



SEASTAR SOLUTIONS®

Steering • Controls & Cables • For All Types Of Boats



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Mechanical and Hydraulic Steering Overview

Generally, it is a good practice to replace a steering system with one of the same type: rotary with rotary (i.e. Safe-T®), rack with rack (i.e. The Rack™), hydraulic with hydraulic (i.e. SeaStar®), etc. Use a steering system with the same number of steering wheel turns lock-to-lock as the original system.

This insures the boat continues to perform in maneuvers as designed and makes installation of the replacement system as simple as possible.

Changing the type of steering on a boat requires some careful consideration. Your steering system was

selected by the boat builder based on the following criteria:

- Fit: steering components accommodate dash design and splashwell dimensions.
- Performance: meets manufacturer's performance specifications.
- Value: quality products supplied by a reliable, experienced company that stands behind them.

Any change from the original steering system may affect the handling and feel of the boat. In addition, installation may be further complicated by modifications needed to accommodate components for which the boat was not originally designed.

About Our Mechanical Steering Designs

Mechanical cable steering is durable and reliable and comes in two main forms, each of which has advantages in specific applications. They are:

- Rotary (cable wraps around a gear).
- Rack & Pinion (cable attached to rack gear moved by a pinion).

All mechanical steering systems except Big-T are for single station use only. Hydraulic steering is the preferred system for dual station boats.

ROTARY STEERING (2 TYPES):

Various Rotary helms are available, each resulting in a different number of lock-to-lock steering wheel turns. All SeaStar Solutions helms feature a unique mounting plate that allows installation at several angles to accommodate the many space constraints which occur behind all dashboards. Most versions are available with No FeedBack (NFB) technology. NFB is recommended for all outboards and stern drives without power-assisted steering. HPS and Safe-T QC are offered for most boats with power-assisted steering. Big-T is a good choice for small inboards, especially those with twin stations. There are two main rotary helm designs:

Reduction Gear Type: (one or more gears mesh externally with the drum to move the helical core of the steering cable). This is the best rotary design in terms of strength and efficiency as there are usually only two gears. The one drawback is that the helm shaft must be placed outside the cable drum, resulting in a fairly large round helm behind the dash. These helms often cannot be used in small dashboards. The original, time-proven SeaStar Solutions helms such as Big-T® and Safe-T® were designed with reduction gears, resulting in simple, efficient gearboxes. With smaller, more crowded dashboards came the need for a more compact helm, thus one with planetary gears to save space.

Planetary Gear Type: (three or more gears mesh internally with the cable drum to move the helical core of the steering cable). This is an alternative rotary design whose purpose is to take up the least possible space behind the dash, useful in boats with small dashboards and/or instruments clustered right around the wheel.

RACK AND PINION (1 TYPE):

There is only one kind of Rack and Pinion. A pinion gear hobbled directly into the helm shaft engages a rack gear in a tubular housing. Rack and pinion steering is the most efficient mechanical approach to moving the cable. The drawback is that it requires a long tubular rack housing and cannot fit behind many dashboards. SeaStar Solutions rack mounting allows installation of the rack tube at several different angles, but because it is very long, there is not as much mounting flexibility as with rotary helms. The Rack (without the NFB feature) is offered for most boats with power-assisted steering.

DUAL (TWIN) CABLE SYSTEMS:

All mechanical steering systems rely on a push-pull cable to do the work of moving the engine or rudder. The efficiency of the system depends on the efficiency of the cable. By virtue of their design, all cables have some backlash or lost motion. While this is acceptable for most boats, some high performance boat/engine combinations develop instability at high speed. Instability becomes more prevalent in boats faster than 50 MPH. Dual cable (or SeaStar PRO) steering is recommended by SeaStar Solutions and engine makers for these boats. Dual cable steering allows adjustment at the engine of one steering cable versus the other to remove most of the backlash (free play) inherent in even the best mechanical systems. This reduction of backlash helps minimize engine flutter and the resulting handling instability.

SeaStar Solutions Steering Cables

All SeaStar Solutions steering cables exceed ABYC safety standards and ISO/IMCI/NMMA certification requirements. SeaStar Solutions steering cables are designed with a rotary or rack and pinion design to fit various helm space and application requirements. All SeaStar steering cables feature:

- A tightly controlled core to conduit fit to offer precise steering.
- Outer jacket is constructed with HDPE, a high density polyethylene material that is abrasion resistant and provides a high resistance to water penetration.
- All cables feature output ends constructed of stainless steel material for corrosion resistance.

ROTARY STEERING CABLES

Simple snap in connection for easy installation



SSC62XX

Standard quick connect rotary cable fits [SH5150P](#), [SH4910P](#), [SH4920P](#), [SH5094-1P](#), [SH91190P](#), [SH91526P](#), [SH91527P](#), [SH91523-1P](#).

Trapped nut stays in place during cable routing

SSC63XX

High Performance quick connect rotary steering cable designed to reduce backlash used in conjunction with the [SH5180P](#) and [SH91650P](#) helms. This cable has a special powder coated helical core to allow the most precise fit to the conduit. This cable and helm will allow incredible response with minimal lost motion.



SA27620P
Adaptor

(For use with older Safe-T and Big-T Helms)

SSC290XX

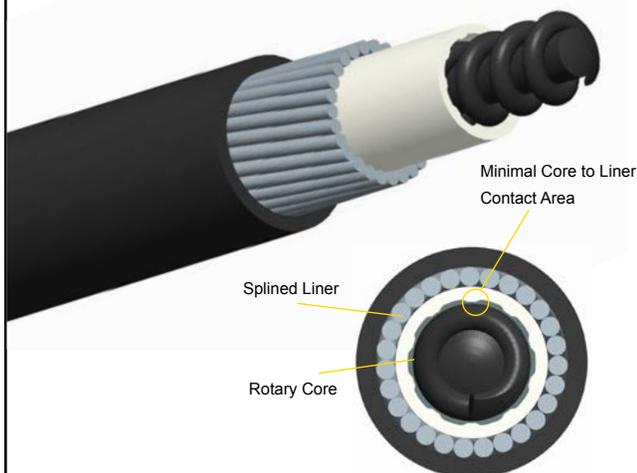
Rotary replacement steering cable for the Morse® 304411 and the SeaStar Solutions [SSC52XX](#) Command 290 steering helms; 292525, (The following are all obsolete) 305015, 304857, 310988, 310989, 310990, 310991.

Note: SA88304 adaptor allows a SSC62 cable to fit the DO290 helm.

SSC62XX (with SA27620P adaptor)

Old Safe T ([SH5023P](#), [SH5075P](#), [SH91075P](#) and [SH91077P](#)) and Big T helms ([SH5000P](#) and [SH91525P](#)) use with [SSC61XX](#) steering cable.

Note: SSC61XX is directly replaced by SSC62XX and SA27620P



SSCX64XX XTREME Cable

A brand new XTREME™ steering cable was designed specifically for the XTREME helms. This cable offers lower backlash and is more efficient than a standard steering cable. It provides the lowest ease of effort, a close "fit" of the core to liner for lowest lost motion. The concept provides the "tight" fit of core to liner yet allows area for lubrication. The design of the helm allows higher loads to be placed into the cable requiring this new design cable. There is a quick connect feature on both the steering cable and spent travel tube for easy, quick installation.

Note: All SSCX XTREME Cables are designed to ONLY fit XTREME helms.

SeaStar Solutions Steering Cables

JET BOAT STEERING CABLE

SSC219XX

JBS steering cable for the SeaStar Solutions Jet boat steering helms; [SH5087P](#), [SH5088P](#), [SH91691P](#), [SH91692P](#) (the following are obsolete) [SH91678P](#), [SH91679P](#).

***Note: Direct Replacement for SSC229XX**



SSC144XX

Dual Cable Assembly - Yamaha



SSC146XX

Single Cable Assembly - Yamaha



SSC145XX

Single Cable Assembly - BRP



SSC149XX

Dual Cable Assembly - BRP

RACK STEERING CABLES



SSC134XX

Standard rack cable fits SH5210P, SH5230P, SH91610P, and SH91630P. For single cable steering only.



SSC135XX

Twin rack cable fits SH5210P, SH5230P, SH91610P, and SH91630P.



SSC154XX

***xtreme** rack cable fits SH5210P, SH91610P, SH5230P, and SH91630P. Upgrade replacement for SSC134XX Single Cable.



SSC130XX

Rack replacement cable for the Morse® 300619 cable used on the Command 200 rack steering system helms; 300252, 300853, 310992, 310993, 910994, 310995. All of these helms are obsolete.



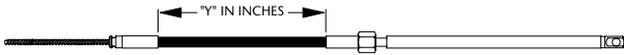
SSC124XX

Old style XR-4 rack steering cable that fits the old SeaStar Solutions rack helms; SH5098P, SH5097P, SH91528, SH91529 All of these helms are obsolete.

HOW TO MEASURE STEERING CABLES "MEASURE TWICE. ORDER ONCE."

REPLACEMENT OF EXISTING CABLE:

If possible, find the part number stamped on the plastic jacket of the old cable. If you removed the old cable, measure for the replacement cable as follows:



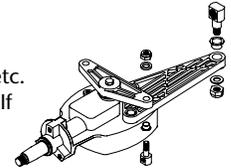
For Rotary Steering Cable Replacement, Measure Existing Cable as follows: Measure plastic cable jacket ("Y" dimension, shown in above drawing) in inches, add 18", and round up to the next foot. Order that length cable.

For Rack Steering Cable Replacement, Measure Existing Cable as follows: Measure plastic cable jacket

("Y" dimension shown in above drawing) in inches, add 30", and round up to the next foot. Order that length cable.

For JBS Jet Boat Cable Replacement, Measure Existing Cable as follows: Measure cable from tip to tip. (Round up to next foot if needed for whole foot.) Order that length cable.

JBS helms are ONLY for smaller jets such as Mercury Sport Jet®, OMC Turbo Jet®, etc. and look like the helm depicted at right. If your jet steering is different, contact SeaStar Solutions.



If your engine does not have a tilt tube cable connection as shown below, see "Connection Kits" pages later in this section to get the information or visit us on-line at .

NEW INSTALLATION:

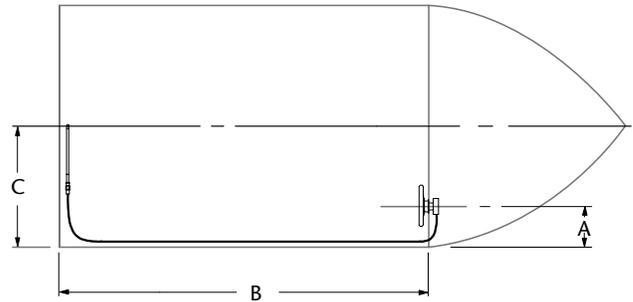
Measure cable routing path from wheel center line to engine connection, as follows:

- A = Center line of wheel to gunwale (or deck, if routed downward),
- B = Dash to transom,
- C = Gunwale to centerline of cable connection at centered tiller.

For Cable Installations through the Engine Tilt Tube: Add A, B & C + 6", and round up to the next foot. Order that length cable.

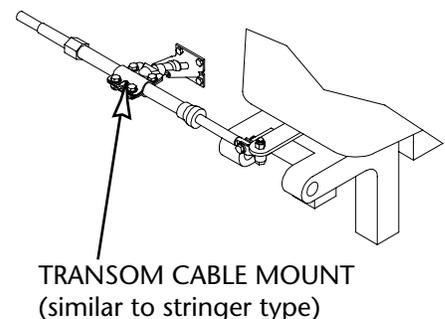
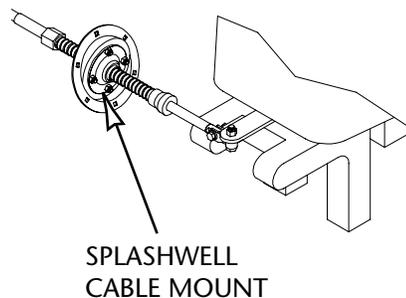
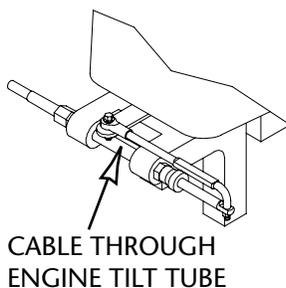
For Cables Mounted to Transom, Splashwell or Stringer: Add A, B & C, then subtract 6" and round up to the next foot. Order that length cable.

TYPICAL SINGLE STATION ROUTING



A single-cable, starboard drive push-pull mechanical cable system is shown in this diagram. If your mechanical system is different than the one depicted and/or you have any questions about mechanical steering after reviewing this guide, please contact SeaStar Solutions Technical Service.

Cable routings (such as those found on pontoon boats) may vary from this drawing. Confirm length by laying a garden hose (or similar object) along cable path and measure run from wheel to engine connection point.



STEERING OPTIONS BASED ON ENGINE TYPE

All Outboards & Power Assisted Stern Drives ⓘ denotes Tilt Steering available for this product

ALL NON-POWER-ASSISTED OUTBOARD ENGINES (NO FEEDBACK)					
CURRENT STEERING TYPE	NOTE: "turns" in parentheses refers to number of steering wheel turns lock-to-lock. Higher number means lower turning effort. Lower number means quicker steering response.				
	Up to V-4 & V-6 50 MPH or less	Up to V-6 to 55 MPH	V-6 & Larger (to 300 HP) 60 MPH+	Power-Assisted Outboards/ Stern Drives Inboards	
	Rotary Mechanical (cable)	XTREME SSX176 ⓘ NFB™ Safe-T II ⓘ SS132XX (3 turns) or NFB 4.2 Rotary Single Cable ⓘ SS147XX (4.2 turns)	NFB™ 4.2 Rotary No FeedBack Dual Cable ⓘ (4.2 turns) <i>(best for lower speeds)</i>	Upgrade to SeaStar® PRO ⓘ HK73XXA-3 or HK75XXA-3 (no hoses) (both: 4.25 turns)	HPS® Rotary ⓘ <i>(order by components)</i> or Safe-T QC® ⓘ SS137XX <i>(both: single cable, 3 turns)</i>
	Rack & Pinion Mechanical (cable)	NFB™ No FeedBack Rack Single Cable ⓘ SS151XX (4 turns) <i>(use SeaStar for multi-engines & autopilots)</i>	NFB™ No FeedBack Pro Rack Dual Cable ⓘ SS152XX (4 turns) <i>(use SeaStar for multi-engines & autopilots)</i>	NFB™ No FeedBack Pro Rack Dual Cable ⓘ SS152XX (4 turns) <i>(use SeaStar for multi-engines & autopilots)</i>	HPS® Rack & Pinion ⓘ <i>(order by components)</i> or The Rack™ ⓘ SS141XX <i>(both: single cable, 4 turn (use SeaStar for multi-engines & autopilots)</i>
Hydraulic	BayStar™ ⓘ HK4200/4230 <i>(O/B to 150 HP; 4.5 turns) or</i> SeaStar® ⓘ HK63XX-3/ HK6400-3 (5 turns) or SeaStar® P/A* ⓘ	BayStar™ ⓘ or SeaStar® ⓘ HK63XX/ HK6400-3 (no hoses) or SeaStar® P/A* ⓘ <i>(order by components)</i>	SeaStar® PRO ⓘ HK73XXA or HK75XXA-3 (no hoses) (both: 4.25 turns) or SeaStar® P/A* ⓘ (must use P/A Pro with SeaStar Pro helm)	SeaStar® Steering ⓘ or SeaStar® P/A* ⓘ <i>(both: best for autopilots, cylinders are drive-specific)</i>	

*SeaStar® P/A is a power-assist add-on subsystem which requires presence or purchase of a complete SeaStar steering system (SeaStar Pro helms require use of SeaStar P/A Pro). NOTE: Some high performance boats/engine combinations develop instability at high speed. Instability becomes more prevalent in boats faster than 50 MPH. Dual-cable steering or SeaStar PRO systems are recommended by SeaStar Solutions and engine makers for these boats. IMPORTANT: No FeedBack Steering must not be used in dual station, power-assisted, or autopilot installations!

NOTE: XTREME Steering cannot replace dual cable steering.

WILL IT FIT?

MECHANICAL CONSIDERATIONS: Mounting hardware for XTREME NFB 4.2, Safe-T II and HPS helms fits the Safe-T dash cutout. NFB Rack helms fit 1984-date "The Rack" mounting holes. 1996-date "back mount" rack helms use a wider rack cable and will not work with old style rack cable ([SSC124XX](#)).

HYDRAULIC CONSIDERATIONS: SeaStar helms retrofit into most boats. The SeaStar front mount cylinder is best for outboards with 22" splashwells or wider. Side/splashwell mount cylinders are offered, but require more room. Check splashwell dimensions before ordering outboard cylinders.

Outboards (without power steering): No FeedBack™ (NFB™ - mechanical), BayStar® or SeaStar® (hydraulic) is recommended as replacement steering for all non-power-assisted outboards. For high performance boats or other applications in which there may be engine flutter or some steering instability, dual cable NFB (4.2/Pro Rack) mechanical systems or SeaStar PRO® hydraulic systems are recommended. For most rotary steered boats made after 1993, upgrading to NFB can be as simple as a helm and bezel change.

Stern Drives & Outboards (with power steering): HPS™ High Performance Steering is recommended for power-steered stern drives and other power-assisted applications. Both rotary and rack versions feature unique, coated core construction for minimal backlash at the wheel. Traditional mechanical systems (Safe-T QC® & Back Mount Rack & Pinion) may also be used for power-assisted applications. SeaStar® is recommended for all vessels using autopilots.

STEERING OPTIONS BASED ON ENGINE TYPE

All Inboards & Non-Power Assisted Stern Drives  denotes Tilt Steering available for this product

CURRENT STEERING TYPE	STERN DRIVES	INBOARD POWERED BOATS, INCLUDING MULTIPLE STATIONS		
	(non power-assisted)	Up to 34 feet (most engines)	Up to 50 feet (single or dual engines)	Over 50 feet (most engines)
<p>NOTE: "turns" in parentheses refers to number of steering wheel turns lock-to-lock. Higher number means lower turning effort. Lower number means quicker steering response.</p> <p>Mechanical (cable)</p>	<p>NFB™ 4.2 Rotary Single Cable  SS147XX (4.2 turns) or NFB™ Rack Single Cable  SS151XX (4 turns)</p>	<p>Big-T® (single cable; order by components; dual station version available) (3 turns)</p>	—	—
<p>Hydraulic General Purpose (number of turns varies with helm & cylinder)</p>	<p>SeaStar®  Stern Drive Steering  or SeaStar® P/A*  (order system by components; dual station versions available; best for boats with autopilots; cylinders are drive-specific)</p>	<p>SeaStar®  or Hynautic® Inboard or SeaStar® P/A*  (order system by components; dual station version available; best for autopilots; many cylinder options)</p>	<p>SeaStar® or Capilano™ Inboard Steering (order system by components) or SeaStar® or Hynautic® Inboard Steering (order by components)</p>	<p>SeaStar® Power Steering  (order system by components; dual station version available; best for autopilots; many cylinder options)</p>
<p>Hydraulic Heavy Duty (turns vary)</p>	<p>SeaStar® Hynautic® (Twin External Cylinders) (order components; dual station version available)</p>	<p>SeaStar® Capilano™ or SeaStar® Hynautic® (order components; dual station version available)</p>	<p>SeaStar® Capilano™ SeaStar® Hynautic® or SeaStar® Power Steering  (order by components)</p>	<p>NOTE: Boats over 50 feet should have steering loads reviewed by SeaStar Solutions. Please contact SeaStar Solutions Canada tech service for assistance.</p>

*SeaStar® P/A is a power-assist add-on subsystem which requires presence or purchase of a complete SeaStar steering system (SeaStar Pro helms require use of SeaStar P/A Pro).

Please use these guides to assist in making your selection, but remember that *the recommendations are general in nature. Any boat/steering system combination should be water-tested by the installer to ensure safe and dependable steering.* Displacement hulls do react differently than planing hulls. As a result, the type of hull on the boat, as well as the horsepower, may affect steering system selection.

Stern Drives (without power steering): SeaStar or NFB 4.2 No FeedBack Steering is recommended for *non-power-assisted* stern drives and small inboards. SeaStar is recommended for all vessels using autopilots.

Inboards: Big-T®, SeaStar, SeaStar Capilano™, and SeaStar Power Steering are available for various inboard and sail boats. SeaStar® is recommended for vessels with dual stations and those using autopilots. Big-T is the only mechanical steering system currently offered for twin station boats. Big-T service parts are available or you can upgrade to SeaStar.

Jet Boats: SeaStar Solutions has supplied many versions of steering for jet boats. If you are replacing jet boat steering, please get the part number from your old cable and refer to the SeaStar Solutions [catalog](#) or contact Technical Service for assistance.

Tilt Steering: You can upgrade to the comfort and convenience of Tilt steering with all SeaStar Solutions systems except Capilano and Big T.

Multiple Engine Tie Bars: Installation of a new steering system may require the replacement of tie bars for dual or triple engines. Please refer to the SeaStar Selection Guide to make sure you order the proper one.

MECHANICAL STEERING IDENTIFICATION GUIDE

ORIGINAL SYSTEM NAME (VERSION)	DATES USED & CABLE COLOR(S)	REPLACEMENT (NON-POWER-ASSIST OUTBOARDS & I/OS)	REPLACEMENT (POWER-ASSIST & SMALL INBOARDS)
Teleflex® and Morse® Traditional-Technology ROTARY Steering Systems To SeaStar Solutions			
Big-T® (older) SSC72XX/SC69XX Cable	1963-1972 White, Blue or Black	Big-T (components) (Page 107)	SeaStar (components)
Big-T® (current)	1972-date White, Blue or Black	Big-T (components) (Page 107)	SeaStar (components)
Easy-T SC89XX Cable	1968-1972 Silver	Safe-T II (SS132XX)† or NFB 4.2 (SS147XX) XTREME (SSX176XX)	HPS Rotary (components) or Safe-T QC (SS137XX)
HPS Rotary SC63XX Cable	1999-date Black	(HPS not recommended for non-power-assist steering)	HPS Rotary (components) (Page 106)
Midi-T** SC75XX Cable	1969-1972 Green	Safe-T II (SS132XX)† or NFB 4.2 (SS147XX) XTREME (SSX176XX)	HPS Rotary (components) or Safe-T QC (SS137XX)
Mini-T SC74XX Cable	1969-1972 Black	Safe-T II (SS132XX)† or NFB 4.2 (SS147XX) XTREME (SSX176XX)	HPS Rotary (components) or Safe-T QC (SS137XX)
Morse® Command 2 Rotary 300622/300623/300624	OBSOLETE Red	Safe-T II (SS132XX)† or NFB 4.2 (SS147XX) XTREME (SSX176XX)	HPS Rotary (components) or Big-T (components)
Morse® Command 290 304411-00-XXX.0	TO DATE	Safe-T II (SS132XX)† or NFB 4.2 (SS147XX) XTREME (SSX176XX)	HPS Rotary (components) or Safe-T QC (SS137XX)
SeaStar Solutions Direct Replacement Cable for these systems is SSC290XX			
Morse® Command 250 300962/312020	Red or Black OBSOLETE	Safe-T II (SS132XX)† or NFB 4.2 (SS147XX) XTREME (SSX176XX)	HPS Rotary (components) or Safe-T QC (SS137XX)
Morse® Command 290 Dual Cable Systems (2) 304411 Cables	TO 2000 Red or Black	NFB 4.2 NFB Dual † or SeaStar (components) (see SeaStar Selection Guide)	4.2 Non-NFB (components)
SeaStar Solutions Direct Replacement Cable for these systems is SSC290XX			
Safe-T® (Version 1) SC89XX Cable	1968-1972 White or Black	Safe-T II (SS132XX)† or NFB 4.2 (SS147XX) XTREME (SSX176XX)	HPS Rotary (components) or Safe-T QC (SS137XX)
Safe-T® "TS" (Version 2)*	1972-date White or Black	Safe-T II (SS132XX)† or NFB 4.2 (SS147XX) XTREME (SSX176XX)	HPS Rotary (components) or Safe-T QC (SS137XX) Cable Adapter Required
SC69XX/ SSC72XX	SeaStar Solutions Direct Replacement Cable for these systems is SSC62XX		
Safe-T® QC (Quick Connect)	1990-1996 Black	Safe-T II (SS132XX)† or NFB 4.2 (SS147XX) XTREME (SSX176XX)	HPS Rotary (components) or Safe-T QC (SS137XX)
SSC62XX	SeaStar Solutions Direct Replacement Cable for these systems is SSC62XX		
Safe-T® QC (Quick Connect)*	1996-date Black	Safe-T II (SS132XX)† or NFB 4.2 (SS147XX) XTREME (SSX176XX)	HPS Rotary (components) or Safe-T QC (SS137XX)
SSC62XX	SeaStar Solutions Direct Replacement Cable for these systems is SSC62XX		
Safe-T® Dual Cable systems SSC62XX	1975-date White or Black	NFB 4.2 Dual Cable or SeaStar (components)	4.2 Non-NFB (components)
SeaStar Solutions Direct Replacement Cable for these systems is SSC62XX			

* ** † For footnotes indicated by these symbols, please See Page 13.

MECHANICAL STEERING IDENTIFICATION GUIDE

ORIGINAL SYSTEM NAME (VERSION)	DATES USED & CABLE COLOR(S)	REPLACEMENT (NON-POWER-ASSIST OUTBOARDS & I/OS)	REPLACEMENT (POWER-ASSIST & SMALL INBOARDS)
Teleflex® NFB™ NO-FEEDBACK™ & Morse® NFS™ ROTARY Steering Systems To SeaStar Solutions			
Morse® NFS 304415 Cable	To 2001 Red or Black	NFB 4.2 (SS147XX) XTREME (SSX176XX)	(NFB not for power steering or inboard)
Morse® NFS Dual Cable (2) 304415 Cable	To 2001 Red or Black	NFB 4.2 Dual Cable (Components)	(NFB not for power steering or inboard)
NFB 4.2 SSC62XX Cable	1990-date Black	NFB 4.2 (SS147XX) XTREME (SSX176XX)	(NFB not for power steering or inboard)
NFB 4.2 Dual Cable (2) SSC62XX Cable	1990-date Black	SeaStar direct Replacement Cable for these systems is SSC62XX NFB 4.2 Dual Cable (SS148XX) XTREME (SSX176XX) SeaStar direct Replacement Cable for these systems is SSC62XX	(NFB not for power steering or inboard)
NFB Safe-T II SSC62XX Cable	1996-date Black	Sate-T II (SS132XX) SeaStar Solutions direct Replacement Cable for these systems is SSC62XX	(NFB not for power steering or inboard)
Morse® Command 200 Rack 300619XX	To 2001 Red or Black	NFB Rack (SS151XX) SeaStar Solutions direct Replacement Cable for these systems is SSC130XX	HPS Rack (components) or The Rack (SS141XX)
Morse® Rack Dual Cable (2) 300619XX	To 2001 Red or Black	NFB Pro Rack (SS152XX) SeaStar Solutions direct Replacement Cable for these systems is SSC130XX	The Rack dual (components)
TR211 (Rack & Pinion) SC98XX Cable	1973-1975 Blue	NFB Rack (SS151XX)	HPS Rack (components) or The Rack (SS141XX)
TR188 (Rack & Pinion) SC54XX Cable	1975-1978 Brown	NFB Rack (SS151XX)	HPS Rack (components) or The Rack (SS141XX)
TR188 (Rack & Pinion) SC105XX Cable	1978-1986 Black	NFB Rack (SS151XX)	HPS Rack (components) or The Rack (SS141XX)
"The Rack" (Rack & Pinion) SSC124XX Cable	1984-1996 Black	NFB Rack (SS151XX)	HPS Rack (components) or The Rack (SS141XX)
SeaStar Solutions direct Replacement Cable for these systems is SSC124XX			
"The Rack" (Back Mount) SSC134XX Cable	1996-date Black	NFB Rack (SS151XX)	HPS Rack (components) or The Rack (SS141XX)
SeaStar Solutions direct Replacement Cable for these systems is SSC134XX/SSC154XX			
"The Rack" Dual Cable System (2) SSC124XX Cable	To 1996 Black	NFB Pro Rack (SS152XX) SeaStar Solutions direct Replacement Cable for these systems is SSC124XX	The Rack dual (components)
"The Rack" Dual (Back Mount) 2 Cable SSC135XX Cable	1996-date Black	NFB Pro Rack (SS152XX) SeaStar Solutions direct Replacement Cable for these systems is SSC135XX	The Rack dual (components)

* ** † For footnotes indicated by these symbols, please See Page 13.
NOTE: Morse® Rack Cable 300620XX cannot be replaced by SSC130XX.

MECHANICAL STEERING IDENTIFICATION GUIDE

ORIGINAL SYSTEM NAME (VERSION)	DATES USED & CABLE COLOR(S)	REPLACEMENT (NON-POWER-ASSIST OUTBOARDS & I/OS)	REPLACEMENT (POWER-ASSIST & SMALL INBOARDS)
Teleflex® NFB™ NO-FEEDBACK™ RACK & PINION Steering Systems To SeaStar Solutions			
NFB Rack (Back Mount)* SSC134XX Cable	1996-date Black SeaStar Solutions direct Replacement Cable for these systems is	NFB Rack (SS151XX)	(NFB not for power steering or Inboard) SSC134XX/SSC154XX
NFB Pro Rack (Back Mount)* Dual Cable System SSC135XX	1996-up Black SeaStar Solutions Direct Replacement Cable for these systems is	NFB Pro Rack (SS152XX)	(NFB not for power steering or Inboard) SSC135XX
Competitive Brand ROTARY Steering Systems To SeaStar Solutions			
ACCO® Steermaster® MK II 56-8226 (Morse® ARC 305396)	Obsolete	Big-T (components)	Big-T (components) (Page 107)
ACCO Steermaster® MK III Mercury® Ride Guide®	Obsolete Obsolete	Big-T (components) Big-T (components)	Big-T (components) Big-T (components)
Morse® Command 290® Morse® Command 290 Cable Only		Safe-T II NFB (SS132XX)† or NFB 4.2 (SS147XX)† SSC290XX	HPS or Safe-T QC (SS137XX) SSC290XX
Morse® TRC Cable 304415	Obsolete	SSC62XX (Big-T/Safe-T TS)	SSC62XX (Big-T/Safe-T TS)
OMC® (not Tru-Course)	Obsolete	Safe-T II (SS132)† or NFB 4.2 (SS147XX)†	HPS or Safe-T QC (SS137XX)
OMC Tru-Course® Drumstyle 2 Cables	Obsolete	SeaStar (see SeaStar Selection Guide)	SeaStar (see SeaStar Selection Guide)
OMC Thru-Transom I/O	Obsolete	N/A	N/A
U-Flex® OLD style Cable M47 Cable	TO DATE	SS132XX or SS147XX XTREME (SSX176XX)	SS137XX HPS Big-T (components)
U-Flex NEW style Cable M66 Cable	TO DATE	SS132XX or SS147XX XTREME (SSX176XX)	SS137XX HPS Big-T (components)
U-Flex Single Cable M47/M66 Cable	TO DATE	Safe-T II (SS132XX/SS147XX)† XTREME (SSX176XX)	HPS or Safe-T QC (SS137XX)
U-Flex Tilt Single Cable M47/M66 Cable	TO DATE	Safe-T II Tilt†/SSX177 XTREME Tilt (components)	HPS or Safe-T QC Tilt (components)
U-Flex Dual Cable M47/M66 Cable	TO DATE	SeaStar 4.2 NFB (components)	4.2 Non NFB (components)
U-Flex Tilt Dual Cable M47/M66 Cable	TO DATE	NFB 4.2 Dual Tilt† (components)	4.2 Non NFB Dual Tilt (components)
U-Flex NR Single Cable M47/M66 Cable	TO DATE	Safe-T II (SS132XX)† or NFB 4.2 (SS147XX)† XTREME (SSX176XX)	(NFB not for power steering)
U-Flex NR Tilt Single Cable M47/M66 Cable	TO DATE	Safe-T II Tilt (components)† or NFB 4.2 Tilt (Components)†	(NFB not for power steering)
U-Flex NR Dual Cable M47/M66 Cable	TO DATE	NFB 4.2 Dual Cable (Components)†	(NFB not for power steering)
U-Flex NR Tilt Dual Cable M47/M66 Cable	TO DATE	NFB 4.2 Dual Cable Tilt† (components)	(NFB not for power steering)

* † For footnotes indicated by these symbols, please See Page 13.

MECHANICAL STEERING IDENTIFICATION GUIDE

ORIGINAL SYSTEM NAME (VERSION)	DATES USED & CABLE COLOR(S)	REPLACEMENT (NON-POWER-ASSIST OUTBOARDS & I/OS)	REPLACEMENT (POWER-ASSIST & SMALL INBOARDS)
Competitive Brand Rack & Pinion Steering Systems To SeaStar Solutions			
ACCO 58-8724 (Morse® ARC Cable 305396)	Obsolete	NFB Rack (SS151XX)† No Replacement Cable	HPS Rack (components) or The Rack (SS141XX)
DetMar® (Detroit Marine) Cables 4-200/4-400/4-600/DMS500 (Morse® DRC 305013)	Obsolete	NFB Rack (SS151XX)† No Replacement Cable	HPS Rack (components) or The Rack (SS141XX)
Mercury Ride Guide and Quicksilver®	Obsolete	NFB Rack (SS151XX)† No Replacement Cable	HPS Rack (components) or The Rack (SS141XX)
Morse® Command 200 Cable Only 300619-XXX		SSC130XX	SSC130XX
Morse® Command 401® 47209 Cable	Obsolete	NFB Rack (SS151XX)† No Replacement Cable	HPS Rack or The Rack (SS141XX)
OMC Rack & Pinion 1719/2805/200	Obsolete	NFB Rack (SS151XX)† (NOTE: Thru-transom cable not avail.)	HPS Rack or The Rack (SS141XX) (NOTE: Thru-transom cable not avail.)
U-Flex old style cable M86	TO DATE	SS151XX Single/SS152XX Dual	SS141XX
U-Flex Rack & Pinion	TO DATE	NFB Rack (SS151XX)†	HPS Rack (components) or The Rack (SS141XX)

Footnotes to Previous Charts

MECHANICAL STEERING IDENTIFICATION SEASTAR SOLUTIONS AND MORSE® BRANDS

* Since this may be relatively new, replacement of entire system may not be necessary. Please consult your dealer/distributor to determine which part of the system may need to be replaced. If engine is power-assisted, NFB steering cannot be used. Note that only difference between 1990-1996 and 1996-date Safe-T QC helms is shape of the helm housing castings.

** Slight dash modification required for installation of recommended new helm. If engine is power-assisted, NFB steering cannot be used.

† Safe-T II is for engines up to and including V-4's. For manually steered outboards larger than V-4, use NFB 4.2 or XTREME NFB.

KEY TO CHART HEADINGS: Rotary Steering has a rounded diecast helm (steering gear case) behind dash; Rack & Pinion Steering has a long metal tubular rack housing behind dash; Hydraulic Steering has 2 or 3 hoses (or tubing sections) attached to helm behind dash.

MECHANICAL STEERING IDENTIFICATION COMPETITIVE BRANDS

* Cable only can be replaced if SeaStar Solutions helm is present. ** Some dashboard modifications required to install SeaStar Solutions helm.

† No FeedBack steering is recommended for non-power-assisted engines only. Safe-T II is for engines up to and including V-4's. For manually steered outboards larger than V-4, use NFB 4.2 (single or dual cable) or NFB Rack (single or dual cable). If engine is power-assisted, NFB steering cannot be used.

NOTE: When a Rack system is being replaced by a Rotary system (or vice-versa), you must measure for the replacement system using SeaStar Solutions [catalog](#) measuring instructions. See steering cable measurement section for information on how to measure for replacement cables. The Morse® (P/N 312020) and U-Flex (P/N M66) "universal" replacement cables for rotary steering systems are not recommended for use with SeaStar Solutions helms. In accordance with A.B.Y.C. recommended practices, SeaStar Solutions recommends that engine maker connection kits be used with all outboard motors.



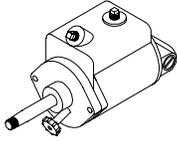
HYDRAULIC STEERING IDENTIFICATION GUIDE

ORIGINAL SYSTEM NAME (VERSION)	DATE USED	PART NUMBERS AND/OR SPECIAL CHARACTERISTICS
Capilano®	1973-DATE	Large heavy duty cast iron rear mount helm; variable displacement knob.
Hynautic® Stern Drive Steering	TO DATE	Transom or guide tube-mount cylinder; 80 Series round helm w/square flange (looks like 1984 SeaStar helm). Large or twin drives may use H-40 series square block type helm.
Hynautic® Inboard 2-line	TO DATE	HC5323-3 (ball joints) or K-51 (trunnion) cylinder; 80 Series round helm w/square flange (looks like 1984 SeaStar helm).
Hynautic® Inboard 3-line	TO DATE	K-1, K-2, K-3, K-4 (trunnion mount) cylinders; H-20 or H-40 square machined block type helm.
Hy-Trac Outboard	TO DATE	K-6 drag-link type cylinder; 80 Series round helm w/square flange.
Hy-Trac Outboard	TO DATE	K-10 front-mount type cylinder; 80 Series round helm w/square flange.
Hy-Trac Outboard	TO DATE	K-13 side-mount type cylinder; 80 Series round helm w/square flange.
SeaStar® (Version 1)	1984-1990	Round black helm with square flange; HC5340, HC5370-3 , HC5365, HC5380 cylinders used.
SeaStar® (Version 2)	1990-DATE	Round black helm with domed or flat shaft seal (3-screws); HC5340/ HC5342/HC5345-3/HC5347-3/HC5348-3/HC5358-3/HC5365 (outboard front mount); HC5370-3 (outboard side mount), HC5380 (outboard splashwell mount); HC5343 HC5375-3 (catamaran/pontoon); and many stern drive/inboard cylinder models used.
SeaStar Pro®	1993-DATE	Looks like SeaStar helm, has "SeaStar Pro" decal; HC5365, HC5345-3/47/48/58 cylinders used.
Competitive Brands	TO DATE	Hydraulic steering (including power steering by Hynautic & other brands) for boats up to 100 feet in length.
Hynautic® Tubing & Hose	TO DATE	Synflex® 5/16" O.D. Nylon Tubing; 3/8" Nylon Tubing; 1000 PSIW 5/16" I.D. Hose; 1000 PSIW 3/8" I.D. Hose & others.

HYDRAULIC STEERING IDENTIFICATION GUIDE

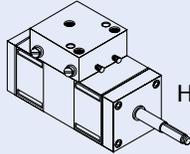
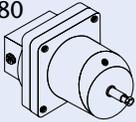
HELM
LOOKS LIKE
THIS

RECOMMENDED
REPLACEMENT
SYSTEM



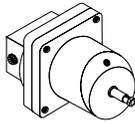
Capilano (see selection guide)

H-80



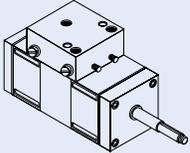
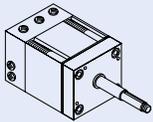
H-40

SeaStar, Capilano or Hynautic as available
(see selection guide for best option)

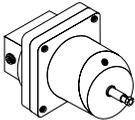


SeaStar (see selection guide for best option)

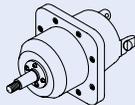
H-20



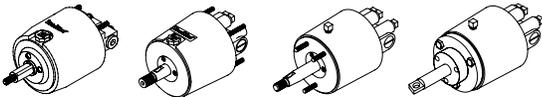
Hynautic as available or SeaStar (see selection guide AND:
Hynautic-SeaStar Cross Reference in the Tech Reference section)



SeaStar or BayStar (see selection guide for best option)
SeaStar or BayStar (see selection guide for best option)
SeaStar with side mount cylinder(s) (see selection guide)



SeaStar or BayStar (see selection guide for best option)

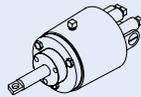
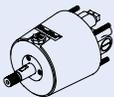


Front Mount

Rear Mount

Tilt

SeaStar or BayStar (see selection guide for best option)



SeaStar Pro (see selection guide)



SyTen®

Identified by the stainless steel band that wraps around the base of the unit.

SeaStar or BayStar (see selection guide for best option)

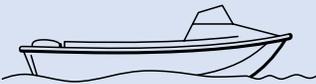
Tilt Steering is available as an option for BayStar, SeaStar and SeaStar PRO systems. It is not offered for Capilano and Hynautic systems. For an overview of Tilt Steering see pages 126-127. Other helm mounting options, see pages 133-134.

SeaStar (see selection guide for best option)

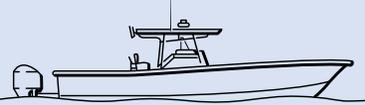
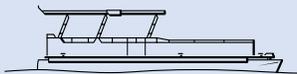
SeaStar tubing/hose
(may require purchase of appropriate fittings to complete connection)

STEERING OPTIONS BASED ON BOAT TYPE:

Following are some common boat types and suggested SeaStar Solutions hydraulic steering systems likely to be applicable. For a general overview of mechanical and hydraulic steering system options, please see Steering Options Based On Engine Type on pages 4-5.

<p>INFLATABLE: Boats manufactured from waterproofed fabric which are inflated with air in order to achieve their shape. The bottom of the hull may be made of fabric and/or fiberglass. They typically have narrow transoms. Boats may have one or two engines, and are generally slower than 40 MPH.</p>	<p>Outboard — Single Engine: Basic System: BayStar (up to 150 HP) Easier Steering: BayStar PLUS (up to 150 HP) Easiest Steering: SeaStar P/A</p> <p>Outboard — Dual Engine: Basic System: SeaStar (Pivot Mount Cylinder) Premium system: SeaStar P/A</p> <div style="text-align: right;">  INFLATABLE </div>
<p>CRUISER: Cuddy/express/bridge cruiser primarily designed for cruising. It has overnight accommodations. Typically rigged with two steering stations. Boats may be equipped with single or multiple engines and are generally slower than 45 MPH.</p> <div style="text-align: center;">  CRUISER </div>	<p>Stern Drive: Basic System: SeaStar Stern Drive Heavy Duty System: Hynautic (K-5 Cylinder) Easiest Steering: SeaStar P/A</p> <p>Inboard (small to medium size): Basic System: SeaStar 2-line Heavy Duty System: Capilano 2-line Extra Heavy Duty System: Hynautic 3-line Easiest Steering: SeaStar P/A or SeaStar Power Steering</p> <p>Inboard (medium to large size): Basic System: SeaStar 2-line Heavy Duty System: Capilano 2-line Extra Heavy Duty System: Hynautic 3-line Easiest Steering: SeaStar Power Steering</p>
<p>RUNABOUT: Intended for day boating. Typically a single engine, but can be a dual engine boat. This includes tournament ski boats and performance outboards. Boat speeds generally do not exceed 60 MPH.</p> <div style="text-align: center;">  RUNABOUT </div>	<p>Outboard — Single Engine: Basic System: BayStar (up to 150 HP) Easier Steering: BayStar PLUS (up to 150 HP) Easier Steering: SeaStar (up to 350 HP) Easiest Steering: SeaStar P/A</p> <p>Outboard — Dual or Triple Engine: Basic System: SeaStar (up to 700 HP) Extra Heavy Duty System: SeaStar Tournament Series (up to 900 HP, triple engines) Easiest Steering: SeaStar P/A</p> <p>Stern Drive: Basic System: SeaStar Stern Drive Heavy Duty System: Hynautic (K-5 Cylinder) Easiest Steering: SeaStar P/A</p> <p>Inboard: Basic System: SeaStar 2-line Heavy Duty System: Hynautic 3-line Easiest Steering: SeaStar P/A</p>
<p>FISH 'N' SKI: Single engine boat designed for day fishing or skiing in protected waters. Boat speeds are generally lower than 40 MPH.</p>	<p>Outboard — Single Engine: Basic System: BayStar (up to 150 HP) Easier Steering: BayStar PLUS (up to 150 HP) Easier Steering: SeaStar (up to 350 HP) Easiest Steering: SeaStar P/A</p> <p>Stern Drive: Basic System: SeaStar Stern Drive Easiest Steering: SeaStar P/A</p> <div style="text-align: right;">  FISH 'N SKI </div>

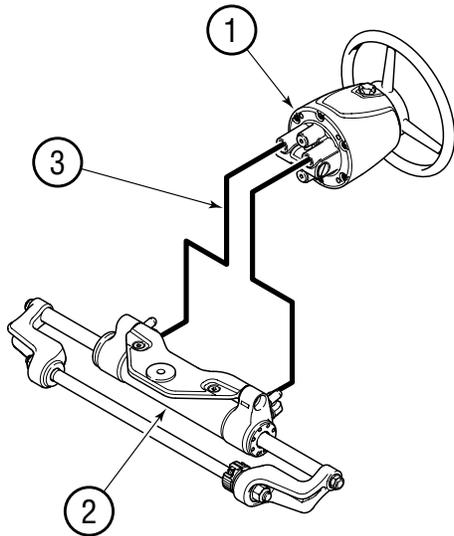
STEERING OPTIONS BASED ON BOAT TYPE:

<p>CATAMARAN: Twin hull vessels. Typically twin engine boats where the use of a mechanical tie bar is not possible. Speeds do not exceed 60 MPH.</p>	<p>Catamaran System: SeaStar (up to 700 HP) — several configurations available Easiest Steering: SeaStar P/A</p>
<p>FISH BOAT: Boat primarily designed and equipped for offshore fishing. May be rigged with a second station and have single or multiple outboards. Speeds are generally slower than 50 MPH.</p>	<p>Outboard — Single Engine: Basic System: BayStar (up to 150 HP) Easier Steering: SeaStar (up to 350 HP) Easiest Steering: SeaStar P/A</p> <p>Outboard — Dual or Triple Engine: Basic System: SeaStar (up to 700 HP) Extra Heavy Duty System: SeaStar Tournament Series Cylinders (up to 900 HP, triple engines) Easiest Steering: SeaStar P/A</p> <p>Stern Drive: Basic System: SeaStar Stern Drive Heavy Duty System: Hynautic (K-5 Cylinder) Easiest Steering: SeaStar P/A</p> <p>Inboard: Basic System: SeaStar 2-line Heavy Duty System: Capilano 2-line Extra Heavy Duty System: Hynautic 3-line Easiest Steering: SeaStar P/A or SeaStar Power Steering</p>
<p>CENTER CONSOLE: Boats with the control station located on the center line of the boat. Designed specifically for fishing, may have single or multiple engines. Boat speeds are generally slower than 65 MPH.</p>  <p>CENTER CONSOLE</p>	<p>Outboard — Single Engine: Basic System: SeaStar (up to 350 HP) Easiest Steering: SeaStar P/A Maximum Steering Precision: SeaStar PRO</p> <p>Outboard — Dual or Triple Engine: Basic System: SeaStar (up to 700 HP) Extra Heavy Duty System: SeaStar Tournament Series Cylinders (up to 900 HP, triple engines) Easiest Steering: SeaStar P/A</p> <p>Stern Drive: Basic System: SeaStar Stern Drive Heavy Duty System: Hynautic (K-5 Cylinder) Easiest Steering: SeaStar P/A</p> <p>Inboard: Basic System: SeaStar 2-line Heavy Duty System: Capilano 2-line Extra Heavy Duty System: Hynautic 3-line Easiest Steering: SeaStar P/A or SeaStar Power Steering</p>
<p>BASS BOAT: Single engine designed specifically for fishing in protected waters with a flat-bottomed hull. Generally performance oriented with speeds that can exceed 60 MPH.</p>	<p>Outboard — Single Engine: Basic System: SeaStar Pro Maximum Steering Precision: SeaStar PRO Easiest Steering: SeaStar P/A PRO</p>  <p>BASS</p>
<p>PONTOON: Twin or Triple tube boats. Single and dual engine capable. Generally speeds do not exceed 60 MPH. Note: High steering loads when equipped with engines over 115 HP.</p>	<p>Pontoon System: SeaStar (up to 700 HP) — several configurations available Easiest Steering: SeaStar P/A</p>  <p>PONTOON</p>
<p>COMMERCIAL/WORK/RESCUE/RACE:</p>  <p>WORK/RESCUE</p>	<p>Any of the boats described above used in a more severe environment. Take special care when selecting a system for these boats to ensure that you have both comfortable and reliable steering for your boating conditions.</p>

SeaStar Hydraulic Steering

Our manual hydraulic steering systems are simple and efficient. The basic system consists of four main components; 1) the helm pump, 2) the cylinder, 3) the hose or tubing required to connect the cylinder to the helm pump, and 4) genuine SeaStar Steering Fluid.

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



1. THE HELM UNIT

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

2. THE CYLINDER

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

IMPORTANT

3. HOSES AND TUBING



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

SeaStar hoses are a custom multi-layered composite design, engineered specifically for our systems. They are designed to exceed SAE and ABYC specifications and provide precise steering control not achievable with hydraulic industry standard hoses. Due to performance and safety concerns, SeaStar recommends that ONLY SeaStar or SeaStar Pro hoses be used in SeaStar steering systems.

IMPORTANT

4. STEERING FLUID



Due to recent upgrades to our steering system components, SeaStar Solutions recommends use of SeaStar Steering Fluid Only in our hydraulic steering systems. SeaStar steering systems have been engineered and validated using our proprietary SeaStar Hydraulic Steering Fluid. SeaStar steering fluid is engineered with a special additive package that contains anti-foaming and anti-rust agents, anti-oxidants, viscosity stabilizers, corrosion inhibitors, wear additives as well as water emulsification adders that were formulated not to harm or degrade our components. It is highly recommended that SeaStar Steering Fluid be used to ensure optimum system performance and safety.

MECHANICAL STEERING KIT OVERVIEW:



XTREME™ NFB™ TILT SSX177XX

The kit contains the following:

- 1 - SHX97606 XTREME™ Tilt NFB Helm
- 1 - SH91800 Sport Tilt Mechanism
- 1 - SSCX64XX XTREME™ QC Steering Cable

Hardware & Instruction sheets

Kit sizes: 11-25 feet

SSCX64XX can be used as a replacement cable.

APPLICATIONS:

XTREME NFB Tilt single-cable systems are suitable for most single-station boats with a single non-power-assisted outboard engine up to V-6 and minimal engine flutter or steering instability.



XTREME™ NFB™ SSX176XX

The kit contains the following:

- 1 - SHX7606 XTREME™ NFB Helm, Bezel and Hardware Kit
- 1 - SSCX64XX XTREME™ QC Steering Cable

Hardware & Instruction sheets

Kit sizes: 11-25 feet

SSCX64XX can be used as a replacement cable.

APPLICATIONS:

XTREME NFB single-cable systems are suitable for most single-station boats with a single non-power-assisted outboard engine up to V-6 and minimal engine flutter or steering instability. Use dual cable system for boats with engine flutter or steering instability.



4.2 steering wheel turns lock-to-lock

NFB™ 4.2 SS147XX (SINGLE)

The kit contains the following:

- 1- SH4910P No FeedBack Helm
- 1- SB27150P 90 Degree Bezel Kit
- 1- SSC62XX Steering Cable

Hardware & Instruction sheets

Kit sizes: 10-20 feet (Single cable)

SSC62XX can be used as a replacement cable.

APPLICATIONS:

NFB 4.2 single-cable systems are suitable for most single-station boats with a single non-power-assisted outboard engine up to V-6 and minimal engine flutter or steering instability. Use dual cable system for boats with engine flutter or steering instability.

NFB = No FeedBack, an exclusive SeaStar Solutions feature built into the helm to fight prop torque feedback.
 Steering Wheel Turns Lock-to-lock = steering wheel revolutions from hard over port to hard over starboard.
 NFB should not be used with autopilots or power assisted steering.

MECHANICAL STEERING KIT OVERVIEW (Continued):

NFB™ PRO RACK SS152XX (DUAL)

The kit contains the following:

- 1- [SH5230P](#) No FeedBackHelm
- 1- [SB39544P](#) 90 Degree Bezel Kit
- 1- [SSC135XX](#) Dual Steering Cable

Hardware & Instruction sheets

Kit sizes: 12-16 feet (Dual cable)

[SSC124XX](#) old style rack cables CANNOT be used with these systems.

APPLICATIONS:

NFB Pro Rack systems are suitable for single-station, high performance boats equipped with a single non-power-assisted outboard (up to V-6) in which engine flutter or steering instability is present. New Back Mount design installs easily and replaces standard SeaStar Solutions rack steering without dash modifications.



4 steering wheel turns lock-to-lock

NFB™ RACK SS151XX (SINGLE)

The kit contains the following:

- 1- [SH5230P](#) No FeedBackHelm
- 1- [SB39544P](#) 90 Degree Bezel Kit
- 1- [SSC134XX](#) Steering Cable

Hardware & Instruction sheets

Kit sizes: 10-20 feet (Single cable)

[SSC154XX](#) can be used as an upgrade replacement cable (single cable systems only).

[SSC124XX](#) old style rack cables CANNOT be used with these systems.

APPLICATIONS:

NFB Rack single-cable systems are suitable for most single-station boats with a single non-power-assisted outboard engine 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 SeaStar Solutions rack steering without dash modifications.



4 steering wheel turns lock-to-lock

BACK MOUNT RACK SS141XX

The kit contains the following:

- 1- [SH5210P](#) Helm
- 1- [SB39526P](#) 90 Degree Bezel Kit
- 1- [SSC134XX](#) Steering Cable

Hardware & Instruction sheets

Kit sizes: 8-23 feet (Single cable)

[SSC154XX](#) can be used as an upgrade replacement cable (single cable systems only).

[SSC124XX](#) old style rack cables CANNOT be used with these systems.

APPLICATIONS:

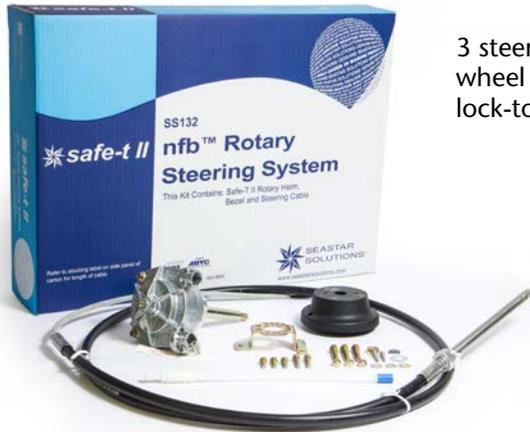
Back Mount Rack Replaces 1984-date SeaStar Solutions "The Rack" steering without dash modification. (Requires use of [SSC134XX](#) Back Mount Rack cable.) For single station use only. Components are available for dual cable systems, but we recommend No-FeedBack steering for all dual cable steered, non-power-assisted outboards and sterndrives.



4 steering wheel turns lock-to-lock

NFB = No FeedBack, an exclusive SeaStar Solutions feature built into the helm to fight prop torque feedback. Steering Wheel Turns Lock-to-lock = steering wheel revolutions from hard over port to hard over starboard. NFB should not be used with autopilots or power assisted steering.

MECHANICAL STEERING KIT OVERVIEW (Continued):



3 steering wheel turns lock-to-lock

NFB™ SAFE-T II SS132XX

The kit contains the following:
 1- [SH5150P](#) No FeedBack Helm
 1- [SB27150P](#) 90 Degree Bezel Kit
 1- [SSC62XX](#) Steering Cable
 Hardware & Instruction sheets
 Kit sizes: 10-20 feet
[SSC62XX](#) can be used as a replacement cable.

APPLICATIONS:

NFB Safe-T II single-cable systems are suitable for most single-station boats with a single non-power-assisted outboard engine up to V-4 and minimal engine flutter or steering instability. (NFB Safe-T II is available in single cable configuration only).



3 steering wheel turns lock-to-lock

SAFE-T QC® SS137XX (SINGLE)

The kit contains the following:
 1- [SH5094-1P](#) Helm
 1- [SB27484P](#) 90 Degree Bezel Kit
 1- [SSC62XX](#) Steering Cable
 Hardware & Instruction sheets
 Kit sizes: 8-23 feet
[SSC62XX](#) can be used as a replacement cable.

APPLICATIONS:

Safe-T QC® replaces all SeaStar Solutions Safe-T helms made since 1968 with little or no dash modifications. Requires use of SSC62. We recommend No FeedBack steering for all dual cable steered, non-power-assisted outboards and sterndrives.



NFB = No FeedBack, an exclusive SeaStar Solutions feature built into the helm to fight prop torque feedback. Steering Wheel Turns Lock-to-lock = steering wheel revolutions from hard over port to hard over starboard. NFB should not be used with autopilots or power assisted steering.

HYDRAULIC STEERING KIT OVERVIEW:



WE RECOMMEND

The use of SeaStar Steering Fluid ONLY in our hydraulic steering systems.
See Page 144

SEASTAR **HK6400A-3**

The kit contains the following:

- 1- **HH5271-3** SeaStar Helm 1.7 cu" (27.80cc)
- 1- **HC5345-3*** SeaStar Pivot Cylinder
- 2- **HAS430** Hydraulic Oil (1 Liter)

SeaStar kit HK63xx-3 (featured right) includes **HK6400A-3** and hoses.

APPLICATIONS:

Single and dual non-power-assisted outboard engines up to 350 HP (700 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.



HK63xxA-3
Shown

5 steering wheel turns lock-to-lock

SEASTAR PRO **HK75XXA-3**

The kit contains the following:

- 1- **HH5770-3** SeaStar Helm 2.0 cu" (32.77cc)
- 1- **HC6345-3*** SeaStar Pro Pivot Cylinder
- 2- **HAS430** Hydraulic Oil (1 Liter)

APPLICATIONS:

Seastar Pro is for high-performance boats with single non-power-assisted outboards up to 350 HP, especially those capable of speeds over 60 MPH, which demand maximum steering control and comfort. It is suitable for use with high-performance propellers and jack plates.



HK75xxA-3
Shown

4.15 steering wheel turns lock-to-lock

BAYSTAR **HK4200A-3**

The kit contains the following:

- 1- **HH4314-3** BayStar Helm 1.4 cu" (22.94cc)
- 1- **HC4645H*** BayStar Compact Cylinder
- 1- **HT4420H** 20 ft. tubing kit - cut to length
- 2- **HAS430** Hydraulic Oil (1 Liter)

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 is not intended for high speed, high performance type boats, such as Bass Boats.

NOTE: **HK4300A-3** & **HK4500A-3** Do NOT include tubing.



5.0 steering wheel turns lock-to-lock

*Some engines may require alternative cylinders that require high precision steering.

SEASTAR TILT STEERING KITS:



WE RECOMMEND

The use of SeaStar Steering Fluid ONLY in our hydraulic steering systems.
See Page 144

SEASTAR TILT STEERING KIT (CLASSIC) **HK6400TC-3**

The kit contains the following:

- 1- **HH6541-3** SeaStar Tilt Helm, Classic, 1.7
- 1- **HC5345-3** SeaStar Pivot Cylinder
- 2- **HA5430** Hydraulic Oil (1 Liter)

APPLICATIONS:

For use with single engine, up to 350HP



SEASTAR TILT STEERING KIT (SPORT) **HK6400TS-3**

The kit contains the following:

- 1- **HH6191-3** SeaStar Tilt Helm, Sport, 1.7 Remote Fill
- 1- **HC5345-3** SeaStar Pivot Cylinder
- 2- **HA5430** Hydraulic Oil (1 Liter)

APPLICATIONS:

For use with single engine, up to 350HP



OPTIMUS ELECTRONIC POWER STEERING

OPTIMUS ELECTRONIC POWER STEERING

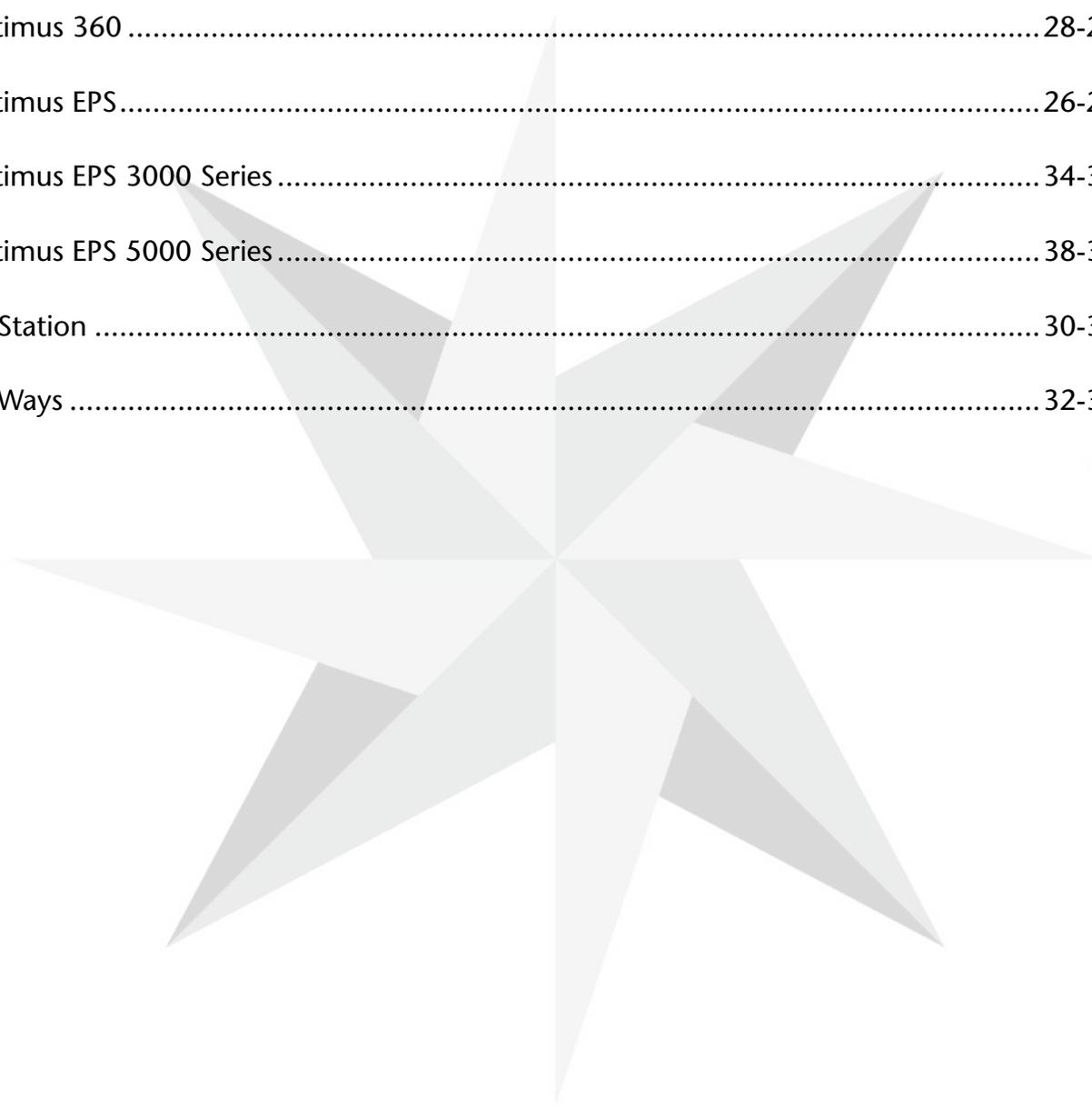


OPTIMUS 360



ALPHABETICAL INDEX

Optimus 360	28-29
Optimus EPS.....	26-27
Optimus EPS 3000 Series	34-37
Optimus EPS 5000 Series	38-39
SeaStation	30-31
SeaWays	32-33





ADVANTAGES:

- No oil at helm.
- Boat that steers like a sports car.
- Plug and play autopilot compatibility.
- No autopilot pump or rudder feedback unit.
- Adjustable speed sensitive turns lock-to-lock.
- Adjustable speed sensitive wheel effort.
- Can be retrofitted to existing mechanical and electronic controlled engines. You do not have to buy new engines.
- No tie bars (twin configuration).
- No liquid tie bar (CAT).
- On demand pumps which extend battery life.
- Components based on existing SeaStar reliability and quality.
- NMEA 2000 Certified.

OPTIMUS ELECTRONIC POWER STEERING SYSTEM:

Optimus EPS truly raises the bar when it comes to comfort, control and maneuverability, especially for the new breed of high performance powerboats, saltwater fishing vessels, catamarans, RIBs and high end pontoon boats. It's unlike anything you've ever experienced when it comes to steering. We know you will be impressed.

OPTIONS FOR OPTIMUS EPS:

- Second station electronic helm.
- Heavy-duty tournament cylinders.
- Triple with tie bars.
- Quad with tie bars.

APPLICATIONS FOR OPTIMUS EPS:

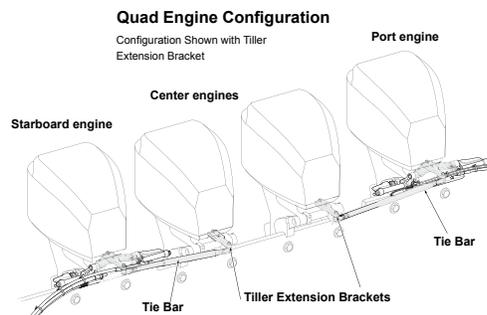
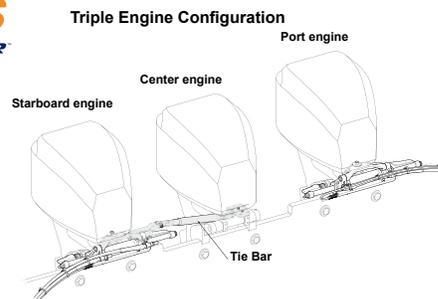
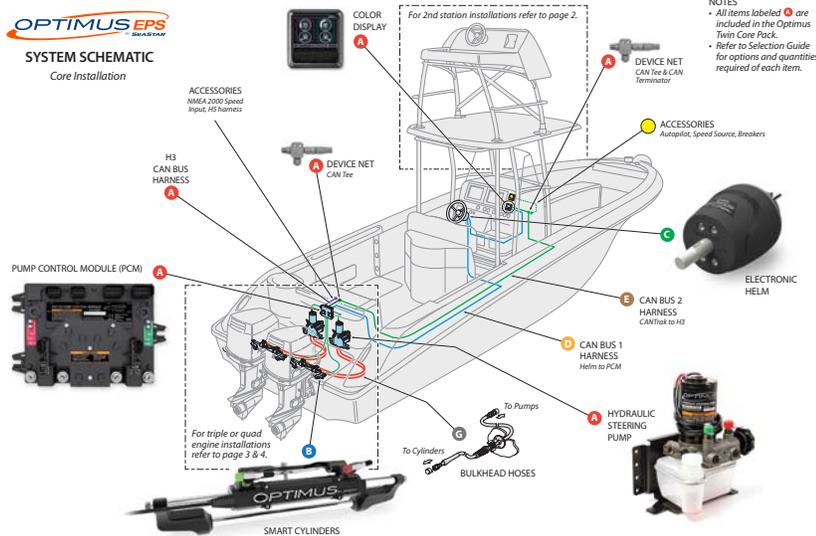
- All twin, triple and quad outboard engine boats - electronic and mechanical controlled.
- Single and dual helm station boats.
- High performance powerboats, saltwater fishing vessels, RIBs, catamarans, houseboats and pontoon boats.
- For sterndrive applications contact your SeaStar Solutions representative.

* To determine if Optimus EPS and 360 is suitable for your boat please visit www.optimusbom.com

INSTALLATION



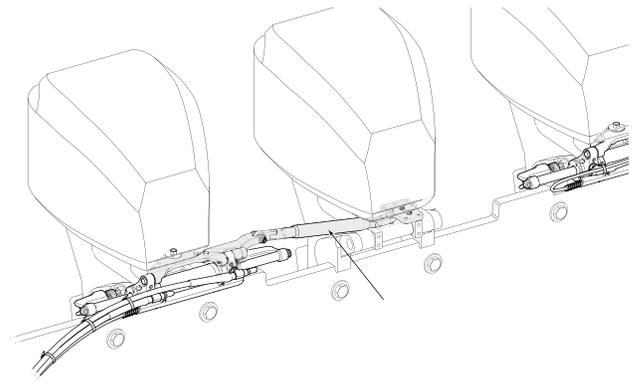
System Schematic Core Installation



"This product is only available through Authorized Optimus Dealers."

THE TECHNOLOGY BEHIND THE SYSTEM

The incredible feel you get when you're behind the wheel of a boat equipped with Optimus EPS is the result of an incredible array of technology and engineering. Each component has been designed to complement the other, resulting in a seamless experience of steering control in virtually every situation on the water. The high level of engineering also extends to the reliability of the system, with quality materials, careful manufacturing and redundant systems, all to stand up to the rigors of life on the water.



KEY SYSTEM COMPONENTS

FEATURES	BENEFITS
OPTIMUS ELECTRONIC HELM (PART NO. EH15XX)	
Adjustable helm turns and steering wheel effort	Adjustable steering sensitivity and resistance for maximum comfort
Speed sensitive helm turns, effort and steering response	Driver comfort, control and performance as speed varies
Dual independent sensors and circuits	Provides redundancy for reliable operation
Electronic helm	No hydraulic oil at helm
Optional tilt helms available	Adjustable position of steering wheel for personal comfort
Optional 2nd helm	Easy installation, requires only a harness connection
OPTIMUS SMART CYLINDER (PART NO. EC53XX)	
Dual independent non-contact sensors and proven SeaStar cylinder design	System reliability and operation
Integrated rudder feedback unit (RFU)	No additional RFU required for autopilot system
Adjustable stainless steel ORB fittings	Simplifies the installation and allows for easy orientation in any direction
OPTIMUS CORE PACK (PART NO. EPSK12XX)	
OPTIMUS HYDRAULIC STEERING PUMP	
On demand hydraulic steering pump	Significantly reduces overall power consumption
Simplified semi auto-purge mode	Allows user to purge system with existing components
Designed using SAE J-1171 rated motor	Meets Coast Guard requirement for ignition protection
Third party auto-pilot certified	A separate auto-pilot pump is not required.
OPTIMUS CANTRAK DISPLAY	
CANtrak digital display for messaging and user interface	Provides interface for adjusting helm turns and steering effort
	Dealer adjustable toe in/out and engine turning ratio
Displays visual information on system status	Real-time system status rudder direction and RPM
OPTIMUS PUMP CONTROL MODULE	
Fault tolerant CANbus network	Ensures system reliability and operation
Sealed locking cable connections	Ensures reliable cable connection protection from vibration
Accommodates certified 3rd party autopilot systems	No additional autopilot pump and RFU
Automatic battery selector	Ensures system operates at peak performance

For more information contact SeaStar Solutions



ADVANTAGES OF OPTIMUS 360

- Intuitive high precision joystick docking with confidence.
- Seamless integration with electronic controlled engines.
- Autopilot ready - just a simple connection.
- Dual station compatible.
- Tie bar engines (triple/quad) - less components, simple installation, less cost.
- Available as a retrofit or for new engine installation.
- All the benefits of Optimus EPS, including auto adjusting steering effort and steering turns lock-to-lock.
- Compatible with select mechanical shift & throttle outboards
- Compatible with select mechanical shift & throttle inboards with stern drives

OPTIMUS 360 JOYSTICK DOCKING SYSTEM

The patented Optimus 360 system builds on the Optimus EPS. The Optimus EPS system replaces the traditional hydraulic steering system.

OPTIMUS 360 FOR TWIN, TRIPLE AND QUAD ENGINE APPLICATION:

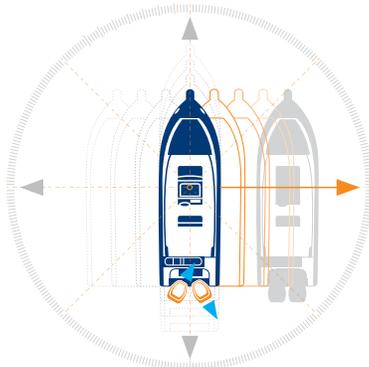
The Optimus 360 gives your boat a whole new dimension of control. By developing the joystick function to be intuitive, the Optimus 360 allows you to move your boat not only forward and back, but also sideways, by pushing the joystick to the left, or to the right, and even, rotate on a dime, all with a simple twist of the joystick.

Optimus 360 is designed for low speed maneuvering, and really excels in the marina, when pulling in and out of your slip, or docking. Optimus 360 uses intelligent programming to minimize the amount of shifting required to complete a maneuver.

Optimus 360 steering/shift/throttle control system is engineered for powerboats with electronic shift and throttle engines, allowing you to use the existing electronic controls.

Optimus 360 connects to the existing control head with closed loop processing, providing a very seamless integration.

OPTIMUS360
BY SEASTAR

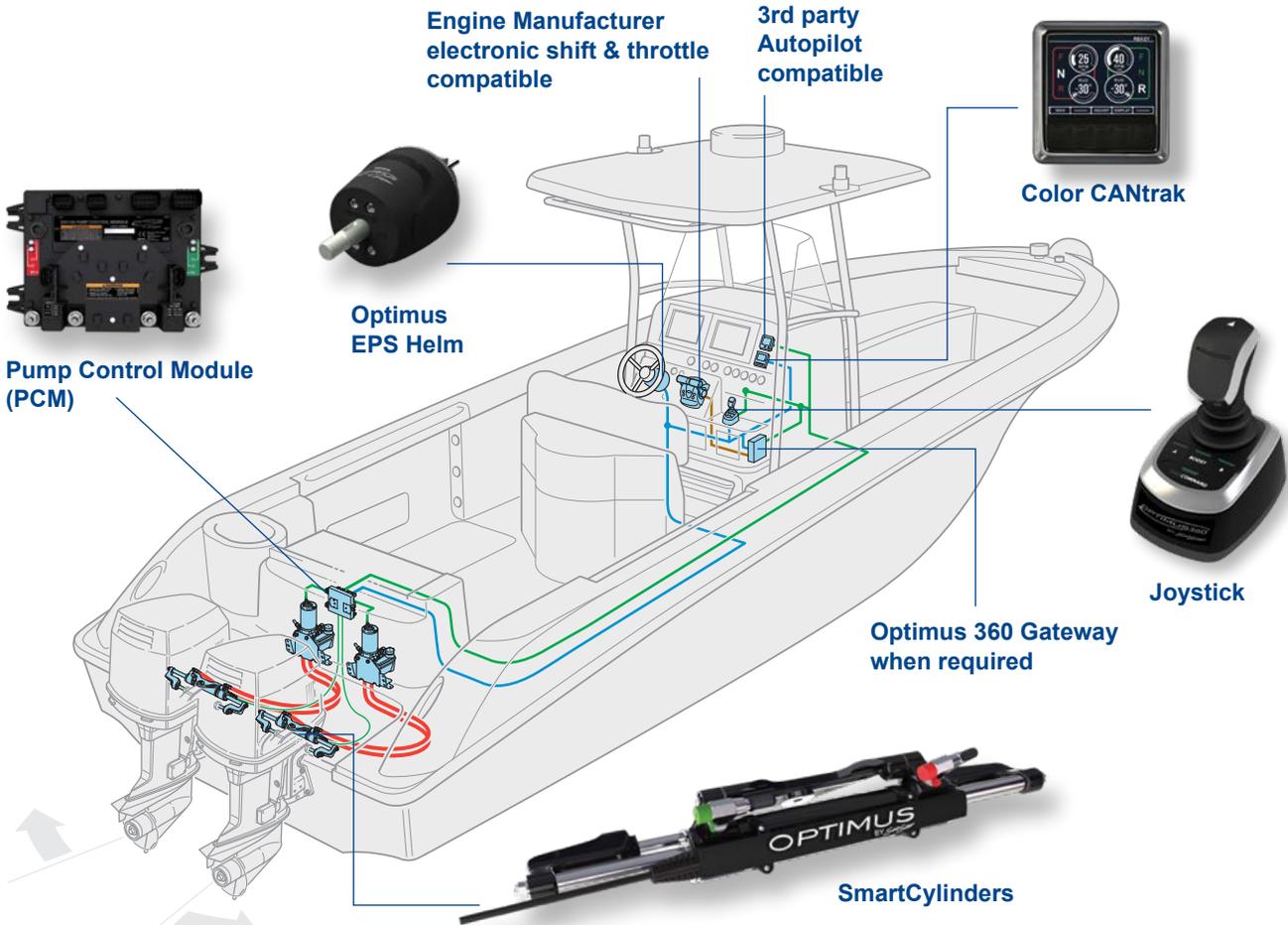


"This product is only available through Authorized Optimus Dealers." Contact SeaStar Solutions for more information.



Advantages of Optimus Electronic Power Steering

- No oil at helm
- Boat that steers like a sports car
- Plug and play autopilot compatibility
- No autopilot pump or rudder feedback unit
- Adjustable speed sensitive wheel effort
- Adjustable speed sensitive turns lock-to-lock
- Can be retrofitted to existing mechanical and electronic controlled engines. You do not have to buy new engines.
- No tie bars (twin configuration)
- No liquid tie bar (CAT)
- On demand pumps which extend battery life
- Components based on existing SeaStar reliability and quality
- NMEA 2000 Certified

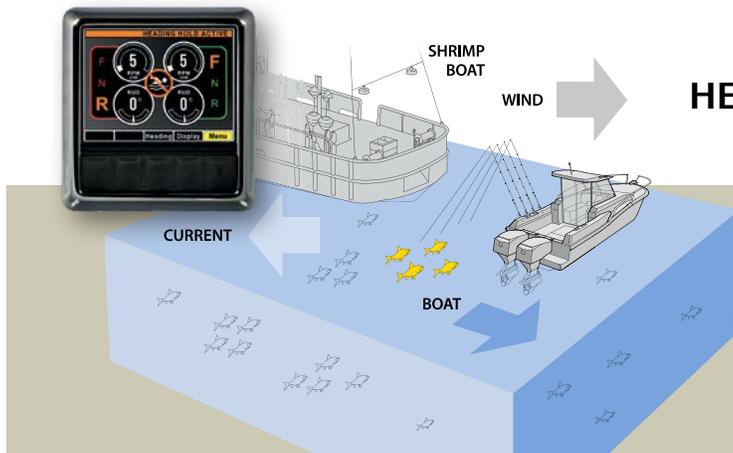


Optimus EPS + Joystick = Optimus 360 Joystick Control



HOLDS POSITION & HEADING VIA GPS

When you are trying to locate that ideal spot over a reef or a wreck, SeaStation is ideal. Just hold your position and heading, drop your lines and see if you have success, if not, simply move to another location and engage SeaStation. No physical anchor required.



HEADING HOLD

Mode 1: HEADING HOLD

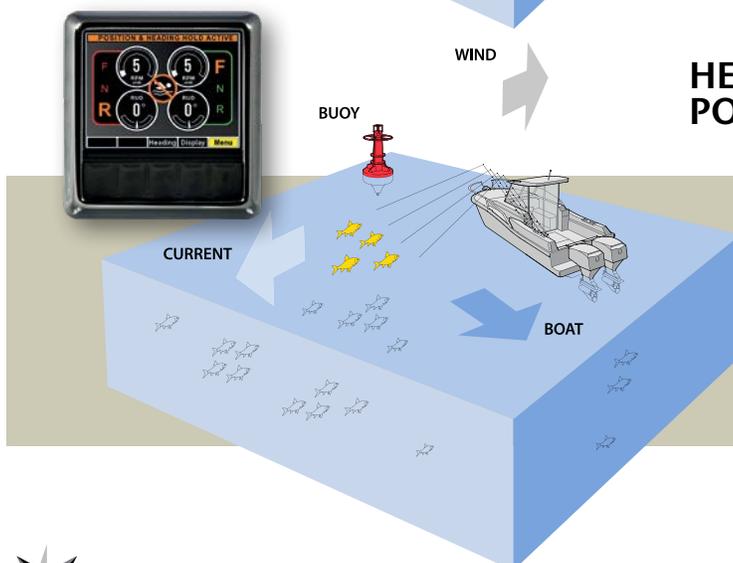
Hold heading regardless of position. Applications include Kite fishing/Drift fishing. Easier setup - Maximize fishing time.



POSITION HOLD

Mode 2: POSITION HOLD

Hold position regardless of heading. Applications include bait fishing and wreck/reef fishing. Finding the natural heading when in position hold could be the best option.



HEADING AND POSITION HOLD

Mode 3: HEADING AND POSITION HOLD

Stay in position and hold heading. Applications include waiting for a bridge to open, a spot at the dock to become available and bait fishing near a structure.



Represents fishing lines

EASY ADD-ON TO YOUR OPTIMUS 360 BOAT

SeaStar Solutions has applied the same smart algorithms to SeaStation as you have experienced with Optimus 360 joystick control to reduce unnecessary shifting and jockeying of the engines while providing superior position and heading functions for a large selection of engine platforms.

Captains have told us that we can't have the jarring from the engines shifting and unnecessary movement as it does not sound good and also could impact the fishing outcome.

We took this input seriously and we are confident SeaStation will be a fishing enabler.

Another common use for SeaStation will be when you are waiting for a spot to open at the dock or waiting for a bridge to lift. Simply push the A button or A&C buttons on the joystick, acknowledge via the Color CANtrak display and the boat will hold its position.

When ready to take command, simply toggle the A and/or C button off for control with the joystick.

As SeaStar adds more functions and features to SeaStation they will be available with s/w updates. Please contact your OEM or Optimus Certified dealer for more information.

WARNING: This is not to be used for any kind of swimming and diving.



SYSTEM REQUIRES:

Optimus 360 Joystick Control System
SeaStation Kit EPSK1600

includes: Dual antenna GPS sensor
DeviceNet CAN2 harness and T-connector
Software and sensor license activation code
Warning decals are provided to be placed near all boarding access points

Accuracy (target) ± 3 Meters Position hold
± 10° Heading hold

Sensor and mounting information:

Dimensions Not including mount: 25.9 L x 12.9 W x 4.5 H (cm)
10.2 L x 5.1 W x 1.8 H (in)
Including mount: 25.9 L x 12.9 W x 12.8 H (cm)
10.2 L x 5.1 W x 5.0 H (in)

Weight Not including mount: 0.42 kg (0.9 lb)
Including mount: 0.51 kg (1.1 lb)



A - Position
C - Heading



SEASTATION MODES

This is a safety step to make sure that all precautions have been taken to make sure there is nothing in the water when SeaStation is engaged. After pressing the A and C buttons on the joystick, the captain will be prompted to engage SeaStation by pushing the button on the CANtrak display.

HEADING ADJUSTMENT

Jog buttons have been created to adjust heading in five degree increments.

This feature allows heading adjustment without disengaging SeaStation to align the vessel stern to wind and current to reduce engine activity.



SEAWAYS AUTOPILOT

SeaWays is a simple enhancement (update) to the Optimus 360 system using the CANtrak display and can use the same heading and position sensor as SeaStation.

FEATURES:

- SeaWays will be included with SeaStation and is accessible using the CANtrak display that is part of the Optimus 360 system.
- The display image is simple making it easy to engage one of the 3 modes and understand what the boat is doing.
- Track mode will compensate for wind and current keeping the boat on course.
- Now you have SeaStation (GPS anchor) and Autopilot all in one system from SeaStar.



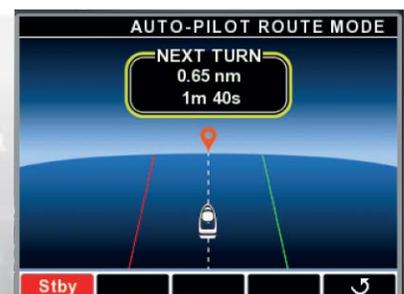
HEADING MODE

Autopilot holds a desired heading. Boat may drift with wind and current.



TRACK MODE

Autopilot holds a desired course over ground. Boat heading may be changed by the autopilot to hold the desired course.



ROUTE MODE

Autopilot follows waypoints provided by third party chart plotter. Boat heading will be changed by the autopilot to follow the waypoints.

OVERRIDE

Autopilot is temporarily disabled when the helm is turned. The autopilot re-engages automatically when the helm is no longer turned and the boat heading is stable. When the autopilot re-engages, the current heading becomes the new desired heading.



The SeaWays autopilot Heading and Track modes can be activated via the CANtrak display. If you desire Route Mode, a third party chartplotter is required for setting the waypoints.

WHAT MAKES SEAWAYS AUTOPILOT SO SIMPLE?

-  All other displays, Course Control Units (CCU), and GPS/compasses are no longer required.
-  The autopilot CCU resides inside the steering controller (PCM) and has access to all the steering characteristics for optimum performance.
-  All the steering commands are sent internally providing a more integrated system, unlike 3rd party autopilot systems where communication is external.
-  SeaWays commissioning is simple with a three step tuning process for accurate autopilot performance.
-  Installers can import SeaWays autopilot tuning parameters from a golden file via the CANtrak display.



EASY HEADING CHANGE WITH A SIMPLE TAP OF THE JOYSTICK.

Instead of changing your heading via the CANtrak display, can easily change your heading by tapping the joystick to get 1 degree or 10 degree changes in heading.

Tap the joystick port or starboard for 1 degree change or hold it for 2 seconds for 10 degree change.

OPTIMUS EPS
3000 SERIES

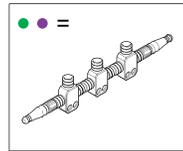
INBOARD YACHTS 18-34 FEET RANGE

APPLICATIONS

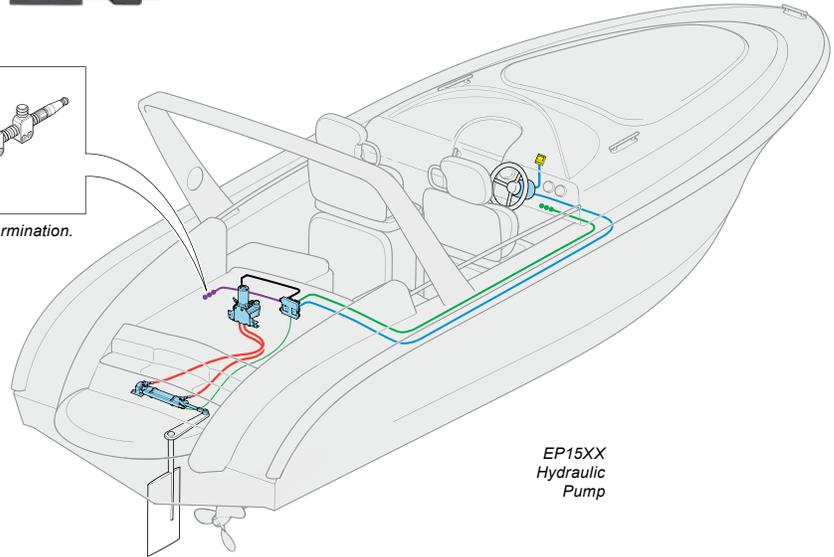
Electronic Power Steering (EPS) system suitable for vessels from approximately 18 ft to 34 ft * with single or dual rudders.



EH1512 Electronic Helm
Front mount 3/4 taper shaft shown
5 other options inc. 1" straight
shaft available



CAN Tee's termination.



* Subject to submission of survey form and rudder load calculation.

ENVIRONMENTAL

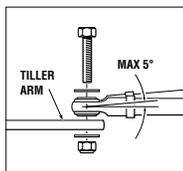
- Operating temperature: -18°C to +77°C [ISO 25197]
- Storage temperature: -40°C to +85°C [ISO 25197]
- Corrosion resistance: 300 hours salt spray [ASTM B117]
- Water ingress protection: IPX7 [IEC 60529]
- Random vibration: 0.0284 g²/Hz [ABYC P-27]
- Resonant vibration: 4 G zero-peak, 20-2000 Hz [ABYC P-27]
- Mechanical shock: 50 G, 11 m-sec half-sine shape [ISO 25197]
- Ignition protection: SAEJ-1171
- Meets EN60945 electro-magnetic compatibility requirement

FEATURES:

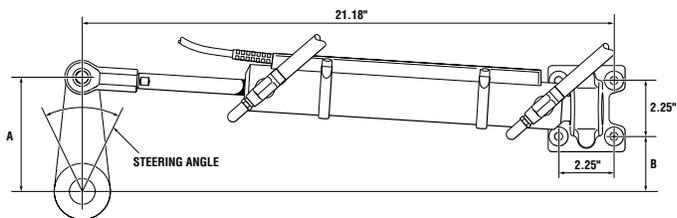
- Up to two helms stations
- Automatic battery management with sensing, warnings & best battery selection
- On demand hydraulic steering pump minimizing power consumption
- No oil at the helm
- Rugged electronics for 12 or 24 VDC applications
- Color dash display showing rudder command and rudder position graphic
- Displays system health
- Display provides system setup interface
- Communicates faults and any special handling instructions to the operator
- Simple software updating via USB port
- Programmable number of turns lock to lock with speed
- Auto-adjusting steering end stops and resistance with speed
- Dual redundant position sensing on all moving components
- Helm offers both 3/4" taper or 1" straight shaft options
- Utilizes fault tolerant CAN network
- Full autopilot CANbus connectivity and integration. No additional pumps or sensors required
- Adjustable max rudder hard over angle with speed range 25° to 40° Center to hard over
- Position proportional rudder gain for faster steering response near neutral rudder position
- RPM input: NMEA 2000, J1939 or analog pulse compatible
- Pump features an Integrated service/bypass valve allows a limp home mode
- Meets or exceeds ABYC, CE, ISO and SAE electrical and environmental requirements

MOUNTING CONFIGURATIONS & SYSTEM SCHEMATIC

While using the table below be sure that your steering cylinder is at mid-stroke as shown in the figure right to ensure the cylinder operates correctly.

