

Tech Reference: Mechanical Steering

do
you
need
more
information?

The following section addresses technical questions often asked about mechanical steering. It is organized by frequency of question. If you require further assistance, please contact Teleflex Marine Tech Service as noted below.

*For Technical Support of
Teleflex Mechanical Products,
contact:*

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FAX: 610-495-7688
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Frequently Asked Questions

1. Are replacement gears available for Teleflex helms?

No. Teleflex 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.

2. How do I know which length steering cable I need?

The cable part number and length can usually be found about 2 feet from the helm connection, 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 (spiral wrapped black core wire sticks out at helm end of cable) or rack and pinion (cable has long metal housing with rack [flat] gear inside)?

Measure the Existing Cable as Follows:

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", then round **up** to the next **whole** foot. Order that length cable.

For Transom/Splashwell/Stringer Support Mounting, add A, B & C, then subtract 6" and round **up** to the next **whole** foot.

Order that length cable.

3. What do I need in order to add another steering station to my boat?

Teleflex 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.

4. I'm replacing a Teleflex 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 a "The Rack (older)" model (1984-2001). If the rack housing is green, it may be a TR188 model (1975-86). This is a Teleflex 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. Replacement cables only for 1984-2001 Teleflex Rack systems are available (part number SSC124XX).

5. 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 3953114P.

NOTE: If you have any NFB system (Rack or Rotary), a friction adjustment device is not required nor recommended.

6. 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 perpendicular 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, 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

7. 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 Teleflex. I want to install a Teleflex 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-Teleflex systems:

- **Morse Command 290 Rotary:** use Teleflex 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 Teleflex Back Mount Rack for power-assisted or NFB Rack for non-power-assisted.
- **Morse Command 2 Rotary:** use Teleflex 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 Teleflex, Morse and other brands begins on page 12 of this catalog.

8. I need a link arm to connect the steering cable output ram to the tiller of my outboard. Can I get the link arm from Teleflex?

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.

9. 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 Teleflex steering, either:

- a. Replace the helm and cable (or hoses and cylinder) with a Teleflex system
- or
- b. Contact the steering maker for options. Tilt steering is not available for all systems.

If you have Teleflex 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 Teleflex 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 Teleflex systems:

- Safe-T “QC” (1968-present)
- “The Rack” Rack & Pinion (1996-present)
- Big-T
- NFB (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.)

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Frequently Asked Questions (continued)

10. What size steering wheel should I use?

Teleflex 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.

11. 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 Teleflex Marine, please see Steering Connection Kits Overview and Teleflex Steering Connection Kits, on previous pages.

12. 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.

NOTE: An overview of NFB can be found on page 23 in this catalog. Available NFB systems are shown after that.

13. I want to install an autopilot on a boat with cable steering. What do I need?

Teleflex 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.

14. 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 Teleflex (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 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 Teleflex steering kit.

If any cable connection part is deteriorated, too stiff or too loose, replace it with the correct type of component. Teleflex 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.

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 Teleflex 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 FAQ #18 on the next page.

15. 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. 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 gently 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.

16. 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.**

(continued on next page)

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Frequently Asked Questions *(continued)*

- 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.
- Always remember: GREASE, GREASE, GREASE!**

NOTE: To ensure maximum performance and service life for your mechanical steering system, please read and follow the procedures outlined in Maintenance Tips, later in these FAQs.

17. 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 Teleflex steering kit.

18. I've heard steering cables should be "maintained". How exactly is this done?

We suggest the following periodic maintenance, at least twice a season:

- 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).

- Clean and lubricate the engine tilt tube or cable support tube and the steering cable telescopic output ram as follows:
 - Remove the steering cable from the tilt tube.
 - Clean the tilt tube inside diameter thoroughly.
 - Remove corrosion in the tilt tube with a wire brush. Wipe until all loose material is removed.
 - Lubricate the tilt tube with a good water resistant grease.
 - Scour the steering cable telescopic ram with a **brass** wire brush and wipe until clean.
 - Lubricate the sliding parts of the telescopic ram with a high-quality, water resistant grease.
 - 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.

