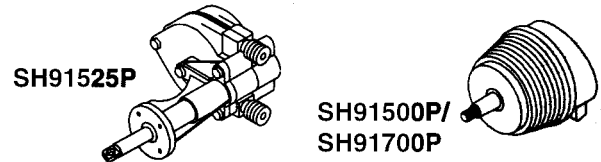
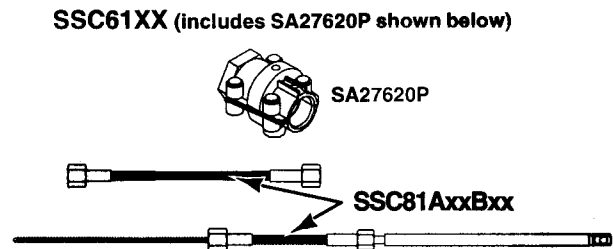
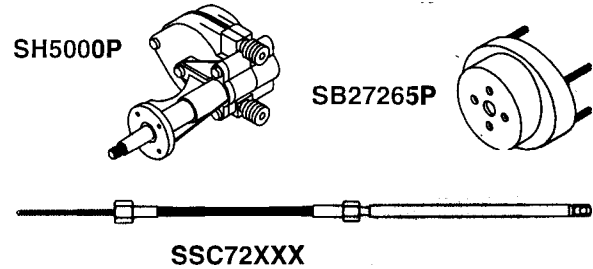
- Big-T Helm.....SH5000P
- Big-T Cable (single station push-pull)SSC72XX
(XX = cable length in feet. A 14' SSC72 would be SSC7214.)
- QC II Cable (single station push-pull)SSC61XX
- Big-T Cable (dual station)..... SSC81AxxBxx
(This is a special-order cable and is not returnable; xx = length in feet.)
- Bezel 2-pc. Black (90°/20° mount) .. SB27265P

Options:

- Big-T Tilt Helm SH91525P*
- * Requires SH91500/SH91700 tilt mechanism to complete Tilt Steering system installation.*
- Performance Tilt Mechanism SH91500P
- TFXtreme Tilt Mechanism SH91700P
- Bezel 2-pc. White (90°/20° mount).. SB27263P
- Bezel 1-pc. Chrome (90° mount)..... SB27268P
- Cable Gard (fits most tilt tubes) SA39329P

Service Items:

- Steering Wheel Hardware Kit 2745417P
- Spent Travel Tube (Big-T) SA35680P
- Dual Station Conduit (Path "A") SC70XX
- Dual Station Cable (Path "B") SSC40XX

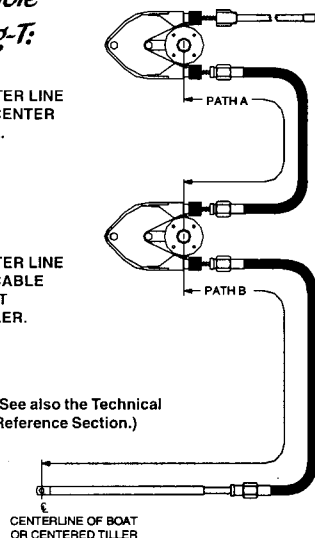


How To Measure Cable for Dual Station Big-T:

PATH "A": CENTER LINE OF WHEEL TO CENTER LINE OF WHEEL.

PATH "B": CENTER LINE OF WHEEL TO CABLE CONNECTION AT CENTERED TILLER.

(See also the Technical Reference Section.)



(For example, if the cable routing from engine to lower station is 18 feet and 10 feet from station to station, order part number SSC81A10B18 cable.)

Phone: 800-225-0004 Fax: 908-486-1056
e-mail: sales@sealandpower.com

NFB™ 4.2 outboard steering

Patented No FeedBack Steering Control for about the cost of an old-fashioned steering replacement. With the advantage of 4.2 turns lock-to-lock and our patented No FeedBack steering to lock out steering loads, Teleflex's 4.2 Rotary NFB Steering Systems are the most revolutionary advance in mechanical steering in many years. Available with a single cable configuration for most boats and dual cable for applications with engine flutter or steering instability.



Features:

- Patented No FeedBack™ Steering mechanism.
- Comfortable 4.2 turns from lock-to-lock.
- Minimal clutch free play.
- Standard 3/4" tapered steering shaft.
- Stainless steel cable output ends.
- Fast, easy installation: uses Teleflex Quick Connect (QC) steering cable and industry-standard Safe-T mounting hardware.
- Meets A.B.Y.C. standards.
- Meets N.M.M.A. certification requirements.

Applications:

Virtually all of today's outboard boats with wheels to 16" diameter.

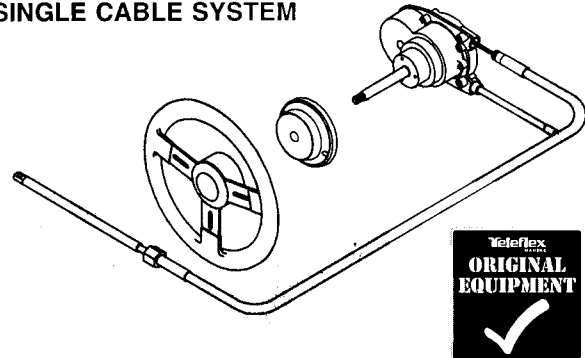
Single cable configuration for most boats. Dual cable for boats with engine flutter or steering instability.

Replaces Teleflex Safe-T® steering systems without dash modification.

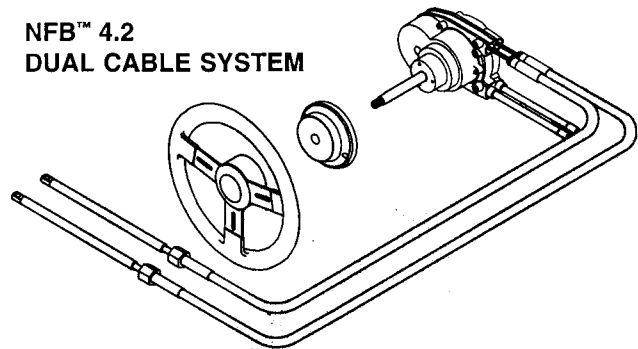
For single station use only.

****Replaces most MORSE CONTROLS and older TELEFLEX rotary steering systems for non-power-assist outboards & I/Os.**

NFB™ 4.2 SINGLE CABLE SYSTEM



NFB™ 4.2 DUAL CABLE SYSTEM



(4.2 turns lock-to-lock)

Tilt
STEERING
available!