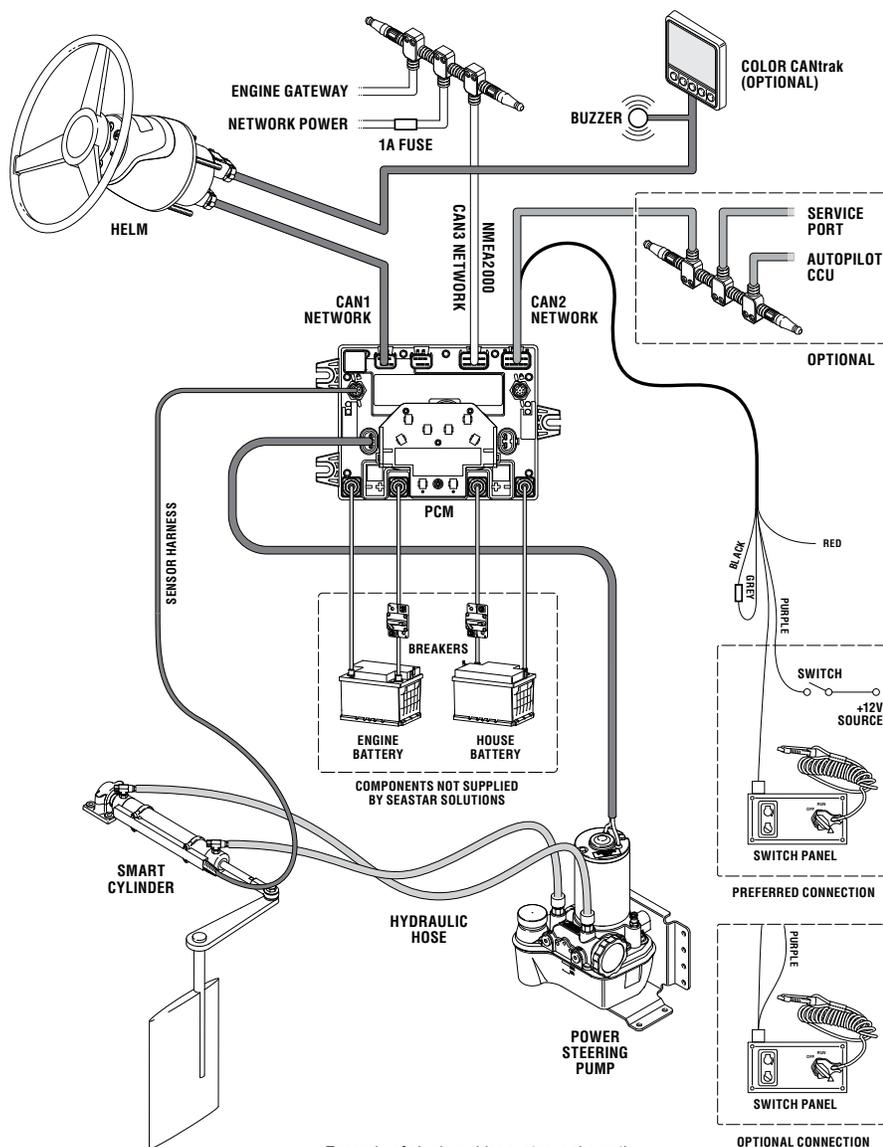


Attachment to Tiller Arm, recommended per ABYC.



Model EC5380			
STEERING ANGLES			
50°		60°	
A	B	A	B
8.33"	6.43"	7.04"	4.98"
11,004 in-lbs		8,887 in-lbs	

STEERING ANGLES			
70°		80°	
A	B	A	B
6.14"	3.91"	5.48"	3.07"
7,328 in-lbs		6,115 in-lbs	



Example of single rudder system schematic.



INBOARD YACHTS 30-50 FEET RANGE

APPLICATIONS

Electronic Power Steering (EPS) system suitable for vessels from approximately 30 ft to 50 ft* with single or dual rudders.



EM1200
PCM



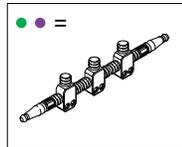
ED1700
Color
CANtrak



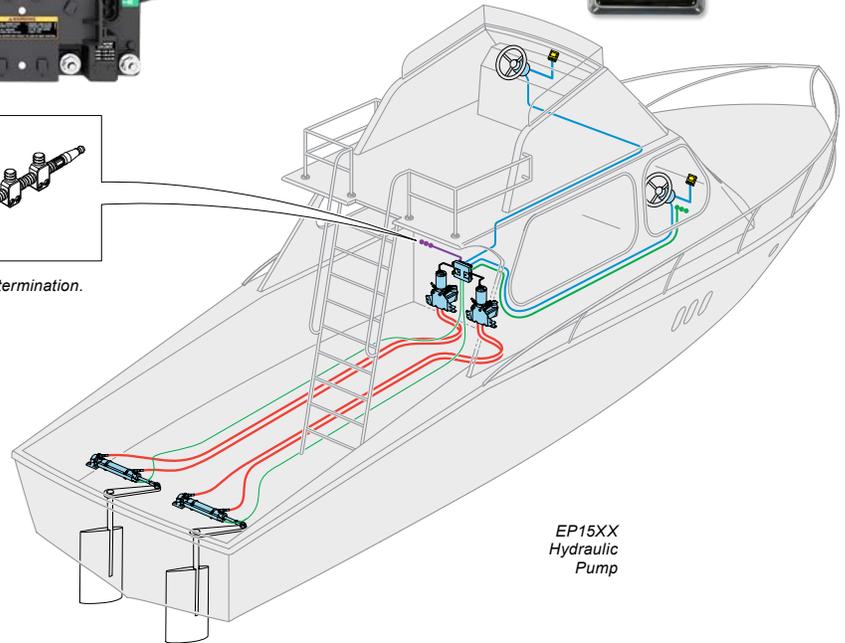
EH1512 Electronic Helm
Front mount 3/4" taper shaft shown
5 other options inc. 1" straight
shaft available



EC5380
Steering Cylinder



CAN Tee's termination.



EP15XX
Hydraulic
Pump

* Subject to submission of survey form and rudder load calculation.

ENVIRONMENTAL

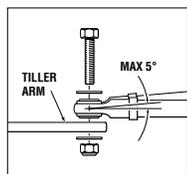
- Operating temperature: -18°C to +77°C [ISO 25197]
- Storage temperature: -40°C to +85°C [ISO 25197]
- Corrosion resistance: 300 hours salt spray [ASTM B117]
- Water ingress protection: IPX7 [IEC 60529]
- Random vibration: 0.0284 g²/Hz [ABYC P-27]
- Resonant vibration: 4 G zero-peak, 20-2000 Hz [ABYC P-27]
- Mechanical shock: 50 G, 11 m-sec half-sine shape [ISO 25197]
- Ignition protection: SAEJ-1171
- Meets EN60945 electromagnetic compatibility requirement

FEATURES

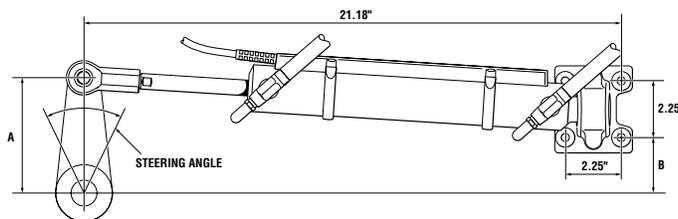
- Up to two helms stations
- Automatic battery management with sensing, warnings & best battery selection
- On demand hydraulic steering pump minimizing power consumption
- No oil at the helm
- Rugged electronics for 12 or 24 VDC applications
- Color dash display showing rudder command and rudder position graphic
- Displays system health
- Display provides system setup interface
- Communicates faults and any special handling instructions to the operator
- No requirement for tie-bars depending on rudder loads.
- Simple software updating via USB port
- Programmable number of turns lock to lock with speed
- Auto-adjusting steering end stops and resistance with speed
- Dual redundant position sensing on all moving components
- Helm offers both 3/4" taper or 1" straight shaft options
- Utilizes fault tolerant CAN network
- Full autopilot CANbus connectivity and integration. No additional pumps or sensors required
- Adjustable max rudder hard over angle with speed range 25° to 40° Center to hard over
- Rudder toe in or out up to 5° with speed
- Position proportional rudder gain for faster steering response near neutral rudder position
- RPM input: NMEA 2000, J1939 or analog pulse compatible
- Pump features an Integrated service/bypass valve allows a limp home mode
- Meets or exceeds ABYC, CE, ISO and SAE electrical and environmental requirements

MOUNTING CONFIGURATIONS & SYSTEM SCHEMATIC

While using the table below be sure that your steering cylinder is at mid-stroke as shown in the figure right to ensure the cylinder operates correctly.

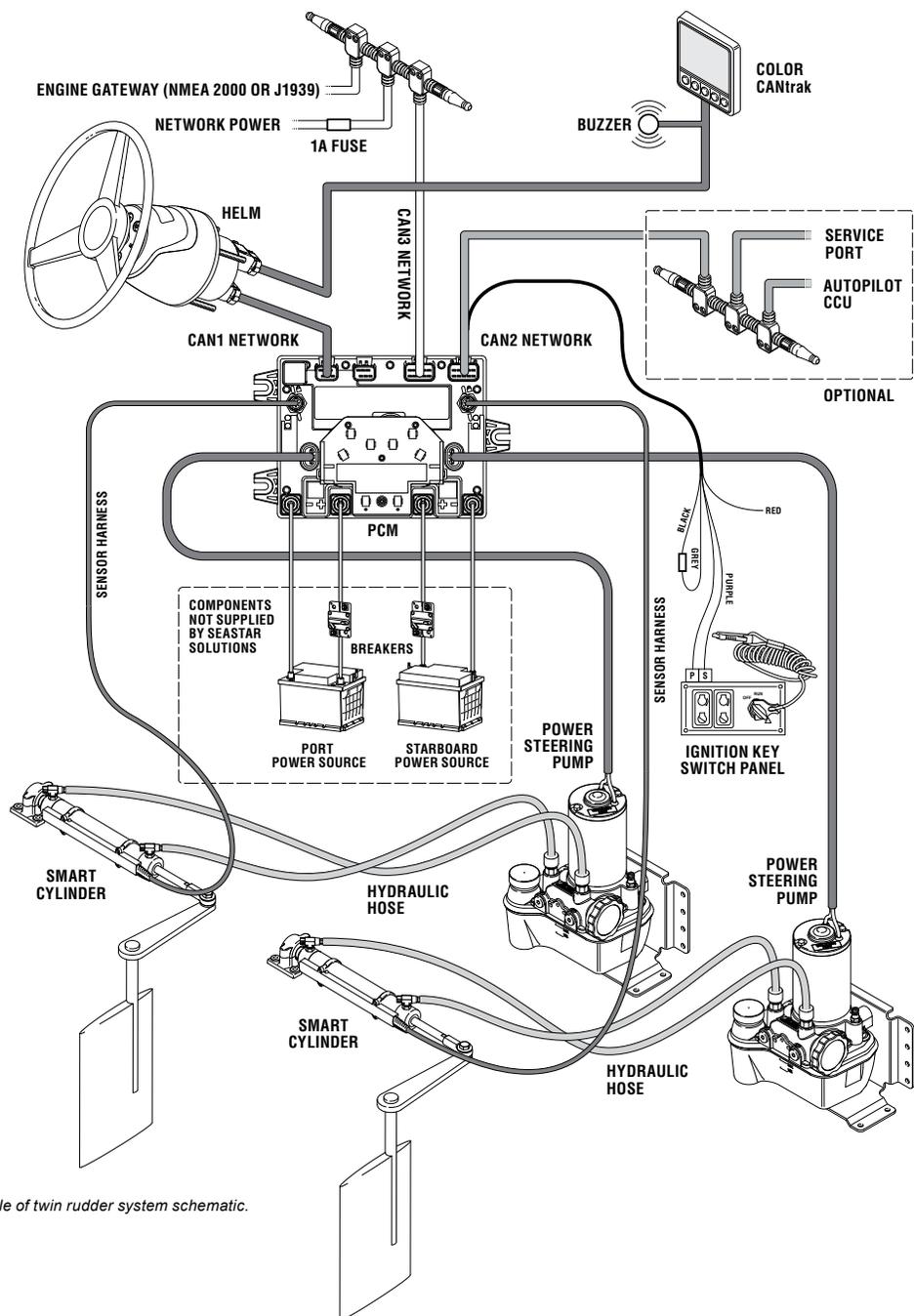


Attachment to Tiller Arm, recommended per ABYC.



Model EC5380			
STEERING ANGLES			
50°		60°	
A	B	A	B
8.33"	6.43"	7.04"	4.98"
11,004 in-lbs*		8,887 in-lbs*	
STEERING ANGLES			
70°		80°	
A	B	A	B
6.14"	3.91"	5.48"	3.07"
7,328 in-lbs*		6,115 in-lbs*	

* Torque shown is per cylinder.
Example: two cylinders at 60° steering angle will give a combined total of 17,774 in-lbs of torque.



Example of twin rudder system schematic.

OPTIMUS EPS
5000 SERIES

YACHTS 55-100 FEET RANGE

APPLICATIONS

Electronic Power Steering (EPS) system suitable for vessels from approximately 55 ft to 100 ft * with single or dual rudders.



EH1512 Electronic Helm
Front mount 3/4" taper shaft shown
5 other options inc. 1" straight shaft available



EG5810
Steering Cylinder

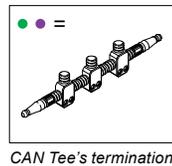
* Subject to submission of survey form and rudder load calculation.



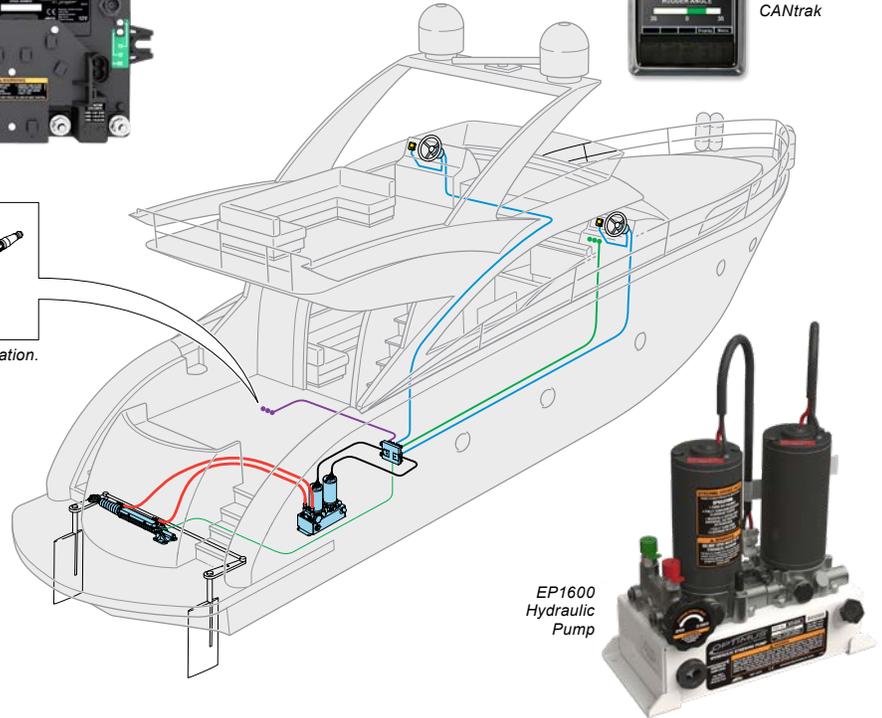
EM1200
PCM



ED1700
Color
CANtrak



CAN Tee's termination.



EP1600
Hydraulic
Pump

ENVIRONMENTAL

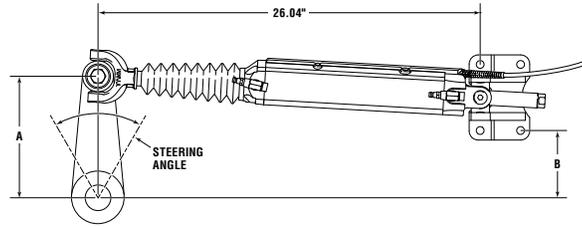
- Operating temperature: -18°C to +77°C [ISO 25197]
- Storage temperature: -40°C to +85°C [ISO 25197]
- Corrosion resistance: 300 hours salt spray [ASTM B117]
- Water ingress protection: IPX7 [IEC 60529]
- Random vibration: 0.0284 g²/Hz [ABYC P-27]
- Resonant vibration: 4 G zero-peak, 20-2000 Hz [ABYC P-27]
- Mechanical shock: 50 G, 11 m-sec half-sine shape [ISO 25197]
- Ignition protection: SAEJ-1171
- Meets EN60945 electromagnetic compatibility requirement

FEATURES

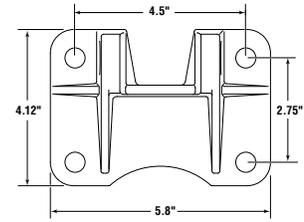
- Up to three helms stations
- Automatic battery management with sensing, warnings & best battery selection
- On demand hydraulic steering pump minimizing power consumption
- No oil at the helm
- Rugged electronics for 24 VDC applications
- Color dash display showing rudder command and rudder position graphic
- Displays system health
- Display provides system setup interface
- Communicates faults and any special handling instructions to the operator
- Simple software updating via USB port
- Programmable number of turns lock to lock with speed
- Auto-adjusting steering end stops and resistance with speed
- Dual redundant position sensing on all moving components
- Helm offers both 3/4" taper or 1" straight shaft options
- Utilizes fault tolerant CAN network
- Full autopilot CANbus connectivity and integration. No additional pumps or sensors required
- Adjustable max rudder hard over angle with speed range 25° to 40° Center to hard over
- Position proportional rudder gain for faster steering response near neutral rudder position
- RPM input: NMEA 2000, J1939 or analog pulse compatible
- Pump features an Integrated service/bypass valve allows a limp home mode
- Meets or exceeds ABYC, CE, ISO and SAE electrical and environmental requirements

MOUNTING CONFIGURATIONS & SYSTEM SCHEMATIC

While using the table below be sure that your steering cylinder is at mid-stroke as shown in the figure right to ensure the cylinder operates correctly.

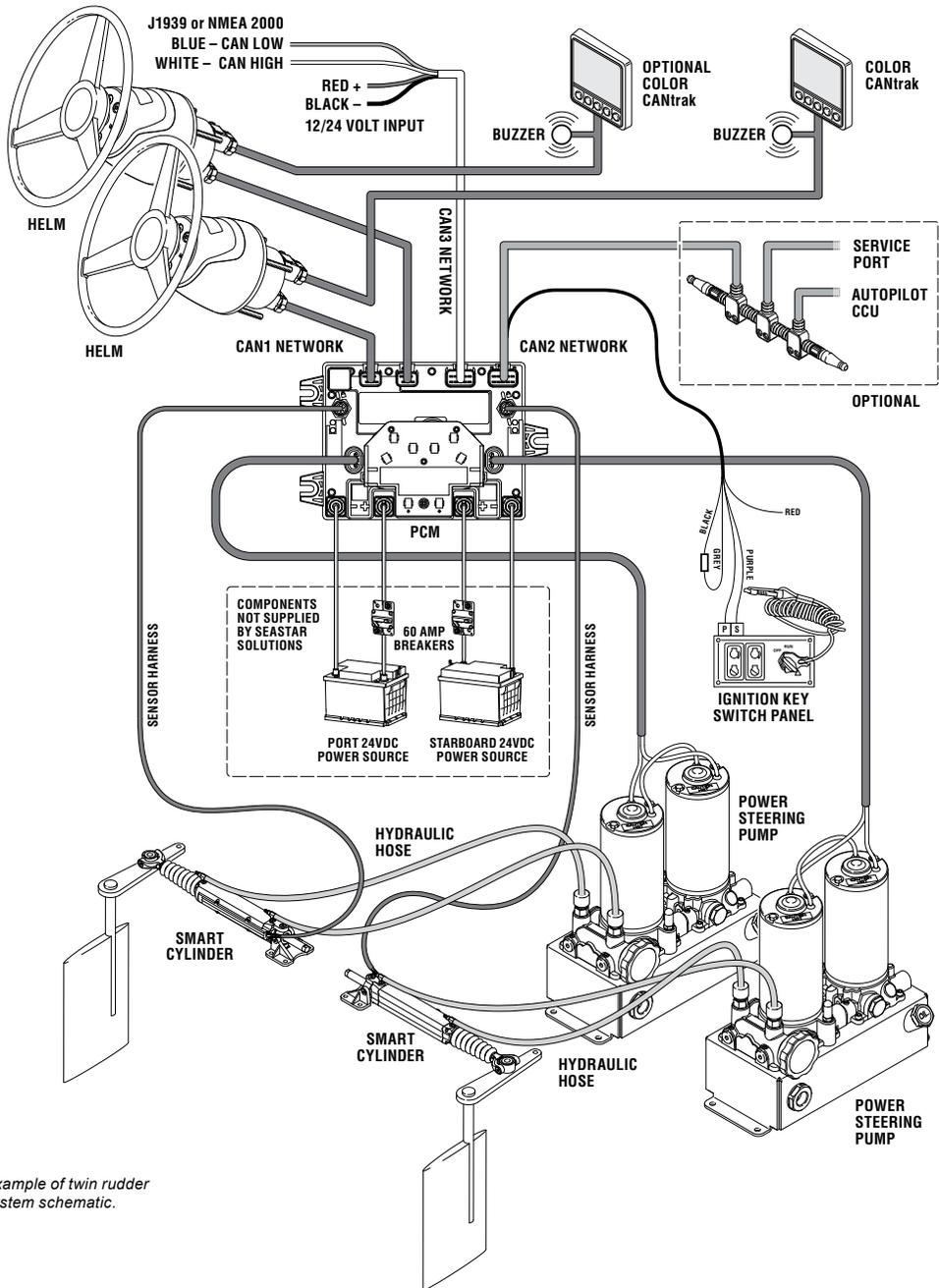


Cylinder at mid-stroke.



Mounting foot.

Model EC5810			
STEERING ANGLES			
50°		60°	
A	B	A	B
11.27"	7.96"	9.50"	5.98"
56,300 in-lbs		45,400 in-lbs	
STEERING ANGLES			
70°		80°	
A	B	A	B
8.25"	4.50"	7.40"	3.41"
37,400 in-lbs		31,200 in-lbs	



Example of twin rudder system schematic.

which outboard steering system?

As specialists in the art of steering, SeaStar Solutions takes the recommendation of steering systems very seriously especially as modern outboard engines become more powerful. Unlike other steering manufacturers we prefer to make systems recommendations based on "optimum comfort" and safety.

NOTE: Some high performance boats/engine combinations develop instability at high speed. Instability becomes more prevalent in boats faster than 50 MPH. Dual-cable steering or SeaStar PRO systems are recommended by SeaStar Solutions and engine manufacturers for these boats. **IMPORTANT:** No FeedBack Steering **MUST NOT** be used in dual station, power-assisted, or autopilot installations! (Mechanical Systems Only)

Please use these guides to assist in making your selection, but remember that the recommendations are general in nature. Any boat/steering system combination should be water-tested by the installer to ensure safe and dependable steering. Displacement hulls do react differently than planing hulls. As a result, the type of hull on the boat, as well as the horsepower, may affect steering system selection. If in doubt, please contact SeaStar Solutions Technical Service for assistance.

step 1

MECHANICAL systems

- * Affordable
- * Simple installation
- * Fixed number of turns lock-to-lock

HYDRAULIC systems

- * Superior feel
- * Ideal for higher torque applications
- * Reduces driver fatigue
- * Flexible number of turns lock-to-lock

HH4314-3



HH5271-3



step 2

MECHANICAL ROTARY

Compact housing allows installation where behind dash space is limited.

MECHANICAL RACK

More efficient than Mechanical Rotary steering, Rack helms require more mounting space side to side behind dash.

step 3

ROTARY - NO FEED BACK



For more comfort and control, NFB steering locks out load created by propeller torque. NFB is recommended as replacement steering for all non-power assisted outboards. Replacement for original helm as specified by the boat manufacturer.



RACK - NO FEED BACK



For more comfort and control, NFB steering locks out load created by propeller torque. NFB is recommended as replacement steering for all non-power assisted outboards. Replacement for original helm as specified by the boat manufacturer.



BAYSTAR

The latest edition to the SeaStar family featuring the same trademark "pivot" design seen in the world renowned SeaStar outboard cylinder.



SEASTAR

The most popular hydraulic cylinder in the world, featuring a unique "pivot" design that ensures optimum efficiency in all applications (SINGLE or MULTIPLE) engine.



SEASTAR PRO

Featuring the patented design SeaStar Pro helm, for use with high torque SINGLE outboard applications such as high performance bass boats.



SEASTAR POWER ASSIST

Designed for use with SeaStar hydraulic cylinders, dramatically reducing steering effort in heavy/high torque applications. The Pro version is specifically designed for high torque SINGLE outboard applications such as high performance bass boats.



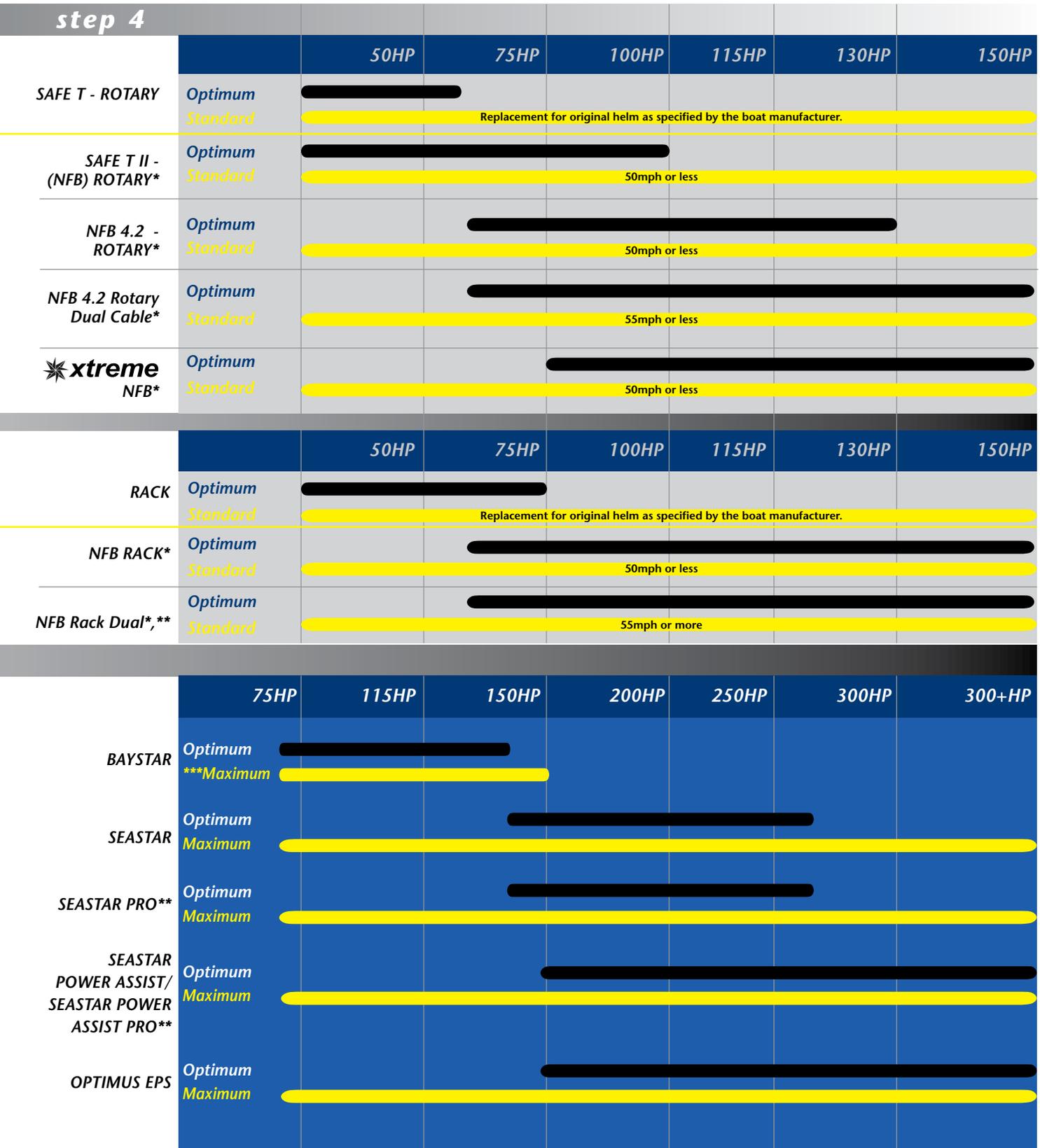


Chart based on "optimum comfort"

* Not suitable for boats with power steering or autopilots

** Ideal for bass boats that exceed 60mph

*** High performance engines should use SeaStar Steering

which inboard steering system?

step 1

MECHANICAL systems

- * Affordable
- * Simple installation
- * Fixed number of turns lock-to-lock

step 2

MECHANICAL ROTARY

Compact housing allows installation where behind dash space is limited.



MECHANICAL RACK

More efficient than Mechanical Rotary steering, Rack helms require more mounting space side to side behind dash.



HYDRAULIC systems

- * Superior feel
- * Ideal for higher torque applications
- * Reduces driver fatigue
- * Variable number of turns lock-to-lock is dependent on helm/cylinder selection
- * Easy to add autopilot

BOAT LENGTH	PLANNING HULLS 				DISPLACEMENT HULLS 				SAIL	
	1 Engine		2 Engines		1 Engine		2 Engines		1 Engine	
	Pleasure	Work	Pleasure	Work	Pleasure	Work	Pleasure	Work	Pleasure	Work
26ft (8m)	1	4	1	4	2	4	2	4	4	4
32ft (10m)	2	4	1	4	3	4	3	4	4	4
38ft (11.5m)	3	5	2	5	5	5	3	5	4	5
44ft (13.5m)	5	-	3	5	-	-	5	-	5	-
50ft (15m)	-	-	5	-	-	-	-	-	-	-

Choose a system using the chart above



1	Cylinder	QTY 1	HC5312-3
	Helm (4 Turns)	QTY 1	HH5271-3
	Nylon Tubing 3/8"	As Req'd	HT5100
	Oil 1 liter	QTY 2	HA5430
2	Cylinder	QTY 1	HC5313-3
	Helm (5 Turns)	QTY 1	HH5271-3
	Nylon Tubing 3/8"	As Req'd	HT5100
	Oil 1 liter	QTY 2	HA5430
3	Cylinder	QTY 1	HC5314-3
	Helm (6 Turns)	QTY 1	HH5271-3
	Nylon Tubing 3/8"	As Req'd	HT5100
	Oil 1 liter	QTY 2	HA5430
4	Cylinder	QTY 1	HC5318
	Helm (4.25 Turns)	QTY 1	HH5272-3
	Copper Tubing 3/8"	As Req'd	NA
	Oil 1 liter	QTY 2	HA5430
5	Cylinder	QTY 1	HC5319
	Helm (5.5 Turns)	QTY 1	HH5272-3
	Copper Tubing 3/8"	As Req'd	NA
	Oil 1 liter	QTY 1	HA5430

SeaStar Solutions recommend that all steering applications are validated by a qualified SeaStar Solutions dealer/installer.

BIG-T STEERING COMPONENTS (Single/Dual):	
Big-T Helm	SH5000P
Big-T (QC Cable & Helm Converter)	SSC62xx SA27620P
Big-T Cable (Dual Station)	SSC81AxxBxx†
Bezel 2-pc. Black (90°/20° mount)	SB27265P

SAFE T STEERING KIT SS137xx comprising:	
Safe T Helm	SH5094-1P
QC Cable	SSC62xx
Rotary Bezel (90°)	SB27484P

RACK STEERING KIT SS141xx comprising:	
Back Mount Rack Helm (single/dual)	SH5210P
Back Mount Bezel (90°)	SB39526P
Back Mount Rack Single Cable	SSC134xx



OPTIONS

TILT MECHANISMS		
Sport	Flexible Rubber Bellows	SH91800P*
Sport	Flexible Rubber Bellows	SH91810P* •
Sport Plus	Solid Round Cover	SH91900P*
Sport Plus	Solid Round Cover	SH91910P* •

* Mechanical Tilt mechanism only - select helm type from lists below

ROTARY TILT HELMS		RACK TILT HELMS	
Safe T-QC Tilt Helm	SH91523-1P	Rack Tilt Helm	SH91610P

Note:
† Dual station requires purchase of special cable. See preceding page for Big-T single station steering.

• Tilt mechanisms with splined steering wheel shafts.

OPTIONS

SELECTABLE OPTIONS/VARIABLES
1 - Use an alternative helm to increase or reduce number of turns lock-to-lock
2 - Reduce or increase wheel torque (larger capacity helm will reduce number of turns and increase torque)
3 - Gain the advantages of a Tilt function Select from 3 different styles
4 - Mount the helm behind the dash (various back mount helm options also available)
5 - Multi Station or Autopilots require HF6010 "add station kit"



SPORT
SH91800P



SPORT PLUS
SH91900P



CLASSIC
HH6541

Hydraulic
Only

which sterndrive steering system?

step 1

MECHANICAL systems

- * Affordable
- * Simple installation
- * Fixed number of turns lock-to-lock

HYDRAULIC systems

- * Superior feel
- * Ideal for higher torque applications
- * Reduces driver fatigue
- * Flexible number of turns lock-to-lock
- * Easy to add autopilot

step 2

MECHANICAL ROTARY

Compact housing allows installation where behind dash space is limited.



MECHANICAL RACK

More efficient than Mechanical Rotary steering, Rack helms require more mounting space side to side behind dash.



To choose a cylinder use the chart below

Engine Maker/ Brand	Steering Config	Engine Drive/ Model	Year	CYLINDER USED	
				Model	Part No.
MERCUISER	Non Power	MerCruiser I	1983 Prior	BA125-8EMV	HC5330-3
	Non Power	Alpha I	1984 To Date	BA135-7EM	HC5332
	Non Power	Bravo I, II, III	1984 To Date	BA135-7EM	HC5332
	Power Assist	MerCruiser I	To 1983	125-8EM	HC5328-3
	Power Assist	Alpha I	1984 To Date	125-8EM	HC5328-3
	Power Assist	Bravo I, II	1984 To Date	125-8EM	HC5328-3
	Power Assist	Bravo III	1984 To Date	125-8EM	HC5328-3
OMC	Non Power	400/800 series	1985 & Prior	N/A	N/A
	Non Power	Cobra	1986 To Date	BA150-7EM	HC5326-3
	Non Power	King Cobra	1986 To Date	BA150-7EM	HC5326-3
	Power Assist	400/800 series	1985 & Prior	N/A	N/A
	Power Assist	Cobra	1986 To Date	125-8EM	HC5328-3
	Power Assist	King Cobra	1986 To Date	125-8EM	HC5328-3
VOLVO	Non Power	275	To Date	BA150-7ATM	HC5314-3
	Non Power	280,290	To Date	BA135-7EM	HC5332
	Non Power	Diesel	To Date	BA135-7EM	HC5332
	Power Assist	275	To Date	N/A	N/A
	Power Assist	280, 290	To Date	125-8EM	HC5328-3
	Power Assist	Diesel	To Date	125-8VEM	HC5329-3
	Power Assist	32, Diesel	1997 To Date	92-VPS	HC5331-3
	Power Assist	41-42, Diesel	1992 To Date	92-VPS	HC5331-3
	Power Assist	DPS & SX	1996 To Date	92-VPS	HC5331-3

SeaStar Solutions recommends that all steering applications are validated by a qualified SeaStar Solutions dealer/installer.



step 3

HPS ROTARY COMPONENTS:

HPS Rotary Helm	SH5180P
HPS Rotary Cable (QC interface)	SSC62XX
Bezel (90°)	SB27484P

SAFE T STEERING KIT SS137xx comprising:

Safe T Helm	SH5094-1P
QC Cable	SSC62XX
Rotary Bezel (90°)	SB27484P

RACK STEERING KIT SS141xx comprising:

Back-Mount Rack Helm (single/dual)	SH5210P
Back-Mount Bezel (90°)	SB39526P
Back-Mount Rack Single Cable	SSC134XX

BIG-T COMPONENTS:

Big-T Helm	SH5000P
Bezel	SB27265P
Cable	SSC62XX
Helm Converter	SA27620P



OPTIONS

TILT MECHANISMS

Sport	Flexible Rubber Bellows	SH91800P*
Sport	Flexible Rubber Bellows	SH91810P* •
Sport Plus	Solid Round Cover	SH91900P*
Sport Plus	Solid Round Cover	SH91910P* •

* Mechanical Tilt mechanism only - select helm type from lists below

ROTARY TILT HELMS

Safe T-QC Tilt Helm	SH91523-1P
HPS Tilt	SH91650P

RACK TILT HELMS

Rack Tilt Helm	SH91610P
----------------	----------

Note:

- Tilt mechanisms with splined steering wheel shafts.

Choose a helm

NUMBER OF WHEEL TURNS	
HH5271 Front mount Helm	HH5272 Front mount Helm
4.9	N/A
5.0	3.5
5.0	3.5
4.9/5.8	3.4/4.1
4.9/5.8	3.4/4.1
4.9/5.8	3.4/4.1
4.9/5.8	3.4/4.1
N/A	N/A
6.0	N/A
6.0	N/A
N/A	N/A
4.9/5.8	3.4/4.1
4.9/5.8	3.4/4.1
6.0	N/A
5.0	3.5
5.0	3.5
N/A	N/A
4.8/5.8	3.4/4.1
4.9/5.8	3.4/4.1
4.8/5.5	3.4/4.1
4.8/5.8	3.4/4.1
4.9/5.5	3.4/4.1

OPTIONS

ALTERNATIVE HELMS

- 1 - Use an alternative helm to increase or reduce number of turns lock-to-lock
- 2 - Reduce or increase wheel torque (larger capacity helm will reduce number of turns and increase torque)
- 3 - Gain the advantages of a Tilt function Select from 3 different styles
- 4 - Mount the helm behind the dash (various back-mount helm options also available)



Hydraulic Only

HCS330-3



HCS331-3



HHS271-3





NEW SEALING SYSTEM

State of the art proprietary seal material similar to Tournament 2 cylinder.

- High wear resistance extended life.
- Resistant to compression set and improved contact for better sealing.
- 8 pin wrench holes, making it easier to service.

NEW LOOK

- Updated styling & branding
- Robust barrel

ORB FITTINGS

- Adjustable stainless steel O-ring seal (ORB) fittings for easier installation.

HC5345-3 FEATURES:

- Independent engine tilt for twin/triple engine installations
- Easy steering
- Suitable for use with all SeaStar Helms & SeaStar Power Assist
- Varying lock-to-lock turn ratio, dependant on helm selection
- State of the art proprietary sealing system
- Grease fittings on cylinder support bracket for easy maintenance



HA5521



WE RECOMMEND

The use of SeaStar Steering Fluid ONLY in our hydraulic steering systems.
See Page 144

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COMPLETE SYSTEMS

BayStar Steering Kit (20' tubing run)	HK4200A-3
BayStar Steering Kit (30' tubing run)	HK4230A-3
BayStar Steering Kit (Without tube)	HK4300A-3
BayStar Plus Steering Kit (Without tube)	HK4500A-3

COMPONENTS

BayStar 1.4 Front Mount Helm	HH4314-3
BayStar Compact Cylinder	HC4645H
BayStar Compact Cylinder	HC4647H
BayStar Compact Cylinder	HC4648H
BayStar Compact Cylinder	HC4658H
HK4200 Tubing (2 x 20' lengths)	HT4420H
HK4230 Tubing (2 x 30' lengths)	HT4430H
SeaStar Oil (1 Quart)	HA5430 (x2)
BayStar Filler Kit (Ships with Steering Kit)	HA5438

OPTIONS

BayStar 1.1 - Front Mount Helm	HH4311-3
BayStar 1.4 - Sport Tilt Helm	HH4315-3
BayStar Plus Tilt	HH4316-3

SERVICE ITEMS

Helm Service Kit Comes with wheel shaft nut, key, shaft seal & seal plate	HP6032
Cylinder Support Rod Kit (ships with 2 rods, nut and clip)	HP6050
Cylinder Tee/Bleeder Fitting	HF4202
Cylinder Tiller Bushing Kit	HA5820

NOTE: SeaStar Outboard Steering hoses (Part No. HO51xx) can be used to plumb a BayStar Steering Systems

BAYSTAR STEERING KIT:

With mechanical steering you sacrifice a degree of comfort. Traditional hydraulic systems may be more than is needed on lower horsepower outboard engines. Built in the tradition of SeaStar, BayStar brings the same efficiency and durability you would expect from SeaStar Solutions Hydraulic steering to smaller outboards up to 150 HP. Compact form and affordable price make it an ideal upgrade for mechanically steered boats up to 150 total HP.

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 is not intended for high speed, high performance type boats, such as Bass Boats.

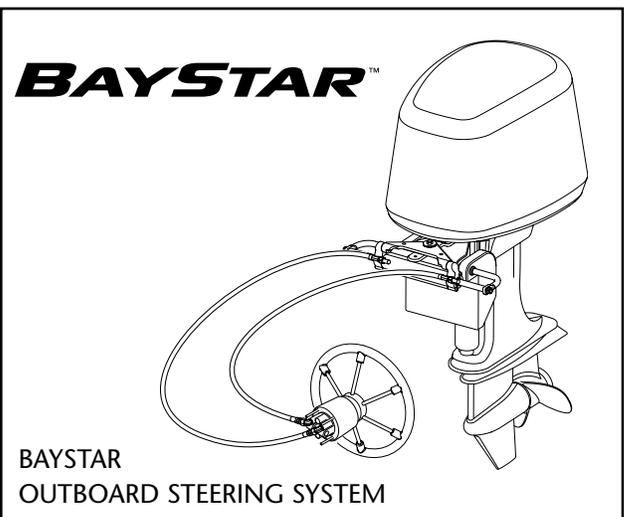
FEATURES:

- Designed just for smaller outboards.
- Low friction hydraulic steering system.
- 5 turns from lock-to-lock.
- Balanced cylinder, featuring a compact design that fits most splashwells and 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.



WE RECOMMEND

The use of SeaStar Steering Fluid ONLY in our hydraulic steering systems. See Page 144



BAYSTAR
OUTBOARD STEERING SYSTEM

BAYSTAR SINGLE ENGINE APPLICATION GUIDE: CYLINDERS (HC4645H/47H/48H/58H)

ENGINE MAKER/ BRAND	YEAR	MODEL	CYLINDER PART NUMBER	NOTES
HONDA	1992–DATE	30–90 HP	HC4645H	
	2001–DATE	150 HP	HC4645H	SEE NOTE 5
	2003–DATE	BF135 HP	HC4645H	
JOHNSON / EVINRUDE <small>Note: Johnson 115 HP 2-stroke engines require that the cylinder's pivot be flipped. See note #4 below.</small>	1991–DATE	40–150 HP	HC4645H	
	1997–DATE	115 HP FICHT	HC4658H	SEE NOTE 4
	1997–DATE	75–150 HP FICHT	HC4645H	SEE NOTE 5
	1998–DATE	40–140 HP 4-STROKE	HC4658H	SEE NOTES 1, 4
MERCURY/MARINER	1984–DATE	75–150 HP	HC4645H	SEE NOTE 5
	1998–DATE	40-60 HP	HC4648H	SEE NOTE 1
SUZUKI	1986–DATE	150 HP	HC4645H	SEE NOTE 5
	1996 ONLY	115–140 HP	N/A	
	1987–2002	115–140 HP	HC4645H	SEE NOTE 1
	1990–2000	90–100 HP	HC4645H	
	1998–DATE	40–70 4-STROKE	HC4645H	SEE NOTE 1
	2001–DATE	115–140 HP 4-STROKE	HC4658H	SEE NOTES 1, 4
TOHATSU	1990–DATE	40–140 HP	HC4645H	
YAMAHA	1998–DATE	40–50 HP	HC4645H	SEE NOTE 2
	1998–DATE	60 HP	HC4645H	SEE NOTE 3
	1986–DATE	70–90 HP	HC4645H	SEE NOTE 1
	1997–DATE	80–150 HP 4-STROKE	HC4645H	
	2000–DATE	25–70 HP 4-STROKE	HC4648H	SEE NOTE 1
	2010–DATE	115A & B	HC4648H	

NOTES:

- Requires Spacer Kit Part No. [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 No. 63D-48511-00-4D must be installed.
- Cylinder [HC4645H](#) may be used in these applications. The pivot plate will need to be flipped before installation. Instructions provided with Owner's Manual.
- High performance 150HP engines should use SeaStar.

*BAYSTAR CYLINDER PIVOT PLATES:

[HC4645H](#) compact cylinder is included in the BayStar steering kits. This cylinder can be converted to [HC4658H](#) by following instructions included with the product. If your engine requires use of a cylinder other than [HC4645H](#) or [HC4658H](#), please refer to the figure below for the appropriate replacement pivot plate, which must be purchased separately. NOTE: read and understand all related product instructions before performing any work on a hydraulic steering system.



HA4641
(Install onto [HC4645H](#) to make [HC4647H](#))



HA4642
(Install onto [HC4645H](#) to make [HC4648H](#))

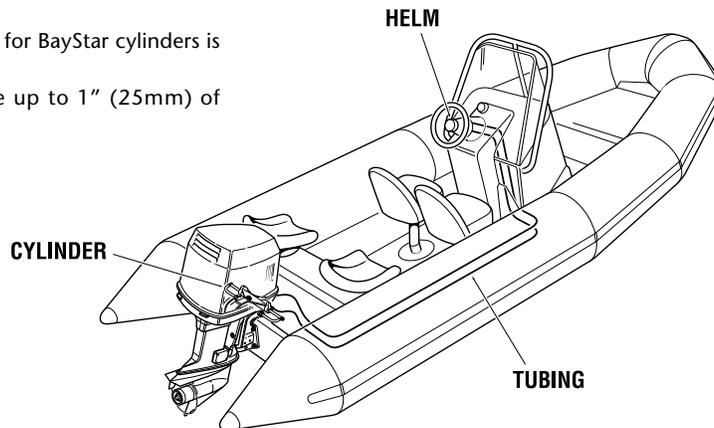
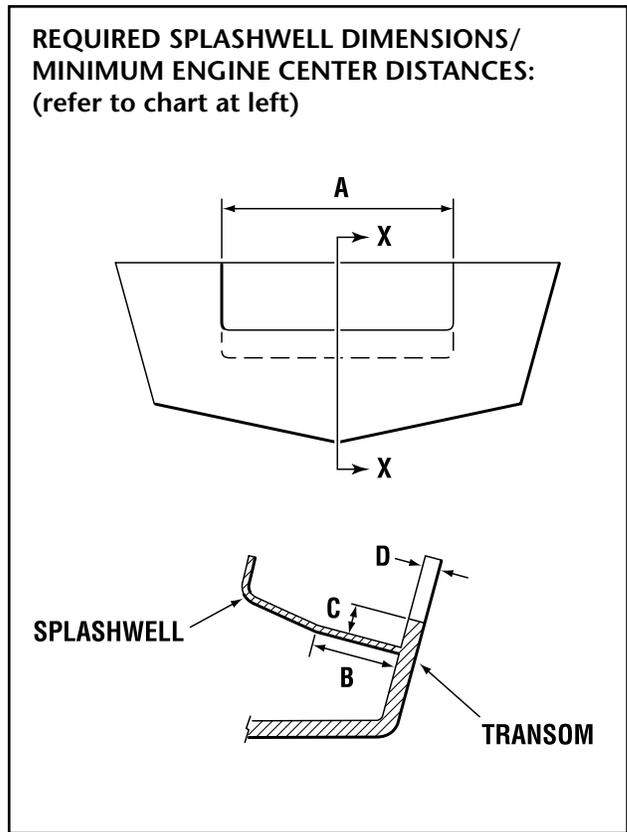
SPLASHWELL SIZE REQUIREMENTS:

CYL MODEL NO.	NO. OF ENG.	SPLASHWELL DIAG. DIM.			MINIMUM ENGINE CENTER DISTANCE
		A	B	C	
HC4645H	1	21" (534 mm)	6" (153 mm)	5" (127 mm)	N/A
HC4647H	1	21" (534 mm)	6" (153 mm)	5" (127 mm)	N/A
HC4648H	1	21" (534 mm)	6" (153 mm)	5" (127 mm)	N/A
HC4658H	1	21" (534 mm)	6" (153 mm)	5" (127 mm)	N/A

(Twin engine applications not available at this time.)

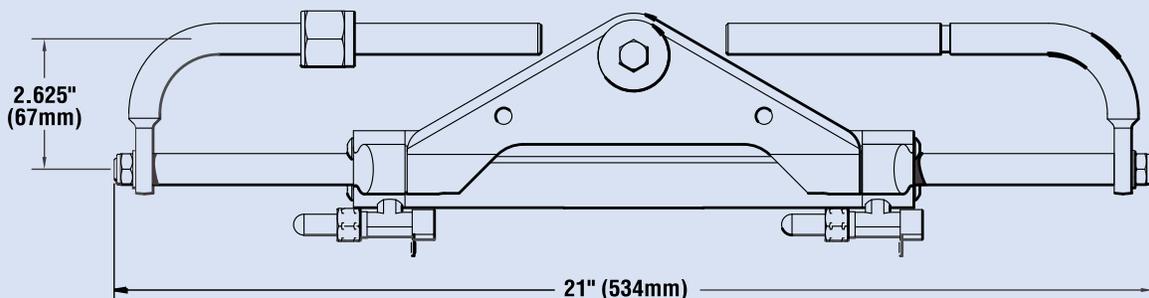
NOTES:

1. Ensure there is no interference between the BayStar cylinder rod and the splashwell boot or engine controls & cables.
2. Dimensional restrictions also apply to external motor mount brackets.
3. Ensure dimension "A" can be maintained at 32" (813mm) throughout the full trim/tilt range.
4. Maximum allowable transom thickness for BayStar cylinders is 3" (76mm).
5. Engines less than 70 HP may require up to 1" (25mm) of additional splashwell clearance.



BAYSTAR CYLINDER DIMENSIONS:

HC4645H/HC4647H/HC4648H/HC4658H



FRONT MOUNT OUTBOARD INSTALLATION RECOMMENDATIONS

Outboard recommendations made in this section are based on our experience with typical installations, applications and usage. Ensure you select the system which provides the best comfort versus performance. It is the boat manufacturer and the installer's responsibility to ensure the components selected are sufficiently validated on the boat for safe and acceptable operation. DO NOT use SeaStar Solutions Steering in applications they are not intended for.

ENGINE	SEASTAR TOURNAMENT SERIES (Aggressive Use - See Note 1 - Refer to Page 55)	SEASTAR FRONT MOUNT (Normal Use - Refer to Page 135)	HYNAUTIC K-6 (Normal Use ONLY)
SINGLE ENGINE	SINGLE CYLINDER 350 HP Max HC63XX-3 Pro Cylinder Page 135 (See Notes 2 & 3) or HC6845S (See Page 55)	SINGLE CYLINDER 350 HP Max 75 MPH Max HC53XX-3 Cylinder (See Note 2)	SINGLE CYLINDER 300 HP Max 55 MPH Max
DUAL ENGINE NON COUNTER ROTATING	SINGLE CYLINDER Tournament Cylinders (See Page 55)	SINGLE CYLINDER 450 HP Max 55 MPH Max HC53XX-3 Cylinder H060XX Tie Bar	SINGLE CYLINDER 400 HP Max 55 MPH Max
	DUAL CYLINDER Tournament Cylinders (See Page 55)	DUAL CYLINDER 600 HP Max HC53XX-3 Cylinders H060XX Tie Bar	DUAL CYLINDER 500 HP Max 55 MPH Max
DUAL ENGINE COUNTER ROTATING	SINGLE CYLINDER Tournament Cylinders (See Page 55)	SINGLE CYLINDER 600 HP Max 55 MPH Max HC53XX-3 Cylinder H060XX Tie Bar	SINGLE CYLINDER 500 HP Max 55 MPH Max
	DUAL CYLINDER Tournament Cylinders (See Page 55)	DUAL CYLINDER 600 HP Max 55 MPH Max HC53XX-3 Cylinders H060XX Tie Bar	DUAL CYLINDER 500 HP Max 55 MPH Max
TRIPLE ENGINE ONE WITH COUNTER ROTATING	DUAL CYLINDER Tournament Cylinders (See Page 55)	DUAL CYLINDER 600 HP Max 55 MPH Max HC53XX-3 Cylinders H060XX Tie Bar *MAX center engine drop <.75"	NOT RECOMMENDED
	Consult SeaStar Solutions Technical Service	TRIPLE CYLINDER 900 HP Max 55 MPH Max HC53XX-3 Cylinders H060XX Tie Bar *MAX center engine drop <.75"	Consult SeaStar Solutions Technical Service
<p>1. SeaStar Solutions has specific steering equipment for boats that are driven aggressively, used in severe conditions or with more than 300 HP per engine.</p> <p>2. ALL ENGINES over 300 HP and all boats that are driven aggressively must use a high strength tiller bolt, kit part # HAS822. All front mount cylinders built after June 15, 2007 will have this high strength bolt included in the box. High strength tiller bolts can be identified by the marking "SEASTAR ARP" on the head of the bolt.</p>		<p>3. HC63xx PRO Cylinders are designed for all those critical high speed, single outboard engine boats, such as Bass, Flats combo Race/Ski and other performance orientated boats capable of speeds in excess of 65 mph. For optimal performance, the use of SeaStar PRO helms and PRO Hoses are recommended.</p>	



SEASTAR STEERING (FRONT MOUNT PIVOT CYLINDER) SYSTEM:

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 700 HP combined. It's the OEM Choice for center consoles, cruisers and more.

APPLICATIONS:

Single and dual non-power-assisted outboard engines up to 350 HP (700 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.

FEATURES:

- Patented steering lock valves.
- Low friction hydraulic steering system.
- 5 turns from lock-to-lock (single cylinder) when using 1.7 helms.
- 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.



WE RECOMMEND

The use of SeaStar Steering Fluid ONLY in our hydraulic steering systems. See Page 144

COMPLETE SYSTEMS

SeaStar 1.7 Steering Kit (with Hoses)	HK63XXA-3
SeaStar 1.7 Steering Kit (no Hoses)	HK6400A-3
SeaStar 1.7 Tilt Steering Kit (Classic)	HK6400TC-3
SeaStar 1.7 Tilt Steering Kit (Sport)	HK6400TS-3

COMPONENTS

SeaStar 1.7 - Front Mount Helm	HH5271-3
Pivot Mount Outboard Cylinder (Black)	HC5345-3/58-3
SeaStar Hose Kit (2 hoses) (Not included in HK6400A-3)	HO51xx
SeaStar Oil (1 Quart)	HA5430 (x2)

OPTIONS

SeaStar 1.7 - Front Mt. Commercial Helm	HH5217-3**
SeaStar 1.7 - Rear Mount Helm	HH5261-3
SeaStar 1.7 - Sport Tilt Helm	HH6191-3
SeaStar 1.7 - Classic Tilt Helm	HH6541-3
SeaStar 1.7 - Sport Plus Tilt Helm	HH6491-3
SeaStar 2.4 - Front Mount Helm	HH5272-3
SeaStar 2.4 - Front Mt. Commercial Helm	HH5224-3
SeaStar 2.4 - Sport Tilt Helm	HH6192-3
SeaStar 2.4 - Classic Tilt Helm	HH6542-3
Power Assist, 15' Harness	PA1200-2
Pivot Mount Cylinder (Silver)	HC53xxSIL
Pivot Mount Cylinder — PRO (Black)	HC63xx-3
Pivot Mt. Cylinder — PRO (Red)	HC63xxRED-3
SeaStar Round Bezel Kit	HA5478*
SeaStar Backplate Kit	HA5418
SeaStar 20° Dash Wedge Kit	HA5419
SeaStar Bulkhead Hose Kit (2 hoses)	HO81xx
SeaStar Twin Engine Tie Bar Kit	HO6xxx
Add-A-Station/Autopilot Fitting Kit	HF6007

SERVICE ITEMS

Pivot Cylinder Support Bracket Kit	HP6014
Pivot Cylinder Spacer Kit	HP6033
Pivot Cylinder Elbow Hose Fitting Kit (for -3 cylinders only)	HF6004
Pivot Cylinder Mounting Hardware Kit	HP6036
Pivot Cylinder Seal Kit	HS5157
Pivot Cylinder Tiller Bushing Kit	HA5820

* Helms dated 2008-Earlier use HA5417

**The Commercial Helm Pumps are designed with a stainless steel shaft and heavy duty shaft seal and wiper.



SEASTAR PRO STEERING (FRONT MOUNT CYLINDER) SYSTEM:

The ultimate steering for high speed single outboards, SeaStar PRO®, is designed for the high speed and performance of today's top-end bass boats. Recommended for single outboards up to 350 HP (even with jackplates and performance props), SeaStar PRO has steered the BASS Masters Classic® since 1994 and it's the choice of high performance outboard boatbuilders.

APPLICATIONS:

Seastar Pro is for high-performance boats with single non-power-assisted outboards up to 300 HP, especially those capable of speeds over 60 MPH, which demand maximum steering control and comfort. It is suitable for use with high-performance propellers and jack plates.

FEATURES:

- Patented steering lock valves.
- Low friction hydraulic steering system.
- 4.25 turns from lock-to-lock.
- Compact helm has only a 4-7/16" footprint — needs only 3" dash hole (Tilt requires larger hole).
- Optional PRO Cylinders with longer shaft bushings and larger pivot bushings for an even more solid feel!
- Optional hoses with through-bulkhead fittings; multiple helm mounting options
- Factory swaged hoses are Kevlar® reinforced.
- 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.

COMPLETE SYSTEMS	
SeaStar Pro Steering System, 14 Ft Pro Hoses	HK7514A-3
SeaStar Pro Steering System, 16 Ft Pro Hoses	HK7516A-3
SeaStar Pro Steering System, 18 Ft Pro Hoses	HK7518A-3
SeaStar Pro Steering System, 20 Ft Hoses	HK7520A-3
SeaStar Pro Steering System, 22 Ft Hoses	HK7522A-3
SeaStar Pro Steering System, 24 Ft Hoses	HK7524A-3
SeaStar Pro Steering System, No Hoses	HK7500A-3
COMPONENTS	
SeaStar PRO 2.0 - Front Mount Helm	HH5770-3
Pivot Mt. Cylinder — PRO (Black)	HC6345-3
SeaStar PRO Hose Kit (2 hoses)	HO57xx
SeaStar Oil (1 Quart)	HA5430 (x2)
OPTIONS	
SeaStar PRO 1.7 - Front Mount Helm	HH5779 -3
SeaStar PRO 2.0 - Sport Tilt Helm	HH6190-3
SeaStar PRO 2.0 - Classic Tilt Helm	HH6574-3
SeaStar PRO 2.4 - Front Mount	HH5772
Pro Power Assist	PA1315-2
Pivot Mount Cylinder (Silver)	HC6345SIL-3
SeaStar Round Bezel Kit	HA5478
SeaStar Backplate Kit	HA5418
SeaStar 20° Dash Wedge Kit	HA5419
PRO Bulkhead Hose Kit (2 hoses)	HO82xx
SERVICE ITEMS	
Helm Service Kit - Wheel Shaft Nut, Key, Shaft	HP6032
Seal & Seal Plate	
Keyed Support Rod	HP6111
Keyed Support Bracket	HP6101



WE RECOMMEND

The use of SeaStar Steering Fluid ONLY in our hydraulic steering systems. See Page 144

APPLICATION GUIDE

MFG	YEAR	MODEL	CYLINDER	NOTES
HONDA	1996-DATE	150-300HP	HC6345-3	NOT AVAILABLE FOR BF SERIES ENGINES.
JOHNSON/ EVINRUDE	1977-1990	150-300HP	N/A	
	2002-DATE	150-250HP 4-STROKE	HC6345-3	
	2003-DATE	150-300HP ETECH	HC6345-3	
	2005-DATE	E250HP VINDICATOR	N/A	
MERCURY	1989-DATE	150-300 2-STROKE, 4-STROKE AND XS ENGINES	HC6345-3	
SUZUKI	1986-DATE	150-250HP 2-STROKE, 4-STROKE	HC6345-3	INCLUDES ALL MODELS.
YAMAHA	1986-DATE	150-350HP 2-STROKE, 4-STROKE	HC6345-3	

ORDERING GUIDE

ENGINE/CYLINDER CONFIGURATION	COMPONENT DESCRIPTION	QTY. REQ'D	MODEL	PART NO.
SINGLE ENGINE (SINGLE CYLINDER) APPLICATIONS UP TO 300 HP MAX. NUMBER OF TURNS: 4.25	CYLINDER (see application guide)	1	PIVOT FRONT MOUNT	HC_3XX-3
	HELM	1	SEASTAR PRO	HH5770-3
	HOSE KIT	1	SEASTAR PRO HOSE	HO57XX
	OIL	3	SEASTAR OIL (QT.)	HA5430
OPTIONAL EQUIPMENT	BACK PLATE KIT		(FRONT MOUNT HELMS)	HA5418
	20 DEGREE WEDGE		(FRONT MOUNT HELMS)	HA5419
	SPORT TILT HELM		SEASTAR PRO	HH6190-3
	CLASSIC TILT HELM		SEASTAR PRO	HH6574-3
	BULKHEAD HOSE KIT		SEASTAR PRO HOSE	HO82XX
	SILVER CYLINDERS			HC53XXSIL-3
	PRO CYLINDERS (available in red, silver or traditional black)			HC63XX-3
	POWER ASSIST PRO STEERING			PA1315-2

NOTES:

- Do NOT use with unbalanced cylinder.
- SeaStar PRO is for single engine applications only.
- The recommendations shown above apply to factory stock outboards only. Modified installations may require a higher capacity steering system. (Cylinder volume / helm displacement = number of turns.) If in doubt, contact SeaStar Solutions Canada technical service for assistance.
- Some applications vary from what is depicted in this [catalog](#). Always consult SeaStar manual for diagrams specific to your application.
- Interference between the cylinder and boat can occur under certain conditions. Check installation thoroughly throughout the full range of movement for engine tilt and trim (and jack plate, if present).
- For all Seastar PRO outboard systems: use only SeaStar PRO Hose Kit Part No. HO57xx or HO82xx, where last two digits equal length in feet.

SEASTAR PRO LOCK VALVE SYSTEM:

SeaStar PRO's unique valve system keeps pressures in the two hydraulic lines about equal, so the wheel feels solid and sure at all times.

SeaStar PRO is the only hydraulic steering system uniquely designed to give you maximum steering comfort and control of your high-performance bass boat.

SeaStar PRO has been installed on premium bass boats as original equipment for many years. It's the ideal upgrade for twin-cable mechanical steering.



PT2000-1P
Pictured

Want precise control of engine trim without taking your hands off the wheel?
Check out our new Pro-Trim on page 203 .



FEATURES:

- Suitable for use with all SeaStar Helms & SeaStar Power Assist.
- Heavy duty universal cylinder.
- Bolt on stainless steel tie bar plates, also reversible (patent pending).
- Robust design with heavy duty support brackets, barrel, shaft & seals.
- Superior corrosion resistance.
- New pivot plate design provides smooth articulation and a sealed joint (patent pending).
- Heavy duty adjustable tie bar (patent pending).
- Equipped with stainless steel adjustable o-ring sealed elbow fittings which can be easily orientated in any direction.

SEASTAR TOURNAMENT CYLINDERS

Tournament Series Cylinders & Tie Bars are ESSENTIAL for multi-engine boats and recommended by blue water pros, these rugged, high-performance cylinders and tie bars are designed with professional fishermen in mind.

APPLICATIONS:

Ideal for nearly any multi-engine outboard-powered boat which sees heavy use.

For use with SeaStar helms and hoses. (See SeaStar Outboard Steering for list of helm and hose options.)

These cylinders and tie bars are application-specific. Please see the chart below.

APPLICATION GUIDE: TOURNAMENT SERIES CYLINDERS & TIE BARS

CONFIGURATION	CYLINDER		HARDWARE KIT		TIE BAR				NOTES
	PART NO.	QTY.	PART NO.	QTY.	PART NO.	QTY.	CENTER TO CENTER (IN.)	CENTER TO CENTER (MM)	
Single Engine	HC6845S	1	Included	N/A	N/A	N/A	N/A	N/A	
Twin Engine - Single Cylinder (STBD)	HC6845	1	HA6802	1	HO6002	1	25.0 - 25.6	635 - 650	1, 3, 4, 5, 7
						1	25.7 - 30.6	653 - 777	1, 3, 4, 5, 7
						1	30.7 - 39.0	780 - 991	1, 3, 4, 5, 7
Twin Engine - Dual Cylinder	HC6845	2	HA6804	1	HO6820	1	25.0 - 26.5	635 - 673	1, 3, 4, 5
					HO6821	1	26.6 - 29.3	676 - 744	1, 3, 4, 5
					HO6822	1	29.4 - 34.2	747 - 869	1, 3, 4, 5
					HO6823	1	34.3 - 43.0	871 - 1092	1, 3, 4, 5
Triple Engine - Dual Cylinder	HC6845	2	HA6806	1	HO6822	2	25.0 - 27.9	635 - 709	1, 2, 3, 4, 5, 6
					HO6823	2	28.0 - 36.0	711 - 914	1, 2, 3, 4, 5, 6
Quad Engine - Dual Cylinder	HC6845	2	HA6811	1	Consult SeaStar Solutions technical service				1, 2, 3, 4, 5
Quintuplet Engine (Plus)	Consult SeaStar Solutions technical service								1, 2, 3, 4, 5
NOTES					4. Based on recommended engine manufacturer minimum center to center distances. Deviating from these recommendations may require stroke limiting cylinders and/or engine tilt limiting, please consult SeaStar Solutions Technical Service.				
1. Installation may vary according to the following factors: engine mounting height, transom thickness, use of transom savers, tiller bolt location, engine tilt range, and engine size.					5. Cylinder's must be plumbed in parallel only, no series connections. Only exception is if cylinders are utilizing liquid tie bar.				
2. For center engine drops greater than 3 inches (76mm), please consult SeaStar Solutions Technical Service.					6. Maximum drop: <3 inches (76mm). Contact SeaStar Solutions Technical Support for center engine drops greater than 3 inches.				
3. Tie bar length may vary depending on toe in/toe out setup. To allow for toe, add or subtract from your nominal engine center to center distance.					7. Extra long tie bar kits available, contact SeaStar Solutions Technical Support for details				

IMPORTANT: Each configuration requires a hardware kit and tie bar kit(s), with the exception of the single engine configuration.

NOTE: The Kicker Cable Tie bar will ONLY work with SeaStar HC5345-3, HC5358-3 and HC5348-3 steering cylinders.

SINGLE & DUAL ENGINE APPLICATION GUIDE:

ENGINE MANUF.	YEAR	MODEL	CYLINDER	TIE BAR KITS		NOTES
				Twin Engine Single Cyl.	Twin Engine Dual Cyl.	
Force	1985 TO DATE	90-150HP	HC5345-3	HO5008A	HO5008A	
Honda	1996 TO DATE	75-90HP	HC5345-3	HO6001	HO6002	See Note 3
	1998 TO 2009	115-130HP	HC5347-3	HO5063	HO5064	See Note 5
	1998 TO DATE	30-50HP	HC5345-3	HO6001	HO6002	See Note 2
	2001 TO DATE	150HP 4-STROKE	HC5345-3	N/A	HO6002	See Note 6
	2001 TO DATE	225-250HP 4-STROKE	HC5445-3	HO6001	HO6002	
	2003 TO DATE	BF135HP	HC5345-3	HO6003	HO6002	
	2010 TO DATE	115HP	HC5345-3	HO6003	HO6002	
Johnson / Evinrude	1977 TO 1990	65-300HP	HC5348-3	HO6003	HO6002	
	1988 TO 1997	250-300HP V8	HC5342-3	HO5001A	HO5030	See Note 5
	1991 TO DATE	40-300HP	HC5345-3	HO6003	HO6002	Inc. ETech Engines
	1996 TO DATE	75-250HP FICHT	HC5345-3	HO6003	HO6002	
	1998 TO DATE	40-140HP 4-STROKE	HC5358-3	HO6003	HO6002	See Note 2
	2000 TO DATE	115HP FICT	HC5358-3	HO6003	HO6002	See Note 2
	2002 TO DATE	200-225HP 4-STROKE	HC5345-3	HO6003	HO6002	
	2005 TO DATE	E250 DPX VINDICATOR	HC5348-3	HO6003	HO6002	
Mercury	2007 TO DATE	3.3L/3.4L 200-250HP	HC5345-3	HO6003	HO6002	Inc. H.O. Models.
	1984 TO 1994	2.4/2.5HP EFI	HC5345-3	HO6001	HO6002	See Note 4
	1989 TO DATE	75-300HP	HC5345-3	HO6001	HO6002	See Note 3
	1996 TO DATE	75-200HP 2 & 4-STROKE	HC5345-3	HO6001	HO6002	
	1998 TO DATE	30-60HP	HC5345-3	HO6001	HO6002	See Note 2
	2002 TO 2003	225HP 4-STROKE	HC5358-3	HO6001	HO6002	See Note 1
	2004 TO DATE	150-200HP VERADO	HC5345-3	HO6001	HO6002	
	2003 TO DATE	150-200XS	MUST Use Tournament Cylinders. Contact tech. support for details.			
2003 TO DATE	250-300HP XS	MUST Use Tournament Cylinders. Refer to Page 55				
Nissan	1990 TO DATE	90-140HP	HC5345-3	HO6001	HO6002	
Suzuki	1986 TO DATE	100HP	HC5345-3	HO6003	HO6002	
	1986 TO DATE	150-300 2 & 4 STROKE	HC5345-3	HO6003	HO6002	
	1986 TO 2002	115-140HP	HC5345-3	HO6001	HO6002	NOT 1996
	1996 ONLY	115-140HP	HC5348-3	HO6001	HO6002	
	1998 TO DATE	40-140HP 4-STROKE	HC5358-3	HO6003	HO6002	See Note 2
	2003 TO DATE	90HP 4-STROKE	HC5358-3	HO6003	HO6002	See Note 2
Yamaha	2013 TO DATE	DF150 - DF175 HP	HC5345-3	HO6001	HO6002	
	1990 TO 2007	40-90HP	HC5345-3	HO6003	HO6002	
	1986 TO DATE	100-250HP 2-STROKE	HC5345-3	HO6001	HO6002	
	2000 TO DATE	150-300 HPDI	HC5345-3	HO6001	HO6002	
	2001 TO 2003	80-250 HP 4-Stroke	HC5358-3	HO6001	HO6002	See Note 1
	2003 TO DATE	F200-F250 3.3L	HC5358-3	HO6001	HO6002	
	2003 TO DATE	25-70HP 4-STROKE	HC5348-3	HO6003	HO6002	See Note 2
	2007 TO DATE	200-300 HP 4.2L V6 4-Stroke	HC5345-3	HO6001	HO6002	
	2007 TO DATE	F300-F350 HP 5.3V8	MUST Use Tournament Cylinders. Refer to Page 55			
2011-2013	F115A	HC5358-3	HO6003	HO6002		
2014-DATE	F115B	HC5345-3	HO6003	HO6002		

1. [HC5345-3](#) is optional for SINGLE ENGINE ONLY applications. DO NOT use [HC5345-3](#) for twin engine applications as operational interference may occur.

2. Requires Kit [HO5090](#)

3. Minimum Engine Center = 27"

4. May Require Extensive Cowling Modifications

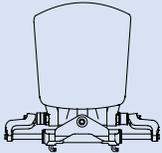
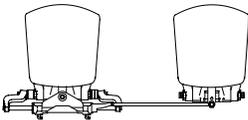
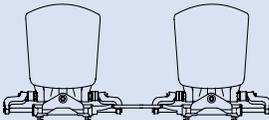
5. HO5030 and [HO5064](#) comes without Tie Bar

6. Interference will occur when using a single [HC5345-3](#) cylinder and [HO6003](#) tie bar when installed in the aft hole on the steering arm Options include, a) install tie bar into most forward hole (this will limit steering articulation), b) purchase K-6 Cylinder, and tie bar kit part # [HO5009](#). There will no be no interference when using twin [HC5345-3](#) cylinders.

•Catamaran Steering. See page 82 for Catamaran cylinder options.

Note: Contact Technical Support if engine is not listed.

SINGLE & DUAL ENGINE ORDERING GUIDE: PIVOT MOUNT SYSTEMS

ENGINE/CYLINDER CONFIGURATION	COMPONENT DESCRIPTION	QTY. REQ'D	MODEL	PART NO.
<p>SINGLE ENGINE (SINGLE CYLINDER) Applications up to 350 HP maximum <u>NUMBER OF TURNS: 5</u></p> 	CYLINDER (See Application Guide)	1	PIVOT MOUNT	HC_3xx-3
	HELM	1	SEASTAR 1.7	HH5271-3
	HOSE KIT	1	OUTBOARD HOSE	HO51xx
	OIL	3	SEASTAR OIL (QT.)	HA5430
	FOR EXTRA STEERING STATION ADD:			
	HELM	1	SEASTAR 1.7	HH5271-3
	FITTING KIT	1	ADD A STATION	HF6007
	HOSE KIT	1	OUTBOARD HOSE	HO51xx
	OIL	1	SEASTAR OIL (QT.)	HA5430
	<p>DUAL ENGINE (SINGLE CYLINDER) Non-Counter-Rotating Applications to 450 HP max; Counter-Rotating Applications to 700 HP maximum. <u>NUMBER OF TURNS: 5</u></p> 	CYLINDER (See Application Guide)	1	PIVOT MOUNT
TIE BAR KIT		1	SEE APPLICATION GUIDE	HO60xx
HELM		1	SEASTAR 1.7	HH5271-3
HOSE KIT		1	OUTBOARD HOSE	HO51xx
OIL		3	SEASTAR OIL (QT.)	HA5430
FOR EXTRA STEERING STATION ADD:				
HELM		1	SEASTAR 1.7	HH5271-3
FITTING KIT		1	ADD A STATION	HF6007
HOSE KIT		1	OUTBOARD HOSE	HO51xx
OIL		1	SEASTAR OIL (QT.)	HA5430
<p>DUAL ENGINE (DUAL CYLINDERS) Non-Counter-Rotating Applications to 450 HP max; All Counter-Rotating Engine Applications <u>NUMBER OF TURNS: 7</u></p> 	CYLINDER (See Application Guide)	2	PIVOT MOUNT	HC_3xx-3
	TIE BAR KIT	1	SEE APPLICATION GUIDE	HO60xx
	HELM	1	SEASTAR 2.4	HH5272-3
	HOSE KIT	1	OUTBOARD HOSE	HO51xx
	HOSE KIT	1	OUTBOARD HOSE	HO51xx
	HOSE KIT	1	OUTBOARD HOSE	HO51xx
	FITTING KIT	1	TEE FITTINGS	HF5530
	OIL	3	SEASTAR OIL (QT.)	HA5430
	FOR EXTRA STEERING STATION ADD:			
	HELM	1	SEASTAR 2.4	HH5272-3
FITTING KIT	1	ADD A STATION	HF6007	
HOSE KIT	1	OUTBOARD HOSE	HO51xx	
OIL	1	SEASTAR OIL (QT.)	HA5430	



(Splashwell Mount)

SEASTAR STEERING (SPLASHWELL MOUNT CYLINDER) SYSTEM:

A Very Economical Hydraulic Steering Alternative, SeaStar splashwell mount steering is ideal for engines which do not have threaded engine tilt tubes (cannot use front or side mount cylinders). The splashwell mount cylinder typically attaches to an anchor point on or near the inside of the boat's transom.

APPLICATIONS:

An ideal hydraulic steering solution for engines without tilt tubes.

Single and dual non-power-assisted outboard engines up to 300 HP (600 combined HP for counter-rotating duals).

Suitable for speeds up to 60 MPH and dual station use (with purchase of extra helm, hose & fittings). Dual engines require purchase of a tie bar kit and extra hardware. Not suitable for engines fitted with factory power steering.

FEATURES:

- Ideal for outboard engines which do not have a tilt tube.
- Design allows wide variety of mountings.
- Light duty alternative to front mount cylinder where space allows.
- Suitable for installation in shallow splashwells.
- 5.5/6.5 turns lock-to-lock using SeaStar 1.7 helm (unbalanced cylinder).
- Compact helm has only a 4-7/16" footprint — needs only 3" dash hole (Tilt requires larger hole).
- Standard 3/4" tapered steering shaft.
- **HC5380-3** features a compact 9" stroke for tight applications.
- Meets A.B.Y.C. standards.
- Meets N.M.M.A. certification requirements.



WE RECOMMEND

The use of SeaStar Steering Fluid ONLY in our hydraulic steering systems. See Page 144

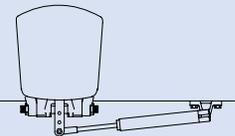
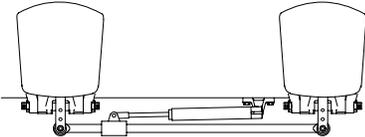
COMPLETE SYSTEM	
System components sold separately. See application and ordering guides to select appropriate components.	
COMPONENTS	
SeaStar 1.7 Helm	HH5271-3
Splashwell Mount Outboard Cylinder	HC5380-3
Hose Kit (2 hoses)	HO51xx
SeaStar Oil (1 Quart)	HA5430
OPTIONS	
SeaStar 1.7 - Front Mt. Commercial Helm	HH5217-3**
SeaStar 1.7 - Rear Mount Helm	HH5261-3
SeaStar 1.7 - Sport Tilt Helm	HH6191-3
SeaStar 1.7 - Classic Tilt Helm	HH6541-3
Power Assist, 15' Harness	PA1200-2
SeaStar Round Bezel Kit	HA5478
SeaStar Backplate Kit	HA5418
SeaStar 20° Dash Wedge Kit	HA5419
SeaStar Bulkhead Hose Kit (2 hoses)	HO81xx
SeaStar Twin Engine Tie Bar Kit	HO5010
Add-A-Station/Autopilot Fitting Kit	HF6007
SERVICE ITEMS	
Cylinder seal kit	N/A
Cylinder tee/bleeder hose fitting	HF6002

**Stainless steel shaft / robust shaft seal area



UPGRADE WITH SEASTAR POWER ASSIST

ORDERING GUIDE: SPLASHWELL 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: 5.5/6.5</u>	CYLINDER	1	SPLASHWELL MOUNT	HC5380-3
	HELM	1	SEASTAR 1.7	HH5271-3
	HOSE KIT	1	OUTBOARD HOSE	HO51xx
	OIL	3	SEASTAR OIL (QT.)	HA5430
	FOR EXTRA STEERING STATION ADD:			
	HELM	1	SEASTAR 1.7	HH5271-3
	FITTING KIT	1	ADD A STATION	HF6007
	HOSE KIT	1	OUTBOARD HOSE	HO51xx
	OIL	1	SEASTAR OIL (QT.)	HA5430
	DUAL ENGINE (SINGLE CYLINDER) Non-Counter-Rotating Applications to 300 HP max; Counter-Rotating Applications to 600 HP maximum. <u>NUMBER OF TURNS: 5.5/6.5</u>	CYLINDER	1	SPLASHWELL MOUNT
TIE BAR KIT	1	TIE BAR ONLY	HO5010	
HELM	1	SEASTAR 1.7	HH5271-3	
HOSE KIT	1	OUTBOARD HOSE	HO51xx	
OIL	3	SEASTAR OIL (QT.)	HA5430	
	FOR EXTRA STEERING STATION ADD:			
	HELM	1	SEASTAR 1.7	HH5271-3
	FITTING KIT	1	ADD A STATION	HF6007
	HOSE KIT	1	OUTBOARD HOSE	HO51xx
	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)	HF6007
	TILT HELM-SEASTAR 1.7			HH6541-3
	REAR MOUNT HELM - SEASTAR 1.7			HH5261-3
	POWER ASSIST STEERING			PA1200-2

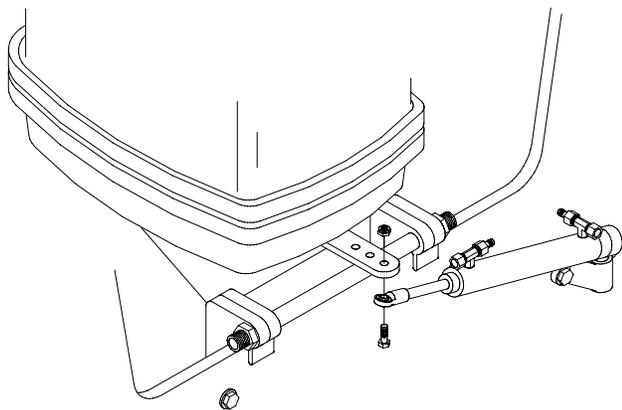
NOTES:

These recommendations apply to factory stock outboards only. Modified installations may require a higher capacity steering system. If in doubt, contact SeaStar Solutions technical service for assistance. (Cylinder volume / helm displacement = number of turns.) The splashwell mount cylinder can be used on all engines complying with ABYC P17/NMMA/BIA standards provided they have a threaded attachment hole (3/8"-24 UNF thread) in the steering arm. The splashwell mount cylinder (part no. HC5380) is not suitable for use on engines fitted with factory power steering. For dual engines, use SeaStar or engine manufacturer's tie bar.

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

- A) Outboard hose: order standard lengths (cannot be cut to length.) Part No. HO51xx/HO57xx, where last two digits = length in feet.
- B) Copper tube: 3/8" diameter copper tube and hose kit part No. HF5508.

SINGLE ENGINE CYLINDER CONNECTION TO ENGINE



HC5380-3 SPLASHWELL CYLINDER
TYPICAL SINGLE ENGINE MOUNTING

WARNING:

Do NOT use SeaStar PRO helms with the unbalanced splashwell cylinder. Doing so may cause steering wheel to lock up leading to possible loss of steering causing property damage and/or personal injury.



(Side Mount)

COMPLETE SYSTEM

System components sold separately. See application and ordering guides to select appropriate components.

COMPONENTS

SeaStar 1.7 Helm	HH5271-3
Side Mount Outboard Cylinder	HC5370-3
Hose Kit (2 hoses)	HO51xx
SeaStar Oil (1 Quart Mil Spec H5006)	HA5430

OPTIONS

SeaStar 1.7 - Front Mt. Commercial Helm	HH5217-3**
SeaStar 1.7 - Rear Mount Helm	HH5261-3
SeaStar 1.7 - Sport Tilt Helm	HH6191-3
SeaStar 1.7 - Classic Tilt Helm	HH6541-3
SeaStar 2.4 - Front Mount Helm	HH5272-3
SeaStar 2.4 - Front Mt. Commercial Helm	HH5224-3
SeaStar 2.4 - Sport Tilt Helm	HH6192-3
SeaStar 2.4 - Classic Tilt Helm	HH6542-3
Power Assist, 15' Harness	PA1200-2
SeaStar Round Bezel Kit	HA5478
SeaStar Backplate Kit	HA5418
SeaStar 20° Dash Wedge Kit	HA5419
SeaStar Bulkhead Hose Kit (2 hoses)	HO81xx
SeaStar Twin Engine Tie Bar Kit	HO5009
Add-A-Station/Autopilot Fitting Kit	HF6007

SERVICE ITEMS

Cylinder tee/bleeder hose fitting	HF6002
Cylinder seal kit	HP6088
Extension rod/pin kit	HP6055

**Stainless steel shaft / robust shaft seal area

SEASTAR STEERING (SIDE MOUNT CYLINDER) SYSTEM:

A great alternative for wide, shallow splashwells. SeaStar side mount steering is a good choice for engines with threaded tilt tubes that comply with ABYC P17/NMMA/BIA standards for mechanical steering. The cylinder attaches to an engine tilt tube which meets the above standards.

APPLICATIONS:

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

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

Dual engines require purchase of a tie bar kit and extra hardware. For power steered engines, contact SeaStar Solutions Technical Service.

FEATURES:

- Drag link design fits most engines with threaded tilt tubes. Fast, easy installation.
- Alternative to front mount cylinder where space allows, especially useful in boats with shallow splashwells.
- Suitable for use on engines with power steering.
- 4.8/5.7 turns lock-to-lock using SeaStar 1.7 helm (unbalanced cylinder).
- Compact helm has only a 4-7/16" footprint — needs only 3" dash hole (Tilt requires larger hole).
- Standard 3/4" tapered steering shaft.
- Meets A.B.Y.C. standards.
- Meets N.M.M.A. certification requirements.

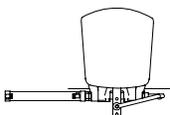
WE RECOMMEND

The use of SeaStar Steering Fluid ONLY in our hydraulic steering systems. See Page 144



UPGRADE WITH SEASTAR POWER ASSIST

ORDERING GUIDE: SIDE 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: 4.8/5.7</u>	CYLINDER	1	SIDE MOUNT	HC5370-3	
	HELM	1	SEASTAR 1.7	HH5271-3	
	HOSE KIT	1	OUTBOARD HOSE	HO51xx	
	OIL	3	SEASTAR OIL (QT.)	HA5430	
					
DUAL ENGINE (SINGLE CYLINDER) Non-Counter-Rotating Applications to 300 HP max; Counter-Rotating Applications to 600 HP maximum. <u>NUMBER OF TURNS: 4.8/5.7</u>	FOR EXTRA STEERING STATION ADD:				
	HELM	1	SEASTAR 1.7	HH5271-3	
	FITTING KIT	1	ADD A STATION	HF6007-3	
	HOSE KIT	1	OUTBOARD HOSE	HO51xx	
	OIL	1	SEASTAR OIL (QT.)	HA5430	
DUAL ENGINE (SINGLE CYLINDER) Non-Counter-Rotating Applications to 300 HP max; Counter-Rotating Applications to 600 HP maximum. <u>NUMBER OF TURNS: 4.8/5.7</u>	CYLINDER	1	SIDE MOUNT	HC5370-3	
	TIE BAR KIT	1	TIE BAR ONLY	HO5009	
	HELM	1	SEASTAR 1.7	HH5271-3	
	HOSE KIT	1	OUTBOARD HOSE	HO51xx	
	OIL	3	SEASTAR OIL (QT.)	HA5430	
DUAL ENGINE (DUAL CYLINDERS) Non-Counter-Rotating Applications to 600 HP max; All Counter-Rotating Engine Applications <u>NUMBER OF TURNS: 7.5</u>	FOR EXTRA STEERING STATION ADD:				
	HELM	1	SEASTAR 1.7	HH5271-3	
	FITTING KIT	1	ADD A STATION	HF6007	
	HOSE KIT	1	OUTBOARD HOSE	HO51xx	
	OIL	1	SEASTAR OIL (QT.)	HA5430	
DUAL ENGINE (DUAL CYLINDERS) Non-Counter-Rotating Applications to 600 HP max; All Counter-Rotating Engine Applications <u>NUMBER OF TURNS: 7.5</u>	CYLINDER	2	SIDE MOUNT	HC5370-3	
	TIE BAR KIT	1	TIE BAR ONLY	HO5009	
	HELM	1	SEASTAR 2.4	HH5272-3	
	HOSE KIT	1	OUTBOARD HOSE	HO51xx	
	HOSE KIT	1	OUTBOARD HOSE	HO51xx	
DUAL ENGINE (DUAL CYLINDERS) Non-Counter-Rotating Applications to 600 HP max; All Counter-Rotating Engine Applications <u>NUMBER OF TURNS: 7.5</u>	HOSE KIT	1	OUTBOARD HOSE	HO51xx	
	FITTING KIT	1	TEE FITTINGS	HF5530	
	OIL	3	SEASTAR OIL (QT.)	HA5430	
	FOR EXTRA STEERING STATION ADD:				
	HELM	1	SEASTAR 2.4	HH5272-3	
DUAL ENGINE (DUAL CYLINDERS) Non-Counter-Rotating Applications to 600 HP max; All Counter-Rotating Engine Applications <u>NUMBER OF TURNS: 7.5</u>	FITTING KIT	1	ADD A STATION	HF6007-3	
	HOSE KIT	1	OUTBOARD HOSE	HO51xx	
	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)	HF6007	
TILT HELM - SEASTAR 1.7				HH6541-3	
REAR MOUNT HELM - SEASTAR 1.7				HH5261-3	
TILT HELM - SEASTAR 2.4				HH6542-3	
REAR MOUNT HELM - SEASTAR 2.4				HH5262-3	
POWER ASSIST STEERING				PA1200-2	

NOTES:

These recommendations apply to factory stock outboards only. Modified installations may require a higher capacity steering system. If in doubt, contact SeaStar Solutions technical service for assistance. (Cylinder volume / helm displacement = number of turns.) For dual engines, use SeaStar or engine manufacturer's tie bar.

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

- A) Outboard hose: order standard lengths (cannot be cut to length.) Part No. HO51xx/HO57xx, where last two digits = length in feet.
- B) Copper tube: 3/8" diameter copper tube and hose kit part No. [HF5508](#).

WARNING:

Do NOT use SeaStar PRO helms with the unbalanced side mount cylinder. Doing so may cause steering wheel to lock up leading to possible loss of steering causing property damage and/or personal injury.

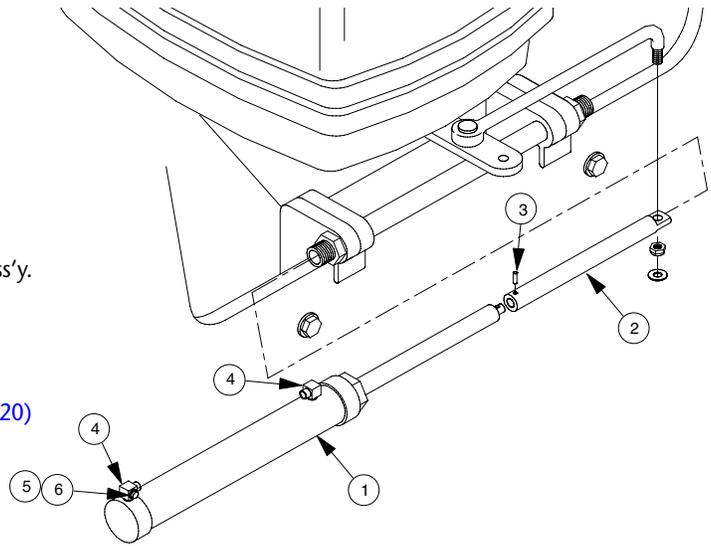
SINGLE ENGINE CYLINDER/CONNECTION PARTS

HC5370-3 SIDE MOUNT CYLINDER PARTS

SIDE MOUNT CYLINDER (HC5370-3) PARTS LIST

ITEM	P/N	QTY	DESCRIPTION
1	HC5370-3	1	Side Mount Cyl. Tube & Gland Ass'y.
2	HP6055	1	Extension Rod — Stainless Steel
3	HP6055	1	Pin - Stainless Steel
4	HF6002	1	Hose/Bleeder Tee Fitting Set (2)
5	NOT AVAIL.	2	Bleed Screw (use HF5520)
6	NOT AVAIL.	2	Washer for Bleed Screw (use HF5520)

(USE ENGINE MANUFACTURER'S LINK ARM.)