19. 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 rack to the helm with the cable in mid-travel position and wheel centered.

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.



**BIG-T
SAFE-T "TS"**
(180°)



**SAFE-T QC
SAFE-T II**
(150°)



**NFB 4.2
(210°)**

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.

20. 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 Teleflex 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.

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.

21. Are there any "tricks" to installing a steering system? Is there anything I should definitely avoid doing?

If you have an outboard or stern drive with non-power-assisted steering, we recommend you use either a NoFeedBack (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 6-7.

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 and in more detail on page 26.

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 Teleflex 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 Tech Support 610-495-7011 • www.teleflexmarine.com

U.S./Metric Conversion Chart:

UNIT	X	= UNIT
U.S. TO METRIC:		
Feet	.3048	Meters
Meters	3.2808	Feet
METRIC TO U.S.:		
Inches	25.4	Millimeters
Millimeters	.0394	Feet

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Mechanical Steering Essential P/Ns:

NFB SAFE-T II:

Complete System:	
Steering Kit (1-cable).....	SS132XX
System Components:	
Helm (1-cable).....	SH5150P
QC Cable.....	SSC62XX
Bezel (90°).....	SB27150P
Tilt/Optional Components:	
Dash Module.....	SH1535150
Tilt Helm.....	SH91190P*
Performance Tilt Mech.....	SH91500P
Bezel (20°).....	SB27483P

NFB 4.2:

Complete System:	
Steering Kit (1-cable).....	SS147XX
Steering Kit (2-cable).....	SS148XX
Tilt Steering Kit (1-cable).....	SS157XX
System Components:	
Helm (1-cable).....	SH4910P
Helm (2-cable).....	SH4920P
QC Cable.....	SSC62XX
Bezel (90°).....	SB27150P
Tilt/Optional Components:	
Dash Module (1 cbl.).....	SH1534910
Tilt Helm (1-cable).....	SH91526P*
Tilt Helm (2-cable).....	SH91527P*
Performance Tilt Mech.....	SH91500P
Bezel (20°).....	SB27483P

NFB RACK/PRO RACK:

Complete System:	
Steering Kit (1-cable).....	SS151XX
Steering Kit (2-cable).....	SS152XX
System Components:	
Helm (single/dual).....	SH5230P
Single Cable.....	SSC134XX
Dual Cable.....	SSC135XX
Bezel (90°).....	SB39544P
Tilt/Optional Components:	
Dash Module (1-cable).....	SH1535230
Tilt Helm (single/dual).....	SH91630P*
Performance Tilt Mech.....	SH91500P
Dash Wedge Kit (10°).....	SB27448P
Dash Wedge Kit (20°).....	SB27449P
TFXTREME Sgl. Cable.....	SSC154XX

BIG-T:

System Components:	
Helm.....	SH5000P
Cable (1-station).....	SSC72XX
Cable (2-station).....	SSC81AxBxx
(Special-order cable. Not returnable.)	
Bezel-Black (90°/20°).....	SB27265P
Tilt/Optional Components:	
Tilt Helm.....	SH91525P*
Performance Tilt Mech.....	SH91500P
Bezel-White (90°/20°).....	SB27263P
Bezel-Chrome (90°).....	SB27268P
QC II Cable.....	SSC61XX
Conduit (Path "A").....	SC70XX
Cable (Path "B").....	SSC40BXX

* Requires SH91500 tilt mechanism and current-generation cable to complete the Tilt Steering system installation.

** For 1984-1996 "Old Style" The Rack rack & pinion systems — is *not* interchangeable with SSC134.

† For dual cable steered stern drives.

†† SSC63 Cable **MUST** be used with HPS rotary helms.