Phone: 800-225-0004 ☎ Fax: 908-486-1056
e-mail: sales@sealandpower.com

NFB™ 4.2 outboard steering

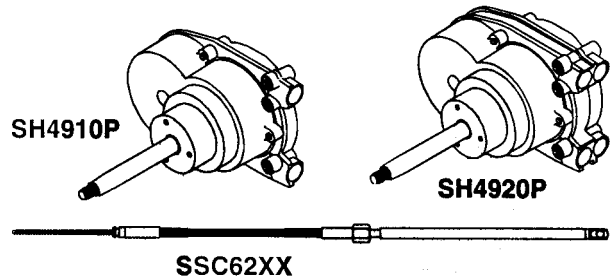
Complete Systems:

- NFB 4.2 Tilt Steering Kit
(Single Cable) SS157XX
- NFB 4.2 Steering Kit
(Single Cable) SS147XX
- NFB 4.2 Dual Steering Kit
(Dual Cable) SS148XX



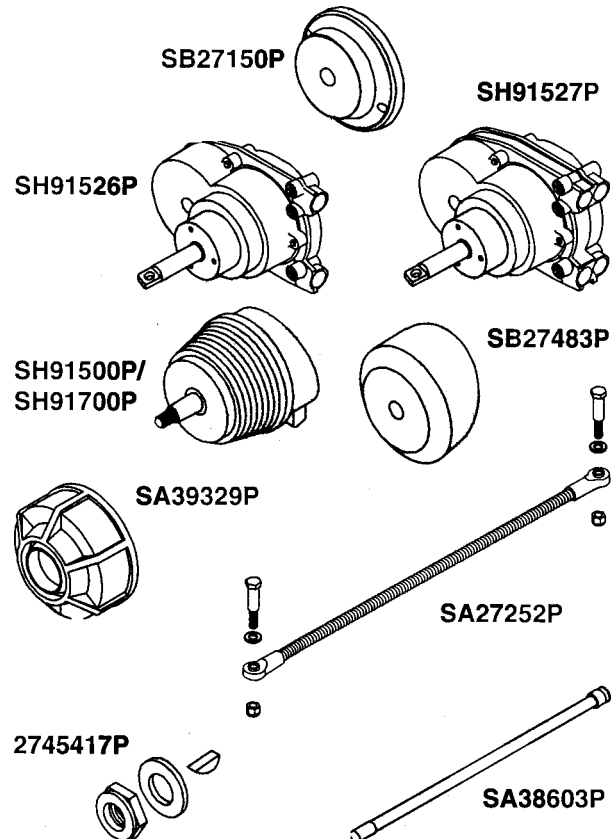
Components:

- NFB 4.2 Helm SH4910P
- NFB 4.2 Dual Helm SH4920P
- QC Cable SSC62XX
(XX = cable length in feet. A 14' SSC62 would be SSC6214.)
- Rotary NFB Bezel (90°) SB27150P



Options:

- NFB 4.2 Single Tilt Dash Module .. SH1534910
Includes tilt helm and mechanism. Easy way to upgrade to Tilt or replace older Tilt systems. Requires SSC61 or SSC62 cable.
- NFB 4.2 Single Tilt Helm SH91526P*
- NFB 4.2 Dual Tilt Helm SH91527P*
** Requires SH91500/SH91700 tilt mechanism to complete Tilt Steering system installation.*
- Performance Tilt Mechanism SH91500P
- TFXtreme Tilt Mechanism SH91700P
- Bezel (20°) SB27483P
- Universal Tie Bar SA27252P
(NOTE: Maximum tie bar length: 25-1/2")
- Cable Gard (fits most tilt tubes) SA39329P



Service Items:

- Steering Wheel Hardware Kit 2745417P
- Spent Travel Tube (Rotary NFB) SA38603P

Phone: 800-225-0004 Fax: 908-486-1056
e-mail: sales@sealandpower.com

Safe-T[®] QC sterndrive steering

Traditional Teleflex Marine mechanical steering is still the choice for stern drives, inboards and other power assisted applications. It's just right for power steered boats in which No FeedBack™ systems are not required. Safe-T[®] QC offers the quick response of three-turn steering, and easy installation with a patented, no-tools-required cable connection at the helm. In single cable configurations, this is a great 3-turn choice for power-steered boats.

Features:

- Quick-response of 3 turns lock-to-lock.
- Kits include: cable, helm, bezel and hardware.
- Standard 3/4" tapered steering shaft.
- Stainless steel cable output ends.
- Fast, easy installation: uses simple snap-in cable connection, Teleflex Quick Connect (QC) cable, and industry-standard Safe-T mounting hardware.
- Meets A.B.Y.C. standards.
- Meets N.M.M.A. certification requirements.

Applications:

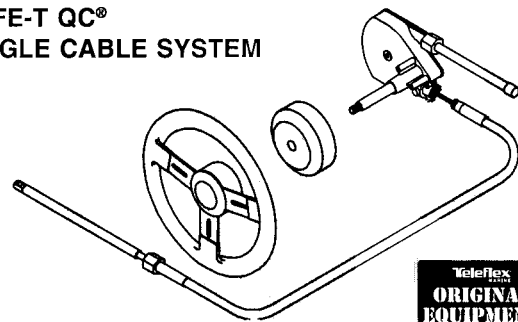
Virtually all power-assisted stern drive boats with wheels up to 16" diameter. Safe-T QC™ replaces all Teleflex Safe-T helms made since 1968 with little or no dash modifications. (Requires use of SSC62 QC steering cable.)

For single station use only.

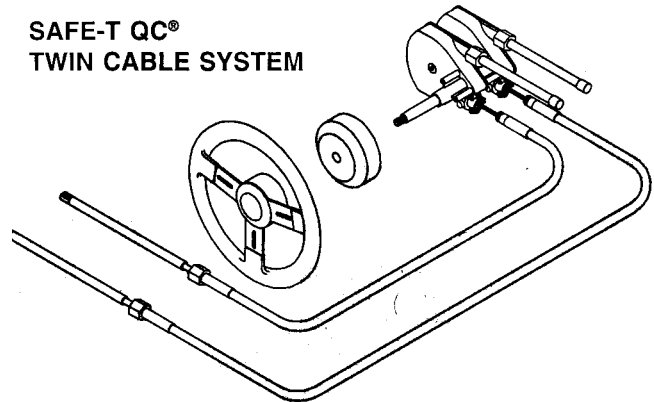
**** Replaces most MORSE CONTROLS and older TELEFLEX rotary steering systems for power-assist outboards, I/Os and small inboards.**

Teleflex[®]
MARINE

SAFE-T QC[®]
SINGLE CABLE SYSTEM



SAFE-T QC[®]
TWIN CABLE SYSTEM



(3 turns lock-to-lock)

Tilt
STEERING
available!