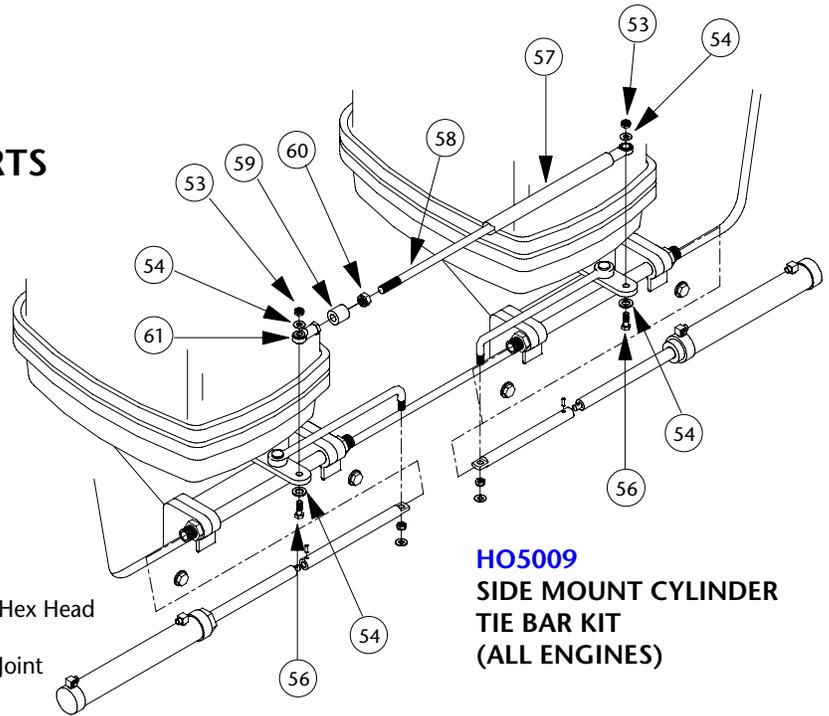
DUAL ENGINES CYLINDER TIE BAR KITS & PARTS

SIDE MOUNT CYLINDER TIE BAR KIT (HO5009)

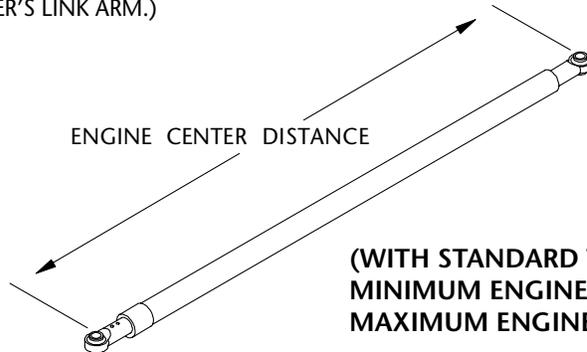
Replacement parts for the HO5009 tie bar kit are listed below.

ITEM	P/N	QTY	DESCRIPTION
53	N/A	2	Nut 3/8" NF Nylock
54	N/A	4	Washer 3/8" dia.
56	N/A	2	Screw 3/8" NF x 1-3/4" Hex Head
57	N/A	1	Stringer Tube
58	N/A	1	Threaded Rod with Ball Joint
59	N/A	1	Plastic Cap
60	N/A	1	Nut 1/2" NF Nylock
61	HP6003	1	Ball Joint

(USE ENGINE MANUFACTURER'S LINK ARM.)



HO5009 SIDE MOUNT CYLINDER TIE BAR KIT (ALL ENGINES)



(WITH STANDARD TIE BAR:)
 MINIMUM ENGINE CENTER DISTANCE: 26" (660mm)
 MAXIMUM ENGINE CENTER DISTANCE: 36" (914mm)



SEASTAR STERNDRIVE STEERING SYSTEM:

SeaStar Sterndrive Steering is the best choice for non-power assisted sterndrives. 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.

APPLICATIONS:

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

FEATURES:

- Best and Most Economical autopilot interface for sterndrives! 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.

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 [HF6007](#) (outboards) or [HF5502](#) (sterndrives and inboards) fitting kits when adding an autopilot to your SeaStar system.



WE RECOMMEND

The use of SeaStar Steering Fluid ONLY in our hydraulic steering systems.
See Page 144



COMPLETE SYSTEM	
System components sold separately. See applications and ordering guides to select appropriate components.	
COMPONENTS	
SeaStar 1.7 - Front Mount Helm	HH5271-3
Sterndrive Cylinder <small>cylinder part numbers vary, see application chart on page 64</small>	HC53xx-3
Hose Kit (2 hoses)	HO51xx
SeaStar Oil (2 Quarts)	HA5430
OPTIONS	
SeaStar 1.7 - Front Mt. Commercial Helm	HH5217-3
SeaStar 1.7 - Rear Mount Helm	HH5261-3
SeaStar 1.7 - Sport Tilt Helm	HH6191-3
SeaStar 1.7 - Classic Tilt Helm	HH6541-3
SeaStar 2.0 - Front Mount Helm	HH5273-3
SeaStar 2.4 - Front Mount Helm	HH5272-3
SeaStar 2.4 - Front Mt. Commercial Helm	HH5224-3
SeaStar 2.4 - Rear Mount Helm	HH5262-3
SeaStar 2.4 - Sport Tilt Helm	HH6192-3
SeaStar 2.4 - Classic Tilt Helm	HH6542-3
SeaStar Round Bezel Kit	HA5478
SeaStar Backplate Kit	HA5418
SeaStar 20° Dash Wedge Kit	HA5419
SeaStar Bulkhead Hose Kit (2 hoses)	HO81_ _
Add-A-Station Kit (Nylon/Copper Tube)	HF6010
Add-A-Station Kit (Hose)	HF6007
3/8" Tubing (see ordering guide)	HT5xxx
SERVICE ITEMS	
SeaStar Oil (1 Qt.)	HA5438
Steering Wheel Locknut	HP6032

APPLICATION GUIDE:

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	HC5330-3	4.9	N/A	1
	POWER ASSIST	ALL	TO DATE	125-8EM	HC5328-3	4.9/5.8	3.4/4.1	2
MERCURISER	NON POWER	MERCURISER 1	1983 & 2000	BA125-8EMV	HC5330-3	4.9	N/A	1,6
	NON POWER	ALPHA I	2001 TO DATE	BA135-7EM	HC5332-3	5.0	3.5	1,4,5,6
	NON POWER	BRAVO I, II, III	2001 TO DATE	BA135-7EM	HC5332-3	5.0	3.5	1,4,5,6
	POWER ASSIST	MERCURISER 1	1983 TO DATE	125-8EM	HC5328-3	4.9/5.8	3.4/4.1	2
	POWER ASSIST	ALPHA I	1984 TO DATE	125-8EM	HC5328-3	4.9/5.8	3.4/4.1	2
	POWER ASSIST	BRAVO I, II	1984 TO DATE	125-8EM	HC5328-3	4.9/5.8	3.4/4.1	2
	POWER ASSIST	BRAVO III	1984 TO DATE	125-8EM	HC5328-3	4.9/5.8	3.4/4.1	2,7
OMC	NON POWER	400/800 SERIES	1985 & PRIOR	N/A	N/A	N/A	N/A	
	NON POWER	COBRA	1986 TO DATE	BA150-7EM	HC5326-3	6.0	N/A	1,3
	NON POWER	KING COBRA	1986 TO DATE	BA150-7EM	HC5326-3	6.0	N/A	1,3
	POWER ASSIST	400/800 SERIES	1985 & PRIOR	N/A	N/A	N/A	N/A	
	POWER ASSIST	COBRA	1986 TO DATE	125-8EM	HC5328-3	4.9/5.8	3.4/4.1	2
	POWER ASSIST	KING COBRA	1986 TO DATE	125-8EM	HC5328-3	4.9/5.8	3.4/4.1	2
VOLVO	NON POWER	270	TO DATE	BA125-8EMV	HC5330-3	4.9	N/A	1,6
	NON POWER	275	TO DATE	BA150-7ATM	HC5314-3	6.0	N/A	1,6
	NON POWER	280	TO DATE	BA135-7EM	HC5330-3	5.0	3.5	1,4,5,6
	NON POWER	290	TO DATE	BA135-7EM	HC5332-3	5.0	3.5	1,4,5,6
	NON POWER	DIESEL	TO DATE	BA135-7EM	HC5332-3	5.0	3.5	1,4,5,6
	POWER ASSIST	275	TO DATE	N/A	N/A	N/A	N/A	
	POWER ASSIST	280, 290	TO DATE	125-8EM	HC5328-3	4.8/5.8	3.4/4.1	2
	POWER ASSIST	DIESEL	TO DATE	125-8VEM	HC5329-3	4.9/5.8	3.4/4.1	2
	POWER ASSIST	32, DIESEL	1997 TO DATE	125-6VPS	HC5331-3	4.8/5.5	3.4/4.1	2
	POWER ASSIST	41-42, DIESEL	1992 TO DATE	125-6VPS	HC5331-3	4.8/5.8	3.4/4.1	2
	POWER ASSIST	DPS & SX	1996 TO DATE	125-6VPS	HC5331-3	4.8/5.5	3.4/4.1	2

NOTES:

- Balanced system – ie: the number of turns lock-to-lock is equal port to starboard or vice-versa.
- Unbalanced system – ie: the number of turns lock-to-lock is not equal port to starboard or vice-versa.
- Requires cylinder rod end adapter [HA5424](#) supplied by SeaStar Solutions.
- HC5332-3 replaces [HC5326-3](#) as of January 2000. If installing HC5326, additional clevis supplied by engine manufacturer required. Mastry Engine part #SUN144 *not provided by SeaStar Solutions.
- The installation of the HC5332-3 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 torquetab 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 HC5326-3.8. Installs like cable.

ORDERING GUIDE:

ENGINE/CYLINDER CONFIGURATION	COMPONENT DESCRIPTION	QTY. REQ'D	MODEL	PART NO.
SINGLE & DUAL STERNDRIVES (Number of Turns varies by Helm & Cylinder. See Application Guide.) For dual sterndrive applications use engine manufacturers supplied tie bar. ADD EXTRA STEERING STATION:	CYLINDER	1	SEE APPLICATION GUIDE	
	HELM	1	SEASTAR 1.7 (SEE NOTE 1)	HH5271-3
	HELM (OPTIONAL)		SEASTAR 2.4 (SEE NOTE 2)	HH5272-3
	OIL	3	SEASTAR OIL (QT.)	HA5430
	EXTRA TUBE/HOSE		SEE NOTE 3	
	HELM	1	SEASTAR 1.7 (SEE NOTE 1)	HH5271-3
			SEASTAR 2.4 (SEE NOTE 2)	HH5272-3
	FITTING KIT	1	FOR USE WITH 3/8 NYLON/COPPER TUBE FOR USE WITH SEASTAR HOSE	HF6010 HF6007
	OIL	1	SEASTAR OIL	
	EXTRA TUBE/HOSE		(SEE NOTE 3)	
OPTIONAL EQUIPMENT	BACK PLATE KIT		(FRONT STANDARD HELMS)	HA5418
	20 DEGREE WEDGE		(FRONT STANDARD HELMS)	HA5419
	AUTOPILOT FITTING KIT		(FOR ALL HELMS) NYLON/COPPER TUBE FOR USE WITH SEASTAR HOSE	HF6010 HF6007
	Tilt Helm-SeaStar 1.7			
	Rear Mount Helm-SeaStar 1.7			HH5261-3
	Tilt Helm-SeaStar 2.4			HH6542-3
	Rear Mount Helm-SeaStar 1.7			HH5262-3
	POWER ASSIST STEERING			PA1200-2

NOTE: These recommendations apply to factory stock sterndrives only. Modified instalations 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. HT5xxx). For SeaStar 2.4 systems or any system using the [HC5332](#) cylinder, use the following option: (A) Outboard Hose: hoses must be ordered in standard lengths. They cannot be cut to length. **OR** (B) Copper tube: 3/8" diameter copper tube and hose kit (Part No. [HF5508](#)).



SEASTAR 2-LINE HYDRAULIC STEERING SYSTEM:

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.

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.

FEATURES:

- Low friction hydraulic steering system.
- Configurations for most inboards.
- Compact helm has only a 4-7/16" foot print — 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)

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 at the end of this section.

COMPLETE SYSTEM	
System components sold separately. See application and ordering guides to select appropriate components.	
COMPONENTS	
SeaStar 1.7 Helm	HH5271-3 or
SeaStar 2.4 Helm	HH5272-3
Inboard Cylinder	HC5313-3*
3/8" Tubing	HT5xx or copper
Fitting Kit (for Copper Tubing/1.7 helm)	HF5507
UnionHose Kit for Copper Tubing (2 hoses)	HF5508
SeaStar Oil (1 Quart Mil Spec H5606)	HA5430
OPTIONS	
SeaStar 1.7 - Front Mt. Commercial Helm	HH5217-3
SeaStar 1.7 - Rear Mount Helm	HH5261-3
SeaStar 1.7 - Sport Tilt Helm	HH6191-3
SeaStar 1.7 - Classic Tilt Helm	HH6541-3
SeaStar 2.4 - Front Mt. Commercial Helm	HH5224-3*
SeaStar 2.4 - Sport Tilt Helm	HH6192-3*
SeaStar 2.4 - Classic Tilt Helm	HH6542-3*
SeaStar Round Bezel Kit	HA5478
SeaStar Backplate Kit	HA5418
SeaStar 20° Dash Wedge Kit	HA5419
Ball Joint Mount Cylinder (7 cu. in.)	HC5322-3
Ball Joint Mount Cylinder (9 cu. in.)	HC5323-3
Fixed Mount Cylinder (13.3 cu. in.) (two ball joint ends)	K-22
Add-A-Station/Autopilot Fittings Kit (Tube Only)	HF6010
Add-A-Station/Autopilot Fittings Kit (Hose Only)	HF6007
SeaStar Hose Kit (2 hoses)	HO51xx
SERVICE ITEMS	
SeaStar Oil (1 Gallon)	HA5440
Steering Wheel Locknut	HP6032
* 2.4 helms require use of 3/8" copper, OR, SeaStar Steering hoses. Use of nylon tubing with a 2.4 helm may result in increased steering effort	



WE RECOMMEND

The use of SeaStar Steering Fluid ONLY in our hydraulic steering systems. See Page 144

ORDERING GUIDE: SEASTAR 2-LINE INBOARD STEERING

ENGINE/CYLINDER CONFIGURATION	COMPONENT DESCRIPTION	QTY. REQ'D	MODEL	PART NO.
SYSTEM #1	CYLINDER	1	BA125-7ATM	HC5312-3
<u>NUMBER OF TURNS: 4.0</u>	HELM	1	SEASTAR 1.7 *	HH5271-3
**Ships with HK4410-3 Kit	TUBING (SEE NOTES 1 & 3)		3/8" DIA. NYLON	HT5xxx
FOR EXTRA STEERING STATION, ADD:	OIL	3	SEASTAR OIL (QT.)	HA5430
	HELM	1	SEASTAR 1.7 *	HH5271-3
	FITTING KIT	1	ADD A STATION	HF6010
	EXTRA TUBING (SEE NOTES 1 & 3)		3/8" DIA. NYLON	HT5xxx
	OIL	1	SEASTAR OIL (QT.)	HA5430
SYSTEM #2	CYLINDER	1	BA135-7ATM	HC5313-3
<u>NUMBER OF TURNS: 5.0</u>	HELM	1	SEASTAR 1.7 *	HH5271-3
**Ships with HK4420-3 Kit	TUBING (SEE NOTES 1 & 3)		3/8" DIA. NYLON	HT5xxx
FOR EXTRA STEERING STATION, ADD:	OIL	3	SEASTAR OIL (QT.)	HA5430
	HELM	1	SEASTAR 1.7 *	HH5271-3
	FITTING KIT	1	ADD A STATION	HF6010
	EXTRA TUBING (SEE NOTES 1 & 3)		3/8" DIA. NYLON	HT5xxx
	OIL	1	SEASTAR OIL (QT.)	HA5430
SYSTEM #3	CYLINDER	1	BA150-7ATM	HC5314-3
<u>NUMBER OF TURNS: 6.0</u>	HELM	1	SEASTAR 1.7 *	HH5271-3
FOR EXTRA STEERING STATION, ADD:	TUBING (SEE NOTES 1 & 3)		3/8" DIA. NYLON	HT5xxx
	OIL	3	SEASTAR OIL (QT.)	HA5430
	HELM	1	SEASTAR 1.7 *	HH5271-3
	FITTING KIT	1	ADD A STATION	HF6010
	EXTRA TUBING (SEE NOTES 1 & 3)		3/8" DIA. NYLON	HT5xxx
	OIL	1	SEASTAR OIL (QT.)	HA5430
SYSTEM #4	CYLINDER	1	BA150-7TM	HC5318
<u>NUMBER OF TURNS: 4.25</u>	HELM	1	SEASTAR 2.4 *	HH5272-3
FOR EXTRA STEERING STATION, ADD:	TUBING (SEE NOTES 1 & 3)		3/8" DIA. COPPER	
	HOSE KIT	1	SEASTAR HOSE KIT	HF5508
	OIL	3	SEASTAR OIL (QT.)	HA5430
	HELM	1	SEASTAR 2.4 *	HH5272-3
	FITTING KIT	1	ADD A STATION	HF6010
	EXTRA TUBING (SEE NOTES 1 & 3)		3/8" DIA. COPPER	
	OIL	1	SEASTAR OIL (QT.)	HA5430
SYSTEM #5	CYLINDER	1	BA175-7TM	HC5319
<u>NUMBER OF TURNS: 5.5</u>	HELM	1	SEASTAR 2.4 *	HH5272-3
FOR EXTRA STEERING STATION, ADD:	TUBING (SEE NOTES 1 & 3)		3/8" DIA. COPPER	
	HOSE KIT	1	SEASTAR HOSE KIT	HF5508
	OIL	3	SEASTAR OIL (QT.)	HA5430
	HELM	1	SEASTAR 2.4 *	HH5272-3
	FITTING KIT	1	ADD A STATION	HF6010
	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)	HF6010 (Tube)
	POWER ASSIST STEERING			PA1200-2

* Many helm styles available, See Page 128-129 for Options

1. For systems 1, 2 & 3 – nylon tubing (3/8" dia.) is the standard requirement for plumbing the system. Copper tubing (3/8" dia.) can be substituted but Fitting Kit [HF5507](#) is required.

2. For systems 4 & 5 – copper tubing (3/8" dia.) is the standard requirement for plumbing the system. Fitting Kit [HF5508](#) is required.

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

APPLICATION GUIDE: SEASTAR 2-LINE INBOARD STEERING

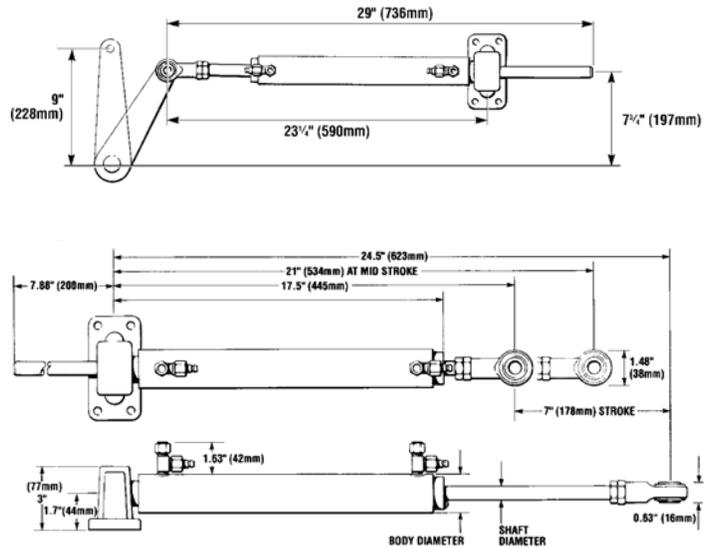
APPLICATION GUIDE (INBOARD STEERING)

Use "System Numbers" in chart below to select the components from ordering guide on previous 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

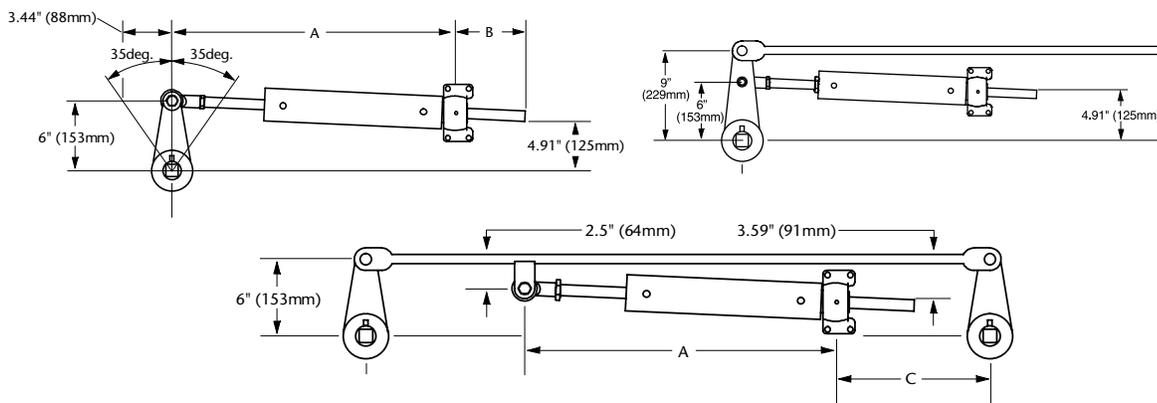
TM (BRASS BODY) INBOARD CYLINDERS
P/N [HC5318/HC5319](#) (MODEL BA1_ _-7TM):



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 (SEE DIAGRAMS ABOVE)	SHAFT DIAMETER	DIM.		DIM. C
				A	B	
BA125-7ATM	HC5312-3	1.375" (34.9mm)	.50" (12.7mm)	20" (508mm)	6.5" (165mm)	8.5" (216mm)
BA135-7ATM	HC5313-3	1.50" (38.1mm)	.625" (15.9mm)	20" (508mm)	6.5" (165mm)	8.5" (216mm)
BA150-7ATM	HC5314-3	1.75" (44.4mm)	.625" (15.9mm)	20" (508mm)	6.5" (165mm)	8.5" (216mm)
BA150-7TM	HC5318	1.75" (44.4mm)	.625" (15.9mm)	21" (534mm)	8.0" (204mm)	10.0" (254mm)
BA150-9TM	HC5369	1.75" (44.4mm)	.625" (15.9mm)	21" (534mm)	8.0" (204mm)	10.0" (254mm)
BA175-7TM	HC5319	2.00" (50.8mm)	.75" (19.0mm)	21" (534mm)	8.0" (204mm)	10.0" (254mm)





CAPILANO HEAVY DUTY HYDRAULIC STEERING SYSTEM:

This system is designed for sterndrive, 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 SeaStar Solutions. 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.

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

CAPILANO COMPONENTS	
Capilano 1275V Helm	HH5275
External Sterndrive Cylinder	K-5-B (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
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)	HA6450
SERVICE ITEMS	
Steering Fluid	Dexron II® ATF
Helm Seal Kit	HS5161
Cylinder Seal Kit	KS-15

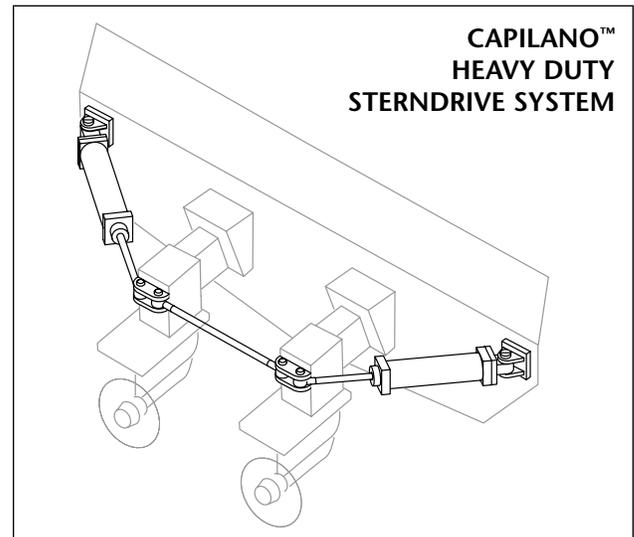
HELM OPTIONS:

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



WE RECOMMEND

The use of SeaStar Steering Fluid ONLY in our hydraulic steering systems. See Page 144





CAPILANO 2-LINE HEAVY DUTY HYDRAULIC STEERING SYSTEM:

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.

COMPLETE SYSTEM

System components sold separately. See application guide to select appropriate items.

COMPONENTS

Capilano 1250V Helm	HH5250 or
Capilano 1275V Helm	HH5275
Inboard Cylinder	HC5351
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
Hose Kit for Copper Tubing (2 hoses)	HA5731
Capilano Steering Fluid	Dexron II® ATF

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
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 (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	HP6032

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.

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.

WE RECOMMEND
The use of SeaStar Steering Fluid ONLY in our hydraulic steering systems. See Page 144

(SINGLE STATION)

(DUAL STATION)

CAPILANO™

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.

FOR VESSEL SIZES UP TO:	HELM PUMP MODEL	STEERING WHEEL TURNS ADJUST. RANGE Min.-Max.	REQUIRES CYLINDER MODEL (2x = 2 cylinders)	TUBING/HOSE DIAMETERS		MAXIMUM OUTPUT TORQUE FROM CYLINDER(S)	
				when distance from Cylinder to farthest Helm is: 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	BA200-11TM_	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	BA200-11TM_	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.

CAPILANO 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.

HELM PART#	MODEL	DISPLACEMENT ADJUSTMENT RANGE	RELIEF VALVE SETTING
HHS250	1250V	1.7-3.4 cu.in. (27.8-55.7 cc)	1000 PSI (70 BAR)
HHS275	1275V	2.7-5.4 cu.in. (44.2-88.4 cc)	1000 PSI (70 BAR)

CAPILANO 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.

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

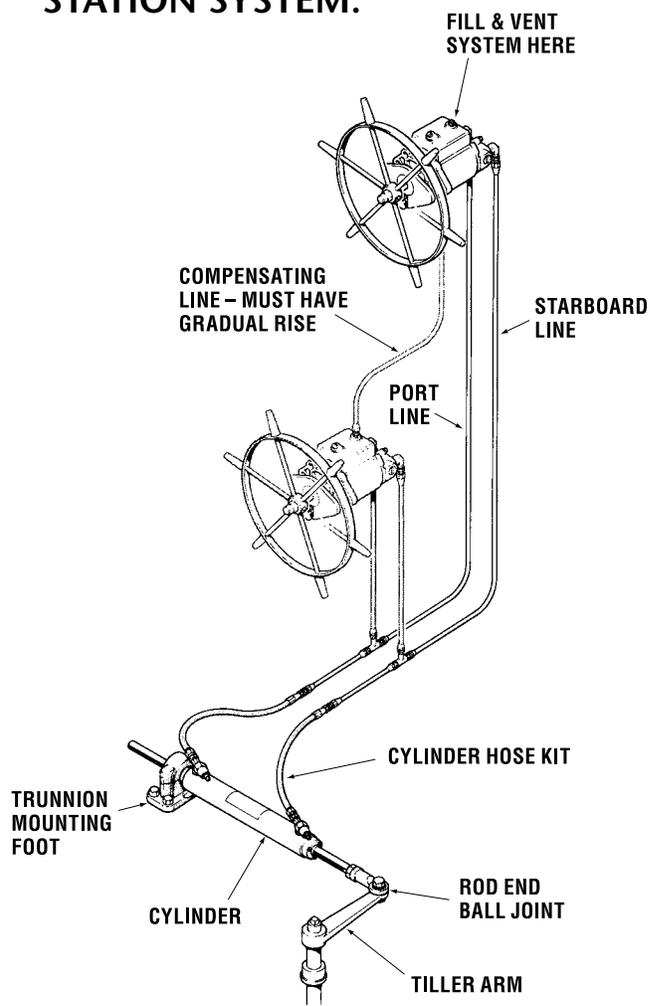
CAPILANO CYLINDER OPTIONS

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)
9" STROKE MODEL:	
HC5373	Cylinder BA175-9TMB (rod end ball joint)
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-9](#) (55 cu.in.). See cylinder specifications and dimensions, later in this [catalog](#), for more information. The number of steering wheel turns is based on total displacement of the cylinder(s) divided by the displacement of one helm.

TYPICAL CAPILANO DUAL STATION SYSTEM:





HYNAUTIC HEAVY DUTY HYDRAULIC STEERING SYSTEM:

This system is designed for sterndrive, 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 SeaStar Solutions. 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.

HYNAUTIC COMPONENTS

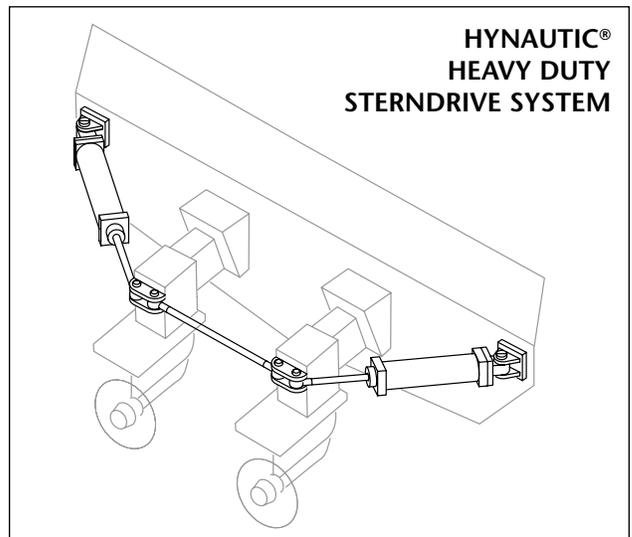
Hynautic H-40 Helm (1" straight shaft)	H-42 or
Hynautic H-40 Helm (3/4" tapered shaft)	H-42-02 or
Hynautic H-40 Helm (1" straight shaft)	H-41 or
Hynautic H-40 Helm (3/4" tapered shaft)	H-41-02 or
H-40 Fittings Kit for Main Station	HF-21
H-40 Fittings Kit for Second Station	HF-22
External Sterndrive Cylinder	K-5-B (2 required)
Reservoir - Standard (2 quart)	HP5810HY
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
SeaStar Oil (2 Quart Mil Spec H5606)	HA5430
OPTIONS	
Add-A-Station Fitting Kit (1/2" tubing)	HF5591
Add-A-Station Fitting Kit (5/8" tubing)	HF5593
SERVICE ITEMS	
Reservoir (2 quart, with hand pump)	HP5810HY
Relief Valve (500 PSI)	MSV-19
SeaStar Oil (1 Gallon)	HA5440

HELM OPTIONS:

HELM PART#	HELM DISPLACEMENT RANGE	NUMBER OF WHEEL TURNS LOCK-TO-LOCK	RELIEF VALVE SETTING
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

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



WE RECOMMEND

The use of SeaStar Steering Fluid ONLY in our hydraulic steering systems.
See Page 144

HYNAUTIC 3-LINE HEAVY DUTY HYDRAULIC STEERING SYSTEM:

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.



COMPONENTS	
Hynautic H-20 helm (1" straight shaft)	H-21 or
Hynautic H-20 helm (3/4" tapered shaft)	H-25 or
Hynautic H-40 helm (1" straight shaft)	H-42 or
Hynautic H-40 helm (3/4" tapered shaft)	H-42-02 or
Hynautic H-40 helm (1" straight shaft)	H-41 or
Hynautic H-40 helm (3/4" tapered shaft)	H-41-02
H-20 Fittings Kit for Main Station	HF-10
H-40 Fittings Kit for Main Station	HF-21
Inboard Cylinder	HCS350
Reservoir - Standard (2 quart)	HP5810HY
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
Fitting Kit (for 1/2" Copper Tubing)	HF5590 or
Fitting Kit (for 5/8" Copper Tubing)	HF5592
Hose Kit for Copper Tubing (2 hoses)	HA5731
SeaStar Oil (1 Gallon)	HA5440
OPTIONS	
Pivot Mount Inboard Cylinder	K-31
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
Relief Valve (500 PSI)	MSV-19
Reservevalve (500 PSI, top read, 3/8)	Obsolete
Reservevalve (500 PSI, top read, 3/8, w/pump)	Obsolete
Reservevalve (500 PSI, top read, 5/16, w/pump)	Obsolete

Reservevalve (950 PSI, top read, 5/16)	Obsolete
Reservevalve (950 PSI, frt.read, 5/16, w/pump)	Obsolete
H-20 Fittings Kit for Second Station	HF-11
H-40 Fittings Kit for Second Station	HF-22
SERVICE ITEMS	
Relief Valve (500 PSI)	MSV-19
Reservevalve (500 PSI, top read, 3/8)	Obsolete
Reservevalve (500 PSI, top read, 3/8, w/pump)	Obsolete
Reservevalve (500 PSI, top read, 5/16, w/pump)	Obsolete
SeaStar Oil (1 Gallon)	HA5440



WE RECOMMEND

The use of SeaStar Steering Fluid ONLY in our hydraulic steering systems. See Page 144

APPLICATION GUIDE: HYNAUTIC 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.	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)

SEASTAR INBOARD STEERING COMPONENTS:

COMPLETE SYSTEMS	
See application and ordering guides to select appropriate components.	
COMPONENTS	
HELM	
SeaStar 1.7 - Front Mount Helm	HH5271-3
SeaStar 1.7 - Rear Mount Helm	HH5261-3
SeaStar 1.7 - R. Mt. 1" Taper. Shaft	HH5281-3
SeaStar 1.7 - Classic Tilt	HH6541-3



HH5271

CYLINDER	
Cylinder-power steering (primary)	HC58xx
Cylinder-power steering (additional)	HC58xx



HC5801

OIL COOLERS	
Oil Cooler (2.25 Kw, 1" Water Lines)	HP5825
Oil Cooler (6.25 Kw, 2" Water Lines)	HP5826
OIL RESERVOIR & FILTER	
Oil Reservoir	HP5810
Oil Filter	HP5815
HOSE/TUBING	
Hose/Tubing for Manual Circuit	5/16" I.D.†
Hose/Tubing for Power Circuit	100R1 type
PUMPS	
Outlet Check Power Pump	HP5820
Pressure Relief Twin Pump	HP5822
Pumps — Right-Hand Rotation:	
Pump—Belt Drive, Right Rotation (Universal)	HP5830
Pump—Keyed Shaft, Right Rotation	HP5848
Pump—Keyed Shaft, Direct Drive, Right Rotation (Detroit Diesel)	HP5832
Pump—Keyed Shaft, Direct Drive, Right Rotation (2 GPM)	HP5834
Pump—Direct Drive, Right Rotation (No Flow Control)	HP5836

Pump—Splined Shaft, Direct Drive, Right Rotation (Caterpillar)	HP5833*
Pump—6-tooth (B Flange) Splined Shaft, Direct Drive, Right Rotation)	HP5844
Pump—9-tooth Splined Shaft, Direct Drive, Right Rotation	HP5837
Pump—9-tooth Splined Shaft, Direct Drive, Right Rotation	HP5839
Pump—9-tooth Splined Shaft, Direct Drive, Right Rotation	HP5846
Pump—11-tooth Splined Shaft, Direct Drive, Right Rotation	HP5838
Pump—11-tooth Splined Shaft, Direct Drive, Right Rotation	HP5847
Pump—13-tooth Splined Shaft, Direct Drive, Heavy Duty Right Rotation (Twin Disc)	HP5835
Pumps — Left-Hand Rotation:	
Pump—Belt Drive, Left Rotation (Universal)	HP5831
Pump—Keyed Shaft, Right Rotation	HP5850
Pump—Direct Drive, Left Rotation	HP5841
Pump—9-tooth Splined Shaft, Direct Drive, Left Rotation	HP5843
Pump—9-tooth Splined Shaft, Direct Drive, Left Rotation	HP5845
Pump—11-tooth Splined Shaft, Direct Drive, Left Rotation	HP5840
Pump—11-tooth Splined Shaft, Direct Drive, Left Rotation	HP5842
Pump—11-tooth Splined Shaft, Direct Drive, Left Rotation	HP5849
Pump—11-tooth Splined Shaft, Direct Drive, Left Rotation	HP5852
FLUID	
SeaStar Oil (1 Gallon)	HA5440‡ or
Capilano Steering Fluid	Dexron II® ATF‡

† If using 1/4" I.D. tube, runs should be short and SeaStar oil must be used.

‡ Use SeaStar fluid with SeaStar 1.4, 1.7, 2.0 & 2.4 helms or Dexron II® type ATF if using Capilano 1250V/1275V helms.

SEASTAR INBOARD STEERING COMPONENTS (Cont.):



HP5833

MISCELLANEOUS

Outlet Check Valve (Power Pump)	HP5820
Auto Flow Control (Twin Pump)	HP5821
Crossover Pressure Relief	HP5822
System Pressure Gauge Kit	HA5821
Adapter Kit, Twin Disc #5050	HA5823
Adapter Kit, Twin Disc #5061	HA5824
Adapter Kit, MAN to V10 Pump	HA5827
Tiller Bolt Kit (stainless steel)	HA5819
Pressure Relief Valve (1250psi setting)	HP5818

HELM OPTIONS

Add-A-Station/Autopilot Fittings Kit	HF6010
Helm Remote Fill Kit (through-dash)	HA6450

1.4 HELMS (4.3 WHEEL TURNS WITH 9" STROKE CYLINDER)

SeaStar 1.4 - Front Mount Helm (Above helm has 3/4" tapered shaft.)	HH5269-3
SeaStar 1.4 - Rear Mount Helm (Above helm has 3/4" tapered shaft.)	HH5260-3
SeaStar 1.4 - Rear Mount Helm (Above helm has 1" straight shaft.)	HH5279-3
SeaStar 1.4 - Rear Mount Helm (Above helm has 1" tapered shaft.)	HH5280-3
SeaStar 1.4 - Classic Helm (Above helm has 3/4" tapered shaft.)	HH6544-3

1.7 HELMS (3.5 WHEEL TURNS WITH 9" STROKE CYLINDER)

SeaStar 1.7 - Front Mount Helm	HH5271-3
SeaStar 1.7 - Front Mt. Commercial Helm	HH5217-3
SeaStar 1.7 - Rear Mount Helm (Above helm has 3/4" tapered shaft.)	HH5261-3
SeaStar 1.7 - Rear Mount Helm (Above helm has 1" tapered shaft.)	HH5281-3
SeaStar 1.7 - Sport Tilt Helm (Above helm has 3/4" tapered shaft.)	HH6191-3
SeaStar 1.7 - Classic Tilt Helm (Above helm has 3/4" tapered shaft.)	HH6541-3

2.0 HELMS (3.0 WHEEL TURNS WITH 9" STROKE CYLINDER)

SeaStar 2.0 Front Mount Helm	HH5273-3
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(Above helm has 3/4" tapered shaft.)	
SeaStar 2.0 Sport Tilt Helm (Above helm has 3/4" tapered shaft.)	HH6145-3
SeaStar 2.0 Classic Tilt Helm (Above helm has 3/4" tapered shaft.)	HH6543-3

2.4 HELMS (2.5 WHEEL TURNS WITH 9" STROKE CYLINDER)

SeaStar 2.4 - Front Mount Helm (Above helm has 3/4" tapered shaft.)	HH5272-3
SeaStar 2.4 - Front Mt. Commercial Helm	HH5224-3
SeaStar 2.4 - Rear Mount Helm (Above helm has 3/4" tapered shaft.)	HH5262-3
SeaStar 2.4 - Sport Tilt Helm	HH6192-3
SeaStar 2.4 - Classic Tilt Helm	HH6542-3



HH5262-3

CAPILANO HELM (1.8-3.5 WHEEL TURNS WITH 9" STROKE CYLINDER)

Capilano 1250V Helm	HH5250
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SEASTAR FRONT MOUNT HELM MOUNTING OPTION KITS

SeaStar Round Bezel Kit (Reduces helm protrusion by 3.75")	HA5478
SeaStar Backplate Kit	HA5418
SeaStar 20° Dash Wedge Kit	HA5419
SeaStar Helm Fill Kit	HA5438

SERVICE ITEMS

SeaStar Power Steering Purge Kit	HA5456
SeaStar Power Steering Purge Kit	HA5457
SeaStar Oil (1 Gallon)	HA5440
SeaStar Oil (1 Quart)	HA5430
Steering Wheel Locknut	HP6032



HA5430



WE RECOMMEND

The use of SeaStar Steering Fluid ONLY in our hydraulic steering systems.
See Page 144

APPLICATION GUIDE: SEASTAR POWER STEERING CYLINDERS

The chart below is only a guide to selecting a steering system. A steering system maker 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 customer service with rudder dimensions, vessel size and anticipated maximum speed. Boats over 70 feet should have steering loads reviewed by SeaStar Solutions.

FOR VESSEL SIZES UP TO:	HELM PUMP MODEL	STEERING WHEEL TURNS Lock to Lock	REQUIRES CYLINDER PART NUMBER(S) (stroke, bore ")	RECOMMENDED TUBING/HOSE DIAMETERS		MAXIMUM OUTPUT TORQUE	
				Power Circuit	Manual Circuit	In.-Lb.	Nm
PLANING HULLS:							
up to 65' (20m)	SeaStar 1.7	3.5	HC5801-2 (9" 1.0")	100R1	5/16"	18,900	2,130
up to 75' (23m)	SeaStar 1.7	4.25	HC5803-2 (11" 1.0")	100R1	5/16"	23,140	2,610
up to 85' (26m)	SeaStar 1.7	3.5	HC5801-2 + HC5802 (9" 2.0")	100R1	5/16"	37,800	4,260
up to 100' (31m)	SeaStar 1.7	4.25	HC5803-2 + HC5804 (11" 2.0")	100R1	5/16"	46,280	5,220
up to 110' (34m)	SeaStar 1.7	3.5	HC5805 (9" 2.5")	100R1	5/16"	33,065	3,736
up to 120' (37m)	SeaStar 1.7	3.5	HC5805 + HC5806 (9" 2.5")	100R1	5/16"	66,130	7,472
DISPLACEMENT HULLS (STANDARD):							
up to 50' (15m)	SeaStar 1.7	3.5	HC5801-2 (9" 1.0")	100R1	5/16"	18,900	210
up to 60' (18m)	SeaStar 1.7	4.25	HC5803-2 (11" 1.0")	100R1	5/16"	23,140	260
up to 75' (22m)	SeaStar 1.7	3.5	HC5801-2 + HC5802 (9" 2.0")	100R1	5/16"	37,800	420
up to 85' (26m)	SeaStar 1.7	4.25	HC5803-2 + HC5804 (11" 2.0")	100R1	5/16"	46,280	520
up to 100' (31m)	SeaStar 1.7	3.5	HC5805 (9" 2.5")	100R1	5/16"	33,065	3,736
up to 110' (34m)	SeaStar 1.7	3.5	HC5805 + HC5806 (9" 2.5")	100R1	5/16"	66,130	7,472
DISPLACEMENT HULLS (HEAVY DUTY):							
up to 40' (12m)	SeaStar 1.7	3.5	HC5801-2 (9" 1.0")	100R1	5/16"	18,900	210
up to 50' (15m)	SeaStar 1.7	4.25	HC5803-2 (11" 1.0")	100R1	5/16"	23,140	260
up to 55' (17m)	SeaStar 1.7	3.5	HC5801-2 + HC5802 (9" 2.0")	100R1	5/16"	37,800	420
up to 60' (18m)	SeaStar 1.7	4.25	HC5803-2 + HC5804 (11" 2.0")	100R1	5/16"	46,280	520
up to 70' (22m)	SeaStar 1.7	3.5	HC5805 (9" 2.5")	100R1	5/16"	33,065	3,736
up to 80' (25m)	SeaStar 1.7	3.5	HC5805 + HC5806 (9" 2.5")	100R1	5/16"	66,130	7,472

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

POWER STEERING CYLINDER SPECIFICATIONS:

CYLINDER MODEL	PART NUMBER	BORE DIAMETER Inches (mm)	NOMINAL SHAFT		VOLUME CUBIC IN. (cc)	OUTPUT FORCE Ft.-Lbs. (N)	TORQUE (SEE NOTE) In.-Lb. (Nm)
			DIAMETER Inches (mm)	STROKE Inches (mm)			
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)	25.9 (425)	2,946 (13090)	23,140 (2,610)
SINGLE 9" STROKE x1	HC5805-2	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)	51.80 (850)	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.

SEASTAR HELM OPTIONS:

Most SeaStar/Capilano helms can be used with SeaStar Power Steering systems, offering a wide choice of steering response. In addition, SeaStar helms offer a variety of options, including Tilt Steering and behind-the-dash mounting. (SeaStar PS and Capilano helms are available in rear mount versions only and cannot be equipped for Tilt Steering.)

HELM TYPE	DISPLACEMENT PER WHEEL TURN	NUMBER OF WHEEL TURNS	
		9" stroke cylinder	11" stroke cylinder
SeaStar 1.4	1.4 cu.in. (22.9 cc)	4.3	5.2
SeaStar 1.7	1.7 cu.in. (27.8cc)	3.5	4.25
SeaStar 2.0	2.0 cu.in. (33.0cc)	3.0	3.7
SeaStar 2.4	2.4 cu.in. (39.3cc)	2.5	3.0
Cap. 1250V	1.7-3.4 cu.in. (27.8-55.7cc)	1.75-3.5	1-4.25

ORDERING GUIDE: SEASTAR POWER STEERING

ENGINE/CYLINDER CONFIGURATION	COMPONENT DESCRIPTION	QTY. REQ'D	MODEL	PART NO.
SINGLE CYLINDER APPLICATIONS <u>NUMBER OF TURNS:</u> 3.5 (9" stroke cylinder) 4.25 (11" stroke cylinder) (For different number of turns, or Tilt Steering helms, refer to the Optional Equipment list below.)	CYLINDER	1	SEE APPLICATION GUIDE	HC58_ _
	FRONT MOUNT HELM	1	SEASTAR 1.7	HH5271-3
	POWER STEERING PUMP	1	SEE APPLICATION GUIDE	HP583_
	OIL RESERVOIR	1	SEASTAR	HP5810
	OIL COOLER	1	2.25Kw, 1" WATER LINES	HP5825
	OIL COOLER (OPTIONAL, HEAVY DUTY)	1	6.25Kw, 2" WATER LINES	HP5826
	OIL FILTER	1	SEASTAR	HP5815
	TUBING/HOSE (POWER CIRCUIT)		100R1 TYPE	
	TUBING/HOSE (MANUAL CIRCUIT)		5/16" I.D.	
	OIL	2	SEASTAR OIL (GAL.)*	HA5440
TWIN CYLINDER APPLICATIONS <u>NUMBER OF TURNS:</u> 3.5 (9" stroke cylinder) 4.25 (11" stroke cylinder) (For different number of turns, or Tilt Steering helms, refer to the Optional Equipment list below.)	CYLINDER	1	SEE APPLICATION GUIDE	HC58_ _
	CYLINDER (SECOND)	1	SEE APPLICATION GUIDE	HC58_ _
	FRONT MOUNT HELM	1	SEASTAR 1.7	HH5271-3
	POWER STEERING PUMP	1	SEE APPLICATION GUIDE	HP583_
	OIL RESERVOIR	1	SEASTAR	HP5810
	OIL COOLER	1	2.25Kw, 1" WATER LINES	HP5825
	OIL COOLER (OPTIONAL, HEAVY DUTY)	1	6.25Kw, 2" WATER LINES	HP5826
	OIL FILTER	1	SEASTAR	HP5815
	TUBING/HOSE (POWER CIRCUIT)		100R1 TYPE	
	TUBING/HOSE (MANUAL CIRCUIT)		5/16" I.D.	
OIL	2	SEASTAR OIL (GAL.)*	HA5440	
FOR EXTRA STEERING STATION, ADD:	HELM	1	SEASTAR 1.7	HH5271-3
	FITTING KIT	1	ADD A STATION	HF6010
	EXTRA TUBING/HOSE (MANUAL CIRCUIT)		5/16" I.D.	
	OIL	1	SEASTAR OIL (QT.)*	HA5430
OPTIONAL EQUIPMENT (# TURNS: 4.3 or 5.2) (# TURNS: 3.5 or 4.25) (# TURNS: 3.5 or 4.25) (# TURNS: 3.5 or 4.25) (# TURNS: 3.0 or 3.7) (# TURNS: 2.5 or 3.0) (# TURNS: 2.5 or 3.0) (# TURNS: 2.5 or 3.0) (# TURNS: 2.5 or 3.0) (# TURNS: 1.8-3.5 or 2.1-4.25)	ROUND BEZEL KIT		(FRONT MOUNT HELMS)	HA5478
	BACK PLATE KIT		(FRONT MOUNT HELMS)	HA5418
	20 DEGREE WEDGE		(FRONT MOUNT HELMS)	HA5419
	AUTOPILOT FITTING KIT		(ALL HELMS)	HF6010
	REAR MOUNT HELM		SEASTAR 1.4	HH5260-3
	SPORT TILT HELM		SEASTAR 1.7	HH6191-3
	CLASSIC TILT HELM		SEASTAR 1.7	HH6541-3
	REAR MOUNT HELM		SEASTAR 1.7	HH5261-3
	FRONT MOUNT HELM		SEASTAR 2.0	HH5273-3
	SPORT TILT HELM		SEASTAR 2.4	HH6192-3
	CLASSIC TILT HELM		SEASTAR 2.4	HH6542-3
	REAR MOUNT HELM		SEASTAR 2.4	HH5262-3
	SEASTAR CAPILANO HELM		CAPILANO 1250V	HH5250*

* Capilano helms require use of Dexron II® ATF. All other SeaStar helms use Seastar oil.



DC POWER STEERING UNIT:

SeaStar Power Steering provides super responsive, automotive style steering performance for today's large motor yachts. The SeaStar DC Power Steering Unit is the heart of the system providing reliable and economical hydraulic flow to the steering cylinders whenever the wheel is turned. Whether docking or cruising at high speed, the system will deliver 100% power regardless of engine speed.

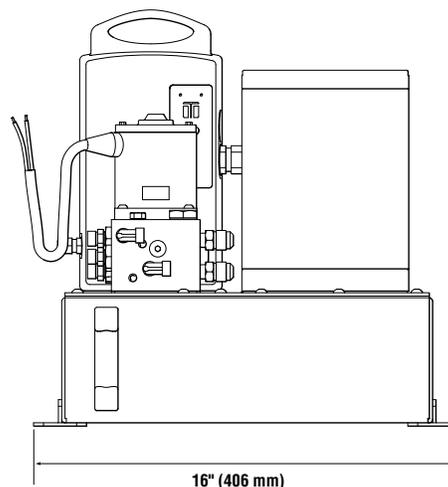
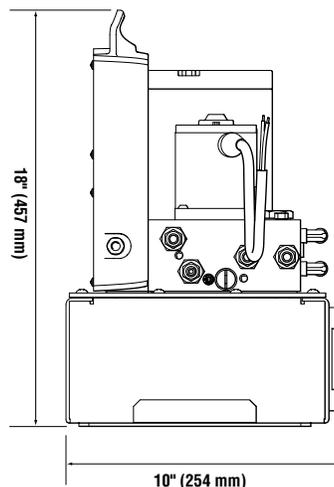
FEATURES:

- Highly responsive, effortless steering performance at all speeds.
- Low number of turns lock-to-lock (based on helm selection).
- Few components to spec and install.
- Semi-Auto purge feature.
- Suitable for multi-station applications.
- Integrated autopilot pump.
- Suitable for use with most SeaStar helms (including tilt versions).
- Automatic manual back up system.



WE RECOMMEND

The use of SeaStar Steering Fluid ONLY in our hydraulic steering systems. See Page 144



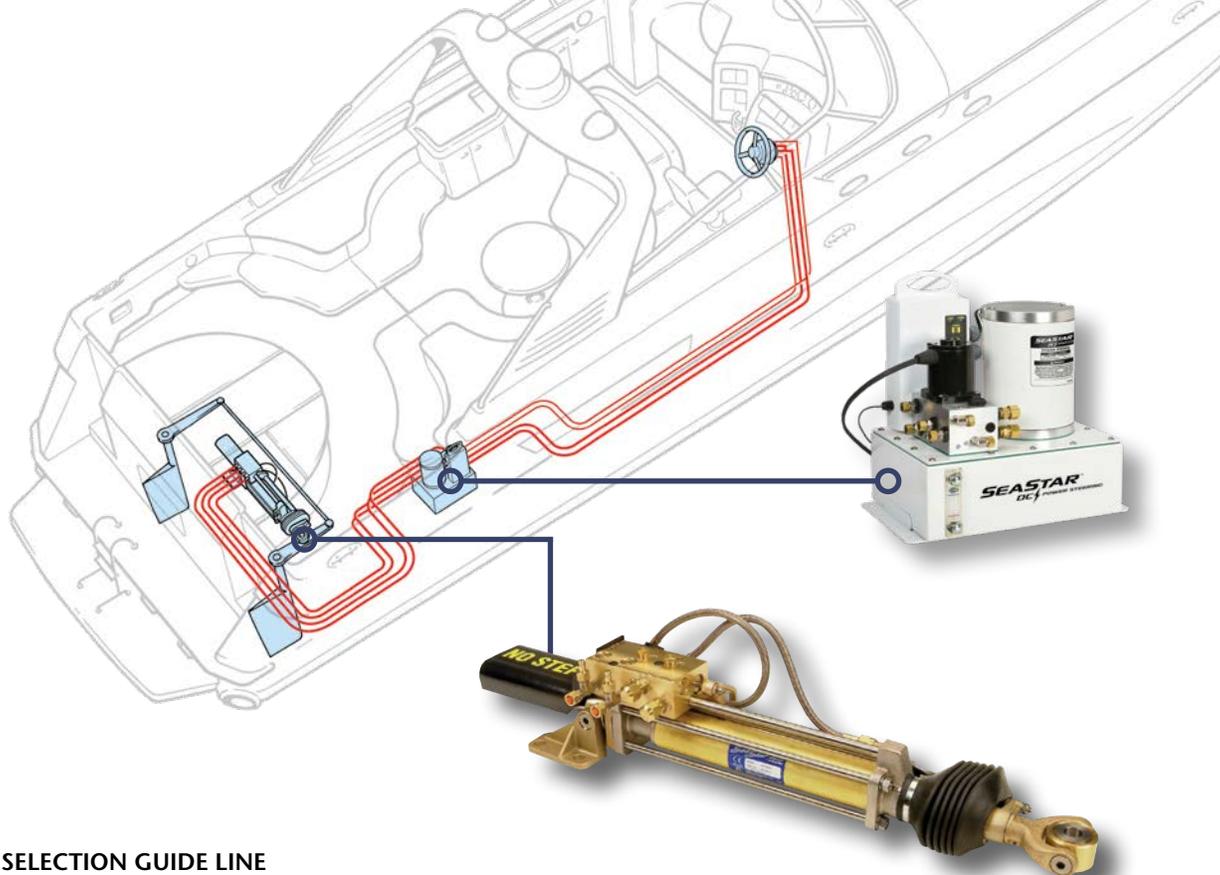
HELM SELECTION GUIDE

HELM	HC5801-2	HC5803-2	HC5805
SEASTAR 1.4 in ³	4.3 turns	5.3 turns	4.3 turns
SEASTAR 1.7 in ³	3.6 turns	4.4 turns	3.6 turns

Number of turns lock-to-lock (for a given helm/cyl combination)

DC POWER UNIT SPECIFICATIONS

DC1000	DC2000
Main Motor: 24 Volts	Main Motor: 24 Volts
Autopilot Motor: 12 Volts	Autopilot Motor: 24 Volts
Peak Current Draw @ 1250 psi: 72 amps	Peak Current Draw @ 1250 psi: 72 amps
Idle Current Draw: 0.2 amps max	Idle Current Draw: 0.2 amps max
Average Current Draw: 10-12 amps (Depending on application)	Average Current Draw: 10-12 amps (Depending on application)
Weight: 55lbs 25kg (Dry weight)	Weight: 55lbs 25kg (Dry weight)
Tank Capacity: 7 Liters	Tank Capacity 7 Liters
Adjustable Flow Autopilot: 0 – 60 in ³ /min (984cc)	Adjustable Flow Autopilot: 0 – 60 in ³ /min (984cc)



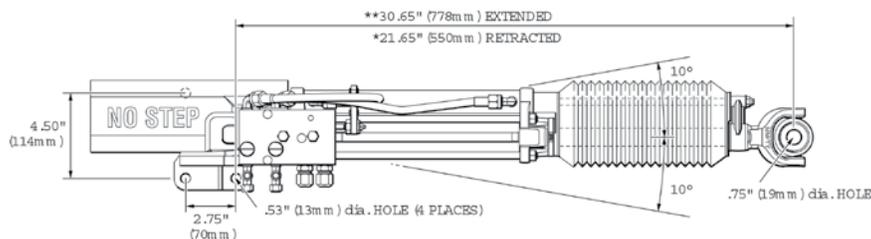
CYLINDER SELECTION GUIDE LINE

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

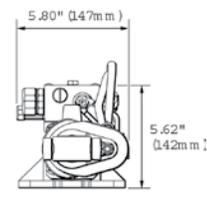
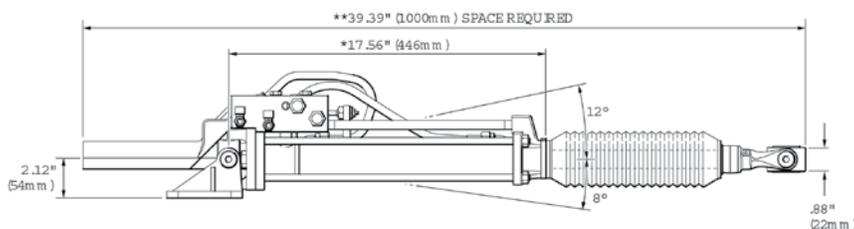
CYLINDER GUIDE	DISPLACEMENT HULLS (STD)	DISPLACEMENT HULLS (HEAVYDUTY)	PLANING HULLS
SINGLE - 9" X 2" CYL (HC5801-2)	UP TO.....50' (15m)	UP TO.....40' (12m)	UP TO.....65' (20m)
TWIN - 9" X 2" CYL (HC5802 & HC5801-2)	UP TO.....75' (22m)	UP TO.....55' (17m)	UP TO.....85' (26m)
SINGLE - 11" X 2" CYL (HC5803-2)	UP TO.....60' (18m)	UP TO.....50' (15m)	UP TO.....75' (23m)
TWIN - 11" X 2" CYL (HC5804 & HC5803-2)	UP TO.....100' (31m)	UP TO.....70' (22m)	UP TO.....110' (34m)
*SINGLE - 9" X 2.5" CYL (HC5805)	UP TO.....85' (26m)	UP TO.....60' (18m)	UP TO.....100' (31m)

* 2.5" cylinder bore (Twin applications require conventional engine driven pump power steering.)

CYLINDER SPECIFICATION	DISPLACEMENT	BORE	STROKE	OUTPUT FORCE	MAX. TORQUE (35° from Ctr)
SINGLE - 9" X 2" CYL (HC5801-2)	21.25 in ³ (348cc)	2.0" (51mm)	9" (229mm)	2946 lbf (13,090 N)	18,900 in-lbs (217kg/m)
TWIN - 9" X 2" CYL (HC5802 & HC5801-2)	42.50 in ³ (697cc)	2.0" (51mm)	9" (229mm)	5892 lbf (26,190 N)	37,800 in-lbs (435kg/m)
SINGLE - 11" X 2" CYL (HC5803-2)	26.00 in ³ (426cc)	2.0" (51mm)	11" (280mm)	2946 lbf (13,090 N)	23,140 in-lbs (266kg/m)
TWIN - 11" X 2" CYL (HC5804 & HC5803-2)	52.00 in ³ (853cc)	2.0" (51mm)	11" (280mm)	5892 lbf (26,190 N)	46,280 in-lbs (533kg/m)
SINGLE - 9" X 2.5" CYL (HC5805)	37.11 in ³ (608cc)	2.5" (64mm)	9" (229mm)	5154 lbf (22,926 N)	33,065 in-lbs (380kg/m)



* Add 2" (50mm) to this dimension for HC5803-2
 ** Add 4" (101mm) to this dimension for HC5803-2





SEASTAR CATAMARAN HYDRAULIC SYSTEM:

Unmatched comfort and control. Only with SeaStar, offering smooth, super-efficient steering designed for today's catamarans and pontoon boats with dual outboards up to 600 HP combined.

APPLICATIONS:

The components listed in this section are ideal for outboard-powered catamarans and pontoon boats with dual non-power-assisted outboard engines up to 450 HP (600 combined HP for counter-rotating duals) that have ABYC standard engine tilt tubes. These systems are suitable for speeds up to 75 MPH and dual station use as noted (with purchase of extra helm, hose & fittings). All systems allow for independent engine tilt.

FEATURES:

- Patented steering lock valves.
- Low friction hydraulic steering system.
- Configurations to suit nearly any boat.
- Compact helm has only a 4-7/16" footprint — needs only 3" dash hole (Tilt requires larger hole).
- Standard 3/4" tapered steering shaft.
- Fast, easy installation.
- Meets A.B.Y.C. standards and N.M.M.A. certification requirements.



WE RECOMMEND

The use of SeaStar Steering Fluid ONLY in our hydraulic steering systems. See Page 144

TIE BAR TYPE SYSTEM	
SeaStar 1.7 - Front Mount Helm	HH5271-3 or
SeaStar 2.4 - Front Mount Helm	HH5272-3
Pivot Mt. Outboard Cylinder (Black)	HC5345-3 or
Side Mount Outboard Cylinder	HC5370-3
SeaStar Hose Kit (2 hoses)	HO5116
SeaStar Oil (1 Quart Mil Spec H5606)	HA5430 (x2)
Tie Bar for Pivot Mount Cylinder	HO600x-3 or
Tie Bar for Side Mount Cylinder	HO5009-3
DRAG LINK TYPE SYSTEM	
SeaStar 1.7 - Front Mount Helm	HH5271-3 or
SeaStar 2.4 - Front Mount Helm	HH5272-3
Catamaran Twin O/B Fixed Mount Cylinder (7" wide mounting hole pattern)	HC5343-3
Catamaran Twin O/B Fixed Mount Cylinder (13.25" wide mounting hole pattern)	HC5374-3
SeaStar Hose Kit (2 hoses)	HO51xx
SeaStar Oil (1 Quart)	HA5430 (x2)
Drag Link (not available from SeaStar)	(x2)
Pivot Mt. Outboard Cylinder (Black)	HC5345-3 or
Side Mount Outboard Cylinder	HC5370-3
Cylinder Alignment Valve	HA5471-2
SeaStar Hose Kit (2 hoses)	HO51xx
SeaStar Oil (1 Quart)	HA5430 (x3)
HYDRAULIC TIE BAR SYSTEM (55 MPH+)	
SeaStar Helm	HH5271-3
Pivot Mt. Outboard Cylinder (Black)	HC5375-3
Side Mount Outboard Cylinder	HC5370-3
Cylinder Alignment Valve	HA5471-2
SeaStar PRO Hose Kit (2 hoses)	HO57xx
SeaStar Oil (1 Quart)	HA5430 (x3)
OPTIONS	
SeaStar 1.7 - Front Mt. Commercial Helm	HH5217-3
SeaStar 1.7 - Rear Mount Helm	HH5261-3
SeaStar 1.7 - Sport Tilt Helm	HH5291-3

SeaStar 1.7 - Classic Tilt Helm	HH6541-3
SeaStar 2.4 - Front Mount Helm	HH5272-3
SeaStar 2.4 - Front Mt. Commercial Helm	HH5224-3
SeaStar 2.4 - Rear Mount Helm	HH5262-3
SeaStar 2.4 - Sport Tilt Helm	HH6192-3
SeaStar 2.4 - Classic Tilt Helm	HH6542-3
SeaStar PRO 2.0 - Sport Tilt Helm	HH6190-3
SeaStar PRO 2.0 - Classic Tilt Helm	HH6574-3
Pivot Mount Cylinder (Silver)	HC53xxSIL-3
Pivot Mount Cylinder — PRO (Black)	HC63xx-3
Pivot Mt. Cylinder — PRO (Red)	HC63xxRED-3
SeaStar Round Bezel Kit	HA5478
SeaStar Backplate Kit	HA5418
SeaStar 20° Dash Mounting Wedge Kit	HA5419
SeaStar Bulkhead Hose Kit (2 hoses)	HO81xx
Add-A-Station/Autopilot Fitting Kit	HF6007
SERVICE ITEMS	
SeaStar Oil (1 Gallon)	HA5440
Steering Wheel Locknut	HP6032

THREE CONFIGURATIONS:

There are three ways to steer dual engine pontoon boats and catamarans with SeaStar, summarized below in order of preference:

MECHANICAL TIE BAR SYSTEM

(PIVOT MOUNT OR SIDE MOUNT CYLINDERS REQUIRED)

Dual engines should be connected with a mechanical tie bar whenever possible. This is the preferred method. Single or dual cylinders (pivot or side mount) can be used depending on steering effort and mounting space.



Pivot Mount:

DRAG LINK SYSTEM

(FIXED MOUNT CYLINDERS REQUIRED)

An [HC5343/HC5374](#) cylinder can be used where boat design allows. This requires 2 drag links (not supplied by SeaStar) to connect the engines to the cylinder.

NOTE: To establish whether or not this type of cylinder is suitable for your application, the following points should be considered:
 1.) Fore and aft alignment of cylinder. If not mounted in line, each motor will have a different turning radius.
 2.) Distance between motors.
 3.) Distance of travel in tilt arc.
 4.) Horizontal alignment of cylinder.



Fixed Mount:

HYDRAULIC TIE BAR SYSTEM

(PIVOT MOUNT OR SIDE MOUNT CYLINDERS AND ALIGNMENT VALVE REQUIRED)

“Hydraulic Tie Bar” — SeaStar Alignment Valve may be used in conjunction with a cylinder mounted to each engine (only if a tie bar or drag links cannot be used).

NOTE: The Cylinder Alignment Valve (part # [HA5471-2](#)) will allow for the periodic required realignment of two outboard motors or rudders that are linked together with a Hydraulic Tie Bar as opposed to a solid link or a Mechanical Tie Bar. Boats exceeding 55 mph must use the SeaStar Pro Helm Pump (part # [HH5770](#)) and SeaStar Pro Kevlar® Hoses.



Side Mount:

HOW TO MEASURE HOSES FOR CATAMARANS & PONTOON BOATS:

For a New Installation:

Measure Hose Routing Path in Boat as follows:

- A = Center line of wheel to gunwale,
- B = Dash to transom,
- C = Gunwale to centerline of cylinder connection at centered tiller.

Outboard cylinders move with engine; enough slack must be left in hoses to prevent sharp bends (less than 3" radius) and/or kinking.

For Tilt Tube Mounting only, add A, B & C + 24", round up to next even foot. Order that length hose kit.

For “Hydraulic Tie Bar” installations only, note locations of helm, cylinders and alignment valve. (See diagram on Alignment Valve page for typical hose routing.) Hoses are sold in pairs.

ORDERING GUIDE: CATAMARAN

ENGINE/CYLINDER CONFIGURATION	COMPONENT DESCRIPTION	QTY. REQ'D	MODEL	PART NO.
(MECHANICAL TIE BAR SYSTEM DUAL ENGINES, SINGLE CYLINDER:)				
(SINGLE PIVOT MOUNT CYLINDER)	CYLINDER	1	PIVOT MOUNT*	HC53xx-3
Non-Counter-Rotating Applications to 450 HP max; Counter-Rotating Applications to 600 HP maximum. <u>NUMBER OF TURNS: 5</u>	TIE BAR KIT (26-36" center distance)	1	SEE APPLICATION GUIDE***	HO60xx
	HELM	1	SEASTAR 1.7	HH5271-3
	HOSE KIT	1	OUTBOARD HOSE	HO51xx
	OIL	2	SEASTAR OIL (QT.)	HA5430
	(SINGLE SIDE MOUNT CYLINDER)	CYLINDER	1	SIDE MOUNT**
Non-Counter-Rotating Applications to 300 HP max; Counter-Rotating Applications to 600 HP maximum. <u>NUMBER OF TURNS: 4.8/5.7</u>	TIE BAR KIT (26-36" center distance)	1	TIE BAR ONLY	HO5009
	HELM	1	SEASTAR 1.7	HH5271-3
	HOSE KIT	1	OUTBOARD HOSE	HO51xx
	OIL	2	SEASTAR OIL (QT.)	HA5430
	(MECHANICAL TIE BAR SYSTEM (TWIN ENGINES, TWIN CYLINDERS:)			
(DUAL PIVOT MOUNT CYLINDERS)	CYLINDER	2	PIVOT MOUNT*	HC53xx-3
Non-Counter-Rotating Applications to 600 HP max; All Counter-Rotating Engine Applications <u>NUMBER OF TURNS: 7</u>	TIE BAR KIT (26-36" center distance)	1	SEE APPLICATION GUIDE***	HO60xx
	HELM	1	SEASTAR 2.4	HH5272-3
	HOSE KIT	3	OUTBOARD HOSE	HO51xx
	FITTING KIT	1	TEE FITTINGS	HF5530
	OIL	3	SEASTAR OIL (QT.)	HA5430
(DUAL SIDE MOUNT CYLINDERS)	CYLINDER	2	SIDE MOUNT**	HC5370-3
Non-Counter-Rotating Applications to 600 HP max; All Counter-Rotating Engine Applications <u>NUMBER OF TURNS: 7.5</u>	TIE BAR KIT (26-36" center distance)	1	TIE BAR ONLY	HO5009
	HELM	1	SEASTAR 2.4	HH5272-3
	HOSE KIT	3	OUTBOARD HOSE	HO51xx
	FITTING KIT	1	TEE FITTINGS	HF5530
	OIL	3	SEASTAR OIL (QT.)	HA5430
(DRAG LINK SYSTEM (TWIN ENGINES, SINGLE CYLINDER:)				
(SINGLE CATAMARAN CYLINDER)	CYLINDER	1	CATAMARAN TYPE	HC5343-3
Non-Counter-Rotating Applications to 450 HP max; Counter-Rotating Applications to 600 HP maximum. <u>NUMBER OF TURNS: 5</u>	HELM	1	SEASTAR 1.7	HH5271-3
	HOSE KIT	1	OUTBOARD HOSE	HO51xx
	OIL	3	SEASTAR OIL (QT.)	HA5430
	DRAG LINKS	2	CUSTOMER-SUPPLIED	N/A
	(SINGLE CATAMARAN CYLINDER)	CYLINDER	1	CATAMARAN TYPE
Non-Counter-Rotating Applications to 450 HP max; Counter-Rotating Applications to 600 HP maximum. <u>NUMBER OF TURNS: 5.5</u>	HELM	1	SEASTAR 2.4	HH5272-3
	HOSE KIT	1	OUTBOARD HOSE	HO51xx
	OIL	3	SEASTAR OIL (QT.)	HA5430
	DRAG LINKS	2	CUSTOMER-SUPPLIED	N/A
	"HYDRAULIC TIE BAR" SYSTEM TO 55 MPH (TWIN ENGINES, TWIN CYLINDERS:)			
(DUAL PIVOT MOUNT CYLINDERS)	CYLINDER	2	PIVOT MOUNT*	HC53xx-3
Non-Counter-Rotating Applications to 600 HP max; All Counter-Rotating Engine Applications <u>NUMBER OF TURNS: 6.7</u>	TIE BAR KIT (26-36" center distance)	1	SEE APPLICATION GUIDE***	HO60xx
	HELM	1	SEASTAR 2.4	HH5272-3
	HOSE KIT	3	OUTBOARD HOSE	HO51xx
	ALIGNMENT VALVE	1	TIE BAR VALVE	HA5471-2
	OIL	3	SEASTAR OIL (QT.)	HA5430
(DUAL SIDE MOUNT CYLINDERS)	CYLINDER	2	SIDE MOUNT**	HC5370-3
Non-Counter-Rotating Applications to 600 HP max; All Counter-Rotating Engine Applications <u>NUMBER OF TURNS: 7.5</u>	TIE BAR KIT (26-36" center distance)	1	TIE BAR ONLY	HO5009
	HELM	1	SEASTAR 2.4	HH5272-3
	HOSE KIT	3	OUTBOARD HOSE	HO51xx
	ALIGNMENT VALVE	1	TIE BAR VALVE	HA5471-2
	OIL	3	SEASTAR OIL (QT.)	HA5430

Recommendations shown on these two pages apply to factory stock outboards only. Modified installations may require a higher capacity steering system. If in doubt, contact our SeaStar Solutions Canada tech service for assistance. (Cylinder volume/helm displacement = number of turns.)

ORDERING GUIDE (CONTINUED): CATAMARAN

ENGINE/CYLINDER CONFIGURATION	COMPONENT DESCRIPTION	QTY. REQ'D	MODEL	PART NO.
"HYDRAULIC TIE BAR" SYSTEM FOR 55+ MPH (TWIN ENGINES, TWIN CYLINDERS:)				
(DUAL PIVOT MOUNT CYLINDERS)	CYLINDER	2	PIVOT MOUNT*	HC53xx-3
Non-Counter-Rotating Applications to 600 HP max; All Counter-Rotating Engine Applications	TIE BAR KIT (26-36" center distance)	1	SEE APPLICATION GUIDE***	HO60xx
	HELM	1	SEASTAR PRO	HH5770-3
	HOSE KIT	3	SEASTAR PRO HOSE	HO57xx
<u>NUMBER OF TURNS: 4</u>	ALIGNMENT VALVE	1	TIE BAR VALVE	HA5471-2
	OIL	3	SEASTAR OIL (QT.)	HA5430
(DUAL SIDE MOUNT CYLINDERS)	CYLINDER	2	SIDE MOUNT**	HC5370-3
Non-Counter-Rotating Applications to 600 HP max; All Counter-Rotating Engine Applications	TIE BAR KIT (26-36" center distance)	1	TIE BAR ONLY	HO5009
	HELM	1	SEASTAR PRO	HH5770-3
	HOSE KIT	3	SEASTAR PRO HOSE	HO57xx
<u>NUMBER OF TURNS: 5</u>	ALIGNMENT VALVE	1	TIE BAR VALVE	HA5471-2
	OIL	3	SEASTAR OIL (QT.)	HA5430

NOTES:

* See SeaStar Outboard Pivot Mount Cylinder application guide earlier in this [catalog](#) for some engines which may require [HC5347-3](#), [HC5348-3](#) or [HC5358-3](#).

** When using two [HC5370-3](#) cylinders, the rods must face each other.

*** For [HC5345-3](#), [HC5347-3](#), [HC5348-3](#) and [HC5358-3](#) cylinders, tie bars vary by engine make & model (see application guide in the SeaStar Outboard Pivot Mount Cylinder section) or use engine manufacturer's tie bar.

For [HC5370-3](#) cylinders, use SeaStar tie bar [HO5009](#).

For dual engines with engine center distances from 26-36", use the appropriate SeaStar tie bar. For dual engines with center distances greater than 36", obtain longer tie bar, use [HC5343](#)/[HC5374](#) cylinder with drag links, or use "Hydraulic Tie Bar" system with SeaStar Alignment Valve.

For speeds over 55 MPH, use SeaStar PRO helm #[HH5770](#). (Must NOT be used with **single** side mount [unbalanced] cylinder.)

For information on additional steering stations or other optional helms, refer to the ordering guides in the SeaStar Outboard Pivot Mount Cylinder and/or Side Mount Cylinder steering sections.

SeaStar Power Assist (P/A) is an option for most of these systems. For SeaStar helms, use SeaStar P/A systems; for SeaStar PRO helms, use SeaStar P/A PRO systems.

ALIGNMENT VALVE FOR HYDRAULIC TIE BAR (WHEN A MECHANICAL TIE BAR CANNOT BE USED)

The SeaStar® Cylinder Alignment Valve (part # [HA5471-2](#)) will allow for the periodic required realignment of two outboard motors or rudders that are linked together with a Hydraulic Tie Bar as opposed to a solid link or a Mechanical Tie Bar.

A standard helm and SeaStar hoses may be used on vessels not exceeding speeds of 55 MPH. Boats exceeding 55 MPH must use the SeaStar Pro Helm Pump (part # [HH5770](#)) and SeaStar Pro Kevlar® Hoses.

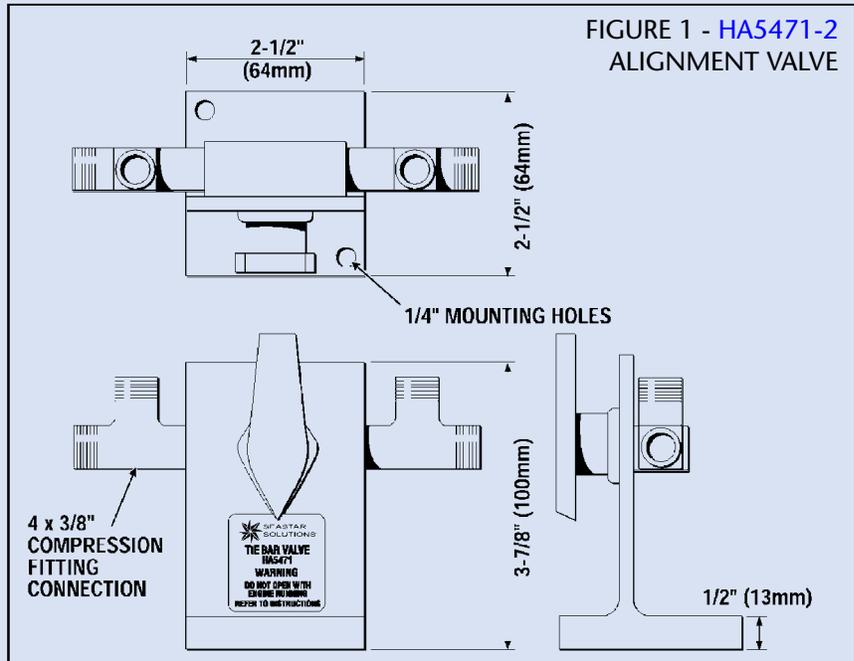


FIGURE 1 - [HA5471-2](#) ALIGNMENT VALVE



OPTIMUS ELECTRONIC POWER STEERING SYSTEM:

Optimus EPS truly raises the bar when it comes to comfort, control and maneuverability, especially for the new breed of high performance powerboats, saltwater fishing vessels, catamarans, RIBs and high end pontoon boats. It's unlike anything you've ever experienced when it comes to steering. We know you will be impressed.

ADVANTAGES:

- No oil at helm.
- Boat that steers like a sports car.
- Plug and play autopilot compatibility.
- No autopilot pump or rudder feedback unit.
- Adjustable speed sensitive turns lock-to-lock.
- Adjustable speed sensitive wheel effort.
- Can be retrofitted to existing mechanical and electronic controlled engines. You do not have to buy new engines.
- No tie bars (twin configuration).
- No liquid tie bar (CAT).
- On demand pumps which extend battery life.
- Components based on existing SeaStar reliability and quality.
- NMEA 2000 Certified.

OPTIONS FOR OPTIMUS EPS:

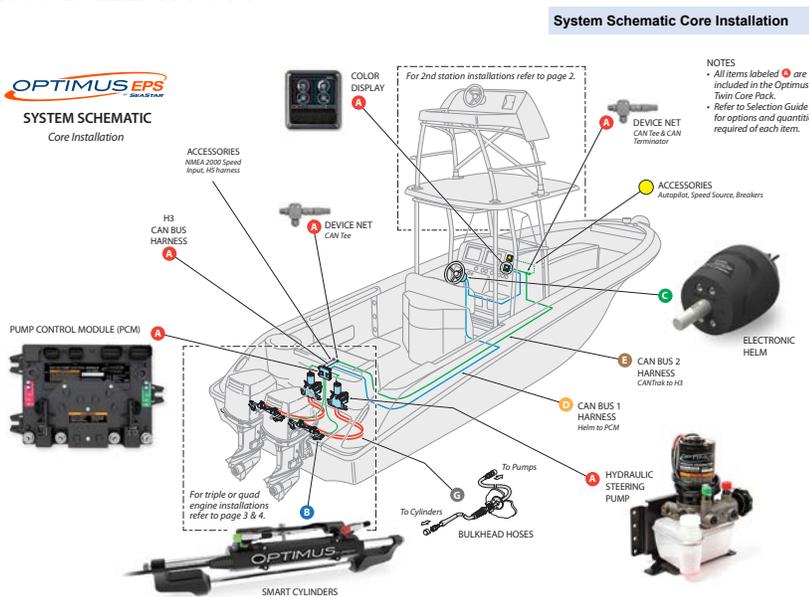
- Second station electronic helm.
- Heavy-duty tournament cylinders.
- Triple with tie bars.
- Quad with tie bars.

APPLICATIONS FOR OPTIMUS EPS:

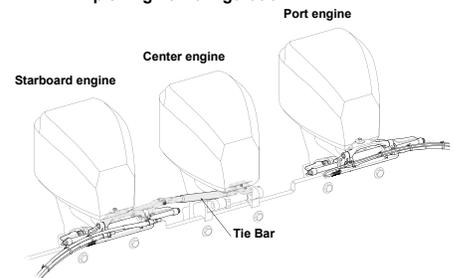
- All twin, triple and quad outboard engine boats - electronic and mechanical controlled.
- Single and dual helm station boats.
- High performance powerboats, saltwater fishing vessels, RIBs, catamarans, houseboats and pontoon boats.
- For sterndrive applications contact your SeaStar Solutions representative.



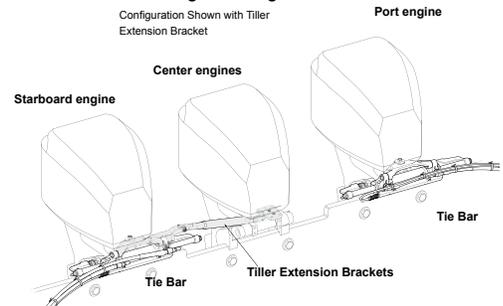
INSTALLATION



Triple Engine Configuration



Quad Engine Configuration



THE TECHNOLOGY BEHIND THE SYSTEM

The incredible feel you get when you're behind the wheel of a boat equipped with Optimus EPS is the result of an incredible array of technology and engineering. Each component has been designed to complement the other, resulting in a seamless experience of steering control in virtually every situation on the water. The high level of engineering also extends to the reliability of the system, with quality materials, careful manufacturing and redundant systems, all to stand up to the rigors of life on the water.



KEY SYSTEM COMPONENTS

FEATURES	BENEFITS
OPTIMUS ELECTRONIC HELM (PART NO. EH15XX)	
Adjustable helm turns and steering wheel effort	Adjustable steering sensitivity and resistance for maximum comfort
Speed sensitive helm turns, effort and steering response	Driver comfort, control and performance as speed varies
Dual independent sensors and circuits	Provides redundancy for reliable operation
Electronic helm	No hydraulic oil at helm
Optional tilt helms available	Adjustable position of steering wheel for personal comfort
Optional 2nd helm	Easy installation, requires only a harness connection
OPTIMUS SMART CYLINDER (PART NO. EC53XX)	
Dual independent non-contact sensors and proven SeaStar cylinder design	System reliability and operation
Integrated rudder feedback unit (RFU)	No additional RFU required for autopilot system
Adjustable stainless steel ORB fittings	Simplifies the installation and allows for easy orientation in any direction
OPTIMUS CORE PACK (PART NO. EPSK12XX)	
OPTIMUS HYDRAULIC STEERING PUMP (PART NO.)	
On demand hydraulic steering pump	Significantly reduces overall power consumption
Simplified semi auto-purge mode	Allows user to purge system with existing components
Designed using SAE J-1171 rated motor	Meets Coast Guard requirement for ignition protection
Third party auto-pilot certified	A separate auto-pilot pump is not required.
OPTIMUS CANTRAK DISPLAY	
CANtrak digital display for messaging and user interface	Provides interface for adjusting helm turns and steering effort
	Dealer adjustable toe in/out and engine turning ratio
Displays visual information on system status	Real-time system status rudder direction and RPM
OPTIMUS PUMP CONTROL MODULE	
Fault tolerant CANbus network	Ensures system reliability and operation
Sealed locking cable connections	Ensures reliable cable connection protection from vibration
Accommodates certified 3rd party autopilot systems	No additional autopilot pump and RFU
Automatic battery selector	Ensures system operates at peak performance

For more information contact SeaStar Solutions

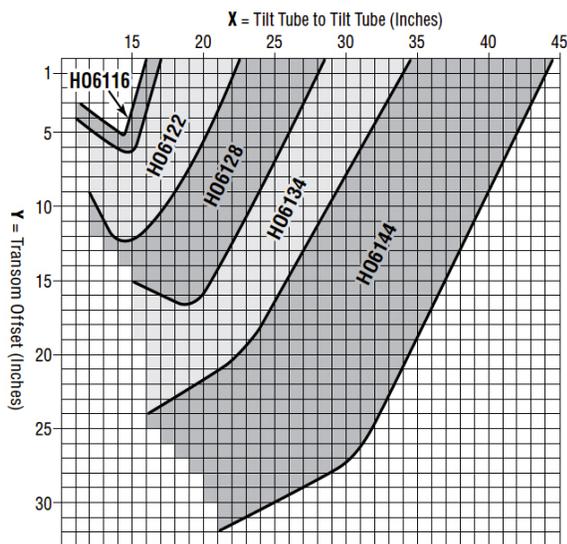


DESCRIPTION	PART No.
xtreme 40 series (20HP Maximum)	HO61xx

REPLACEMENT KIT	DESCRIPTION
HP6157	Link arm assembly
HP6156	Drive Mount Plate kit (port/starboard)
HP62xx	Kicker Cable replacement
HP6158	Support Rod/nut

MEASURING CABLE LENGTH:

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



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

SEASTAR KICKER CABLE TIE BAR:

This new SeaStar product allows a user to manually steer an auxiliary engine (kicker motor) using their existing SeaStar hydraulic steering system. Today this is accomplished with a variety of solid mechanical linkages between the main engine and the auxiliary engine. SeaStar Solutions has developed a patent pending design that incorporates a **xtreme** cable as the linkage between the two engines.

The SeaStar Solutions SeaStar Kicker Cable Tie Bar has been engineered for easy and secure installation on outboard powered vessels with popular SeaStar Solutions SeaStar hydraulic steering. By using a universal ABYC steering connection on the kicker motor, SeaStar Solutions has made it simpler than ever for builders, dealers and boaters to rig, operate and steer both motors simultaneously.

FEATURES:

- Flexible cable allows for adjustable locations of kicker motor.
- Allows independent trim/tilt of both engines.
- Allows full steering stroke of both engines.
- Simplified installation using universal ABYC steering connection (as per ABYC P17 & P21 standards) on kicker motor.
- Retrofittable to Seastar Front Mount Cylinders.
- Incorporates unique patented **xtreme** cable technology.

HO61XX KIT INCLUDES:

- 1 Steering Cable Assembly (TFXTREME 40 series cable and a custom drilled out support rod)
 - 1 Pivot Cylinder Drive Link-arm (connects the drive bracket to one side of the cable assembly)
 - 1 Pivot Cylinder Drive Plate (allows for the link-arm to mount to the pivot cylinder pivot plate)
 - 2 Support Brackets (keyed version for use with this product)
- Fasteners

Not Included:

Drive/drag link from auxiliary (kicker) engine to the end of the kicker steering cable



Twin Engine – Single Cylinder ([HA5521](#))



Twin Engine – Dual Cylinder ([HA5520](#))

TOURNAMENT DRIVE BRACKET KIT & ADJUSTABLE TIE BAR:

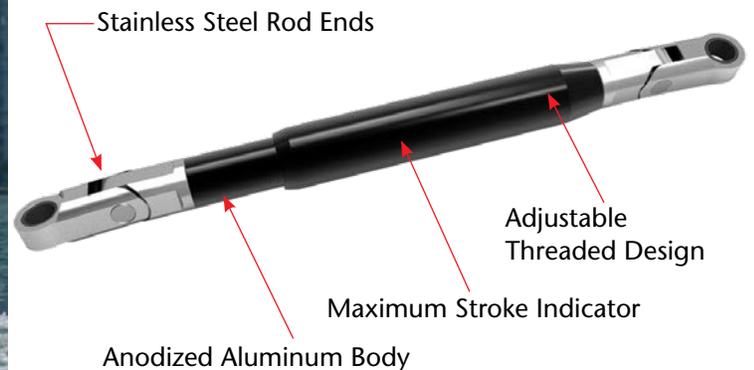
The Tournament Drive Bracket kit is for use with our Adjustable Tie Bars on standard SeaStar steering cylinders. This new series of hardware kits will allow the consumer to take full advantage of all the features and benefits of our heavy-duty adjustable tie bar products for twin engine applications up to 600 HP.

FEATURES:

- Meets/exceeds all applicable standards.
- Designed and assembled in North America.
- Utilizes proven Tournament series adjustable tie bars
- Anodized aluminum adjustable tie bar with built in maximum stroke indicator
- High strength forged aluminum drive bracket
- Eliminates the need for cut-to-length traditional tie bars

SEASTAR TWIN ENGINE TOURNAMENT TIE BAR APPLICATION GUIDE

CONFIGURATION	HARDWARE KIT		TIE BAR			
	Part#	Qty	Engine Center to Center Distance (inches)	Engine Center to Center Distance (mm)	Part#	Qty
Twin Engine Single Cylinder (STBD)	HA5521	1	25.0 - 25.7	635 - 653	HO6821	1
			25.8 - 30.7	655 - 780	HO6822	1
			30.8 - 39.3	782 - 998	HO6823	1
			39.4 - 54.5	1000 - 1384	HO6824	1
Twin Engine Dual Cylinder	HA5520	1	28.0 - 29.0	771 - 737	HO6819	1
			29.1 - 30.6	739 - 777	HO6820	1
			30.7 - 33.4	779 - 848	HO6821	1
			33.5 - 38.4	850 - 975	HO6822	1
			38.5 - 47.1	977 - 1196	HO6823	1





SEASTAR POWER ASSIST STEERING SYSTEM:

SeaStar Power Assist steering dramatically reduces steering effort in heavy or high torque applications. Power assisted steering delivers exceptional performance and unparalleled levels of safety and comfort, even in the most extreme conditions.

FEATURES:

- Dramatically reduces steering effort.
- Wall or Floor mount.
- Easy to install.
- OEM or retro-fit.
- Compatible with power purge system.
- Simple add-on to an existing SeaStar steering system (from 1.4 to 2.4 SeaStar helms).
- OEM or retro-fit.
- Compatible with power purge system.
- Return to manual in failure mode.
- Suitable for use with autopilots.
- 12V or 24V operation.
- Wiring harness included.
- Ignition protected (SAE J-1171).
- ABYC, CE, NMMA, ISO 10592 Approved.

COMPLETE SYSTEMS	
Power Assist, 15' Harness	PA1200-2
Power Assist, 25' Harness	PA1225-2
Power Assist PRO, 15' Harness	PA1315-2
OPTIONS	
Dual Ignition Control Kit	HA1201
Harness Fuse Kit	HA1206
Replacement Motor	HA1203

WHY USE POWER ASSIST?