SAFE-T QC:

Complete System:	
Steering Kit (1-cable).....	SS137XX
System Components:	
Helm (1-cable).....	SH5094P
QC Cable.....	SSC62XX
Bezel (90°).....	SB27484P
Tilt/Optional Components:	
Dash Module.....	SH1535094
Tilt Helm (1-cable).....	SH91523P*
Tilt Helm (2-cable).....	SH91524P*†
Performance Tilt Mech.....	SH91500P
Bezel (20°).....	SB27483P
Service Items:	
Old Style "TS" helm.....	SH5023P
Old Style "TS" Cable.....	SSC72XX
QC II Cable (QC/"TS").....	SSC61XX
QC II Helm Converter.....	SA27620P

HPS ROTARY:

System Components:	
Helm (1-cable).....	SH5180P
QC Cable.....	SSC63XX††
Bezel (90°).....	SB27484P
Tilt/Optional Components:	
Tilt Helm (1-cable).....	SH91650P*
Performance Tilt Mech.....	SH91500P
Bezel (20°).....	SB27483P

"BACK MOUNT" RACK:

Complete System:	
Steering Kit (1-cable).....	SS141XX
System Components:	
Helm (single/dual).....	SH5210P
Single Cable.....	SSC134XX
Bezel (90°).....	SB39526P
Tilt/Optional Components:	
Dash Module (sgl./dual).....	SH1535210
Tilt Helm (single/dual).....	SH91610P*
Performance Tilt Mech.....	SH91500P
Dash Wedge Kit (10°).....	SB27448P
Dash Wedge Kit (20°).....	SB27449P
Friction Device.....	3953114P
TFXTREME Sgl. Cable.....	SSC154XX
Dual Cable.....	SSC135XX†
Service Items:	
Old Style Cable.....	SSC124XX**

HPS RACK & PINION:

System Components:	
Helm (single/dual).....	SH5210P
Single Cable.....	SSC154XX
Bezel (90°).....	SB39526P
Tilt/Optional Components:	
Tilt Helm (single/dual).....	SH91610P*
Performance Tilt Mech.....	SH91500P
Dash Wedge Kit (10°).....	SB27448P
Dash Wedge Kit (20°).....	SB27449P

Hydraulic Steering Essential P/Ns:

BAYSTAR:

Complete System:	
Steering Kit (20" tubing run).....	HK4200A
Steering Kit (30" tubing run).....	HK4300A
System Components:	
Helm (Front Mount).....	HH4016
Compact Cylinder.....	HC4645H*
Tubing (2 x 20").....	HT4420H
Tubing (2 x 30").....	HT4430H
SeaStar Oil (Quart) (x2).....	HA5430
Fill Kit.....	HA5438
Tilt/Optional Components:	
Sport Tilt Helm/Mech.....	HH4015
Compact Cylinder.....	HC4647H*
Compact Cylinder.....	HC4648H*
Compact Cylinder.....	HC4658H*

SEASTAR PRO:

Complete System:	
Steering Kit (w/hoses).....	HK73XX
Steering Kit (no hoses).....	HK7400
System Components:	
Helm (Pro Front Mount).....	HH5770
Cylinder (Pivot Mount).....	HC5345*
Hose Kit (2 hoses).....	H051__
SeaStar Oil (Quart) (x2).....	HA5430
Fill Kit.....	HA5438
Tilt/Optional Components:	
Sport Tilt Helm/Mech. (Pro).....	HH5290
Trad. Tilt Helm/Mech. (Pro).....	HH5774
Cylinder (Pivot Mount) (Pro).....	HC6345*
Cylinder (Pivot Mount).....	HC5347/Pro: HC6347*
Cylinder (Pivot Mount).....	HC5348/Pro: HC6348*
Cylinder (Pivot Mount).....	HC5358/Pro: HC6358*
Cylinder (Side Mount).....	HC5370*
Bulkhead Hose Kit (2 hoses).....	H082__

SEASTAR OUTBOARD:

Complete System:	
Steering Kit (w/hoses).....	HK63XX
Steering Kit (no hoses).....	HK6400
System Components:	
Helm (1.7 Front Mount).....	HH5271
Cylinder (Front Mount).....	HC5345*
Hose Kit (2 hoses).....	H051__
SeaStar Oil (Quart) (x2).....	HA5430
Fill Kit.....	HA5438
Tilt/Optional Components:	
Sport Tilt Helm/Mech. (1.7).....	HH5291
Trad. Tilt Helm/Mech. (1.7).....	HH5741
Sport Tilt Helm/Mech. (2.4).....	HH5292
Trad. Tilt Helm/Mech. (2.4).....	HH5742
Helm (2.4 Front Mount).....	HH5272
Helm (1.7 Rear Mount).....	HH5261
Helm (2.4 Rear Mount).....	HH5262
Commercial Helm (1.7).....	HH5217
Commercial Helm (2.4).....	HH5224
Cylinder (Pivot Mount).....	HC5347*
Cylinder (Pivot Mount).....	HC5348*
Cylinder (Pivot Mount).....	HC5358*
Cylinder (Side Mount).....	HC5370*
Cylinder (Splashwell Mt.).....	HC5380*
Cylinder (Cat/Pontoon).....	HC53__*
Bulkhead Hose Kit (2 hoses).....	H081__
Tie Bar Kit (Pivot Mount).....	H05__*
Tie Bar Kit (Side/Splash Mt.).....	H05009*
Add-A-Station/Autopilot Kit.....	HF5501

SEASTAR STERN DRIVE:

Complete System:	
Steering Kit (w/hoses).....	HK63XX
Steering Kit (no hoses).....	HK6400
System Components:	
Helm (1.7 Front Mount).....	HH5271
Cylinder (Front Mount).....	HC5345*
Hose Kit (2 hoses).....	H051__
SeaStar Oil (Quart) (x2).....	HA5430
Fill Kit.....	HA5438
Tilt/Optional Components:	
Sport Tilt Helm/Mech. (1.7).....	HH5291
Trad. Tilt Helm/Mech. (1.7).....	HH5741
Sport Tilt Helm/Mech. (2.4).....	HH5292
Trad. Tilt Helm/Mech. (2.4).....	HH5742
Helm (2.4 Front Mount).....	HH5272
Helm (1.7 Rear Mount).....	HH5261
Helm (2.4 Rear Mount).....	HH5262
Commercial Helm (1.7).....	HH5217
Commercial Helm (2.4).....	HH5224
Cylinder (Pivot Mount).....	HC5347*
Cylinder (Pivot Mount).....	HC5348*
Cylinder (Pivot Mount).....	HC5358*
Cylinder (Side Mount).....	HC5370*
Cylinder (Splashwell Mt.).....	HC5380*
Cylinder (Cat/Pontoon).....	HC53__*
Bulkhead Hose Kit (2 hoses).....	H081__
Tie Bar Kit (Pivot Mount).....	H05__*
Tie Bar Kit (Side/Splash Mt.).....	H05009*
Add-A-Station/Autopilot Kit.....	HF5501

System Components:	
Helm (1.7 Front Mount).....	HH5271*
Cylinder (Drive-Specific).....	HC53__*
Hose Kit (2 hoses).....	H051__
SeaStar Oil (Quart) (x2).....	HA5430
Fill Kit.....	HA5438
Tilt/Optional Components:	
Sport Tilt Helm/Mech. (1.7).....	HH5291
Trad. Tilt Helm/Mech. (1.7).....	HH5741
Sport Tilt Helm/Mech. (2.4).....	HH5292
Trad. Tilt Helm/Mech. (2.4).....	HH5742
Helm (2.4 Front Mount).....	HH5272
Helm (1.7 Rear Mount).....	HH5261
Helm (2.4 Rear Mount).....	HH5262
Commercial Helm (1.7).....	HH5217
Commercial Helm (2.4).....	HH5224
Cylinder (Pivot Mount).....	HC5347*
Cylinder (Pivot Mount).....	HC5348*
Cylinder (Pivot Mount).....	HC5358*
Cylinder (Side Mount).....	HC5370*
Cylinder (Splashwell Mt.).....	HC5380*
Cylinder (Cat/Pontoon).....	HC53__*
Bulkhead Hose Kit (2 hoses).....	H081__
Tie Bar Kit (Pivot Mount).....	H05__*
Tie Bar Kit (Side/Splash Mt.).....	H05009*
Add-A-Station/Autopilot Kit.....	HF5501