Phone: 800-225-0004 ☎ Fax: 908-486-1056
e-mail: sales@sealandpower.com

Safe-T[®] QC sterndrive steering

Complete System:

Safe-T QC Steering Kit (single cable) SS137XX

Components:

Safe-T QC Single Helm SH5094P

QC Cable SSC62XX
(XX = cable length in feet. A 14' SSC62 would be SSC6214.)

Safe-T QC Bezel (90°) SB27484P

Options:

Safe-T QC Sgl. Tilt Dash Module .. SH1535094
Includes tilt helm and mechanism. Easy way to upgrade to Tilt or replace older Tilt systems. Requires SSC61 or SSC62 cable.

Safe-T QC Single Tilt Helm SH91523P*
* Requires SH91500/SH91700 tilt mechanism to complete Tilt Steering system installation.

Safe-T QC Dual Tilt Helm SH91524P*†
* Requires SH91500/SH91700 tilt mechanism to complete Tilt Steering system installation.
† For dual cable steered stern drives.

Performance Tilt Mechanism SH91500P
TFXtreme Tilt Mechanism SH91700P

Safe-T QC Dual Helm SH5294P†

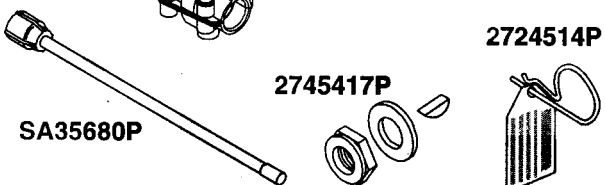
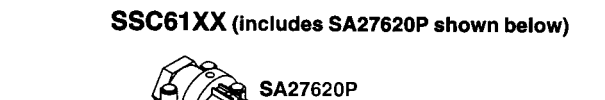
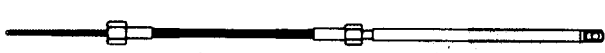
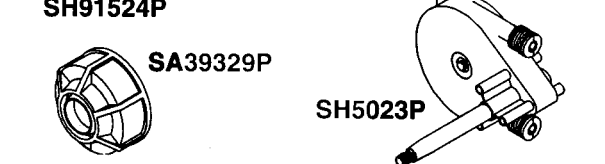
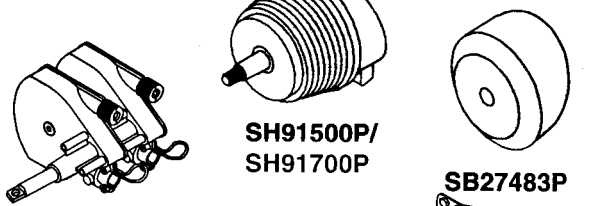
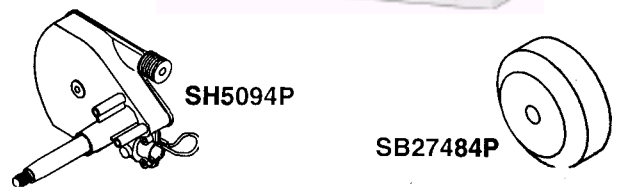
Safe-T QC Bezel (20°) SB27483P
Cable Gard (fits most tilt tubes) SA39329P

Service Items:

Safe-T "TS" helm SH5023P

Safe-T Cable (with helm nut) SSC72XX
QC II Cable (Safe-T QC or "TS") SSC61XX
QCII Threaded Helm Converter SA27620P

Steering Wheel Hardware Kit 2745417P
Spent Travel Tube SA35680P



Morse®

mechanical steering connection kits and parts

Connection Kits:

Support Tube (Aluminum) 64480

Front Hookup, Outboard Transom Mount
(Galvanized) 300610

Front Hookup, Outboard Transom Mount
(Stainless Steel) 300611

Adapter Bracket for Johnson/Evinrude
40 hp and under 300612
(See also Teleflex outboard clamp block kits on following pages.)

Front Hookup, Outboard
Splashwell Mount 300613
(See also Teleflex splashwell mount kits on following pages.)

Hookup, Inboard Transom Mount
for Volvo, 1977 and earlier 300614

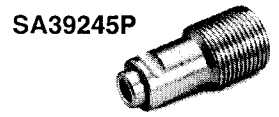
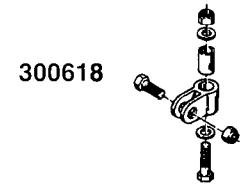
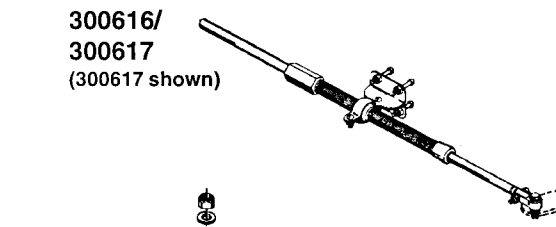
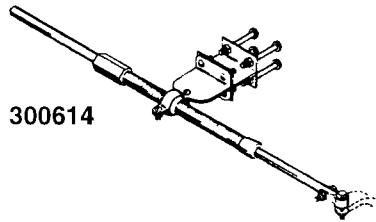
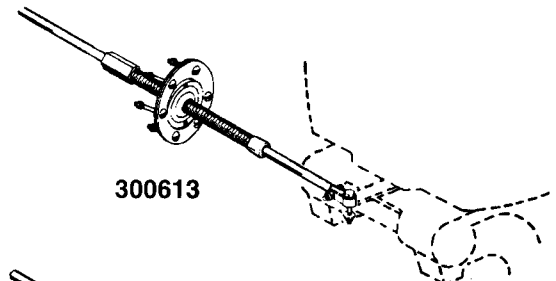
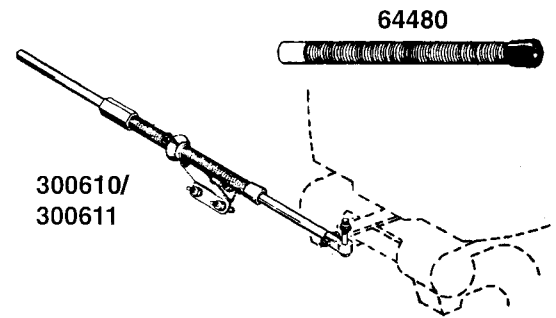
Hookup, Inboard Stand-off,
Tall Bracket 300616

Hookup, Inboard Stand-off,
Short Bracket, 2" 300617

Hookup Inboard Stand-off,
Short Bracket 2" (Stainless Steel) 307046
(See also Teleflex ski boat inboard clamp block kits on following pages.)