Today's high horsepower engines are much heavier and are producing more propeller torque than ever before. Naturally, this additional weight and torque has an effect on the boat's steering when these loads are transferred to the wheel. Unacceptable levels of steering load can increase driver fatigue and discomfort. The SeaStar Power Assist virtually eliminates all steering loads and provides modern boaters the same level of steering comfort and control found in cars. Even in the most extreme applications, the boat will be more comfortable to steer. The SeaStar Power Assist allows the boat to be driven safely and easily by the whole family.



SEASTAR POWER ASSIST PRO

Specifically designed for high torque single engine outboard applications fitted with SeaStar Pro helms, such as performance bass boats.

SYSTEM OVERVIEW:

The SeaStar Power Assist unit can be installed on new SeaStar steering installations or as an easy retro-fit to existing systems.

Suitable for most boat types, the SeaStar Power Assist uses an electronically controlled hydraulic pump to provide on-demand power steering.

It is installed into the hydraulic steering circuit between the helm and steering cylinder. The Power Assist unit is powered from the boat's battery and adjusts automatically to the input voltage (12V or 24V).

The SeaStar Power Assist can be used on boats with multiple engines and rudders, multiple steering stations and autopilots.

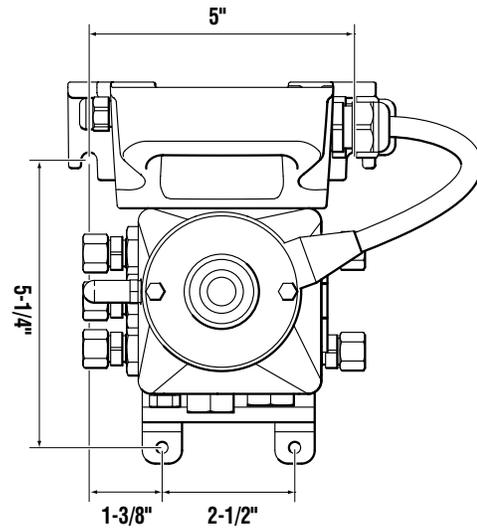
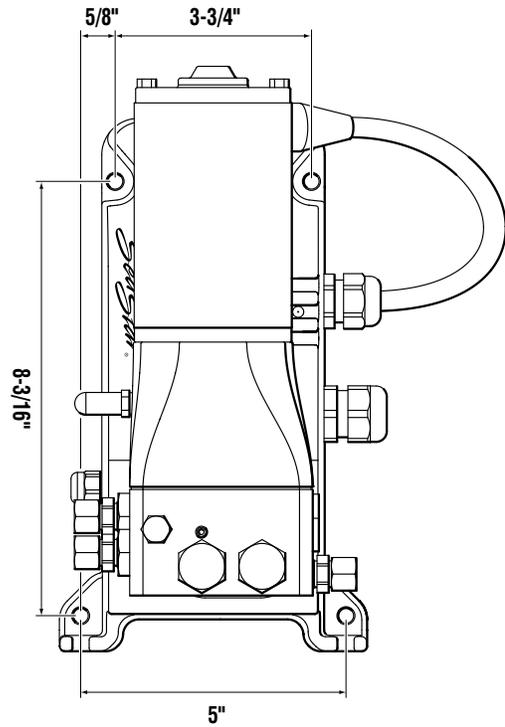
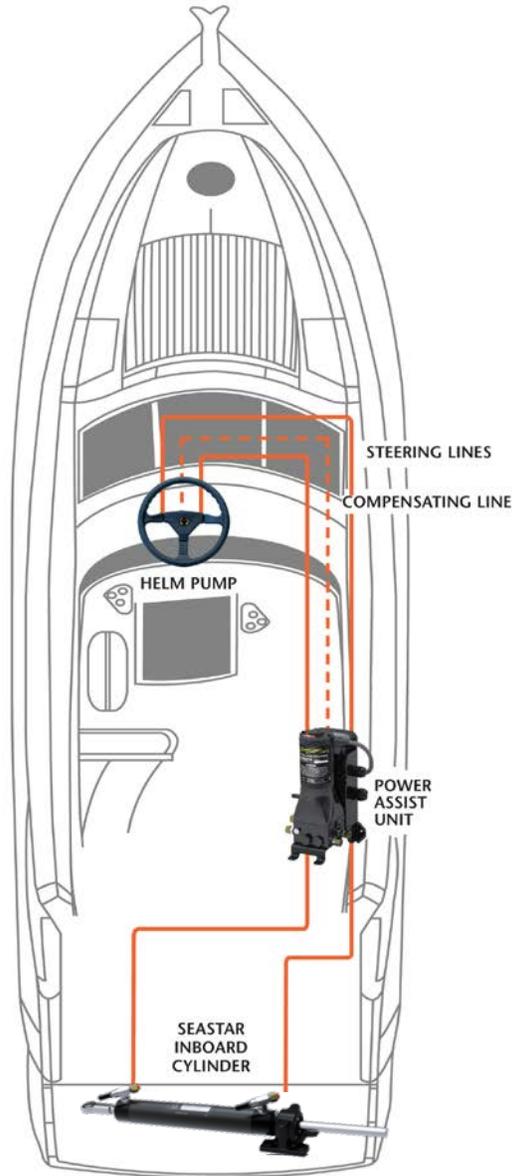
If power to the unit is interrupted for any reason, the steering system will automatically return to manual operation without any change to the number of lock-to-lock turns. In this case, the steering will of course be heavier than with the Power Assist activated.



WE RECOMMEND

The use of SeaStar Steering Fluid ONLY in our hydraulic steering systems. See Page 144

TYPICAL POWER ASSIST APPLICATION
IN AN INBOARD BOAT



TECHNICAL SPECIFICATIONS	
Voltage	12V or 24V (automatically recognized)
System Pressure	1000 psi MAX (1500 psi MAX Power Assist Pro)
Current Draw	40 A MAX, 60 A Peak (1 A System Electronics)
TYPICAL APPLICATIONS	
150hp+ single outboards	
Heavy 4-stroke outboards	
Twin/Triple outboards	
High performance bass boats (SeaStar Power Assist Pro)	
Non counter rotating twin outboards	



SEASTAR POWER ASSIST WITH AUTOPILOT:

The SeaStar Autopilot pump, combined with our SeaStar Power Assist system, provides power assisted steering when the autopilot is in standby mode. Available in type 1 or type 2 the SeaStar Autopilot pump is a fixed flow, reversible pump set that uses a high efficiency hydraulic gear pump, producing very little vibration or noise. It is offered in 12 and 24 volt configurations.

FEATURES:

- Autopilot pump combined with SeaStar power assist in one easy to fit package
- Converts manual hydraulic steering to power steering
- Dramatic reduction in steering wheel torque
- Easy installation
- OEM or Retrofit
- Simple add on to an existing SeaStar manual system
- From 1.4-2.4 SeaStar helm pumps
- Compatible with power purge system
- Ignition protected (SAE J-1171)
- ABYC, CE, NMMA, ISO 10592 Approved
- Replaces other 12 & 24 volt systems



WE RECOMMEND

The use of SeaStar Steering Fluid ONLY in our hydraulic steering systems. See Page 144

COMPLETE SYSTEMS	
Standard SPA + type 1 12V Autopilot pump	PA6010
Standard SPA + type 2 12V Autopilot pump	PA6020
Standard SPA + type 1 24V Autopilot pump	PA7010
Standard SPA + type 2 24V Autopilot pump	PA7020
OPTIONS	
SmartStick (Ray Marine) Installations Only 2.2V - 2.8V	AR4502RM
SmartStick (Simrad) Installations Only 2.8kHz - 4.0kHz	AR4502SI
SmartStick 0.5V - 4.5V	AR4502
Hydraulic Fluid 1 Liter	HA5430
Hydraulic Fluid 4 Liter	HA5440
Hydraulic Hose Kit	H051xx
Nylon Tubing (25ft roll) - Return Line ONLY	HT5092



SmartStick [AR4502](#)

Only available for SeaStar Pivot Cylinder part numbers, [HC5345-3](#), [HC5348-3](#), [HC5358-3](#), [HC6345-3](#) and [HC6358-3](#).

TECHNICAL SPECIFICATION	
Voltage	12 or 24 volts
Fittings	Compatible w/ Standard SeaStar Hoses (HO51xx etc)
WIRE DETAILS	
Length	24"
Gauge	12 awg
Connector	None - Bare Leads
Oil Compatibility	SeaStar Steering Fluid (MIL 5606)
Weight	4.9 lbs (2.2 kg)
Autopilot Pump Sizes	Type 1: 60 in ³ /min (no-load) Type 2: 100 in ³ /min (no-load)
Maximum Pressure	1000 psi
Typical Current Draw (Depending on Application)	12V Type 1: 4 – 8 amps 12V Type 2: 5 – 11 amps 24V Type 1: 2 – 4 amps 24V Type 2: 3 – 6 amps
AUTOPILOT PUMP CYLINDER CAPACITY	
Type 1	4.9 in ³ - 12.5 in ³
Type 2	12.5 in ³ - 21 in ³



WE RECOMMEND

The use of SeaStar Steering Fluid ONLY in our hydraulic steering systems.
See Page 144

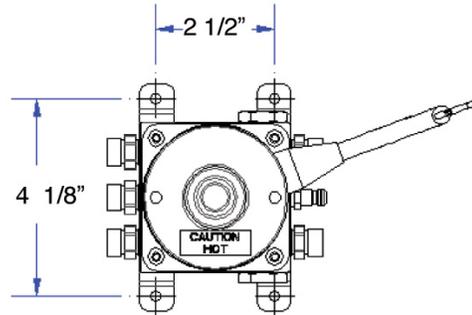
COMPLETE SYSTEM	
Type 1 - 12V - 60cu"/min	AP1219
Type 2 - 12V - 100cu"/min	AP1233
Type 1 - 24V - 60cu"/min	AP2419
Type 2 - 24V - 100cu"/min	AP2433
OPTIONS	
SPA Retrofit kit	HA1205
Add a Station kit	HF6007
Nylon Return Line Required	HT5092
Additional Steering Hose Required	HO51xx
Stand alone pilot pump - can be retrofit to a PA unit	

SEASTAR AUTOPILOT PUMP:

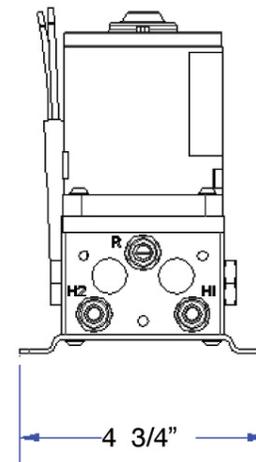
The SeaStar Autopilot pump is a high efficiency, fixed flow, reversible type Pump set producing very little vibration or noise. It is offered in 12 and 24 volt configurations, as well as two different pump sizes (type 1 & type 2). It can be used as a stand alone pilot pump or can be mounted to a previously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

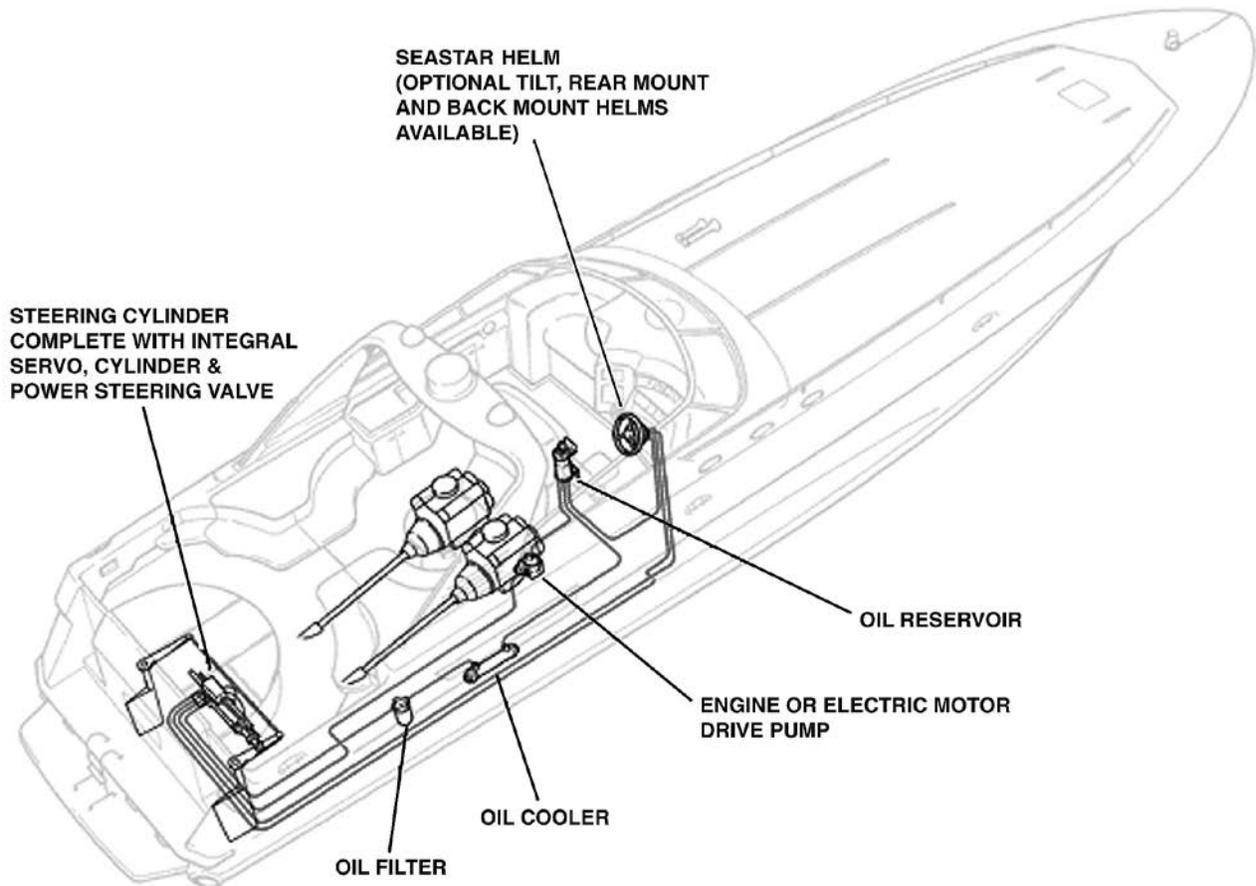
FEATURES:

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



TECHNICAL SPECIFICATION	
Voltage	12 or 24 volts
Fittings	Compatible w/ Standard SeaStar Hoses (HO51xx etc)
WIRE DETAILS	
Length	24"
Gauge	12 awg
Connector	None - Bare Leads
Oil Compatibility	SeaStar Steering Fluid
Weight	4.9 lbs (2.2 kg)
Autopilot Pump Sizes	Type 1: 60 in ³ /min (no-load) Type 2: 100 in ³ /min (no-load)
Maximum Pressure	1000 psi
Typical Current Draw (Depending on Application)	12V Type 1: 4 – 8 amps 12V Type 2: 5 – 11 amps 24V Type 1: 2 – 4 amps 24V Type 2: 3 – 6 amps
AUTOPILOT PUMP CYLINDER CAPACITY	
Type 1	4.9 in ³ - 12.5 in ³
Type 2	12.5 in ³ - 21 in ³





SEASTAR HYDRAULIC POWER STEERING SYSTEM:

Steering today's high horsepower luxury yachts and commercial craft all too often challenges physical endurance and cruising enjoyment on the water.

SeaStar Power Steering provides the ultimate in comfort, simplicity, safety and reliability.

Superior design and manufacturing deliver an outstanding, rugged product — in the SeaStar tradition.

APPLICATIONS:

Vessels up to 120 feet (planing hulls using twin 2.5" bore cylinders).

FEATURES:

- Effortless steering at any speed.
- Responsive 3-1/2 turns lock-to-lock. (Number of turns can be varied by helm.)
- Multiple steering stations can be installed.
- Compact helm has only a 4-7/16" footprint — needs only 3" dash hole.
- Tilt Steering available (requires larger dashboard hole).
- Standard 3/4" tapered steering shaft (1" straight or tapered versions available).
- Simplified installation.
- Easy autopilot interface.
- Automatic manual back-up steering.
- Meets A.B.Y.C./N.M.M.A. standards.



WE RECOMMEND

The use of SeaStar Steering Fluid ONLY in our hydraulic steering systems.
See Page 144

HOW IT WORKS:

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

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

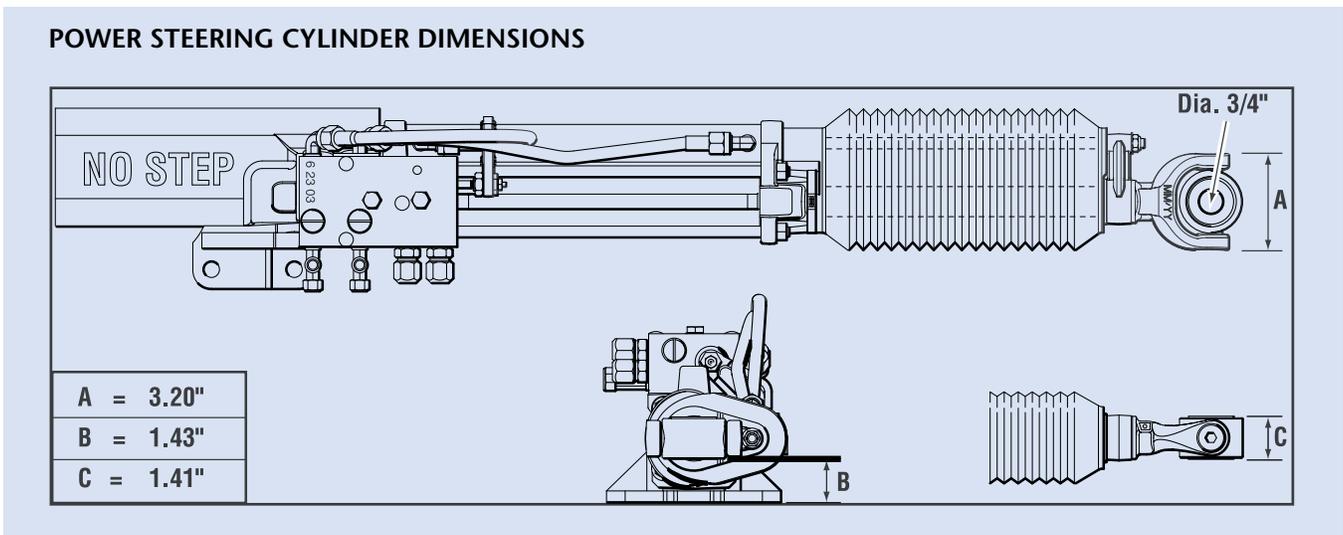
Under normal conditions, with engines running, a hydraulic oil supply is in a stand-by mode, ready to be directed to the steering cylinder as dictated by the steering wheel, servo cylinder and power steering valve.

Turning the steering wheel left or right makes the system go from "stand-by" into "operating" mode and move the steering cylinder accordingly.

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

An engine room mounted oil reservoir allows easy fill and assists the in-line cooler in cooling the hydraulic oil.

An in-line oil filter helps to protect the steering system components against contaminants.

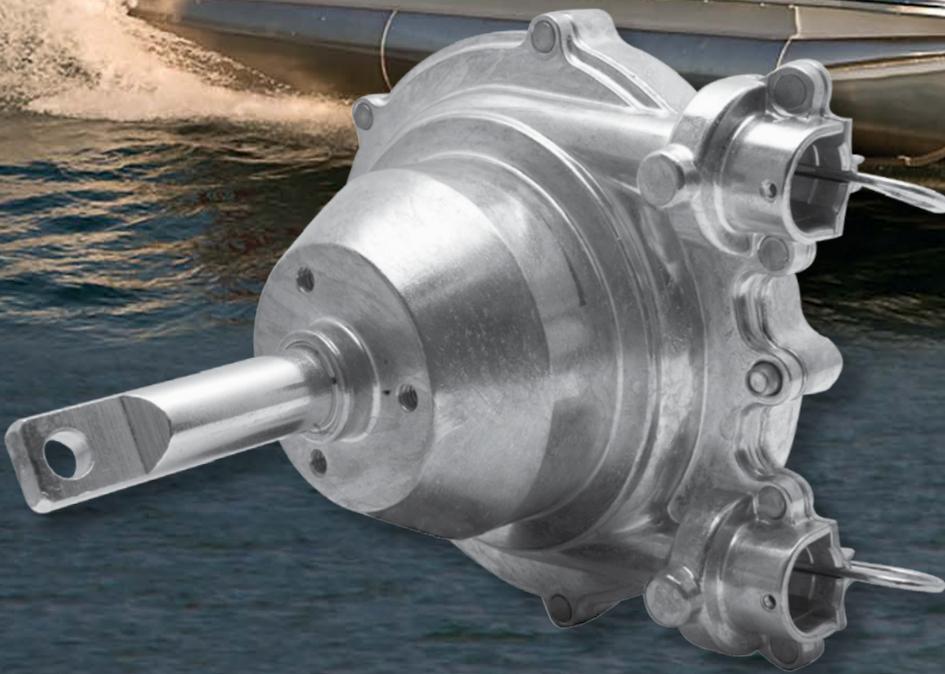


HOW TO SPEC A SYSTEM:

1. Vessel size and hull type determine the kind of cylinder required. (All boats over 70 feet in length should have steering loads reviewed by SeaStar Solutions.)
2. Engine type determines which power steering pump should be used. If in doubt, contact SeaStar Solutions.
3. A SeaStar 1.7 helm is recommended; this will result in a system with 3-1/2 wheel turns lock-to-lock when 9" stroke cylinders are used. If a different number of wheel turns is desired, contact SeaStar Solutions for recommended helm to achieve desired number of steering wheel turns.

THE MOST ADVANCED MECHANICAL STEERING

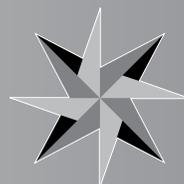
ENGINEERED WITH PRECISION TO PERFORM EFFORTLESSLY



Feel the superior driving performance from the best mechanical steering system in the marketplace. The “No Feedback” feature eliminates the effect of the driver fighting prop torque when steering the boat, providing the smoothest and lowest steering effort possible.

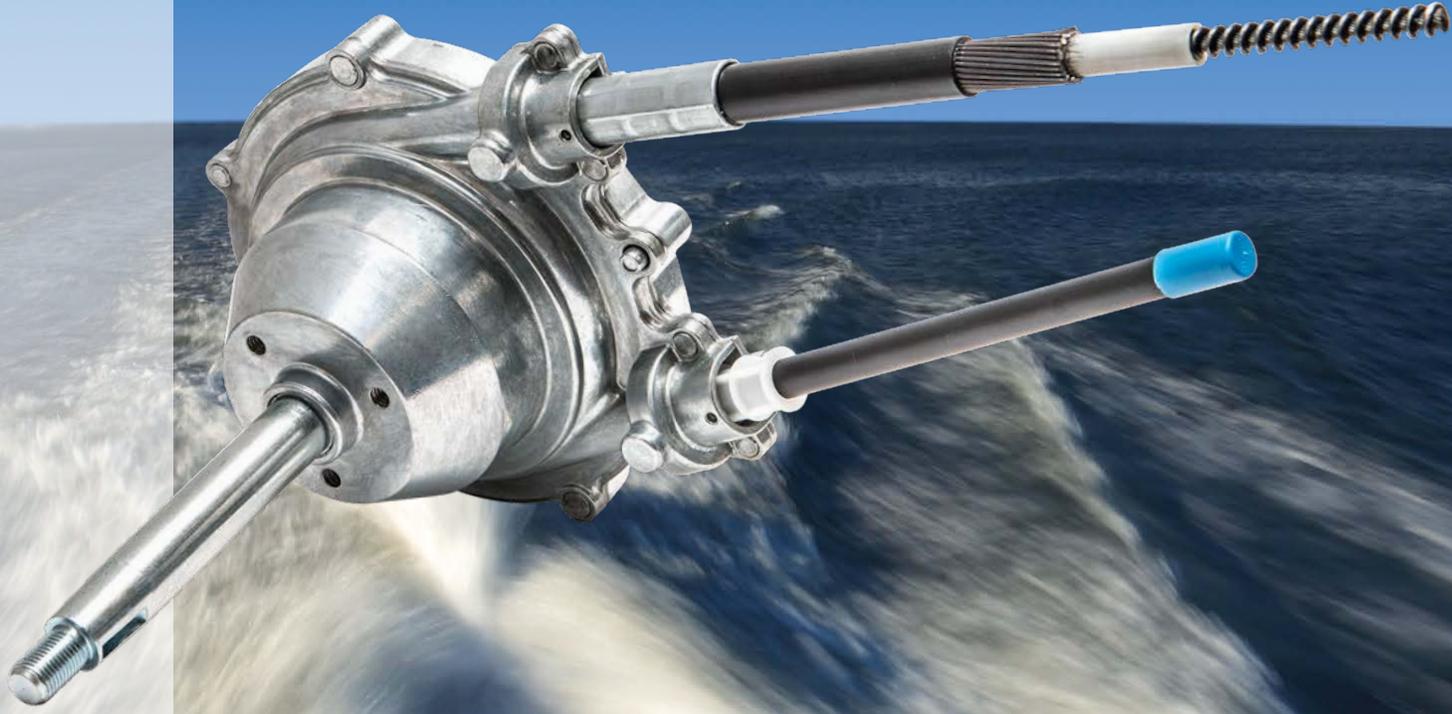
This American-built steering system fits a wide range of outboard powered boats including aluminum fishing boats, pontoons, flats, skiffs, and more.

 **xtreme**



SEASTAR
SOLUTIONS®

MECHANICAL STEERING



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★ Xtreme NFB™ TILT MECHANICAL ROTARY STEERING SYSTEM:

New Helm - The patent pending helm has a complete new gear train designed to provide smooth feel minimal backlash and low effort at the wheel. It also offers the smoothest NFB clutch release and has a smaller footprint than the current 4.2 helm. All castings are designed to reduce weight while offering superior strength.

The XTREME tilt steering system uses the [SH91800P](#) tilt mechanism which should require no dash modifications from the old style Teleflex Marine or Seastar Solutions tilt steering systems

SSCX64 XTREME Cable - A brand new XTREME™ steering cable was designed specifically for this system. This cable offers lower backlash and is more efficient than a standard steering cable. It provides the lowest ease of effort, a close "fit" of the core to liner for lowest lost motion. The concept provides the "tight" fit of core to liner yet allows area for lubrication. The design of the helm allows higher loads to be placed into the cable requiring this new design cable. There is a quick connect feature on both the steering cable and spent travel tube for easy, quick installation.

APPLICATIONS:

XTREME single cable steering systems are suitable for most single-station boats with a single non-power assisted outboard engine up to V6 and minimal engine flutter or steering instability.

XTREME steering accepts steering wheels up to 16" diameter.

Use either the 4.2 NFB dual rotary or Pro Rack dual cable systems for boats with engine flutter or steering instability.

Replaces nearly all SeaStar Solutions Safe-T steering systems without dash modifications.

FEATURES:

- Smoothest and lowest steering effort mechanical helm offered in the market place yet still offers easy installation.
- Complete steering system including new helm, high efficiency XTREME™ steering cable design and new style bezel.
- Quick connect feature on both steering cable and spent travel tube for easy quick installation.
- Installs in same mounting pattern and bracket location as most current SeaStar Solutions rotary steering systems.
- Smallest footprint possible to accommodate small, tight dash helm stations.
- Made, designed and assembled in the USA.

Note: All SSCX XTREME Cables are designed to fit only XTREME helms.

COMPLETE SYSTEMS	
XTREME™ NFB Tilt Steering Kit	SSX177XX
COMPONENTS	
XTREME™ Tilt NFB Helm	SHX97606
Sport Tilt Mechanism	SH91800
XTREME™ QC Steering Cable	SSCX64XX
OPTIONS	
XTREME™ Non-NFB Helm, Bezel and Hardware Kit	SHX7626
XTREME™ Tilt Non-NFB Helm	SHX97626
SERVICE ITEMS	
XTREME™ QC Steering Cable	SSCX64XX
XTREME™ Bezel and Hardware Kit NFB	SBX76061
XTREME™ Bezel and Hardware Kit Non-NFB	SBX76261
NOTE: Cannot replace dual cable steering.	



Xtreme NFB™ MECHANICAL ROTARY STEERING SYSTEM:

New Helm - The patent pending helm has a complete new gear train designed to provide smooth feel minimal backlash and low effort at the wheel. It also offers the smoothest NFB clutch release and has a smaller footprint than the current 4.2 helm. All castings are designed to reduce weight while offering superior strength.

New Bezel - New style, patent pending bezel keeping with the design of the SH91900 tilt and hydraulic helm pump designs.

SSCX64 XTREME Cable - A brand new XTREME™ steering cable was designed specifically for this system. This cable offers lower backlash and is more efficient than a standard steering cable. It provides the lowest ease of effort, a close "fit" of the core to liner for lowest lost motion. The concept provides the "tight" fit of core to liner yet allows area for lubrication. The design of the helm allows higher loads to be placed into the cable requiring this new design cable. There is a quick connect feature on both the steering cable and spent travel tube for easy, quick installation.

APPLICATIONS:

XTREME single cable steering systems are suitable for most single-station boats with a single non-power assisted outboard engine up to V6 and minimal engine flutter or steering instability.

XTREME steering accepts steering wheels up to 16" diameter.

Use either the 4.2 NFB dual rotary or Pro Rack dual cable systems for boats with engine flutter or steering instability.

Replaces nearly all SeaStar Solutions Safe-T steering systems without dash modifications.

FEATURES:

- Smoothest and lowest steering effort mechanical helm offered in the market place yet still offers easy installation.
- Complete steering system including new helm, high efficiency XTREME™ steering cable design and new style bezel.
- Quick connect feature on both steering cable and spent travel tube for easy quick installation.
- Installs in same mounting pattern and bracket location as most current SeaStar Solutions rotary steering systems.
- Smallest footprint possible to accommodate small, tight dash helm stations.
- Made, designed and assembled in the USA.

Note: All SSCX XTREME Cables are designed to fit only XTREME helms.

COMPLETE SYSTEM	
XTREME™ NFB Steering Kit	SSX176XX
COMPONENTS	
XTREME™ NFB Helm, Bezel and Hardware Kit	SHX7606 **
XTREME™ QC Steering Cable	SSCX64XX **
OPTIONS	
XTREME™ Tilt NFB Helm	SHX97606 **
XTREME™ Non-NFB Helm, Bezel and Hardware Kit	SHX7626 **
XTREME™ Tilt Non-NFB Helm	SHX97626 **
XTREME™ Tilt NFB Steering Kit	SSX177XX
SERVICE ITEMS	
XTREME™ QC Steering Cable	SSCX64XX **
XTREME™ Bezel and Hardware Kit NFB	SBX76061 **
XTREME™ Bezel and Hardware Kit Non-NFB	SBX76261 **
** Only offered to OEM builders as separate items.	
NOTE: Cannot replace dual cable steering.	



NFB™ 4.2 MECHANICAL ROTARY STEERING (DUAL) SYSTEM:

Patented No FeedBack Steering Helm 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, SeaStar Solutions' 4.2 Rotary NFB Steering is the ideal system for most non-power-steered boats. This rugged dual cable system is made for applications with engine flutter or steering instability. The helm is a drop-in replacement for current generation Safe-T with no dash modifications required.

(See preceding page for single cable system.)

APPLICATIONS:

NFB 4.2 dual-cable systems are suitable for most single-station boats with a **single** non-power-assisted outboard engine up to V-6 in which engine flutter or steering instability is present. 4.2 accepts wheels up to 16" diameter.

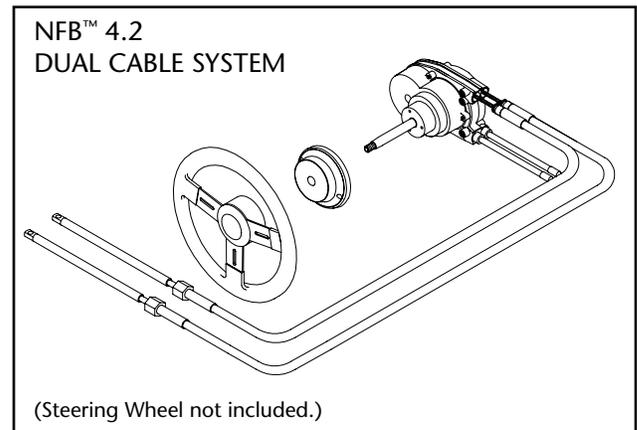
Replaces nearly all SeaStar Solutions Safe-T® steering systems (including twin cable) without dash modification.

FEATURES:

- Patented No FeedBack™ Steering mechanism.
- Twin cable system for maximum control.
- Comfortable 4.2 turns from lock-to-lock.
- Minimal clutch free play.
- Standard 3/4" round tapered steering shaft.
- Stainless steel cable output ends.
- Fast, easy installation: uses SeaStar Solutions Quick Connect (QC) steering cable.
- Kits include: 2 cables, helm, 90° bezel and hardware.
- Meets A.B.Y.C. standards.
- Meets N.M.M.A. certification requirements.
- Made, designed and assembled in the USA.

COMPONENTS	
NFB 4.2 Dual Helm	SH4920P
(2) QC Cables	SSC62XX
Rotary NFB Bezel (90°)	SB27150P
OPTIONS	
NFB 4.2 Dual Tilt Helm	SH91527P*
Sport Tilt Mechanism	SH91800P
Sport Plus Tilt Mechanism	SH91900P
Bezel (20°)	SB27483P
Cable Gard (fits most tilt tubes)	SA39329P
SERVICE ITEMS	
QC Cable (for most SeaStar Solutions rotary)	SSC62XX
Steering Wheel Hardware Kit (Old #2745417P)	SA27454P
Spent Travel Tube (Rotary NFB)	SA38603P

* Requires tilt mechanism to complete Tilt Steering system installation.





NFB™ 4.2 MECHANICAL ROTARY STEERING (SINGLE) SYSTEM:

Patented No FeedBack Steering Helm 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, SeaStar Solutions' 4.2 Rotary NFB Steering is the ideal single-cable system for most non-power-steered boats. The helm is a drop-in replacement for current generation Safe-T with no dash modifications required.

(See following page for twin cable system.)

APPLICATIONS:

NFB 4.2 single-cable systems are suitable for most single-station boats with a single non-power-assisted outboard engine up to V-6 and minimal engine flutter or steering instability. 4.2 accepts wheels up to 16" diameter.

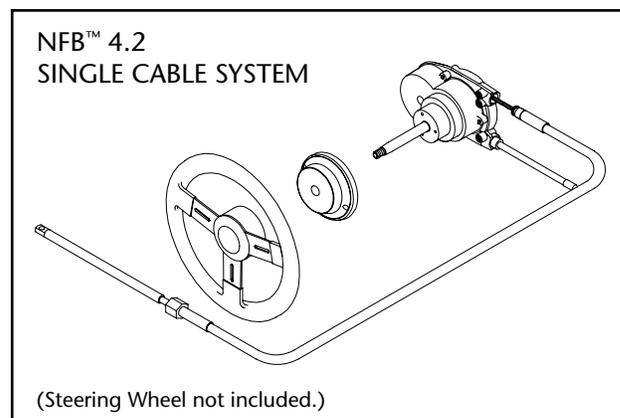
Use dual cable system for boats with engine flutter or steering instability. (See next page.)

Replaces nearly all SeaStar Solutions Safe-T® steering systems without dash modification.

FEATURES:

- Patented No FeedBack™ Steering mechanism.
- Comfortable 4.2 turns from lock-to-lock.
- Minimal clutch free play.
- Standard 3/4" round tapered steering shaft.
- Stainless steel cable output ends.
- Fast, easy installation: uses SeaStar Solutions Quick Connect (QC) steering cable.
- Kits include: cable, helm, 90° bezel and hardware.
- Meets A.B.Y.C. standards.
- Meets N.M.M.A. certification requirements.
- Made, designed and assembled in the USA.

COMPLETE SYSTEMS	
NFB 4.2 Steering Kit (Single Cable)	SS147XX
COMPONENTS	
NFB 4.2 Helm	SH4910P
QC Cable	SSC62XX
Rotary NFB Bezel (90°)	SB27150P
OPTIONS	
NFB 4.2 Single Tilt Dash Module	SHT91526
Each Kit Includes Tilt Helm & Tilt Mechanism	
NFB 4.2 Single Tilt Helm	SH91526P*
Sport Tilt Mechanism	SH91800P
Sport Plus Tilt Mechanism	SH91900P
Bezel (20°)	SB27483P
Cable Gard (fits most tilt tubes)	SA39329P
SERVICE ITEMS	
QC Cable (for most SeaStar Solutions rotary)	SSC62XX
Steering Wheel Hardware Kit (Old #2745417P)	SA27454P
Spent Travel Tube (Rotary NFB)	SA38603P
* Requires tilt mechanism to complete Tilt Steering system installation.	





NFB™ MECHANICAL RACK STEERING (SINGLE) SYSTEM:

The easy-to-sell, easy-to-install upgrade to the most popular Rack and Pinion steering system in boating. SeaStar Solutions 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. And — it's a drop-in replacement for SeaStar Solutions "The Rack".

APPLICATIONS:

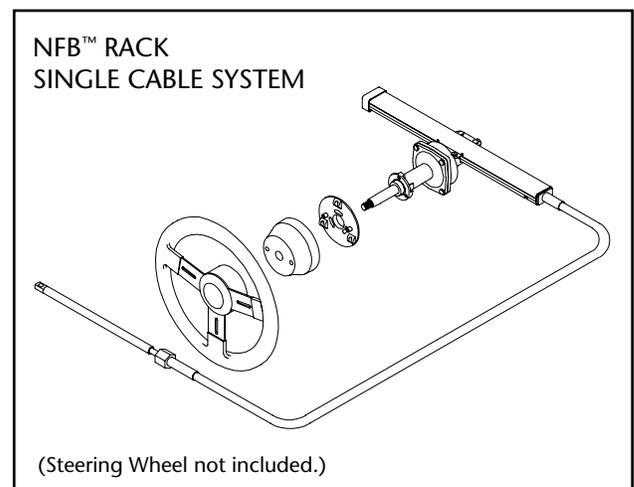
NFB Rack single-cable systems are suitable for most single-station boats with a single non-power-assisted outboard engine up to V-6 and minimal engine flutter or steering instability. NFB Rack accepts wheels up to 16" diameter.

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

FEATURES:

- Patented No FeedBack™ Steering mechanism.
- Precise feel of 4 turns from lock-to-lock.
- Minimal clutch free play.
- Standard 3/4" round 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 SeaStar Solutions rack holes.
- Kits include: cable, helm, 90° bezel and hardware.
- Meets A.B.Y.C. standards.
- Meets N.M.M.A. certification requirements.
- Made, designed and assembled in the USA.

COMPLETE SYSTEM	
NFB Rack Steering Kit (Single Cable)	SS151XX
COMPONENTS	
NFB Rack Helm (single/dual)	SH5230P
Rack Single Cable	SSC134XX
Rack NFB Bezel (90°)	SB39544P
OPTIONS	
NFB Rack Tilt Dash Module (single/dual) Each Kit Includes Tilt Helm & Tilt Mechanism	SHT91630
NFB Rack Tilt Helm (single/dual)	SH91630P*
Sport Tilt Mechanism	SH91800P
Sport Plus Tilt Mechanism	SH91900P
Dash Wedge Kit (10°)	SB27448P
Dash Wedge Kit (20°)	SB27449P
 xtreme Rack Single Cable	SSC154XX
Cable Gard (fits most tilt tubes)	SA39329P
Steering Wheel Hardware Kit (Old #2745417P)	SA27454P
* Requires tilt mechanism to complete Tilt Steering system installation.	





NFB™ PRO MECHANICAL RACK STEERING (DUAL) SYSTEM:

The only Rack and Pinion steering system for the high performance boater. SeaStar Solutions combines its patented No FeedBack technology with the incredible precision and control of a dual cable rack and pinion system. Now more than ever, NFB means performance! SeaStar Solutions offers Pro Rack for high performance hulls and motors — boats which have engine flutter, experience instability or simply need that extra margin of control at the helm. It's a drop-in replacement for SeaStar Solutions “The Rack”.

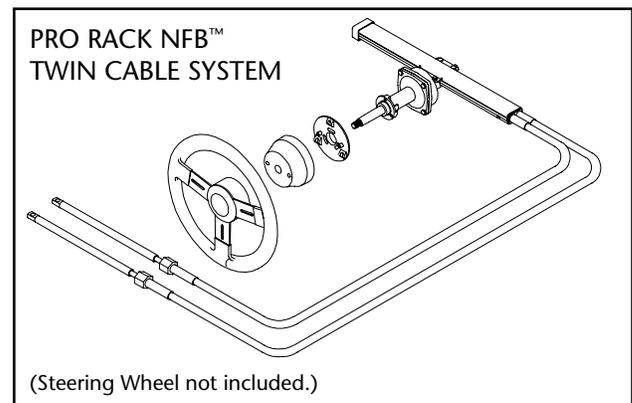
APPLICATIONS:

NFB Pro Rack systems are suitable for single-station, high performance boats equipped with a single non-power-assisted outboard (up to V-6) in which engine flutter or steering instability is present. NFB Pro Rack accepts wheels up to 16" diameter. New Back Mount design installs easily and replaces standard SeaStar Solutions rack steering without dash modifications.

FEATURES:

- Patented No FeedBack™ Steering mechanism.
- Dual cables minimize lost motion in system.
- Precise feel of 4 turns from lock-to-lock.
- Minimal clutch free play.
- Standard 3/4" round 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 SeaStar Solutions rack holes.
- Kits include: cables, helm, 90° bezel and hardware.
- Meets A.B.Y.C. standards.
- Meets N.M.M.A. certification requirements.
- Made, designed and assembled in the USA.

COMPLETE SYSTEMS	
NFB Pro Rack Steering Kit (Dual Cable)	SS152XX
COMPONENTS	
NFB Rack Helm (single/dual)	SH5230P
Rack Dual Cable (as pictured below)	SSC135XX
Rack NFB Bezel (90°)	SB39544P
OPTIONS	
NFB Rack Tilt Dash Module (single/dual) Each Kit Includes Tilt Helm & Tilt Mechanism	SHT91630
NFB Rack Tilt Helm (single/dual)	SH91630P*
Sport Tilt Mechanism	SH91800P
Sport Plus Tilt Mechanism	SH91900P
Dash Wedge Kit (10°)	SB27448P
Dash Wedge Kit (20°)	SB27449P
Cable Gard (fits most tilt tubes)	SA39329P
Steering Wheel Hardware Kit (Old #2745417P)	SA27454P
* Requires tilt mechanism to complete Tilt Steering system installation.	





NFB™ SAFE-T® II MECHANICAL ROTARY STEERING SYSTEM:

Major OEMs use SeaStar Solutions Safe-T II, and so will your customers. It's the next generation of Safe-T, the world's #1 rotary steering system — rugged, compact, lightweight, and with SeaStar Solutions No FeedBack technology. This ultra-smooth, 3-turn system takes the work out of steering most V-4 outboard powered boats. The Safe-T II helm is a drop-in replacement for current generation Safe-T QC with no dash modifications!

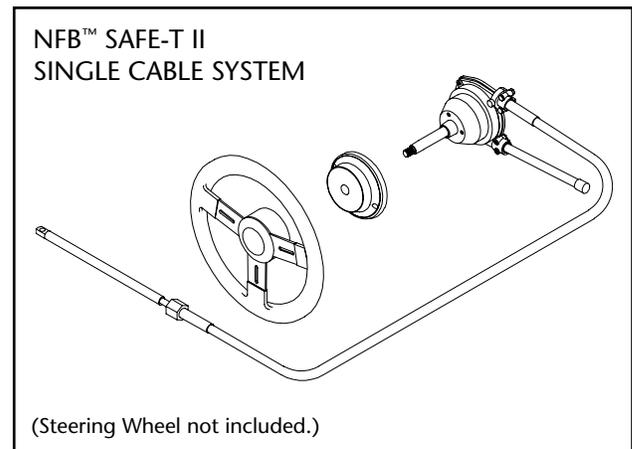
APPLICATIONS:

NFB Safe-T II single-cable systems are suitable for most single-station boats with a single non-power-assisted outboard engine up to V-4 and minimal engine flutter or steering instability. Safe-T II accepts wheels up to 16" diameter. (NFB Safe-T II is available in single cable configuration only). Replaces nearly all standard Safe-T® steering without dash modifications.

FEATURES:

- Patented No FeedBack™ Steering mechanism.
- Quick response of 3 turns lock-to-lock.
- Minimal clutch free play.
- Standard 3/4" round tapered steering shaft.
- Stainless steel cable output ends.
- Fast, easy installation: uses SeaStar Solutions Quick Connect (QC) cable.
- Kits include: cable, helm, 90° bezel and hardware.
- Meets A.B.Y.C. standards.
- Meets N.M.M.A. certification requirements.
- Made, designed and assembled in the USA.

COMPLETE SYSTEM	
NFB Safe-T II Steering Kit	SS132XX
COMPONENTS	
NFB Safe-T II Helm	SH5150P
QC Cable	SSC62XX
Rotary NFB Bezel (90°)	SB27150P
OPTIONS	
NFB Safe-T II Tilt Dash Module	SHT91190
Each Kit Includes Tilt Helm & Tilt Mechanism	
NFB Safe-T II Tilt Helm	SH91190P*
Sport Tilt Mechanism	SH91800P
Sport Plus Tilt Mechanism	SH91900P
Bezel (20°)	SB27483P
Cable Gard (fits most tilt tubes)	SA39329P
SERVICE ITEMS	
QC Cable (for most SeaStar Solutions rotary)	SSC62XX
Steering Wheel Hardware Kit (Old #2745417P)	SA27454P
Spent Travel Tube (Rotary NFB)	SA38603P
Hitch Pin for Quick Connect Helms (Old #2727514P)	SA27245P
* Requires tilt mechanism to complete Tilt Steering system installation.	





NEW! 4.2 NON NFB ROTARY STEERING:

For the boat owner that likes the ease of the 4.2 mechanical advantage and does not want the NFB clutch in the helm.

Great for pontoon boats, and sail boats.

This system will fit most old Teleflex and SeaStar Solutions rotary mounting holes with no dash modification.

APPLICATIONS:

Ideal for boats that do not require the NFB clutch, yet want the ease of 4.2 rotary steering. Inboards, pontoons, where the steering loads may make three turn steering systems hard to turn. Uses the same steering cable and mounting holes.

FEATURES:

- 4 turn lock to lock, providing more mechanical steering advantage over the three turn systems.
- Standard 3/4 round taper steering wheel shaft.
- Stainless Steel steering cable output end.
- Fast easy installation using the quick connect steering cable [SSC62XX](#).
- Meets ABYC standards.
- Meets N.M.M.A. certification requirements.
- Made, designed & assembled in the U.S.A.

COMPONENTS	
4.2 NON NFB Helm (Single Cable)	SH4951P
90 Degree Bezel Kit	SB27484P
Steering Cable	SSC62XX
OPTIONS	
* 4.2 NON NFB Single Tilt Helm	SH4971P
* 4.2 NON NFB Dual Tilt Helm	SH94952P
4.2 NON NFB Dual Cable Helm	SH4952P
Sport Tilt Mechanism	SH91800P
Sport Plus Tilt Mechanism	SH91900P
20 Degree Bezel Kit	SB27483P
Cable Guard	SA39329P
SERVICE ITEMS	
Steering Wheel Hardware Kit	SA27454P
Spent Travel Tube	SA38603P
* Requires tilt mechanism to complete Tilt Steering system installation.	



HPSTM MECHANICAL ROTARY STEERING SYSTEM:

HPSTM Rotary High Performance Steering by SeaStar Solutions is the best 3-turn way to steer a power-assisted sterndrive! Designed exclusively for power-steered boats, HPS reduces backlash (free-play at the wheel) associated with power steered boats by up to 50%!

APPLICATIONS:

HPSTM Rotary is ideal for all power-assisted sterndrives that can accept a mechanical steering cable.

It replaces standard current generation Safe-T® steering without dash modifications and most other rotary steering systems with minimal dash modifications.

HPS Rotary is available in single cable configuration and is for single station use only. It accepts wheels up to 16" diameter.

FEATURES:

- Designed exclusively for boats with power-assisted steering.
- Unique 3-turn helm with planetary gears and coated helical steering cable combine to deliver a compact helm with incredible response and minimal lost motion!
- HPS Rotary helms fit industry-standard SeaStar Solutions dash cutouts: either Safe-T/Rotary NFB™ or Tilt.
- Compact helm takes up little room behind the dash.
- Designed to handle normal steering loads.
- Standard 3/4" round tapered steering shaft.
- Stainless steel cable output ends.
- Fast, easy installation: uses SeaStar Solutions Quick Connect™ (QC) cable & standard Safe-T mounting hardware.
- Meets A.B.Y.C. standards.
- Meets N.M.M.A. certification requirements.
- Made, designed and assembled in the USA.

COMPLETE SYSTEM

This steering system is sold by components. Select helm, bezel and cable or Tilt helm, Tilt Mechanism and cable from items listed below.

COMPONENTS

HPS Rotary Helm	SH5180P
HPS Rotary Cable (QC interface)	SSC63XX
Bezel (90°)	SB27484P

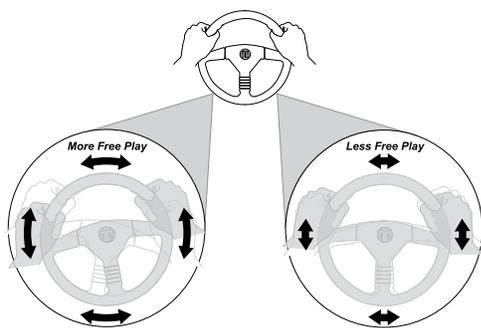
OPTIONS

HPS Rotary Tilt Helm	SH91650P*
Sport Tilt Mechanism	SH91800P
Sport Plus Tilt Mechanism	SH91900P
Bezel (20°)	SB27483P
Cable Gard (fits most tilt tubes)	SA39329P

SERVICE ITEMS

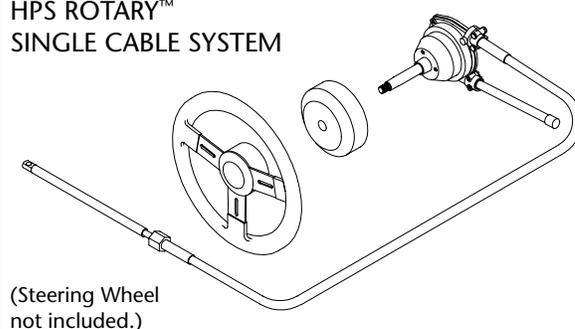
Steering Wheel Hardware Kit (Old #2745417P)	SA27454P
Spent Travel Tube	SA38603P
Hitch Pin for Quick Connect Helms (Old #2724514P)	SA27245P

* Requires tilt mechanism to complete Tilt Steering system installation.



UP TO 50% LESS FREE-PLAY AT WHEEL VS. CONVENTIONAL STEERING.

HPSTM ROTARY™ SINGLE CABLE SYSTEM





BIG-T® MECHANICAL ROTARY STEERING (SINGLE) SYSTEM:

The Original SeaStar Solutions Steering System! For over 50 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 SeaStar Solutions Big-T since 1963!

APPLICATIONS:

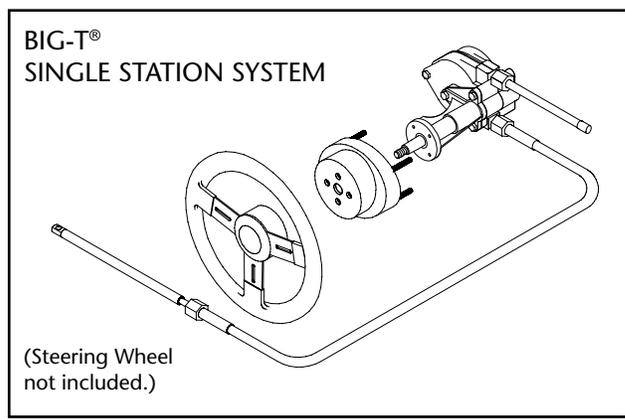
Inboards to 34 feet with one engine. Also suitable for sterndrive boats with power-assisted steering. Big-T systems accept steering wheels up to 20" diameter.

The type of system shown on this page is for single station use. For dual station Big-T, please see the next page.

FEATURES:

- Available in single or dual station versions. (See next page for dual station version.)
- Responsive 3 turns from lock-to-lock.†
- Standard 3/4" round 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 SeaStar Solutions SSC62 type cable with helm converter SA27620P.
- Meets A.B.Y.C. standards.
- Meets N.M.M.A. certification requirements.
- Made, designed and assembled in the USA.

COMPLETE SYSTEM	
This steering system is sold by components. Select helm, bezel and cable from items listed below.	
COMPONENTS	
Big-T Helm (single station push-pull)	SH5000P
Big-T Cable (QC II Cable) Replaces SSC72XX Includes SA27620P Helm Converter	SSC61XX*
Bezel 2-pc. Black (90°/20° mount)	SB27265P
OPTIONS	
Cable Gard (fits most tilt tubes)	SA39329P
SERVICE ITEMS	
Steering Wheel Hardware Kit (Old #2745417P)	SA27454P
Spent Travel Tube (Big-T)	SA35680P
* Can also use steering cable SSC62xx and helm converter SA27620P	





BIG-T® MECHANICAL ROTARY STEERING (DUAL STATION) SYSTEM:

The Original SeaStar Solutions Steering System! For over 50 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 SeaStar Solutions Big-T since 1963!

APPLICATIONS:

Inboards up to 34 feet. Also suitable for sterndrive boats with power-assisted steering. Big-T systems accept steering wheels up to 20" diameter.

The type of system shown on this page is for dual station use. For single station Big-T, please see the previous page.

FEATURES:

- Available in single or dual station versions. (See previous page for single station version.)
- Responsive 3 turns from lock-to-lock.
- Standard 3/4" round 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 a special-order, non-returnable type cable SSC81AxxBxx. †
- Meets A.B.Y.C. standards.
- Meets N.M.M.A. certification requirements.
- Made, designed and assembled in the USA.

COMPLETE SYSTEM

This steering system is sold by components. Select helm, bezel and cable from items listed below.

COMPONENTS

(2) Big-T Helm	SH5000P
(1) Big-T Cable (dual station)	SSC81AxxBxx †
(2) Bezel 2-pc. Black (90°/20° mount)	SB27265P

OPTIONS

Cable Gard (fits most tilt tubes)	SA39329P
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SERVICE ITEMS

Steering Wheel Hardware Kit (Old #2745417P)	SA27454P
Spent Travel Tube (Big-T)	SA35680P

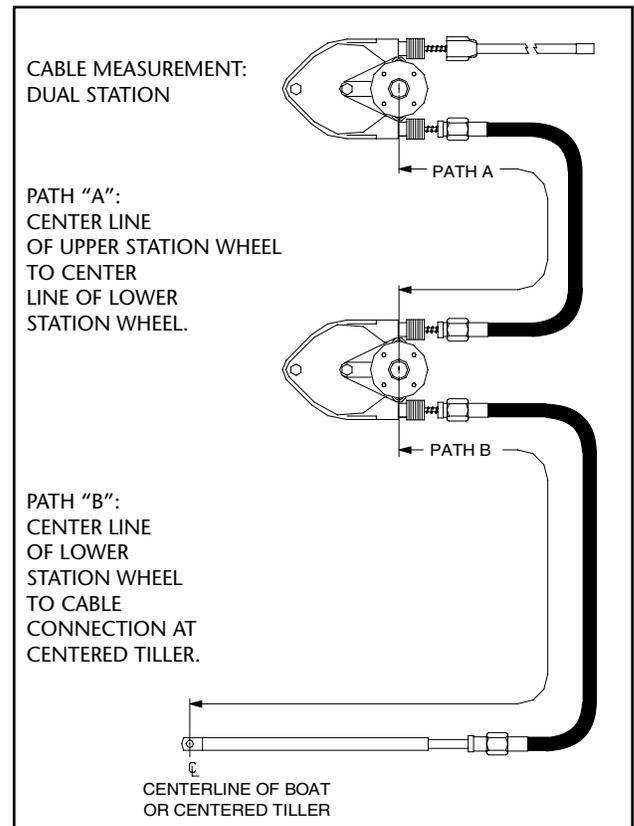
† Dual station requires purchase of special order non-returnable cable.

HOW TO MEASURE CABLE FOR DUAL STATION BIG-T:

For a Big-T dual station steering system, the cable required is SSC81AxxBxx, where xx = the lengths of the two cable sections in feet. The letter "A" in the part number represents the cable routing path distance between steering stations. The letter "B" represents the cable routing path distance from the lower station to the engine/rudder area. The different cable lengths are available in one-foot increments only.

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.

NOTE: Please be sure of your measurements because this cable is special order non-returnable.





HPST™ MECHANICAL RACK & PINION STEERING SYSTEM:

HPST™ Rack by SeaStar Solutions is the best 4-turn way to steer a power-assisted sterndrive and is Ideal for small inboards too, HPS reduces backlash (free-play at the wheel) associated with power steered boats by up to 50%!

A great choice for ski boats, too!

APPLICATIONS:

HPST™ Rack is ideal for all power-assisted sterndrives that can accept a mechanical steering cable and have adequate room for a rack & pinion steering cable behind the dash.

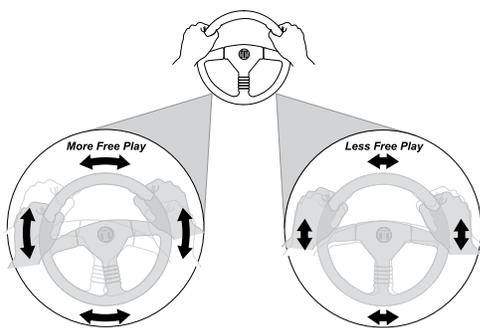
It replaces most standard SeaStar Solutions Rack & Pinion steering without dash modifications.

HPS Rack is available in single cable configuration and is for single station use only. It accepts wheels up to 16" diameter.

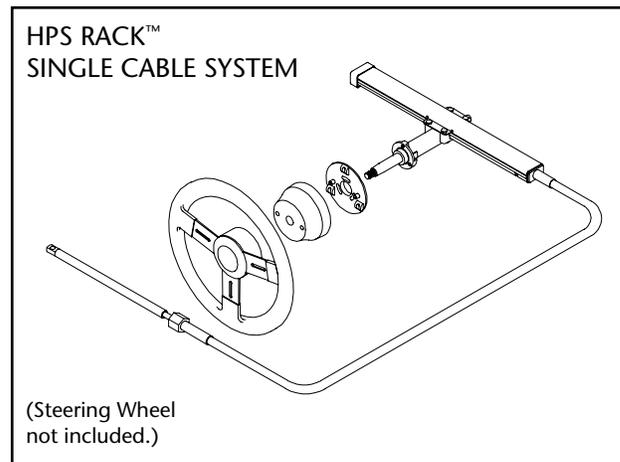
FEATURES:

- Designed for boats with power-assisted steering.
- Unique **xtreme** core steering cable technology delivers incredible response and minimal lost motion!
- Precise, 4-turn response of Rack & Pinion steering.
- Designed to handle normal steering loads.
- Standard 3/4" round tapered steering shaft.
- Stainless steel cable output ends.
- Fast, easy installation: back mount design allows quick placement in dash PLUS mounting hardware fits SeaStar Solutions rack holes.
- Meets A.B.Y.C. standards.
- Meets N.M.M.A. certification requirements.
- Made, designed and assembled in the USA.

COMPLETE SYSTEM	
This steering system is sold by components. Select helm, bezel and cable or Tilt helm, Tilt Mechanism and cable from items listed below.	
COMPONENTS	
Back Mount Rack Helm (single/dual)	SH5210P
xtreme Rack Single Cable	SSC154XX
Back Mount Rack Bezel (90°)	SB39526P
OPTIONS	
BM Rack Tilt Dash Module Each Kit Includes Tilt Helm & Tilt Mechanism	SHT91610
BM Rack Tilt Helm (single/dual)	SH91610P*
Sport Tilt Mechanism	SH91800P
Sport Plus Tilt Mechanism	SH91900P
Dash Wedge Kit (10°)	SB27448P
Dash Wedge Kit (20°)	SB27449P
Back Mount Rack Friction Device (Old #3953114P)	SA39531P
Cable Gard (fits most tilt tubes)	SA39329P
SERVICE ITEMS	
Steering Wheel Hardware Kit (Old #2745417P)	SA27454P
* Requires tilt mechanism to complete Tilt Steering system installation.	



UP TO 50% LESS FREE-PLAY AT WHEEL VS. CONVENTIONAL STEERING.





THE RACK MECHANICAL RACK STEERING SYSTEM:

Traditional SeaStar Solutions mechanical steering is still the choice for sterndrives, 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 with a cable and helm that install easily from behind the dash. In single cable configurations, this is the best 4-turn choice for power-steered boats.

APPLICATIONS:

Virtually all power assisted sterndrive boats with wheels up to 16" diameter.

Back Mount Rack Replaces 1984-date SeaStar Solutions "The Rack" steering without dash modification. (Requires use of [SSC134XX](#) Back Mount Rack cable.)

For single station use only. Components are available for dual cable systems, but we recommend No FeedBack steering for all dual cable steered, non-power assisted outboards and sterndrives. See the NFB Pro Rack Dual Cable and SeaStar PRO sections of this [catalog](#).

FEATURES:

- Precise, easy 4 turns lock-to-lock.
- Kits include: cable, helm, 90° bezel and hardware.
- Standard 3/4" round 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 SeaStar Solutions rack holes.
- Meets A.B.Y.C. standards.
- Meets N.M.M.A. certification requirements.
- Made, designed and assembled in the USA.

DISCLAIMER: This system is only recommended as replacement for the original system as installed by the boat manufacturer. SeaStar Solutions always recommends NFB helms for outboard applications. NFB helms lock out steering loads caused by propeller torque eliminating the driver fatigue normally experienced with a standard helm. Patented SeaStar Solutions steering helms are a drop in replacement for standard rack system.

COMPLETE SYSTEM	
BM Rack Steering Kit (single cable)	SS141XX
COMPONENTS	
Back Mount Rack Helm (single/dual)	SH5210P
Back Mount Rack Single Cable	SSC134XX
Back Mount Bezel (90°)	SB39526P
OPTIONS	
BM Rack Tilt Dash Module Each Kit Includes Tilt Helm & Tilt Mechanism	SHT91610
BM Rack Tilt Helm (single/dual)	SH91610P*
Sport Tilt Mechanism	SH91800P
Sport Plus Tilt Mechanism	SH91900P
xtreme Rack Single Cable	SSC154XX
Dash Wedge Kit (10°)	SB27448P
Dash Wedge Kit (20°)	SB27449P
Back Mount Rack Friction Device (Old #3953114P)	SA39531P
Cable Gard (fits most tilt tubes)	SA39329P
SERVICE ITEMS	
Back Mount Rack Dual Cable	SSC135XX†
Steering Wheel Hardware Kit (Old #2745417P)	SA27454P
* Requires tilt mechanism to complete Tilt Steering system installation.	
† For dual rack & pinion steered boats. If steering is NOT power-assisted, upgrading to NFB 4.0 Pro Rack is recommended.	



SAFE-T® QC MECHANICAL ROTARY STEERING SYSTEM:

Traditional SeaStar Solutions mechanical steering is still the choice for sterndrives, 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.

APPLICATIONS:

Virtually all power-assisted sterndrive boats with wheels up to 16" diameter. Safe-T QC® replaces all SeaStar Solutions Safe-T helms made since 1968 with little or no dash modifications. (Requires use of SSC62 QC or SSC62 QC II steering cable.)

For single station use only. Safe-T QC accepts wheels up to 16" diameter.

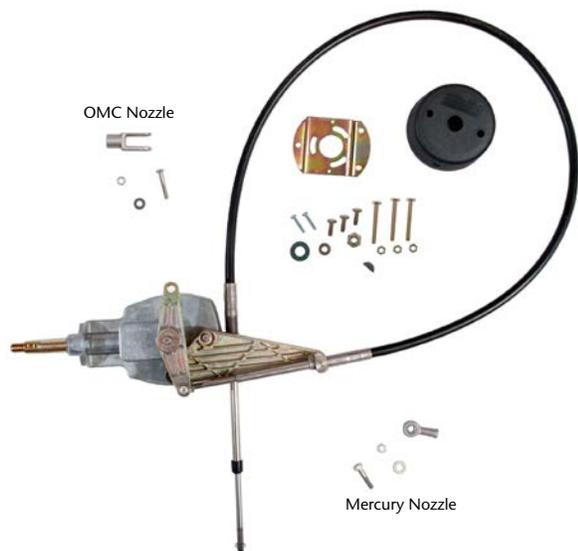
We recommend No FeedBack steering for all dual cable steered, non-power-assisted outboards and sterndrives. See the NFB 4.2 Dual Cable and SeaStar PRO sections of this [catalog](#).

FEATURES:

- Quick-response of 3 turns lock-to-lock.
- Kits include: cable, helm, 90° bezel and hardware.
- Standard 3/4" round tapered steering shaft.
- Stainless steel cable output ends.
- Fast, easy installation: uses simple snap-in cable connection, SeaStar Solutions Quick Connect (QC) cable, and industry-standard Safe-T mounting hardware.
- Meets A.B.Y.C. standards.
- Meets N.M.M.A. certification requirements.
- Made, designed and assembled in the USA.

DISCLAIMER: This system is only recommended as replacement for the original system as installed by the boat manufacturer. SeaStar Solutions always recommends NFB helms for outboard applications. NFB helms lock out steering loads caused by propeller torque eliminating the driver fatigue normally experienced with a standard helm. Patented SeaStar Solutions steering helms are a drop in replacement for Safe-T systems.

COMPLETE SYSTEM	
Safe-T QC Steering Kit (single cable)	SS137XX
COMPONENTS	
Safe-T QC Single Helm	SH5094-1P
QC Cable	SSC62XX
Safe-T QC Bezel (90°)	SB27484P
OPTIONS	
Safe-T QC Sgl. Tilt Dash Module Each Kit Includes Tilt Helm & Tilt Mechanism	SHT91523
Sport Tilt Mechanism	SH91800P
Sport Plus Tilt Mechanism	SH91900P
Safe-T QC Single Tilt Helm	SH91523-1P*
Safe-T QC Bezel (20°)	SB27483P
Cable Gard (fits most tilt tubes)	SA39329P
SERVICE ITEMS	
QC Cable (For most SeaStar Solutions rotary helms)	SSC62XX
QC II Threaded Helm Converter	SA27620P
Steering Wheel Hardware Kit (Old #2745417P)	SA27454P
Spent Travel Tube	SA35680P
Hitch Pin for Quick Connect Helms (Old #2724514P)	SA27245P
Safe-T "TS" Helm (Old Style)	SH5023P
* Requires tilt mechanism to complete Tilt Steering system installation.	



COMPLETE SYSTEM

This steering system is sold by components. Select helm, bezel and cable or Tilt helm, and cable from items listed below. Note engine type and desired steering arc.

COMPONENTS

JBS Helm (135° turning arc)	SH5087P or
JBS Helm (270° turning arc)	SH5088P
JBS Steering Cable (XX = length in feet; measurement is length from tip to tip)	SSC219XX
JBS Bezel & Mounting Hardware Kit	SB39452P
Nozzle Connection Kit (Mercury)	SA27591P or
Nozzle Connection Kit (OMC)	SA27590P

OPTIONS:

JBS Tilt Steering Helm (135° arc) Sport Tilt Mechanism Included	SH91691P
JBS Tilt Steering Helm (270° arc) Sport Tilt Mechanism Included	SH91692P

SERVICE ITEMS:

Steering Wheel Hardware Kit (Old #2745417P)	SA27454P
Dual Cable Kit	3946214

Helm Parts (see diagram at right)

1. Pivot – cable conduit fitting	3941615
2. Bushing for cable cond. ftg. pivot	3604811
3. Pivot – cable terminal end	3941117
4. Bushing for cable term. end pivot	3828412
Helm Cable Bracket Hardware Kit Contents	3962715
5. Locknut (3/8-24) – conduit fitting pivot	
6. Lock Washer for 3/8-24 Locknut	
7. Locknut (1/4-20) – cable terminal end pivot	
8. Lock Washer for 1/4-20 Locknut	
9. 3 Hex Bolts (anti-vibratory patch) – bracket	

If you are replacing a jet boat steering cable, you must determine the part number of the existing steering cable. SSC219 cables are ONLY for JBS systems shown on this page.

*Note: SSC219XX replaces SSC229XX cables.

Use only genuine SeaStar Solutions replacement hardware specifically designed for this product. Do not substitute other parts.

JBS JET BOAT MECHANICAL STEERING SYSTEM:

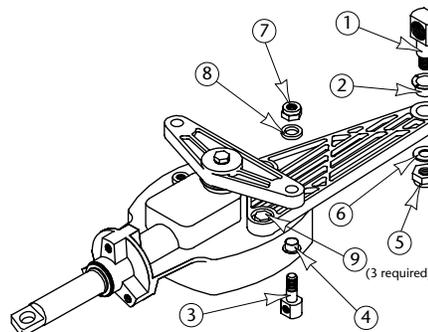
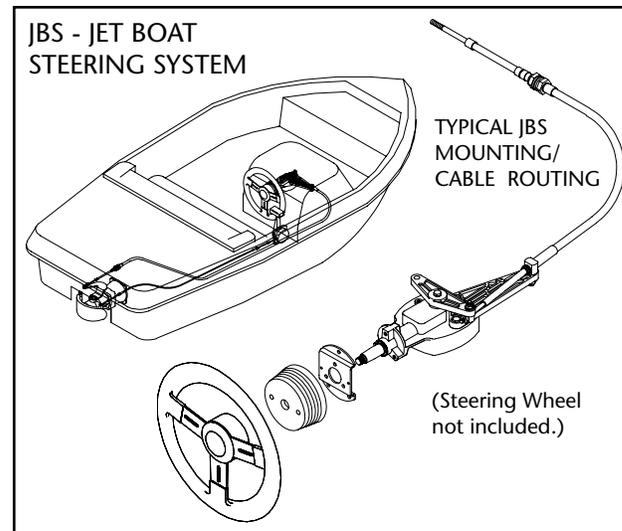
Just for Jets! JBS™ by SeaStar Solutions means Jet Boat Steering! Designed exclusively for jet boats, JBS features a choice of two steering arcs, a special steering cable (not a control cable) plus an assortment of mounting options for virtually any boat! Nobody knows steering like SeaStar Solutions!

APPLICATIONS:

SeaStar Solutions JBS is recommended for use in all jet boat applications powered by Mercury® Sport Jet or OMC® Turbo Jet drives that meet ABYC P-23.

FEATURES:

- Ultra-compact helm with stylish 4.4" bezel is easy to install and very rugged.
- 135° or 270° turning arc lock-to-lock.
- Uses a special steering cable.
- 90° dash mount. (Tilt Steering option available!)
- 90° or 180° cable entry into helm allows alternate cable routing. (Looking at dash, options are 9:00, 12:00 or 3:00 routing positions.)
- Built-in steering stops prevent additional cable stress in hard over positions.
- Standard 3/4" round tapered steering shaft, 3.5" total allowable cable travel.
- Mercury® & OMC® nozzle/gate connection kits.
- Stainless steel cable output ends.
- Meets A.B.Y.C./N.M.M.A. requirements.
- Made, designed and assembled in the USA.





JET BOAT MINI RACK STEERING SYSTEM

This new mechanical steering system is designed to deliver the smoothest and most efficient steering available for twin engine jet boats. Developed for twin jet engine boats, this new product combines the mechanical advantage of a four turn steering system with the responsiveness of a 1 $\frac{1}{2}$ turn system.

Featuring SeaStar Solutions pioneered Xtreme cable technology, the system has a small behind-dash profile and independently routed steering cables mounted to each bucket of the twin engine system. The robust, high performance armor wrapped cable core features splined ridges molded on the core for minimal contact between the liner and core. This design allows the core to glide freely, for minimal lost motion and smoother, easier steering. The resulting reduction in cable friction not only improves performance, it keeps the entire steering system running smoother, longer. The new system is also easier to install than other jet boat steering systems. Ease of installation combined with decreased driver fatigue make Mini Rack unmatched by other mechanical jet steering systems.

Utilizing proven rack and pinion gear design mated with Xtreme cable technology, the Mini-Rack has been rigorously validated through both laboratory and on-water testing. The system is fully approved and compliant with ABYC P-23 and NMMA.

This competitively priced system is available in both standard-helm and tilt-helm options.

APPLICATIONS:

SeaStar Solutions jet boat mini rack is recommended for inboard jet boats that meet ABYC P-23 specifications. Not for use with larger jet pumps using V8 engines or outboards using lower unit jet pumps. Minimum dash space is 19 1/2 inches. Accepts steering wheels up to 16 inch diameter maximum.



COMPLETE SYSTEM

This Steering System is sold by components. Select helm, bezel and cable or tilt helm, tilt mechanism and cable from items listed below.

COMPONENTS

Standard Jet Boat Rack Helm	SH5220P
Back Mount Rack Bezel	SB39526P
Dual Cable Assembly - Yamaha	SSC144XX
Single Cable Assembly - Yamaha	SSC146XX
Dual Cable Assembly - BRP	SSC149XX
Single Cable Assembly - BRP	SSC145XX

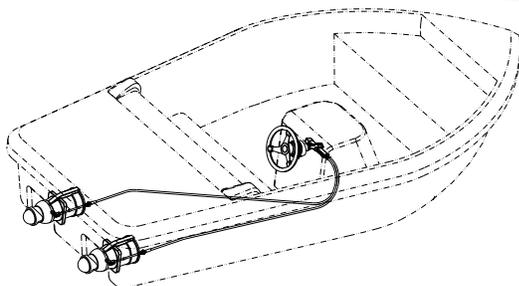
OPTIONS

Tilt Jet Boat Rack Helm	SH91620P*
Sport Tilt Mechanism	SH91800P
Sport Plus Tilt Mechanism	SH91900P

SERVICE ITEMS

Steering Wheel Hardware Kit	SA27454P
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*Requires tilt mechanism to complete Tilt steering system installation.



FEATURES:

- 1 $\frac{1}{2}$ turns lock-to-lock travel with four turn mechanical advantage.
- 90° dash mount (Tilt steering option available).
- Standard $\frac{3}{4}$ " round taper steering shaft, 3.5" cable travel.
- Stainless steel cable output ends.
- Fast, easy installation: back mount design allows quick placement in dash, PLUS mounting hardware fits industry-standard SeaStar Solutions rack mounting holes.
- Meets A.B.Y.C. standards.
- Meets N.M.M.A. certification requirements

SEASTAR JACKPLATES

HYDRAULIC XTREME (Up to 400 HP)

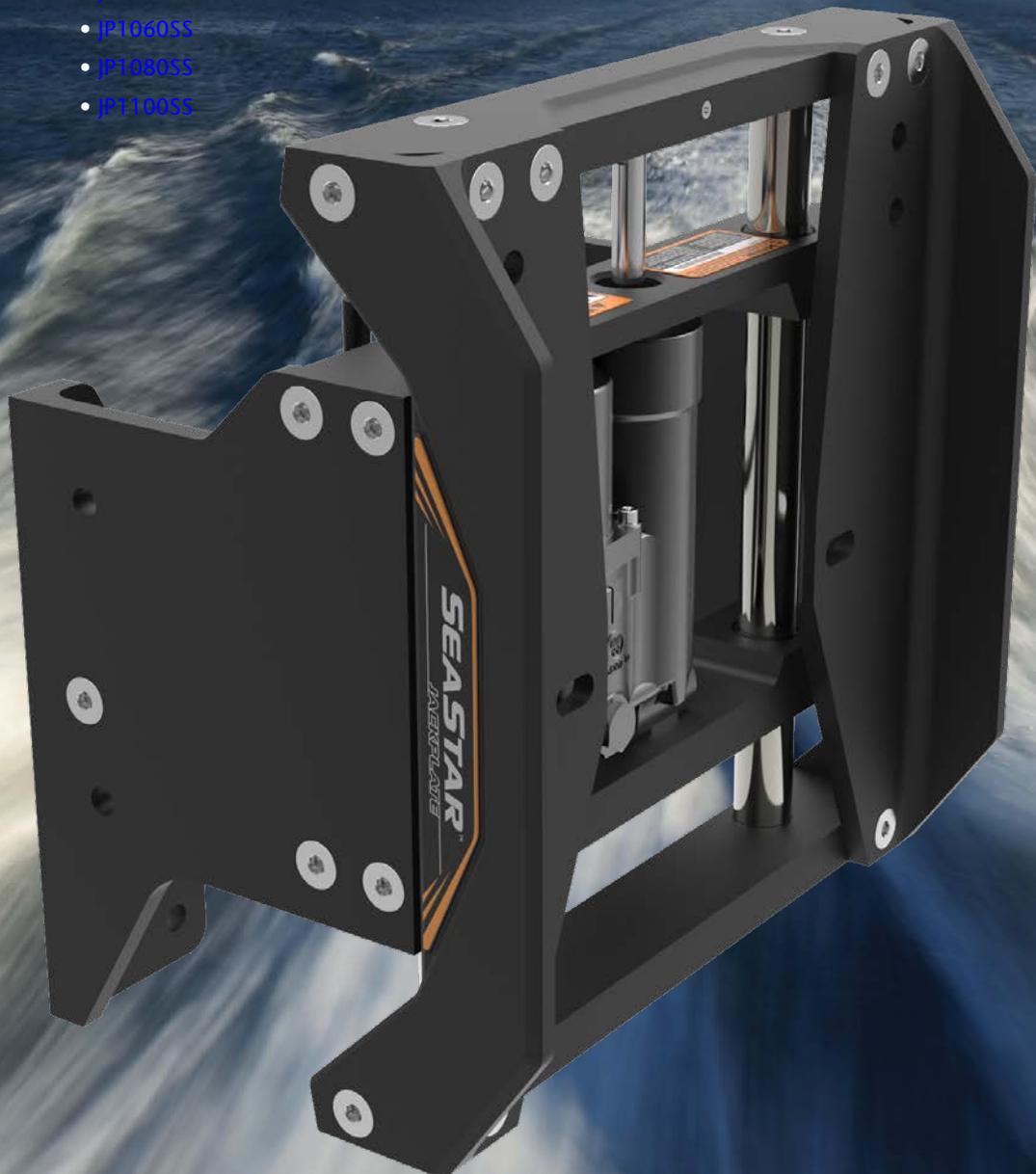
- JP5040X
- JP5060X
- JP5080X
- JP5100X
- JP5120X

HYDRAULIC STANDARD (Up to 300 HP)

- JP5040R
- JP5060R
- JP5080R
- JP5100R
- JP5120R

MANUAL (Up to 250 HP)

- JP1040SS
- JP1060SS
- JP1080SS
- JP1100SS



SEASTAR XTREME JACKPLATES (RATED TO 400 HP):

The SeaStar Xtreme Jackplates utilize high strength materials to be able to handle some of the strongest engines on the water. The heavy duty frames are capable of handling engines up to 400 horse power. Designed with speed and durability in mind the Xtreme Jackplates can adjust the engine height in just 8.5 seconds, even while the boat is moving at full power.

FEATURES:

- Xtreme jackplate is using high strength materials and is easily capable of handling up 400 horsepower engines.
 - Rapid hydraulic response in 8.5 seconds.
 - Complete rigid engine support at full thrust.
 - Easily moves engine up or down at full thrust.
 - Smooth operation with composite bushings
 - Easy wrench access to engine bolts from the side
 - Compatible with Power Pole® and Talon®.
- * NOTE: JP5040X requires adapter kit [DK4600](#) for Power Pole® or Talon® anchor systems mounting.



XTREME HYDRAULIC PLATE (UP TO 400 HP)	PART NO.
Hydraulic Jackplate 4" Xtreme	JP5040X*
Hydraulic Jackplate 6" Xtreme	JP5060X
Hydraulic Jackplate 8" Xtreme	JP5080X
Hydraulic Jackplate 10" Xtreme	JP5100X
Hydraulic Jackplate 12" Xtreme	JP5120X



JP5040X
4" Setback



JP5060X
6" Setback



JP5080X
8" Setback



JP5100X
10" Setback



JP5120X
12" Setback



SEASTAR STANDARD JACKPLATES (RATED TO 300 HP):

The SeaStar Jackplate is one of the sleekest and most durable engine jackplates available. This essential performance accessory allows for higher speed, gains in fuel economy and the ability to run in shallow water. SeaStar Jackplate features sleek, bold styling that is redefining the look for Jackplates. The SeaStar Jackplate is rated for 300 horsepower and it is designed to maximize engine tilt when used with SeaStar steering cylinders.

FEATURES:

- Our standard jackplate is easily capable of handling up to 300 horsepower engines.
 - Rapid hydraulic response in 8.5 seconds.
 - Complete rigid engine support at full thrust.
 - Easily moves engine up or down at full thrust.
 - Smooth operation with composite bushings
 - Easy wrench access to engine bolts from the side
 - Compatible with Power Pole® and Talon®.
- * NOTE: JP5040R requires adapter kit [DK4600](#) for Power Pole® or Talon® anchor systems mounting.

STANDARD HYDRAULIC PLATE (UP TO 300 HP)	PART NO.
Hydraulic Jackplate 4" Standard	JP5040R*
Hydraulic Jackplate 6" Standard	JP5060R
Hydraulic Jackplate 8" Standard	JP5080R
Hydraulic Jackplate 10" Standard	JP5100R
Hydraulic Jackplate 12" Standard	JP5120R



JP5040R
4" Setback



JP5060R
6" Setback



JP5080R
8" Setback



JP5100R
10" Setback



JP5120R
12" Setback



DK4020*



PT2000-1P
PT1000-1P



DK4600



DK4710 / DK4720



Smartstick
(DK4220 Kit)



Gauge
(DK4220 Kit &
DK4320 Kit)



DK4420



DK6125/DK6135/
DK6145/DK6165

ACCESSORIES	PART NO.
Basic Rocker Switch	DK4020*
ProTrim Switch Single Function	PT1000-1P
ProTrim Switch Dual Function	PT2000-1P
SmartStick and Gauge Kit	DK4220
Gauge and Harness Kit	DK4320
Accessory Adapter	DK4600
Jackplate Replacement Relay	DK3010
Jackplate Wire Harness	DK4420
Actuator Kit, 3/8" Mount Bolt, 5/16" socket	DK4710
Actuator Kit, 7/16" Mount Bolt, 3/8" socket	DK4720
SeaStar Stabilizer Clips, (pack of 2)	HYCL-001
Transom Plate, Small, 2" x 15"	18-79987
Transom Plate, Large, 4" x 17"	18-79988
Bolt Kit, 1/2-20 UNC 2.5" L, 4 pack	DK6125
Bolt Kit, 1/2-20 UNC 3.5" L, 4 pack	DK6135
Bolt Kit, 1/2-20 UNC 4.5" L, 4 pack	DK6145
Bolt Kit, 1/2-20 UNC 6.5" L, 4 pack	DK6165



HYCL-001



18-79987



18-79988

* Included with jackplate harness.



SEASTAR MANUAL JACKPLATES

The JP1000 Series Jackplate comes in 4", 6", 8", and 10" setbacks to help you find the best match for your boat and optimize performance.

- The interlocking slide guides offer enhanced strength while providing smooth, bind-free travel.
- The lead screw assembly sets the plate height and the Side Locks are used to hold the position.
- The stainless steel lead screw is resistant to corrosion and pre-greased for smooth operation.
- The maximum supported engine weight of 585 lbs is capable of handling the most demanding outboard engines, including the latest generation of 4-strokes.

JP1000 (SIDE LOCKED)

PART NO.	LEGACY NO.	MODEL	DESCRIPTION
JP1040SS	400SS 4"	Manual Jackplate	4" Setback with Side Locks
JP1060SS	600SS 6"	Manual Jackplate	6" Setback with Side Locks
JP1080SS	800SS 8"	Manual Jackplate	8" Setback with Side Locks
JP1100SS	1000SS 10"	Manual Jackplate	10" Setback with Side Locks



[JP1040SS](#)
4" Setback



[JP1060SS](#)
6" Setback



[JP1080SS](#)
8" Setback



[JP1100SS](#)
10" Setback

HOLE SHOT KITS

FEATURES:

- Get on plane faster using SeaStar Hole Shot Kits.
- Available for 6", 8", 10" and 12" setbacks
- Fits both Standard and Xtreme Hydraulic Jackplates



DESCRIPTION	PART NO.
Hole Shot Kit, 6" Setback	HSP5060
Hole Shot Kit, 8" Setback	HSP5080
Hole Shot Kit, 10" Setback	HSP5100
Hole Shot Kit, 12" Setback	HSP5120

PROTAP CONTROLLER

FEATURES:

- Gets your boat to max speed at the touch of a button
- Memorize your favorite Jackplate and engine trim positions
- Quickly tap control switch for fine adjustment of both Jackplate and engine trim in set increments
- Don't have to adjust your boat every time when on plane. Set it and forget it!
- Synchronizes 2 engines to each other
- Provides 0-5V Jackplate height signal
- CAN expandability and MFD integration



DESCRIPTION	PART #
Bass/Bay-Mode ProTap	JC4010
Bass/Bay-Mode ProTap/Smartstick Kit	JC4110
Flats-Mode Controller	JC4020
Flats-Mode ProTap/Smartstick Kit	JC4120



TRIM SIGNAL HARNESS

DESCRIPTION	PART #
Harness, ProTap, NMEA 2000	PTK5010
Harness, Yamaha, 2 wire sender	PTK5020
Harness, Yamaha, 3 wire sender	PTK5021
Harness, Mercury, Smartcraft digital sender	PTK5040
Harness, Mercury, Verado	PTK5041

STEERING

WHEELS

HELMS

- Hydraulic
- Mechanical

CYLINDERS

- SeaStar
- Tournament
- Baystar
- Hynautic

FITTINGS & HARDWARE



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**STEERING WHEELS:
PUT THE CLASSIC FINISHING TOUCH ON ANY BOAT!**



NAVIGATOR

SW60100P

All ABS wheel with black EVA soft touch rim, brushed aluminum look ABS spoke inserts and center ring with resin logo.

ARMADA

SW60105P

All ABS wheel with black EVA soft touch rim, chromed ABS spoke inserts and center ring with resin logo.



MOLINARA

SW60300P

All aluminum slotted spoke with black EVA rim. Large plastic and aluminum center cap with logo.



COMMANDER

SW60900P

All aluminum slotted spoke with black EVA rim and large plastic and aluminum center cap with logo.

BELLOCA

SW60200P

All stainless steel spoke and tubular rim with finger grove rim back and SS center nut.



CIMBRO

SW60500P

Cast stainless steel rim and spoke with soft touch, finger grooved rim back. Stainless steel center nut cover and SS ball bearing knob.

STEERING WHEELS (CONTINUED)



CHAMPION (w/cover)
SW59201P



CHAMPION (w/cap)
SW59291P



STEALTH (w/cover)
SW59401P



STEALTH (w/cap)
SW59491P



TALON
SW56811P



VIPER
SW52022P



ACE
SW59691P

(FOR HELMS WITH STANDARD
ROUND 3/4" TAPERED SHAFTS)

FEATURES:

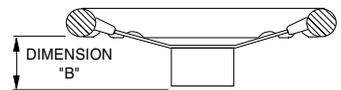
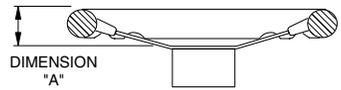
- Beautiful, high-detail styling.
- Rugged construction for marine use.
- U.V. and corrosion resistant materials.
- Stylish center medallion included.
- For helms with standard marine round 3/4" tapered shaft.
- All styles suitable for mechanical steering.
- Equidistant spoke model (Talon) offered for use with hydraulic steering systems.
- Meet or exceed all applicable industry requirements.

NOTE: When properly installed, these steering wheels will attach to marine helms with ABYC standard 3/4" tapered steering shafts, using SeaStar Solutions or equivalent anti-vibratory lock nuts. Wheels with equidistant spokes are suggested for boats equipped with hydraulic steering in which a centered or "master spoke" wheel cannot be maintained.

STEERING WHEELS	
Ace (with flush center cap)	SW59691P
Champion (with center cover)	SW59201P
Champion (with center trim cap)	SW59291P
Stealth (with center pad)	SW59401P
Stealth (with center trim cap)	SW59491P
Talon (equidistant, with trim cap)	SW56811P*
Viper (with round center trim cap)	SW52022P
* Equidistant spoke wheel — recommended for hydraulic steering systems.	
SERVICE ITEMS	
Ace Center Cap (Plastic)	3876613 (A)
Champion Center Cover (Plastic)	3881611 (J)
Champion Trim Cap (Plastic)	3879414 (D)
Stealth Spoke Cover (Plastic)	3919912 (K)
Stealth Trim Cap (Plastic)	3879414 (D)
Talon Trim Cap (Polyurethane)	3878515 (C)
Viper Trim Cap (Plastic)	5202211P
Trim Cap, Beveled (Polyurethane)	3882511
Medallion with SeaStar Solutions Logo	3914016**(F)
Medallion with SeaStar Solutions Logo	7173910
Adapter 3/4" Taper to 1" Taper	HB0572
Adapter 3/4" Taper to 1" Straight	HB0573
Wheel Hardware Kit (Mechanical) (Old #2745417P)	SA27454P
Service Kit for BayStar/SeaStar	HP6032
** Included with all aftermarket wheels except Talon, which includes a compass decal, and Viper which uses 7173910	



WHEEL DIMENSIONS:
The dimensions shown in the chart are reference dimensions. Actual dimensions may vary slightly.



STEERING WHEEL DIMENSIONS & DATA:

WHEEL TYPE	RIM SIZE	SPOKE COLOR	DIMENSION "A"	DIMENSION "B"	CAP (PAD), MEDALLION	PART NUMBER	N.M.M.A. TYPE
3 SPOKE							
Aluminum Spokes, Soft Urethane or PVC Grip:							
Viper *1	14"	Black	1.1"	2.2"	D, F	SW52022P	855022
6-SPOKE							
Stainless Steel Spokes, Hard PVC Grip:							
Talon *4	14"	SS	1.5"	2.6"	C	SW56811P	855026
3-SPOKE							
Hard PVC Grip:							
Champion *2	13.5"	Black	1.3"	2.3"	J, F	SW59201P	855029
Champion *1	13.5"	Black	1.6"	2.3"	D, F	SW59291P	855029
Stealth *2	14"	Black	1.3"	2.8"	K, F	SW59401P	855029
Stealth *1	14"	Black	2.1"	2.8"	D, F	SW59491P	855029
Ace *3	13"	Black	1.3"	2.3"	A, F	SW59691P	855029

NOTES:

- *1 With removable center cap.
- *2 With removable center cover.
- *3 With integral molded center cover.
- *4 Equidistant spokes (recommended for hydraulic steering where "master" spoke cannot be maintained.)