System Components:	
Helm (1.7 Front Mount).....	HH5271*
Cylinder (Drive-Specific).....	HC53__*
Hose Kit (2 hoses).....	H051__
SeaStar Oil (Quart) (x2).....	HA5430
Fill Kit.....	HA5438
Tilt/Optional Components:	
Sport Tilt Helm/Mech. (1.7).....	HH5291
Trad. Tilt Helm/Mech. (1.7).....	HH5741
Sport Tilt Helm/Mech. (2.4).....	HH5292
Trad. Tilt Helm/Mech. (2.4).....	HH5742
Helm (2.4 Front Mount).....	HH5272
Helm (1.7 Rear Mount).....	HH5261
Helm (2.4 Rear Mount).....	HH5262
Commercial Helm (1.7).....	HH5217
Commercial Helm (2.4).....	HH5224
Cylinder (Pivot Mount).....	HC5347*
Cylinder (Pivot Mount).....	HC5348*
Cylinder (Pivot Mount).....	HC5358*
Cylinder (Side Mount).....	HC5370*
Cylinder (Splashwell Mt.).....	HC5380*
Cylinder (Cat/Pontoon).....	HC53__*
Bulkhead Hose Kit (2 hoses).....	H081__
Tie Bar Kit (Pivot Mount).....	H05__*
Tie Bar Kit (Side/Splash Mt.).....	H05009*
Add-A-Station/Autopilot Kit.....	HF5501

Pivot Mount cylinders available in black or silver; Pro cylinders available in black, red or silver. For boats with multiple engines and/or multiple stations, pontoons, catamarans and specialty craft, please refer to Teleflex catalog.

SEASTAR P/A:

System Components:	
Helm (1.7 Front Mount).....	HH5271*
Cylinder (Drive-Specific).....	HC53__*
Hose Kit (2 hoses).....	H051__
SeaStar Oil (Quart) (x2).....	HA5430
Fill Kit.....	HA5438
Tilt/Optional Components:	
Sport Tilt Helm/Mech. (1.7).....	HH5291
Trad. Tilt Helm/Mech. (1.7).....	HH5741
Sport Tilt Helm/Mech. (2.4).....	HH5292
Trad. Tilt Helm/Mech. (2.4).....	HH5742
Helm (2.0 Front Mount).....	HH5273
Helm (2.4 Front Mount).....	HH5272
Helm (1.7 Rear Mount).....	HH5261
Helm (2.4 Rear Mount).....	HH5262
Commercial Helm (1.7).....	HH5217
Commercial Helm (2.4).....	HH5224
Bulkhead Hose Kit (2 hoses).....	H081__
Tie Bar Kit (Front Mount).....	H05__*
Tie Bar Kit (Side/Splash Mt.).....	H05009*
Add-A-Station/Autopilot Kit.....	HF5502
3/8" Tubing (1/O & 1/B only).....	HT5__*

For boats with multiple engines, refer to the Teleflex catalog for systems using Capilano or Hynautic helms and twin K-5 type cylinders.

SEASTAR INBOARD:

System Components:	
Power Assist Module (12V).....	PA1200
Power Assist Module (24V).....	PA2415
Mounting Bracket.....	HA1202
Dual Ignition Kit.....	HA1201

SEASTAR 2-line:

Components are determined by boat size, power, speed, type of hull and several other factors. Consult Teleflex catalog for ordering information.

SeaStar 2-line:

System utilizes SeaStar helm(s), tubing, SeaStar oil and one or two cylinders. Many helm and cylinder models are available.

SeaStar Capilano 2-line:

System utilizes Capilano helm(s), copper tubing and hoses, ATF and one or two cylinders. Several cylinder models are available.

Hynautic 3-line:

System utilizes Hynautic helm(s), copper tubing and hoses, SeaStar oil and one or two cylinders. Several helm and cylinder models are available.

SeaStar Power Steering:

System utilizes SeaStar helm(s), tubing and/or hoses, SeaStar oil, engine-driven pump(s), reservoir(s), oil cooler(s) and one or two cylinders. The system is a manual circuit within a power-assisted circuit. Many helm and cylinder models are available.

* Always refer to SeaStar Application & Ordering Guides when ordering. SeaStar offers several accessory options for front-mount helms which reduce the helm's protrusion from the dash. See Teleflex catalog or SeaStar steering on line.