Swivel Assembly Only 300618
(See also Teleflex ski boat clevis kit on following pages.)

Command 290 Helm Converter
(replaces 300959) SA39245P
(Adapts Morse Command 290 single-cable helms for use with Teleflex SSC72 [threaded helm nut] or SSC61 [QC II] steering cables.)



Steering Connection Kits:

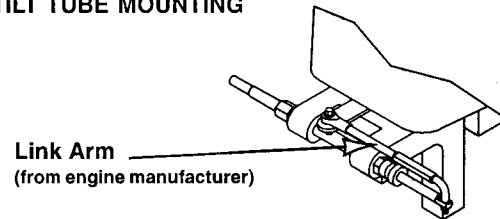
There are four basic types of connections for mechanical steering.

Tilt Tube Mount

This is the most popular steering cable-to-engine connection method for outboards with an ABYC standard tilt tube. This installation requires the use of a link arm which can be purchased from the engine manufacturer.

Parts Required: Engine Manufacturer's Link Arm

TILT TUBE MOUNTING

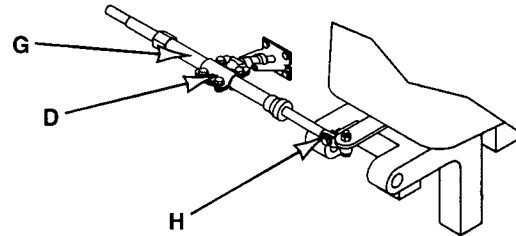


Transom Support Mount

This cable connection is used for older model outboards without tilt tubes, low HP outboards or applications where transom design interferes with standard tilt tube mounting.

Parts Required: D, G & H
Master Kits (Include D, G & H):
Stainless Steel Transom Mount Kit SA27255P or
Corrosion Resistant Transom Mount Kit SA27256P

TRANSOM SUPPORT MOUNTING

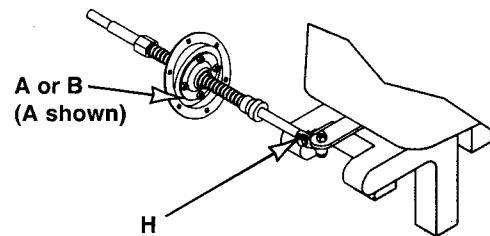


Splashwell Mount

This cable connection is used on boats where standard tilt tube or transom support mounting methods are precluded by a splashwell box or lack of engine tilt tube. The mounting surface is usually near perpendicular to the transom and between 12 and 16 inches from the center line of the boat and/or tiller (25-33" total splashwell width).

Parts Required: B, H (90°) or A, H (15°)
Master Kits (Include H & A/B):
90° Splashwell Mount Kit SA27254P or
15° Splashwell Mount Kit SA27253P

SPLASHWELL MOUNTING

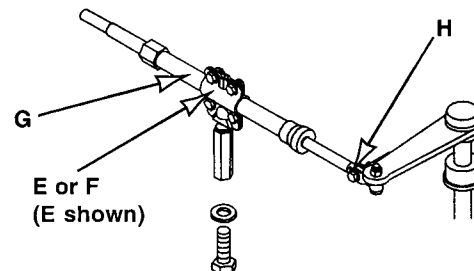


Inboard Stringer Support Mount

This connection is used on inboards and is attached to a stringer or suitable mounting bracket below deck. The cable is perpendicular to the centered tiller and in half stroke for proper operation. An additional bracket may be needed to support the ball post. Available in heavy duty "Ski Boat" versions, with either long (4.5") or short (2.25") post standoff.

Parts Required: E,G,H (long post) or F,G,H (short post)

INBOARD STRINGER SUPPORT MOUNTING

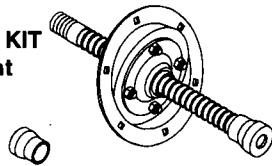


*See following page for part numbers of lettered component parts.

Steering Connection Kits:

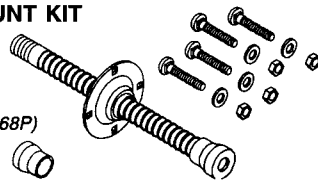
A

SPLASHWELL MOUNT KIT
15° Corrosion Resistant
SA27253P
(BOOT ONLY P/N: SA37868P)



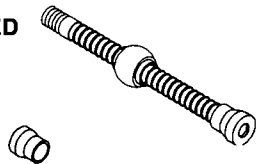
B

SPLASHWELL MOUNT KIT
90° Corrosion Resistant
SA27254P
(BOOT ONLY P/N: SA37868P)



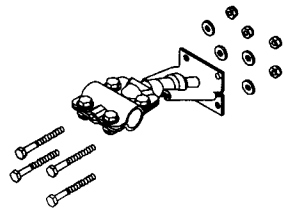
C

SPLASHWELL THREADED TUBE WITH BALL
Corrosion Resistant
SA36316P
(BOOT ONLY P/N: SA37868P)



D

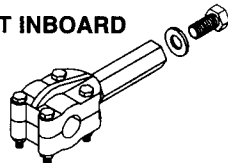
CLAMP BLOCK — OUTBOARD
Stainless Steel
SA27149P
Corrosion Resistant
SA27055P



NOTE: Parts shown on this page are available in kit form ONLY.

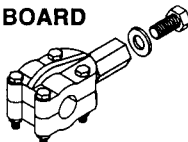
E

CLAMP BLOCK — SKI BOAT INBOARD
4-1/2" Stand-Off SA27579P
(Heavy Duty with Black Metal Flake Finish)



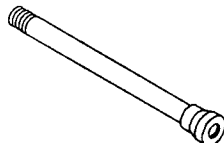
F

CLAMP BLOCK — SKI BOAT INBOARD
2-1/4" Stand-Off SA27578P
(Heavy Duty with Black Metal Flake Finish)



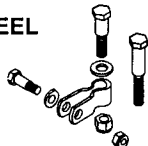
G

SUPPORT TUBE
Aluminum SA27274P
Stainless Steel SA27275P



H

CLEVIS KIT — STAINLESS STEEL
With Short Bolt SA27314P
With Long Bolt SA27329P
NOTE: SA27313P Bushing should be ordered with SA27329P.