**CLASSIC TILT
(HYDRAULIC ONLY)**
HH6541



SPORT PLUS TILT
SH91900



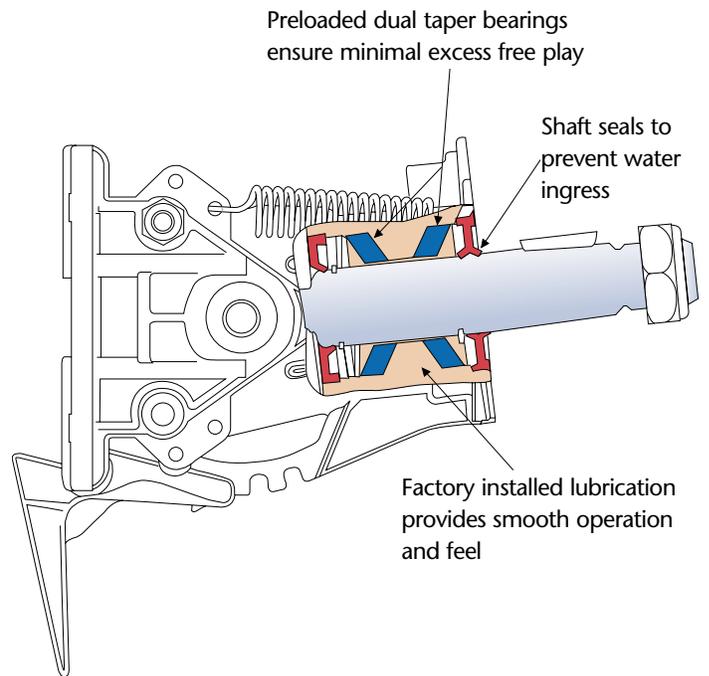
SPORT TILT
SH91800

TILT STEERING:

The ultimate in Tilt Steering Technology. SeaStar Solutions Tilt Steering delivers unsurpassed performance and flexibility making it the perfect system for all possible applications and boat types.

FEATURES:

- Preloaded dual taper bearings ensure minimal excess free play
- Smooth operation and feel
- Shaft seals prevent water ingress
- 48 degrees of tilt articulation
- 5 positive lock positions
- Up to three style options
- Compact footprint
- Maintenance free
- Fits most styled and formed dashes



MECHANICAL TILT STEERING

TYPE	COVER STYLE	WHEEL SHAFT	PART NUMBER
Sport	Flexible Rubber Bellows	Taper	SH91800*
Sport	Flexible Rubber Bellows	Spline	SH91810*
Sport Plus	Solid Round Cover	Taper	SH91900*
Sport Plus	Solid Round Cover	Spline	SH91910*
* Mechanical Tilt mechanism only - select Helm type from list below			
Mounting Options			PART NUMBER
Optional 12° Wedge Tilt Mounting Kit			SB91592
For applications where special mounting angle is required			
DESCRIPTION (All Helms require Tilt Mechanism as shown above)			PART NUMBER
Safe T QC Tilt Helm			SH91523-1P
Safe T II (NFB) Tilt Helm			SH91190P
4.2 (NFB) Tilt Helm			SH91526P
4.2 (NFB) - Dual Cable Tilt Helm			SH91527P
Rack Tilt Helm			SH91610P
Rack (NFB) Tilt Helm			SH91630P
Pro Rack (NFB) Tilt Helm (Dual Cables)			SH91630P
HPS Tilt Helm			SH91650P
Jet Boat Tilt Helm (135° tilt) - Tilt Mechanism Included			SH91691P
Jet Boat Tilt Helm (270° tilt) - Tilt Mechanism Included			SH91692P
** XTREME™ Tilt NFB Helm			SHX97606P

SPORT PLUS TILT ANGLES



DASH TILT MODULE KITS

COVER TYPE	PART NUMBER
NFB Safe-T II	SHT91190
Safe-T QC Single	SHT91523
NFB 4.2 Single	SHT91526
BM Rack	SHT91610
NFB Rack	SHT91630

Each Kit Includes Tilt Helm & Tilt Mechanism



REPLACEMENT TILT KITS (HYDRAULIC)

DESCRIPTION	PART NUMBER
Sport Tilt Replacement Kit	HA6123
Sport Plus Replacement Kit	HA6423
Classic Tilt Replacement Kit	HA6523

Includes Mechanism Only. Replaces Part Number HA5253

CLASSIC TILT ANGLES

HYDRAULIC TILT STEERING (All hydraulic tilt kits have stainless steel shafts)

COVER TYPE	DISPLACEMENT (CU"-IN)	PRO*	WHEEL SHAFT	PART NUMBER
Sport	1.4	No	Taper	HH4315-3
Sport	1.4	No	Taper	HH6193-3
Sport	1.7	Yes	Taper	HH6189-3
Sport	1.7	No	Taper	HH6191-3
Sport	2.0	No	Taper	HH6145-3
Sport	2.0	Yes	Taper	HH6190-3
Sport	2.4	Yes	Taper	HH6188-3
Sport	2.4	No	Taper	HH6192-3
Sport Plus	1.7	Yes	Taper	HH6489-3
Sport Plus	1.7	No	Taper	HH6491-3
Sport Plus	2.0	Yes	Taper	HH6490-3
Sport Plus	2.0	No	Taper	HH6445-3
Sport Plus	2.4	No	Taper	HH6492-3
Classic	1.7	No	Taper	HH6541-3
Classic	2.4	No	Taper	HH6542-3
Classic	1.4	No	Taper	HH6575-3
Classic	2.0	No	Taper	HH6543-3
Classic	1.4	Yes	Taper	HH6575-3
Classic	1.7	Yes	Taper	HH6573-3
Classic	2.0	Yes	Taper	HH6574-3

* Pro Helms have a patented lock valve system designed for high torque single outboard applications.

** OEM Only

All Hydraulic Tilt Helms listed include the hydraulic helm and tilt mechanism with cover. Pro helms cannot be used with an un-balanced cylinder.



HYDRAULIC HELMS:

BAYSTAR HELMS

HH4314-3

BayStar hydraulic steering is brought to you by the manufacturers of SeaStar®, the most trusted name in pleasure boat steering. BayStar allows you to install all of the safety, reliability and comfort of hydraulic steering onto your boats rated to a MAXIMUM of 150 HP. Combine this with a superior design rigid ISO quality control, finest materials and precision manufacturing—BayStar continues the tradition of bringing comfort and safety to boating.



HELM DESCRIPTION	HELM PART NUMBER	SEAL KIT PART NUMBER
BAYSTAR 1.1 - FRONT MOUNT	HH4311-3	HP6032
BAYSTAR 1.4 - FRONT MOUNT	HH4314-3	HP6032
BAYSTAR 1.4 - SPORT TILT*	HH4315-3	HP6032
BAYSTAR 1.4 - SPORT PLUS TILT*	HH4316-3	HP6032
BAYSTAR PLUS 1.4 - FRONT MOUNT	HH4514-3	HP6032
BAYSTAR PLUS 1.4 - SPORT TILT*	HH4513-3	HP6032

BayStar Plus Helms offer superior overall performance to BayStar due to an enhanced internal design.

* Refer to page 126-127 for additional tilt steering information.

CAPILANO HELMS

HH5250

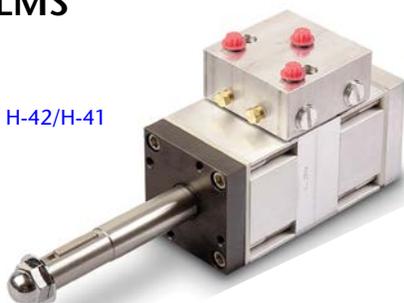


HELM DESCRIPTION	HELM PART NUMBER	SEAL KIT PART NUMBER
CAPILANO 1250V	HH5250	HS5161
CAPILANO 1275V	HH5275	HS5161

For extra heavy duty/commercial vessels, SeaStar Solutions' Capilano steering system offers extremely rugged and reliable 'variable flow' rear-mount helms and heavy duty brass cylinders with stainless steel and bronze mounting hardware.

HYNAUTIC HELMS

H-42/H-41



HELM DESCRIPTION	HELM PART NUMBER	SEAL KIT PART NUMBER
HYNAUTIC H-20 (3/4" SHAFT)	H-26	HS-01/02* ²
HYNAUTIC H-20 (3/4" SHAFT)	H-25	HS-01/02* ²
HYNAUTIC H-20 (1" SHAFT)	H-21	HS-01/02* ²
HYNAUTIC H-40 (3/4" SHAFT)	H-42-02	HS-03/04* ³
HYNAUTIC H-40 (1" SHAFT)	H-42	HS-03/04* ³
HYNAUTIC H-40 (3/4" SHAFT)	H-41-02	HS-03/04* ³
HYNAUTIC H-40 (1" SHAFT)	H-41	HS-04

SEAL KITS FOR HYNAUTIC RESERVOIRS:
RS-01: R-4/R-04, R-10, R-13, R-14 models.

SEAL KITS FOR OBSOLETE HYNAUTIC HELMS:
HS-05: H-50 series helms.
HS-06: H-60 series helms.
HS-08: H-80 series helms, before date code 8000.
HS-09: H-80 series helms, after date code 8000.
HS-10: H-100 & H-200 series helm pumps.

*² H-20 and H-30 helms produced in 1978 and earlier use Seal Kit #HS-01. 1979-date H-20 and H-30 helms use Seal Kit # HS-02.

*³ H-40 helms produced in 1978 and earlier use Seal Kit #HS-03. 1979-date H-40 Helms use Seal Kit # HS-04.

HYDRAULIC HELMS:

SEASTAR HELMS



HH5271-3

Unmatched comfort and control only with SeaStar Steering. The world's most popular hydraulic steering system – offering smooth, efficient No Feedback Steering for single and multi-outboard engines up to 350Hp (700HP combined for counter rotating twins) for speeds up to 60 MPH.

* Refer to page 32-33 for additional tilt steering information.

HELM DESCRIPTION	HELM PART NUMBER	SEAL KIT PART NUMBER
SEASTAR 1.4 - FRONT MOUNT	HH5269-3	HP6032
SEASTAR 1.4 - REAR MOUNT	HH5260-3	HP6032
SEASTAR 1.4 - R. MT. 1" STRT. SHAFT	HH5279-3	HS5201
SEASTAR 1.4 - R. MT. 1" TAPER. SHAFT	HH5280-3	HS5201
SEASTAR 1.4 - CLASSIC TILT*	HH6544-3	HP6032
SEASTAR 1.7 - FRONT MOUNT	HH5271-3	HP6032
SEASTAR 1.7 - FRONT MT. COMMERCIAL	HH5217-3	HP6037
SEASTAR 1.7 - REAR MOUNT	HH5261-3	HP6032
SEASTAR 1.7 - R. MT. 1" TAPER. SHAFT	HH5281-3	HS5201
SEASTAR 1.7 - SPORT TILT*	HH6191-3	HP6032
SEASTAR 1.7 - CLASSIC TILT*	HH6541-3	HP6032
SEASTAR 1.7 - SPORT PLUS TILT*	HH6491-3	HP6032
SEASTAR 2.0 - FRONT MOUNT	HH5273-3	HP6032
SEASTAR 2.0 - SPORT TILT*	HH6145-3	HP6032
SEASTAR 2.0 - CLASSIC TILT*	HH6543-3	HP6032
SEASTAR 2.0 - SPORT PLUS TILT*	HH6445-3	HP6032
SEASTAR 2.0 - SPORT PLUS (SPLINE SHAFT)	HH6345-3	HP6032
SEASTAR 2.0 - REAR MOUNT	HH5263-3	HP6032
SEASTAR 2.4 - FRONT MOUNT	HH5272-3	HP6032
SEASTAR 2.4 - FRONT MT. COMMERCIAL	HH5224-3	HP6037
SEASTAR 2.4 - REAR MOUNT	HH5262-3	HP6032
SEASTAR 2.4 - SPORT TILT*	HH6192-3	HP6032
SEASTAR 2.4 - CLASSIC TILT*	HH6542-3	HP6032
SEASTAR 2.4 - SPORT PLUS TILT*	HH6492-3	HP6032
SEASTAR 3.0 - REAR MOUNT	HH5265-3	HP6032
SEASTAR 3.0 - FRONT MOUNT	HH5285-3	HP6032

SEASTAR PRO HELMS

HH5770-3



Designed for the performance boater, SeaStar Pro is the ultimate steering system for high-speed single engine outboards. As the

premier SeaStar Solutions No Feedback System, SeaStar Pro delivers uncompromising steering control! Suited for all those critical high speed outboard powered boat applications like Bass, Flats, Combo Race and Ski, and other performance boats capable of speeds in excess of 60 MPH. SeaStar PRO has steered the Bass Masters since 1994 and is the choice of high performance outboard boat builders.

* Refer to page 32-33 for additional tilt steering information.

HELM DESCRIPTION	HELM PART NUMBER	SEAL KIT PART NUMBER
SEASTAR PRO 1.4 - CLASSIC TILT*	HH6575-3	HP6032
SEASTAR PRO 1.7 - FRONT MOUNT	HH5779-3	HP6032
SEASTAR PRO 1.7 - FT. MT. COMMERCIAL	HH5218-3	HP6037
SEASTAR PRO 1.7 - REAR MOUNT	HH5778-3	HP6032
SEASTAR PRO 1.7 - SPORT TILT*	HH6189-3	HP6032
SEASTAR PRO 1.7 - CLASSIC TILT*	HH6573-3	HP6032
SEASTAR PRO 1.7 - SPORT PLUS TILT*	HH6489-3	HP6032
SEASTAR PRO 2.0 - FRONT MOUNT	HH5770-3	HP6032
SEASTAR PRO 2.0 - REAR MOUNT	HH5771-3	HP6032
SEASTAR PRO 2.0 - SPORT TILT*	HH6190-3	HP6032
SEASTAR PRO 2.0 - CLASSIC TILT*	HH6574-3	HP6032
SEASTAR PRO 2.0 - SPORT PLUS TILT*	HH6490-3	HP6032
SEASTAR PRO 2.4 - FRONT MOUNT	HH5772-3	HP6032

HELM VISUAL IDENTIFICATION GUIDE:

This is an overview of SeaStar Solutions ROTARY steering helms likely to be encountered.

XTREME™ NFB™

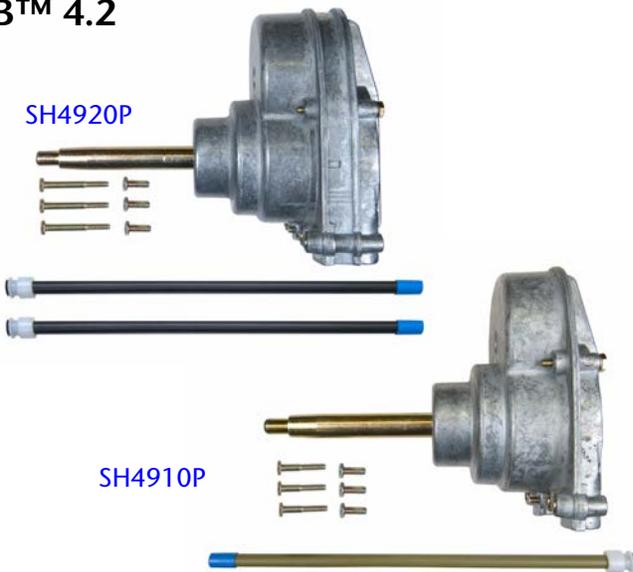


- Quick connect feature on both the cable and spent travel tube side.
- Improved NFB feature for smoother release.

Kits: SSX176XX (XTREME™ NFB)
 SSX177XX (XTREME™ Tilt NFB)

* only sold in kits to aftermarket

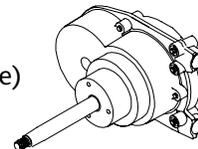
NFB™ 4.2



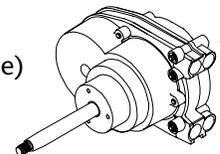
- Two bolts secure QC cable to helm.
- One bolt holds spent travel tube.
- Cast finish helms have No FeedBack™ feature.

Kits: SS147XX (4.2 Single Cable)

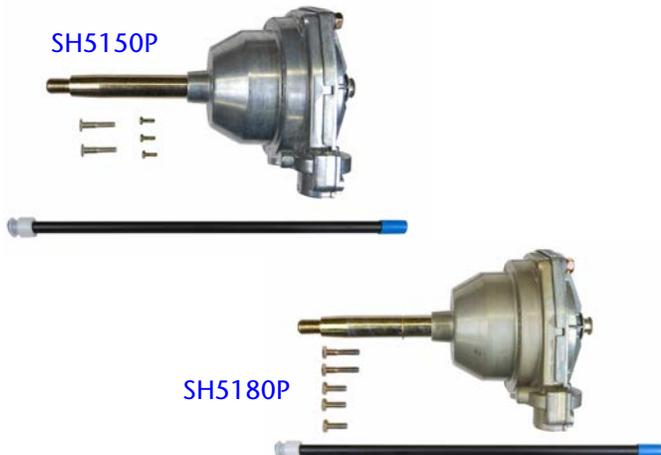
SH4910P
(Single Cable)



SH4920P
(Dual Cable)



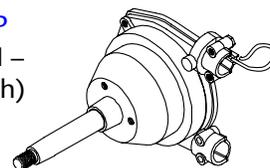
NFB™ SAFE-T II & HPS ROTARY™



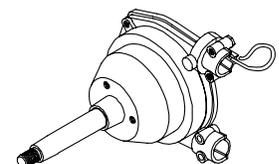
- Collet & hitch pin secure QC cable to helm.
- One bolt holds spent travel tube.
- Safe-T II cast finish helm has No FeedBack™ feature; HPS gold-finish helm does not.

Kit: SS132XX (Safe-T II Single Cable); HPS Rotary is sold as components only.

SH5150P
(Safe-T II – cast finish)



SH5180P
(HPS – gold finish)



SAFE-T® QC

SH5094-1P



- Collet & hitch pin secure QC cable to helm.
- Conical plastic nut holds spent travel tube.

Kit: SS137XX (Safe-T QC Single Cable)

Note: The old style helm has a threaded spent travel tube. The SH5094-1P is a quick connect spent travel tube. Both use the same cable.

SAFE-T® TS (OLD STYLE)

SH5023P



- Large thread-on nut secures cable to helm.
- Conical plastic nut holds spent travel tube.

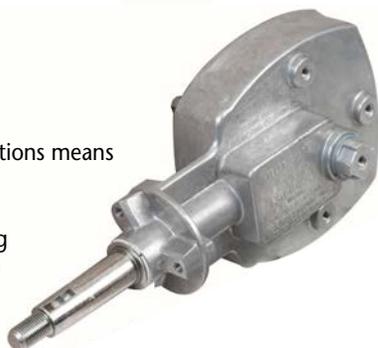
Kit: None. Safe-T TS is sold as components.

Requires SA27620P

Note: Latest bezel styles shown; several other configurations offered since 1968.

JBS HELMS

Just for Jets! JBS by SeaStar Solutions means Jet Boat Steering. Designed exclusively for jet boats, JBS features a choice of two steering arcs, a real steering cable (not a control cable) plus an assortment of mounting options for virtually any boat. Nobody knows steering like SeaStar Solutions!



HELM DESCRIPTION	HELM PART NUMBER
JBS HELM (135° TURNING ARC)	SH5087P
JBS HELM (270° TURNING ARC)	SH5088P



SB27150P
(90° Bezel)
NFB 4.2
Safe-T II



SB27483P
(20° Bezel)
NFB 4.2
Safe-T II & HPS
Safe-T QC
Safe-T TS



SB27484P
(90° Bezel)
HPS
Safe-T QC
Safe-T TS

HELM VISUAL IDENTIFICATION GUIDE:

This is an overview of SeaStar Solutions ROTARY steering helms likely to be encountered.

BIG-T®

SH5000P



- Large thread-on nut secures cable to helm.
- Conical plastic nut holds spent travel tube.
- Diecast bezel which can be either round one-piece or oval 2-piece design.
- Older systems may have 2 helms (twin station).

Kit: None. Big-T is sold as components.

This is an overview of SeaStar Solutions RACK & PINION steering helms likely to be encountered.

THE RACK™ & HPS RACK™ ("BACK MOUNT" RACK)

SH5210P



Note: Rack steering requires 2 1/4" hole.

- Four bolts and nuts secure cable's rack housing to helm.
- Helm/cable install as unit from back of dash.
- Helm requires current generation rack cables (will not bolt up to older style cables).
- Dual cable has one rack housing with two cables attached. Single helm works on both single and dual cable applications (NFB recommended for non-power assist outboards).
- One bezel is offered; angle to dash is changed by adding wedges. See below:

Kit: SS141XX (Rack Single Cable);
HPS Rack is sold as components only.

NFB™ RACK & NFB™ PRO RACK™ ("BACK MOUNT" RACK)

SH5230P



- Four bolts and nuts secure cable's rack housing to helm.
- Helm has No FeedBack™ feature.
- Helm/cable install as unit from back of dash.
- Helm requires current generation rack cables (will not bolt up to older style cables).
- Dual cable has one rack housing with two cables attached. Single helm works on both single and dual cable applications.
- One bezel is offered; angle to dash is changed by adding wedges. See below:

Kits: SS151XX (NFB Rack Single Cable),
SS152XX (NFB Pro Rack Dual Cable).



SB27265P
Big-T



SB39526P
(90° Bezel)
The Rack
HPS Rack



SB39544P
(90° Bezel)
NFB Rack
NFB Pro Rack

RACK WEDGE KITS



SB27448P
(10° Wedge Kit)
The Rack, HPS Rack,
NFB Rack & NFB Pro Rack

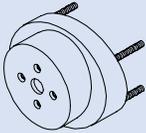
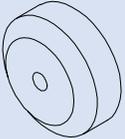
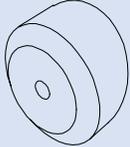


SB27449P
(20° Wedge Kit)
The Rack, HPS Rack,
NFB Rack & NFB Pro Rack

MECHANICAL HELM MOUNTING OPTIONS:

SeaStar Solutions offers several helm mounting options to accommodate nearly any preference. These options are available for all helms, except as noted. Please take a moment to familiarize yourself with these options before ordering replacement steering systems or components.

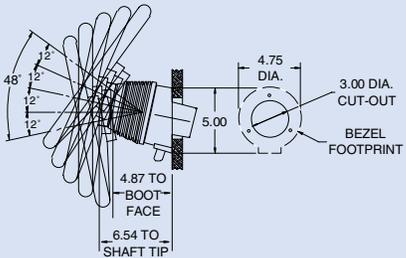
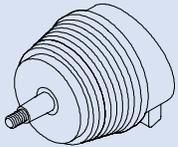
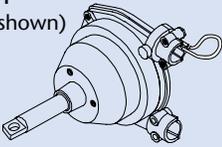
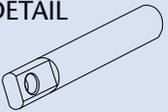
Mechanical (cable) steering typically comes with 90° mounting hardware for the helm. (Steering shaft is perpendicular to dash). 20° mounting kits (steering shaft 20° from perpendicular) can be purchased as options. Rack steering allows variations from 90° mounting in two settings: 10° and 20° from perpendicular. Big-T has two bezel mounting options, a 2-piece oval bezel which can be configured in either 90° or 20° helm mounting plus a 1-piece 90° bezel which reduces shaft protrusion from the dashboard.

<p>MECHANICAL STEERING BEZEL MOUNTS: (typical)</p>		<p>BIG-T 2-PIECE 90°/20° BEZELS: SB27265P</p> 
<p>TYPICAL BEZEL FOR 90° MOUNT (steering wheel parallel to dash)</p> 	<p>TYPICAL ROTARY BEZEL FOR 20° MOUNT (steering wheel 20° from parallel to dash) SB27483P</p> 	
<p>Note: Requires 3 1/4" center hole.</p>		<p>Note: Requires 3 1/2" center hole.</p>

TILT STEERING:

Tilt Steering is an option for all mechanical steering systems. Tilt allows the wheel to be moved in 48° arc, in five 12° increments. When ordering mechanical Tilt Steering, note that a special Tilt version of the helm must be ordered. Also, a Tilt Mechanism must be ordered. The best way to order is the tilt module kit.

Tilt helms are similar in appearance to standard mechanical helms, except for the steering shaft. Tilt helms have a flat ended shaft with a cross hole for connection to the “universal joint” in the tilt mechanism. (Standard helm shafts have a threaded end.) Please also see the “Dimensions” section for more information.

<p>PERFORMANCE TILT (available for all SeaStar Solutions mechanical systems)</p> 	<p>TILT STEERING MECHANISM SH91800P (requires purchase of tilt helm)</p> 	
	<p>SH91900P</p> 	
	<p>TILT HELM (SH91650P shown)</p> 	<p>TILT HELM SHAFT DETAIL</p> 

HYDRAULIC HELM MOUNTING OPTIONS:

SeaStar offers a variety of helm mounting options to accommodate nearly any preference. These options are available for all helms, except Capilano and Hynautic helms. Please take a moment to familiarize yourself with these options before ordering replacement steering systems or components.

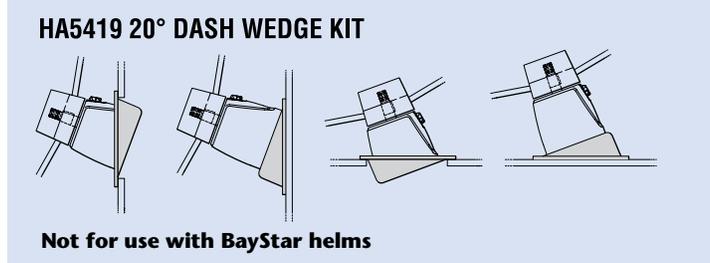
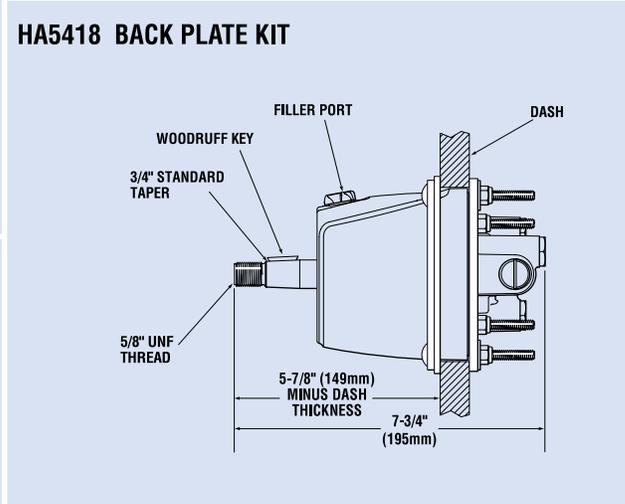
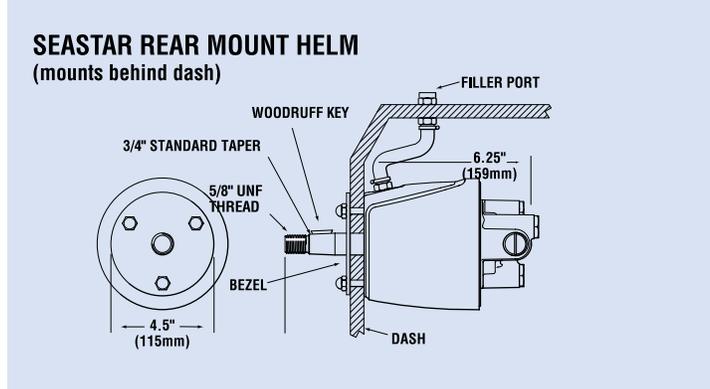
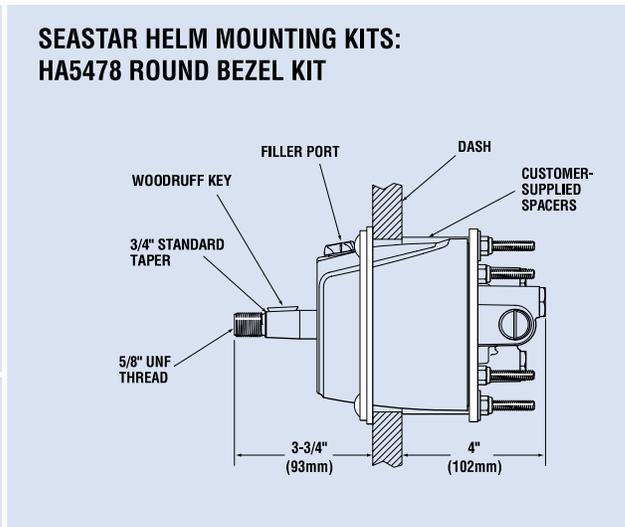
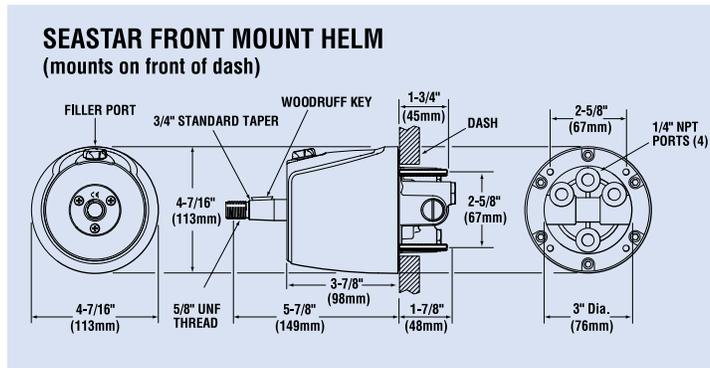
SeaStar hydraulic steering helms typically mount on the dash surface with the steering shaft at 90° to the dash. A SeaStar rear mount helm is also available for concealed (behind the dash) mounting. Capilano and Hynautic helms are available in only one mounting style: behind the dash at 90°.

Optional kits are available to reduce SeaStar helm protrusion from the dash, or to cover dash holes left by steering systems previously installed on the boat.

The Round Bezel Kit ([HA5478](#)) reduces SeaStar helm protrusion from the front of the dash by 3.75". (Not for BayStar.)

The Backplate Kit ([HA5418](#)) reduces SeaStar helm protrusion from the front by the thickness of the dash and allows clean retrofit of SeaStar helm where following helms were previously installed: pre-1991 SeaStar, SyTen, or mechanical rotary steering. (Not for BayStar.)

The 20° Dash Mounting Wedge Kit ([HA5419](#)) allows a SeaStar helm to be mounted 20° from perpendicular in any or four configurations. (Not for BayStar.)



STEERING CYLINDERS: BAYSTAR OUTBOARD CYLINDERS



This balanced cylinder features a compact design that fits most splashwells. BayStar allows you to install all of the safety, reliability and comfort of hydraulic steering onto your boats rated up to MAX. 150HP. Combine this with the superior design, rigid ISO quality control, the finest materials and precision manufacturing—BayStar continues the tradition bringing comfort and safety to boating.

NOTE: Mercury Optimax should use SeaStar cylinders. Not recommended for use on high performance engines.

PART NUMBER	DESCRIPTION
HC4645H	Outboard Compact Cylinder
HC4647H	Outboard Compact Cylinder - Honda
HC4648H	Outboard Compact - short plate
HC4658H	Outboard Compact Cylinder

SEASTAR FRONT MOUNT OUTBOARD CYLINDERS

NEW LOOK

- Updated styling & branding
- Robust barrel



NEW SEALING SYSTEM

- State of the art proprietary seal material
- Similar to Tournament 2
- Excellent resistance to compression set
- 8 hole end gland design for improved serviceability

ORB FITTINGS

- Adjustable stainless steel O-ring seal (ORB) fittings



Want precise control of engine trim without taking your hands off the wheel? Check out our new Pro-Trim on page 204 .

SeaStar Outboard Hydraulic Steering offers three models of steering cylinders to suit most applications. The standard and most commonly used model is the Front Mount Steering Cylinder HC5345-3/47/48/58. Before ordering it is necessary to determine the best possible application for your boat, taking into account the hull design, speed and usage of the boat. Keep in mind that engines today have become larger, more powerful and heavier than in the past.

PART NUMBER	DESCRIPTION
HC5345-3	Outboard FM PP Cylinder
HC5345RED-3	Outboard FM PP Cylinder (Red)
HC5345SIL-3	Outboard FM PP Cylinder (Silver)
HC5347-3	Outboard FM PP Cylinder (Honda)
HC5348-3	Outboard FM PP Cylinder
HC5358-3	Outboard FM PP Cylinder
HC5358SIL-3	Outboard FM PP Cylinder Silver

SEASTAR PRO FRONT MOUNT OUTBOARD CYLINDERS



The SeaStar Pro Front Mount Outboard Cylinders have keyed support brackets to prevent racking of the cylinder which gives it a more solid feel and more robust bushings.

SeaStar PRO Outboard cylinders are suited for all those critical high speed, single powered outboard boats, like Bass, Flats, combo Race/Ski and other performance orientated boats capable of speeds in excess of 65mph. All SeaStar PRO systems require the use of a SeaStar PRO helm and SeaStar PRO (1500psi) reinforced Kevlar hoses only!

PART NUMBER	DESCRIPTION
HC6345-3	O/B Pro FM PP Cylinder
HC6345RED-3	O/B Pro FM PP Cylinder (Red)
HC6345SIL-3	O/B Pro FM PP Cylinder (Silver)
HC6358-3	O/B Pro FM PP Cylinder
HC6358RED-3	O/B Pro FM PP Cylinder - Red
HC6358SIL-3	O/B Pro FM PP Cylinder - Silver

SEASTAR TOURNAMENT SERIES CYLINDERS



Extreme heavy duty cylinders and tie bars designed for primarily high performance multiple engine applications. Also available for single engine applications. This heavy duty universal cylinder features reversible bolt on stainless steel tie bar plates that are suitable for use with all SeaStar Helms and SeaStar Power Assist.

PART NO.	ORDER INFORMATION
HC6845	Outboard Tournament Series Cylinder, Front Mount
HC6845S	Outboard Tournament Series Cylinder, Front Mount, c/w Single Engine Hardware Kit

SEASTAR SIDE MOUNT OUTBOARD CYLINDER



This cylinder is suitable for installation in shallow splashwells and use on engines fitted with power steering. This unbalanced cylinder is 4.8/5.7 turns lock-to-lock. Typical applications include center console fishboats and cruisers. For single and multiple outboard engine installations with total power to 600 HP in counter rotating application. **NOTE: Not for use with SeaStar Pro helms.**

PART NUMBER	DESCRIPTION
HC5370-3	O/B Cylinder Kit, Side Mount, Unbalanced

SEASTAR SPLASHWELL MOUNT OUTBOARD CYLINDER



This cylinder is a light duty alternative to front & side mount cylinders. It is unbalanced with 5.5/6.5 turns lock-to-lock and fits engines with/without support (steering) tube. The splashwell mount cylinder is for single & multiple engine capability and has total power to 600 HP in counter rotating application. It can be transom or hull mounted cylinder. **NOTE: Not for use with SeaStar Pro helms.**

PART NUMBER	DESCRIPTION
HC5380-3	Outboard Splashwell Mount Cylinder

SEASTAR CATAMARAN CYLINDERS



OUTBOARD CYLINDER

The SeaStar Front Mount Pivot Cylinder is for Catamaran designs. This cylinder will fit ALL engines that require HC5375-3 steering cylinder. The internal o-ring is designed to limit the amount of fluid bypass decreasing the amount of re-alignment. This cylinder is best used in applications that require a liquid tie bar.

NOT recommended for single engine applications.

INBOARD CYLINDER & PICTURE OF HC5375-3 ABOVE

PART NUMBER	DESCRIPTION
HC5375-3	Catamaran Outboard Front Mount C/W Rodend
HC5318CAT	Catamaran Inboard Cylinder
HC5319CAT	Catamaran Inboard Cylinder

SEASTAR INBOARD CYLINDERS



Features:

- All anodized aluminum construction
 - Adjustable o-ring sealed ports
 - Common components (i.e. end glands, pistons, seals)
- New cylinders will be designated by HC53XX-3



These cylinders are for single and dual rudder vessels with two axis articulation and easy autopilot interface. Cylinders are also supplied with bleeder fittings.

PART NUMBER	DESCRIPTION
HC5312-3	SeaStar Cylinder, BA 125 ATM, Inboard Type
HC5313-3	SeaStar Cylinder, BA 135 ATM, Inboard Type
HC5314-3	SeaStar Cylinder, BA 150 ATM, Inboard Type
HC5318	SeaStar Cylinder, BA 150-7TM, Inboard Type
HC5319	SeaStar Cylinder, BA 175-7TM, Inboard Type
HC5369	SeaStar Cylinder, BA150-9TM, Inboard Type

HYNAUTIC UNIVERSAL MOUNT INBOARD CYLINDERS



The HC5322-3 and HC5323-3 balanced cylinders are double rod ended, each end held in place with internal wire ties. Every cylinder is equipped with a swivel joint at each end. One provides for a fixed mount attachment point at the end of the housing to protect the moving rod. The other swivel joint, located at the rod end, allows for free movement of the cylinder without binding when attached to the rudder arm.

PART NUMBER	DESCRIPTION
HC5322-3	Cylinder Assembly. 125-7", replaces HC5322-3
HC5323-3	Cylinder Assembly. 125-9", replaces HC5323-3

HYNAUTIC FIXED AND PIVOT MOUNT INBOARD CYLINDERS



These Brass cylinders are for larger boats up to approximately 70 ft. Tubes, ends, and external rods are brass: cylinder rods are 17-4 stainless steel: mounts are manganese bronze. There are two different types of mounting packages for Brass cylinders: fixed mount and pivot mount.

PART NUMBER	DESCRIPTION
K-22	Cylinder Assy. 150-10" stroke fixed mount
K-31	Cylinder Assy. 200-10" stroke pivot mount

HYNAUTIC LARGE INBOARD CYLINDERS



The K-9 cylinder is a double rod end, tie rod constructed hydraulic cylinder. This cylinder has a universal mount, which allows two planes of pivot freedom. This cylinder is equipped with a stainless steel ball joint. Porting is through two 1/4" ports at each end of the cylinder.

PART NUMBER	DESCRIPTION
K-9	Cylinder Assy. 250-14.5" stroke balance c/w clevis

CAPILANO INBOARD CYLINDERS



- Features:
- All anodized aluminum construction
 - Adjustable o-ring sealed ports
 - Common components (i.e. end glands, pistons, seals)
- New cylinders will be designated by HC53XX-3



A wide choice of cylinder configurations make it easy to spec a system which can handle a variety of large boat performance requirements and accommodate most user preferences. Heavy duty brass cylinders. Two-axis articulation. Easy installation for single or dual rudder vessels.

PART NUMBER	DESCRIPTION
HC5349	Cyl BA 150-7 TMB Bronze - Brass, Rod end ball joint type
HC5350	Cyl BA 175-7 TMB Bronze - Brass, Rod end ball joint type
HC5351	Cyl BA 200-7 TMB Bronze - Brass, Rod end ball joint type
HC5356	Cylinder BA 175-7 TMC, Rod end clevis type
HC5355	Cylinder BA 150-7 TMC, Rod end clevis type
HC5357	Cylinder BA 200-7 TMC, Rod end clevis type
HC5378	Cylinder BA200-11TMB (Rod end ball joint)
HC5379	Cylinder BA200-11 TMC, 1" Shaft

SEASTAR STERNDRIVE CYLINDERS



This cylinder fits most most power and non-power assist sterndrives. It can be used on single and multiple drives with multiple steering station connection. This cylinder features simple autopilot interface.

PART NUMBER	DESCRIPTION
HC5326-3	SeaStar Cylinder, BA 150-7EM, Sterndrive Type
HC5329-3	SeaStar Cylinder, 125-8VEM
HC5327-3	SeaStar Cylinder, BA 135-8EM, Sterndrive Type
HC5328-3	SeaStar Cylinder, 125-8EM
HC5330-3	SeaStar Cylinder, BA125-8EMV, Sterndrive Type
HC5331-3	SeaStar Cylinder, I/O Model 92VPS
HC5332	SeaStar Cylinder, Stern Drive (MerCruiser & Volvo SX nonPA)

HYNAUTIC STERNDRIVE CYLINDERS



The **K-5-B** cylinder was designed for inboard/outboard boats requiring external cylinders of substantial size and strength. The **K-5-B** cylinders are nickel plated for aesthetics and protection against the elements. This cylinder does not include the wing plates or hardware required for mounting to the outdrive. Porting is through two through-hull 1/4" NPT ports located at the mounting end of the cylinder.

PART NUMBER	DESCRIPTION
K-5-B	Cylinder Assy.

SEASTAR POWER STEERING CYLINDERS



These power steering cylinders use the ship's engine(s) to provide the "power" for the steering system, via an engine or electric motor driven hydraulic pump. Features effortless steering from docking to top speed.

PART NUMBER	DESCRIPTION
HC5801	Power Steering Cylinder Kit 2" x 9" Stroke
HC5801-2	Power Steering Cylinder Kit 2" x 9" Stroke
HC5802	Power Steering Cylinder Add 2" x 9" Stroke
HC5802HY	Cylinder BA200-9TMB, w/o fittings
HC5802HYC	(K3C) 2X9Bal Cyl Clvs
HC5803	Power Steering Cylinder Kit 2" x 11" Stroke
HC5804	Power Steering Cylinder Add 2" x 11" Stroke
HC5805	Power Steering Cylinder Kit 2.5" x 9" Stroke
HC5806	Power Steering Cylinder Add 2.5" x 9" Stroke

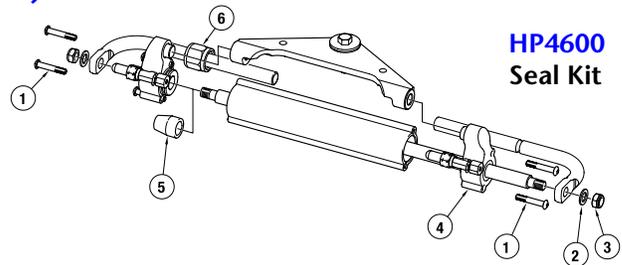
OUTBOARD CYLINDER SERVICE PARTS:

BayStar Cylinder HC46__

(HC4645H, HC4647H, HC4648H, HC4658H)

SERVICE KITS

ITEM	P/N	QTY	DESCRIPTION
1	HP4600	4	Socket Head Screw - Bracket
2	HP6050	2	Locknut
3	HP6050	2	Washer
4	HP4600	1	Gland End/Bracket, Right Side
	HP4600	1	Gland End/Bracket, Left Side
5	HP4600	1	Seal Gland Assembly Guide Tool
6	HP6050	1	Nut - Support Rod
7	HF4202	2	Bleed - Tube Fitting



HP4600
Seal Kit

Individual part numbers cannot be ordered at this time. All parts are only available in kit form.

BAYSTAR CYLINDER HC4600 (CYLINDER NOT SHOWN)

HC4600 & HC4600H ARE OBSOLETE. ONLY SEAL KITS ARE AVAILABLE.

GLAND KIT 'A' (HP5607) PORT SIDE KIT

INCLUDES ITEMS AS FOLLOWS:

Complete assembled end gland with replacement retaining wire



HP5607
PORT SIDE GLAND

GLAND KIT 'B' (HP5608) STARBOARD SIDE KIT

INCLUDES ITEMS AS FOLLOWS:

Complete assembled end gland with replacement retaining wire



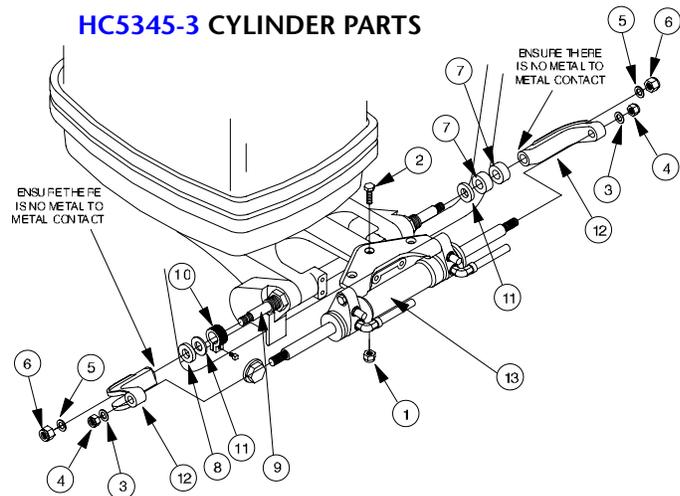
HP5608
STARBOARD
SIDE GLAND

SEASTAR PIVOT MOUNT PARTS

The pivot front mount cylinder (P/N HC5345-3) fits most single-engine applications without requiring additional connection hardware.

ITEM	P/N	QTY	DESCRIPTION
1	HAS822	1	Nut 3/8" NF Nylock S.S.
2	HAS822	1	Screw 3/8" x 1-1/4" Hex Head S.S.
3	HP6036	2	Washer 7/16" dia. S.S.
4	HP6036	2	Nut 7/16" NF Nylock S.S.
5	HP6036	2	Washer 1/2" dia. S.S.
6	HP6036	2	Nut 1/2" NF Nylock (nickel plated brass)
7	HP6031	2	Spacer (Thick)
8	HP6031	1	Spacer (Thin)
9	HP6016	1	Support Rod
10	HP6031	1	Adjusting Nut & Screw
11	HP6031	2	Washer 5/8" dia. S.S.
12	HP6018	2	Support Bracket

HC5345-3 CYLINDER PARTS

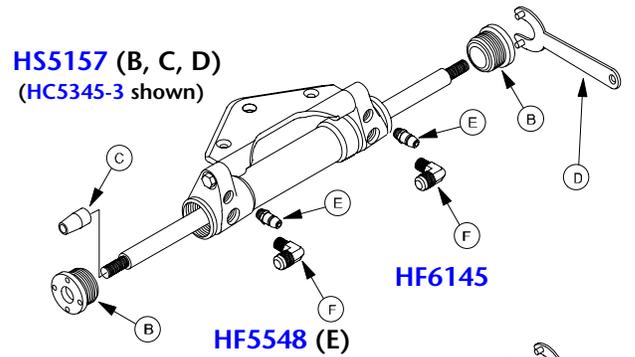


STEERING SERVICE PARTS: SEASTAR FRONT MOUNT PARTS

FRONT MOUNT CYLINDER SEAL KIT

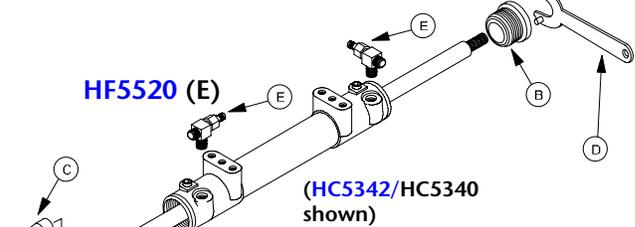
(HS5157) Replacement front seal for kit for SeaStar pivot/front mount cylinders. Includes 2 seal glands, pin wrench and guide tool. Available separately: (B) Seal Gland, (C) Seal Gland Assembly Guide Tool, (D) Pin Wrench. (Includes items B, C & D in illustration.)

Note: **HS5167** ships without wrench



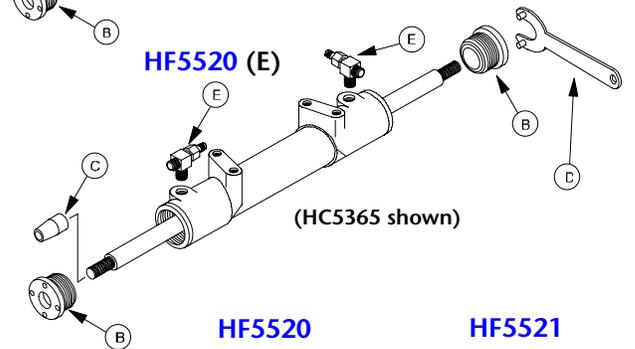
FRONT MOUNT CYLINDER ELBOW FITTING

(HF6145) Elbow fitting for **HC5345-3/HC5347-3/HC5348-3/HC5358-3/HC5445-3** SeaStar front mount cylinder. (Item F in illustration). **NOTICE: NOT for use with ANY -3 steering cylinder (i.e. HC5345-3). -3 steering cylinders use HF6004**



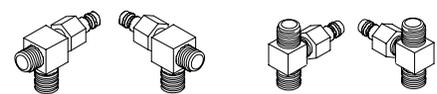
FRONT MOUNT CYLINDER BLEED FITTING

(HF5548) (formerly 828980) Contains: 2 bleed fittings, 2 o-rings and 2 soft caps for applicable cylinders: **HC5345-3/HC5347-3/HC5348-3/HC5358-3/HC5445-3**. (Note: Soft caps for item E not shown in illustration.)



CYLINDER BLEEDER TEE FITTING SET

(HF5520) Pair of bleeder tee fittings for older-style standard and compact SeaStar front mount cylinders (**HC5342/HC5340/HC5365**), side mount cylinders (**HC5370**), and splashwell mount cylinders (**HC5380**). **NOTICE: NOT for use with ANY -3 steering cylinder (i.e., HC5370-3). -3 steering cylinders use HF6002**



VERTICAL BLEEDER FITTING SET **(HF5521)**

Pair of 90° fittings with integrated vertical bleeders for use where clearances are tight.

PIVOT MOUNT CYLINDER — DUAL & TRIPLE ENGINE TIE BARS

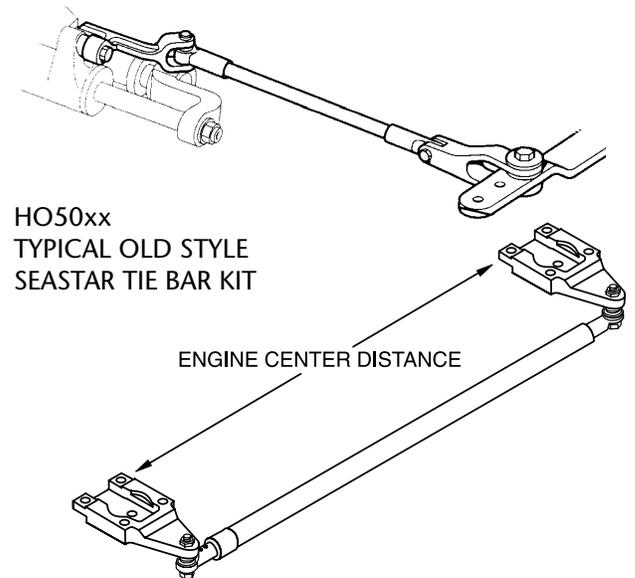
WITH NEW STYLE **HO6001/6002/6003** TIE BAR KITS:

No adapters are required. Use the dual and triple engine application guides on Page 59 to select the tie bar kit required.

WITH OLDER SEASTAR TIE BAR KITS:

When using the **HC5345-3** with a pre-1998 SeaStar tie bar kit, contact SeaStar Solutions Technical Service.

TYPICAL FRONT MOUNT TIE BAR KIT FOR **HC5345-3** TYPE FRONT MOUNT CYLINDER **HO6001/HO6002/HO6003**



SEASTAR / BAYSTAR HOSE AND TUBING:

SeaStar Steering hoses are a custom multi-layered composite design, engineered specifically for our systems. They are designed to exceed SAE and ABYC specifications and provide precise steering control not achievable with hydraulic industry standard hoses. SeaStar Hoses are engineered to provide the system with very low thermal expansion properties and are kink and abrasion resistant. Our hoses also feature a swaged solid fitting connection with an O-ring seal and a metal to metal backup to the primary seal. Due to performance and safety concerns, SeaStar Solutions recommends that ONLY SeaStar or SeaStar PRO steering hoses be used in SeaStar Steering Systems.

BAYSTAR TUBING ([HT4420H/HT4430H](#))

Can be used with all BayStar helms with appropriate fittings. Kit contains two cut lengths of tubing.

BayStar Tubing Kits:

20' Kit (2 x 20' lengths tubing): [HT4420H](#)

30' Kit (2 x 30' lengths tubing): [HT4430H](#)

(NOTE: BayStar Cylinders with H suffix must use tubing part number with H suffix.)

* Decrease effort by installing SeaStar HO51xx Outboard hose

**BAYSTAR
TUBING KIT
HT44xxH**



SEASTAR OUTBOARD HOSE KIT (HO51xx*)

Includes two hoses - can be used with all SeaStar systems, except SeaStar PRO, Capilano and 3-line inboard systems.

**OUTBOARD
HOSE KIT
HO51xx**



SEASTAR PRO OUTBOARD KEVLAR HOSE KIT (HO57xx*)

Includes two hoses - can be used with all SeaStar / BayStar Steering Systems.

**OUTBOARD
HOSE KIT
HO57xx**



NYLON TUBING (HT5xxx)

Can be used with SeaStar 1.7 helms on stern drives (except with [HC5332](#) cylinder) and small inboards with fitting kit; do not use on outboard systems.

Part #	Length x OD
HT5092	25' x 3/8"
HT5095	50' x 3/8"
HT5097	75' x 3/8"
HT5100	100' x 3/8"



* SeaStar and SeaStar Pro Hose Kits are available in 2', 3',4',5' and in 2' increments from 6'-30'. 40 foot hose kits are special order only.

SEASTAR BULKHEAD HOSE KITS (HO81xx*)

SeaStar® Bulkhead Hose Kits assure a neat hydraulic steering installation. Each hose has an integral bulkhead fitting for tidy routing of hoses through a splashwell bulkhead, helping to eliminate excess loose hose, kinking or chafing. Includes two hoses - can be used with all SeaStar / BayStar Steering Systems.

Boxed Hose Sets:

- SeaStar Bulkhead Hose Kit (2 hoses): HO81xx
- SeaStar PRO Bulkhead Hose Kit (2 hoses): HO82xx

Bulk-Packed Hose Pairs:

- SeaStar Bulkhead Hose Kit (2 hoses): HO83xx
- SeaStar PRO Bulkhead Hose Kit (2 hoses): HO84xx

BULKHEAD HOSE KIT HO81xx



STAINLESS STEEL BULKHEAD HOSE KITS:

SeaStar Stainless Steel Bulkhead Hoses assures a neat and clean steering installation. These hose assemblies have integral 316 stainless steel bulkhead plate(s) and 316 stainless steel fittings which allow for tidy hose routing while preventing hose kinking or chafing.



SINGLE BULKHEAD HOSE KIT HO86xx



DOUBLE BULKHEAD HOSE KIT HO88xx

- SeaStar Single Stainless Steel Bulkhead Hose Kit (2 hoses): HO86XX
- SeaStar Single Stainless Steel Pro Kevlar Bulkhead Hose Kit (2 hoses): HO87XX
- SeaStar Double Stainless Steel Bulkhead Hose Kit (2 hoses): HO88XX
- SeaStar Double Stainless Steel Pro Kevlar Bulkhead Hose Kit (2 hoses): HO89XX

**AVAILABLE IN 2019
FIELD INSTALLABLE HOSE BULKHEAD KITS**

HOW DOES IT WORK?

1. Wind-on split pigtail on the hose.



2. Attach split grommet to the hose and push into the pigtail.

SINGLE

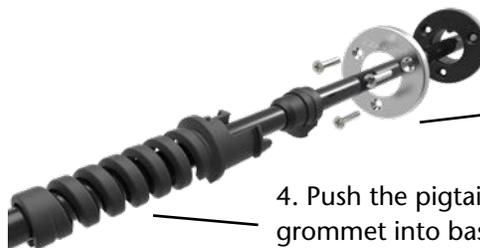


DUAL



3. Attach base plate to the transom (Stainless steel cover optional).

4. Push the pigtail and grommet into base plate until it snaps in.



HYDRAULIC FLUID



ANY NON-APPROVED FLUID MAY CAUSE SERIOUS DAMAGE TO THE STEERING SYSTEM RESULTING IN POSSIBLE LOSS OF STEERING, CAUSING PROPERTY DAMAGE, PERSONAL INJURY AND/OR DEATH.

Due to recent upgrades in our steering system components, SeaStar Solutions recommends use of SeaStar Steering Fluid ONLY in our hydraulic steering systems. SeaStar Steering Systems have been engineered and validated using our proprietary SeaStar Hydraulic Steering Fluid. SeaStar Steering fluid is engineered with a special additive package that contains anti-foaming and anti-rusting agents, anti-oxidants, viscosity stabilizers, corrosion inhibitors and wear additives as well as water emulsification additives. It is highly recommend that SeaStar Steering Fluid be used to ensure optimum system performance and safety.

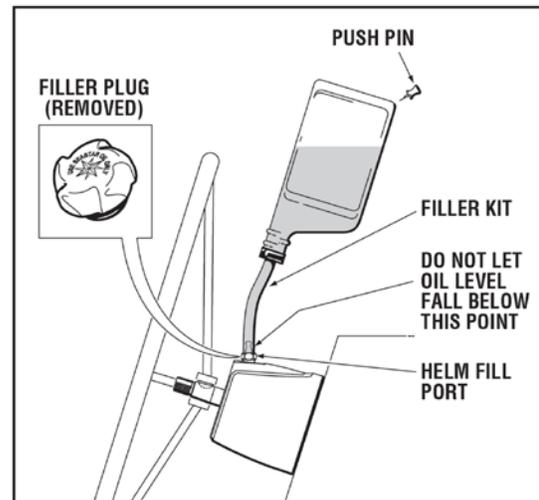
Use of any non-approved fluid may result in the following;

- Higher steering effort, particularly at ambient or lower temperatures and/or over time due to oil degradation and breakdown
- Increased steering slip and/or drift resulting in lost motion
- Foaming or air entrainment causing a bumpy feel during steering
- High rates of moisture absorption causing internal component corrosion
- Scratched steering cylinder bores and shafts due to contamination or elevated wear rates
- Seal degradation – incompatibility with various proprietary seal compounds used in our products

In an emergency, SeaStar EPS Fluid, any MD-3/4 rated ATF or MIL-PRF-5606H equivalent fluid that is filtered through a fine mesh screen can be used. The system MUST be thoroughly flushed as soon as possible with genuine SeaStar Steering Fluid after using an emergency fluid. In an EXTREME emergency, any non-toxic, non-flammable fluid that is filtered through a fine mesh screen may provide temporary steering.

Optional Filler Kit

Part # [HA5438](#)



⚠ WARNING

Use of non-standard fluids will require an immediate and complete system flush using approved fluids, by an approved steering technician.

⚠ WARNING

NEVER FILL OR MIX BRAKE FLUIDS, TRIGLYCERIDES OR POLYALKYLENE GLYCOLS WITHIN A HYDRAULIC STEERING SYSTEM.

NOTICE

SeaStar Hydraulic Steering Fluid can be used in Hynautic, BayStar and BayStar Plus steering systems.

NOTICE

Help protect your boating environment by ensuring that all used oil is disposed of properly.

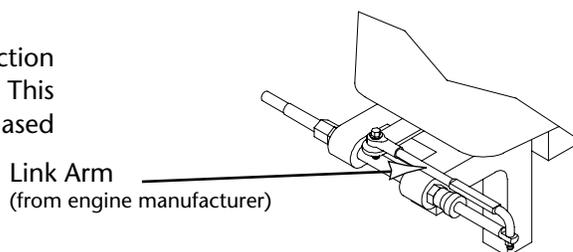
STEERING CONNECTION KITS:

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.

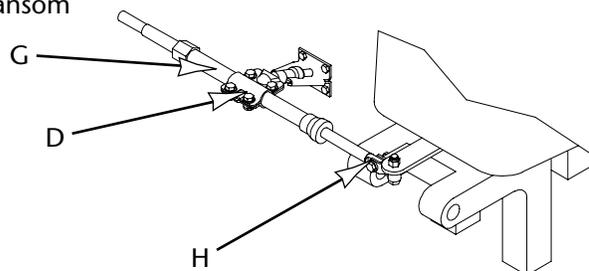
Parts Required: Engine Manufacturer's Link Arm



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](#)
 (See following pages for individual components.)

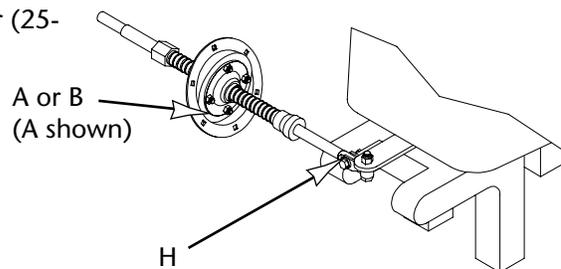


*** In salt or brackish water only use Stainless Steel kit**

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](#)
 (See following pages for individual components.)

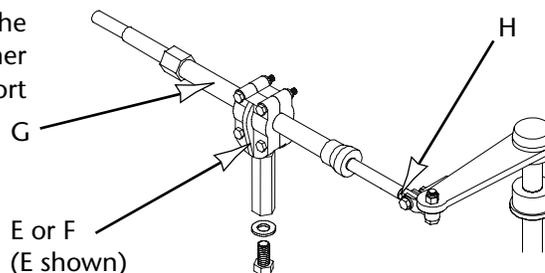


NOTE: Not for thru hull applications.

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 to center of support tube.

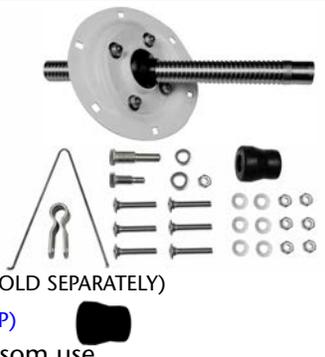
Parts Required: E,G,H (long post) or
 F,G,H (short post)
 (See following pages for individual components.)



SEASTAR SOLUTIONS STEERING CONNECTION KITS:

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

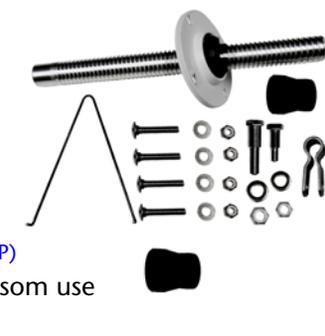
A SPLASHWELL MOUNT KIT
15° Corrosion Resistant



Part No. [SA27253P](#)

(NOTE: OUTER RING NOT SOLD SEPARATELY)
(BOOT ONLY P/N: [SA37868P](#))
**Not for through-transom use

B SPLASHWELL MOUNT KIT
90° Corrosion Resistant



Part No. [SA27254P](#)
(BOOT ONLY P/N: [SA37868P](#))
**Not for through-transom use

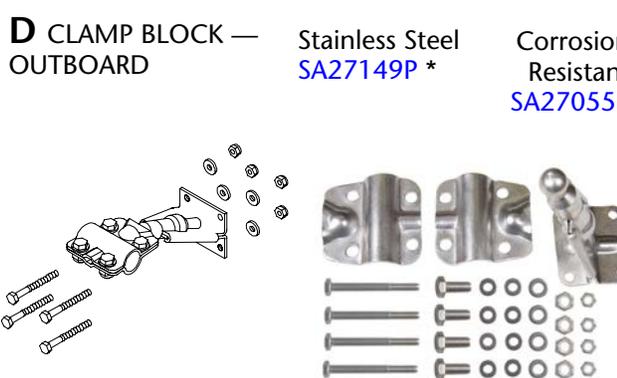
C SPLASHWELL THREADED TUBE WITH BALL
Corrosion Resistant
[SA36316P](#)



(BOOT ONLY P/N: [SA37868P](#))
**Not for through-transom use

D CLAMP BLOCK — OUTBOARD

Stainless Steel [SA27149P](#) * Corrosion Resistant [SA27055P](#)



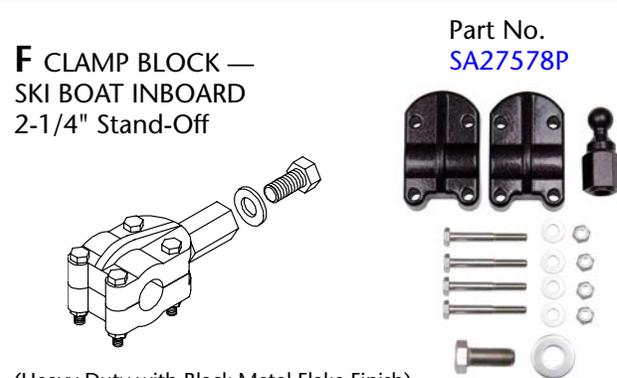
E CLAMP BLOCK — SKI BOAT INBOARD
4-1/2" Stand-Off



Part No. [SA27579P](#)

(Heavy Duty with Black Metal Flake Finish)

F CLAMP BLOCK — SKI BOAT INBOARD
2-1/4" Stand-Off



Part No. [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](#).

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

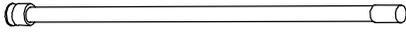
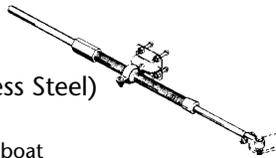


Part No. [SA27313P](#)

* Using stainless steel in salt or brackish water is recommended

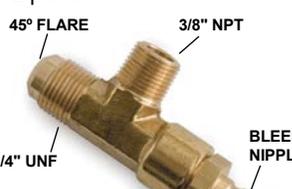
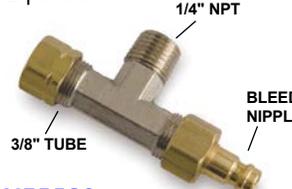
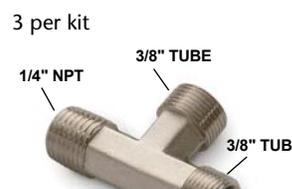
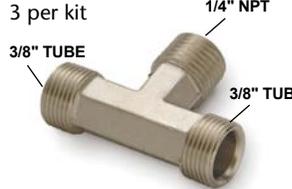
SEASTAR SOLUTIONS STEERING CONNECTION KITS:

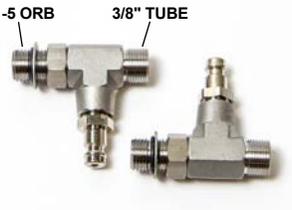
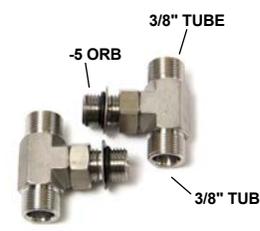
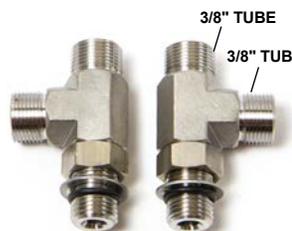
NOTE: Parts shown on this page are available in kit form ONLY.

<p>M SPENT TRAVEL TUBES FOR ROTARY HELMS</p> <p>SAFE-T QC/ SAFE-T "TS"/ BIG-T Helms SA35680P</p>  <p>NFB 4.2 / NFB SAFE-T II / HPS Rotary Helms SA38603P</p> 	<p>SUPPORT TUBE (Aluminum) 064480 Grooved Old Morse® Style 064480</p> 
<p>N UNIVERSAL TIE BAR KIT SA27252P (Maximum length: 25-1/2")</p> 	<p>ADAPTER BRACKET for Johnson/Evinrude 40 hp and under (not pictured) 300612 (See also SeaStar Solutions outboard clamp block kits on preceding pages.)</p> 
<p>O CABLE GARD For Most Outboards with Tilt Tube SA39329P (Helps to keep the tilt tube clean.)</p> 	<p>ADAPTER PLATE KIT for Honda and Mercury Adapter Kit for Honda HO5028 Adapter Kit for Mercury HO5035</p> 
<p>P STEERING WHEEL HARDWARE KIT SA27454P (Old #2745417P) (For All SeaStar Solutions Mechanical Helms with standard marine round 3/4" Tapered Shaft.)</p> 	<p>HOOKUP, INBOARD TRANSOM MOUNT for Volvo, 1977 and earlier 300614</p> 
<p>Q QC II HELM CONVERTER For Helms with Threaded Spigots SA27620P (Upgrades older SeaStar Solutions rotary helms to Quick-Connect cable interface, allowing use of SSC62 QC cables.)</p>  	<p>HOOKUP, INBOARD STAND-OFF Tall Bracket 300616 (300617 shown) HOOKUP, INBOARD STAND-OFF Short Bracket 2" 300617 Short Bracket 2" (Stainless Steel) 307046 (See also SeaStar Solutions ski boat inboard clamp block kits on preceding pages.)</p>  
<p>R HITCH PIN & TAG FOR QUICK CONNECT HELM AND QC II HELM CONVERTER SA27245P (Old #2724514P) (Replacement hitch pin for all SeaStar Solutions helms with the Quick Connect cable attachment port and for all SeaStar Solutions SA27620P QC II Helm Converters.)</p> 	<p>HP6046 Bellows Tilt Helm Cover For New Sport Tilt Helms 6 per kit HP6053 Bezel, Lower For SS Sport Tilt Helms, No Bellows</p>  

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

* NPT fittings CANNOT be used with any -3 helms or cylinders. Damage will occur. Only use ORB fittings with -3 helms and cylinders. See next page for ORB fittings.

<p>2 per kit</p>  <p>3/8" TUBE 1/8" NPT BLEED NIPPLE</p> <p>HF4202 Horizontal Bleeder Tee For Baystar Systems Only</p>	<p>2 per kit</p>  <p>3/8" NPT BLEED NIPPLE 3/8" TUBE</p> <p>HF5518 Vertical Bleeder Tee NOT for use with -3 cylinders/helms</p>	<p>2 per kit</p>  <p>45° FLARE 3/8" NPT 3/4" UNF BLEED NIPPLE</p> <p>HF5519 Bleed Tee (TM Cylinders)</p>	<p>2 per kit</p>  <p>1/4" NPT 3/8" TUBE BLEED NIPPLE</p> <p>HF5520 Horizontal Bleeder Tee Not for use with Baystar NOT for use with -3 cylinders/helms</p>
<p>2 per kit</p>  <p>3/8" TUBE BLEED NIPPLE 1/4" NPT</p> <p>HF5521 Vertical Bleeder Tee Not for use with Baystar NOT for use with -3 cylinders/helms</p>	<p>2 per kit Includes O-ring. For use with Front Mount Cylinder ONLY.</p>  <p>HF5548 Bleed Nipple 1998 - Date Cylinders</p>	<p>3 per kit</p>  <p>3/8" TUBE</p> <p>HF5527 Union Coupling Fitting</p>	<p>3 per kit</p>  <p>1/4" NPT 3/8" TUBE</p> <p>HF5528 Straight Fitting NOT for use with -3 cylinders/helms</p>
<p>3 per kit</p>  <p>3/8" NPT 3/8" TUBE</p> <p>HF5532 Connector Fitting</p>	<p>3 per kit</p>  <p>3/8" TUBE 1/4" NPT</p> <p>HF5529 Elbow Fitting NOT for use with -3 cylinders/helms</p>	<p>3 per kit</p>  <p>3/8" TUBE 3/8" NPT</p> <p>HF5534 Elbow Fitting</p>	<p>3 per kit</p>  <p>1/4" NPT 3/8" TUBE</p> <p>HF5538 Street Elbow</p>
<p>2 per kit</p>  <p>3/8" TUBE 1/4" NPT</p> <p>HF5540 45° Fitting NOT for use with -3 cylinders/helms</p>	<p>3 per kit</p>  <p>3/8" TUBE 1/4" NPT 3/8" TUBE</p> <p>HF5533 Tee Fitting</p>	<p>3 per kit</p>  <p>1/4" NPT 3/8" TUBE 3/8" TUBE</p> <p>HF5531 Tee Fitting NOT for use with -3 cylinders/helms</p>	<p>3 per kit</p>  <p>3/8" TUBE 3/8" TUBE 3/8" TUBE</p> <p>HF5530 Tee Fitting</p>
<p>3 per kit</p>  <p>3/8" TUBE 1/4" NPT 3/8" TUBE</p> <p>HF5536 Tee Fitting NOT for use with -3 cylinders/helms</p>	<p>2 per kit</p>  <p>9/16" - 18UNF JIC 37.5 FLARE 3/8" TUBE</p> <p>HF5566 Adapter Fitting</p>	<p>3 per kit</p>  <p>3/8" TUBE</p> <p>HF5524 Cap Plug Nut</p>	<p>6 per kit For use with 3/8" Nylon and/or 3/8" copper tubing</p>  <p>3/8" TUBE</p> <p>HF5526 Tube Nut</p>

 <p>HF6001 ORB Fitting Kits</p>	 <p>HF6002 ORB Fitting Kits</p>	 <p>HF6003 ORB Fitting Kits</p>	 <p>HF6004 ORB Fitting Kits</p>
 <p>HF6005 ORB Fitting Kits</p>	 <p>HF6006 ORB Fitting Kits</p>	 <p>HF6007 ORB Fitting Kits</p>	 <p>HF6009 ORB Fitting Kits</p>
 <p>HF6010 ORB Fitting Kits</p>	 <p>HF6011 ORB Fitting Kits</p>	 <p>HF6012 ORB Fitting Kits</p>	 <p>HP0962 Outlet Checkvalve For Capilano 250V/275V</p>
 <p>HP0964 Outlet Checkvalve For Capilano 1250V/1275V</p>	 <p>HP4600 Gland Kit BayStar compact cylinder</p>	 <p>HP5603 Mounting Hardware Steel</p>	 <p>HP5607 Gland Kit BayStar cylinder HP5607 port side</p>
 <p>HP5608 Gland Kit BayStar cylinder HP5608 starboard side</p>	 <p>HP5611 Trunion Mount Assembly All ATM Inboard Cylinder</p>	 <p>HP5613 Rocker Arm Bridge Kit Capilano Helms Only</p>	 <p>HP5615 Clevis and Pins 5/8" Pin X 5/8" Thread</p>

 <p>HP5616 Clevis, Pin, Cotter Pins Kit 3/4" Thread X 5/8" Pin</p>	 <p>HP5618 Clevis, Pin, Cotter Pins 1" X 1"</p>	 <p>HP5620 Slider Assembly Hardware *Slide Plate not included HC5340 and HC5342 Only</p>	 <p>HP5632 Bezel Kit V series Capilano helms</p>
 <p>HP5652 Mounting Hardware</p>	 <p>HP5810 Oil Reservoir</p>	 <p>HP5815 Oil Filter</p>	
 <p>HP5815-W Oil Filter</p>	 <p>HP5820 Power Steering Outlet Check</p>	 <p>HP5821 Autoflow Valve</p>	
 <p>HP5822 Power Steering Pressure Relief</p>	 <p>HP5825 Oil Cooler 2.25 KW, 1" Lines</p>	 <p>HP5826 Oil Cooler 6.25 KW, 2" Lines</p>	



HP5830
Power Steering Pump
Belt Drive, R.R.



HP5831
Power Steering Pump
Belt Drive, L.R.



HP5832
Power Steering Pump
Direct Drive, R.R. (Heavy Duty)



HP5833
Power Steering Pump
DD, R.R. Pump (for Caterpillar)



HP5835
Power Steering Pump
Direct Drive, R.R. (Heavy Duty)



HP6000
Plug
non vent. 5ea.



HP6001
Cap Screw
hex head, 3/8" NF x 1-1/4" SST.
3ea.



HP6003
Ball Joint for Tie Bar
1/2" SST.



HP6004
Gauge
bottom mount, 0-60 PSI



HP6005
Gauge
rear mount, 0-60 PSI



HP6006
Cover Boot
K-22, K-27, K-31 and K-33
cylinder shafts



HP6007
Bolt, Hex Head and Nut
3/8" x 1-5/8", 3ea.



HP6013
SS Rod End Ball Joint
5/8" hole, 5/8" x 18UNF thread



HP6014
Support Bracket Kit O/B PVT CYL
Ships with greasable zerker fittings
Will work on ALL pivot mount,
outboard cylinders



HP6015
Washer
5/8" SST. p/n 202121 5ea.



HP6016
Support Rod
all front mount O/B cylinders
NOT for use with PRO cylinders



HP6017
Washer
5/8" SST. p/n 202300 5ea.



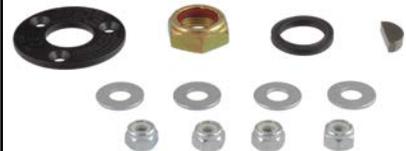
HP6019
Ss Rod End Ball Joint
3/4" hole, 3/4" x 16 UNF thread



HP6022
Cap Screw, Socket Head
7/8" x 1/4" NF. SST. 4ea.
For use with K-6 cylinders only



HP6031
Mounting Hardware And
Slide Plate For O/B Cylinder
HC5340 and HC5342 Only



HP6032
Service Kit
For Seastar Helms
except commercial helms

 <p>HP6033 Spacer Kit For O/B Front Mount Cylinder</p>	 <p>HP6034 Nut, Adjusting For All Front Mount O/B Cylinders</p>	 <p>HP6035 Support Brackets For O/B Slide Plate Cylinder 2Ea HC5340 and HC5342 Only</p>
 <p>HP6036 Mounting Hardware For O/B Pivot Plate Cylinder</p>	 <p>HP6037 Service Kit For Seastar Commercial Helms</p>	 <p>HP6039 Ball Joint K-22, 27, 28, 29</p>
 <p>HP6040 Air Valve Plug Assembly Hydraulic Reservoirs Only.</p>	 <p>HP6042 Bolt And Bushing Merc. And Honda Tiller Arms</p>	 <p>HP6044 Bleed Nipple Caps. All Seastar Cylinders 12ea.</p>
 <p>HP6045 Drag Link Adapter Kit For K-6 Cylinder (Sterndrive appl.)</p>	 <p>HP6047 Cap Screw, Socket Head 7/8 x 10-24 SST. 10ea.</p>	 <p>HP6048 Cap Screw, Hex Head 1-1/2 x 3/8 NF SST. 10ea.</p>



HP6049
Nut, Tie Rod For K-22,K-27,K-28,
K-29 Cylinder 10ea.



HP6050
Support Rod
2ea.
Baysstar Cylinder Only



HP6051
Cap Screw, Flat Head Socket
1-1/4 x 3/8 NF SST. 10ea.



HP6052
Bezel, For Tilt Helms
Traditional Tilts Only



HP6054
Cap Screw, Hex Head
2-1/4 x 3/8 NF SST. 10ea.



HP6055
Extention Rod And Pin
For O/B Side Mount Cylinder



HP6056
Clevis Connection
1/2" Thread, 3/8" Pin



HP605
Nut, Acorn
3/4 NC 6ea.
**Hynautic H-20 and H-40
Series Only**



HP6058
Clip And Nut,
For O/B Cylinder Support Rod
10ea.



HP6059
Spacer
Tie Bar Stand-Off 10ea.



HP6060
Spare Parts Kit
For Seastar Power Purge Sr



HP6061
Cap Screws, Socket Head
3/8 x 1/4NC 6ea

 <p>HP6064 Relief Valve 950PSI, for RV60</p>	 <p>HP6065 Washer, Locking Tab M10 6ea.</p>	 <p>HP6067 Cover Boot For HC5801 and HC5803 Power Steering Cylinder</p>
 <p>HP6068 Cylinder Mounting Foot, For Capilano And SeaStar Inboard Cylinder - Brass</p>	 <p>HB0573 Wheel Bushing 3/4" - 1" Straight Capilano Helms Only</p>	 <p>HP6070 Bezel, Round Plate Chrome Polish For SeaStar Rear Mount Helm</p>
 <p>HP6072 Rod End for TK-01-02 Trim Cylinder</p>	 <p>HP6074 Relief Valve 500PSI, for RV50</p>	 <p>HP6075 Washer 1/4" x 5/8" OD 6ea.</p>
 <p>HP6076 Pin, Clevis For K-31, K-3, K-4 and PSK-10-C Cylinder 6ea.</p>	 <p>HP6077 Ss Rod End Ball Joint 1/2" hole, 1/2" x 20 UNF Threads</p>	 <p>HP6081 Mounting Bolt Kit for SeaStar Rear Mount Helm</p>
 <p>HP6082 Fill And Air Valve For SeaStar Power Steering Reservoir</p>	 <p>HP6083 Tie Bar Kit, Kicker Engine</p>	 <p>HP6084 Relay Switch For Hynautic TP-01 Trim Pump 2ea.</p>

 <p>HP6085 Relay Switch For Hynautic TP-02 Trim Pump</p>	 <p>HP6090 Key, Hynautic H-29, H-30 Helm Shaft 12ea.</p>	 <p>HP6091 Key 1/4" square 12ea.</p>
 <p>HP6092 Tube Support Kit for HC5331 cylinder</p>	 <p>HP6093 SS Rod End Ball Joint 5/8" Hole, 1/2" x 20 UNF Thread</p>	 <p>HP6098 Cap Screw 1-1/4" x 5/16" NF SST. 10ea.</p>
 <p>HP6100 Cover Boot, Rudder Side Shaft For HC5805 Power Steering Cylinder</p>	 <p>HP6101 Support Brackets, 2ea HC6345-3 and HC6358-3 Only</p>	 <p>HP6102 Mounting Kit For K-6H Cylinder Honda 115-130 hp only</p>
 <p>HP6103 Relay Switch for Hynautic TP-02 Trim Pump</p>	 <p>HP6104 Mounting Kit, For Baystar Helms</p>	 <p>HP6106 Bolt, Carriage 2" x 1/4" UNC GR5 FT ZP 10ea.</p>
 <p>HP6107 Ss Rod End Ball Joint 3/4" hole, 3/4" x 16 UNF</p>	 <p>HP6108 Trim Plate for H-20, H-40 series helms</p>	 <p>HP6110 End Gland for HC5380 cylinder transom side</p>

 <p>HP6111 Support Rod Pro For Cylinders HC6345-3 And HC6358-3</p>	 <p>HP6112 Shaft Shield For SS Power Steering Cylinder</p>	 <p>HP6115 Bushing Adapter, 3/8" Volvo 6ea.</p>
 <p>HP6116 Pump, Replacement For Power Purge Jr.</p>	 <p>HP6117 Mounting Hardware Kit For K-6 Cylinder</p>	 <p>HP6118 Cover, Shaft Shield Mounting Foot Side For HC5805 Power Steering Cylinder</p>
 <p>HP6119 Drive Bracket Extension For Tie Bar, Cylinder Connect Side</p>	 <p>HP6120 Drag Link Connection For K-6 Cylinder</p>	 <p>HP6121 Gauge, Pressure 0-60PSI For SeaStar Power Steering Oil Reservoir</p>
 <p>HP6122 Fill And Valve Assembly For Hynautic Reservoirs</p>	 <p>HP6123 Clevis Connection 7/8" Thread, 5/8" Hole</p>	 <p>HP6124 Rod End 1/2" NF for HO6001 Tie Bar</p>
 <p>HP6126 Plug, Vent For SeaStar Helms 5ea.</p>	 <p>HP6130 Washer 5/16" ID x 3/4" OD SST. 20ea.</p>	 <p>HP6131 Nut 5/16"NC, Nyloc Thin, SST 10ea.</p>

 <p>HP6132 Cap Screw, Shoulder Socket Head 1-1/4" x 3/8" NC 10ea.</p>	 <p>HP6133 Nut, Bulkhead, 6ea.</p>	 <p>HP6134 Washer 1/2" ID x 1-1/16" OD SST. 10ea.</p>
 <p>HP6135 Key, woodruff 606 SST. SeaStar Helm Shaft. 20ea.</p>	 <p>HP6136 Key, Woodruff 606 SST. Hynautic Helm Shaft. 20ea.</p>	 <p>HP6137 SS Rod End Ball Joint 1/2" hole, 7/16" x 20 UNF thread</p>
 <p>HP6140 Filter Element SeaStar Power Steering</p>	 <p>HP6142 Cap Screw, Hex Head 3-1/2" x 5/16 NF 12ea.</p>	 <p>HP6143 Slave Bracket for HO6001 Tie Bars</p>
 <p>HP6144 Drive Bracket For HO60xx Tie Bars</p>	 <p>HP6145 Fitting, Elbow 90° 2ea.</p>	 <p>HP6146 Nut, 5/16" NC Nyloc, SST 12ea.</p>
 <p>HP6147 Fitting, Elbow 139-8B 6ea.</p>	 <p>HYCL-001 Stabilizer Clips (2Pk) 4" Long Stabilizer Clips For SeaStar Steering Cylinders</p>	

Old No.	New No.	Description	Old No.	New No.	Description
670030	HP6039	BALL JOINT	600606	HF6023	SEASTAR ELBOW FITTING, 3/8" COMP X 1/4" NPT
010924	HP6130	WASHER 5/16 FLAT 3/4OD SS	653220	HF6024	HYNAUTIC TEE FITTING, FLARED STYLE
747521	HP6037	SERVICE KIT, SEASTAR COMMERCIAL HELM	690011	HF6025	HYNAUTIC STRAIGHT FITTING, 1/4" NPT X 3/8" FLARED
225226	HP6037	SERVICE KIT, SEASTAR COMMERCIAL HELM	690511	HF6026	HYNAUTIC TEE FITTING, 1/4" NPT X 2 SIDES 3/8" FLARED
260130	HP6037	SERVICE KIT, SEASTAR COMMERCIAL HELM	690751	HF6027	HYNAUTIC UNION FITTING, 3/8" FLARED
793687	HP6037	SERVICE KIT, SEASTAR COMMERCIAL HELM	691231	HF6028	HYNAUTIC HELM FITTING
798567	HP6037	SERVICE KIT, SEASTAR COMMERCIAL HELM	794926	HF6029	SEASTAR BLEED TUBE NUT
827926	HP6037	SERVICE KIT, SEASTAR COMMERCIAL HELM	961241	HP6143	SLAVE BRACKET
798676	HP6037	SERVICE KIT, SEASTAR COMMERCIAL HELM	721126	HP6031	SEASTAR SLIDE CYLINDER MTG HARDWARE
826025	HP6037	SERVICE KIT, SEASTAR COMMERCIAL HELM	721220	HP6031	SEASTAR SLIDE CYLINDER MTG HARDWARE
067424	HP6037	SERVICE KIT, SEASTAR COMMERCIAL HELM	721427	HP6031	SEASTAR SLIDE CYLINDER MTG HARDWARE
210429	HP6037	SERVICE KIT, SEASTAR COMMERCIAL HELM	722222	HP6031	SEASTAR SLIDE CYLINDER MTG HARDWARE
690051	HF6089	ELBOW FITTING N11249F-6-4	724021	HP6031	SEASTAR SLIDE CYLINDER MTG HARDWARE
961501	HP6083	Tie bar, KICKER ENGINE	809900	HP6035	SEASTAR SLIDE CYLINDER MTG HARDWARE
225320	HS6038	QUAD RING #214	736028	HP6031	SEASTAR SLIDE CYLINDER MTG HARDWARE
833657	HP6115	BUSHING, 3/8" VOLVO ADAPT	202121	HP6031	SEASTAR SLIDE CYLINDER MTG HARDWARE
590025	HP4600	KIT GLAND B/S COMPACT	747521	HP6032	SEASTAR HELM SERVICE KIT
590027	HP4600	KIT GLAND B/S COMPACT	067424	HP6032	SEASTAR HELM SERVICE KIT
724529	HP6031	SS S/P CYL. MTG HARDWARE AND SLIDE PLATE	201429	HP6032	SEASTAR HELM SERVICE KIT
441300	HP5607 OR HP5608	GLAND KIT, BAYSTAR CYL. HP5607 PORT SIDE, HP5608 STB. SIDE	260130	HP6032	SEASTAR HELM SERVICE KIT
440620	HP5608	GLAND KIT, BAYSTAR CYL, HP5608 STB. SIDE	225226	HP6032	SEASTAR HELM SERVICE KIT
371422	HP5611	TRUNION MTN. KIT ALUM.	828020K	HP6033	SEASTAR FRONT MOUNT CYLINDER SPACER KIT
371225	HP5611	TRUNION MTN. KIT ALUM.	828085	HP6033	SEASTAR FRONT MOUNT CYLINDER SPACER KIT
371329	HP5611	TRUNION MTN. KIT ALUM.	731720	HP6036	SEASTAR FRONT MOUNT CYLINDER SPACER KIT
112225	HP5615	CLEVIS AND PINS. 5X8 X 5/8	731625	HP6036	SEASTAR FRONT MOUNT CYLINDER SPACER KIT
312020	HP5632	BEZEL KIT, V SERIES CAPILANO HELMS	202300	HP6033	SEASTAR FRONT MOUNT CYLINDER SPACER KIT
068821	HP5632	BEZEL KIT, V SERIES CAPILANO HELMS	995876	HP6033	SEASTAR FRONT MOUNT CYLINDER SPACER KIT
013020	HP5632	BEZEL KIT, V SERIES CAPILANO HELMS	996689	HP6033	SEASTAR FRONT MOUNT CYLINDER SPACER KIT
515321	HP5632	BEZEL KIT, V SERIES CAPILANO HELMS	828085	HP6034	SEASTAR FRONT MOUNT, ADJUSTING NUT
825522	HP5815	OIL FILTER, POWER STEERING	809900	HP6035	SEASTAR SLIDE MOUNT CYLINDER SUPPORT BRKT
825633	HP5815-W	OIL FILTER, WHITE, POWER STEERING	763721	HP6032	PART OF SS HELM SERVICE KIT
582103	HP5821	AUTO FLOW VALVE	760735	HP6104	MTG KIT PKG. BAYSTAR HELMS
582325	HP5821	AUTO FLOW VALVE	380020	HP6040	ALL HYNAUTIC RESERVOIRS/RESER VALVES
058733	HP6000	SEASTAR NON-VENT PLUG 5EA	722829	HP6041	EXTENSION PLATE HARDWARE KIT 6EA NO PLATES
113222	OBSOLETE	SEASTAR HEX BOLT, 3/8NFX1-1/4 + NUT SS, 3 EA.	113600	HP6041	EXTENSION PLATE HARDWARE KIT 6EA NO PLATES
113330	HP6001	SEASTAR HEX BOLT, 3/8NFX1-3/8 + NUT, 3 EA.	203123	HP6041	EXTENSION PLATE HARDWARE KIT 6EA NO PLATES
116527	HP6003	SEASTAR Tie bar BALL JOINT	753428	HP6041	EXTENSION PLATE HARDWARE KIT 6EA NO PLATES
160012	HP6004	HYNAUTIC BOTTOM MOUNT PRESSURE GAGE 0-60PSI	191424	HP6041	EXTENSION PLATE HARDWARE KIT 6EA NO PLATES
160042	HP6005	HYNAUTIC REAR MOUNT PRESSURE GAGE 0-60PSI	961193	HP6042	MERC/HON BOLT & BUSH
170001	HP6006	HYNAUTIC K-22, K-27, K-31 AND K-33 SHAFT BOOT COVER	186530	HP6042	MERC/HON BOLT & BUSH
185921	HP6007	SEASTAR HEX BOLT, 3/8NFX1-5/8 + NUT SS, 3 EA.	800126	N/A	
192126	HF6008	SEASTAR NUT 1/2NF NYLK BRASS NP 6EA	293721	HP6044	BLEED NIPPLE CAP, ALL SEASTAR CYLINDERS
287825	HP6010	SEASTAR HOSE SWAGE END FITTING	680197	HP6045	HYNAUTIC K-6 DRAG LINK ASSEMBLY
432720	HP6011	SEASTAR HOSE, BEND RESTRICTOR	270307	HP6045	HYNAUTIC K-6 DRAG LINK ASSEMBLY
432720	HP6012	SEASTAR HOSE, BEND RESTRICTOR	279047	HP6046	SEASTAR SPORT TILT, RUBBER BELLOWS COVER
560930	HP6013	SEASTAR/CAPILANO BRASS CYLINDER ROD END BALL	757927	HP6047	SOCKET HEAD CAP SCREW #10 X 24
690941	HF6014	HYNAUTIC MSH-6 HOSE END, SAE 45	116320	HP6048	HHCS 3/8NFX1-1/2 SS
202121	HP6015	SEASTAR WASHER 5/8 SS MS15795-820	340061	HP6049	TIE ROD NUT
729221	HP6031	SEASTAR SLIDE CYLINDER MTG HARDWARE	590040	HP6050	BAYSTAR O/B CYL.SUPPORT RODS BENT
730229	HP6016	SEASTAR SLIDE AND FRONT MOUNT SUPPORT ROD	186000	HP6051	FHSCS 3/8NFX1-1/4 SS DWG
202300	HP6017	SEASTAR WASHER 5/8 SS AN960C1016	750928	HP6052	SEASTAR CLASSIC TILT COVERS TOP AND BOTTOM
839120	HP6018	SEASTAR FROUNT MOUNT, SUPPORT BRKTS	750824	HP6052	SEASTAR CLASSIC TILT COVERS TOP AND BOTTOM
928137	HP6019	ALL SYSTEMS, LARGE ROD END BALL, CYLINDER SPECIFIC	157477	HP6053	SEASTAR SPORT TILT LOWER BEZEL, NO BELLOWS INCLUDED
954410	HP6020	SEASTAR OUTBOARD HOSE, DUST CAPS	186426	HP6054	HHCS 3/8NFX2-1/4 SS
954420	HP6021	SEASTAR OUTBOARD HOSE, DUST CAPS	449721	HP6055	SIDE MOUNT CYL. SERVICE KIT
241297	HP6022	SHCS 1/4NFX 7/8 SS 4EA			

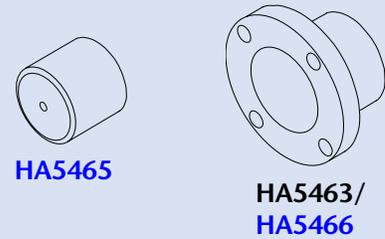
Old No.	New No.	Description	Old No.	New No.	Description
122229	HP6056	SEASTAR OLD CATAMARAN CLEVIS CONNECTION	680080A	HP6120	HYNAUTIC K-6 DRAG LINK CONNECTION
340041	HP6057	HYNAUTIC H20/40 SERIES SHAFT ACORN NUT	825128	HP6121	SEASTAR P/S RESERVOIR, BOTTOM MOUNT GAGE 0-60PSI
590044	HP6058	BAYSTAR COMPACT SUPPORT ROD CLIP AND NUT			
590042	HP6058	BAYSTAR COMPACT SUPPORT ROD CLIP AND NUT	160041	HP6122	HYNAUTIC RESERVOIR FILL / VALVE ASSEMBLY
710921	HP6059	SEASTAR Tie bar STANDOFF SPACERS, VARIOUS APPLICATIONS	345324	HP6123	CAPILANO, CLEVIS CONNECTION, 7/8" NF THREAD
470410	HP6060	HOSE ASSY - CYLINDER END	961685	HP6124	ROD END, SS, 1/2 NF THREAD
470416	HP6060	HOSE ASSY - CYLINDER END	962626	OBSOLETE	CAPILANO CYLINDER ROD END BALL, 7/8" NF THREAD
470419	HP6060	HOSE ASSY - CYLINDER END	HA5431	HP6126	SEASTAR HELM VENT PLUGS
441410	N/A	BAYSTAR COMPACT CYLINDER SERVICE KIT	113021	HP6131	NUT 5/16NC NYLOC THIN SS
240317	HP6061	SHCS 1/4NCX 3/8 SS	186540	HP6132	SHCS 3/8ODX1-1/4 SHLDR SS
560381	N/A	PART OF NEW HYN CYL SERVICE KIT	192324	HP6133	BULKHEAD NUT 6EA
740011	N/A	PART OF NEW HYN HELM SERVICE KIT	202027	HP6134	WASHER 1/2IDX1-1/16OD SS
860028	HP6064	HYNAUTIC RESERVALVE FILL / AIR PLUG ASSEMBLY 950PSI	260126	HP6135	WOODRUFF KEY 606 SS 20EA
			260130	HP6136	WOODRUFF KEY 20EA
823673	HP6065	WASHER LOCKING TAB - M10	292135	HP6137	RODEND BALL 1/2"SS
449824	N/A	SIDE MOUNT CYL. SERVICE KIT	821723	HP6140	FILTER ELEMENT PS
823203	HP6067	SEASTAR HCS801/03 P/S CYLINDER BOOT COVERS AND CLAMP	752021	HP6142	HHCS 5/16NFX3-1/2 SS 12EA
			961490	HP6143	PKG SLAVE BRKT AND COMPS
823204	HP6067	SEASTAR HCS801/03 P/S CYLINDER BOOT COVERS AND CLAMP	961660	HP6144	PKG DRIVE BRKT AND COMPS
			600620	HP6145	FTG 90 DEG ELBOW 2EA
135725	HP6068	SEASTAR AND CAPILANO I/B CYL MOUNTING FOOT	704525	HP6146	NUT 5/16NC NYLOC SS 12EA
337826	HB0573	SHAFT WHEEL BUSHING 3/4 T - 1" STRAIGHT	652123	HP6147	FTG 139-8B ELBOW 6EA
840100	HP6070	SEASTAR R/MOUNT HELM TRIM PLATE	112249	HP6024	KIT-CLEVIS & PINS 1/2X5/8
680107	HP6072	HYNAUTIC TRIM CYL ROD END TK-01/02	80926	HP6024	KIT-CLEVIS & PINS 1/2X5/8
860047	HP6074	HYNAUTIC RELIEF VALVE RV60 950PSI	270071	HP6024	KIT-CLEVIS & PINS 1/2X5/8
067528	HP6075	WASHER 1/4 FLAT SS 5/8 OD	800136	HP6148	ASSY FTG P. PURGE HELM
680067	HP6076	HYNAUTIC CLEVIS PIN, K-33 CYL			
292127	HP6077	SEASTAR ALUMINUM I/B CYL ROD END BALL			
833529	HP6081	SEASTAR REAR MOUNT HELM MTG. HARDWARE KIT			
168625	HP6082	SEASTAR P/S RESERVOIR, FILL / AIR VALVE			
330315	HP6082	SEASTAR P/S RESERVOIR, FILL / AIR VALVE			
870360	HP6084	HYNAUTIC TRIM POWER PUMP -RELAY SWITCH-TP-01/03			
870371	HP6085	HYNAUTIC TRIM POWER PUMP -RELAY SWITCH-TP-02			
650036	HP6090	HYN HELM SHAFT KEY, H-29/30			
650047	HP6091	HYN HELM SHAFT KIT, H-20/40 SERIES			
785255K	HP6092	SEASTAR HCS331 TUBE SUPPORT KIT			
560948	HP6093	ROD END BALL 5/8" SS 17-4			
750027	HP6098	HHCS 5/16NF X 1-1/4 SS			
800107	N/A				
823207	HP6100	SEASTAR HCS805 SHAFT, BOOT COVER			
839121	HP6101	SEASTAR FRONT MOUNT PRO CYL SUPPORT BRKT			
860071	HP6102	HYNAUTIC K-6H MOUNTING KIT, HONDA 115-130 ONLY			
870300	HP6103	KIT ASSY, RELAYS, TP-02			
800123	N/A	REVIEW, POWER PURGE SERVICE KIT			
984829	HP6106	CB 1/4-UNCX2 GR5 FT ZP			
082021	HP6107	SEASTAR P/S CYL, OLD STYLE ROD END BALL			
520061	HP6108	HYNAUTIC H-20/40 SERIES TRIM PLATE			
641222	HP6110	SEASTAR HCS380 CYL END GLAND, TRANSOM SIDE			
730230	HP6111	SEASTAR FRONT MOUNT PRO CYL SUPPORT ROD			
823105	HP6112	SEASTAR P/S CYL SHAFT SHIELD			
470500	HP6116	SEASTAR POWER PURGE JR. REPLACEMENT PUMP			
860066	HP6117	HYNAUTIC K-6 MOUNTING HARDWARE KIT			
823115	HP6118	SEASTAR HCS805 SHAFT SHIELD			
961650	HP6119	SEASTAR TIBAR DRIVE BRKT EXT., CYL CONNECT SIDE			

DASH HOLE CUTOUT FIXTURES:

These tools simplify dash modifications for BayStar and SeaStar upgrades. They are designed to help you install these helms into dashboards with mechanical steering cutouts, older (square flange) SeaStar helms and even dashes without pre-cut holes.

DASHES WITH RACK & PINION HOLES:

- Drill GuideHA5465
(Use with 3" hole saw to enlarge an existing 2" rack & pinion dash cutout to 3" diameter; use with HA5466, listed below.)
- Round Drill Jig (BayStar)HA5463
- Round Drill Jig (SeaStar).....HA5466
(Requires a 3" hole in dash; allows drilling of mounting bolt holes for SeaStar front mount helms; use with HA5465, listed above).



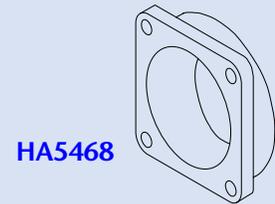
DASHES WITH ROTARY STEERING HOLES:

- Round Drill Jig (BayStar)HA5464
- Round Drill Jig (SeaStar).....HA5467
(Requires a 3-1/4" hole in dash [existing cutout size for most SeaStar Solutions rotary steering]; allows drilling of mounting bolt holes for SeaStar front mount helms.)



DASHES WITH PRE-1991 SEASTAR HOLES (HELM WITH SQUARE FLANGE):

- Square Drill Jig.....HA5468
(Requires 4-1/2" hole in dash; allows drilling of mounting bolt holes for SeaStar Sport Tilt Helms or HA5418 Backplate Kit.)



DASHES REQUIRING REINFORCEMENT:

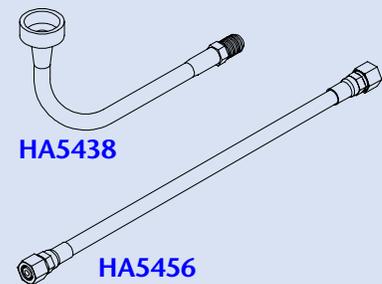
- Backup Ring.....HA5405
(Install behind dash to increase helm mounting rigidity when required. Ring not required when using HA5417 or HA5418.)



OTHER HANDY ITEMS:

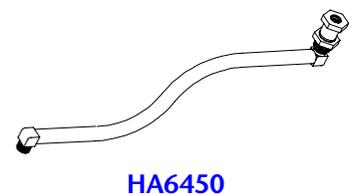
BLEEDING SEASTAR SYSTEMS:

- SeaStar Helm Fill KitHA5438
(Includes hose with screw cap which fits SeaStar or equivalent oil bottles. Also includes push pin for venting/resealing bottle. Allows for clean bleed when used properly.)
- SeaStar Power Steering Purge KitHA5456
(25' hose to connect steering cylinder to reservoir for bleeding.)
- SeaStar Power Steering Purge KitHA5457
(Central bleeding location — no need to run hoses to reservoir. Can only be used with Power Steering Cylinders made after October, 2005.)



REMOTE FILL FOR SEASTAR HELMS:

- SeaStar Helm Remote Fill KitHA6450
(Allows relocation of your SeaStar helm fill to either a more convenient or a more concealed location. This kit can be used with ALL SeaStar helms.)



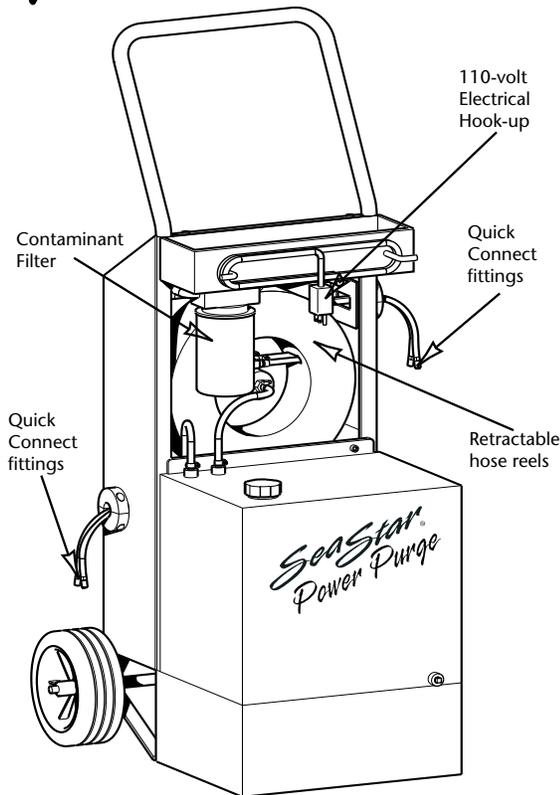
POWER PURGE SYSTEMS:

The Power Purge and Power Purge, Jr. are the quickest ways to bleed a SeaStar® or BayStar® system and assure a rock-solid steering feel every time!

Power Purge systems reduce installation and warranty costs while enhancing the quality of the boat for the end user. A typical manual fill and purge takes the average, experienced installer about 30 minutes per boat — by using Power Purge this can be reduced to 10 minutes or less.

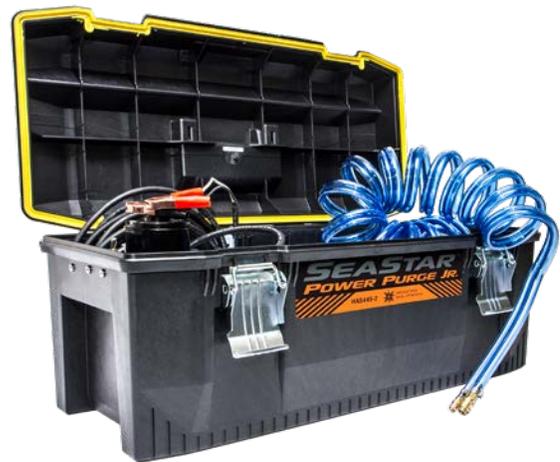
Power Purge and Power Purge, Jr. are available to any business at which SeaStar® is installed by qualified marine hydraulic steering technicians.

Power Purge



HA5447
SEASTAR POWER PURGE

Power Purge JR



HA5445-2
SEASTAR POWER PURGE JR.

SERVICE PARTS	
REPLACEMENT MOTOR	HP6116 (1EA)
REPLACEMENT HELM ADAPTER	HP6148 (1EA)
REPLACEMENT QUICK CONNECT HOSE ENDS (ALL ENDS/CLAMPS INCLUDED)	HP6170
SERVICE KIT (FILTERS, O-RING AND MOUNTING HARDWARE INCLUDED)	HP6125
90° ADAPTER	HP6149

POWER PURGE FEATURES:

- Dramatically reduced purging time.
- Increased quality of system purge for solid, responsive steering feel.
- Fast and efficient set-up; easy to operate.
- Screens contaminants from oil.
- Quick connect fittings.
- Retractable hose reels.
- Utilizes 110 volt electrical hook-up.

POWER PURGE, JR. FEATURES:

- All of the speed, qualities, and ease-of-operation of the original Power Purge, plus:
- Extended portability for use in the field — weighs only 12 pounds.
- Convenient electrical hook-up utilizing an available 12-volt boat battery.
- Optional Dual Cylinder Purging Kit available: Part # [HA5461](#).
- Optional 50' Hose Extension Kit available for longer runs: Part # [HA5462](#).

FREQUENTLY ASKED QUESTIONS

Are replacement gears available for SeaStar Solutions helms?

No. SeaStar Solutions does not offer repair parts for any steering helms or cables. All helms and cables must be replaced as units. If the helm in question is within our 2-year warranty period, we will authorize a free replacement helm (not including labor). Attempting to repair a helm will void the warranty and can lead to steering failure, which may result in personal injury and property damage.

How do I know which length steering cable I need?

The cable part number and length can usually be found about 2 feet from one end of the cable, stamped into the plastic conduit (exterior jacket or casing). If you can't locate/read it, proceed to step a:

a. Is the cable you are replacing rotary?

Rotary is a spiral wrapped black core wire that sticks out at helm end of cable. The rack and pinion cable has long metal housing with rack [flat] gear inside (under the dash).

Measure the cable's plastic jacket (casing) in inches. If rotary, add 18" and round up to the next foot. If rack & pinion, add 30" and round up to the next foot. Order that length cable.

b. Are you doing a first-time steering cable installation?

Measure Cable Routing Path in Boat as Follows:

- A = Center line of wheel to gunwale (inches),
- B = Dash to transom (inches),
- C = Gunwale to cable connection at centered tiller (inches).

For Tilt Tube Mounting, add A, B & C + 6", and round up to the next foot. Order that length cable. For Transom/Splashwell/Stringer Support Mounting, add A, B & C, then subtract 6" and round up to the next foot. Order that length cable.

What do I need in order to add another steering station to my boat?

SeaStar Solutions Big-T is the only mechanical steering system with a version designed for dual station boats. This specialized product cannot be added on to any existing steering system.

SeaStar hydraulic steering is the preferred choice for dual station boats.

NOTE: Please see the Big-T Dual Station product pages, earlier in this [catalog](#). The cable for this system is special-order and non-returnable, so please take extra care when measuring.

I'm replacing a SeaStar Solutions rack & pinion cable in a 1985 boat. I ordered an SSC134 "The Rack" cable and it won't connect to the helm. What's the problem?

Note the old cable's rack housing color. It is probably black or gray, meaning that the old cable is "The Rack (older) model (1984-2001). If the rack housing is green, it may be a TR188 model (1975-86). This is a SeaStar Solutions system, but the helm will not bolt up to the new SSC134 cable. Replace the helm and bezel kit with 1996-date "The Rack" versions.

Note: Please see The Rack Stern Drive product pages earlier in this [catalog](#). Only the replacement cables for 1984-1995 SeaStar Solutions Rack systems are available (part number [SSC124XX](#)).

I need a link arm to connect the steering cable output ram to the tiller of a outboard. Can I get the link arm from SeaStar Solutions?

No. You should obtain this link arm from the engine maker. Link arms vary by engine, and the engine maker offers the correct link arm for your particular brand and model.

FREQUENTLY ASKED QUESTIONS

I just bought a steering kit and I would like to add a friction screw to the system, but none was included with the kit. What should I do?

Friction adjustment is not a standard item in our steering kits and is not available for Rotary Systems. If you have installed a non-tilt "Back Mount Rack Helm," order Friction Kit part number [SA39531P](#).

NOTE: If you have any NFB system (Rack or Rotary), a friction adjustment device is not required nor recommended.

I just bought a steering kit and I would like the steering shaft to be at an angle to the dash. The bezel kit included in the steering kit only allows a 90° mount. Which parts do I need?

The standard Bezel (mount) Kit included with the steering system allows the helm to be installed at 90° (perpendicular) to the surface of the dash. Optional Bezel Kits for Rotary Steering systems provide the ability to mount the helm at 20° from perpendicular. The Rack and Pinion system uses "Wedge Kits" that provide 10° and 20° angles.

For Rotary Steering (Safe-T QC, NFB Safe-T II or 4.2), order 20° Bezel Kit part number [SB27483P](#).
For Rack and Pinion Steering (NFB, Non-NFB, and Pro Rack), order: 10° Wedge Kit part number [SB27448P](#) or 20° Wedge Kit part number [SB27449P](#).

I need to replace the steering system on my boat, but I looked at the back of the helm and saw it was not made by SeaStar Solutions. I want to install a SeaStar Solutions system, but how do I know which one I should get?

Generally, replace rotary with rotary, rack & pinion with rack & pinion and hydraulic with hydraulic. Rotary helm gearboxes are round in shape. Rack & pinion helms are tubular and connect to a long, thin metal rack housing. The following is a brief cross reference for the most popular non-SeaStar Solutions systems:

- Morse® Command 290™ Rotary: use SeaStar Solutions HPS or Safe-T QC for power-assisted or NFB 4.2 Rotary for non-power-assisted. (Some Morse® Command 290 products are still available.)
- Morse® Command 200™ Rack: use SeaStar Solutions Back Mount Rack for power-assisted or NFB Rack for non-power-assisted and The Pro Rack for dual cable boats.
- Morse® Command 2™ Rotary: use SeaStar Solutions HPS or Big-T for power-assisted or NFB Safe-T II or 4.2 for non-power-assisted.

A comprehensive steering interchange listing (with illustrations of helms and cables) for SeaStar Solutions, Morse® and other brands begins on page 9 of this [catalog](#).

What size steering wheel should I use?

SeaStar Solutions does not make specific recommendations regarding steering wheel size, except that the wheel be at or below the maximum wheel diameter noted for each type of helm and that the wheel is sized/located so it can be rotated freely by the boat operator through the entire steering arc with no obstruction or hindrance to movement. Wheels in the 14" diameter range are used widely with mechanical steering systems. Any size wheel may be used so long as the helm's recommended maximum wheel diameter is not exceeded and steering effort is acceptable.

An "equidistant-spoke" steering wheel is suggested for hydraulic steering systems since a certain amount of oil bypass in the helm will gradually result in the wheel becoming "not centered" when the engine/drive/rudder is in the straight ahead position. Again, please note the maximum wheel diameter recommended for the helm.

NOTE: For mechanical steering, please note the maximum wheel diameter listed for each product earlier in Mechanical Steering section of this [catalog](#). For Hydraulic systems, maximum wheel diameter is listed for each helm in the SeaStar/BayStar/Hynautic Helm Specifications chart in the Hydraulic Steering Tech Reference section.

FREQUENTLY ASKED QUESTIONS

I just bought a NFB (No-FeedBack) helm and cannot turn the shaft by hand. Why?

Without the steering wheel on the shaft, NFB helms are very difficult to turn by hand. This reason is the No-FeedBack clutch is always on “standby” to grip the helm shaft and hold it steady against torque feedback from the engine (which can make the steering wheel turn on non-No-FeedBack systems). Once the helm is mounted in the dash and the steering wheel is properly attached, you will be able to turn the shaft easily. Follow the installation instructions completely.

I want to install an autopilot on a boat with cable steering. What do I need?

SeaStar Solutions does not make adapters or interface parts to connect an autopilot to mechanical cable steering. This is left to the autopilot manufacturers. We do however strongly recommend that if you are installing an autopilot, upgrade your mechanical steering to a SeaStar hydraulic system. SeaStar is designed to interface with most autopilots and will give you superior all around performance.

NOTE: Autopilots cannot be used with any type of mechanical NFB (No FeedBack) steering. In that case, you MUST upgrade to SeaStar.

How do I remove the steering cable from the engine's tilt tube?

Disconnect the link arm that attaches the output end of the cable (telescopic ram) to the tiller arm of the engine. Unscrew the large nut that attaches the cable to the tilt tube (support tube). If the cable was greased regularly, it should slide out through the tube.

If the cable does not easily slide out, spray inside the tube with liberal amounts of penetrating oil. With care, use a small hammer and block of wood to tap the cable out (after the attachment nut has been removed from the tilt tube). Severe blows can damage not only the cable but the engine's tilt tube and other areas. This process requires care and patience. Do not try to drive the cable out by turning the steering wheel — this can damage the helm.

How do I measure steering cables for a vessel with two steering stations?

The only cable steering system available for dual station boats is the SeaStar Solutions Big-T. One cable with two outer jacket (casing) sections is used to make the run from the engine/rudder to the lower station helm and then to the upper station helm. Please see the Big-T Dual Station product pages, earlier in this [catalog](#).

NOTE: The cable for this system is special-order and non-returnable, so please take extra care when measuring.

The steering cable's “core wire” is broken. How can this be repaired?

Steering cables cannot be repaired.

If a steering cable inner core wire separates or breaks within the steering helm (gear box), the steering cable must be replaced with the correct one for the helm.

The helm may need to be replaced as well. Cable breakage within the helm may have caused damage to the gears. A helm cannot be repaired and must be replaced as a unit.

If the correct replacement cable and/or helm is no longer available, replace the helm, bezel and cable with an appropriate SeaStar Solutions steering kit. See chart on pages 9-12.

FREQUENTLY ASKED QUESTIONS

My steering cable is stiff/stuck and won't move properly when I turn the wheel. What should I do?

The first step is to isolate the problem component(s) of the steering system. Several factors can lead to what feels like a "stiff" or "frozen" steering cable. If you do not have installation instructions for the system's cable and helm, contact SeaStar Solutions (or other manufacturer, if appropriate) to obtain them. Also, have your engine and boat owner's manuals handy.

The following troubleshooting sequence is suggested, during which the steering wheel should remain on the helm.

a. Is the steering cable in fact "stiff/frozen"?

Carefully disconnect the steering cable from the link arm, tiller arm or rudder post arm. (Refer to installation instructions for that steering system and boat/engine owner's manual.) From the helm, attempt to turn the steering wheel in both directions by hand to ensure that it moves freely through its prescribed steering arc. Also, check the hardware that connected the cable to the engine/drive/rudder for signs of binding, excessive free play, corrosion, deterioration and/or incorrect assembly.

If everything does move freely and is in good working order, go to step c.
If the steering is still hard, continue to step b.

Steering cables cannot be repaired. If the steering cable is deteriorated, does not move or operates in any manner other than correctly, replace it with the correct one for the helm. If the cable for your helm is no longer available, replace the helm, bezel and cable with an appropriate SeaStar Solutions steering kit.

If any cable connection part is deteriorated, too stiff or too loose, replace it with the correct type of component. SeaStar Solutions offers most types of cable connection hardware, except link arms which should be obtained from the engine manufacturer. Note that locking fasteners are used on connection components. Do not substitute non-locking fasteners as this may lead to steering failure. Measure the cable's plastic jacket (casing) in inches. If rotary, add 18" and round up to the next foot. If rack & pinion, add 30" and round up to the next foot. Order that length cable.

b. Is the helm "stiff/frozen"?

With the steering cable disconnected from the link arm, tiller arm or rudder post arm, disconnect the cable from the helm. (Refer to installation instructions for that steering system.)

From the helm, attempt to turn the steering wheel in both directions by hand to ensure that it moves freely through its prescribed steering arc.

If everything does move freely and is in good working order, go to step c.

If the wheel does not move, replace the helm and bezel kit. If the helm and bezel are no longer available, replace helm, bezel and cable with an appropriate SeaStar Solutions steering kit.

c. Does the engine/drive/rudder pivot freely through its entire arc from port to starboard?

With the steering cable disconnected from the link arm, tiller arm or rudder post arm, move the engine/drive/rudder back and forth by hand to ensure that it moves freely through its prescribed steering arc. If it does not move or is extremely stiff, have proper maintenance or repairs done. If it does move freely, then check for obstructions that may have been limiting engine movement and/or revisit steps a-b.

NOTE: To ensure maximum performance and service life for your mechanical steering system, please read and follow the procedures outlined in the next FAQ.

FREQUENTLY ASKED QUESTIONS

I've heard steering cables should be "maintained". How exactly is this done?

We suggest the following periodic maintenance at least twice a season:

1. Be certain the helm(s), cable(s), steering wheel and connection hardware are correctly assembled and in proper working order. Check for signs of stiffness, binding, excessive free play and/or wear. These items cannot be repaired; if any components are not in good working order, replace them. Disassembly of these items will void the warranty and can lead to steering failure. Always replace steering cables that are stiff in operation or have damage to the plastic jacket (outer casing).
2. Clean and lubricate the engine tilt tube or cable support tube and the steering cable telescopic output ram as follows:
 - a. Remove the steering cable(s) telescoping ram from the tilt tube.
 - b. Clean the tilt tube inside diameter thoroughly.
 - c. Remove corrosion in the tilt tube with a wire brush. Wipe until all loose material is removed.
 - d. Lubricate the tilt tube with a good water resistant marine grease.
 - e. Scour the steering cable telescopic ram with a brass wire brush and wipe until clean.
 - f. Lubricate the sliding parts of the telescopic ram with a high-quality, water resistant marine grease.
 - g. Reassemble, making sure all (correct) fasteners are tight and there is no binding or excessive free play in moving parts.

Note where locking fasteners are used. Do not use non-locking fasteners; vibration can loosen them, causing steering failure.

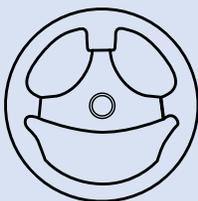
How do I install a steering wheel so it is centered when the engine is in the "straight-ahead" position?

There are several methods, depending on the type and model of steering:

For mechanical rack & pinion steering, attach the cable to the engine, then center the engine and center your steering wheel. Then bolt the Rack to the helm (you may have to wiggle the steering wheel to get the gears to mesh).

For mechanical rotary steering helms, the starting steering wheel position when you first feed the cable into the helm determines where it will be when the steering cable is "centered". To center the steering wheel properly, we suggest orienting the wheel (depending on the rotary helm installed) in the positions depicted below. These starting positions assume the helm is mounted for an ordinary starboard cable exit.

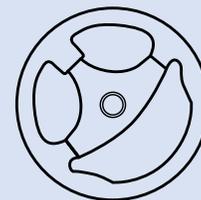
You won't have to worry about centering a steering wheel when installing hydraulic steering. Due to a small amount of "slip" or "drift" inherent in any hydraulic system, the steering wheel will not remain centered. Use of a wheel with equidistant spokes is the best solution for hydraulic steering since that type of wheel has no natural "up", "down" or "sideways" position.



XTREME
BIG-T
SAFE-T "TS"
(180°)



SAFE-T QC
SAFE-T II
(150°)



NFB 4.2
(210°)

Degrees from normal center position

FREQUENTLY ASKED QUESTIONS

I have a [model/year] boat and [model/year] engine. How do I hook up my steering cable to the engine?

There are many ways to connect a steering cable to an engine, drive unit or rudder. For outboards, the most common connection method is fastening the steering cable to the engine tilt tube and attaching a link arm from the engine's "tiller arm" to the cross-hole in the steering cable's "telescopic ram". Generally, it is best to replace what was originally installed with similar components whenever possible. When that is not feasible in a mechanical steering installation, consider upgrading to SeaStar.

NOTE: For an overview of the basic types of steering connections and available components from SeaStar Solutions, please see Steering Connection Kits Overview and SeaStar Solutions Steering Connection Kits in the next FAQ.

I would like to upgrade the steering in my boat to Tilt Steering. What steps do I need to take?

First determine the brand of steering in your boat, then whether it is mechanical or hydraulic.

If you do not have SeaStar Solutions steering, either:

- a. Replace the helm and cable (or hoses and cylinder) with a SeaStar Solutions system or
- b. Contact the steering maker for options. Tilt steering is not available for all systems.

If you have SeaStar Solutions rotary steering that was made after 1991 or rack steering made after 1996, you probably only need to purchase a Tilt helm and Tilt mechanism.

Determine which kind of SeaStar Solutions steering you have, then refer to the appropriate section of this [catalog](#) for Tilt Dash Module or Tilt Helm part number.

Tilt helms are offered for these SeaStar Solutions systems:

- Safe-T "QC" (1991-present)
- "The Rack" Rack & Pinion NFB Rack (1996-present)
- Big-T (no longer offered in tilt version)
- NFB Rotary (1991-present)
- HPS (2000-present)
- SeaStar & SeaStar PRO (1991-present)
- BayStar (2001-present)

NOTE: Some pre-1991 Hydraulic, pre-1991 Rotary and pre-1996 Rack systems may require purchase of additional items and/or modification of the dash. Please see The Tilt Steering product pages, earlier in this [catalog](#) or contact Tech Support for assistance.

(Tilt helms have a special shaft to engage the Tilt mechanism; a non-Tilt helm cannot be used.)

The steering cable is stuck in the engine's tilt tube. Now what should I do?

1. Sometimes a cable cannot be removed from an outboard engine tilt tube because the tube has rusted on the inside. The following method is suggested for those cases in which "gentle persuasion" won't prevail:
 - a. Fully loosen the large hex nut on the starboard side of the engine that secures the steering cable to the engine tilt tube.
 - b. Cut the cable's output ram close to the tilt tube.
 - c. Drive the cable out of the engine tilt tube. You may not want to hammer or heat the tilt tube in order to remove the jammed cable end. Heating and hammering may damage the engine mounting or pivot areas. You may have to replace the engine tilt tube. If so, consult your engine manufacturer's repair instructions.
2. When installing the new cable and tilt tube (if necessary), be sure the inside of the tilt tube is clean and well lubricated. Lubricate the external parts of the steering cable's telescopic (output) ram as well. Use a good quality, water resistant grease.
3. Be certain that all steering components are correctly assembled and in good working order. These items cannot be repaired; if any are not in good working order, replace them.
4. Note that locking fasteners are used to secure the steering wheel, helm, steering cable and link arm (drag link). Do not substitute non-locking hardware; engine vibration can loosen non-locking fasteners, causing loss of steering and personal injury and/or property damage.
5. Always remember: GREASE, GREASE, GREASE!

FREQUENTLY ASKED QUESTIONS

Are there any “tricks” to installing a steering system? Is there anything I should definitely avoid doing?

If you have an outboard or sterndrive with non-power-assisted steering, we recommend you use either a No FeedBack (NFB) mechanical or hydraulic (SeaStar/BayStar/Hynautic) system. For boats with power-assisted steering, use HPS (mechanical) or SeaStar. If you have or plan to install an autopilot, use SeaStar.

Be sure you have the correct cable for the helm on the boat (or vice versa). There are several kinds of cables and helms that are not interchangeable; this is true whether the system is rotary or rack & pinion. See the steering identification guides in the front of the Mechanical Steering section of the [catalog](#) and the Steering Options Based on Engine Type charts, pages 7-8.

Be sure you have measured properly and ordered the correct length of cable. (The #1 reason for cable returns is “wrong length ordered”.) See How to Measure, earlier in these FAQs.

Follow the installation instructions for steering products completely. This will ensure the maximum performance and reliability of the product. If the instructions are missing, contact the manufacturer.

Handle the products with care and do not expose them to impact or external stress.

Allow for generous (large) cable bends, notably where the cable exits from the helm (or rack housing) and where the cable makes the bend to connect to the engine/drive/rudder. The tighter the bends, the stiffer the cable will tend to be in operation. Also, tight bends reduce cable life. Note; 8" is the minimum bend radius generally recommended for SeaStar Solutions steering cables.

When using tie wraps to affix the cable along the gunwale area, allow some slack (do not cinch tight). Slack in the tie wraps allows for cable flex as it is actuated. This leads to smoother operation and longer life.

Replace all worn steering connection/mounting components with correct replacement parts that are designed for the application. Do not substitute parts. If you think parts are missing from a kit, contact your distributor or the kit manufacturer for replacements.

When installing the cable at the engine end, be sure to lubricate the telescopic ram (output end that slides in and out) with liberal amounts of a good, waterproof Lithium-based grease. This is ESPECIALLY critical if the steering cable is connected through the engine tilt tube as this area tends to get very rusty.

Avoid the use of add-on grease fitting products designed to lubricate cables. These units can in fact force old grease, dirt and rust onto the moving internal parts of a steering cable, shortening its life. There is no substitute for proper cable maintenance procedures, as noted earlier in these FAQs.

NOTE: The information in this section is a general guide. If you have questions about our mechanical steering, please contact SeaStar Solutions Technical Support.

Why are equidistant wheels suggested for hydraulic steering?

Due to a small amount of internal hydraulic slip, a “master spoke” or “centered” steering wheel can’t be maintained with hydraulic steering. For best results, use an equal distance spoke steering wheel.

Do not use a wire coil type trim switch with hydraulic steering. Wire coil can wind up tight around the steering wheel shaft and prevent further steering! SeaStar Solutions offers fingertip control with Pro Trim, a column-mounted switch, without the problem of wires wrapping around the steering column. Pro Trim [PT1000P](#) controls trim or jackplate only. Pro Trim Dual [PT2000-1P](#) controls both functions.

FREQUENTLY ASKED QUESTIONS

Is there anything special I need to know about SeaStar hoses and fittings?

When installing Hydraulic Hoses make sure that the bend restrictor is located at the Steering Cylinder.

Use the shortest, most convenient path for routing hoses without exceeding a minimum bend radius of 2-1/2" (6 cm), but provide sufficient hose length to allow full, uninterrupted steering motion, including trim and tilt.

Route hydraulic hoses with a gradual rise from SeaStar Helm to Cylinder(s) along gunwale or builder-installed conduit.

Hydraulic hoses must be protected from chafing and should be secured wherever possible. Prevent hoses from hanging free in an area where they could become a safety hazard.

Install hoses in such a way that they will not come in contact with sharp objects, such as fasteners or edges.

Leave protective fitting caps on until connection of hose fitting to helm and cylinder is complete.

Prevent mix-up in hose connections by marking one hose on both ends with tape or chalk.

Do not use nylon tubing for outboard steering installations. Use the appropriate type of hose or tubing specified by SeaStar Solutions for your type of system.

Use a pipe sealant, such as Loctite P.S.T. or equivalent, on all pipe threads. Do not use "tape" sealers.

Replacing our nickel plated brass fittings with brass or cad-plated fittings may cause cylinder threads to corrode.

Refer to SeaStar installation illustrations for the correct connection of hoses from helm pump to cylinder. Note that in dual cylinder installations, hose connections to balanced cylinders are different than unbalanced models.

What kind of oil should I use in my SeaStar system?

ANY NON-APPROVED FLUID MAY CAUSE SERIOUS DAMAGE TO THE STEERING SYSTEM RESULTING IN POSSIBLE LOSS OF STEERING, CAUSING PROPERTY DAMAGE, PERSONAL INJURY AND/OR DEATH.

Due to recent upgrades in our steering system components, SeaStar Solutions recommends use of SeaStar Steering Fluid ONLY in our hydraulic steering systems. SeaStar Steering Systems have been engineered and validated using our proprietary SeaStar Hydraulic Steering Fluid. SeaStar Steering fluid is engineered with a special additive package that contains anti-foaming and anti-rusting agents, anti-oxidants, viscosity stabilizers, corrosion inhibitors, wear additives as well as water emulsification additives. It is highly recommended that SeaStar Steering Fluid be used to ensure optimum system performance and safety.

Use of any non-approved fluid may result in the following;

- Higher steering effort, particularly at ambient or lower temperatures and/or over time due to oil degradation and breakdown.
- Increased steering slip and/or drift resulting in lost motion.
- Foaming or air entrainment causing a bumpy feel during steering.
- High rates of moisture absorption causing internal component corrosion.
- Scratched steering cylinder bores and shafts due to contamination or elevated wear rates.
- Seal degradation – incompatibility with various proprietary seal compounds used in our products.

FREQUENTLY ASKED QUESTIONS

How do I “check my oil?”

Unscrew the vent cap in your helm (upper station on dual station boats).

NOTE: Side mount cylinders are unbalanced. If you have a side mount cylinder, the oil level in the helm must be set with the cylinder rod fully retracted. Failing to do so will result in an oil spill at the helm. Turning the wheel to port (left) will retract the cylinder rod.

Helms mounted with wheel shaft completely horizontal must be filled to bottom of filler hole at all times. Do not allow oil level to drop more than 1/4" (6.3mm). For helms mounted on a 20° angle or with wheel shaft vertical, oil level should be within 1/2" (12.7mm) of hole.

Check oil level periodically. At this time the steering system must be checked for proper connections of hose, tube and fittings, possible leaks and air removal. To do so, turn steering wheel (any on a multi-station) and pressurize very hard to port. Apply enough force to the wheel to overcome pressure relief valve. You will not harm the helm. While pressure is maintained on steering wheel, check all port (left) fittings and line connections for leaks.

If no leaks are present, the system is ready for use. If leaks are found, correct before using. Failure to correct leaks will lower system oil level and could result in loss of steering.

Repeat procedure by turning wheel to starboard. Watch the oil level in the helm pump when the steering wheel reaches either hard over position. If there is no obvious drop in oil level, air was removed. If there is an obvious drop in oil level, you are compressing air — further filling/purging is required.

(See fill and purge procedure on the following pages.)

I’ve just installed a SeaStar steering system and am ready to water test the boat. What should I look for?

Before operating your boat, ensure that the following checklist is carried out:

- a. Perform system pressure test by turning helm all the way to hard over and then forcing the helm another 1/4 to 1/2 turn. This should be done in both directions. This will pressurize the system. Any weakness in the system should show up at this time.
- b. Confirm that extruded nylon tubing has NOT been substituted for SeaStar Hydraulic Steering Hose.
- c. Confirm that there is no interference between the steering cylinder and the transom, splashwell or jackplate or any combination of these parts by performing these steps:
 - With engine fully tilted, turn steering from hard over to hard over and confirm that no interference occurs. If you are using a hydraulic jack plate this also must be performed at the top and bottom position of the jack plate. (If interference is present, it must be eliminated with trim limiting switches and/or jack plate lift restrictors. Contact jack plate maker for advice if required.)
 - Confirm that the steering cylinder can be stroked fully in both directions as well as full tilt and trim without stretching and/or kinking the hydraulic hoses.
 - Make sure hoses are not subjected to chafing or rubbing. Stretched, kinked or chafed hose will fail over time.

Failure to comply with this checklist may result in loss of steering, causing property damage and/or personal injury.

Use only the self-locking fasteners provided; using non-locking fasteners can result in loosening or separation of equipment and loss of steering.

Please read the manuals packed with the product and keep them handy.

FREQUENTLY ASKED QUESTIONS

I am upgrading to SeaStar steering, but have discovered that the new helm won't cover the holes left by the old one. What should I do?

That depends on what was in the boat originally:

- If you are upgrading from SeaStar Solutions rotary mechanical steering (Safe-T, Big-T or rotary NFB), pre-1991 SeaStar (with square mounting flange) or SyTen, you will need to purchase a [HA5418](#) Back Plate Kit. This will cover the old holes and provide extra dash rigidity.
- If you are upgrading from SeaStar Solutions' Rack & Pinion or Morse® mechanical steering, you will have to enlarge the dash holes to accommodate the new helm. You may also need to purchase the [HA5405](#) Backing Ring Kit to increase dash rigidity.

I notice that unbalanced cylinders (like the HC5370-3 outboard side mount) have a different number of turns to hard over in each direction. Why is this so?

The answer is in the design of an unbalanced cylinder.

When the helm is turned one turn, a certain volume of fluid is pumped into the cylinder.

On one side of an unbalanced cylinder piston is a rod, which reduces the effective cylinder volume.

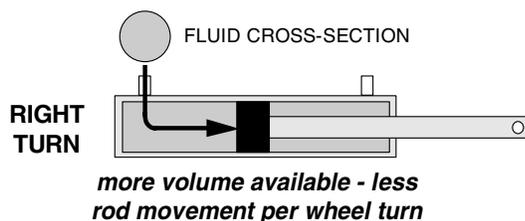
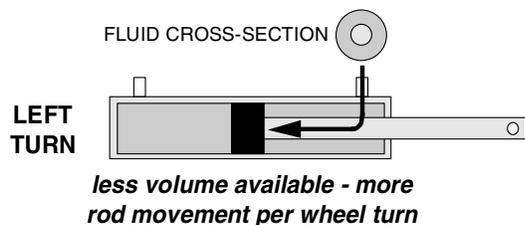
The cylinder area on the other side of the piston has no rod, thus more volume available for fluid pumped in from the helm.

The piston side with the rod will move farther per turn of the wheel (less turns to hard over) because less space is available for the fluid than the side with no rod.

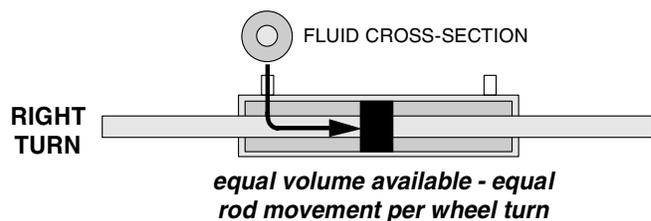
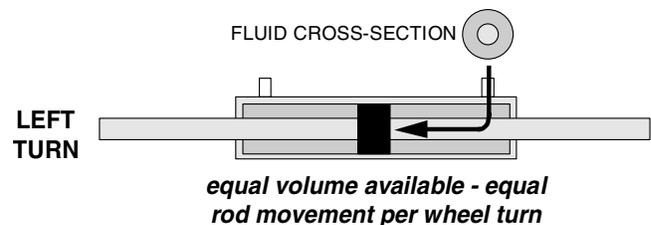
A balanced cylinder has a rod on each side of the piston and will move equally to either side per wheel turn to that side.

(See diagrams below.)

UNBALANCED CYLINDER:



BALANCED CYLINDER:



FREQUENTLY ASKED QUESTIONS

My power assist motor is not running when I turn the wheel, however there is a green light ON.

Blown fuse. Check fuse in main battery line. Replace with 50amp MAXI fuse

I am replacing an older helm with a new -3 model and my hoses are different, or, I have more than two fittings?

We recommend you order hose adapter fitting kit [HF6012](#), this will allow use of existing hose fittings if they are in good, proper working order.

How can I reduce effort on with my existing BayStar system?

You will gain a 20% decrease in effort if you install SeaStar Outboard hose, part # HO51xx.



NMMA TYPE ACCEPTED LIST FOR SEASTAR SOLUTIONS STEERING:

STEERING SYSTEM NAME

NMMA #

XTREME STEERING:

NFB (No FeedBack) Helms Rotary Steering Systems:
Includes No FeedBack / Non No Feedback helms, Tilt helms, Bezels and Cables2541379

NFB NO FEEDBACK MECHANICAL STEERING:

Safe-T II (No FeedBack) Rotary Steering Systems:
includes No FeedBack standard helms, Tilt helms, bezels and cables.855582

NFB Rack/Pro Rack Rack & Pinion Steering Systems:
includes No FeedBack standard helms, Tilt helms, Dual Cable Systems, bezels and cables.2511762

NFB 4.2 (No FeedBack) Rotary Steering Systems:
includes No FeedBack standard helms, Tilt helms, Dual Cable Systems, bezels and cables.855575

XTREME™2541379

HPS HIGH PERFORMANCE STEERING:

HPS Rotary Steering Systems:
includes Quick Connect standard helms, Tilt helms, bezels and cables.855582

HPS Rack & Pinion Steering Systems:
includes standard helms, Tilt helms, bezels and cables.2511762

TRADITIONAL MECHANICAL STEERING:

Safe-T Rotary Steering Systems:
includes standard helms, Quick Connect helms, Tilt helms, bezels and cables.2511769

Safe-T Dual Cable Rotary Steering Systems:
includes standard helms, Quick Connect helms, Tilt helms, bezels and cables.855480

“The Rack” Rack & Pinion Steering Systems:
includes standard helms, Tilt helms, Dual Cable Systems, bezels and cables.2511771

“Back Mount Rack” Rack & Pinion Steering Systems:
includes standard helms, Tilt helms, Dual Cable Systems, bezels and cables.2511762

Big-T Rotary Steering Systems:
includes standard helms, Tilt helms, Dual Station Systems, bezels and cables.855475

JBS BY SeaStar Solutions Jet Boat Steering Systems:

includes standard helms, Tilt helms, Dual Cable Systems, bezels and cables.855580

Jet Boat Mini Rack:
Includes standard helm, Tilt helm, bezel, Single/Dual cable2511721

BAYSTAR HYDRAULIC STEERING:

BayStar Hydraulic Steering Systems:
includes all BayStar Systems.855592

SEASTAR HYDRAULIC STEERING SYSTEMS:

SeaStar/SeaStar PRO Hydraulic Steering Systems:
includes all SeaStar outboard, sterndrive and inboard Systems as well as SeaStar PRO Systems.855560

SEASTAR P/A HYDRAULIC STEERING SYSTEMS:

includes all SeaStar P/A and SeaStar P/A PRO Power Assist add-on Systems.2457010

CAPILANO LARGE VESSEL/SPECIALTY CRAFT STEERING SYSTEMS:

SeaStar Capilano 250V/275V Hydraulic Steering Systems:
includes all Capilano 250V/275V Systems.855555

SeaStar Capilano 1250V Hydraulic Steering Systems:
includes all Capilano 1250V Systems.855565

SeaStar Capilano 1275V Hydraulic Steering Systems:
includes all Capilano 1275V Systems.855570

SEASTAR POWER STEERING LARGE VESSEL HYDRAULIC STEERING SYSTEMS:

includes all SeaStar Power Steering Systems.2457545



A touch ahead

From the leaders in steering technologya joystick docking control system that simply feels incredible!



CONTROLS

CONTROLS



i7700
Pictured



CHX8242P
Pictured

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PRODUCT RANGE CONTROLS

SINGLE FUNCTION

KEY:

- standard,
- optional,
- * optional for ski version, CH2200



SERIES: CH4400 CH5600 SR TWIN S ST/STB MJB

CONTROL FEATURES

- START-IN-GEAR PROTECTION
- NEUTRAL INTERLOCK
- ENGINE WARM-UP PROVISION
- ENGINE CUT-OFF SWITCH
- ADJUSTABLE THROTTLE BRAKE
- TRIM & TILT SWITCH
- ADJUSTABLE TRAVEL STOPS
- MAXIMUM NUMBER OF ENGINES

START-IN-GEAR PROTECTION	○	○	○	○		
NEUTRAL INTERLOCK						
ENGINE WARM-UP PROVISION	•	•	•	•		•
ENGINE CUT-OFF SWITCH						
ADJUSTABLE THROTTLE BRAKE	•	•	•	•	○	•
TRIM & TILT SWITCH						
ADJUSTABLE TRAVEL STOPS	•	•	•	•		
MAXIMUM NUMBER OF ENGINES	1	1	1	1	1	1

CONTROL CABLES

- 33C/3300 UNIVERSAL TYPE
- 43 SERIES CABLES
- XTREME CABLES

33C/3300 UNIVERSAL TYPE	•	•	•	•	•	•
43 SERIES CABLES			○	○	•	
XTREME CABLES	○	○	○		○	○

GENERAL CONTROLS CABLES



Gen II type cable designed specifically to be used with mercury 4000 series controls.



3300/33C (1ft increments)	COLOR	PART NO
Standard	Black	CC230XX
Midrange	Red	CC332XX
Mercury/Mercruiser (1ft increments)		
Standard (600A type)	Black	CC179XX
Standard (Gen II type)	Black	CC189XX
BRP-OMC-Johnson/Evinrude 1979 to date (1ft increments)		
Standard (479 type)	Black	CC205XX

XX = Length in feet

DUAL FUNCTION



MT3 TOP



MT3 SINGLE



CH2200/
CH2300



CH2600/
CH2700



MV3



CHX8000/
CHX8500



CHX8300/
CHX8800



CHX8100/
CHX8600



CHX8200/
CHX8700



I7700

•	•	•*	○	○	•	•	•	•	•
		•	•	•	•	•	○		•
•	•	•	•	•	•	•	•	•	•
				○	•	•			
		•	•		•	•	•	•	•
			○		○	○	○	○	•
2	1	1	1	1	1	1	1	2	2
•	•	•	•	•	•	•	•	•	○
	○			○					
○	○	○	○	○	○	○	○	○	○



xtreme CONTROLS CABLES



CCX633XX



CCX179XX



CCX630XX



CCX189XX



CCX205XX

3300/33CC (1ft Increments)	COLOR	PART NO
Premium (Universal)	Black	CCX633XX
Mercury/Mercruiser (1ft increments)		
Premium xtreme (600A type)	Black	CCX179XX
Premium xtreme (3600 type)	Black	CCX630XX
Premium xtreme (Gen II type)	Black	CCX189XX
BRP-OMC-Johnson/Evinrude (1ft increments)		
Premium xtreme (479 type)	Black	CCX205XX

XX = Length in feet

XTREME control cables are simply the best cable in the business.

Patent-pending unique splined-core design gives you maximum performance with no lost motion. Recommended for long cable runs.



XTREME SIDE MOUND:

XTREME side mount controls are the most sure handling and comfortable you can buy. The shapely, balanced grip provides a very smooth yet solid feel. This side mount control is designed for Starboard (right side) gunwale mounting only. These controls come with the standard features of neutral safety switch, neutral lock out, neutral warm up and the safety stop switch with lanyard. You can also get the optional trim switch (most outboards) or trim and tilt (most stern drives). These controls can not only use the 3300/33C style control cables, they can also use Mercury style cables from 1965 to date, including the Gen II, OMC/Johnson/Evinrude/BRP control cables from 1979 to date. This makes it one of the most desirable replacement controls in the market today.

APPLICATION:

Dual-function control — one lever controls throttle AND shift. For nearly any engine.

FEATURES:

- Superior feel and function for most outboards, stern drives & inboards.
- Dual function lever controls both throttle and shift of one engine.
- Neutral interlock and start-in-gear protection (standard).
- Optional Trim in the handle.
- Neutral engine warm-up feature (standard).
- Optional tilt switch available.
- Standard lanyard-style cut-off switch for emergency engine shutdown.
- Friction adjustment feature included.
- "Easy-On" cable design accepts virtually every type of OEM and 3300/33C type cable.
- Easily adapted to push or pull cable actuation mode.
- Mechanical advantage 2.38:1.
- Meets/exceeds all applicable standards.
- Made in the U.S.A.

ENGINE CONTROLS	
XTREME Side Mount, Chrome, Engine Cut Off Switch	CHX8050P
XTREME Side Mount, Chrome with Engine Cut Off Switch, Trim Switch	CHX8051P
XTREME Side Mount, Chrome with Engine Cut Off Switch, Trim Switch, Tilt Switch	CHX8052P
XTREME Side Mount, Black, Engine Cut Off Switch	CHX8550P
XTREME Side Mount, Black, Engine Cut Off Switch, Trim Switch	CHX8551P
XTREME Side Mount, Black, Engine Cut Off Switch, Trim Switch, Tilt Switch	CHX8552P
XTREME Side Mount, Black	CHX8553P
XTREME Side Mount, Black, Trim Switch	CHX8554P
XTREME Side Mount, Black, Trim Switch, Tilt Switch	CHX8555P

SeaStar Solutions
 Recommends Using



Cables With This
 Control

NOTE: When properly installed, these engine controls will connect to outboard, stern drive and inboard engines, utilizing Mercury/Mariner® and OMC® OEM type control cables as well as universal 3300/33C type cables and engine connection kits.



XTREME CENTER CONSOLE:

The ergonomics and features of our Xtreme controls are advanced beyond those of any other control on the market.

A shapely, balanced handle design provides an incredibly smooth yet positive feel. Neutral interlock, throttle warm-up, and start-in-gear protection features are standard on all Xtreme Side mount models, with power trim/tilt, emergency cut off switches offered as an option. In addition, the cosmetics of these controls can be configured to suit many tastes on center console or port side mounted boats.

Xtreme center console controls are suitable for use with both 3300/33C universal or OEM type control cables without adaptation at the control.

APPLICATION:

Dual-function control — one lever controls throttle AND shift. For nearly any engine.

FEATURES:

- Superior feel and function for most outboards, stern drives & inboards.
- Dual function lever controls both throttle and shift of one engine.
- Neutral safety offers start-in-gear protection (standard).
- Optional Trim in the handle for each model.
- Neutral engine warm-up feature (standard).
- Optional tilt switch available.
- Friction adjustment feature included.
- “Easy-On” cable design accepts virtually every type of OEM and 3300/33C type cable.
- Easily adapted to push or pull cable actuation mode.
- Mechanical advantage 2.38:1
- Meets/exceeds all applicable standards.
- Made in the U.S.A.

ENGINE CONTROLS	
Single Top-Mount Control - Lever on the Right	
XTREME Side Mount, Chrome, Engine Cut Off Switch	CHX8350P
XTREME Side Mount, Chrome with Engine Cut Off Switch, Trim Switch	CHX8351P
XTREME Side Mount, Chrome with Engine Cut Off Switch, Trim Switch, Tilt Switch	CHX8352P
XTREME Side Mount, Black, Engine Cut Off Switch	CHX8850P
XTREME Side Mount, Black, Engine Cut Off Switch, Trim Switch	CHX8851P
XTREME Side Mount, Black, Engine Cut Off Switch, Trim Switch, Tilt Switch	CHX8852P

SeaStar Solutions
 Recommends Using



Cables With This
 Control

NOTE: When properly installed, these engine controls will connect to outboard, stern drive and inboard engines, utilizing Mercury/Mariner® and OMC® OEM type control cables as well as universal 3300/33C type cables and engine connection kits.



ENGINE CONTROLS

Single Top-Mount Control - Lever on the Left

XTREME Side Mount, Chrome	CHX8140P
XTREME Side Mount, Chrome, Trim Switch	CHX8141P
XTREME Side Mount, Chrome, Trim Switch Tilt Switch	CHX8142P
XTREME Side Mount, Chrome, Neutral Interlock	CHX8150P
XTREME Top Mount, Chrome Neutral Interlock, Trim Switch	CHX8151P
XTREME Top Mount, Chrome, Neutral Interlock, Trim Switch, Tilt Switch	CHX8152P
XTREME Side Mount, Black	CHX8640P
XTREME Side Mount, Black Trim Switch	CHX8641P
XTREME Side Mount, Black Trim Switch Tilt Switch	CHX8642P
XTREME Side Mount, Black Neutral Interlock	CHX8650P
XTREME Top Mount, Black Neutral Interlock, Trim Switch	CHX8651P
XTREME Top Mount, Black Neutral Interlock, Trim Switch, Tilt Switch	CHX8652P

XTREME TOP MOUNT:

Xtreme top mount controls offer options that most top mount controls in the market do not. Options include trim (most outboards), trim and tilt (most stern drives) or the neutral lock out button. The lock out button is great for center console boats where there is a possibility the control can be bumped while passing by knocking it into gear. The standard items on these controls are the shapely and balanced hand grip that gives you a very smooth yet solid feel, the neutral safety switch, and the neutral warm up button. These controls can not only use the 3300/33C style control cables they can also use Mercury style cables from 1965 to date including the Gen II, OMC/Johnson/Evinrude/BRP control cables from 1979 to date. This makes it one of the most desirable replacement controls in the market today.

APPLICATION:

Dual-function control — one lever controls throttle AND shift. For nearly any engine.

FEATURES:

- Superior feel and function for most outboards, stern drives & inboards.
- Dual function lever controls both throttle and shift of one engine.
- Neutral safety offers start-in-gear protection (standard).
- Optional Trim in the handle for each model.
- Neutral engine warm-up feature (standard).
- Optional tilt switch available.
- Friction adjustment feature included.
- “Easy-On” cable design accepts virtually every type of OEM and 3300/33C type cable.
- Easily adapted to push or pull cable actuation mode.
- Mechanical advantage 2.38:1.
- Meets/exceeds all applicable standards.
- Made in the U.S.A.

SeaStar Solutions
Recommends Using

Cables With This
Control

NOTE: When properly installed, these engine controls will connect to outboard, stern drive and inboard engines, utilizing Mercury/Mariner® and OMC® OEM type control cables as well as universal 3300/33C type cables and engine connection kits.



XTREME DUAL TOP MOUNT:

The ergonomics and features of our controls are the most advanced available and are suitable for most types of boat with dual engine applications. The shapely, balanced handle provides a very comfortable feel and the state of the art mechanism guarantees a smooth yet solid action, assuring you have maximum control at all times. This control is designed for twin engine applications. XTREME dual top mount controls are suitable for use with both universal type (3300) or OEM type control cables without the need for adaptation.

These controls not only use the 3300/33C style control cables they can also use Mercury style cables from 1965 to date including the Gen II, OMC/Johnson/Evinrude/BRP control cables from 1979 to date. This makes it one of the most desirable replacement controls in the market today.

ENGINE CONTROLS	
XTREME Dual Top Mount, Chrome	CHX8240P
XTREME Dual Top Mount, Chrome, Trim Switch	CHX8241P
XTREME Dual Top Mount, Chrome, Trim Switch, Tilt Switch	CHX8242P
XTREME Dual Top Mount, Black	CHX8740P
XTREME Dual Top Mount, Black, Trim Switch	CHX8741P
XTREME Dual Top Mount, Black, Trim Switch, Tilt Switch	CHX8742P

FEATURES:

- Superior feel and function for most outboards, stern drives & inboards.
- All controls include start in gear protection.
- Designed for use with both universal and OEM shift and throttle cable connections.
- Suitable for most boat/dual engine combinations.
- Dual action levers (throttle and shift control in each handle).
- Trim, Tilt, options available.
- Drag adjustment on all models.
- Easy installation and set up.
- Throttle friction adjustment is included for each handle.

SeaStar Solutions
 Recommends Using

 Cables With This
 Control

NOTE: When properly installed, these engine controls will connect to outboard, stern drive and inboard engines, utilizing Mercury/Mariner® and OMC® OEM type control cables as well as universal 3300/33C type cables and engine connection kits.

Neutral Safety Switch [051801-033](#)

CONTROL REPLACEMENT PARTS

SL-3 TOP AND SIDE MOUNT CONTROLS:

212442	Instruction Manual	Instruction manual for both side & top mount controls.
212151-003	Cable Nest Kit	Complete hardware set to connect 2 cables to the control. Twin lever requires 2.
051801-003	Neutral Safety Switch	
315590	Trim Switch	Trim switch located behind toggle paddle. Must open handle to install.

FOR SL-3 SIDE MOUNT CONTROLS:

317002	SL-3 Side Mount Parts Kit	Neutral safety switch, ty-raps, instruction manual, bezel cover, trim style grip, plain grip, hub cover kit.
317003	SL-3 Side Mount Parts Kit With Cutoff Switch	Neutral safety switch, ty-raps, instruction manual, bezel cover with cutoff switch hole, trim style grip, plain grip, hub cover kit.
309598	Hub Cover Kit	Handle base cover with rubber push button and white push rod.

SL-3 SINGLE LEVER TOP MOUNT CONTROLS:

316941	SL-3 Top MT. Single Parts Kit	Neutral safety switch, ty-raps, instruction manual, flexible rubber cover and push rod for neutral warm up, cover, gasket and hardware, 2 grips (1 trim & 1 plain).
309172	Flexible Rubber Button	Rubber button for neutral warm up.
309184	Push Rod Extension	Goes under the flexible button for neutral warm up.

SL-3 TWIN TOP MOUNT CONTROLS:

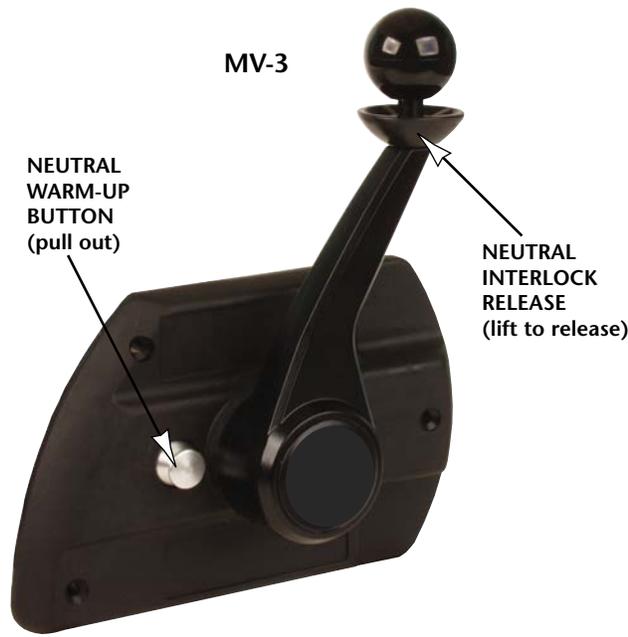
316942	SL-3 Twin Top Mount Parts Kit	Neutral safety switch, ty-raps, instruction manual, flexible rubber cover and push rod for neutral warm up, cover, gasket and hardware, 2 grips (1 for 2 trim actuators, 1 plain).
309172	Flexible Rubber Button	Rubber button for neutral warm up.
309184	Push Rod Extension	Located under the flexible button for neutral warm up.

FOR ALL OSPREY CONTROLS CH1700/CH7500/CH7600/CH7800:

212151-003	Cable Nest Kit	Complete hardware set to connect 2 cables to the control. Twin lever requires 2.
051801-003	Neutral Safety Switch	

CH1700 SERIES SIDE MOUNT CONTROLS:

CA76441P	Replacement Handle	Handle with trim button.
ISCH7500_r5	Instruction Manual	
7213111	Insert Kit Black	
7213017	Insert Kit Chrome	
7206215	Tilt Switch	Switch with chrome and black inserts.
7206212	Outboard Cutoff Switch	Switch with chrome and black inserts.
7206211	Inboard/sterndrive cutoff switch.	Switch with chrome and black inserts.



MV-3 SERIES:

The MV-3 offers style and incredible versatility in a dual-function, single-lever control. Several models are offered for outboards, stern drives, inboards, ski boats and jet boats, including versions with a lanyard-type emergency cut-off switch.

APPLICATION:

Dual-function control — The lever controls throttle AND shift. Ideal for many outboards, stern drives and inboards, with specialized versions for ski and jet boats. Single lever, dual action units control throttle and shift with one lever, using 3300/33C or 4300 type control cables. Not suitable for use with Mercury® and OMC® OEM type control cables.

FEATURES:

- Specially styled for today's integrated cockpit.
- Fits most popular outboards, inboards and stern drives.
- Emergency cut-off feature available.
- Crisp, positive detents.
- Pullout clutch disengagement feature for engine warm-up with automatic disengagement.
- Neutral interlock feature to prevent accidental shifting.
- Mechanical advantage - Shift 2.9:1 / Throttle 3.20:1.
- Uses 3300 and 4300 type cables.
- Can be used for Berkeley Jet (with 4300 type cables) and Mercury 175 HP Sport Jet (with special cable).
- Meets/exceeds all applicable industry standards.
- SeaStar Solutions Recommends Using ***xtreme** Cables With This Control

ENGINE CONTROLS	
MV-3 Standard For Outboard, Stern Drive Or Inboard	
MV-3 Standard Control RH Orientation, AFT Cable Entry, Neutral Safety Switch (Old No. 311364)	CH2920P
MV-3 Standard Control with Neutral Safety Switch (Old No. 311480)	CH2930P
MV-3 Competition Ski Boat	
MV-3 Competition Ski Boat, RH Orientation, Forward Cable Entry (Old No. 311335)	CH2900P
MV-3 Competition Ski Boat with I/O Cut-Off Switch. (Old No. 311335-001) Forward Cable Entry	CH2910P
MV-3 For Jet Berkeley:	
MV-3 Jet Control (Berkeley), RH Orientation, Aft Cable Entry (Old No. 311412)	CH2940P
MV-3 Jet Control (Berkeley), LH Orientation, Forward Cable Entry (Old No. 311413)	CH2945P
Mercury Sport Jet 175 (uses special 4300 cable for reverse gate):	
MV-3 HD Control (Merc 175) RH Orientation, Aft Cable Entry, Immersible Neutral Safety Switch, Throttle Limiter (Old No. 311508)	CH2950P
MV-3 Electronic Version:	
MV-3 E control	0249818

ELECTRONIC CONTROL:

Electrified side mount Ski boat control designed to operate electronic throttle and mechanical shift engine and drive. This control is based on the MV-3 control. This control is designed to operate MEFI V GM based "throttle by wire" marine engines.

The non-contact Hall Effect sensor is programmed for these engines and has no "wear" items to provide the best reliability.

OPTIONS/SERVICE ITEMS	
Ball Knob, Black	4009819
Neutral Safety Switch Replacement	300928
Immersible Neutral Safety Switch for Jet	051801-031
MV-3 Emergency Cut-Off Switch Kit for Jet and Outboard	311482-002
MV-3 Emergency Cut-Off Switch Kit for I/O and Inboard	311482-001
Cable Connection Kits (See Connection Kits and Jet Boat Steering sections.)	
NOTES:	
Check with Engine/Drive Manufacturer for details particular to your power train.	



**SKI BOAT (CH2200P)
JET BOAT (CH2300P):**

Considered the best by boat builders, these controls feature superior styling, a compact design, positive lockout and smoothest feel available — and they're standard equipment on ski and jet boats. The ski boat unit includes superior neutral warm-up action, while the jet boat version features a waterproof neutral safety switch.

APPLICATION:

Dual-function control — each lever controls throttle AND shift. Ski version: inboard ski boats and other single station craft requiring super smooth, precise throttle control. Jet version: jet boats powered by Mercury® Sport Jet 90 & early 120, OMC® Turbo Jet, or similar propulsion systems. Single lever, dual action design controls both throttle and shift with one lever using 3300/33C type cables.

FEATURES:

- Single lever, dual action for throttle & shift.
- Superior neutral engine warm-up control (ski version).
- Flush mount design for quick, tidy installation.
- Includes hardware for two 3300/33C type cables.
- Crisp shifting ball grip for a solid, sure feel.
- Neutral safety switches are standard on the CH2300P and optional on the CH2200P.
- Meets/exceeds all applicable industry standards.

Please note that while the CH2200P and CH2300P are similar in appearance, they have different neutral safety switches and internal mechanisms.

They are NOT interchangeable. Do not substitute CH2200P for CH2300P or vice-versa.

ENGINE CONTROL	
Side Mount Ski Boat Control	CH2200P
Side Mount Jet Boat Control	CH2300P
Side Mount CH2200 Electronic Control	CH2200ENC
OPTIONS/SERVICE ITEMS	
CH2200P Ski	
Optional Neutral Safety Switch (Ski)	CA27090P
CH2300P Jet	
Neutral Safety Switch (Jet)	CA27100P
CH2200P OR CH2300P	
Stainless Steel Knob (red-grooved)	CA69052P
Stainless Steel Knob (smooth)	CA69051P
Cable Connection Kit	190008
SPECIAL ORDER	
Handle For CH2200P & CH2300P	0223019
Neutral Warm Up Button	0220913

ELECTRONIC CONTROL:

Electrified side mount Ski boat control designed to operate electronic throttle and mechanical shift engine and drive. This control is based on the CH2200P control. This control is designed to operate MEFI V GM based "throttle by wire" marine engines.

The non-contact Hall Effect sensor is programmed for these engines and has no "wear" items to provide the best reliability.



**SeaStar Solutions
Recommends Using
xtreme
Cables With This
Control**



CH5300P
Pictured

**MT-3 SINGLE LEVER (CH5310P)
MT-3 TWIN LEVER (CH5300P):**

Ideal for inboards, stern drives and outboards, MT-3 combines classic binnacle control styling with dual function levers, a neutral safety switch and an engine warm-up feature! Control throttle and shift with one lever instead of two. MT-3 Twin can control two engines using the 3300/33C cables.

APPLICATION:

Dual-function control — each lever controls throttle AND shift. Great for single station inboards stern drives and outboards, single or dual engine. Perfect for applications in which a binnacle control appearance is desired, but one-lever throttle/shift control is preferred. Also a great choice when space is at a premium. This control uses 3300/33C type cables (single and dual lever) and 4300/43 type cables (single lever version only). Not suitable for use with Mercury® and OMC® OEM type control cables.

FEATURES:

- Binnacle styling with the advanced features of a dual-function control: one-handle engine control, neutral warm-up.
- Neutral safety switch to help prevent starting in gear (standard).
- Mechanical advantage - shift 2.77:1/throttle 3.57:1.
- Can be used in a dual station application with the DS unit.
- Meets/exceeds all applicable industry standards.

ENGINE CONTROL	
SINGLE LEVER: Pull Shift, Push Throttle MT-3 Single (Old No. 308601, 309075)	CH5310P
TWIN LEVER: Pull Shift, Push Throttle MT-3 Twin (Old No. 308602, 309076)	CH5300P
SINGLE LEVER: Pull Shift/Throttle MT-3 Single (Old No. 308731, 309077)	CH5330P
TWIN LEVER: Pull Shift/Throttle MT-3 Twin (Old No. 308732, 309078)	CH5320P
OPTIONS/SERVICE ITEMS	
Optional Neutral Safety Switch	305499
Hand Lever	032778-002
Chrome Side Plate, MT-3	308598-001
Ball Knob, Red	4009912
Stainless Steel Knob (red-grooved)	CA69052P
Hardware Kit for MT-3 single lever	308599
Hardware Kit for MT-3 twin lever	308727
43 Cable Heavy Duty Connection Kit (Must be used when connecting a 4300/43CC or 4300/43BC cable to the control. (43 series cables can only be used with the single-lever model.)	308742
Engine Connection Kits (see Connection Kits section)	
NOTE: 4300/43 type cables cannot to be used on MT-3 Twin, as interference will occur.	

SeaStar Solutions
Recommends Using

Cables With This
Control

MT-3 SINGLE

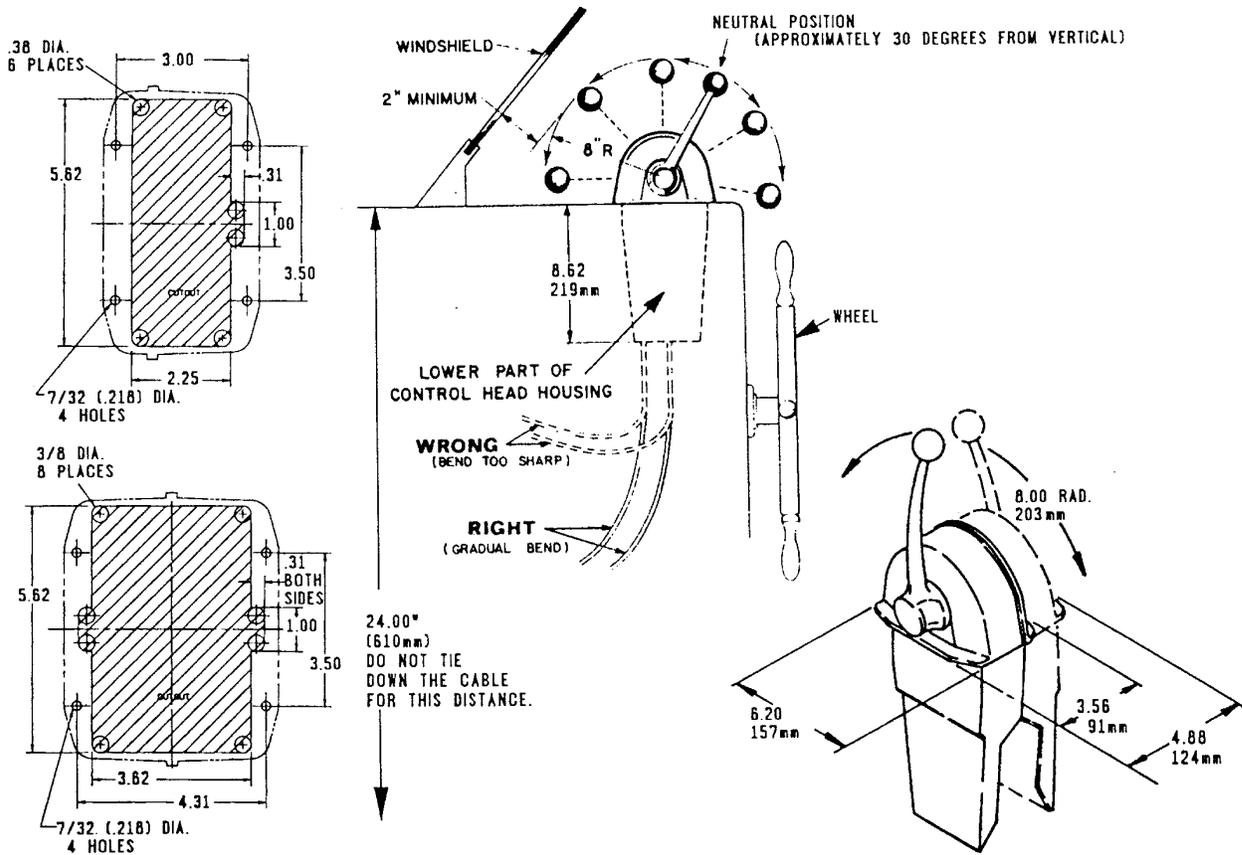


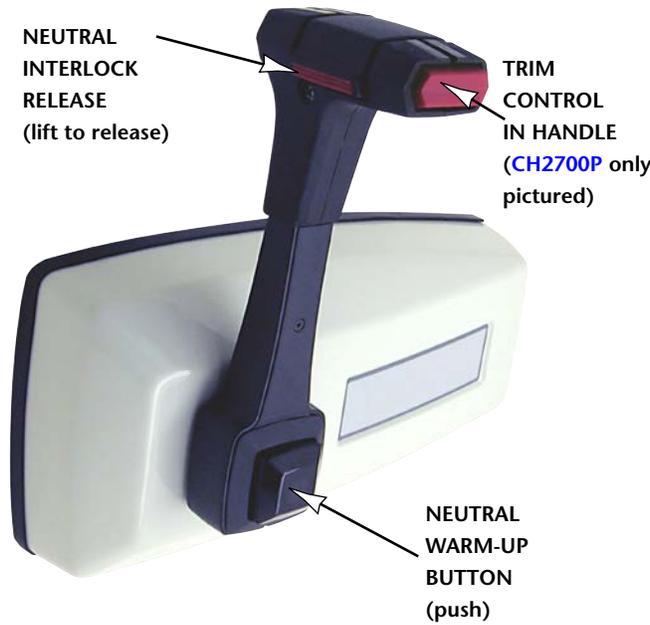
MT-3 TWIN



Controls are shown with levers in partial forward throttle positions. At neutral, the control levers are about 30° aft from vertical to provide more forward throttle lever arc.

**MOUNTING
CUTOUT
DIMENSIONS:**





SIDE MOUNT (CH2600P)

SIDE MOUNT WITH TRIM (CH2700P):

Outboard Side Mount Control. This economical single lever, dual function control features positive shift detents, an optional engine trim switch (CH2700P) in the handle and easy installation. (Mounts to gunwale surface — no hole cutout required.)

It's an excellent replacement for both outboard and stern drive controls using (3300/33C type) cables only. Not suitable for use with Mercury and OMC type control cables.

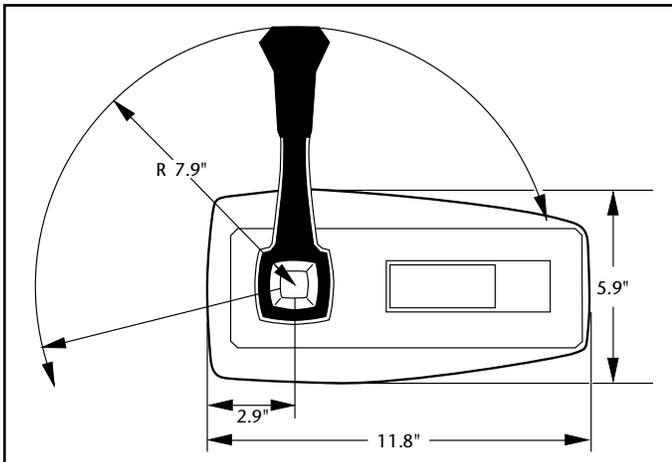
APPLICATION:

Dual-function control — each lever controls throttle AND shift. Virtually all single-station outboards and stern drives with mechanical transmissions. Single lever, dual action design controls throttle and shift with one lever. Utilizes 3300/33C type “universal” engine control cables only. Not suitable for use with Mercury® and OMC® OEM type control cables.

FEATURES:

- Single lever, dual action for throttle & shift.
- Surface mount design for quick, tidy installation.
- Includes neutral warm up capability.
- Includes hardware for two 3300/33C control cables.
- Positive shift detents and neutral lock-out.
- Optional engine trim switch in handle.
- Optional neutral safety switch.
- Weatherproof exterior, rugged die cast frame.
- Meets/exceeds all applicable industry standards.

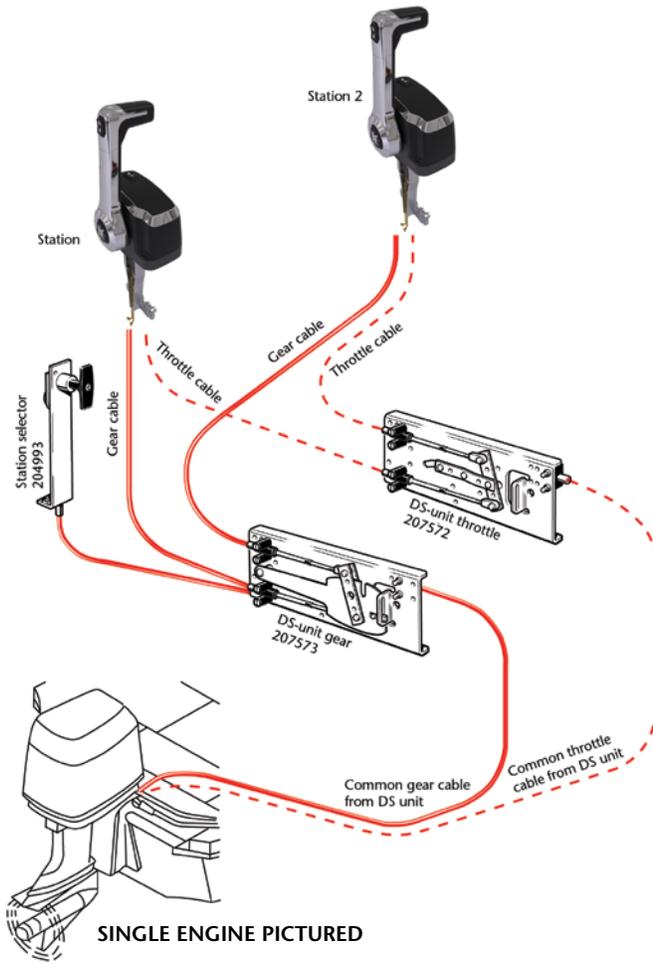
ENGINE CONTROL	
Side Mount (no Trim Switch)	CH2600P
Side Mount with Trim Switch	CH2700P
OPTIONS/SERVICE ITEMS	
Optional Neutral Safety Switch	CA27090P
Cable Connection Kit	190008



**SeaStar Solutions
Recommends Using**



**Cables With This
Control**



OUTBOARD DS UNIT:

The DS unit is designed for those boaters that like using one lever to do both throttle and shift in their dual station boat. The Station Selector allows smooth operation of dual function controls in a dual station application.

APPLICATION:

The dual function DS unit is great for dual station boats without a lot of room on the dash or if you wanted to use side mounted controls in two stations. Just put both levers in neutral, turn the selector switch and you have changed stations.

SeaStar Solutions recommends that you only use the **xtreme** 33C cable part number **CCX633XX** with the DS unit.

FEATURES:

- Allows dual function mechanical controls to be used in a dual station boat.
- Side mount controls can now be used in dual station boats.
- You only require one station selector for both a single engine or dual station boats.
- Using the recommended **xtreme** control cables allow smooth control operation.

SINGLE ENGINE OUTBOARD			
QUANTITY	PART NUMBER	DESCRIPTION	NOTES
1	207573	DS GEAR UNIT	TWO CABLES IN ONE CABLE TO SHIFTER
1	204993	STATION SELECTOR UNIT	ONE CABLE FROM UNIT TO GEAR DS UNIT
1	207572	DS THROTTLE UNIT	TWO CABLES IN ONE CABLE TO THROTTLE
1	CCX633XX	CABLE TO GO FROM SELECTOR TO GEAR DS UNIT	XX = CABLE LENGTH IN FEET
1	CCX633XX	CABLE FROM STATION 1 TO GEAR DS UNIT	XX = CABLE LENGTH IN FEET
1	CCX633XX	CABLE FROM STATION 2 TO GEAR DS UNIT	XX = CABLE LENGTH IN FEET
1	CCX633XX	CABLE FROM GEAR UNIT TO TRANSMISSION	XX = CABLE LENGTH IN FEET
1	CCX633XX	CABLE FROM STATION 1 TO THROTTLE DS UNIT	XX = CABLE LENGTH IN FEET
1	CCX633XX	CABLE FROM STATION 2 TO THROTTLE DS UNIT	XX = CABLE LENGTH IN FEET
1	CCX633XX	CABLE FROM THROTTLE UNIT TO ENGINE	XX = CABLE LENGTH IN FEET
1 engine adapter kit for the control cables unless provided by the engine manufacturer			
1 DUAL ACTION CONTROL PER STATION = 2 TOTAL CONTROLS THAT MUST USE 3300/33C xtreme STYLE CONTROL CABLES CCX633XX			
DUAL ENGINE OUTBOARDS			
QUANTITY	PART NUMBER	DESCRIPTION	
2	207573	DS GEAR UNIT	<p style="text-align: center;">SeaStar Solutions Recommends Using xtreme Cables With This Control</p>
1	204993	STATION SELECTOR UNIT	
2	207572	DS THROTTLE UNIT	
2	CCX633XX	CABLE TO GO FROM SELECTOR TO GEAR DS UNITS	
1	CCX633XX	CABLE FROM PORT STATION 1 TO GEAR DS UNIT	
1	CCX633XX	CABLE FROM STARBOARD STATION 1 TO GEAR DS UNIT	
1	CCX633XX	CABLE FROM PORT STATION 2 TO GEAR DS UNIT	
1	CCX633XX	CABLE FROM STARBOARD STATION 2 TO GEAR DS UNIT	
2	CCX633XX	CABLE FROM GEAR DS UNITS TO TRANSMISSIONS	
1	CCX633XX	CABLE FROM PORT STATION 1 TO THROTTLE DS UNIT	
1	CCX633XX	CABLE FROM STARBOARD STATION 1 TO THROTTLE DS UNIT	
1	CCX633XX	CABLE FROM PORT STATION2 TO THROTTLE DS UNIT	
1	CCX633XX	CABLE FROM STARBOARD STATION 2 TO THROTTLE DS UNIT	
2	CCX633XX	CABLE FROM THROTTLE DS UNITS TO ENGINES	
2 engine adapter kit for the control cables unless provided by the engine manufacturer			
1 DUAL ACTION TWIN LEVER CONTROL PER STATION = 2 TOTAL CONTROLS THAT MUST USE 3300/33C xtreme STYLE CONTROL CABLES CCX633XX			

INBOARD OR STERNDRIVE DS UNIT:

The DS unit is designed for those boaters that like using one lever to do both throttle and shift in their dual station boat. The Station Selector allows smooth operation of dual function controls in a dual station application.

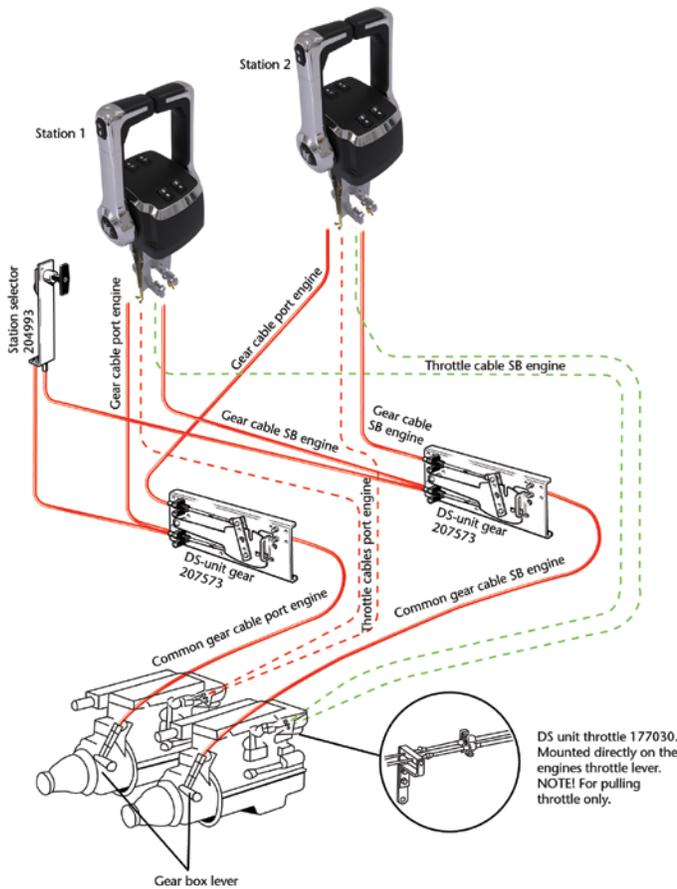
APPLICATION:

The dual function DS unit is great for dual station boats without a lot of room on the dash or if you wanted to use side mounted controls in two stations. Just put both levers in neutral, turn the selector switch and you have changed stations.

SeaStar Solutions recommends that you only use the **xtreme** 33C cable part number **CCX633XX** with the DS unit.

FEATURES:

- Allows dual function mechanical controls to be used in a dual station boat.
- Side mount controls can now be used in dual station boats.
- You only require one station selector for both a single engine or dual station boats.
- Using the recommended **xtreme** control cables allow smooth control operation.
- This DS throttle unit is a pull only set up. For a push throttle use the outboard DS throttle unit.