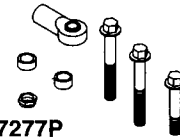
H (continued)

CLEVIS KIT — SKI BOAT
(STAINLESS STEEL)
With Short Bolt SA27576P
With Long Bolt SA27577P



I

ROD END KIT
(1/2-20 THD.)
Steel SA27276P
Stainless Steel SA27277P



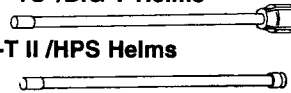
J

BUSHING KIT — INBOARD TILLER ARM
SA27313P



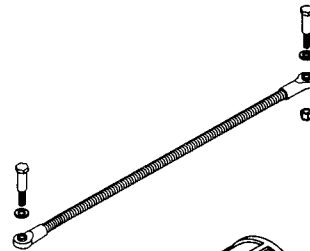
M

SPENT TRAVEL TUBES FOR ROTARY HELMS
SAFE-T QC/SAFE-T "TS"/BIG-T Helms
SA35680P
NFB 4.2 /NFB SAFE-T II /HPS Helms
SA38603P



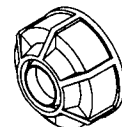
N

UNIVERSAL TIE BAR KIT
SA27252P
(Max. length: 25-1/2")



O

CABLE GARD
For Most Outboards with Tilt Tube
SA39329P
(Keeps tilt tube clean.)



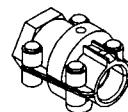
P

STEERING WHEEL HARDWARE KIT
2745417P
(For All Teleflex Mechanical Helms with 3/4" Tapered Shaft.)



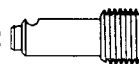
Q

QC II HELM CONVERTER
For Helms w/Threaded Spigots
SA27620P
(Upgrades older Teleflex rotary helms to Quick-Connect cable interface, allowing use of SSC61/SSC62 QC cables.)



R

COMMAND 290 HELM CONVERTER
SA39245P (replaces 300959)
(Adapts Morse Command 290 single-cable helms for use with Teleflex SSC72 [threaded helm nut] steering cables.)

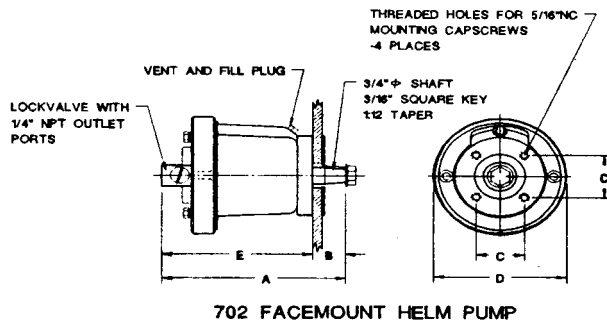
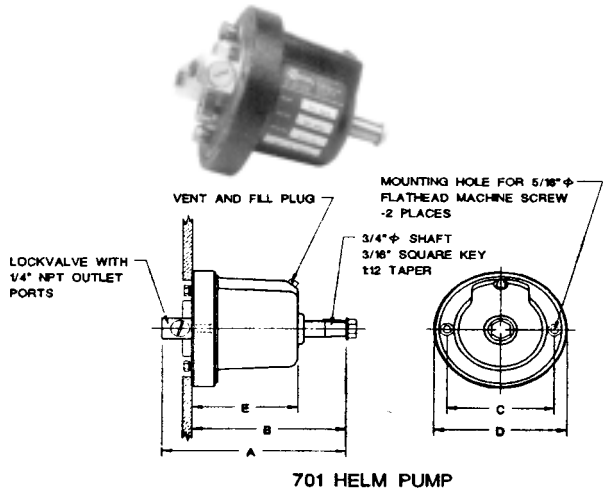




700 Series Hydraulic Steering

700 Series Helm Pumps

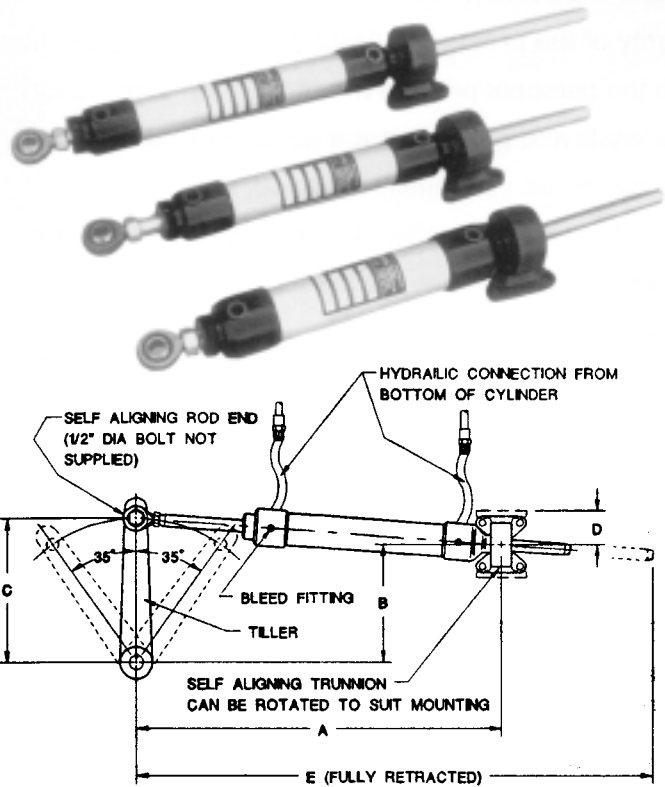
- Performance.**
 The 701 is a positive displacement axial piston pump based on the same design found in larger Wagner helm pumps. The pistons are ground and honed, then hand assembled for a precise fit resulting in the most efficient manual hydraulic helm pump available.
- Dependable.**
 The pump is a rugged all metal construction with a hard baked-on enamel finish. The brass shaft is supported at both ends for extra strength. A replaceable external shaft seal is used.
- Multiple steering stations.**
 Multiple helm pumps are easily connected. Each pump operates independently and has full rudder control. A lockvalve on each pump prevents the wheels not in use from "motoring" as well as eliminating the wheel effort required to maintain rudder position.
- Simple installation.**
 Pumps have a simple two bolt mounting and may be located in front or behind the dash panel. An optional trim ring provides the perfect finish for a through dash panel mounting.



PUMP MODEL	DIMENSIONS					PUMP DISPLACEMENT (IN ³ /REV)	WEIGHT (LBS)
	A	B	C	D	E		
701	7"	5-3/4"	4-3/8"	5-5/8"	4-3/8"	1.95	9.5
702	9"	2-3/4"	2.30"	5-5/8"	6-1/4"	1.95	9.5

700 Series Cylinders

- Strong and compact design.**
 700 series systems offer pleasure boaters and yachtsmen the same high quality design and construction found in larger commercial Wagner systems. Cylinders are a double acting, balanced displacement design.
- Flexibility.**
 Standard systems use a 1 1/4 or 1 1/2 cylinder with a 7" stroke. For outboard and inboard/outboard applications there is a 1 1/4 cylinder with a 9" stroke.
- Corrosion free construction.**
 Cylinder barrels are manufactured using anodized marine grade aluminum and honed to provide a smooth surface for longer seal life. The piston rods are constructed using stainless steel.
- Simple installation.**
 Self-aligning rod end and trunnion mounting pad allow for easy installation and less critical alignment. Bleed fittings installed in the cylinders ensure easy filling of the system.



CYLINDER MODEL	BORE	TORQUE (ft-lbs) 2 X 35 ²	STROKE (inches)	CYLINDER DISPLACEMENT (IN ³)	WHEEL TURNS ^①	DIMENSIONS				
						A	B	C	D	E
1-1/4 X 7	1-1/4"	384	7"	6.44	3-1/4	16-3/8"	5"	6-1/8"	1-5/16"	22-3/4"
1-1/4 X 9	1-1/4"	492	9"	8.28	4-1/4	19-3/8"	6-7/16"	7-7/8"	1-5/16"	27-3/4"
1-1/2 X 7	1-1/2"	610	7"	10.22	5-1/4	16-3/8"	5"	6-1/8"	1-5/16"	22-3/4"

① WHEEL TURNS BASED ON USING WAGNER MODEL 701 OR 702 HELM PUMPS.
 ② TORQUE RATINGS DEVELOPED IN THE HARDOVER POSITION AT 1000 PSI PRESSURE.

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Type N Hydraulic Steering

Wagner Type "N" Steering Systems offer effortless control for all types of vessels from 20 to 150 ft in length. They are exceptionally tough and reliable and provide long and virtually maintenance-free performance. Type N Steering systems are available in 12 progressive sizes to ensure the systems selection matches each application. The basic manual system includes a helm pump, with lock valve and a steering cylinder. Optional power steering and autopilots are easily added to the system by teeing into the hydraulic helm lines.

Type N Cylinders are specifically designed for marine use. A larger than common bore and a shorter stroke provide a more compact installation, more resistant to failure caused by overload. Cylinders are made of corrosion free bronze, brass and stainless steel. Cylinder barrels are honed and polished to provide a smooth surface for longer seal life. Piston heads, rod bearings and spherical bearing are larger than competitive units, providing more strength and longer life. U-cups, which provide better sealing than O-rings, are used as dynamic seals.

Self aligning spherical bearings at the rod end and trunnion mounting pad allow for easy installation and less critical alignment. Bleed fittings ensure easy filling of the system. Cylinders are supplied with a high strength tiller bolt designed for an accurate fit in the cylinder rod end and tiller. Flex hoses are supplied with large diameter ports to minimize hydraulic restrictions.



Wagner Helm Pumps are high efficiency axial piston pumps with fixed, positive displacements from 1.95 cu. in./rev. to 13.4 cu.in./rev. They are matched to cylinder size to give the optimum number of wheel turns according to rudder torque.

The pumps are a rugged all metal construction with a hard baked-on enamel finish. The brass shaft is supported by large bearings for greater strength and longer life. A replaceable external shaft seal is used. The pistons are ground and honed, then hand assembled for a precise fit, resulting in smooth operation and producing the most efficient manual hydraulic helm pump available.



Multiple steering stations are easily connected. Each pump operates independently and has full rudder control. A lock-valve on each pump prevents the wheels not in use from "motoring" and eliminates the wheel effort required to maintain rudder position. A helm control valve is available for sailboat installation. This three position valve allows the helmsman to select "locked rudder / unlocked rudder" to allow rudder feel; and "cylinder bypass" for use with a hand tiller.

Wagner Helm Pumps have a simple two bolt mounting and are designed to be located behind the dash panel. Some models are available with an optional front mount. The system is simply filled by pouring the recommended oil into the helm pump filler port. External pressurization is not required.



Application Guide

SYSTEM MODEL	DISPLACEMENT HULLS								PLANING HULLS	
	TUG BOATS		WORK AND PLEASURE BOATS		SAILBOATS					
	•LENGTH	HP	•LENGTH	HP	•LENGTH	▲AREA	•LENGTH	▲AREA	•LENGTH	HP
NX1-63	16-30	125	26-40	140	26-40	3-10	26-36	3-7	26-46	400
NX1-100	20-30	130	30-40	150	33-46	5-13	30-40	4-8.5	33-50	450
NX2-126	23-30	140	40-46	160	40-50	9-15	36-50	6.5-9.5	40-52	500
NX1-160	26-40	160	40-50	170	46-56	14-17	40-50	8.5-12	43-55	600
NX2-200	26-40	180	40-60	180	50-60	15-19	43-52	9.5-15	46-60	650
NX1-250	26-40	200	40-65	190	50-65	16-21	46-60	11-16	46-62	700
NX2-320	30-40	250	50-72	200	52-68	17-25	50-62	12-18	56-68	750
NX1-400	33-46	300	60-80	250	52-72	19-30	50-66	13-19	60-72	850
NX2-500	36-52	350	60-82	300	56-79	20-32	52-72	14-21	60-79	900
NX1-630	45-60	400	65-85	350					65-82	950
NX2-800	50-65	500	65-98	400					72-88	1000
NX2-1260	65-85	800	82-121	650					85-115	1200

• Overall length in feet.
▲ Area in square feet.