DUAL ENGINE PICTURED

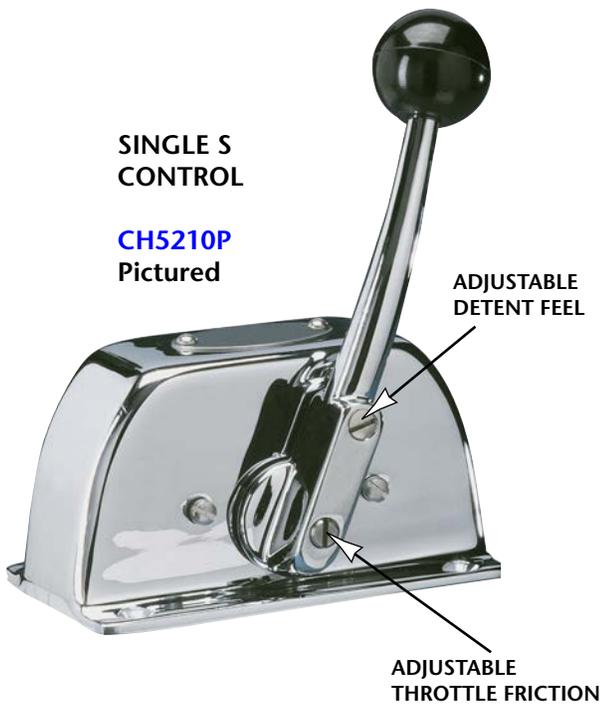
SINGLE ENGINE DUAL STATION INBOARD OR STERNDRIVE			
QUANTITY	PART NUMBER	DESCRIPTION	NOTES
1	207573	DS GEAR UNIT	TWO CABLES IN ONE CABLE TO SHIFTER
1	204993	STATION SELECTOR UNIT	ONE CABLE FROM UNIT TO GEAR DS UNIT
1	177030	DS THROTTLE UNIT	TWO CABLES IN ONE CABLE TO THROTTLE
1	CCX633XX	CABLE TO GO FROM SELECTOR TO GEAR DS UNIT	XX = CABLE LENGTH IN FEET
1	CCX633XX	CABLE FROM STATION 1 TO GEAR DS UNIT	XX = CABLE LENGTH IN FEET
1	CCX633XX	CABLE FROM STATION 2 TO GEAR DS UNIT	XX = CABLE LENGTH IN FEET
1	CCX633XX	CABLE FROM GEAR UNIT TO TRANSMISSION	XX = CABLE LENGTH IN FEET
1	CCX633XX	CABLE FROM STATION 1 TO THROTTLE DS UNIT	XX = CABLE LENGTH IN FEET
1	CCX633XX	CABLE FROM STATION 2 TO THROTTLE DS UNIT	XX = CABLE LENGTH IN FEET
THE THROTTLE CABLES SHOULD BE A PULL TO ADVANCE THROTTLE SET UP OR USE THE OUTBOARD THROTTLE DS UNIT			
1 engine adapter kit for the control cables unless provided by the engine manufacturer			
1 DUAL ACTION CONTROL PER STATION = 2 TOTAL CONTROLS THAT MUST USE 3300/33C xtreme STYLE CONTROL CABLES CCX633XX			
DUAL ENGINE DUAL STATION INBOARD OR STERNDRIVE			
QUANTITY	PART NUMBER	DESCRIPTION	
2	207573	DS GEAR UNIT	
1	204993	STATION SELECTOR UNIT	
2	177030	DS THROTTLE UNIT	
2	CCX633XX	CABLE TO GO FROM SELECTOR TO GEAR DS UNITS	
1	CCX633XX	CABLE FROM PORT STATION 1 TO GEAR DS UNIT	
1	CCX633XX	CABLE FROM STARBOARD STATION 1 TO GEAR DS UNIT	
1	CCX633XX	CABLE FROM PORT STATION 2 TO GEAR DS UNIT	
1	CCX633XX	CABLE FROM STARBOARD STATION 2 TO GEAR DS UNIT	
2	CCX633XX	CABLE FROM GEAR DS UNITS TO TRANSMISSIONS	
1	CCX633XX	CABLE FROM PORT STATION 1 TO THROTTLE DS UNIT	
1	CCX633XX	CABLE FROM STARBOARD STATION 1 TO THROTTLE DS UNIT	
1	CCX633XX	CABLE FROM PORT STATION2 TO THROTTLE DS UNIT	
1	CCX633XX	CABLE FROM STARBOARD STATION 2 TO THROTTLE DS UNIT	
THE THROTTLE CABLES SHOULD BE A PULL TO ADVANCE THROTTLE SET UP OR USE THE OUTBOARD THROTTLE DS UNIT			
2 engine adapter kit for the control cables unless provided by the engine manufacturer			
1 DUAL ACTION TWIN LEVER CONTROL PER STATION = 2 TOTAL CONTROLS THAT MUST USE 3300/33C xtreme STYLE CONTROL CABLES CCX633XX			

SeaStar Solutions
 Recommends Using

Cables With This
Control

SINGLE S CONTROL

CH5210P
Pictured



**SINGLE S (CH5210P)
TWIN S (CH5200P):**

This classic control is great for inboards, single or dual station. The time-proven design of Twin S means years of reliable operation. Accepts universal control cables. Optional lever extension, detent kits and neutral safety switch available. Additional hardware is required for twin station use.

APPLICATION:

Single-function control — each lever controls throttle OR shift. Ideal for inboards, stern drives and outboards. The S controls are suitable for single or dual station use. These single function engine controls are available in both one or two-lever models. Both S controls use 3300/33C and 4300 type cables. Not suitable for use with Mercury® and OMC® OEM type control cables. 4300 cables require the additional 40 series hardware kit.

FEATURES:

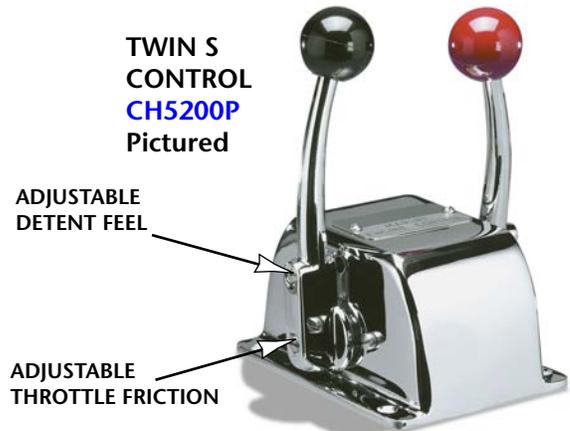
- Highly polished stainless steel cover.
- Simple, rugged, compact design.
- Easily adjustable throttle friction and shift detent feel.
- Optional neutral safety switch to prevent starting in gear.
- Optional hand lever extension.
- Optional shift detent kit (if used in dual stations; use on main station only).
- Option throttle hold kit.
- Uses 3300/33C and 4300 type cables.
- Mechanical advantage - shift 2.77:1/throttle 2.77:1.
- Meets/exceeds all applicable industry standards.
- SeaStar Solutions Recommends Using ***xtreme** Cables With This Control.

OPTIONS:

The Dual Station Transfer Unit from SeaStar Solutions is recommended where long or difficult cable paths make parallel installations costly and/or difficult. When single function two lever controls are used in a parallel, dual station application, some installations may cause the clutch or throttle levers to operate "stiff". Adding a transfer unit can improve control performance in these cases.

ENGINE CONTROLS	
Single S (Old No. 031002-001)	CH5210P
Twin S (Old No. 031001-001)	CH5200P
OPTIONS/SERVICE ITEMS	
Single S - Hardware & Bearing Kit 3300 Cables	CA67868P
Twin S - Hardware & Bearing Kit 3300 Cables	CA67869P
Single S - Handle Replacement	CA67866P
Twin S - Handle Replacement	CA67867P
Single S - Cover Replacement	CA67864P
Twin S - Cover Replacement	CA67865P
Clutch Detent Kit	022328
In-Series Dual Station Kit, 3300/33C (2 required for twin)	039489-002
In-Series Dual Station Kit, 40 Series (2 required for twin)	042152
Neutral Safety Switch Kit	047307
Lever Extension	036773
Throttle Hold Kit (one per lever, prevents throttle creep)	306997
Ball Knob, Red	035232-001
Ball Knob, Black	035232-004
Stainless Steel Throttle Knob (grooved)	CA69052P**
Stainless Steel Shift Knob (smooth)	CA69051P**
Cable Mounting Hardware Kit 3300, Twin	061001
Dual Station Transfer Unit	061371
Connection Kits (see Connection Kits section)	
** Fits most controls with 3/8-24 threaded levers.	

TWIN S CONTROL
CH5200P
Pictured





TWIN SR
CH5400P
Pictured

TWIN SR (CH5400P):

Ideal for single and dual station boats, SR Twin is rugged and made with the finest marine grade materials. Removable cover enables easy access to the mechanism. Includes adjustable brakes and stops. Accepts universal control cables. Optional detent kits and neutral safety switch available. Additional hardware is required for twin station use.

APPLICATION:

Single-function control — each lever controls throttle OR shift. Ideal for inboards, stern drives and outboards. Twin SR controls are suitable for single or dual stations and can utilize 3300/33C or 4300/43C type cables. Not suitable for use with Mercury® and OMC® OEM type control cables.

FEATURES:

- Polished stainless steel cover, stainless steel levers and rugged cast hanger plate.
- Removable cover enables easy access to the control mechanism.
- Adjustable brakes and stops.
- Optional neutral safety switch to prevent starting in gear.
- Optional shift detent kit (if used in dual stations; use on main station only).
- Uses 3300/33C and 4300/43C type cables.
- Mechanical advantage - shift 3.10:1/throttle 3.10:1.
- Meets/exceeds all applicable industry standards.
- SeaStar Solutions Recommends Using ***xtreme** Cables With This Control.

OPTIONS:

The Dual Station Transfer Unit from SeaStar Solutions is recommended where long or difficult cable paths make parallel installations costly and/or difficult. When single function two lever controls are used in a parallel, dual station application, some installations may cause the clutch or throttle levers to operate “stiff”. Adding a transfer unit can improve control performance in these cases.

ENGINE CONTROLS	
Twin SR 2-lever control (Old No. 036469-001)	CH5400P
OPTIONS/SERVICE ITEMS	
Clutch Detent Kit	036774
In-Series Dual Station Kit, 3300/33C (2 required for twin lever control)	039490-002
In-Series Dual Station Kit, 40 Series (2 required for twin)	048501-002
Neutral Safety Switch Kit	041117
Ball Knob, Red	4009912**
Ball Knob, Black	4009819**
Stainless Steel Throttle Knob (grooved)	CA69052P**
Stainless Steel Shift Knob (smooth)	CA69051P**
Replacement Stainless Steel Lever <small>(Fits SeaStar Solutions® CH5600 SLT and Twin SR controls only.)</small>	CA69060P
Mounting Hardware Kit, Twin	060991
Replacement Dome Cover, Twin	047682
Dual Station Transfer Unit	061371
Engine Connection Kits <small>(see Connection Kits section)</small>	
** Fits most controls with 3/8-24 threaded levers.	



EASY ACCESS UNDER DOME (remove screw near each lever)

SLT (CH5600P):

There's nothing else like it! Patented Self Locking Throttle technology makes the SLT the only control that stops cable creep and works flawlessly in single or in series multi-station applications. SLT stops unwanted throttle cable movement without the need for cable brakes or other friction devices that cause poor feel at the lever and negate the performance advantages of **xtreme** cables. Additional hardware is required for twin station use.

APPLICATION:

Single-function control — each lever controls throttle OR shift. For single or dual stations with single or twin engines (one control per engine per station utilizing an optional neutral safety switch kit). Uses 3300/33C type universal control cables. Not suitable for use with Mercury® and OMC® OEM type control cables.

FEATURES:

- Patented SLT technology prevents throttle creep. Lever stays where it is placed.
- Superior twin station performance.
- Polished Stainless Steel levers & dome.
- Positive detent for shifts.
- Can be user-configured as either Push or Pull to operate throttle and/or shift.
- Includes hardware for two 3300/33C type universal control cables.
- Easy-access adjustable shift detents/lever stops (under easily removable dome).
- Optional neutral safety switch.
- Meets/exceeds all applicable industry standards.
- SeaStar Solutions Recommends Using **xtreme** Cables With This Control.

OPTIONS:

The Dual Station Transfer Unit from SeaStar Solutions is recommended where long or difficult cable paths make parallel installations costly and/or difficult. When single function two lever controls are used in a parallel, dual station application, some installations may cause the clutch or throttle levers to operate "stiff". Adding a transfer unit can improve control performance in these cases.

ENGINE CONTROLS	
SLT Top Mount Control	CH5600P
OPTIONS/SERVICE ITEMS	
Optional Neutral Safety Switch	CA69009P
Cable Attachment Hardware for 3300/33C Dual Station & Replacements	CA69022P
Replacement Red Knob	4009912**
Replacement Black Knob	4009819**
Stainless Steel Throttle Knob (grooved)	CA69052P**
Stainless Steel Shift Knob (smooth)	CA69051P**
Pivot Kit for CH5600P and CH4400 series controls	CA27563P
(For replacement detent balls and springs, order CA68057P Hardware Kit for the CH4400 control.)	
Replacement Stainless Steel Lever (Fits SeaStar Solutions® CH5600 SLT and Morse® Twin SR controls only.)	CA69060P
Dual Station Transfer Unit	061371
Detent Kit	6902112
Engine Connection Kits (see Connection Kits section)	
** Fits most controls with 3/8-24 threaded levers.	



CH4451P
Pictured

TOP MOUNT STRAIGHT (CH4451P) TOP MOUNT RAKED (CH4481P):

These stylish, low profile top mount control features twin levers/single action with visual and tactile throttle/shift identification. Available in chrome with straight or raked handles and smooth throttle friction, it can be used for single or twin stations. CH4400 controls accept 3300/33C type control cables and are ideal drop-in replacements for older CH4500 or CH4800 units. Additional hardware is required for twin station use.

APPLICATION:

Single-function control — each lever controls throttle OR shift. For single or dual station applications with single or twin engines (one control per engine per station utilizing an optional neutral safety switch kit when required). Uses 3300/33C type universal control cables. Not suitable for use with Mercury® and OMC® OEM type control cables.

FEATURES:

- Dual lever, single action for throttle & shift.
- Dual station capability.
- Stylish look with either straight or raked handles.
- Positive detent for shifts.
- Push or Pull to operate throttle and/or shift.
- Includes hardware for two 3300/33C control cables.
- Optional neutral safety switch.
- Adjustable throttle friction.
- Removable knobs for recessed mounting.
- Meets/exceeds all applicable industry standards.
- SeaStar Solutions Recommends Usin **xtreme** Cables With This Control.

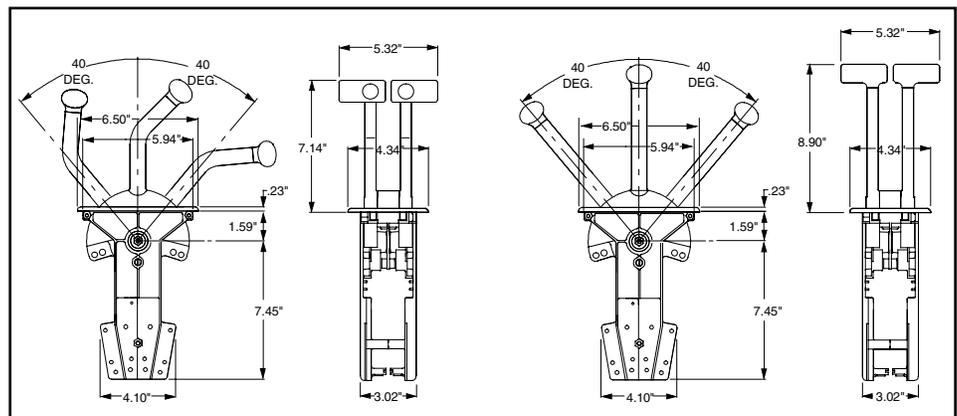
OPTIONS:

The Dual Station Transfer Unit from SeaStar Solutions is recommended where long or difficult cable paths make parallel installations costly and/or difficult. When single function two lever controls are used in a parallel, dual station application, some installations may cause the clutch or throttle levers to operate "stiff". Adding a transfer unit can improve control performance in these cases.

ENGINE CONTROLS (CH4400 CHROME)	
Chrome Finish, Straight Handles, Smooth Friction (Throttle Friction/Shift Detent)	CH4451P
Chrome Finish, Raked Handles, Smooth Friction (Throttle Friction/Shift Detent)	CH4481P
OPTIONS/SERVICE ITEMS	
Optional Neutral Safety Switch	CA68075P
CH4400 Cable Hardware Kit for single or dual station <small>This kit is for use with 3300/33C type universal cables only.</small>	CA68065P
CH4400 Hardware Kit	CA68057P
CH4400 Cover (Black Plastic)	6800611
CH4400 Cover (Stainless Steel)	6800618
CH4400 Knob (Chrome Zinc Alloy)	6801812
CH4400 Knob (Black Aluminum)	6801811
CH4400 Knob (Red Aluminum)	6801815
Pivot Kit for CH5600P and CH4400 series controls	CA27563P
Dual Station Transfer Unit	061371
NOTES: The adjustable smooth (resistance type) friction features are for use with throttle control only. Use detents for shift. If application is twin station, use detents on lower station only.	



CH4481P
Pictured



ST
CH2400P
Pictured

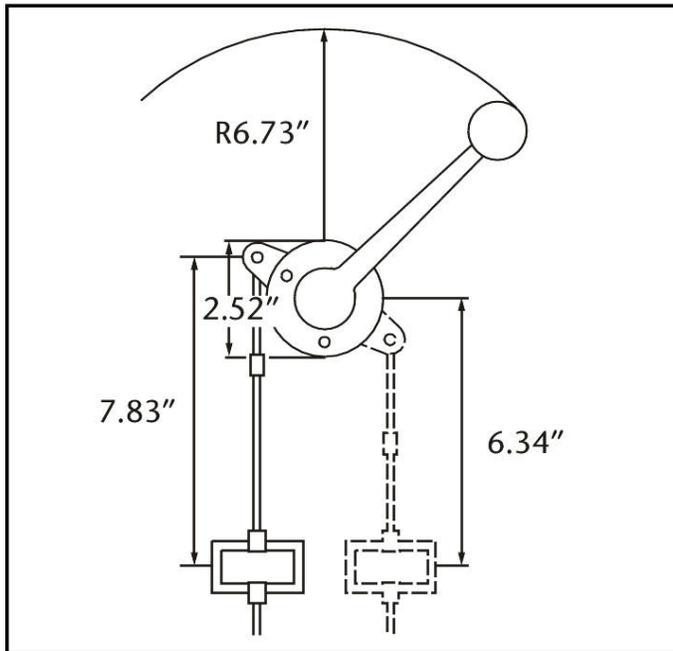


STB
CH2410P
Pictured



ADJUSTABLE
THROTTLE
FRICTION

ENGINE CONTROLS	
ST Control with no brake (3300 and 4300 control cables) (Old No. 031791 or 039115)	CH2400P
STB w/external brake (3300 and 4300 control cables) (Old No. 044777 or 045978)	CH2410P
OPTIONS/SERVICE ITEMS	
Hand Lever Assembly, Chrome	031046-002
Ball Knob, Black (replaces 035232-044)	4009819**
Stainless Steel Shift Knob (smooth)	CA69051P**
Throttle Cable Brake (Goes on cable)	044386
** Fits most controls with 3/8-24 threaded levers.	



**ST (CH2400P)
STB (CH2410P):**

The ST & STB controls are economical and durable, with a simple, classic design. Single-function lever moves one cable only. Versions are available for 3300/33C and 4300/43C type cables, with or without external, adjustable throttle brake.

APPLICATION:

Single-function control — The lever controls throttle OR shift. The STB control includes a throttle brake and can shift Berkeley® or similar type jets when a foot throttle is used. ST/STB units can utilize 3300/33C type universal control cables and 4300/43C type control cables. ST/STB controls are for single-station use only and are not suitable for use with Mercury® and OMC® OEM type control cables.

FEATURES:

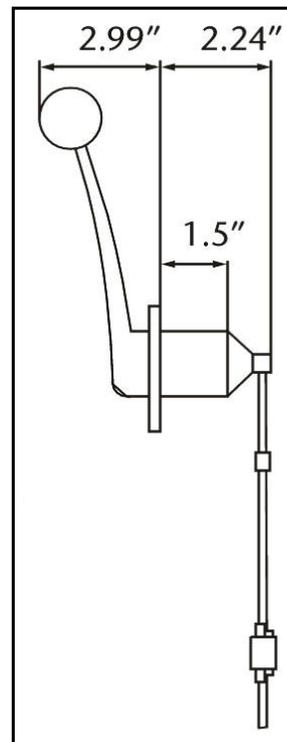
- Compact, rugged design and classic traditional styling.
- Durable heavy chrome finish.
- Uses 3300/33C or 4300/43C type cables.
- Available with or without adjustable external throttle brake.
- Mechanical advantage - 3.20:1.

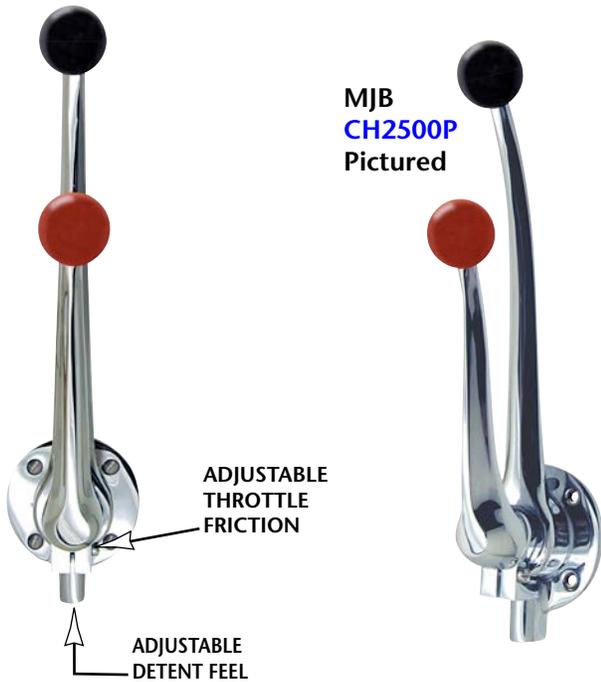
SeaStar Solutions

Recommends Using



Cables With This Control





MJB (CH2500P):

The MJB control is ideal for sailboats and inboards with hard to shift transmissions. An extra long shift handle provides ample leverage. The shorter handle controls the throttle. The MJB uses only 3300/33C type cables for throttle and heavy duty 6400/64 type cables for shift.

APPLICATION:

Single-function two-lever control. The MJB control is a great choice for inboards, stern drives, sailboats and Berkeley® or similar type jets. 3300/33C type universal control cables are used for throttle; 6400/64 type control cables are used for shift. MJB controls are for single-station use only and are not suitable for use with Mercury® and OMC® OEM type control cables.

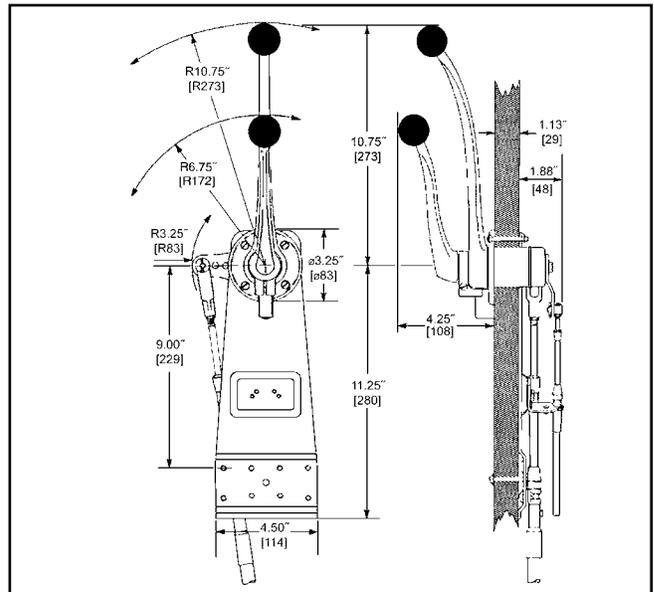
FEATURES:

- Compact, rugged design and classic traditional styling.
- Separate handles for throttle and shift. (Shift lever is long for optimal leverage with hard-to-shift transmissions.)
- Accepts 3300/33C type cables for throttle and 6400/64 type cables for shift only.
- Durable heavy chrome finish.
- Includes external adjustable brake for throttle friction adjustment.
- Has detent for positive neutral feel.
- Right or left hand installation.
- Engine linkage and travel direction can be accommodated in the control.
- Mechanical advantage - Shift 3.63:1, Throttle 3.20:1.
- Meets/exceeds all applicable industry standards.

ENGINE CONTROL	
MJB Control (Old No. 044716-001) (Uses 3300/33C and 6400/64 type cables)	CH2500P
OPTIONS/SERVICE ITEMS	
Handles Replacement Kit	CA68011P
Bearings Replacement Kit	CA68012P
Detent/Friction Replacement Part Kit	CA68013P
Hand Lever Assembly, Chrome	031046-002
Ball Knob, Red	035232-001**
Ball Knob, Black (replaces 035232-044)	035232-004**
Stainless Throttle Knob (grooved)	CA69052P**
Stainless Steel Shift Knob (smooth)	CA69051P**
Neutral Safety Switch	047346
Mounting Hardware Kit (30 Series Kit)	062307

NOTE: MJB shift only uses 6300 or 6400 series control cables.

** Fits most controls with 3/8 - 24 threaded levers.



SeaStar Solutions Recommends Using **xtreme**
Cables With This Control



FEATURES:

- Dependable control for luxury cruisers, workboats and commercial fishing boats - 'nothing moves boats better'.
- Proven performance and reliability for over 30 years.
- Hynaumatic controls provide precise control of shift and throttle without friction, backlash or lost motion.
- Up to four stations possible depending on length of tubing run.
- Unique and highly accepted feel.
- Simple installation.

HYNAUTIC CONTROLS:

Hynaumatic hydraulic engine controls offer the boat owner a very positive, smooth, synchronised method of relaying remote commands from multiple stations to the engine's throttle and transmission linkages.

APPLICATION:

Separate left and right sending units can be used as either shift or throttle controls. The sender face is brushed anodized aluminium, as is the handle. Optional mounting plate simplifies side-by-side installation.

By incorporating a double check valve in the system, throttles cannot be retarded by heavy duty governor springs common to most large engines. Quick disconnect linkage at the engine allow for independent throttle operation while servicing the engine.

A spring-loaded clutch detent on each shift slave ensures that all stations register a distinct feel when the transmission is in neutral. Also available is an optional Neutral Safety switch kit which prevents the engine from starting while the transmission is in gear.

The reservoir maintains the fluid reserve and pressure for the hydraulic system. Clear sight tube makes visual fluid level inspection easy. The lower charging valve section keeps all parts of the system under positive fluid pressure.

SeaStar Solutions Recommends Using **xtreme** Cables With This Control

HYNAUTIC CONTROLS:			MC-B4-S1 (Ball) or MC-T4-S1 ("T")						MC-B4-T1 (Ball) or MC-T4-T1 ("T")					
Items	Part Number	Description	SINGLE ENGINE						TWIN ENGINE					
1	R-13	Reservoir & Charging Valve	1	1	1	1	1	1	1	1	1	1	1	1
2	MCVF-04	Charging Valve Fittings	-	-	-	-	-	-	1	1	1	1	1	1
3	MCVF-05	Charging Valve Fittings	1	1	1	1	1	1	-	-	-	-	-	-
4	CL-B4 or CL-T4	Control-Left (Ball Handle) or Control-Left ("T" Handle)	1	1	2	2	3	3	2	2	4	4	6	6
5	CR-B4 or CR-T4	Control-Right (Ball Handle) or Control-Right ("T" Handle)	1	1	2	2	3	3	2	2	4	4	6	6
6	CDF-04	Dual Mounting Plate	-	1	-	2	-	3	-	2	-	4	-	6
7	CF-04	Control Fittings	2	2	4	4	6	6	4	4	8	8	12	12
8	SS-04	Shift Slave	1	1	1	1	1	1	1	2	2	2	2	2
9	SSF-04	Slave Fittings	1	1	1	1	1	1	1	2	2	2	2	2
10	ST-06	Throttle Slave & Double Pilot Check Valve	1	1	1	1	1	1	1	2	2	2	2	2
11	STF-12	Slave Fittings	1	1	1	1	1	1	1	2	2	2	2	2
ADDITIONAL REQUIREMENTS - NOT INCLUDED IN SYSTEMS														
	MCEF-04	Extra Fittings Package	1	1	1	1	1	1	1	1	1	1	1	1
	MCT-02	100' Nylon Tube	2*	2*	2*	2*	3*	3*	3*	3*	4*	4*	-	-
	MCT-05	500' Nylon Tube	-	-	-	-	-	-	-	-	-	-	1*	1*
	MCO-03	Hydarulic Fluid	2*	2*	2*	2*	3*	3*	2*	2*	3*	3*	4*	4*

* As Required Ball: Ball Handle "T": T Handle



CONTROL HEAD STYLING

The control heads are ergonomically designed for maximum comfort and control. Available with or without universal trim switches, they each also include easily adjustable drag and detent adjustment pins to suit the operator's preference.

APPLICATIONS

- Suitable for all engines with mechanical shift and mechanical throttle.
- Single or twin engine applications.
- Inboard, IO and Outboard.
- Supports up to three stations.

TROLLING MODE

The trolling mode is a unique feature that is built into the control system and does not require additional components. Imagine you are trolling and trying to find that perfect speed to catch that big fish. When placing the control into trolling mode by simply selecting the mode, you now have greater resolution of the throttle from 0-50%. You no longer have to fight the controls to be at that perfect speed.

NOTES:

- Control cables ordered separately.
- Requires EST Display setup tool for configuration ([EPSK1207](#)).
- Additional CAN cable lengths are available.
- Compatible with Optimus 360, Contact SeaStar Solutions for Information on upgrading.
- Please refer to i7700 Electronic Control datasheet for specifications.

Optional Trim Switch

This will enable the engines to be trimmed individually when the situation calls for it.



i7700

The simple to install i7700 electronic control system replaces the existing mechanical control system. Why wrestle with your mechanical controls when you can have the benefits of electronic controls for a fraction of the cost of a new engine.

The smooth movement of the electronic controls enables much greater handling of the throttle and a fluid transition between gears. This translates into better control of the boat in all applications ranging from sport fishing and cruisers to commercial vessels. You will find it hard to go back to mechanical controls after the smooth and reliable response you get from the i7700 electronic controls. Regardless of the type of engine and drive, i7700 can provide precise control and comfort for your boating application.

SINGLE LEVER OPERATION

The ability to synchronize the engines and control cruise with one lever is incredibly useful. This feature enhances your boating experience by making it easier to control your boat regardless of the speed.

FEATURES:

- Mechanical override "get home" feature
- Trolling mode
- Add a station kits available - total of 3 stations
- Meets: ABYC P-24, CE, EN 60945
- Neutral warm-up
- Dual engine RPM synchronization for single handle operation
- Incorporates neutral start protection
- Adjustable control lever drag and detent settings
- Works on 12v systems
- Programmable shift delay
- Comes with 30' of harness to connect actuators to control head
- Utilizes standard [CCX633xx](#) type control cables - Xtreme type recommended
- Optional independent trim switches ([HA5491](#))

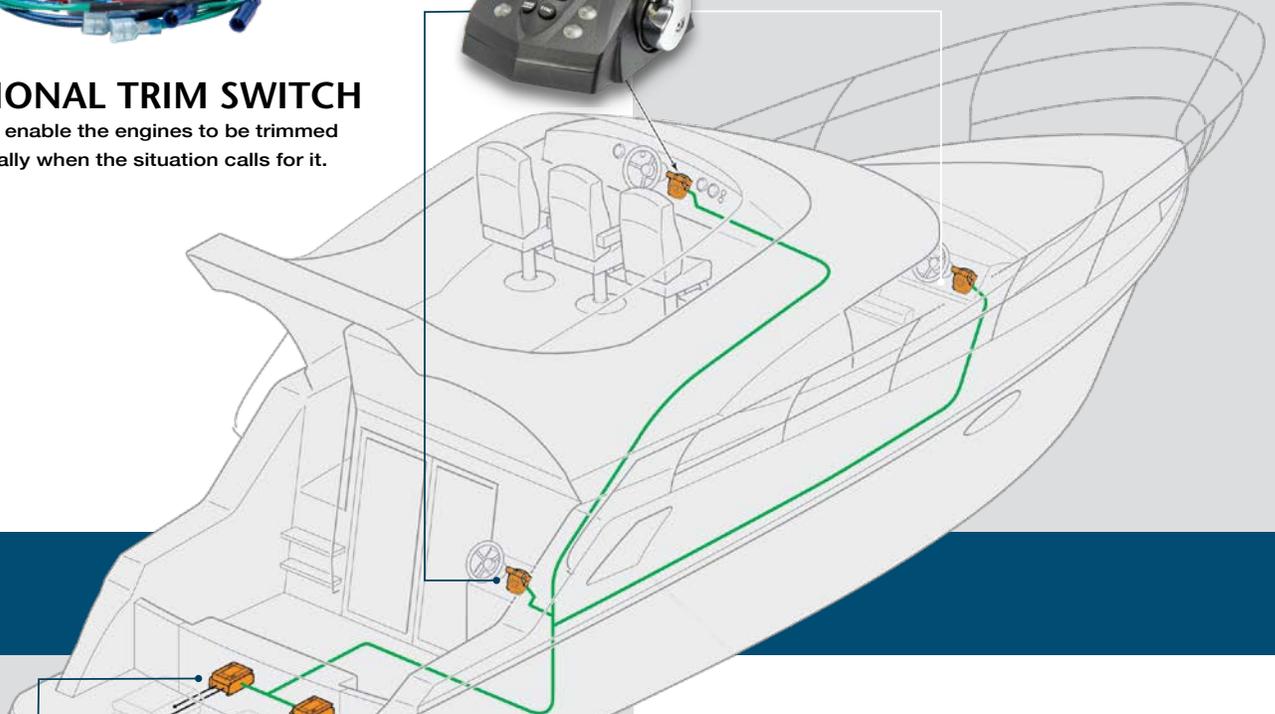
SeaStar Solutions
 Recommends Using

 Cables With This
 Control



OPTIONAL TRIM SWITCH

This will enable the engines to be trimmed individually when the situation calls for it.



NOTES:

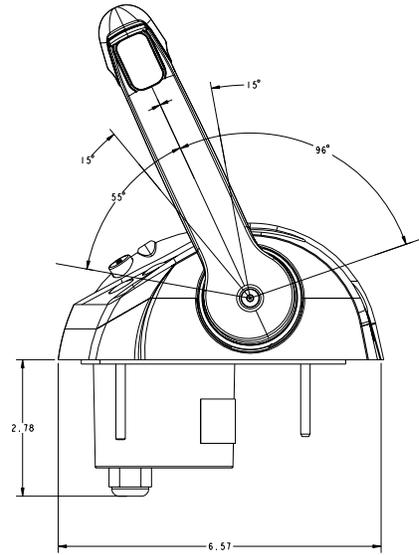
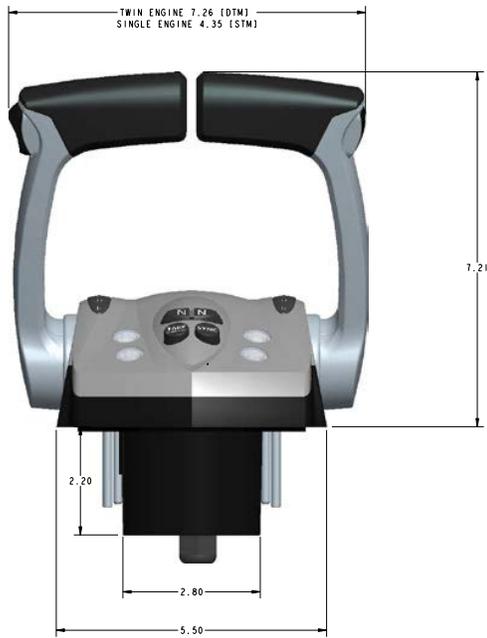
- Control cables ordered separately.
- Requires EST Display setup tool for configuration (EPSK1207).
- Additional CAN cable lengths are available.
- Compatible with Optimus 360, Contact SeaStar Solutions for Information on upgrading.
- Please refer to i7700 Electronic Control datasheet for specifications.

SHIFT AND THROTTLE ACTUATORS

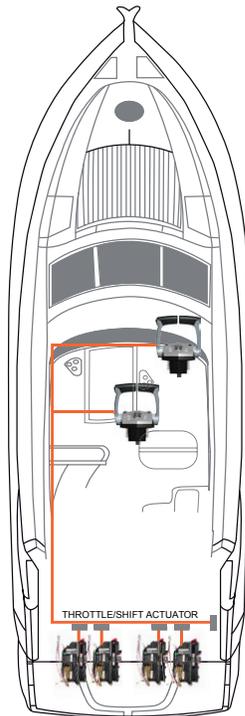
The NEW i7700 actuator contains both the shift and throttle actuator within one compact housing and are not only powerful enough to manage the shift and throttle functions on the most extreme applications, they are also exceedingly responsive and robust.

The actuators are linked to the control heads via a single 1/4" (6mm) CANbus cable making cable routing incredibly easy. In addition, the i7700 actuators have a mechanical back up "get home" feature which allows simple manual control should the need arise.

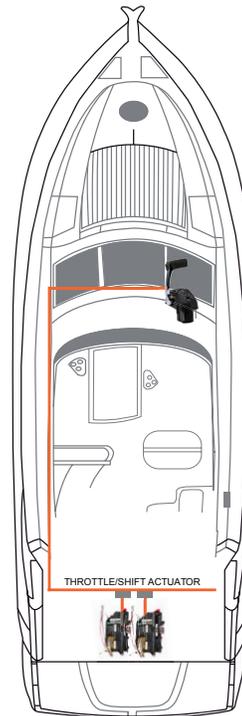
i7700 TECHNICAL DATA



DUAL STATION/ DUAL ENGINE



SINGLE STATION/ SINGLE ENGINE



Note: **EPK1207** Tool required for all i7700 installations

Base Systems – Single Station Kits	Kit Part #	i7711	i7751	i7712	i7752
		Single Engine	Single Engine with Trim	Dual Engine	Dual Engine with Trim
ACTUATORS					
Actuator, i7700 Universal	AC7700	1	1	2	2
CONTROL HEAD KITS					
Single Top Mount, Control Head Kit	CH6810NT	1	-	-	-
Single Top Mount, Control Head Kit, with Trim	CH6810	-	1	-	-
Dual Top Mount Control Head Kit	CH6800NT	-	-	1	-
Dual Top Mount Control Head Kit, with Trim	CH6800	-	-	-	1
HARNESSES/TEES					
NMEA Communication Kit (2 tees, 1 male and 1 female terminator)	CM20001	1	1	1	1
Single CanBus Tee	CM10060	-	-	1	1
Micro C Ext, M-F (6ft CAN bus harness)	CM10006	1	1	1	1
Micro C Ext, M-F (12ft CAN bus harness)	CM10012	1	1	1	1
Micro C Ext, M-F (20ft CAN bus harness)	CM10020	1	1	1	1
MANUALS					
Book # 79 i7700 User Manual (stand alone)	710465	1	1	1	1
Book # 77 i7700 Installation Manual	710351	1	1	1	1
Quick Ref. – Single	710038	1	1	-	-
Quick Ref. – Dual	710013	-	-	1	1
OPTIONAL ACCESSORIES					
Dual trim switch panel for independent operation	HA5491	-	-	-	-

Additional Stations Kits	Kit Part #	i7711A	i7751A	i7712A	i7752A
		Single Engine	Single Engine with Trim	Dual Engine	Dual Engine with Trim
CONTROL HEAD KITS					
Single Top Mount, Control Head Kit	CH6810NT	1	-	-	-
Single Top Mount, Control Head Kit, with Trim	CH6810	-	1	-	-
Dual Top Mount Control Head Kit	CH6800NT	-	-	1	-
Dual Top Mount Control Head Kit, with Trim	CH6800	-	-	-	1
HARNESSES/TEES					
Single Tee	CM10060	1	1	1	1
Micro C Ext, M-F (30ft CAN bus harness)	CM10030	1	1	1	1

SHIFT AND THROTTLE ACTUATORS

The NEW i7700 actuator contains both the shift and throttle actuator within one compact housing and are not only powerful enough to manage the shift and throttle functions on the most extreme applications, they are also exceedingly responsive and robust. The actuators are linked to the control heads via a single 1/4" (6mm) CANbus cable making cable routing incredibly easy. In addition, the i7700 actuators have a mechanical back up "get home" feature which allows simple manual control should the need arise.





PT2000-1P
Pictured

PT1000-1P
Pictured

PRO TRIM CONTROLS	
Pro Trim Single Function	PT1000-1P
Pro Trim Dual Function	PT2000-1P
SERVICE ITEMS	
Replacement Switch & Decal	CA76431-1P

PRO TRIM FITS:

Any boat using one of the following SeaStar Solutions steering systems:

- Safe-T mechanical steering.
- Rack & Pinion mechanical steering.
- NFB No FeedBack steering (all helms).
- Baystar ([HH4314-3](#)).
- SeaStar hydraulic steering 1991 to date.
- SeaStar PRO hydraulic steering.
- Command 200 Rack & Pinion.

PRO TRIM:

Trim control the way it's meant to be . . . at your fingertips. With Pro Trim from SeaStar Solutions, you can keep both hands on the wheel and concentrate on your driving. Its clean, modern design looks at home in any cockpit and there are no cords to tangle around the steering wheel, a big plus for boats with hydraulic steering! The Pro Trim single-switch controls one function (engine trim or jackplate). Pro Trim Dual controls two functions (trim and jackplate).

APPLICATION:

Engine trim control — single or dual function. Control any one of these functions . . . Engine Trim/Tilt, Jackplate, Horn. . . or any two with Pro Trim Dual! Pro Trim is a “bolt-on” for most SeaStar Solutions steering systems and is attractively packaged, with everything you need. Also suitable for use with Command 200 rack & pinion steering, and it's the only trim switch recommended for SeaStar® and SeaStar PRO® hydraulic steering systems!

FEATURES:

- Momentary-on switch is off in its center “at-rest” position; actuates in up and down directions.
- UV-Stabilized ABS switch cover blends with dash.
- Strong stainless steel bracket fits most steering systems and adjusts for regular or deep-dish wheels.
- Heavy duty marine wiring harness, color-coded to match existing trim and jackplate wiring.
- Durable Mylar® decals allow labelling of switch functions.
- All mounting hardware and complete, user-friendly instructions included.
- 15 Amp switch capable of handling most tilt and trim applications



PT2000-1P
Pictured

PT1000-1P
Pictured

Car like steering with SeaStar power assist



On-demand SeaStar Power Assist virtually eliminates all steering loads and provides boaters the same level of steering comfort and control found in cars.

This power assisted steering delivers exceptional performance and unparalleled levels of safety and comfort, even in the most extreme conditions.



CONTROL CABLES

CONTROL CABLES



MADE IN THE
U.S.A.

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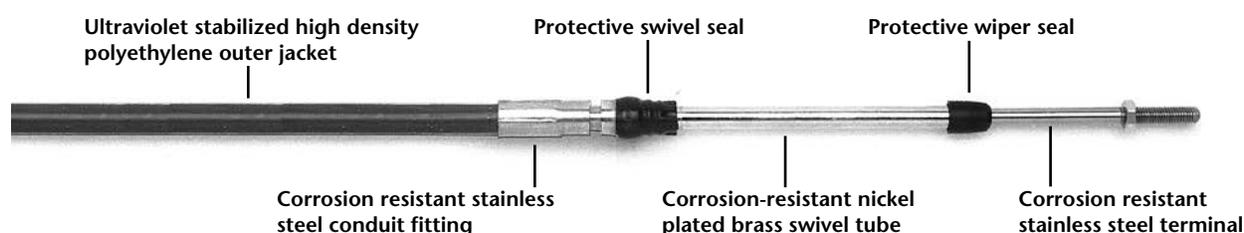
SHIFT AND THROTTLE CONTROL CABLES

The control cable is a very important component in the control system. It is the vital link between the control head and the propulsion unit. Employing the best cable helps insure that your shift and throttle system operates smoothly and efficiently. The design, technology and materials, which are used in SeaStar Solutions cables, have literally set the standard for the entire marine industry.

Our control cables are environmentally tested for marine applications. They have stainless steel terminals and conduit fittings, as well as stainless or

nylon covered core wires with moisture protective seals for added corrosion protection and longer life. Their durable HDPE outer jackets resist abrasion and withstand the effects of UV, salt water, chemicals, gasoline and oil. Each SeaStar Solutions cable is lifetime lubricated at the factory.

SeaStar Solutions pioneered the development of high efficiency control cables. Since not all cables utilize this technology there can be significant operating differences between SeaStar Solutions cables and other brands.



HOW TO CHOOSE THE RIGHT 3300/33C CABLE:

SeaStar Solutions offers several models of universal 3300/33C type cables, each suited to certain operating conditions and installation parameters. Below are key variables that affect how cables perform:

Backlash: the lost motion between the amount of movement put in (input end of the cable) and the amount of movement which occurs at the output end of the cable. Some motion is generally lost in “take up” between the inner wire (core) of the cable and the outer casing (conduit). Backlash manifests itself as free play (slop) felt at the control handle.

Efficiency: the percentage of input force that is transmitted through the cable as output force. For example, if a 10-pound force was exerted on the cable at its input end and resulted in the cable exerting an 8-pound output force, the cable would be 80% efficient.

Breakaway: the “feel” of the cable when put into motion; the breakaway threshold is the force that must be applied to the cable’s input end before something happens at the output end. An example of excessive breakaway: a control that would have to be moved to half-throttle before the engine responded.

Cable Routing: the shorter and straighter the cable routing, the better the cable will perform. With increased length and bends, cable efficiency is reduced, while breakaway and backlash rise.

Environment: generally, the more rugged the cable construction, the longer the cable will last. In harsh environments such as heavy salt and UV exposure, control cables with thicker conduits and stainless steel fittings will generally outlast those with thinner conduits and brass or steel fittings.

Cable design, manufacturing tolerances, length and installation care are additional factors to consider.

3300/33C CABLE TYPE	BACK-LASH	BREAK-AWAY/ EFFICIENCY	LONG/ COMPLEX ROUTINGS	HARSH ENVIRONMENT
CC230 Standard	Good	Good	N/A	Good
CC332 Mid-Range	Better	Better	Better	Better
CCX633 <i>xtreme</i>	Superior	Superior	Superior	Superior

WHAT TO CONSIDER WHEN SELECTING CABLES

SeaStar Solutions makes engine control cables for a wide variety of applications. We recommend their use with our controls as well as in engine manufacturers' control systems.

We offer three grades of cable: standard, midrange and **✱xtreme**.

THREE PERFORMANCE GRADES:

✱xtreme control cables can be used in any boat. They are by far the best choice for long runs, twin stations or other difficult routings with multiple cable bends.

Midrange cables are recommended for somewhat longer cable routings and heavier use than their standard counterparts.

Standard cables are suitable for most applications with short, simple cable routings.

FOUR APPLICATION TYPES:

OEM Replacement Type

SeaStar Solutions offers a direct replacement cable for almost every engine manufacturer's control. Most of our OEM type cables are available in both standard and **✱xtreme** versions.

Universal (3300/33C) Type

Universal (or 3300/33C) type throttle/shift control cables are direct replacements for many boats using aftermarket controls or most engine manufacturer's controls with the correct adapter kit. Universal 3300/33C cables can be connected to most engines. These cables are offered in all three grades: standard, midrange and **✱xtreme**.

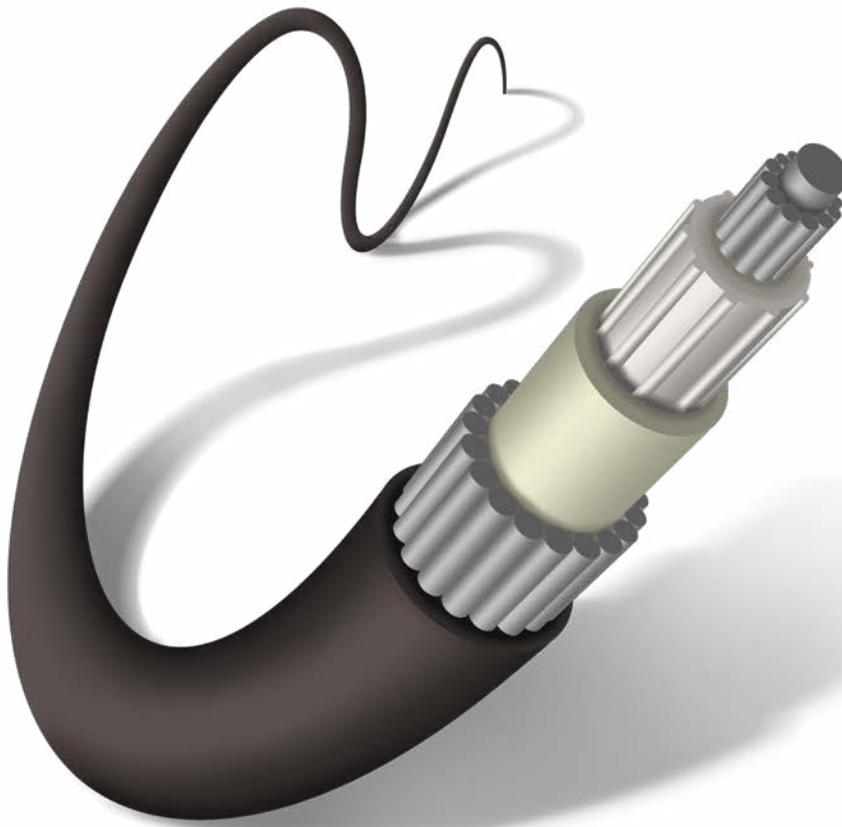
Universal (4300/43 6400/64) Types

Heavy duty universal type control cables are available in **✱xtreme** versions only. These are drop-in replacements for 43C, 43BC, 64C and 64BC style cables.

Jet Boat Gate Control Cables

Three styles of drive-specific jet boat gate control cables are available for: Mercury Sport Jet® 90 and early 120s, Sport Jet 175s and OMC Turbo Jet®. Our **✱xtreme** 43BC cable is used for shifting on most other popular jet drives. Replacement throttle control cables are generally an OEM or 3300/33C Universal type.

SeaStar Solutions control cables meet OEM specifications for fit, function, reliability and quality. They are built with marine-grade, corrosion-resistant materials and feature either **✱xtreme** premium core construction or Lubri-Core™ lifetime internal lubrication.



HOW TO MEASURE CONTROL CABLES “MEASURE TWICE. ORDER ONCE.”

FOR A NEW INSTALLATION:

Measure cable routing path from control head attachment point to engine connection, as follows:

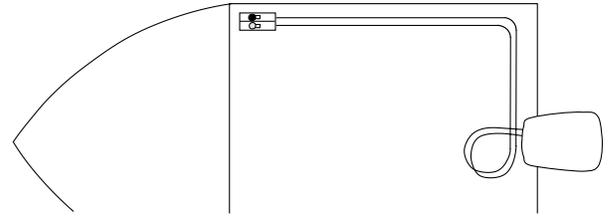
OUTBOARDS:

Measure from control along unobstructed cable routing to center of outboard. Add four feet to allow for loop, which provides unrestricted engine movement. Round up to the next foot and order required cable part number. (Last two digits of cable part number equal cable length in feet.)

INBOARDS & STERN DRIVES:

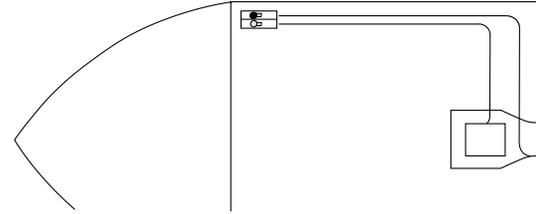
Measure from control along unobstructed cable routing to shift and/or throttle connection. Round this dimension up to the next foot and order required cable part number. (Last two digits of cable part number equal cable length in feet.)

TYPICAL OUTBOARD CABLE ROUTING:



TYPICAL OUTBOARD CABLE ROUTING
(MEASURE CABLE PATH + ROUND UP TO NEXT EVEN FOOT + ADD 4 FEET FOR LOOP AT ENGINE TO PREVENT KINKING)

TYPICAL STERN DRIVE (I/O) OR INBOARD CABLE ROUTING:



TYPICAL STERN DRIVE/INBOARD CONTROL CABLE ROUTING
(MEASURE CABLE PATH + ROUND UP TO NEXT EVEN FOOT)

FOR REPLACEMENT OF EXISTING CABLE:

If you removed the old cable, measure for replacement cable as follows:

Measure from tip to tip and round up to the next foot, if necessary (aftermarket cables are sold in foot increments up to 30 feet. After that use only even foot increments).

The control cable part number contains its length. SeaStar Solutions cables are usually listed as CC???XX, where XX = length in feet.

FOR EXAMPLE:

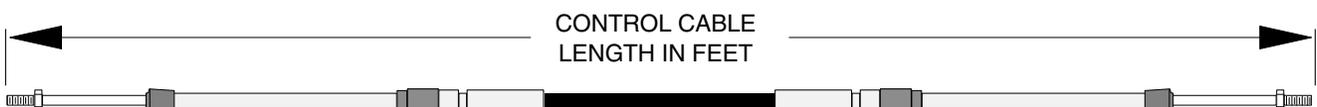
Part Number **CCX63320** = 20 ft. CCX633 Control Cable

or

Morse® Part Number *032377-03-240.0 = 20 ft. 33C Control Cable

(240" = 20')

* This cable is no longer available.
Use **CCX633XX** as a replacement





REALLY DIFFERENT

Traditional cables vary by the stiffness of the core wire and how tightly it fits in the casing. Thus, the classic trade-offs that have existed in control cable design:

A Stiffer core/tighter fit offers less lost motion, but is harder to move. With longer and more complex runs, cable movement becomes progressively more difficult.

More flexible core/looser fit has an easier feel, but allows more lost motion. This approach leads to an overall sloppy feel, RPM loss or difficult gear engagement.

These trade-offs aren't an issue for cables with  **xtreme** technology because they are different — really different!

SeaStar Solutions' unique  **xtreme** technology incorporates a patented splined core.

Ridges on the core allow a close fit with the cable's inner liner, but with minimum contact, so the core glides back and forth smoothly like a skater on ice.

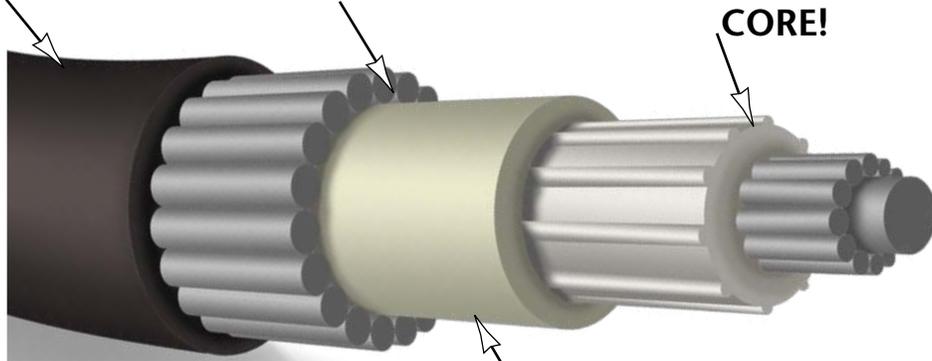
RESULT: a control cable with easy movement AND minimum lost motion.

THE CORE DIFFERENCE:

.34" Super Tough HDPE Jacket for Ultimate Protection Against the Elements.

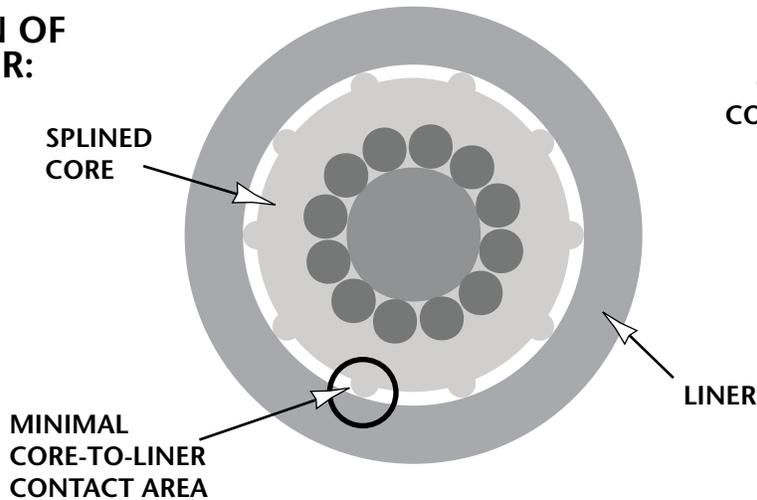
Oil Tempered Lay Wires for Superior Strength & Performance.

UNIQUE SPLINED CORE!



Long Wearing HDPE Liner: Ultra Smooth and Lubed for Life.

CROSS SECTION OF CORE AND LINER:



CORE HAS 10 CONTACT POINTS

A COMPLETE FAMILY OF CABLES:



CCX189XX
Merc Gen II type
(4000 series controls)

CCX179XX
Merc type (600A)

CCX205XX
OMC type (479)

CCX630XX
3600 Merc type

CCX633XX
3300CC type
(10-32 threaded end)

CCX430XX
4300/43BC type
(1/4-28 threaded end)

CCX433XX
4300/43CC type
(1/4-28 threaded end)

CCX640XX
6400/64BC type
(5/16-24 threaded end)

CCX643XX
6400/64CC type
(5/16-24 threaded end)

SeaStar Solutions
 **xtreme** technology cables are
 the **ONLY** high performance cable family
 with a **FULL RANGE** of universal cables and
ALL popular direct replacement OEM type cables.

OEM CABLE APPLICATIONS:

OEM direct-replacement type cables are designed to fit BRP®, Mercury®, Mariner®, OMC®, Volvo® and similar OEM engine control heads which use a proprietary control cable connection. ***xtreme** versions of the most popular cables are offered for demanding applications in which a smooth feel at the control is essential.

FOR THESE CONTROLS:

Mercury®, MerCruiser®, Mariner®, Force®, OMC®, Evinrude®, Johnson®, Volvo®, SeaStar Solutions Osprey Series CH1700, CH7500, CH7600, CH7800 and SL-3 Series.

MERCURY/MARINER/FORCE/U.S. MARINE:	
Mercury Gen II type (standard)	CC189XX
Mercury Gen II type (premium)	CCX189XX
Mariner®/Mercury®/MerCruiser® and other engines using Mercury 2003-date 4000 series controls. CCX189XX is a *xtreme cable.	
Mercury 600A type (standard)	CC179XX
Mercury 600A type (premium)	CCX179XX
Mariner®/Mercury®/MerCruiser® (1965-date); Force® (1993-date) with Mercury controls. All Mariner engines with Mercury/Mariner controls (except pre-1993 40 HP & lower models). All 1993-date Force (US Marine) with Force/US Marine/Mercury controls. CCX179XX is a *xtreme cable.	
Mariner 630 type (standard)	CC210XX
Mariner® (pre-1993 40 HP & less) with Mariner/Mercury controls.	
Mercury 3600 type (premium)	CCX630XX
Mercury® products (1965-date); Force® (1993-date) using controls which accept 10-32 threaded ends or using most aftermarket controls. Mercury style engine end connection.	
US Marine® L-Drive shift cable (std.)	CC213XX
U.S. Marine "L-Drive" engines with original equipment controls. Drop-in replacement for "L-Drive" shift cables.	

FEATURES:

- Drop-in replacement cables are engineered as replacements for original equipment cables.
- Cables use the existing connection components.
- Stainless steel and brass fittings.
- Standard cables use stainless steel Lubri-Core™ core wire for smooth operation and long life. (8" minimum bend radius.)
- Premium cables have a heavy jacket and the ***xtreme** splined, coated core element for maximum smoothness with minimal lost motion. (4" min. bend radius.)
- Black HDPE outer casing for durability and best resistance to UV and chemicals.
- Red conduit international only.

BRP, OMC, JOHNSON, EVINRUDE, VOLVO/OMC:

400 type (standard)	CC170XX
Pre-1979 OMC®/Johnson®/Evinrude® with BRP/OMC controls. Exceeds engine manufacturer's specifications.	
479 type (standard)	CC205XX
479 type (premium)	CCX205XX
1979-date BRP®/OMC®/Johnson®/Evinrude®/Gale® with BRP/OMC controls. Exceeds engine manufacturer's specifications. CCX205XX is a *xtreme cable.	
Volvo/OMC cable (premium)	CCX214XX
Volvo engines using BRP/OMC side mount controls.	
Volvo/OMC cable (premium)	CCX740XX
Volvo engines using top mount BRP/OMC controls.	



CONTROL CABLES - OEM Cross Reference

EXISTING PART NUMBER	DESCRIPTION	PART NUMBER TO REORDER		Conduit Color / End Metal
		Standard	Premium	
MERCURY/MARINER - STANDARD CABLE CC179XX	600A Series Control Cable Assembly			black/brass
6' - 9' specialty length cables (N/A - all markets) use premium * xtreme cables		N/A	CCX179XX	black/brass
10' - 24' length cables (Aftermarket)		CC179XX	GCX179XX	black/brass & stainless
10' - 24' length cables use premium * xtreme cables		N/A	CCX179XX	black/stainless
25' - up specialty length cables (N/A - all markets) use premium * xtreme cables		N/A	CCX179XX	black/stainless
CC189XX	Gen II Series Control Cable			black/brass
6' - 9' specialty length cables (N/A - all markets) use premium * xtreme cables		N/A	CCX189XX	black/brass
10' - 24' length cables (Aftermarket)		CC189XX	CCX189XX	black/brass & stainless
10' - 24' length cables use premium * xtreme cables		N/A	GCX189XX	black/stainless
25' - up specialty length cables (N/A - all markets) use premium * xtreme cables		N/A	CCX189XX	black/stainless
CC210XX	630 Mariner Series Control Cable			black/brass & stainless
6' - 9' specialty length cables (N/A - all markets)		N/A	CCX633XX & 301074	
10' - 24' length cables (Aftermarket)		CC210XX	N/A	black/brass & stainless
25' - up specialty length cables (N/A - all markets)		N/A	CCX633XX & 301074	
MERCURY/MARINER - PREMIUM CABLE CC630XX (N/A) Use CCX630XX	3600 Control Cable Assembly			black/stainless
All lengths (all markets) superseded to new part number		N/A	CCX630XX	black/stainless
CC635XX (N/A) Use CCX179XX	600A Control Cable Assembly			black/stainless
All lengths (all markets) superseded to new part number		N/A	CCX179XX	black/stainless
CC679XX (N/A) Use CCX189XX	Gen II Control Cable			black/stainless
All lengths (all markets) superseded to new part number		N/A	CCX189XX	black/stainless
BRP OMC, EVINRUDE, JOHNSON - STANDARD CABLES CC205XX	479 Series Control Cable Assembly			black/brass
6' - 9' specialty length cables (N/A - all markets) use premium * xtreme cables		N/A	CCX205XX	black/brass
10' - 24' length cables (Aftermarket)		CC205XX	GCX205XX	black/brass & stainless
25' - up specialty length cables (N/A - all markets) use premium * xtreme cables		N/A	CCX205XX	black/stainless
CC170XX	400 Series Control Cable Assembly			black/brass
6' - 24' specialty length cables (Aftermarket)		CC170XX	N/A	black/brass
25' - up specialty length cables (N/A - all markets)		N/A	N/A	
BRP OMC, EVINRUDE, JOHNSON - PREMIUM CABLES CC636XX (N/A) Use CCX205XX	479 Series Control Cable Assembly			black/stainless
All lengths (all markets) superseded to new part number		N/A	CCX205XX	black/stainless
CC214XX (N/A) Use CCX214XX	OMC, Volvo Penta, Side Mount Control Cable			black/brass
All lengths (North America Aftermarket) superseded to new part number		N/A	CCX214XX	black/brass & stainless
CC740XX (N/A) Use CCX740XX	OMC, Volvo Penta, Top Mount Control Cable			black/brass
All lengths (North America Aftermarket) superseded to new part number		N/A	CCX740XX	black/brass & stainless

NOTES

XX = Length in feet

CONTROL CABLE OPTIONS BASED ON ENGINE TYPE:

OUTBOARD ENGINES:	STANDARD GRADE USING ENG. MFR. CONTROLS	STANDARD GRADE USING AFTMKT. CONTROLS
Chrysler®	CC230XX + ball joint kit*	CC230XX + ball joint kit*
Force® pre-1993 Force® 1993-date	CC230XX + ball joint kit* CC179XX (600A type)	CC230XX + ball joint kit* CC230XX + CA27319P kit**
Johnson®/Evinrude® 1979-date Johnson®/Evinrude® pre-1979	CC205XX (479 type) CC170XX (400 type)	CC230XX + CA27320P kit** CC230XX + CA27321P kit**
Mariner® 40 HP & below pre-1993 Mariner® 40 HP & below 1993-date Mariner® all above 40 HP	CC210XX (630 type) CC179XX (600A type) CC179XX (600A type)	CC230XX CC230XX + CA27319P kit** CC230XX + CA27319P kit**
Mercury® 1965-date Mercury® products 2003-date (4000 series Gen II controls)	CC179XX (600A type) CC189XX (Gen II type)	CC230XX + CA27319P kit** N/A
Honda®, Nissan®, Suzuki®, Tohatsu®, Yamaha®	CC230XX	CC230XX

STERNDRIVE (I/O) AND SOME INBOARDS:

Chrysler®, All Inboards	CC230XX	CC230XX
MerCruiser®, All Stern Drives (except 4000 series controls) MerCruiser® 2003-date (using 4000 series controls) Mercury®, All Inboards (except 4000 series controls) Mercury® Inboards 2003-date (using 4000 series controls)	CC179XX (600A type) CC189XX (Gen II type) CC179XX (600A type) CC189XX (Gen II type)	CC230XX + CA27319P kit** N/A CC230XX + CA27373P kit** N/A
OMC® 1979-date OMC® pre-1979	CC205XX (479 type) CC170XX (400 type)	CC230XX + CA27320P kit** CC230XX + CA27321P kit**
Volvo® using Volvo® controls Volvo® using OMC® controls Volvo® Turbo, SX, new-gen OMC drives w/OMC® controls	CC230XX N/A N/A	CC230XX N/A N/A
Others	CC172XX/CC230XX	CC172XX/CC230XX

HEAVY DUTY APPLICATIONS, INCLUDING SOME INBOARD & JET ENGINES:

1/4-28 terminal, 1 bulkhead, 1 clamp fitting (43BC) 1/4-28 terminal, 2 clamp fittings (43C)	(see Premium Grade) (see Premium Grade)	(see Premium Grade) (see Premium Grade)
5/16-24 terminal, 1 bulkhead, 1 clamp fitting (64BC) 5/16-24 terminal, 2 clamp fittings (64BC)	(see Premium Grade) (see Premium Grade)	(see Premium Grade) (see Premium Grade)

JET ENGINES (MERCURY SPORT JET®, OMC TURBO JET® & SIMILAR):

Mercury® Sport Jet 90 & 120 (throttle cable) Mercury® Sport Jet 90 & early 120 (gate cable) Mercury® Sport Jet 175 (gate cable)	CC230XX + CA27319P kit** CC213XX N/A	CC230XX + CA27319P kit** CC213XX N/A
OMC® Turbo Jet (throttle control cable) OMC® Turbo Jet (gate control cable)	CC205XX (479 type) N/A	CC230XX + CA27320P kit** N/A

* Proprietary ball joint type cable adapter kit required to complete connection to the engine. This part (formerly SeaStar Solutions P/N CA27019P) is no longer available from SeaStar Solutions. Please consult with Mercury Marine for more information about Chrysler and early model Force engines using this type of cable connection.

** Cable adapter kits listed are required to complete connection to the engine. Consult engine manufacturer, dealer or distributor if kit is not listed.

General rule: use direct replacement type cable whenever possible;
use **✳xtreme** cables for difficult routings/multiple stations.

MIDRANGE GRADE USING ENG. MFR. CONTROLS	MIDRANGE GRADE USING AFTMKT. CONTROLS	PREMIUM GRADE (✳xtreme) USING ENG. MFR. CONTROLS	PREMIUM GRADE (✳xtreme) USING AFTMKT. CONTROLS
CC332XX + + ball joint kit*	CC332XX + ball joint kit*	CCX633XX + ball joint kit*	CCX633XX + ball joint kit*
N/A	CC332XX CC332XX + CA27319P**	CCX633XX + ball joint kit* CCX179XX (600A type)	CCX633XX + ball joint kit* CCX630XX
N/A	CC332XX + CA27320P** CC332XX + CA27319P**	CCX205XX (479 type) N/A	CCX633XX + CA27320P kit** CCX633XX + CA27321P kit**
N/A	** (For connection kit number see premium grade listing at right for same engine/control.)	N/A	CCX633XX
N/A		CC332XX	CCX630XX
N/A		CC332XX + CA27319P**	CCX630XX
N/A		CC332XX + CA27319P**	CCX630XX
N/A	CC332XX + CA27319P**	CCX179XX (600A type) CCX189XX (Gen II type)	CCX630XX N/A
N/A	CC332XX**	CCX633XX/✳xtreme **	CCX633XX**
CC332XX	CC332XX	CCX633XX	CCX633XX
N/A	CC332XX	CCX179XX (600A type) CCX189XX (Gen II type)	CCX630XX N/A
N/A	** (For connection kit number see premium grade listing at right for same engine/control.)	CCX179XX (600A type) CCX189XX (Gen II type)	CCX630XX N/A
N/A		CC332XX	CCX630XX
N/A		CC332XX	CCX630XX
N/A		CC332XX	CCX630XX
N/A	CC332XX	CCX205XX (479 type) N/A	CCX633XX + CA27320P kit** CCX633XX + CA27321P kit**
CC332XX**	CC332XX**	CCX633XX	CCX633XX
N/A	N/A	CCX214XX*** or CCX740XX	N/A
N/A	N/A	CCX214XX*** or CCX740XX	N/A
CC332XX	CC332XX	CCX633XX	CCX633XX
(see Premium Grade)	(see Premium Grade)	CCX430XX (replaces Morse® 43BC)	CCX430XX (replaces Morse® 43BC)
(see Premium Grade)	(see Premium Grade)	CCX433XX (replaces Morse® 43CC)	CCX433XX (replaces Morse® 43CC)
(see Premium Grade)	(see Premium Grade)	CCX640XX (replaces Morse® 64BC)	CCX640XX (replaces Morse® 64BC)
(see Premium Grade)	(see Premium Grade)	CCX643XX (replaces Morse® 64CC)	CCX643XX (replaces Morse® 64CC)
CC332XX + CA27319P kit**	CC332XX + CA27319P**	CCX630XX	CCX630XX
N/A	N/A	N/A	N/A
CC400XX	CC400XX	N/A	N/A
N/A	CC332XX + CA27320P**	CCX205XX (479 type)	CCX633XX + CA27320P kit**
N/A	CC332XX	CCX214XX*** or CCX740XX***	CCX633XX

*** Cable part numbers shown are for OMC side-mount controls (CCX214XX); OMC binnacle-top mount controls (CCX740XX).

NOTE: Most control cables are available in lengths from 6 to 50 feet. See the SeaStar Solutions list price sheet for current offering. Where Part Numbers are indicated, XX = length in feet for SeaStar Solutions cables. Lengths above 30 feet are only available in two-foot increments (32, 34, 36, etc.)

UNIVERSAL 3300/33C APPLICATIONS:

Universal type cables are designed to fit aftermarket engine controls as well as OEM units from BMW®, Chrysler®, Honda®, Nissan®, Suzuki®, Volvo®, Yamaha® and others. Several versions of the 3300/33C type are available, including a **xtreme** model.

xtreme versions of the 3300/33C cables are offered for demanding applications in which a smooth feel at the control is essential.

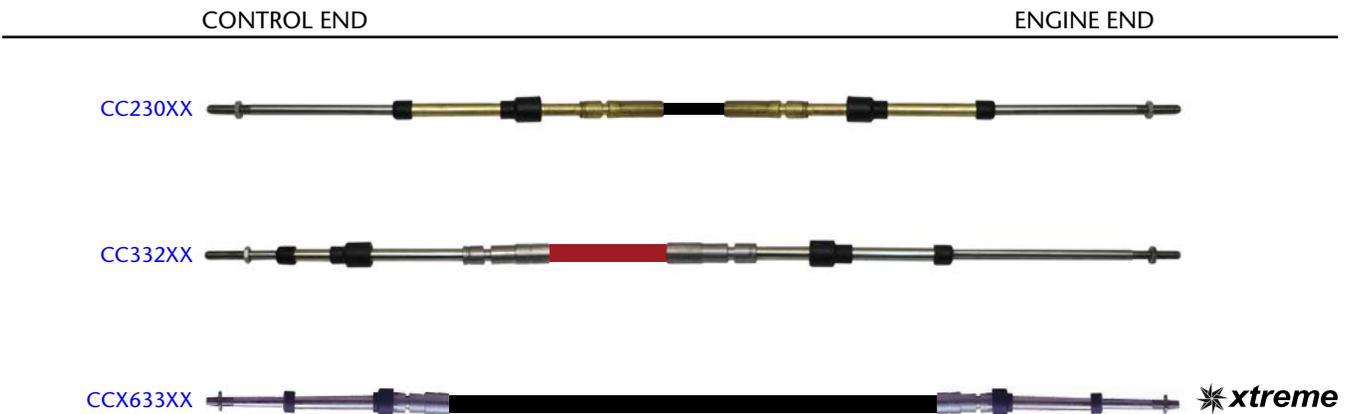
3300/33C TYPES (10-32 ENDS):		
3300 cable (standard)	CC230XX	Stainless Fittings
Cable has a 10-32 threaded terminal and a clamp-type fitting at each end. 3" nominal travel.		
33C cable (midrange)	CC332XX	Red Conduit
Cables have a 10-32 threaded terminal and a clamp-type fitting at each end. 3" nominal travel.		
xtreme		
3300 cable (premium)	CCX633XX	Stainless Fittings
Cable has a 10-32 threaded terminal and a clamp-type fitting at each end. 3" nominal travel. 4" minimum bend radius.		

FEATURES:

- Cables can use the existing connection components.
- Stainless steel and brass fittings.
- Standard cables use stainless steel Lubri-Core™ core wire for smooth operation and long life. (8" minimum bend radius.)
- Midrange cables use a heavier jacket and a stainless steel Lubri-Core™. (8" minimum bend radius for Lubri-Core construction)
- Premium 3300/33C cables have a heavy jacket and the **xtreme** splined, coated core element for maximum smoothness with minimal lost motion. (4" min. bend radius.)
- Black HDPE outer casing for durability and best resistance to UV and chemicals.

FOR THESE CONTROLS:

SeaStar Solutions and other brands which accept "universal" type control cables.

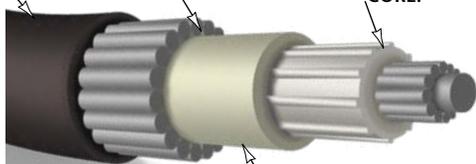


CABLE CONSTRUCTION

THE CORE DIFFERENCE:
.34" Super Tough HDPE Jacket for Ultimate Protection Against the Elements.

Oil Tempered Lay Wires for Superior Strength & Performance.

UNIQUE SPLINED CORE!



xtreme

Long Wearing HDPE Liner: Ultra Smooth and Lubed for Life.



CONSTRUCTION CC230XX

- 16 Lay wires.
- Stainless Steel conduit fittings.

CONTROL CABLES - Universal 3300/33C

EXISTING PART NUMBER	DESCRIPTION	PART NUMBER TO REORDER		Conduit Color / End Metal
		Standard	Premium	
CC230XX/CC172XX*	3300 Series Control Cable Assembly			CC230XX black/ stainless CC172XX black/brass
6' - 9' specialty length cables (N/A - all markets) use premium * xtreme cables		N/A	CCX633XX	black/stainless
10' - 24' length cables (Aftermarket Only)		CC230XX	CCX633XX	CC230XX black/stainless CC172XX black/ brass CCX633XX black/stainless
25' - up specialty length cables (N/A - all markets) use premium * xtreme cables		N/A	CCX633XX	black/stainless
CC330XX	3300 Series Control Cable Assembly			black/stainless
6' - 9' specialty length cables (N/A - all markets) use premium * xtreme cables		N/A	CCX633XX	black/stainless
10' - 24' length cables		CC332XX	CCX633XX	CC332XX red/stainless CCX633XX black/stainless
25' - up specialty length cables (N/A - all markets) use premium * xtreme cables		N/A	CCX633XX	black/stainless
032377-03-XXX.0	33C Control Cable			black/stainless red/stainless
6' - 9' specialty length cables (N/A - all markets) use premium * xtreme cables		N/A	CCX633XX	CCX633XX black/stainless
10' - 24' length cables (N/A - Aftermarket)		CC332XX	CCX633XX	CCX633XX black/stainless
10' - 24' length cables use premium * xtreme cables		N/A	CCX633XX	CCX633XX black/stainless
25' - up specialty length cables (N/A - all markets) use premium * xtreme cables		N/A	CCX633XX	CCX633XX black/stainless
301947-03-XXX.0	33C Supreme Control Cable			CCX633XX black/stainless red/stainless
All lengths (N/A - North America Aftermarket) use premium * xtreme cables		N/A	CCX633XX	black/stainless
CC633XX	3300 Premium * xtreme Control Cable Assembly			black/stainless
All lengths (N/A - all markets) superseded to new part number		N/A	CCX633XX	black/stainless

NOTES

XX = Length in feet

Red text denotes red conduit cable

* CC172xx is replaced by CC230xx

3300/33C type cables (10-32 end threads)

Engines and connection kits that accept a 10-32 threaded end may require a connection kit from SeaStar Solutions or the engine manufacturer

N/A = No Longer Available

UNIVERSAL 4300/43 & 6400/64 APPLICATIONS:

Universal type cables are designed to fit aftermarket engine controls as well as OEM units from BMW®, Chrysler®, and others. For heavy duty applications, SeaStar Solutions offers 4300/43 and 6400/64 series **xtreme** cables.

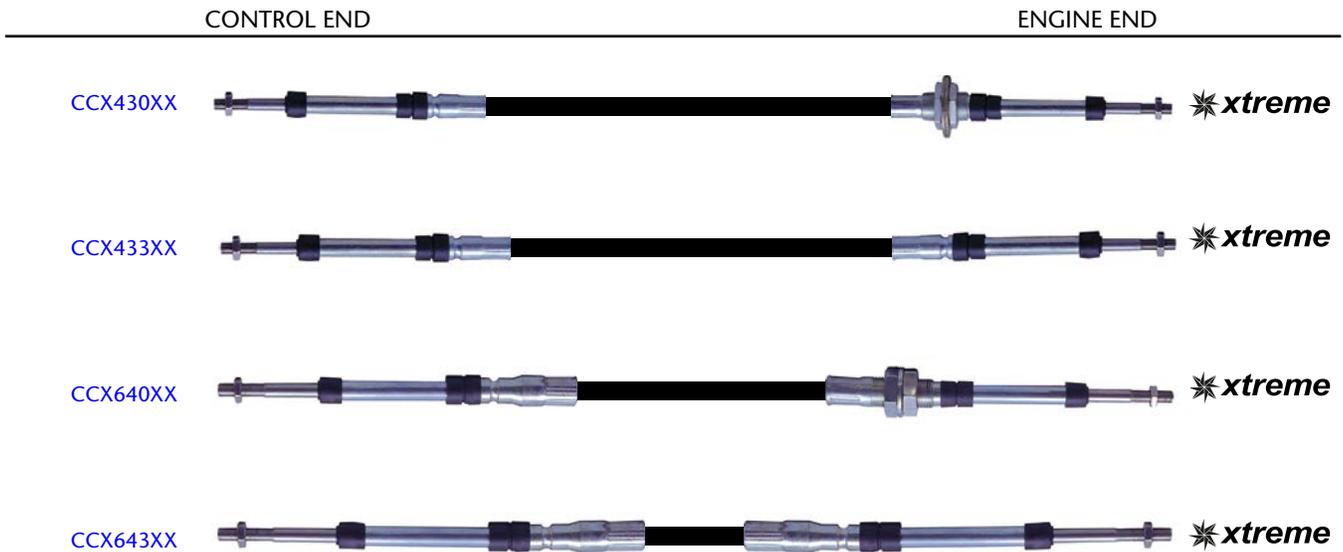
4300/43 TYPES (1/4-28 ENDS):	
xtreme 4300 BC cable	CCX430XX
Cable has one bulkhead and one clamp fitting. There is a 1/4-28 threaded terminal at each end. 3" nominal travel. 5" minimum bend radius.	
xtreme 4300 CC cable	CCX433XX
Cable has a 1/4-28 threaded terminal and a clamp-type fitting at each end. 3" nominal travel. 5" minimum bend radius.	
6400/64 TYPES (5/16-24 ENDS):	
xtreme 6400 BC cable	CCX640XX
Cable has one bulkhead and one clamp fitting. One 5/16-24 threaded terminal at each end. 4" nominal travel. 8" minimum bend radius.	
xtreme 6400 CC cable	CCX643XX
Cable has a 5/16-24 threaded terminal and a clamp-type fitting at each end. 4" nominal travel. 8" minimum bend radius.	
*NOTE: 64 Series cables cannot be replaced by 63 Series cables.	

FEATURES:

- 4300/43 type cables have stainless steel conduit fittings. (5" minimum bend radius.)
- 6400/64 type cables have stainless steel conduit fittings. (8" minimum bend radius.)
- Black HDPE outer casing for durability and best resistance to UV and chemicals.
- Cables meet/exceed all applicable industry standards

FOR THESE CONTROLS:

SeaStar Solutions® and other brands which accept "universal" type control cables.



4300/43 TYPE HEAVY-DUTY CABLES

EXISTING PART NUMBER	DESCRIPTION	PART NUMBER TO REORDER		Conduit Color / End Metal
		Standard	Premium	
CC692XX (N/A)*	✳️ xtreme 4300BC Control Cable Assembly			black/stainless
All lengths (all markets) superceded to premium ✳️ xtreme cable		N/A	CCX430XX*	black/stainless
CC693XX (N/A)*	✳️ xtreme 4300CC Control Cable Assembly			black/stainless
All lengths (all markets) superceded to premium ✳️ xtreme cable			CCX433XX*	black/stainless

6400/64 TYPE HEAVY-DUTY CABLES

EXISTING PART NUMBER	DESCRIPTION	PART NUMBER TO REORDER		Conduit Color / End Metal
		Standard	Premium	
CC694XX (N/A)*	✳️ xtreme 6400BC Control Cable Assembly			black/stainless
All lengths (all markets) superceded to premium ✳️ xtreme cable		N/A	CCX640XX*	black/stainless
CC695XX (N/A)*	✳️ xtreme 6400CC Control Cable Assembly			black/stainless
All lengths (all markets) superceded to premium ✳️ xtreme cable		N/A	CCX643XX*	black/stainless

NOTES

XX = Length in feet

4300/43 type cables (1/4-28 end thread) + 3" Travel

6400/64 type cables (5/16-24 end thread) + 4" Travel

64 Series cables cannot be replaced by 63 Series cables.

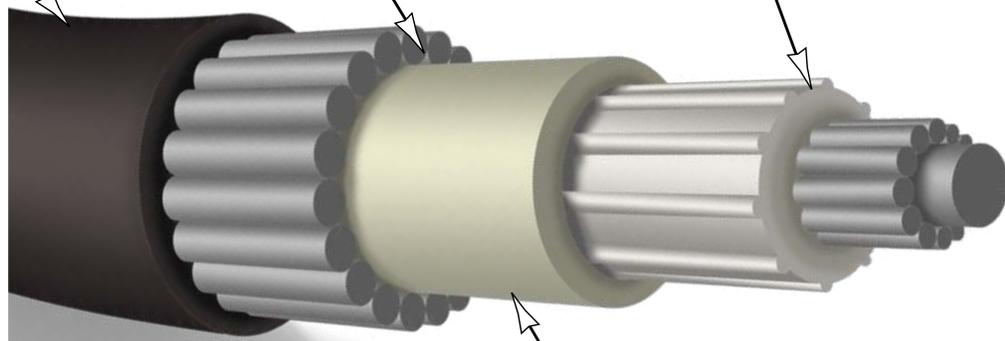
*Part Number Change Only.

THE CORE DIFFERENCE:

.34" Super Tough HDPE Jacket for Ultimate Protection Against the Elements.

Oil Tempered Lay Wires for Superior Strength & Performance.

UNIQUE SPLINED CORE!



Long Wearing HDPE Liner: Ultra Smooth and Lubed for Life.

BRP/OMC TURBO JET®:**THROTTLE CABLES:**479 type cable (✱**xtreme**) [CCX205XX](#)479 type cable (standard) [CC205XX](#)

For OMC Turbo Jets with OMC side mount controls that accept OMC "snap in" O.E.M. type cable. Drop-in replacement cable; uses existing connection components.

GATE CABLES:Turbo Jet cable (✱**xtreme**) [CCX214XX](#)

For OMC Turbo Jets with OMC **side mount** controls that accept OMC "snap in" O.E.M. type cable. Drop-in replacement cable; uses existing connection components.

Turbo Jet cable (✱**xtreme**) [CCX740XX](#)

For OMC Turbo Jets with OMC **top mount** controls that accept OMC "snap in" O.E.M. type cable. Drop-in replacement cable; uses existing connection components.

THROTTLE/GATE CABLES (10-32):3300/33C cable Use [CCX633XX XTREME](#)

(For OMC Turbo Jets with OMC binnacle mount, SeaStar Solutions or other controls that accept a cable with 10-32 threaded ends. Drop-in replacement cable; uses existing connection components.)

FOR THESE CONTROLS:

Mercury SportJet®, OMC TurboJet® SeaStar Solutions®

*CH2300, MV-3 and others

MERCURY SPORT JET®:**THROTTLE CABLES:**3300 cable (standard) [CC230XX](#)33C cable (midrange) [CC332XX](#)3300 cable (✱**xtreme**) [CCX633XX](#)

3300/33C cables are for Mercury Sport Jets with controls that accept a cable with 10-32 threaded ends. Drop-in replacement cable; requires connection kit #[CA27319P](#) for engine end.

Mercury 3600 type cable (✱**xtreme**) [CCX630XX](#)

Cable has a 10-32 threaded terminal at control end and Mercury type engine end. CA27319 kit is **not** required.

GATE CABLES:Sport Jet 90 & early 120 (standard) [CC213XX](#)

For Mercury Sport Jets with controls which accept a cable with 10-32 threaded ends. Drop-in replacement cable; uses existing connection components.

175 HP:Sport Jet 175 (midrange) [CC400XX](#)

For Mercury Sport Jets with controls which accept a 40BC high-load, stainless steel cable with 1/4-28 threaded end at the control. Drop-in replacement; uses existing connection components.

* CH2300 Control only uses 3300/33C style cable for both throttle and shift.

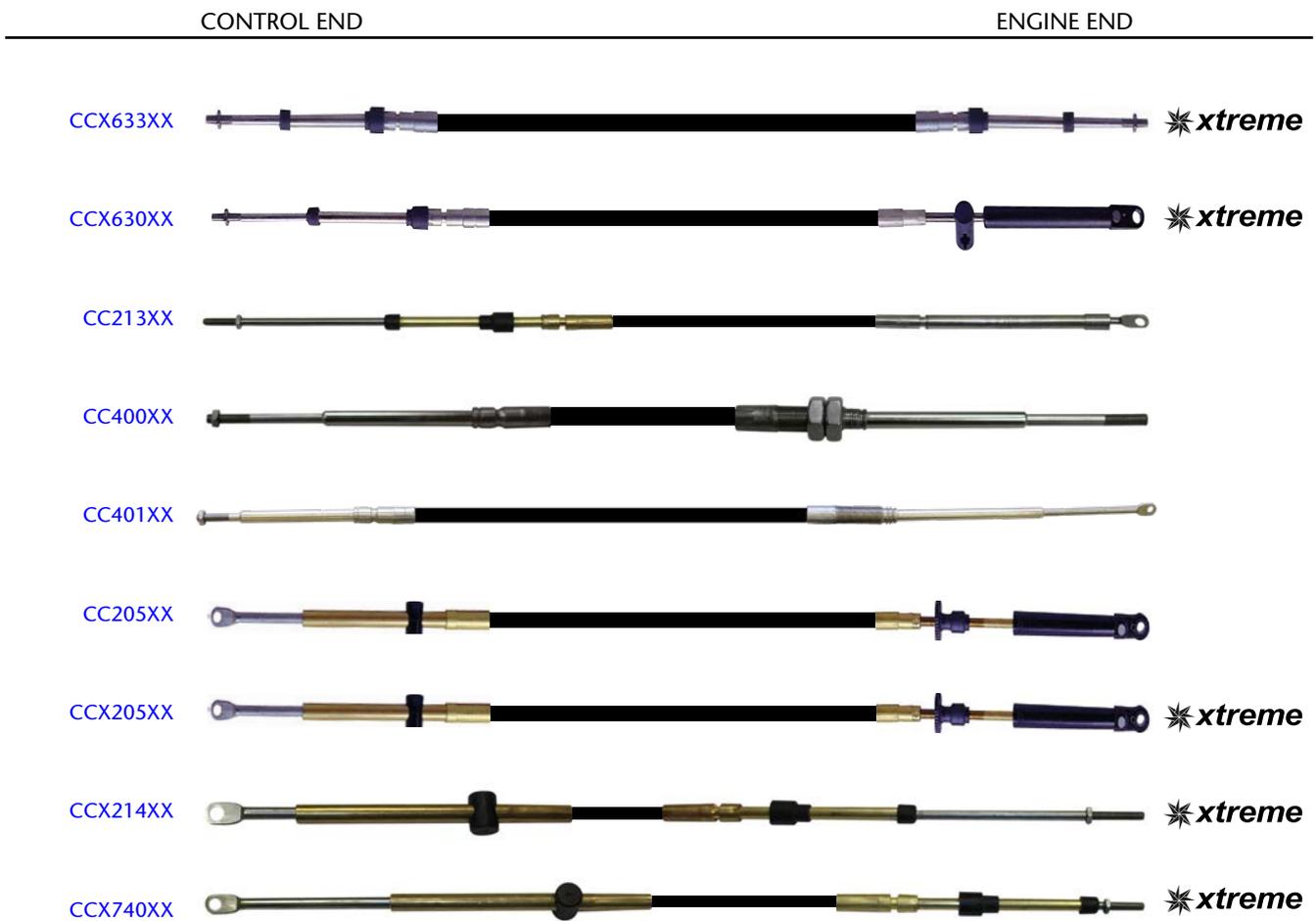
JET BOAT APPLICATIONS:

Just for Jets! Two families of jet boat control cables are available for replacement of Mercury Sport Jet® and OMC Turbo Jet® throttle and reverse-gate cables. ✱**xtreme** versions of the three most popular cables are offered for demanding applications in which a smooth feel at the control is essential.