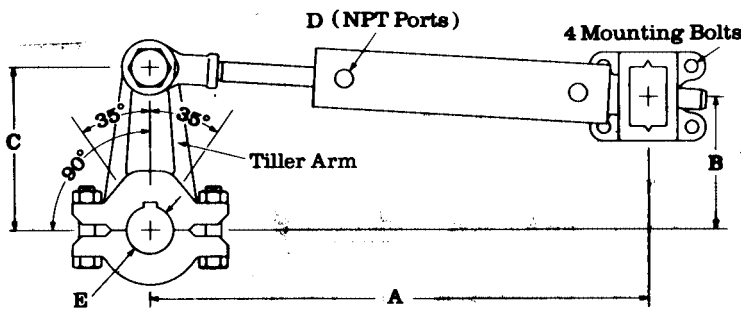
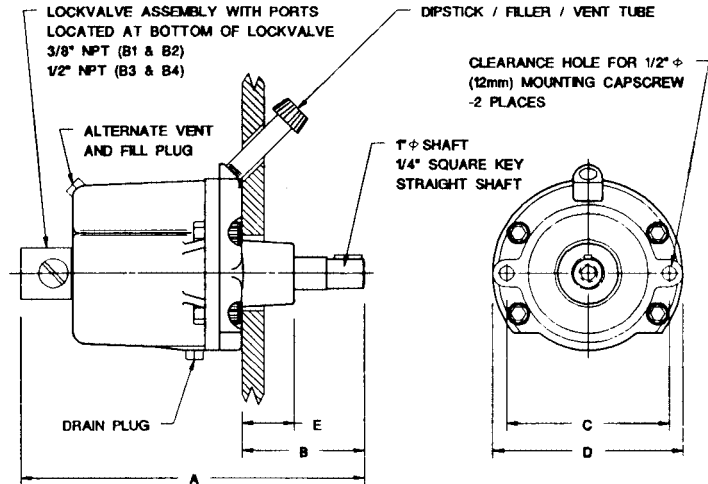
*This is a reference guide only and system selection must be decided by a torque calculation. Minimum information required: description of boat, rudder dimensions and hull speed.

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Type N Hydraulic Steering

PUMP MODEL	DIMENSIONS					PUMP DISPLACEMENT (N ³ /REV)	WEIGHT
	A	B	C	D	E		
B1	12-1/16" (322)	5" (127)	5-1/2" (140)	6-1/2" (165)	1-7/8" (48)	2.95	15.5 lbs (7.3 kg)
B2						4.02	
B3	15-1/4" (387)	5-1/2" (140)	7" (178)	8-1/2" (203)	1-1/8" (29)	6.33	34 lbs (15.6 kg)
B4						9.89	



SYSTEM MODEL CODE

NX1-63

- └─ Torque (kg.m) @ 7000 kPa
- └─ '1': One cylinder
- └─ '2': Two cylinders
- └─ Use 'A': Single rudder
- └─ Use 'B': Twin rudder
- └─ Use 'X': if unknown
- N 40-120
- └─ Stroke (mm)
- └─ Bore (mm)

SYSTEM MODEL	TORQUE *2 x 35°		SUGGESTED HELM PUMP		TYPE N STEERING CYLINDER							E MAXIMUM TILLER ARM BORE	
					DISPLACEMENT		OVERALL DIMENSIONS (in.)						
	kg-m	lb.ft	MODEL	TURNS	MODEL	cm ³	in ³	A	B	C	D	mm	in.
NX1-63	63	456	B1	3.0	N40-120	127	7.7	15.8	3.3	4.1	1/4	48	1.89
NX1-100	100	723	B1	4.7	N40-190	200	12.2	20.0	5.3	6.5	1/4	56	2.20
NX2-126	126	912	B2	3.8	N40-120	254	15.5	15.8	3.3	4.1	1/4	48	1.89
NX1-160	160	1157	B2	4.8	N50-190	314	19.1	21.3	5.3	6.5	3/8	65	2.56
NX2-200	200	1446	B2	6.1	N40-190	400	24.5	20.0	5.3	6.5	1/4	56	2.20
NX1-250	250	1808	B3	4.8	N50-300	495	30.2	27.8	8.4	10.3	3/8	75	2.95
NX2-320	320	2314	B3	6.0	N50-190	628	38.3	21.3	5.3	6.5	3/8	65	2.56
NX1-400	400	2893	B3	7.7	N80-190	802	49.0	25.4	5.3	6.5	1/2	88	3.46
NX2-500	500	3616	B3	9.5	N50-300	990	60.4	27.8	8.4	10.3	3/8	75	2.95
NX1-630	630	4557	B4	7.8	N80-300	1267	77.3	31.9	8.4	10.3	1/2	100	3.94
NX2-800	800	5786	B4	9.9	N80-190	1604	97.9	25.4	5.3	6.5	1/2	88	3.46
NX2-1260	1260	9114	B4	15.6	N80-300	2534	154.6	31.9	8.4	10.3	1/2	100	3.94

*Torque ratings at 7000 kPa (1000 psi)

24.5 mm = 1 inch

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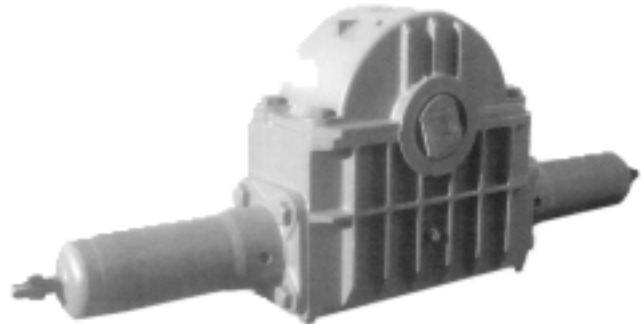
Type T Hydraulic Steering

Wagner Type T hydraulic steering systems are exceptionally tough and reliable. Available in 16 models, ranging from 820 to 37,500 foot-pounds torque, they provide trouble free installations on all types of commercial vessels, 25 to 200 ft in length. The Type T actuator utilizes the "Rapson Slide" principle in which ability to generate torque increases with increasing rudder angle. This matching of ram capacity to rudder torque enables the Type T system to provide the most effective steering at the least cost. Rapson slide T-rams require fewer turns on hand steering (producing the same torque as an equivalent cylinder/tiller configuration). Less power is consumed in an electrically driven pump set. Rudder angles from 2 x 35° to 2 x 45° are standard.

All moving parts are hand fitted and encased in a grease filled, heavy, ductile iron housing. Protected from corrosion and mechanical damage the T-ram provides years of maintenance free service. Internal bearing surfaces are 5 to 10 times larger than necessary for strength alone, reducing wear to a minimum even after many years of service.