FEATURES:

- Drop-in replacement cables are engineered as replacements for original equipment cables.
- Cables use the existing connection components.
- Stainless steel and brass fittings.
- Standard cables use stainless steel Lubri-Core™ core wire for smooth operation and long life. (8" minimum bend radius.)
- Midrange cables use a heavier jacket and a stainless steel Lubri-Core™. (8" minimum bend radius for Lubri-Core construction)
- Premium cables have a heavy jacket and the ✱**xtreme** splined, coated core element for maximum smoothness with minimal lost motion. (4" min. bend radius.)
- 4300/43 type cables have stainless steel conduit fittings. (5" minimum bend radius.)
- Black HDPE outer casing for durability and best resistance to UV and chemicals.

EXISTING PART NUMBER	DESCRIPTION	PART NUMBER TO REORDER		Conduit Color / End Metal
		Standard	Premium	
311748-00-XXX.0 N/A	40BC Mercury (9-21 feet) Control Cable	CC400XX	N/A	black/stainless
All lengths (all markets) superceded to new part number	Theaded Terminal Control End	CC400XX	N/A	black/stainless
312240-00-XXX.0 N/A	Mercury Sport Jet Control Cable	CC401XX	N/A	black/stainless
All lengths (all markets) superceded to new part number	Eye Terminal Control End	CC401XX	N/A	black/stainless
CC213XX	Jet Boat Shift Control Cable	CC213XX	N/A	black/brass
All lengths (all markets)		CC213XX	N/A	black/brass & stainless
CC692XX N/A	*xtreme 4300 BC Control Cable Assembly	N/A	CCX430XX	black/stainless
All lengths (all markets) superceded to premium *xtreme cable		N/A	CCX430XX	black/stainless
CC694XX N/A	*xtreme 6400BC Control Cable Assembly	N/A	CCX640XX	black/stainless
All lengths (all markets) superceded to premium *xtreme cable		N/A	CCX640XX	black/stainless
<p>NOTES XX = Length in feet N/A = No Longer Available</p>				



UTILITY & VERNIER APPLICATIONS:

UTILITY:	
WITH KNOB AND T-HANDLE:	
Utility Cable (5')	CC34305
Utility Cable (10')	CC34310
Utility Cable (15')	CC34315
Utility Cable (20')	CC34320
Utility Cable (25')	CC34325
Utility Cable (30')	CC34330
Utility Cable (35')	CC34335
Utility Cable (40')	CC34340
VERNIER:	
The vernier cable requires ordering 2 part numbers: a Vernier Cable Head (which includes knob, button, panel body and fine adjustment mechanism) PLUS a Cable, which attaches to the Cable Head.	
Vernier Cable Head	317310
Vernier Cable (5')	CC34505
Vernier Cable (10')	CC34510
Vernier Cable (15')	CC34515
Vernier Cable (20')	CC34520
Vernier Cable (25')	CC34525
Vernier Cable (30')	CC34530
Vernier Cable (35')	CC34535
Vernier Cable (40')	CC34540
CONDUIT FITTING KITS:	
Use these (formerly known as Hub Adapter Kits) to mount utility cables to mount in either bulkhead or clamp type applications.	
Bulkhead Adapter Kit	300673
Clamp Adapter Kit	302485
Stop Collar	037693
DC CONTROL:	
Converts standard 3300/33C cable into a utility control. Install through a panel or mount nearly anywhere with optional bracket.	
DC Control	301916
Uses CCX633XX *	3300/33C Type Cable
Mounting Bracket (stainless steel)	048210

* CCX633 is the recommended 3300/33C cable for use with the DC control

UTILITY CABLE:

An easy-to-install, easy to operate, flexible push-pull cable for remote control of choke, throttle, shut off, fuel valves, vents and many other applications.

- Available with both knob and T-handle.
- Solid stainless steel core wire resists corrosion, moves easily in HDPE liner.
- HDPE outer casing for durability and best resistance to UV and chemicals.

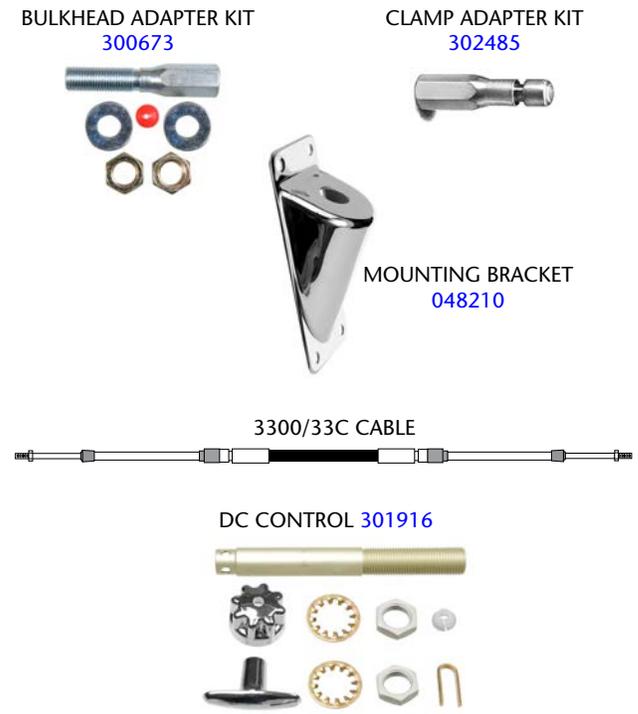
VERNIER CABLE:

Great for throttles or other applications where precise control is desired. Push the button for fast easy setting of approximate position, then turn the knob for micro adjustment.

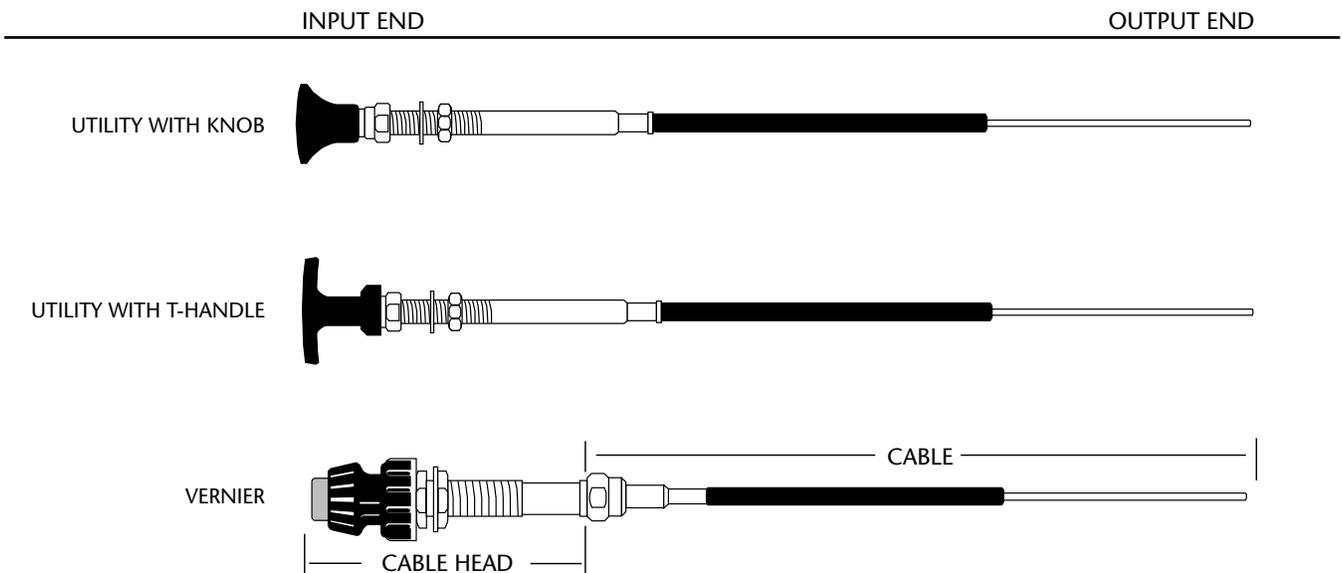
- Positive, adjustable brake maintains settings regardless of vibration or governor back pressure.
- HDPE outer casing for durability and best resistance to UV and chemicals.

FOR USE ON:

Remote control of choke, governor, throttle, fuel valves, vents and other applications.



EXISTING PART NUMBER	DESCRIPTION	PART NUMBER TO REORDER		Conduit Color / End Metal
		Standard	Premium	
018872-00-XXX.0	33LU Utility Control Cable w/Knob	CC343XX*	N/A	black/brass
All lengths (NLA - all markets)		CC343XX*	N/A	black/brass
018873-00-XXX.0	33LU Utility Control Cable w/T-handle	CC343XX*	N/A	black/brass
All lengths (NLA - all markets)		CC343XX*	N/A	black/brass
043820-03-XXX.0	33LPL Control Cable, No Hub	N/A	N/A	black/brass
All lengths (NLA - all markets)		OBSOLETE	N/A	
307141-00-XXX.0	33LV Vernier Control Cable No Hub	CC345XX **	N/A	black/aluminum
All lengths (NLA - all markets)		CC345XX **	N/A	black/aluminum
307941-003	Vernier Cable Head	317310***	N/A	N/A
No longer available all markets		317310***	N/A	N/A
<p>NOTES</p> <p>XX = Length in feet</p> <p>* Contains knob and t-handle</p> <p>** CC345XX cables use 317310 Vernier Control Head</p> <p>*** Part number change only</p>				



Note: The Marine Utility and Vernier control cable has a bare conduit at the output end with a .075 stainless steel wire.

CROSS-REFERENCE FOR OTHER BRANDS OF CONTROL CABLES:

NAME & MODEL NUMBER	DESCRIPTION (PART NUMBER)	REPLACEMENT (STANDARD)	REPLACEMENT (MIDRANGE)	RECOMMENDED REPLACEMENT (PREMIUM)
MORSE®:				
Type KM	Mercury 1965-date (063732-000) N/A	CC179XX	N/A	CCX179XX
Mercury Sport Jet up to 120	(310530) N/A	CC213XX	N/A	N/A
Mercury Sport Jet 175	(311748-000) N/A	N/A	CC400XX	N/A
Type OS	OMC 1979-date (048296-000) N/A	CC205XX	N/A	CCX205XX
Type O	OMC pre-1979 (302029-000) N/A	CC170XX	N/A	N/A
Type OC	OMC/Volvo new gen. (310048-000) N/A	N/A	N/A	CCX214XX (side mt.) CCX740XX (top mt)
33C	(032377-003) N/A	CC230XX	CC332XX	CCX633XX
33C Supreme	(301947-003) N/A	N/A		CCX633XX
43BC SST & 43BC	(046348-003/038013-003) N/A	N/A	N/A	CCX430XX
43C SST & 43C	(065885-003/038012-003) N/A	N/A	N/A	CCX433XX
63BC XL & 63BC*	(304263-003/037913-003) N/A (3" stroke)	N/A	N/A	N/A
64BC XL & 64BC	(304263-004/037913-004) N/A (4" stroke)	N/A	N/A	CCX640XX
63C XL & 63C*	(304262-003/037912-003) N/A (3" stroke)	N/A	N/A	N/A
64C XL & 64C	(304262-004/037912-004) N/A (4" stroke)	N/A	N/A	CCX643XX (4" stroke)
Positive Lock (3300TL)	Positive Lock (Turn-To-Lock) (043820) N/A	N/A	N/A	N/A
Utility (3300 UT)	Utility Cable (with knob) (018872-00-XXX.0) N/A	N/A	CC343XX**	N/A
Utility (3300 UT)	Utility Cable (with T-handle) (018873-00-XXX.0) N/A	N/A	CC343XX**	N/A
Vernier (3300 VC)	Vernier Cable & Head (separate) (Cable 307141-00-XXX.0 + Head 307941-03) N/A	N/A	CC345XX + Head 317310	N/A
ACCO®:				
OMTS	OMC pre-1979	CC170XX	N/A	N/A
KMTS	Mercury 1965-date	CC179XX	N/A	CCX179XX
M330L	3300CC or 33C type	CC172XX/CC230XX	CC332XX	CCX633XX
M430C	4300CC or 43C type	N/A	N/A	CCX433XX
M430CB	4300BC or 43BC type	N/A	N/A	CCX430XX
M640C	6400CC or 64C type	N/A	N/A	CCX643XX

* 64 Series cables cannot be used as replacements for 63 Series cables.

N/A = No Longer Available

** Has both round and T-handle knobs.

General rule: use direct replacement type cable whenever possible;
use **xtreme** cables for difficult routings/multiple stations.

NAME & MODEL NUMBER	DESCRIPTION (PART NUMBER)	REPLACEMENT (STANDARD)	REPLACEMENT (MIDRANGE)	RECOMMENDED REPLACEMENT (PREMIUM)
HI-LEX® (TSK):				
CC33-30-00	3300CC or 33C type	CC230XX	CC332XX	CCX633XX
MERCURY®, MOST MARINER®, LATE MODEL FORCE®:				
Control Cable	(C34555A)	CC179XX	N/A	CCX179XX
Mercury Sport Jet	Mercury Sport Jet 120 HP & lower	CC213XX	N/A	N/A
NW CONTROLS®:				
O Style	OMC pre-1979 (A5119)	CC170XX	N/A	N/A
O2 Style	OMC 1979-date (A6523)	CC205XX	N/A	CCX205XX
M3 Style	Mercury 1965-date (A5153)	CC179XX	N/A	CCX179XX
WW Style	CC172 type (A5124)	CC230XX	CC332XX	CCX633XX
Series 75 W-W	CC330/33C type (A5797)	CC230XX	CC332XX	CCX633XX
Series 95 W-W	33C performance cable (A5805)	N/A		CCX633XX
Series 125 W-W	43C type (A5773)	N/A	N/A	CCX433XX
Series 125 W-WB	43BC type (A5804)	N/A	N/A	CCX430XX
Series 185 W-W	64CC type (A6057)	N/A	N/A	CCX643XX (4" stroke)
Series 185 WB-WB	64BC type (A6064)	N/A	N/A	CCX640XX (4" stroke)
OMC®, BRP®, EVINRUDE®, JOHNSON®, GALE®:				
Long-Life Cable	OMC 1979-date (3773-) (3798-)	CC205XX	N/A	CCX205XX
Snap-In Cable	OMC pre-1979 (1731-)	CC170XX	N/A	N/A
OMC/Volvo New Gen	With OMC controls (M-10)	N/A	N/A	CCX214XX (side mount) CCX740XX (top mount)
VOLVO®:				
Volvo Old Style	With controls that accept 10-32 end	CC230XX	CC332XX	CCX633XX
OMC/Volvo New Gen.	With OMC controls (M-10)	N/A	N/A	CCX214XX (side mount)
OMC/Volvo New Gen.	With OMC controls (M-10)	N/A	N/A	CCX740XX (top mount)

SEASTAR SOLUTIONS UNIVERSAL CONTROL CABLES IDENTIFICATION GUIDE:

STANDARD	MIDRANGE	PREMIUM
3300/33 UNIVERSAL (10-32 ENDS)	3300/33 UNIVERSAL (10-32 ENDS)	3300/33 UNIVERSAL (10-32 ENDS)
** CC172XX/CC230XX	CC332XX	CCX633XX
	CC199XX (N/A) USE PREMIUM CABLE	CCX633XX
	CC223XX (N/A) USE PREMIUM CABLE	CCX633XX
	CC215XX (N/A) USE PREMIUM CABLE	CCX633XX
4300/43 UNIVERSAL (1/4-28 ENDS)	4300/43 UNIVERSAL (1/4-28 ENDS)	4300/43 UNIVERSAL (1/4-28 ENDS)
038012-03-LENGTH 43C (N/A)	065885-03-LENGTH 43C (N/A)	CCX433XX (4300CC)
CC193XX (4300CC) (N/A) CC693XX (4300CC) (N/A)	USE PREMIUM CABLE	CCX433XX (4300CC)
038013-03-LENGTH 43BC (N/A)	046348-03-LENGTH 43BC (N/A)	CCX430XX (4300BC)
CC192XX (4300BC) (N/A) CC692XX (4300BC) (N/A)	USE PREMIUM CABLE	CCX430XX (4300BC)
311748-00-LENGTH 40BC 175 JET CABLE (N/A)	USE CC400XX	N/A
63/6400/64 SERIES (5/16-24 ENDS)	63/6400/64 SERIES "XL" (5/16-24 ENDS)	6400/64 SERIES (5/16-24 ENDS)
037912-03-LENGTH 63C (N/A)	304262-03-LENGTH 63CXL (N/A)*	N/A
037912-04-LENGTH 64C (N/A)	304262-04-LENGTH 64CXL (N/A)	CCX643XX (6400CC)
CC195XX (6400CC) (N/A) CC695XX (6400CC) (N/A)	USE PREMIUM CABLE	CCX643XX (6400CC)
037913-03-LENGTH 63BC (N/A)	304263-03-LENGTH 63BCXL (N/A)*	N/A
037913-04-LENGTH 64BC (N/A)	304263-04-LENGTH 64BCXL (N/A)	CCX640XX (6400BC)
CC194XX (6400BC) (N/A) CC694XX (6400BC) (N/A)	USE PREMIUM CABLE	CCX640XX (6400BC)
NOTE: N/A = "No Longer Available"; N/A = "Not Available".		
* 64 Series control cables cannot replace 63 Series cables.		
** CC172 is no longer available. Replaced directly by CC230XX		

N/A = No Longer Available

CONTROL CONNECTION KITS

OEM Control-Specific Connection Kits for 3300/33C cables

Description	Part No.
Merc/Mariner Control Adapter - 3300/33C cable	301074
OMC/J/E Control Adapter - 3300/33C cable	304939



ENGINE CONNECTION KITS

Engine-Specific Connection Kits for 1973-1978 OMC OEM ("400" type) cables with bare wire ends:

Evinrude/Johnson O/B Kit (35HP & less)	CA27208P
Evinrude/Johnson O/B Kit (over 35HP)	CA27247P
OMC Stern Drive Kit (all)	CA27247P

(NOTE: included clip is not used on stern drives.)



CA27247P

Engine-Specific Connection Kits for 3300/33C cables

Evinrude/Johnson O/B Kit (1979-date)	CA27320P
Evinrude/Johnson O/B Kit (pre-1979)	CA27321P
Mercury Outboard Kit (1965-date)	CA27319P
Mercury Stern Drive Kit (all)	CA27319P
Mercury Inboard Kit (all)	CA27373P
OMC Stern Drive Kit (all)	CA27320P
Yamaha Outboard Kit	CA38383P



CA27320P

CA27373P

Universal Ball Joint Kits

Univ. 3300/33C Ball Joint (1/4-28) (1)	CA37701P
Univ. 3300/33C Ball Joint (10-32) QR (1)	031799-001
Univ. 3300/33C Ball Joint (1/4-28) QR (1)	031126
Univ. 3300/33C Ball Joint (5/16-24) QR (1)	035242
Univ. 4300/43 Ball Joint (1/4-28) (1)	CA28014P
Univ. 4300/43 Ball Joint (1/4-28) QR (1)	029104
Univ. 4300/43 Ball Joint (5/16-24) QR (1)	032267
Univ. 6400/64 Ball Joint (5/16-24) (1)	CA28021P
Univ. 6400/64 Ball Joint (5/16-24) QR (1)	029108
Univ. 6400/64 Ball Joint (5/16-24) ST (1)	038491

SeaStar Solutions Type
CA37701P



ST Type
038491



QR Type
029104



(NOTE: QR type has external spring over ball receptor; ST does not.)

CABLE CONNECTION KITS

For two cables, except where otherwise noted.
(1) = for use with one cable.

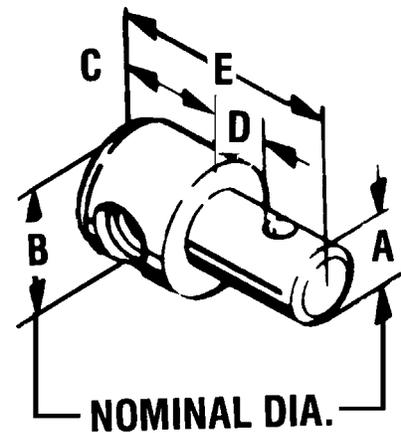
Universal Clevis Kits

Description	Part No.
Univ. 3300/33C Clevis (10-32, 1/4" pin) (1)	031125
Univ. 3300/33C Clevis (10-32, 3/16" pin) (1)	031800
Univ. 3300/33C Clevis (10-32, 5/16" pin) (1)	033395
Univ. 4300/43 Clevis (1/4-28, 1/4" pin) (1)	029025
Univ. 4300/43 Clevis (1/4-28, 5/16" pin) (1)	042212
Univ. 4300/43 Clevis (1/4-28, 3/8" pin) (1)	045985
Univ. 6400/64 Clevis (5/16-24, 5/16" pin) (1)	029132-001
Univ. 6400/64 Clevis (5/16-24, 3/8" pin) (1)	042034



Other Universal Cable Connection Kits

Pivots – 3300/33C Series:						
	A	B	C	D	E	
in	3/16	7/16	3/8	9/64	11/16	045583
mm	4.8	11.1	9.5	3.6	17.5	
in	1/4	7/16	21/64	9/64	5/8	031029
mm	6.4	11.1	8.3	3.6	15.9	
in	1/4	7/16	3/8	.191	23/32	031539
mm	6.4	11.1	9.5	4.9	18.3	
in	1/4	7/16	21/64	.295	25/32	032392
mm	6.4	11.1	8.3	7.5	19.8	
in	1/4	7/16	3/8	.316	15/16	039890
mm	6.4	11.1	9.5	8.0	23.8	
in	1/4	1/2	3/8	.376	15/16	043939
mm	6.4	12.7	9.5	9.6	23.8	
in	5/16	7/16	3/8	13/32	1-1/16	037691
mm	7.9	11.1	9.5	10.3	27.0	
in	5/16	7/16	3/8	7/16	1	039471
mm	7.9	11.1	9.5	11.1	25.4	
Pivots – 4300/43 Series:						
in	1/4	1/2	7/16	9/64	3/4	039110
mm	6.4	12.7	11.1	3.6	19.1	
in	1/4	1/2	1/2	13/64	7/8	031537
mm	6.4	12.7	12.7	5.2	22.2	
in	1/4	1/2	1/2	17/64	15/16	036361
mm	6.4	12.7	12.7	6.7	23.8	
in	5/16	1/2	9/16	9/64	29/32	045199
mm	7.9	12.7	14.3	3.6	23.0	

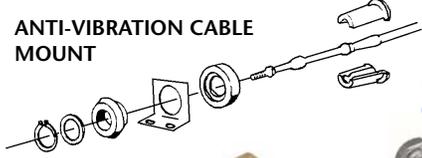


CABLE CONNECTION KITS (Cont.)

Other Universal Cable Connection Kits, continued

Description	Part No.	
3300/33C Series:		
Eye Terminal (Metal) – 3300 (10-32, 5/16" pin) (1)	317413	EYE TERMINAL 317413 
Eye Terminal (Red Nylon) – 3300 (10-32, 5/16" pin) (1)	300646	
4300/43 Series:		
Eye Terminal – 4300/43 (1/4-28, 5/16" pin) (1)	041134	
6400/64 Series:		
Eye Terminal – 6400/64 (5/16-24, 5/16" pin) (1)	045428	
Pin for Eye Terminal (1.5", 5/16" dia.) (pin only)	300965	EYE TERMINAL PIN 300965 
Terminal Pin Kit (300965, ring, nut, washer)	301456	
Univ. 3300/33C Clamp & Shim Kit (1)	CA28020P	
Univ. 3300/33C Clamp (1)	032010	CLAMP 032010 
3300/33C Clamp – 4 bolt holes (for bare conduit) (1)	037664	
3300/33C Clamp (for bare cond. or ftg.) (1)(2 Bolt)	031509	
3300/33C Clamp Shim for 032010 (1)	035777	
Univ. 4300/43 Clamp & Shim Kit (1)	CA28018P	CLAMP & SHIM KIT CA28018P 
Univ. 4300/43 Clamp – 2 Holes (1)	031532	
Heavy Duty 4300/43 Clamp – 4 Holes (1)	021227	
4300/43 Clamp Shim for 031532 & 021227 (1)	031538	
(NOTE: 2 shims required for each 021227 clamp.)		
Univ. 6400/64 Clamp & Shim Kit (1)	CA28019P	036174 031419 
Heavy Duty 6400/64 Clamp (1)	036733	
6400/64 Clamp Shim (1)	037884	
Univ. 3300/33C Inboard Connection Kit (2)	CA27024P	CA27024P 
(Above contains: (2) CA37701P Ball Joints & (2) 031419 Brackets.)		
Univ. 3300/33C Inboard Connection Bracket (1)	036174	
(Old Morse® description: "Cable Hook Clip – Single")		
Univ. 3300/33C Inboard Connection Bracket (1)	031419	
(Old Morse® description: "Cable Clip – 30 Series Only")		
Univ. 3300/33C Cable Clip DS	035531	035531 
(Old Morse® description: "Cable Hook Clip – Dual")		

Other Cable Kits/Accessories

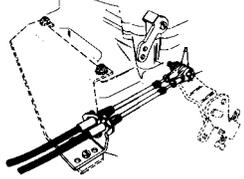
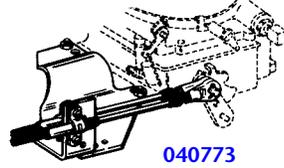
Anti-Vibration Cable Mount – 3300/33C	294200-001	ANTI-VIBRATION CABLE MOUNT 
Anti-Vibration Cable Mount – 4300/43	294201-001	
Stop Collar – 3300/33C	037693	STOP COLLAR 037693 
Cable Brake – 3300/33C, 4300/43 & 6400/64 Cables	044386	CABLE BRAKE 044386 

CABLE CONNECTION KITS (Cont.)

Conduit Fitting [Hub] Adapter Kits for Panel/Utility and Vernier Cables

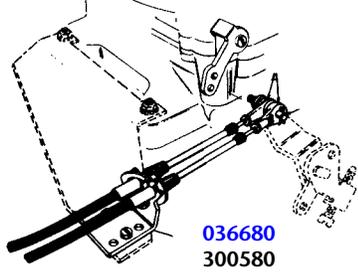
Description	Part No.	300673	302485
Bulkhead Adapter Kit – Panel Cables	300673		
Clamp Adapter Kit – Panel Cables	302485		

All-Purpose Clutch & Throttle Kits – BY PART NUMBER

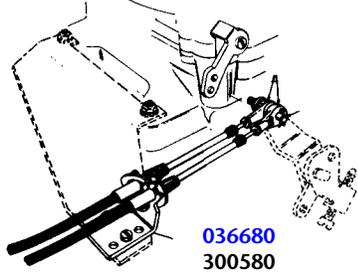
Connection Kit –3300/33C Cable	036680		
Connection Kit – 4300/43 Cable	040773		
Connection Kit – Dual Station 3300/33C (TwinDisc)	042577		
Adapter Kit –4300/43 Cable (Cummins, GM, Borg-Warner, Twin Disc)	300580		

PRE-ENGINEERED CLUTCH & THROTTLE KITS – BY ENGINE APPLICATION

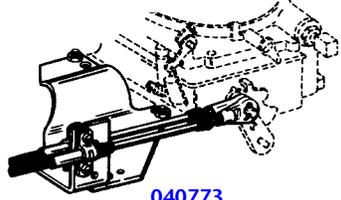
For Single Station 3300/33C Cables

Caterpillar 334, 3304 & 3306	036680	
Caterpillar 343, 3406 & 3408	036680	
Cummins (all with MVSGOV)	036680	
Cummins (V, VT, KT, KTA 1975-up)	300580	
GM (2, 3 & 4-53 w/left & right hand gov.)	036680	
GM (GV-53 rear & front entry)	036680	
GM (6 & 8V-71 front entry shutdown kit)	036680	
Universal (Atomic 4)	036680	
Universal (Atomic 1&2 63C clutch & 33C throttle)	036680	

For Dual Station 4300/43C Cables

Caterpillar 334, 3304 & 3306	036680	
Caterpillar 343, 3406 & 3408	036680	
Cummins (all with MVSGOV)	036680	
Cummins (V, VT, KT, KTA 1975-up)	300580	
GM (2, 3 & 4-53 w/left & right hand gov.)	036680	
GM (GV-53 rear & front entry)	036680	
GM (6 & 8V-71 front entry shutdown kit)	036680	
Universal (Atomic 4)	036680	
Universal (Atomic 1&2 63C clutch & 33C throttle)	036680	

To convert from 3300/33C Dual Station to 4300/43C Dual Station, add

Caterpillar 334, 3304 & 3306	040773	
Caterpillar 343, 3406 & 3408	040773	
Cummins (all with MVSGOV)	040773	

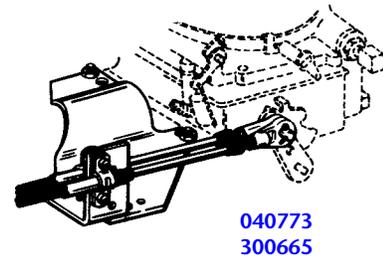
(listing continued on next page)

For two cables, except where otherwise noted. (1) = for use with one cable.

PRE-ENGINEERED CLUTCH & THROTTLE KITS – BY ENGINE APPLICATION (Cont.)

To convert from 3300/33C Dual Station to 4300/43C Dual Station, add

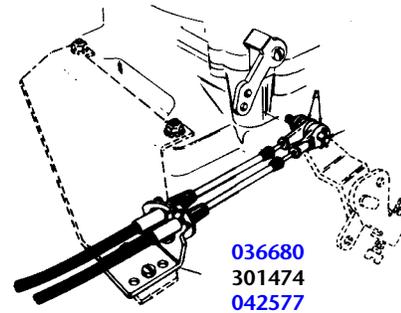
Description	Part No.
Cummins (V, VT, KT, KTA 1975-up)	300665
GM (3,4 & 6-71 w/var. spd. Gov.)	300665
GM (6, 8 & 12 V-71, 6 & 8 V-92 w/v.s.g.)	300665
GM (2, 3 & 4-53 w/left & right hand gov.)	040773
GM (GV-53 rear & front entry)	040773
GM (6 & 8V-71 front entry shutdown kit)	040773
Universal (Atomic 4)	040773
Universal (Atomic 1&2 63C clutch & 33C throttle)	040773



PRE-ENGINEERED CLUTCH & THROTTLE KITS – BY TRANSMISSION

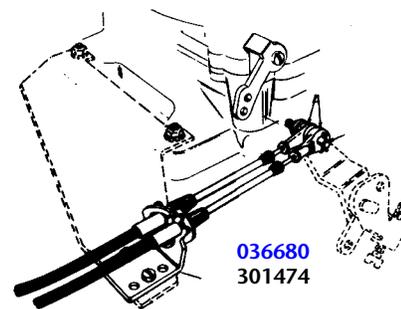
For Dual Station 3300/33C Cables

Borg-Warner (70, 71 & 72 inline-red gear)	301474
Capital (12400, 2, 3 & 4 HD & HE)	036680
Paragon (HF-7)	036680
Twin Disc (MG, 508, 509, 510, 510A, 512)	042577
Twin Disc (514C, 514CHP, 518, 521, 527)	042577
Twin Disc (530 & 540)	042577



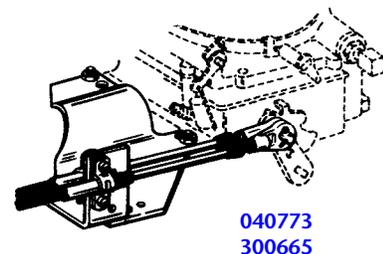
For Dual Station 4300/43C Cables

Borg-Warner (70, 71 & 72 inline-red gear)	301474
Capital (12400, 2, 3 & 4 HD & HE)	036680
Paragon (HF-7)	036680



To convert from 3300/33C Dual Station to 4300/43C Dual Station, add

Borg-Warner (70, 71 & 72 inline-red gear)	300665
Borg-Warner (71C & 72C drop center)	300665
Capital (12400, 2, 3 & 4 HD & HE)	040773
Paragon (HF-7)	040773
Twin Disc (MG, 508, 509, 510, 510A, 512)	300665
Twin Disc (514C, 514CHP, 518, 521, 527)	300665
Twin Disc (530 & 540)	300665
Twin Disc (MG502, 506 & 507)	300665



For two cables, except where otherwise noted. (1) = for use with one cable.

INSTALLATION TIPS

Control cable routing paths should be chosen to minimize bends, kinks and obstructions.

Cable routing with a few gradual bends will result in better feel at the control than one with many sharp bends.

- a. Avoid tight or sharp bends in the cable routing.
- b. Take care not to kink the jacket (casing) or core wire.
- c. Handle cable with care during installation/maintenance.
- d. Keep cable away from excessive heat and moisture. (Do not route near exhaust manifolds or in a bilge, for example.)
- e. Don't lubricate core wire (moving wire inside the casing).
- f. Make sure cable moves freely before connecting to control and engine. Keep cable ends aligned correctly.
- g. Keep cable ends dirt and corrosion free.
- h. Lubricate pivot points and sliding parts of the cable with a good quality, water-resistant grease.

When connecting the THROTTLE control cable, ensure that cable travel and feel are properly adjusted:

- a. Adjust cable position so that throttle lever movement allows the full throttle range, from idle to full speed. This can be done at the engine end of OEM type cables and at either end of "universal" type cables.
- b. Adjust lever stops in control (if so equipped) to limit lever movement to slightly less than cable travel. This adjustment will help prevent cable damage if the lever is moved beyond the cable's range of travel.
- c. Adjust cable or lever brake (if so equipped) so that lever is easy to move, but does not creep due to vibration.
- d. In twin station applications, do not engage cable or lever brake at upper station control. This will create additional drag and make the control difficult to operate.
- e. In all cases, ensure that the cable end is aligned properly with the control lever arm (control end) and throttle arm (engine end). A control cable must swivel somewhat throughout its range of movement; ensure that the cable anchor points can swivel freely throughout its range of movement.

When connecting the SHIFT control cable, ensure that cable travel and feel are properly adjusted:

- a. Adjust cable position so that shift lever movement allows the full shift range, from neutral to forward and reverse, with full engagement of forward and neutral. Ensure that control detents (if so equipped) are synchronized with transmission detents, so that lever action matches the appropriate shift arm movement at the transmission. This can be done at the engine end of OEM type cables and at either end of "universal" type cables.
- b. Adjust lever stops in control (if so equipped) to limit lever movement to slightly less than cable travel. This adjustment will help prevent cable damage if the lever is moved beyond the cable's range of travel.
- c. Don't use a cable brake or lever brake on the shift cable. The cable must have some free movement to allow the transmission's shift detents to "center" themselves.
- d. In twin station applications, do not engage the control's detents at upper station control. This will make it difficult to properly engage forward, neutral and reverse.
- e. In all cases, ensure that the cable end is aligned properly with the control lever arm (control end) and shift arm (engine end). A control cable must swivel somewhat throughout its range of movement; ensure that the cable anchor points can swivel freely throughout its range of movement.

FREQUENTLY ASKED QUESTIONS

What kind of control cables go on my boat? The boat has a [brand name] engine.

There are several ways to determine this information by noting:

- a. appearance of the cable
- b. part number of the cable
- c. engine(s) and controls on which cable is used

Take a look at the existing cable.

Usually, the part number is stamped in white on the existing cable's plastic outer casing.

If you can't locate it or read the part number, check to see what brand of control and brand/year of engine is on the boat now.

With this information, you can determine which cable you need from identification/application charts in this [catalog](#). These charts will help you identify cables by appearance, part number, control type and engine brand/type.

In most cases, SeaStar Solutions offers three performance grades, called Standard, Midrange and Premium.

For maximum performance, we recommend our Premium  **xtreme** cables.

Once the part number of the replacement control cable is known, measure the one you have now if at all possible.

Please see "How to Measure Control Cables" in this [catalog](#) and take special note of how measurements are made. The most frequent reason for the return of a new cable is that the incorrect length was ordered.

Can I use a dual function control in a dual station boat?

Yes, If you use the DS units shown on pages 193 and 194 of our [catalog](#).

If you do not use the DS units the controls will bind up.

Instead, use one single function dual lever control per engine at each station. We have several from which to choose, but recommend the [CH5600P](#) — a state-of-the-art mechanical control specifically designed to work smoothly in twin station boats.

Single function controls for twin stations are set up with the cables "in series". This means that each cable is run from one lever of an upper station control to the corresponding lever of the lower station control. Another cable is then run from the lower station control to the engine. When the cables are properly connected, moving the levers at one station will move the levers at the other station in addition to actuating throttle and shift.

Shift detents should be used in the lower station control(s) (closest to the engine) only. Do not install shift detents in the second station control.

When mechanical controls are used in two stations, we always recommend  **xtreme** cables, which are also specifically designed to work smoothly in twin station applications. When combined with CH5600 controls, these cables give you superior smoothness and response. Because of their unique construction, these cables have very little backlash, so a high-quality synchronization of the control head lever position and feel at each station (including shift detents) is possible.

If a mechanical control system cannot deliver acceptable feel or response, upgrade to an electronic control system.

FREQUENTLY ASKED QUESTIONS

I want to add a station to my boat. What do I need to do?

First determine the type of control system on your boat now. That will help you identify the options available to you.

Measure the distance between stations and approximately how you would route the cables from one station to another.

This will give you a starting point as to which components you may need and how long any cables might be.

Generally speaking, if the run between stations is relatively short and uncomplicated, mechanical controls will do.

(Please see previous FAQ for information about which kind of control is recommended and general installation parameters).

If the run between stations is long or complex, or there are more than two stations on the boat, mechanical controls are not recommended.

Use an electronic control system instead.

(Please see previous FAQ for options.)

When adding a station, a substantial amount of components will be required no matter which types of systems are selected.

If the boat has mechanical steering and controls, this is a good time to consider upgrading to SeaStar hydraulic steering and the SeaStar Solutions electronic controls.

I have a Teleflex® (SeaStar Solutions) control from 1989 and I need internal parts. Are any available?

We do not make available internal repair parts for any of our control components.

Proper field repair of these components is not possible.

The only service parts offered are those listed in this [catalog](#) on the page with each control.

Generally speaking, these are cable attachment hardware kits, neutral safety switches, handle knobs and other optional accessories.

For some control models, we do offer additional service parts.

If the repairs your control needs cannot be made, please replace it for safety reasons.

SeaStar Solutions offers the most comprehensive line of marine controls available — it is likely we have one that is a drop-in replacement (or very close to one).

An overview of our controls line and specifics on each model are shown earlier in this section.

FREQUENTLY ASKED QUESTIONS

My control used to work fine, but now one lever is hard to move. What should I do to fix this?

First, determine where the problem lies. There are three possible trouble areas: the control, the cable and the throttle or transmission connection. By isolating these one at a time, you will find the problem. Engine(s) must be OFF when performing these checks:

- Disconnect the cable at the throttle or transmission attachment point. Move the throttle or transmission arm through its arc to be certain there is no restriction or binding. If the arm is stiff or binding, clean and lubricate moving parts. If this does not solve the problem, make the appropriate repairs. Generally, the force required to move a throttle or shift arm should be no more than 5-10 pounds.
- With the cable disconnected at the engine end, try to move the control lever. If it moves freely, the problem was the throttle/transmission arm. If the control handle is still hard to operate, disconnect the cable from the control. If the lever operates smoothly, the control cable needs replacement. If the lever is still hard to move, lubricate the lever pivot point in the control with penetrating oil and a light grease.
- If the problem is with a throttle lever, you may have a cable brake installed to limit cable feedback to the handle. If this is the case, loosen or remove the brake. If throttle lever creep back is a problem on the boat, you should consider installing a SeaStar Solutions [CH5600P](#) SLT control. This unit will stop cable creep without sacrificing a smooth feel.

How Does the CH5600P Work?

Each control lever has both a self-locking and direct drive lever arm. The cable from the engine throttle directly to the control should be connected to the control's self-locking lever arm. The cable from the transmission should only be connected to the control's direct-drive lever arm. Cables between stations should only be connected to the direct drive lever arms of those controls.

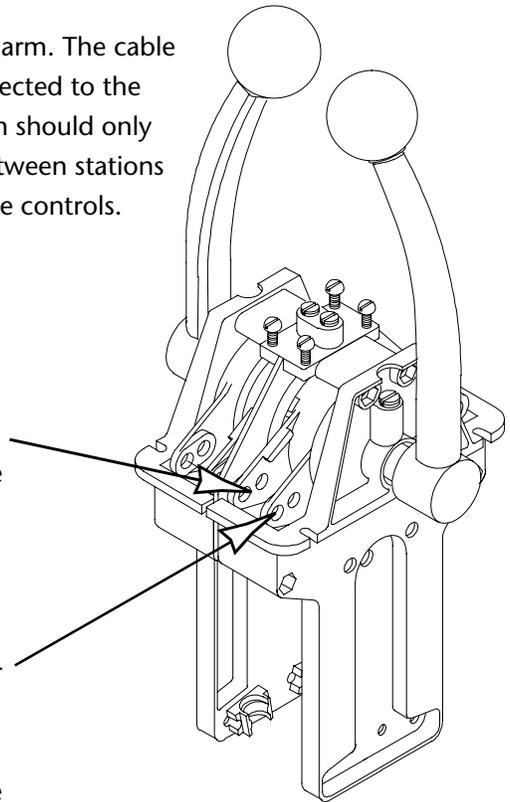
CH5600P SLT-two types of lever arms:

Direct Drive Lever Arm:

When a cable from the transmission or a "slave station" is connected to the direct-drive arm, it will allow the control lever to be moved from another station. Cables from the main station to any additional stations must be attached to direct drive arms on those stations.

Self-Locking Lever Arm:

When a cable from the throttle is connected to the self-locking arm (black in color), it will only move if the lever is moved; engine vibration and return spring feedback will not move the control lever. Only throttle cables routed directly from the engine to the control should be connected to self-locking lever arms.



FREQUENTLY ASKED QUESTIONS

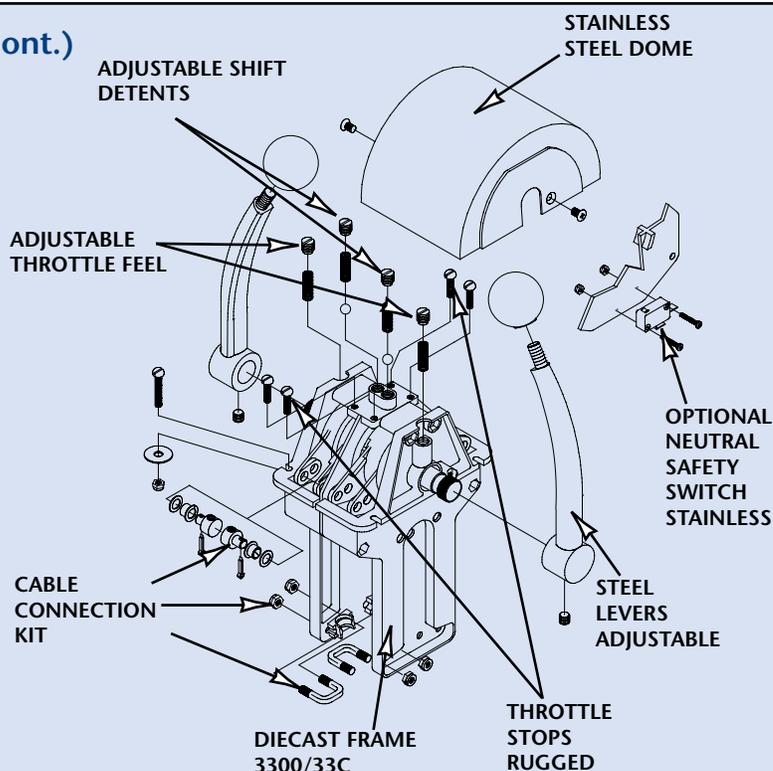
How Does the CH5600P Work? (Cont.)

Inside the CH5600P:

This exploded view diagram shows key components and features of the SLT top mount control. The SLT can be configured as throttle/shift, throttle/throttle, or shift/shift.

This control is designed to work well with virtually any 3300/33C type universal cable. For superior results, use SeaStar Solutions *xtreme* cables.

For a list of part numbers for available options and replacement items, see the CH5600 pages earlier in this section.



How Do I Set-up the CH5600P?

Throttle/Shift Configuration:

Each SLT can be configured for Throttle and Shift, Twin Throttle or Twin Shift, simply by screwing in the appropriate throttle stops, detents and knobs that come with the control. Shift cables must always be connected to the direct drive arm, regardless of which control station.

Single & Dual Station Use:

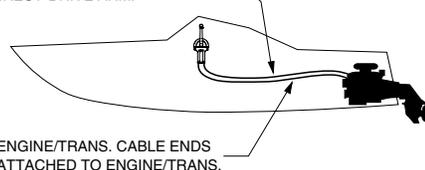
The SLT can be used in Single or Twin Station applications. Dual station setups must only utilize the Self-Locking feature, shift detents and throttle stops for throttle at the station whose cables are directly connected to the engine. All cables from the "master" control to the other station(s) must be connected to the direct drive arms of secondary control(s), which must not have active throttle friction or shift detents. Multiple stations require that the controls be hooked in series if the Self-Locking feature is used.

NOTE: The SLT feature should only be used for throttle. (Gear shift cable needs free movement at the lever to properly engage the transmission detent.) The SLT feature should only be used on the station-to-engine ("master") control. (Cables running from control to control must be able to move freely at all times.)

NOTE: This is the only twin station mechanical control that allows you to take full advantage of SeaStar Solutions[®] cables' superior performance characteristics. You can use the ultra-smooth *xtreme* cables without requiring a cable brake or other device to limit unwanted lever creep. Cable brakes and similar devices tend to denigrate cable performance and degrade the feel of the control when the levers are moved.

SINGLE STATION:

THROTTLE CONTROL CABLE END ATTACHED TO SELF-LOCKING CONTROL ARM (CABLE FEEDBACK STOPPED HERE) — SHIFT CABLE END ATTACHED TO DIRECT-DRIVE ARM.

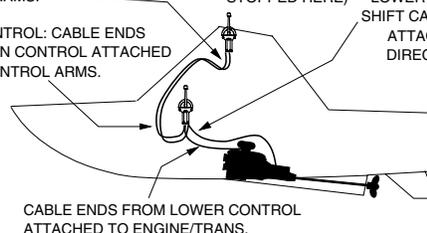


DUAL STATION:

UPPER STATION CONTROL: CABLE ENDS FROM LOWER STATION CONTROL ATTACHED TO DIRECT-DRIVE CONTROL ARMS.

LOWER STATION CONTROL: CABLE ENDS FROM UPPER STATION CONTROL ATTACHED TO DIRECT-DRIVE CONTROL ARMS.

LOWER STATION THROTTLE CONTROL CABLE END ATTACHED TO SELF-LOCKING CONTROL ARM (CABLE FEEDBACK STOPPED HERE) — LOWER STATION SHIFT CABLE END ATTACHED TO DIRECT-DRIVE ARM.



FREQUENTLY ASKED QUESTIONS

How do I know which control cable I need?

In order to determine that, you need to know what brand(s) of engine and control head are on the boat. Mercury/Mariner/Force and OMC/Johnson/Evinrude engines usually require an "OEM type" cable when using those engine makers' control heads. OEM type cables have special end fittings designed to connect to the control and engine with minimal hardware. Generally, all other engines and controls use a "universal" 3300/33C type control cable. Universal cables have 10-32 threaded ends and often require extra hardware to connect to the engine and control. Contact the engine manufacturer if you need details on the hookup. Diesels and twin station vessels may use larger diameter (4300/43 or 6400/64 type) universal cables; 4300/43 type cables have 1/4-28 threaded ends and 6400/64 cables have 5/16-24 threaded ends. Refer to the "Control Cables" section of this [catalog](#) for more information.

How do I know which control cable length I need?

This depends on two things:

- a. Are you doing a first-time control cable installation?

Outboards: Measure from control along unobstructed cable routing to center of outboard. Add four feet to allow for loop which provides unrestricted engine movement. Round up to next whole foot and order that length cable(s).

Stern Drives and Inboards: Measure from control along unobstructed cable routing to shift and/or throttle connection. Round this dimension off to the next whole foot and order that length cable(s).

- b. Are you replacing an existing cable?

Measure the Existing Cable as Follows: Measure the cable from tip to tip in inches, and round up to next even foot. Order that length cable.

What kind of ongoing maintenance do cables need? Can they be repaired?

We suggest the following periodic maintenance be performed at least twice a season:

- a. Check overall operation for proper gear engagement, full and idle throttle, and overall feel.
- b. Visually inspect control head cable, as well as engine and transmission cable attachment points for proper tightness of fasteners, correct operation of all moving parts, worn or broken items, cable chafing or misalignment, etc.
- c. Do not lubricate core wire (moving wire inside the casing). If the cable operates stiffly, replace it.
- d. Keep cable ends dirt and corrosion free.
- e. Lubricate pivot points and sliding parts of the cable with a good quality, water-resistant grease.

When to replace a cable or connection hardware:

- a. Excessive free play felt at the control even after all cable connections have been verified as in good working order.
- b. Visual inspection shows signs of chafing, breakage, bent, loose or worn parts.

Never attempt to repair a cable. Always replace a malfunctioning cable. A cable cannot be properly repaired in the field and must always be replaced as an assembly. Attempting to repair a cable can result in control system failure, leading to personal injury and/or property damage.

ALPHABETICAL INDEX

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BAYSTAR INBOARD STEERING SYSTEM:

Built in the same tradition as SeaStar Inboard Steering, these BayStar Systems are designed for relatively low torque inboard applications, including inland waterway boats and other low speed displacement vessels. The systems are easy to install with "cut-to-length" tubing. Available in complete kits or by individual components. (If unsure of total steering loads, contact SeaStar Solutions Technical Support for assistance)

FEATURES:

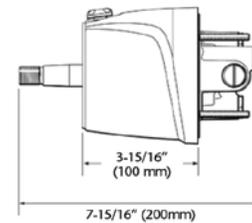
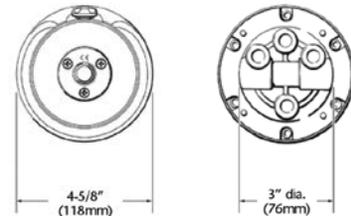
- Compact cylinder design.
- HC4460-3 - 6.25" stroke.
- HC4461-3 - 6.0" stroke.
- Optional Tilt helm available.
- Helm fits standard 3" dash cut outs.
- Fast easy installation.



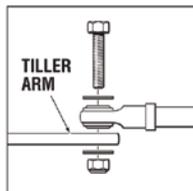
WE RECOMMEND

The use of SeaStar Steering Fluid ONLY in our hydraulic steering systems. See Page 144

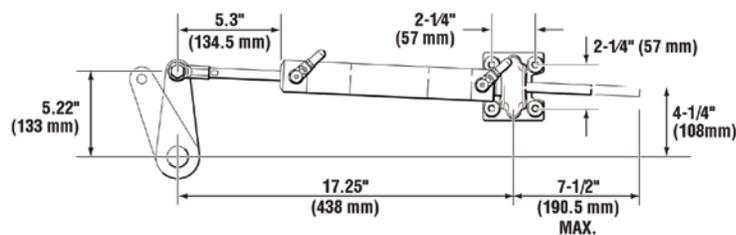
ENGINE CONTROL	
BayStar 1.4 30kg/m (2600 in/lbs) Inboard Steering Kit (comprising: HH4314-3 helm + HC4461-3 cylinder + HT4420 tubing kit + 2 x HA5430 oil)	HK4401-3
BayStar 1.4 52kg/m (4500 in/lbs) Inboard Steering Kit (comprising HH4314-3 helm + HC4460-3 cylinder + HT4420 tubing kit + 2 x HA5430 oil)	HK4400H-3
OPTIONS	
BayStar 1.1 - Front Mount Helm	HH4311
BayStar 1.4 - Sport Tilt Helm	HH4315
BayStar 1.4 - Sport Plus Tilt Helm	HH4316
BayStar 30 ft tubing kit	HT4430H
BayStar Mounting Kit	HA5476



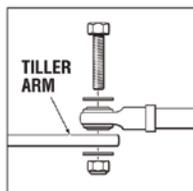
HC4461



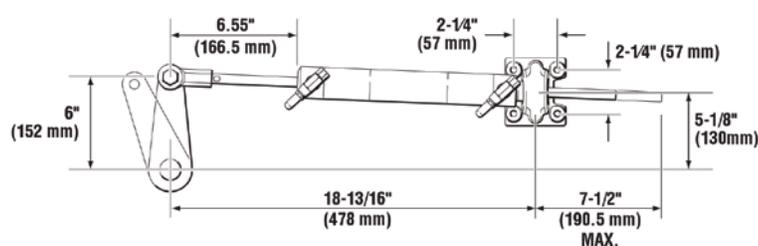
Attachment to Tiller Arm



HC4460H



Attachment to Tiller Arm



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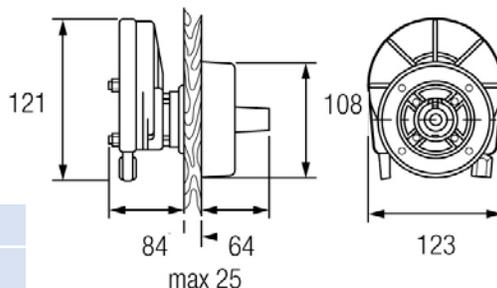
SH8050-1P

LIGHT DUTY STEERING SYSTEM:

Suits outboard engines up to 53 HP supplied complete with 90° bezel to suit most applications. Available as a complete "system in a box" or as separate components.

FEATURES:

- Comfortable 2.5 turns from lock-to-lock.
- Standard 3/4" tapered steering shaft.
- Uses SSC131.
- Complete systems and individual cables available in 25cm increments.

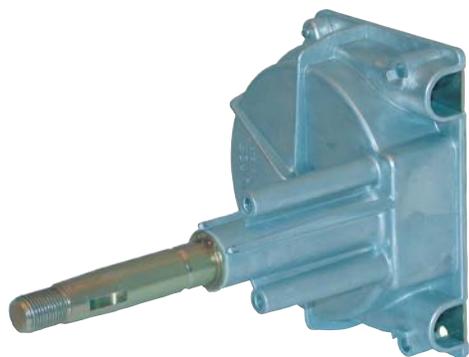


DESCRIPTION	PART NO.
Light duty helm and bezel	SH8050-1P
Steering cable (black)	SSC131XX



SSC131XX

SH8050-1P is a direct helm replacement for SH8050P.



D0290

C290/D290 STEERING SYSTEM:

DESCRIPTION	PART NO.
Helm	D0290
D0290 Steering Cable	SSC290XX
Bezel Kit 90° (Black)	292748

SERVICE ITEMS

D290 Helm Adaptor (For use with SSC62 Cables)	SA88304
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[SSC290XX](#)

[SSC290XX](#) is a direct replacement cable for 304411-000-XXX and [SSC52XX](#)

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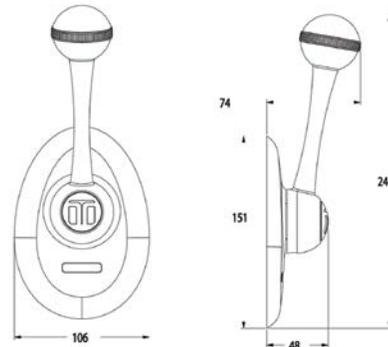


SIDE MOUNT CONTROLS (CH2800/CH2850):

CH2800 features unique twistgrip switch for control of Bow thruster or windlass. Designed for steering pedestal or cockpit well mounting. Polished stainless steel lever. Dual action design. Suits 33c type cables.

FEATURES:

- Stainless Steel lever / Composite knob.
- Momentary switch to control Bow Thruster or Windlass.
- Suitable for power or sail.
- Can be mounted with or without cover plate.
- Drop in replacement for popular 700 SS control.
- Standard control suits 33C type cables.
- Neutral "warm up" button for throttle only operation.



ENGINE CONTROL	
Side Mount Control (with switch)	CH2800
Side Mount Control (without switch)	CH2850
OPTIONS	
Optional Neutral Safety Switch	178000
CH2850 Service Kit Includes: Top Knob, O-Ring, Screw, Center Neutral Warm Up Button	CA76251P

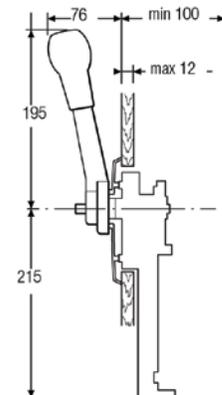


SAIL BOAT FLUSH/SIDE MOUNT CONTROL (700 SS):

Dual action side mount control designed for sail boats. More than 1 million sold worldwide. This control is the first choice of all premium sail boat manufactures. Suits 33C type cables.

FEATURES:

- Dual action (throttle and shift in one lever).
- Heavy duty lever in black polyester powder coated finish.
- Flush mount design.
- Neutral safety switch option (prevents starting in gear).
- Standard control suits 33C type cables.
- Neutral "warm up" button for throttle only operation.



ENGINE CONTROL		
Type of control	Flush/side mounted complete controls	
Features	B - mechanism Double action Order No.	
700 SS	Standard	172103
OPTIONS		
Neutral Safety Switch	178000	

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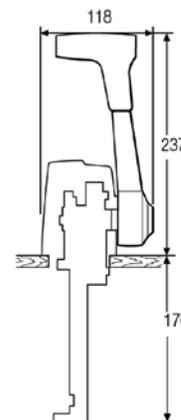


POWER BOAT TOP MOUNT CONTROL (700 TS, TST, TSL, TSLT):

Top mount control suitable for power boats with single engines and one or two helm stations. More than 1 million sold worldwide. Dual action design available with trim and tilt and/or neutral interlock. Suits 3300/33C control cables.

FEATURES:

- Top mounted single engine control
- For power boats with one inboard, I/O or outboard engine with one or two helm stations
- Single dual action lever
- Available with power trim (700 TST), neutral lever interlock (700 TSL) or Power trim and neutral lever interlock (700 TSLT)
- Standard control suits 3300/33C control cables
- Neutral "warm up" button for throttle only operation



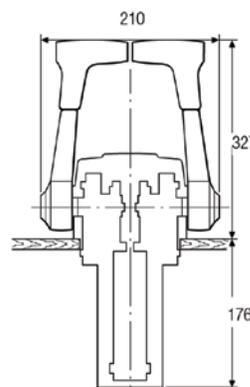
ENGINE CONTROL		
Type of control	Single top mounted complete controls	
	Features	B - mechanism Double action Order No.
700 TS	Standard	172107
700 TST	Standard with power trim	172135
700 TSL	Standard with interlock	172122
700 TSLT	Standard with interlock and power trim	172123
OPTIONS		
Neutral Safety Switch		178000

POWER BOAT TOP MOUNT CONTROL (700 TD, TDT):

Top mount twin lever control suitable for power boats with single engines (single action version) or twin engine (dual action version) and one or two helm stations. More than 1 million sold worldwide. Available with trim and tilt. Suits 3300/33C control cables.

FEATURES:

- Top mounted single or twin engine control
- Single action or dual action options
- Available with power trim (700 TDT).
- "Start-in-gear protection" Safety Switch, optional
- Standard control suits 3300/33C control cables
- Neutral "warm up" button for throttle only operation



ENGINE CONTROL		
Type of control	Top mounted complete controls	
	Features	B+B mechanisms Double action Order No.
700 TD	Standard	172109
700 TDT	Standard with power trim	172149
OPTIONS		
Neutral Safety Switch		178000 gear only

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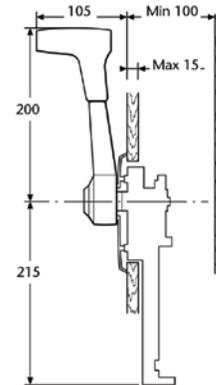


POWER BOAT FLUSH/SIDE MOUNT CONTROL (700 SM, SMT, SML, SMLT):

Side mount control suitable for power boats with single engines and one or two helm stations. More than 1 million sold worldwide. Dual action design available with trim and tilt and/or neutral interlock. Suits 33C type cables.

FEATURES:

- Flush mounted single lever control
- Single dual action lever
- Available with power trim (700 SMT), neutral interlock (700 SML) or Power trim and neutral interlock (700 SMLT)
- Standard control suits 33C type cables
- Neutral "warm up" button for throttle only operation



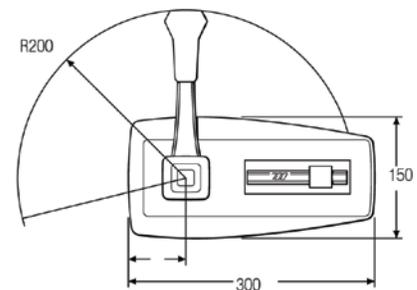
ENGINE CONTROL		
Type of control	Flush/side mounted complete controls	
	Features	B - mechanism Double action Order No.
700 SM	Standard	172105
700 SMT	Standard with power trim	172133
700 SML	Standard with neutral interlock	172120
700 SMLT	Standard with power trim and neutral interlock	172121
OPTIONS		
Neutral safety switch		178000

POWER BOAT SURFACE/SIDE MOUNT CONTROL (700 SO, SOT, SOL, SOLT):

Single engine surface mount control for powerboats. More than 1 million sold worldwide. Dual action design available with trim and tilt and/or neutral interlock. Suits 33C type cables.

FEATURES:

- Surface mounted dual action single lever control
- For power boats with outboard motors
- Available with power trim (700 SOT), neutral interlock (700 SOL) or Power trim and neutral interlock (700 SOLT)
- Optional neutral safety switch
- Standard control suits 33C type cables
- Neutral "warm up" button for throttle only operation



ENGINE CONTROL			
Type of control	Surface/side mounted complete controls		
	Features	B - mechanism Double action Order No.	A - mechanism Double action Order No. *
700 SO	Standard	172101	172100
700 SOT	Standard with power trim	172131	
700 SOL	Standard with neutral interlock	172118	
700 SOLT	Standard with power trim and neutral interlock	172119	
OPTIONS			
Neutral safety switch		178000	

* Needed on some smaller outboard engines that require extra throttle when engaging gear

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INTERNATIONAL ONLY - Universal Control Cables

EXISTING PART NUMBER	DESCRIPTION	PART NUMBER TO REORDER		Conduit Color / End Metal
		Standard	Premium	
CC2300XX	2300 Series Control Cable Assembly			black/stainless
6' - 9' specially length cables (NLA) use premium *xtreme cables		CC230XX	CCX633XX	black/stainless
10' - 24' length cables		CC230XX	CCX633XX	black/stainless
25' - up specially length cables (NLA) use premium *xtreme cables		N/A	CCX633XX	black/stainless
CC3300XX	3300 Series Control Cable Assembly			black/stainless
6' - 9' specially length cables (NLA) use premium *xtreme cables		N/A	CCX633XX	black/stainless
10' - 24' length cables		CC330XX black/stainless	CCX633XX	black/stainless
25' - up specially length cables (NLA) use premium *xtreme cables		N/A	CCX633XX	black/stainless
032377-03-XXXX.0	33C Control Cable			black/stainless red/stainless
6' - 9' specially length cables (NLA - all markets) use premium *xtreme cables		N/A	CCX632XX / CCX633XX	CCX632XX red/stainless CCX633XX black/stainless
10' - 24' length cables (NLA) use premium *xtreme cables		CC332XX	CCX632XX / CCX633XX	CC332XX red/stainless CCX632XX red/stainless CCX633XX black/stainless
25' - up specially length cables (NLA - all markets) use premium *xtreme cables		N/A	CCX632XX / CCX633XX	CCX632XX red/stainless CCX633XX black/stainless
301947-03-XXX.0	33C Supreme Control Cable			red/stainless
All lengths (NLA) use premium *xtreme cables		N/A	CCX632XX / CCX633XX	red/stainless red/stainless

NOTES

XX = Length in feet

Red text denotes red conduit cable

3300/33C type cables (10-32 end threads)

Engines and connection kits that accept a 10-32 threaded end may require a connection kit from SeaStar Solutions or the engine manufacturer

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FEET TO METERS

Feet	Meters	Feet	Meters	Feet	Meters	Feet	Meters
1.00	0.31	26.00	7.93	51.00	15.54	76.00	23.16
2.00	0.61	27.00	8.24	52.00	15.85	77.00	23.47
3.00	0.92	28.00	8.54	53.00	16.15	78.00	23.77
4.00	1.22	29.00	8.85	54.00	16.46	79.00	24.08
5.00	1.53	30.00	9.15	55.00	16.76	80.00	24.38
6.00	1.83	31.00	9.46	56.00	17.07	81.00	24.69
7.00	2.14	32.00	9.76	57.00	17.37	82.00	24.99
8.00	2.44	33.00	10.07	58.00	17.68	83.00	25.30
9.00	2.75	34.00	10.37	59.00	17.98	84.00	25.60
10.00	3.05	35.00	10.68	60.00	18.29	85.00	25.91
11.00	3.36	36.00	10.98	61.00	18.59	86.00	26.21
12.00	3.66	37.00	11.29	62.00	18.90	87.00	26.52
13.00	3.97	38.00	11.59	63.00	19.20	88.00	26.82
14.00	4.27	39.00	11.90	64.00	19.51	89.00	27.13
15.00	4.58	40.00	12.20	65.00	19.81	90.00	27.43
16.00	4.88	41.00	12.51	66.00	20.12	91.00	27.74
17.00	5.19	42.00	12.81	67.00	20.42	92.00	28.04
18.00	5.19	43.00	13.12	68.00	20.73	93.00	28.35
19.00	5.80	44.00	13.42	69.00	21.03	94.00	28.65
20.00	6.10	45.00	13.73	70.00	21.34	95.00	28.96
21.00	6.41	46.00	14.03	71.00	21.64	96.00	29.26
22.00	6.71	47.00	14.34	72.00	21.95	97.00	29.57
23.00	7.02	48.00	14.64	73.00	22.25	98.00	29.87
24.00	7.32	49.00	14.95	74.00	22.56	99.00	30.18
25.00	7.63	50.00	15.25	75.00	22.86	100.00	30.48

METERS TO FEET

Meters	Feet	Meters	Feet	Meters	Feet	Meters	Feet
0.50	1.64	6.75	22.15	13.00	42.65	19.25	63.16
0.75	2.46	7.00	22.97	13.25	43.47	19.50	63.98
1.00	3.28	7.25	23.79	13.50	44.29	19.75	64.80
1.25	4.10	7.50	24.61	13.75	45.11	20.00	65.62
1.50	4.92	7.75	25.43	14.00	45.93	20.25	66.44
1.75	5.74	8.00	26.25	14.25	46.75	20.50	67.26
2.00	6.56	8.25	27.07	14.50	47.57	20.75	68.08
2.25	7.38	8.50	27.89	14.75	48.39	21.00	68.90
2.50	8.20	8.75	28.71	15.00	49.21	21.25	69.72
2.75	9.02	9.00	29.53	15.25	50.03	21.50	70.54
3.00	9.84	9.25	30.35	15.50	50.85	21.75	71.36
3.25	10.66	9.50	31.17	15.75	51.67	22.00	72.18
3.50	11.48	9.75	31.99	16.00	52.49	22.25	73.00
3.75	12.30	10.00	32.81	16.25	53.31	22.50	73.82
4.00	13.12	10.25	33.63	16.50	54.13	22.75	74.64
4.25	13.94	10.50	34.45	16.75	54.95	23.00	75.46
4.50	14.76	10.75	35.27	17.00	55.77	23.25	76.28
4.75	15.58	11.00	36.09	17.25	56.59	23.50	77.10
5.00	16.41	11.25	36.91	17.50	57.41	23.75	77.92
5.25	17.23	11.50	37.73	17.75	58.23	24.00	78.74
5.50	18.05	11.75	38.55	18.00	59.06	24.25	79.56
5.75	18.87	12.00	39.37	18.25	59.88	24.50	80.38
6.00	19.69	12.25	40.19	18.50	60.70	24.75	81.20
6.25	20.51	12.50	41.01	18.75	61.52	25.00	82.02
6.50	21.33	12.75	41.83	19.00	62.34	25.25	82.84

PSI TO BAR TO KG

PSI	Bar	Kg/cmp	PSI	Bar	Kg/cmp
10	0.68	0.7	60	4.13	4.21
20	1.73	1.4	70	4.82	4.92
30	2.06	2.1	80	5.51	5.62
40	2.75	2.81	1000	68.96	70.3
50	3.44	3.51	1500	103.4	105.5

NOTICE: The products on these pages are NOT for sale in North America. These products are only available internationally.

SeaStar Product Codes

CC.....	Control Cable
CH.....	Control Head
CA.....	Control Accessory and/or Control/Cable Connection Kit
H.....	Hynautic Helm
HA.....	Hydraulic Accessory/Component
HB.....	Hydraulic Adapter
HC.....	Hydraulic Cylinder
HF.....	Hydraulic Fittings Kit
HH.....	Hydraulic Helm
HK.....	Hydraulic Steering Kit
HO.....	Hydraulic Option (Hose, Tie Bar, etc.)
HP.....	Hydraulic Part; also Hydraulic Power Steering Item
HS.....	Hydraulic Seal Kit; Hynautic Helm Seal Kit
HT.....	Hydraulic Tubing
K.....	Hynautic Cylinder
KS.....	Hynautic Cylinder Seal Kit
MSV.....	Hynautic Relief Valve
MSVF.....	Hynautic Relief Valve Fitting
PA.....	SeaStar P/A Power Assist Module
PT.....	Pro Trim
R.....	Hynautic Reservoir
RS.....	Hynautic Reservoir Seal Kit
RV.....	Hynautic Reservalve
SA.....	Steering Accessory and/or Connection Kit (Mechanical)
SB.....	Steering Bezel (Mechanical)
SH.....	Steering Helm (Mechanical)
SS.....	Steering System (Mechanical)
SSC.....	Stainless Steel output end Steering Cable
SSCX.....	XTREME Steering Cable
SSX.....	XTREME Steering Kit
SHX.....	XTREME Steering Helm
SBX.....	XTREME Bezel Kit
SW.....	Steering Wheel
TC.....	Hynautic Trim Tab Control Switch
TCS.....	Hynautic Trim Tab System
TK.....	Hynautic Trim Tab Cylinder
TFK.....	Hynautic Trim Tab Fitting
TP.....	Hynautic Trim Tab Power Pump

Old Part Number	New Part Number	Old Part Number	New Part Number	Old Part Number	New Part Number
018872-00-060.0	CC34305	032377-03-432.0	CCX63336	301947-03-360.0	CCX63330
018872-00-072.0	CC34306	032377-03-456.0	CCX63338	301947-03-384.0	CCX63332
018872-00-120.0	CC34310	032377-03-480.0	CCX63340	301947-03-408.0	CCX63334
018872-00-180.0	CC34315	032377-03-504.0	CCX63342	301947-03-432.0	CCX63336
018872-00-240.0	CC34320	032377-03-528.0	CCX63344	301947-03-456.0	CCX63338
018872-00-264.0	CC34322	032377-03-552.0	CCX63346	301947-03-480.0	CCX63340
018872-00-276.0	CC34323	032377-03-576.0	CCX63348	301947-03-504.0	CCX63342
018872-00-300.0	CC34325	032377-03-600.0	CCX63350	301947-03-528.0	CCX63344
018872-00-312.0	CC34326	036469-001	CH5400P	301947-03-552.0	CCX63346
018872-00-360.0	CC34330	036469-004	CH5400P	301947-03-576.0	CCX63348
018872-00-420.0	CC34335	043820-03-060.0	OBSOLETE NO REPLACEMENT	301947-03-600.0	CCX63350
018872-00-480.0	CC34340			306490	CH2900P
018873-00-060.0	CC34305	043820-03-120.0	OBSOLETE NO REPLACEMENT	306950	CH2920P
018873-00-072.0	CC34306			306951	CH2940P
018873-00-084.0	CC34307	043820-03-180.0	OBSOLETE NO REPLACEMENT	306983	Obsolete
018873-00-096.0	CC34308			307141-00-060.0	CC34505
018873-00-108.0	CC34309	043820-03-240.0	OBSOLETE NO REPLACEMENT	307141-00-120.0	CC34510
018873-00-120.0	CC34310			307141-00-180.0	CC34515
018873-00-180.0	CC34315	043820-03-300.0	OBSOLETE NO REPLACEMENT	307141-00-240.0	CC34520
018873-00-240.0	CC34320			307141-00-300.0	CC34525
018873-00-264.0	CC34322	043820-03-360.0	OBSOLETE NO REPLACEMENT	307141-00-360.0	CC34530
018873-00-300.0	CC34325			307141-00-420.0	CC34535
018873-00-312.0	CC34326	043820-03-540.0	OBSOLETE NO REPLACEMENT	307141-00-480.0	CC34540
018873-00-360.0	CC34330			308601	CH5310P
018873-00-432.0	CC34336	043820-03-600.0	OBSOLETE NO REPLACEMENT	308602	CH5300P
018873-00-480.0	CC34340			309556	OBSOLETE
031001-001	CH5200P	044716-001	CH2500P	310036	OBSOLETE
031002-001	CH5210P	2724514P	SA27245P	310714-001	OBSOLETE
032377-03-072.0	CCX63306	2745417P	SA27454P	310714-002	OBSOLETE
032377-03-084.0	CCX63307	300610	SA27256P	310714-004	OBSOLETE
032377-03-096.0	CCX63308	300611	SA27255P	310714-005	OBSOLETE
032377-03-108.0	CCX63309	301947-03-072.0	CCX63306	311109-460	OBSOLETE
032377-03-120.0	CC33210	301947-03-084.0	CCX63307	311110-420	OBSOLETE
032377-03-132.0	CC33211	301947-03-096.0	CCX63308	311111-161	OBSOLETE
032377-03-144.0	CC33212	301947-03-108.0	CCX63309	311111-261	OBSOLETE
032377-03-156.0	CC33213	301947-03-120.0	CCX63310	311111-460	OBSOLETE
032377-03-168.0	CC33214	301947-03-132.0	CCX63311	311111-521	OBSOLETE
032377-03-180.0	CC33215	301947-03-144.0	CCX63312	311111-560	OBSOLETE
032377-03-192.0	CC33216	301947-03-156.0	CCX63313	311113-560	OBSOLETE
032377-03-204.0	CC33217	301947-03-168.0	CCX63314	311118-261	OBSOLETE
032377-03-216.0	CC33218	301947-03-180.0	CCX63315	311118-560	OBSOLETE
032377-03-228.0	CC33219	301947-03-192.0	CCX63316	311120-460	OBSOLETE
032377-03-240.0	CC33220	301947-03-204.0	CCX63317	311122-460	OBSOLETE
032377-03-252.0	CC33221	301947-03-216.0	CCX63318	311122-560	OBSOLETE
032377-03-264.0	CC33222	301947-03-228.0	CCX63319	311133-151	OBSOLETE
032377-03-276.0	CC33223	301947-03-240.0	CCX63320	311133-460	OBSOLETE
032377-03-288.0	CC33224	301947-03-252.0	CCX63321	311133-560	OBSOLETE
032377-03-300.0	CCX63325	301947-03-264.0	CCX63322	311188-460	OBSOLETE
032377-03-312.0	CCX63326	301947-03-276.0	CCX63323	311188-461	OBSOLETE
032377-03-324.0	CCX63327	301947-03-288.0	CCX63324	311193-460	OBSOLETE
032377-03-336.0	CCX63328	301947-03-300.0	CCX63325	311335	CH2900P
032377-03-348.0	CCX63329	301947-03-312.0	CCX63326	311335-001	CH2910P
032377-03-360.0	CCX63330	301947-03-324.0	CCX63327	311335-002	CH2910P
032377-03-384.0	CCX63332	301947-03-336.0	CCX63328	311364	CH2920P
032377-03-408.0	CCX63334	301947-03-348.0	CCX63329	311364-001	OBSOLETE

PRODUCT INTERCHANGE

Old Part Number	New Part Number	Old Part Number	New Part Number	Old Part Number	New Part Number
311364-002	OBSOLETE	CC17248	CCX63348	CC20538	CCX20538
311412	CH2940P	CC17250	CCX63350	CC20540	CCX20540
311413	CH2945P	CC17906	CCX17906	CC20542	CCX20542
311414	OBSOLETE	CC17907	CCX17907	CC20544	CCX20544
311414-002	OBSOLETE	CC17908	CCX17908	CC20546	CCX20546
311415	OBSOLETE	CC17909	CCX17909	CC20548	CCX20548
311415-002	OBSOLETE	CC17925	CCX17925	CC20550	CCX20550
311421	OBSOLETE	CC17926	CCX17926	CC21406	CCX21406
311480	CH2930P	CC17927	CCX17927	CC21407	CCX21407
311481	OBSOLETE	CC17928	CCX17928	CC21408	CCX21408
311508	CH2950P	CC17929	CCX17929	CC21409	CCX21409
311508-002	OBSOLETE	CC17930	CCX17930	CC21410	CCX21410
311748-00-108.0	CC40009	CC17932	CCX17932	CC21411	CCX21411
311748-00-120.0	CC40010	CC17934	CCX17934	CC21412	CCX21412
311748-00-132.0	CC40011	CC17936	CCX17936	CC21413	CCX21413
311748-00-144.0	CC40012	CC17938	CCX17938	CC21414	CCX21414
311748-00-156.0	CC40013	CC17940	CCX17940	CC21415	CCX21415
311748-00-168.0	CC40014	CC17942	CCX17942	CC21416	CCX21416
311748-00-180.0	CC40015	CC17944	CCX17944	CC21417	CCX21417
311748-00-192.0	CC40016	CC17946	CCX17946	CC21418	CCX21418
311748-00-204.0	CC40017	CC17948	CCX17948	CC21419	CCX21419
311748-00-216.0	CC40018	CC17950	CCX17950	CC21420	CCX21420
311748-00-228.0	CC40019	CC18906	CCX18906	CC33006	CCX63306
311748-00-240.0	CC40020	CC18907	CCX18907	CC33007	CCX63307
311748-00-252.0	CC40021	CC18908	CCX18908	CC33008	CCX63308
311789-001	OBSOLETE	CC18909	CCX18909	CC33009	CCX63309
311789-002	OBSOLETE	CC18925	CCX18925	CC33025	CCX63325
311789-003	OBSOLETE	CC18926	CCX18926	CC33026	CCX63326
311789-004	OBSOLETE	CC18927	CCX18927	CC33027	CCX63327
31791	CH2400P	CC18928	CCX18928	CC33028	CCX63328
311821	OBSOLETE	CC18929	CCX18929	CC33029	CCX63329
317461	CH5310P	CC18930	CCX18930	CC33030	CCX63330
317462	CH5300P	CC18932	CCX18932	CC33032	CCX63332
39115	CH2400P	CC18934	CCX18934	CC33034	CCX63334
3924516P	Obsolete	CC18936	CCX18936	CC33036	CCX63336
44777	CH2410P	CC18938	CCX18938	CC33038	CCX63338
45978	CH2410P	CC18940	CCX18940	CC33040	CCX63340
CC17206	CCX63306	CC18942	CCX18942	CC33042	CCX63342
CC17207	CCX63307	CC18944	CCX18944	CC33044	CCX63344
CC17208	CCX63308	CC18946	CCX18946	CC33046	CCX63346
CC17209	CCX63309	CC18948	CCX18948	CC33048	CCX63348
CC17225	CCX63325	CC18950	CCX18950	CC33050	CCX63350
CC17226	CCX63326	CC20506	CCX20506	CC63006	CCX63006
CC17227	CCX63327	CC20507	CCX20507	CC63007	CCX63007
CC17228	CCX63328	CC20508	CCX20508	CC63008	CCX63008
CC17229	CCX63329	CC20509	CCX20509	CC63009	CCX63009
CC17230	CCX63330	CC20525	CCX20525	CC63010	CCX63010
CC17232	CCX63332	CC20526	CCX20526	CC63011	CCX63011
CC17234	CCX63334	CC20527	CCX20527	CC63012	CCX63012
CC17236	CCX63336	CC20528	CCX20528	CC63013	CCX63013
CC17238	CCX63338	CC20529	CCX20529	CC63014	CCX63014
CC17240	CCX63340	CC20530	CCX20530	CC63015	CCX63015
CC17242	CCX63342	CC20532	CCX20532	CC63016	CCX63016
CC17244	CCX63344	CC20534	CCX20534	CC63017	CCX63017
CC17246	CCX63346	CC20536	CCX20536	CC63018	CCX63018

Old Part Number	New Part Number	Old Part Number	New Part Number	Old Part Number	New Part Number
CC63019	CCX63019	CC63348	CCX63348	CC63624	CCX20524
CC63020	CCX63020	CC63350	CCX63350	CC63625	CCX20525
CC63021	CCX63021	CC63506	CCX17906	CC63626	CCX20526
CC63022	CCX63022	CC63507	CCX17907	CC63627	CCX20527
CC63023	CCX63023	CC63508	CCX17908	CC63628	CCX20528
CC63024	CCX63024	CC63509	CCX17909	CC63629	CCX20529
CC63025	CCX63025	CC63510	CCX17910	CC63630	CCX20530
CC63026	CCX63026	CC63511	CCX17911	CC63632	CCX20532
CC63027	CCX63027	CC63512	CCX17912	CC63634	CCX20534
CC63028	CCX63028	CC63513	CCX17913	CC63636	CCX20536
CC63029	CCX63029	CC63514	CCX17914	CC63638	CCX20538
CC63030	CCX63030	CC63515	CCX17915	CC63640	CCX20540
CC63032	CCX63032	CC63516	CCX17916	CC63642	CCX20542
CC63034	CCX63034	CC63517	CCX17917	CC63644	CCX20544
CC63036	CCX63036	CC63518	CCX17918	CC63646	CCX20546
CC63038	CCX63038	CC63519	CCX17919	CC63648	CCX20548
CC63040	CCX63040	CC63520	CCX17920	CC63650	CCX20550
CC63042	CCX63042	CC63521	CCX17921	CC67906	CCX18906
CC63044	CCX63044	CC63522	CCX17922	CC67907	CCX18907
CC63046	CCX63046	CC63523	CCX17923	CC67908	CCX18908
CC63048	CCX63048	CC63524	CCX17924	CC67909	CCX18909
CC63050	CCX63050	CC63525	CCX17925	CC67910	CCX18910
CC63306	CCX63306	CC63526	CCX17926	CC67911	CCX18911
CC63307	CCX63307	CC63527	CCX17927	CC67912	CCX18912
CC63308	CCX63308	CC63528	CCX17928	CC67913	CCX18913
CC63309	CCX63309	CC63529	CCX17929	CC67914	CCX18914
CC63310	CCX63310	CC63530	CCX17930	CC67915	CCX18915
CC63311	CCX63311	CC63532	CCX17932	CC67916	CCX18916
CC63312	CCX63312	CC63534	CCX17934	CC67917	CCX18917
CC63313	CCX63313	CC63536	CCX17936	CC67918	CCX18918
CC63314	CCX63314	CC63538	CCX17938	CC67919	CCX18919
CC63315	CCX63315	CC63540	CCX17940	CC67920	CCX18920
CC63316	CCX63316	CC63542	CCX17942	CC67921	CCX18921
CC63317	CCX63317	CC63544	CCX17944	CC67922	CCX18922
CC63318	CCX63318	CC63546	CCX17946	CC67923	CCX18923
CC63319	CCX63319	CC63548	CCX17948	CC67924	CCX18924
CC63320	CCX63320	CC63550	CCX17950	CC67925	CCX18925
CC63321	CCX63321	CC63606	CCX20506	CC67926	CCX18926
CC63322	CCX63322	CC63607	CCX20507	CC67927	CCX18927
CC63323	CCX63323	CC63608	CCX20508	CC67928	CCX18928
CC63324	CCX63324	CC63609	CCX20509	CC67929	CCX18929
CC63325	CCX63325	CC63610	CCX20510	CC67930	CCX18930
CC63326	CCX63326	CC63611	CCX20511	CC67932	CCX18932
CC63327	CCX63327	CC63612	CCX20512	CC67934	CCX18934
CC63328	CCX63328	CC63613	CCX20513	CC67936	CCX18936
CC63329	CCX63329	CC63614	CCX20514	CC67938	CCX18938
CC63330	CCX63330	CC63615	CCX20515	CC67940	CCX18940
CC63332	CCX63332	CC63616	CCX20516	CC67942	CCX18942
CC63334	CCX63334	CC63617	CCX20517	CC67944	CCX18944
CC63336	CCX63336	CC63618	CCX20518	CC67946	CCX18946
CC63338	CCX63338	CC63619	CCX20519	CC67948	CCX18948
CC63340	CCX63340	CC63620	CCX20520	CC67950	CCX18950
CC63342	CCX63342	CC63621	CCX20521	CC69206	CCX43006
CC63344	CCX63344	CC63622	CCX20522	CC69207	CCX43007
CC63346	CCX63346	CC63623	CCX20523	CC69208	CCX43008

PRODUCT INTERCHANGE

Old Part Number	New Part Number	Old Part Number	New Part Number	Old Part Number	New Part Number
CC69209	CCX43009	CC69346	CCX43346	CC74018	CCX74018
CC69210	CCX43010	CC69348	CCX43348	CC74019	CCX74019
CC69211	CCX43011	CC69350	CCX43350	CC74020	CCX74020
CC69212	CCX43012	CC69406	CCX64006	CC74021	CCX74021
CC69213	CCX43013	CC69407	CCX64007	CC74022	CCX74022
CC69214	CCX43014	CC69408	CCX64008	CC74023	CCX74023
CC69215	CCX43015	CC69409	CCX64009	CC74024	CCX74024
CC69216	CCX43016	CC69410	CCX64010	CC74025	CCX74025
CC69217	CCX43017	CC69411	CCX64011	CC74026	CCX74026
CC69218	CCX43018	CC69412	CCX64012	CC74027	CCX74027
CC69219	CCX43019	CC69413	CCX64013	CC74028	CCX74028
CC69220	CCX43020	CC69414	CCX64014	CC74029	CCX74029
CC69221	CCX43021	CC69415	CCX64015	CC74030	CCX74030
CC69222	CCX43022	CC69416	CCX64016	CC74032	CCX74032
CC69223	CCX43023	CC69417	CCX64017	CH1700-000000	CH1750P
CC69224	CCX43024	CC69418	CCX64018	CH1700-000010	CH1751P
CC69225	CCX43025	CC69419	CCX64019	CH1700-001010	CH1751P
CC69226	CCX43026	CC69420	CCX64020	CH1700-002010	CH1751P
CC69227	CCX43027	CC69421	CCX64021	CH1700-010010	CH1752P
CC69228	CCX43028	CC69422	CCX64022	CH1700-011010	CH1752P
CC69229	CCX43029	CC69423	CCX64023	CH1700-012010	CH1752P
CC69230	CCX43030	CC69424	CCX64024	CH1700-100000	CH1750P
CC69232	CCX43032	CC69425	CCX64025	CH1700-200000	CH1750P
CC69306	CCX43306	CC69506	CCX64306	CH1700-200010	CH1751P
CC69307	CCX43307	CC69507	CCX64307	CH1700-201010	CH1751P
CC69308	CCX43308	CC69508	CCX64308	CH1700-202000	CH1750P
CC69309	CCX43309	CC69509	CCX64309	CH1700-202010	CH1751P
CC69310	CCX43310	CC69510	CCX64310	CH1700-210010	CH1752P
CC69311	CCX43311	CC69511	CCX64311	CH1700-211010	CH1752P
CC69312	CCX43312	CC69512	CCX64312	CH1700-212010	CH1752P
CC69313	CCX43313	CC69513	CCX64313	CH4452P	CH4451P
CC69314	CCX43314	CC69514	CCX64314	CH4453P	CH4451P
CC69315	CCX43315	CC69515	CCX64315	CH4454P	CH4451P
CC69316	CCX43316	CC69516	CCX64316	CH4482P	CH4481P
CC69317	CCX43317	CC69517	CCX64317	CH4483P	CH4481P
CC69318	CCX43318	CC69518	CCX64318	CH4484P	CH4481P
CC69319	CCX43319	CC69519	CCX64319	CH7500-000000	CH7540P
CC69320	CCX43320	CC69520	CCX64320	CH7500-000010	CH7541P
CC69321	CCX43321	CC69521	CCX64321	CH7500-000100	CH7550P
CC69322	CCX43322	CC69522	CCX64322	CH7500-000110	CH7551P
CC69323	CCX43323	CC69523	CCX64323	CH7500-010010	CH7542P
CC69324	CCX43324	CC69524	CCX64324	CH7500-010110	CH7552P
CC69325	CCX43325	CC69525	CCX64325	CH7500-100000	CH7540P
CC69326	CCX43326	CC74006	CCX74006	CH7500-100010	CH7541P
CC69327	CCX43327	CC74007	CCX74007	CH7500-200000	CH7540P
CC69328	CCX43328	CC74008	CCX74008	CH7500-200010	CH7541P
CC69329	CCX43329	CC74009	CCX74009	CH7500-200100	CH7550P
CC69330	CCX43330	CC74010	CCX74010	CH7500-200110	CH7551P
CC69332	CCX43332	CC74011	CCX74011	CH7500-210010	CH7542P
CC69334	CCX43334	CC74012	CCX74012	CH7500-210110	CH7552P
CC69336	CCX43336	CC74013	CCX74013	CH7600-000000	CH7640P
CC69338	CCX43338	CC74014	CCX74014	CH7600-000010	CH7641P
CC69340	CCX43340	CC74015	CCX74015	CH7600-010010	CH7642P
CC69342	CCX43342	CC74016	CCX74016	CH7600-100000	CH7640P
CC69344	CCX43344	CC74017	CCX74017	CH7600-100010	CH7641P

Old Part Number	New Part Number	Old Part Number	New Part Number	Old Part Number	New Part Number
CH7600-200010	CH7641P	SSC14221	SSC154	SSC5234	SSC29034
CH7600-200100	CH7650P	SSC14222	SSC154	SSC5236	SSC29036
CH7600-200110	CH7651P	SSC14223	SSC154	SSC5238	SSC29038
CH7600-210010	CH7642P	SSC14224	SSC154	SSC5240	SSC29040
CH7600-210110	CH7652P	SSC14225	SSC154	SSC5242	SSC29042
SB27263P	SB27265P	SSC14226	SSC154	SSC5244	SSC29044
SB27268P	SB27265P	SSC14227	SSC154	SSC5246	SSC29046
SSC7005	SSC81special order	SSC14228	SSC154	SSC5248	SSC29048
SSC7006	SSC81special order	SSC14229	SSC154	SSC5250	SSC29050
SSC7007	SSC81special order	SSC14230	SSC154	SSC7206	SSC6206
SSC7008	SSC81special order	SSC14232	SSC154	SSC7207	SSC6207
SSC7009	SSC81special order	SSC40B10	SSC81special order	SSC7208	SSC6208
SSC7010	SSC81special order	SSC40B12	SSC81special order	SSC7209	SSC6209
SSC7011	SSC81special order	SSC40B13	SSC81special order	SSC7210	SSC6210
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