The T-ram is easier to install and more tolerant to shock than any other rudder actuator. The integral tiller simply clamps onto the rudder post and the whole assembly self-aligns to it. Time consuming alignment with shims, and preparation of flat mounting beds are not necessary. The steering torque is transmitted to the vessel by two torque arms made of standard angle bar. Due to the construction of the T-ram, the clamp fitted tiller provides an integral rudder carrier bearing. The mounting of the T-ram allows it to "float" on the rudder stock. When mounted this way, it is almost impossible to damage the steering, should the vessel go aground or hit some obstruction.

Wagner Type T steering systems are available in standard rudder stock diameters or can be custom bored and keyed to suit a specific project.



Rudder Angle Indicator Systems

Model 150 Rudder Angle Indicator

This 3" diameter indicator is enclosed in a standard SAE housing for flush mount in consoles or pedestals. The front face of the indicator is completely watertight. The indicator draws less current than a pilot light and may be run off any boat's 12 to 40 volt DC current supply. Up to six stations may be used by simply connecting them in series. The indicator is fitted with internal, indirect illumination. An optional remote dimmer control allows for selection of a comfortable level of brightness. The indicator comes complete with a prewired cable, ready for installation.



Universal Rudder Follow-up

This completely watertight transmitter contains an infinite resolution sensing device rated for 20 million operations, providing extremely long life, even under high vibration conditions. The slightest movement of the rudder generates an electrical signal which causes an accurate proportional movement of the indicator(s). This unit is mechanically linked to the rudder stock. It comes complete with a prewired cable, a brass linkage rod and a set of swivels.



Universal Rudder Stock Clamp

This brass clamp fits rudder stocks up to 4" inches (115mm) maximum diameter. The lever of a rudder follow-up unit is mechanically linked to this clamp to provide rudder feedback to an indicator system. A series of connection points are predrilled in the clamp arm for various rudder angles.



**We can offer Wagner steering gear for just about any inboard pleasure or commercial vessel.
Call us for a recommendation.**

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DATA SHEET

hydraulic steering

NAME _____

BOAT NAME _____

ADDRESS _____

HULL NO. _____

HULL DIMENSIONS LENGTH _____ BEAM _____ DRAFT _____

BOAT TYPE YACHT TOWBOAT

HULL TYPE PLANING HULL DISPLACEMENT HULL

SAILBOAT FISHBOAT

RUDDER DIMENSIONS HEIGHT(OVERALL) _____ WIDTH(OVERALL) _____ COUNTERBALANCE _____

NEW CONSTRUCTION

RUDDER TYPE FLAT SINGLE SCREW SINGLE RUDDER OTHER _____

EXISTING BOAT

STREAMLINE TWIN SCREW TWIN RUDDER OTHER _____

DEGREE OF STEERING DESIRED (MIDSHIP TO HARD OVER) 35 DEGREES 45 DEGREES

NUMBER OF STATIONS: MANUAL POWER

HULL SPEED ACTUAL MEASURED _____ KNOTS ESTIMATED _____ KNOTS

PROPELLER INFORMATION

ENGINE MAKE _____

PITCH _____

MODEL _____

DIAMETER _____

RPM, IDLE _____

RPM _____

RPM, FULL _____

REDUCTION GEAR RATIO _____

RPM, WORKING _____

POWER STEERING

HYDRAULIC POWER SOURCE DESIRED

ELECTRIC MOTOR DRIVE

ENGINE DRIVEN

AUTOMATIC PILOT

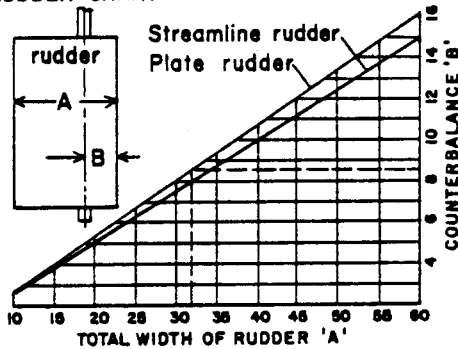
MAKE _____

MODEL _____

ELECTRICAL VOLTAGES AVAILABLE _____ VOLTS AC _____ VOLTS DC

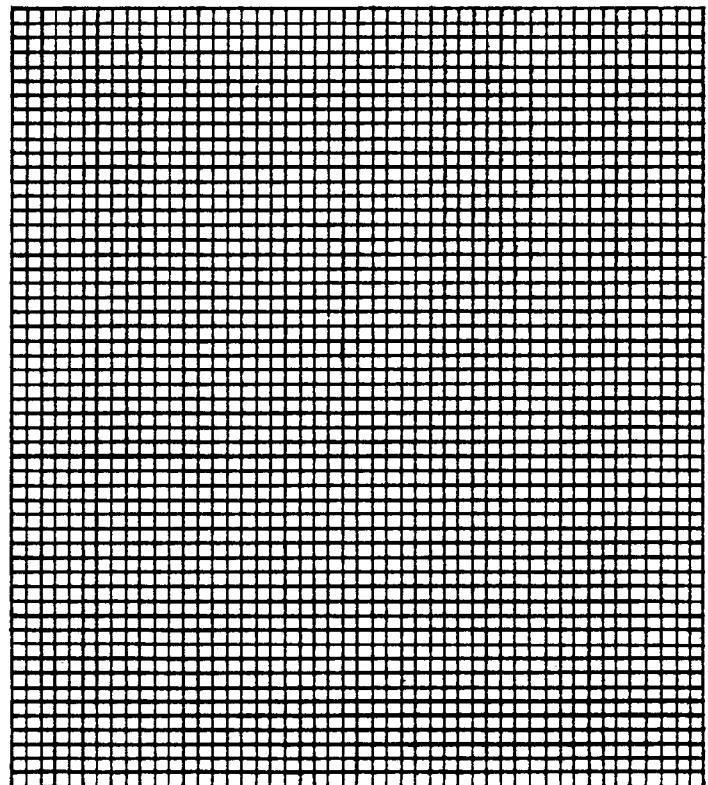
RUDDER STOCK DIAMETER _____

RUDDER CHART:



It is advantageous to use a rudder with a larger counterbalance than is normally used with a mechanical steering system. Reduced steering effort and better rudder efficiency can be obtained by adhering closely to the rudder proportions shown on the above graph.

RUDDER SKETCH



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